PERPETUAL

TROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

VOLUME VI

by

JOHN F. RIDER

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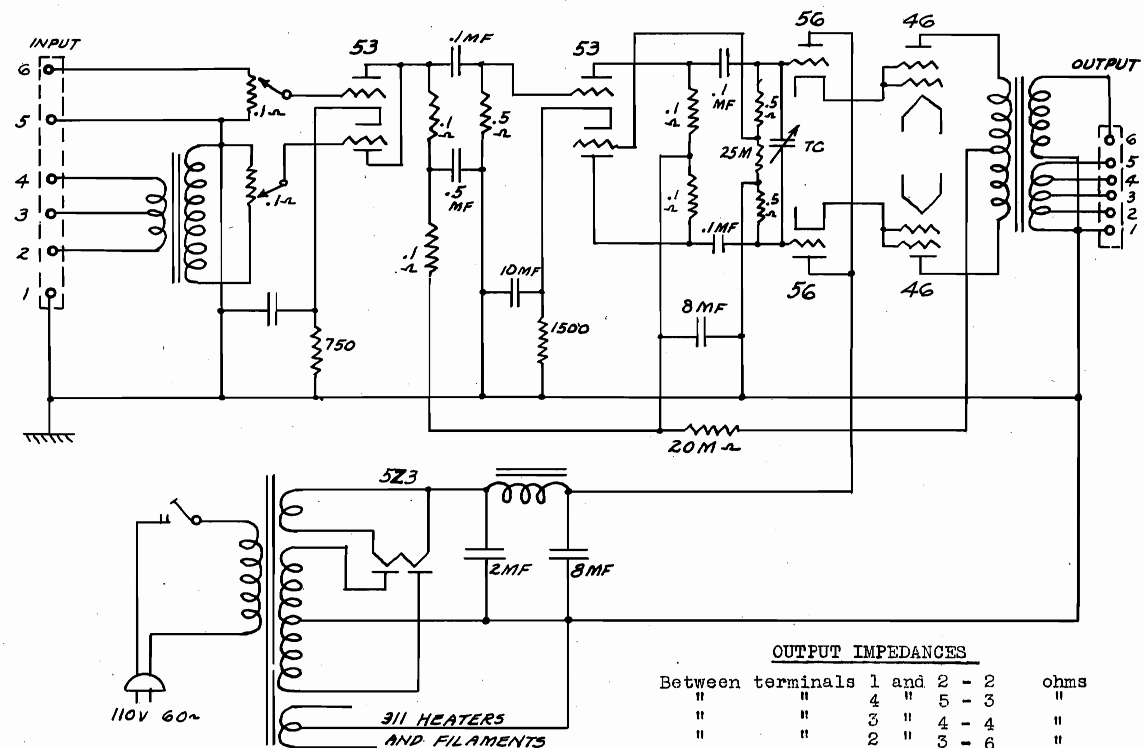
Printed in U.S.A.

ACRATEST PRODUCTS

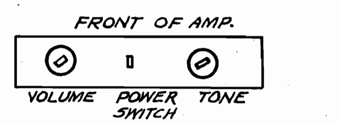
MODEL 37
MODELS 196,197
Schematics
Impedances

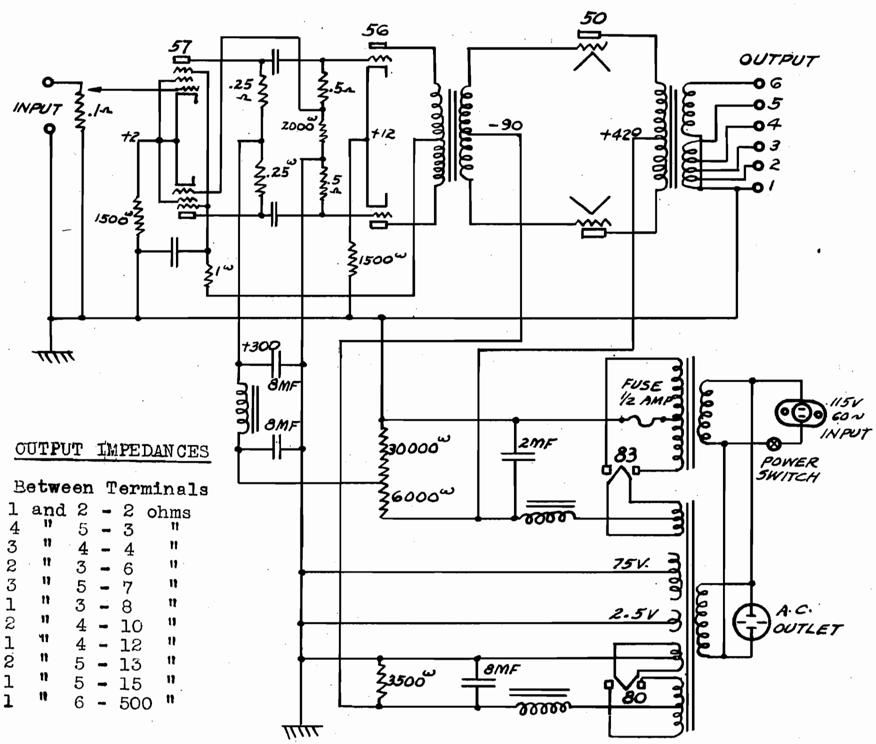


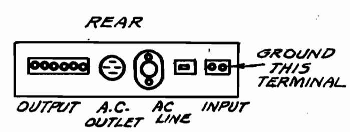
MODEL 37 AMPLIFIER

OUTPUT IMPEDANCES

Between terminals		ohms
1 and 2	2	ohms
4 " 5	3	"
3 " 4	4	"
2 " 3	6	"
3 " 5	7	"
1 " 3	8	"
2 " 4	10	"
1 " 4	12	"
2 " 5	13	"
1 " 5	15	"
1 " 6	500	"







AC OUTLET IS CONTROLLED BY POWER SWITCH AND CAN BE USED FOR AC SPEAKERS, TUNERS, ETC.

11/7/34 REVISED

OUTPUT IMPEDANCES

Between Terminals		
1 and 2	2	ohms
4 " 5	3	"
3 " 4	4	"
2 " 3	6	"
3 " 5	7	"
1 " 3	8	"
2 " 4	10	"
1 " 4	12	"
2 " 5	13	"
1 " 5	15	"
1 " 6	500	"

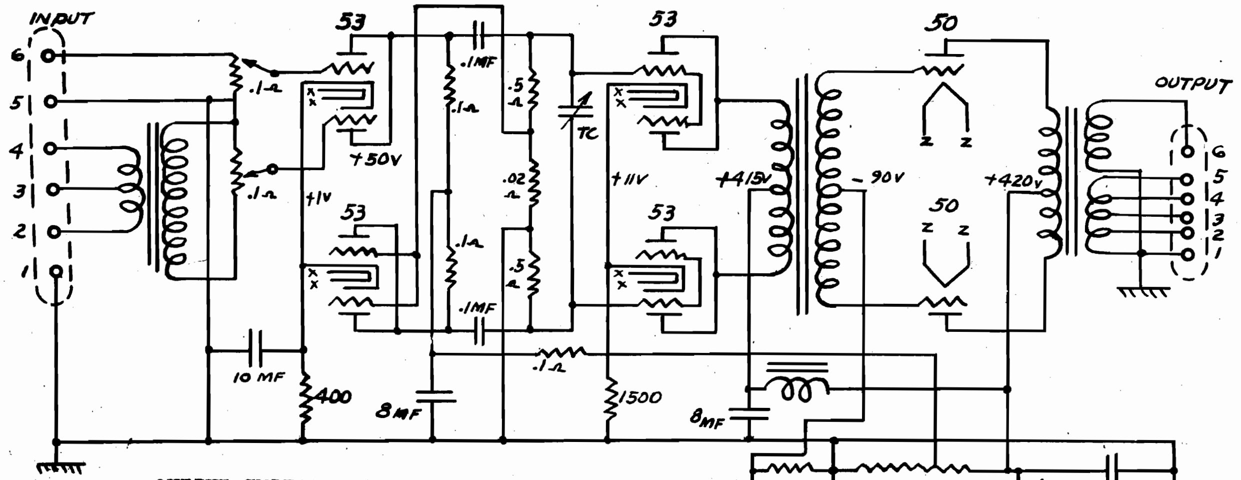
30 Watt AMPLIFIERS

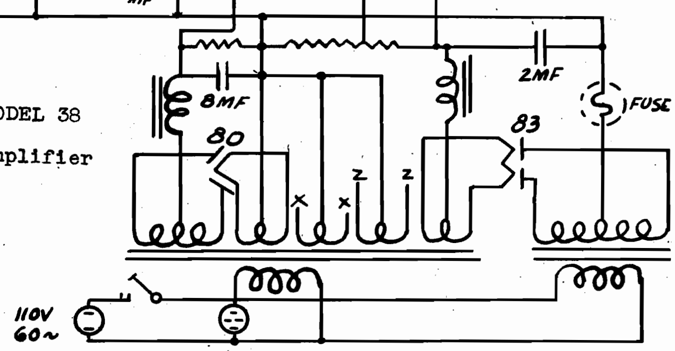
MODEL 196 115 VOLTS

MODEL 197 230 VOLTS

MODEL 38
MODELS 198,199
Schematics
Impedances

ACRATEST PRODUCTS

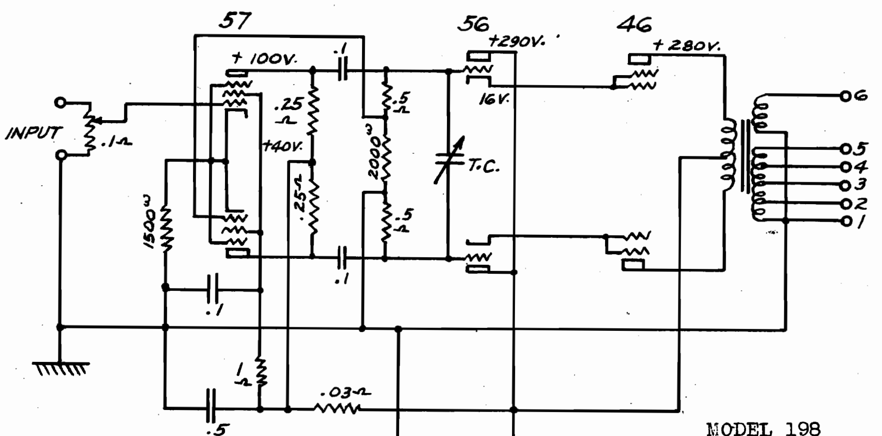


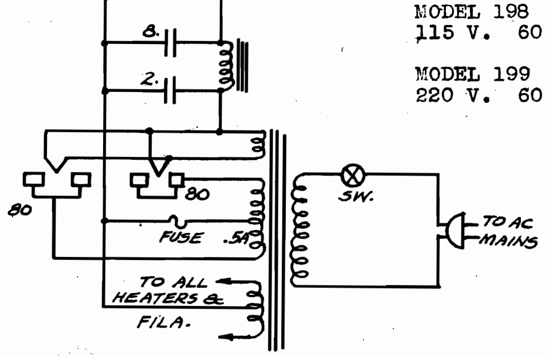


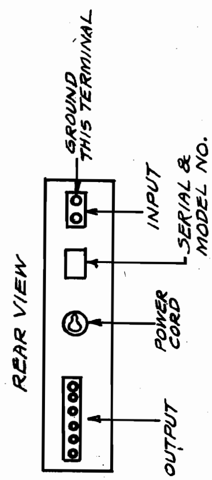
OUTPUT IMPEDANCES

Between	terminals	1	and	2 - 2	ohms
"	"	4	"	5 - 3	ohms
"	"	3	"	4 - 4	ohms
"	"	2	"	3 - 6	ohms
"	"	3	"	5 - 7	ohms
"	"	1	"	3 - 8	ohms
"	"	2	"	4 -10	ohms
"	"	1	"	4 -12	ohms
"	"	2	"	5 -13	ohms
"	"	1	"	5 -15	ohms
"	"	1	"	6 -500	ohms

MODEL 38
Amplifier





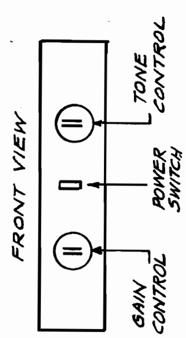


OUTPUT IMPEDANCES

Between	Terminals			ohms
1	and	2	- 2	ohms
4	"	5	- 3	"
3	"	4	- 4	"
2	"	3	- 6	"
3	"	5	- 7	"
1	"	3	- 8	"
2	"	4	- 10	"
1	"	4	- 12	"
2	"	5	- 13	"
1	"	5	- 15	"
1	"	6	- 500	"

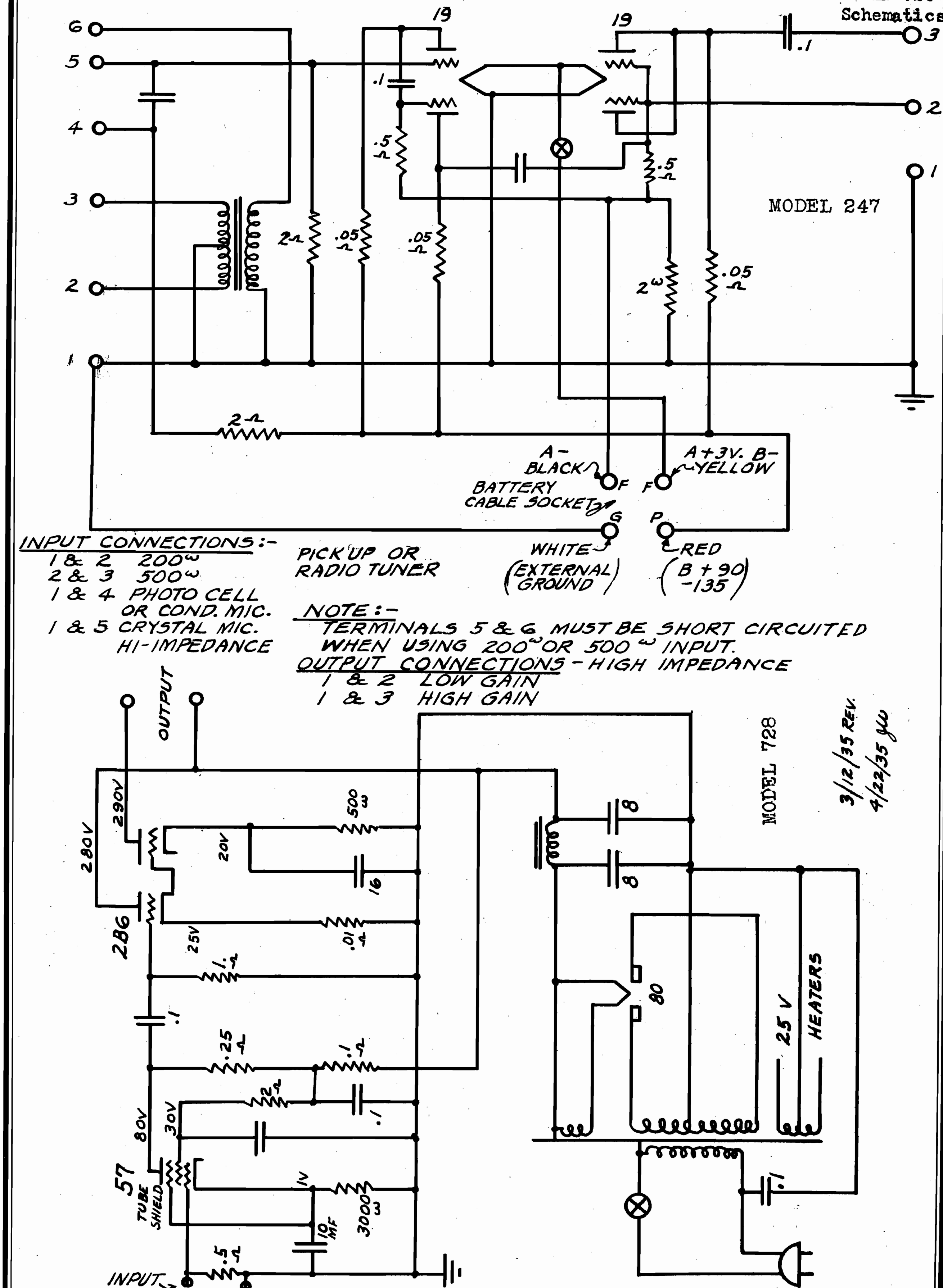
MODEL 198
115 V. 60 CPS

MODEL 199
220 V. 60 CPS



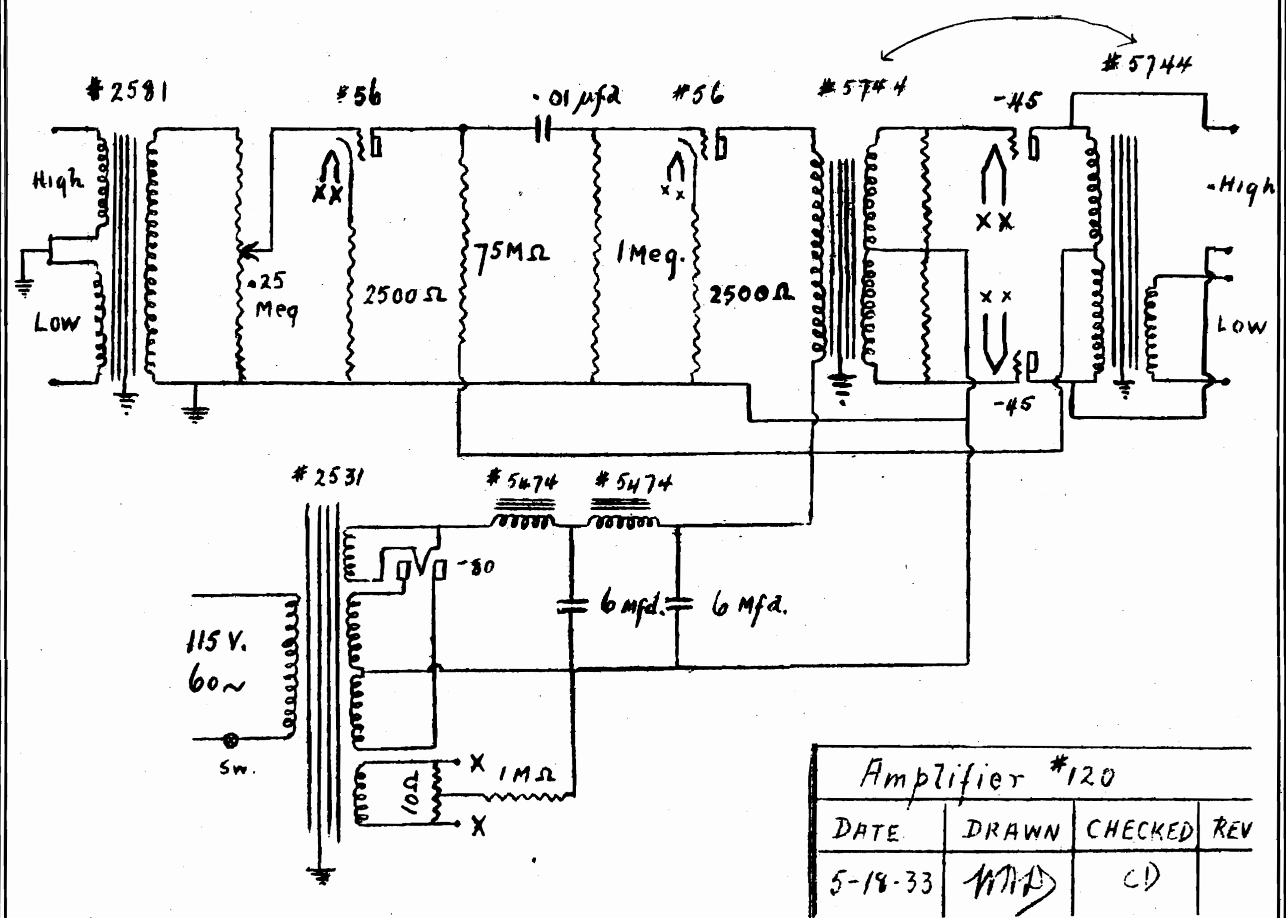
MODEL 247
MODEL 728
Schematics

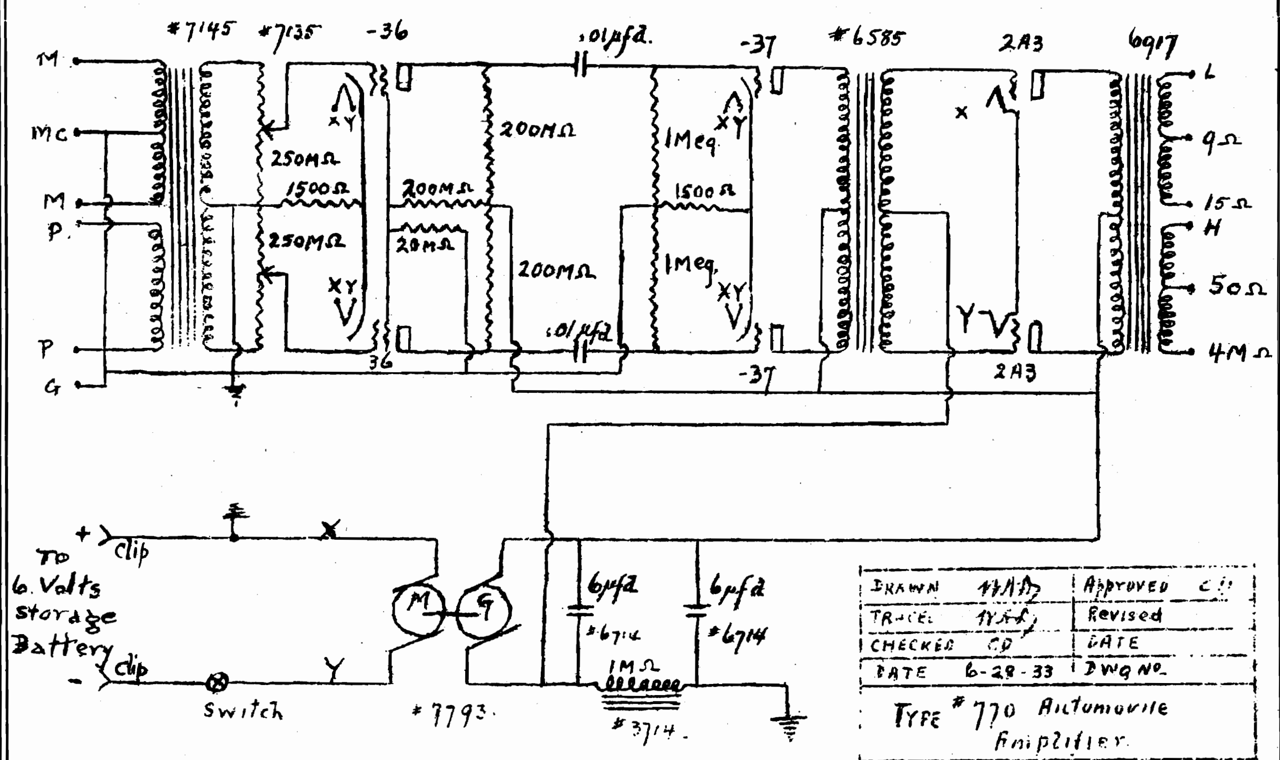
ACRATEST PRODUCTS



MODEL 120
MODEL 770
Schematics

ACRATEST PRODUCTS

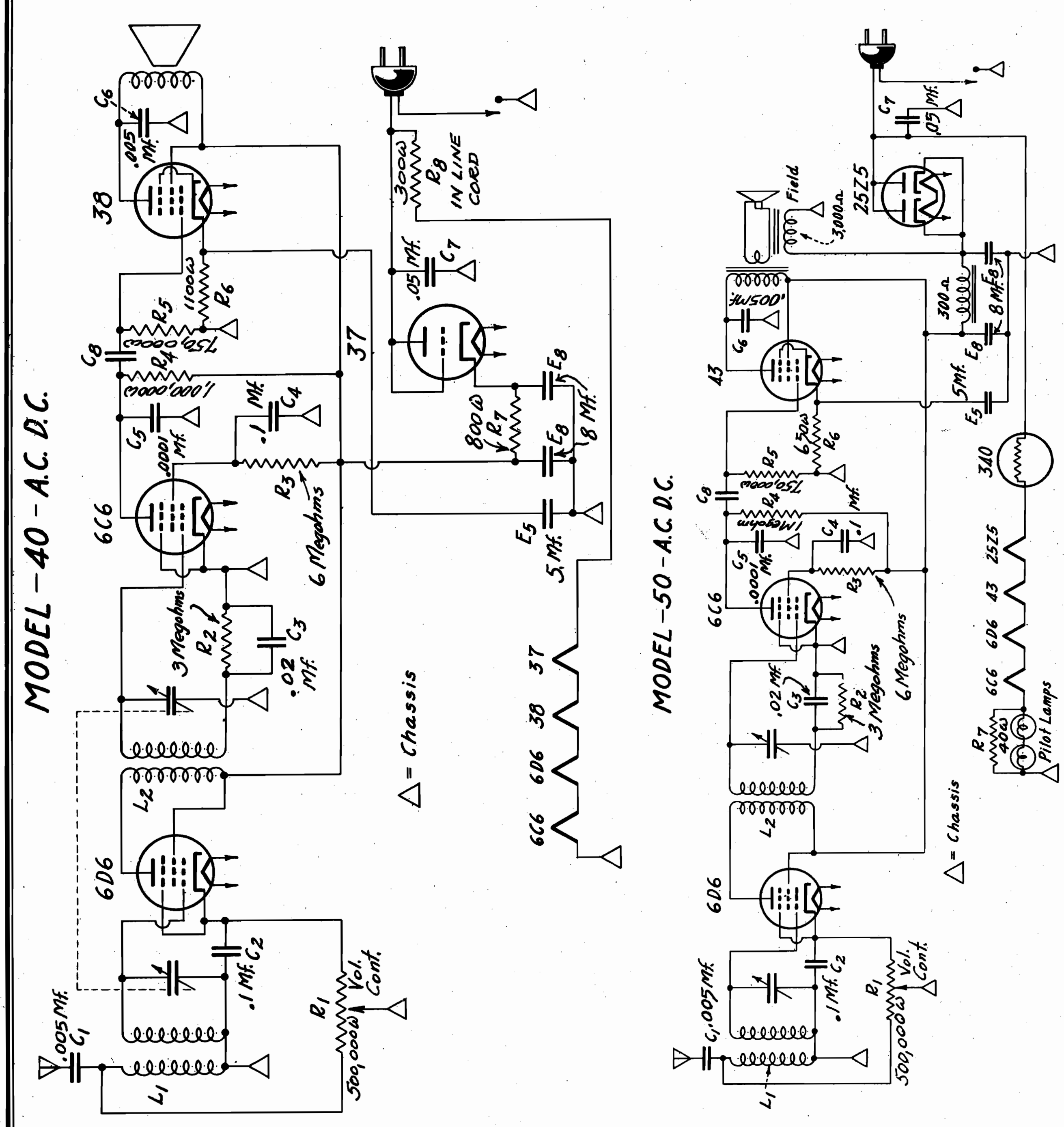




Air King

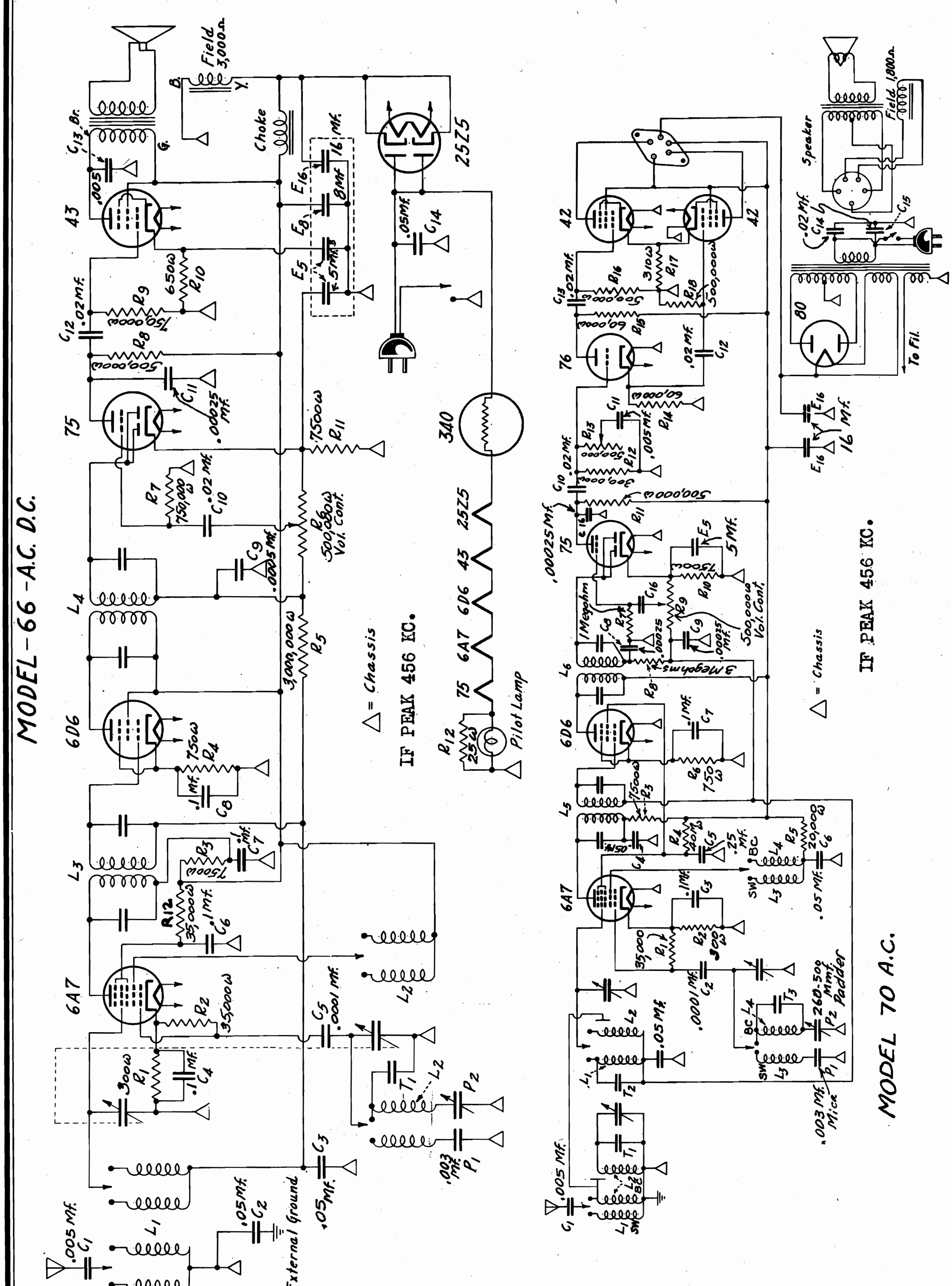
AIR KING PRODUCTS CORP.

MODEL 40
MODEL 50
Schematics



MODEL 66
MODEL 70
Schematics

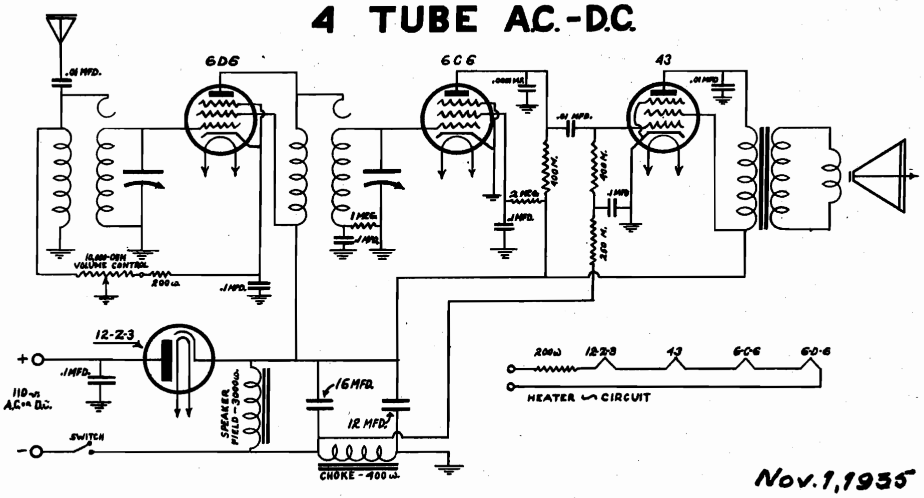
AIR KING PRODUCTS CORP.



MODEL G-9503
MODEL G-9505
MODEL G-9511-13
Schematics

ALLIED RADIO CORP.

4 TUBE AC.-D.C.

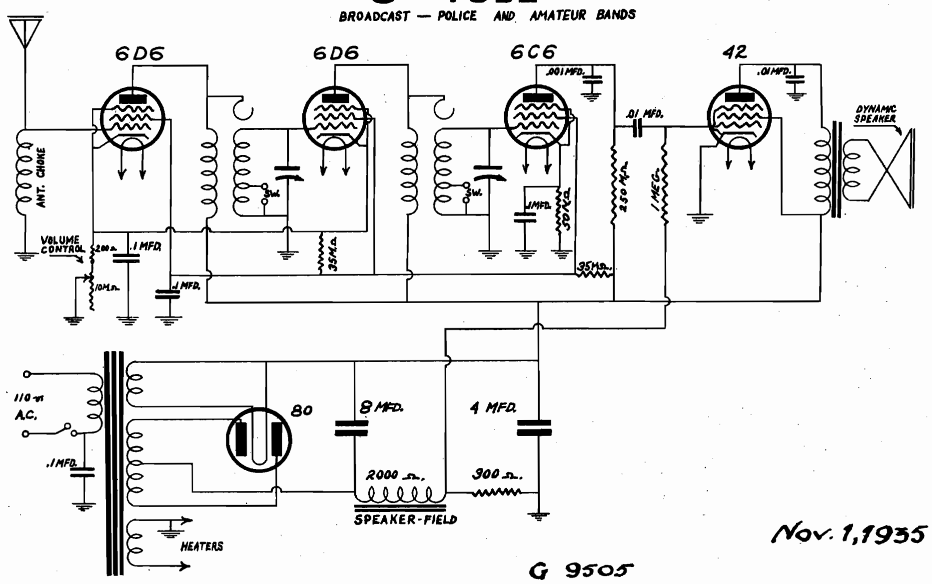


Nov. 1, 1935

G 9503

T.R.F. - 5 TUBE - 2 BANDS

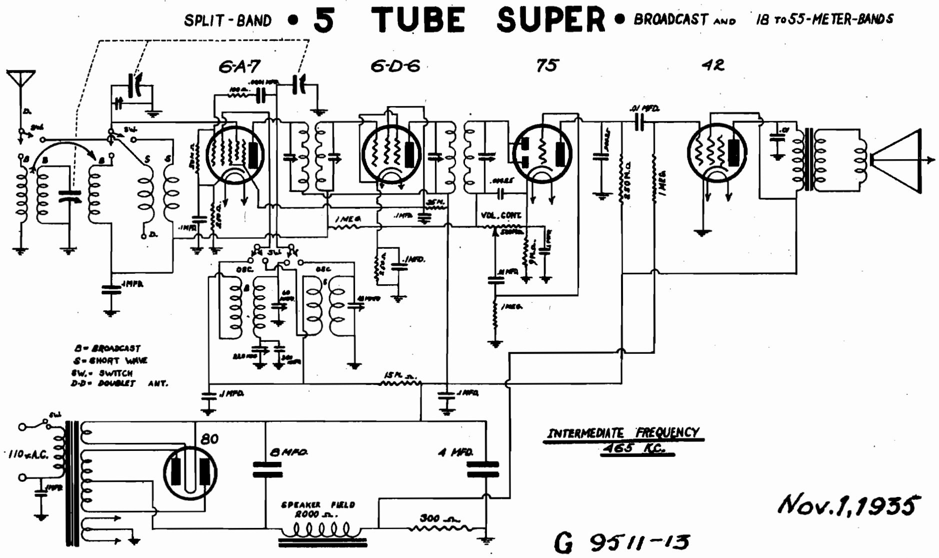
BROADCAST — POLICE AND AMATEUR BANDS



Nov. 1, 1935

G 9505

SPLIT-BAND • 5 TUBE SUPER • BROADCAST AND 18 TO 55-METER-BANDS

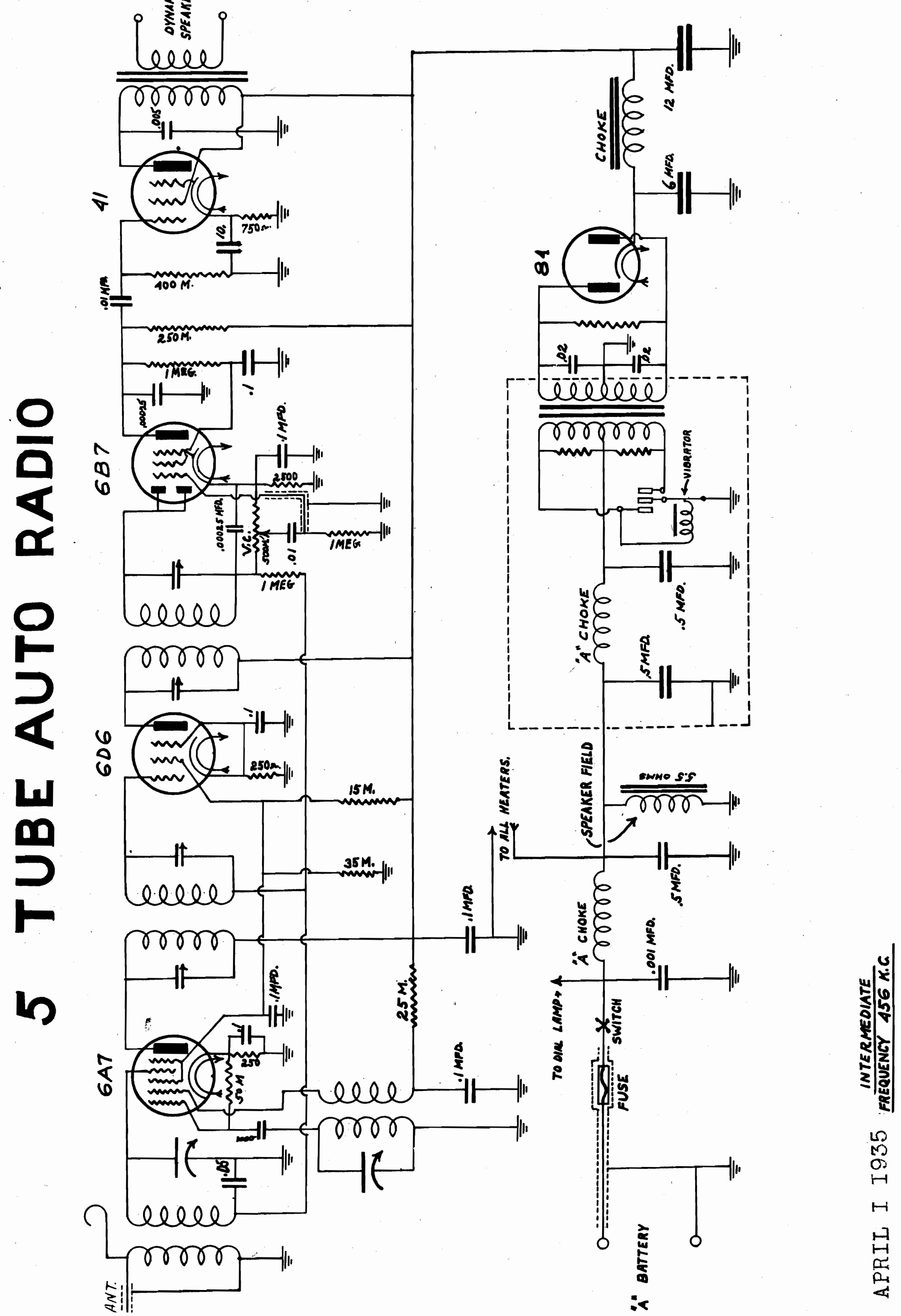


Nov. 1, 1935

G 9511-13

MODELS G-9515, G-9881
Schematic

ALLIED RADIO CORP.

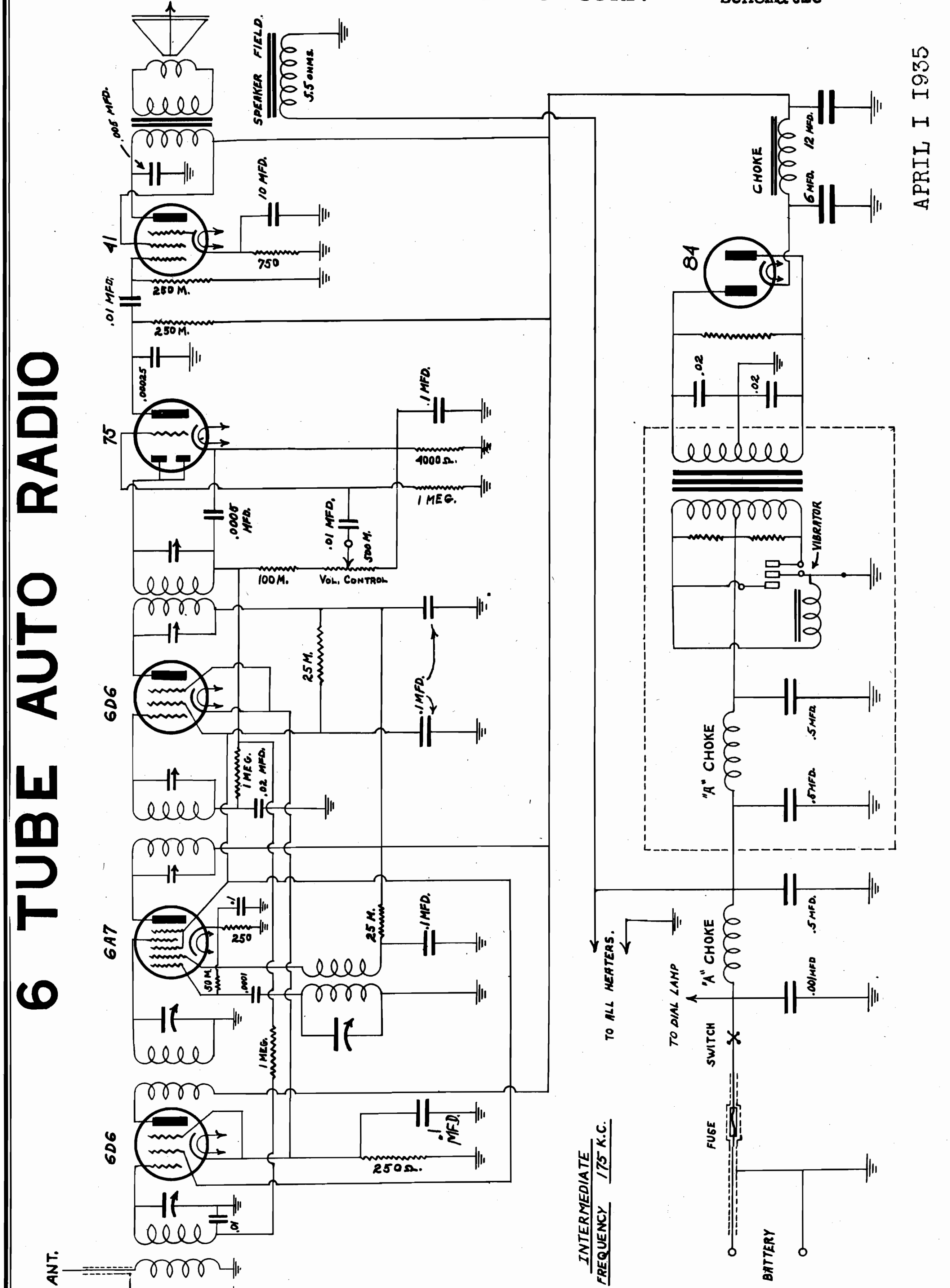


ALLIED RADIO CORP.

MODELS G-9517, G-9882
Schematic

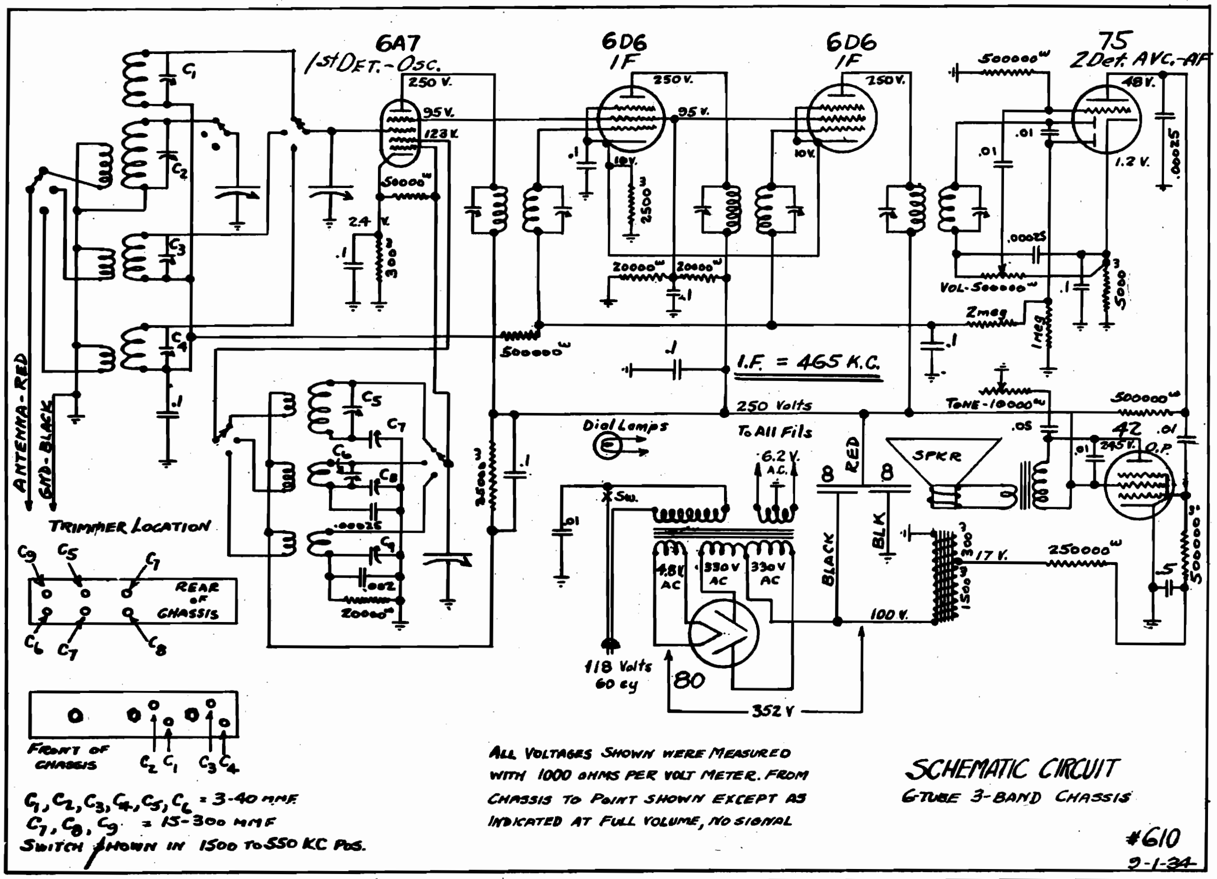
6 TUBE AUTO RADIO

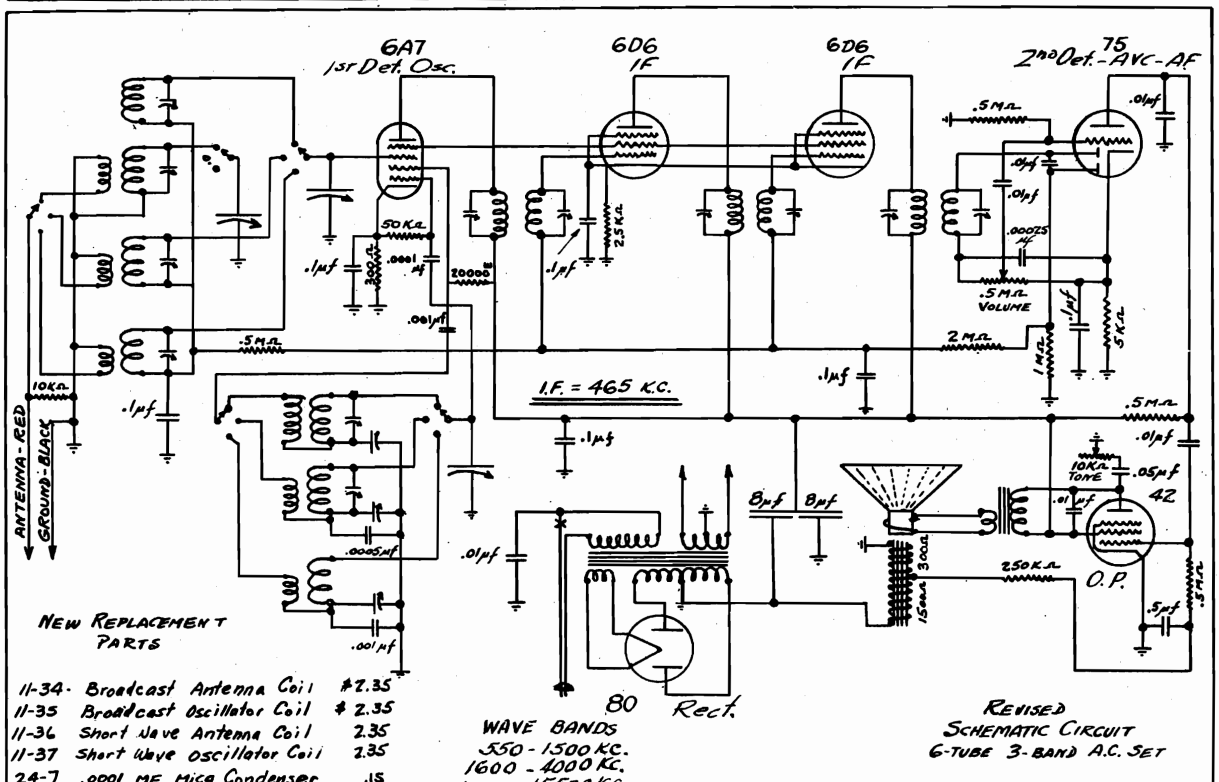
APRIL I 1935



MODEL G-9533
Two Types
Schematics

ALLIED RADIO CORP.

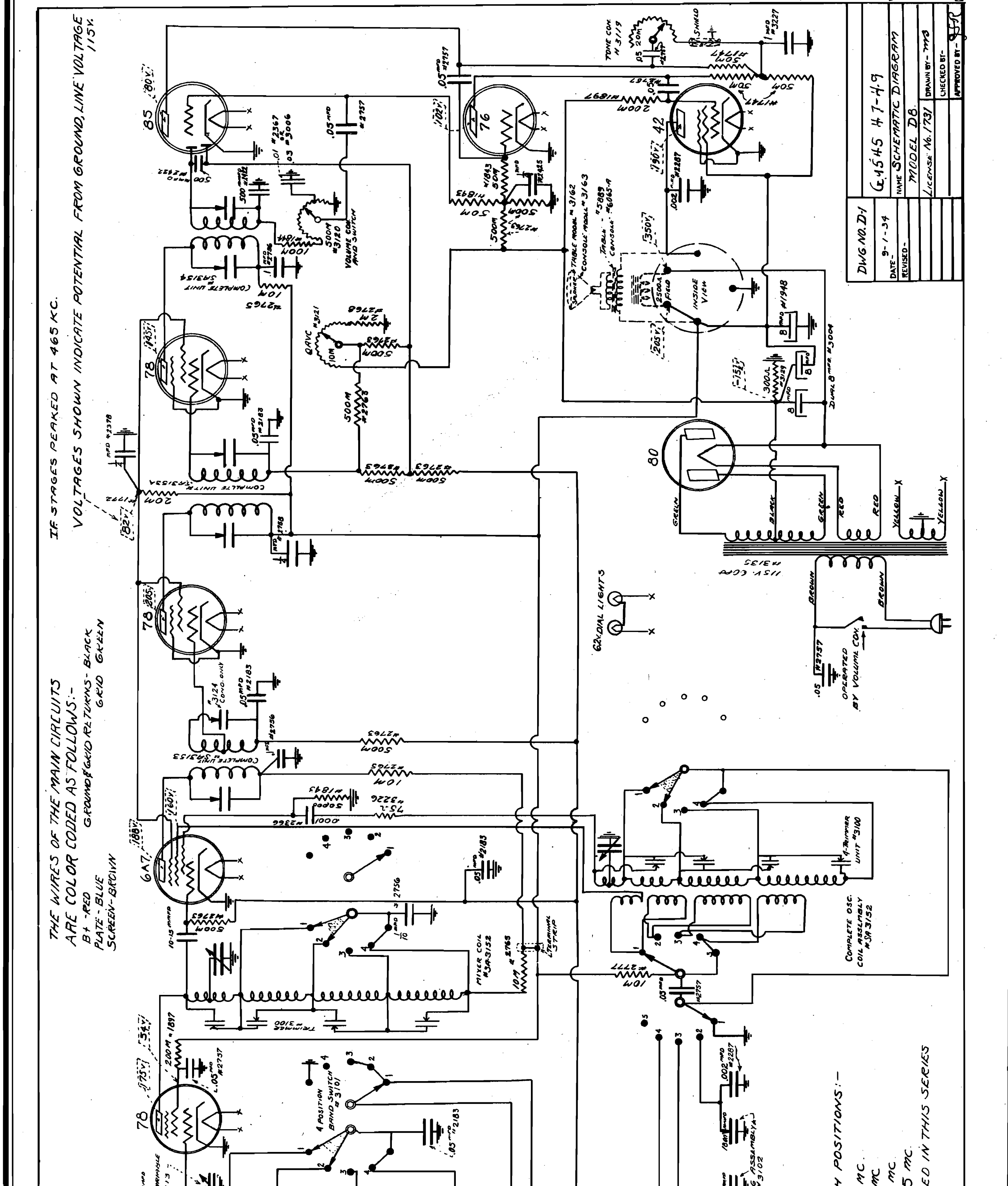




MODEL G-9545, G-9547, G-9549

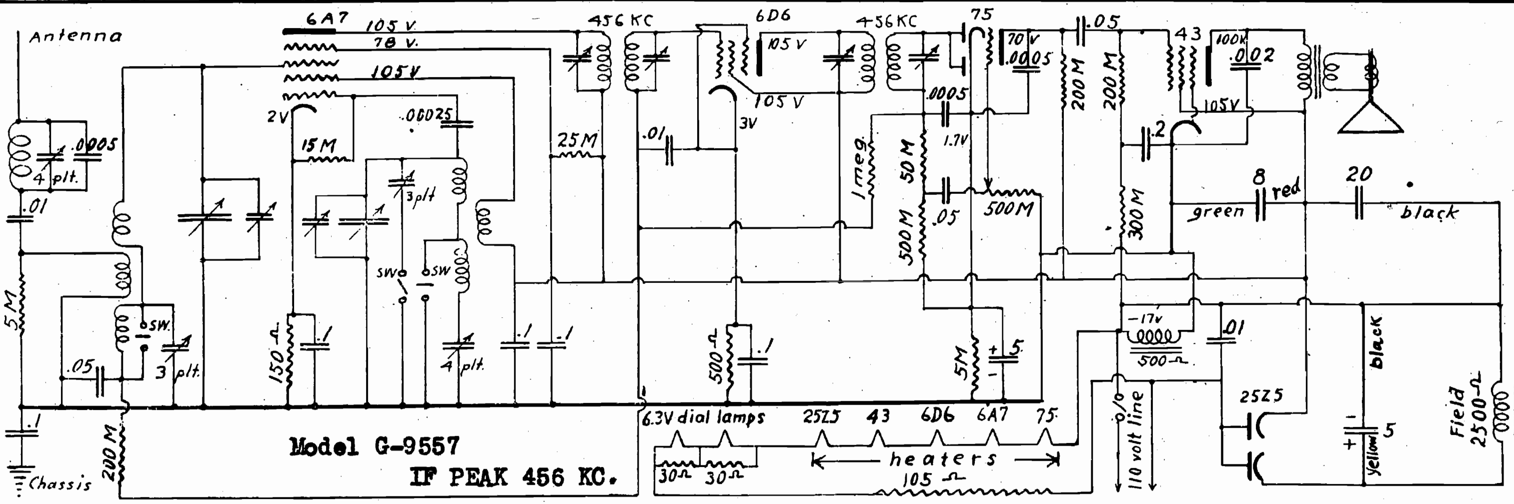
Schematic, Voltage

ALLIED RADIO CORP.



MODEL G-9551
MODEL G-9557
Schematics, Voltage
Alignment, Notes

ALLIED RADIO CORP.



Model G-9557
IF PEAK 456 KC.

CAUTION—This instrument is equipped for operation on 110 volts D. C. or A. C., any frequency from 25 to 133 cycles per second. Before attempting to operate on any other voltage be sure that the proper adaptors are connected and the instructions accompanying them are understood. Special adaptor can be secured from the factory at a slight extra cost, for operating this receiver on 220 volt A. C. or D. C. Cord for 110 volt or 220 volt heats moderately, as the cord contains resistance necessary for operation at these voltages.

The 20-foot aerial packed with the set may be unwound and hung outside a window or stretched along the floor under a rug after attaching one end to the antenna lead from the back of the set, and is ordinarily all the aerial required.

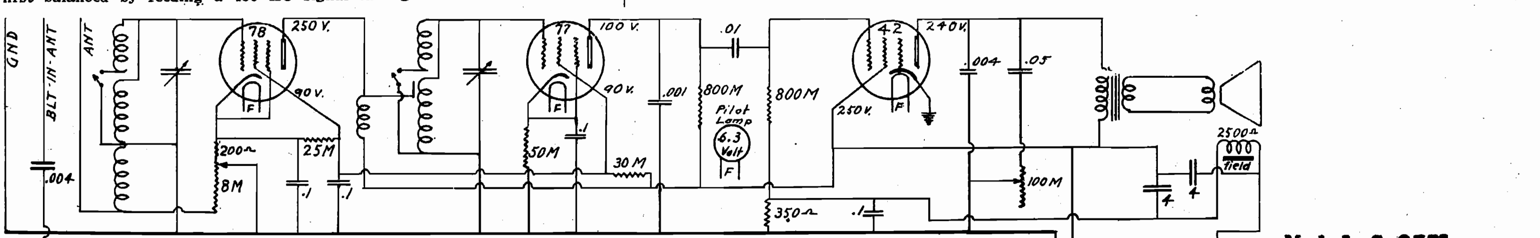
No ground connection should be used. Sometimes results are better if the tip of the antenna wire is connected to an outside aerial.

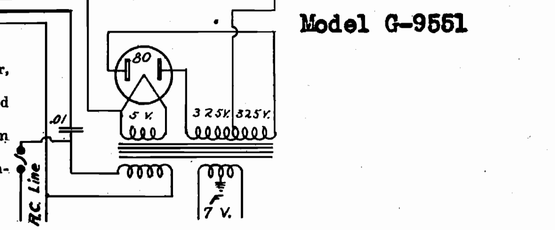
NOTE—When operating on D. C. current and set fails to operate after waiting a reasonable length of time for tubes to heat up, reverse power supply plug.

To remove set from cabinet, disconnect from power supply, remove knobs, remove back if compact model, and unscrew the four felt-headed screws on bottom of cabinet. To rebalance set, remove from cabinet. Intermediates are first balanced by feeding a 456 KC signal into grid of 6A7 tube and adjusting trimmers in top of the two tall cans to greatest volume. Adjust wave trap in rear flange of chassis by turning the trimmer screw until a 456 KC signal applied to the antenna lead cannot be heard. Next, set band switch to broadcast position (counter-clock), turn tuning knob to 1400 KC, feed a 1400 KC signal into antenna lead and adjust trimmers on tuning condenser to greatest volume. Next, set band switch to long-wave (clockwise), turn tuning knob to 350 KC, feed a 350 KC signal into the antenna lead and adjust the two 3-plate trimmers on the under side of the panel to greatest volume. Turn tuning knob to 150 KC, set test oscillator to this frequency and adjust the 4-plate section of dual trimmer to maximum volume. Repeat the operations at 350 KC and 150 KC until trimming at one frequency does not affect the other.

NOTE—Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

PHONOGRAPH—Install a single pole double-throw toggle switch and two pin jacks at a convenient place on the chassis near the 75 tube. Disconnect the .05mfd. condenser from volume control and attach to one side of toggle switch, connect disconnected volume control terminal to middle terminal of switch, other side of switch to one side of phonograph pickup, and other side of pickup to "B" minus.





Model G-9551

CAUTION: Do Not Attempt to Operate on Current Other Than That Noted on Instrument.

INSTALLATION: Twist "ANT" and "BLT-IN-ANT" leads together for operation without aerial. Best results, however, may be had with a good outdoor aerial, especially on short wave.

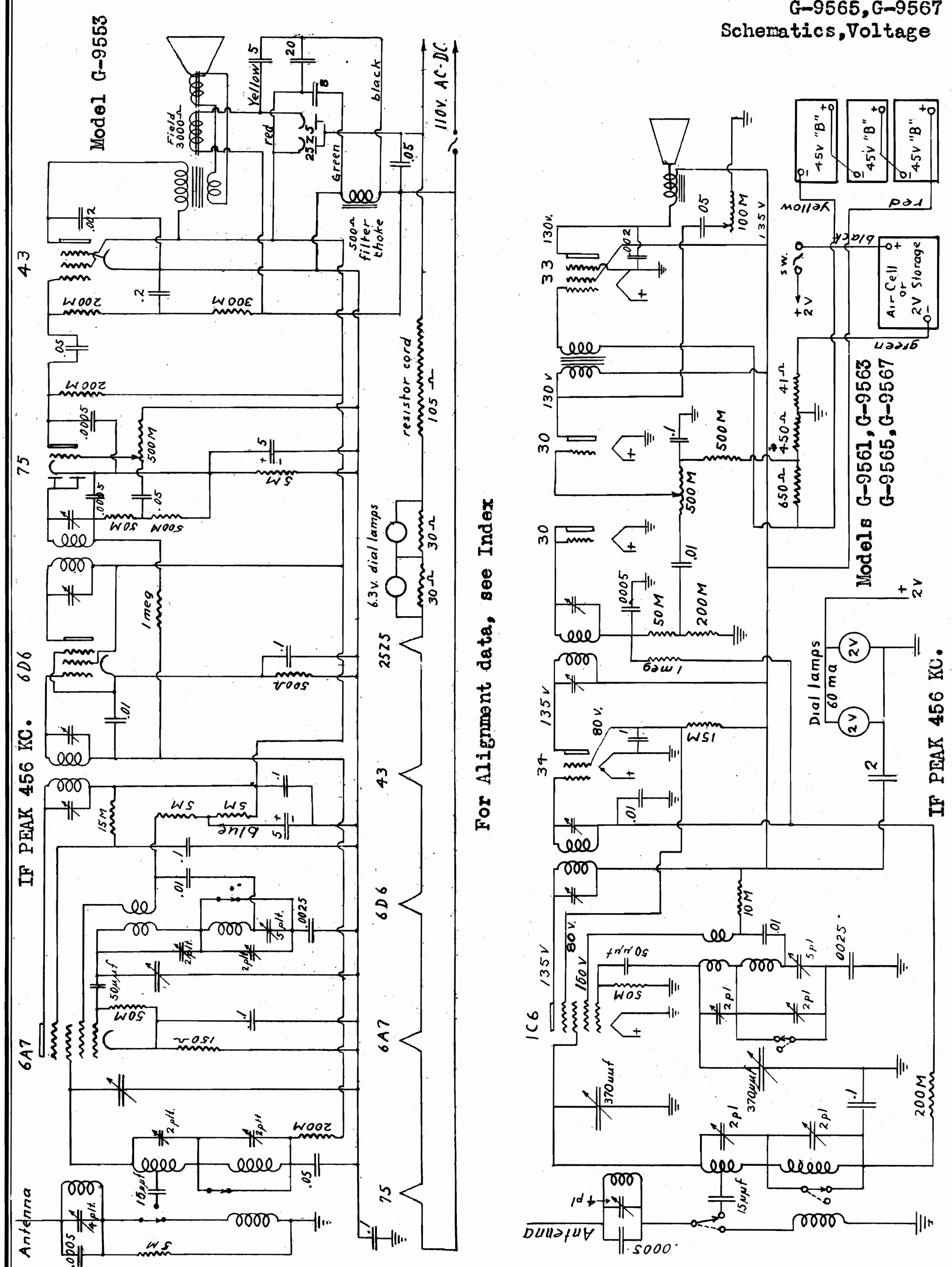
SHORT WAVE: Left hand knob, when clear to the left, is on Short Wave. A one-quarter inch movement to the right and it is on regular broadcast. Beyond this point it functions as a tone control.

PHONOGRAPH: Use a single pole switch mounted as near as possible to detector socket, connect in series with lead from ground end of grid coil of detector tube. Solder phonograph pickup leads to switch terminals.

SERVICE NOTES: To balance, set dial to 1400 KC, remove from cabinet, feed 1400 KC signal from test oscillator into antenna lead and adjust trimmers on tuning condenser to loudest signal.

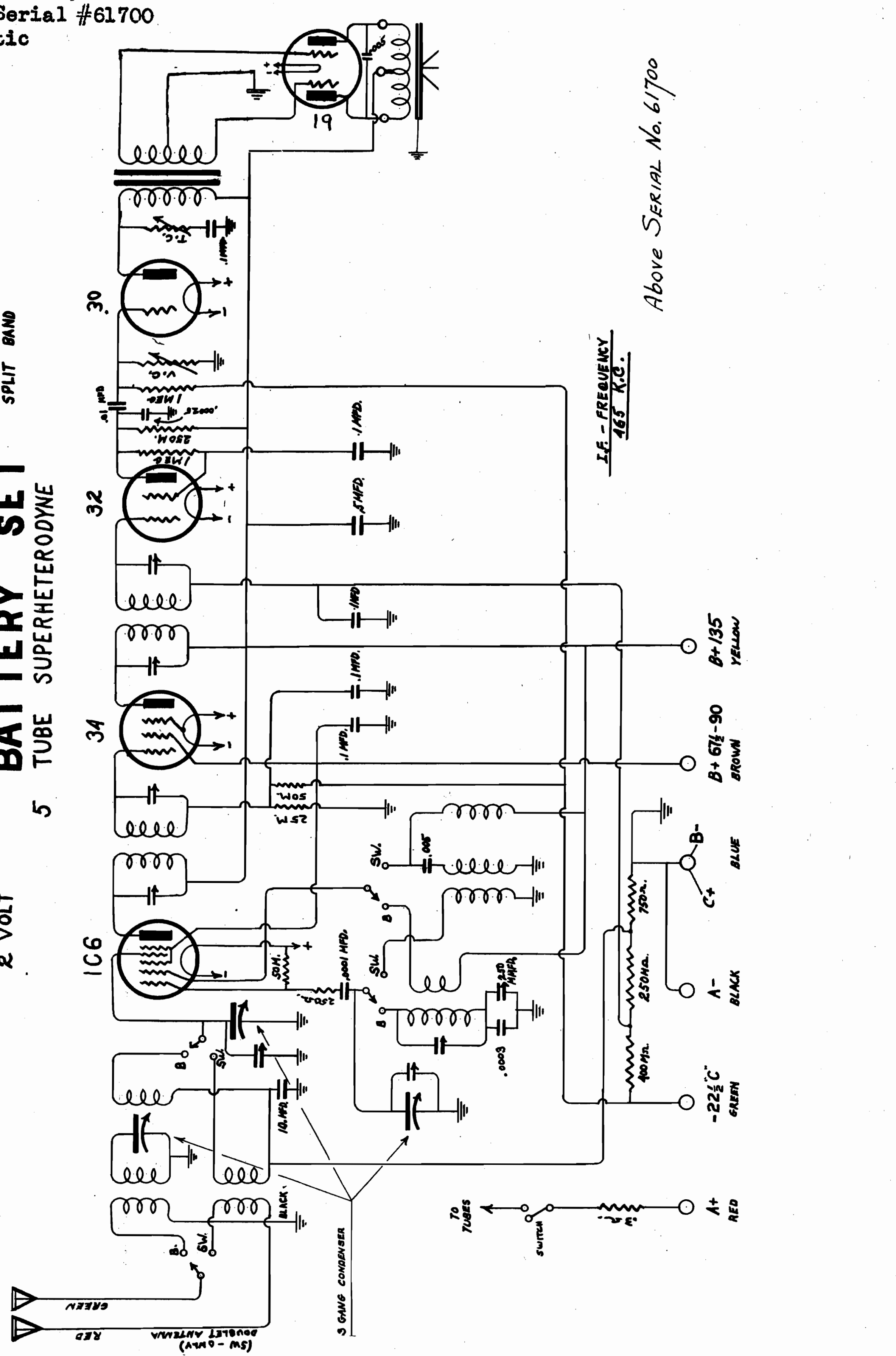
ALLIED RADIO CORP.

MODEL G-9553
MODEL G-9561, G-9563, G-9565, G-9567
Schematics, Voltage



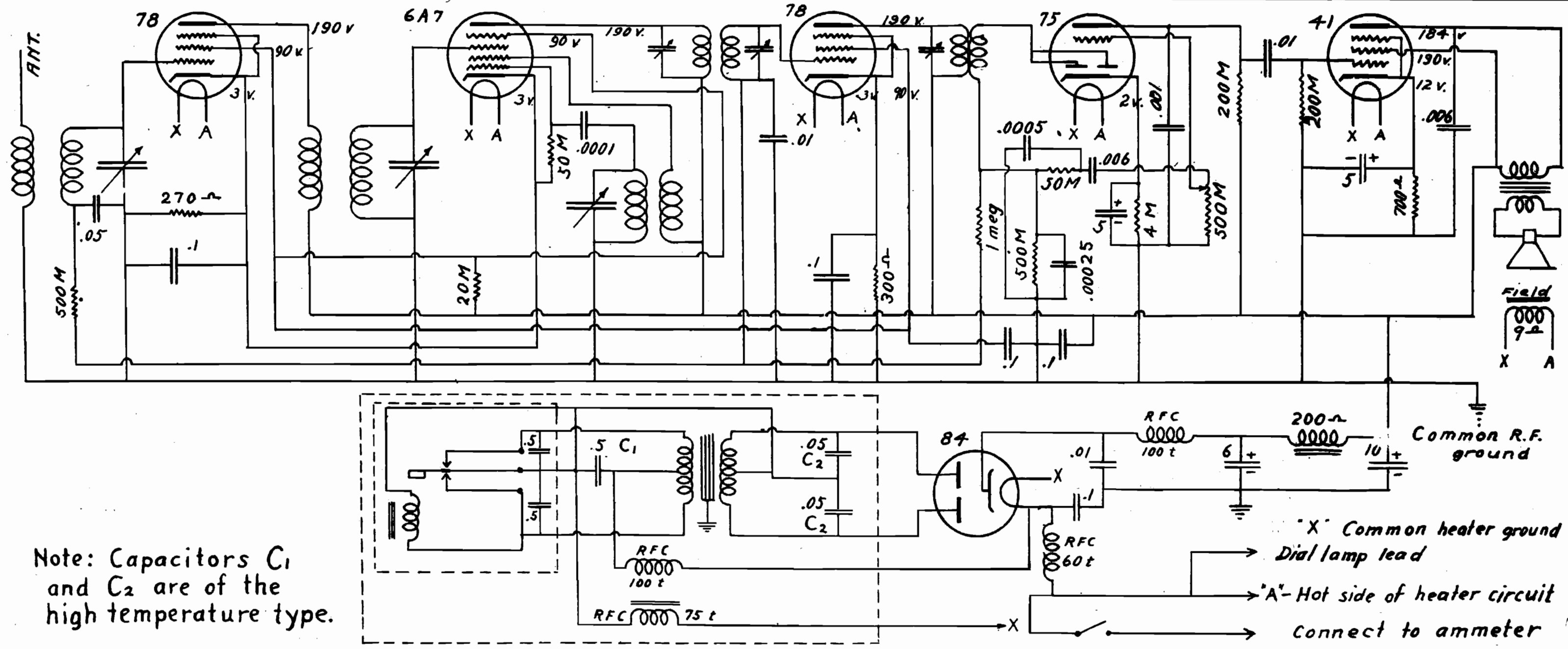
MODEL G-9561, G-9563,
G-9565, G-9567
Above Serial #61700
Schematic

ALLIED RADIO CORP.



MODEL G-9599
Schematic, Data
Voltage

ALLIED RADIO CORP.



Note: Capacitors C_1 and C_2 are of the high temperature type.

BALANCING I-F. COILS. These are trimmed through the tops of the tall cans by means of a small screwdriver and a 5-16" socket wrench. Remove chassis from cabinet and feed signal from test oscillator into grid cap of the 6A7.

BALANCING R-F. COILS. Tuning control must be attached to tuning condenser shaft with pointer set to 530 when condenser is turned to maximum. Tune in a weak signal at its proper dial marking near 1400 and adjust first and second trimmers on variable from front of chassis for loudest signal. If signal does not come at proper dial setting, carefully adjust rear trimmer on variable to shift signal to its proper location and then readjust first and second trimmers. After reinstalling set in car, slightly readjust the first trimmer through hole in top of cabinet.

Determine most satisfactory mounting position on bulkhead which should be at the left hand side or directly in front of steering column. Spot the mounting bolt location and drill ½" diameter hole. Insert bolt through hole and assemble washer and nut on engine side. Hang receiver over bolt head and tighten nut.

Attach flexible shafts to control unit by first inserting shaft as far in as possible and then tighten set screws of shaft housing, being careful it is not so tight as to cause shaft to bind in housing.

Mount control unit on steering column in approximately correct position, set pointer to 530 on dial, turn upper control of receiver to extreme clockwise position, carefully place right hand shaft in position on upper receiver control and left hand shaft on lower control and tighten set screws securely.

Adjust control unit position so that shafts leave set with least amount of bend possible and fasten securely in this position. Trial of controls will show best location for smooth operation.

Attach heavy rubber covered lead to ammeter terminal.

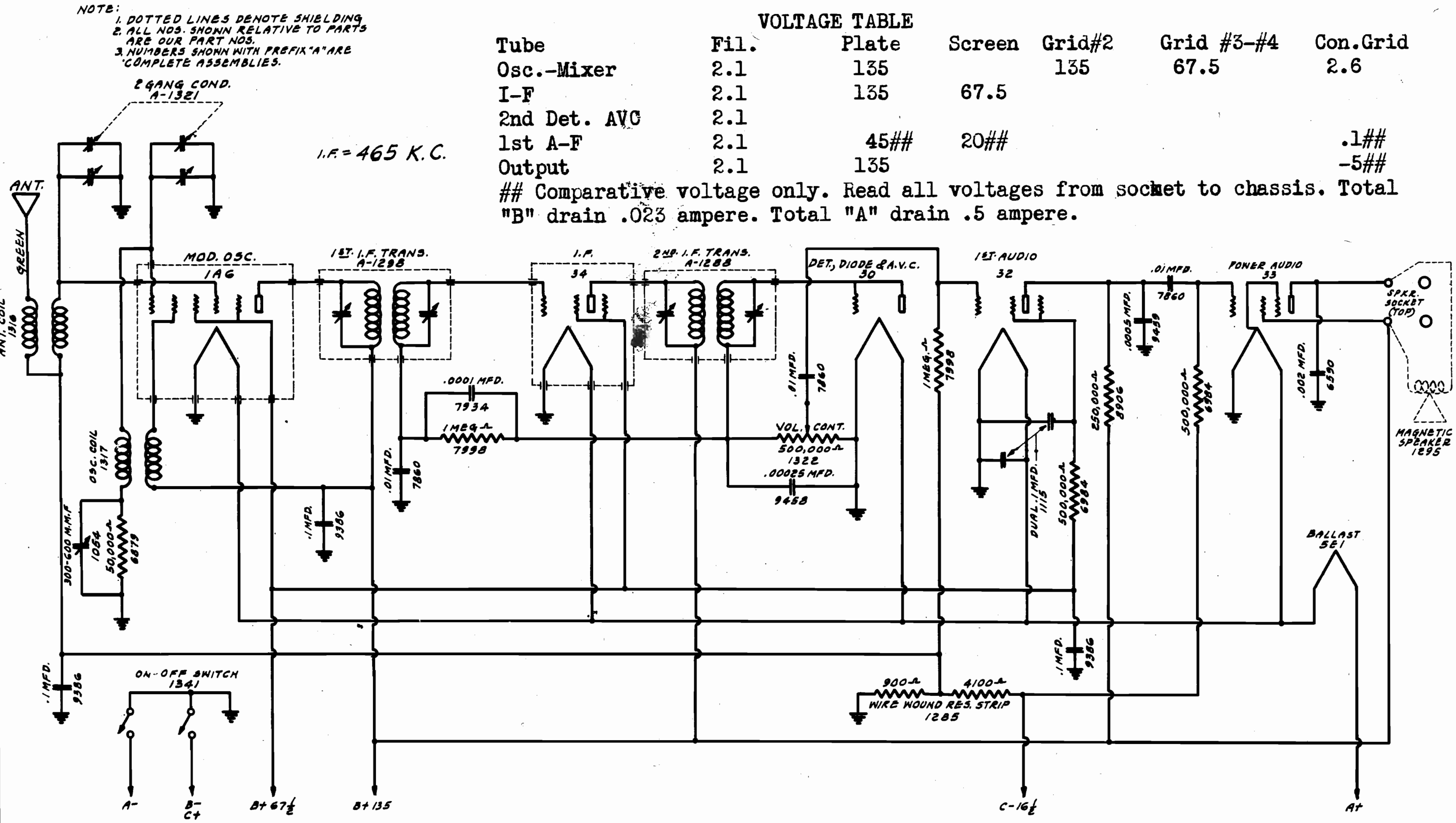
Connect pilot light wire from control head to short black wire on set, making connection close to set, and tape up joint. Ground shield by loosening screw under nearest corner of set and connecting wire therefrom to end of shield and tighten up screw.

Disconnect ignition leads from spark plugs, attach one suppressor to top of each plug and reattach the ignition lead to free end of suppressor. Disconnect center wire from distributor head, and substitute distributor suppressor, then plug center wire into free end of suppressor.

Attach generator bypass condenser to generator frame by means of screw holding cut-out. Connect wire from condenser to generator side of cut-out switch.

MODEL G-9611, G-9613
Schematic, Voltage
Alignment

ALLIED RADIO CORP.



VOLTAGE TABLE

Tube	Fil.	Plate	Screen	Grid#2	Grid #3-#4	Con.Grid
Osc.-Mixer	2.1	135		135	67.5	2.6
I-F	2.1	135	67.5			
2nd Det. AVC	2.1					
1st A-F	2.1	45##	20##			.1##
Output	2.1	135				-5##

Comparative voltage only. Read all voltages from socket to chassis. Total "B" drain .023 ampere. Total "A" drain .5 ampere.

INTERMEDIATE ALIGNMENT

Align at 465 kc. Two types of i-f trimmers are used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for one trimmer, the other intermediate trimmer being adjusted by means of of the trimmer screw located within the brass hex nut.

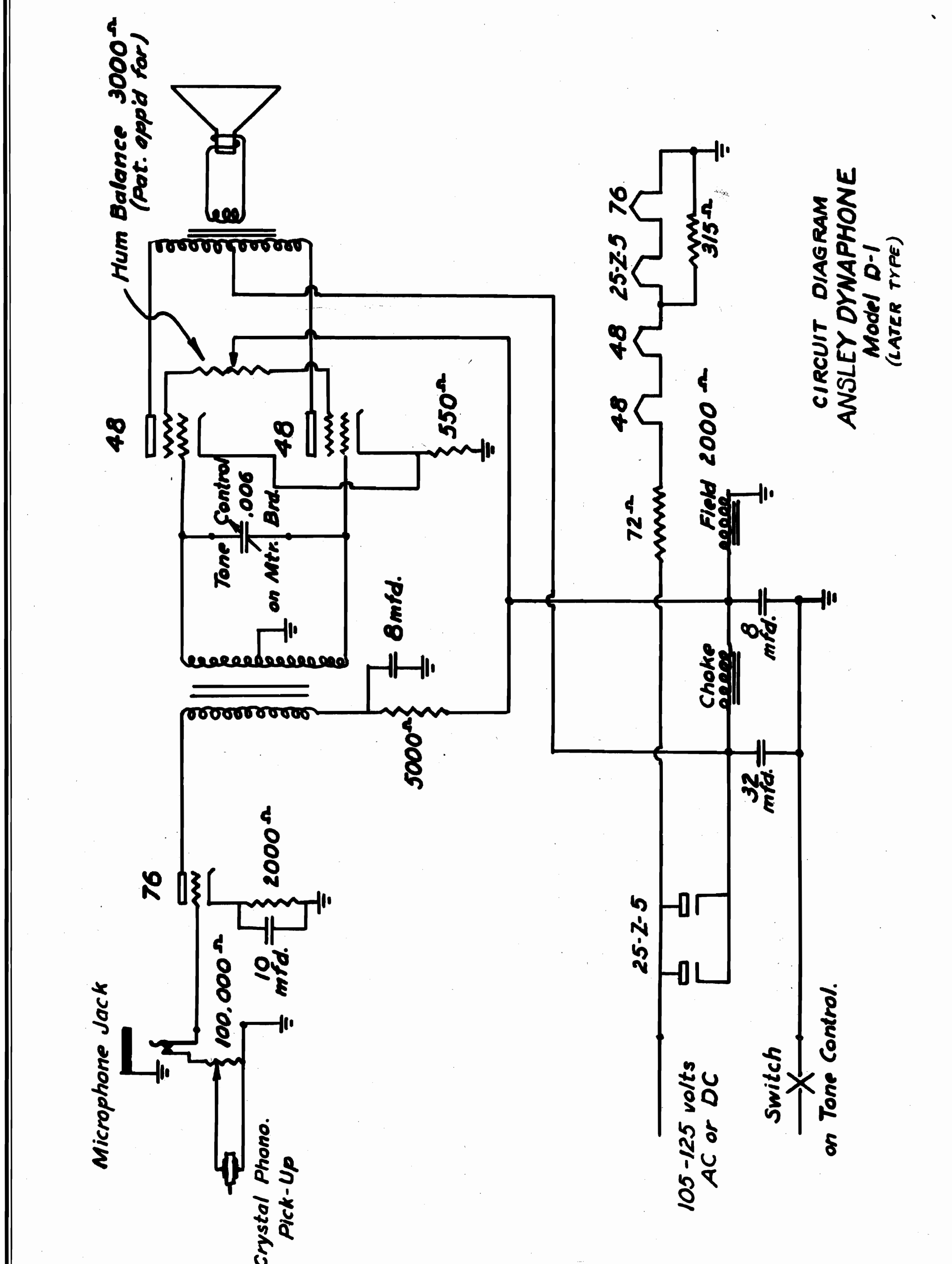
MIXER-OSCILLATOR ALIGNMENT

Connect test oscillator to antenna post and ground or chassis. Set test oscillator and receiver dial to 1720 kc. Then adjust trimmer condenser located on top of the oscillator (front section) unit of the gang condenser.

Then tune the receiver to 600 kc. and reset the test oscillator to this frequency. Then rock the tuning condenser slightly to the right and left, while adjusting the 600 kc. oscillator padding condenser, which is accessible through the hole provided on the front of the chassis. Repeat all the adjustments for maximum output.

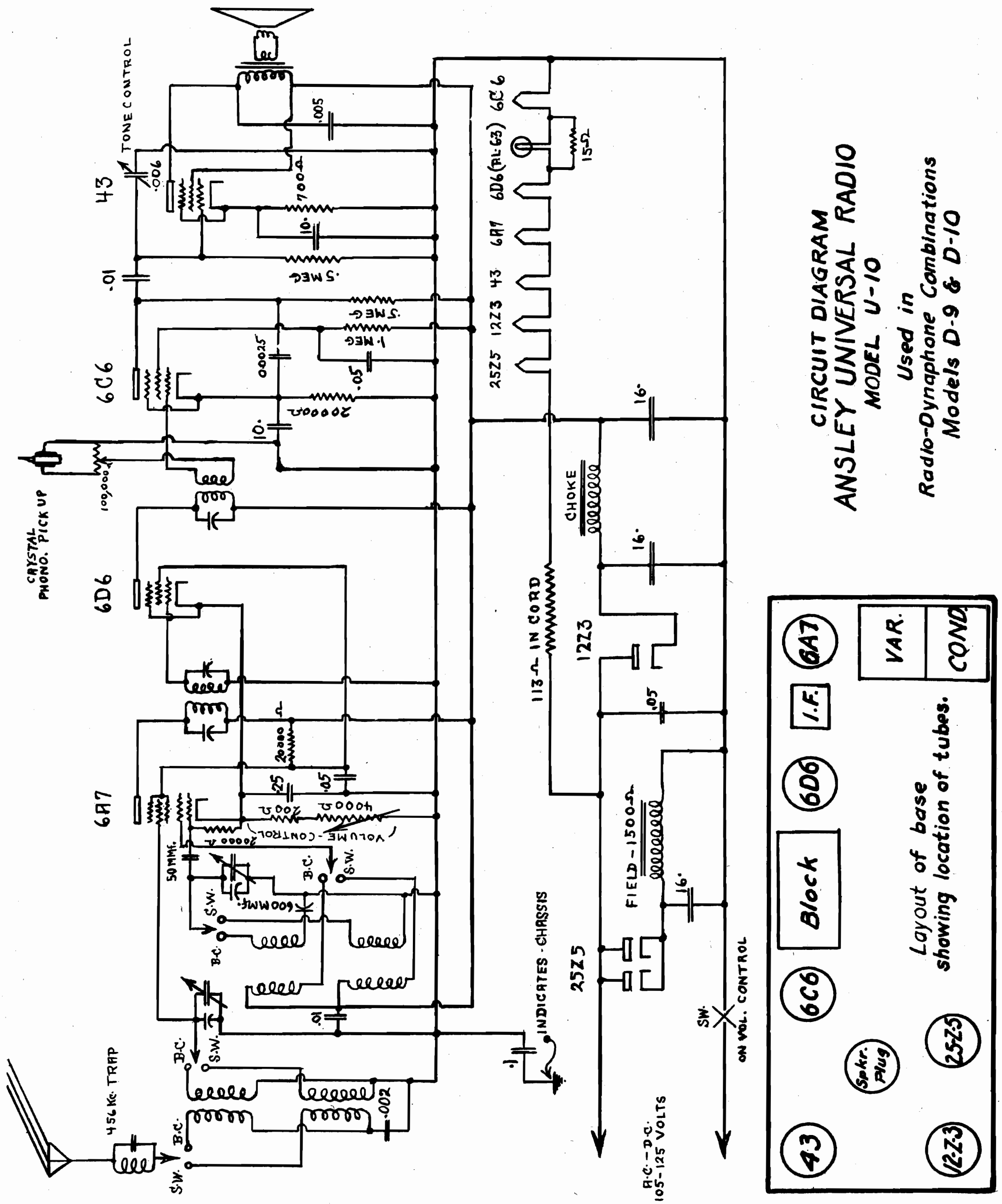
ANSLEY RADIO LABORATORIES

MODEL D-1
Dynaphone,Late Type
Schematic



MODEL U-10
Schematic
Socket

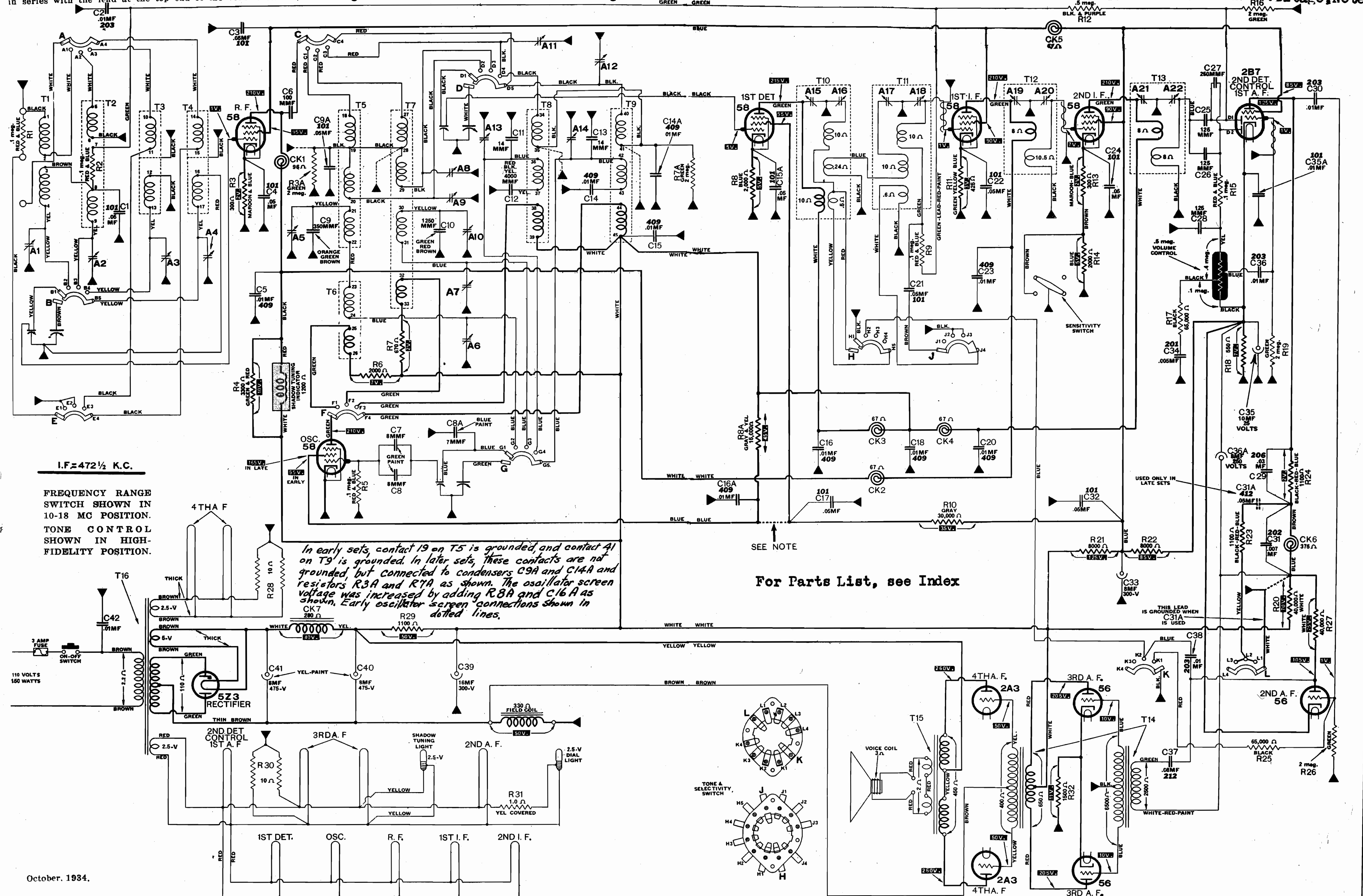
ANSLEY RADIO LABORATORIES



ATWATER-KENT MFG. CO.

In early Model 112, the volume control is oblong shaped and in sets using this type of control, a .1 MF condenser is connected in series with the lead at the top end of the volume control, and a .5 Ω resistor is connected from the bottom end of the .1 Ω resistor (in series with volume control) to the cathode of the 2B7 tube.

The voltages in this diagram were made with the 250-volt scale of a 1000 Ω per volt D. C. voltmeter.



I.F.=472½ K.C.

FREQUENCY RANGE SWITCH SHOWN IN 10-18 MC POSITION.

TONE CONTROL SHOWN IN HIGH-FIDELITY POSITION.

In early sets, contact 19 on T5 is grounded, and contact 41 on T9 is grounded. In later sets, these contacts are not grounded, but connected to condensers C9A and C14A and resistors R3A and R7A, as shown. The oscillator screen voltage was increased by adding R8A and C16A as shown. Early oscillator screen connections shown in dotted lines.

For Parts List, see Index

October, 1934.

ATWATER-KENT MFG. CO.

MODEL 112
Trimmer Notes

ADJUSTING TRIMMER CONDENSERS

EQUIPMENT.

1. OSCILLATOR. The oscillator should extend from the lowest I. F. frequency (125 KC in Atwater Kent sets) to at least 18 MC. The oscillator should have a good attenuator and should be well shielded. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers on some models, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025MFD fixed condenser in series with the oscillator pick-up lead at the antenna terminal of the set.

2. OUTPUT METER. Use a sensitive output meter and keep the radio volume control turned on full volume. This is necessary to minimize the effect of the automatic-volume-control action of the set which would otherwise prevent sharp peaking of the trimmers.

3. BALANCING UNIT. Build two of the Type "A" balancing units and one of the I. F. coupling units shown below. These are required for correct adjustment of Atwater Kent super-heterodynes. The Type "B" balancing unit, also described, is used on earlier models of Atwater Kent sets.

(These Atwater Kent units may be purchased from your distributor.)

To use the I. F. coupling unit, place it on the grid cap of the 1st-detector tube as shown, and clip the lead (that ordinarily goes to the 1st-detector grid cap) to the left-hand end of the 10,000 Ω resistor as shown.

4. Use a non-metallic screw driver for adjustment of the trimmers.

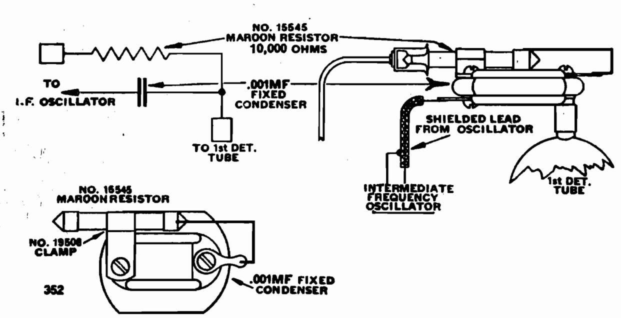


Fig. 1. I. F. Coupling unit, part No. 42590.

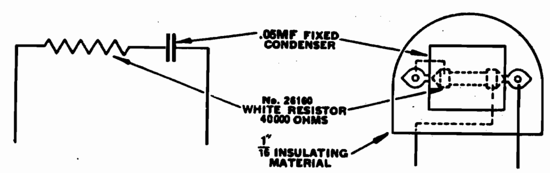


Fig. 2. Balancing unit "A," part No. 42610.

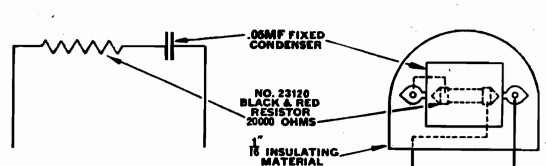


Fig. 3. Balancing unit "B," part No. 42620.

GENERAL NOTES.

1. Do not make any trimmer adjustments and do not disturb the dial gear or the dial indicator adjustments unless absolutely necessary.

2. With all-wave sets, it is very desirable to use a test oscillator that extends to 18 MC (18,000 KC). If you attempt to use harmonics of a broadcast oscillator, you are likely to use the wrong harmonic and set the trimmers incorrectly.

3. When using a test oscillator, you will experience "double-spot" or image reception, particularly on the highest frequency range of the set. The double-spot point is twice the I. F. frequency below the correct point. For instance, if a set has an I. F. frequency of 472½ kilocycles, and you are tuning in an 18 MC signal, the double-spot or image will be twice 472½ or 945 KC (.94 MC) below 18. In such a case you will hear the signal at 18 MC and also at 17.06 MC. In properly aligned sets of six tubes or more, the image should be weaker than the desired signal.

4. Because of the facts mentioned in paragraphs 2 and 3 above, it is very desirable, wherever possible, first to check the short-wave dial calibration and determine how far, and in what direction, the readings are "off." This should be done on actual reception of short-wave stations of known frequency. This pre-checking will assist you in selecting the correct harmonic (in case you are using a broadcast oscillator), and it will also minimize possibility of confusing the correct signal and the image signal.

5. On oscillator trimmers there may be two different settings at which the signal is received. Always use the *first* of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.

6. On sets with a combined oscillator and 1st-detector tube, tune the set to a quiet point near 1000 KC while adjusting the I. F. trimmers.

OSCILLATOR GOVERNS DIAL ACCURACY.

It is essential to understand definitely that in a super-heterodyne the dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration but simply affect sensitivity.

If the dial calibration of one or more of the frequency ranges of the set is "off," check the oscillator trimmer, the oscillator tracking condenser and tracking trimmer, and the oscillator transformer for the particular range or ranges in question.

The oscillator **trimmer** is used to adjust the **high-frequency** end of the particular range.

The oscillator **tracking condenser** adjusts the **low-frequency** end of the particular range.

In Atwater Kent sets the fixed tracking condenser on the broadcast range (and in some models also on the police range) is shunted with an adjustable tracking trimmer condenser. The adjustable tracking trimmer condenser is not used on the high-frequency ranges.

The adjustment of the trimmers for the high-frequency and low-frequency end of a particular range is slightly interlocking. For example, assume that the broadcast range of a set is off calibration. First turn the tuning knob so the dial pointer is at 1500 KC and, using a 1500 KC signal, peak the broadcast oscillator trimmer. Then turn the set to 560 KC and, using a 560 KC signal, peak the oscillator broadcast tracking trimmer for maximum output. This adjustment will have slightly affected the previous adjustment at 1500 KC so it will be necessary to repeat the adjustment at 1500 KC and also possibly at 560 KC.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer for that particular range.

Naturally, the I. F. trimmers should be checked, and adjusted if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

GENERAL PROCEDURE

First check the I. F. trimmers. If reception is satisfactory and the dial calibration is correct on the broadcast range, it is safe to assume that the I. F. trimmers are correctly adjusted.

If the dial calibration is "off" (or the set is weak) on only one range, adjust the trimmers for that range only. If this does not correct the trouble, inspect the resistors, condensers, transformers, and switch contacts associated with that particular range.

In checking a set, do not disturb the position of the wiring any more than necessary.

MODEL 112
Alignment, Trimmers
Socket

ATWATER-KENT MFG. CO.

ADJUSTING TRIMMER CONDENSERS (Contd.)

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the I. F. coupling unit shown in Fig. 1. Adjust the I. F. oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. **Put tone control in 2nd-position from right.**

Put balancing unit A (shown in Fig. 2) across trimmer A21 and peak A22.

Put unit A across A22 and peak A21.

Put unit A across A19 and peak A20.

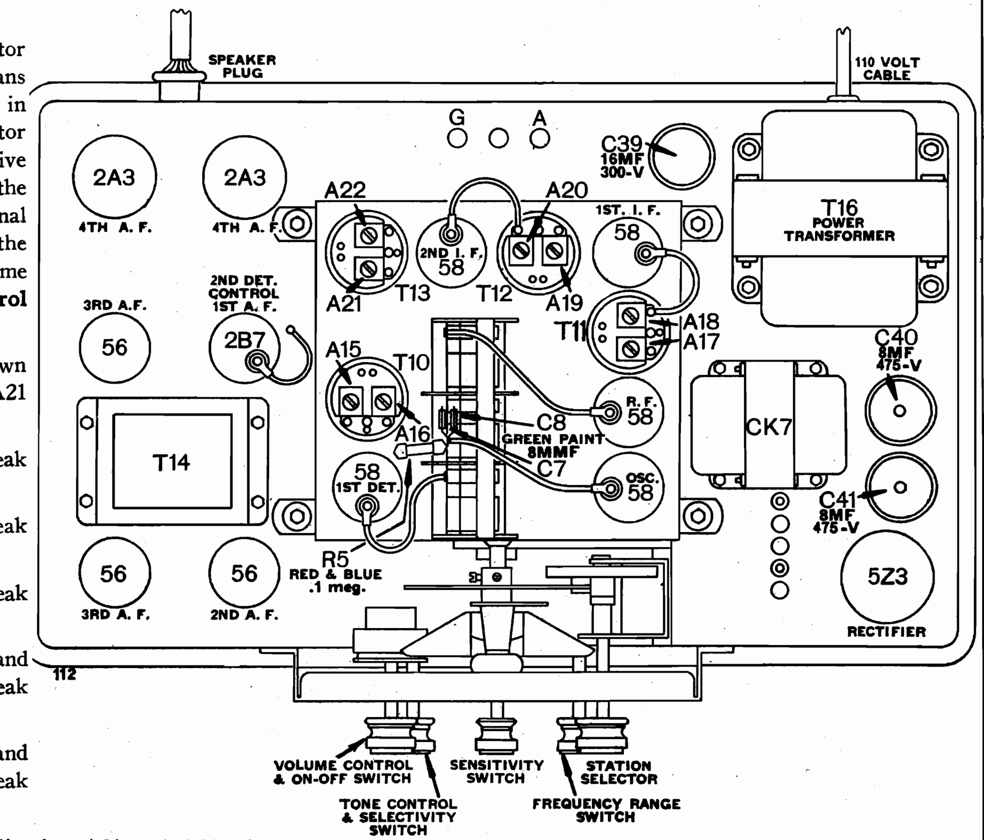
Put unit A across A20 and peak A19.

Put one unit A across A17 and another unit A across A15; peak A18 and A16.

Put one unit A across A18 and another unit A across A16; peak A17 and A15.

In case of instability while adjusting A21 and A22, place an extra balancing unit A across A18.

Remove the I. F. coupling unit and the balancing units and seal the trimmer screws.



R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground terminals of the set. Use the weakest possible signal to give a reading on the output meter. Loosen the trimmer screws for the frequency range or ranges that are to be re-adjusted.

10 to 18 MC range. Tune oscillator exactly to 18 MC and turn tuning knob of set so indicator is at 18 MC mark. Adjust trimmers A14, A4 and A12 for peak output.

4 to 10 MC range. Tune oscillator exactly to 10 MC and turn set to 10 MC mark on the 4 to 10 MC range. Peak trimmers A13, A3 and A11.

1.5 to 4 MC range. Tune oscillator to 4 MC and turn set to the 4 MC mark on the 1.5 to 4 MC scale. Peak trimmers A7, A2 and A8. Tune oscillator to 1.5 MC and, with set at 1.5, peak A10. Repeat adjustments on A7 and A10 if necessary.

Broadcast range. Tune oscillator and set to 1500 KC. Peak trimmers A6, A1 and A9. Tune oscillator to 560 KC and turn set to the 560 KC mark. Peak A5. Repeat adjustments on A6 at 1500 and A5 at 560 if necessary.

TUNING MECHANISM

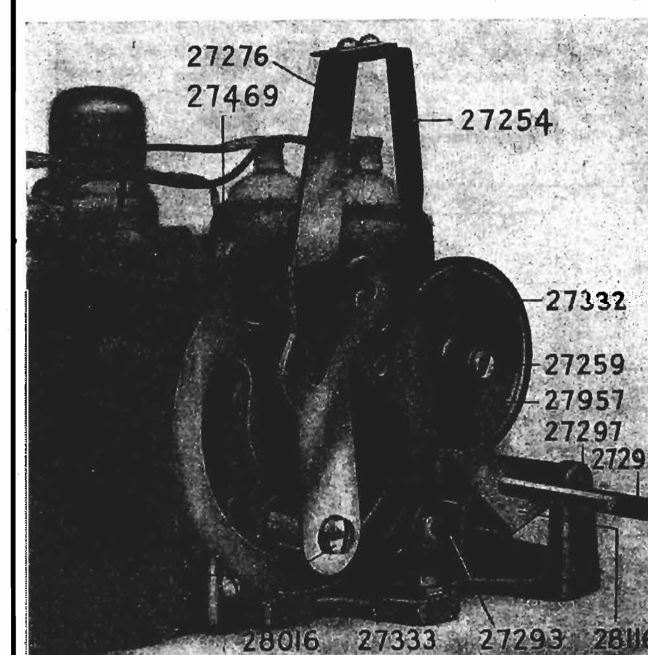


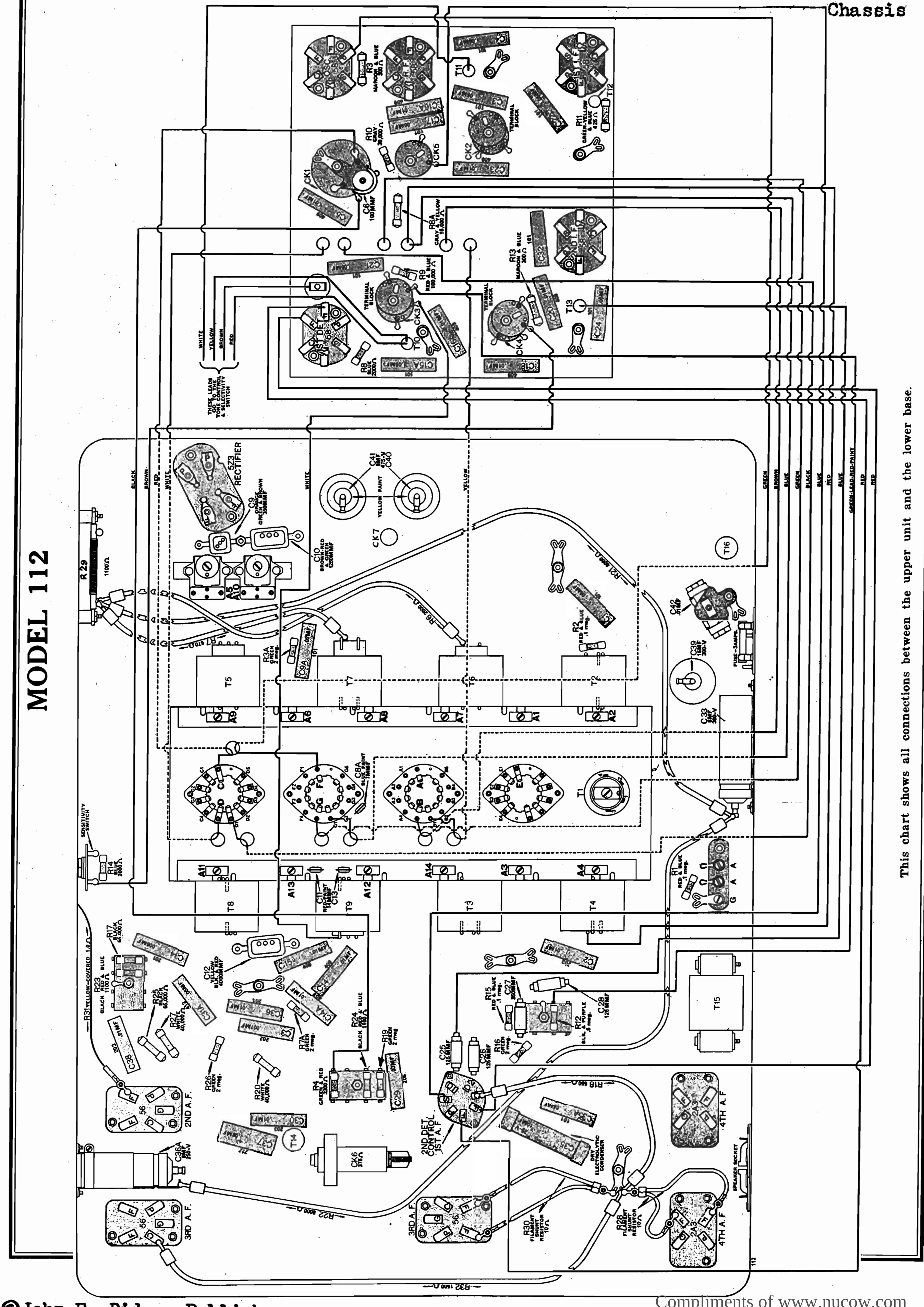
Illustration of parts in dual-speed compensated tuning mechanism in Models 112, 318, 447 and 559.

TRIMMERS ON MODEL 112

	10-18 MC Range	4-10 MC Range	1.5-4 MC Range	540-1600 KC Range
R. F.	A4	A3	A2	A1
1st-Detector	A12	A11	A8	A9
Oscillator	A14	A13	A7	A6
Tracking	None	None	A10	A5

The I. F. trimmers are A15 to A22, inclusive.

ATWATER-KENT MFG. CO.



MODEL 112
MODEL 511
Parts Lists

ATWATER-KENT MFG. CO.

MODEL 112

Replacement Parts

27287	Var. cond. assem.
25601	Rubber grommet
27301	Washer
22649	Screw
27286	Range switch
27272	Crank arm
35380	Reflector assem.
28379	Front panel assem.
27554	Escutcheon
27674	Vol. control, .5 U
27314	Vol. cont. mtg. bracket
27587	Tone cont. switch
27317	Mtg. bracket for above
38740	Sensitivity switch assem.
27628	Shaft and blade for above
27472	Antenna jumper
25913	R. F. coil shield
25056	I. F. T. shield
26255	I. F. T. shield insul.
25058	I. F. T. shield cover without hole
25059	I. F. T. shield cover with hole
25906	Filter choke cover
25758	Power trans. cover
15331	Audio trans. lid
23774	Fuse (3 amp.)
27057	Bottom cover
22683	Tube shield
23743	Aux. tube shield
27334	Tone cont. cond. clamp
27249	Mica for trimmers on strips
17109	Screw for above
17064	Insul. washer for above
27072	Station directory, F-1131
27545	Inst. folder, F-1143
27864	Shipping container
27728	Knob vol. control and tuning
27494	Knob, tone control
27358	Knob, range switch
26571	Knob, silencing
28115	Spring (large knob)
28114	Spring (small knob)

TRANSFORMERS

T1	38310	No. 1 R. F. T., broadcast
T2	38340	No. 1 H. F., 1st range
T3	38360	No. 1 H. F., 2nd range
T4	38380	No. 1 H. F., 3rd range
T5	38320	No. 2 R. F. T., broadcast
T6	38330	Oscillator T., broadcast
T7	38350	No. 2 H. F., 1st range
T8	38370	No. 2 H. F., 2nd range
T9	38390	No. 2 H. F., 3rd range
T10	27448	No. 1 I. F. T.
T11	27449	No. 2 I. F. T.
T12	27451	No. 3 I. F. T.
T13	27452	No. 4 I. F. T.
T14	39730	Audio trans.
T15	39740	Output trans.
T16	26257	Power trans.

CHOKES

CK1	17015	R. F. plate choke
CK2	19210	R. F. plate circuit choke
CK3	19210	1st det. plate circuit choke
CK4	19210	2nd I. F. plate circuit choke
CK5	19210	R. F. 1st I. F. screen choke
CK6	28372	1st A. F. plate choke
CK7	25894	Audio filter choke

TRIMMERS

38770	Single trimmer
32880	Double I. F. trimmer

CONDENSERS*

C1	31160	.05 MF (101)
C2	27630	.01 MF (203)
C3	31160	.05 MF (101)
C4	31160	.05 MF (101)
C5	32810	.01 MF (409)
C6	22220	100 MMF (mica), 450-V.
C7	25661	8 MMF (green), 500-V.
C8	25661	8 MMF (green), 500-V.
C8A	36220	7 MMF (blue)
C9	27391	350 MMF (orange, green and brown)
C9A	31160	.05 MF (101)
C10	27389	1250 MMF (brown, red and green)
C11	34470	14 MMF (red on T8)
C12	27392	4000 MMF (yellow, black and red)
C13	34470	14 MMF (red on T9)
C14	32810	.01 MF (409)
C14A	32810	.01 MF (409)
C15	32810	.01 MF (409)
C15A	31160	.05 MF (101)
C16	32810	.01 MF (409)
C16A	32810	.01 MF (409)
C17	31160	.05 MF (101)
C18	32810	.01 MF (409)
C20	32810	.01 MF (409)
C21	31160	.05 MF (101)
C22	31160	.05 MF (101)
C23	32810	.01 MF (409)
C24	31160	.05 MF (101)
C25	39340	125 MMF (mica)
C26	39340	125 MMF (mica)
C27	33670	250 MMF (mica), 500-V.
C28	39340	125 MMF (mica)
C29	29530	.03 MF (206)
C30	27630	.01 MF (203)
C31	36670	.007 MF (202)
C31A	36490	.05 MF (412)
C32	31160	.05 MF (101)
C33	25384	8 MF, 300-V.
C34	28040	.005 MF (201)
C35	25379	10 MF, 25-V.
C35A	31160	.01 MF (101)
C36	27630	.01 MF (203)
C36A	25385	8 MF, 250-V.
C37	35420	.08 MF (212)
C38	27630	.01 MF (203)
C39	27583	16 MF, 300-V.
C40	28031	8 MF, 475-V.
C41	28031	8 MF, 475-V.
C42	23250	.01 MF, 450-V.

PARTS FOR TUNING MECHANISM

(See illustration on page 6.)

27469	Dial gear
27276	Pointer arm
27254	Dial pointer
27332	Counter shaft gear (lge.)
27333	Idler gear (sml.)
27259	Gear screw
27957	Broadcast pinion gear
28116	Gear frame
27351	Screw (5/32" dia.)
27294	Tuning shaft

28016	Tuning bracket
27293	Detention spring
27298	Shaft spacer
27297	Bracket holding pin

RESISTORS

R1	30340	Red-blue, .1 U, 1/3-W.
R2	30340	Red-blue, .1 U, 1/3-W.
R3	37530	Maroon-blue, 300 Ω, ½-W.
R3A	30370	Green, 2 U, 1/3-W.
R4	30380	Green-red, 3300 Ω, 1/3-W.
R5	20980	Red-blue, .1 U, ½-W.
R6	33230	Flexible, 2000 Ω
R7	33210	Flexible, 670 Ω
R7A	30370	Green, 2 U, 1/3-W.
R8	33250	Blue, 2000 Ω, 1/3-W.
R8A	20960	Gray-yellow 15,000 Ω, ½-W.
R9	30340	Red-blue, .1 U, 1/3-W.
R10	31840	Gray, 30,000 Ω, 1/3-W.
R11	37540	Green-yellow-blue, 425 Ω, ½-W.
R12	30350	Black-purple, .5 U, 1/3-W.
R13	37530	Maroon-blue, 300 Ω, ½-W.
R14	33250	Blue, 2000 Ω, 1/3-W.
R15	30340	Red-blue, .1 U, 1/3-W.
R16	30370	Green, 2 U, 1/3-W.
R17	31980	Black, 65,000 Ω, 1/3-W.
R18	23780	Flexible, 550 Ω
R19	30370	Green, 2 U, 1/3-W.
R20	26160	White, 40,000 Ω, ½-W.
R21	24340	Flexible, 8000 Ω
R22	24340	Flexible, 8000 Ω
R23	31480	Black-red-blue, 1100 Ω, 1/3-W.
R24	31480	Black-red-blue, 1100 Ω, 1/3-W.
R25	21040	Black, 65,000 Ω, ½-W.
R26	30370	Green, 2 U, 1/3-W.
R27*	26160	White, 40,000 Ω, ½-W.
R28	17077	Flexible, 10 Ω
R29	19180	Iron core, 1100 Ω
R30	17077	Flexible, 10 Ω
R31	16081	Flexible, .6 Ω
R32	20380	Flexible, 1500 Ω

SOCKETS

22734	5 prong (56)
22735	4 prong (2A3)
26111	7 prong
24494	6 prong (58)
22733	6 prong (2a5-55)
22689	4 prong (rect.)
21336	4 prong (speaker)
18449	Fuse

112 SPEAKER No. 36700

26243	Diaphragm
23668	Cable and plug
35080	Field coil (325 Ω)
15079	Speaker plug

CABINET PARTS

25925	Wing nut
21142	Washer
25742	Clamp (large)
25746	Clamp bolt

* Voltages for condensers are determined by the first numeral of the code number on the condenser.
Example: 101=100 volts, 202=200 volts, 403=450 volts.

Ω=ohms. U=megohms.

PARTS LIST FOR MODEL 511

Tune♦O♦Matic

28913	Front panel assem.
27923	Escutcheon
25689	Shadow tuning meter
27675	Range switch
22678	R.-F. coil shield
23774	Fuse (3 amp.)
22683	Tube shield
23743	Aux. tube shield
27289	Tone control switch
27829	Base cover
25906	Filter choke cover
25758	Power T. cover
27732	Vol. control, .5 meg.
27682	Var. cond. assem.
27828	On-off switch
28556	Wrench
28296	Dealer inst. folder, F 1207
28297	Customer inst. folder F 1208
28572	Shipping container (wood)
29013	Shipping container (chassis)
26569	Knob, vol. cont. and tuning
27495	Knob, tone and silencing
26571	Knob, range switch

TRANSFORMERS

T1	40560	No. 1 R. F. T.
T2	40570	No. 2 R. F. T.
T3	40580	No. 3 R. F. T.
T4	40590	Oscillator T.
T5	28172	No. 1 I. F. T.
T6	28173	No. 2 I. F. T.
T7	28174	No. 3 I. F. T.
T8	28175	No. 4 I. F. T.
T9	40760	Audio T.
T10	40770	Output T.
T11	26257	Power T.

RESISTORS

R1	30340	Red, blue, .1 U, ⅓ W.
R2	37530	Maroon, blue, 300 Ω, ½ W.
R3	37530	Maroon, blue, 300 Ω, ½ W.
R4	31980	Black, 65,000 Ω, ⅓ W.
R5	30340	Red, blue, .1 U, ⅓ W.
R6	20950	Maroon, 10,000 Ω, ½ W.
R7	36430	Blue, yellow, 5000 Ω, ⅓ W.
R8	30340	Red, blue, .1 U, ⅓ W.
R9	37540	Blue, yellow, green, 425 Ω, ½ W.
R10	24340	Flexible, 8000 Ω
R11	24340	Flexible, 8000 Ω
R12	30350	Black, purple, .5 U, ⅓ W.
R13	31480	Blue, red, black, 1100 Ω ⅓ W.
R14	39130	Green, gray, red, 2500 Ω, ⅓ W.
R15	31980	Black, 65,000 Ω, ⅓ W.
R16	30340	Red, blue, .1 U, ⅓ W.
R17	39790	Blue, green, red, 500 Ω, ⅓ W.
R18	30370	Green, 2 U, ⅓ W.
R19	26160	White, 40,000 Ω, ½ W.
R21	39790	Blue, green, red, 500 Ω.
R22	30370	Green, 2 U, ⅓ W.
R23	30370	Green, 2 U, ⅓ W.
R24	16081	Flexible, .6 Ω.
R25	26160	White, 40,000 Ω, ½ W.
R26	20380	Flexible, 1500 Ω.
R27	17077	Flexible, 10 Ω
R28	19180	Iron core, 1100 Ω.
R29	17077	Flexible, 10 Ω.
R30	31860	Flexible, 1.0 Ω

CONDENSERS*

C1	31160	.05 MF (101)
C2	31530	.1 MF (102)
C3	31160	.05 MF (101)
C4	26820	.05 MF (208)
C5	35840	50 MMF, 500-V.
C6	31530	.1 MF (102)
C7	27391	350 MMF (orange, green, brown)
C8	27598	3700 MMF (orange, violet, red)
C9	26820	.05 MF (208)
C10	31160	.05 MF (101)
C11	31160	.05 MF (101)
C12	26820	.05 MF (208)
C13	31530	.1 MF (102)
C14	31530	.1 MF (102)
C15	29530	.03 MF (206)
C16	26820	.05 MF (208)
C17	26820	.05 MF (208)
C18	39340	125 MMF
C19	39340	125 MMF
C20	39340	125 MMF
C21	28130	500 MMF (402)
C22	29890	.005 MF (408)
C23	27630	.01 MF (203)
C24	25385	8 MF, 250-V.
C28	25379	10 MF, 25-V.
C29	27630	.01 MF (203)
C30	39650	.004, .001 MF (419)
C31	35420	.08 MF (212)
C32	23250	.01 MF, line cond., 450-V.
C33	22538	8 MF, 475-V.
C34	22538	8 MF, 475-V.
C35	27911	16 MF, 300-V.
C36	25384	8 MF, 300-V.

*Voltages for condensers are determined by the first numeral of the code number which is found on the condenser.
Example: 101 = 100 volts, 202 = 200 volts, 403 = 450 volts.

CHOKES

CK1	19210	1st det. filter
CK2	19210	Screen
CK3	25894	Filter choke

TRIMMERS

39430	Double R. F. trimmer
38770	Tracking trimmer (A8)
32880	Double I. F. trimmer

SOCKETS

24492	4-prong (2A3)
24493	5-prong
22689	4-prong, (rect.)
21336	4-prong, (spkr.)
26111	7-prong
24494	6-prong
18449	Fuse

40870 CLOCK ASSEMBLY

The only parts sold separately are those listed below.

28317	Spool assembly
27697	Cord assembly
27818	Cord check
28373	Cord and plug assem.
27811	Time adj. knob
27797	Crystal
27798	Retaining ring
28911	Shipping container

Ω=ohms. U=megohms.

TUNE-O-MATIC PARTS

28237	Disc and bushing assem.
27735	Gear friction disc fibre
27737	Gear friction spring
28236	Cam
27741	Disc spacer
28238	Station selector disc
27742	Disc spacer spring
28229	Collar
27736	Worm gear
27744	Worm shaft support
27753	Bearing (left hand)
27752	Bearing (right hand)
27526	Ball bearing
28233	Small wheel
28232	Large wheel
28231	Shaft and worm
27784	Locknut
27783	Thrust screw
40860	Solenoid coil
27352	Rubber pad for above
28301	Contact fingers
28234	Knob gear
27836	Knob shaft
22717	Dial pointer arm
28235	Dial gear
27646	Gear stop
22649	Pointer arm screw
22651	Pointer arm washer
25857	Bracket
28302	Reversal switch
27758	Spring
28405	Disc cover
28433	Motor assem.
27774	Plunger
27767	Felt washer for the above.
27775	Plunger hanger wire
28371	Switch shield

REMOTE CONTROL No. 41940

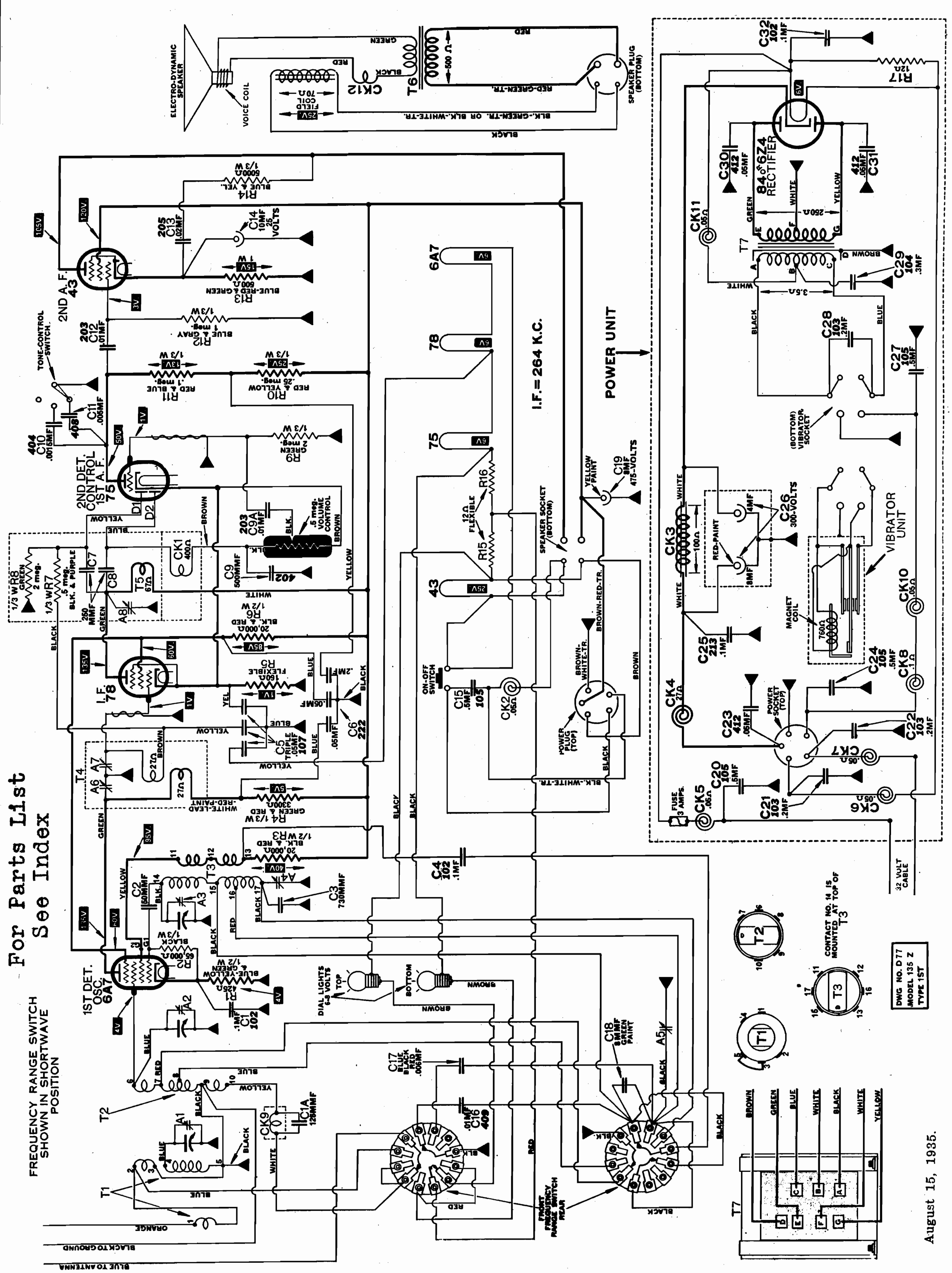
28494	Control switch
42450	Resistor, 150 Ω.
28816	Dial assem.
28299	Lamp, 6-8-v., frosted
24278	Knob
25865	Escutcheon
28753	Base cover
28655	Cable and plug assem. (15-wire)
28648	Cable (11-wire)
28926	Base assem.
28925	Box
28469	Cable clamp
28657	Wood screw
28219	Spring in lamp socket
28218	Washer in lamp socket
28815	Socket assembly
28658	Inst. sheet, F-1214
28659	Shipping container

MODEL 511 SPEAKER

26243	Diaphragm
23668	Cable and plug assem.
35080	Field coil (325Ω)
15079	Plug (only)

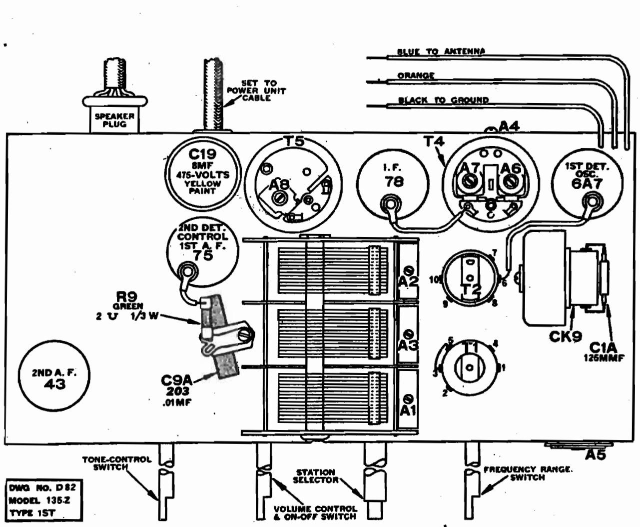
ATWATER-KENT MFG. CO.

MODELS 135Z,215Z
Schematic,Voltage

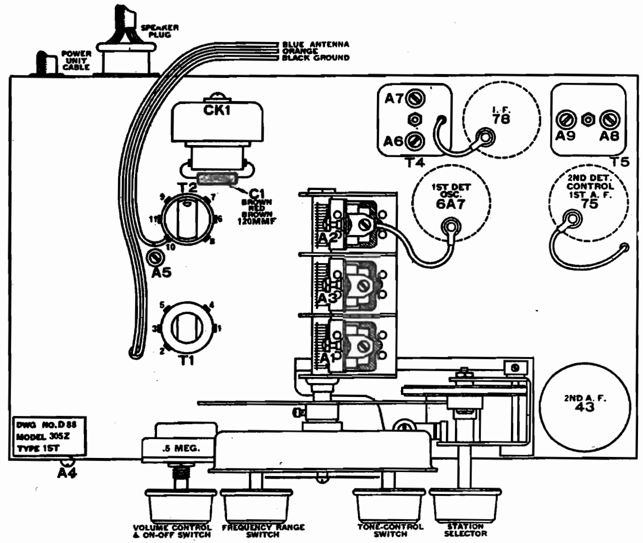


ATWATER-KENT MFG. CO.

ADJUSTING TRIMMER CONDENSERS



MODELS 135Z AND 215Z



MODELS 305Z AND 565Z

A1—Preselector, 1500 KC.
A2—1st-detector, 1500 KC.
A3—Oscillator, 15 MC.
A4—Tracking, 560 KC.
A5—Oscillator, 1500 KC.
A6—1st-detector plate, 264 KC.
A7—I. F. grid, 264 KC.
A8—I. F. plate, 264 KC.

A1—Preselector, 1500 KC.
A2—1st-detector, 1500 KC.
A3—Oscillator, 15 MC.
A4—Tracking, 560 KC.
A5—Oscillator, 1500 KC.
A6—1st-detector plate, 264 KC.
A7—I. F. grid, 264 KC.
A8—I. F. plate, 264 KC.
A9—2nd-detector, 264 KC.

EQUIPMENT.

1. OSCILLATOR. The oscillator should cover the I. F. and R. F. frequencies. It should be well shielded and have a good attenuator. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025 MFD fixed condenser in series with the pick-up lead at the antenna terminal of the set.

2. OUTPUT METER. Use a sensitive output meter and keep the radio volume control turned on full volume, and the tone control at high pitch. This is necessary to minimize the effect of the automatic volume control action of the set which would otherwise prevent sharp peaking of the trimmers.

3. I. F. COUPLING UNIT. Purchase from your distributor one of the special Atwater Kent I. F. coupling units No. 42590. This is placed on the grid cap of the I. F. or the 1st-detector tube, as specified, and the lead that normally connects to the grid cap is attached to the coupling unit.

4. Use a non-metallic screw driver for adjustment of the trimmers.

GENERAL NOTES.

1. Do not tamper with the trimmer adjustments unless the necessity is clearly apparent.

2. On the oscillator trimmer there are two different settings at which the signal will be received. Always use the *first* of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.

3. Check the I. F. trimmers first.

4. In checking the set, do not disturb the position of the wiring any more than necessary.

DIAL CALIBRATION.

The dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned to their specified frequency. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration, but simply affect sensitivity.

The oscillator trimmer is used to adjust the high-frequency end of the scale.

The oscillator tracking condenser adjusts the low-frequency end of the scale.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer condenser does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer.

Naturally the I. F. trimmers should be checked and adjusted, if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

PROCEDURE

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. grid by means of regular I. F. coupling unit. Peak A8 (and A9 in 305Z, 565Z). Connect I. F. oscillator to 1st-detector grid and peak A7, A6.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 538 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to antenna and ground of set.

Short-wave range. With oscillator and dial at 15 MC, peak A3. Use the first point on the trimmer, as it is screwed in from a loose or minimum-capacity position.

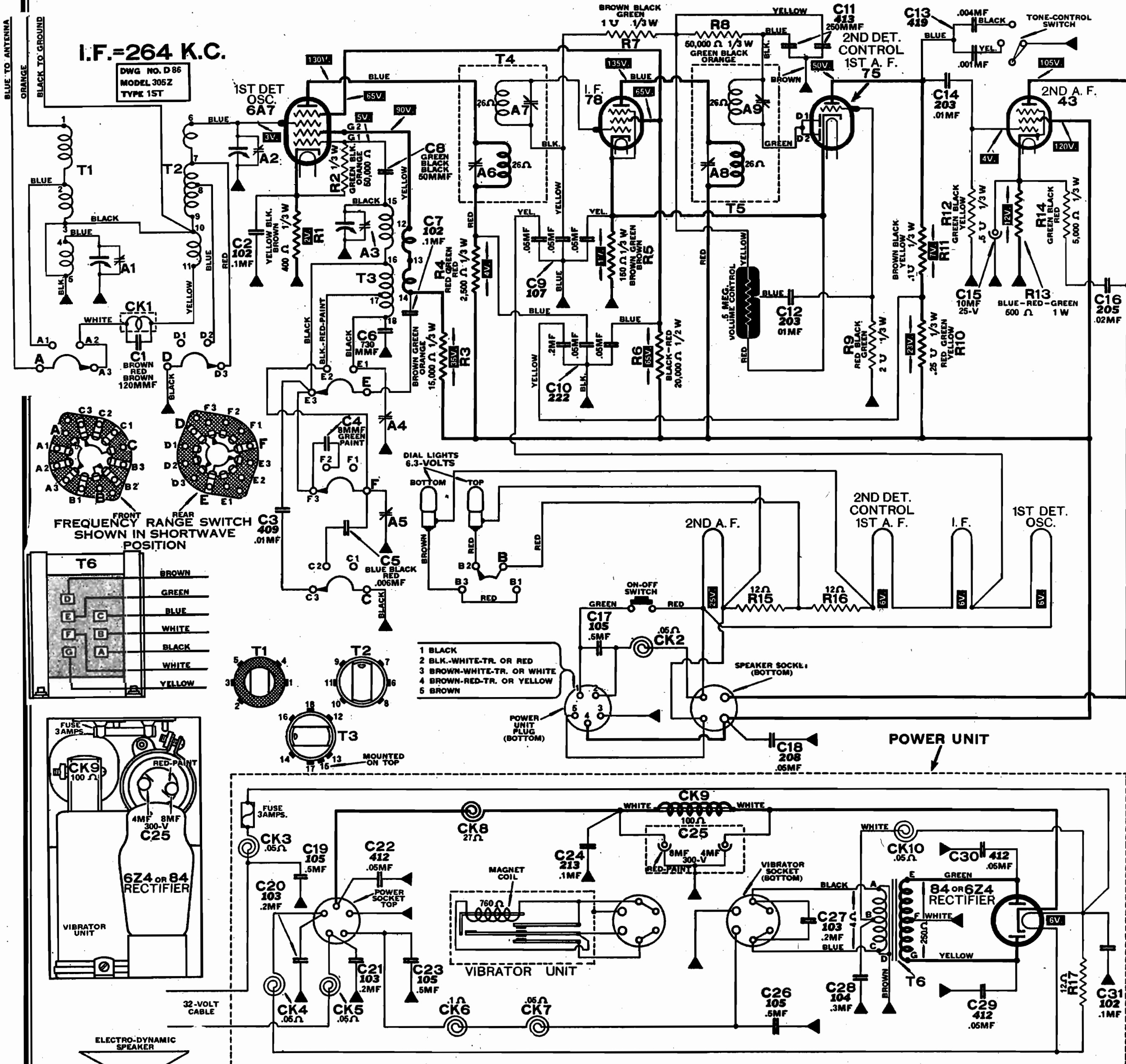
Police range. No trimmers on this range.

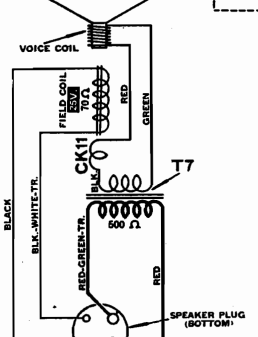
Broadcast range. With oscillator and dial at 1500 KC, peak A5, A2 and A1. With oscillator and dial at 560 KC, peak A4.

ATWATER-KENT MFG. CO.

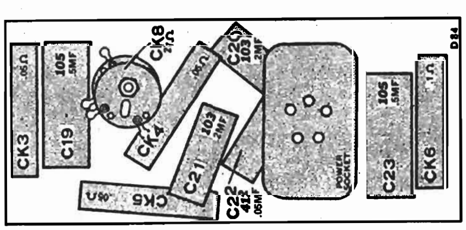
MODELS 305Z AND 565Z

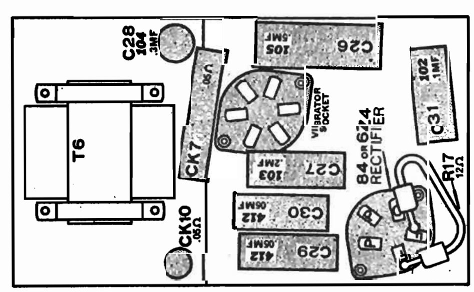
For Parts List See Index





Charts Showing Location of Parts in Power Unit.

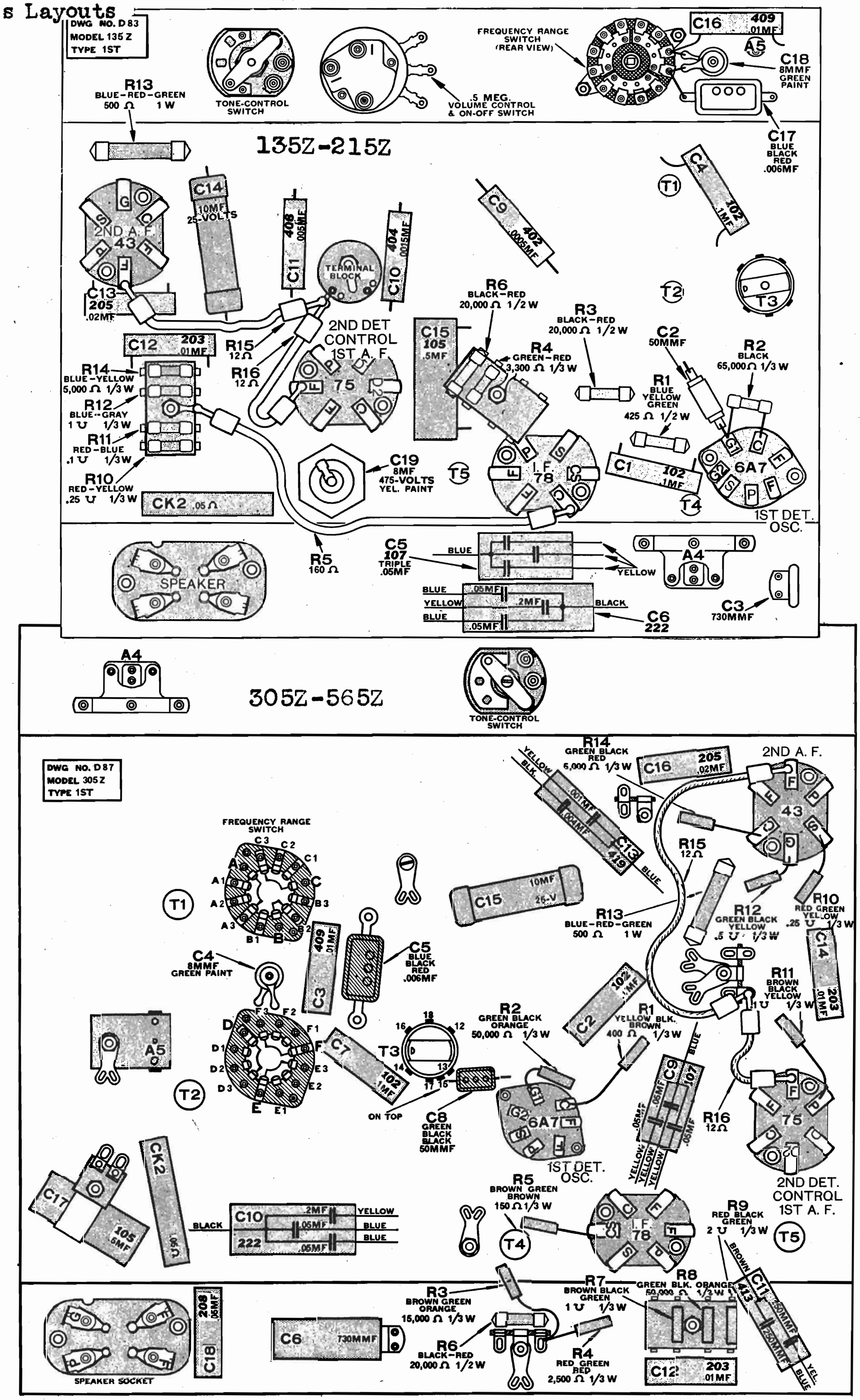




August 15, 1935.

MODELS 135Z,215Z
MODELS 305Z,565Z
Chassis Layouts

ATWATER-KENT MFG. CO.



ATWATER-KENT MFG. CO.

PARTS LIST
MODELS 305Z AND 565Z

For part numbers of tubular resistors and condensers, refer to lists in previous supplements.

30039 Cabinet with screen
29984 Screen
29759 Escutcheon and crystal
28961 Vol. control, .5 Ʊ
42750 Tone control switch assembly
29101 Shaft and blade for above
45130 Range switch
27431 Variable cond. assem.
29583 Dial holder
29582 Dial plate (305Z)
29901 Dial plate (565Z)
45170 Pilot light socket assem.
29848 Lamp, 6.3-V. (bayonet)
28577 Cable and plug assem. (5-prong)
22683 Tube shield
29183 Shield for T4, T5
31151 Base cover (565Z)
24327 Shield for trap choke
28946 Knob without dot
28947 Knob with dot
28063 Spring
29576 Inst. Sheet (F1259)
46920 Shipping Container (305Z)
46940 Shipping container (565Z)

TRIMMERS

A4	39630	(Front of chassis)
A5	28843	(Top of chassis)
A6, 7	29119	Double I. F. (on T4)
A8, 9	29119	Double I. F. (on T5)

RESISTORS

R15, 16, 17	41840	12 Ω, flexible

TRANSFORMERS

T1	43060	No. 1 R. F. T.
T2	44970	No. 2 R. F. T.
T3	43080	Osc. trans.
T4	45420	No. 1 I. F. T.
T5	45150	No. 2 I. F. T.
T6	41820	Power T.
T7	21672	Output T.

CONDENSERS

C1	41650	120 MMF, 500-V., on wave trap
C4	25661	8 MMF, 500-V.
C5	25035	6000 MMF, 450-V.
C6	45080	730 MMF, 100-V.
C8	29603	50 MMF, 450-V.
C15	25379	10 MF, 25-V. (electrolytic)
C25	26995	8 MF, 4 MF, 300-V.

CHOKES

CK1	41020	Wave trap assembly
CK6	41780	Double layer choke
CK8	36620	R. F. +B filter choke.
CK9	27011	A. F. +B filter choke. (iron core)

Chokes not listed above are No. 36630.

SOCKETS

21336 4-prong speaker socket
24494 6-prong tube socket on chassis
26111 7-prong tube socket
21337 5-prong cable socket on power unit
26985 5-prong tube socket on power unit
26986 6-prong vibrator socket

POWER UNIT

(Models 135Z, 215Z, 305Z, 565Z)

41910 Power unit complete with vibrator and 84 tube
28845 Power unit less 84 tube
28452 Power unit container
26094 Power unit lid
28915 Side cover
28449 Vibrator
27038 Vibrator cover tube
23774 Fuse, 3 amps.
18449 Fuse socket

Condensers, chokes, etc., in the power unit are listed separately for the different models.

135Z, 305Z SPEAKER No. 42700

19465 Diaphragm
35310 Field coil, 70 Ω
21672 Output transformer
23657 Small choke
19487 Cable and plug assembly

215Z, 565Z SPEAKER No. 42800

20737 Diaphragm
35310 Field coil, 70 Ω
21672 Output transformer
25525 Small choke
19789 Cable and plug assembly

Illustration of Dual-Speed Tuning Mechanism in Models 305Z, 565Z, etc.

PARTS FOR TUNING MECHANISM

28944 Condenser mounting bracket (rear)
28934 Tuning gear bracket
28995 Gear stop stud
28956 Tuning gear
27947 Dial pointer holder
27696 Screw for the above
29759 Escutcheon and crystal assem.
27522 Dial pointer
27535 Dial pointer screw
28116 Gear frame
27332 Large gear (rubber tired)
27333 Small gear (rubber tired)
28959 Tuning shaft
27957 Broadcast pinion gear
27297 Pin
27293 Detention spring

August 15, 1935.

PARTS LIST
MODELS 135Z AND 215Z

For part numbers of tubular resistors and condensers, refer to lists in previous supplements.

28831 Cabinet with screen
27908 Screen
28531 Escutcheon and crystal
27425 Volume control, .5 Ʊ
39620 Tone control switch assembly
28192 Tone control shaft and blade
41670 Range switch
27431 Variable condenser
27692 Tuning gear
28281 Front and back plate assembly
28594 Tuning shaft assembly
22657 Dial rubber and bushing
28354 Dial plate holder
27947 Dial pointer holder
27523 Dial plate (135Z)
28537 Dial plate (215Z)
27522 Dial pointer
42130 Dial light socket assembly, less lamp
28878 Lamp socket
28218 Fibre washer for lamp socket
28219 Spring for lamp socket
28299 Lamp, 6-8 volts, frosted
28577 Cable and plug assembly (5-prong)
22683 Tube shield
25056 Shield for T4, T5
24327 Shield for trap choke
27985 Base plate (215Z)
27496 Knob, volume control
24278 Knob, tuning (front)
27498 Knob, tuning (back)
27495 Knob, tone control
26569 Knob, frequency range
27952 Instruction sheet, F-1159
28741 Shipping container (135Z)
28739 Shipping container (215Z)

TRANSFORMERS

T1	39820	No. 1 R. F. T.
T2	39830	No. 2 R. F. T.
T3	39840	Oscillator trans.
T4	28625	No. 1 I. F. T.
T5	27791	No. 2 I. F. T.
T6	21672	Output trans.
T7	41820	Power trans.

RESISTORS

R5	28950	160 Ω, flexible
R15, 16, 17	41840	12 Ω, flexible

CONDENSERS

C1A	41650	125 MMF, 500-V.
C2	35840	50 MMF, 500-V.
C3	39660	730 MMF, 100-V.
C7, 8	33670	250 MMF, 500-V.
C14	25379	10 MF, 25-V. (dry electrolytic)
C17	25035	.006 MF, 450-V.
C18	25661	8 MMF, 500-V.
C19	22538	8 MF, 475-V. (electrolytic)
C19	27585	8 MF, 350-V. in some sets
C26	26995	8 MF, 4 MF, 300-V. (electrolytic)

TRIMMERS

A4	39630	Rear of chassis
A5	38890	Front of chassis
A6, 7	32880	On T4
A8	40610	On T5

CHOKES

CK1	27792	In No. 2, I. F. T., assembly
CK3	27011	Filter choke (iron core)
CK4	36620	+B R. F. filter
CK8	41780	Double-layer choke on power unit
CK9	41020	Trap choke and condenser assembly

Chokes not listed above are No. 36630.

SOCKETS

21336 4-prong speaker socket
26985 5-prong tube socket on power unit
21337 5-prong cable socket on power unit
26986 6-prong socket on power unit
24494 6-prong tube socket on chassis
26111 7-prong tube socket

POWER UNIT

(Models 135Z, 215Z, 305Z, 565Z)

41910 Power unit complete with vibrator and 84 tube
28845 Power unit less 84 tube
28452 Power unit container
26094 Power unit lid
28915 Side cover
28449 Vibrator
27038 Vibrator cover tube
23774 Fuse, 3 amps.
18449 Fuse socket

Condensers, chokes, etc., in the power unit are listed separately for the different models.

135Z, 305Z SPEAKER No. 42700

19465 Diaphragm
35310 Field coil, 70 Ω
21672 Output transformer
23657 Small choke
19487 Cable and plug assembly

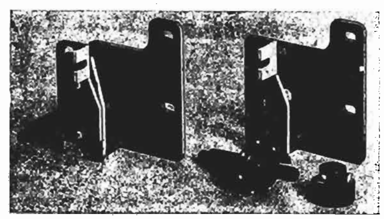
215Z, 565Z SPEAKER No. 42800

20737 Diaphragm
35310 Field coil, 70 Ω
21672 Output transformer
25525 Small choke
19789 Cable and plug assembly

Illustration of Early and Late Type Vernier Drive Arrangements used in Models 135Z, 215Z, etc.

The early type is superseded by the late type and parts for the early type are NOT furnished. When any part of the early type drive requires replacement, it is necessary to install the complete new type assembly, which consists of two parts: No. 28281, front-and-back-plate assembly; and No. 28594, tuning shaft assembly.

The dial rubber and bushing, No. 22657, is the same in both types.

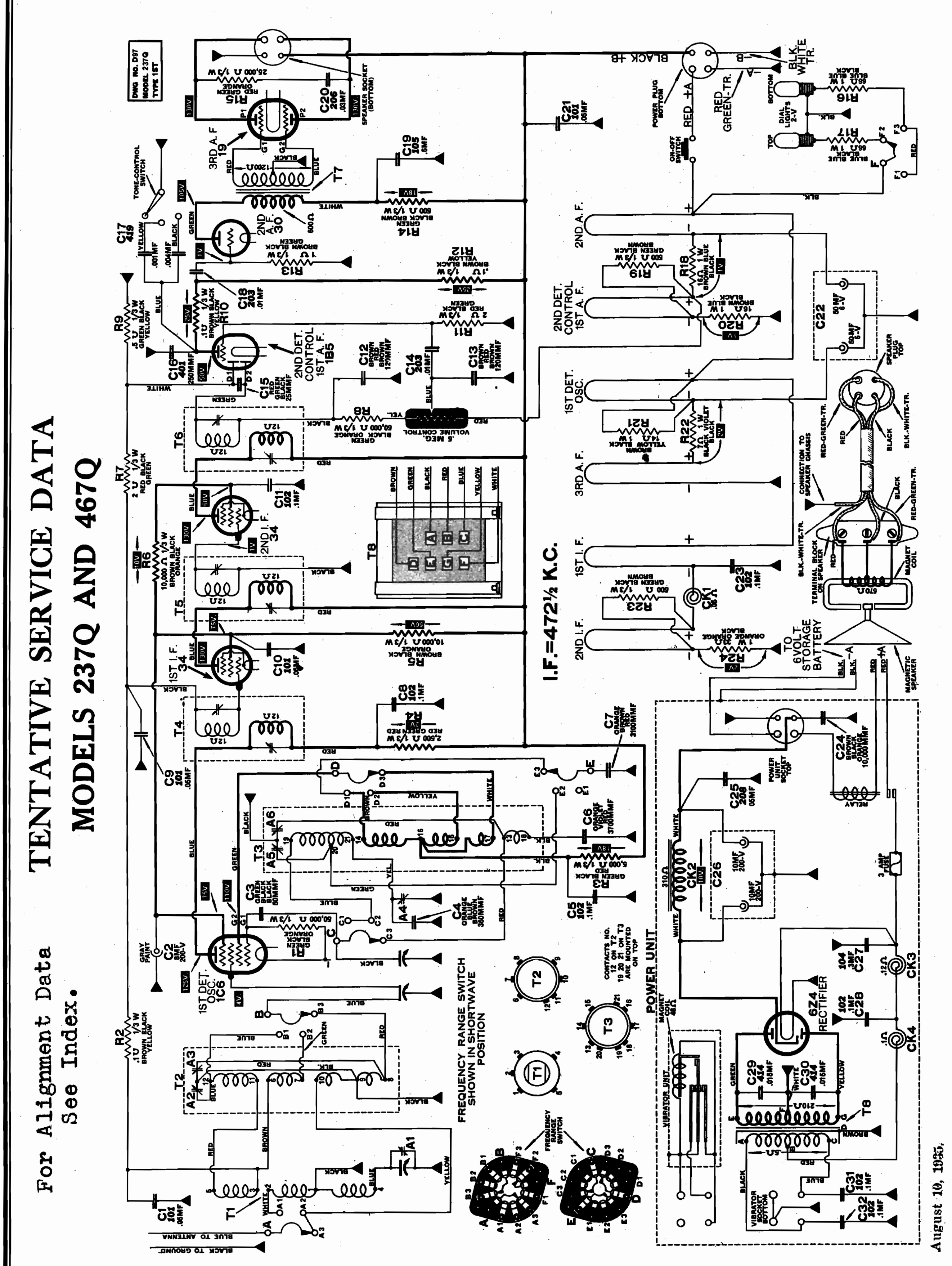


EARLY TYPE LATE TYPE

August 15, 1935.

MODELS 237Q, 467Q
Schematic, Voltage

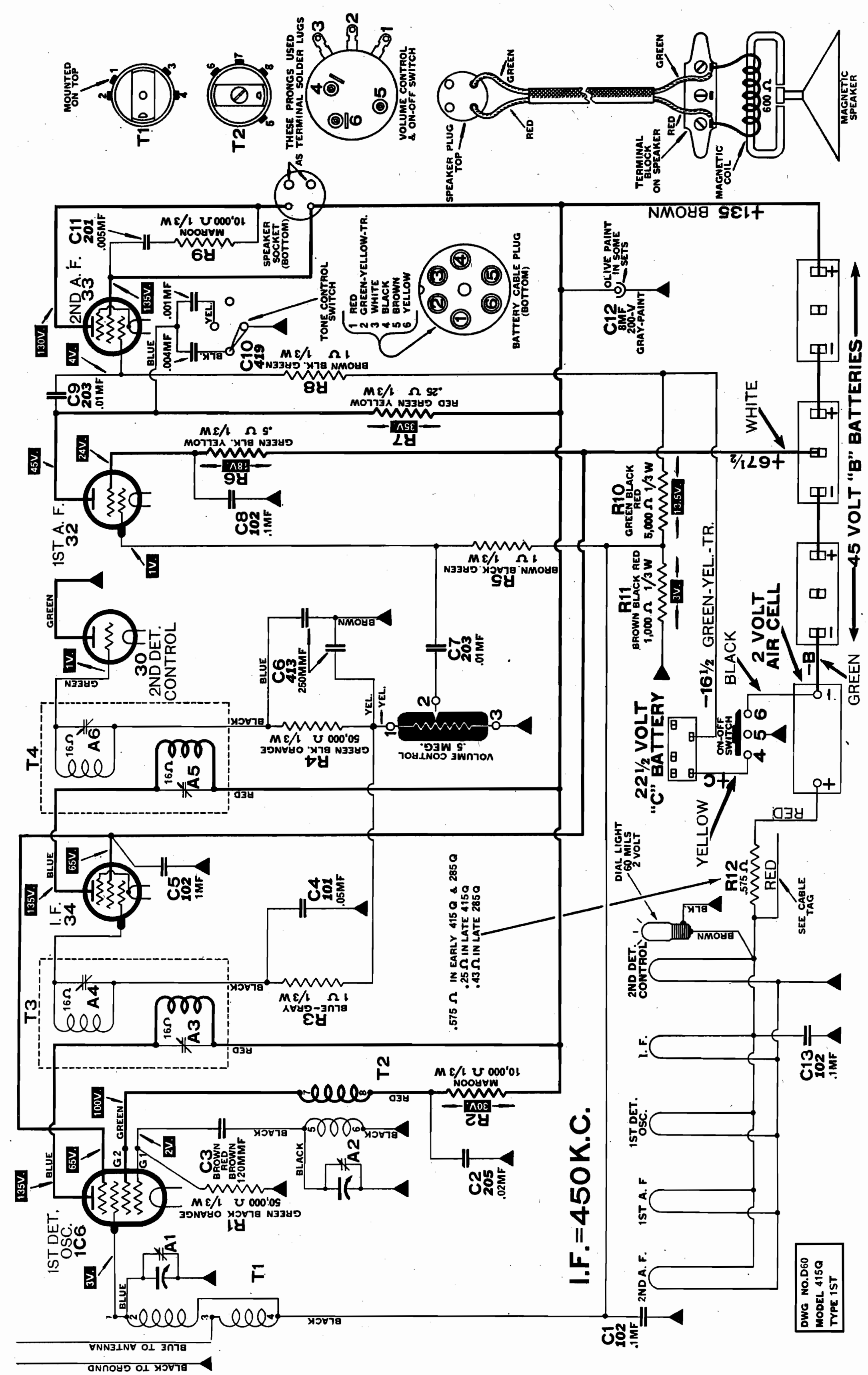
ATWATER-KENT MFG. CO.



MODELS 285Q, 415Q
Schematic, Voltage

ATWATER-KENT MFG. CO.

MODELS 285Q AND 415Q

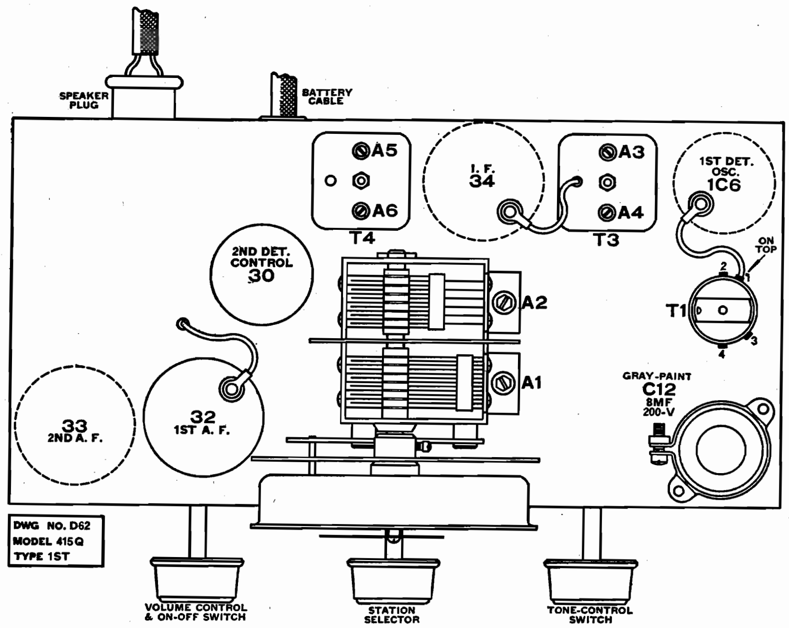


CHANGES. In late sets trimmer A1 is omitted; resistor R10 is 7500 ohms and resistor R11 is 1500 ohms.

June, 1935

MODELS 285Q, 415Q
Trimmers, Chassis
Alignment

ATWATER-KENT MFG. CO.

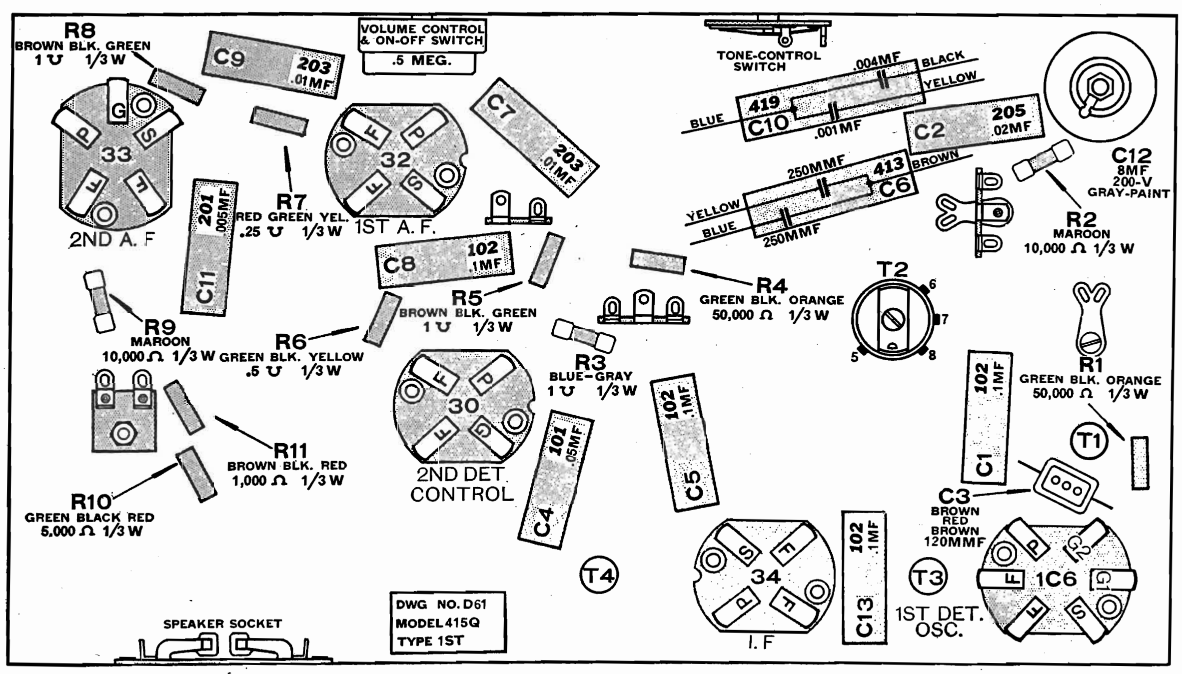


ADJUSTING TRIMMERS

I. F. Connect I. F. test oscillator (450 KC) to I. F. tube by means of regular I. F. coupling unit. Adjust A6 and A5 for maximum output. Connect coupling unit to 1st-detector and peak A4 and A3.

DIAL. With rotor of variable condenser fully meshed, dial indicator should be at 545 KC.

R. F. Connect R. F. test oscillator (1700 KC) to antenna and ground. With dial at 1700 KC, Peak A1 and A2. (On late sets A1 is not used.)



In late sets, R10 is 7500 ohms, and R11 is 1500 ohms.

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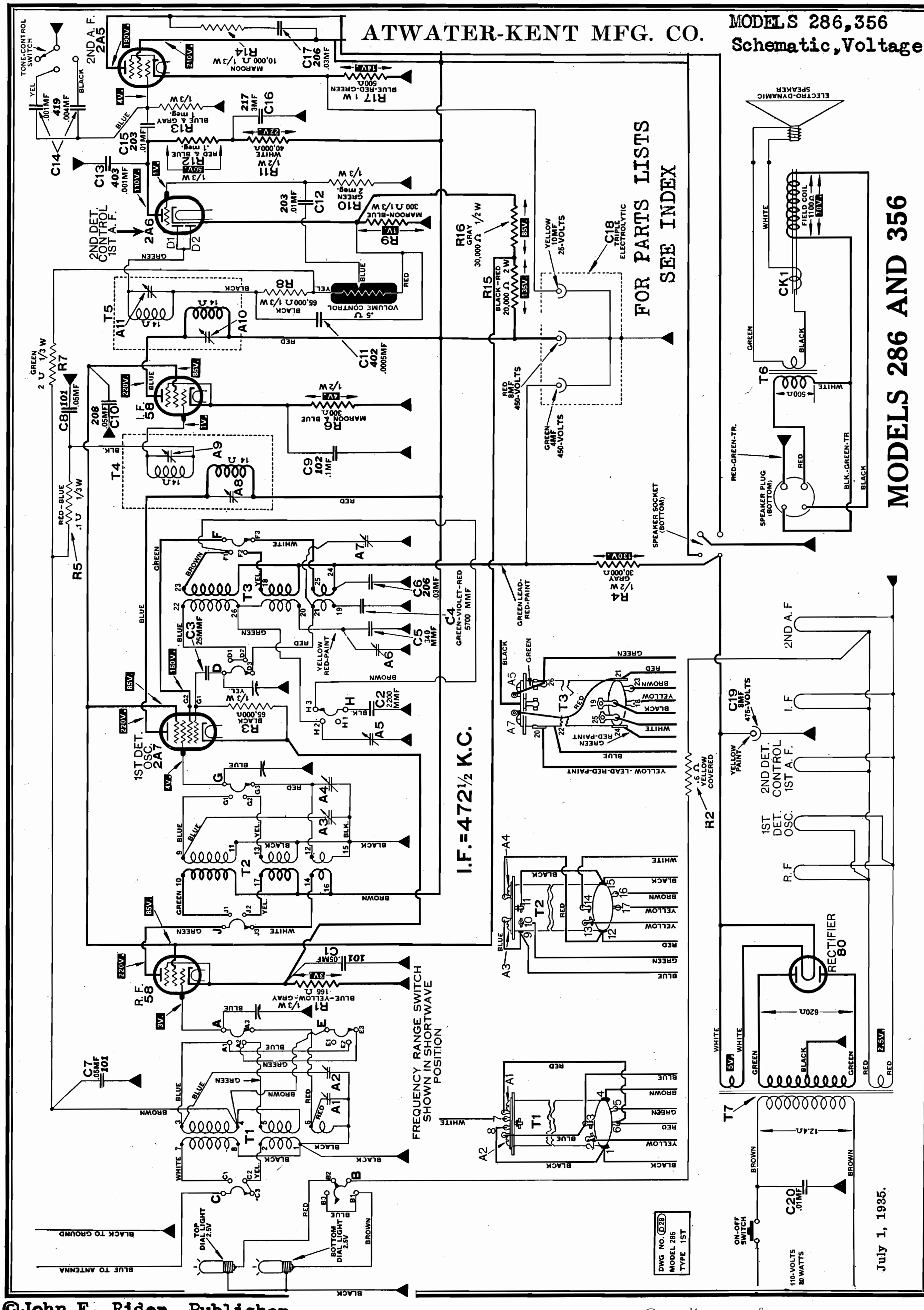
MODELS 286,356
Schematic,Voltage



MODELS 286,356
Trimmers,Chassis
Alignment

ATWATER-KENT MFG. CO.

MODELS 286 AND 356

I. F. TRIMMERS.

Connect test oscillator (472½ KC) to I. F. tube by means of regular I. F. coupling unit. Peak A10, A11. Connect oscillator to 1st-detector tube and peak A8, A9.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 535 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to antenna and ground of set.

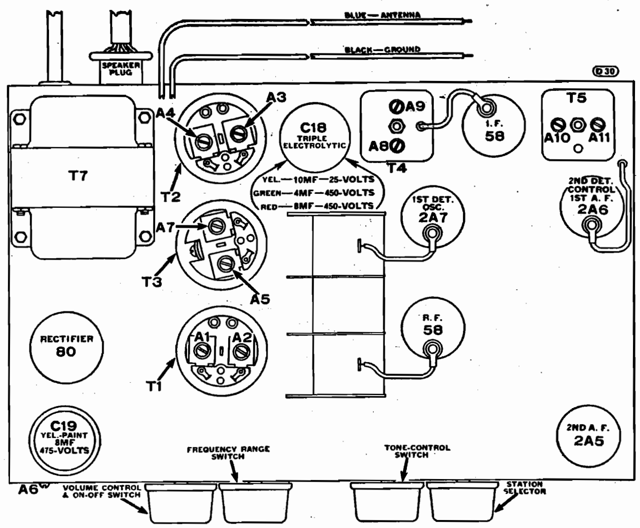
Short-wave range. With oscillator and dial at 15 MC, peak A7, A4, A1.

Police range. No trimmers on this range.

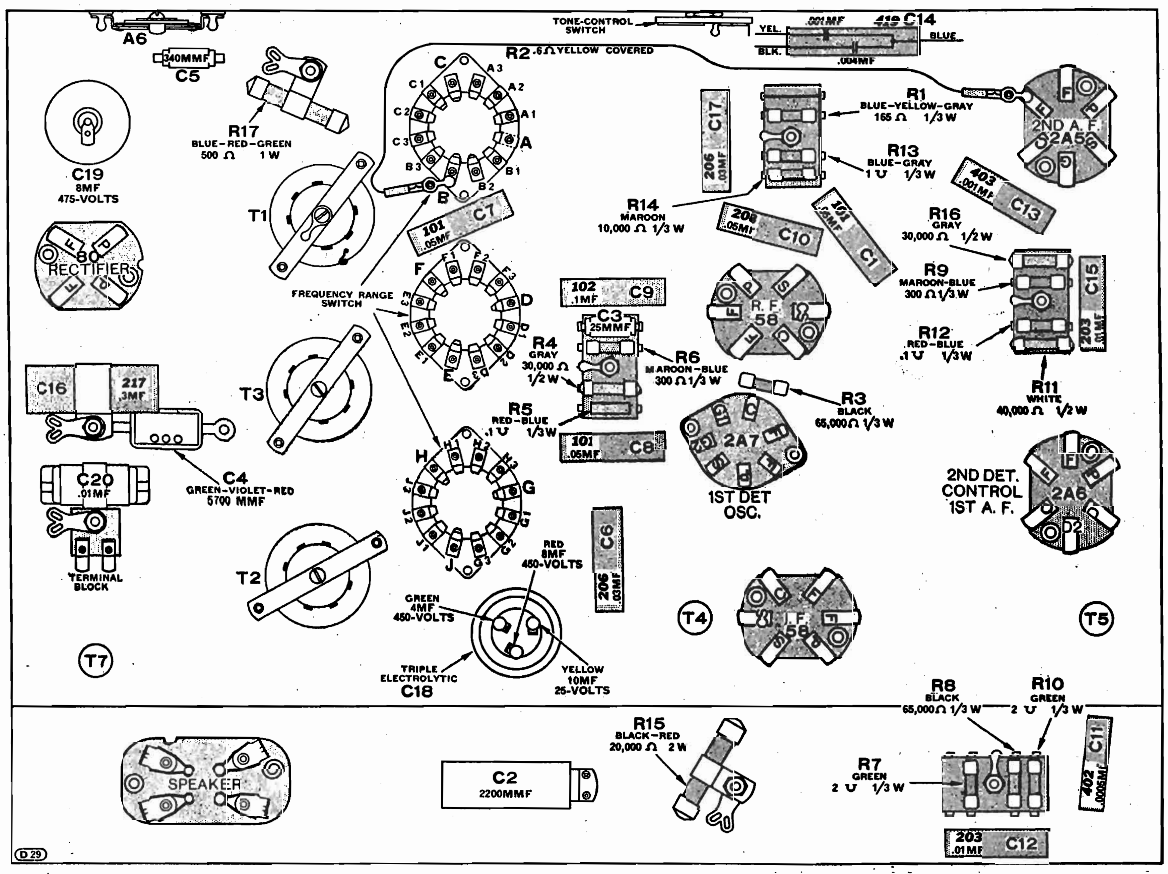
Broadcast range. With oscillator and dial at 1500 KC, peak A5, A3, A2. With oscillator and dial at 560 KC, peak A6.

TRIMMERS

A1—R. F., 15 MC.
A2—R. F., 1500 KC.
A3—1st-detector, 1500 KC.
A4—1st-detector, 15 MC.
A5—Oscillator, 1500 KC.
A6—Oscillator, 560 KC.
A7—Oscillator, 15 MC.
A8—1st-detector plate, 472½ KC.
A9—I. F. grid, 472½ KC.
A10—I. F. plate, 472½ KC.
A11—2nd-detector, 472½ KC.



Trimmer location, Models 286, 356



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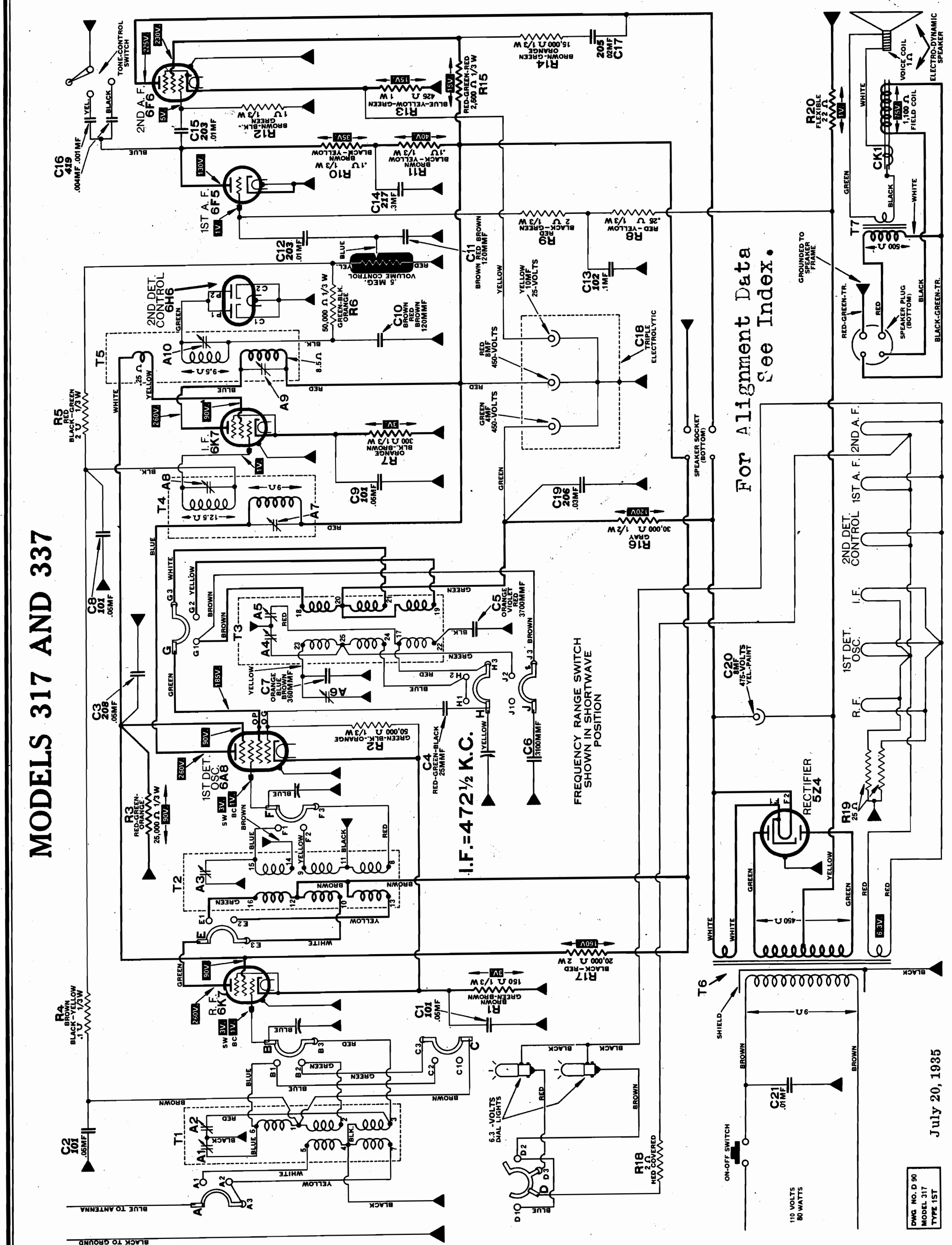
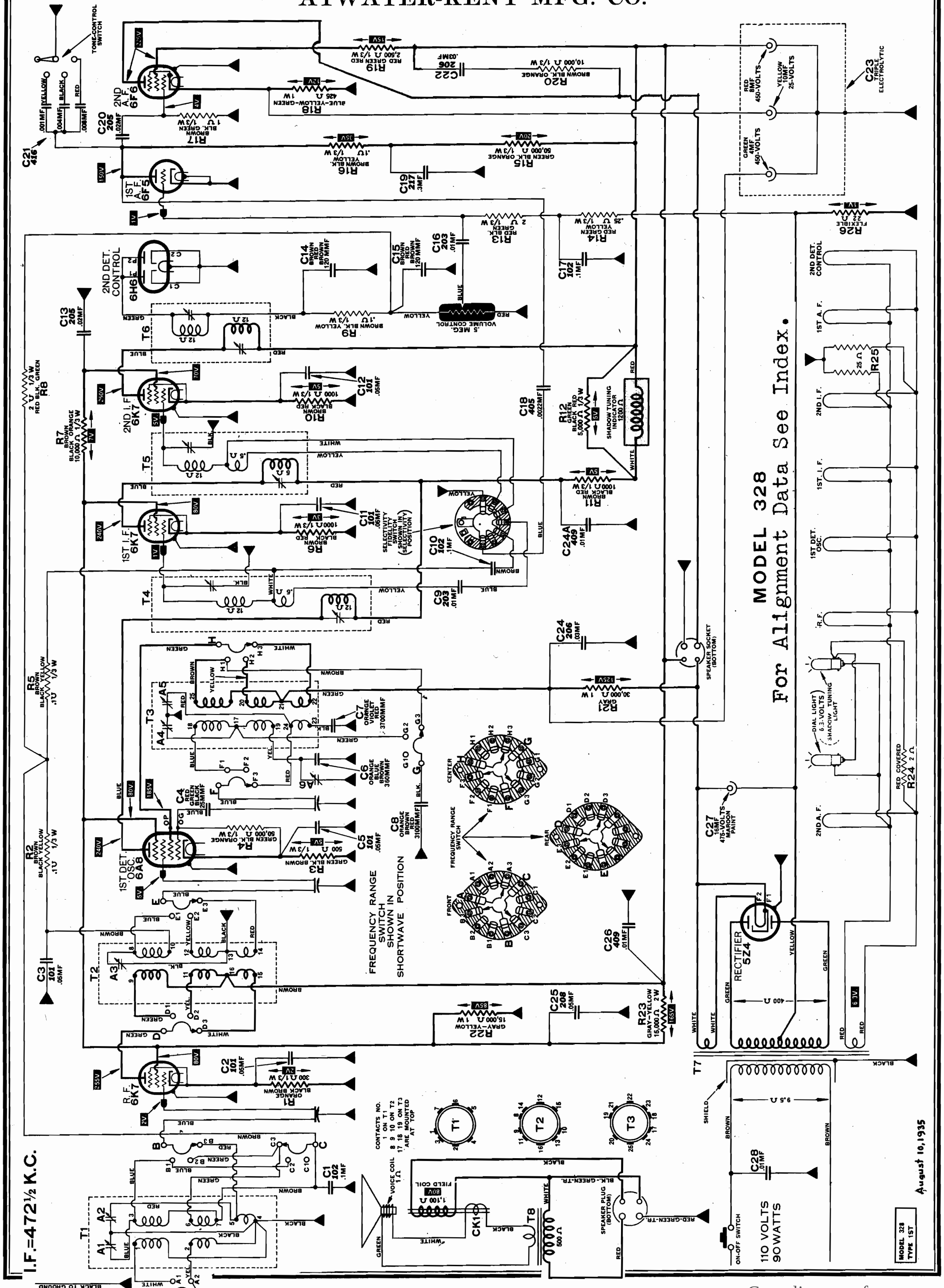
MODELS 317,337 (Early)
Schematic,Voltage



MODEL 328 (Early)

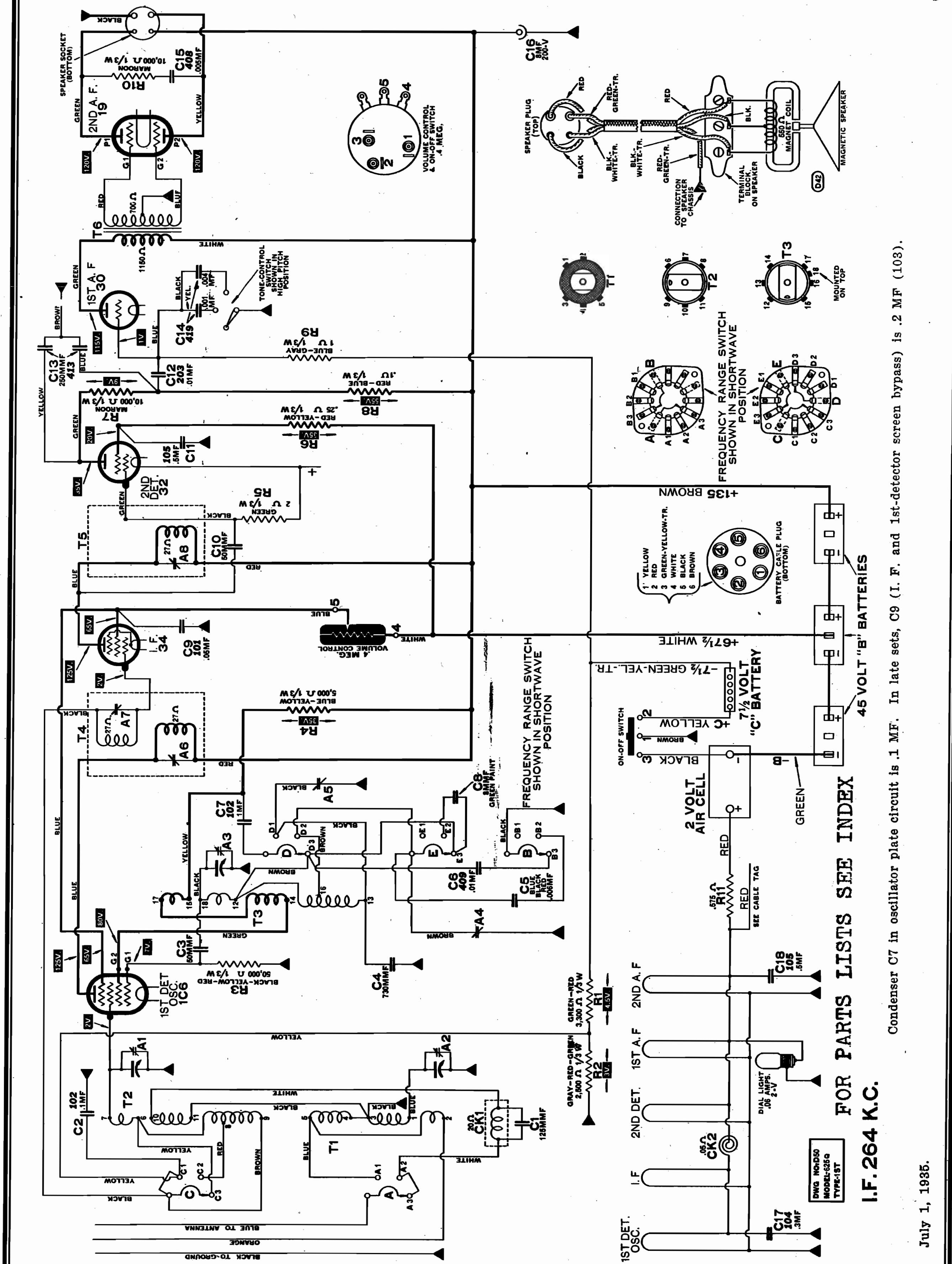
ATWATER-KENT MFG. CO.

Schematic, Voltage



ATWATER-KENT MFG. CO.

MODELS 385Q, 625Q
Schematic, Voltage



ATWATER-KENT MFG. CO.

MODELS 385Q AND 625Q

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of regular I. F. coupling unit. Peak A8. Connect I. F. oscillator to 1st-detector tube and peak A6, A7.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 535 KC.

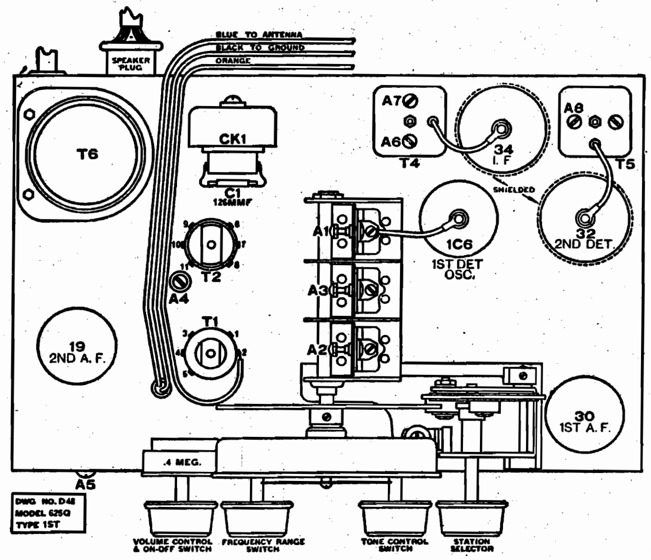
R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground of set.

Short-wave range. With oscillator and dial at 15 MC, peak A3.

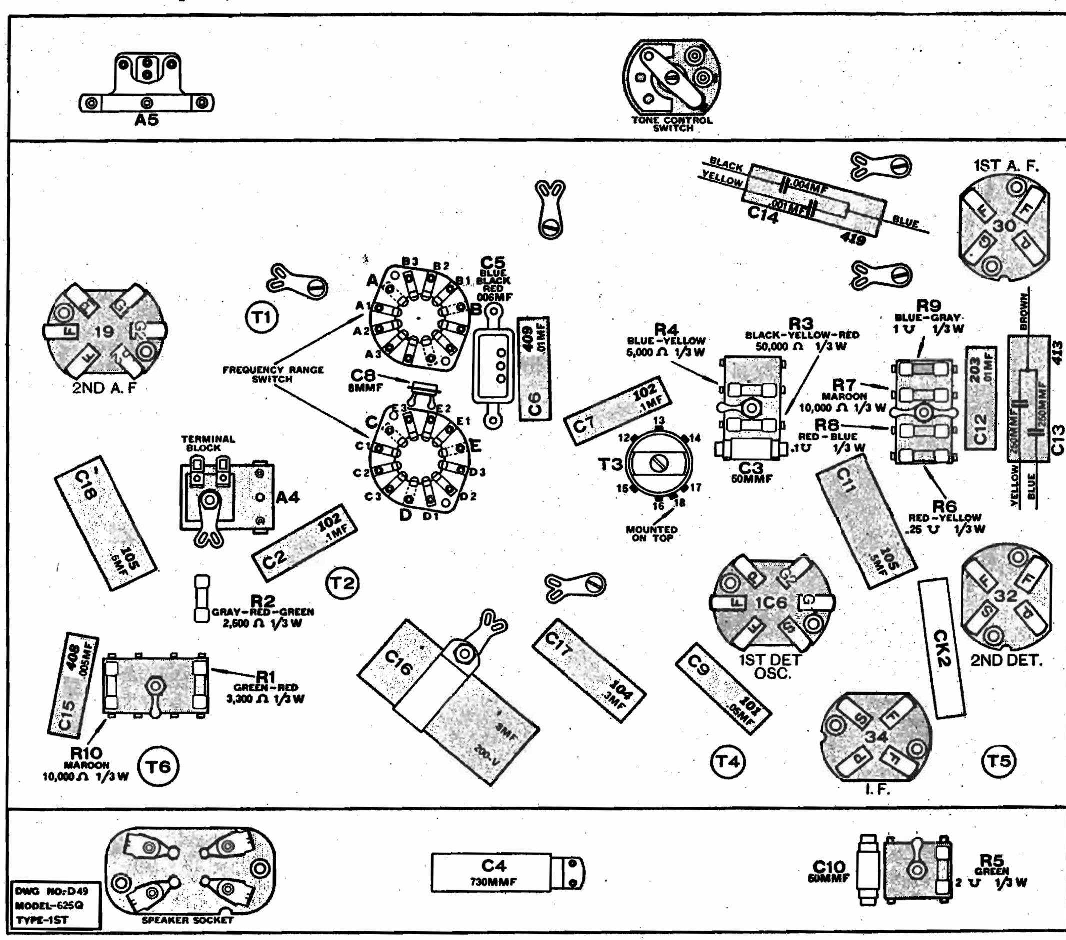
Police range. No trimmers on this range.

Broadcast range. With oscillator and dial at 1500 KC, peak A4, A1, A2. With oscillator and dial at 560 KC, peak A5.



TRIMMERS

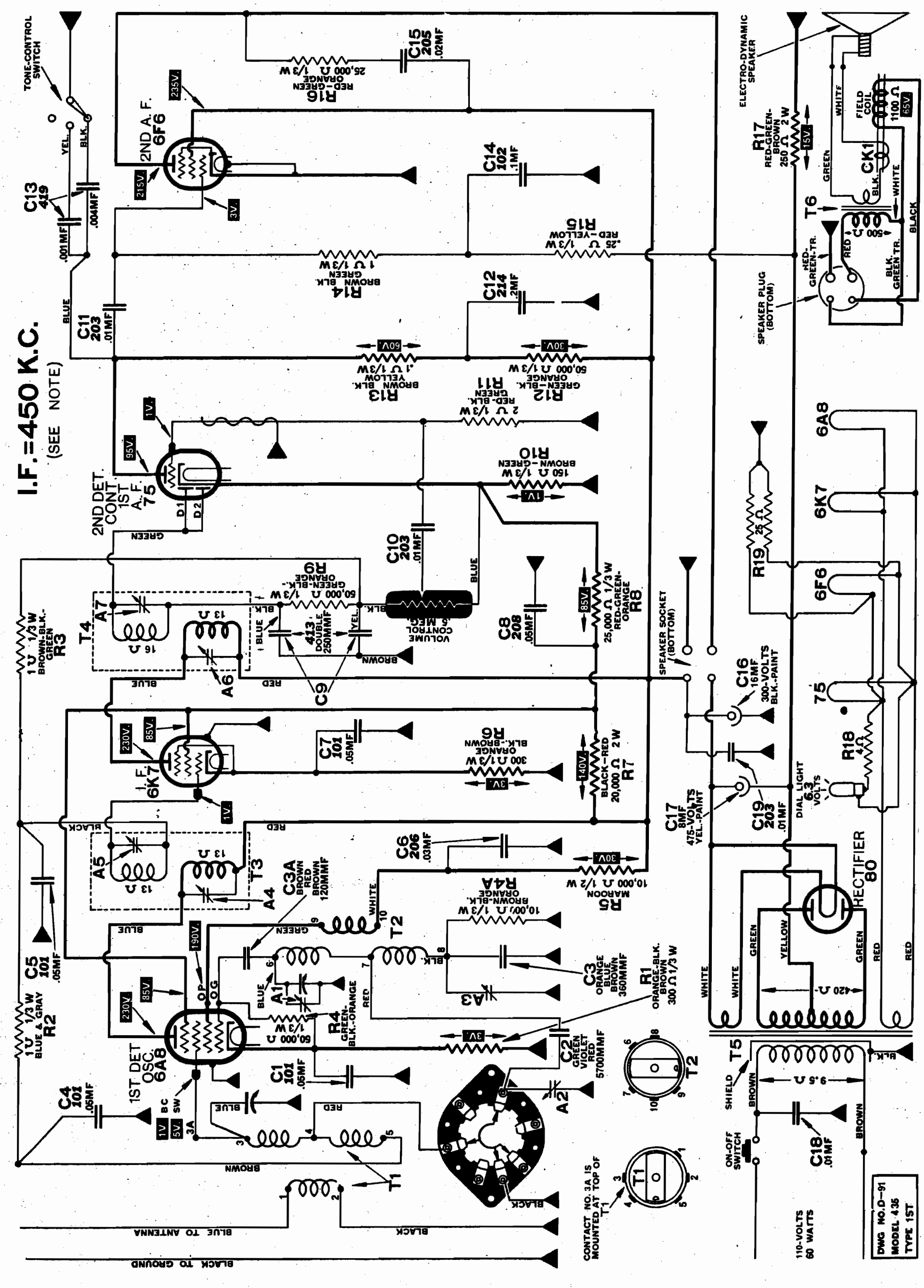
A1—1st-detector, 1500 KC.
A2—Pre-selector, 1500 KC.
A3—Oscillator, 15 MC.
A4—Oscillator, 1500 KC.
A5—Oscillator, 560 KC.
A6—1st-detector plate, 264 KC.
A7—I. F. grid, 264 KC.
A8—I. F. plate, 264 KC.



ATWATER-KENT MFG. CO.

MODEL 435 (Early)
Schematic, Voltage

MODEL 435 DIAGRAM



The frequency-range switch is shown in the short-wave position.

The I. F. in some Model 435 sets is 472½ KC and a label to this effect is attached to the rear of the chassis. The I. F. transformers and trimmers, etc., are exactly the same for either 450 or 472½ KC.

July 20, 1935.

ATWATER-KENT MFG. CO.

MODELS 286, 356

29404	Cabinet with screen (356)
29127	Screen (356)
28531	Escutcheon and crystal
28954	Range switch
28961	Vol. control
42750	Tone control switch assem.
29101	Shaft and blade for the above
28946	Knob without dot (tuning and range)
28947	Knob with dot (volume and tone)
27432	Var. condenser
28968	Dial holder
28542	I. F. T. shield
27933	T1, T2 shield
27932	T3 shield
40090	Dial light socket assem.
27676	Dial lamp, 2.5-V (frosted)
22683	Tube shield
25058	R. F. T. shield cover
15213	Tube shield (R. F.)
29038	Shipping container (286)
29135	Shipping container (356)
29017	Instruction sheet, F-1217

TRANSFORMERS

T1	42560	No. 1 R. F. T.
T2	42570	No. 2 R. F. T.
T3	42580	Osc. trans.
T4	28527	No. 1 I. F. T. (includes trimmers)
T5	28528	No. 2 I. F. T. (includes trimmers)
T6	21672	Output trans.
T7	28084	Power trans.

RESISTORS

R2	16081	.6 Ω dial light resis.

CONDENSERS

C2	40380	2200 MMF, 100-V.
C3	33930	25 MMF, 500-V.
C4	27599	5700 MMF, 450-V.
C5	41580	340 MMF, 500-V.
C18	27592	Triple elec., 4 MF, 8 MF, 450-V., 10 MF, 25-V.
C19	28031	8 MF, 475-V.
C20	23250	.01 MF, 450-V., line cond.

TRIMMERS

A1, 2	39430	On T1
A3, 4	39430	On T2
A5, 7	39430	On T3
A6	39630	Front of chassis (560 KC)

SOCKETS

24492	4 prong
24494	6 prong
26111	7 prong
21336	Speaker

475 and 286 SPEAKER No. 41800

25525	Small choke
21260	Field coil (1100 Ω)
21672	Output transformer
20737	Diaphragm
27611	Cable and plug
15079	Plug

735 and 356 SPEAKER No. 41900

25525	Small choke
21260	Field coil (1100 Ω)
21672	Output transformer
19465	Diaphragm
28345	Cable and plug
15079	Plug

MODELS 475, 735

29403	Cabinet with screen (735)
29143	Screen (735)
28531	Escutcheon and crystal assem.
27431	Variable condenser
42750	Tone control switch assem.
29101	Shaft and blade for the above
28961	Volume control, .5 Ʊ
28986	Range switch
28946	Knob without dot
28947	Knob with dot
28968	Dial holder
29121	Dial plate (735)
28989	Dial plate (475)
29183	I. F. T. shield
41020	Wave trap assem. (264 KC)
40090	Dial light socket assem.
27676	Dial lamp, 2.5-V. (frosted)
22683	Tube shield
28993	Base cover (475)
29133	Instruction sheet, F-1217
29184	Shipping container (735)
29038	Shipping container (475)

TRANSFORMERS

T1	43060	No. 1 R. F. T.
T2	43070	No. 2 R. F. T.
T3	43080	Osc. trans.
T4	43290	No. 1 I. F. T.
T5	43310	No. 2 I. F. T.
T6	21672	Output trans. (on speaker)
T7	25191	Power trans.

RESISTORS

R1	16081	.6 Ω dial light

CONDENSERS

C1	41650	125 MMF, 500-V.
C2	25035	.006 MF, 450-V.
C3	25661	.8 MMF, 500-V.
C7	42830	800 MMF, 100-V.
C9	33930	25 MMF, 500-V.
C20	25379	10 MF, 25-V.
C21	28031	8 MF, 475-V.
C22	27585	8 MF, 350-V.

TRIMMERS

A4	28843	Osc. trimmer
A5	39630	On front of chassis
A6, 7	29119	On T4
A8, 9	29119	On T5

CHOKES

CK2	25525	On speaker

SOCKETS

24492	4 prong
24494	6 prong
26111	7 prong
21336	Speaker

PARTS FOR TUNING MECHANISM

(Used in all sets in this supplement)

28944	Condenser mounting bracket (rear)
28934	Tuning gear bracket
28995	Gear stop stud
28956	Tuning gear
27947	Dial pointer holder
27696	Screw for the above
28531	Escutcheon and crystal assem.
27522	Dial pointer
27535	Dial pointer screw
28116	Gear frame
27332	Large gear (rubber tired)
27333	Small gear (rubber tired)
28959	Tuning shaft
27957	Broadcast pinion gear
27297	Pin
27293	Detention spring

MODELS 385Q, 625Q

28986	Range switch
42750	Tone control switch assembly
29101	Shaft and blade for above
29251	Volume control, .4 Ʊ
40090	Dial light socket assembly
26721	Lamp, 2-V., .06 amp.
27431	Variable cond. assem.
29262	Dial holder
28531	Escutcheon and crystal assem.
29228	Dial plate (625Q)
29229	Dial plate (385Q)
29282	Tube shield (paper)
29183	I. F. T. shield
24327	Wave trap shield
29236	Instruction sheet, F-1238
29038	Shipping container (385Q)
29135	Shipping container (625Q)
30032	Cabinet with screen (625Q)
29127	Screen
28993	Base cover
41020	Wave trap assem. (264 KC)

CABLES

29331	Male cable and plug assembly (625Q)
29673	Female cable and socket assem. (385Q and 625Q)
30036	Male cable and plug assem. (385Q)
29055	Battery socket assembly
29054	Battery plug assembly
29227	Battery cable tag, F-1234

TRANSFORMERS

T1	43060	Antenna trans.
T2	44040	1st-det. trans.
T3	44050	Osc. trans.
T4	44070	No. 1 I. F. transformer
T5	44170	No. 2 I. F. transformer
T6	44240	Audio transformer

RESISTORS

R11	40330	.575 Ω (on cable)
	44230	1.03 Ω (in envelope)

CONDENSERS

C1	41650	125 MMF, 500-V.
C3	35840	50 MMF. 500-V.
C4	43970	730 MMF, 100-V.
C5	25035	.006 MF, 450-V., blue, blk., red
C8	25661	8 MMF. 500-V.
C10	35840	50 MMF. 500-V.
C16	22472	8 MF, 200-V., dry electro.

TRIMMERS

A4	28843	Osc. BC trimmer
A5	39630	Osc. track cond.
A6, 7	29119	On No. 1 I. F. T.
A8	29119	On T5, No. 2 I. F. T.

CHOKES

CK2	44160	Filament choke

SOCKETS

24492	4 prong
24494	6 prong
21336	Speaker

385Q SPEAKER No. 46800
625Q SPEAKER No. 46700

28974	Cone housing (625Q)
28979	Cone housing (385Q)
19469	Segment
29074	Cable and plug assembly
29075	Diaphragm assembly
29076*	Sound unit complete
29077	Drive rod
17868	Drive rod nut

* Parts for this unit are not sold separately.

Schematic, Voltage

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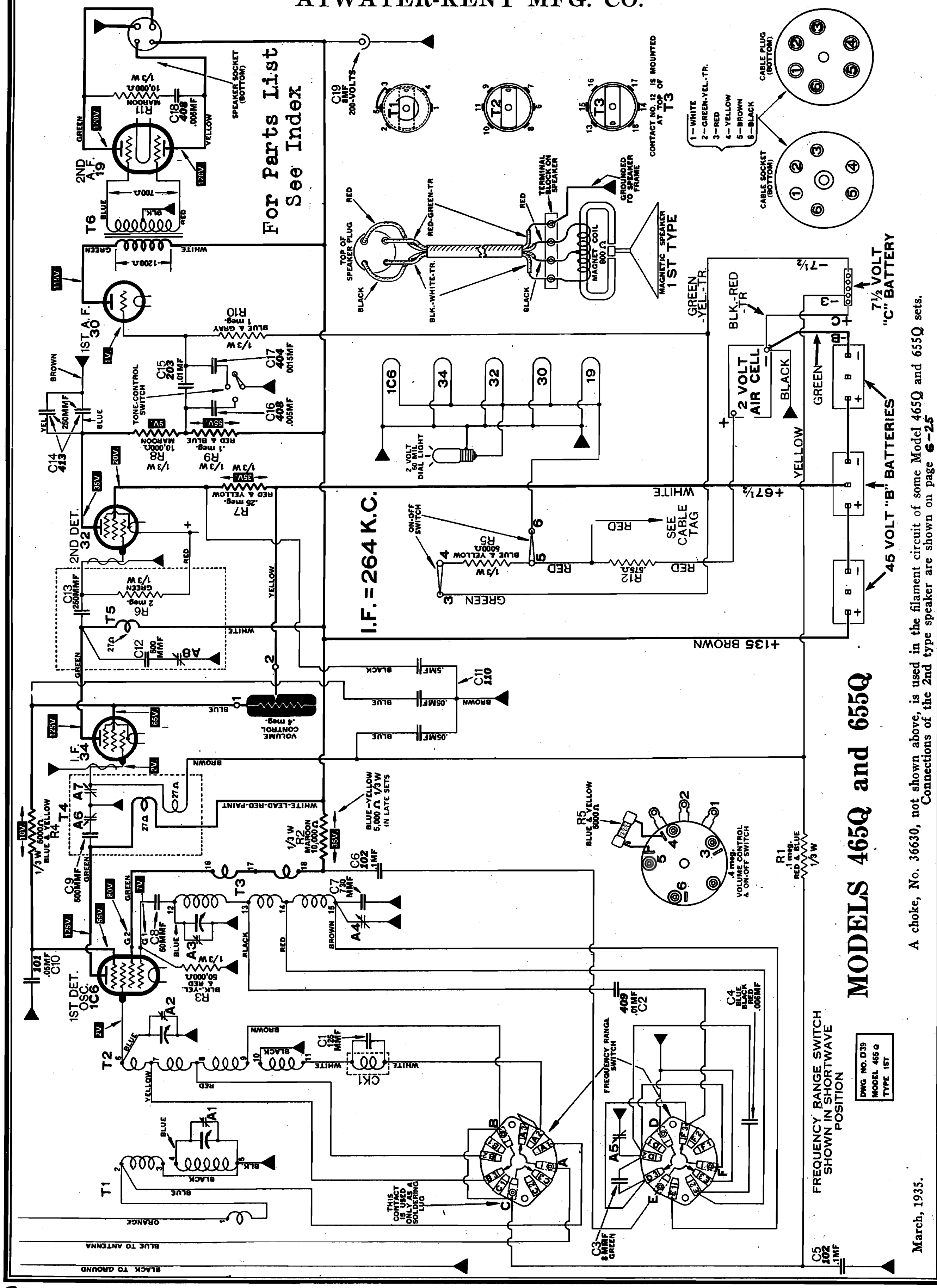
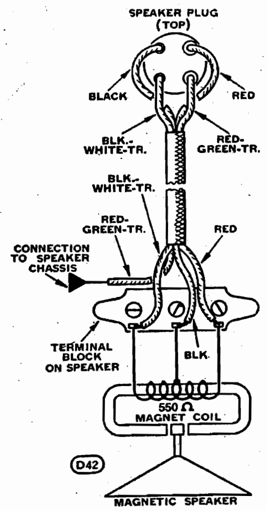
MODELS 465Q, 655Q

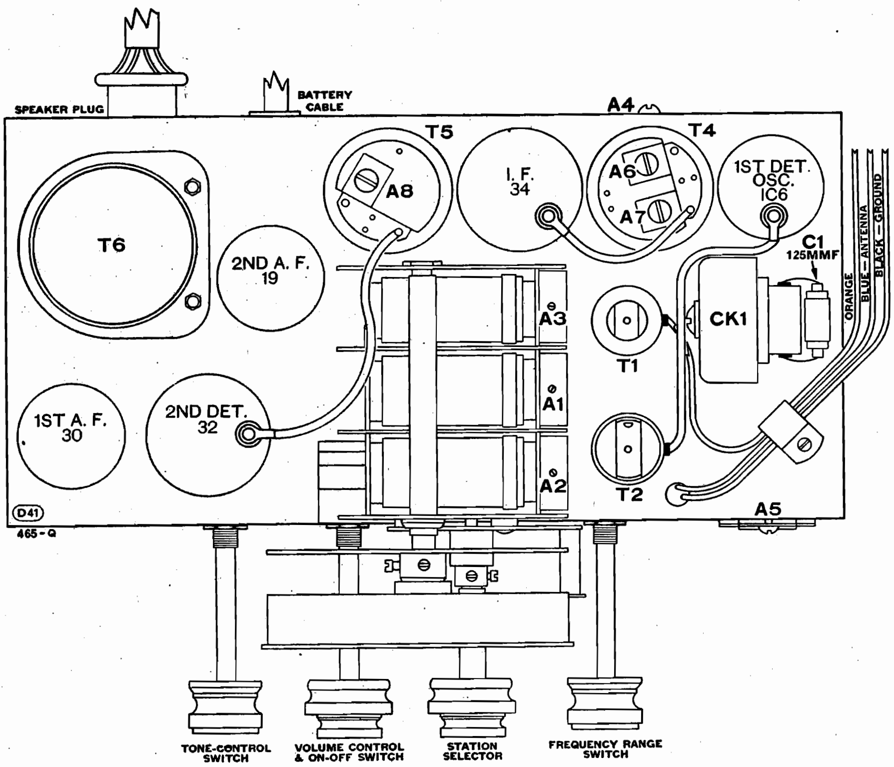


MODELS 465Q,655Q
Trimmers, Socket
Chassis

ATWATER-KENT MFG. CO.



2ND TYPE



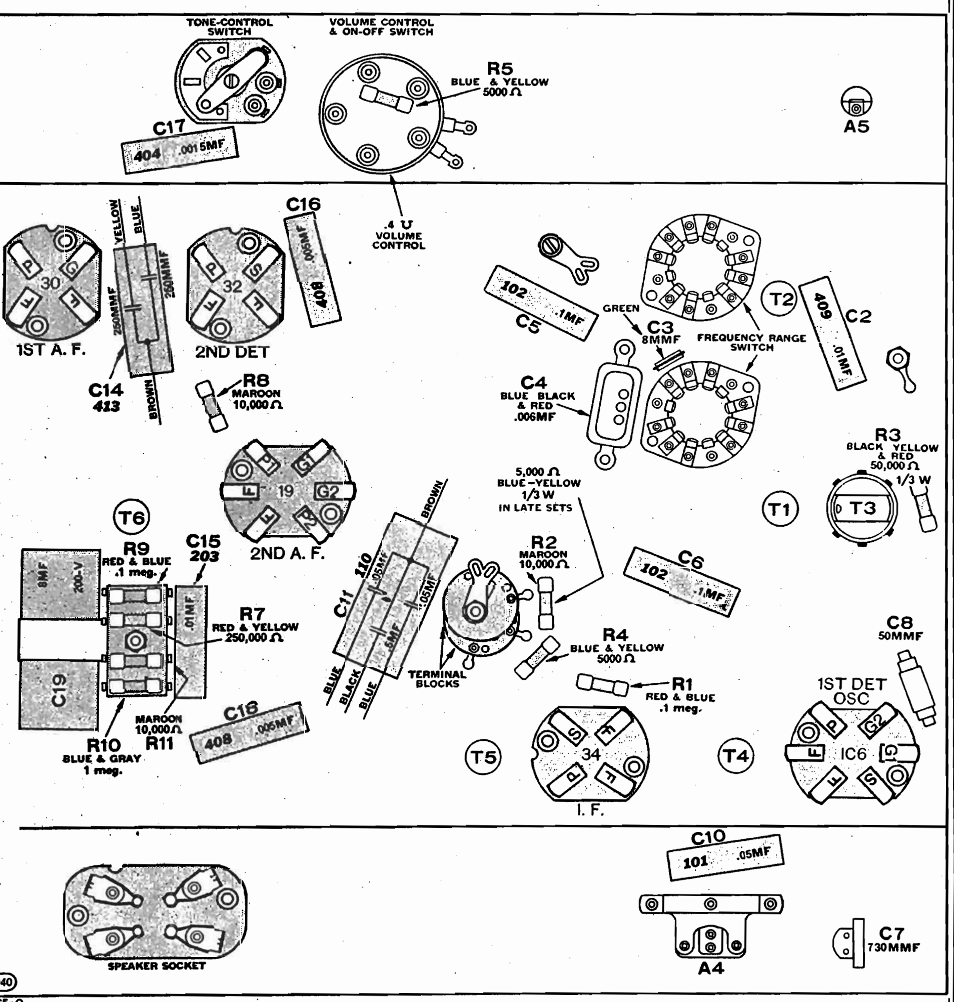
TRIMMERS ON MODELS 465Q and 655Q

I. F. TRIMMERS
I. F. (264 KC)......A6, A7, A8

5.3 to 16 MC RANGE
Oscillator (15MC)...........A3

1.6 to 4.8 MC RANGE
There are no trimmer adjustments for this range.

540 to 1600 KC RANGE
Antenna (1500 KC).........A1
1st-Det. (1500 KC)..........A2
Oscillator (1500 KC)........A5
Tracking (560 KC)..........A4



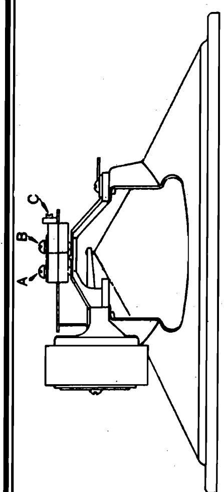
MODELS 465Q, 655Q
Speaker Data, Alignment
MODELS 768Q, 978Q
Speaker Data

ATWATER-KENT MFG. CO.

SERVICE DATA

MODELS 465Q, 655Q, 768Q and 978Q

SPEAKER ADJUSTMENT

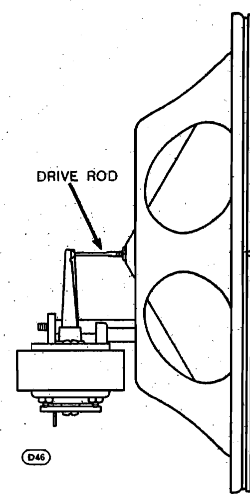


1st TYPE

1st Type: When adjustment is required, place set and speaker in operation and tune in a signal. Loosen screw A and tighten B, or vice versa, in order to center the armature in the magnet gap. If the armature is not correctly centered, it may strike against one pole of the magnet and cause chattering. If the speaker overloads or chatters only on a very strong signal, turn screw C anti-clockwise. This tightens the armature movement. In general it is not advisable to disturb the adjustment of screw C.

2nd Type: There are no centering adjustments on the 2nd type speaker used in late models 465Q and 655Q. If the unit becomes open or requires adjustment, it is necessary to replace the complete sound unit.

The diaphragm is clamped to the drive rod between two nuts. When installing a new diaphragm or unit, turn the rear nut back on the drive rod, fasten the diaphragm or unit to cone housing, and turn rear nut forward until it touches apex of diaphragm. Put the front nut on drive rod and tighten securely.



2nd TYPE

SYNCHRONIZING TRIMMER CONDENSERS

MODELS 465Q and 655Q

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the standard I. F. coupling unit described in January, 1935, supplement. Adjust the I. F. oscillator to 264KC. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control on full. Turn the set to a quiet point near 1000 KC.

Peak trimmers A6, A7, and A8. Remove the I. F. coupling unit and seal the I. F. trimmers.

DIAL POINTER ADJUSTMENT.

With the variable condenser all the way in, the dial pointer should be set at 535 KC.

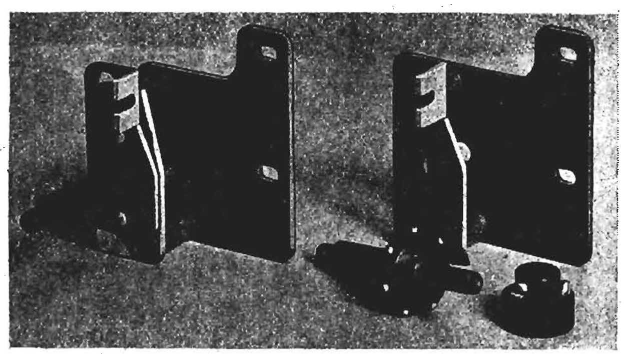
R. F. TRIMMERS.

Connect an R. F. test oscillator to the antenna and ground terminals of set. Use the weakest possible oscillator signal. Loosen the trimmer screws.

Short-wave range. Oscillator at 15 MC, and set turned to 15 MC mark, peak trimmer A3.

Police range. There are no trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC, and dial pointer at 1500 KC mark, peak trimmers A5, A2 and A1. Tune oscillator and set to 560 KC. Peak A4. Repeat adjustments on A5 at 1500 KC and A4 at 560 KC if necessary.



EARLY TYPE LATE TYPE

*Illustration of Early and Late Type Vernier Drive Arrangements used in Models 465Q, 655Q, etc.

The early type is superseded by the late type and parts for the early type are NOT furnished. When any part of the early type drive requires replacement, it is necessary to install the complete new type assembly, which consists of two parts: No. 28281, front-and-back-plate assembly; and No. 28594, tuning shaft assembly.

The dial rubber and bushing, No. 22657, is the same in both types.

ATWATER-KENT MFG. CO.

PARTS LIST FOR MODEL 465Q

28832 Cabinet with screen
28518 Baffle board with screen
28531 Esc. and crystal assem.
27431 Var. cond. assembly
27692 Tuning gear
28281 Front and back plate assem.
28594 Tuning shaft assem.
22657 Dial rubber
28356 Dial plate holder
27523 Dial plate
27947 Dial pointer holder
27522 Dial pointer
27535 Dial pointer screw
22683 Tube shield (1C6)
15213 Tube shield (32)
44180 Range switch
27495 Knob (tone control)
27496 Knob (vol. control)
26569 Knob (range)
27498 Knob (tuning, large)
24278 Knob (tuning, small)
28827 Lamp socket
26526 Ferrule and bushing
26524 Spring
26721 Pilot lamp (2-V., 60 mils.)
25056 No. 1 I. F. T. shield
28239 No. 2 I. F. T. shield
27966 Vol. control, .4 U
29003 Battery cable and plug assem (male)
29004 Battery cable and socket assem (female)
29055 Battery socket assembly
29054 Battery plug assembly
15739 Battery cable clamp
26688 Battery cable tag F-1116
39620 Tone control switch assem.
28192 Shaft and blade for the above.
20093 Mtg. nut for vol. control and tone control
28663 Shipping container
27953 Instruction folder F-1160

TRANSFORMERS

T1 41250 No. 1 R. F. T.
T2 41260 No. 2 R. F. T.
T3 41270 Oscillator trans.
T4 28164 No. 1 I. F. T.
T5 28165 No. 2 I. F. T.
T6 40660 Audio input trans.

WAVE TRAP

41020 Trap assembly (264KC)
28458 Choke only (CK1)
41650 125 MMF, 500-V. condenser (C1)
24327 Shield

RESISTORS

R1 30340 .1 U, ⅓ watt, red, blue
R2* 30320 10,000 Ω, ⅓ watt, maroon
R3 30330 50,000 Ω, ⅓ watt, black, yellow, red
R4 36430 5000 Ω, ⅓ watt, blue, yellow
R5 36430 5000 Ω, ⅓ watt, blue, yellow
R6 30370 2 U, ⅓ watt, green
R7 31970 .25 U, ⅓ watt, red, yellow
R8 30320 10,000 Ω, ⅓ watt, maroon
R9 30340 .1 U, ⅓ watt, red, blue
R10 30360 1 U, ⅓ watt, blue, gray
R11 30320 10,000 Ω, ⅓ watt, maroon
R12 40330 .575 Ω, wire wound
— 40340 1.03 Ω, wire wound (for use with 3-V. "A" battery).

*If set fails to operate over entire dial, with partially used "B" batteries, change R2 to 5000 ohms (No. 36430, blue and yellow).

CONDENSERS

C1 41650 125 MMF, mica
C2 32810 .01 MF, 400-V. (409)
C3 28341 8 MMF, 500-V., mica
C4 25035 .006 MF, blue, black, red, mica
C5 31530 .1 MF, 100-V. (102)
C6 31530 .1 MF, 100-V. (102)
C7 39660 730 MMF, 100-V., mica
C8 35840 50 MMF, 500-V., mica
C9 36510 500 MMF, 500-V., mica
C10 31160 .05 MF, 100-V. (101)
C11 31920 .05, .05, and .5, 100-V (110)
C12 36510 500 MMF, 500-V., mica
C13 33670 250 MMF, 500-V., mica
C14 33630 250 and 250 MMF, 400-V. (413)
C15 27630 .01 MF, 200-V (203)
C16 29890 .005 MF, 400-V. (408)
C17 36650 .0015 MF, 400-V. (404)
C18 29890 .005 MF, 400-V. (408)
C19 22472 8 MF, 200-V., electrolytic

TRIMMERS

A4 39630 Rear of chassis
A5 38890 Front of chassis
A6, 7 32880 On T4 (double)
A8 40610 On T5 (single)

CHOKES

CK1 28458 264KC trap choke
CK2 36630 Filament choke

SOCKETS

21336 4 prong (speaker)
24492 4 prong
24494 6 prong

465-Q SPEAKER No. 42900 (1st type)

655-Q SPEAKER No. 45900 (1st type)

28348 Cable and plug assembly
27128 Magnet
27129 Magnet clamping plate
8188 8/32 hex. nut
9898 No. 6 lock washer
23318 No. 2 washer
27138 Clamping block top
27139 Clamping block bottom
27141 Adjusting screw, 6/32
27142 Cover plate
27143 Mounting bracket
27144 Sound unit assembly, less magnets
27145 Conehead assembly
27146 Coil
27147 Armature
27211 Mount. brackets, pair (655-Q)
27148 Spring
27149 Terminal

465-Q SPEAKER No. 46700 (2d type)

655-Q SPEAKER No. 46800 (2d type)

28974 Cone housing (465-Q)
28979 Cone housing (655-Q)
19469 Segment
29074 Cable and plug assembly
29075 Diaphragm assembly
29076* Sound unit complete
29077 Drive rod
17868 Drive rod nut

*Parts for this unit are not sold separately.

MODEL 655-Q

For parts not listed below refer to Model 465-Q.

27985 Base plate
28661 Shipping container
29011 Cable and plug assem. (male)
29012 Cable and socket assem. (female)
28629 Cabinet with screen
27904 Screen
27292 Var. cond. assem.
27922 Range switch assem.
28253 Battery cable and plug (male)
28254 Battery cable and socket
29056 Battery plug assem. (male)
29057 Battery socket assem.
27254 Dial pointer
27869 Dial and frame assembly
27262 Dial frame only
27511 Dial plate
27962 Escutcheon
28896 Front panel assembly
26721 Dial lamp (2-V., 60 mils.)
27965 Vol. control .5 U
28907 Tone control switch assem.
28908 Shaft and blade for the above
38740 Sensitivity switch assem.
27628 Shaft and blade for the above
28946 Knob (tuning and range)
28947 Knob (vol. and tone)
26571 Knob (sensitivity)
27695 Battery cable tag F1155
27951 Inst. sheet F1158
27993 Shipping container

TRANSFORMERS

T1 41080 BC antenna trans.
T2 41090 BC and 4-12 det. trans.
T3 41120 1.6-4.5, 12-22 det. trans.
T4 41110 BC and 4-12 osc. trans.
T5 41130 1.6-4.5, 12-22 osc. trans.
T6 28166 No. 1 I. F. T.
T7 28167 No. 2 I. F. T.
T8 28168 No. 3 I. F. T.
T9 40710 Audio input trans.

RESISTORS

R1 30340 .1 U, red, blue, ⅓ watt
R2 31970 .25 U, red, yellow, ⅓ watt
R3 15545 10,000 Ω, maroon, 1 watt
R4 36430 5000 Ω, blue, yel., ⅓ w.
R5 36430 5000 Ω, blue, yel., ⅓ w.
R6 30380 3300 Ω, green, red, ⅓ w.
R7 30350 .5 U, black, purple, ⅓ w.
R8 30370 2 U green, ⅓ watt
R9 30360 1 U blue, gray, ⅓ watt
R10 30340 .1 U red, blue, ⅓ watt
R11 30340 .1 U, red, blue, ⅓ watt
R12 30390 20,000 Ω, black, red, ⅓ w
R13 37530 300 Ω, maroon, blue, ½ watt
R14 37540 425 Ω, blue, yel., green, ½ w.
R15 39790 500 Ω, blue, red, green, ⅓ watt
R15A 30320 10,000 Ω, maroon, ⅓ watt
R16 30360 1 U, blue, gray, ⅓ watt
R17 30350 .5 U, black, purple, ⅓ watt
R18 31970 .25 U, red, yellow, ⅓ watt
R19 40330 .575 Ω, wire wound
— 40350 1.03 Ω, wire wound (for use with 3-V. "A" battery)

CHOKES

CK1 23530 Filament choke
CK2 27792 2nd det. plate choke

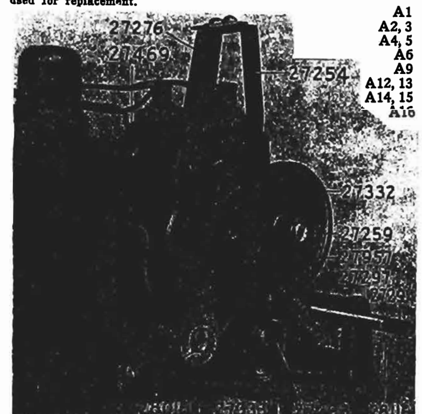
SHIELDS

27932 Shield for T1, 3
27933 Shield for T2
25056 Shield for T6, 7, 8
27335 Shield for T4, 5
22683 Tube shield (30-1C6)
15213 Tube shield (32-34)
25659 I. F. T. shield cover (with hole)
25058 I. F. T. shield cover (without hole)

CONDENSERS

C1 31160 .05 MF, 100-V. (101)
C2 31160 .05 MF, 100-V. (101)
C3 35840 50 MMF, mica, 500-V.
C4 28118 360 MMF, mica, 100-V.
C5 27598 .0037 MF, orange, violet, red
C6 39290 1350 MMF, mica, 400-V.
C7* 27599 .0057 MF, green, violet, red
C8 36510 500 MMF, mica, 500-V.
C9 31160 .05 MF, 100-V. (101)
C10 26820 .05 MF, 200-V. (208)
C10A 26820 .05 MF, 200-V. (208)
C11 36510 500 MMF, mica, 500-V.
C12 36510 500 MMF, mica, 500-V.
C13 35290 125 MMF, mica, 500-V.
C14 35290 125 MMF, mica, 500-V.
C15 26820 .05 MF, 200-V. (208)
C16 26820 .05 MF, 200-V. (208)
C17 27630 .01 MF, 200-V. (203)
C18 31510 .5 MF, 100-V. (105)
C19 32390 .05, .05, .2 MF, 200-V. (222)
C20 27630 .01 MF, 200-V. (203)
C21 33620 250 MMF, 400-V. (401)
C22 38260 .001, .004, .008 MF, 400-V. (416)
C23 29530 .03 MF, 200-V. (206)
C24 22472 8 MF, 200-V. dry electrolytic
C25 31150 .3 MF, 100-V. (104)

*In some sets C7 is .006 MF (No. 25035), blue, black, red. Either the .0057 or the .006 may be used for replacement.



PARTS FOR TUNING MECHANISM

27469 Dial gear
27276 Pointer arm
27254 Dial pointer
27332 Counter shaft gear (large)
27333 Idler gear (small)
27259 Gear screw
27957 Broadcast pinion gear
28116 Gear frame
27351 Screw (5/32" dia.)
27294 Tuning shaft
28016 Tuning bracket
27293 Detention spring
27298 Shaft spacer
27297 Bracket holding pin

768-Q SPEAKER No. 43100

978-Q SPEAKER No. 43200

28348 Cable and plug assembly
27128 Magnet
27129 Magnet clamping plate
8188 8/32 hex. nut
9898 No. 6 lock washer
23318 No. 2 washer
27138 Clamping block top
27139 Clamping block bottom
27141 Adjusting screw, 6/32
27142 Cover plate
27143 Mounting bracket
27145 Conehead assembly
28976 Coil
27147 Armature
27211 Mount. brackets, pair (978-Q)
27148 Spring
27149 Terminal

MODEL 978-Q

For parts not listed below refer to Model 768-Q.

28897 Front panel assem.
27963 Escutcheon
27832 Base cover
28256 Battery cable and plug (male)
28254 Battery cable and socket (female)

TRIMMERS

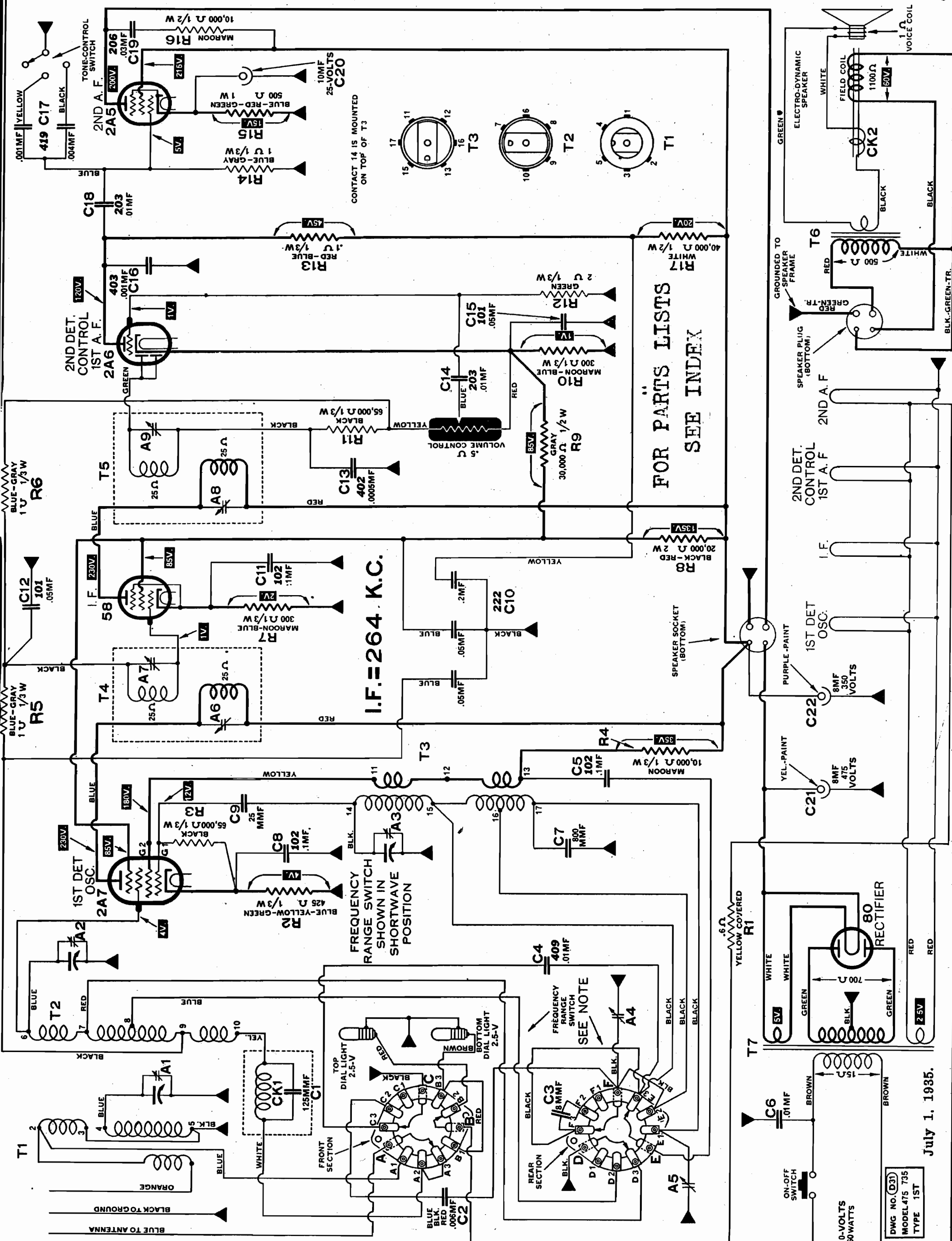
A1 38180 Single trimmer on T1.
A2, 3 39430 Double trimmer on T2
A4, 5 39430 Double trimmer on T3
A6 39420 560 KC tracking
A9 39420 1.6 MC tracking
A12, 13 32880 Double trimmer on T6
A14, 15 32880 Double trimmer on T7
A16 40610 Single trimmer on T8.
39140 Strip of four trimmers

Illustration of parts in dual-speed compensated tuning mechanism in Models 768Q, 978Q, etc.

Ω = ohms.
U = megohms.

ATWATER-KENT MFG. CO.

MODELS 475,735
Schematic, Voltage



The dial light switch arm connects to the top light when range switch is in "short-wave" position; connects bottom light at "police"; and connects both lights at "broadcast." In late sets R9 is 1 watt, and R4 (oscillator plate) is ½ watt.

MODELS 475,735
Trimmers, Socket
Chassis, Alignment

ATWATER-KENT MFG. CO.

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of regular I. F. coupling unit. Peak A9, A8. Connect I. F. oscillator to 1st-detector tube and peak A7, A6.

DIAL POINTER ADJUSTMENT.

With rotor of variable condenser fully meshed, dial indicator should be at 535 KC.

R. F. TRIMMERS.

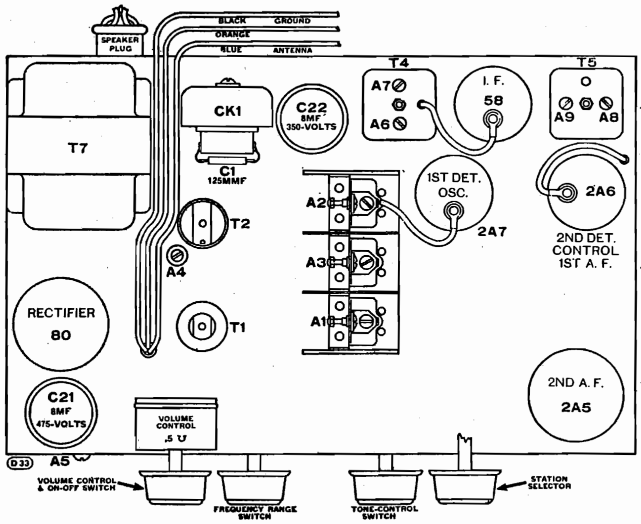
Connect an R. F. oscillator to antenna and ground of set.

Short-wave range. With oscillator and dial at 15 MC, peak A3. Use the first point on the trimmer, as it is screwed in from a loose or minimum-capacity position.

Police range. No trimmers on this range.

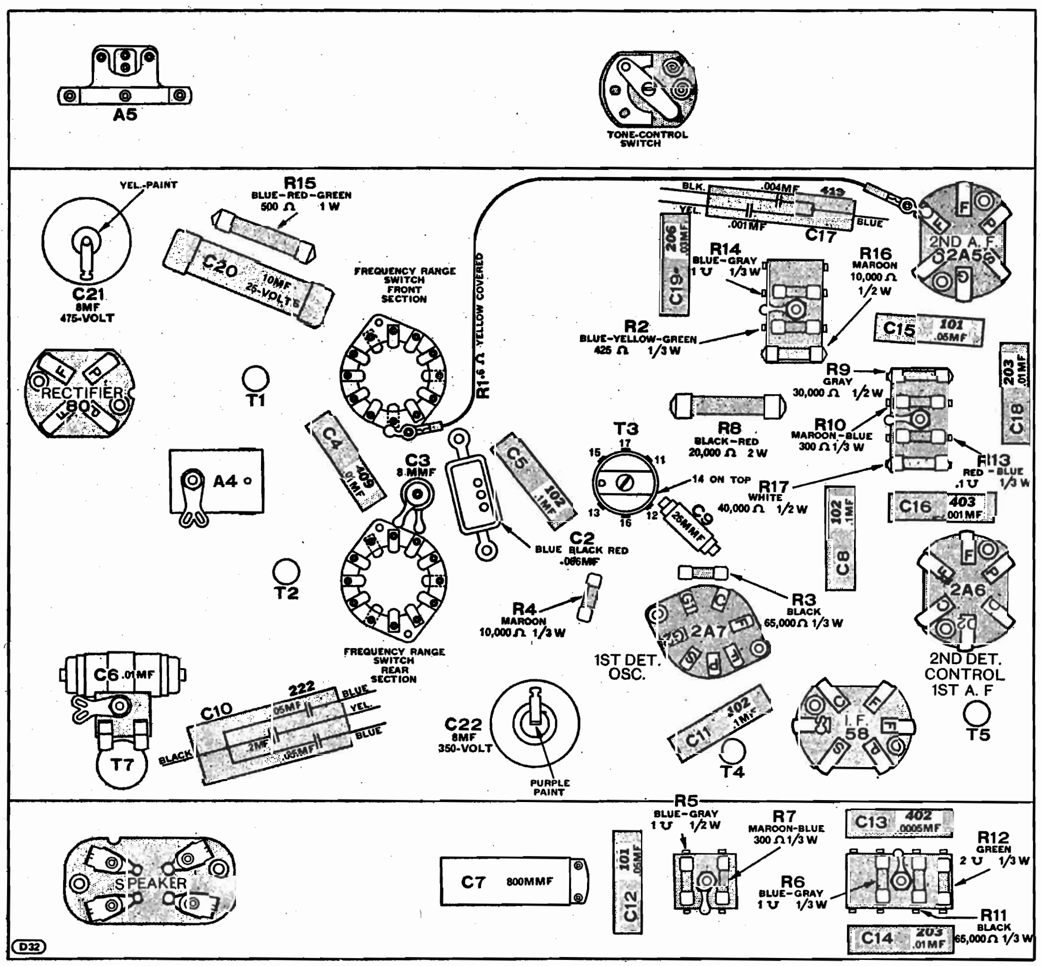
Broadcast range. With oscillator and dial at 1500 KC, peak A4, A2 and A1. With oscillator and dial at 560 KC, peak A5.

MODELS 475 AND 735



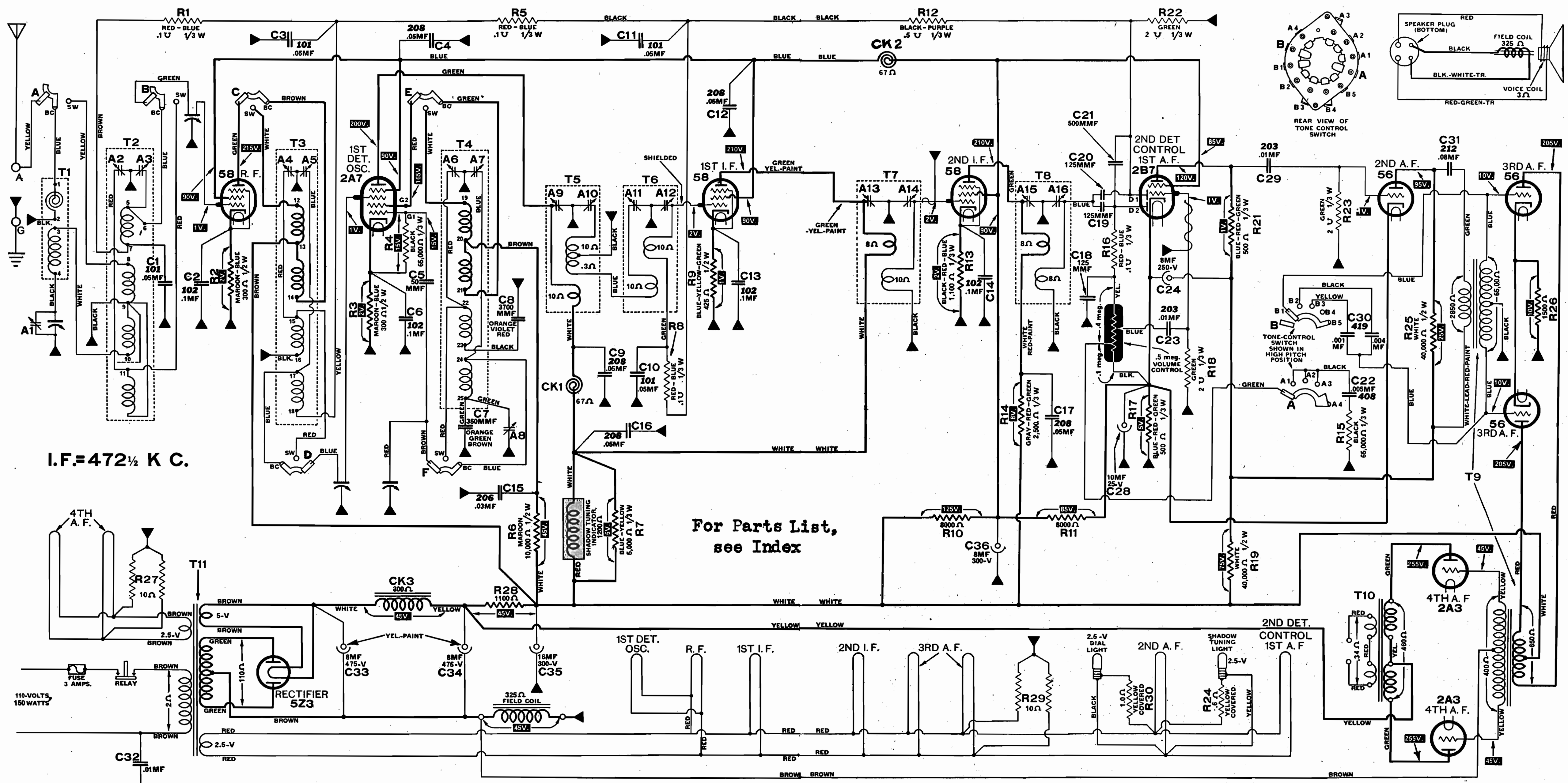
TRIMMERS

A1—1st-detector, 1500 KC.
A2—1st-detector, 1500 KC.
A3—Oscillator, 15 MC.
A4—Oscillator, 1500 KC.
A5—Oscillator, 560 KC.
A6—1st-detector plate, 264 KC.
A7—I. F. grid, 264 KC.
A8—I. F. plate, 264 KC.
A9—2nd-detector, 264 KC.



MODEL 511
Schematic
Voltage

ATWATER-KENT MFG. CO.



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Model 511 has two frequency ranges: the broadcast range (BC) covers 540 to 1600 kilocycles, and the short-wave range (SW) covers 5500 to 15500 kilocycles.

Only the late type audio circuit is shown above. In early sets, the plate circuit of the 2B7 is similar to that used in Model 112.

ATWATER-KENT MFG. CO.

SERVICING THE Tune♦O♦Matic MECHANISM

In addition to the simplicity of design and operation of the TUNE-O-MATIC, the rugged construction and positive adjustments are such that, under normal conditions of operation, it WILL NOT be necessary for the Service Man to make ANY mechanical adjustments on this mechanism, other than that of setting the station selector discs.

However should the initial adjustments of any part of the mechanism become changed at any time, it will cause the mechanism to function unsatisfactorily and corrective adjustments will be necessary. Several of the probable sources of trouble in this respect have been tabulated below, with a brief statement of the adjustments required. For additional details in regard to the latter, reference should be made to the respective sections under ADJUSTMENTS.

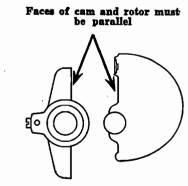
TROUBLE OBSERVED	ADJUSTMENT REQUIRED
1. Reversal switch control cam does not operate reversing switch.	1. Loosen reversal switch mounting screws and move bakelite switch base to the right or left as required. (See Adjustments—Sec. A.)
2. Motor does not drive mechanism through complete operating cycle.	2. Check bearing adjustments. Check large and small pulley adjustments. Check for continuous contact between selector disc and contact finger in question.
3. Mechanism runs continuously.	3. Reversal switch does not trip or does not make contact after it does trip. (See also, instructions—clock assembly adjustments.)
4. Difficulty in manual tuning.	4. Loosen setscrew of reversal switch control cam on condenser shaft and relieve pressure of clutch-spring on clutch-disc gear sufficiently to allow tuning knob to turn easily during manual operation, but not enough to cause it to slip during automatic operation.

MECHANICAL NOISE DURING OPERATION OF MECHANISM

CAUSED BY	REMEDY
1. Dry worm and gear.	1. Use graphite sparingly.
2. "Squeak" in motor bearings.	2. ONE DROP of 3 in 1 oil.
3. Improper mesh of worm and gear.	3. See that gear is centered in worm, and meshes about half the depth of the teeth.
4. Worm shaft loose in bearings.	4. See Adjustments Sec. B.
5. Solenoid plunger hangar wire does not hold plunger snugly.	5. Pinch ends of hangar wire with pliers.
6. Solenoid plunger and mounting arm vibrate.	6. Set spacing between plunger and top of solenoid to ½" by adjustment of large pulley.
7. Felt washer omitted between top of plunger and plunger mounting arm.	7. Replace with Part No. 27767.
8. Pointer control gear teeth in contact with metal of pointer control pinion instead of bakelite section.	8. Adjust pointer control gear on condenser shaft.
9. Noise from selector disc dust cover.	9. Tighten mounting screws and make sure that cover does not contact clutch-disc gear.

ADJUSTMENTS

SEC. A. Failure of reversal switch control cam to operate reversal switch in either maximum positions may be corrected by adjusting solenoid switch position as previously mentioned. If further adjustment is necessary it should be made as follows: Checking the reversal switch by manual operation of the large pointer control gear—in position of minimum capacity of the gang condenser, the pointer control gear is adjusted on the condenser shaft so that the stop arm attached to the gear makes contact with the pointer control pinion gear. Take notice, however, that the reverse switch is tripped to the OFF position by reversal switch control cam, when the stop is within approximately ⅛" of the pointer control pinion gear. In the position of maximum capacity of the gang condenser, it may be necessary to move the reversal switch control cam slightly in a clockwise direction (when facing the rear of the mechanism) on the condenser shaft, in order that the reversal switch will be tripped to the ON position when the gang condenser is within ${1/16}''$ of complete mesh. It should be noted that when the proper adjustment has been made, the contact faces of the reversal switch cam are parallel to the flat edge of the condenser rotors.



Nov., 1934

SEC. B. Improper adjustment of large and small pulleys. The large pulley is adjusted first, so that when it makes contact with the lower portion of the motor driving-nib, the space between the solenoid plunger and the top of the solenoid is approximately one-half inch. The small pulley is then adjusted so that there is about ${1/32}''$ space between large pulley and motor driving-nib when the driving-nib is in contact with the small pulley. This adjustment should place the small pulley in a position of positive contact with the motor driving-nib when the solenoid is not energized. If it does not, the mechanism will fail to return from the position of maximum mesh of the gang condenser.

Improper adjustment of worm shaft bearings will cause heating and partial or complete "freezing" of the shaft and bearing. To adjust the worm gear drive shaft bearings, the bearing adjusting screw is turned clockwise until a slight movement of the small pulley is observed, indicating contact of the shaft and the bearing. The adjusting screw is then given ¼ additional turn in the same direction and the lock nut tightened.

RELAY

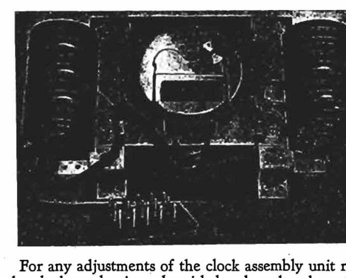
No trouble should be experienced with the OFF and ON relay used in conjunction with the TUNE-O-MATIC mechanism. Any tendency for contacts to stick may be removed by the use of emery cloth. In cases where buzzing of the relay occurs, it should be noted whether the armature seats properly.

STATION SELECTOR DISCS

Tension collar at rear of station discs may be loosened if station selector discs are difficult to set. However sufficient pressure should be retained to keep the discs in the position which they have been set, while the mechanism is in operation.

SERVICING TUNE-O-MATIC CLOCK ASSEMBLY

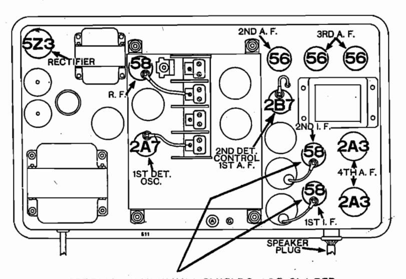
The TUNE-O-MATIC clock assembly is illustrated at right. No attempt should be made to make adjustments on any part of the clock assembly unit other than pointed out below. Where major adjustments are required, the complete unit must be removed from the cabinet and returned to the distributor.



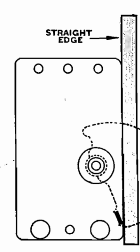
In cases where the contact arm, on the rear of the jack panel, jumps a noticeable period of time before or after the MINUTE hand reaches each successive 15 minute mark on the clock face, it will be necessary to set both the hour hand and the minute hand on 12, when the contact arm is on the 12 o'clock jack. To make this adjustment the clock crystal should be carefully removed, by releasing the crystal retaining spring (use narrow blade screwdriver), to allow access to the clock hands. Turn the knurled clock-hand adjusting knob on the rear of the clock until the hand is almost at 12, then allow the clock to run on its own power. The instant the contact arm jumps to the 12 o'clock jack see that both the hour and the minute hand are within the black mark at 12. Both hands are held on their respective shafts by friction only, and therefore may be moved in either direction manually to the 12 o'clock position. After the hands have been adjusted as indicated above, the relation of the minute hand and the time the contact arm jumps to the succeeding positions may be checked at other points on the clock face in a like manner, and if found satisfactory, the clock crystal should be replaced and the retaining spring adjusted.

For any adjustments of the clock assembly unit relative to the clock mechanism, sluggish break and make action of the jack contact arm from one position to the next, etc., will require that the complete clock assembly be returned to the distributor.

It may be well to note that if any selector cord tip, after being released from a time selector jack, should become lodged against a selector cord tip of another station, the TUNE-O-MATIC mechanism will operate continuously until the cord tip is dislodged from its contact with the cord tip in the jack. The same action will occur if the contact arm should lodge on two jack contacts.



Top View, Model 511

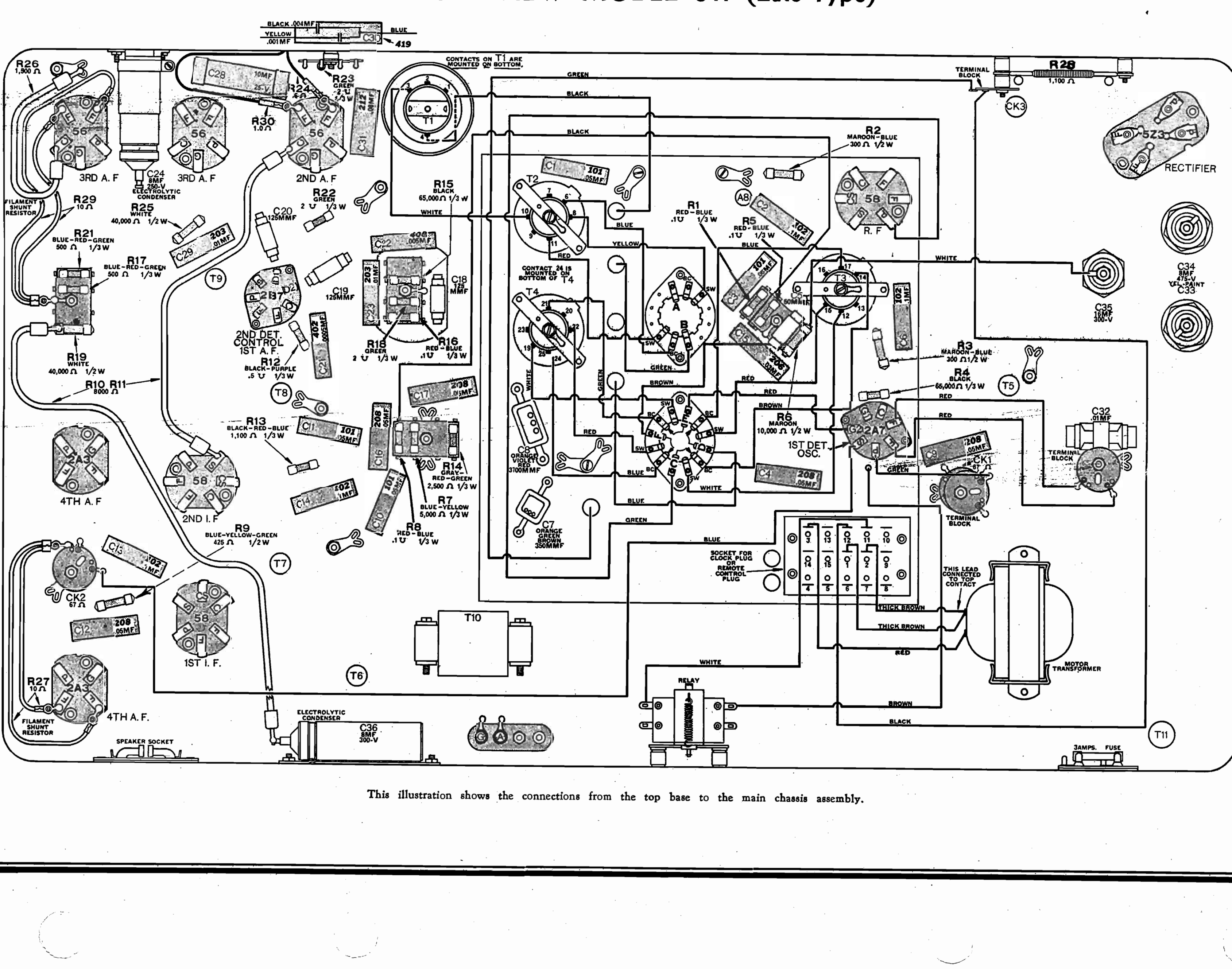


This illustration shows the correct position of the variable condenser rotor for a dial-pointer setting of 1575 KC. The straight-edge is held firmly against the front mounting plate of the variable condenser and the rotor is turned so the spacing bar (shown as a small black oblong) is just touching the straight edge. The straight edge is a strip of bakelite or hard rubber ¼" thick, ⅝" wide, and 6" long. The ⅝" side is held against the mounting plate.

See section on "Dial Pointer Adjustment"

ATWATER-KENT MFG. CO.

BOTTOM VIEW MODEL 511 (Late Type)



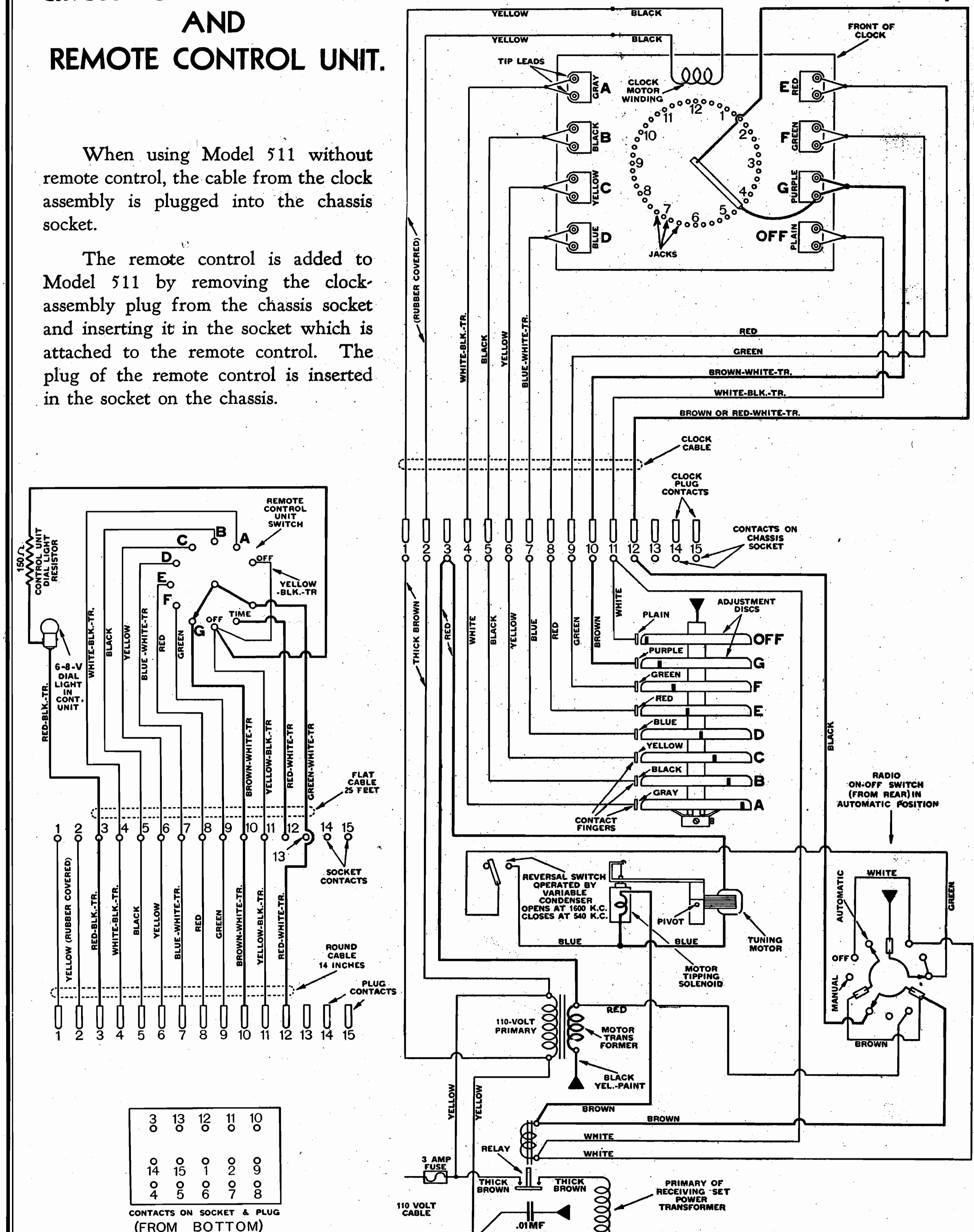
This illustration shows the connections from the top base to the main chassis assembly.

ATWATER-KENT MFG. CO. MODEL 511 Automatic Tuning, Clock, Control Units Schematic

CIRCUIT OF AUTOMATIC TUNING MECHANISM, CLOCK ASSEMBLY, AND REMOTE CONTROL UNIT.

When using Model 511 without remote control, the cable from the clock assembly is plugged into the chassis socket.

The remote control is added to Model 511 by removing the clock-assembly plug from the chassis socket and inserting it in the socket which is attached to the remote control. The plug of the remote control is inserted in the socket on the chassis.



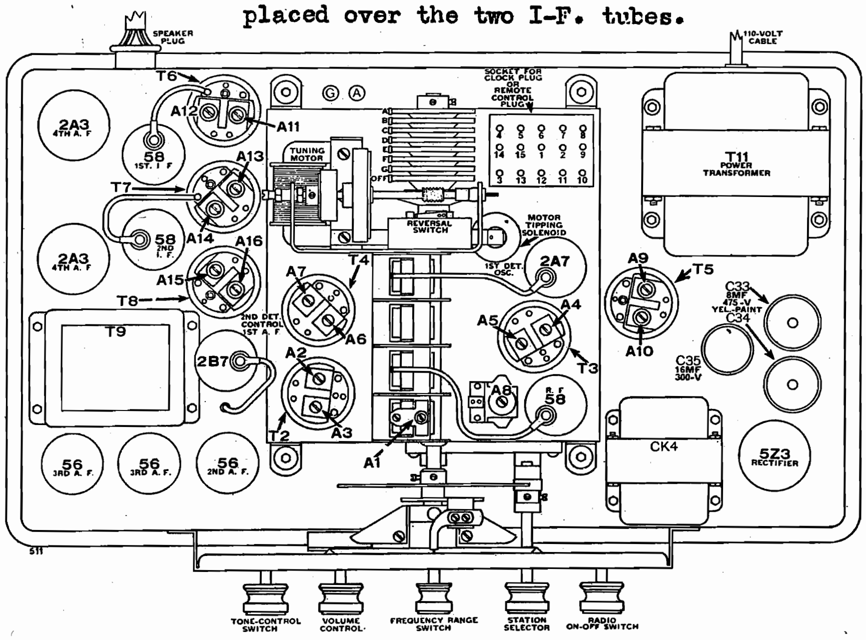
3	13	12	11	10
14	15	1	2	9
4	5	6	7	8

CONTACTS ON SOCKET & PLUG (FROM BOTTOM)

MODEL 511
Trimmers, Socket, Alignment Data

ATWATER-KENT MFG. CO.

Special aluminum shields are placed over the two I-F. tubes.



TOP VIEW MODEL 511

	5.4 to 15.5 M.C.	540 to 1600 K.C.
R. F.	A2	A1 & A3
1st-Detector ...	A4	A5
Oscillator	A6	A7
Tracking	None	A8

I. F. Trimmers are A9 to A16 inclusive

DIAL POINTER ADJUSTMENT.

If the dial gear and indicator have not been tampered with, leave them alone; but if they have been changed in any way, reset as follows:

1. Loosen the two set screws which hold pointer gear on condenser shaft.
2. Turn condenser to minimum.
3. See illustration at bottom of page 13. Place straight-edge gauge in vertical position with the long flat face against the front mounting plate of the variable condenser as shown. Turn the condenser until the front edge of the rotor spacing bar just touches the straight edge. Hold the condenser in this position and move the pointer arm so the pointer is at 1575 KC, after which tighten the set screws to hold the dial gear securely.
4. Loosen the screws which hold the pointer to the pointer arm, and adjust the pointer so that when the condenser is completely meshed, the pointer is at 530 KC.

Recheck at 1575 KC and repeat proceedure 3 and 4 if necessary.

EQUIPMENT.

1. OSCILLATOR. The oscillator should extend from the lowest I. F. frequency (125 KC in Atwater Kent sets) to at least 18 MC. The oscillator should have a good attenuator and should be well shielded. If the oscillator is not well shielded, it may be difficult to peak the pre-selector trimmers on some models, owing to pick-up by the 1st-detector grid circuit. In general, it is advisable to connect an .00025MFD fixed condenser in series with the oscillator pick-up lead at the antenna terminal of the set.

2. OUTPUT METER. Use a sensitive output meter and keep the radio volume control turned on full volume. This is necessary to minimize the effect of the automatic-volume-control action of the set which would otherwise prevent sharp peaking of the trimmers.

3. BALANCING UNIT. Build or purchase from your distributor two of the Type "A" balancing units and one of the I. F. coupling units shown on right. These are required for correct adjustment of Atwater Kent super-heterodynes. The coupling unit is placed on the grid cap of the 1st-detector tube, and the lead that normally connects to the grid cap is attached to the end of the maroon resistor as shown.

4. Use a non-metallic screw driver for adjustment of the trimmers.

I. F. TRIMMERS.

Connect an IF test oscillator to the 1st-detector tube by means of the IF coupling unit shown in FIG. 1. Adjust the IF oscillator to 472½ K.C. Connect a sensitive output meter to the set. Use the weakest possible oscillator signal that will give a reading on the output meter with the radio volume control full on. Put tone control in 2nd position from right.

Put unit A on A15 and peak A16.
Put unit A on A16 and peak A15.
Put unit A on A13 and peak A14.
Put unit A on A14 and peak A13.
Put one unit A on A11 and one on A 9. Peak A12 and A10.
Put one unit A on A12 and one on A10. Peak A11 and A 9.

In case of instability while adjusting A15 and A16, place an extra balancing unit A across A12.

Remove the I. F. coupling unit and the balancing units and seal the trimmers.

R. F. TRIMMERS.

Connect an RF oscillator to the antenna and ground terminals of the set. Use the weakest possible oscillator signal to give a reading on the output meter. Loosen the trimmer screws for the range or ranges that are to be re-adjusted.

5.4 to 15.5 MC range. Tune test oscillator to 15 MC. Turn oscillator trimmer A6 "in", stopping at the peak of position where the signal is first heard as the trimmer is turned in. Then tune the set to 14.06 MC and note whether the oscillator signal is present at this frequency and considerably weaker than at 15 MC. If so, the oscillator trimmer adjustment is correct and the R.F. trimmers A2 and A4 should be peaked at 15 MC.

Broadcast range. Tune test oscillator and set to 1500 KC. Turn trimmer A7 "in" until oscillator signal is heard and peaked. Peak R.F. trimmers A1, A3, and A5. Tune test oscillator and set to 560KC. Peak A8. Go back and forth between A7 at 1500 and A8 at 560 until both of these frequencies come in at the correct points on the dial.

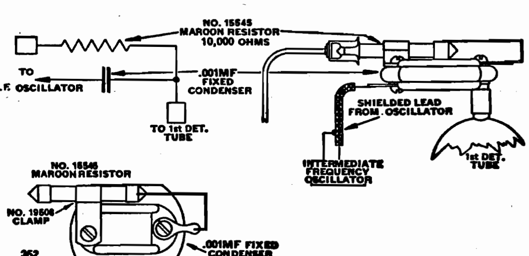


Fig. 1. I. F. Coupling unit, Part No. 42590

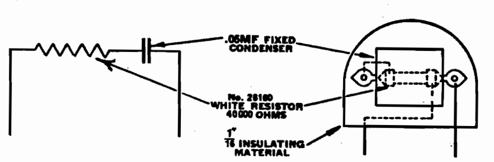
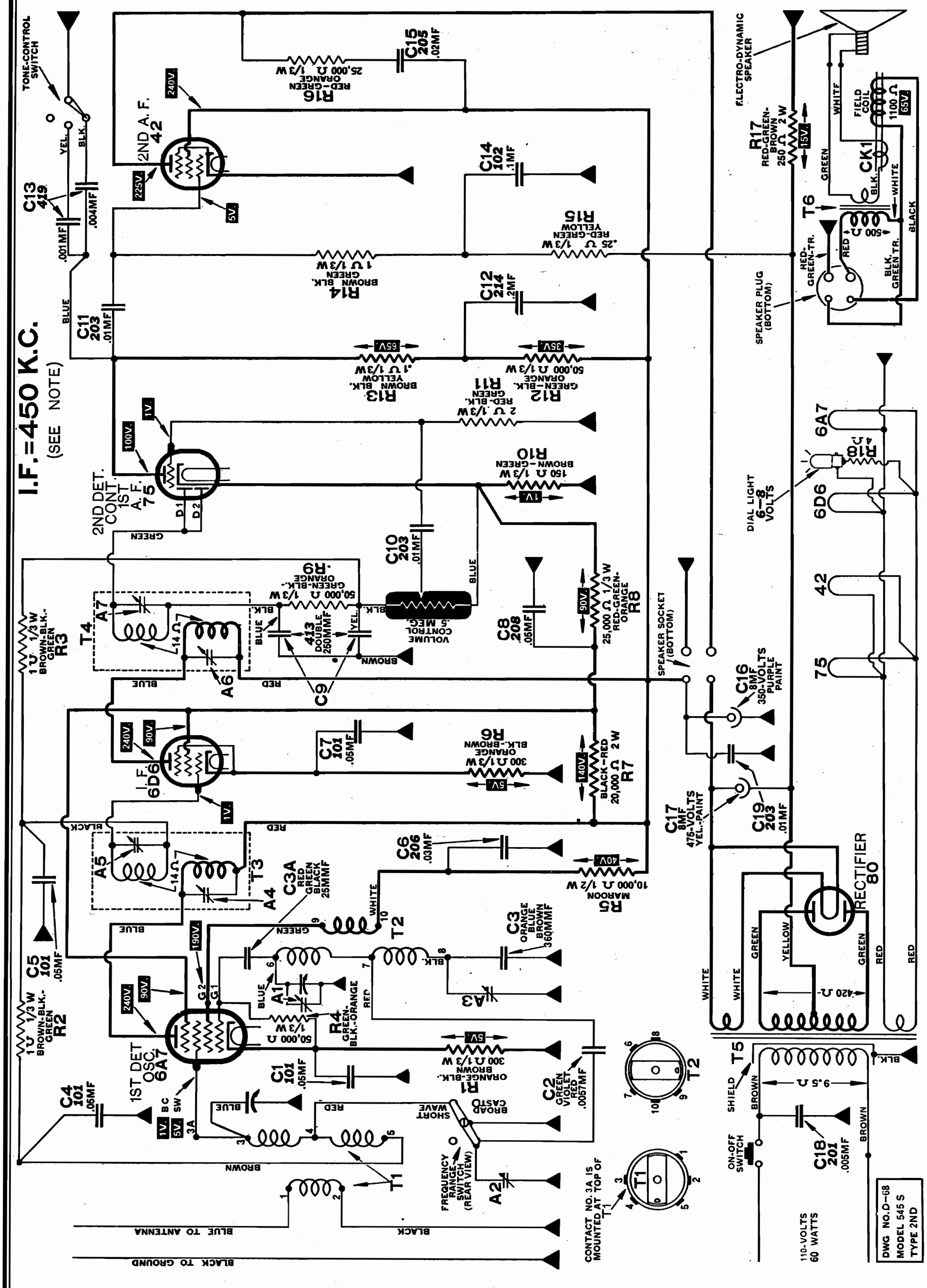


Fig. 2. Balancing unit "A," Part No. 42610

ATWATER-KENT MFG. CO.

MODEL 545

Schematic, Voltage



The I. F. in some Model 545 sets is 472½ KC and a label to this effect is attached to the rear of the chassis. The I. F. transformers and trimmers, etc., are exactly the same for either 450 or 472½ KC.

CHANGES. Early Model 545 has 2.5-volt tubes and the circuit is similar to that shown above. Late sets have .01 MF line bypass; electrolytic C16 is 300-V, 16 MF; a filament-shunt resistor of 25-ohms (tapped at 12.5) is added and the filament circuit is not grounded except through this resistor; dial light in late sets is 6.3 volts.

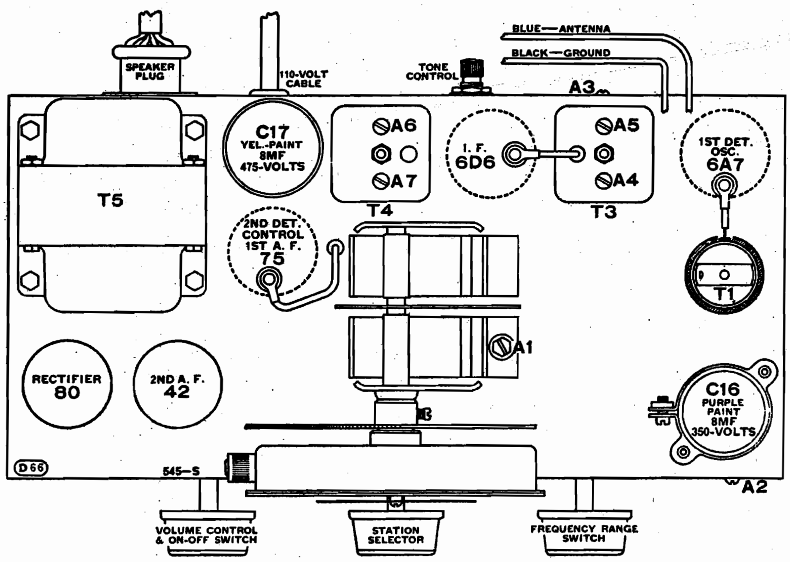
June, 1935

MODEL 545
Trimmers, Socket, Chassis, Alignment

ATWATER-KENT MFG. CO.

ADJUSTING TRIMMERS

I. F. Connect I. F. test oscillator (450* KC) to I. F. tube by means of regular I. F. coupling unit. Peak A7 and A6. Connect coupling unit to 1st-detector and peak A5 and A4.



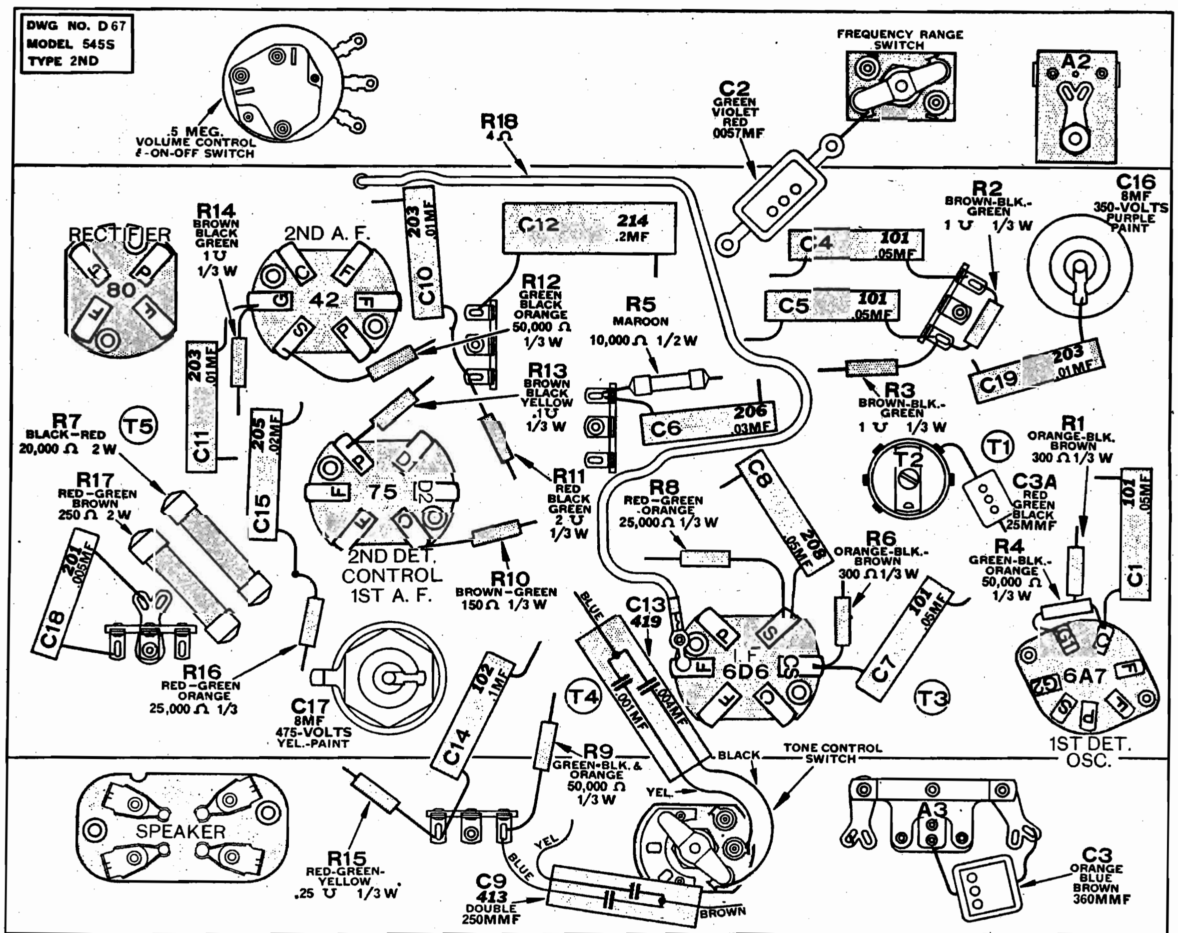
DIAL. With rotor of variable condenser fully meshed, dial indicator should be at 540 KC.

R. F. Connect a 6 MC oscillator to antenna and ground. Peak A1. With oscillator and dial at 1700 KC, peak A2. With oscillator and dial at 540 KC, peak A3.

	Short-Wave Range	Broadcast Range
1st Detector	.....	.....
Oscillator	A1	A2
Tracking	.....	A3

The I. F. trimmers are A4 to A7, inclusive.

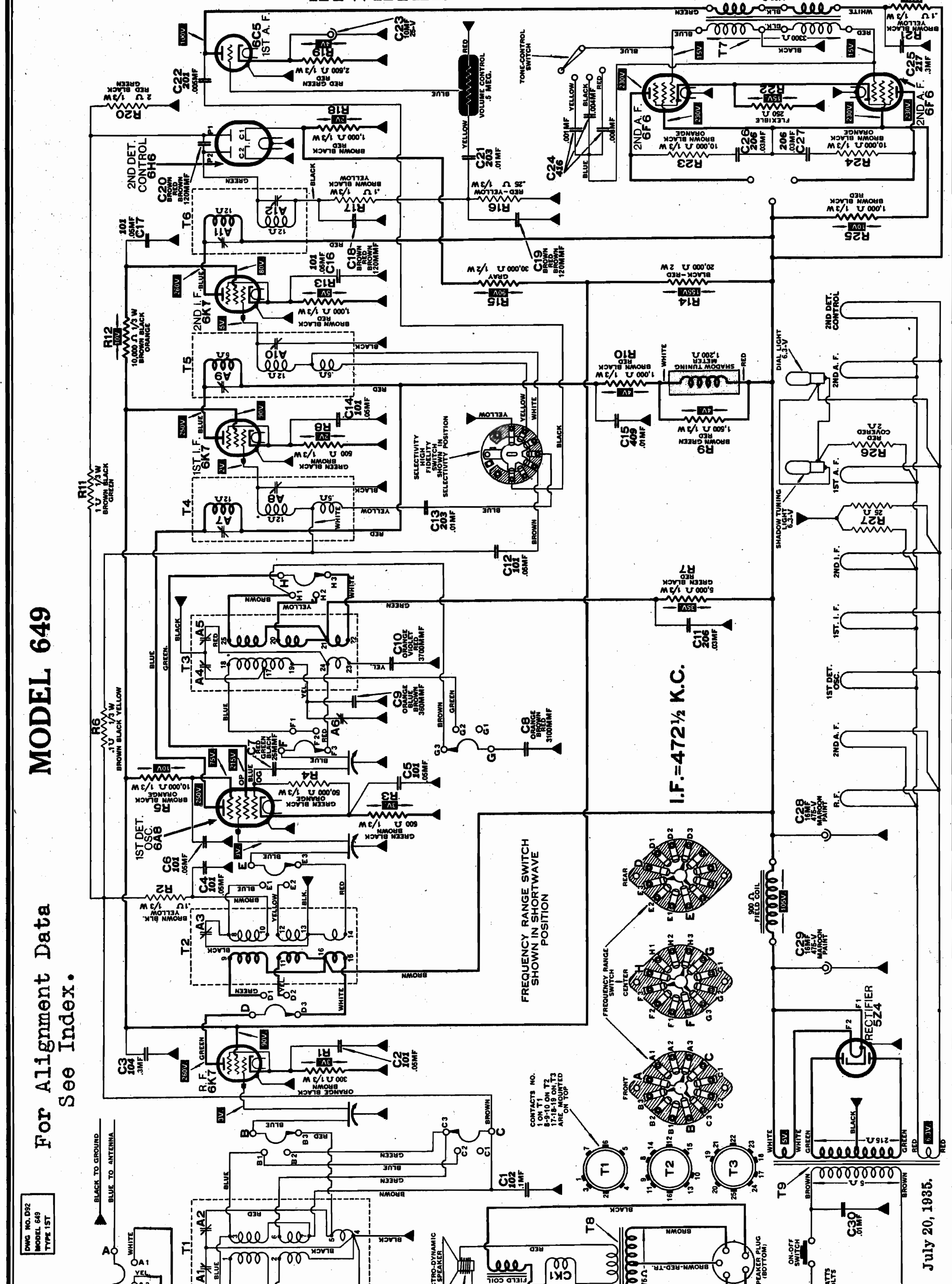
*In some Model 545 sets, the I. F. is 472½ KC and a label to this effect is attached to rear of chassis.



Schematic, Voltage

ATWATER-KENT MFG. CO.

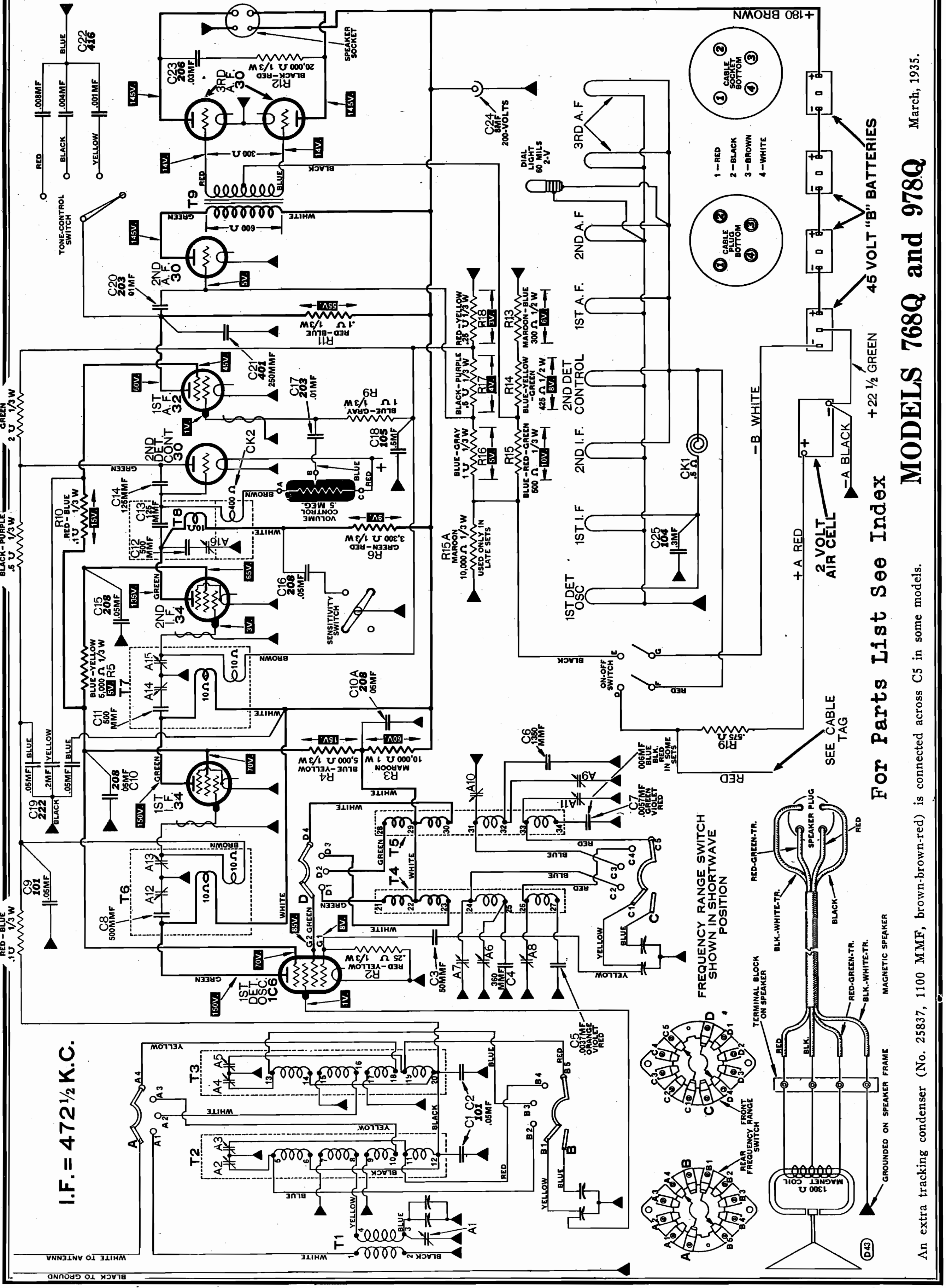
MODEL 649 (Early)



MODELS 768Q, 978Q

ATWATER-KENT MFG. CO.

Schematic, Voltage



ATWATER-KENT MFG. CO.

MODELS 768Q and 978Q

I. F. TRIMMERS.

Connect an I. F. test oscillator to the 1st-detector tube by means of the standard I. F. coupling unit described in the January, 1935, supplement. Adjust the test oscillator to 472½ KC. Connect a sensitive output meter to the set. Use the weakest oscillator signal that will give a reading on the output meter with the radio volume control on full.

Peak A16. Then peak A15, 14, 13, and 12, using a 40000-ohm balancing unit alternately in the usual manner. Remove the coupling unit and seal the I. F. trimmers.

DIAL POINTER ADJUSTMENT.

This procedure is the same as for Models 447 and 318

R. F. TRIMMERS.

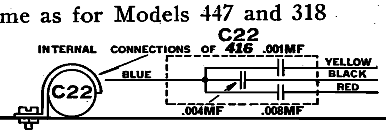
12 to 22.5 MC range. Oscillator at 18 MC, dial pointer at 18 MC, peak trimmers A11, and A5.

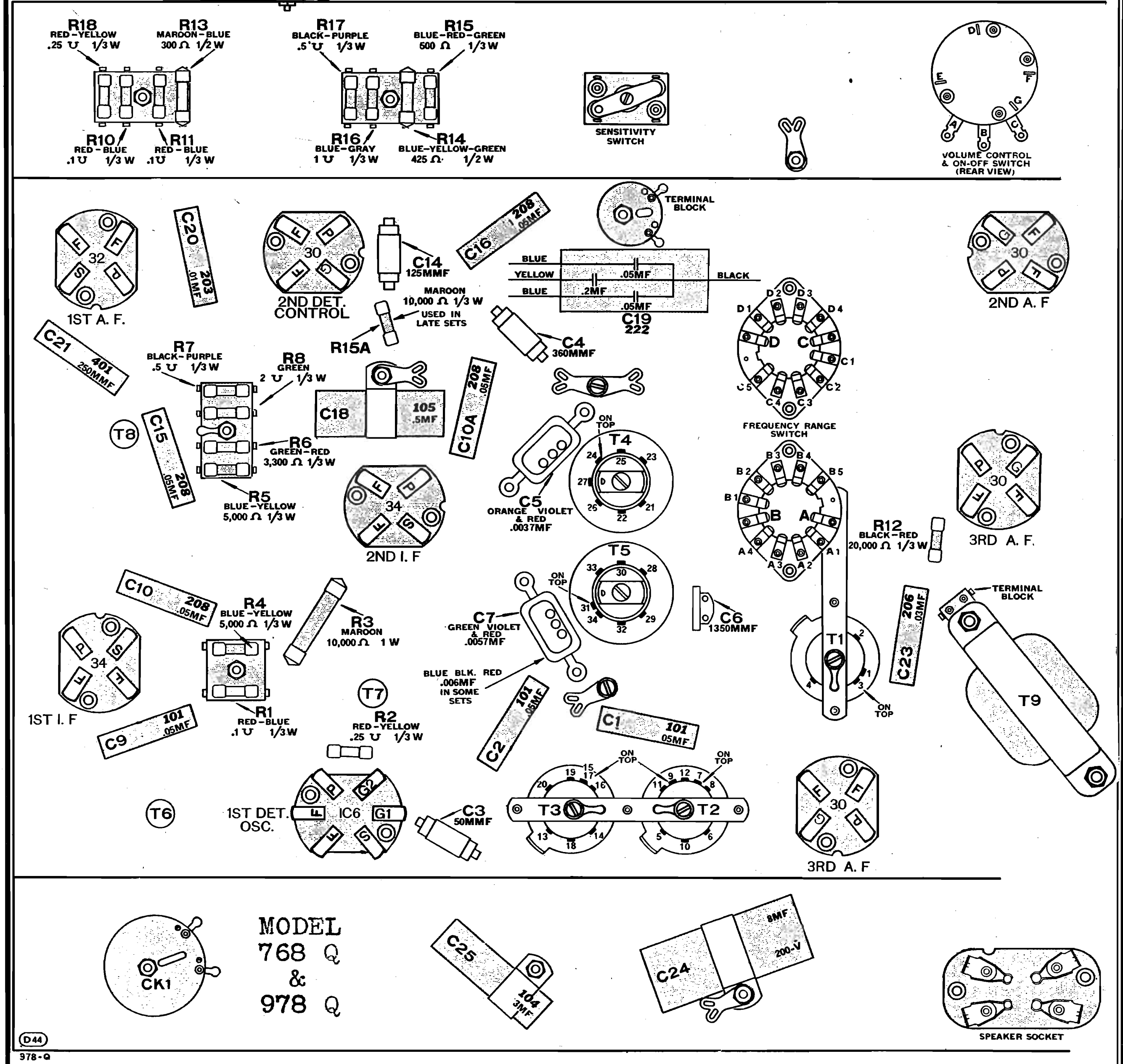
4.6 to 12.2 MC range. Oscillator and pointer at 12 MC, peak trimmers A8, and A3.

1.6 to 4.6 MC range. Oscillator and pointer at 4 MC, peak trimmers A10, and A4.

Tune oscillator to 1.7 with pointer at 1.7, peak A9.

Broadcast range. Oscillator at 1500 KC, and pointer at 1500 KC, peak A7, A1, and A2. With oscillator and dial pointer at 560, peak A6.

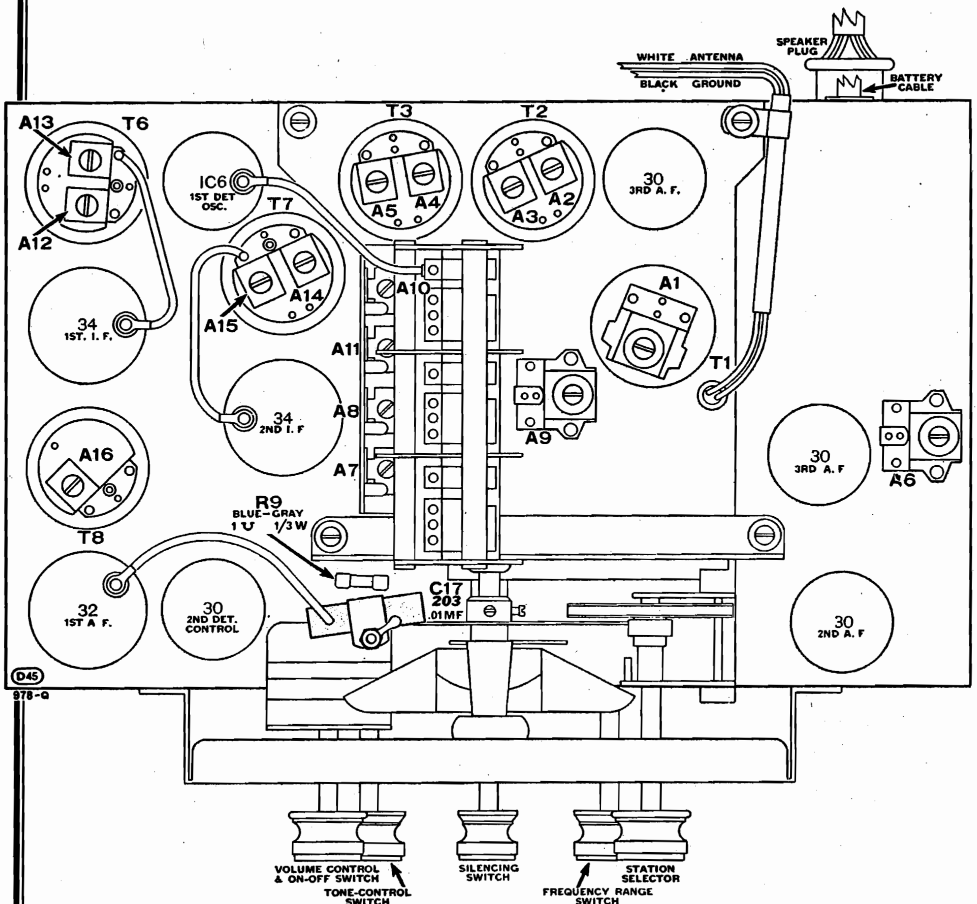




MODELS 768Q,978Q
Socket,Trimmers
Battery Connections

ATWATER-KENT MFG. CO.

TOP VIEW, MODELS 768Q and 978Q



TRIMMERS ON MODELS 768Q and 978Q

(See page 1 for trimmer adjustment data.)

I. F. TRIMMERS

I. F. (472½ KC)....A12 to A16

12 to 22.5 MC RANGE

1st-Det. (18 MC)............A5
Oscillator (18 MC).........A11

4.6 to 12.2 MC RANGE

1st-Det. (12 MC)............A3
Oscillator (12 MC)..........A8

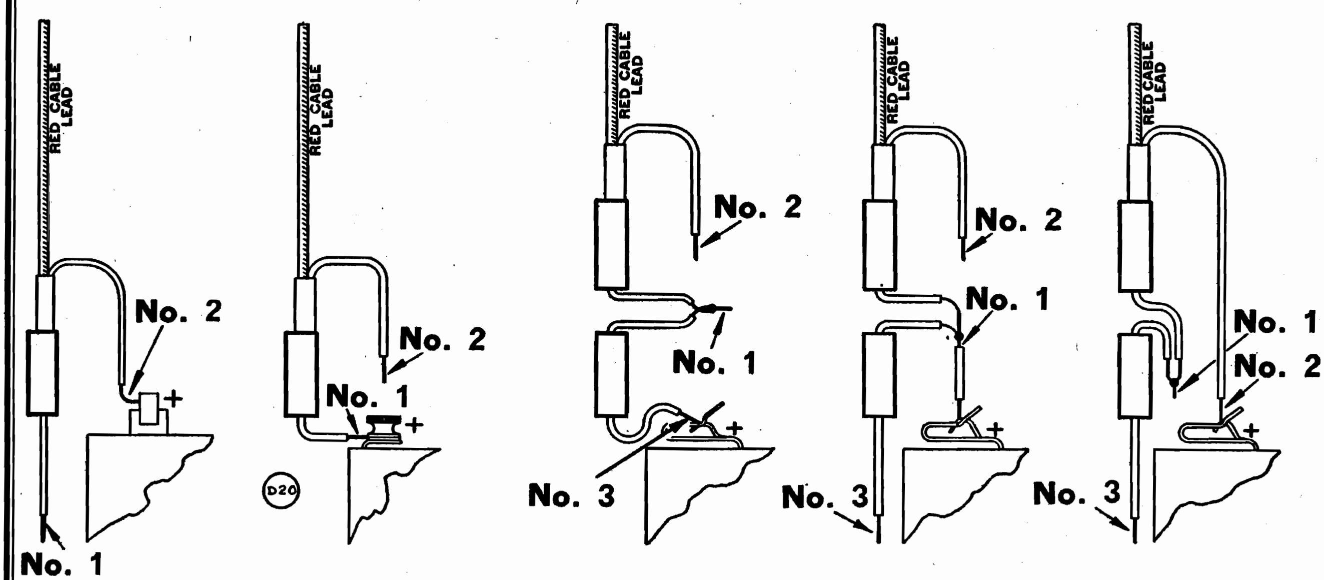
1.6 to 4.6 MC RANGE

1st-Det. (4 MC).............A4
Oscillator (4 MC)..........A10
Tracking (1.7 MC)..........A9

540 to 1600 KC RANGE

Antenna (1500 KC)..........A1
1st-Det. (1500 KC)..........A2
Oscillator (1500 KC)........A7
Tracking (560 KC)..........A6

CONNECTIONS FOR DIFFERENT TYPES OF "A" BATTERIES



2-VOLT STORAGE CELL
Connect No. 2 as shown, do not use No. 1

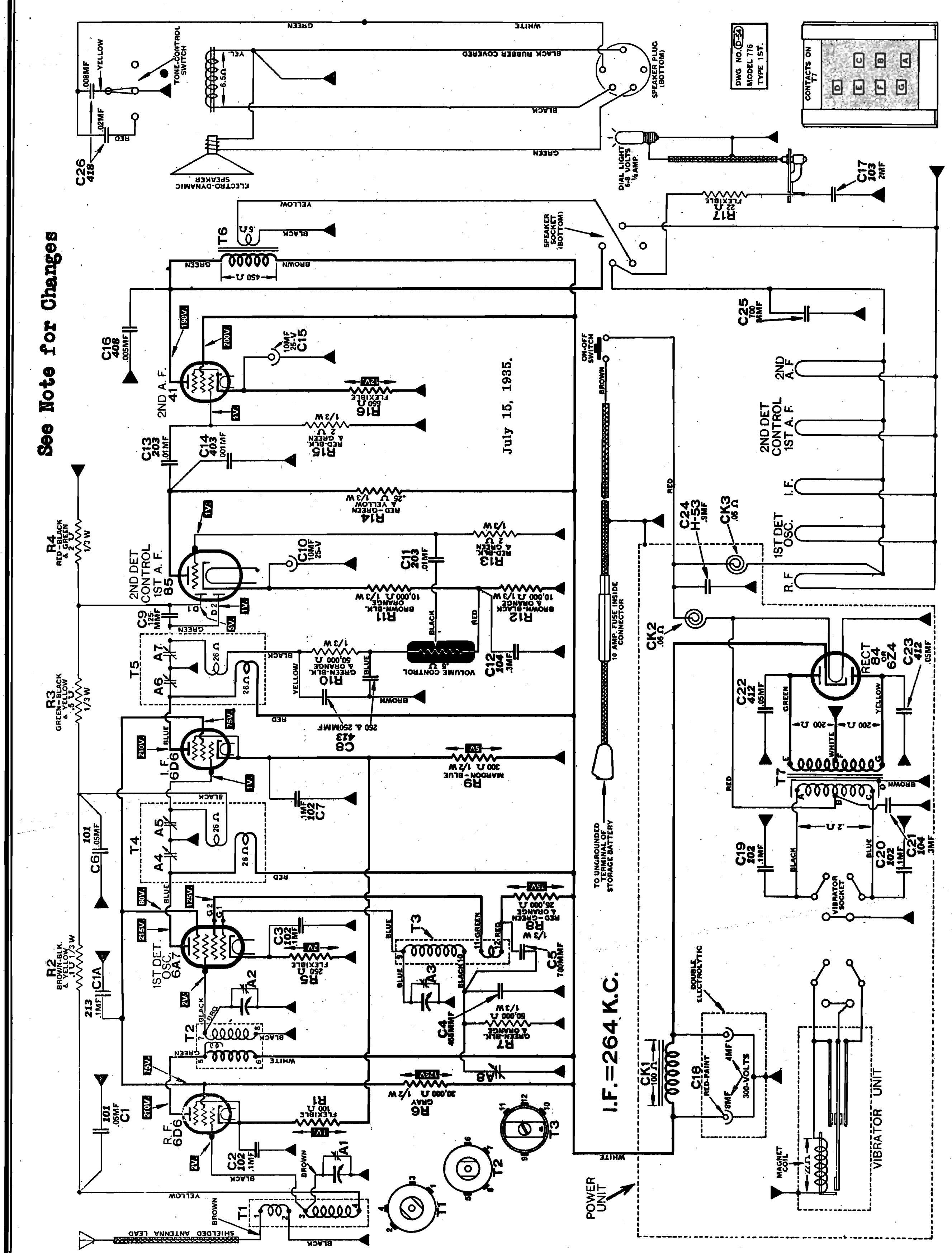
2-VOLT AIR CELL
Connect No. 1 as shown, do not use No. 2

Connections when battery is fresh — Connections after 300 hours' use — Connections after 600 hours' use

3-VOLT DRY "A" BATTERY
(Use Extra Resistor Furnished in Envelope with Set)

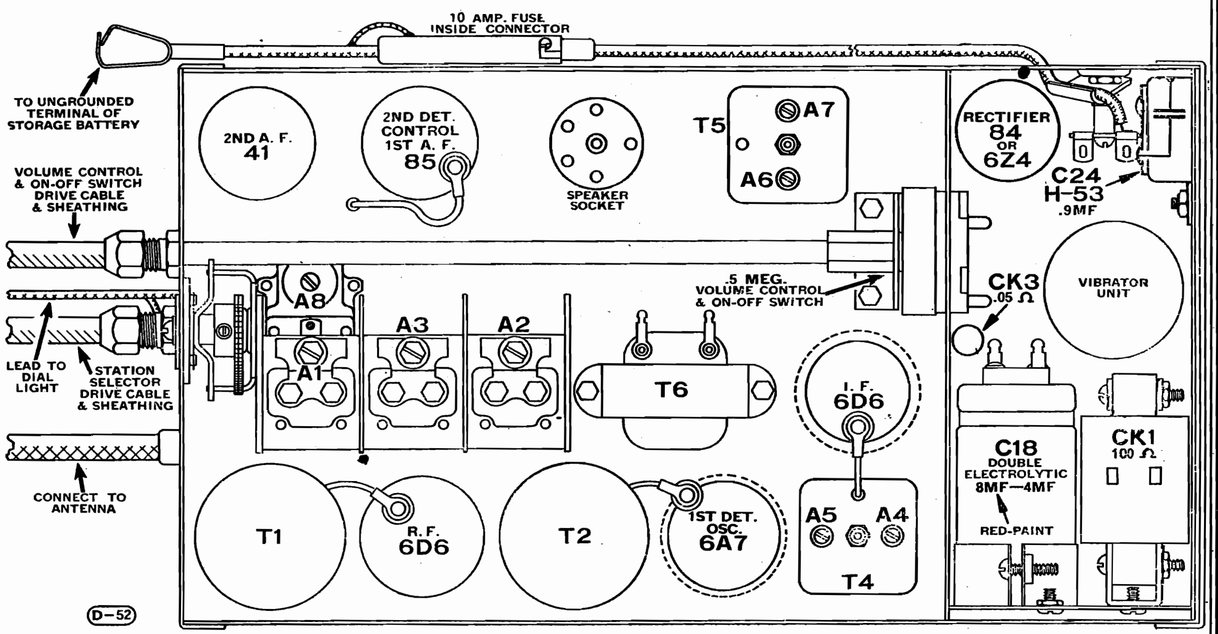
ATWATER-KENT MFG. CO.

MODEL 776
Schematic, Voltage



MODEL 776
Socket, Trimmers
Chassis
Changes

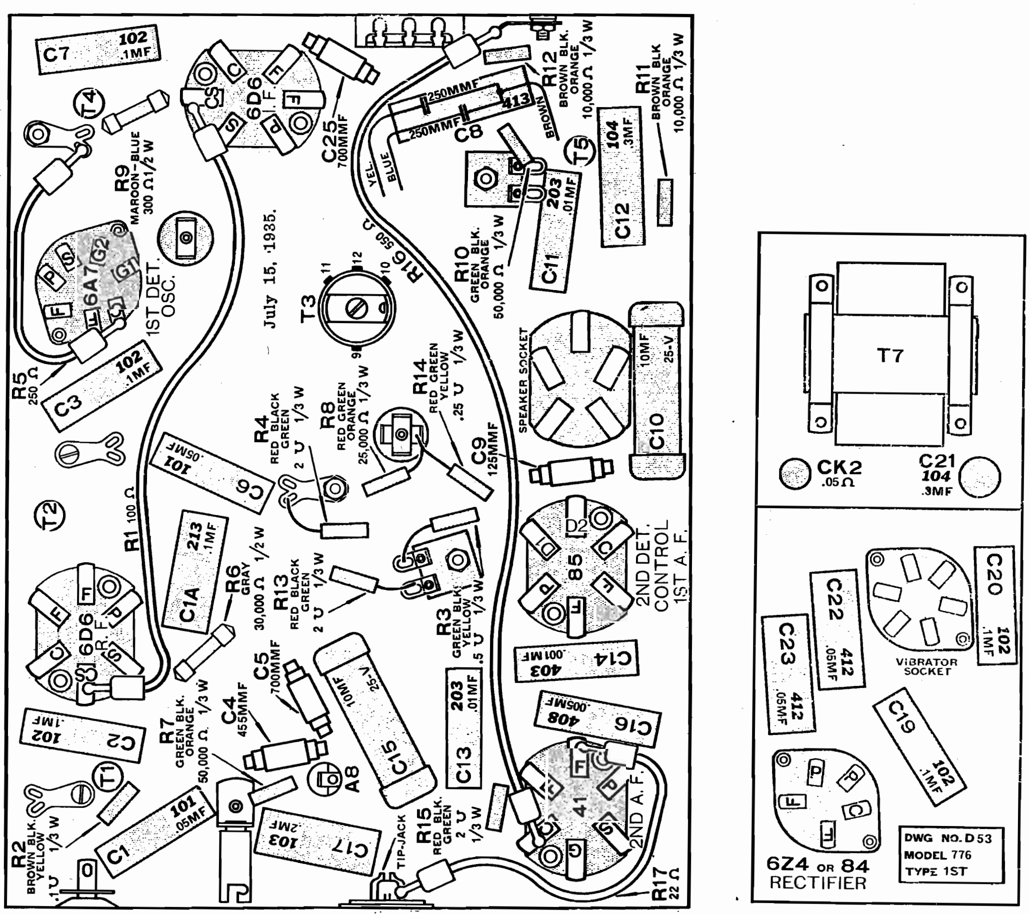
ATWATER-KENT MFG. CO.



In early sets R11 is 5,000 ohms with a drop of 4 volts and R12 is 15,000 ohms with a drop of 10 volts. In late sets these two resistors are each 10,000 ohms and there is approximately 6 volts across each. (At the same time this change was made, the 1st-A. F. plate resistor, R14 was changed from .1 meg. to .25 meg. With the .1 meg. resistor, the drop across it is 55 volts, and the plate voltage is 125. With the .25 meg. resistor, the plate voltage is lower. All voltages are measured with the 250-volt scale of a 1,000-ohm-per-volt voltmeter.)

The voltage across R11 regulates the "squelch" or minimum-signal level at which the 2nd-detector begins to function. The combined voltage across R11 and R12 acts as the bias on the AVC and the 1st-A. F. grid.

Early Model 776 sets do not have tone control, and the "A" filter circuit is slightly different from that shown. C17 in the lower right-hand part of the diagram is .2 MF.



ATWATER-KENT MFG. CO.

PARTS LIST FOR MODEL 776

For part numbers of tubular resistors and condensers, refer to lists in previous supplements.

29296	Cabinet body, complete, less lid
29297	Inner plate with spring
29298	Tuning cable chuck and plate less nut
29225	Vol. control chuck less nut
29226	Chuck nut
26523	Rubber gasket
26128	Thumbscrew (specify gold finish)
29233	Instruction folder, F-1235
21143	Plug suppressor
21144	Distributor suppressor
23260	1 MF, 200-V. condenser (K 1)
38270	Filter cond., .5 MF (224)
26098	Antenna cable
26099	Battery cable
26611	Shipping container
26462	Variable condenser
29286	Shield for T3
27095	Shield for T1 and T2
29183	I. F. T. shield
26505	Volume control .5 U
26033	Volume control mounting bracket
29224	Volume control hex. nut
29232	Volume control shaft-tube support
29279	Volume control shaft tube
44340	Tone control switch assembly
30037	Tone control shaft and blade
26451	Tube shield (cardboard)
29094	Terminal card

SOCKETS

24493	5-prong socket
24494	6-prong socket (85, 41)
27023	6-prong socket (6D6)
26111	7-prong socket
26572	Tip jack

TRANSFORMERS

T1	38010	No. 1 R. F. T.
T2	43840	No. 2 R. F. T.
T3	43860	Osc. trans.
T4	43640	No. 1 I. F. T.
T5	43650	No. 2 I. F. T.
T6	26982	Output T.
T7	26291	Power T.

RESISTORS

R1	20040	100 Ω, flexible
R5	31830	250 Ω, flexible
R16	23780	550 Ω, flexible
R17	16840	22 Ω, flexible

CONDENSERS

C4	43910	455 MMF, 500-V.
C5	36510	700 MMF, 500-V.
C9	35290	125 MMF, 500-V.
C10, 15	25379	10 MF, 25-V. (electrolytic)
C18	26995	8 MF-4 MF, 300-V. (electrolytic)
C24	45530	.9 MF (H53)
C25	36510	700 MMF, 500-V.

TRIMMERS

A4, 5	29119	On T4
A6	29119	On T5
A7	39420	Under var. cond.

POWER UNIT

43940	Power unit complete with tube
29289	Power unit container
27005	Vibrator
27038	Vibrator cover tube
26985	5-prong socket (rectifier)
26986	6-prong socket (vibrator)
27011	Filter choke (iron core)
36630	Choke (48-turn)
29264	Clamp for 48-turn choke
29094	Terminal card
29252	"A" lead from power unit
26291	Power transformer
26995	Electrolytic cond., 4 and 8 MF, 300-V.

SPEAKER

26851	Speaker less cable
29293	Lid with metal screen
26448	Plug only
19508	Cond. clamp
26826	Cone head assem.
26827	Field coil (6.5 Ω)

CONTROL UNIT

(The key numbers refer to illustration on facing page.)

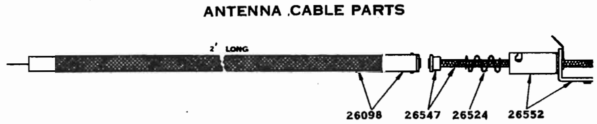
1	30001	Case
2	30003	Bezel
3	30016	Dial plate
4	30002	Crystal
5	29341	Remote control complete with mounting parts less cables
6	30011	Key knob (volume)
7	30008	Tuning knob
8	30009	Tuning knob set screw
9	30023	Case mounting screw
10	30017	Pointer shaft
11	30007	Drive-shaft retaining screw
12	30038	Key retaining spring
13	30022	Post mounting screw
14	27118	6-8-volt dial light (green)
15	30013	Dial light socket and lead less lamp
16	30005	Drive shaft (gear)
17	30004	Dial pointer
18	30021	Lock washer
19	30006	Drive-shaft washer
20	29338	Strap and bushing
21	30015	Pointer gear
22	30014	Pointer pinion gear
23	26894	"U" washer, blued
24	30012	"U" washer, flat
25	29254	Vol. control cable assem.
26	29339	Steering post mtg. bracket
27	26105	Tuning cable assem.
	30019	Sheath-clamping screw

Part Number	Description
26943	Universal mounting bracket for control unit in Models 666, 816, 926, 936, for mounting control head at lower edge of instrument panel.

The mounting plates and bracket listed below are for Model 776 control unit

30025	1934 Ford	Dash finish.
30029	Universal mounting bracket for flush mounting of control head at lower edge of instrument panel. This type mounting may be used on all General Motors and other cars for which there are no mounting plates available. Also for cars which do not have the cut-out space in instrument panel.	
29592	1935 Chrysler Air Stream	Vertical wood-grain finish.
30027	1935 Plymouth, Dodge, DeSoto	Horizontal wood-grain finish.
29591	1935 Ford	Taupe finish.
30028	1935 Hudson and Terraplane	Vol. finish.
30026	1934 Chrysler, Plymouth, Dodge	Black finish.

ANTENNA CABLE PARTS



Ω = ohms. U = megohms.

I. F. COUPLING UNIT. Purchase from your distributor one of the special Atwater Kent I. F. coupling units No. 42590. This is placed on the grid cap of the I. F. or the 1st-detector tube, as specified, and the lead that normally connects to the grid cap is attached to the coupling unit.

GENERAL NOTES.

1. Do not tamper with the trimmer adjustments unless the necessity is clearly apparent.

2. On the oscillator trimmer there are two different settings at which the signal will be received. Always use the *first* of these two positions as you screw the trimmer in from a loose or minimum-capacity position. THIS IS IMPORTANT.

3. Check the I. F. trimmers first.

4. In checking the set, do not disturb the position of the wiring any more than necessary.

DIAL CALIBRATION.

The dial calibration depends on the oscillator circuit of the set, providing that the I. F. trimmers are correctly aligned to their specified frequency. The pre-selector (R. F. and 1st-detector) trimmers do not affect the dial calibration, but simply affect sensitivity.

The oscillator trimmer is used to adjust the high-frequency end of the scale.

The oscillator tracking condenser adjusts the low-frequency end of the scale.

If adjustment of the oscillator trimmer and the oscillator tracking trimmer condenser does not correct the dial readings, it may be necessary to replace the fixed oscillator tracking condenser or the oscillator transformer.

Naturally the I. F. trimmers should be checked and adjusted, if necessary, before any attempt is made to align the R. F. or oscillator trimmers.

PROCEDURE

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of the regular I. F. coupling unit. Peak A6, A7. Connect I. F. oscillator to 1st-detector tube and peak A4, A5.

DIAL POINTER ADJUSTMENT.

Connect oscillator (560 KC) to antenna and ground and peak A8 while rocking the variable condenser for maximum sensitivity. Then adjust dial pointer to 560 KC mark by turning the adjustment nut at rear of control unit.

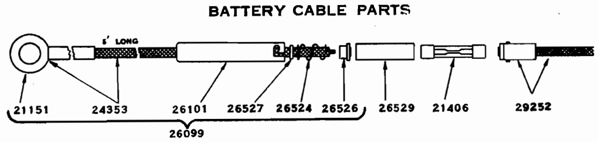
R. F. TRIMMERS.

Connect R. F. oscillator to antenna and ground of set.

With oscillator and dial at 1500 KC, peak A3, A2, A1. Check frequency alignment at 560 KC.

Part Number	Description
21144	Distributor suppressor, 15,000 Ω
27943	.5 MF, 200-V., condenser for Ford cars.
21143	Plug suppressor, 15,000 Ω.
23520	Ignition filter. (Used in early models of Atwater Kent motor car receivers.)
38270	.5 MF, 200-V. condenser.
23260	1 MF, 200-V., condenser (K1)

BATTERY CABLE PARTS



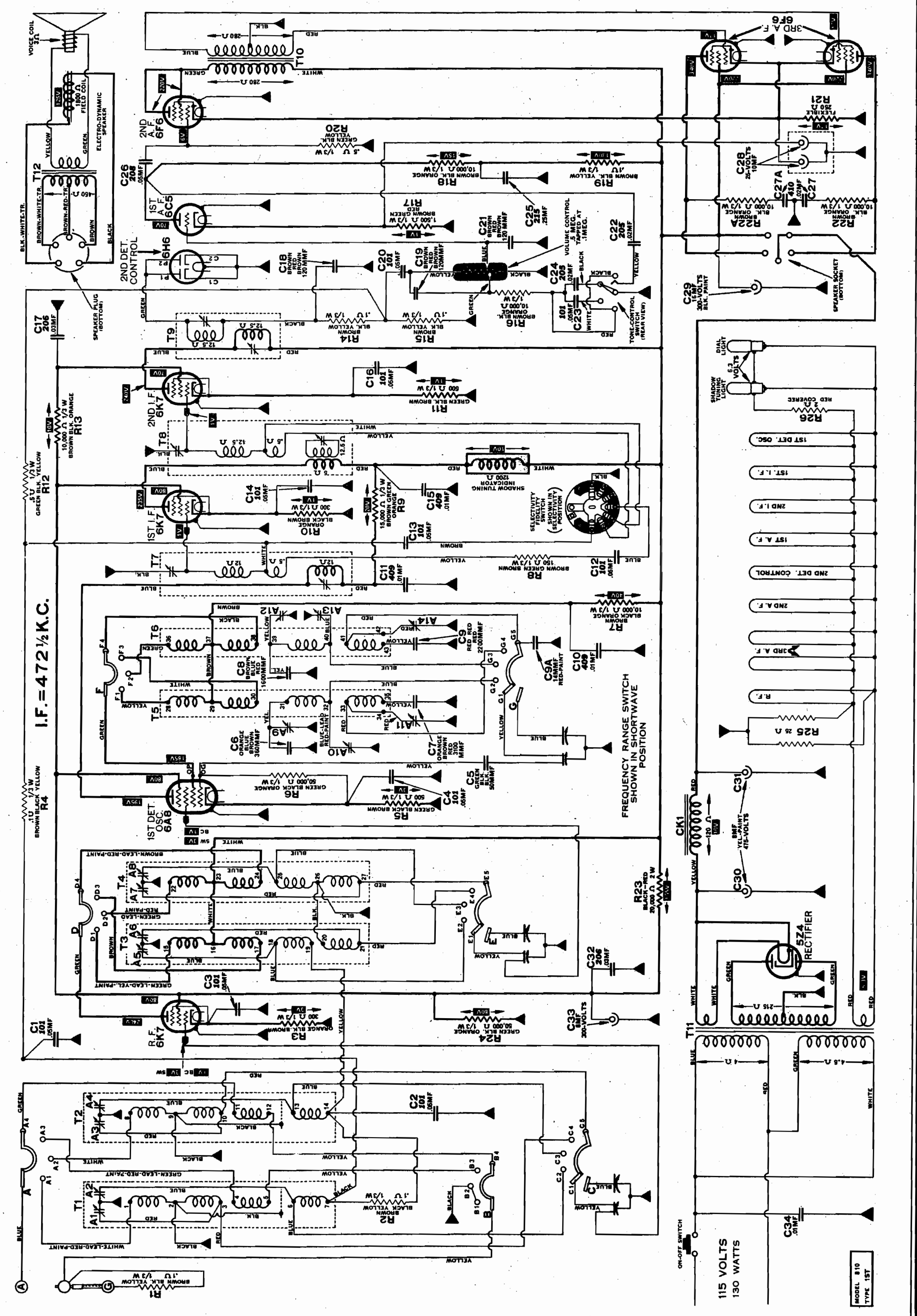
MODEL 810
Schematic, Voltage

ATWATER-KENT MFG. CO.

MODEL 810

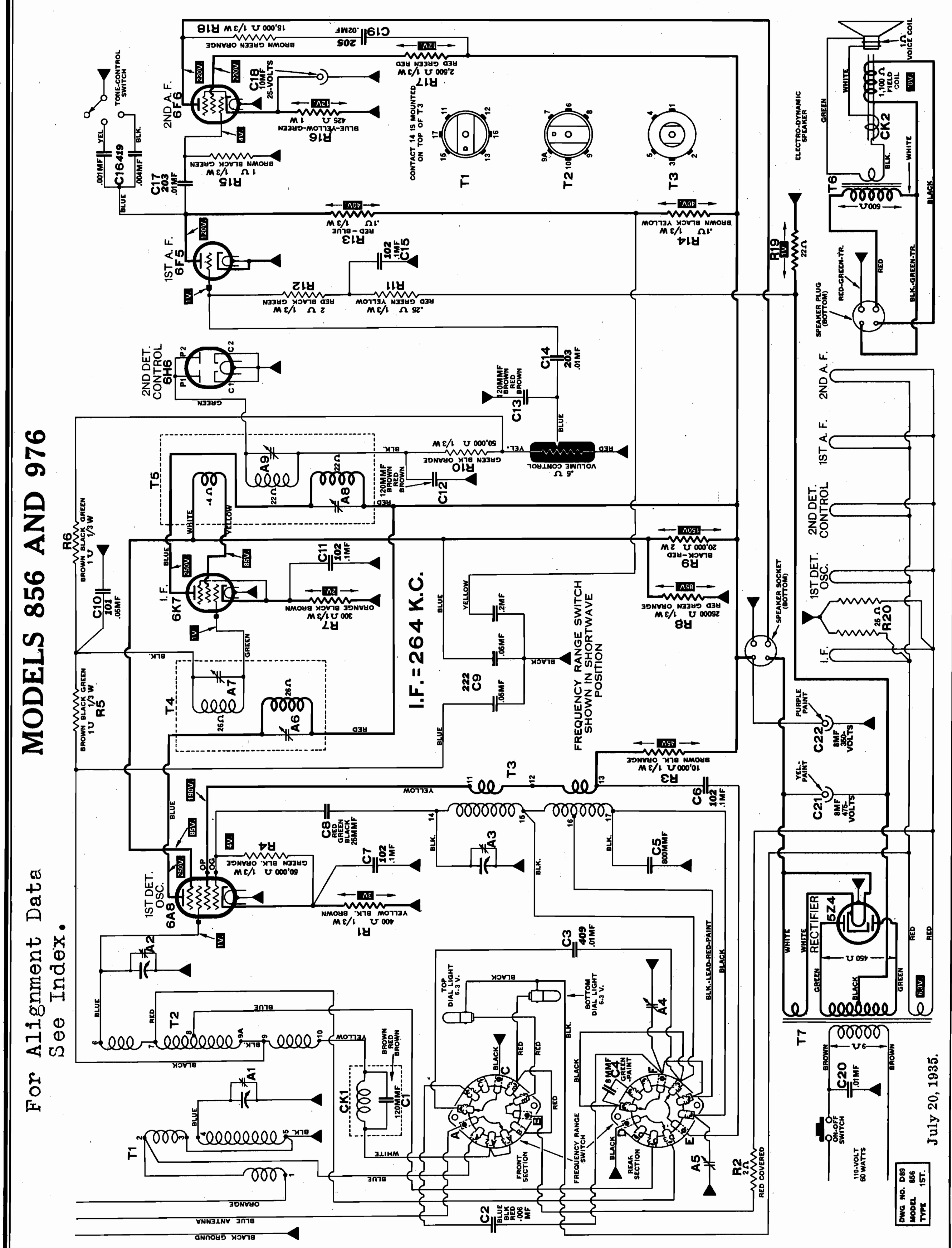
I.F. = 472½ K.C.

For Alignment Data See Index.



MODELS 856,976 (Early)
Schematic, Voltage

ATWATER-KENT MFG. CO.



MODELS 237Q,467Q
MODELS 317,337
MODELS 856,976
Trimmers,Alignment

ATWATER-KENT MFG. CO.

ATWATER KENT RADIO

ADJUSTING TRIMMER CONDENSERS

MODELS 237Q, 317, 328, 337, 467Q, 649, 810, 856 AND 976

GENERAL DATA.

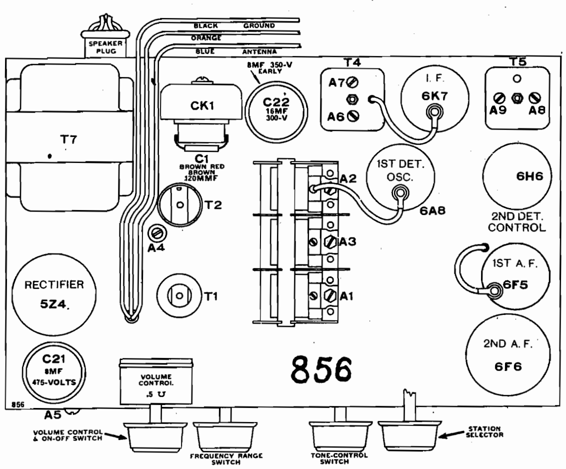
When adjusting trimmers, keep the radio volume control turned on full, keep the tone control at "high," and turn the selectivity-fidelity switch (used in some models) to "selectivity."

Use the weakest possible oscillator signal that will give a reading on a sensitive output meter.

Use an Atwater Kent No. 42590 coupling unit to couple the I. F. oscillator to set. The coupling unit may be purchased from any Atwent Kent distributor, and is a necessity for correct I. F. alignment of Atwater Kent receivers.

On trimmers in the oscillator circuit, it may be found that there are two peaks (one peak where the oscillator frequency is higher than the signal by an amount equal to the I. F. frequency, and the second peak where the oscillator is lower than the signal by an amount equal to the I. F. frequency). The first peak (as the trimmer is screwed in from a loose or minimum-capacity position) is the correct peak.

On the 5- and 6-tube models, always peak the short-wave oscillator trimmer, which is mounted on variable condenser, before peaking the broadcast trimmer.



MODELS 856 AND 976

I. F. TRIMMERS.

Connect I. F. test oscillator (264 KC) to I. F. tube by means of regular I. F. coupling unit No. 42590. Peak A9 and A8. Connect I. F. oscillator to the 1st-detector grid and peak A7 and A6.

DIAL POINTER ADJUSTMENT.

With the variable condenser fully meshed, the dial pointer should be set at 535 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground terminals of set.

Short-wave range. With oscillator and dial at 18 MC, peak A3.

Police range. No trimmers on this range.

Broadcast range. With oscillator and dial at 1500 KC, peak A4, A2 and A1. With oscillator and dial at 560 KC, peak A5.

MODELS 317 AND 337

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to I. F. tube by means of regular I. F. coupling unit No. 42590. Peak A9 and A10. Connect I. F. oscillator to grid of 1st-detector and peak A7 and A8.

DIAL POINTER ADJUSTMENT.

With variable condenser fully meshed, the dial pointer should be set at 538 KC.

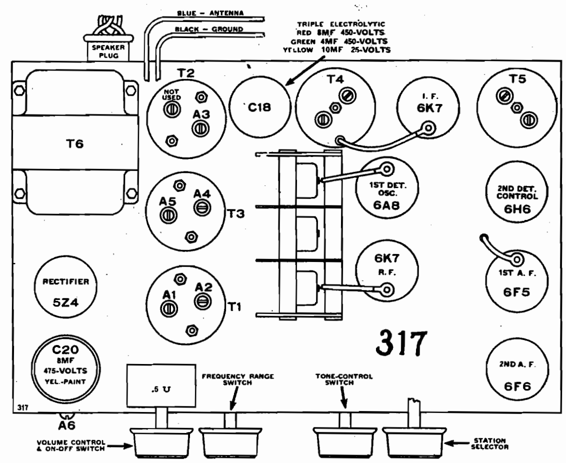
R. F. TRIMMERS.

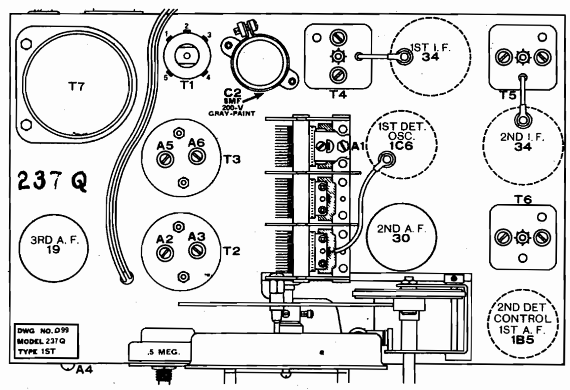
Connect an R. F. test oscillator to the antenna and ground leads of set.

Short-wave range. With oscillator and dial at 18 MC, peak A5 and A2.

Police range. No trimmer adjustments on this range.

Broadcast range. With oscillator and dial at 1500 KC, peak A4, A3 and A1. With oscillator and dial at 560 KC, peak A6.





MODELS 237Q AND 467Q

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to 2nd-I. F. grid by means of regular I. F. coupling unit No. 42590. Peak two trimmers on top of T6.

Connect oscillator to 1st-I. F. grid and peak two trimmers on top of T5.

Connect oscillator to 1st-detector grid and peak two trimmers on T4.

DIAL POINTER ADJUSTMENT.

With the variable condenser fully meshed, the dial pointer should be set slightly below 540 KC.

R. F. TRIMMERS.

Connect an R. F. oscillator to the antenna and ground leads of set.

Short-wave range. Oscillator at 18 MC, and dial pointer at 18 MC, peak A6 and A3.

Police range. No trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC, and dial pointer at 1500 KC, peak A5, A2 and A1. Tune oscillator to 560 KC, and with dial pointer at 560 KC mark, peak A4. Repeat adjustment of A5 at 1500 KC and A4 at 560 KC, if necessary.

ATWATER-KENT MFG. CO.

TRIMMERS ON MODEL 810

	12 to 18 MC range	4.6 to 12.2 MC range	1.6 to 4.6 MC range	540 to 1600 KC range
R. F.	A3	A1	A4	A2
1st-DET.	A7	A6	A8	A5
OSCILLATOR	A14	A11	A13	A10
TRACKING			A12	A9

There are six I. F. trimmers, two on top of each I. F. transformer (T7, 8, 9). These are adjusted at 472½ KC.

MODELS 328 AND 649

I. F. TRIMMERS.

Connect I. F. test oscillator (472½ KC) to grid of 2nd-I. F. tube by means of regular I. F. coupling unit No. 42590. Peak two trimmers on top of T6. Connect I. F. oscillator to grid of 1st-I. F. and peak two trimmers on top of T5. Connect I. F. oscillator to grid of 1st-detector and peak two trimmers on top of T4.

DIAL POINTER ADJUSTMENT.

Refer to instructions under Model 810.

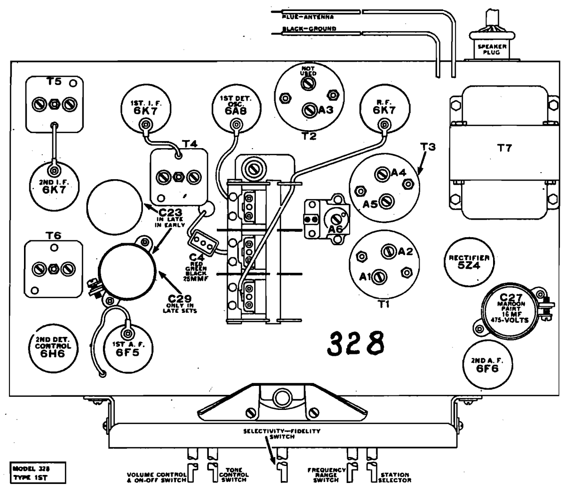
R. F. TRIMMERS.

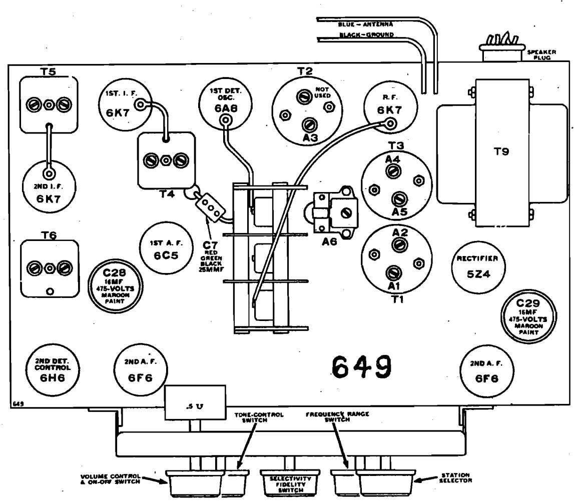
Connect an R. F. test oscillator to the antenna and ground terminals of set. Loosen the trimmer screws for the range or ranges that are to be adjusted.

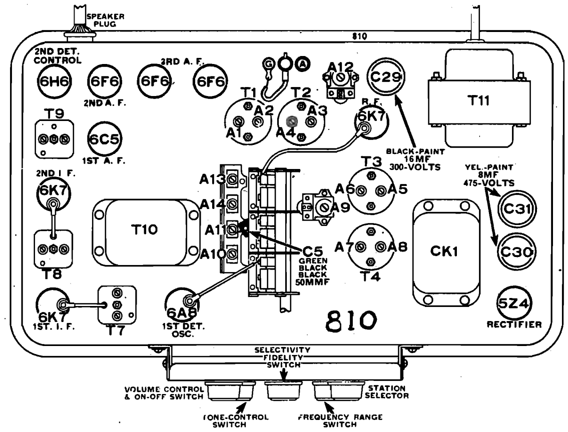
Short-wave range. Oscillator at 18 MC, dial at 18 MC, peak A5 and A2.

Police range. No trimmer adjustments for this range.

Broadcast range. Oscillator at 1500 KC and dial at 1500 KC, peak A4, A3 and A1. Oscillator and dial at 560 KC, peak A6.







MODEL 810

I. F. TRIMMERS.

Connect a sensitive output meter to set. Connect I. F. test oscillator (472½ KC) to grid cap of 2nd-I. F. tube, using an Atwater Kent No. 42590 coupling unit. Use the weakest possible oscillator signal that will give a reading on the output meter, and peak two trimmers on T9.

Connect oscillator to 1st-I. F. grid cap and peak two trimmers on T8.

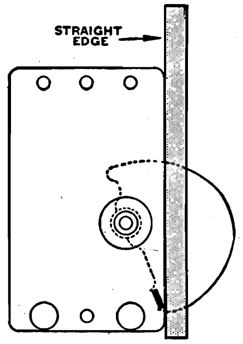
Connect oscillator to 1st-detector grid cap and peak two trimmers on T7.

DIAL POINTER ADJUSTMENT.

If the dial gear and indicator have been changed in any way, reset as follows:

1. Loosen the two set screws which hold pointer gear on condenser shaft.
2. Turn condenser to minimum.
3. See illustration below. Place straight-edge gauge in vertical position with the long flat face against the front mounting plate of the variable condenser as shown. Turn the condenser until the front edge of the rotor spacing bar just touches the straight edge. Hold the condenser in this position and move the pointer arm so the pointer is at 1520 KC (1580 KC in 328, 649), after which tighten the set screws to hold the dial gear securely.
4. Loosen the screws which hold the pointer to the pointer arm, and adjust the pointer so that when the condenser is completely meshed, the pointer is at 535 KC.

Recheck at 1520 KC (1580 KC in 328, 649) and repeat procedure 3 and 4, if necessary.



This illustration shows the correct position of the variable condenser rotor for a dial pointer setting of 1520 KC (1580 KC in 328, 649). The straight edge is held firmly against the front mounting plate of the variable condenser and the rotor is turned so the spacing bar (shown as a small black oblong) is just touching the straight edge. The straight edge is a strip of bakelite or hard rubber ¼" thick, ⅝" wide, and 6" long. The ⅝" side is held against the mounting plate.

R. F. TRIMMERS.

12 to 18 MC range. Oscillator and dial pointer at 18 MC, peak A14, A7 and A3.

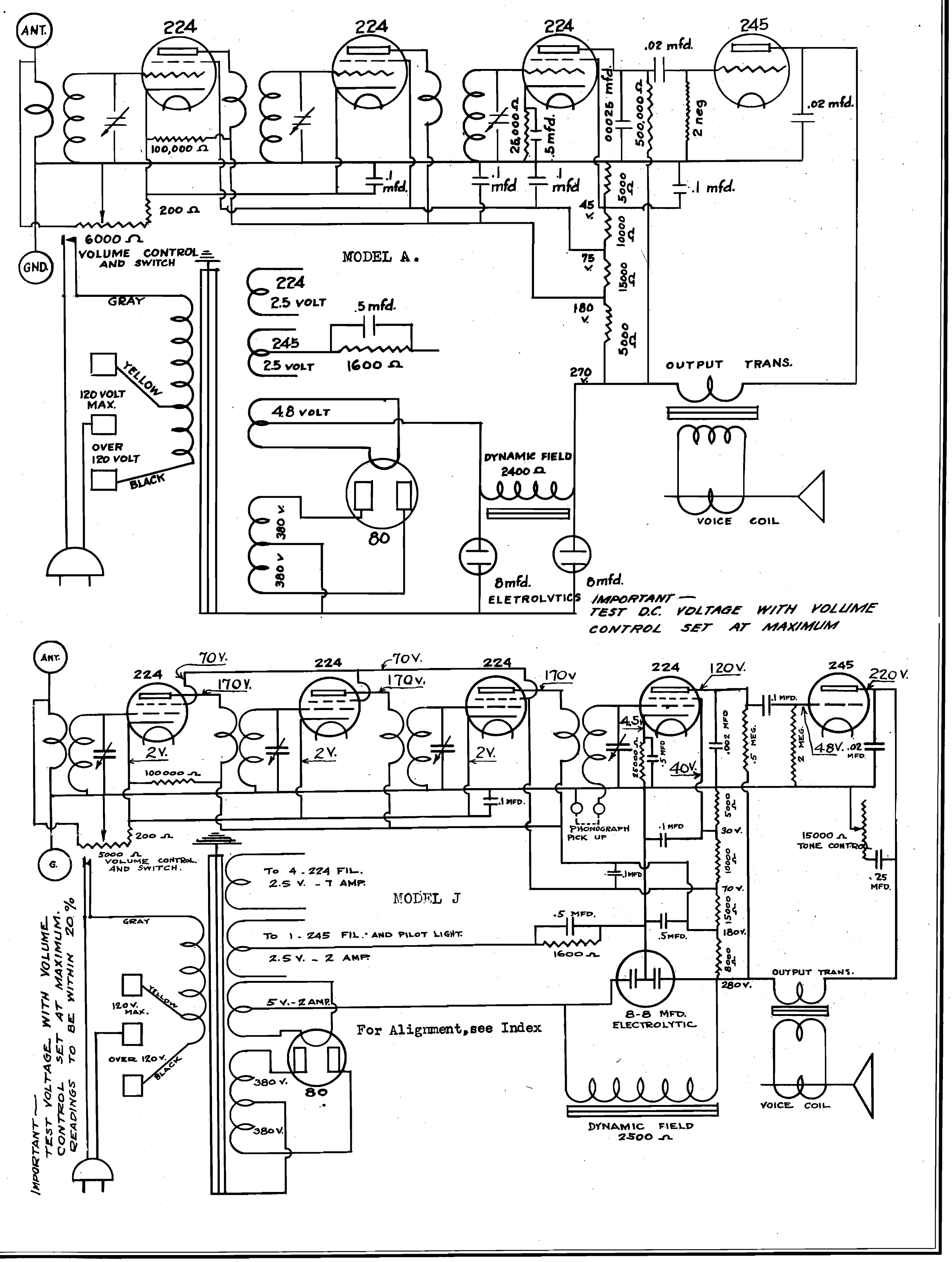
4.6 to 12.2 MC range. Oscillator and pointer at 12 MC, peak A11, A6 and A1.

1.6 to 4.6 MC range. Oscillator and pointer at 4 MC, peak A13, A8 and A4. Tune oscillator to 1.7 MC, and with pointer at 1.7, peak A12.

540 to 1600 KC range. Oscillator and pointer at 1500 KC, peak trimmers A10, A5 and A2. Oscillator and pointer at 540 KC, peak A9.

MODEL A
MODEL J
Schematic, Voltage

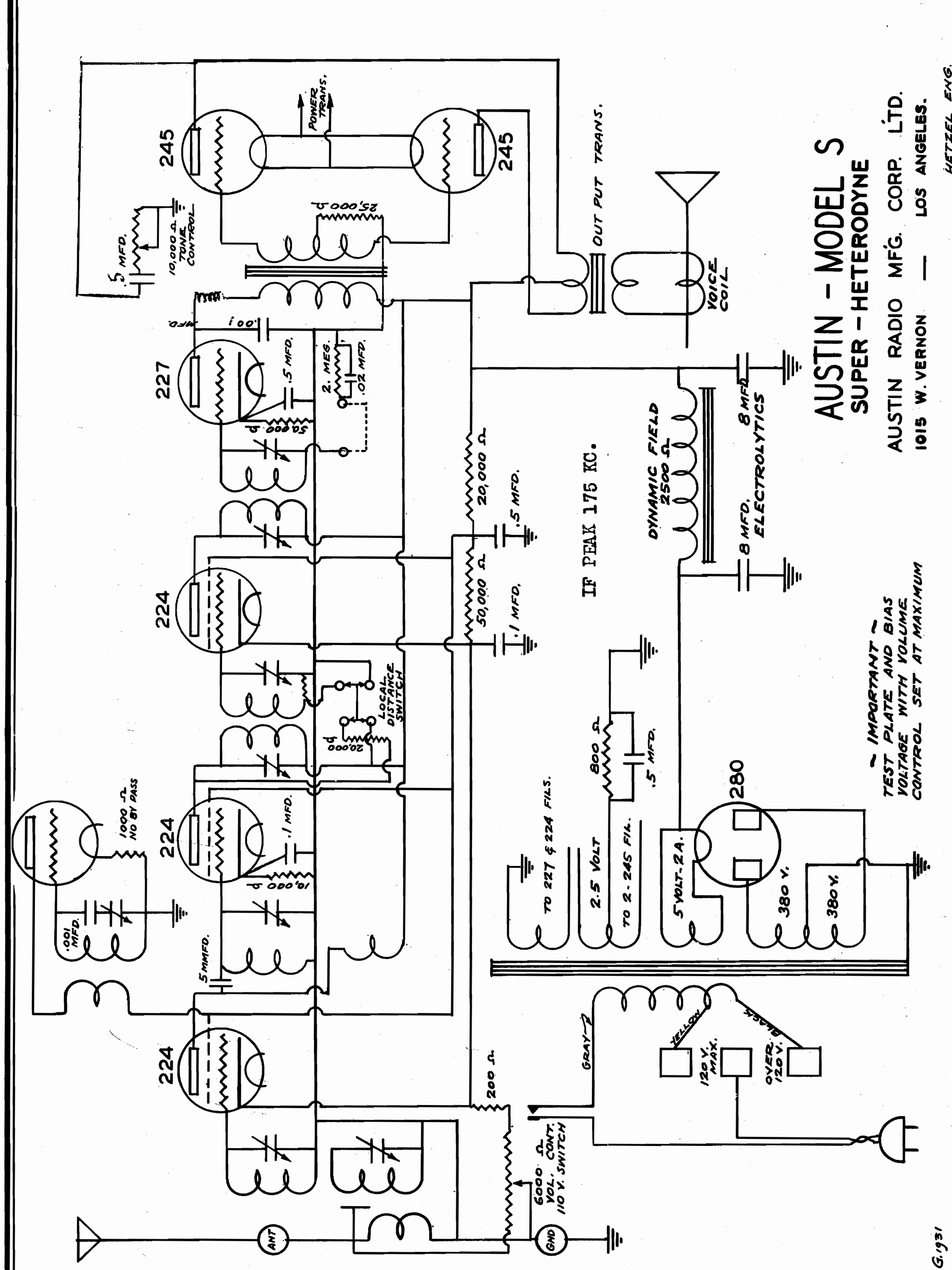
AUSTIN RADIO MFG. CO.



For Alignment, see Index

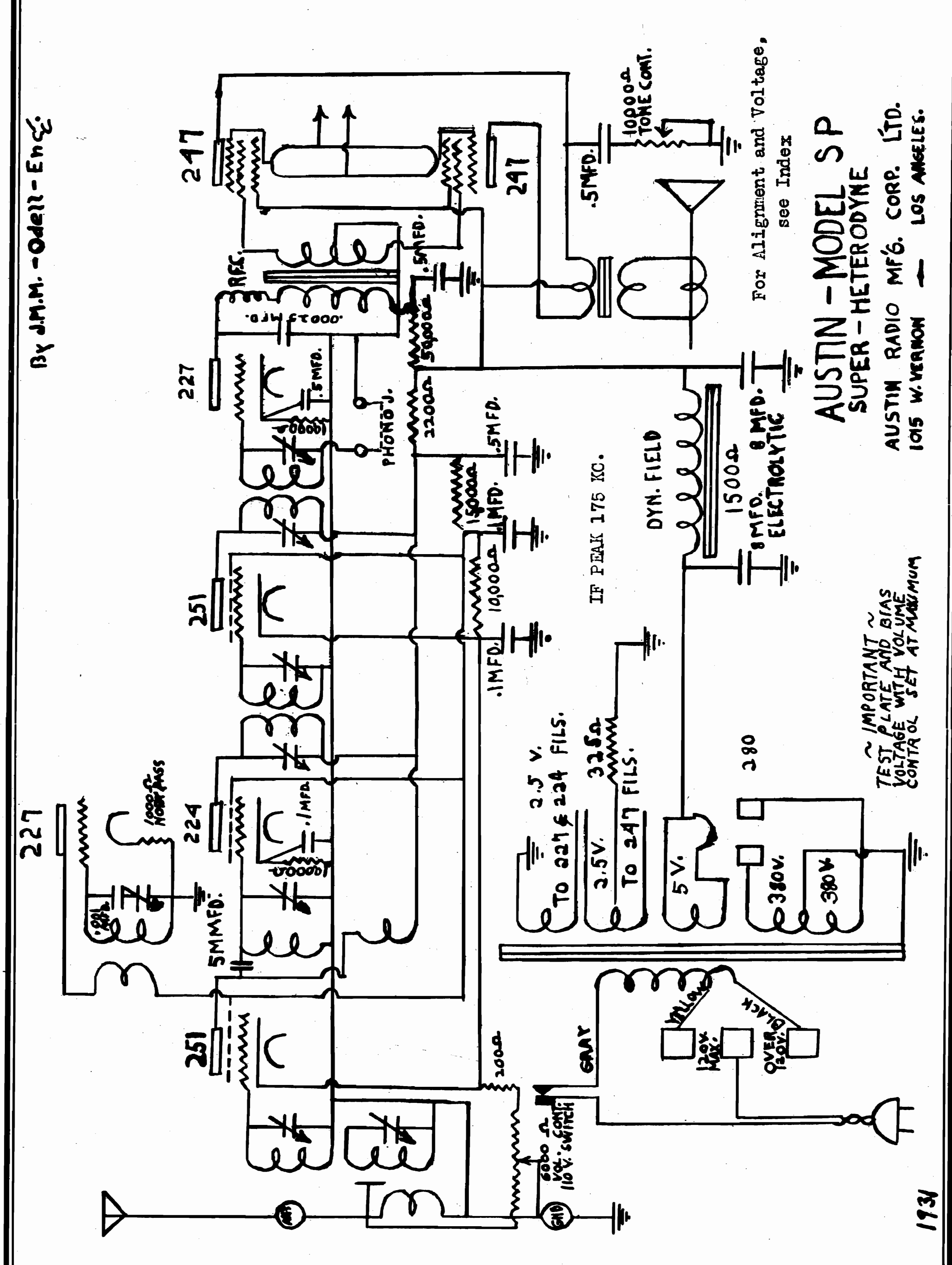
MODEL S
Schematic

AUSTIN RADIO MFG. CO.



MODEL SP
Schematic

AUSTIN RADIO MFG. CO.



MODEL J
MODEL SP
Alignment, Voltage

AUSTIN RADIO MFG. CO.

MODEL SP

(a) Intermediate frequency amplifier adjustment.

The intermediate frequency amplifier has four tuning adjustments, accessible thru holes underneath the chassis. The amplifier should be peaked at 175 kilocycles.

(b) Tuning condenser adjustment.

The four gang tuning condenser has four trimming condensers located on the top of the condenser unit. These should be all set at maximum (clockwise) and then reversed one full revolution. Set condenser dial at approximately 1350 K.C. and re-adjust all trimmers for maximum response. Then set condenser at approximately 650 K.C. and obtain maximum response by bending the split roter plates.

Testing

All plate, screen, cathode or bias voltage readings must be made with a volt meter having a resistance of at least 1000 ohms per volt. Readings should be taken with the volume control full on with no signal.

R.F. amplifier plate voltage	190
Oscillator plate	60
Het. Det. plate	190
I. F. plate	190
Det. plate	110
Audio plate	230
R.F. & I.F. screens	60
R.F. cathode	2.8
Osc. cathode	2.5
Het. Det. cathode	4.8
I.F. cathode	3
Det. cathode	8.2
Audio bias	18
Audio screen bias	248

MODEL J

Balancing

Set all trimmer condensers on the gang variable condenser to maximum by turning adjusting screws to right (clockwise) and then reverse one complete revolution. Tune some station in at approximately 1400 kilocycles on the dial and adjust all trimmers for maximum signal strength. Next turn dial to approximately 700 kilocycles. Bend the split rotor plates on the variable gang condenser to accomplish the same condition of maximum signal strength.

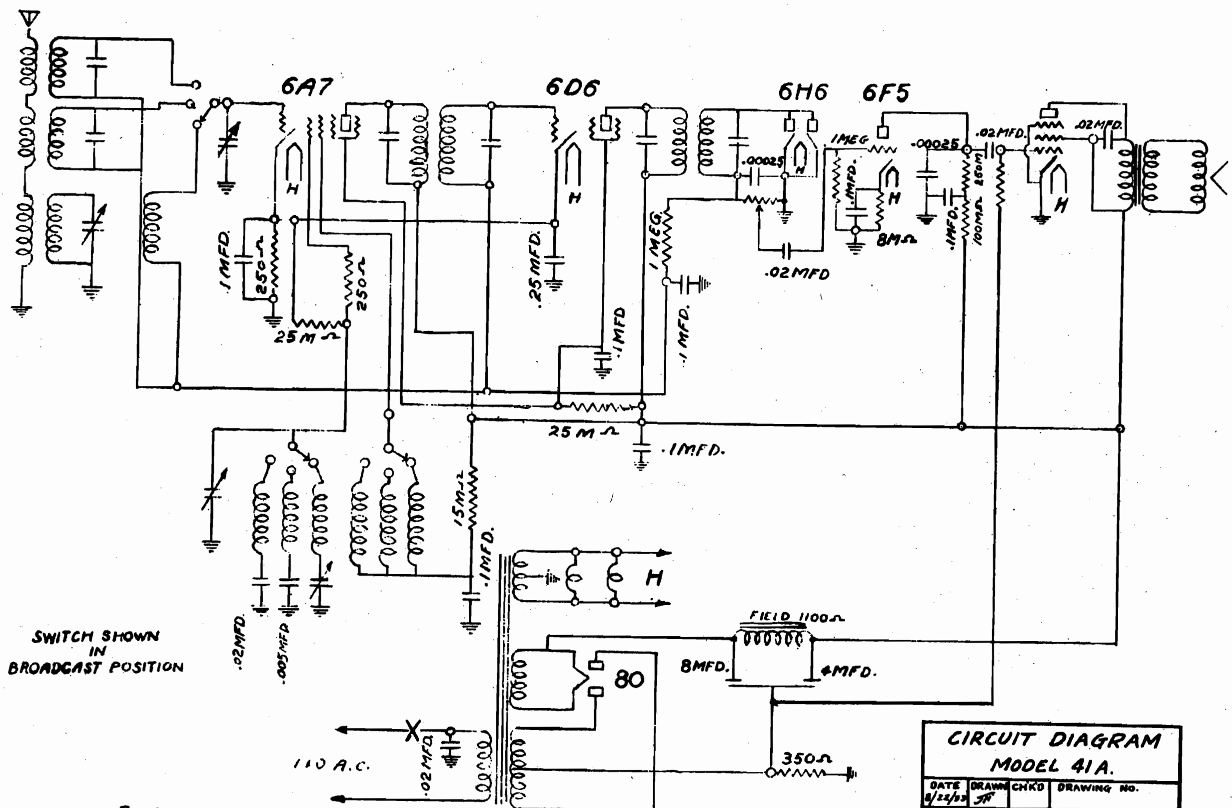
Testing

All readings of direct current voltage should be made with a high resistance voltmeter of at least 1000 ohms per volt. The following readings should be obtained with an allowable variation of 15%, with volume control set at maximum.

R.F. Plate voltage		170.
R.F. Screen	"	70.
R.F. Cathode	"	2.
Det. Plate	"	120.
Det. Screen	"	40.
Det. Cathode	"	4.5
Audio Plate	"	220.
Audio Bias	"	48.

MODEL GT-16A
MODEL 41-A
Schematics

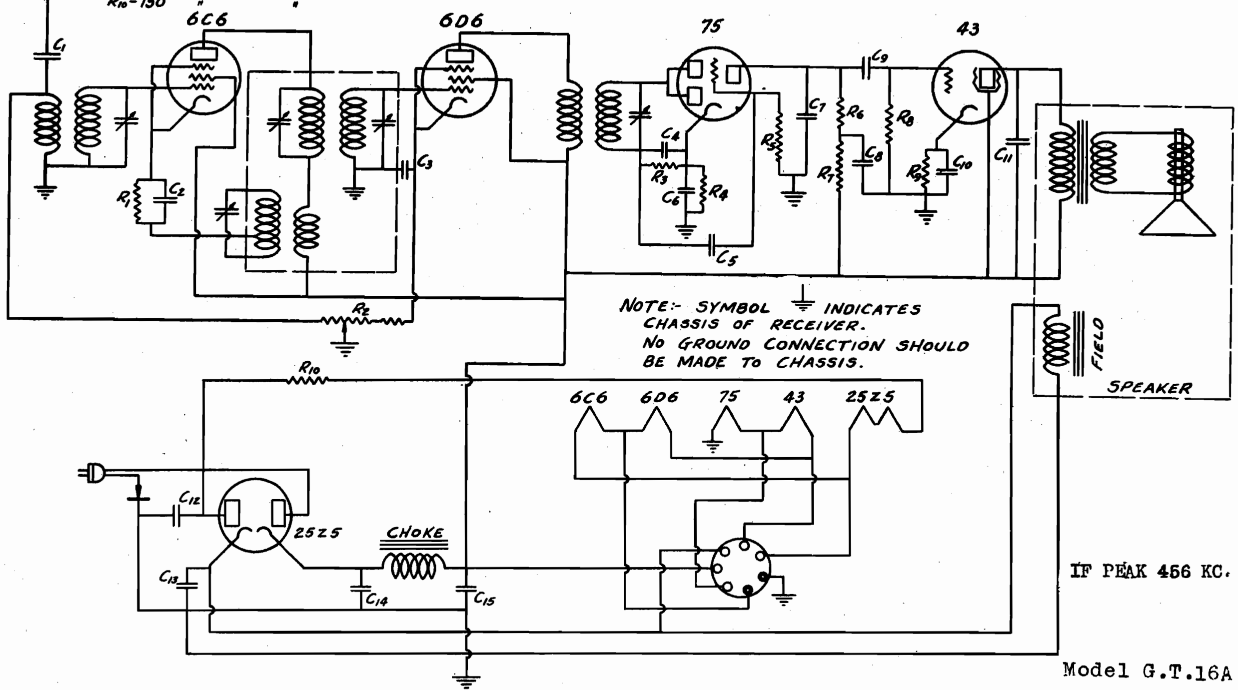
BALKEIT RADIO CO.



R_1 - 8 M. OHM RESISTOR.
R_2 - 300 M. OHM VOLUME CONTROL WITH 250 OHM FIXED BIAS RESISTOR.
R_3 - .5 MEGOHM RESISTOR.
R_4 - 8 M. OHM "
R_5 - .5 MEGOHM "
R_6 - 100 M. OHM "
R_7 - 100 M. " "
R_8 - .5 MEGOHM "
R_9 - 600 OHM "
R_{10} - 150 " "

C_1 - .001 MFD. CONDENSER
C_2 - .002 " "
C_3 - .1 " "
C_4 - .00015 " "
C_5 - .01 " "
C_6 - 10 " "
C_7 - .001 " "
C_8 - .1 " " 400 VOLT.

C_9 - .01 MFD. CONDENSER
C_{10} - 10 " "
C_{11} - .006 " "
C_{12} - .01 " "
C_{13} - 4 " "
C_{14} - 8 " "
C_{15} - 12 " "

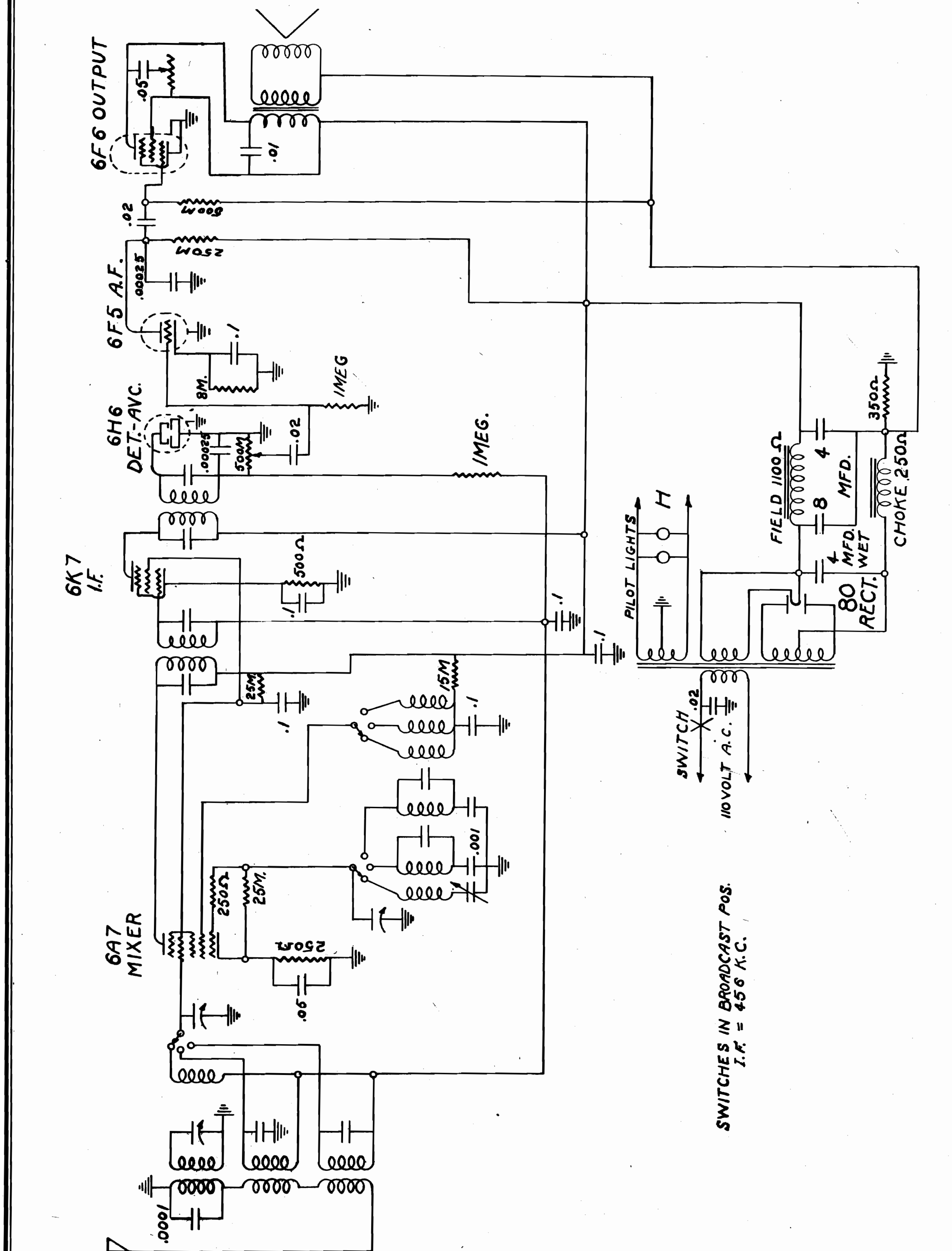


IF PEAK 456 KC.

Model G.T.16A

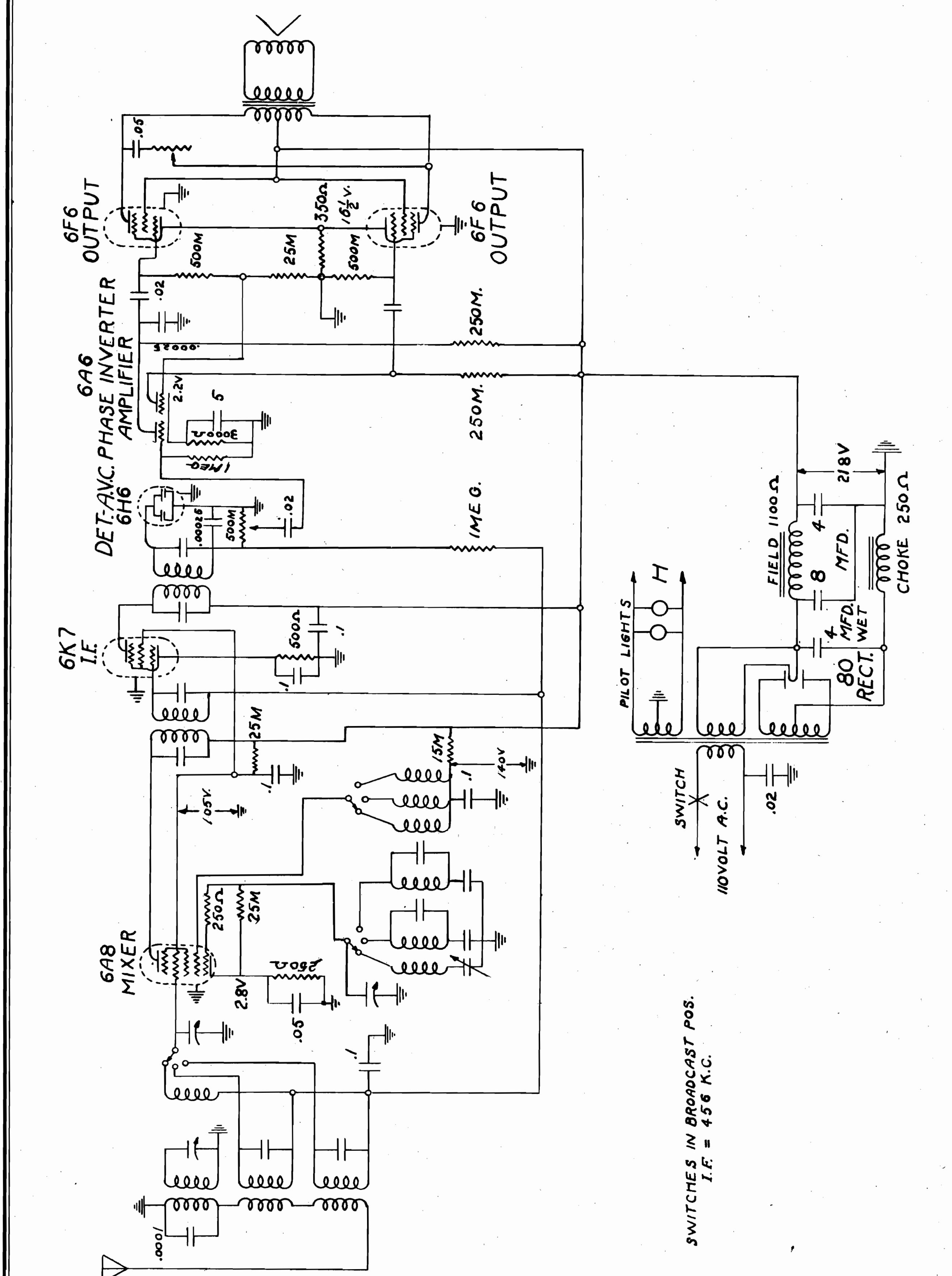
MODELS G-18A, G-19B
Schematic

BALKEIT RADIO CO.



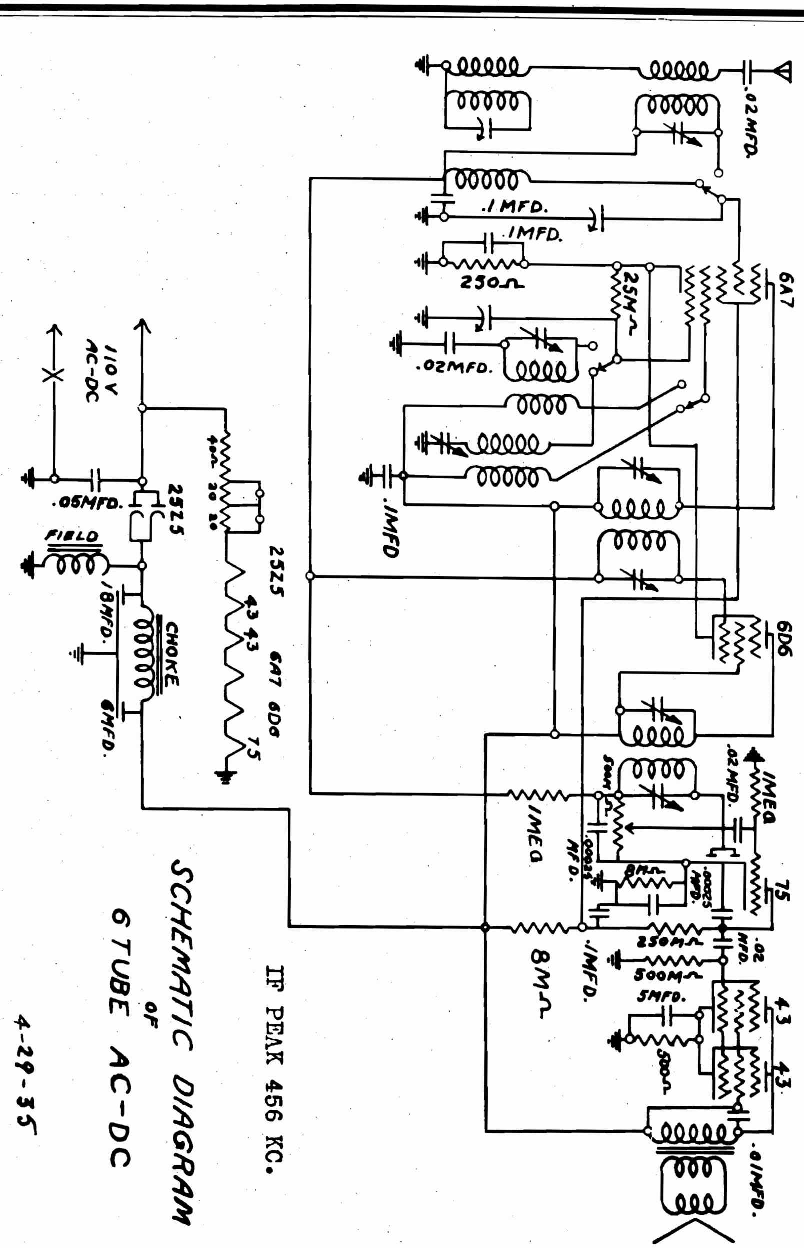
BALKEIT RADIO CO.

MODELS GT-20, GT-200X.
Schematic



MODEL GT-33
Schematic, Alignment

BALKEIT RADIO CO.



The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456,600,1400,3000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CAUTION: Do not let the test oscillator come in direct contact with the receiver Chassis.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through a .05 or .1 mfd. condenser. If desired the ground on the test oscillator can be connected to the chassis ground. Align all four I.F. Trimmers to peak or maximum reading on the output meter.

R.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the two front gang trimmers to peak.

Next rest the dial pointer on the receiver and the test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the preselector or R. F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the Dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

CAUTION: Be very careful in handling the receiver chassis as it is connected to one side of the power line.

LOW VOLUME This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition)open antenna coil, open or shorted by-pass condensers or defective wave change switch. Poor receiving locations such as steel buildings may require extra antenna to get good reception.

LOW VOLTAGE Low voltage may be caused by a defective rectifier tube, open filter condenser or shorted by-pass condensers.

HUM Excessive hum may be caused by a defective tube,open or shorted by-pass condensers or open audio grid leads.

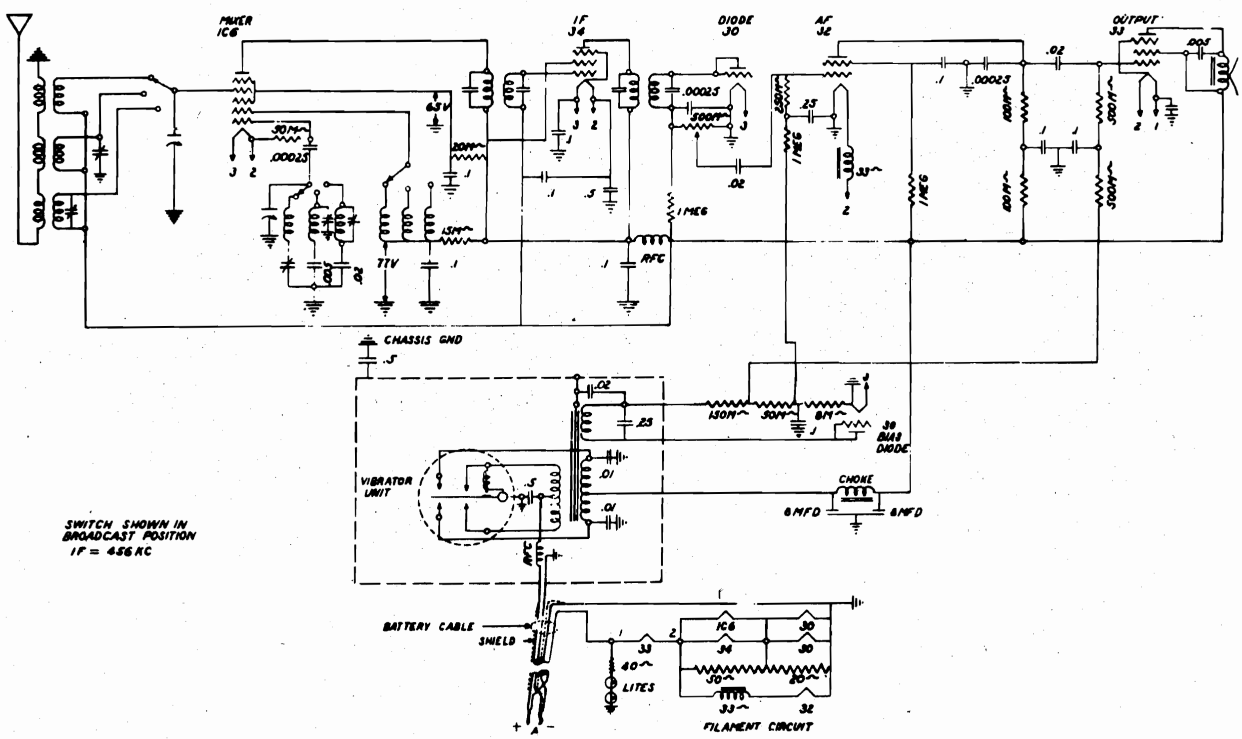
DISTORTED REPRODUCTION This may be caused by a defective 75 or 43 tube or a ground or open in the automatic volume control circuit. Check all circuits with an ohmmeter or continuity tester.

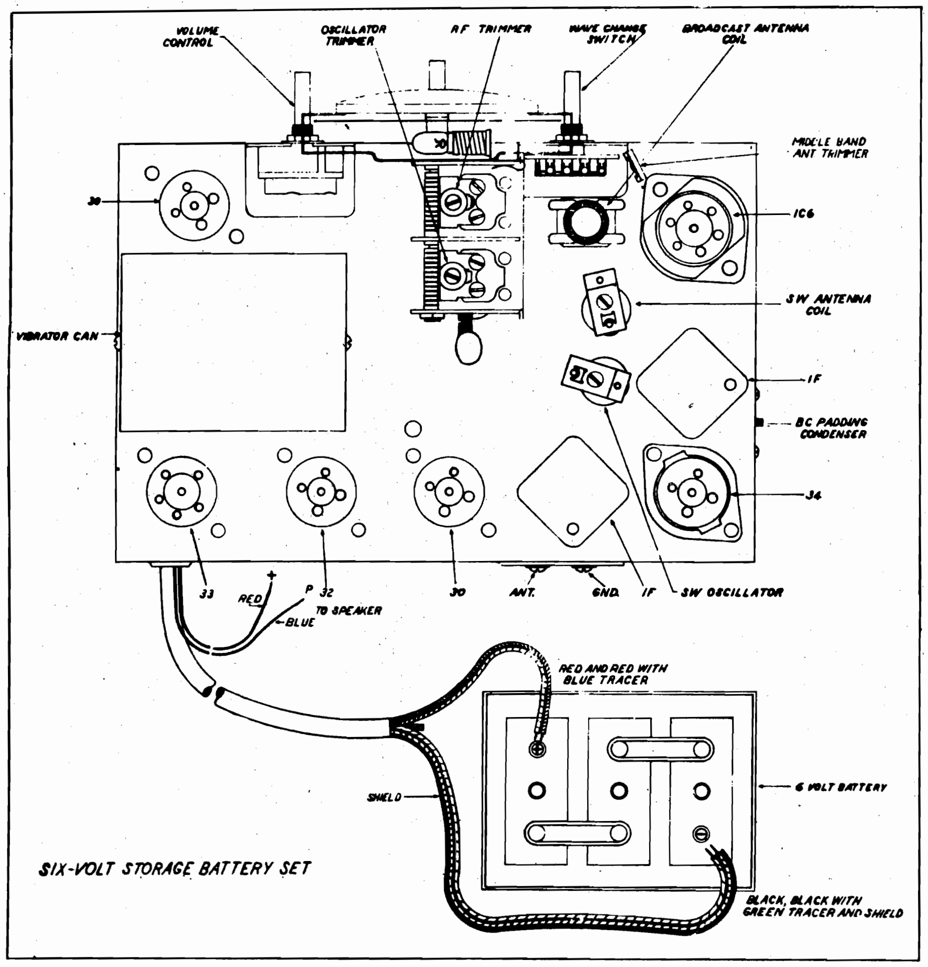
OSCILLATION Most trouble from oscillation is due to open by-pass condensers in the R.F. or I.F. circuits. Test each condenser with another condenser in parallel.

The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

MODEL GT-156BA
Schematic, Socket
Trimmers

BALKEIT RADIO CO.





SIX-VOLT STORAGE BATTERY SET

MODEL GT-156BA
Alignment Data

BALKEIT RADIO CO.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 3000 and 10,000 K. C. and an output meter to be connected across the speaker terminals.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna wire through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the front or R.F. trimmer to peak.

Next rest the dial pointer on the receiver and test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustment at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

VIBRATOR Vibrator noise may be due to the following: a discharged "A" battery, high resistance connections on battery terminals, a defective vibrator or a loose cover on the vibrator can.

The vibrator unit is a plug-in type and can be removed for replacement very easily. This unit should last a very long time as current through the contact points is very small.

Never leave the power switch turned on when the "A" battery is too low to make the receiver function as this is liable to seriously injure the vibrator or vibrator transformer. Never remove any of the tubes when the power switch is turned on as they are connected in a series parallel circuit.

MICROPHONICS The two volt type of tubes used in this receiver are ordinarily more microphonic than heater types. They can be detected by touching each tube with the finger tips. Another source might be caused by the dial glass touching the front or escutcheon plate.

LOW VOLUME This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition); antenna disconnected from the receiver· open antenna coil or open or shorted by-pass condensers.

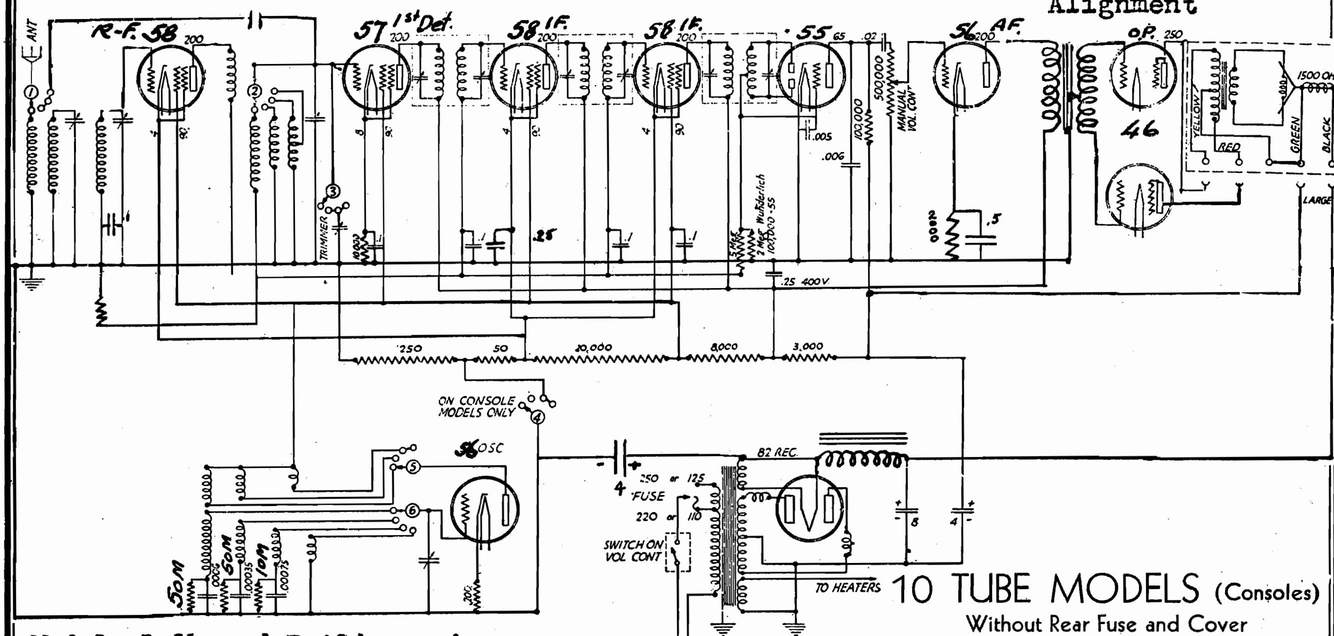
Some localities remote from broadcasting stations may require an extra long antenna of about two hundred feet.

LOW VOLTAGE Low voltage may be caused by a low battery, a defective vibrator, corroded battery terminal or shorted by-pass condensers. Increasing the length of battery leads might cause low voltage ard vibrator noise.

MODEL P
Alignment

BARKER BROS.

MODEL L
MODEL M
Schematic, Voltage
Alignment



10 TUBE MODELS (Consoles)
Without Rear Fuse and Cover
No. 46 Power Tubes

Models L, M, and P Alignment

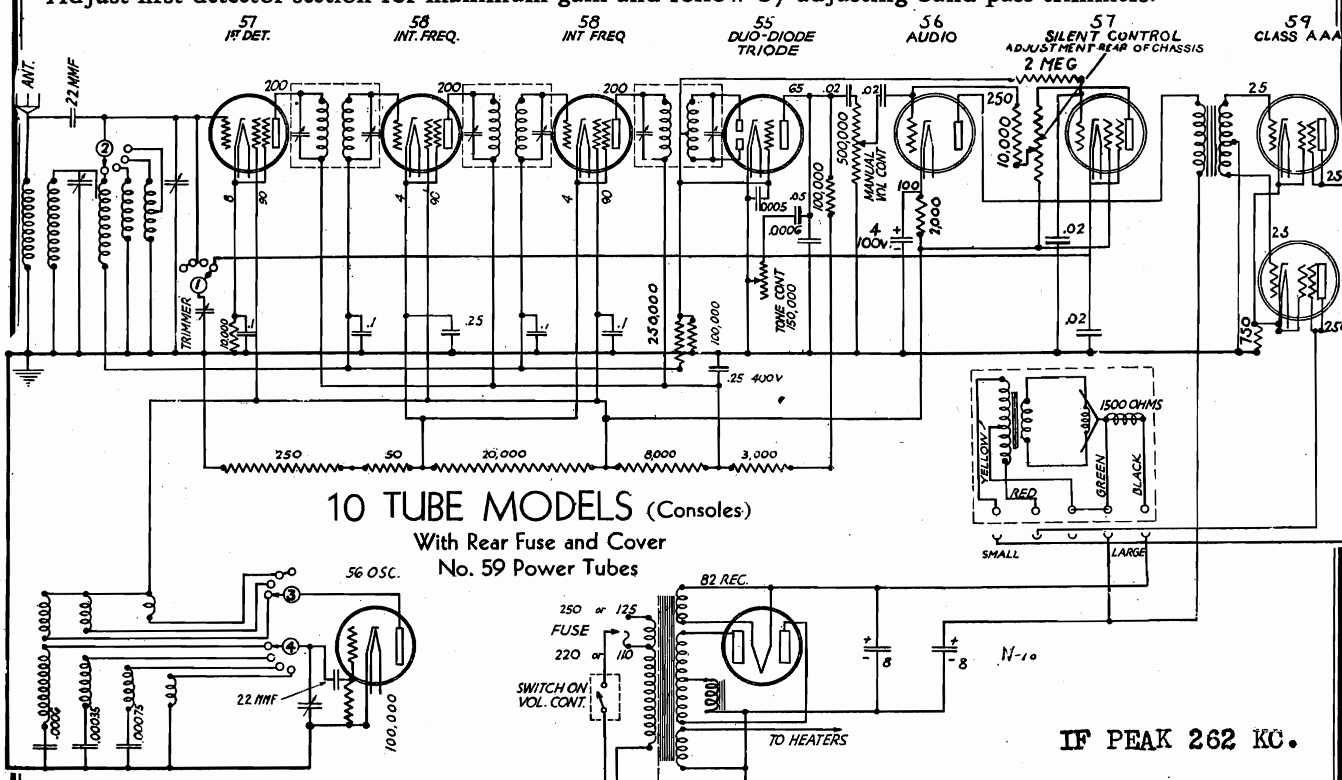
INTERMEDIATES

Connect a 262 K.C. oscillator to the first detector grid (No. 57 tube next to the dial) leaving grid cap in place. Remove oscillator tube (No. 56). Set dial at 100. Hook up vacuum tube volt meter as described and carefully adjust 6 varitor screws for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 100 when gang is at maximum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262 K.C., the dial will now track within 5 K.C. over the entire dial. Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.



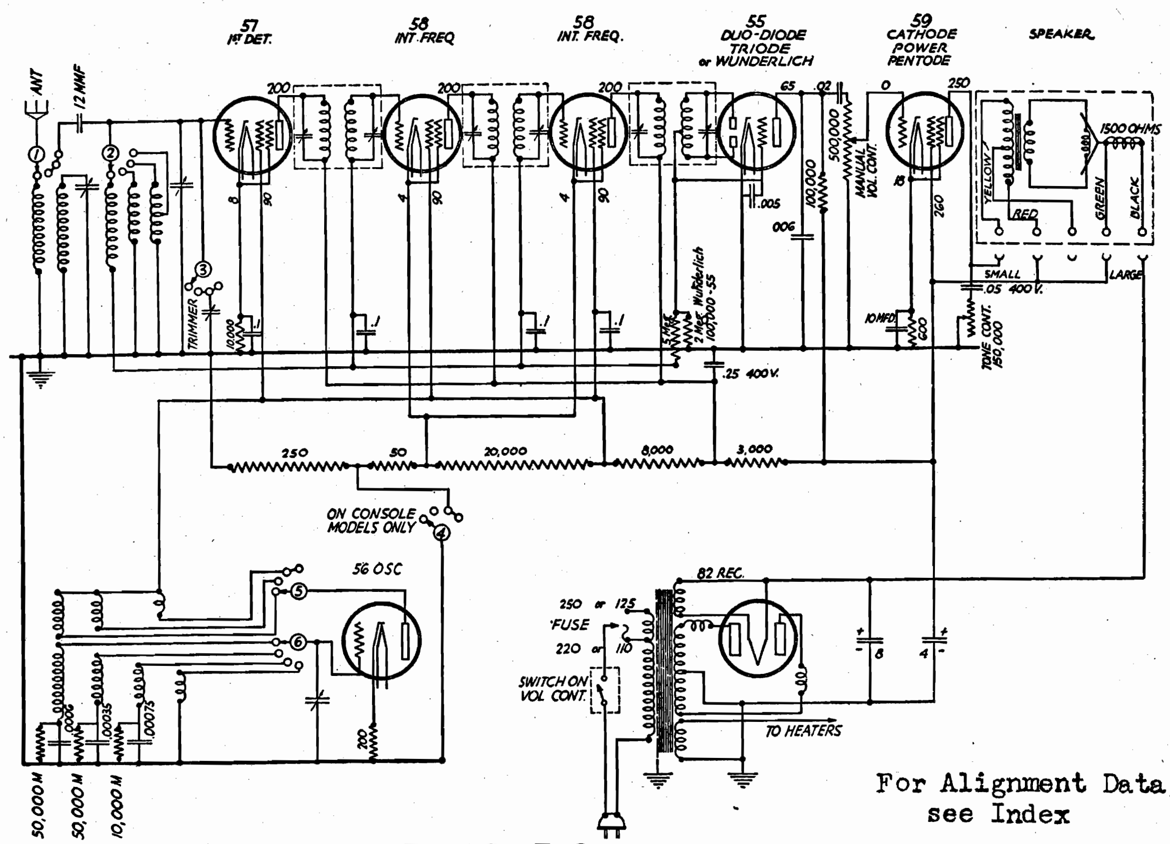
10 TUBE MODELS (Consoles)
With Rear Fuse and Cover
No. 59 Power Tubes

IF PEAK 262 KC.

MODEL P
Two Types
Schematic, Voltage

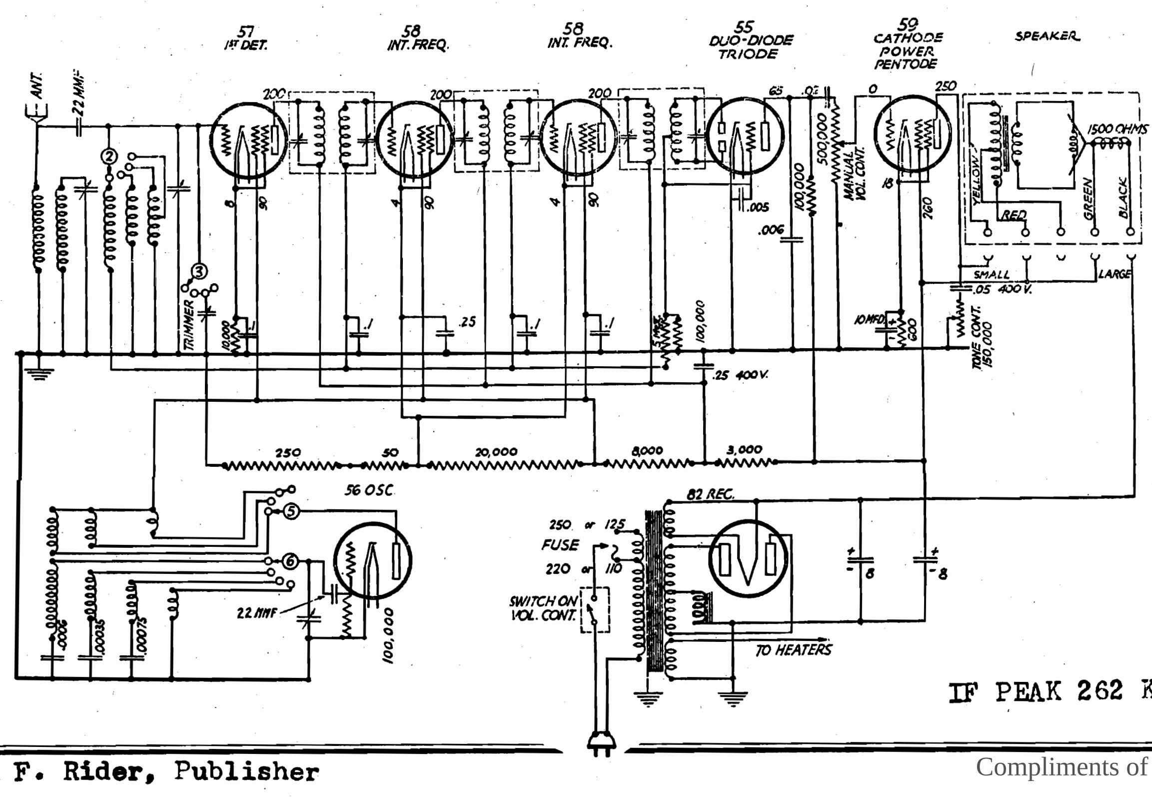
BARKER BROS.

7 TUBE MODELS (Compact and Consoles)
Without Rear Fuse and Cover



For Alignment Data, see Index

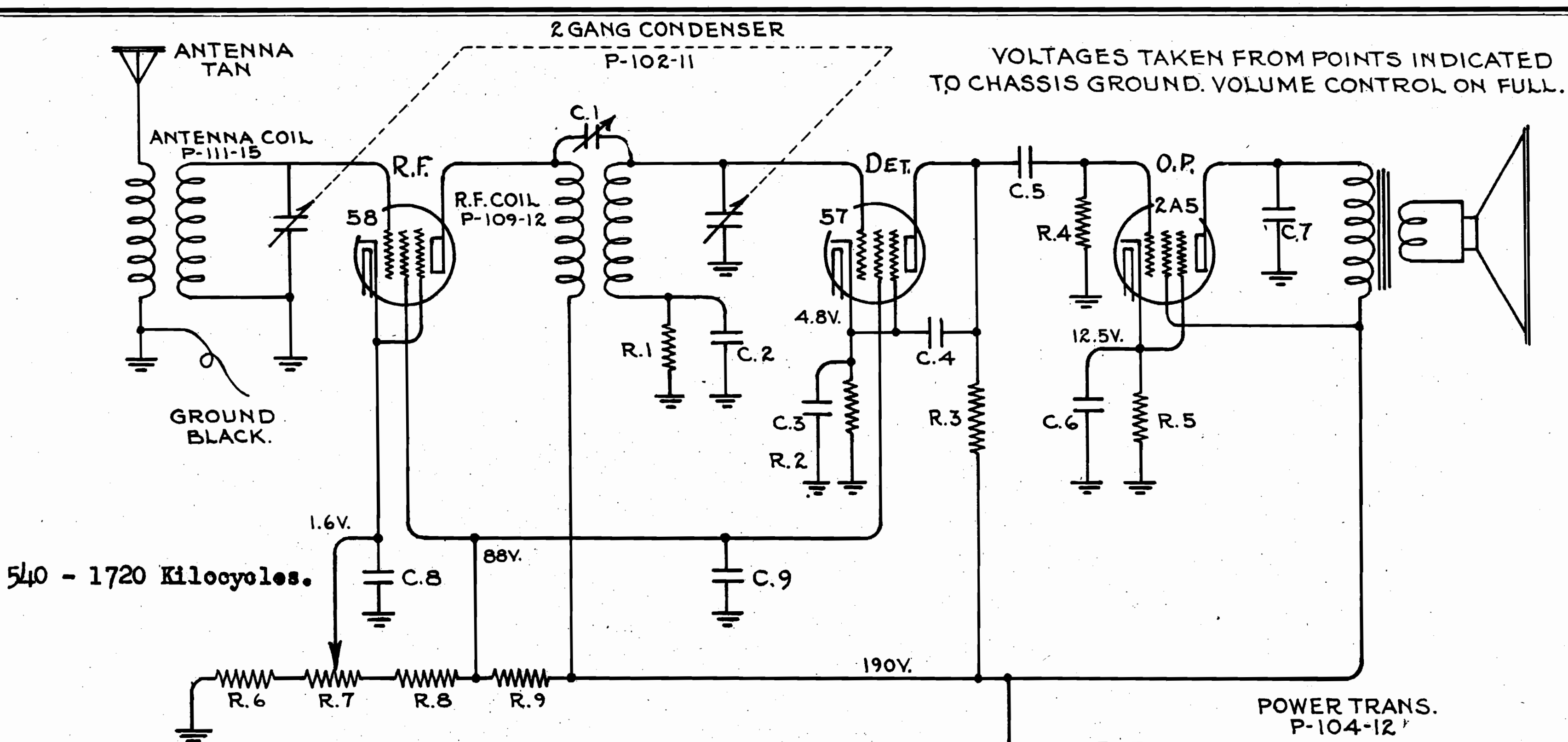
7 TUBE MODELS (Compact and Consoles)
With Rear Fuse and Cover



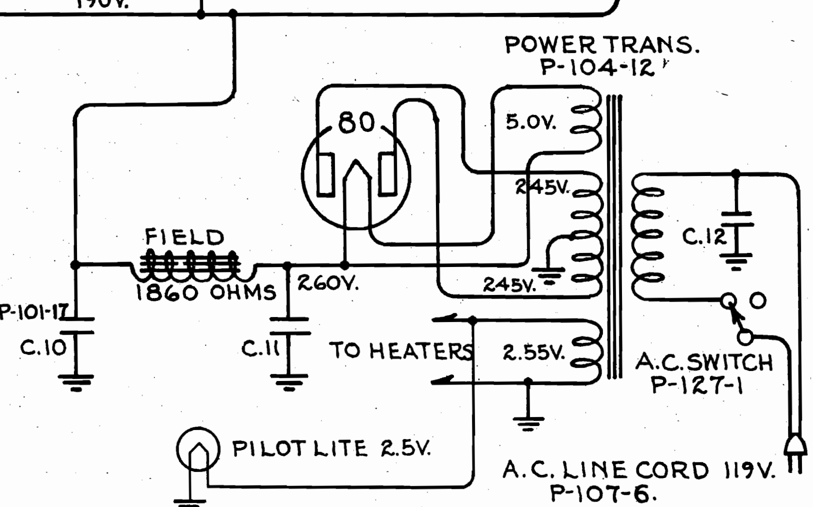
IF PEAK 262 KC.

MODEL 401
Schematic
Voltage

BELMONT RADIO CORP.



540 - 1720 Kilocycles.



Nº	VALUE
C.1:-	2-20 μμf P-124-12
C.2:-	.05 X 200V.
C.3:-	.25 X 200V.
C.4:-	.0005 MICA
C.5:-	.01 X 400V.
C.6:-	4.0 MFD. X 20V.
C.7:-	.01 X 400V.
C.8:-	.05 X 200V.
C.9:-	.25 X 200V.
C.10:-	4.0 MFD. X 200V.
C.11:-	5.0 MFD. X 250V.
C.12:-	.006 X 600V.

Nº	VALUE	
R.1:-	2 MEG.	1/5W.
R.2:-	25M	1/5W.
R.3:-	750M	1/5W.
R.4:-	500M	1/5W.
R.5:-	500	1/2W.
R.6:-	100	1/5W.
R.7:-	10M VOL. CONTROL P-101-17	
R.8:-	10M	1/3W.
R.9:-	19M	1W.

NOTE:- CONDENSERS C.2, C.8 ARE DUAL TYPE.
CONDENSERS C.3, C.9, ARE DUAL TYPE.
CONDENSERS C.6, C.10, C.11 IN ONE UNIT P-119-10
RESISTOR R.6 IN VOL. CONTROL P-101-17

NOTE:- NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

11-34

MODEL 401
Socket, Trimmers
Alignment, Notes

BELMONT RADIO CORP.

MODEL 401

SERVICE MANUAL FOUR TUBE A.C. - T.R.F. RECEIVER

105-125 Volts, 60 Cycle Alternating Current - 40 Watts

FOR VOLTAGES IN EXCESS OF 125, A SPECIAL TRANSFORMER IS REQUIRED, ALSO FOR 25 CYCLES. A UNIVERSAL TRANSFORMER IS NOT AVAILABLE FOR THIS MODEL.

SERVICE NOTES

Should it ever become necessary or desirable to realign this receiver the proper procedure is as follows:

Before attempting any adjustment, the set must be disconnected from the power supply, the tubes should be checked, aerial inspected and connections cleaned if necessary. To remove chassis from cabinet, pull off volume, selector and switch knobs and remove the three bolts which fasten chassis to cabinet.

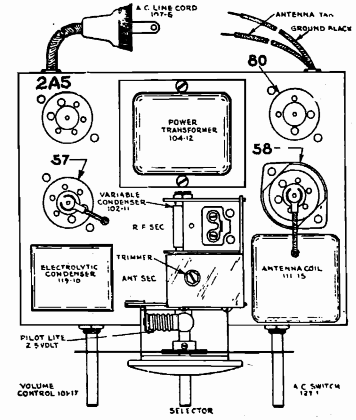
ALIGNMENT:

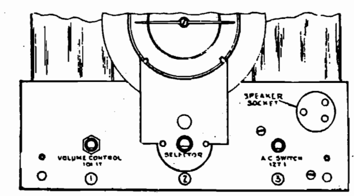
1. With an external oscillator set at 1720 kilocycles connected to the grid of the type 58 R.F. tube (cap at top of tube) and with the variable condenser at its minimum capacity position, plates entirely out of mesh, adjust trimmer on R.F. coil (accessible from the under side of the chassis) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter to the plate and screen terminals of the type 2A5 output tube.
2. Re-set external oscillator to 1400 kilocycles and connect in series with a 50 mmfd. condenser, to the tan antenna lead and black ground lead and adjust the antenna trimmer (front section of variable condenser - see illustration) to resonance. When making this adjustment, rock the condenser back and forth with the selector knob while adjusting the trimmer until maximum output is obtained.
3. Bend plates of antenna, front section of condenser, to resonance with external oscillator set at 1200, 1000, 800, 600 kilocycles. Output should be fairly uniform over the entire band, dropping off slightly at the higher frequencies.

NOTES:

The pilot light used is a 2.5 volt, type T-41-G3½. It can be replaced without removing the chassis from the cabinet, by removing the clip which fastens the assembly to the gang condenser (see illustration).

Voltages from chassis ground to different points are indicated on the schematic circuit diagram and should be measured with a voltmeter having a resistance of 1000 ohms per volt.





From left to right, when facing the set, the controls are as follows:

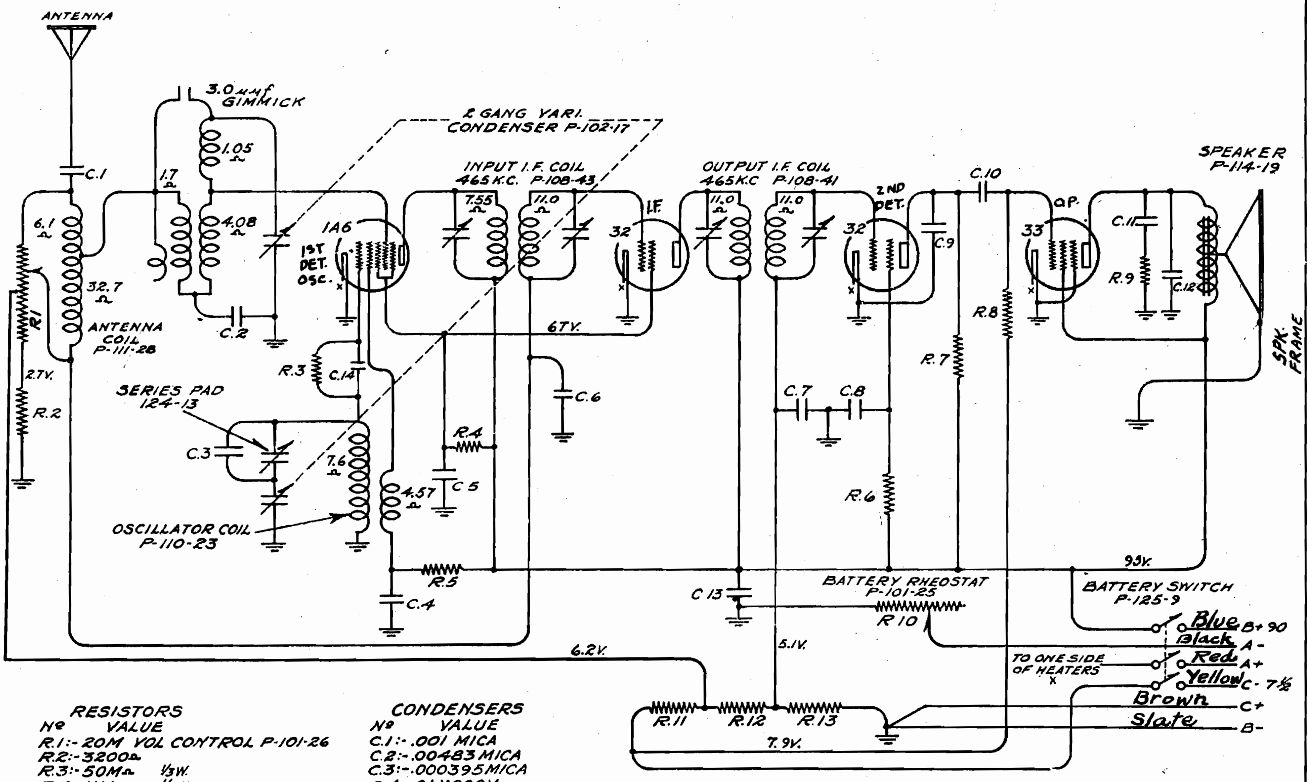
(1) Volume control. Clockwise, right turn, increases volume.

(2) Center control, station selector. The top half of the pointer traverses a scale calibrated directly in kilocycles the bottom half a scale calibrated in meters. This scale is provided for your convenience, some stations are listed in kilocycles, others in meters.

(3) Right rotation turns set on, left rotation turns set off. When turning receiver on dial will become illuminated. It is necessary to wait approximately 45 seconds for the tubes to heat up after turning set on.

MODEL 404
Schematic, Voltage
Socket, Trimmers

BELMONT RADIO CORP.



RESISTORS

Nº	VALUE
R.1	20M VOL CONTROL P-101-26
R.2	3200Ω
R.3	50MΩ 1/3W.
R.4	11MΩ 1/3W
R.5	10MΩ 1/3W.
R.6	3 MEG.Ω 1/3W.
R.7	750MΩ 1/3W.
R.8	500MΩ 1/3W.
R.9	35MΩ 1/3W.
R.10	4Ω BAT. RHEOSTAT P-101-25
R.11	1300Ω
R.12	1920Ω
R.13	9800Ω 1/3W

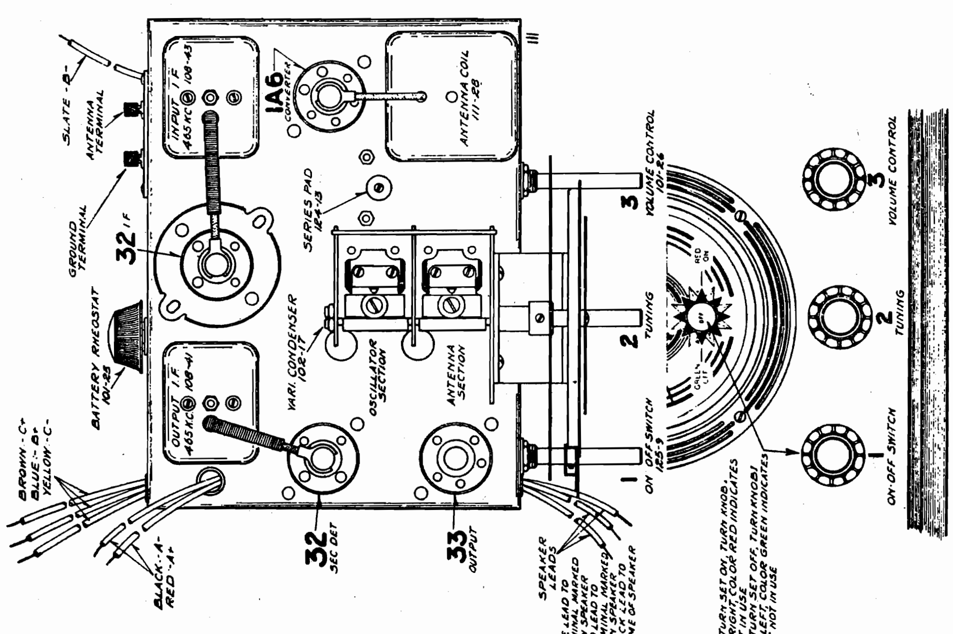
CONDENSERS

Nº	VALUE
C.1	.001 MICA
C.2	.00483 MICA
C.3	.000395 MICA
C.4	.01 X 200V.
C.5	.05 X 200V
C.6	.25 X 200V.
C 7	.05 X 200V
C.8	.01 X 200V.
C 9	.00025 MICA
C.10	.01 X 400V
C.11	.01 X 400V
C.12	.0005 MICA
C.13	.25 X 200V
C.14	.00025 MICA

- NOTE -
R.2, R.11, R.12 ARE IN ONE UNIT. P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " " P-118-5
C 7, C 8 " " " " P-118-11
NUMBERS PREFIXED BY LETTER 'P' ARE PART Nºs
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES, VOLUME CONTROL ON FULL

IF PEAK 465 KC.

Serial No. 5D115200A and up



BATTERIES NEEDED

The following batteries are needed.

2..........45 volt "B" Batteries.
1..........7½ Volt "C" Battery.
1..........3 Volt Dry "A" Battery or 2 Volt Storage Battery.

MODEL 404
Alignment,Parts
Battery Data

BELMONT RADIO CORP.

LIST OF REPAIR PARTS
Serial No. 5D115200A and up

Part No.	DECRIPTION	No. Used In Set
	CONDENSERS	
	Unless Otherwise Listed— All Molded Mica Condensers	
	Unless Otherwise Listed— All Dual Section Tubular Paper By-Pass Condensers	
100-5	1 Mfd. x 120 V.—Plus 50%: Minus 10%	1
100-11	.01 x 400 V. + or — 25%	2
129-27	.00483 Mica—Type MH + or — 5%	1
	RESISTORS	
106-21	Metal Clad Resistor	1
	All Carbon Resistors	
	COILS	
108-41	Output I.F. Coil Assembly Complete	1
108-43	Input I.F. Coil Assembly Complete	1
110-23	Oscillator Coil Complete	1
111-28	Antenna Coil Assembly Complete	1

	MISCELLANEOUS	
101-25	Filament Rheostat—4 Ohms	1
101-26	Volume Control	1
102-17	Two Gang Variable Condenser	1
112-19	Drive Disc Assembly Complete	1
112-65	Bakelite Escutcheon with Glass	1
112-93	Dial Scale	1
112-94	"On-Off" Indicator Complete with Hub and Scr	1
112-95	Drive and Bracket Assembly Complete	1
113-34	Antenna and Ground Strip	1
114-19	Six Inch Magnetic Speaker	1
115-37	Tube Shield	1
124-13	Type J-2-S Series Pad with Insulating Washer	1
125-9	"On-Off" Switch	1
131-2	Bakelite Knob	3
131-12	Bakelite Knob with Arrow	1
136	Complete Set of Connecting Wires	1

SERVICE DATA

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram, are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

ALIGNING INSTRUCTIONS

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as run down batteries, defective tubes, poor installations, open or grounded antenna systems, defective condensers and resistors. In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.
   (c) Re-set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-13 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
   (d) Check for sensitivity at 800, 1000, 1200 K.C. DO NOT BEND PLATES.

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

1. With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and with external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-41 and 108-43, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 33 output tube. Maximum deflection of the volt meter indicates resonance.
Use only enough signal to get a readily readable output.
A low range output meter or the low scale of a multi-range meter should be used.

PICTURE OF INSTRUCTIONS ATTACHED TO BACK OF CHASSIS

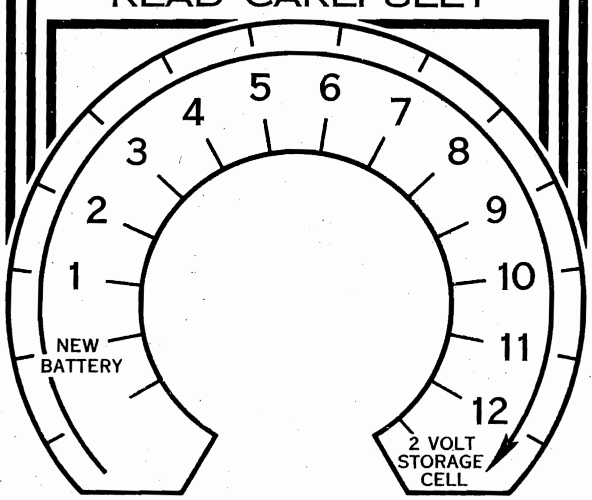
3 VOLT DRY "A" BATTERY OPERATION

The purpose of this knob is to reduce the 3 volt battery to the 2 volts required by the tubes.

If you use your radio about three hours each day turn the knob up one mark each week. However always keep the knob turned down as low as you can and still get proper reception. Whenever you install a new battery be sure to turn the control to the starting point marked new battery

NEVER TURN THE KNOB HIGHER THAN NECESSARY OR IT WILL BURN OUT THE TUBES AND RUN DOWN YOUR BATTERY

— CAUTION —
READ CAREFULLY



2 VOLT WET STORAGE BATTERY OPERATION

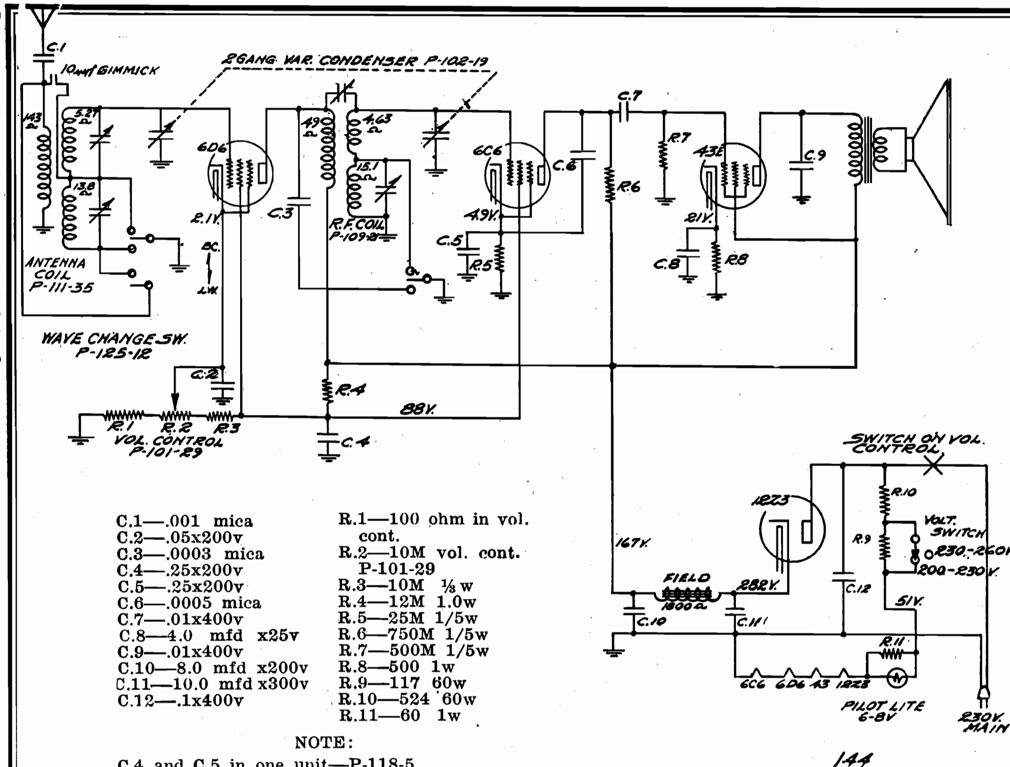
This radio may be operated with a 2 volt storage battery instead of the 3 volt Dry "A"

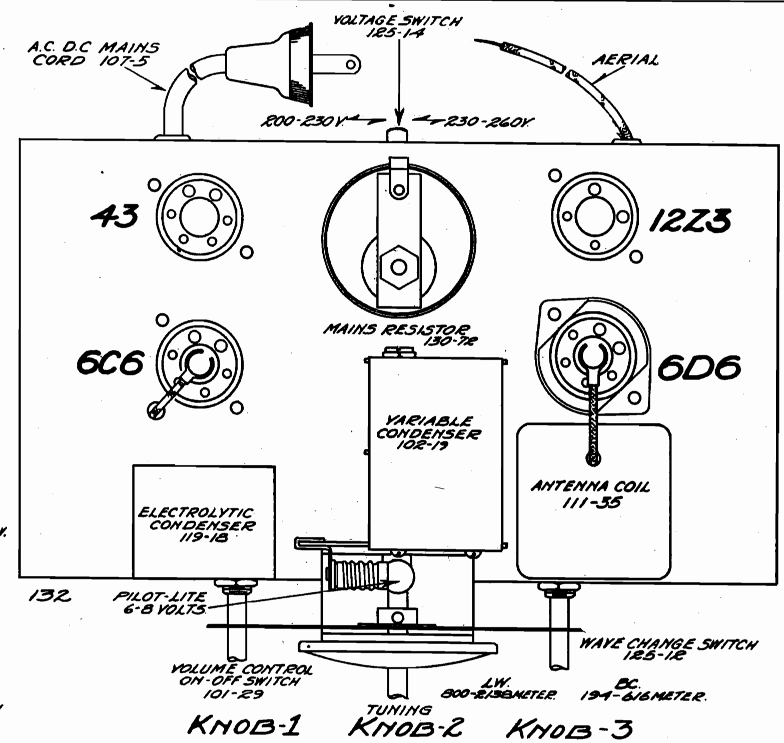
When this is done the knob at left should be turned to the point marked storage battery and left there at all times. Never attempt to use a 6 volt Auto or Radio storage battery.

THIS MODEL APPROVED BY RMA MEMBER ENGINEERING INSTITUTE

MODEL 444
Schematic, Voltage
Socket, Chassis

BELMONT RADIO CORP.





C.1—.001 mica
C.2—.05x200v
C.3—.0003 mica
C.4—.25x200v
C.5—.25x200v
C.6—.0005 mica
C.7—.01x400v
C.8—4.0 mfd x25v
C.9—.01x400v
C.10—8.0 mfd x200v
C.11—10.0 mfd x300v
C.12—.1x400v

R.1—100 ohm in vol. cont.
R.2—10M vol. cont. P-101-29
R.3—10M 1/8 w
R.4—12M 1.0w
R.5—25M 1/5w
R.6—750M 1/5w
R.7—500M 1/5w
R.8—500 1w
R.9—117 60w
R.10—524 60w
R.11—60 1w

NOTE:
C.4 and C.5 in one unit—P-118-5
C.8, C.10, C.11 in one unit—P-119-18
R.9 and R.10 in one unit—P-130-72
R.8, R.11 in one unit—P-106-22
Voltages taken from points indicated to chassis ground.
Vol. control on full. Line voltage switch at 230-260 v. position.
Numbers prefixed by letter "P" are part nos.
Serial No. 5G130820A and up.

NOTE:—Buffer Resistor (106-24) of 300 Ohms added in series with cathode of 12Z3 tube not shown on diagram.

REPAIR PARTS LIST—MODEL 444

Serial No. 5G130820A and up

RESISTORS

106-22	500-60 Ohm—1 Watt—Candohm Resistor Strip
106-24	300 Ohm—2 Watt—Metal Clad Resistor
130-1	25M Ohm—1/4 Watt—20%— 9 Volts Carbon
130-3	500M Ohm—1/4 Watt—20%—100 Volts Carbon
130-17	10M Ohm—1/4 Watt—20%— 50 Volts Carbon
130-37	750M Ohm—1/4 Watt—20%— 50 Volts Carbon
130-49	12M Ohm— 1 Watt—20%—100 Volts Carbon
130-72	641 Ohm Vitreous Resistor

CONDENSERS

100-1	.1 x 400 Volt Tubular
100-9	.05 x 200 Volt Tubular
100-11	.01 x 400 Volt Tubular
118-9	.25 - .25 x 200 Volt Dual Tubular
119-18	10-8-4 Mfd. Electrolytic Condenser
129-1	.001 Mica—Type MW—20%
129-2	.0005 Mica—Type MT —20%
129-36	.0003 Mica—Type MT —10%

COILS

109-21	R.F. Coil and Trimmer Assembly Complete
111-35	Antenna Coil Complete with Can

SPEAKERS

114-23	Five Inch Dynamic

MISCELLANEOUS

101-29	Volume Control and Switch
102-19	Two Gang Variable Condenser
107-5	Line Cord and Plug
112-15	Glass Dial Crystal Only
112-16	Dial Pointer
112-19	Dial Drive Disc Complete
112-60	Dial Bracket—Drive Complete
112-61	Pilot Light Clip
112-109	Dial Scale
112-66	Bakelite Escutcheon with Glass Complete
115-37	Resistor Shield
116-5	Pilot Light Bulb, T-50, 6-8 Volt
125-12	Wave Change Switch
125-14	Voltage Switch
115-22	Tube Shield
131-2	Bakelite Knob
131-8	Springs for Bakelite Knob
134-22	Felt Washer—(Under Knob)
135-14	Dial Pointer Screw

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than 20%	None

MODEL 444
Alignment
Notes

BELMONT FOUR TUBE TWO-BAND RECEIVER

Model 444

Tuning Range

194— 616 Meters
800—2136 Meters

TUBE COMPLEMENT:

1 6D6—Super control R.F. pentode as R.F. Amplifier.
1 6C6—R.F. pentode as second detector.
1 43E—Special pentode output amplifier.
1 12Z3—Rectifier.

POWER INPUT:

This receiver is designed for A.C. (any frequency) and D.C. operation over a range of 200-260 V. A line voltage switch is provided for operation from 200 to 230 and from 230 to 260 volts. The switch is mounted on the back flange of the chassis and the proper position is indicated by stamping the chassis with the voltage ranges. Chassis are sent from the factory in the high voltage position. In order to change the switch position, it is necessary to remove the back of the cabinet.

In case it is desired to use the receiver on 110 V. A.C. it is necessary to use a 110 to 220 volt transformer, having a power capacity of approximately 80 watts.

ALIGNMENT

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the chassis, pull knobs off, remove the three bolts by which chassis is fastened and the speaker plug which you will find on the rear flange of the chassis panel.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 43E output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range voltmeter should be used.

DUMMY ANTENNAS:

Dummy (1)—Consists of .1 mfd. condenser in series with the ungrounded lead of the external oscillator.
Dummy (2)—Consists of 100 mmf. condenser in series with the ungrounded lead of the external oscillator.

TEST FREQUENCIES:

	Meters	Kilocycles
Long Wave Band	2000	150
	1200	250
	857.1	350
	800	375
Broadcast Band	500	600
	300	1000
	214.3	1400
	193.4	1550

ALIGNMENT BROADCAST BAND:

1. Turn wave band switch to broadcast position (clockwise rotation).
2. Connect external oscillator to antenna lead through dummy (2) and set to 193.4 M.
3. Open condenser plates all the way (completely out of mesh) and align all broadcast trimmers:
   (a) Lower hole in B.C. antenna coil shield (111-35). See top view.
   (b) Trimmer on R.F. coil nearest end of chassis.
4. Set external oscillator to 214.3 meters. Tune in signal with receiver and realign broadcast antenna coil (3a) while rocking gang condenser to and fro until maximum output is obtained.
5. Check sensitivity and tracking at 300 and 500 meters.

ALIGNMENT LONG WAVE BAND:

1. Turn switch to long wave position (counter-clockwise).
2. Clip external oscillator on R.F. grid through dummy (1) and set at 800 meters.
3. With plates of variable condenser completely out of mesh, adjust long wave R.F. trimmer for maximum output:
   (a) Trimmer on R.F. coil (No. 109-21) toward center of chassis.
4. Clip external oscillator on to antenna lead through dummy (1) and set at 857.1 meters.
5. Tune receiver to signal and adjust long wave antenna trimmer for maximum output:
   (a) Upper hole in antenna coil (No. 111-35) can.
6. Check tracking and sensitivity at 1200 and 2000 meters.

SERVICE NOTES

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 43E tube) will cause low volume and distorted tone.

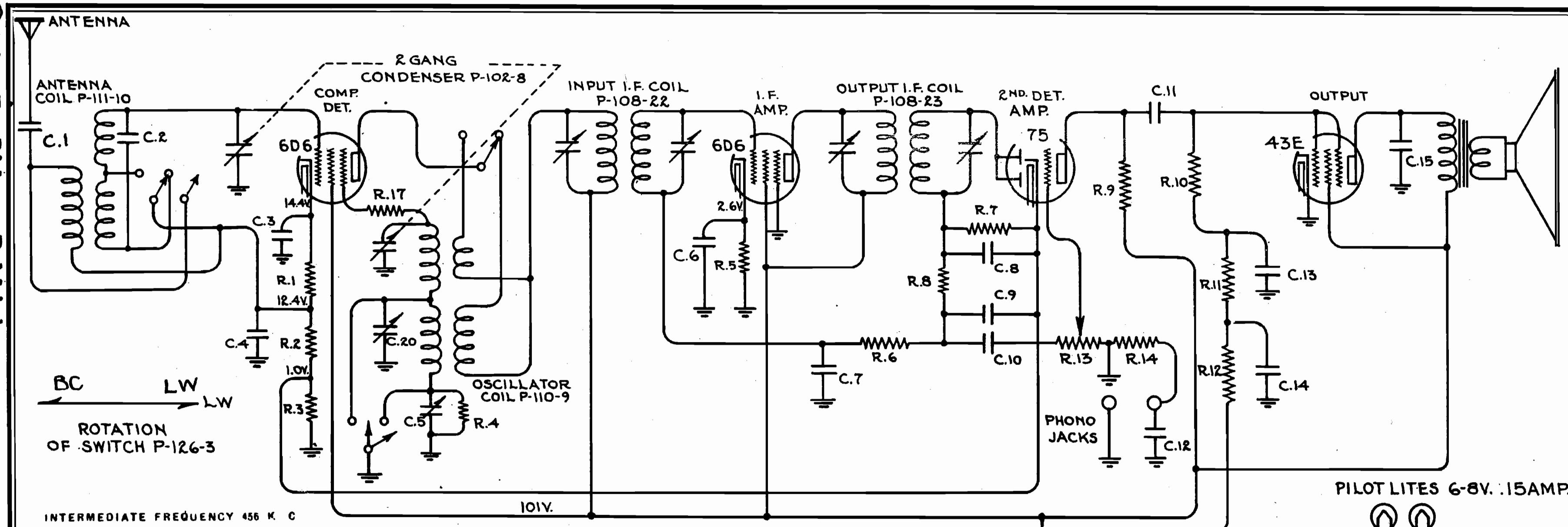
Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

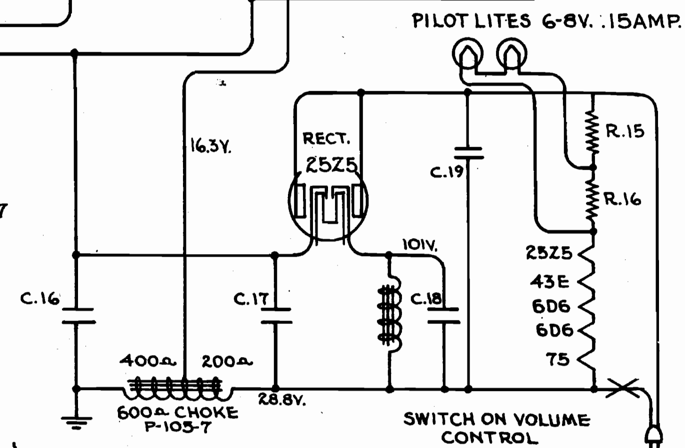
All voltages are measured with 230 volt mains and the switch in the 230-260 volt position.

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

MODEL 541
Schematic, Voltage
Socket, Trimmers

BELMONT RADIO CORP.





CONDENSERS

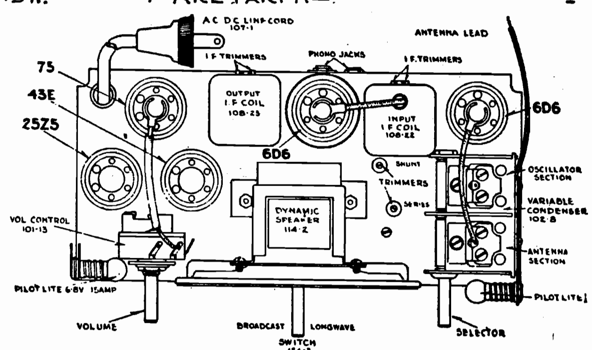
Nº	VALUE
C.1:-	.001 MICA
C.2:-	6μμf GIMMICK
C.3:-	.05 X 200V.
C.4:-	.05 X 200V.
C.5:-	3PL. SECTION
C.6:-	.05 X 200V.
C.7:-	.1 X 200V.
C.8:-	.0005 MICA
C.9:-	.0005 MICA
C.10:-	.01 X 600V.
C.11:-	.01 X 600V.
C.12:-	.003 X 600V.
C.13:-	.05 X 200V.
C.14:-	.1 X 200V.
C.15:-	.006 X 600V.
C.16:-	8.0 MFD. X 100V.
C.17:-	12.0 MFD. X 100V.
C.18:-	4.0 MFD X 100V.
C.19:-	.1 X 400V.
C.20:-	2PL. SECTION

RESISTORS

Nº	VALUE	
R.1:-	300Ω	
R.2:-	2MΩ	1/5W.
R.3:-	180Ω	1/5W.
R.4:-	250MΩ	1/5W.
R.5:-	250Ω	1/5W.
R.6:-	250MΩ	1/5W.
R.7:-	250MΩ	1/5W.
R.8:-	50MΩ	1/5W.
R.9:-	100MΩ	1/5W.
R.10:-	301MΩ	1/5W.
R.11:-	28MΩ	1/5W.
R.12:-	101MΩ	1/5W.
R.13:-	500MΩ	
R.14:-	500MΩ	
R.15:-	126Ω	
R.16:-	40Ω	
R.17:-	900Ω	

-: NOTE :-

C.3 & 4 IN DUAL UNIT P-118-7
C.6, 7, 12, 13, 14, & 15 IN ONE UNIT P-145-6
C.16, 17, & 18 IN ONE UNIT P-119-7
R.1, 2 & 3 IN ONE UNIT P-106-15
R.15, IN LINECORD P-107-1
R.6, 7, & 8, C.8, 9, & 10 IN OUTPUT I.F. CAN P-108-23.
R.13, & 14 ONE UNIT, VOL. CONTROL P-101-13
C.5, & 20 DUAL PADDER P-124-9
NUMBERS PREFIXED BY LETTER "P" ARE PART Nos.



VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL
A "GIMMICK" IS AN IMPROVISED CAPACITY FORMED BY TWISTING WIRES.

MODEL 541
Alignment
Parts, Notes

BELMONT RADIO CORP.

MODEL 541

SERVICE MANUAL FIVE TUBE TWO BAND SUPERHETERODYNE WITH A.V.C.

105-125 Volts Alternating (any cycles) or Direct Current - 40 Watts

FOR VOLTAGES IN EXCESS OF 125 AND UP TO 270 VOLTS AN EXTERNAL RESISTOR MUST BE USED SUCH AS AN ADDITIONAL LENGTH OF SPECIAL RESISTANCE CORD.

200-590 Meters - 1000-2000 Meters

The tube complement of this chassis is as follows:

1 Type 6D6 - remote cut-off pentode as oscillator and first detector
1 Type 6D6 - remote cut-off pentode as intermediate frequency amplifier (456 k.c.)
1 Type 75 - duplex diode triode as a diode detector AVC and first AF amplifier
1 Type 43E - pentode output A.F. amplifier
1 Type 25Z5 - high vacuum rectifier.

SERVICE NOTES

Should it ever become necessary or desirable to re-align this receiver the proper procedure is as follows:

Before attempting any adjustments, the set must be disconnected from the power supply and the chassis removed from the cabinet. To remove the chassis, pull off the volume, selector and wave changing switch knobs, remove the back and four screws that fasten the chassis to the cabinet. Insert plug in receptacle and proceed as follows:

I.F. ALIGNMENT:

1. With volume control on full, at the extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:
   (a) Connect an external oscillator adjusted to 456 kilocycles, in series with a .1 mfd. condenser, to the control grid (cap at top of the 6D6 tube), located directly in back of the variable condenser.
   (b) Adjust trimming condensers of both input (108-22) and output (108-23) I.F. transformers (see top view of chassis) to resonance. Use a resonance indicator and output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 43E tube, by means of an adapter. Maximum deflection on the meter indicates resonance.
   Note: There are two trimmer adjustments on each I.F. transformer, they are accessible from the back of the chassis.

BROADCAST ALIGNMENT:
(200-590 Meters)

1. The broadcast band is aligned first. Rotate wave changing switch to the extreme left of its rotation. (Switch located directly under dynamic speaker).
   (a) Attach an external oscillator set at 1550 kilocycles, to the grid of the 6D6 tube, located in back of the variable condenser. With variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the trimmer of the oscillator (rear section of the variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 kilocycles. Change connection of oscillator output lead from cap of 6D6 to tan antenna wire. Rotate variable condenser until signal is picked up, then adjust antenna trimmer (front shaft section of variable condenser) to resonance.
   (c) Check output at 1200-1000-800-600 kilocycles. Bend plates of antenna section, front shaft of variable condenser, if required (do not bend plates of oscillator, rear, section of variable condenser).

LONG WAVE ALIGNMENT:
(1000-2000 Meters)

1. Rotate wave changing switch to the extreme right of its rotation.
   (a) With external oscillator set at 350 kilocycles and connected to the tan antenna lead, rotate variable condenser until signal is picked up, then adjust long wave shunt padder. This adjustment is accessible from the top of the chassis, between the variable condenser and the speaker and is the rear hole marked "shunt" on the top view of the chassis. When making this adjustment, care must be taken to hold the receiver to the frequency of the external oscillator by rocking variable condenser as the padder is adjusted, until maximum output is obtained.
   (b) Re-set external oscillator to 150 kilocycles. Pick up oscillator signal by rotating variable condenser and adjusting the long wave series padder, adjustable from top of chassis, adjustment located between speaker and variable condenser, front hole marked "series" on top view. When making this adjustment, the receiver must be held to the oscillator frequency by rocking the variable condenser as the padder is adjusted until maximum output is obtained.
   (c) After adjusting long wave series padder, as explained in "B", recheck adjustment of shunt padder, as explained in "A". DO NOT BEND PLATES.

NOTES:

The pilot lights are connected in series. Should one burn out, the other will not light. To replace them it is necessary to remove chassis from cabinet. The lamps used are 6-8 volts, .15 amperes.

Voltages from chassis to different points are indicated on the schematic circuit diagram and should be measured with a volt meter having a resistance of 1000 ohms per volt.

To convert kilocycles to meters, divide 300,000 by the frequency in kilocycles.

PARTS LIST

MODEL 541

When ordering parts, always specify part and model number as well as serial number of chassis.

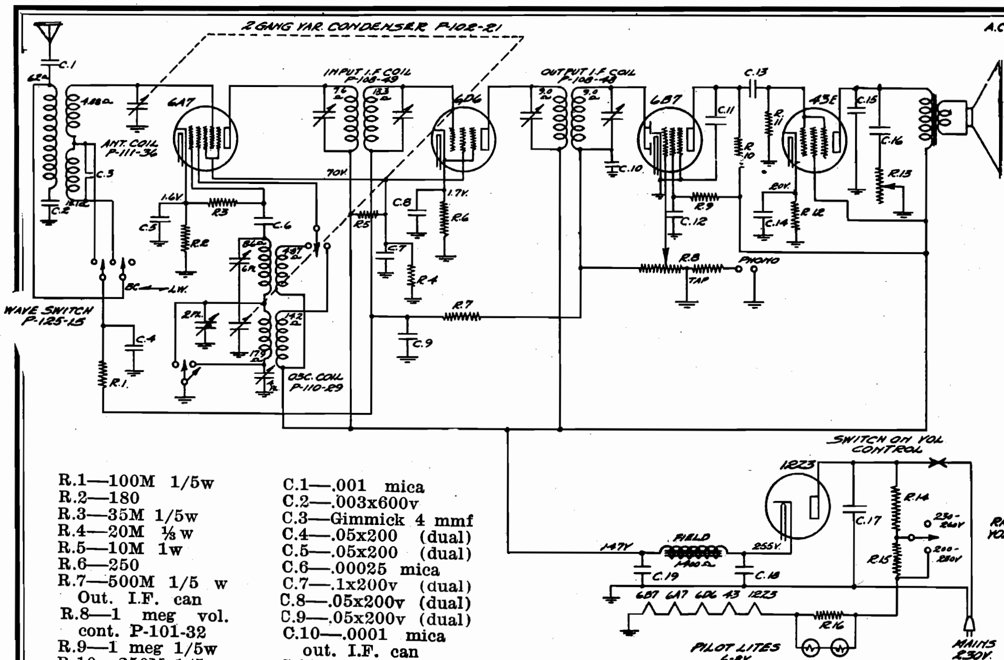
PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
101-13	Phono-Radio Volume Control	112-52	Selector Scale (541)
102-8	Two Gang Variable Condenser	112-53	Volume Scale (541)
105-7	Choke - 600 Ohms	115-22	No. 01360 Tube Shield
106-1	40 Ohm Metal Clad Resistor	115-23	Tube Shield Base
106-15	2480 Ohm Metal Clad Resistor	116-5	6-8 Volt Pilot Light
107-1	Cord & Plug (126 Ohms)	119-7	12-8-5 Mfd. Electrolytic Cond.
108-22	Input I.F. Transformer	124-9	Dual Padder (2 Plate Plus 3 Plate)
108-23	Output I.F. Transformer	126-3	Wave Change Switch
110-9	Oscillator Coil	131-1	Small Knob (Tone & L.W. Switch)
111-10	Antenna Coil	131-6	Knob (Volume & Selector)
112-11	Pilot Light Bracket	145-6	.209 Mfd. By-Pass Cond. Block
		171-1	Phono-Jack

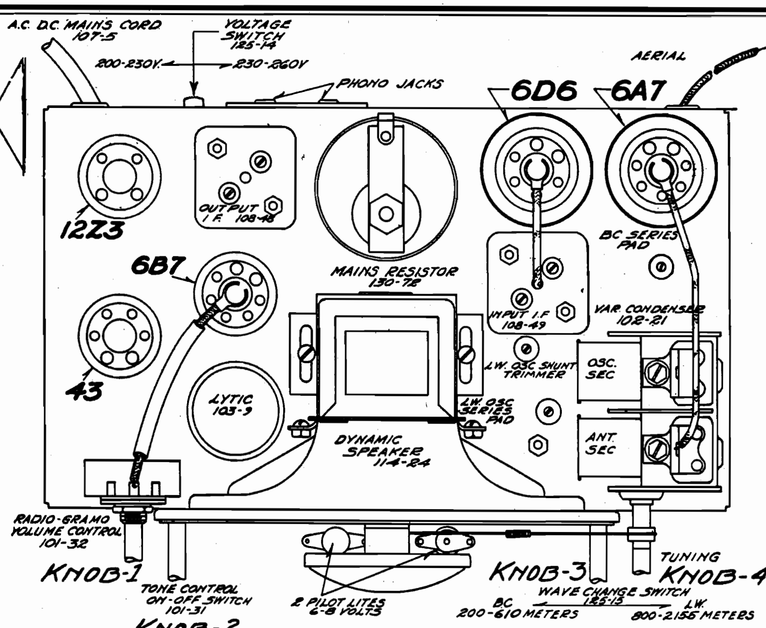
All resistors are RMA coded - specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

MODELS 544,545
Schematic,Voltage
Socket,Trimmers
Parts List

BELMONT RADIO CORP.





R.1—100M 1/5w
R.2—180
R.3—35M 1/5w
R.4—20M ⅛w
R.5—10M 1w
R.6—250
R.7—500M 1/5 w Out. I.F. can
R.8—1 meg vol. cont. P-101-32
R.9—1 meg 1/5w
R.10—250M 1/5 w
R.11—500M 1/5w
R.12—500 1w
R.13—50M tone cont. P-101-31
R.14—524
R.15—117
R.16—60

C.1—.001 mica
C.2—.003x600v
C.3—Gimmick 4 mmf
C.4—.05x200 (dual)
C.5—.05x200 (dual)
C.6—.00025 mica
C.7—.1x200v (dual)
C.8—.05x200v (dual)
C.9—.05x200v (dual)
C.10—.0001 mica out. I.F. can
C.11—.0001 mica
C.12—.1x200v (dual)
C.13—.01x400v
C.14—4 mfd. x25v
C.15—.016x400v
C.16—.05x400v
C.17—.1x400v
C.18—10 mfd. x250v
C.19—8 mfd. x200v

Voltages taken from points indicated to chassis ground.

Volume control on full.
Numbers prefixed by letter "P" are part nos.

NOTE:

C.4 and C.5 in one unit—P-118-7
C.8 and C.9 in one unit—P-118-7
C.14, C.18 and C.19 in one unit—P-103-9
R.2, R.6 and R.16 in one unit—P-106-23
R.14 and R.15 in one unit—P-130-72
C.7 and C.12 in one unit—P-118-1

Serial No. 5G132551A and up.

NOTE:—Above diagram of Model 544-545 exactly the same except speaker is mounted in cabinet and dial is mounted on bracket secured to chassis.

NOTE:—Buffer Resistor (106-24) of 300 Ohms added in series with cathode of 12Z3 not shown on diagram.

REPAIR PARTS LIST—MODEL 544-545

Serial No. 5G132551A and up

Part No.	Description
	CONDENSERS
100-1	.1 x 400 Volt Tubular
100-11	.01 x 400 Volt Tubular
100-12	.003 x 600 Volt Tubular
100-28	.016 x 400 Volt—.05 x 400 Volt Dual Tubular
103-9	10 x 8 x 4 Electrolytic
118-1	.1 - .1 x 200 Volt Dual Tubular
118-7	.05 - .05 x 200 Volt Dual Tubular
129-1	.001 Mica—Type MT —20%
129-5	.0001 Mica—Type MT —20%
129-12	.00025 Mica—Type MT —20%
	RESISTORS
106-23	Candohm Resistor Strip
106-24	300 Ohm— 2 Watt—Metal Clad Resistor
130-3	500M Ohm—⅓ Watt—20%—100 Volt Carbon
130-19	1Meg Ohm—⅓ Watt—20%—100 Volt Carbon
130-20	100M Ohm—⅓ Watt—20%— 50 Volt Carbon
130-21	20M Ohm—⅓ Watt—20%— 20 Volt Carbon
130-45	250M Ohm—⅓ Watt—20%— 20 Volt Carbon
130-57	35M Ohm—⅓ Watt—20%— 50 Volt Carbon
130-72	641 Ohm—Vitreous Enamel Resistor
130-77	10M Ohm— 1 Watt—20%—100 Volt Carbon
130-78	500 Ohm— 1 Watt—20%— 25 Volt Wire Wound
	COILS
108-48	Output I.F. Transformer Complete with Can
108-49	Input I.F. Transformer Complete with Can
110-29	Oscillator Coil Assembly Complete
111-36	Antenna Coil Complete
	SPEAKERS
114-24	Six Inch Dynamic (FOR MODEL 544 ONLY)—Plug and Bracket
114-25	Six Inch Dynamic (FOR MODEL 545 ONLY)—Leads—Less Bracket
	MISCELLANEOUS
101-31	Tone Control and Switch
101-32	Volume Control—Less Switch
102-21	Two Gang Variable Condenser
107-5	Line Cord and Plug
107-9	Pilot Light Assembly
112-111	Dial Drive Complete with Dial
112-112	Metal Escutcheon Only
115-22	Tube Shield
115-37	Resistor Shield
116-5	Pilot Light Bulb, 6-8 Volt, T-50
124-14	J-6-S Single Padder
124-20	J-4-2D Dual Padder
125-14	Voltage Switch
125-15	Band Switch
131-2	Bakelite Knob
131-8	Springs for Bakelite Knob
134-22	Felt Washer (Under Knob)
171-2	Phono-jack Assembly

MODEL 544, 545
Alignment, Notes

BELMONT Model 544 and 545

FIVE TUBE TWO BAND SUPERHETERODYNE

With A. V. C., 200-260 Volts Alternating (any frequency) or Direct Current

200-610 Meters—800-2155 Meters

DESCRIPTION

The tube complement of this chassis is as follows:

1—Type 6A7—Remote cut-off pentagrid converter as oscillator and first detector.

1—Type 6D6—Remote cut-off pentode as intermediate frequency amplifier (465 k.c.)

1—Type 6B7—Duplex diode pentode as a diode detector AVC and first A.F. amplifier.

1—Type 43E—Pentode output A.F. amplifier.

1—Type 12Z3—High vacuum rectifier.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND EFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages should be measured with the switch in the high voltage position with 230 volts, A.C. or D.C., on the line. In case it is impossible to secure the exact mains voltage, suitable allowances should be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

Dial Replacement:

To replace broken or frayed drive cord, turn set off (on model 545 only, pull out speaker plug), remove four chassis mounting bolts, four knobs and withdraw chassis from cabinet. Take off drive bracket assembly by removing two nuts and bolts, which hold same to chassis.

Remove old cord by taking out the set screws that hold it in place, salvaging the spring. Put both set screws back in place as they were, knotting a new piece of fish line 10-inches long around the set screw on the dial drive, about 3 inches from one end. Fasten drive assembly to chassis with nuts and bolts.

With the heads of the set screws pointing opposite each other, namely, east and west, pull cord tightly and knot it around the set screw on condenser shaft. Tie one side of the spring to a loose end of the cord, threading the other end of cord through opposite side of spring. Pull tightly and tie in place while spring is in tension. Cut off hanging ends of cord (on model 545 only, plug in speaker), put chassis back in cabinet and fasten in place.

ALIGNING INSTRUCTIONS

Should it ever become necessary or desirable to re-align this receiver, the proper procedure is as follows:

CAUTION: NO ALIGNING ADJUSTMENTS SHOULD BE ATTEMPTED WITHOUT FIRST THOROUGHLY CHECKING OVER ALL OTHER POSSIBLE CAUSES OF TROUBLE, SUCH AS POOR INSTALLATIONS, OPEN OR GROUNDED ANTENNA SYSTEMS, LOW LINE VOLTAGES, DEFECTIVE TUBES, CONDENSERS AND RESISTORS.

In order to properly align this chassis, an oscillator (generator) is absolutely necessary.

Before attempting any adjustments, the set must be disconnected from the power supply and the chassis removed from the cabinet. To remove the chassis, pull off the volume, selector, tone control and wave changing switch knobs, remove the back and the four screws that fasten the chassis to the cabinet. Insert plug in receptacle and proceed as instructed.

In the case of the Model 544, the speaker is an integral part of the chassis and will be removed with the chassis. In the case of the Model 545, however, the speaker is fastened to the cabinet and connected to the chassis by a plug. It is generally not necessary to remove the speaker from the cabinet, as the cabinet can be tilted in such a manner as to permit alignment with speaker in cabinet adjacent to chassis.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 43E output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

NOTE: All trimmer adjustments are made from the top of chassis.

Dummy Antennae

Two dummy antennae are required:

Dummy (1)—consists of a .1 mfd. condenser in series with the external oscillator.

Dummy (2)—consists of a 200 mmfd. condenser and a 20 ohm resistor in series with each other and in series with the external oscillator.

TEST FREQUENCIES:

	Meters	Kilocycles
Long Wave	2000	150
	857	350
	800	375
I.F.	645.1	465
Broadcast	545	550
	214.3	1400
	200	1500

I. F. ALIGNMENT:

645.1 Meters (465 Kilocycles)

1. Connect external oscillator adjusted to 645.1 meters in series with "Dummy 1" to the grid of type 6A7 tube (cap at top of tube).
2. Open variable condenser until dial pointer reads 200 meters.
3. Set wave changing switch in broadcast position, extreme left of its rotation (see top view for location of switch).
4. Adjust input (part 108-49) and output (part 108-48) I. F. transformer trimmers to resonance (maximum deflection on an output meter). NOTE: There are two (2) adjustments on each transformer, they are accessible from the top of the shield can.
5. Remove oscillator clip from 6A7 tube.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch still in broadcast position (left rotation) and with variable condenser in its minimum capacity position (plates entirely out of mesh), set dial at 200 meters.
2. Connect external oscillator set at 200 meters in series with "Dummy 2", to the tan antenna lead.
3. Adjust broadcast oscillator trimmer to resonance (this is adjustment on top of variable condenser rear section).
4. Re-set variable condenser until dial pointer reads exactly 545 meters.
5. Re-set external oscillator to exactly 545 meters.
6. Tune in oscillator signal by adjusting broadcast oscillator series pad (this adjustment accessible from the top of chassis, it is located directly behind variable condenser—see top view).
7. Re-set dial and external oscillator to 200 meters and re-adjust trimmer of rear section of variable condenser as in "3".
8. Re-set external oscillator to 214.3 meters (1400 K. C.) and tune in signal by rotating condenser (moving pointer).
9. Adjust broadcast antenna trimmer to resonance (this adjustment located on top of front section of variable condenser).
10. Re-set external oscillator to 545 meters, tune in oscillator signal by rotating variable condenser (moving pointer) and while slowly rocking condenser to and fro, adjust broadcast oscillator series pad to resonance (maximum deflection on output of meter).

LONG WAVE BAND ALIGNMENT:

1. Set wave changing switch in long wave position (extreme right of its rotation).
2. Connect external oscillator set at 800 meters in series with "Dummy 1", to the grid of type 6A7 tube (cap at top of tube).
3. Set variable condenser in its minimum capacity position (plates entirely out of mesh), dial pointer reading 800 meters.
4. Tune in external oscillator signal by adjusting long wave oscillator shunt trimmer (this adjustment is accessible from top of chassis and is located to the left of variable condenser rear hole—see top view).
5. Re-set external oscillator and move dial pointer to exactly 2000 meters.
6. Tune in external oscillator signal by adjusting long wave oscillator series pad (this adjustment is accessible from top of chassis, located to the left of variable condenser front hole).
7. Re-set external oscillator and move dial pointer to 800 meters and re-check adjustment "4".

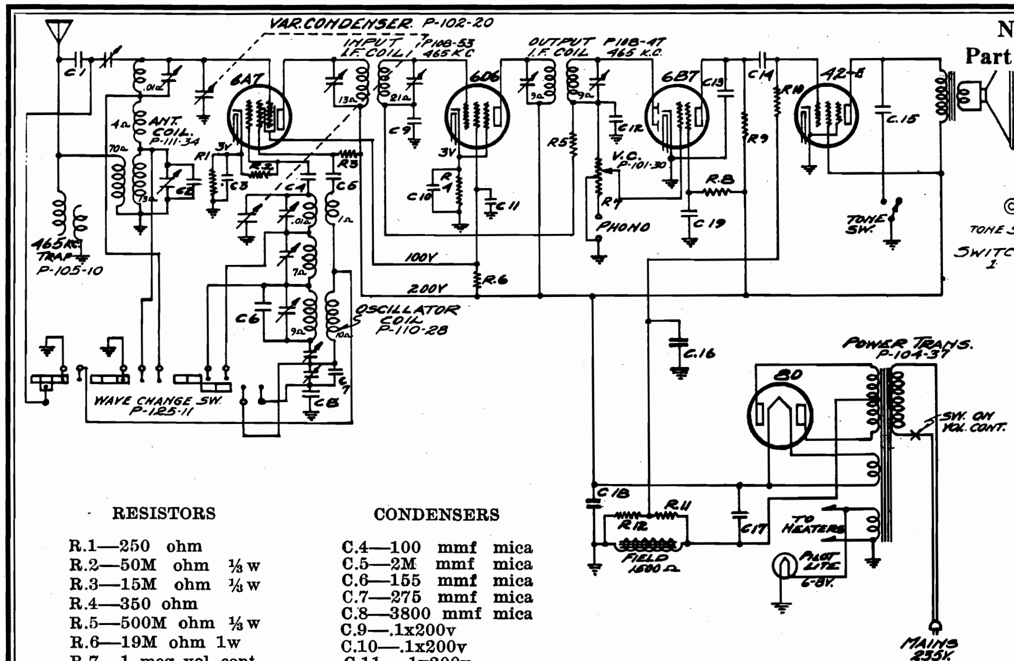
IMPORTANT: It is necessary to make the following adjustments when installing a new replacement antenna coil:

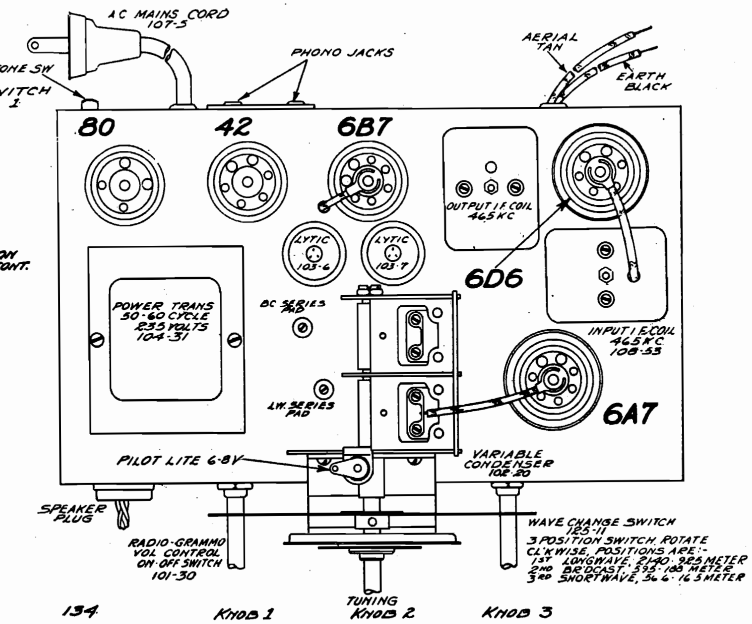
(1) Connect external oscillator set at 857 meters in series with "Dummy 2", to tan antenna lead and adjust gimmick condenser (by unwinding) on antenna coil (gimmick is capacity formed by winding fine wire over a larger wire) for maximum deflection on output meter. While making this adjustment on the gimmick, rock variable condenser to and fro to make certain that set is still in tune with external oscillator.

(2) Re-set external oscillator to 2000 meters, tune in signal by rotating variable condenser and adjust long wave series pad as in "6" until maximum output is obtained.

BELMONT RADIO CORP.

Note—On some chassis part 108-53 was in error marked 108-38. Part 108-53 is the correct number for this input I. F. transformer.





RESISTORS

R.1—250 ohm
R.2—50M ohm ⅓ w
R.3—15M ohm ⅓ w
R.4—350 ohm
R.5—500M ohm ⅓ w
R.6—19M ohm 1w
R.7—1 meg vol. cont.
R.8—1 meg ⅛ w
R.9—250M ohm ⅛ w
R.10—500M ohm ⅛ w
R.11—800M ohm ⅛ w
R.12—201M ohm ⅛ w
C.1—20 mmf mica
C.2—35 mmf mica
C.3—.1x200v

CONDENSERS

C.4—100 mmf mica
C.5—2M mmf mica
C.6—155 mmf mica
C.7—275 mmf mica
C.8—3800 mmf mica
C.9—.1x200v
C.10—.1x200v
C.11—.1x200v
C.12—250 mmf mica
C.13—250 mmf mica
C.14—.02x400v
C.15—.025x400v
C.16—.1x200v
C.17—8.0x350v P-103-6
C.18—8.0x300v P-103-7
C.19—.1x200v

NOTE:

C.9 & C.11 in one unit P-118-1
C.10 & C.19 in one unit P-118-1
Voltages taken from points indicated to chassis ground
Vol. control on full.
Numbers prefixed by letter "P" are part Nos.

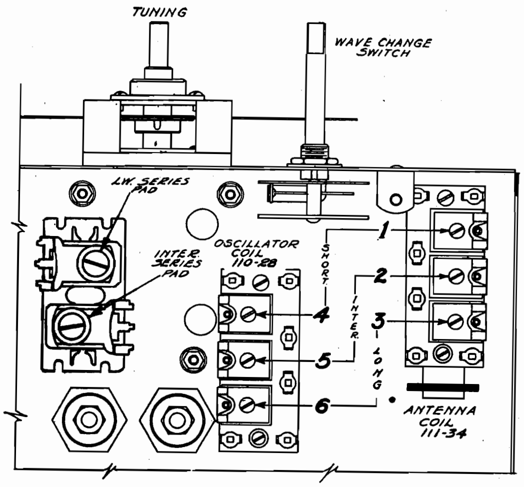
REPAIR PARTS LIST—MODEL 555

Serial No. 5G131400A and up

Part No.	DESCRIPTION
	CONDENSERS
100-19	.006 x 600 Volt Tubular
100-20	.1 x 200 Volt Tubular
100-26	.02 x 400 Volt Tubular
100-27	.025 x 400 Volt Tubular
103-6	8 Mfd. x 350 Volt Electrolytic
103-7	8 Mfd. x 300 Volt Electrolytic
118-1	.1 - .1 x 200 Volt Dual Tubular
129-3	.00002 Mica—Type MT—20%
129-5	.0001 Mica—Type MT—20%
129-6	.002 Mica—Type MW—20%
129-12	.00025 Mica—Type MT—20%
129-29	.0038 Mica—Type MW—2½%
129-33	.000275 Mica—Type MT— 5%
129-35	.000035 Mica—Type MT—10%
129-46	.000155 Mica—Type MT— 5%
	RESISTORS
130-3	500M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-8	201M Ohm—⅓ Watt— 50 Volt—10% Carbon
130-11	250M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-19	1Meg Ohm—⅓ Watt— 50 Volt—20% Carbon
130-32	250 Ohm—⅛ Watt— 10 Volt—20% Wire Wound
130-34	19M Ohm— 1 Watt—100 Volt—20% Carbon
130-46	800M Ohm—⅓ Watt— 50 Volt—10% Carbon
130-52	50M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-73	15M Ohm—⅓ Watt— 50 Volt—20% Carbon
130-74	350 Ohm—⅛ Watt— 10 Volt—20% Wire Wound
	COILS
105-10	Wave Trap Coil Complete
108-47	Output I.F. Transformer Complete with Can
108-53	Input I.F. Transformer Complete with Can
110-28	Oscillator Coil Complete
111-34	Antenna Coil Complete
	TRANSFORMERS
104-31	50/60 Cycle—235 Volt Primary
104-37	40 Cycle—235 Volt Primary
104-38	25 Cycle—235 Volt Primary
104-39	Universal—40 Cycle Primary
104-40	Universal—25 Cycle Primary
	SPEAKERS
114-15	Six Inch Dynamic Speaker
	MISCELLANEOUS
101-30	Volume Control and Switch
102-20	Two Gang Variable Condenser
107-5	Line Cord & Plug
112-15	Glass Dial Crystal Only
112-19	Dial Drive Disc Complete
112-16	Dial Pointer
112-26	Planetary Drive Complete
112-40	Pilot Light Bracket
112-62	Drive Bracket Assembly Complete with Ring
112-66	Bakelite Escutcheon with Glass Complete
112-75	Compression Spring Only
112-98	Dial Scale
115-22	Tube Shield
116-5	Pilot Light Bulb, 6-8 Volt, T-50
124-19	J-6-4D Dual Padder
125-11	Wave Change Switch
131-2	Bakelite Knob
131-8	Springs for Bakelite Knob
134-22	Felt Washer (Under Knob)
135-14	Dial Pointer Screw
143-1	Tone Switch
171-2	Phono-jack Assembly

MODEL 555
Trimmers
Alignment, Notes

BELMONT RADIO CORP.



ALIGNING I. F. TRANSFORMERS:

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, center of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-47 and 108-53—see top view).

   (a) Connect external oscillator which has been adjusted to 645.1 meters in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.

   (b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.

   (c) With generator connected to grid of type 6A7 tube, re-adjust output I.F. transformer, part number 108-47, to resonance.

BROADCAST BAND ALIGNMENT:

(188-595 meters)

1. With wave changing switch in the broadcast position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:

   (a) With external oscillator set at 187.5 meters, adjust oscillator trimmer to resonance, for location of this adjustment, number 5, see diagram.

   (b) Re-set external oscillator to 214.3 meters, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 2, see diagram.

   (c) Re-set external oscillator to 500 meters and adjust series pad to resonance, rotate condenser and move dial pointer to 500 meters by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, rear hole see top view—part number 124-19.

   (d) Check for tracking and sensitivity at 300 meters.

SHORT WAVE BAND ALIGNMENT:

(16.5-56.6 meters)

1. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 16.7 meters.

   (a) With external oscillator adjusted to 16.7 meters and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.

   (b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.

   (c) Re-set external oscillator to 50 meters, rotate condenser, move dial pointer to 50 meters, and check for tracking and sensitivity. Do not bend plates. **Note: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall at a higher wave length.**

LONG WAVE BAND ALIGNMENT:

(925-2140 Meters)

1. With wave changing switch in long wave position (extreme left of its rotation) and with variable condenser in its minimum capacity position (plates entirely out of mesh), make the following adjustments:

   (a) With external oscillator set at 923 meters and connected in series with "Dummy 2" to the tan antenna lead, adjust rear trimmer of oscillator coil (adjustment No. 6, see diagram) until oscillator signal is picked up.

   (b) Adjust rear trimmer of antenna coil to resonance with oscillator (adjustment No. 3, see diagram).

   (c) Re-set external oscillator to 2000 meters and rotate variable condenser (move pointer) and pick up oscillator signal, adjust L.W. pad (front adjustment accessible from top of chassis and located between variable condenser and power transformer) to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.

SERVICE NOTES:

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42E tube) will cause low volume and distorted tone.

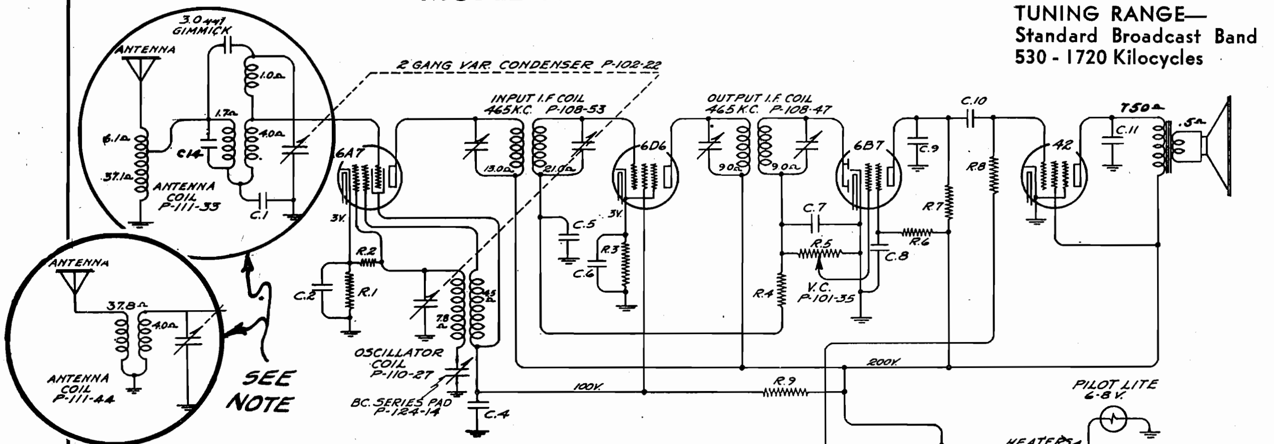
Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

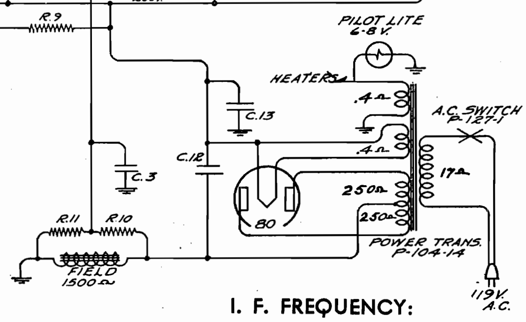
BELMONT RADIO CORP.

MODEL 578(Two Types)
Serial 5G133670A to
5K173250A and
Above Serial 5K173250A
Schematic, Voltage, Parts

MODEL 578—5G133670A—5K173250A

TUNING RANGE—
Standard Broadcast Band
530 - 1720 Kilocycles





CONDENSERS

C.1—.00385 Mica
C.2—.1x200 V.
C.3—.1x200 V.
C.4—.1x200 V.
C.5—.1x200 V.
C.6—.1x200 V.
C.7—.00025 Mica
C.8—.1x200 V.
C.9—.0001 Mica
C.10—.01x400 V.
C.11—.006x600 V.
C.12—8.0 mfd. x 350 V P-103-6
C.13—8.0 mfd. x 300 V P-103-7
C.14—110 mfd. Either external Mica Cond. or cap. winding in coil.

RESISTORS

R.1—350 Ohm
R.2—50M Ohm ⅓ W.
R.3—350 Ohm
R.4—500M Ohm ⅓ W.
R.5—1 meg vol. cont. P-101-35
R.6—1 meg. ⅓ W.
R.7—250M Ohm ⅓ W.
R.8—500M Ohm ⅓ W.
R.9—12M Ohm 1 W.
R.10—800M Ohm ⅓ W.
R.11—201M Ohm ⅓ W.

NOTE: C.4—C.8 One Unit P-118-1

C.5—C.6 One Unit P-118-1

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GRD. VOL. CONT. ON FULL.

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

I. F. FREQUENCY:
465 K.C.

NOTE:-

Beginning with 5K173250A, Antenna Coil No. 111-44 replaced No. 111-33, and capacities C1—.00385 mfd. and C14—.00011 mfd. were eliminated. Note: On early models C14 was a capacity winding on the primary of the No. 111-33 Antenna Coil.

See revised diagram

REPAIR PARTS LIST
MODEL 578 - SERIES A
Serial No. 5G133670A and up

PART NO.	DESCRIPTION
	CONDENSERS
100-11	.01 x 400 Volt Tubular Condenser
100-19	.006 x 600 Volt Tubular Condenser
100-20	.1 x 200 Volt Tubular Condenser
103-6	8 Mfd. x 350 Volt Electrolytic Condenser
103-7	8 Mfd. x 300 Volt Electrolytic Condenser
118-1	Dual .1 x 200 Volt Tubular
129-5	.0001 Mica - Type MT - 20%
129-12	.00025 Mica - Type MT - 20%
129-43	.00385 Mica - Type MW - 5%
	RESISTORS
130-3	500M Ohm - ⅓ Watt - 20% - 100 Volt Carbon
130-8	201M Ohm - ⅓ Watt - 10% - 20 Volt Carbon
130-11	250M Ohm - ⅓ Watt - 20% - 50 Volt Carbon
130-12	50M Ohm - ⅓ Watt - 20% - 20 Volt Carbon
130-19	1 Meg Ohm - ⅓ Watt - 20% - 100 Volt Carbon
130-46	800M Ohm - ⅓ Watt - 10% - 100 Volt Carbon
130-49	12M Ohm - 1 Watt - 20% - 100 Volt Carbon
130-74	350 Ohm - ⅓ Watt - 20% - 10 Volt Wire Wound
	COILS
108-47	Output I.F. Transformer Complete
108-53	Input I.F. Transformer Complete
110-27	Oscillator Coil Complete
111-33	Antenna Coil Complete
111-44	Antenna Coil SK173250A-up
	TRANSFORMERS
104-14	50/60 Cycle Power Transformer
104-17	Universal Power Transformer - 40 Cy. Primary
104-18	25 Cycle Power Transformer

	SOCKETS
121-6	Six Prong Socket - Type 42
121-6	Six Prong Socket - Type 6D6
121-7	Seven Prong Socket - Type 6B7
121-7	Seven Prong Socket - Type 6A7
121-8	Five Prong Socket - Type Speaker
121-9	Four Prong Socket - Type 80
	SPEAKER
114-15	Six Inch Dynamic Speaker
114-16	Five Inch Dynamic Speaker
	MISCELLANEOUS
101-35	Volume Control - Less Switch
102-22	Two Gang Variable Condenser
107-5	Line Cord & Plug
112-15	Dial Crystal Only
112-16	Dial Pointer
112-19	Drive Disc Assembly Complete
112-40	Pilot Light Bracket
112-60	Drive Bracket Assembly Complete
112-66	Bakelite Escutcheon Complete with Glass
112-113	Dial Scale
115-22	Tube Shield
116-5	6-8 Volt, T-50 Pilot Light Bulb
124-14	Type J-6-S Series Pad
127-1	Line Switch
131-2	Bakelite Knob
135-14	Dial Pointer Screw

BELMONT RADIO CORP.

Model 578—Series A

5-TUBE A. C. SUPERHETERODYNE RECEIVER

DESCRIPTION

Tubes

The Tube complement of this chassis is as follows:

1 Type 6A7—pentagrid electron coupled oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 6B7—duplex diode pentode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram

All voltages are measured with 119 volts on the primary of the power transformer.

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

ALIGNING INSTRUCTIONS

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

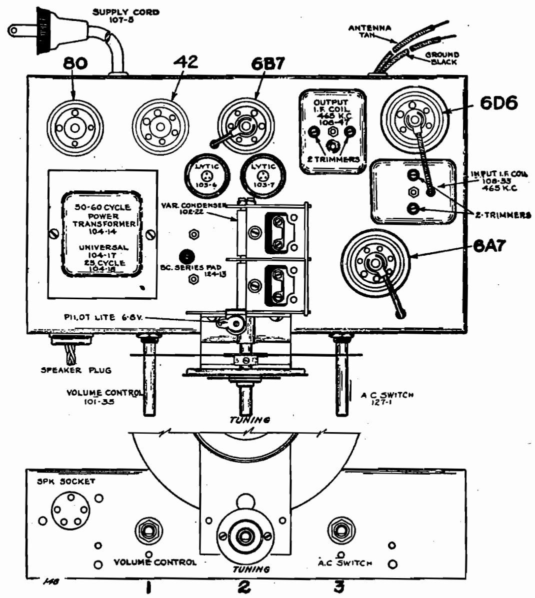
Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-53 and 108-47)
   (a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.
   (b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.



   (c) With generator connected to grid of type 6A7 tube, readjust output I.F. transformer, part number 108-47, to resonance.

R. F. Alignment— (530 - 1720 Kilocycles)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer, (rear of gang condenser).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance, (front section of gang condenser).
   (c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer.

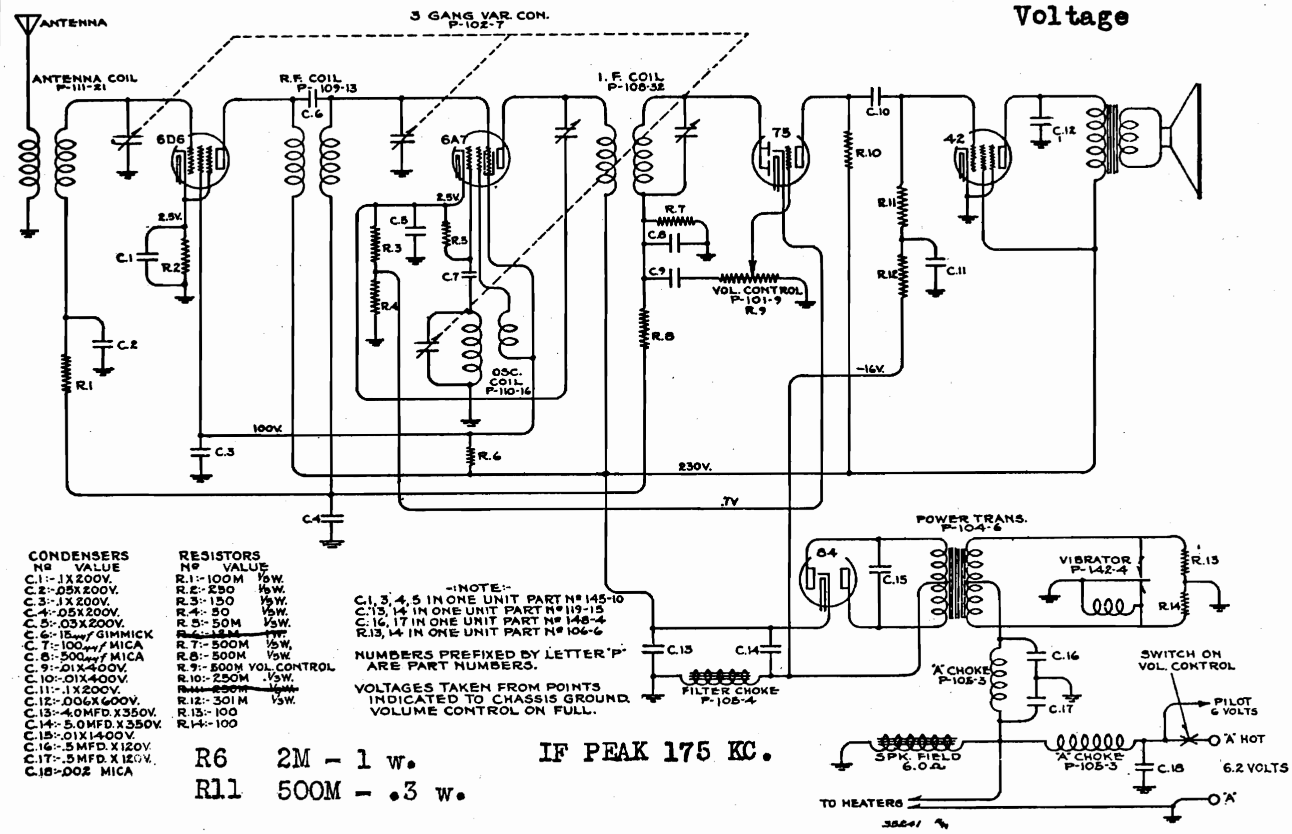
25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

MODEL 580
Schematic, Socket Voltage

BELMONT RADIO CORP.



CONDENSERS Nº	VALUE
C.1:-	.1X200V.
C.2:-	.05X200V.
C.3:-	.1X200V.
C.4:-	.05X200V.
C.5:-	.03X200V.
C.6:-	15μμf GIMMICK
C.7:-	100μμf MICA
C.8:-	500μμf MICA
C.9:-	.01X400V.
C.10:-	.01X400V.
C.11:-	.1X200V.
C.12:-	.006X600V.
C.13:-	4.0MFD.X350V.
C.14:-	5.0MFD.X350V.
C.15:-	.01X1400V.
C.16:-	.5MFD.X120V.
C.17:-	.5MFD.X120V.
C.18:-	.002 MICA

RESISTORS Nº	VALUE	
R.1:-	100M	1/3W.
R.2:-	250	1/3W.
R.3:-	150	1/3W.
R.4:-	50	1/3W.
R.5:-	50M	1/3W.
~~R.6:-~~	~~1.2M~~	~~1W.~~
R.7:-	500M	1/3W.
R.8:-	500M	1/3W.
R.9:-	500M	VOL. CONTROL
R.10:-	250M	1/3W.
~~R.11:-~~	~~250M~~	~~1/3W.~~
R.12:-	301M	1/3W.
R.13:-	100	
R.14:-	100	

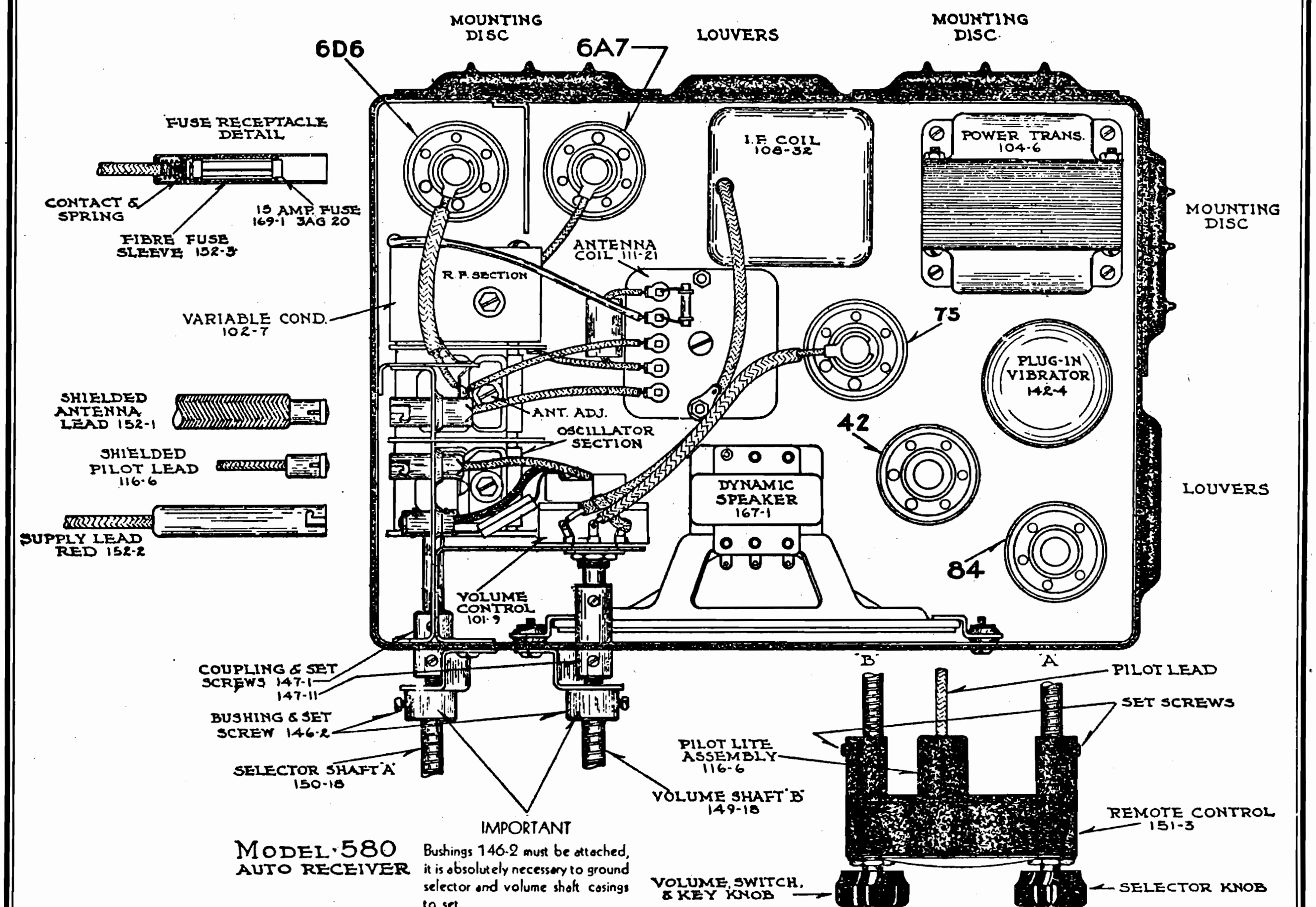
R6 2M - 1 w.
R11 500M - .3 w.

-:NOTE:-
C.1, 3, 4, 5 IN ONE UNIT PART Nº 145-10
C.13, 14 IN ONE UNIT PART Nº 119-15
C.16, 17 IN ONE UNIT PART Nº 148-4
R.13, 14 IN ONE UNIT PART Nº 106-6

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

IF PEAK 175 KC.



MODEL·580
AUTO RECEIVER

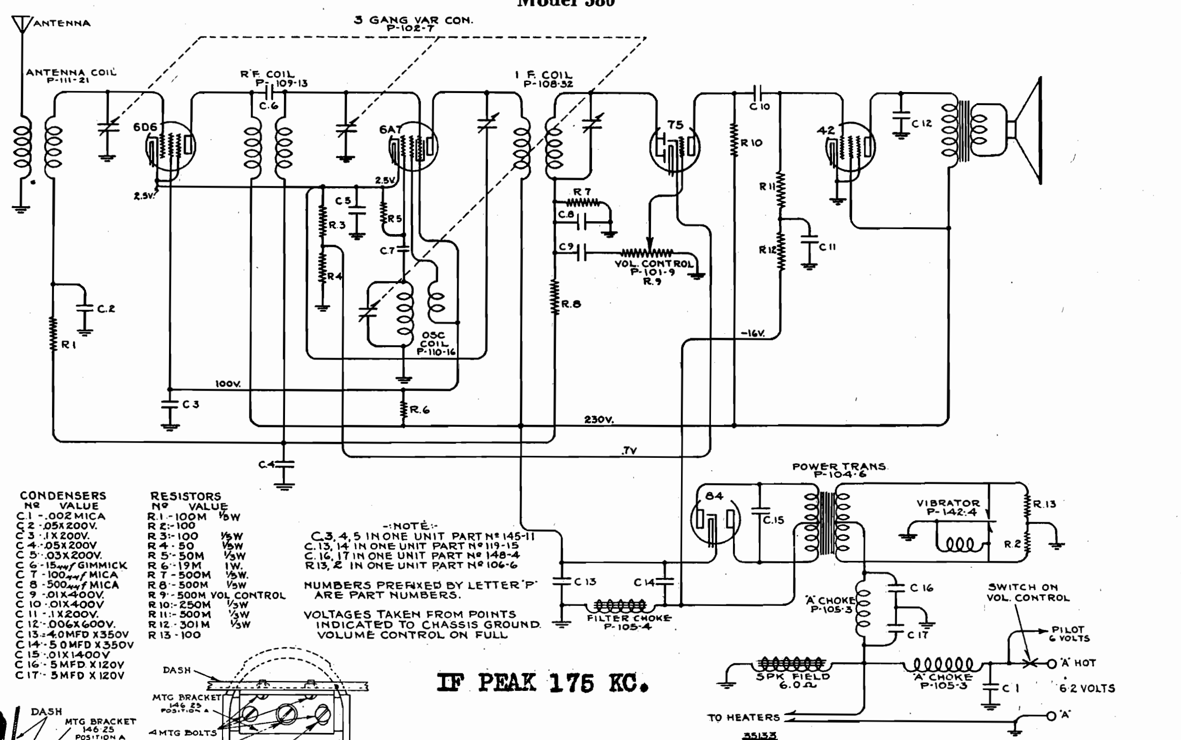
IMPORTANT
Bushings 146-2 must be attached, it is absolutely necessary to ground selector and volume shaft casings to set.

MODEL 580 Revised
Above Serial 11501

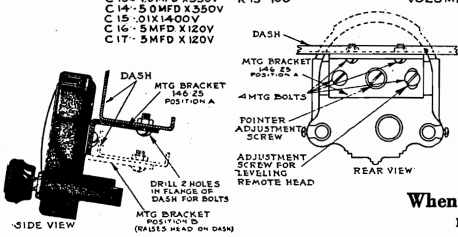
Schematic, Voltage
Parts List

BELMONT RADIO CORP.

Model 580



IF PEAK 175 KC.



REPAIR PARTS—MODEL 580
Serial No. 11501 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

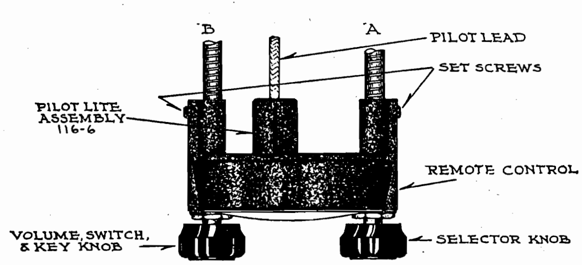
Part No.	Description	List Price Each
101-9	Volume Control with Switch	$1.35
102-7	Three Gang Geared Variable Condenser	4.00
104-6	Vibrator Transformer	3.00
105-3	"A" Choke—40T—No. 16E—½" Dia.	.10
105-4	380 Ohm Filter Choke	.85
106-6	200 Ohm Center Tapped Resistor	.25
108-32	Output I. F. Transformer Complete, less can and resistor and Condenser Assembly (175 K. C.)	1.75
109-13	R. F. Coil	1.00
110-16	Osc. Coil & bracket	.75
111-21	Antenna Coil	1.00
115-18	Special partition shield	.20
116-5	6-8 Volt T-50 pilot lamp, screw base	.10
116-14	6-8 volt T-51 frosted glass bayonet base lamp	.13
116-6	Pilot light assembly, complete, less bulb	.40
119-15	5-4 Mfd. 300 Volt Electrolytic Filter Condenser	2.50
135-5	⅝x3" carriage bolt	.05
140-4	Container complete with top and bottom	2.50
142-4	Plug-In Vibrator	4.50
145-11	By-Pass Block	.75
146-1	Special bracket including battery, antenna, pilot light cable fittings, but less antenna coil volume control	.40
146-2	Bushing and bracket complete	.20
147-1	Selector Control Coupling	.10
147-11	Volume control coupling	.10
148-1	.5 Mfd. Generator Condenser	.50
148-3	.5 Mfd. Ammeter Condenser	.40
148-4	Dual .5 Mfd. x 120 Volt Condenser	.75
148-6	Special Ford ignition condenser	.60
152-1	Antenna cable	.40
152-2	Battery cable	.35
152-3	Fuse Insulating Sleeve	.05
167-1	Dynamic Speaker	5.00
168-1	Spark-plug type suppressor Universal)	.30
168-2	Distributor plug-type suppressor	.40
168-3	Cable type suppressor	.40
169-1	15 Ampere Fuse (3AG-15)	.05
	Unless otherwise listed, all Carbon Resistors	.20
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers	.25
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers	.50
	Unless otherwise listed, all Molded Mica Condensers	.25
	All Sockets	.10
	Plate antenna	3.50

REMOTE CONTROL PARTS

Part No.	Description	List Price Ea
112-39	Selector Control Shaft	.20
112-41	Idler Gear	.15
112-42	Pointer Shaft	.05
112-43	Volume Control Shaft, Key type less knob	.10
112-85	Volume control shaft less knob	.05
112-44	Pointer (Specify White or Black)	.05
112-45	Bezel (Crystal Retainer)	.15
112-46	Celluloid Dial Crystal	.15
112-48	Pointer Shaft Gear	.05
112-89	Dial	.25
131-5	Black bakelite remote control knobs	.15
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-25	Dash Mounting Bracket	.15
147-3	Selector Control Bushing for 112-39 shaft	.10
147-4	Volume Control Bushing for 112-43-112-85 shaft	.10
149-18	Flexible Volume Control Cable—18"	1.25
149-24	Flexible Volume Control Cable—24"	1.50
150-18	Flexible Selector Cable—18"	1.25
150-24	Flexible Selector Cable—24"	1.50
151-7	Remote Control Head, less flexible shafts, with pilot assemblies and with knobs and mounting hardware	4.90

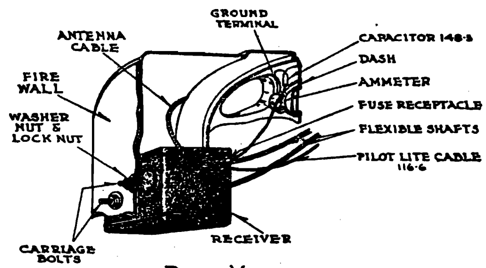
PILOT LIGHT:

Pilot light assembly, part number 116-9, plugs into the set and to the rear of the remote control unit (see illustrations).

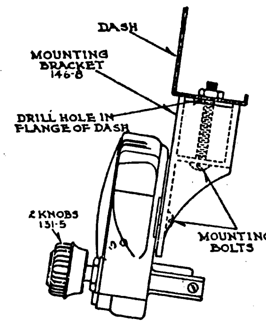


BELMONT RADIO CORP.

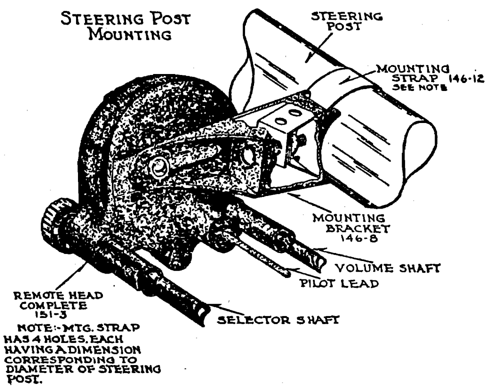
MODEL 580
Installation Details
Parts List

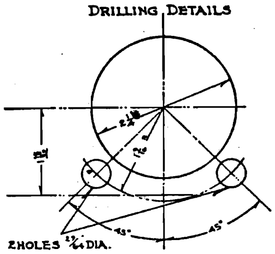


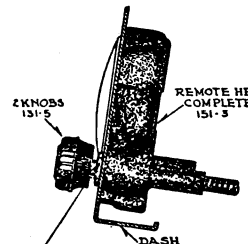
DASH MOUNTING

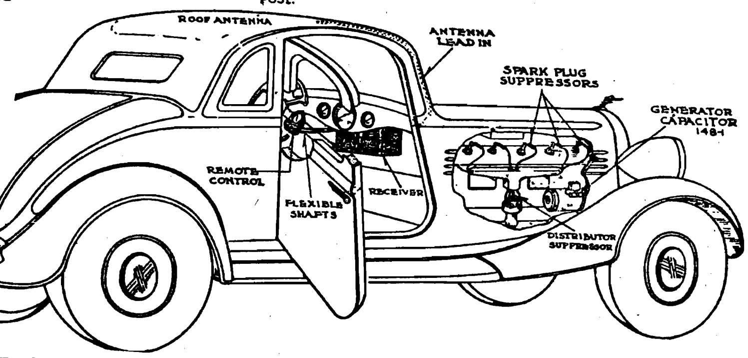


DASH MOUNTING USING BRACKET









PARTS LIST—MODEL 580
Serial No. 10001 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description
101-9	Volume Control with Switch
102-7	Three Gang Geared Variable Condenser
104-6	Vibrator Transformer
105-3	"A" Choke—40T—No. 16E—½" Dia.
105-4	380 Ohm Filter Choke
106-6	200 Ohm Center Tapped Resistor
108-32	Output I. F. Transformer Complete, less can and resistor and Condenser Assembly (175 K. C.)
109-13	R. F. Coil
110-16	Osc. Coil & bracket
111-21	Antenna Coil
115-18	Special partition shield
116-5	6-8 Volt T-50 pilot lamp
116-6	Pilot light assembly, complete, less bulb
119-15	6-3 Mfd. 350 Volt Electrolytic Filter Condenser
135-5	⅝x3" carriage bolt
140-4	Container complete with top and bottom
142-4	Plug-In Vibrator
145-10	By-Pass Block
146-1	Special bracket including battery, antenna, pilot light cable fittings, but less antenna coil volume control
146-2	Bushing and bracket complete
147-1	Selector Control Coupling
147-11	Volume control coupling
148-1	.5 Mfd. Generator Condenser
148-3	.5 Mfd. Ammeter Condenser
148-4	Dual .5 Mfd. x 120 Volt Condenser
152-1	Antenna cable
152-2	Battery cable
152-3	Fuse Insulating Sleeve
167-1	Dynamic Speaker
168-1	Spark-plug type suppressor
168-2	Distributor plug-type suppressor
168-3	Cable type suppressor
168-4	Special Ford spark-plug suppressor
169-1	15 Ampere Fuse (3AG-15)

REMOTE CONTROL PARTS

Part No.	Description
112-39	Selector Control Shaft
112-41	Idler Gear
112-42	Pointer Shaft
112-43	Volume Control Shaft
112-44	Pointer (Specify White or Black)
112-45	Dial Crystal Retainer
112-46	Celluloid Dial Crystal
112-48	Pointer Shaft Gear
112-89	Dial
131-5	Black bakelite remote control knobs
134-8	Black Fibre Washer for Volume and Selector Control Bushings
146-8	Die Cast Remote Control Mounting Bracket
146-12	Steering Column Strap
147-3	Selector Control Bushing
147-4	Volume Control Bushing
149-18	Volume Control Shaft—18"
149-24	Volume Control Shaft—24"
150-18	Selector Shaft—18"
150-24	Selector Shaft—24"
151-3	Remote Control Head, less flexible shafts, with pilot assemblies and with knobs and mounting hardware

Note: Part No. 145-10 consisting of four separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of $2.25 each, if the old unit is returned.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

MODEL 580
Alignment
Installation Data

BELMONT RADIO CORP.

INSTALLATION AND SERVICE INSTRUCTIONS
MODEL 580
FIVE TUBE-SUPERHETERODYNE AUTO RADIO

TUBE COMPLEMENT:

1—Type 6D6—remote cut-off pentode as an R. F. amplifier.
1—Type 6A7—pentode as an oscillator and first detector.
1—Type 75 —duplex diode triode second detector automatic volume control and first audio.
1—Type 42 —pentode output tube.
1—Type 84 —high vacuum full wave rectifier.

ACCESSORIES:

The carton of accessories packed with this set contains the following:
1—No. 152-1 shielded plug-in type antenna cable.
1—No. 152-2 plug-in battery cable.
1—No. 149-18 flexible volume control shaft (slotted fitting).
1—No. 150-18 flexible selector shaft (key fitting).
2—No. 146-2 brackets for anchoring flexible shafts to set container.
2—No. 135-5—3" x ⅜" carriage bolts and nuts for mounting set to bulk head.
2—No. 134-1—⅜" x 1" iron washers.
2—No. 134-2—⅜" lockwashers.
6—No. 154-2 set screws, 4 for attaching flexible cables to set, 2 for anchoring cables to brackets.
4—No. 155-6—No. 6 x ¼" binding head self-tapping screws for attaching brackets (No. 146-2).
6—168-1—Spark plug type suppressors.
1—168-2—Distributor type suppressor.
1—No. 148-1 generator condenser.
1—No. 148-3 ammeter condenser.
1—No. 151-3 remote control head.
1—No. 116-6 pilot light assembly complete.
1—No. 146-8 Die cast mounting bracket.
1—No. 146-12 Steering column strap.
1—No. 116-5 6-8 volt bulb.
1—No. 169-1 15 amp. fuse.
1—No. 152-3 Fuse insulating sleeve.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the paper template included with these instructions and which is the same size as the set. Mark location for two mounting bolts if mounted on the long side and for one mounting bolt if mounted on the short side.

Then drill two (2) one-half inch (½") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DASH MOUNTING FOR THE REMOTE CONTROL HEAD:

The majority of the new 1935 model automobiles have provisions made for mounting the remote control head of an auto radio on the dash. We have available special escutcheon plates for this purpose which can be secured upon request at an additional cost of $1.00. *When requesting escutcheon plates specify make and model of the car, also the finish of the dash.*

Following is a list of 1935 model automobiles which contain removable ash tray receivers and which are able to accommodate the *remote control head of our model 580 auto receiver.*

Chrysler Airstream	Nash	Reo
Dodge	Packard	Ford V-8
Plymouth	Graham DeLuxe	
De Soto Airstream	Hupmobile	

Following is a list of 1935 model automobiles which do not contain ash tray receivers but with the aid of the special drilling dimensions furnished herewith the left hand panel on the dash may be drilled to accommodate our regular remote control head.

La Fayette (Nash)	Graham (Standard)
Franklin	Studebaker

For installation of our remote control head on the following cars we recommend standard steering column or dash mounting with the aid of a bracket:

Auburn	Terraplane	De Soto & Chrysler Airflow
Buick	Pontiac	Hudson
Cadillac	Chevrolet—Standard	Lincoln
La Salle	& De Luxe	Oldsmobile

Many of the 1931 model automobiles contain the same size ash tray receiver as the 1935 models and naturally installation of the remote control head can be made on these models.

We have found that our model 580 auto receiver will fit above the steering column on the fire wall of 75% of the late model automobiles and for dash mounting of the remote control head this location works out very satisfactorily.

The Cadillac, La Salle, Chevrolet, Pontiac and Oldsmobile 1935 automobiles have special blank escutcheon plates on the dash which are intended for remote control heads for auto receivers. The cut-out behind these blank escutcheons will not accommodate our remote control head and for installation in these models we recommend using standard steering column mounting for the remote control head or dash mounting using a bracket as illustrated in drawings contained herein.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration). All bypass leads should be as short as possible.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-4) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

After standard suppression has been applied and the hood clamped down to prevent radiation, the receiver should be turned on and the dial turned off a station, with the volume control at maximum. If motor noise is still objectionable the next step is to determine whether the interference is originating through chassis pickup or from the antenna.

To check for chassis pickup, disconnect the antenna from the antenna cable and ground the antenna lead to shield of cable, or remove antenna cable. Chassis pickup can be reduced by reducing the gap between plug contacts and the rotating arm in the distributor head. To do this, apply solder to the end of the rotor arm. Replace the rotor in the distributor and turn the engine over slowly with the crank in order to clean the excess solder. The rotor should not brush or wipe the contacts inside the distributor cap, but should just clear them. As an additional precaution check the breaker points. They should be thoroughly cleaned and adjusted or new points installed if they are badly worn. The ignition system of a car must be kept in good condition and leaky cracked high tension wires and bad spark plugs should be replaced. In many cars the low tension battery leads, etc., are grouped together with the high tension wires. These leads will very often pick up motor noise and feed it into the receiver through the battery circuit. In cases such as these it will be necessary to separate the low tension from the high tension wires and run them through another hole if they run from the engine compartment up to the instrument panel. This condition is particularly true on the V 8 Ford as the battery and primary leads run through a special tube which also houses the high tension leads. Shield and ground these leads. It is also necessary on V 8 Fords to install a capacitor between the primary terminal of the coil and ground.

Cars with floating power must have the motor bonded to the bulkhead and again to the frame to provide a direct path for the high frequency interference developed in the ignition system. ⅝" copper braid will be necessary, SMALL DIAMETER WIRE WILL NOT DO. Bond flexible shaft leads, such as free wheeling, choke wires, etc., which pick up motor noise and reradiate it into the car. In extreme cases it has been found necessary to ground the steering column. Free wheeling cables should be grounded at the point at which they go through the fire wall of the car.

On cars which have a wooden bulkhead it is necessary to line the motor side with thin sheet metal and ground. This will prevent interference from entering the inside of the car and from there being picked up by the antenna. It is also necessary in some installations to connect a capacitor from the hot side of the dome light wire to frame of the car. This lead can usually be found by referring to the electrical wiring diagram of the car. If the ignition coil is mounted inside the driving compartment, it may be necessary to shield the high tension lead running from the coil to the distributor. This cannot be done effectively, however, if the wire has rubber insulation. Where the car is so equipped this wire should be replaced with a good quality high tension wire such as Packard cable. When applying the shield over this wire be sure that it terminates at least an inch from both ends of the lead and that the shield is grounded at both ends; one end under the dash and the other to the engine. It may be necessary to by-pass the electrical connections of all gauges such as oil, water, gas (Hudson-Terraplane).

The foregoing rules should remove any trace of chassis pickup. Now connect the antenna to the receiver and test for motor noise pickup. It is entirely probable that if any noise is present it will be very slight and only noticeable between stations.

No absolute rule for complete motor noise elimination can be specified inasmuch as many times two cars of the same make present entirely different problems and require bonding or shielding at different points.

A word or two concerning antennas; naturally the performance of any radio depends on the effectiveness of the antenna. The later model cars are coming through with very good Antennas, already installed and no trouble should be experienced from this angle with of course an occasional exception. The older cars present a more difficult problem and naturally the service man will have to take cases of this nature into consideration. Many of the older cars on the market today have a wire network in the roof which is nothing more than ordinary chicken wire.

This wire network acts as a support to the roof and is in the majority of cases grounded directly to the body of the car at the point at which the roof meets the sides of the body. Service men frequently tack antennas to the underside of the top material in these cars, this is not satisfactory. There are but two things to do. Either an underslung (plate or strap) antenna must be used or the wire network must be cut from all grounds to the car. If this is done this network will in itself make a very good antenna, but it will be necessary to cut the wire network back for a distance of at least three inches from all sides of the car.

When running the lead-in up the corner post of the car to the roof antenna ground it every few inches to the frame of the body of the car. If this is not possible insulate it, otherwise scratchy noises will result.

Shield high tension leads.

The ignition system of car must be kept in good condition.

It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery. THIS SHOULD BE DONE BY A COMPETENT SERVICE STATION.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

SERVICE NOTES:

Model 580 is a five tube superheterodyne receiver with an intermediate frequency of 175 kilocycles and a tuning range of from 530 to 1550 kilocycles.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable, any part is replaceable without removing the chassis from the cabinet. All adjustments are made without removing the chassis from the cabinet.

Should it ever become necessary or desirable to re-align this receiver, the proper method is as follows:

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6A7 tube.

2. Adjust trimming condensers of I. F. transformer, part number 108-32 (two adjustments) to resonance, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection of the meter indicates resonance.

Note: I. F. transformer adjustments are accessible from the bottom of the chassis—the bottom cover must be removed.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1400-1000-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

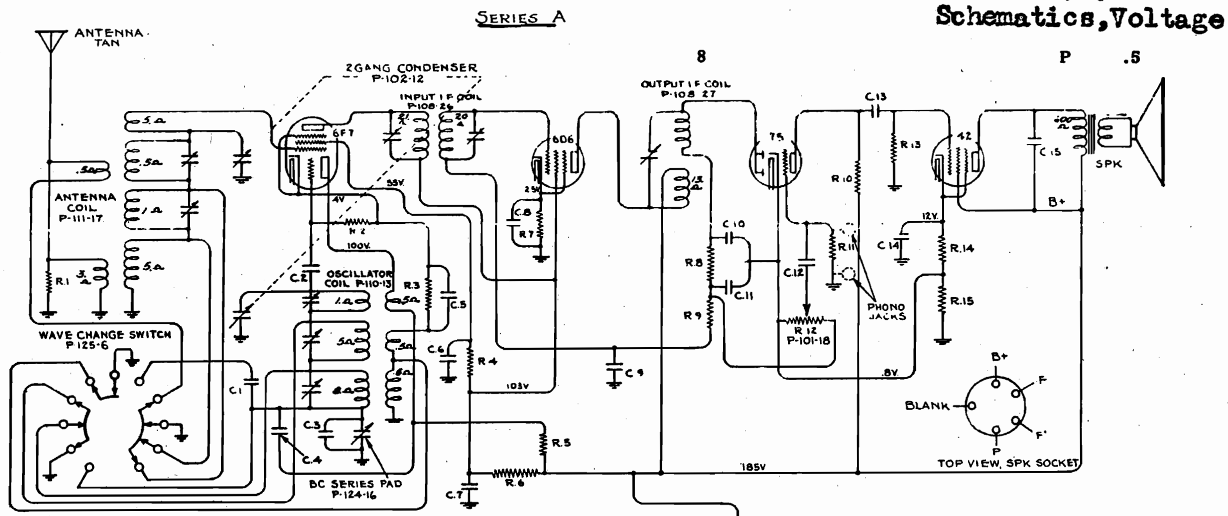
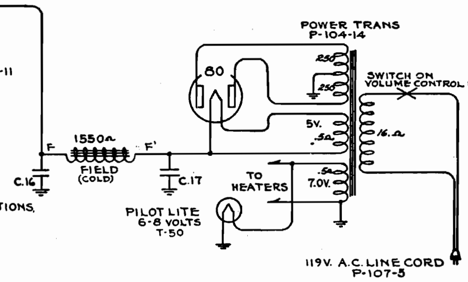
NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:
Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

MODEL 585
Series A,B,C
Schematics,Voltage

BELMONT RADIO CORP.

SERIES A

LEGEND

CONDENSERS

Nº	VALUE
C.1:-	2870 μμf MICA
C.2:-	100 " "
C.3:-	475 "
C.4:-	.1 X 200V
C.5:-	.1 X 200V.
C.6:-	.1 X 200V
C.7:-	.1 X 200V
C.8:-	.1 X 200V
C.9:-	.1 X 200V.
C.10:-	500 μμf MICA
C.11:-	500 μμf MICA
C.12:-	.05 X 200V
C.13:-	.01 X 400V
C.14:-	4.0 MFD. X 25V.
C.15:-	.015 X 400V.
C.16:-	3.0 MFD. X 250V
C.17:-	4.0 MFD. X 300V

RESISTORS

Nº	VALUE	
R.1:-	800 Ω	1/3 W.
R.2:-	50M Ω	"
R.3:-	700 Ω	
R.4:-	100M Ω	"
R.5:-	20M Ω	1/2 W.
R.6:-	19M Ω	1/2 W.
R.7:-	200 Ω	
R.8:-	50M Ω	1/3 W
R.9:-	1 MEG	"
R.10:-	250M Ω	"
R.11:-	2 MEG.	"
R.12:-	500M Ω	VOL. CONTROL
R.13:-	500M Ω	1/3 W.
R.14:-	500 Ω	"
R.15:-	35 Ω	

:NOTE.
C.7, C.9 ARE IN ONE UNIT P-118-1
C.14, C.16, C.17, ONE UNIT LYTIC P-119-11
R.7, R.14, R.15, ONE UNIT P-106-18

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL

WAVE CHANGE SWITCH P-125-6 • 3 POSITIONS, ROTATING CLKWISE -
1ST POSITION - BC. 1720-540 KC
2ND " - MW. 7.6 - 2.3 MC
3RD " - SW 23.0 - 7.5 MC
SWITCH SHOWN AT SW POSITION

TUNING RANGE—SERIES A:
Standard Broadcast Band
540 - 1720 Kilocycles
Intermediate Band
2.3 - 7.6 Megacycles
Short Wave Band
7.5 - 23.0 Megacycles

TUNING RANGE—SERIES B & C:
Standard Broadcast Band
530 - 1720 Kilocycles
Intermediate Band
2.35 - 7.7 Megacycles
Short Wave Band
7.6 - 19.0 Megacycles

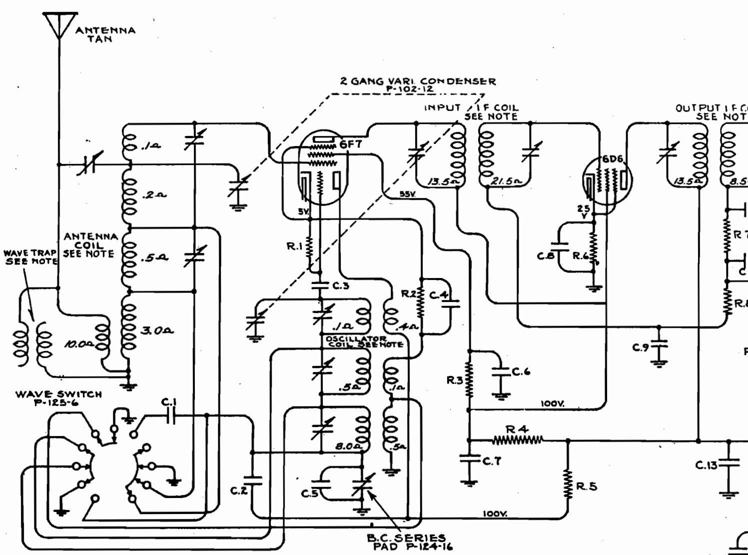
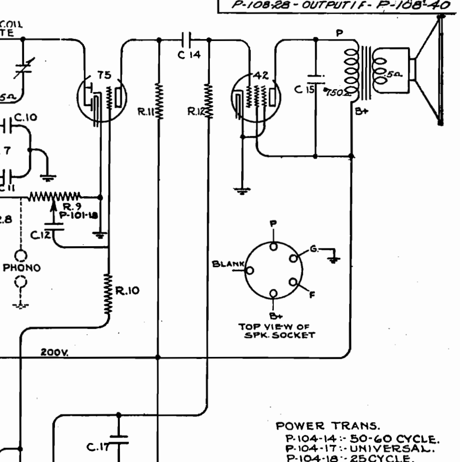
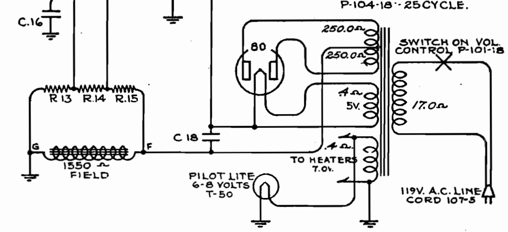
I. F. FREQUENCY:

Series A }
Series B } 370 K.C.
Series C 465 K.C.

SERIAL NUMBERS
SERIES "B" 5A100510B - UP
SERIES "C" 5B105635C - UP

:NOTE:

SERIES B		SERIES C
2870 μμf	C.1	2000 μμf
550 μμf	C 5	380 μμf
P-105-9	WAVE TRAP	P-105-10
P-111-18	ANT. COIL	P-111-27
P-110-14	OSC. COIL	P-110-22
P-108-26	INPUT I.F	P-108-38
P-108-28	OUTPUT I F	P-108-40

CONDENSERS

Nº	VALUE
C.1:-	SEE NOTE
C.2:-	.1 X 200V
C.3:-	100 μμf MICA
C.4:-	.1 X 200V.
C.5:-	SEE NOTE
C.6:-	.1 X 200V
C.7 -	.1 X 200V
C.8:-	.1 X 200V
C 9:-	.1 X 200V.
C.10:-	100 μμf MICA
C.11:-	100 μμf MICA
C.12:-	.05 X 200V.
C.13:-	8.0 MFD. X 300V P-103-7
C.14:-	.01 X 400V.
C.16:-	.1 X 200V.
C.17:-	.1 X 200V.
C.18:-	8.0 MFD. X 350V. P-103-6
C 15 -	.015 x 600V

RESISTORS

Nº	VALUE	
R.1:-	50M	1/3 W.
R.2:-	700	"
R.3:-	100M	"
R.4:-	25M	1/2 W.
R.5:-	20M	"
R.6:-	250	1/3 W.
R.7:-	50M	"
R.8:-	500M	"
R.9:-	500M	VOL. CONT'L
R.10:-	1 MEG.	1/3 W.
R.11:-	250M	"
R.12:-	"	"
R.13 -	15M	"
R.14 -	180M	"
R.15 -	800M	"

C.6, C.8 IN DUAL UNIT P-1.8-1
C.7, C.9 " " " "
C.16, C.17 " " " "

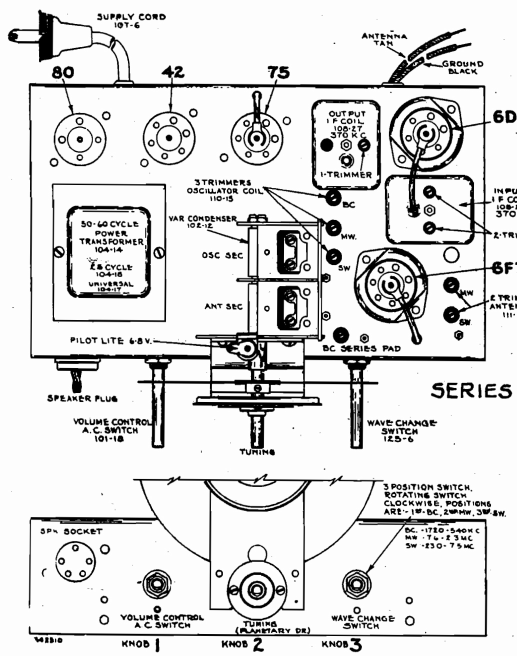
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

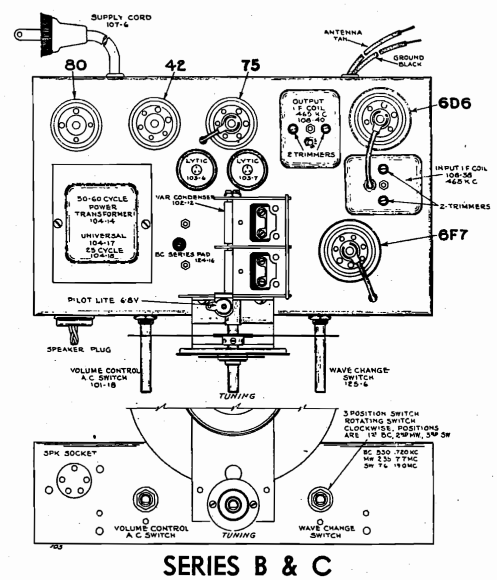
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL

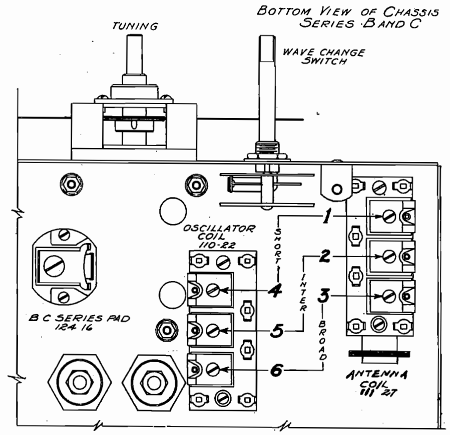
WAVE SWITCH P-125-6, 3 POSITIONS ROTATING CL'KWISE:-
1ST POSITION - BC. 1720-530 KC
2ND " - MW. 7.7 - 2.35 MC
3RD " - SW. 19.0 - 7.6 MC
SWITCH SHOWN AT SW. POSITION

MODEL 585
Series A,B,C
Socket Layouts,Trimmers
Parts, Change Data

BELMONT RADIO CORP.







LIST OF REPAIR PARTS - MODEL 585 (SERIES A-B-C)

Parts Used in Ser. A	Parts Used in Ser. B	Parts Used in Ser. C.	DESCRIPTION	Not Used in Set
			CONDENSERS	
100-11	100-11	100-11	.01 x 400V—25%	
100-15	100-15	100-15	.015 x 400V—Plus 10%; Minus 20%	
100-19	100-19	100-19	.006 x 600V—25%	
100-20	100-20	100-20	.1 x 120V—25%	
Not Used	100-22	100-22	.05 x 200—25%	
Not Used	103-6	103-6	8 Mfd. x 350V Electrolytic	
Not Used	103-7	103-7	8 Mfd. x 300V Electrolytic	
118-1	118-1	118-1	Dual .1 x 200V—Plus 50%; Minus 10% (Series B & C use 3 per set)	
119-11	Not Used	Not Used	4-3-4 Mfd. Electrolytic	
119-12	Not Used	Not Used	8-8-4 Mfd. Electrolytic (For 25 Cy. Only	
129-2	129-2	129-2	.0005 Mica—MT—20%	
129-5	129-5	129-5	.0001 Mica—MT—20%	
129-15	129-15	Not Used	.00055 Mica—MT—5%	
129-16	129-16	Not Used	.00287 Mica—MW—5%	
Not Used	Not Used	129-23	.002 Mica—MW—5%	
Not Used	Not Used	129-24	.000425 Mica—MT—5%	
			RESISTORS	
130-3	130-3	130-3	500M Ohm—1/5 Watt—20%—100V—Carbon	
130-11	130-11	130-11	250M Ohm 1/3 Watt—20%—50V—Carbon	
130-12	130-12	130-12	50M Ohm—1/3 Watt—20%—20V—Carbon	
130-19	130-19	130-19	1 Meg Ohm—1/3 Watt—20%—100V—Carbon	
130-20	130-20	130-20	100M Ohm—1/5 Watt—20%—50V—Carbon	
Not Used	130-32	130-32	250 Ohm—1/3 Watt—20%—10V—Wire W.	
130-38	Not Used	Not Used	2 Meg Ohm—1/3 Watt—20%—20V—Carbon	
130-39	130-39	130-39	700 Ohm—1/3 Watt—20%—20V—Carbon	
130-40	Not Used	Not Used	19M Ohm—1/2 Watt—20%—150V—Carbon	
130-41	Not Used	Not Used	800 Ohm—1/3 Watt—20%—20V—Carbon	
130-42	130-42	130-42	20M Ohm—1/2 Watt—20%—100V—Carbon	
Not Used	130-44	130-44	25M Ohm—1/2 Watt—20%—150V—Carbon	
Not Used	130-46	130-46	800M Ohm—1/5 Watt—10%—100V—Carbon	
Not Used	130-47	130-47	180M Ohm—1/5 Watt—10%—100V—Carbon	
Not Used	130-48	130-48	15M Ohm—1/5 Watt—10%—20V—Carbon	
			POWER TRANSFORMERS	
104-14	104-14	104-14	50/60 Cycle Power Transformer	
104-17	104-17	104-17	Universal Power Trans.—40 Cy. Primary	
104-18	104-18	104-18	25 Cycle Power Transformer	
			COILS	
Not Used	105-9	Not Used	Antenna Choke Coil	
Not Used	Not Used	105-10	Antenna Choke Coil	
108-26	108-26	Not Used	Input I. F. Transformer Complete	
108-27	Not Used	Not Used	Output I. F. Transformer Complete	
Not Used	108-28	Not Used	Output I. F. Transformer Complete	
Not Used	Not Used	108-38	Input I. F. Transformer Complete	
Not Used	Not Used	108-40	Output I. F. Transformer Complete	
110-13	Not Used	Not Used	Oscillator Coil Complete	
Not Used	110-14	Not Used	Oscillator Coil Complete	
Not Used	Not Used	110-22	Oscillator Coil Complete	
111-17	Not Used	Not Used	Antenna Coil Complete	
Not Used	111-18	Not Used	Antenna Coil Complete	
Not Used	Not Used	111-27	Antenna Coil Complete	
			SOCKETS	
121	121	121	Four Prong Socket—Type 80	
121	121	121	Five Prong Socket—Speaker	
121	121	121	Six Prong Socket—Type 42	
121	121	121	Six Prong Socket—Type 75	
121	121	121	Six Prong Socket—Type 6D6	
121	121	121	Seven Prong Socket—Type 6F7	
			MISCELLANEOUS	
101-18	101-18	101-18	Volume Control	
102-12	102-12	102-12	Two Gang Variable Condenser	
106-18	Not Used	Not Used	Metal Clad Resistor	
107-5	107-5	107-5	Line Cord	

DESCRIPTION

Tubes

The Tube complement of this chassis is as follows:

1 Type 6F7—triode pentode as oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 75—duplex diode triode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.

Series "A" chassis are equipped with dry electrolytic filter condensers and are serially numbered on paper tags which are attached to the line cord and to the inside of the cabinet.

Series "B" and "C" chassis are serially numbered on the back flange of the chassis, series "B" beginning with number "5A100510B" and up; series "C" chassis, beginning with number "5B105635C", differs only from series "B" in that the I.F. frequency was changed from 370 to 465 kilocycles.

Series "B" and "C" may be identified by the letter "B" and "C" at the end of the serial numbers.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagrams of series "A," "B," and "C."

All voltages are measured with 119 volts on the primary of the power transformer.

Resistance of coils and transformer windings are indicated in ohms on schematic circuit diagram.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

MODEL 585
Series A,B,C
Alignment Data

BELMONT RADIO CORP.

ALIGNING INSTRUCTIONS—SERIES A

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

SERIES A

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates, entirely out of mesh, adjust the I.F. transformers (adjustments at the top of parts number 108-26 and 108-27—see top view).
   (a) Connect external oscillator in series with I.F. dummy antenna. With external oscillator adjusted to 370 kilocycles, in series with I.F. dummy antenna to the control grid cap of the type 6D6 tube and chassis ground, adjust output I.F. transformer, part number 108-27, to resonance.

   Note: Output I.F. transformer, part number 108-27, has only one adjustment.

   (b) Move generator output clip from grid of 6D6 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-26, to resonance. NOTE: IT IS EXTREMELY NECESSARY TO ALIGN BOTH I.F. STAGES SEPARATELY.

Broadcast Band Alignment—
(540 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with broadcast dummy antenna to tan antenna lead and black ground lead, make the following adjustments:
   (a) Set external oscillator to 1720 kilocycles and adjust oscillator trimmer to resonance. This adjustment is the rear adjustment of a group of three located next to the variable condenser.
   (b) Readjust external oscillator to 600 kilocycles and adjust broadcast series pad to resonance by rotating condenser to approximately 600 kilocycles, rocking it slowly to and fro until by adjusting pad maximum output is attained. This adjustment is located at the front of the chassis next to the variable condenser and wave changing switch.
   (c) Check for tracking and sensitivity at 1400 and 1000 kilocycles. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Short Wave Band Alignment—
(7.5 - 23.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.
   (a) With external oscillator set at 21 megacycles, and connected to the tan antenna lead in series with the short wave dummy and to the black ground lead, adjust the oscillator short wave trimmer until generator signal is picked up. This trimmer is the one closest to the front of the chassis of the group of three trimmers located next to the gang condenser (see top view of chassis).
   (b) Adjust short wave antenna trimmer to resonance. This adjustment is to the right of the 6F7 tube and is the one closest to the front of the chassis (see top view).
   (c) Re-set external oscillator to 9 megacycles and pick up oscillator signal by rotating variable condenser, moving dial pointer. Check for tracking and sensitivity and do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment—
(2.3 - 7.6 Megacycles)

1. With wave selector switch in the center position and with dial pointer set to 7 megacycles, makes the following adjustments:
   (a) With external oscillator set at 7 magacycles and connected in series with the short wave dummy antenna to the tan antenna lead and black ground lead, same as for short wave adjustments, adjust center trimmer of oscillator coil, part number 110-13, until 7 magacycle signal is picked up. This is the center adjustment of a group of three located next to the gang condenser (see top view).
   (b) Adjust antenna trimmer to resonance, this adjustment is the rear of a group of two located at the right of the chassis next to the 6F7 tube (see top view).
   (c) Re-set external oscillator to 2.5 magacycles (2500 kilocycles), pick up signal by rotating condenser and moving dial pointer. Check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

Notes—(Series "A" Only)

25 Cycle chassis differ from regular 60 cycle and 40 cycle chassis in that a larger electrolytic filter condenser is used. The regular condenser is part number 119-11 and the larger unit for the 25 cycle chassis is part number 119-12.

Part number 106-18, a metal clad resistor, consists of the following sections with resistances and wattages as noted: one, 500 ohms; one, 35 ohms, one, 200 ohms, all 1/3 watt, plus or minus 10%.

ALIGNING INSTRUCTIONS—SERIES "B" & "C"

NOTE: These instructions are written for series "C". The instructions are identical for series "B", except that for series "B" the I.F. frequency is 370 kilocycles and for series "C", 465 kilocycles. Also, the I.F. transformers are different:

Series "B"
Part No. 108-26—Input I. F. Trans.
Part No. 108-28—Output I. F. Trans.
Series "C"
Part No. 108-38—Input I. F. Trans.
Part No. 108-40—Output I. F. Trans.

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-38 and 108-40—see top view).
   (a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-40, to resonance.
   (b) Move generator output clip from grid of 6D6 to grid cap of 6F7 tube and align input I.F. transformer, part number 108-38.
   (c) With generator connected to grid of type 6F7 tube, readjust output I.F. transformer, part number 108-40, to resonance.

Broadcast Band Alignment—
(530 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance, for location of this adjustment, number 6, see diagram.
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 3, see diagram.
   (c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, see top view—part number 124-16.
   (d) Check for tracking and sensitivity at 1000 kilocycles.

NOTE (Series "B" and "C" Only)

25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

Short Wave Band Alignment—
(7.6 - 19.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 18 megacycles.
   (a) With external oscillator adjusted to 18 megacycles and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.
   (b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.
   (c) Re-set external oscillator to 9 megacycles, rotate condenser, move dial pointer to 9 megacycles and check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment—
(2.35 - 7.7 Megacycles)

1. With wave changing switch in center position, and with dial pointer set to 7 megacycles, make the following adjustments:
   (a) With external oscillator set at 7 megacycles and connected in series with short wave dummy antenna, as for short wave adjustments, adjust trimmer of oscillator coil, part number 110-22 until 7 megacycle signal is picked up. For location of this adjustment, number 5, see diagram.
   (b) Adjust antenna trimmer to resonance, adjustment number 2, see diagram.
   (c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), rotate variable condenser, move pointer, pick up oscillator signal and check for tracking and sensitivity. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before re-assembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

OPERATION

CONTROLS.—The three control knobs on the front of the cabinet, in sequence from left to right are (see illustration):

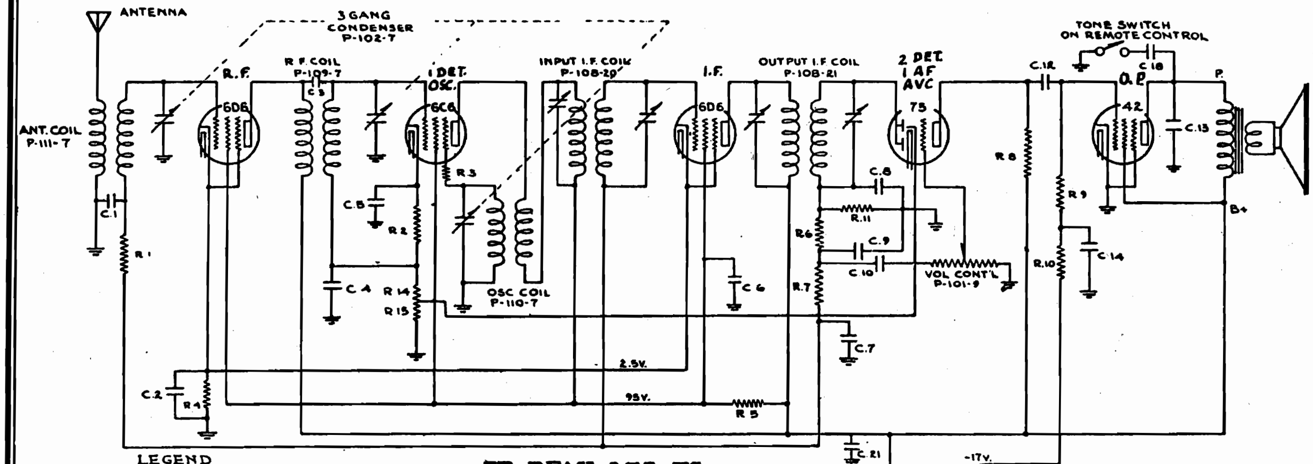
KNOB 1.—*Volume Control and "On-Off" Switch Are Combined.* When turning on, a click will be heard and the dial will light. Wait approximately 45 seconds for the tubes to heat up. Turn knob all the way to the left to turn set off.

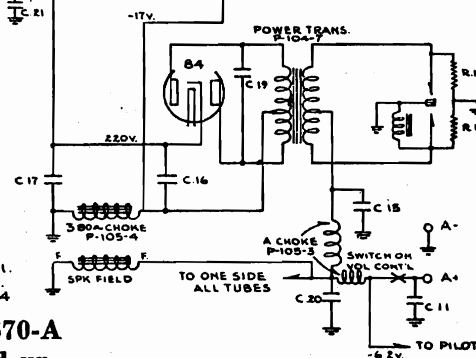
KNOB 2.—*Tuning.* The upper end of the pointer covers the standard broadcast band scale, which is marked in kilocycles, the lower end of the pointer covers the intermediate and short wave bands. The lower scale is the short wave band, marked in megacycles, the short heavy lines on this scale are marked in meters. It is at these points that many foreign broadcasters may be heard. The inner scale, marked in megacycles, includes the 49 meter broadcasting channel, which is shown by the short heavy line, it also includes amateurs and police calls.

KNOB 3.—*Wave Changing Switch.* The knob is marked with three dots and the cabinet with a pin. When the right hand dot is in line with the pin, the switch is set in the broadcast band position, when center dot is opposite pin, the intermediate band is in position and when the left dot is opposite pin, the short wave band is connected. Switch turned all the way left—broadcast position, center—intermediate, all the way right—short wave.

MODEL 670-A
Schematic, Voltage
Parts List

BELMONT RADIO CORP.





LEGEND

RESISTORS

Nº	VALUE
R.1:-	250M 1/3W
R 2:-	450Ω
R 3:-	1500Ω
R.4:-	150Ω
R 5:-	25M 1W.
R 6:-	50M 1/3W
R.7:-	250M 1/3W.
R.8:-	250M 1/3W
R 9:-	200M 1/3W
R 10:-	300M 1/3W
R.11:-	250M 1/3W.
R.12:-	100Ω
R.13:-	100Ω
R.14:-	5M
VAR RESISTOR (VOL CONT'L)	500M
R.15:-	200Ω

CONDENSERS

Nº	VALUE
C 1.-	.05 X 200V.
C 2:-	.1 X 200V.
C.3:-	11.5 μμf GIMMICK
C 4.-	.05 X 200V.
C 5:-	.05 X 200V.
C 6 -	.1 X 200V.
C 7:-	.1 X 200V.
C 8 -	.0005 MICA
C 9:-	.0005 MICA
C 10:-	.01 X 400V.
C 11 -	.002 MICA.
C 12:-	.01 X 400V.
C 13 -	.003 X 600V.
C 14:-	.1 X 200V.
C 15:-	.5 MFD. X 120V.
C 16 -	8 MFD. X 350V.
C 17 -	8 MFD. X 350V.
C 18:-	.01 X 400V.
C 19 -	.015 X 1400V
C.20 -	.5 MFD. X 120V.
C 21 -	.01 X 400V

IF PEAK 175 KC.

- NOTE:-

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.
RESISTORS IN ONE UNIT, P-106-14:- R. 2, 4, 14, 15
CONDENSERS IN ONE UNIT, P-119-4:- C. 16, 17.
CONDENSERS C.2, C.4, C.5, C.6, C.7 ARE IN ONE UNIT P-145-5.
RESISTORS AND CONDENSERS IN OUTPUT I F CAN, P-108-21:- C. 8, 9, 10 AND R. 6, 7, 11.
CONDENSER, C.1, IN ANT. COIL CAN P-111-12.
CONDENSERS C.15, -C 20 IN ONE UNIT P-148-4

PARTS LIST—MODEL 670-A
Serial No. 4D-502501 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description
101-9	Volume Control with Switch
101-12	Tone Control Assembly, complete
102-7	Three Gang Geared Variable Condenser
104-6	Vibrator Transformer
105-3	"A" Choke—40T—No. 16E—½" Dia.
105-4	380 Ohm Filter Choke
106-6	200 Ohm Center Tapped Resistor
106-14	5800 Ohm Metal Clad Resistor
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)
	Resistor and Condenser Assembly for 108-21
109-7	R. F. Coil
110-7	Osc Coil & bracket
111-7	Antenna Coil
112-43	Volume Control Shaft complete with knob
115-18	Special partition shield
115-22	Tube shield
116-5	6-8 Volt T-50 pilot lamp
116-6	Pilot light assembly, complete, less bulb
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser
142-1	Plug-In Vibrator
145-5	.4 Mfd. By-Pass Block
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control
148-4	Dual .5 Mfd. 120 Volt Condenser
161-1	20 Ampere fuse
147-1	Selector Control Coupling
147-2	Bushing and bracket complete
147-11	Volume control coupling
135-5	⅜x3" carriage bolt
140-3	Container complete with top and bottom
148-1	.5 Mfd. Generator Condenser
148-3	.5 Mfd. Ammeter Condenser
149-18	Volume Control Shaft—18"
149-24	Volume Control Shaft—24"
150-18	Selector Shaft—18"

Part No.	Description
150-24	Selector Shaft—24"
151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware
152-1	Antenna cable
152-2	Battery cable
131-5	Black bakelite remote control knobs
146-8	Die Cast Remote Control Mounting Bracket
146-12	Steering Column Strap
168-1	Spark-plug type suppressor
168-2	Distributor plug-type suppressor
168-3	Cable type suppressor
168-4	Special Ford spark-plug suppressor
	Unless otherwise listed, all Carbon Resistors
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Molded Mica Condensers
	All Sockets
167-1	Dynamic Speakers
	Plate antenna (clamps to frame of car)

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

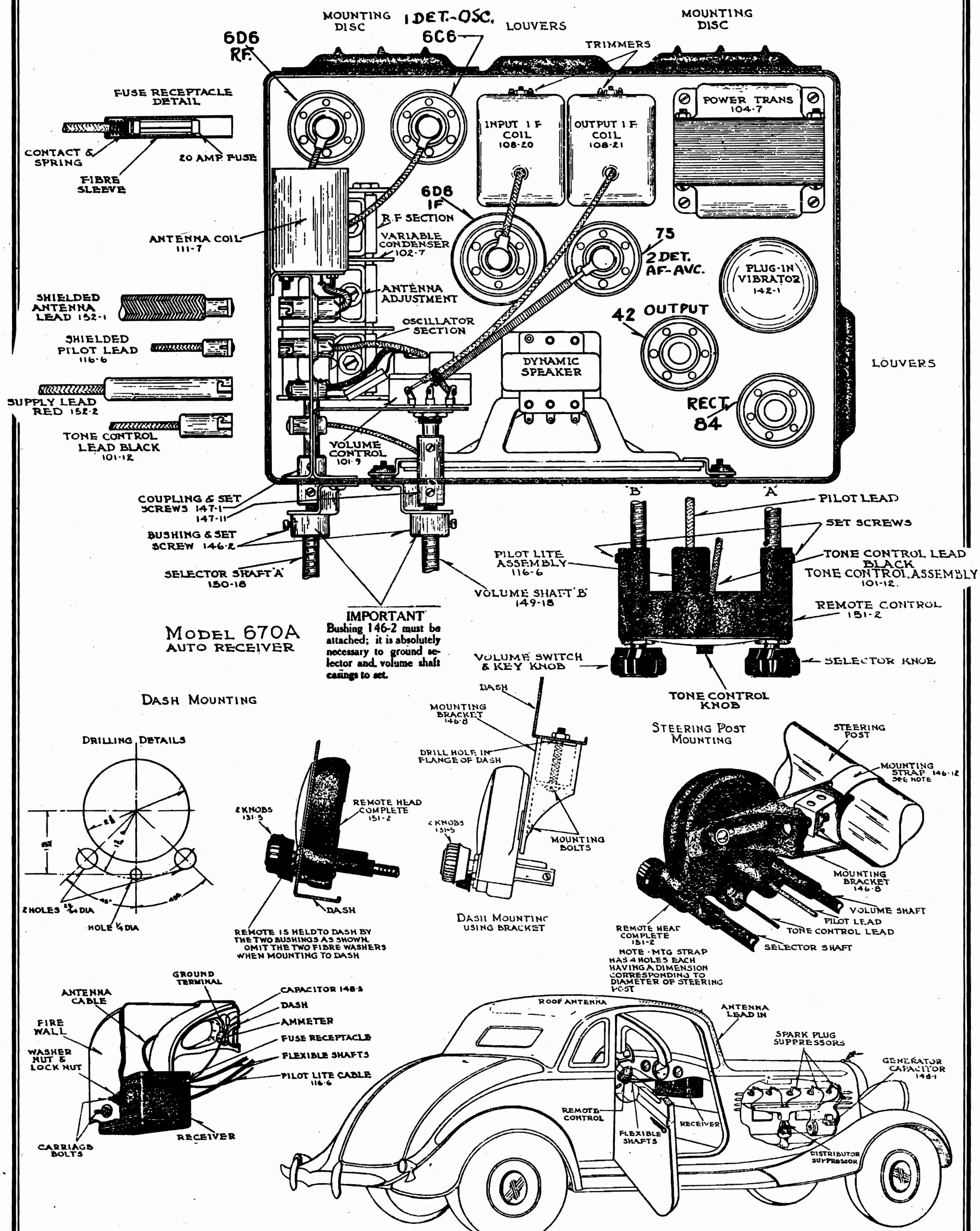
All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

We cannot supply speaker cones only. We can replace a speaker on which a cone has been damaged for $1.50, if defective speaker is returned, transportation charges prepaid.

BELMONT RADIO CORP.

MODEL 670-A
Socket, Trimmers
Installation Details



MODEL 670-A
Alignment
Installation Data

BELMONT RADIO CORP.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvres.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.
3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch (½") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration). All bypass leads should be as short as possible.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

TONE CONTROL:

The tone control assembly, part number 101-12, attaches to the back of the remote control head by means of a special screw and plugs into the set (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver. Tone control knob located between two black knobs (see illustrations) is a BASS and TREBLE switch, it is not a variable tone control. Turning it to the right makes the BASS connection, turning it to the left makes the TREBLE connection. You will note that the BASS position assists materially in reducing interference from static, street car lines and other high pitched disturbances.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

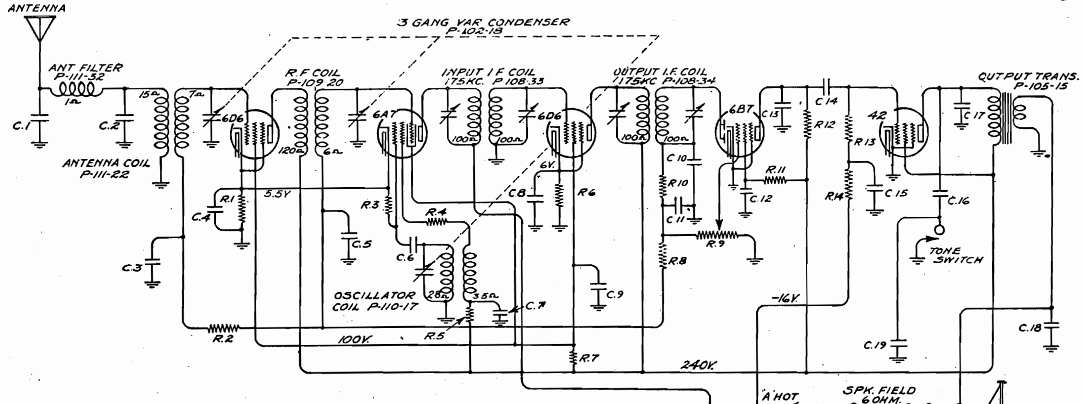
This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-4) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

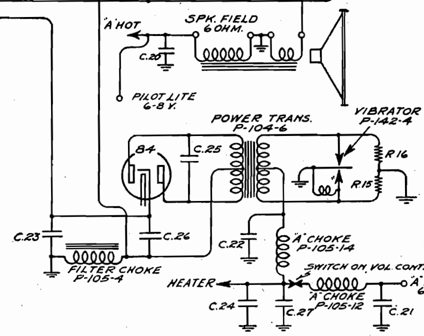
After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

MODEL 680
Schematic, Voltage
Socket, Trimmers

BELMONT RADIO CORP.
MODEL 680





CONDENSERS

No.	Value	No.	Value
C.1	-20 MMF MICA	C.15	-.25x400V.
C.2	-20 MMF MICA	C.16	-.025x400V.
C.3	-.01x400V.	C.17	-.015x400V.
C.4	-.1x200V.	C.18	-500 MMF MICA
C.5	-.05x200V.	C.19	-500 MMF MICA
C.6	-100 MMF MICA	C.20	-500 MMF MICA
C.7	-.1x200V.	C.21	-2000 MMF MICA
C.8	-.1x200V.		
C.9	-.1x200V.	C.22	-.5 MFD.x120V.
C.10	-100 MMF MICA	C.23	-8 MFD.x300V.
C.11	-100 MMF MICA	C.24	-.01x400V.
C.12	-.1x200V.	C.25	-.01x1400V.
C.13	-100 MMF MICA	C.26	-8 MFD.x300V.
C.14	-.01x400V.	C.27	-.5 MFD.x120V.

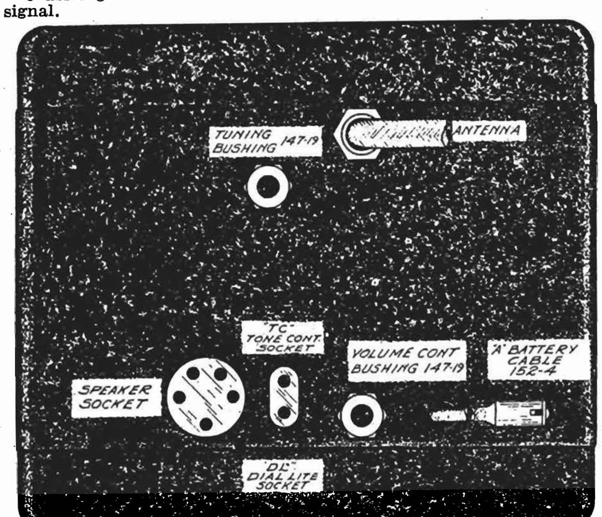
RESISTORS

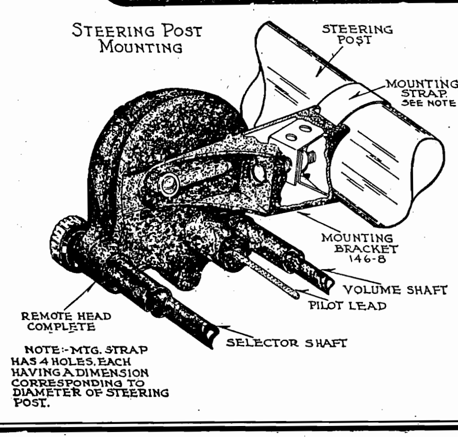
No.	Value	
R.1	-500	1/3 W.
R.2	-100M	1/3 W.
R.3	-50M	1/3 W.
R.4	-3500	1/3 W.
R.5	-20M	1/2 W.
R.6	-1500	1/3 W.
R.7	-25M	1W.
R.8	-500M	1/3 W.
R.9	-1 Meg. Vol. Control P-101-21	
R.10	-100M	1/3 W.
R.11	-1 MEG.	1/3 W.
R.12	-250M	1/3 W.
R.13	-301M	1/3 W.
R.14	-301M	1/3 W.
R.15	-100	
R.16	-100	

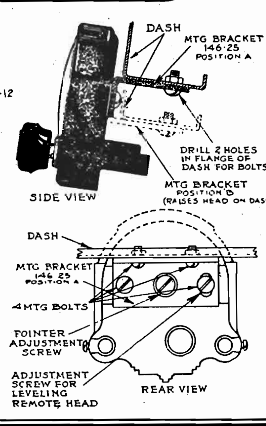
NOTE:
C.4 and C.9 are in one unit P-118-1
C.7 and C.8 are in one unit P-118-1
C.26 and C.23 are in one unit P-119-17
R.16 and R.15 are in one unit P-106-6
Numbers prefixed by letter "P" are part numbers.
Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

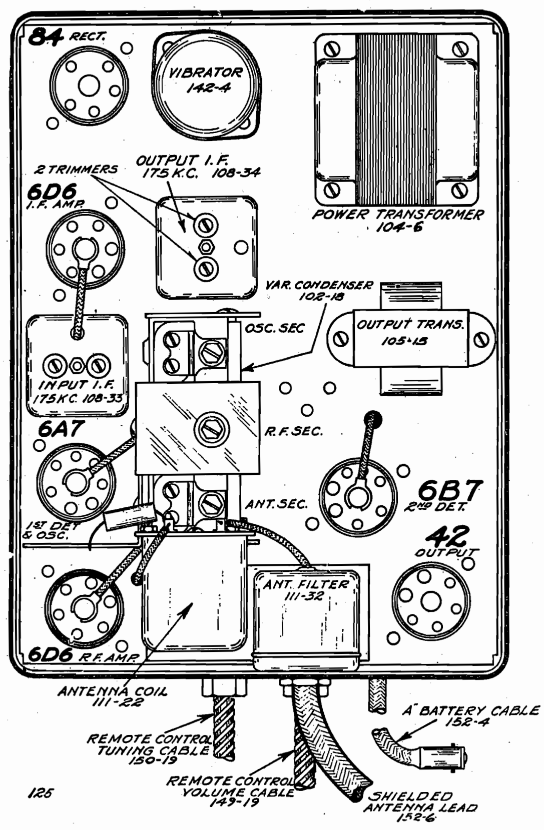
Serial No. 60001 and up.

IF PEAK 175 KC.









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MODEL 680
Alignment
Parts List

BELMONT RADIO CORP.

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and the screen of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT:

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.

(a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

REPAIR PARTS - MODEL 680

Serial No. 60001 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description	List Price Ea.
	CONDENSERS	
	Unless otherwise listed, all single section tubular paper by-pass condensers	$ .25
	Unless otherwise listed, all dual section tubular paper by-pass condensers	.50
	Unless otherwise listed, all molded mica condensers	.25
119-17	Dual 8 mfd. electrolytic filter condenser	2.25
148-1	.5 Mfd. Generator Condenser	.50
148-3	.5 Mfd. Ammeter Condenser	.40
148-5	.5 Mfd. x 120 Volt Condenser	.50
148-6	Special Ford Ignition Coil Condenser	.60
	COILS	
105-12	"A" Choke - 28 Turns No. 12 Wire	.10
105-14	"A" Choke - 37 Turns No. 12 Wire	.10
108-33	Input I.F. Transformer Complete with Shield	1.50
108-34	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	2.50
109-20	R.F. Coil Complete - Less Shield	1.00
110-17	Oscillator Coil Complete with Bracket	.75
111-22	Antenna Coil Complete - Less Shield	1.00
111-32	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
	RESISTORS	
	Unless otherwise listed, all carbon resistors	.20
106-6	200 Ohm Center Tapped Resistor	.25
168-2	Distributor Suppressor	.40
168-3	Cable Type Suppressor	.40
	TRANSFORMERS	
104-6	Power Transformer	3.00
105-4	380 Ohm Filter Choke	.85
105-15	Output Audio Transformer	1.50
	MISCELLANEOUS	
101-21	Volume Control with Switch	1.35
102-18	Three Gang Variable Condenser	4.00
113-30	Two Lug Terminal Strip	.05
113-37	Terminal Strip	.05
115-34	Antenna and R.F. Coil Shield	.15
114-21	Speaker Chassis Only	5.00
114-22	Ford Header speaker chassis only	5.00
128-4	Complete Speaker Housing for 114-21	2.50
128-5	Ford speaker housing for 114-22	2.50
140-5	Set Case less Covers	1.00
140-6	Covers for Above	1.25
142-4	Plug-in Vibrator	4.50
147-19	Flexible Cable Control Bushing	.10
152-2	Battery Cable & Fuse Assembly	.35
152-3	Fuse Insulating Sleeve	.05
152-4	Chassis Battery Cable Assembly	.30
152-6	Antenna Cable	.50
152-8	Speaker Cable with Plug for 114-21	1.00
152-9	Special Ford Header speaker cable and plug	1.25
153-4	Special Speaker-Tone Control-Dial Light Socket Assembly	.25
160-11	Mounting Studs Complete with Nut & Washer	.05
169-1	15 Amp. Fuse (3AG-15)	.05
	All Sockets	.10
123-1	Dome Lite Filter	.90
	Plate Antenna	3.50
	REMOTE CONTROL PARTS	
112-39	Selector Control Shaft	.20
112-41	Idler Gear	.15
112-42	Pointer Shaft	.05
112-85	Volume Control Shaft	.10
112-45	Bezel (Crystal Retainer)	.15
112-46	Celluloid Dial Crystal	.15
112-48	Pointer Shaft Gear	.05
112-96	Celluloid dial	.25
116-13	6-8 Volt, T-51 Bulb Bayonet Base	.10
116-14	6-8 volt T-51 frosted glass bayonet lamp	.13
116-9	Pilot Light Assembly	.45
116-11	Tone Control Assembly Unit Complete	.35
131-5	Black Bakelite Remote Control Knobs	.15
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-25	Dash Mounting Bracket	.15
147-3	Selector Control Bushing for 112-39 Shaft	.10
147-4	Volume Control Bushing for 112-43 Shaft	.10
149-25	Flexible Volume Control Cable - 24"	1.50
150-25	Flexible Selector Control Cable - 24"	1.50
151-7	Remote Control Head complete with Steering Column Bracket	5.00
	Dash Mounting Kit (specify make and year of car)	1.25
151-8	Special General Motors Control Head	7.00
	Dash Mounting Kits for 1935 Chevrolet and Pontiac for use with 151-8 head	1.50
	Dash Mounting Kits for 1935 Oldsmobile for use with 151-8 head	1.75

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None.

All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

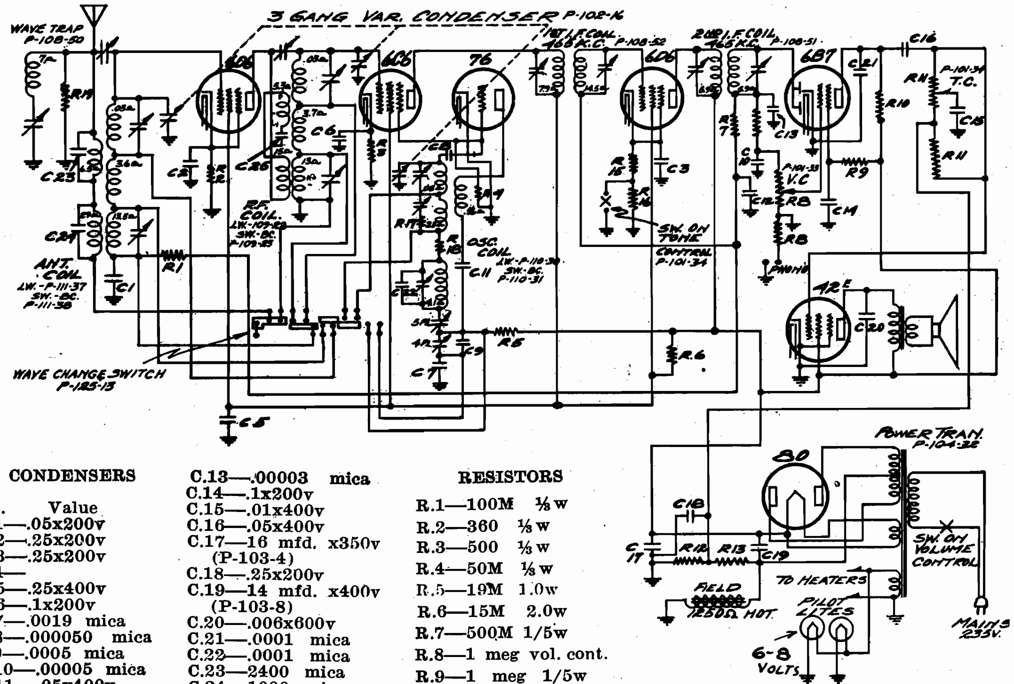
WE CANNOT SUPPLY SPEAKER PARTS, CONES, TRANSFORMERS OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $2.00 NET, IF IT IS RETURNED TO OUR FACTORY TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

BRC - CHICAGO

MODEL 755
Schematic, Socket
Parts, Layout

BELMONT RADIO CORP.



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CONDENSERS

No.	Value
C.1	.05x200v
C.2	.25x200v
C.3	.25x200v
C.4	—
C.5	.25x400v
C.6	.1x200v
C.7	.0019 mica
C.8	.000050 mica
C.9	.0005 mica
C.10	.00005 mica
C.11	.05x400v
C.12	.05x200v
C.13	.00003 mica
C.14	.1x200v
C.15	.01x400v
C.16	.05x400v
C.17	16 mfd. x350v (P-103-4)
C.18	.25x200v
C.19	14 mfd. x400v (P-103-8)
C.20	.006x600v
C.21	.0001 mica
C.22	.0001 mica
C.23	2400 mica
C.24	1000 mica
C.25	3600 mica

NOTE:

C.14, C. 13. In dual unit.
P.118-12 numbers prefixed by letter "P" are part Nos.
Voltages taken from points indicated to chassis ground.
Set not tuned to strong signal. Tone control clockwise.
Serial No. 5G131980A and up
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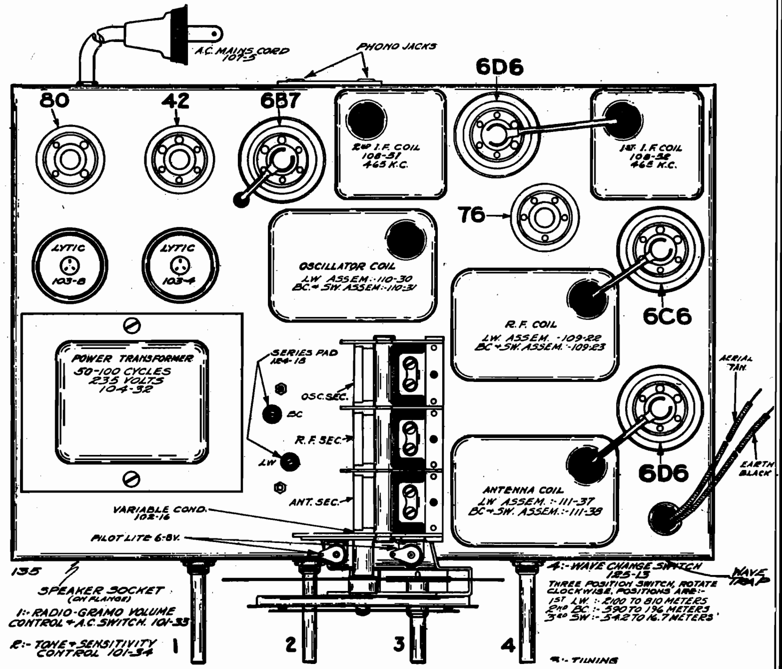
RESISTORS

R.1	100M ⅛ w
R.2	360 ⅓ w
R.3	500 ⅓ w
R.4	50M ⅓ w
R.5	19M 1.0w
R.6	15M 2.0w
R.7	500M 1/5w
R.8	1 meg vol. cont.
R.9	1 meg 1/5w
R.10	600M ½ w
R.11	300M tone control
R.12	250M ⅛ w
R.13	750M 1/5 w
R.15	360 ⅓ w
R.16	30M ⅓ w
R.17	100 ⅓ w
R.18	50 ⅓ w
R.19	10M ⅛ w

I. F. Frequency — 465 Kilocycles

TUNING RANGE:

Long Wave Band
810-2100 Meters.
Broadcast Band
196-590 Meters.
Short Wave Band
16.7-54.5 Meters.



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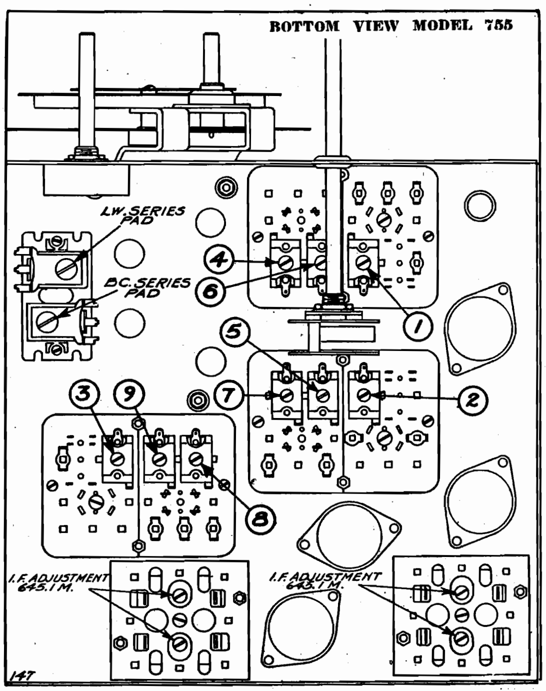
Part No.	Description
	SPEAKERS
114-13	Six Inch Dynamic
114-17	Eight Inch Dynamic
	MISCELLANEOUS
101-33	Volume Control and Switch
101-34	Wizard Control and Switch
102-16	Three Gang Variable Condenser
	TRANSFORMERS
104-32	50/60 Cycle—235 Volt Primary
104-33	40 Cycle—235 Volt Primary
104-34	25 Cycle—235 Volt Primary
104-35	Universal—40 Cycle Primary
104-36	Universal—25 Cycle Primary
	COILS
108-50	Wave Trap Coil and Trimmer Complete
108-51	Output I.F. Transformer Complete—Less Can
108-52	Input I.F. Transformer Complete—Less Can
109-22	Long Wave R.F. Coil Complete—Less Can
109-23	Broadcast and Short Wave R.F. Coil Complete—Less Can
110-30	Long Wave Oscillator Coil Complete—Less Can
110-31	Broadcast and Short Wave Oscillator Coil Complete—Less Can
111-37	Long Wave Antenna Coil Complete—Less Can
111-38	Broadcast and Short Wave Antenna Coil Complete—Less Can

Serial No. 5G131980A and up

MODEL 755
Trimmers
Alignment

BELMONT RADIO CORP.



Dummy Antennas

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast and long wave)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465K.C.) (645.1 Meters)

Each of these I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on, the extreme right of its rotation. and with wave changing switch in the broadcast position, center of its rotation, and with variable condenser set to approximately 550 meters, make the following adjustments:

   (a) Connect external oscillator set at 645.1 meters, in series with "Dummy 1", to the control grid cap of the type 6D6 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6D6 to grid cap to 6C6 and adjust input I.F. transformer to resonance.

   (c) With oscillator still connected to 6C6, re-adjust output I.F. transformer.

   (d) Disconnect oscillator from 6C6 and connect oscillator through "Dummy 2" to antenna lead (tan), adjust wave trap trimmer for a minimum response. (Adjustment located on right front chassis apron).

LONG WAVE BAND ALIGNMENT:

(810-2100 Meters)

1. With wave changing switch in the long wave position, extreme left of its rotation, and with external oscillator set at 2,000 meters and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

   (a) Adjust long wave series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.

   (b) Re-set external oscillator and move dial pointer to 855 m. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.

   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL OSCILLATOR IN FREQUENCY AND ABOVE IN WAVELENGTHS.

SHORT WAVE BAND ALIGNMENT:

(16.7-54.5 Meters)

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17.7 m., and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 17.7 meters and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.

   (b) Re-set external oscillator to 50 meters and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE OR BROADCAST BAND ALIGNMENT:

(196-590 Meters)

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 545 meters and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

   (a) Rotate variable condenser to approximately 545 meters tune in oscillator signal and adjust B.C. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.

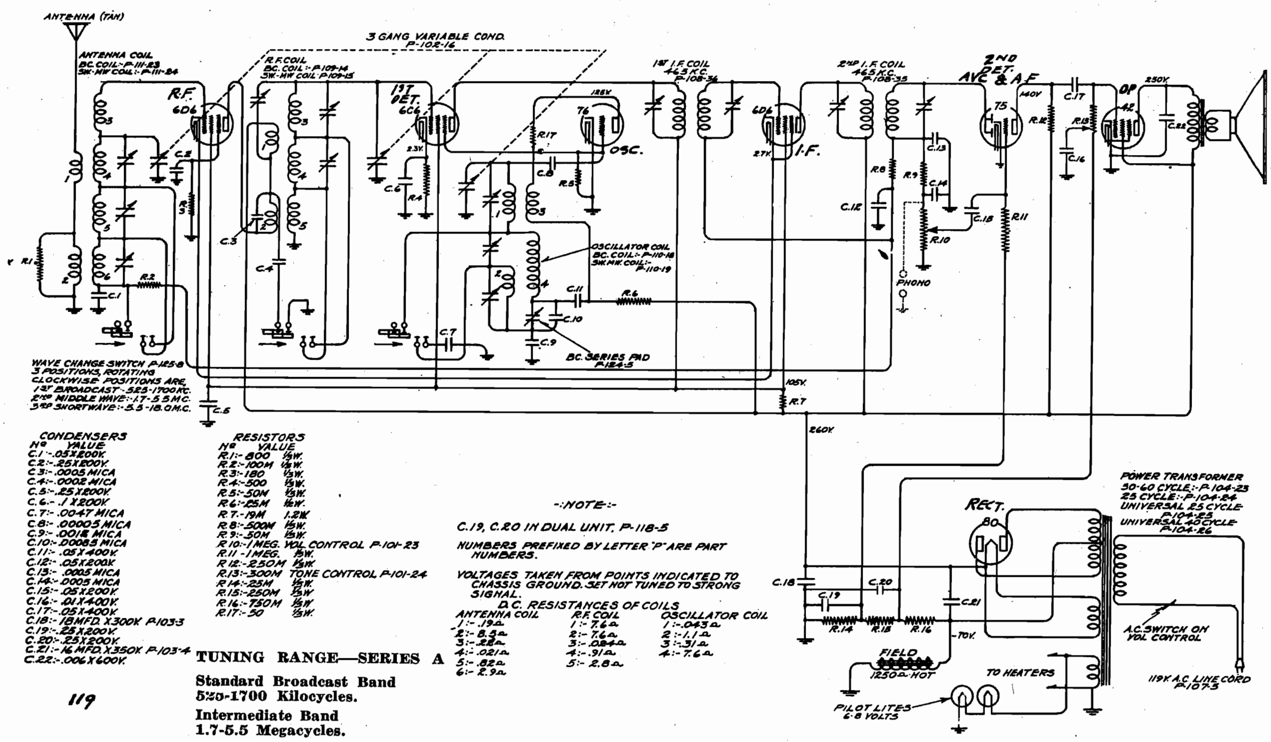
   (b) Set external oscillator at 231 meters, rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.

   (c) Re-check long wave alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17.7 meter short wave and 231 meter broadcast adjustments.

MODEL 777
Series A & B
Schematics
Voltage

BELMONT RADIO CORP.

SERIES A



WAVE CHANGE SWITCH P-125-8
3 POSITIONS, ROTATING
CLOCKWISE POSITIONS ARE,
1ST BROADCAST:-525-1700 KC.
2ND MIDDLE WAVE:-1.7-5.5 MC.
3RD SHORTWAVE:-5.5-18.0 M.C.

CONDENSERS

Nº	VALUE
C.1	.05X200V.
C.2	.25X200V.
C.3	.0005 MICA
C.4	.0002 MICA
C.5	.25X200V.
C.6	.1 X200V.
C.7	.0047 MICA
C.8	.00005 MICA
C.9	.0018 MICA
C.10	.00085 MICA
C.11	.05X400V.
C.12	.05X200V.
C.13	.0005 MICA
C.14	.0005 MICA
C.15	.05X200V.
C.16	.01X400V.
C.17	.05X400V.
C.18	18 MFD. X300V. P-103-3
C.19	.25X200V.
C.20	.25X200V.
C.21	16 MFD. X350V. P-103-4
C.22	.006X600V.

RESISTORS

Nº	VALUE	
R.1	800	1/3W.
R.2	100M	1/3W.
R.3	180	1/3W.
R.4	500	1/3W.
R.5	50M	1/3W.
R.6	25M	1/2W.
R.7	19M	1.2W.
R.8	500M	1/3W.
R.9	50M	1/3W.
R.10	1 MEG.	VOL. CONTROL P-101-23
R.11	1 MEG.	1/3W.
R.12	250M	1/3W.
R.13	300M	TONE CONTROL P-101-24
R.14	25M	1/3W.
R.15	250M	1/3W.
R.16	750M	1/3W.
R.17	50	1/3W.

-:NOTE:-

C.19, C.20 IN DUAL UNIT. P-118-5

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. SET NOT TUNED TO STRONG SIGNAL.

D.C. RESISTANCES OF COILS

ANTENNA COIL	R.F. COIL	OSCILLATOR COIL
1:- .19Ω	1:- 7.6Ω	1:- .043Ω
2:- 8.5Ω	2:- 7.6Ω	2:- 1.1Ω
3:- .22Ω	3:- .084Ω	3:- .31Ω
4:- .021Ω	4:- .91Ω	4:- 7.6Ω
5:- .82Ω	5:- 2.8Ω	
6:- 2.9Ω		

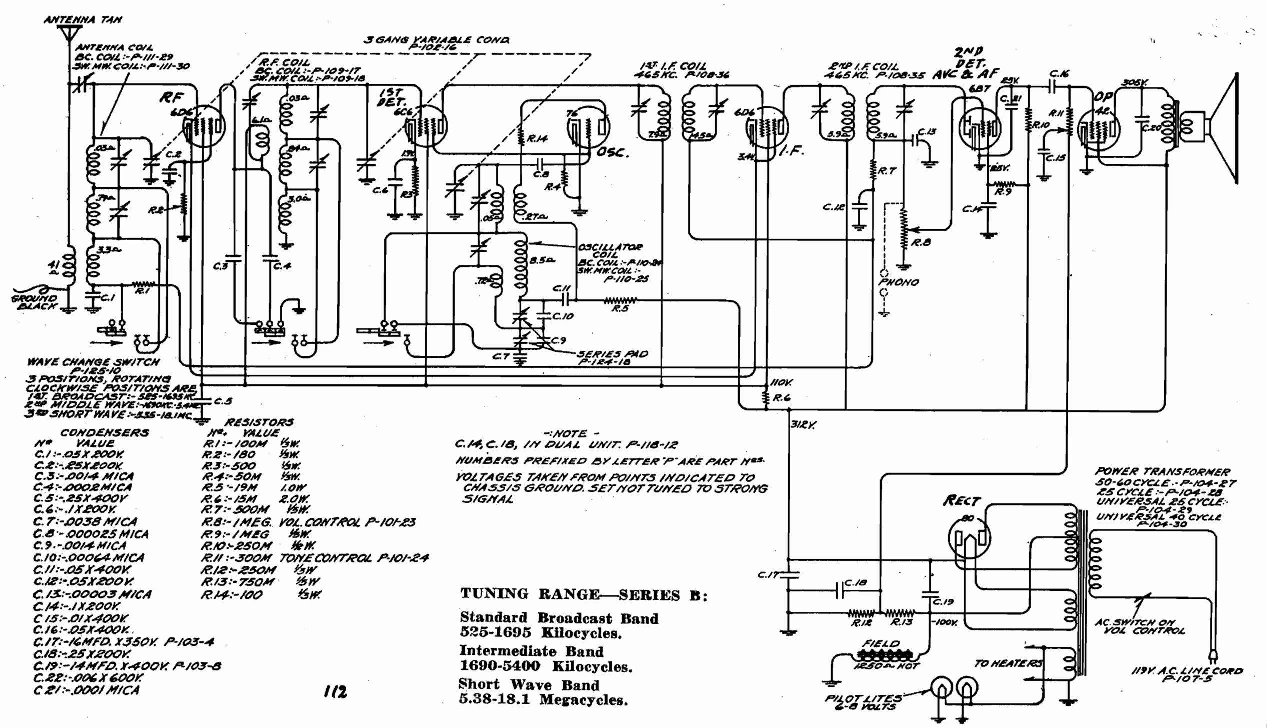
TUNING RANGE—SERIES A

Standard Broadcast Band
525-1700 Kilocycles.
Intermediate Band
1.7-5.5 Megacycles.
Short Wave Band
5.5-18.0 Megacycles.

119

I. F. Frequency — 465 Kilocycles

SERIES B



WAVE CHANGE SWITCH
P-125-10
3 POSITIONS, ROTATING
CLOCKWISE POSITIONS ARE,
1ST. BROADCAST:- 525-1695 KC.
2ND MIDDLE WAVE:-1690 KC.-5.4 MC.
3RD SHORT WAVE:-5.35-18.1 MC.

CONDENSERS

Nº	VALUE
C.1	.05X200V.
C.2	.25X200V.
C.3	.0014 MICA
C.4	.0002 MICA
C.5	.25X400V.
C.6	.1X200V.
C.7	.0038 MICA
C.8	.000025 MICA
C.9	.0014 MICA
C.10	.00064 MICA
C.11	.05X400V.
C.12	.05X200V.
C.13	.00003 MICA
C.14	.1X200V.
C.15	.01X400V.
C.16	.05X400V.
C.17	16 MFD. X350V. P-103-4
C.18	.25X200V.
C.19	14 MFD. X400V. P-103-8
C.22	.006X600V.
C.21	.0001 MICA

RESISTORS

Nº	VALUE	
R.1	100M	1/3W.
R.2	180	1/3W.
R.3	500	1/3W.
R.4	50M	1/3W.
R.5	19M	1.0W.
R.6	15M	2.0W.
R.7	500M	1/3W.
R.8	1 MEG.	VOL. CONTROL P-101-23
R.9	1 MEG.	1/3W.
R.10	250M	1/2W.
R.11	300M	TONE CONTROL P-101-24
R.12	250M	1/3W.
R.13	750M	1/3W.
R.14	100	1/3W.

-:NOTE -

C.14, C.18, IN DUAL UNIT. P-118-12

NUMBERS PREFIXED BY LETTER "P" ARE PART Nos.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. SET NOT TUNED TO STRONG SIGNAL

TUNING RANGE—SERIES B:

Standard Broadcast Band
525-1695 Kilocycles.
Intermediate Band
1690-5400 Kilocycles.
Short Wave Band
5.38-18.1 Megacycles.

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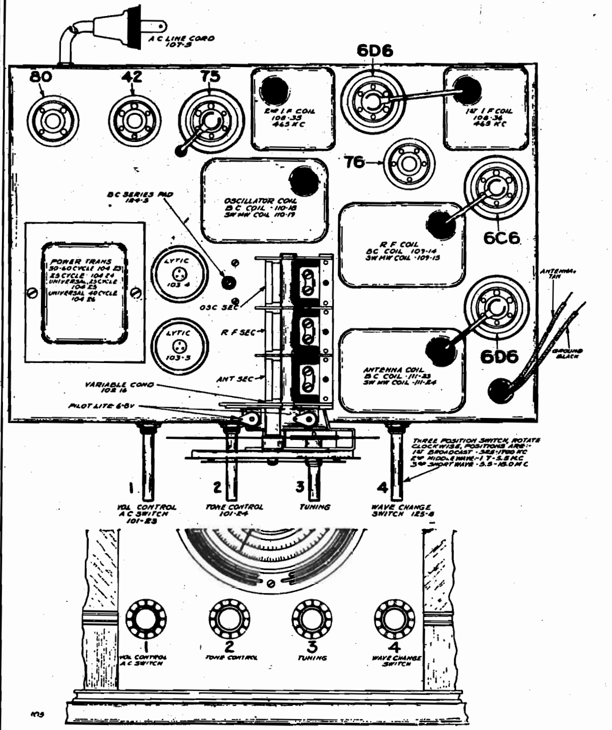
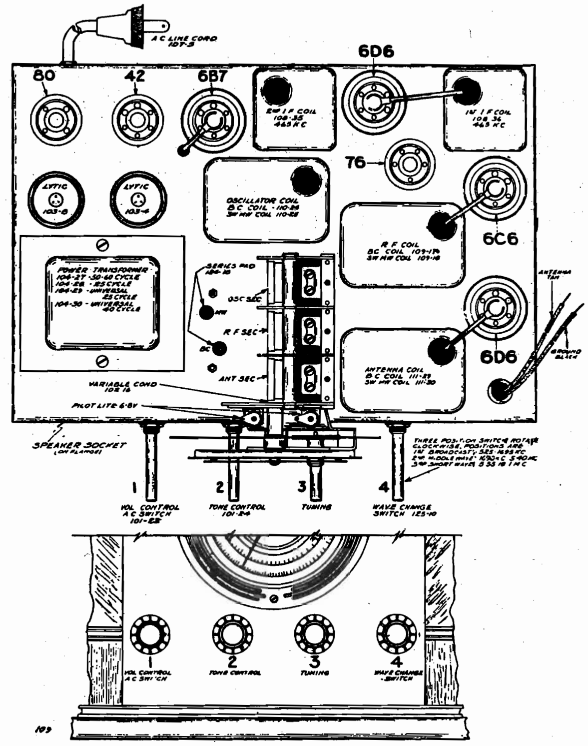
MODEL 777
Series A & B
Trimmers, Socket
Parts, Layouts

BELMONT RADIO CORP.

TOP VIEW - SERIES A



TOP VIEW - SERIES B



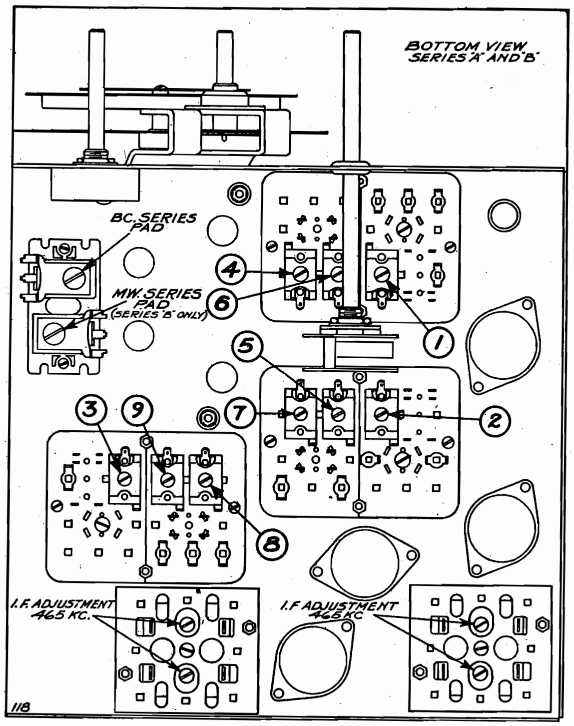
REPAIR PARTS LIST - MODEL 777

SERIES "A" & "B"

Parts Used In Ser. A Only	Parts Used In Ser. B Only	DESCRIPTION	List Price Each
		CONDENSERS	
		Unless Otherwise Listed—All Molded Mica	$0.25
		Unless Otherwise Listed—All Single Section Tubular Paper By-Pass	.25
		Unless Otherwise Listed—All Dual Section Tubular Paper By-Pass	.50
103-3	Not Used.	18 Mfd. x 300 V. Electrolytic	1.35
103-4	103-4	16 Mfd. x 350 V. Electrolytic	1.35
Not Used.	103-8	14 Mfd. x 400 V. Electrolytic	1.35
129-20	Not Used.	.0047 Mica—Type MH + or — 5%	.50
Not Used.	129-29	.0038 Mica—Type MW + or — 2½%	.50
		RESISTORS	
		Unless Otherwise Listed—All Resistors	.20
Not Used.	130-61	15M Ohm—2 Watt + or — 20%—180 V.	.40
		COILS	
108-35	108-35	Output I.F. Coil Assembly Complete—Less Can	1.50
108-36	108-36	Input I.F. Coil Assembly Complete—Less Can	1.50
109-14	Not Used.	Broadcast R.F. Coil Assembly Complete—Less Can	1.00
109-15	Not Used.	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	1.50
Not Used.	109-17	Broadcast R.F. Coil Assembly Complete—Less Can	.70
Not Used.	109-18	Mid-Wave & Short Wave R.F. Coil Assembly Complete—Less Can	1.50
110-18	Not Used.	Broadcast Oscillator Coil Assembly Complete—Less Can	.50
110-19	Not Used.	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	1.25
Not Used.	110-24	Broadcast Oscillator Coil Assembly Com.—Less Can	.75
Not Used.	110-25	Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can	1.50
111-23	Not Used.	Broadcast Antenna Coil Assembly Com.—Less Can	1.00
111-24	Not Used.	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	1.50
Not Used.	111-29	Broadcast Antenna Coil Assembly Com.—Less Can	1.00
Not Used.	111-30	Mid-Wave & Short Wave Antenna Coil Assembly Complete—Less Can	1.50
		TRANSFORMERS	
104-23	Not Used.	50/60 Cycle Power Transformer	3.50
104-24	Not Used.	25 Cycle Power Transformer	5.00
104-25	Not Used.	Universal—25 Cycle Primary	7.50
104-26	Not Used.	Universal—40 Cycle Primary	6 00
Not Used.	104-27	50/60 Cycle Power Transformer	4.50
Not Used.	104-28	25 Cycle Power Transformer	7.00
Not Used.	104-29	Universal—25 Cycle Primary	7.50
Not Used.	104-30	Universal—40 Cycle Primary	7.00
		SPEAKERS	
114-13	114-13	Six Inch Speaker	6.00
114-17	114-17	Eight Inch Speaker	6.50
114-18	114-18	Ten Inch Speaker	8.00

MISCELLANEOUS

101-23	101-23	Volume Control and Switch
101-24	101-24	Tone Control
102-16	102-16	Three Gang Variable Condenser
107-5	107-5	Line Cord and Plug



MODEL 777
Series A & B
Alignment

BELMONT RADIO CORP.

NOTE: IN SERIES B THE TYPE 75 WAS REPLACED BY TYPE 6B7, DUPLEX DIODE PENTODE AS A SECOND DETECTOR, A.V.C. AND AUDIO.

Series A and B chassis are serially numbered on the back flange of the chassis, series A beginning with number "5B104021A" and up, series B chassis beginning with number "5D114175B" and up. Series A and B may be identified by the letter "A" and "B" at the end of the serial numbers.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagrams of series A and B.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 119 volts on the primary of the power transformer.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning both series A and B and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

ALIGNMENT PROCEDURE SERIES A ONLY

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 550 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
   (b) Re-set external oscillator to 1500 K.C., move dial pointer to 1500 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate position center of its rotation, and with external oscillator set at 5 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5 megacycles and adjust intermediate wave oscillator (adjustment number 9), intermediate wave R.F. (adjustment number 5) and intermediate antenna (adjustment number 4) to resonance.
   (b) Re-set external oscillator to 1800 K.C. and pick up signal by rotating variable condenser and check for sensitivity.
   (c) Re-check broadcast sensitivity as outlined under "Broadcast Band Alignment".

Series "A" chassis have no intermediate band series oscillator pad adjustment.

ALIGNMENT PROCEDURE SERIES B ONLY

The following adjustments to be made after the I.F.'s have been aligned as explained above.

BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1800 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate variable condenser to approximately 1800 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
   (b) Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.
   (c) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. intermediate wave adjustments.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Series A and B.

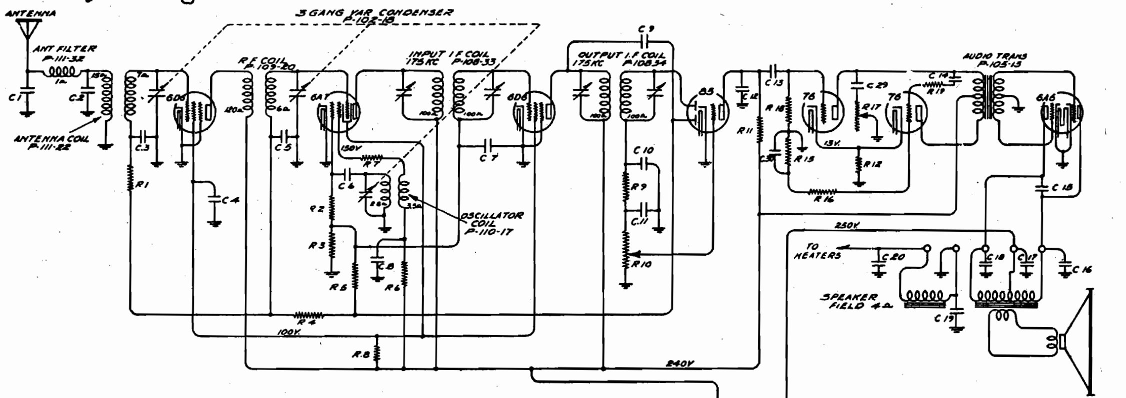
Series A—Part No. 108-35 Output I.F. Transformer
Series A—Part No. 108-36 Input I.F. Transformer
Series B—Part No. 108-35 Output I.F. Transformer
Series B—Part No. 108-36 Input I.F. Transformer

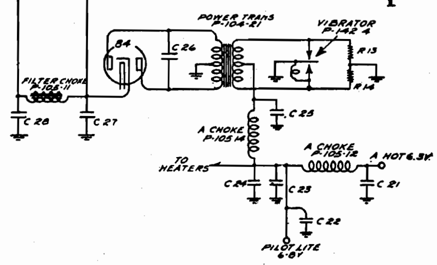
These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6D6 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6D6 to grid cap to 6C6 and adjust input I.F. transformer to resonance.
   (c) With oscillator still connected to 6C6, re-adjust output I.F. transformer.

MODEL 880
Series A & B
Schematics, Voltage

BELMONT RADIO CORP.





CONDENSERS

No.	Value	No.	Value
C.1	-20 MMF MICA	C.16	-500 MMF MICA
C.2	-20 MMF MICA	C.17	-500 MMF MICA
C.3	-.01x400V.	C.18	-500 MMF MICA
C.4	-.1x200V.	C.19	-500 MMF MICA
C.5	-.05x200V.	C.20	-500 MMF MICA
C.6	-100 MMF MICA	C.21	-2000 MMF MICA
C.7	-.05x200V.	C.22	-500 MMF MICA
C.8	-.1x200V.	C.23	-.5x120V.
C.9	-20 MMF MICA	C.24	-.01x400V.
C.10	-100 MMF MICA	C.25	-.5x120V.
C.11	-100 MMF MICA	C.26	-.01x1400V.
C.12	-100 MMF MICA	C.27	-12MFD.x350V.
C.13	-.02x400V.	C.28	-8MFD.x350V.
C.14	-.02x400V.	C.29	-.025x400V.
C.15	-.006x600V.	C.30	-.01x400V.

NOTE:
C.4 and C.8 are in one unit P-118-1
C.27 and C.28 are in one unit P-119-16
R.13 and R.14 are in one unit P-106-6
Numbers prefixed by letter "P" are part numbers.
Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

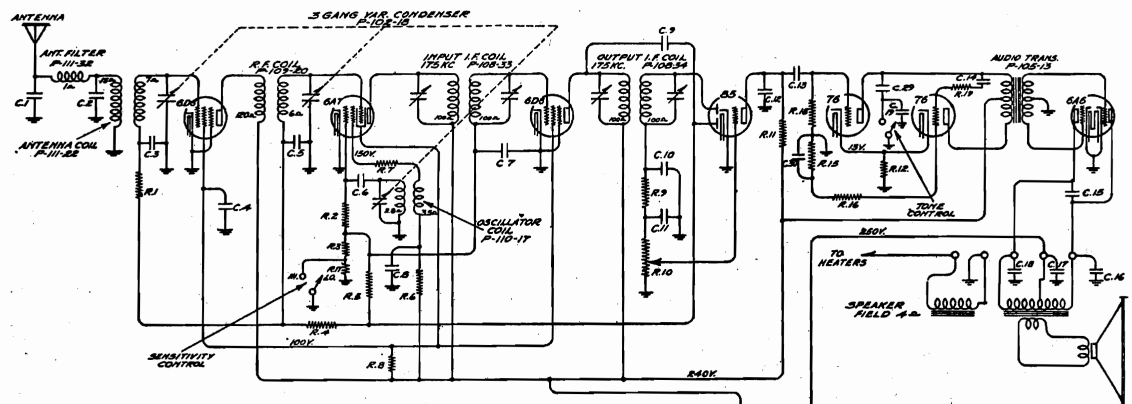
RESISTORS

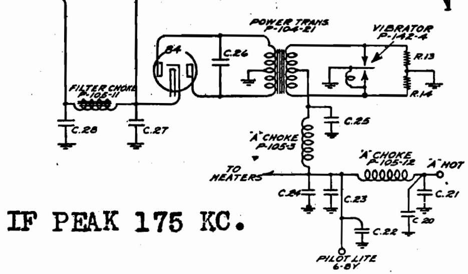
No.	Value	
R.1	-100M	1/3W.
R.2	-41M	1/3W.
R.3	-9M	1/3W.
R.4	-500M	1/3W.
R.5	-500M	1/3W.
R.6	-20M	1/2W.
R.7	-3500	1/3W.
R.8	-30M	1W.
R.9	-100M	1/3W.
R.10	-1 Meg. Vol. Control P-101-21	
R.11	-250M	1/3W.
R.12	-1500	1/3W.
R.13	-100	
R.14	-100	
R.15	-75M	1/3W.
R.16	-90M	1/3W.
R.17	-Switch	
R.18	-500M	1/3W.
R.19	-1 Meg.	1/3W.

Serial No. 80001 and up.

MODEL 880 Series A

IF PEAK 175 KC.





CONDENSERS

No.	Value	No.	Value
C.1	-20 MMF MICA	C.16	-500 MMF MICA
C.2	-20 MMF MICA	C.17	-500 MMF MICA
C.3	-.01x400V.	C.18	-500 MMF MICA
C.4	-.1x200V.	C.19	-500 MMF MICA
C.5	-.05x200V.	C.20	-.5MFD.x120V.
C.6	-100 MMF MICA	C.21	-2000 MMF. MICA
C.7	-.05x200V.	C.22	-500 MMF MICA
C.8	-.1x200V.	C.23	-.5x120V.
C.9	-20 MMF MICA	C.24	-.01x400V.
C.10	-100 MMF MICA	C.25	-1.0MFD.x120V.
C.11	-100 MMF MICA	C.26	-.01x1400V.
C.12	-100 MMF MICA	C.27	-12MFD.x350V.
C.13	-.02x400V.	C.28	-8MFD.x350V.
C.14	-.02x400V.	C.29	-.025x400V.
C.15	-.006x600V.	C.30	-.01x400V.

NOTE:
C.4 and C.8 are in one unit P-118-1
C.27 and C.28 are in one unit P-119-16
R.13 and R.14 are in one unit P-106-6
Numbers prefixed by letter "P" are part numbers.
Voltages taken from points indicated to chassis ground. Vol. control on full, no signal.

RESISTORS

No.	Value	
R.1	-100M	1/3W.
R.2	-41M	1/3W.
R.3	-9M	1/3W.
R.4	-500M	1/3W.
R.5	-500M	1/3W.
R.6	-20M	1/2W.
R.7	-3500	1/3W.
R.8	-30M	1W.
R.9	-100M	1/3W.
R.10	-250M ohms Vol Control P-101-21	
R.11	-250M	1/3W.
R.12	-1500	1/3W.
R.13	-100	
R.14	-100	
R.15	-75M	1/3W.
R.16	-90M	1/3W.
R.17	-4M	1/3W.
R.18	-500M	1/3W.
R.19	-1 Meg.	1/3W.

Series A 80001 up
Series B 81002 up

IF PEAK 175 KC.

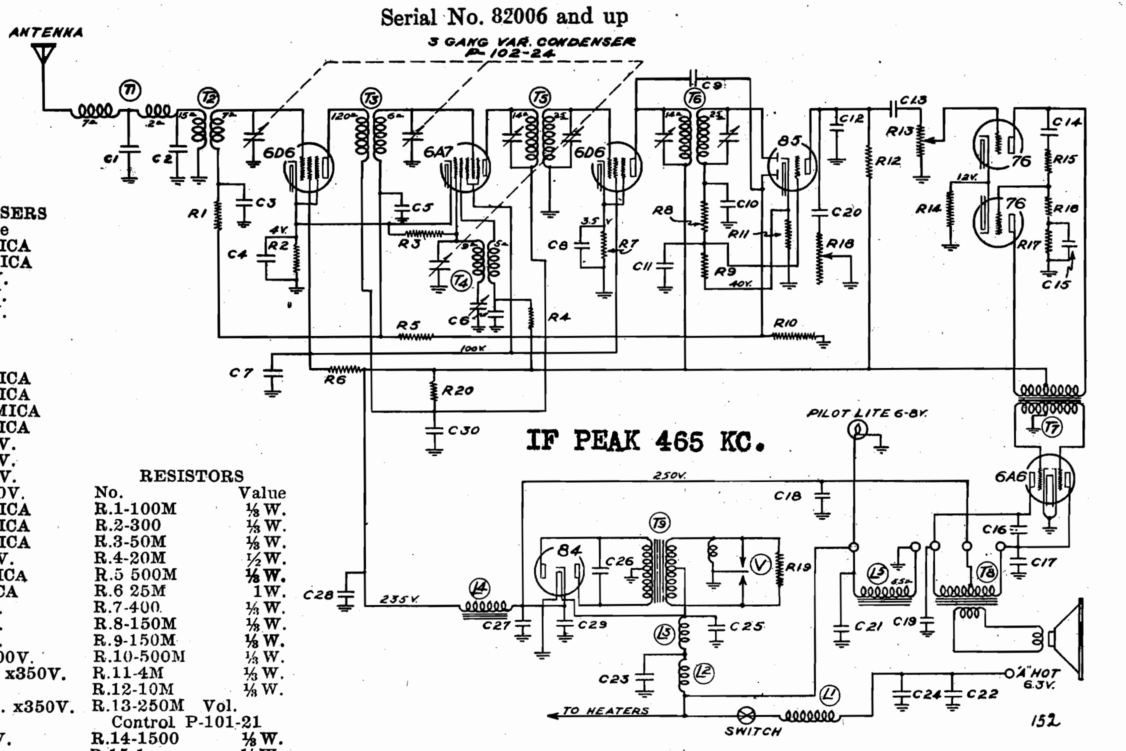
Model 880 Series B

Serial No. 80001 and up

BELMONT RADIO CORP.

MODEL 880
Series C
Schematic, Voltage Data

Model 880 Series C
Serial No. 82006 and up



CONDENSERS

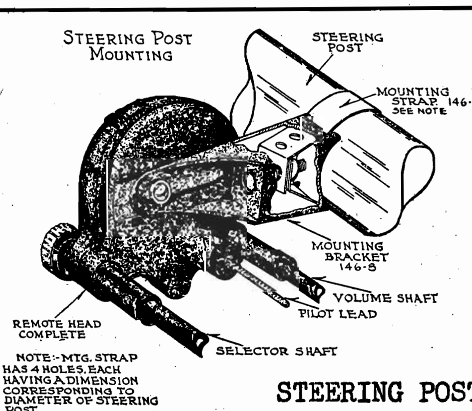
No.	Value
C.1	.00009 MICA
C.2	.00002 MICA
C.3	.01x400V.
C.4	.25x200V.
C.5	.05x200V.
C.6	.1x200V.
C.7	.1x200V.
C.8	.1x200V.
C.9	.00002 MICA
C.10	.0001 MICA
C.11	.00005 MICA
C.12	.0001 MICA
C.13	.02x400V.
C.14	.02x400V.
C.15	.01x400V.
C.16	.006x600V.
C.17	.0005 MICA
C.18	.0005 MICA
C.19	.0005 MICA
C.20	.05x400V.
C.21	.0005 MICA
C.22	.002 MICA
C.23	.5x120V.
C.24	.5x120V.
C.25	.5x120V.
C.26	.015x1400V.
C.27	8.0 mfd. x350V. P-119-16
C.28	12.0 mfd. x350V. P-119-16
C.29	.01x400V.
C.30	.1x400V.
117-2	Dash Mounting Bracket
117-1	Bracket Steering Column
Dash Mounting Assembly	

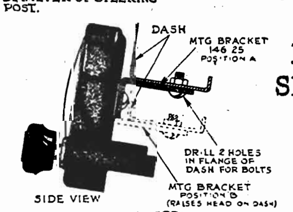
RESISTORS

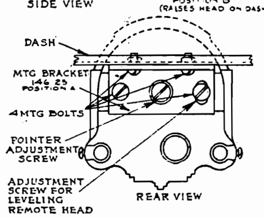
No.	Value	
R.1	100M	⅓ W.
R.2	300	⅓ W.
R.3	50M	⅓ W.
R.4	20M	½ W.
R.5	500M	⅓ W.
R.6	25M	1 W.
R.7	400	⅓ W.
R.8	150M	⅓ W.
R.9	150M	⅓ W.
R.10	500M	⅓ W.
R.11	4M	⅓ W.
R.12	10M	⅓ W.
R.13	250M Vol. Control P-101-21	
R.14	1500	⅓ W.
R.15	1 meg	⅓ W.
R.16	91M	⅓ W.
R.17	75M	⅓ W.
R.18	100M Tone Control P-101-39	
R.19	200	⅓ W.
R.20	1500	⅓ W.

PARTS

No.	Part No.
T1-Antenna Filter	P-111-43
T2-Antenna Coil	P-111-42
T3-R.F. Coil	P-109-20
T4-Oscillator Coil	P-110-34
T5-Input I.F. Coil	P-108-56
T6-Output I.F. Coil	P-108-57
T7-Audio Trans.	P-105-13
T8-Output Trans.	
T9-Power Trans.	P-104-21
L1-"A" Choke	P-105-18
L2-"A" Choke	P-105-18
L3-"A" Choke	P.105-19
L4-Filter Choke	P-105-11
L5-Speaker Field	
V-Vibrator	142-4







STEERING POST & DASH MTGS. SERIES A, B, & C

Its tube complement is as follows: SERIES C

1 Type 6D6—remote cut-off pentode as an R.F. amplifier.
1 Type 6A7—electron coupled oscillator as first detector and converter.
1 Type 6D6—remote cut-off pentode and I.F. amplifier (465 K.C.)
1 Type 85 —duplex diode triode second detector and A.V.C.
2 Type 76 —triodes, push-pull first audio.
1 Type 6A6—class B output.
1 Type 84 —high vacuum rectifier.

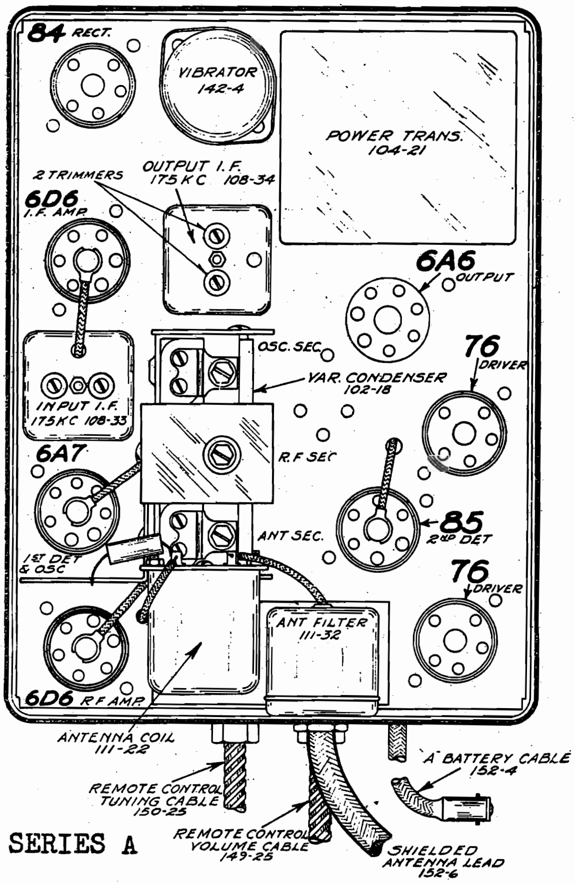
ACCESSORIES:
The carton of accessories packed with this set contains the following:

1—No. 152-2 plug-in battery cable.
1—No. 149-25 flexible volume control cable (slotted fitting).
1—No. 150-25 flexible selector cable (key fitting).
2—No. 154-2 set screws for 147-19 bushings.
2—No. 160-11 3" x 5/16" carriage bolts and nuts for mounting set to bulk head.
2—No. 134-1—Iron washers.
2—No. 134-2—Lockwashers.
1—No. 168-2—Distributor type suppressor.
1—No. 148-1 generator condenser.
1—No. 148-3 ammeter condenser.
1—No. 117-1 Steering column bracket.
1—No. 122-6 remote control head complete with 107-8 and 116-13.
1—No. 152-3 Fuse insulating sleeve.
1—No. 169-1 15 amp. fuse.

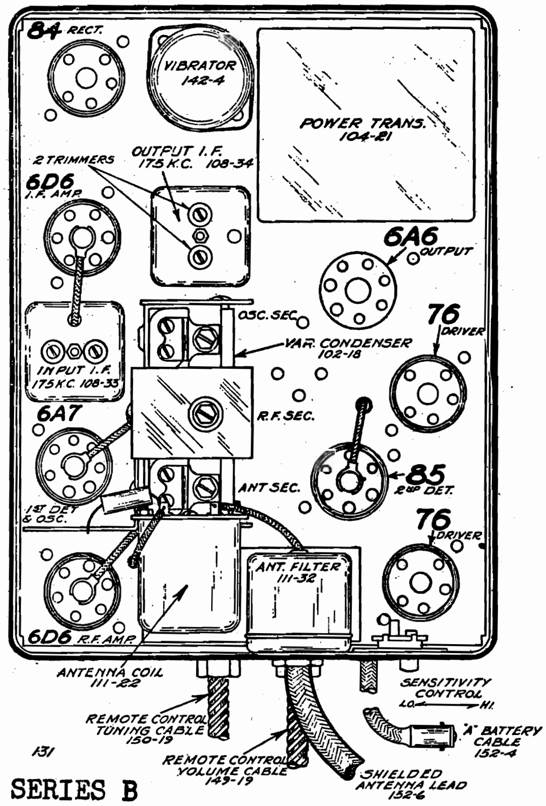
GENERATOR INTERFERENCE:
Remove the generator cutout mounting screw and fasten the condenser (148-1) bracket on the generator cutout mounting lug. Replace the cutout mounting screw and tighten down securely. Connect the condenser lead to the battery terminal of the cutout The generator condenser is absolutely necessary as it is used to eliminate a high pitched whining noise which would otherwise be heard as the motor is accelerated.

MODEL 880
Series A,B,C
Socket,Trimmers

BELMONT RADIO CORP.



SERIES A



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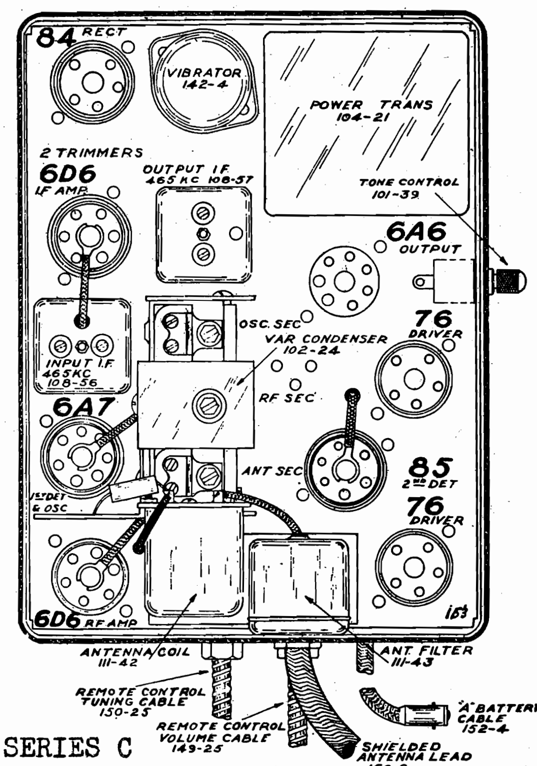
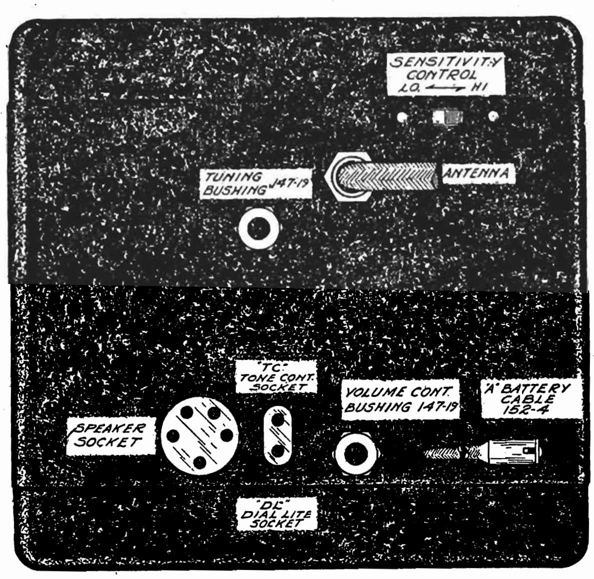


SERIES C



Arrangemnet of Series A & C is similar to Series B, except that Series A & C have no Sensitivity Control Switch

MODEL 880
Series A,B,C
Alignment,Parts

BELMONT RADIO CORP.

DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plates of the type 6A6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

I.F. ALIGNMENT: Series A & B

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 175 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-33) and output (108-34) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
   (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

I.F. ALIGNMENT: Series C

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-56) and output (108-57) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
4. Re-set external oscillator to 600 K.C. and adjust series pad to resonance, rotate condenser and move dial pointer to 600 K.C. by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance. This adjustment is accessible from the bottom of the chassis.
   (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

SERIES A & B REPAIR PARTS - MODEL 880 Serial No. 80001 and up

Part No.	Description	List Price Ea.
	CONDENSERS	
	Unless otherwise listed, all single section tubular paper by-pass condensers	$ .25
	Unless otherwise listed, all dual section tubular paper by-pass condensers	.50
	Unless otherwise listed, all molded mica condensers	.25
119-16	8-12 Mfd. - 350 Volt Electrolytic Filter Condenser	2.50
148-1	.5 Mfd. Generator Condenser	.50
148-3	.5 Mfd. Ammeter Condenser	.40
148-5	.5 Mfd. x 120 Volt Condenser	.50
148-6	Special Ford Ignition Coil Condenser	.60
	COILS	
105-12	"A" Choke - 28 Turns No. 12 Wire	.10
105-14	"A" Choke - 37 Turns No. 12 Wire	.10
108-33	Input I.F. Transformer Complete with Shield	1.50
108-34	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	2.50
109-20	R.F. Coil Complete - Less Shield	1.00
110-17	Oscillator Coil Complete with Bracket	.75
111-22	Antenna Coil Complete - Less Shield	1.00
111-32	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
	RESISTORS	
	Unless otherwise listed, all carbon resistors	.20
106-6	200 Ohm Center Tapped Resistor	.25
168-2	Distributor Suppressor	.40
168-3	Cable Type Suppressor	.40
	TRANSFORMERS	
104-21	Power Transformer	4.00
105-11	380 Ohm Filter Choke	.85
105-13	Input Audio Transformer	1.75
	MISCELLANEOUS	
101-21	Volume Control with Switch	1.35
102-18	Three Gang Variable Condenser	4.00
113-30	Two Lug Terminal Strip	.05
113-36	Terminal Strip	.05
115-34	Antenna and R.F. Coil Shield	.15
114-20	Speaker Chassis Only	10.00
128-4	Complete Speaker Housing	2.50
140-5	Set Case less Covers	1.00
140-6	Covers for Above	1.25
142-4	Plug-in Vibrator	4.50
	Plate Antenna	3.50
147-19	Flexible Cable Control Bushing	.10
152-2	Battery Cable & Fuse Assembly	.35
152-3	Fuse Insulating Sleeve	.05
152-4	Chassis Battery Cable Assembly	.30
152-6	Antenna Cable	.50
152-7	Speaker Cable with Plug	1.00
153-4	Special Speaker-Tone Control-Dial Light Socket Assembly	.25
160-11	Mounting Studs Complete with Nut & Washer	.05
169-1	15 Amp. Fuse (3AG-15)	.05
	All Sockets	.10
123-1	Dome Lite Filter	.90
	REMOTE CONTROL PARTS	
112-39	Selector Control Shaft	.20
112-41	Idler Gear	.15
112-42	Pointer Shaft	.05
112-85	Volume Control Shaft	.10
112-45	Bezel (Crystal Retainer)	.15
112-46	Celluloid Dial Crystal	.15
112-48	Pointer Shaft Gear	.05
112-97	Glass Dial	.35
112-108	Metal Disc Pointer	.10
116-13	6-8 Volt, T-51 Bulb Bayonet Base	.10
116-9	Pilot Light Assembly	.45
116-11	Tone Control Assembly Unit Complete	.35
131-5	Black Bakelite Remote Control Knobs	.15
134-32	Fibre Dial Mask	.05
146-8	Die Cast Remote Control Mounting Bracket	.30
146-12	Steering Column Strap	.15
146-25	Dash Mounting Bracket	.15
147-3	Selector Control Bushing for 112-39 Shaft	.10
147-4	Volume Control Bushing for 112-43 Shaft	.10
149-25	Flexible Volume Control Cable - 24"	1.50
150-25	Flexible Selector Control Cable - 24"	1.50
151-6	Remote Control Head Complete with Sterling Column Bracket	5.00
	Dash Mounting Kit (specify make and year of car)	1.25
151-8	Special General Motors Control Head	7.00
	Dash Mounting Kits for 1935 Chevrolet and Pontiac for use with 151-8 head	1.50
	Dash Mounting Kits for 1935 Oldsmobile for use with 151-8 head	1.75

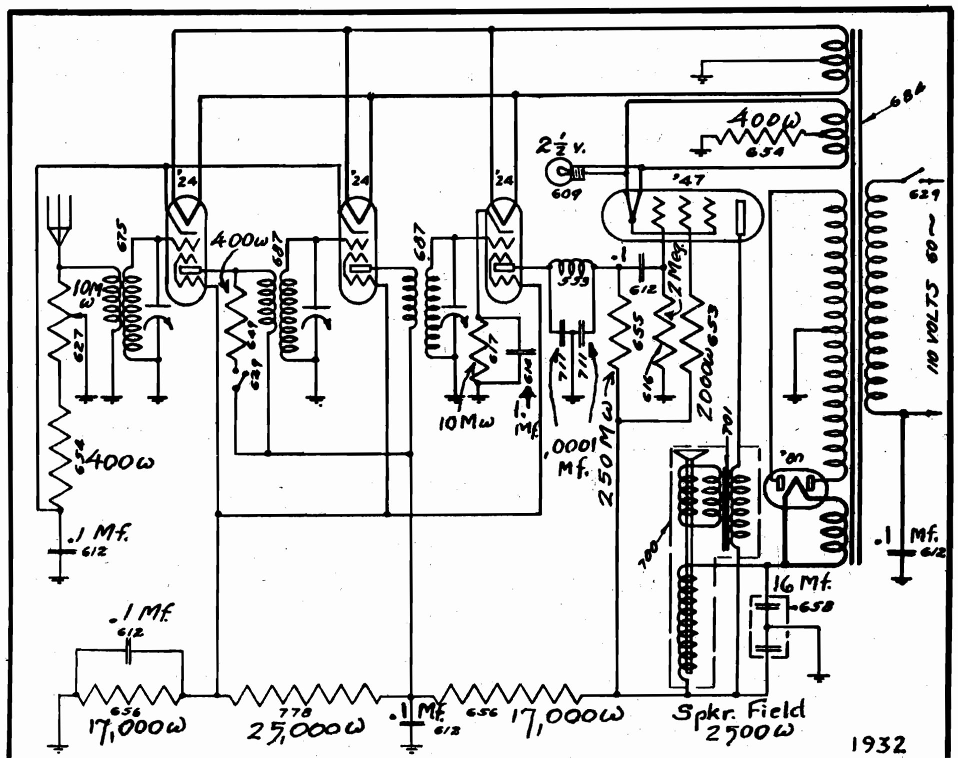
REPAIR PARTS - MODEL 880 SERIES C *82006 and up

Otherwise same as Series A & B - Sensitivity Control is not used

Part No.	Description	List Price Ea.
100-31	.5 Mfd. x 120 Volt Condenser	.60
148-6	Special Ford Ignition Coil Condenser	.60
124-21	.15-S Series Padder	.50
	COILS	
105-18	"A" Choke L1-L2, 32½ Turns, No. 14 wire	.10
105-19	"A" Choke, L3, 60 Turns, No. 18 wire	.15
108-56	Input I.F. Transformer Complete with Shield	1.50
108-57	Output I.F. Transformer Complete with Resistors and Condensers, Mounted in Shield	2.50
106-20	R.F. Coil Complete - Less Shield	1.00
110-34	Oscillator Coil Complete with Bracket	.75
111-42	Antenna Coil Complete - Less Shield	1.00
111-43	Antenna Filter Assembly Complete with Shield and Antenna Cable	1.50
	RESISTORS	
	Unless otherwise listed, all carbon resistors	.20
130-84	200 Ohm Resistor ¼ Watt	.15
	MISCELLANEOUS	
101-39	Tone Control	1.00
101-21	Volume Control with Switch	1.35
102-24	Three Gang Variable Condenser	4.00

CALVERT MOTOR ASSOCIATES

SCHEMATIC WIRING DIAGRAM OF THE Calvert 5-TUBE RADIO



D. C. Voltages

READING FROM—

Chassis (ground)	to plates of R. F. tubes	130 to 150	volts
" "	to plate of Detector	75 to 95	volts
" "	to plate of Pentode	215 to 235	volts
" "	to screen of R. F. tubes	45 to 65	volts
" "	to screen of Detector	45 to 65	volts
" "	to screen of Pentode	215 to 235	volts
" "	to cathode of R. F. tubes	1.5 to 2.5	volts
" "	to Cathode of Detector	4 to 6	volts
" "	to pentode Filament Center Tap	14 to 18	volts

A. C. Voltages

1st R. F., 2nd R. F., Detector and Pentode Filaments	2.3 to 2.5	volts
Rectifier Filament	4.8 to 5.1	volts
Ground to plates of 280	approximately 375	volts

NOTE: Filament Voltages may be measured with a Weston Triple Range (0-4, 0-8, 0-150) Type 528 AC Voltmeter. The high voltage on the Rectifier Plates should be measured with a double range (300, 0-600) Type Weston AC Voltmeter.

Operation of Set

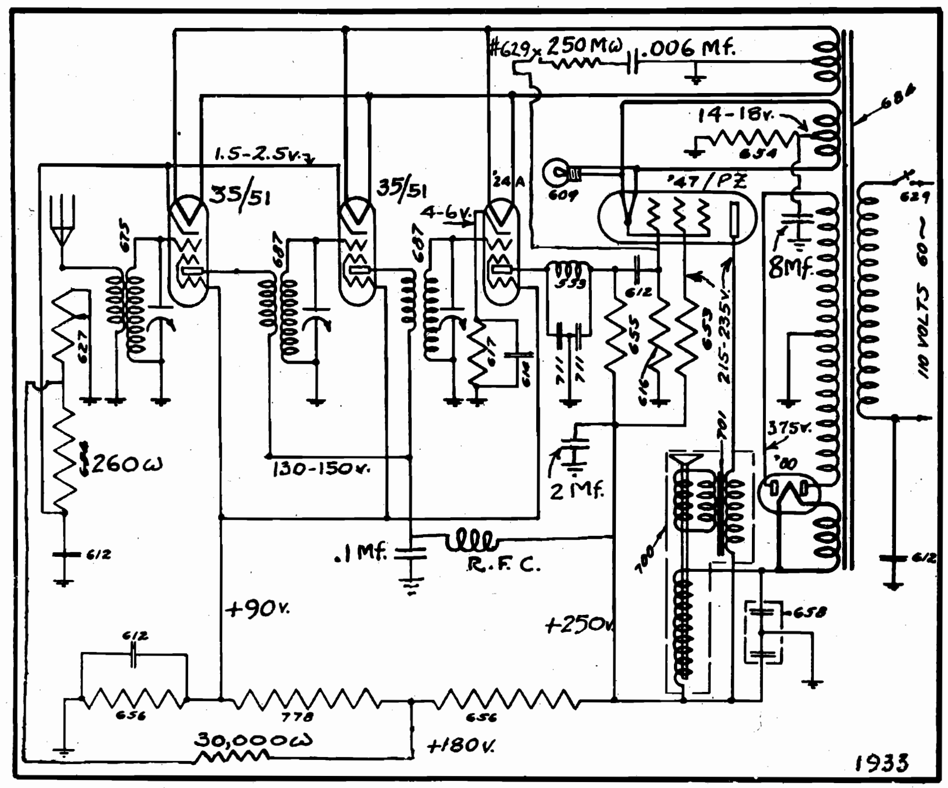
Also Use of Local and Distance Switch

After set is turned on it will be some time before the set will operate due to the tubes heating up. Turn Volume Control full on then rotate dial until station is heard, turn Volume Control until desired volume is reached.

If in the vicinity where a strong local is being received turn local and distance switch (found on left side of cabinet) to local position.

MODELS A-51-A,A-52-A
Schematic,Voltage
Parts List

CALVERT MOTOR ASSOCIATES



385 Tube Shielding Can
386 Antenna Coil Shielding Can
553 700 turn R. F. Choke
605 Grid Grip
609 2½ volt Pilot Light
612 .1 Mfd. Condenser
614 1. Mfd. Condenser
616 2 megohm Resistor, ½ watt
617 10,000 ohm Resistor, ½ watt
627 10,000 ohm Centralab Volume Control
629 Toggle Switch
649 400 ohm Resistor, ½ watt
653 2,000 ohm Resistor, ½ watt
654 400 ohm Resistor, one watt
655 250,000 ohm Resistor, ½ watt
656 17,000 ohm Resistor, ½ watt
658 16 Mfd. Filter Condenser
663 Four prong socket
674 Five prong socket
675 Antenna Coil
687 R. F. Coil
684 Power Transformer
700 Dynamic Speaker with Output Transformer. Magnavox Speaker Model 144, 2,500 ohm field.
701 Output Transformer only for Single Pentode
711 .0001 Mfd. Condenser.
778 25,000 ohm Resistor, ½ watt.

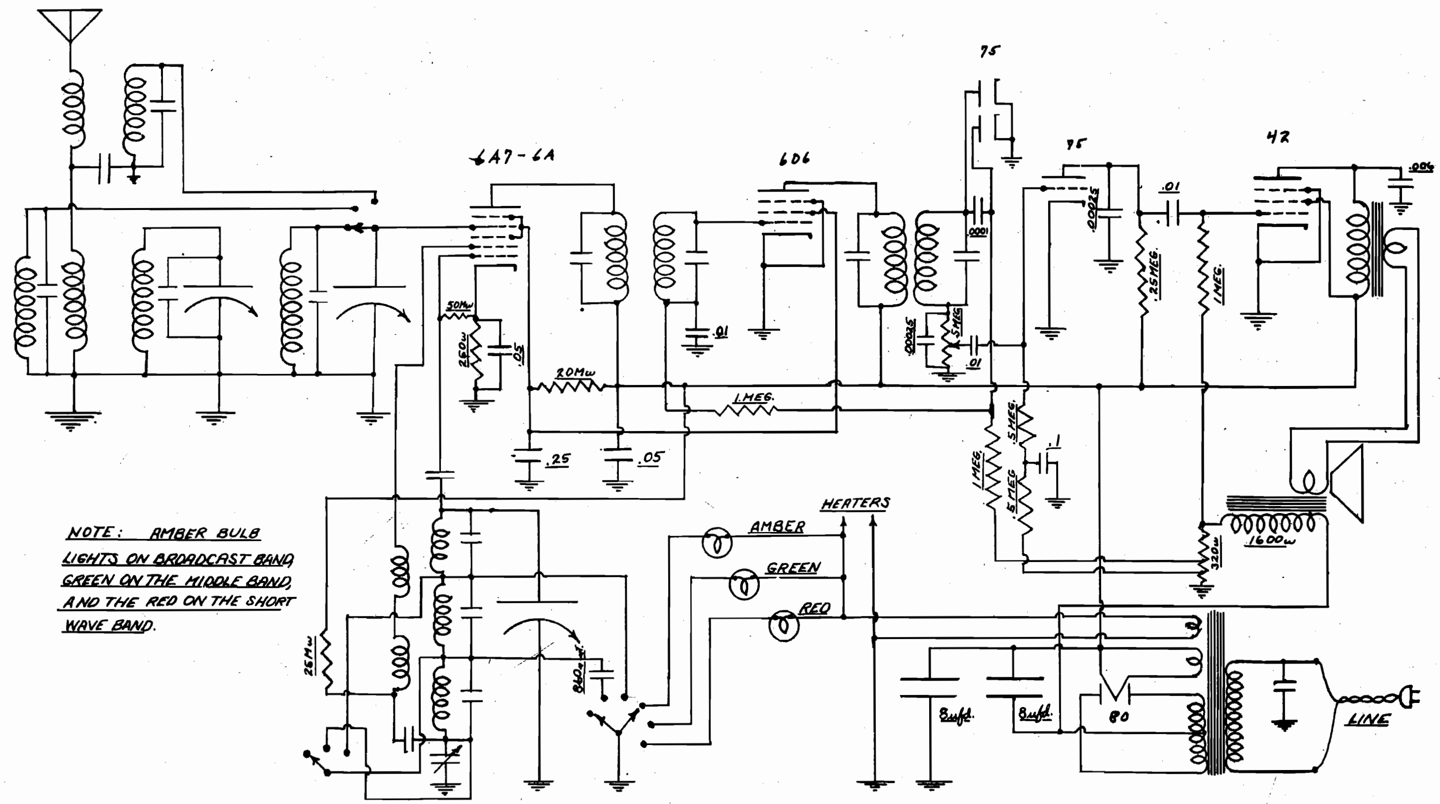
The same chassis is used for Model A52A as is used for Model A51A. The following tubes are used in Model A52A with the suppressor grids connected as usual.

1st R-F. Stage	Type	58
2nd R-F. Stage	"	58
Detector	"	57
Output Stage	"	PZ/47
Rectifier	"	80

1934

MODEL 357
Schematic
Data

CAVALCADE RADIO CO.



IF 456 KC

6-Tube Super heterodyne AC Receiver
For use on 110 volts AC only

This radio is a six-tube Superheterodyne type which operates ON AC CURRENT ONLY at a frequency of 60 cycles and at 110 volts.
It covers three wave bands, as follows:

Standard Broadcast band - 540-1750 kc - AMBER light
Police and Amateur band - 1650-5000 kc - GREEN light
Short wave, American & Foreign - 18-5.7 meg.-RED light

__Antenna and Ground__

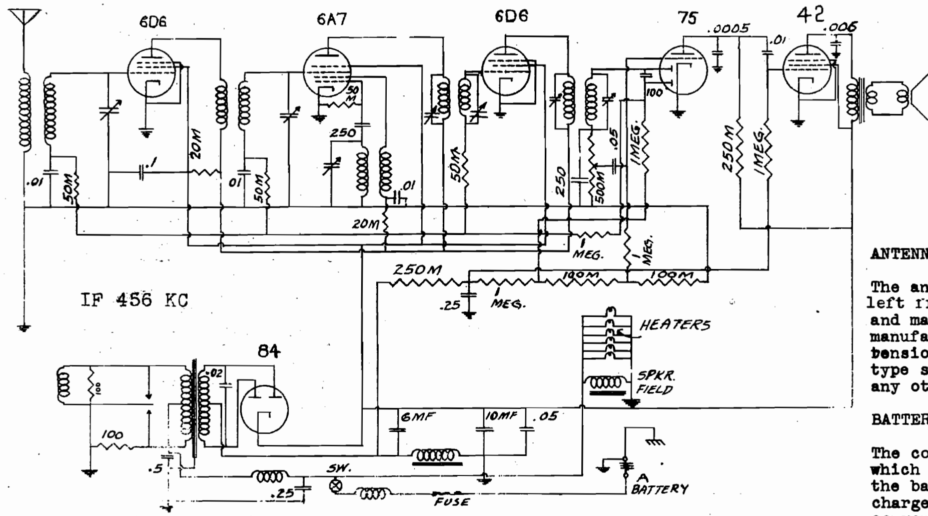
An outside antenna is desirable with this radio in order to obtain the maximum in performance. With an efficient outside antenna, foreign reception is guaranteed. The short red wire in the rear should be connected to the antenna. It is desirable to have this antenna clear of surrounding objects and as high as possible from the ground. The black wire is the grounding terminal. If the lighting circuit is not already grounded, reception will be improved by connecting this black wire to the cold water pipe or radiator; otherwise the ground wire can be left free.

__Operation of Set__

The right hand knob switches on the set, and thereafter acts as the volume control. The upper middle knob is the station selector with which the stations are tuned in. The lower middle knob is the variable tone control, allowing you to control the tone for base or sharp timbre. The left hand knob controls the three wave bands of the set. When turned to the extreme left, the broadcast band is on, showing an AMBER light; switched to the center, the police and amateur band is on, showing a GREEN light; the extreme right brings in the short wave, showing a RED light. Success with short wave requires more careful tuning than with the broadcast band and necessitates study of a chart to ascertain location of the principal short wave broadcasting stations. Air conditions are not always favorable to short wave reception, under which conditions nothing can be done, but with reasonable atmospheric clearance, good foreign reception may be had.

MODEL 359
Schematic
Installation Data

CAVALCADE RADIO CO.



Chassis in metal container
2 Flexible shafts
1 Tuning control head with pilot light
1 "A" Battery cable with fuse
1 Antenna lead
1 Bolt, Nut, and Washer

ASSEMBLY AND MOUNTING:

The set may be mounted by means of a 3/8 inch machine bolt placed through a hole in the center of a space to clear 9½ x 7 inches, and having no obstruction within 7 inches from its surface which will then clear the auto chassis. The rear of the set can then be joined to the head of this bolt, and the nut attached to the bolt and tightened against the opposite side of the partition, leaving the set in a rigid mounting. If, however, sufficient space cannot be found when mounting in this manner, the set may also be mounted from one of the smaller ends. This requires a space 7½ x 7 inches, having no obstruction in front of it for a distance of 9½ inches. In this position the speaker should face towards the floor board, or if at one side of the car, toward the center.

The two flexible shafts should first be connected to the radio. One shaft has two screw-driver shaped ends; this shaft is for the tuning control. One end is inserted in the center hole of the radio and twisted until well engaged; then the set screw is tightened. The other end is inserted into the hole in the rear of the right hand knob on the control head, which is the tuning knob. The other shaft has one screw-driver end and one slotted end. The slotted end fits into the hole in the rear of the left hand knob of the control head, which is the volume control knob. The screw-driver end fits into the edge hole of the radio case, and must be well engaged in the slot before set screw is tightened. Set screws for these shafts must be tightened on the control head as well.

CONTROL MOUNTING:

The control head can next be secured to the steering column by means of the strap or bracket supplied for this purpose, or may be fastened to the dash itself in various positions. The pilot light already attached to control and in position, should be removed from the socket in the rear of the control head. Rotate the tuning knob (right hand knob) clockwise as far as it will go; then, by means of a small screwdriver inserted in the pilot light socket, turn the pointer on the dial until it reaches the right hand end of the scale. Where there is no screw in pilot light socket, this type of control is self adjusting by rotating the pointer clear to one end of scale and then to other, which automatically sets the pointer in proper position.

ANTENNA CONNECTION:

The antenna is a shielded lead which is fastened into the hole at the left front edge of the container fitting into a Delco-Remy receptacle and may be fastened to aerial provided for this purpose by most car manufacturers. In case there is no aerial in the automobile, an extension of shielded wire may be brought down to an aerial of the strap type suspended between the front and rear axles beneath the car, or any other type of automobile antenna.

BATTERY CONNECTION:

The connections to the "A" battery are made with the shielded lead which is brought out to the right rear of the set and is connected to the battery side of the ammeter. This will be indicated by no discharge being shown on the ammeter. The shielding is grounded to a convenient bolt or nut that may be loosened near the ammeter under which it may be tightened.

OPERATION OF SET:

To operate the set, turn the left hand knob to the right and the pilot bulb in the control head will light, showing that the set is connected. After a minute or less, the tubes should be warmed up and by turning the right hand control the stations desired may be tuned in whose frequency may be found on the dial. Adjust the volume by means of the left hand knob and do not turn off the station as distortion will occur unless it is tuned to the center of the signal.

ELIMINATION OF MOTOR NOISE:

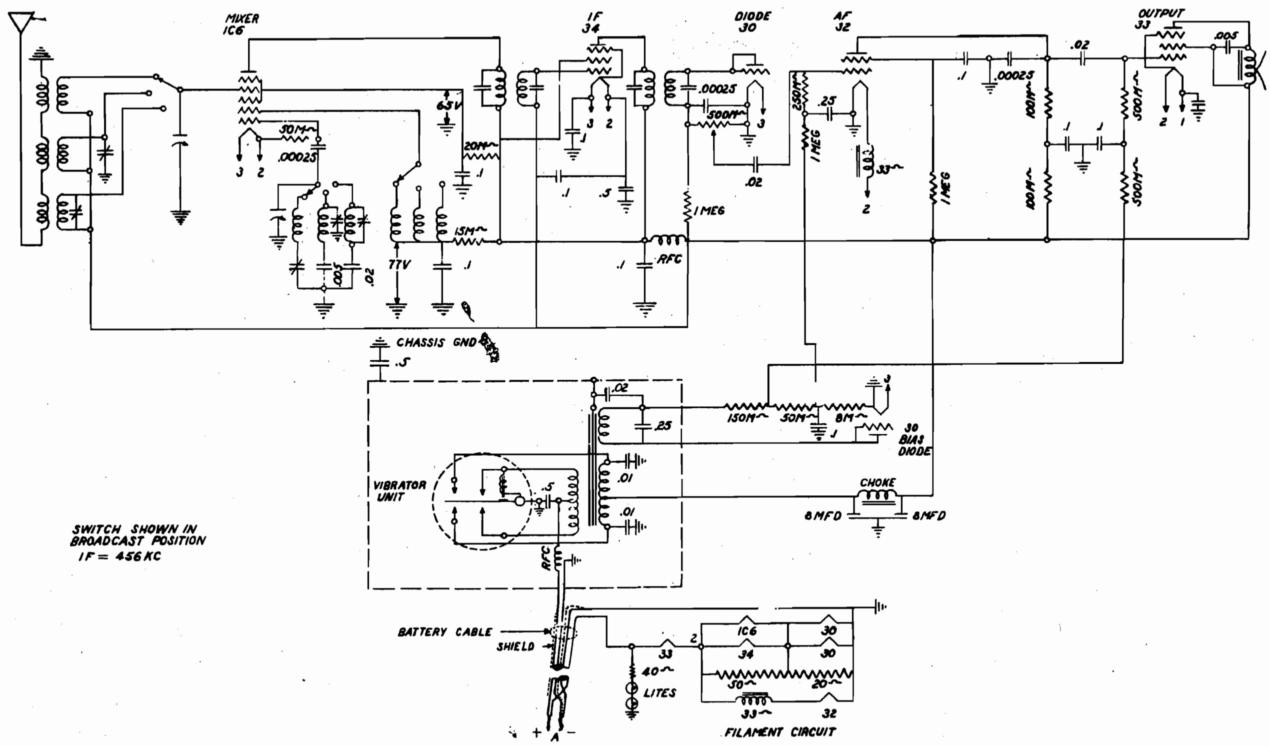
A car of the later type and in good mechanical condition will usually require no suppressors with this set. However, if the body of the car has loosened at joints due to wear, electrical disturbances may be caused which will require bonding of these parts together with heavy braided conductors, soldered across this portion. If considerable motor noises are heard in set they will reach the set through two paths. First, through the "A" battery connection, which is common to the generator and may be corrected by a condenser either from the battery side to the ammeter to ground, or a condenser placed across the charging terminal of the generator to ground. Second, by means of actual radiation from the ignition wireswhichcan be can be reduced by shielding the antenna lead up to the antenna proper. Also, if necessary, suppressors may be inserted on spark plugs and distributor head.

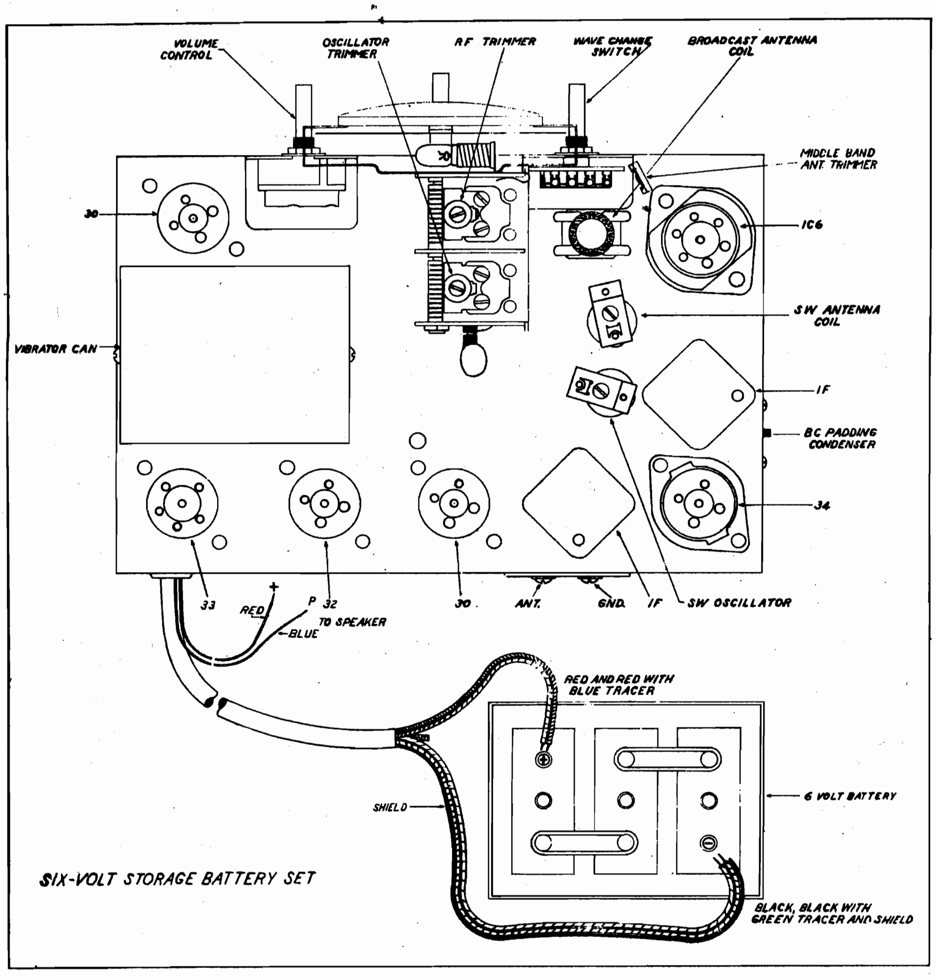
IF SET DOES NOT PLAY:

If after all the above instructions have been followed and set does not operate, the top of the radio case may be removed by unloosening the six screws holding it and ascertaining if all the tubes are lit and fully pressed into sockets, and be sure that all grid caps fastened to the tubes are in place. If tubes fail to light, check the fuse in shielded lead connected to ammeter. If there is no light buzzing sound from set when turned on and set does not play, remove the vibrator contained in can in right rear of set which plugs into socket in the manner of a tube and replace. If the above instructions are carried out and the set still does not play, consult reliable service man.

CAVALCADE RADIO CO.

MODEL 3511
Schematic
Socket, Trimmers





MODEL 3511
Alignment
Data

CAVALCADE RADIO CO.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 3000 and 10,000 K. C. and an output meter to be connected across the speaker terminals.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna wire through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the front or R.F. trimmer to peak.

Next rest the dial pointer on the receiver and test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustment at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

VIBRATOR Vibrator noise may be due to the following: a discharged "A" battery, high resistance connections on battery terminals, a defective vibrator or a loose cover on the vibrator can.

The vibrator unit is a plug-in type and can be removed for replacement very easily. This unit should last a very long time as current through the contact points is very small.

Never leave the power switch turned on when the "A" battery is too low to make the receiver function as this is liable to seriously injure the vibrator or vibrator transformer. Never remove any of the tubes when the power switch is turned on as they are connected in a series parallel circuit.

MICROPHONICS The two volt type of tubes used in this receiver are ordinarily more microphonic than heater types. They can be detected by touching each tube with the finger tips. Another source might be caused by the dial glass touching the front or escutcheon plate.

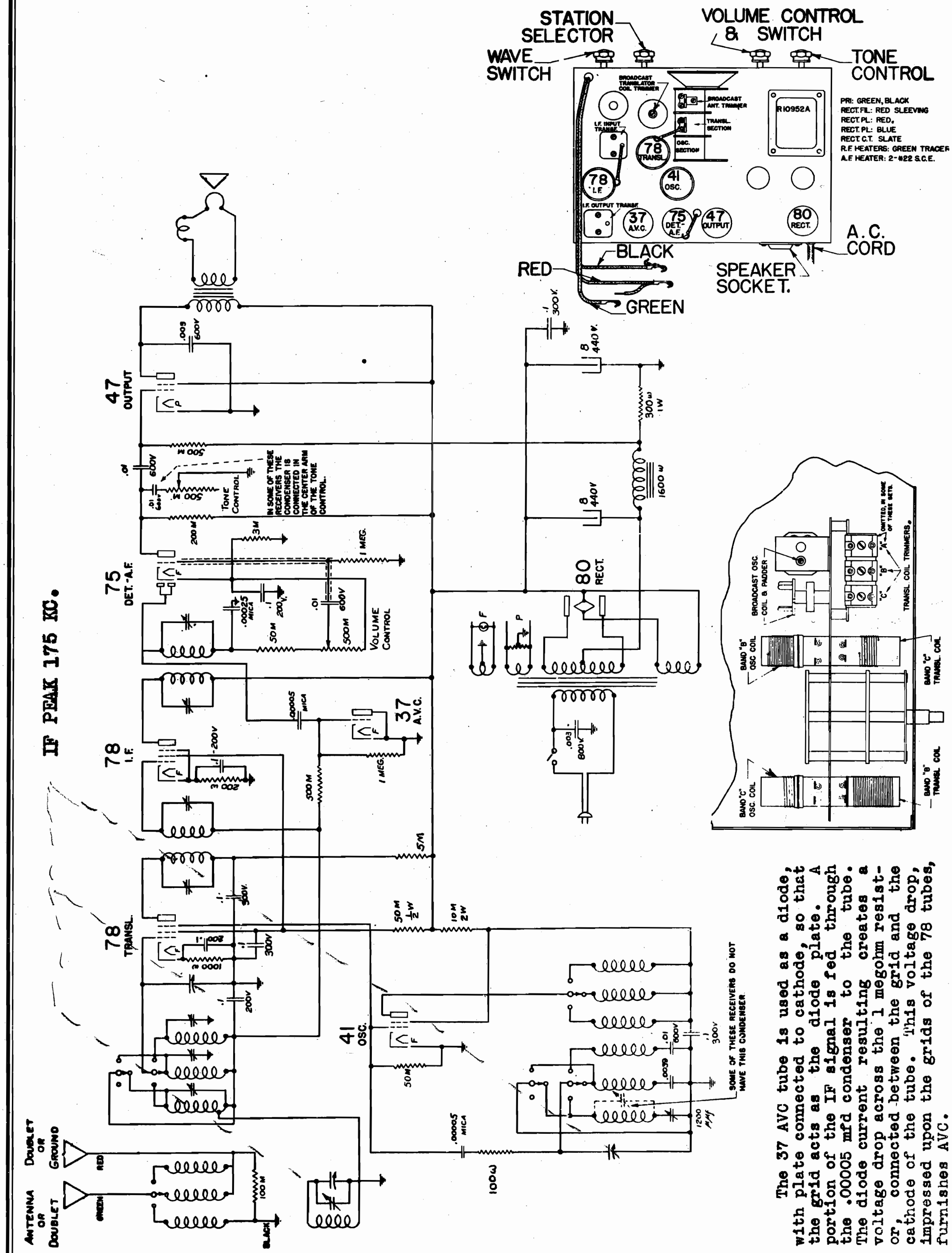
LOW VOLUME This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition); antenna disconnected from the receiver: open antenna coil or open or shorted by-pass condensers.

Some localities remote from broadcasting stations may require an extra long antenna of about two hundred feet.

LOW VOLTAGE Low voltage may be caused by a low battery, a defective vibrator, corroded battery terminal or shorted by-pass condensers. Increasing the length of battery leads might cause low voltage and vibrator noise.

COLONIAL RADIO CORP.

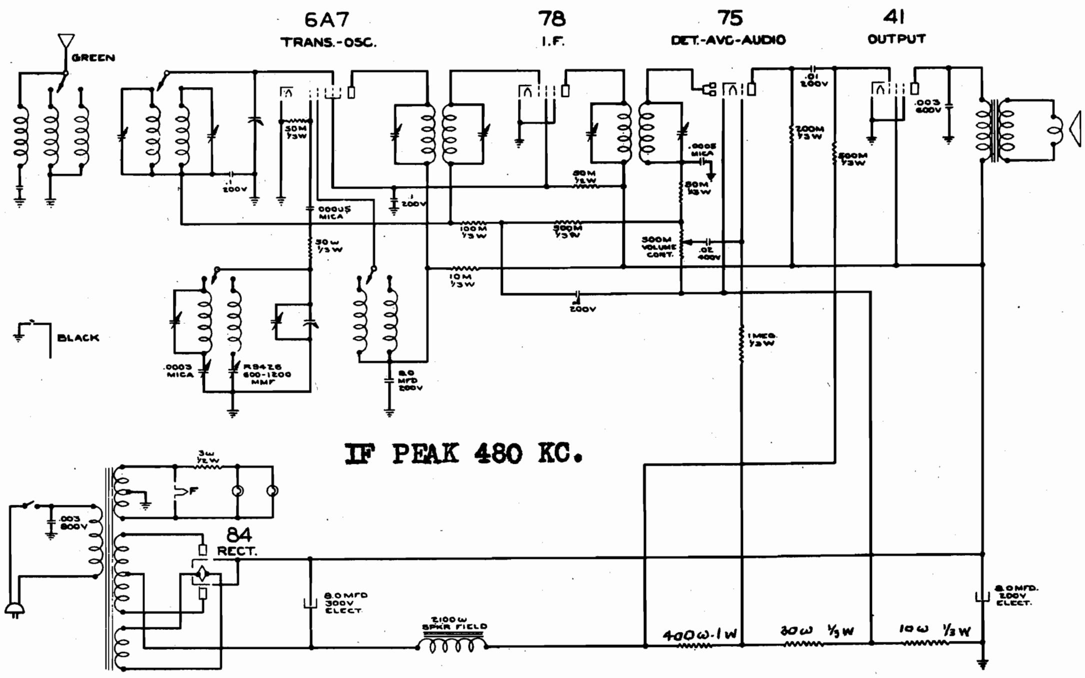
MODEL 605
Schematic
Socket, Trimmers

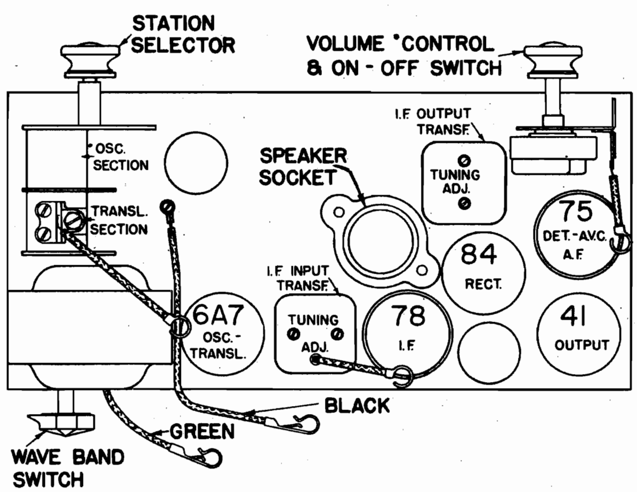


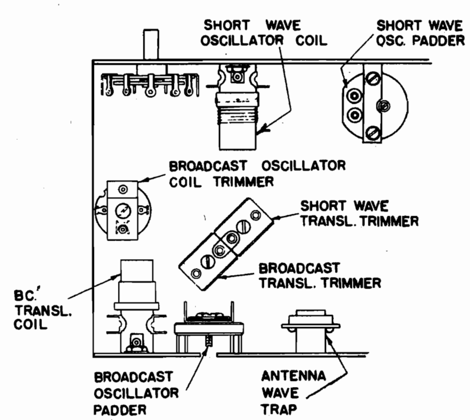
The 37 AVC tube is used as a diode, with plate connected to cathode, so that the grid acts as the diode plate. A portion of the IF signal is fed through the .00005 mfd condenser to the tube. The diode current resulting creates a voltage drop across the 1 megohm resistor, connected between the grid and the cathode of the tube. This voltage drop, impressed upon the grids of the 78 tubes, furnishes AVC.

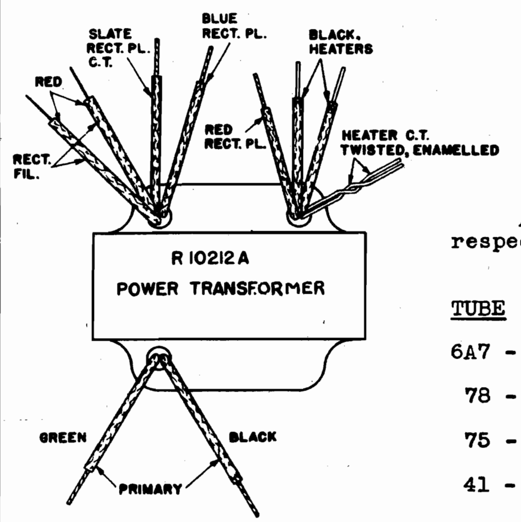
MODEL 662
Schematic, Voltage
Socket, Trimmers

COLONIAL RADIO CORP.









POWER TRANSFORMER CONNECTIONS - MODELS 651 & 662

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE	PLATE	SCREEN	OSCILLATOR SECTION PLATE
6A7 - Osc-Transl	140	60	140
78 - IF	185	60	
75 - AVC-DET-AF	85		
41 - Output	175	185	

COLONIAL RADIO CORP.

MODEL 662

The COLONIAL Model 652 is a five tube superheterodyne, almost identical with Model 651 except for the frequency coverage of its short wave range. The short wave range of the 651 is approximately 5500 kc to 18,000 kc, covering American and Foreign short wave broadcasting. The short wave range of the Model 662 is from approximately 1600 kc to 5200 kc, covering amateur, aircraft, and police transmissions.

Because of the difference in frequency range, the Model 662 uses a conventional type antenna whereas the Model 651 has provision for a short wave doublet antenna.

The tubes and their functions are:

6A7 - Oscillator-Translator
78 - IF
75 - Detector-AVC-AF
41 - Output
84 - Rectifier

In order to prevent interference from code stations, when the receiver is located near the coast, a wave trap is corporated in the antenna circuit. Although this trap is shown in the schematic as a coil with a series condenser, actually it consists of two multi-layer coils wound on top of each other, with one end of each coil left unconnected. The distributed capacity between the coils is represented by the condenser in the schematic. The design of the coil is such that the combination of distributed capacity and inductance is resonant at about 600 meters, which is the frequency used by ships and also is very near the IF frequency of the receiver.

The 75 Detector-AVC-AF Circuit:

The IF signal existing at the IF output transformer secondary is impressed between the diode plates and the cathode of the 75 tube, in series with the 50 M ohm resistor and the 500 M ohms of the volume control. Diode current flows, creating voltage drops across these resistances. Only the drop across the volume control resistance is used for AVC voltage. The control grid returns of the 6A7 and 78 tubes are connected through filter resistances to one end of the volume control. This end is negative in respect to the other end of the control, so that the voltage drop across it, due to the diode current, is impressed as negative bias on the control grids of the 6A7 and 78 tubes. Any increase in signal strength increases the voltage drop across the volume control and so increases the negative bias on the 6A7 and 78 tubes, with a resultant decrease in tube amplification. Since increases in signal strength are offset by decreases in tube amplification, the input to the detector tends to remain at a constant value.

Any desired portion of the audio component across the volume control can be picked off by the movable arm of the control and fed through the .02 mfd. condenser to the triode section of the 75 tube. It is there amplified and then coupled to the 41 output tube.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the 78 tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 6A7 tube and adjust the IF input transformer.

6. Repeat the adjustments to secure greater accuracy.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment; Short Wave:

The short wave range must be aligned before the broadcast range.

1. Set the test oscillator to 5175 kc and couple its output to the green antenna lead of the receiver, leaving the antenna connected.

2. Put the wave switch in the short wave position and open the variable condenser plates all the way. Then adjust the trimmer on the variable con-

MODEL 662
Alignment,Part 2
Parts List

COLONIAL RADIO CORP.

denser for maximum output.

3. Set the test oscillator to 4500 kc and adjust the short wave translator coil trimmer for maximum output.

4. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the condenser back and forth a degree or two and, at the same time, adjust the short wave oscillator padder for maximum output.

5. Repeat the 5175 kc and 4500 kc adjustments. Always use the lowest possible output from the test oscillator.

RF Alignment; Broadcast:

1. Set the test oscillator to 1630 kc, leaving it coupled to the receiver's antenna lead as for short wave alignment.

2. With the wave band switch in the broadcast position, open the variable condenser plates all the way. Then adjust the broadcast oscillator coil trimmer for maximum output.

3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the broadcast translator trimmer for maximum output.

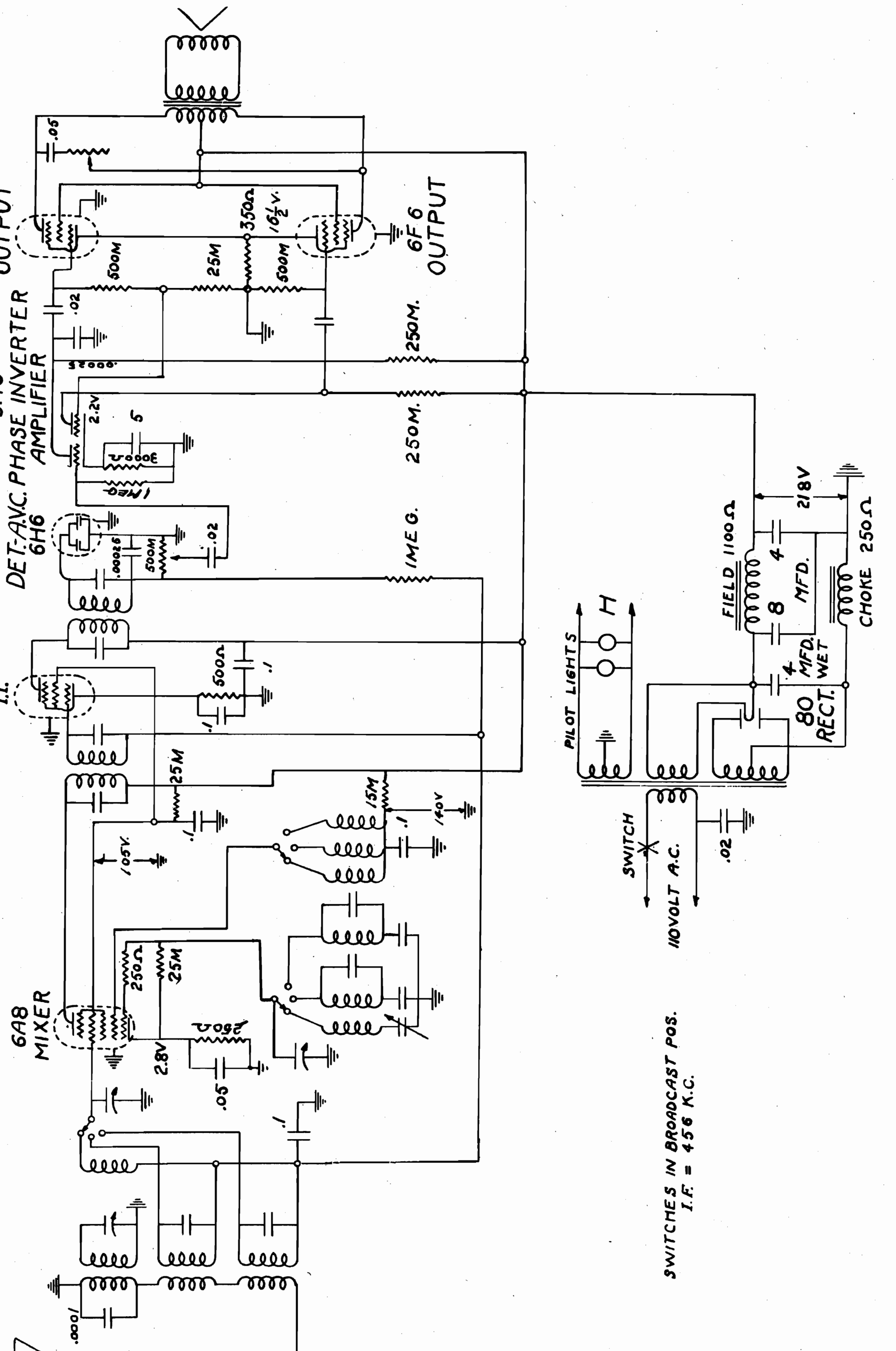
4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.

5. Repeat the 1630 kc and 1400 kc adjustments, always using the lowest possible output from the test oscillator.

PART NO.	DESCRIPTION
R8297A	Board - Terminal, double
R8308A	Board - Terminal, triple
R9446A	Board - Terminal, 4 terminals
R10859	Cabinet -
R10198	Coil - Translator, broadcast
R10199	Coil - Oscillator, broadcast
R9829M	Coil - Translator, short wave
R9829N	Coil - Oscillator, short wave
R9565	Coil - Antenna wave trap
R11198	Condenser - Variable
R9204	Condenser - 8 mfd. 300 volts, electrolytic
R8748	Condenser - 8 mfd. 200 volts, electrolytic
R9426	Condenser - Padding, 1200 mmf.
R9975	Condenser - Padding, 300 mmf.
R10197	Condenser - Trimmer
R6444	Condenser - .1 mfd. 200 volts
R9818	Condenser - .02 mfd. 400 volts
R8432	Condenser - .01 mfd. 200 volts
R7681	Condenser - .003 mfd. 600 volts
R10096	Condenser - .003 mfd. 800 volts
R6760	Condenser - .0005 mfd. mica
R8621	Condenser - .00005 mfd. mica
R10604	Control - Volume with switch
R7566	Cord - AC line
R11212	Escutcheon - Wave switch
R10980	Grommet - Variable condenser mounting
R11213	Indicator - Station selector
R10246	Indicator - Volume control
R11204	Instruction leaflet
R10240	Knob - Station selector
R10247	Knob - Volume control
R8278	Knob - Wave switch
R2288	Lamp - Pilot
R5346B	Lead - Antenna
R5345D	Lead - Ground
R10379A	Pointer
R7585	Resistor - 1 megohm, 1/3 watt carbon
R7228	Resistor - 500 M ohms, 1/3 watt carbon
R6638	Resistor - 200 M ohms, 1/3 watt carbon
R7586	Resistor - 100 M ohms, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6445	Resistor - 50 M ohms, 1/2 watt carbon
R7587	Resistor - 10 M ohms, 1/3 watt carbon
R6632	Resistor - 50 ohms, 1/3 watt carbon
R10364	Resistor - 30 ohms, 1/3 watt carbon
R10493	Resistor - 10 ohms, 1/3 watt carbon
R8066	Resistor - 400 ohms, 2 watts, flexible
R10204	Resistor - 3 ohms, 1 watt, flexible (Pilot light circuit)
R10206	Shield - Electrolytic condenser
R9360	Shield - Tube
R8366	Socket - 4 prong
R8253	Socket - 5 prong
R8092	Socket - 6 prong
R8072	Socket - 7 prong
R10363D	Socket - Pilot light, with volume control mounting bracket
R10373A	Socket - Pilot light, with bracket (mounted on variable condenser)
S10248A	Speaker
R10207	Switch - Wave
R10208A	Transformer - IF input
R10209	Transformer - IF output
R10212B	Transformer - Power

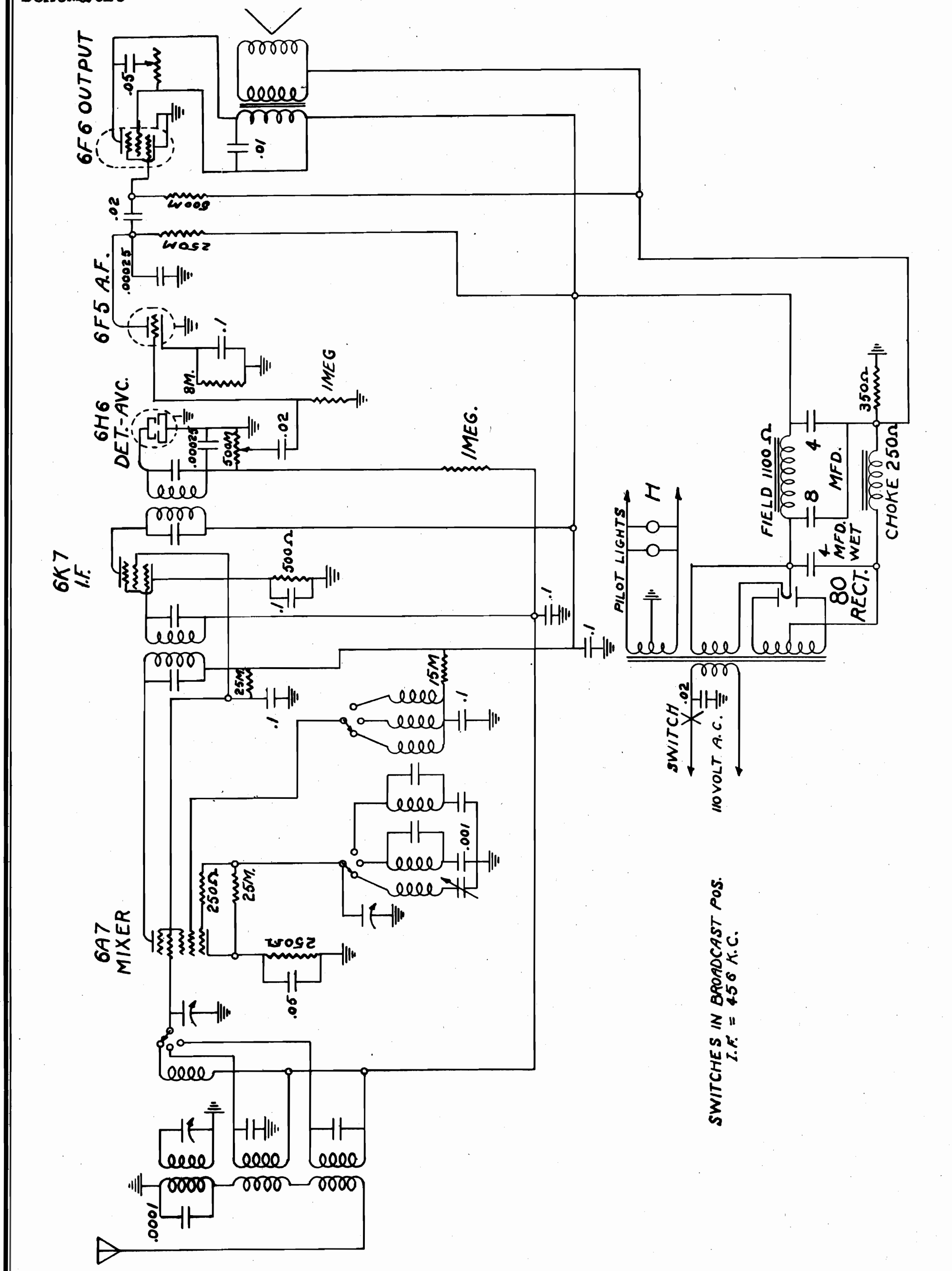
MODEL L4,ML4
Schematic,Voltage

CONTINENTAL RADIO & TELEV. CO.



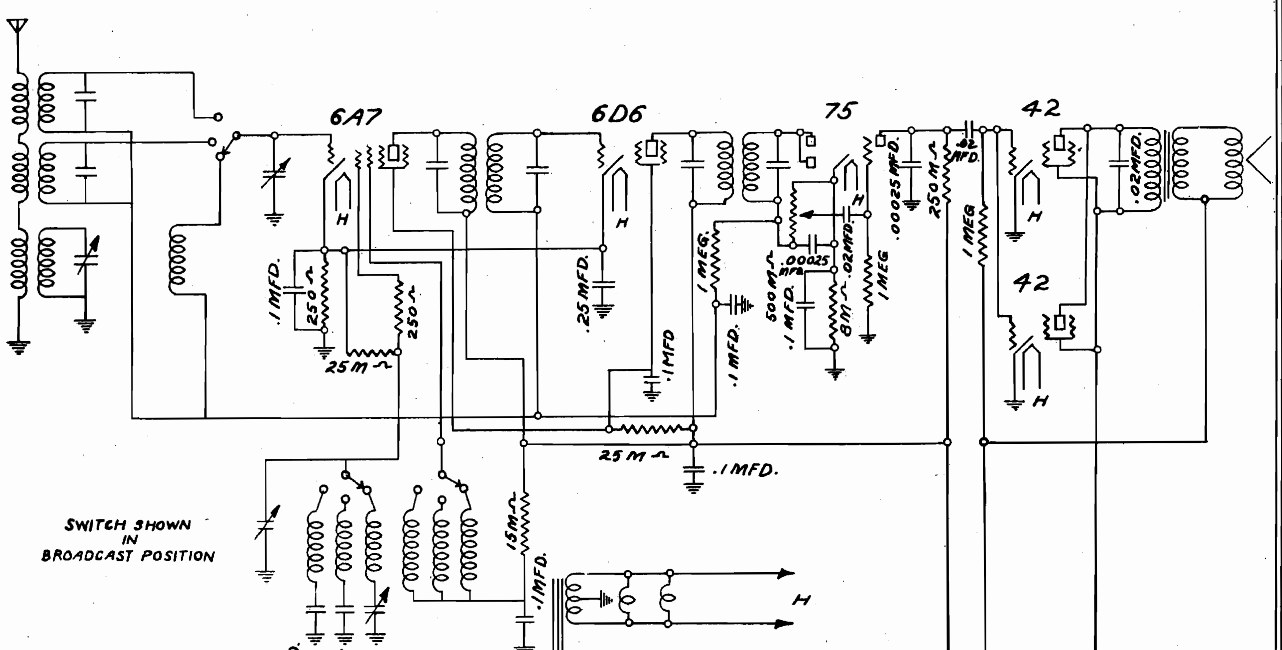
MODELS L2, ML156, ML266
Schematic

CONTINENTAL RADIO & TELEV. CO.



MODELS 137X,150X, 171X
Schematic,Alignment

CONTINENTAL RADIO & TELEV. CO.



IF PEAK 456 KC.

SCHEMATIC DIAGRAM OF MODEL ~ 137X-150X-171X

4-29-35

ALIGNMENT DATA

The Alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456,600,1400,3000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through an .05 or .1 mfd condenser. If desired the ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

R.F. ALIGNMENT Adjust the oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak.

Next rest the dial pointer on the receiver and the test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the preselector or R.F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the Dial. The oscillator trimmer is located underneath the chassis set and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

LOW VOLUME This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition), antenna disconnected from the receiver, open antenna coil, open or shorted by-pass condensers, or defective wave change switch.

LOW VOLTAGE Low voltage may be caused by a defective 80 rectifier, low line voltage, a defective power transformer or shorted by-pass condensers.

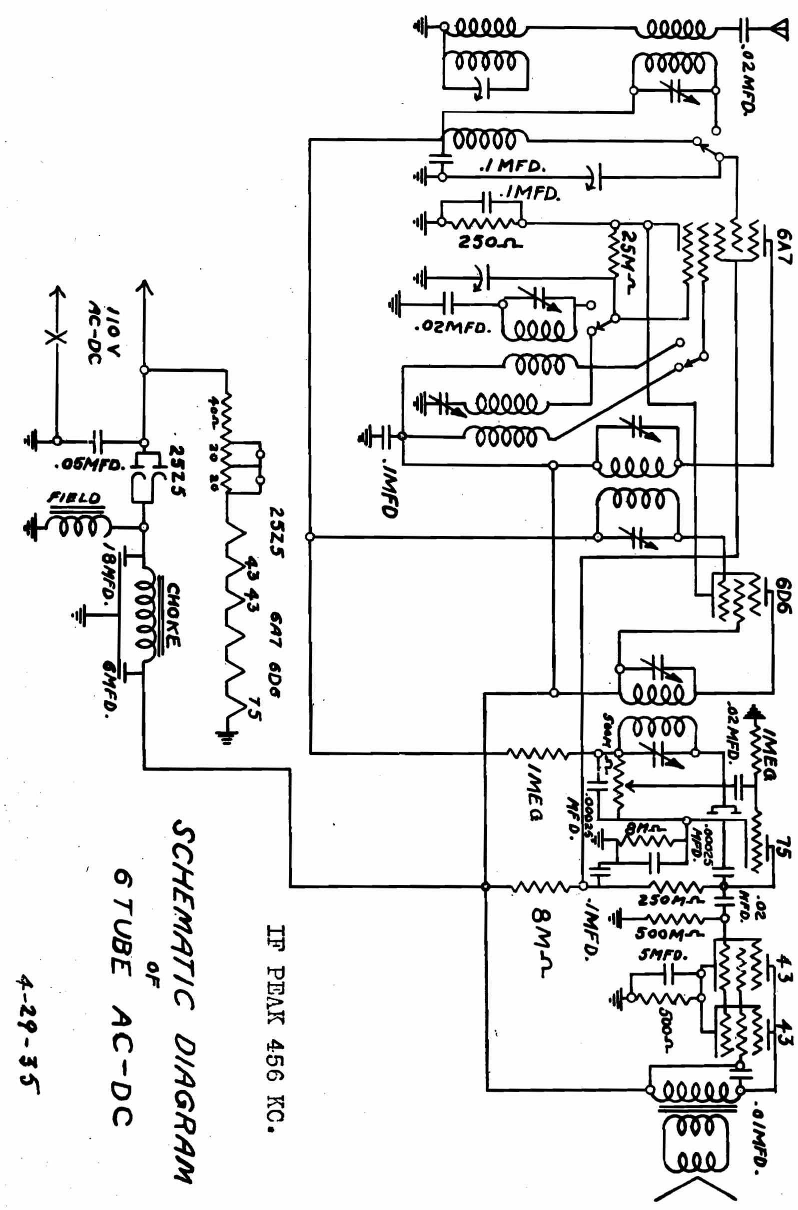
HUM Excessive hum may be caused by a defective 80 tube, open filter condenser, or open audio grid lead.

DISTORTED REPRODUCTIONS This may be caused by a defective 75 or 42 tube or a ground or open in the automatic volume control circuits. Check all circuits with an ohmmeter or continuity tester.

OSCILLATION Most trouble from oscillation is due to open by-pass or defective filter condenser. The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

MODEL X-541
Schematic,Alignment

CONTINENTAL RADIO & TELEV. CO.



The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456,600,1400,3000 and 10,000 K.C. and an output meter to be connected across the primary or secondary of the output transformers.

If possible all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CAUTION: Do not let the test oscillator come in direct contact with the receiver Chassis.

I.F. ALIGNMENT Adjust the test oscillator to 456 K.C. and connect the output to the grid of the 1st detector tube (6A7) through a .05 or .1 mfd. condenser. If desired the ground on the test oscillator can be connected to the chassis ground. Align all four I.F. Trimmers to peak or maximum reading on the output meter.

R.F. ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the output to the antenna post through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 K.C. and adjust the rear gang condenser trimmer to peak. This adjusts the receiver on scale. Then adjust the two front gang trimmers to peak.

Next rest the dial pointer on the receiver and the test oscillator to 600 K.C. Slowly increase or decrease the oscillator padding condenser, and at the same time continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment seems a little complicated but is the easiest way to adjust the oscillator to the preselector or R. F. section. The padding condenser is located on the left hand end of the chassis.

Return to 1400 K.C. and again go over the adjustments at that frequency to be sure they have not been thrown out of adjustment.

SHORT WAVE BANDS

The foreign band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coil located next to the gang condenser. Set the test oscillator to 10 megacycles or 31 meters.

The police and aviation band can be adjusted from a signal set at 3,000 K.C. or 300 on the Dial. The oscillator trimmer is located underneath the chassis and the R.F. trimmer is between the 6A7 tube and the wave change switch.

The gang condenser trimmers are not to be used for alignment of either of the short wave bands.

SERVICE HINTS

CAUTION: Be very careful in handling the receiver chassis as it is connected to one side of the power line.

LOW VOLUME This may be caused by weak or defective tubes (Replace with set of tubes known to be in good condition)open antenna coil, open or shorted by-pass condensers or defective wave change switch. Poor receiving locations such as steel buildings may require extra antenna to get good reception.

LOW VOLTAGE Low voltage may be caused by a defective rectifier tube, open filter condenser or shorted by-pass condensers.

HUM Excessive hum may be caused by a defective tube,open or shorted by-pass condensers or open audio grid leads.

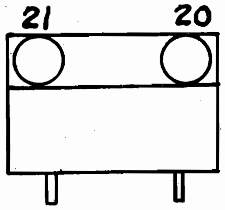
DISTORTED REPRODUCTION This may be caused by a defective 75 or 43 tube or a ground or open in the automatic volume control circuit. Check all circuits with an ohmmeter or continuity tester.

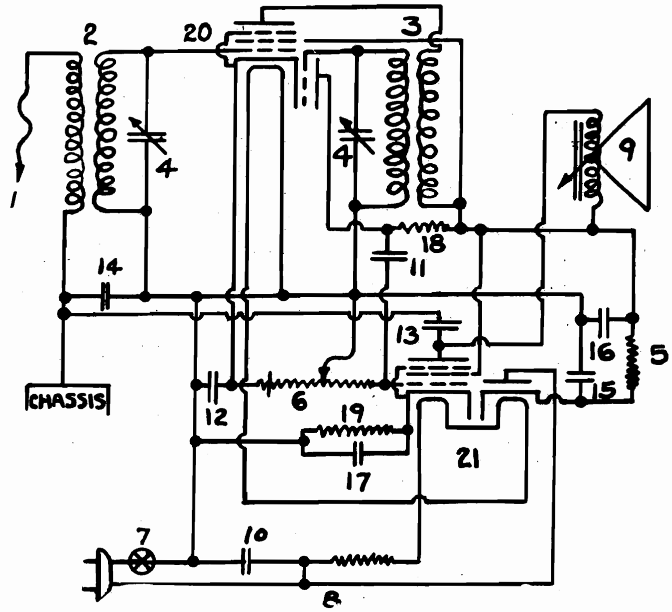
OSCILLATION Most trouble from oscillation is due to open by-pass condensers in the R.F. or I.F. circuits. Test each condenser with another condenser in parallel.

The grid lead on the 75 tube may also cause a howl if it runs too close to the 42 tube.

MODEL 2C1, Sampler
Schematic, Voltage
Socket, Data, Parts

CROSLEY RADIO CORP.





Specifications

Model 2-C-1 is a two tube tuned radio frequency receiver designed for operation from AC or DC 110 Volt electric circuit.

Tubes And Voltage Limits

The following are the tubes and voltages measured from tube contact to negative line with 250,000 ohm 250 Volt voltmeter with receiver in operating condition but with no signal to the antenna, and with a line voltage of 117.5 Volts 60 cy. AC—DC Voltages approximately 90% of values shown.

Tube	Position And Use	Plate	Scr. Grid	Control Grid	Cathode	PL	GL	KL	Filament
6-F-7	R. F. and Regen. Det.	125	125	0	5-30	30	0	—	6.5
12-A-7	A. F. and Rect.	115	125	0	10	117.5	—	135	12.5

VOLTAGE LIMITS ARE PLUS OR MINUS 10% OF VALUES GIVEN

Circuit

Referring to diagram.

The signal enters through antenna and is stepped up by antenna transformer (2) the secondary of which is tuned to the desired signal by one section of the variable condenser (4). This signal activates the pentode section of the 6-F-7 tube. The amplified signal is again stepped up in the R. F. Transformer (3) whose secondary is tuned by the other section of the variable condenser, and this amplified signal is fed into the triode section of the 6-F-7 tube which is operating as a detector. The gain in both sections of this tube is controlled by the volume control (6) which also acts as a grid resistor for the pentode section of the output tube 12-A-7. Resistor (18) serves as the plate resistor for the detector. The signal is coupled to the output pentode through coupling condenser (11) is amplified and then activates the speaker motor. This motor is mechanically connected to the front of the cabinet which serves as the speaker diaphram.

Condenser (12) is the 6-F-7 cathode bypass and condenser (14) is the bypass between chassis and negative line.

The 12-A-7 bias resistor (19) and bypass condenser (17) are combined with condensers (15) and (16) as part of the filter circuit. Resistor (5) is also part of this filter which serves to smooth the B supply from the rectifier section of 12-A-7 tube.

Condenser (10) is the hum modulation suppressor condenser and resistor (8) is a series filament resistor contained in the power supply cable.

Speaker

The front of cabinet is the speaker diaphram. If chassis is to be removed from cabinet the speaker drive rod is unsoldered from speaker motor as explained on instruction card. Do not use glue to fasten front in cabinet. This front is held in place with Hydrolene.

Dec. 1934 **PARTS LIST—MODEL 2-C-1 "Sampler"**

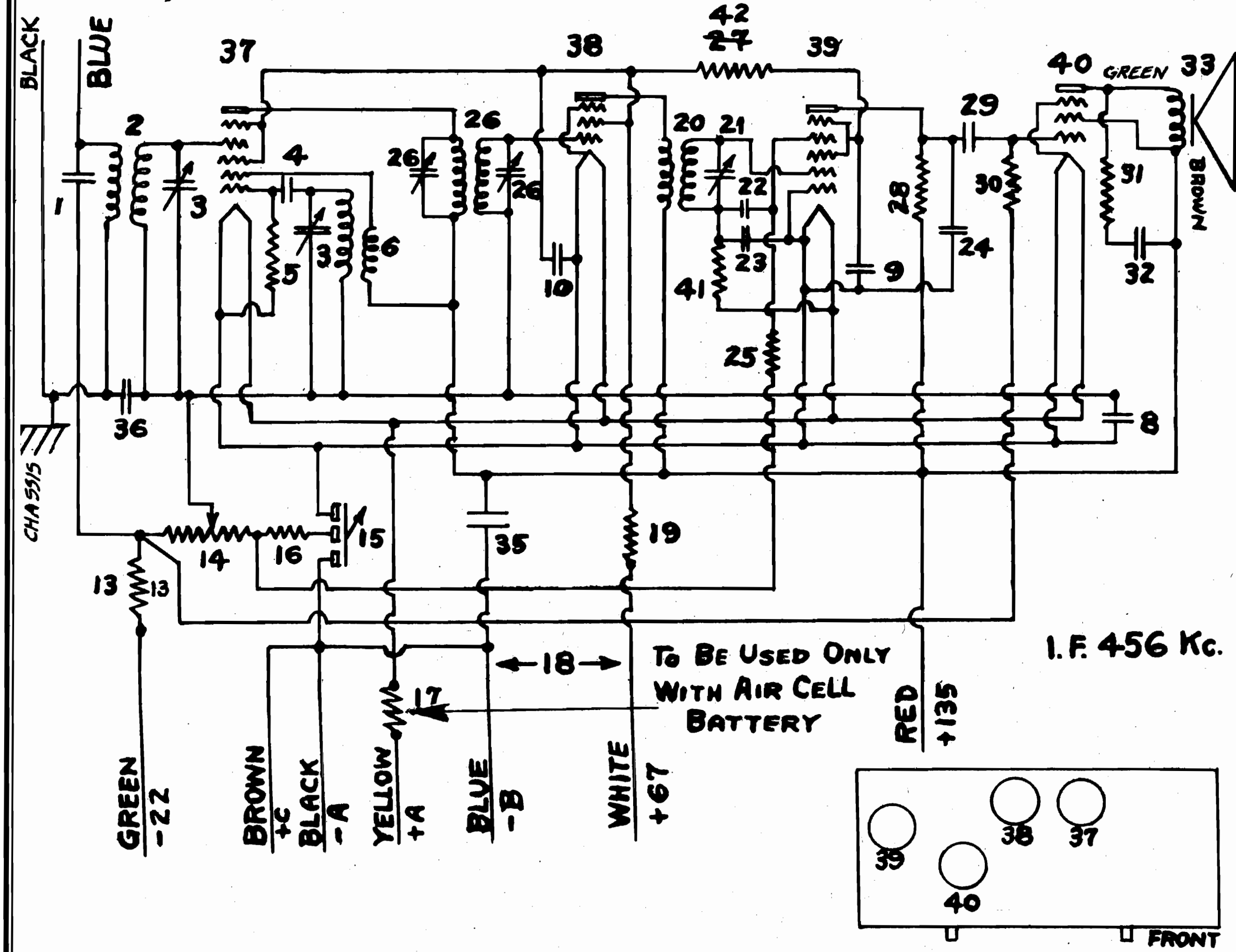
* Figures in 2nd last column refer to parts shown in diagram.

Qty.	Part No.	Description	* Item	List Each
1	G33-32000	Antenna Trans.	2	.55
1	G21-32001	R. F. Trans.	3	.60
1	G8-33001	Variable Condenser	4	2.25
1	W34698B	Volume Control & Switch	6-7	1.00
1	G49-28807	6F7 Socket	20	.10
1	G77-28807	12A7 Socket	21	.10
1	G7-34400	Tube Connector Assem.		.05
1	G8-34400	Tube Connector Assem.		.05
1	B34702B	Resistance Cable and Plug (325 Ohms)	8	.70
1	223M-B	Speaker Unit	9	2.33
1	W34710	Speaker Bracket		.05
		FILTER & BY-PASS CONDENSERS		
1	W34711	.02 Mfd. 110 V.	10	.15
1	W34713	.006 Mfd. 160 V.	11	.15

Qty.	Part No.	Description	* Item	List Each
1	W34712	.25 Mfd. 160 V.	12	.20
1	W34714	.008-.05 Mfd. 160 V.-160 V.	13-14	.20
1	W34704A	16.-16.-8. Mfd. 100 V.-100 V - 20 V.	15 16-17	2.00
		RESISTORS		
2	W22514	750 Ohm Flex.	5-19	.15
1	21454	1 Megohm	18	.15
1	4AC	Cabinet (Ship Design)		.67
	4AE	Cabinet (Artists Pictures)		.67
1	G1-34822	4AC Cabinet Front		.30
	G2-34822	4AE Cabinet Front		.30
1	B34719	Cabinet Back		.05
1	L-34885	Speaker Pin Assem.		.05
2	W2244B	Knobs		.10

MODEL 4B1, Battery Forty
Schematic, Socket, Parts

CROSLEY RADIO CORP.



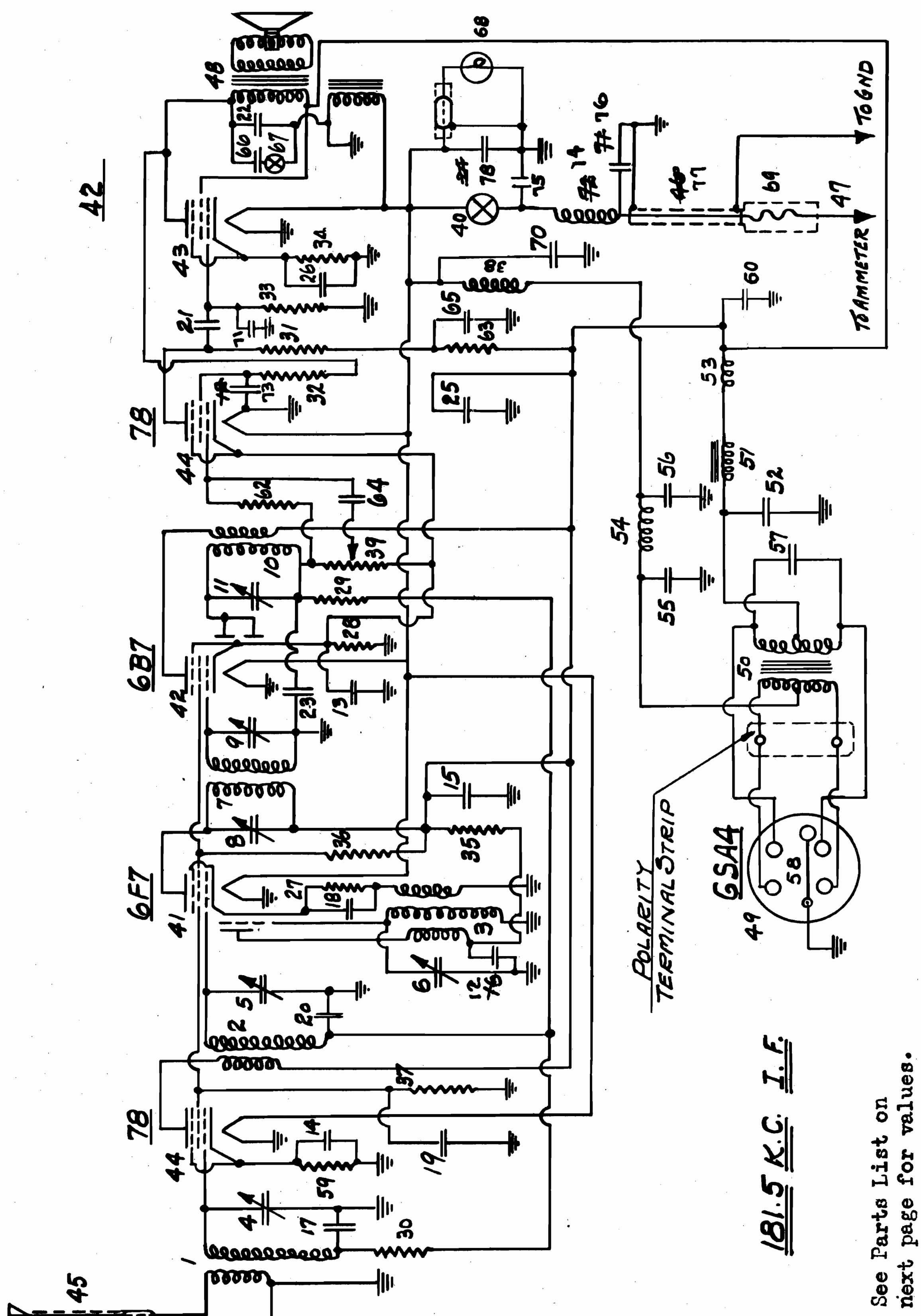
Parts List Model 4B1

Figures in first column correspond to figures in diagram

1	W	—28621	0.02 Mfd. 200 Volt
2	G27	—32000	Antenna Coil
3	G6	—33001	Variable Cond.
4	W	—5382	0.00025 Mfd.
5		21875	100,000 Ohms
6	G9	—32002	Oscillator Coil
7			
8	W	—28622	0.1 Mfd. 200 Volt
9			0.1 Mfd. 200 Volt
10	W	—30321-A	1.0 Mfd. 160 Volt
11			
12			
13		27121	5,000 Ohms
14	W	—33922-A	Volume Control
15			3 P. S. T. Switch
16	W	—23013	2,000 Ohms
17	G5	—23300	0.6 Ohm
18	G2	—29237	Cable & Marker Assem.
19	W	—21452	1,100 Ohms
20	G13	—32004	2nd I. F. Trans.
21	G5	—33005	I. F. Trimmer Cond.
22	W	—28621	0.02 Mfd. 200 Volt
23	W	—25572	0.0005 Mfd. 400 Volt
24			0.0005 Mfd. 400 Volt
25		—26577	3 Meg.
26	G9	—32004	1st I. F. Trans.
27			
28		21455	300,000 Ohms
29	W	—28621	0.02 Mfd. 200 Volt
30		21454	1 Meg.
31		24814	7,000 Ohms
32	W	—28619	0.006 Mfd. 200 Volt
33		21M	Speaker
34			
35	W	—29910-A	0.25 Mfd. 200 Volt
36	W	—28621	0.02 Mfd. 200 Volt
37	G55	—27975	1A6 Socket
38	G31	—27975	34 Socket
39	G4	—33070	1A6 Socket
40	G36	—27975	33 Socket
41		23785	500,000 Ohms
42		24990	25,000 Ohms

MODEL 5A3, Battery Fiver
Schematic

CROSLEY RADIO CORP.



MODEL 5A3, Battery Fiver
Voltage, Parts List

CROSLEY RADIO CORP.

JUNE 1935

MODEL 5A3—ROAMIO

TUBE VOLTAGES—MODEL 5A3

Type	Where Used	Ef	Ep	Eg	Ec	Esg	Eosc	E Sup-G
78	R. A. Amp	6.0	230	0–30	5.0	100	—	5.0
6F7	Osc.-Mod.	6.0	230	0–30	8.0	100	55	—
6B7	I. F. Amp. Diode Det. A. V. C.	6.0	230	0	3.0	100	—	—
78	Audio Amp.	6.0	60	0–30	3.0	25	—	3.0
42	Output	6.0	220	0	16.0	230	—	—

VOLTAGES MEASURED TO CHASSIS WITH A 500 VOLT 1000 OHMS PER VOLT VOLTMETER.

6 VOLT BATTERY USED.

VOLTAGE LIMITS PLUS OR MINUS 10%.

PARTS LIST—MODEL 5A3

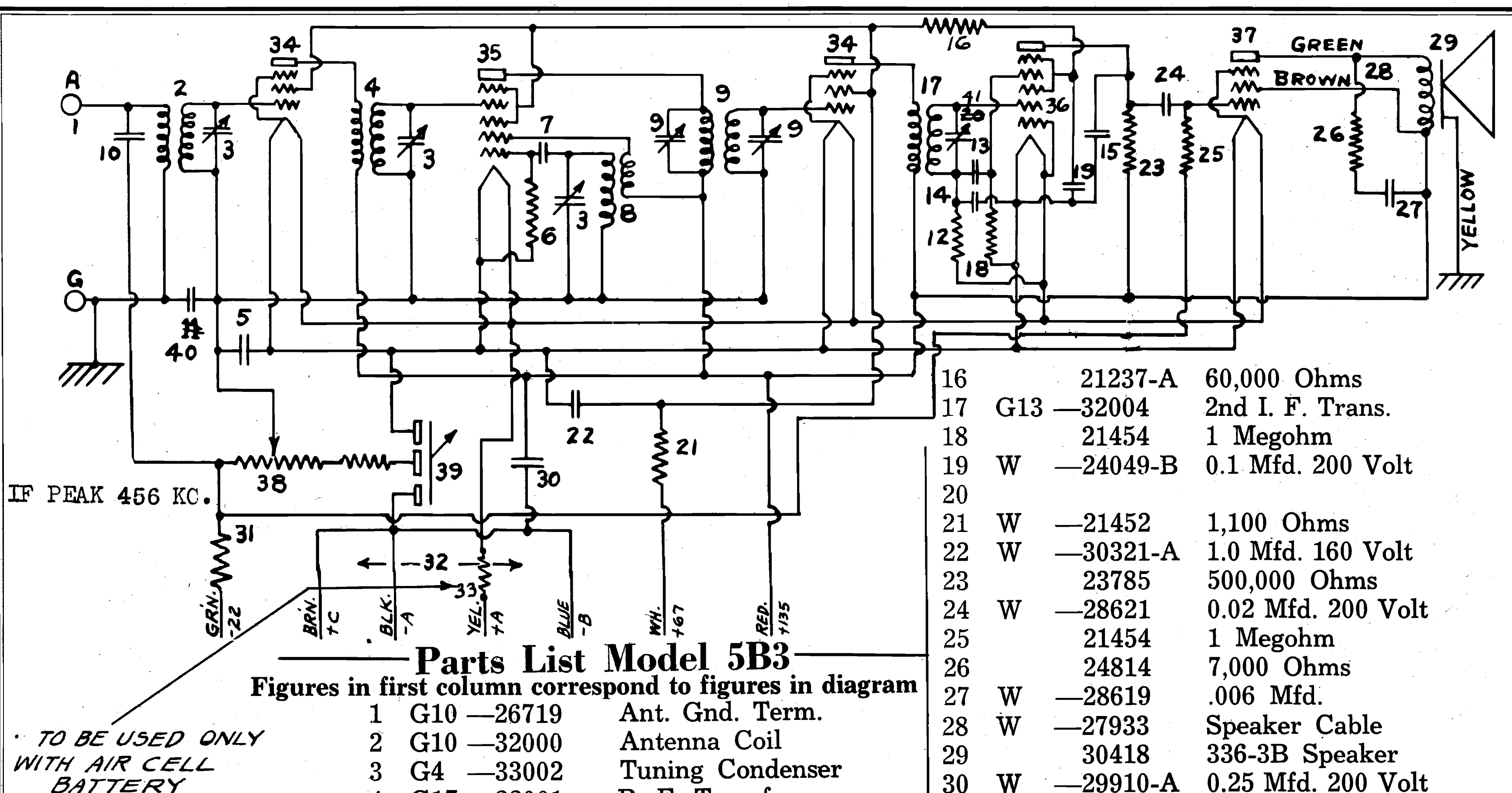
Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1	G19—32000	Antenna Coil
	W —30802A	Coil Shield
	W —30026A	Retaining Shield
2	G11—32001	R. F. Coil
	W —30802A	Coil Shield
	W —30877	Insulating Washer
	W —30026A	Retaining Ring
3	G14—32002	Osc. Coil
	W —25025B	Coil Shield
	W —26891	Insulating Washer
	W —21541C	Retaining Ring
4, 5, 6	G2 —33002	Tuning Cond. Gang
7	G6 —32003	1st. I. F. Trans.
8		1st. I. F. Prim. Tuning Cond.
9		1st. I. F. Sec. Tuning Cond.
10	G7 —32003	2nd. I. F. Trans.
11		2nd. I. F. Sec. Tuning Cond.
12		0.05 Mfd. 400 Volt
13	W —32711A	0.1 Mfd. 200 Volt 4 Section Condenser
14		0.1 Mfd. 200 Volt
15		0.05 Mfd. 400 Volt
16	Deleted	
17	W —32779B	0.02 Mfd. 200 Volt Condenser
18	W —32781B	0.1 Mfd. 200 Volt Condenser
19	W —32780B	0.05 Mfd. 400 Volt Condenser
20	W —32779B	0.02 Mfd. 200 Volt Condenser
21	W —32780B	0.05 Mfd. 400 Volt Condenser
22	W —23635	0.006 Mfd. 400 Volt Condenser
23	W —32741A	0.0005 Mfd. (Mica) Condenser
24	Deleted See 78	
25	W —32802	8. Mfd. 300 Volt Condenser
26		8. Mfd. 20 Volt Condenser
27	W —21452	1,100 Ohms Resistor
28	W —28589	350 Ohms Resistor
29	—21454	1 Megohm 1/3 Watt Resistor
30	—21875	100,000 Ohms Resistor
31	—23403	150,000 Ohms Resistor
32	—21454	1 Megohm Resistor
33	—23875	500,000 Ohm Resistor
34	W —25521	450 Ohm Resistor
35	—32331	55,000 Ohm 1/2 Watt Resistor
36	W —26525B	15,000 Ohm Resistor
37		25,000 Ohm Resistor
38	G4 —28067	R F. "A" Choke
39	W —30436A	Level Control
40		Switch
41	G49—27975	6-F-7 Socket
42	G48—27975	6-B-7 Socket
	W —27981A	Tube Shield Base
	W —30964	Tube Shield
43	G25—27975	42 Socket
44	G39—27975	78 Socket
45	L —35108	Antenna Body and Sleeve Assem.
	G1 —32750	Antenna Lead Assem.
46	Deleted See 77	
47	G5 —31701	"A" Cable Assem.

Item No.	Part No.	Description
	W —31102	Fuse Carrier
48	—33B	Speaker
49	LB —32037	6 SA 4 Syncrotube
50	G1 —32769	Power Transformer
51	G11—24628	"B" Filter Choke
52	W —32759	8. Mfd. 300 Volt Condenser
53	G1 —32755	R. F. "B" Choke
54	G6 —28067	R. F. "A" Choke
55	W —30366	0.5 Mfd. 160 Volt Condenser
56	W —30366	0.5 Mfd. 160 Volt Condenser
57	W —32762	0.005 Mfd. 1,000 Volt Condenser
58	G81—27975	6 SA 4 Socket
59	W —21452	1,100 Ohm Resistor
60	W —30741	0.00025 Mfd. (Mica) Condenser
61	———	
62	W —21454	1 Megohm Resistor
63	W —21237A	60,000 Ohm 1/4 Watt Resistor
64	W —32780B	0.05 Mfd. 400 Volt Condenser
65	W —32780B	0.05 7Mfd. 400 Volt Condenser
66	W —32782B	0.01 Mfd. 400 Volt Condenser
67	W —26156A	S. P. S. T. Switch (Tone Control)
68		Dial Light
69	W —32757	12 Amp. Fuse
70	W —32741A	0.0005 Mfd. (Mica) Condenser
71	W —32741A	0,0005 Mfd. (Mica) Condenser
72	Deleted See 74	
73	W —24784	0.25 Mfd. 200 Volt Condenser
74	G8 —31701	"A" Choke
75		.00025 Mfd. Condenser
76		.00025 Mfd. Condenser
77		"A" Lead
78	W —30741	.00025 Mfd. (Mica) Condenser
	B —32783	Anetnna Cable
	W —29754C	0.5 Mfd. Condenser (Eliminator)
	L —32810	Remote Control Assembly Complete
	B —30372B	Housing
	G2 —31538	Cover Assm.
	W —30370	Dial Glass only
	B —32812	Dial
	W —30371A	Dial Hand
	G1 —30295	Gear Assm.
	G5 —23472	Knob (Tuning)
	G1 —28036	Knob (Key)
	G7 —25868	Drive Shaft 15" (V. C.)
	G21—25868	Drive Shaft 15" (Tuner)
	G8 —25868	Drive Shaft 30" (V. C.)
	G20—25868	Drive Shaft 30" (Tuner)
	W —26315	5/16 x 5/16 Dog Pt. S. P. Set Screw (4 used)
	W —28029B	Steering Column Bracket
	G1 —28035	Strap Assm.
	R —186	5/16 x 3/4 R. H. Machine Screw (black) (1 used)
	W —20802	No. 10 Shakeproof Washer (black) (4 used)
	R —181	No. 10 x 7/16 R.H. Machine Screw (black) (3 used)
	C —141	3/16 x 1 1/8 Fr. Hd. Machine Screw (2 used)
	W —31539	No. 2-56 x 3/16 R.H. Machine Screw (1 used)
	G17—26317	Dial Light Bracket Assem.
	G8 —32750	Dial Light Lead Assem.

MODEL 5B3, Battery Fiver
Schematic, Socket, Parts

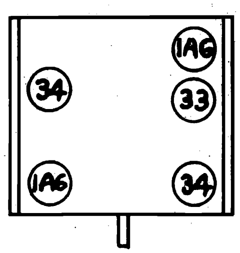
CROSLEY RADIO CORP.



Parts List Model 5B3

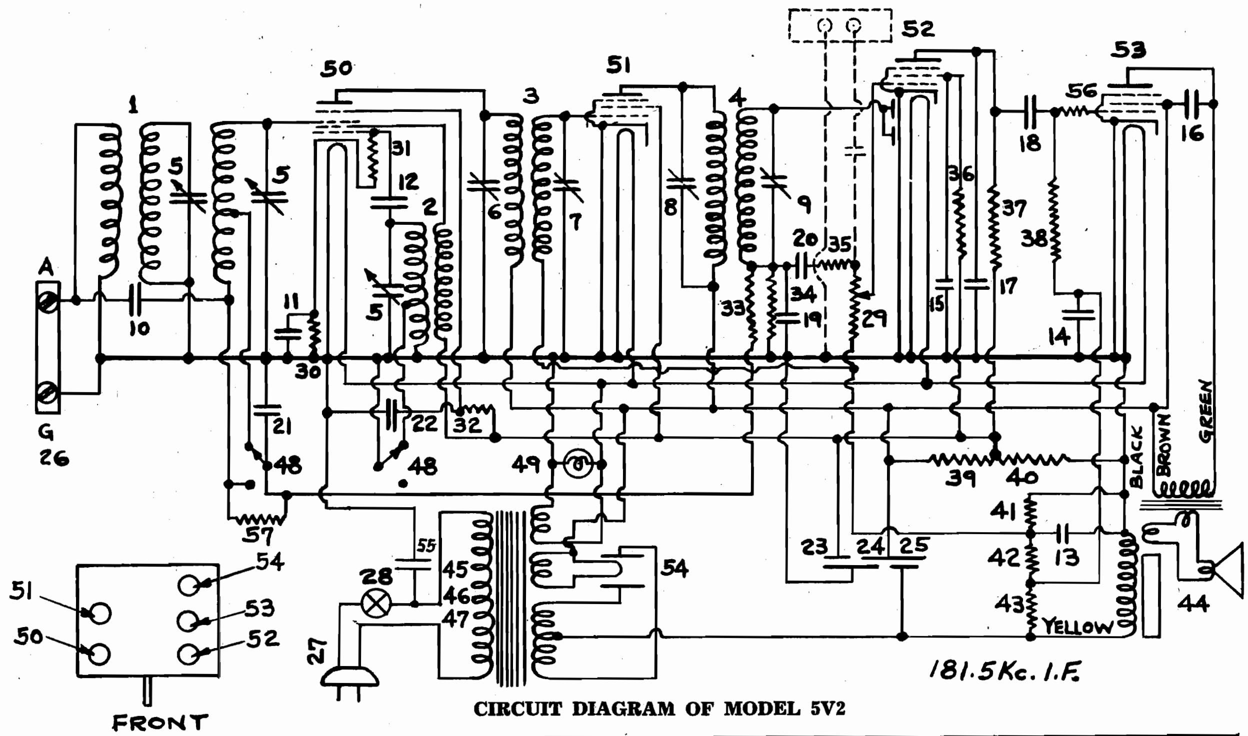
Figures in first column correspond to figures in diagram

1	G10	—26719	Ant. Gnd. Term.
2	G10	—32000	Antenna Coil
3	G4	—33002	Tuning Condenser
4	G17	—32001	R. F. Transformer
5	W	—24049-B	0.1 Mfd. 200 Volt
6		21875	100,000 Ohms
7	G1	—34004	.025 Mfd. (Mica)
8	G9	—32002	Oscillator Coil
9	G9	—32004	1st I. F. Trans.
10	W	—28621	.02 Mfd. 200 Volt
11			
12		23785	500,000 Ohms
13	W	—28621	.02 Mfd. 200 Volt
14	W	—26152-A	.00015 Mfd. 400 Volt
15			.0001 Mfd. 400 Volt
16		21237-A	60,000 Ohms
17	G13	—32004	2nd I. F. Trans.
18		21454	1 Megohm
19	W	—24049-B	0.1 Mfd. 200 Volt
20			
21	W	—21452	1,100 Ohms
22	W	—30321-A	1.0 Mfd. 160 Volt
23		23785	500,000 Ohms
24	W	—28621	0.02 Mfd. 200 Volt
25		21454	1 Megohm
26		24814	7,000 Ohms
27	W	—28619	.006 Mfd.
28	W	—27933	Speaker Cable
29		30418	336-3B Speaker
30	W	—29910-A	0.25 Mfd. 200 Volt
31		27121	5,000 Ohms
32	G2	—29237	Battery Cable
33	G2	—23300	Air Cell Resistor .53 Ohms
34	G31	—27975	34 Socket
35	G55	—27975	1A6 Socket
36	G4	—33070	1A6 Flex. Socket
37	G36	—27975	33 Socket
38	W	—32649	Volume Cont. 10,000 Ohms
39			Switch 3. P. S. T.
40	W	—24049-B	0.1 Mfd. 200 Volt
41	G8	—33005	I. F. Tuning Cond.



MODEL 5V2, Fiver DeLuxe
Schematic, Socket, Parts
Voltage

CROSLEY RADIO CORP.



CIRCUIT DIAGRAM OF MODEL 5V2

TUBE VOLTAGES—MODEL 5V2

Type	Where Used	Ef	Ep	Eg	Esg	Ek	Esup	Eg-osc	Ep-osc
6A7	Osc-Mod.	6.5	240	0	90	3	0	–15	125
6D6	I. F.	6.5	240	–3.5	125	0	0	—	—
6B7	Diode-AF	6.5	30	–3.5	40	0	—	—	—
42	Output	6.5	230	–18	240	0	—	—	—
80	Rectifier	5.1	—	—	—	240	—	—	—

ALL VOLTAGES ARE PLUS OR MINUS 10%. ALL DC VOLTAGES ARE MEASURED TO CHASSIS AT 117.5 LINE WITH 1000 OHMS PER VOLT 250-VOLT VOLTMETER. POWER DEMAND IS 50 WATTS AT 110 VOLTS 60 CYCLES. ALIGNMENT AND SERVICING PROCEDURE SAME AS ON MODEL 5V1.

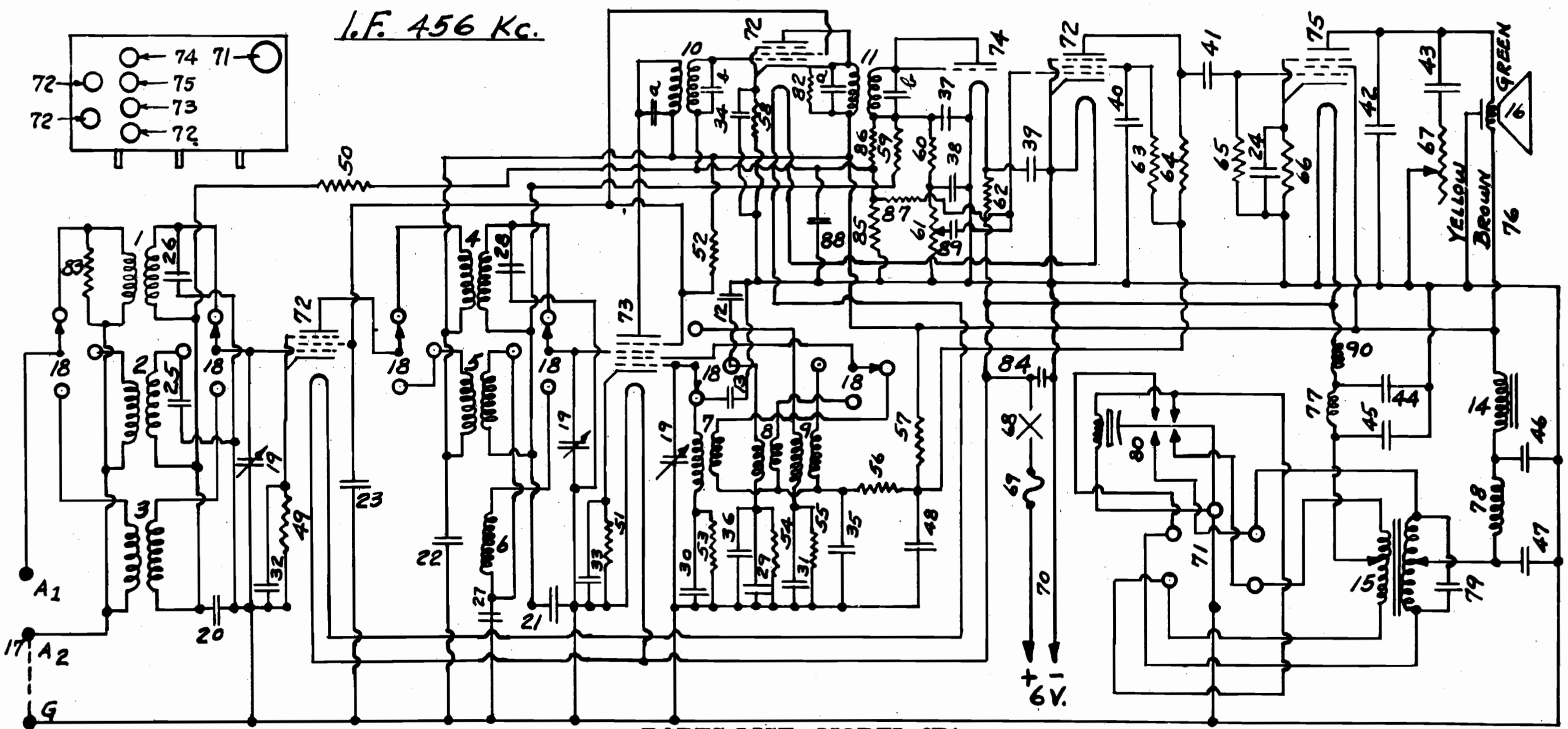
PARTS LIST—MODEL 5V2

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description	Item No.	Part No.	Description
1	G24—32000	Preselecter Coil	26	G10—26719	Ant.-Gnd. Terminal
			27	B —33906A	A. C. Cord and Plug
2	G15—32002	Oscillator Coil	28	W —33556	A. C. Switch
	W —25025B	Coil Shield 1"	29		Level Control
	W —25200	Coil Socket	30	W —25937	275 Ohm Resistor
	W —26891	Insulating Washer	31	—21237A	60,000 Ohm Resistor
	W —21451C	Retaining Ring	32	—21876	10,000 Ohm Resistor
3	G2 —32003	1st. I. F. Transformer	33	—26577	3 Megohm Resistor
	W —25024B	Coil Shield	34	—23785	500,000 Ohm Resistor
	W —25200	Coil Socket	35	—21455	300,000 Ohm Resistor
	W —26891	Insulating Washer	36	—23785	500,000 Ohm Resistor
	W —21451C	Retaining Ring	37	—21875	100,000 Ohm Resistor
4	G1 —32003	2nd. I. F. Transformer	38	—23785	500,000 Ohm Resistor
	W —25024B	Coil Shield	39	W —31883	8,500 Ohm Resistor
	W —25200	Coil Socket	40		25,000 Ohm Resistor
	W —26891	Insulating Washer	41	—24990	25,000 Ohm Resistor
	W —21451C	Retaining Ring	42	—21875	100,000 Ohm Resistor
5	G21—33002	Tuning Condenser Gang	43	—23785	500,000 Ohm Resistor
	G21—25050	Dial Assembly	44	—418C	Speaker
	G8 —32075	Drive Wheel Assembly		W —31007A	Speaker Cable
6	G4 —33005	1st. I. F. Primary Trimmer Condenser	45	G6 —30745	Power Transformer, 110 Volt, 60 Cy.
7	W —25008A	1st. I. F. Secondary Trimmer Condenser Adj. Blade only	46	G7 —30745	Power Transformer, 110 Volt, 25 Cy.
			47	G8 —30745	Power Transformer, 220 Volt, 25 Cy.
8	G3 —33005	2nd. I. F. Primary Trimmer Cond.	48	W —33557	D. P. D. T. Switch
9	G3 —33005	2nd. I. F. Secondary Trimmer Cond.	49	G14—27812	Dial Light Bracket Assembly
10	W —27668	0.0001 Mfd. Condenser	50	G47—27456	6-A-7 Socket
11	W —28621	0.02 Mfd. 200 Volt Condenser		W —27981A	Tube Shield Base
12	W —26571	0.0005 Mfd. 400 Volt Condenser		W —28632A	Tube Shield
13	W —30321A	1.0 Mfd. 160 Volt Condenser	51	G75—27456	6-D-6 Socket
14	W —30321A	1.0 Mfd. 160 Volt Condenser		W —27981A	Tube Shield Base
15	W —28621	0.02 Mfd. 200 Volt Condenser		B —26009D	Tube Shield
16	W —30323	0.01 Mfd. 200 Volt Condenser	52	G48—27456	6-B-7 Socket
17	W —25537A	0.001 Mfd. 400 Volt Condenser		W —27981A	Tube Shield Base
18		0.03 Mfd. 400 Volt Condenser		W —28632A	Tube Shield
19	W —30322A	0.00017 Mfd. 200 Volt Condenser	53	G25—27456	—42 Socket
20		0.006 Mfd. 200 Volt Condenser	54	G6 —27456	—80 Socket
21	W —29271A	0.02 Mfd. 400 Volt Condenser	55	W —30805	0.01 Mfd. 400 Volt Condenser
22		0.02 Mfd. 400 Volt Condenser	56	—21455	300,000 Ohm Resistor
23	B —30059C	8.0 Mfd. 250 Volt (Yellow) Cond.	57	W —23013	2,000 Ohm Resistor
24		8.0 Mfd. 450 Volt (Red) Condenser		W —32352	Knob (Black)
25		8.0 Mfd. 450 Volt (+Red, —No Code) Condenser		W —31585B	Knob (Brown)
				W —31463	Escutcheon

MODEL 6B1, Battery Six
Schematic, Parts
Socket

CROSLEY RADIO CORP.



PARTS LIST—MODEL 6B1

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1	G20—32000	Low Freq. Ant. Coil
	G5 —31267	Coil Shield Assm.
	W —30026A	Retaining Ring
2	G28—32000	High Freq. Ant. Coil
	G4 —31267	Coil Shield Assem.
	W —30026A	Retaining Ring
3	G31—32000	Police Band Ant. Coil
	G6 —31267	Coil Shield Assm.
	W —26891	Insulating Washer
	W —21541C	Retaining Ring
4	G2 —32001	L. F. R. F. Coil
	W —25024B	Coil Shield
	W —25200	Coil Socket
	W —26891	Insulating Washer
	W —21541C	Retaining Ring
5	G18—32001	H. F. R. F. Coil
	W —30802A	Coil Shield
	W —25200	Coil Socket
	W —30026A	Retaining Ring
6	G19—32001	Pol. Band R. F. Sec. Coil (ON NO. 18 SW)
7	G2 —32002	L. F. Osc. Coil
	G6 —31267	Coil Shield Assm.
	W —26891	Insulating Washer
	W —21541C	Retaining Ring
8	G1 —32002	H. F. Osc. Coil
	W —30802A	Coil Shield
	W —25200	Coil Socket
	W —30026A	Retaining Ring
9	G24—32002	Pol. Band Osc. Coil
	G6 —31267	Coil Shield Assm.
	W —26891	Insulating Washer
	W —21541C	Retaining Ring
10	G34—32004	1st I. F. Trans. Assm.
11	G35—32004	2nd I. F. Trans. Assm.
12	G14—33009	H. F. Osc. Trimmer
13		L. F. Osc. Trimmer
14	G12—28069	L. F. Choke
15	G3 —31618	Power Transformer
	W —33592A	Transformer Spring
16	—426PT	Speaker
17	G24—26719	Ant. Gnd. Terminal
18	B —34443B	6 P. 3 T. Switch
	W —32162C	Shield (metal)
19	C —33075B	Tuning Condenser Gang
	G25—32086	Dial Assembly
	W —34657A	Dial Hand only
	W —34655B	Dial Pointer only
	W —34603	Dial Cap Nut
20	W —32379	0.02 Mfd. 200 Volt Condenser
21	W —32379	0.02 Mfd. 200 Volt Condenser
22	W —34896	12. Mfd. 250 Volt Condenser
23		8. Mfd. 250 Volt Condenser
24		8. Mfd. 25 Volt Condenser
25	G1 —33008	H. F. Ant. Trimmer Condenser
26		L. F. Ant. Trimmer Condenser
27	G9 —33009	H. F. R. F. Trimmer Condenser
28		L. F. R. F. Trimmer Condenser
29	G7 —33006	H. F. Osc. Series Trimmer Condenser
30		L. F. Osc. Series Trimmer Condenser
31	G6 —34000	1350 Mmf. Condenser
32	W —28621	0.02 Mfd. 200 Volt Condenser
33	W —28621	0.02 Mfd. 200 Volt Condenser
34	W —28621	0.02 Mfd. 200 Volt Condenser
35	W —32378	0.01 Mfd. 400 Volt Condenser
36	G11—34000	1400 Mmf. Condenser
37	W —26152A	0.00015 Mfd. 400 Volt Condenser
38		0.0001 Mfd. 400 Volt Condenser
39	W —34897	100 Mmf. 2 Volt Condenser
40	W —28621	0.02 Mfd. 200 Volt Condenser
41	W —28621	0.02 Mfd. 200 Volt Condenser
42	W —31052	0.004 Mfd. 400 Volt Condenser
43		0.05 Mfd. 400 Volt Condenser
44	W —33299	0.5 Mfd. 160 Volt Condenser
45	W —33299	0.5 Mfd. 160 Volt Condenser
46	W —34898	8. Mfd. 300 Volt Condenser
47	W —33301	0.25 Mfd. 300 Volt Condenser
48	W —34899	8. Mfd. 250 Volt Condenser
49	W —30127	450 Ohm Flex. Resistor
50	—23785	500,000 Ohm Resistor
51	W —28589	350 Ohm Flex. Resistor
52	—23616	15,000 Ohm Resistor
53	—21237A	60,000 Ohm Resistor
54	—21453	40,000 Ohm Resistor
55	—33390	30,000 Ohm Resistor
56	—31094	4,500 Ohm Resistor
57	—31094	4,500 Ohm Reisitor
58	W —29585	600 Ohm Flex. Resistor
59	—26577	3 Megohm Resistor
60	—21455	300,000 Ohm Resistor
61	W —32062	Level Control
62	W —24537	60 Ohm Flex. Resistor
63	—21454	1 Megohm Resistor
64	—23403	150,000 Ohm Resistor
65	—21454	1 Megohm Resistor
66	W —21452	1,100 Ohm Flex. Resistor
67	W —32063	Tone Control
68		S. P. S. T. Line Switch
69	W — 7983A	3 Amp. Fuse
	G2 —33339	Fuse Panel Assm.
	W —33310A	Fuse Panel Cover
	W —34223	Insulator
	W — 4072	Thumb Screw
70	B —34902	Battery Cable
71	G1 —33314	Syncrotube Socket
	W —33313B	Rubber Cushion
	See 80	
	W —33312	Rubber Sleeve
	B —33349A	Syncrotube Cover
72	G88—28807	Socket (15)
	W —27981A	Tube Shield Base
	W —28632A	Tube Shield
73	G47—28807	Socket (6A7)
	W —27981A	Tube Shield Base
	W —28632A	Tube Shield
74	G9 —28807	Socket (30)
75	G15—28807	Socket (38)
76	W —35111	Speaker Cable, 3 wire
77	G6 —28067	Syncronode "A" Choke
78	G1 —24234	Syncronode R. F. "B" Chok
79	W —32762	0.005 Mfd. 1,000 Volt Cond
	B —33317C	Syncronde Cover
80	L —33345	Syncrotube (6 SA4)
81	See 84	
82	—23785	500,000 Ohm Resistor
83	—31094	4,500 Ohm Resistor
84	G4 —34005	0.002 Mfd. Condenser
85	—26577	3 Megohm Resistor
86	—26578	5 Megohm Resistor
87	—26577	3 Megohm Resistor
88	W —28621	0.02 Mfd. 200 Volt Cond
89	W —28621	0.02 Mfd. 200 Volt Cond
90	G2 —32977	R. F. Choke

MODEL 6B1, Battery Six
Chassis, Trimmers

CROSLEY RADIO CORP.

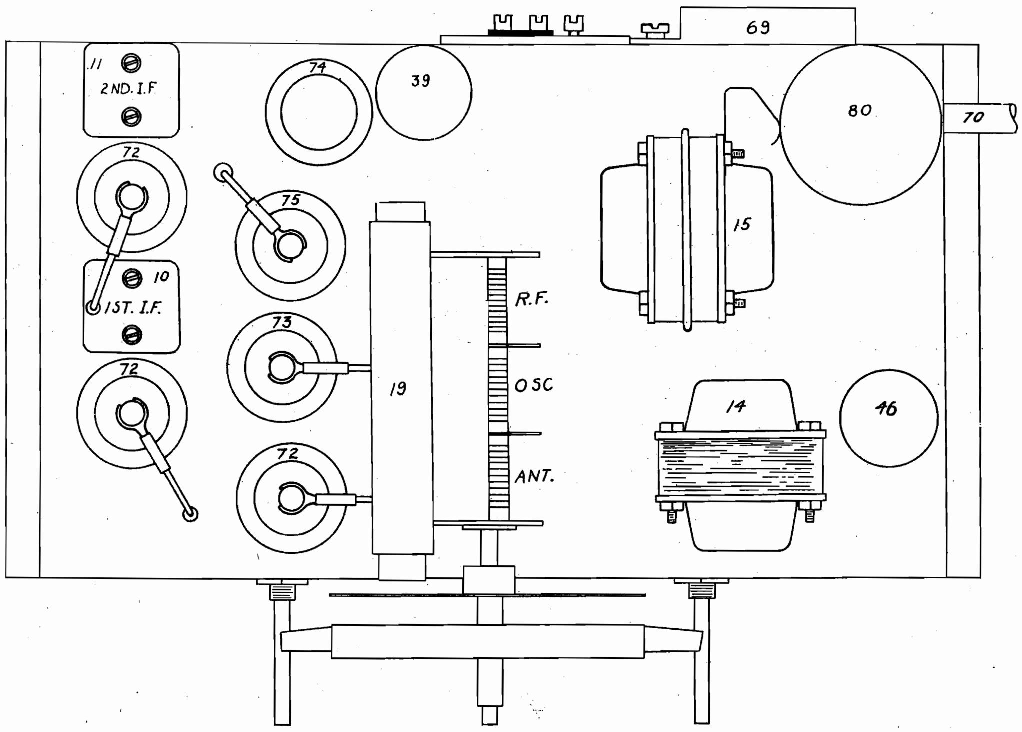


FIG. 2 – TOP VIEW

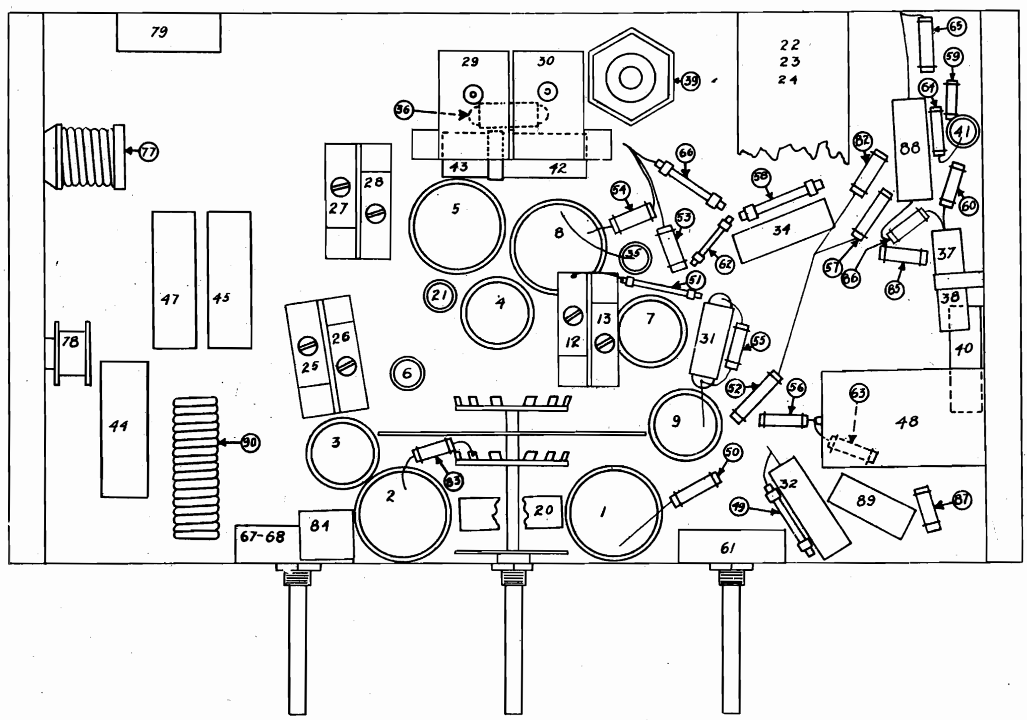


FIG. 3 – BOTTOM VIEW

Osc. Parallel Trimmer Condenser, Band No. 1—Item No. 13.

Osc. Parallel Trimmer Condenser, Band No. 2—Item No. 12.

Osc. Series Trimmer Condenser, Band No. 1—Item No. 30.

Osc. Series Trimmer Condenser, Band No. 2—Item No. 29.

Ant. Parallel Trimmer Condenser, Band No. 1—Item No. 26.

Ant. Parallel Trimmer Condenser, Band No. 2—Item No. 25.

R.F. Parallel Trimmer Condenser, Band No. 1—Item No. 28.

R.F. Parallel Trimmer Condenser, Band No. 2—Item No. 27.

MODEL 6B1, Battery Six
Voltage, Alignment

CROSLEY RADIO CORP.

MAY 1935 — MODEL 6B1—BATTERY SIX — No. 102

SPECIFICATIONS

The Crosley Model 6B1 is a six tube superheterodyne receiver designed for operation on a six volt storage battery. It tunes in three steps covering the following frequencies:

Band No. 1—540-1725 Kilocycles.

Band No. 2—5600-15300 Kilocycles.

Band No. 3—1700-5500 Kilocycles.

Band No. 1 is calibrated on the dial in Myriacycles (10 Kc.) and Bands No. 2 and 3 are calibrated in Megacycles (1000 Kc.). It employs A. V. C., continuously variable tone control, class "A" pentode audio amplification and a band spread pointer, 36-1 ratio.

TUBES AND VOLTAGE LIMITS

The following are the tubes used and the voltages measured from the tube contacts to the chassis with a 250,000 ohm, 250 volt voltmeter with the receiver in full operating condition but with no signal to the antenna and using a six volt storage battery. A low range voltmeter should be used in measuring the filament voltages. Voltage limits are plus or minus 10% of the values given.

TUBE VOLTAGES—MODEL 6B1

Type	Where Used	Ef	Epl	Ep2	Esg	Eg2	Ek
15	R. F. Amp.	1.98	175		80		2.5
6A7	Osc.-Mod.	5.95	175	145	80	6 to 12	4.0
15	I. F. Amp.	1.98	175		80		2.5
30	Det. & A. V. C.	2.0	0				
15	A. F. Amp.	1.98	90		50 V. C. Full		V. C. Full 0
38	Output	5.95	158		175		18

ALL VOLTAGES GIVEN ARE PLUS OR MINUS 10% AND ARE MEASURED WITH A 250 VOLT (1000 OHMS PER VOLT) VOLTMETER WITH A 6 VOLT BATTERY. A LOW RANGE VOLTMETER USED FOR MEASURING FILAMENTS.

POWER DEMAND APPROXIMATELY 12 WATTS. "A" BATTERY DRAIN AT 6 VOLTS APPROXIMATELY 2 AMP.

CIRCUIT DESCRIPTION

The circuit consists of one stage of R.F. amplification, an oscillator-modulator, one stage of I.F. amplification, diode detector, automatic volume control, two stages of audio amplification and power supply. The R. F. stage employs a Type 15 tube, the oscillator-modulator stage uses a Type 6A7 tube and the I.F. amplifier also uses a Type 15 tube. A Type 30 tube is used as a diode detector and to supply A. V. C. voltage to the control grids of the R.F., oscillator-modulator, I.F. and first A.F. tubes. The first A.F. amplifier employs a Type 15 tube which is resistance coupled to the Type 38 power output pentode tube. A permanent magnet, moving coil type speaker is used and is coupled to the plate of the Type 38 tube through an output transformer which is located on the speaker. A 6SA4 Syncrotube, self-rectifying type vibrator, is used to furnish the "B" power supply.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no readjustment unless some coil or condenser has been replaced. Do not change the setting of any trimmer condenser unless it is definitely known that the adjustment is necessary. If re-alignment is found necessary, the circuits can be properly adjusted only with the use of a modulated test oscillator and an output meter.

CONNECTING OUTPUT METER

The output meter may be connected to the output circuit by connecting one terminal to the plate of the 38 power output tube and the other terminal to the screen grid of the same tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first prong to the left of the filament prongs and the screen grid prong will be the second prong to the left of the filament prongs. Be sure that the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolvtic) in series with one of the leads.

PEAKING I.F. STAGES AT 456 KC.

I. Connect the ground lead of the test oscillator to the chassis frame. Connect a .1 mfd., or larger, condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .1 mfd. condenser is necessary to prevent a short circuit which would remove the bias voltage.

II. Set the test oscillator to 456 kilocycles.

III. Turn the volume control of the receiver on full. Rotate the station selector until the condenser plates are completely meshed and set the band change switch to Band No. 2. Turn the tone control all the way to the left. Be sure the bottom plate of the chassis is securely fastened in place.

IV. (a) Peak both tuning condensers located on top of the 2nd I.F. transformer shown in Fig. 2.
NOTE: Be sure to use the lowest test oscillator output that will give a reasonable scale deflection on the output meter. 20-30 volts output should be sufficient for satisfactory alignment.
(b) Peak both tuning condensers located on top of the 1st I.F. transformer shown in Fig. 2.

V. Repeat operation (IV) to insure accurate adjustment of the I.F. tuning condensers.

PEAKING R.F. CIRCUITS

I. Connecting Test Oscillator To The Receiver:
It is necessary to connect a DUMMY ANTENNA in series with the test oscillator and the antenna terminal of the receiver. On Bands No. 1 and No. 3 this consists of a .0002 mfd. *mica* condenser. On Band No. 2 it consists of a *carbon* resistor of approximately 400 ohms. With the tuning condenser plates completely meshed make certain that the dial pointer is exactly horizontal. If not, loosen the nut and set the pointer horizontal and tighten the nut again. The setting of the band spread pointer is not important.

II. To Peak Band No. 1:
NOTE: Be sure to use the lowest test oscillator output that will give a reasonable scale deflection on the output meter. 20-30 volts output should be sufficient for satisfactory alignment.
(a) Set the band change switch to Band No. 1.
(b) Set the test oscillator to 1400 kilocycles. Rotate the station selector until the dial pointer points to 140 on the dial. Then adjust the oscillator parallel trimmer condenser, Fig. 3, for Band No. 1 for maximum reading on the output meter.
(c) With the same dial setting peak the Ant. and R.F. parallel trimmer condensers for Band No. 1.
(d) Set the test oscillator to 600 kilocycles.
(e) Tune in the 600 kilocycle signal with the station selector, in the region of 60 on the dial, for maximum reading on the output meter.
(f) Close the oscillator series trimmer condenser for Band No. 1, Fig. 3, 1/8 turn and re-tune the station selector to the 600 kilocycle signal for maximum reading on the output meter.
(g) Repeat operation (f) as many times as necessary to obtain the highest reading on the output meter. However, if the meter reads lower after operation (f) open the oscillator series trimmer condenser 1/8 turn and re-tune the station selector to the 600 kilocycle signal, noting the reading on the output meter as above, and repeat as many times as necessary to obtain the highest meter reading. Do not re-set the parallel trimmer condensers at this frequency.
(h) Repeat operations (b) and (c) for more accurate adjustments.

III. To Peak Band No. 2:
(a) Be sure to change the DUMMY ANTENNA as described in (I) under Peaking R.F. Circuits.
(b) Close the oscillator parallel trimmer condenser for Band No. 2 and then open it 2 turns.
(c) Close the R.F. parallel trimmer condenser for Band No. 2 and then open it 1/8 turn.
(d) Close the Ant. parallel trimmer condenser for Band No. 2 and then open it 1/4 turn.
(e) Set the test oscillator to 15 megacycles.
(f) Rotate the station selector until the dial pointer points to 15 on the dial (Band No. 2).
(g) Peak the oscillator parallel trimmer condenser for Band No. 2 on the first signal heard when closing this condenser.

NOTE: To check on the adjustment of the oscillator parallel trimmer condenser.
(1) Increase the output of the test oscillator not more than ten times.
(2) Try to tune in the 15 megacycle signal with the station selector at approximately 14 on the dial.
(3) If the 15 megacycle signal is heard at approximately 14 on the dial in addition to 15 on the dial the oscillator parallel trimmer condenser has been aligned on the correct frequency.

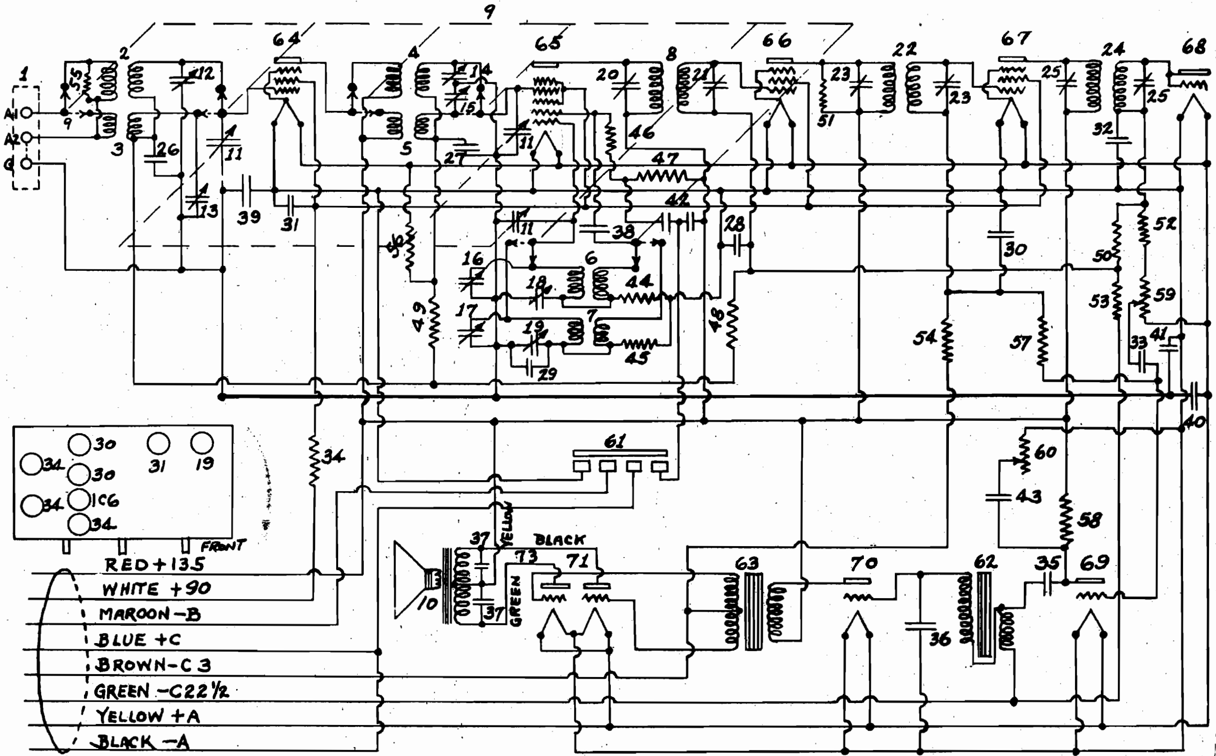
(h) Reduce the output of the test oscillator to the previous output and retune the station selector to the 15 megacycle signal at 15 on the dial.
(i) Close the R.F. parallel trimmer condenser for Band No. 2.
(j) Open the R.F. parallel trimmer condenser for Band No. 2 not more than 1/8 turn and re-tune the station selector to the 15 megacycle signal for maximum output.
(k) Repeat operation (j) as many times as necessary to obtain the highest reading on the output meter on the first peak from the closed position.
(l) Close the Ant. parallel trimmer condenser for Band No. 2.
(m) Open the Ant. parallel trimmer condenser for Band No. 2 not more than 1/8 turn and re-tune the station selector to the 15 megacycle signal for maximum output.
(n) Repeat operation (m) as many times as necessary to obtain the highest reading on the output meter on the first peak from the closed position.

(o) Set the test oscillator to 6 megacycles.
(p) Tune in the 6 megacycle signal with the station selector in the region of 6 on the dial (Band No. 2) for maximum reading on the output meter.
(q) Close the oscillator series trimmer condenser for Band No. 2, Fig. 3, 1/8 turn and re-tune the station selector to the 6 megacycle signal for maximum reading on the output meter.
(r) Repeat operation (q) as many times as necessary to obtain the highest reading on the output meter. However, if the meter reads lower after operation (q) open the oscillator series trimmer condenser 1/8 turn and re-tune the station selector to the 6 megacycle signal, noting the reading on the output meter as above, and repeat as many times as necessary to obtain the highest meter reading. Do not re-set the parallel trimmer condenser at this frequency.
(s) Repeat operations (i), (j) and (k) above in the order given.
(t) Repeat operations (l), (m) and (n) above in the order given.

IV. The circuits of Band No. 3 cannot be aligned as there are no trimmer condensers provided for this band.

MODEL 8B3, Battery 8 AF
Schematic, Parts

CROSLEY RADIO CORP.



1.F. 456 Kc.

Parts List Model 8B3

Figures in first column correspond to figures in diagram

1	G16	—26719	Ant.-Gnd. Term.
2	G3	—32000	L. F. Ant. Trans
3	G28	—32000	H. F. Ant. Trans.
4	G2	—32001	L. F. R. F. Trans
5	G18	—32001	H. F. R. F. Trans.
6	G2	—32002	L. F. Osc. Trans.
7	G21	—32002	H. F. Osc. Trans.
8	G1	—32004	1st I. F. Trans.
9	B	—34094	Band Change Switch
10		—42PM	Speaker
11	G25	—33002	Variable Cond.
12	G1	—33008	L. F. Ant. Trim. Cond.
13			H. F. Ant. Trim. Cond.
14	G9	—33009	L. F. R. F. Trim. Cond.
15			H. F. R. F. Trim. Cond.
16	G18	—33009	L. F. Osc. Trim. Cond.
17			H. F. Osc. Trim. Cond.
18	G20	—33006	L. F. Osc. Series T. C.
19			H. F. Osc. Series T. C.
20	G6	—33006	1st I. F. Pri. T. C.
21			1st I. F. Sec. T. C.
22	G21	—32004	2nd I. F. Trans.
23			Trimmer Cond.
24	G22	—32004	3rd I. F. Trans.
25			Trimmer Cond.
26	W	—32379	.02 Mfd. 200 Volt
27	W	—32379	.02 Mfd. 200 Volt
28	W	—27216	.05 Mfd. 200 Volt
29	G3	—34000	2200 Mmfd.
30	W	—27216	.05 Mfd. 200 Volt
31	W	—28869	2.0 Mfd. 200 Volt
32	W	—27932	.0001 Mfd. 200 Volt
33	W	—27216	.05 Mfd. 200 Volt
34		24814	7000 Ohms
35	W	—29910-A	.25 Mfd. 200 Volt
36	G1	—34004	.00025 Mica Cond.
37	W	—31158	Dual .006 Mfd. 400 Volt
38	W	—25435	.003 Mfd. 400 Volt
39	W	—24049-B	.1 Mfd. 200 Volt
40	W	—29910-A	.25 Mfd. 200 Volt
41	W	—30321-A	1.0 Mfd. 160 Volt
42	W	—33990	Dual 8 Mfd. Elect.
43	W	—27216	.05 Mfd. 200 Volt
44		21875	100,000 Ohms
45		21875	100,000 Ohms
46		21876	10,000 Ohms
47		27121	5,000 Ohms
48		21455	300,000 Ohms
49		21455	300,000 Ohms
50		26577	3 Meg.
51		21455	300,000 Ohms
52		23403	150,000 Ohms
53		33490	10 Meg.
54		21455	300,000 Ohms
55		31094	4,500 Ohms
56		26578	5 Meg.
57		21454	1 Meg.
58		22196	20,000 Ohms
59	W	—34095	Level Control
60	W	—33993-A	Tone Control
61			On-Off Switch
62	G1	—34189	1st Audio Trans.
63	G2	—34189	2nd Audio Trans.
64	G31	—27975	34 Socket
65	G84	—33070	1C6 Socket
66	G31	—27975	34 Socket
67	G31	—27975	34 Socket
68	G9	—33070	30 Socket
69	G9	—27975	30 Socket
70	G14	—27975	31 Socket
71	G44	—27975	19 Socket
72	G3	—29237	Cable & Marker Assem.
73	W	—31009-A	Speaker Cable

MODEL 515,5515,Fiver
Schematic,Socket
Parts

CROSLEY RADIO CORP.

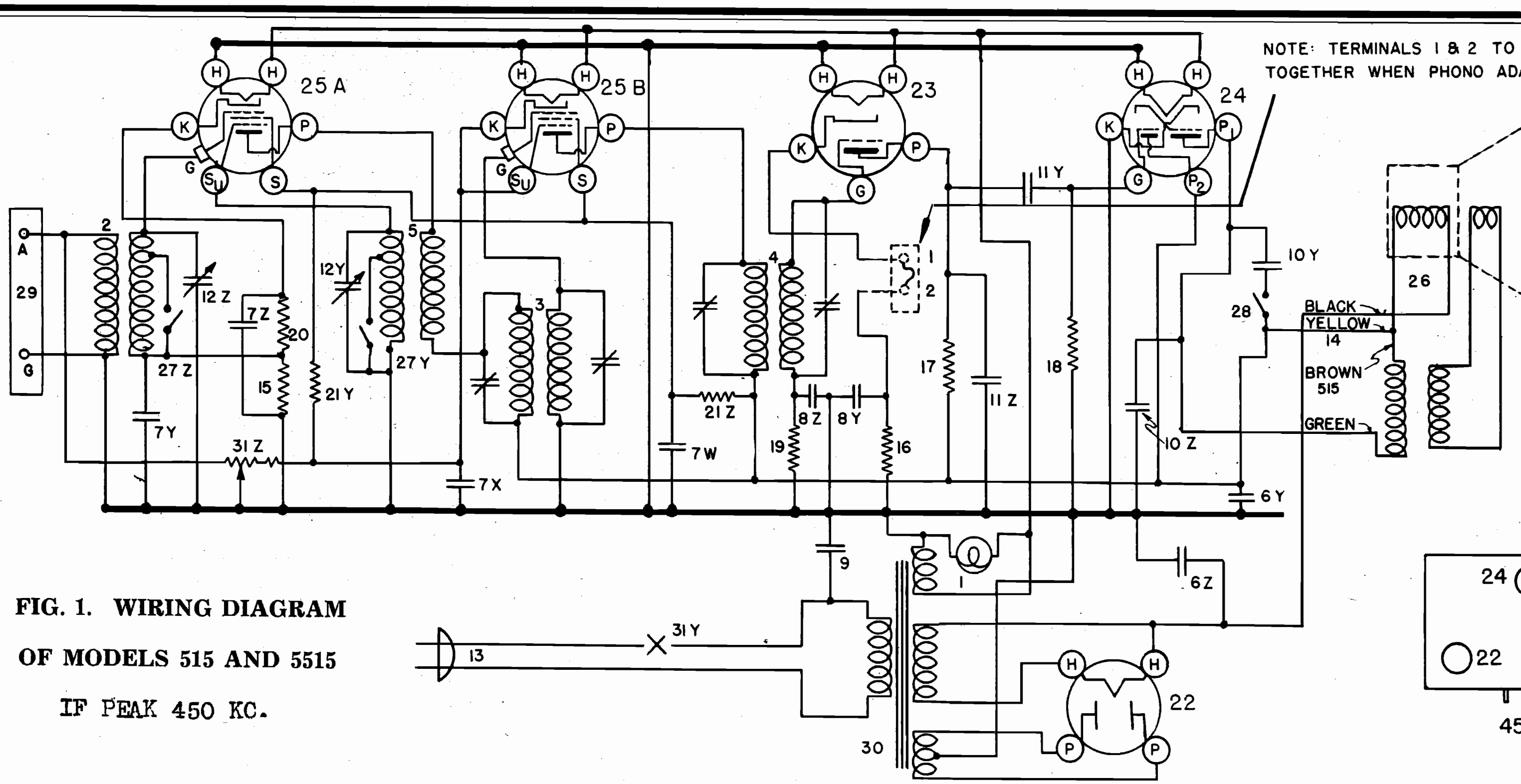
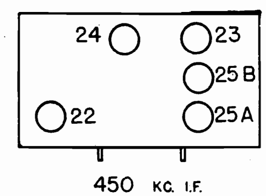


FIG. 1. WIRING DIAGRAM
OF MODELS 515 AND 5515
IF PEAK 450 KC.



OCTOBER 1935

PARTS LIST—MODELS 515 AND 5515

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1	G4 —27134	Dial Light Socket Assembly.
2	G42—32000	Coil Ant.
3	G48—32004	1st. I. F. Trans.
4	G49—32004	2nd. I. F. Trans.
5	G47—32002	Osc. Coil.
6Z, 6Y	W —36719	Condenser, 8 Mfd., 450 Volts. / Condenser, 6 Mfd., 450 Volt.
7Z, 7Y	W —28623	Condenser, 0.02 Mfd. 200 Volt. / Condenser, 0.02 Mfd. 200 Volt.
7X, 7W	W —28623	Condenser, 0.02 Mfd. 200 Volt. / Condenser, 0.02 Mfd. 200 Volt.
8Z, 8Y	W —28622	Condenser, 0.1 Mfd. 200 Volt. / Condenser, 0.1 Mfd. 200 Volt.
9	W —30805	Condenser, 0.01 Mfd. 400 Volt.
10Z, 10Y	W —35011	Condenser, 0.006 Mfd. 400 Volt. / Condenser, 0.03 Mfd. 400 Volt.
11Z, 11Y	W —25537A	Condenser, 0.001 Mfd. 400 Volt. / Condenser, 0.03 Mfd. 400 Volt.
12Z, 12Y	G14—33001	Variable Tuning Condenser Gang.
	—36148	Dial Assembly complete.
13	B —33906A	Cord—Power Supply.
14	G3 —35696	Speaker Cable (5515 only).
15	—31094	Resistor, 4,500 Ohms.
16	—21237A	Resistor, 60,000 Ohms.
17	—21455	Resistor, 300,000 Ohms.
18	—23785	Resistor, 500,000 Ohms.
19	—21454	Resistor, 1 Megohm.
20	W—25937	Resistor, 275 Ohms Flex.
21Z, 21Y	W —35963	Resistor, 8,500 Ohms. / Resistor, 25 000 Ohms.
22	G6 —28807	Socket, 80.
23	G80—28807	Socket, 76.
24	G90—28807	Socket, 6B5.
25A	G75—28807	Socket, 6D6.
25B	G75—28807	Socket, 6D6.
	W —35772	Tube Shield, Half.
	W —35773	Tube Shield Cap.
	W —35774	Tube Shield Base.
26	—219-BL9	Speaker.
27Z, 27Y	W —35753A	Band Change Switch.
28	W —36184A	Tone Control Switch.
29	G1 —26719	Ant. Gnd. Terminal.
30	G5 —28500	Power Transformer, 60 Cy., 110 V.
	G6 —28500	Power Transformer 25 Cy., 110 V.
	G7 —28500	Power Transformer, 25 Cy., 220 V.
31Z, 31Y	—37343	Volume Control. / On-Off Switch.
	B —35917	Escutcheon.
	—37158	Dial Glass.
	—37156	Dial Pointer.
	—37157	Pointer Screw.
	W —31585B	Knob (2) large.
	W —36355	Knob (2) small.

MODEL 515,5515,Fiver
Voltage,Trimmers
Alignment,Chassis

CROSLEY RADIO CORP.

SPECIFICATIONS

The Crosley models 515 and 5515 employ the same chassis. The 515 is a table model with speaker attached and the 5515 is a console model with speaker mounted in the cabinet. It is available or adaptable for operation on A-C lines as follows: 110 V.-60 cycles, 110 V.-25 cycles and 220 V.-25 cycles. It is a two band receiver tuning from approximately 540 to 1570 kilocycles in the broadcast band and from 1570 to 4000 kilocycles in the police and amateur band.

The tubes used are 6D6 Oscillator-Modulator, 6D6 I. F. Amplifier, 76 Detector, 6B5 Output and type 80 Rectifier.

SOCKET VOLTAGES

The tube socket voltages are measured from the socket contacts to the chassis with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given. Filament readings are taken with a low range A. C. voltmeter.

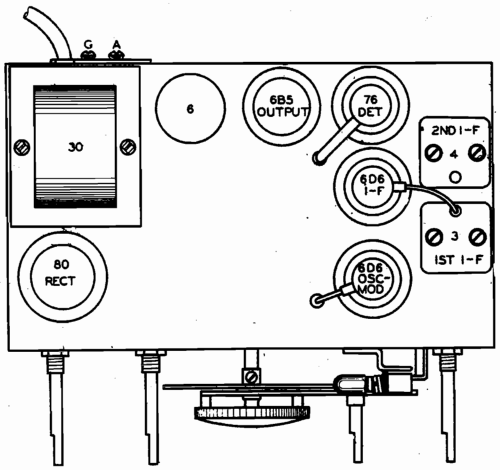


Fig. 2-B. Top View 5515

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	G	P2	K
6D6	Osc-Mod	6.3	210	120	0	28	—	31
6D6	I. F. Amp	6.3	210	120	3	0	—	3
76	Detector	6.3	86	—	—	0	—	8.5
6B5	Output	6.3	200	—	—	0	210	0
80	Rectifier	4.9	280	—	—	—	—	—

Connecting Output Meter.

Connect one terminal of the output meter to P1 and the other terminal to P2 of the 6B5 output tube. Looking at the bottom of the tube with the filament prongs toward you P1 will be the first prong to the left of the filaments and P2 will be next to P1. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Peaking I. F. Stages at 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. series condenser to the top cap of the 6D6 Osc.-Mod. tube, leaving the tube's grid clip in place. KEEP THE GENERATOR LEAD AS FAR AS POSSIBLE FROM THE OTHER S. G. TUBES.

(b) Connect the ground lead of the signal generator to the chassis frame or ground terminal of the receiver.

(c) Set the signal generator to 450 kilocycles.

(d) Rotate the receiver tuning condenser until the rotor plates are completely out of mesh.

(e) Turn the band selector switch to the right hand position. (Short Wave Band).

(f) Turn the volume control of the receiver on full.

(g) With the signal generator set to the lowest usable output level adjust the I. F. trimmer condensers located on top of the I. F. transformers, Fig. 2A&B for maximum output.

NOTE: Make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency. An insulated screw driver should be used to insure accurate adjustments.

2. Aligning R. F. Circuits.

(a) Turn the band selector switch to the left hand position. (Broadcast Band).

(b) Leave the receiver tuning condenser rotor plates completely out of mesh.

(c) Connect the output lead from the signal generator through a .00025 mfd., series condenser to the antenna terminal of the receiver.

(d) Set the signal generator to approximately 1570 kilocycles.

(e) Adjust the trimmer on the "Osc." section of the tuning condenser gang for maximum output. (Fig. 3).

(f) Set the signal generator to 1400 kilocycles.

(g) Tune in the 1400 kilocycle signal with the station selector for maximum output.

NOTE: Do not disturb the setting of the "Osc." trimmer as this is adjusted at 1570 kilocycles only and any further adjustment at this point would affect both the tuning range of the receiver and the tracking of its circuits.

(h) Adjust the trimmer on the "Ant." section of the tuning condenser gang for maximum output.

NOTE: There are no adjustments on this receiver for the Police Band.

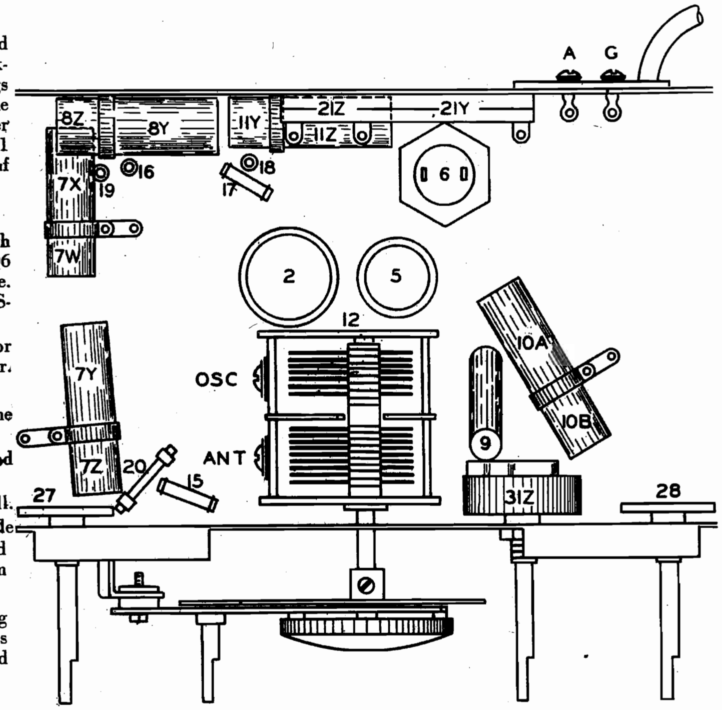


Fig. 3. Bottom View 515 and 5515

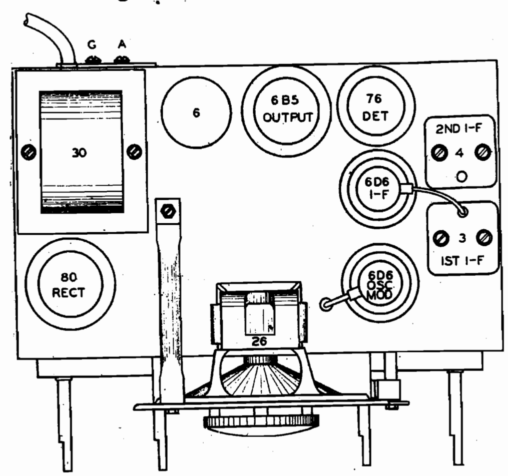


Fig. 2-A. Top View 515

MODEL 525,505
Schematic,Parts

CROSLEY RADIO CORP.

OCTOBER 1935

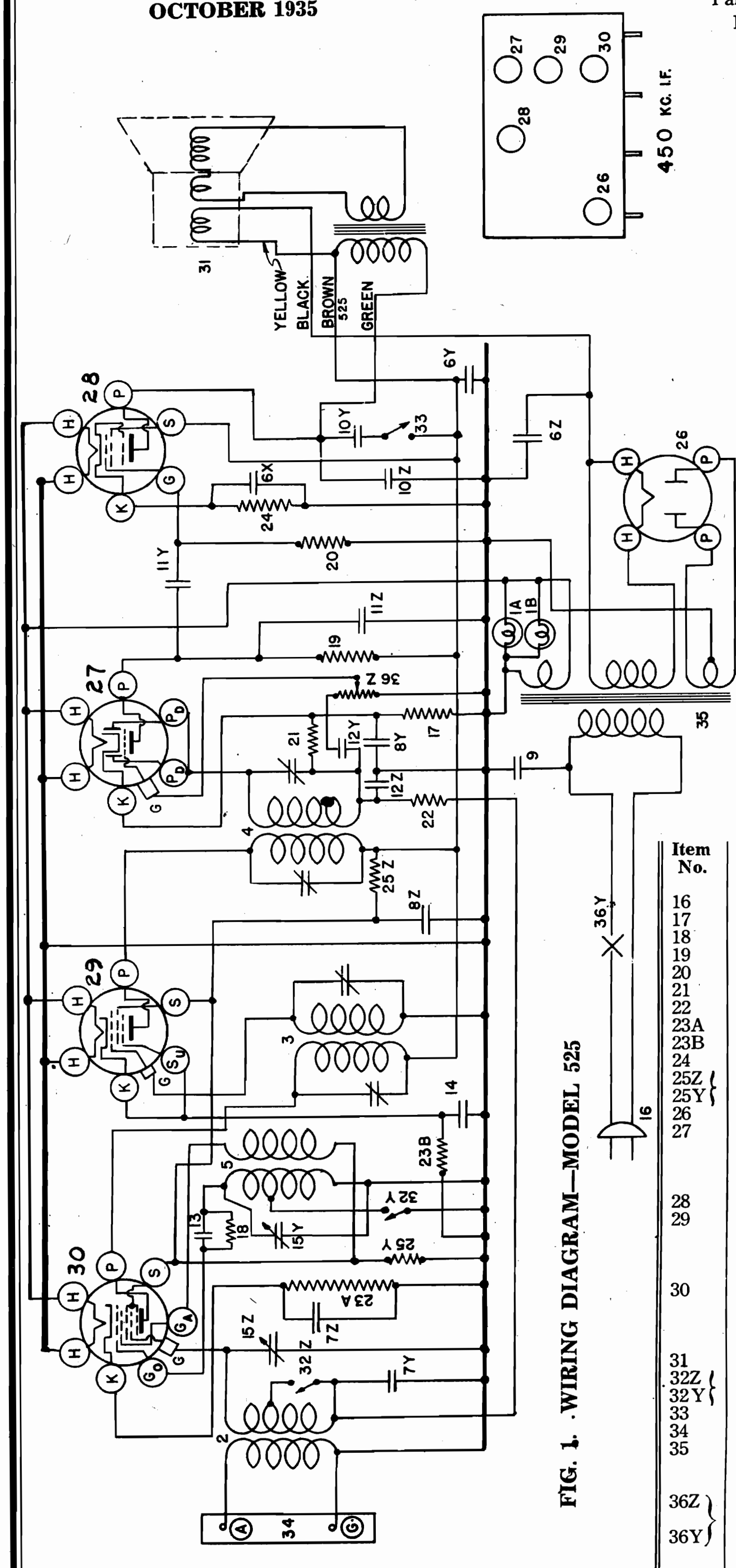


FIG. 1. WIRING DIAGRAM—MODEL 525

PARTS LIST—MODEL 525

Figures in first column refer to parts shown in diagrams.

Part numbers with A. B, etc., following, mean duplicate parts.

Part numbers with Z, Y, X, etc., following, mean parts having multiple sections.

Item No.	Part No.	Description
1A	G4 —27134	Dial Light Bracket Assem
1B	G4 —27134	Dial Light Bracket Assem
2	G42—32000	Coil, Ant. Trans.
	W —30802A	Coil Shield
	W —30026A	Coil Retaining Ring
	W —36178	Coil Insulator
3	G50—32004	Coil, 1st. I. F.
	G3 —31927	Coil Shield
	W —35037A	Coil Insulator
4	G49—32004	Coil, 2nd. I. F.
	G3 —31927	Coil Shield
	W —35037A	Coil Insulator
5	G43—32002	Coil Oscillator
	W —25025B	Coil Shield
	W —21541C	Coil Retaining Ring
	W —26891	Coil Insulator
6Z		Condenser, 8 Mfd. 450 V
6Y	W —35750	Condenser, 6 Mfd. 450 V
6X		Condenser, 12 Mfd. 25 V
7Z	W —28623	Condenser, .02 Mfd. 200 V
7Y		Condenser, .02 Mfd. 200 V
8Z	W —28622	Condenser, 0.1 Mfd. 200 V
8Y		Condenser, 0.1 Mfd. 200 V
9	W —30805	Condenser, .01 Mfd. 400 V
10Z	W —35011	Condenser, .006 Mfd. 400 V
10Y		Condenser, .03 Mfd. 400 V
11Z	W —25537A	Condenser, .001 Mfd. 400 V
11Y		Condenser, .03 Mfd. 400 V
12Z	W —30322A	Condenser, .00017 Mfd.
12Y		Condenser, .006 Mfd.
13	G1 —34002	Condenser, .00025 Mfd.
14	W —28621	Condenser, .02 Mfd. 360
15Z	—35751A	Condenser, 2 Gang Var. R.F.
15Y		Condenser, 2 Gang Var. 450
	—36148	Dial Drive Unit, complete
	—36156	Dial Pointer
	—36157	Dial Pointer Screw
	—36158	Dial Lens
	G16—35757	Dial Drive Mounting Bracket Assem.

Item No.	Part No.	Description
16	B —33906A	Cord, Power Supply
17	—21876	Resistor, 10,000 Ohms
18	—21453	Resistor, 40,000 Ohms
19	—21455	Resistor, 300,000 Ohms
20	—23785	Resistor, 500,000 Ohms
21	—21454	Resistor, 1 Megohm
22	—26577	Resistor, 3 Megohm
23A	—25937	Resistor, 275 Ohms, 1½ Watt Flex.
23B	—25937	Resistor, 275 Ohms, 1½ Watt Flex.
24	W —23907	Resistor, 750 Ohms, 1½ Watt Flex.
25Z	W —35963	Resistor, 8,500 Ohms, 3 Watt
25Y		Resistor, 25,000 Ohms, 3 Watt
26	G6 —28807	Socket 80
27	G41—28807	Socket 75
	W —35774	Tube Shield Base
	W —35772	Tube Shield Half (2 used)
	W —35773	Tube Shield Cap
28	G22—28807	Socket 41
29	G75—28807	Socket 6D6
	W —35774	Tube Shield Base
	W —35772	Tube Shield half (2 used)
	W —35773	Tube Shield Cap
30	G47—28807	Socket 6A7
	W —35774	Tube Shield Base
	W —35772	Tube Shield half (2 used)
	W —35773	Tube Shield Cap
31	—36278	Speaker, 318 BL9
32Z	W —35753A	Switch, Ant.
32Y		Switch, Osc.
33	W —36184A	Switch, Tone Control
34	G10—26719	Terminal, Ant. Gnd.
35	G5 —28500	Transformer, Power, 60 Cy., 110 Volt
	G6 —28500	Transformer, Power, 25 Cy., 110 Volt
	G7 —28500	Transformer, Power, 25 Cy., 220 Volt
36Z	W —36227	Volume Control, 4,800 Ohm, 160 Ohm fixed.
36Y		On-Off Switch
	W —31585B	Knobs
	B —35917	Escutcheon

MODEL 525,505
Voltage,Chassis
Trimmers,Alignment

CROSLEY RADIO CORP.

MODELS 525 AND 505

SPECIFICATIONS

The Crosley models 525 and 505 employ the same chassis. The 525 is a table model with speaker attached and the 505 is a console model with the speaker mounted in the cabinet. It is available or adaptable for operation on A-C lines as follows: 110 V.-60 cycles, 110 V.-25 cycles and 220 V.-25 cycles. It is a two band receiver tuning from approximately 540 to 1570 kilocycles in the broadcast band and from 1570 to 4000 kilocycles in the police and amateur band.

The tubes used are 6A7 Oscillator-Modulator, 6D6 I. F. Ampilfier, 75 Detector, 41 Output and type 80 Rectifier.

SOCKET VOLTAGES

The tube socket voltages are measured from the socket contacts to the chassis with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given. Filaments are measured with a low range A-C Voltmeter.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	G	K	S	Su	Ga	Go
6A7	Osc-Mod	6.3	215	0	3	105	0	105	-4
6D6	I. F. Amp.	6.3	215	0	3	105	3	—	—
75	Detector & A. F. Amp.	6.3	80	0	.75	—	—	—	—
41	Output	6.3	205	0	16	215	—	—	—
80	Rectifier	4.9	280	—	—	—	—	—	—

Measured on 117.5 Volt—60 Cycle Line. Power Consumption Approximately 60 Watts.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can be properly aligned only with the use of a modulated signal generator and an output meter.

Connecting Output Meter.

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 41 output tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs and the screen prong will be next to the plate prong. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Peaking I. F. Stages at 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. series condenser to the top cap of the 6A7 Osc-Mod tube, leaving the tube's grid clip in place. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE OTHER S. G. TUBES.

(b) Connect the ground lead of the signal generator to the chassis frame or ground terminal of the receiver.

(c) Set the signal generator to 450 kilocycles.

(d) Rotate the receiver tuning condenser until the rotor plates are completely out of mesh.

(e) Turn the band selector switch to the right hand position. (Short Wave Band).

(f) Turn the volume control of the receiver on full.

(g) With the signal generator set to the lowest usable output level adjust the I. F. trimmer condensers located on top of the I. F. transformers, Fig. 2A&B for maximum output.

NOTE: Make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency. An insulated screw driver should be used to insure accurate adjustments.

2. Aligning R. F. Circuits.

(a) Turn the band selector switch to the left hand position. (Broadcast Band).

(b) Leave the receiver tuning condenser rotor plates completely out of mesh.

(c) Connect the output lead from the signal generator through a .00025 mfd., series condenser to the antenna terminal of the receiver.

(d) Set the signal generator to approximately 1570 kilocycles.

(e) Adjust the trimmer on the "Osc." section of the tuning condenser gang for maximum output. (Fig. 3).

(f) Set the signal generator to 1400 kilocycles.

(g) Tune in the 1400 kilocycle signal with the station selector for maximum output.

NOTE: Do not disturb the setting of the "Osc." trimmer as this is adjusted at 1570 kilocycles only and any further adjustment at this point would affect both the tuning range of the receiver and the tracking of its circuits.

(h) Adjust the trimmer on the "Ant." section of the tuning condenser gang for maximum output.

NOTE: There are no adjustments on this receiver for the Police Band.

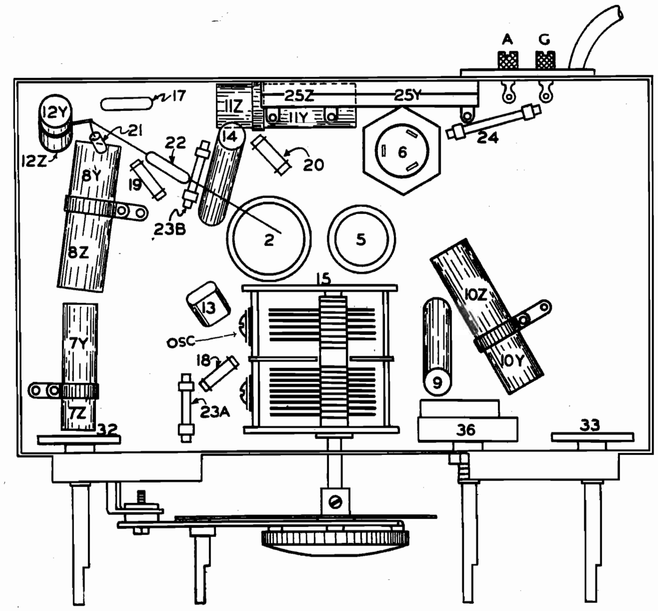


Fig. 3. Bottom View 525 and 505

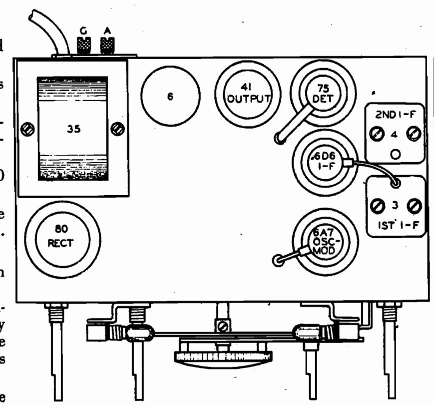


Fig. 2-B. Top View 505

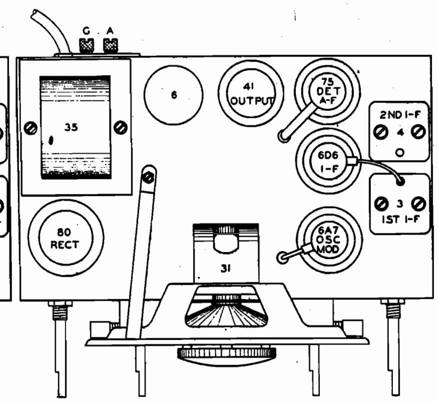


Fig. 2-A. Top View 525

MODEL 534
Schematic
Socket

CROSLEY RADIO CORP.

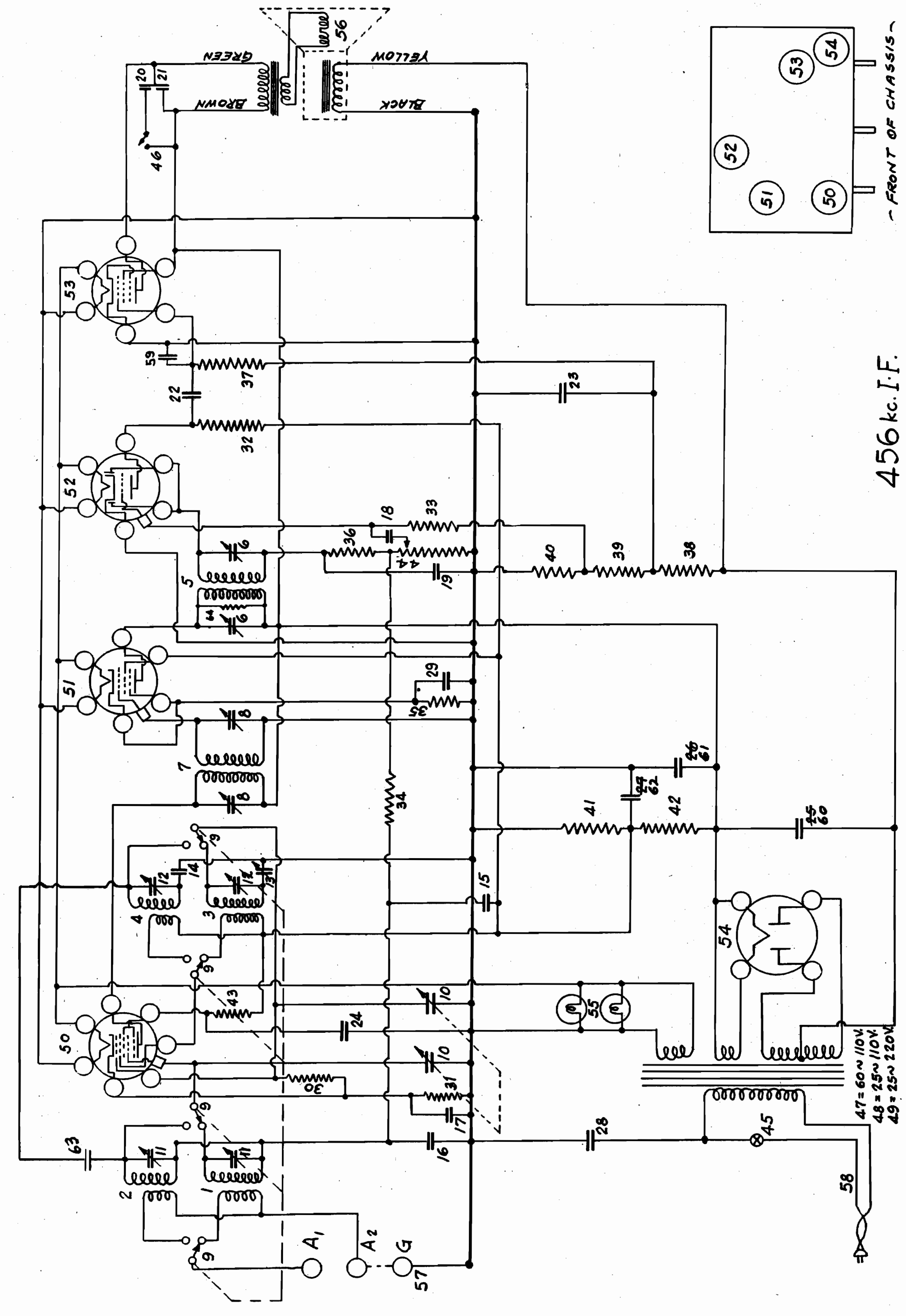


Fig. 1—Wiring Diagram of Model 534

MODEL 534
Chassis, Trimmers
Parts

CROSLEY RADIO CORP.

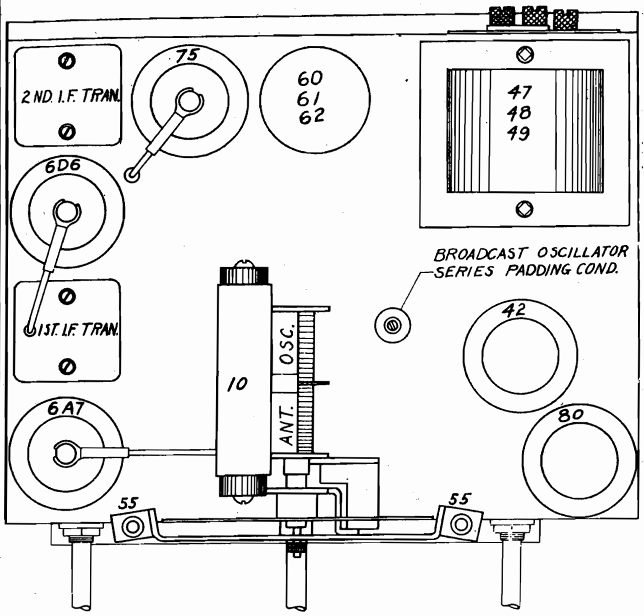


Fig. 2—Top View

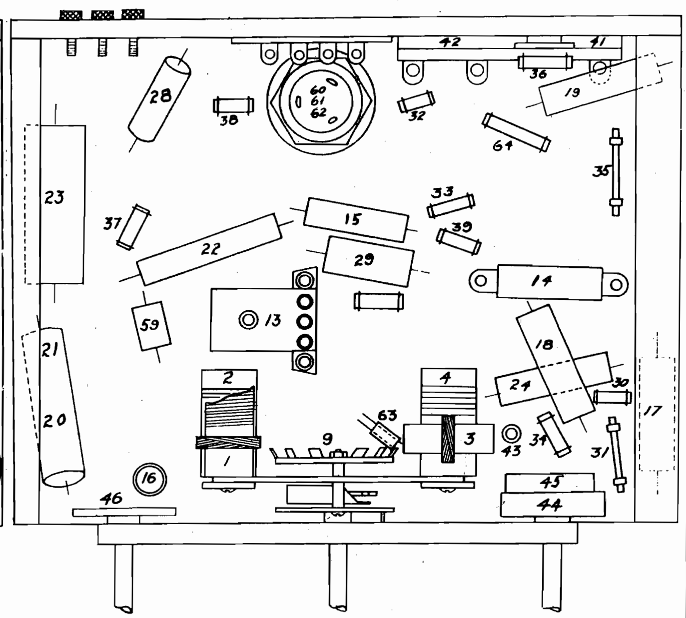


Fig. 4—Bottom View

PARTS LIST—MODEL 534

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1	G39—32000	Low Freq. Ant. Trans.
3	G40—32000	High Freq. Ant. Trans
3	G31—32002	L. F. Osc. Trans.
4	G32—32002	H. F. Osc. Trans
5	G38—32004	2nd I. F. Trans.
6		I. F. Trimmer Cond.
7	G39—32004	1st I. F. Trans.
8		I. F. Trimmer Cond
9	B —35031	4 Pole S. T. Sw.
10	B —35025	Variable Cond. Gang
	G26—32086	Dial Drive Assembly
	W —32008A	Dial Hand
	W —32293	Dial Hand Nuts (2)
11	W —35033	Ant. Trimmer Cond.
12	W —35033	Osc. Trimmer Cond.
13	G10—33005	Series Cond.
14	G12—34000	4725 Mmf. Cond.
15	W —32378	0.01 Mfd. 400 V. Cond.
16	W —32380	0.05 Mfd. 200 V. Cond.
17	W —28621	0.02 Mfd. 200 V. Cond.
18	W —28619	0.006 Mfd. 200 V. Cond.
19	W —27932	0.0001 Mfd. 200 V. Cond.
20	W —35011	0.03 Mfd. 400 V. Cond.
21		0.006 Mfd. 400 V. Cond.
22	W —27216	0.05 Mfd. 200 V. Cond.
23	W —30321A	1.0 Mfd. 160 V. Cond.
24	W —28621	0.02 Mfd. 200 V. Cond.
25		
26	See 60-61-62	
27		
28	W —30805	0.01 Mfd. 400 V. Cond.
29	W —24049B	0.1 Mfd. 200 V. Cond.
30	—21453	40,000 Ohm Resistor
31	W —25937	275 Ohm Flex. Resistor
32	—21455	300,000 Ohm Resistor
33	—26577	3 Megohm Resistor
34	—26577	3 Megohm Resistor
35	W —25937	275 Ohm Flex. Resistor
36	—21455	300,000 Ohm Resistor
37	—23785	500,000 Ohm Resistor
38	—23785	500,000 Ohm Resistor
39	—34018	200,000 Ohm Resistor

Item No.	Part No.	Description
40	—21876	10,000 Ohm Resistor
41	W —31883	25,000 Ohm Resistor
42		8,500 Ohm Resistor
43	—23868	6,500 Ohm Resistor
44	W —35013	Level Control 1 Megohm
45		Power Switch
46	W —34191	Tone Control Switch
47	G8 —28500	Power Trans. 60 Cy. 110 V.
48	G9 —28500	Power Trans. 25 Cy. 110 V.
49	G10—28500	Power Trans. 25 Cy. 220 V.
50	G47—28807	6A7 Socket
	W —27981A	Tube Shield Base
	W —28632A	Tube Shield
51	G75—28807	6D6 Socket
	W —27981A	Tube Shield Base
	B —26009D	Tube Shield
52	G41—28807	-75 Socket
	W —27981A	Tube Shield Base
	W —28632A	Tube Shield
53	G25—28807	-42 Socket
54	G6 —28807	-80 Socket
55	W —4099A	6-8 V. Dial Lamp
	G4 —27134	Light Bracket Assem. (2)
56	—318BL	Speaker
	G5 —31128	Speaker Term. Board
	W —34627	Insulator
	W —34628	Term. Board Cover
57	G16—26719	Ant. Gnd. Terminal
58	B —33905	Power Cable & Plug
59	G1 —34002	0.00025 Mfd. (Mica)
60	B —30059C	8. Mfd. 450 V.) Condenser
61		8. Mfd. 450 V.)
62		8 Mfd. 250 V.)
63	G31—34403	1.0 Mmf.
64	—21454	1 Megohm Resistor
	B —35034	Chassis End (2)
	W —31157B	Knob (1) Station Selector
	W —33991	Knob (1) Band Change
	W —31585B	Knob (2) (Tone Control & Volume Control)

CROSLEY RADIO CORP.

APRIL, 1935 — MODEL 534

SPECIFICATIONS

The Crosley Model 534 chassis is a five tube superheterodyne receiver designed for A. C. operation. It employs a tuned antenna circuit which covers from 535 kilocycles to 1730 kilocycles on the broadcast band and from 5.3 megacycles to 15.7 megacycles on the short wave band, automatic volume control, two step tone control and class "A" pentode audio amplification.

TUBES AND VOLTAGE LIMITS

The following are the tubes and voltages measured from the tube contact to chassis with a 500,000 ohm 500 Volt voltmeter with the receiver in operating condition but with no signal to the antenna, and with a line voltage of 117.5 volts. Voltage limits are plus or minus 10% of values given.

TUBE VOLTAGES—MODEL 534

Type	Where Used	Ef	Ep	Esg	Esup	Ek	Eg
6A7	Osc. Mod.	6.3	100	70	2.5	2.5	0
6D6	I. F. Amp.	6.3	205	100	3.0	3.0	0
75	Diode and A. F.	6.3	50	—	0	0	x
42	Output	6.3	195	205	—	0	-8
80	Rect.	4.9	—	—	—	—	—

VOLTAGE ACROSS SPEAKER FIELD 53 VOLTS.
x INDICATES HIGH RESISTANCE IN THE CIRCUIT WHICH PREVENTS ACCURATE MEASUREMENT.
ALL MEASUREMENTS MADE WITH A 1000 OHM PER VOLT VOLTMETER FROM CHASSIS.

(The power consumption at 117.5 volts is approximately 95 watts).

CIRCUIT DESCRIPTION

The circuit consists of a tuned antenna stage, an oscillator-modulator stage, one stage of I.F. amplification, diode detector and A.V.C., A.F. amplifier and power supply. The oscillator-modulator stage uses a Type 647 tube and the I. F. stage uses a Type 6D6 tube. The A.V.C., second detector and first stage of audio amplification are combined in a type 75 tube. The output stage uses a single Type 42 tube and the power supply uses a Type 80 tube.

PEAKING PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and will not need readjustment unless some coil or condenser has been replaced. Do not change the setting of any trimmer condenser unless it is definitely known that the adjustment is necessary. If realignment is found necessary, the circuits can be properly adjusted only with the use of a modulated test oscillator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate of the Type 42 tube and the other terminal to the screen grid of the Type 42 tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs and the screen grid prong will be next to the plate prong. Be sure that the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger) in series with one of the leads.

PEAKING I.F. STAGES AT 456 Kc.

NOTE: Be sure speaker is connected before turning on receiver.

I. Connect the ground lead of the test oscillator to the chassis frame. Connect a .1 mfd., or larger, condenser in series with the other lead and connect this lead to the grid cap of the Type 6A7 tube, leaving the tube's grid clip in place. The .1 mfd. condenser is necessary to prevent a short circuit which would remove the bias voltage.

II. Set the test oscillator at 456 kilocycles.

III. Turn the volume control of the receiver on full. Turn the tuning condenser until the plates are completely meshed and turn the band selector switch to the right. Turn the tone control to the left.

IV. (a) Peak both I.F. tuning condensers located on top of the 2nd I.F. transformer (Fig. 2). NOTE: Be sure to use the lowest oscillator output that will give a reasonable scale deflection on the output meter. 20 to 60 volts output is satisfactory.

(b) Peak both I.F. tuning condensers located on top of the 1st I.F. transformer (Fig. 2).

V. Repeat operation IV to insure accurate adjustment of the I.F. tuning condensers.

PEAKING R.F. CIRCUITS

Connecting test oscillator to receiver: It is necessary to connect a dummy antenna in series with the test oscillator and the antenna terminal of the receiver. On the Broadcast Band this consists of a .0002 mfd. *mica* condenser and on the Short Wave Band it consists of a *carbon* resistor of approximately 400 ohms. With the tuning condenser plates completely meshed make certain that the dial pointer is exactly horizontal.

I. To Peak The Broadcast Band: See NOTE in IV (a) under peaking I.F. Stages, also Fig. 3 for location of parallel trimmer condensers and Fig. 2 for location of oscillator series trimmer (or padding) condenser.

(a) Set test oscillator at 1400 kilocycles. Tune the station selector until the dial pointer points to 140 on the dial. Then adjust the oscillator parallel trimmer condenser (Broadcast Band) for maximum output.

(b) With the same dial setting peak the antenna parallel trimmer condenser for the Broadcast Band.

(c) Set the test oscillator at 600 kilocycles.

(d) Tune in the 600 kilocycle signal with the station selector in the region of 60 on the dial, for maximum reading on the output meter.

(e) Close the oscillator series padding condenser (Broadcast Band), Fig, 2, 1/8 turn and re-tune the station selector to the 600 kilocycle signal for maximum output, noting the reading on the output meter.

(f) If the meter reads higher after operation (e) repeat the operation again and again until no further improvement in the reading of the output meter can be obtained. If the meter reads lower after operation (e) open the oscillator series trimmer condenser 1/8 turn and re-tune the station selector to the 600 kilocycle signal, noting the reading on the output meter as above and repeat as many times as necessary to obtain the highest meter reading. Do not reset the parallel trimmer condensers at this frequency.

(g) Repeat operations (a) and (b) for more accurate adjustments.

II. To Peak The Short Wave Band:

(a) Be sure to change the dummy antenna as described above.

(b) Close the oscillator parallel trimmer condenser (Short Wave Band) and then open three turns.

(c) Close the antenna parallel trimmer condenser (Short Wave Band) and then open 1/2 turn.

(d) Tune the station selector to 15 megacycles (15 on the dial).

(f) Peak the oscillator parallel trimmer condenser on the first signal heard when closing the condenser.

NOTE: To check on the adjustment of the oscillator parallel trimmer condenser:

(1) Increase the test oscillator output not more than ten times.

(2) Try to tune in the 15 megacycle signal with the station selector tuned to approximately 14 on the dial.

(3) If the 15 megacycle signal is heard at approximately 14 on the dial in addition to 15 on the dial the oscillator parallel trimmer condenser has been aligned on the correct frequency.

(g) Reduce the output from the test oscillator to the previous output and re-tune the station selector to 15 megacycles at 15 on the dial.

(h) Peak the antenna parallel trimmer condenser for the Short Wave Band for maximum output, then re-tune the station selector again for maximum output.

(i) Repeat the two operations in (h) as many times as necessary to obtain the highest reading on the output meter.

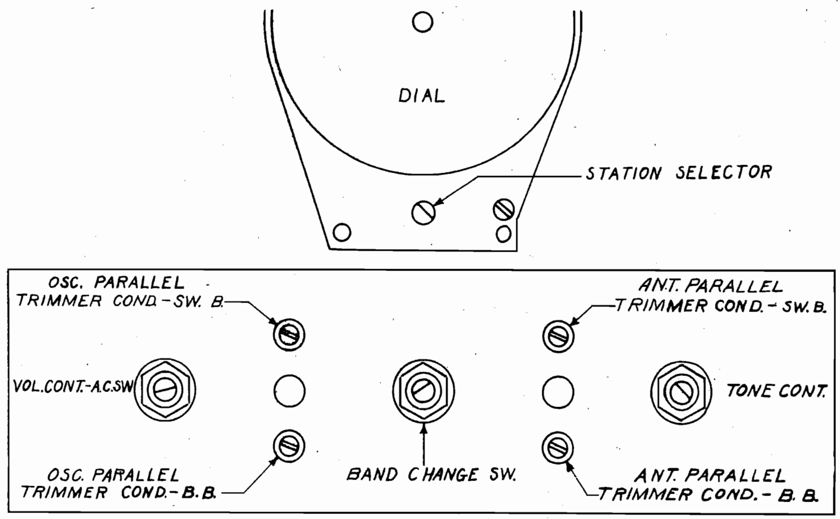
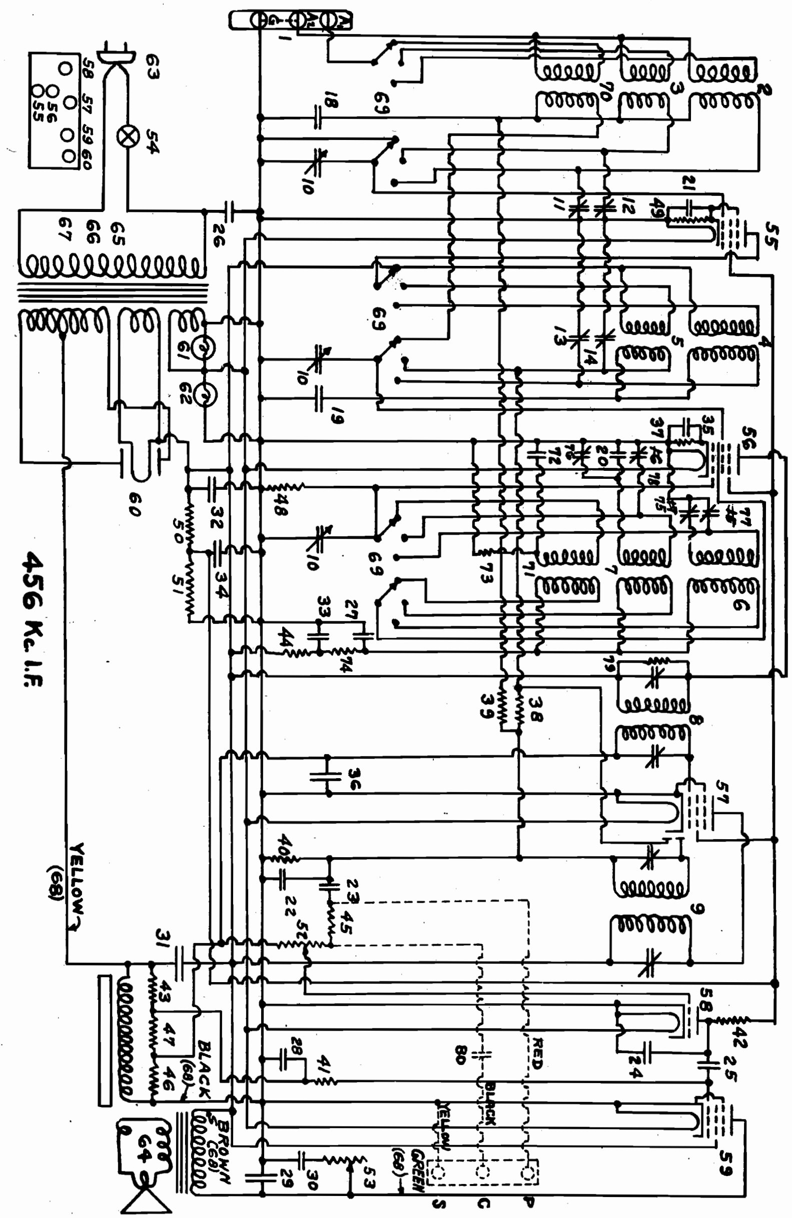


Fig. 3—Front View

MODEL 6H3, 614
Schematic, Socket
Parts

CROSLEY RADIO CORP.



Parts List Model 6H3

Figures in first column correspond to figures in diagram

1	G16	—26719	Ant. Gnd. Term.
2	G3	—32000	L. F. Ant. Coil
3	G1	—32002	H. F. Ant. Coil
4	G2	—32001	L. F. R. F. Coil
5	G1	—32001	H. F. R. F. Coil
6	G2	—32002	L. F. Osc. Coil
7	G1	—32002	H. F. Ocs. Coil
8	G18	—32004	1st I. F. Trans.
9	G19	—32004	Diode Trans.
19	G19	—33002	Variable Cond.
11	G1	—33008	L. F. Ant. Trimmer
12			H. F. Ant. Trimmer
13	G1	—33008	L. F. R. F. Trimmer
14			H. F. R. F. Trimmer
15			
16			
17			
18	W	—32379	0.02 Mfd. 200 Volt
19	W	—32379	0.02 Mfd. 200 Volt
20	W	—32304	1400 Mmfd. H. F.
21	W	—32379	0.02 Mfd. 200 Volt
22	W	—30322-A	.00017 Mfd. 200 Volt
23			.006 Mfd. 200 Volt
24	W	—25537-A	.001 Mfd. 400 Volt
25			.03 Mfd. 400 Volt
26	W	—30805	0.01 Mfd. 400 Volt
27	W	—32378	0.01 Mfd. 400 Volt
28	W	—30321-A	1.0 Mfd. 160 Volt
29	W	—25517-A	.008 Mfd. 400 Volt
30			0.05 Mfd. 400 Volt
31	W	—26194-B	12 Mfd. 475 Volt
32	W	—29097-D	8 Mfd. 450 Volt (Red)
33			8 Mfd. 450 Volt (Green)
34			8 Mfd. .250 V. (No Code)
35	W	—32379	0.02 Mfd. 200 Volt
36	W	—29910-A	0.25 Mfd. 200 Volt
37	W	—28589	350 Ohms
38		26577	3-Megohm
39		26577	3-Megohm
40		21454	1-Megohm
41		23785	500,000 Ohms
42		23403	150,000 Ohms
43		23785	500,000 Ohms
44		21876	10,000 Ohms
45		23785	500,000 Ohms
46		22831	15,000 Ohms
47		21875	100,000 Ohms
48		21453	40,000 Ohms
49	W	—21964	165 Ohms
50	W	—31883	8,500 Ohms
51			25,000 Ohms
52	W	—28552	Level Control
53	W	—25594-B	Tone Control
54			S. P. S. T. Line Switch
55	G75	—27456	6D6 Socket
56	G47	—27456	6A7 Socket
57	G48	—27456	6B7 Socket
58	G80	—27456	76 Socket
59	G25	—27456	42 Socket
60	G6	—27456	80 Socket
61	W	—4099-A	6 V. Dial Light
62	W	—4099-A	6 V. Dial Light
63	B	—33905	Cable & Plug
64		318-B	Speaker
65	G6	—30745	Power Trans. 60 Cy.
66	G7	—30745	Power Trans. 25 Cy. 110 Volt
67	G8	—30745	Power Trans, 25 Cy. 220 Volt
68	W	—31007-A	Speaker Cord
69	B	—34427-A	Band Change Switch
70	G31	—32000	3rd Ant. Coil
71	G24	—32002	3rd Osc. Coil
72	G7	—34000	1450 Mmfd.
73	W	—24990	25,000 Ohms
74		22831	15,000 Ohms
75	G2	—33007	L. F. Osc. Series Cord
76			H .F. Osc. Series Cord
77	G9	—33009	L. F. Osc. Trimmer
78			H. F. Osc. Trimmer
79		23785	500,000 Ohms
80	W	—23191-A	.01 Mfd. 400 V. (For. Only)

MODEL 635, Buccaneer
Schematic, Voltage
Socket, Data

CROSLEY RADIO CORP.

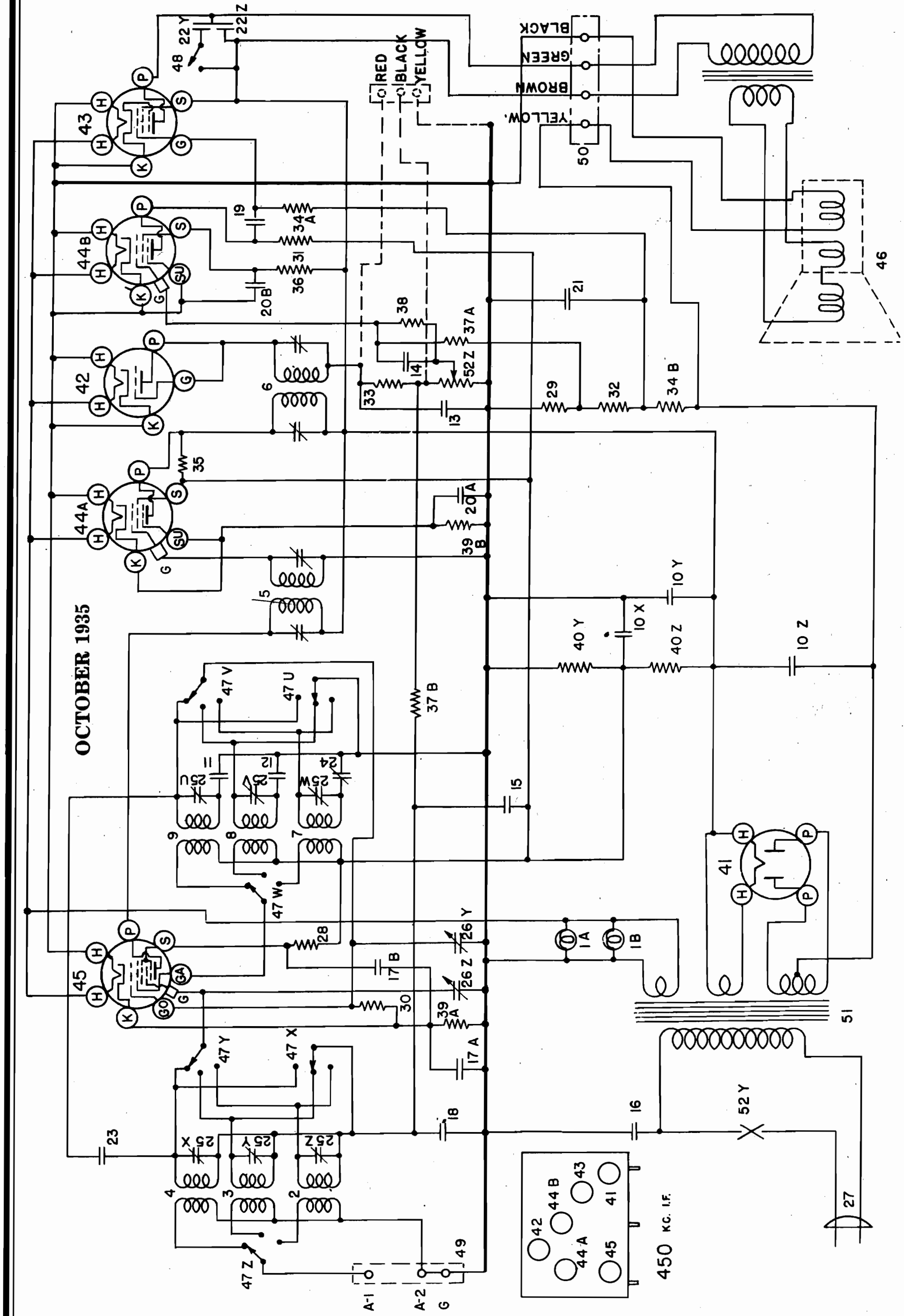
SPECIFICATIONS

The Crosley Model 635 radio is a six-tube superheterodyne receiver and is available or adaptable for operation on A-C lines as follows: 100 V.-60 cycles, 110 V.-25 cycles and 220 V.-25 cycles. It is a three band receiver tuning from 540 to 1700 kilocycles in the broadcast band, 1700 to 5200 kilocycles in the police and amateur band, and 5400 to 15,300 kilocycles in the high frequency band.

The tubes used are: 6A7 Oscillator-Modulator, 6D6 I. F. Amplifier, 76 Detector and AVC, 6D6 A. F. Amplifier, 42 Output and type 80 Rectifier.

SOCKET VOLTAGES

The tube socket voltages are measured from the socket contacts to the chassis with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given.



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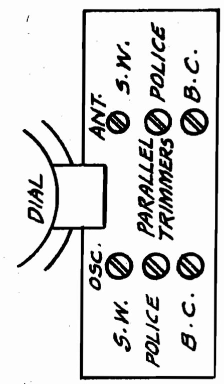


FIG. 4 - FRONT VIEW

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	G	Go	Ga	K
6A7	Osc-Mod	6.3	220	80	—	0	-4 to -10	105	2.5
6D6	I. F. Amplifier	6.3	220	105	3.3	0	—	—	3.3
76	Diode Detector	6.3	—	—	—	—	—	—	0
6D6	A. F. Amplifier	6.3	20	20	0	1.0	—	—	0
42	Output	6.3	210	220	—	8.0	—	—	0
80	Rectifier	4.9	220	—	—	—	—	—	—

Measured on 117.5 Volt—60 Cycle Line. Power Consumption Approximately 60 Watts.

MODEL 635, Buccaneer
Alignment, Chassis
Parts

CROSLEY RADIO CORP.

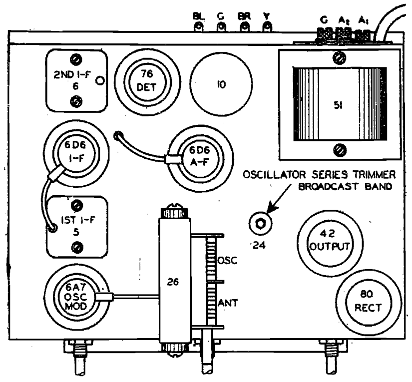


Fig. 2. Top View 635

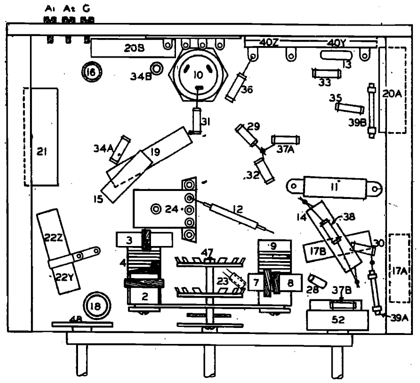


Fig. 3 Bottom View 635

PARTS LIST—MODEL 635

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1A	G4 —27134	Dial Light Bracket Assembly.
1B	G4 —27134	Dial Light Bracket Assembly.
2	G39—32000	Coil, Ant. Trans. 540-1725 Kc.
3	G43—32000	Coil, Ant. Trans. 1.7-5.2 Mc.
4	G40—32000	Coil, Ant. Trans. 5.3-15.5 Mc.
5	G39—32004	Coil, 1st. I. F. Trans.
	G4 —31927	Coil Shield Assembly.
6	G38—32004	Coil 2nd. I. F. Trans.
	G4 —31927	Coil Shield Assembly.
7	G34—32002	Coil, Osc. 540-1725 Kc.
8	G35—32002	Coil, Osc. 1.7-5.2 Mc.
9	G32—32002	Coil, Osc. 5.3-15.5 Mc.
10Z	B —30059-C	Condenser, 8 Mfd. 450 Volts.
10Y	B —30059-C	Condenser, 8 Mfd. 450 Volts.
10X	B —30059-C	Condenser, 8 Mfd. 250 Volts.
11	G12—34000	Condenser, 4725 Mmf.
12	G7 —34000	Condenser, 1450 Mmf.
13	G2 —34002	Condenser, 0.0001 Mfd. 200 Volt.
14	W —28619	Condenser, 0.006 Mfd. 200 Volt.
15	W —32378	Condenser, 0.01 Mfd. 400 Volt.
16	W —30805	Condenser, 0.01 Mfd. 400 Volt.
17A	W —28621	Condenser, 0.02 Mfd. 200 Volt.
17B	W —28621	Condenser, 0.02 Mfd. 200 Volt.
18	W —32380	Condenser, 0.05 Mfd. 200 Volt.
19	W —27216	Condenser, 0.05 Mfd. 200 Volt.
20A	W —24049B	Condenser, 0.1 Mfd. 200 Volt.
20B	W —24049B	Condenser, 0.1 Mfd. 200 Volt.
21	—30321A	Condenser, 1.0 Mfd. 160 Volt.
22Z	W —35011	Condenser, 0.006 Mfd. 400 Volt.
22Y	W —35011	Condenser, 0.03 Mfd. 400 Volt.
23	G49—34403	Condenser, 1.0 Mmf.
24	G10—33005	Condenser, Var. 540-1725 Kc.
25Z, 25Y, 25X	W —35951	Trimmer Condenser Assembly.
25W, 25V, 25U	W —35951	Trimmer Condenser Assembly.
26Z, 26Y	B —35025	Condenser, Variable Tuning Gang
	G29—32086	Dial Drive Assembly.
27	B —33905	Cord, Power Supply.
28	—35934	Resistor, 6,500 Ohms.
29	—22831	Resistor, 15,000 Ohms.
30	—21454	Resistor, 40,000 Ohms.
31	—21875	Resistor, 100,000 Ohms.

Item No.	Part No.	Description
32	—34018	Resistor, 200,000 Ohms.
33	—21455	Resistor, 300,000 Ohms.
34A	—23785	Resistor, 500,000 Ohms.
34B	—23785	Resistor, 500,000 Ohms.
35	—21454	Resistor, 1 Megohm.
36	—34883	Resistor, 2 Megohm.
37A	—26577	Resistor, 3 Megohm.
37B	—26577	Resistor, 3 Megohm.
38	—26578	Resistor, 5 Megohm.
39A	W —25937	Resistor, 275 Ohm, ½ Watt.
39B	W —25937	Resistor, 275 Ohm, ½ Watt.
40Z	W —35963	Resistor, 8,500 Ohm, 3 Watt.
40Y	W —35963	Resistor, 25,000 Ohm, 3 Watt.
41	G6 —28807	Socket, 80.
42	G80—28807	Socket, 76.
	W —35774	Shield Base.
	W —35772	Shield Half (2 used).
	W —36280	Shield Cap.
43	G25—28807	Socket, 42.
44A	G75—28807	Socket, 6D6.
44B	G75—28807	Socket, 6D6.
	W —35774	Shield Base.
	W —35772	Shield Half (2 used)
	W —35773	Shield Cap.
45	G47—28807	Socket, 6A7.
	W —35774	Shield Base.
	W —35772	Shield Half (2 used).
	W —35773	Shield Cap.
46	—318BL	Speaker.
47	B —35935	Switch, Band Change.
48	W —35937	Switch, Tone Control.
49	G16—26719	Terminal, Ant.-Grd.
50	G5 —31128	Terminal, Speaker.
51	G8 —28500	Transformer, Power, 60 Cy., 110 Volt.
	G9 —28500	Transformer, Power, 25 Cy., 110 Volt.
	G10—28500	Transformer, Power, 25 Cy., 220 Volt.
52Z	—35938	Volume Control, 1 Megohm.
52Y	—35938	On-Off Switch.
	W —36492	Knobs.
	W —36831A	Knob (Tail).
	B —36560	Escutcheon.
	W —36563	Glass.
	C —35946	Dial only.
	W —37198	Dial Hand.
	W —32293	Dial Hand Nut.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can be properly aligned only with the use of a modulated signal generator and an output meter.

Connecting Output Meter.

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 output tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filaments and the screen prong will be next to the plate prong. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger —not electrolytic) in series with one of the leads.

1. Peaking I. F. Stages at 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE OTHER S. G. TUBES.

(b) Turn the tuning condenser rotor plates until they are completely meshed.

(c) Turn the band selector switch to the short wave band (extreme left hand position).

(d) Set the signal generator to 450 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I. F. transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I. F. transformer for maximum output.

(g) Using the lowest signal generator output that will give a reasonable scale deflection on the output meter repeat operations (e) and (f) as many times as necessary to obtain the maximum output.

2. Peaking R. F. Circuits—Broadcast Band (540 to 1700 K. C.)

(a) Connect the output of the signal generator through a .00025 mfd. condenser to the "Ant" terminal of the receiver.

(b) Turn the tuning condenser rotor plates until they are COMPLETELY OUT OF MESH.

(c) Turn the band selector switch to the broadcast band (extreme right hand position).

(d) Set the signal generator at 1720 kilocycles.

(e) Adjust the oscillator parallel trimmer (broadcast band) for maximum output.

(f) Set the signal generator at 1400 kilocycles.

(g) Tune-in the 1400 kilocycles signal with the station selector.

(h) Adjust the antenna parallel trimmer (broadcast band) for maximum output.

(i) Using the lowest signal generator output that will give a reasonable output meter reading, repeat operations (g) and (h) until no further increase in output can be obtained.

(j) Set the signal generator to 600 kilocycles.

(k) Tune-in the 600 kilocycle signal with the station selector in the region of 60 on the dial, for maximum reading on the output dial.

(l) Adjust the oscillator series trimmer, (Fig. 2) while rocking the condenser gang plates back and forth slightly, until no further increase in output can be obtained.

(m) Repeat operations (g) and (h) for more accurate adjustments.

3. Peaking R. F. Circuits—Police Band (1700 to 5000 K. C.)

(a) Turn the band selector switch to the police band (middle position).

(b) Set the signal generator to 5000 kilocycles. (5.0 megacycles).

(c) Turn the station selector to 5 on the police band.

(d) Adjust the oscillator parallel trimmer (P. Band) for maximum output.

(e) Adjust the antenna parallel trimmer (P. Band) for maximum output.

4. Peaking R. F. Circuits—Short Wave Band (5.4 to 15 Meg.)

(a) Replace the .00025 mfd. condenser which is being used in series with the output lead of the signal generator with a 400 ohm carbon resistor.

(b) Turn the band selector switch to the short wave band (left hand position).

(c) Set the signal generator to 15 megacycles.

(d) Close the Oscillator parallel trimmer (S-W Band) and then open three turns.

(e) Close the Antenna parallel trimmer (S-W Band) and then open ½ turn.

(f) Turn the station selector to 15 on the dial (S-W Band.)

(g) Peak the oscillator parallel trimmer (S-W Band) on the FIRST signal heard when closing the condenser. In making this adjustment care should be taken not to use too much output from the signal generator to avoid setting the oscillator circuit on the wrong frequency.

NOTE: Check on the adjustment of the S-W Band oscillator parallel trimmer as follows:

1. Increase the signal generator output not more than ten times.

2. Try to tune-in the 15 megacycles signal with the station selector at approximately 14 on the dial.

3. If the 15 megacycle signal can be heard at approximately 14 and 15 both on the dial the oscillator parallel trimmer has been aligned on the correct frequency. It should be noted, however, that the signal tuned in at 15 on the dial should be much stronger than the signal heard at 14. If this condition is not found it will be necessary to repeat operation (g).

(h) Reduce the output of the signal generator to the previous output and retune the station selector to 15 megacycles at 15 on the dial.

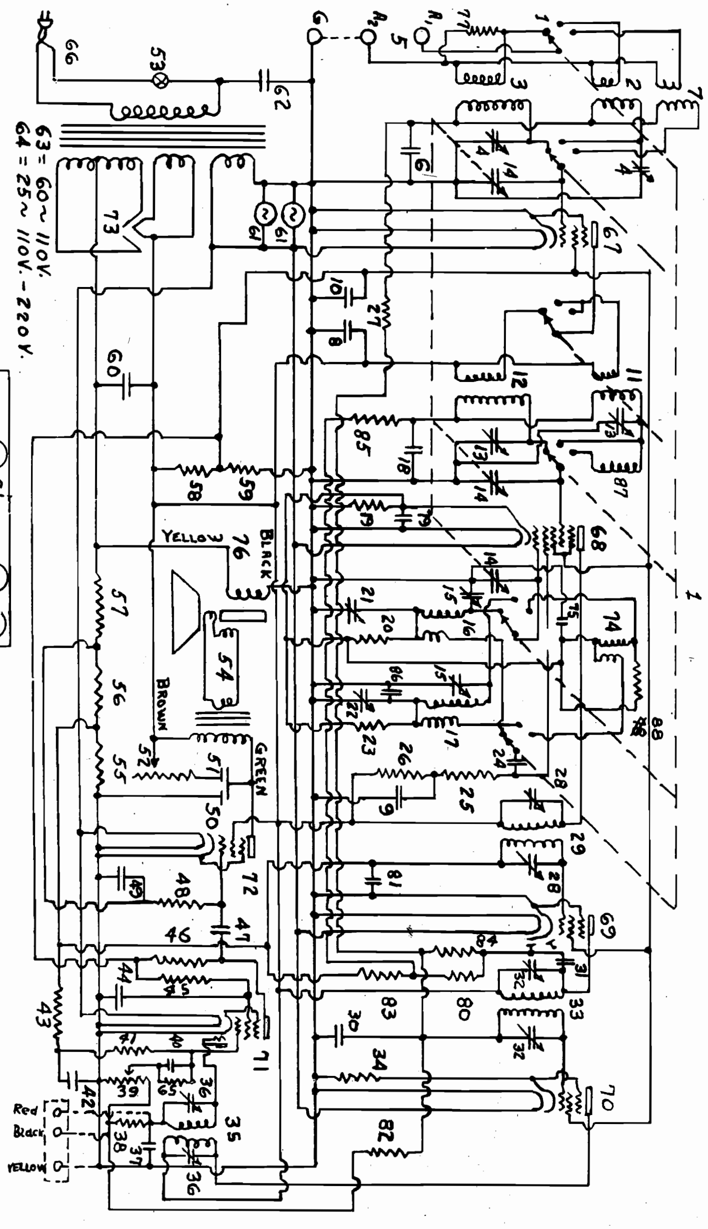
(i) Adjust the antenna parallel trimmer (S-W Band) for maximum output, then re-tune the station selector for maximum output.

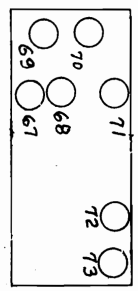
(j) Repeat the two operations in (i) as many times as necessary to obtain the maximum output.

NOTE: On the band selector switch there is a small eyelet soldered to one of the connecting lugs. This eyelet, item No. 23, is used as a small condenser the capacity of which is formed by inserting an insulated wire into the sleeve of the eyelet. If a new band selector switch is installed care should be taken to see that the "capacity wire" is inserted into the sleeve of the eyelet. This insulated wire should be passed through the eyelet and a slight hook made in the end to prevent it from pulling out. (See Fig. 3)

MODEL 714
Schematic, Socket
Parts

CROSLEY RADIO CORP.





456 Kc. I.F.

Parts List Model 714

Figures in first column correspond to figures in diagram

1	B	—34443-A	Band Change Switch	46		21875	100,000 Ohms
2	G28	—32000	6 Pole 3 Throw / H. F. Ant. Coil	47	W	—27216	.05 Mfd. 200 Volt
3	G3	—32000	L. F. Ant. Coil	48		23785	500,000 Ohms
4	G1	—33008	Ant. Trimming Cond.	49	W	—30321	1.0 Mfd. 160 Volt
5	G16	—26719	Ant.-Gnd. Term.	50	W	—31052	.004 Mfd. 400 Volt
6	W	—32379	.02 Mfd. 200 Volt	51			.05 Mfd. 400 Volt
7	G31	—32000	Pol. Ant. Coil	52	W	—32063	Tone Control
8			8 Mfd. 450 Volt (Red)	53			S. P. S. T. Switch
9	W	—29097-D	8 Mfd. 450 Volt (Green)	54		411C	Speaker
10			8 Mfd. 250 Volt (No Code)	55		33390	30,000 Ohms
11	G18	—32001	H. F.-R. F. Coil	56		23403	150,000 Ohms
12	G2	—32001	L. F.-R. F. Coil	57		21454	1 Meg.
13	G9	—33009	R. F. Trimmer Cond.	58	W	—31361	7,000 Ohms
14	G18	—33002	Variable Condenser	59			11,000 Ohms
15	G2	—33009	Osc. Trimming Cond.	60	W	—26194-B	12 Mfd. 475 Volt
16	G2	—32002	L. F. Osc. Coil	61	W	—4099-A	6-8 V. Dial Light
17	G21	—32002	H. F. Osc. Coil	62	W	—30805	.01 Mfd. 400 Volt
18	W	—32380	.05 Mfd. 200 Volt	63	G1	—34432	Power Trans. 60 Cy.
19	W	—21452	1,100 Ohms	64	G39	—25669	Power Trans. 25 Cy. 110 V.-220 V.
20		21237-A	60,000 Ohms	65		26578	5 Meg.
21	G12	—33006	Series Cond. L. F.	66	B	—33906-A	Cord & Plug
22			Series Cond. H. F.	67	G75	—28807	6D6 Socket (R. F. Amp.)
23		21453	40,000 Ohms	68	G47	—28807	6A7 Socket (Osc. Mod.)
24	W	—25435	.003 Mfd. 400 Volt	69	G48	—28807	6B7 Socket (I. F. & Diode)
25		21876	10,000 Ohms	70	G75	—28807	6D6 Socket (2nd I. F.)
26		21876	10,000 Ohms	71	G49	—28807	6F7 Socket (Diode & A. F. Amp.)
27		21455	300,000 Ohms				
28	G6	—33006	I. F. Tuning Cond. 1st	72	G25	—28807	42 Socket (Output)
29	G1	—32004	1st I. F. Transformer	73	G6	—28807	80 Socket (Rect.)
30	W	—27216	.05 Mfd. 200 Volt	74	G24	—32002	Osc .Coil (Pol. Band)
31	W	—31937	.0001 Mfd.	75	G6	—34000	Series Cond. 1350 Mmf.
32	G6	—33006	I. F. Tuning Cond. 2nd	76	W	—31007-A	Speaker Cord
33	G1	—32004	2nd I. F. Transformer	77		31094	4,500 Ohms
34	W	—25937	275 Ohms	78			
35	G26	—32004	3rd I. F. Transformer	79	W	—28621	.02 Mfd. 200 Volt
36			3rd I. F. Tuning Cond.	80	W	—21455	300,000 Ohms
37	W	—27932	.0001 Mfd. 200 Volt	81	W	—28621	.02 Mfd. 200 Volt
38		23403	150,000 Ohms	82		26578	5 Meg.
39	W	—32062	Level Control 1 Meg.	83		21455	300,000 Ohms
40	W	—28619	.006 Mfd. 200 Volt	84		21454	1 Meg.
41		26577	3 Meg.	85		21454	1 Meg.
42	W	—24049	.1 Mfd. 200 Volt	86	G2	—34000	3104 Mmf. Cond.
43		21454	1 Meg.	87	G19	—32001	Pol. Band R. F. Coil
44	W	—24049	.1 Mfd. 200 Volt	88		33390	30,000 Ohms
45		23785	500,000 Ohms				

MODEL 715, Corsair
Alignment, Chassis

CROSLEY RADIO CORP.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can be properly aligned only with the use of a modulated signal generator and an output meter.

Connecting Output Meter.

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 output tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs and the screen prong will be next to the plate prong. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger, not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 450 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A7 tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis. KEEP THE GENERATOR OUTPUT LEAD AS FAR AS POSSIBLE FROM THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are open. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch all the way to the left.

(d) Set the signal generator to 450 kilocycles.

(e) Close the middle trimmer condenser on the 1st I-F transformer. (Fig. 2)

(f) Adjust the trimmers located on top of the 2nd I-F transformer for maximum output. (Fig. 2)

(g) Adjust the top and bottom trimmers of the 1st I-F transformer, for maximum output.

(h) Repeat operations (f) and (g) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

(i) Reduce the output of the signal generator and adjust the middle trimmer on the 1st I-F transformer or maximum output. DO NOT READJUST THE OTHER TRIMMERS.

2. Aligning R-F Amplifier.

(a) When aligning the R-F amplifier the output lead from the signal generator is connected to the "Ant" terminal of the receiver. For the BLACK and GREEN bands a .00025 mfd. condenser must be connected in series with the output lead from the signal generator and for the high frequency band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned (if provision is made for series alignment). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment.

Adjust the "Osc", "R-F" and "Ant" trimmers (Fig. 2) in the order given for maximum output and then check the adjustments in the same order. NOTE: When aligning the Police and High Frequency Band care must be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is always approximately 900 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately ten times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 900 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct position.

To align the "series" trimmer set the signal generator to the frequency indicated and then tune-in this signal with the station selector for maximum output. Adjust the "series" trimmer while rocking the tuning condenser back and forth slightly, until no further improvement in output can be obtained.

(b) Signal Input Frequencies.

	Shunt Alignment	Series Alignment
American Broadcast Band (BLACK)	1400 Kc.	600 Kc.
Police and Amateur Band (GREEN)	4000 Kc.	———
Night H-F Band (RED)	10 Megacycles	———

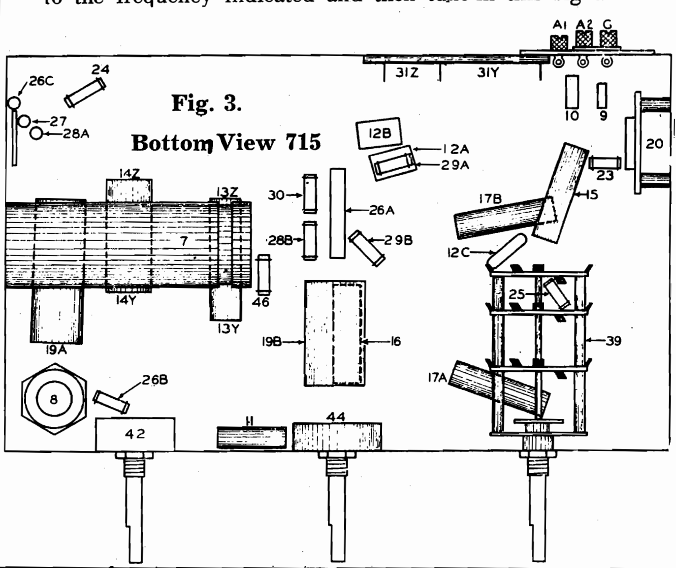


Fig. 3.
Bottom View 715

SPECIFICATIONS MODEL 715

The Crosley Model 715 radio is a seven-tube superheterodyne receiver and is available or adaptable for operation on A-C lines as follows: 110 V-60 cycles, 110 V-25 cycles and 220 V-25 cycles. The tubes used are 6D6 R-F Amplifier, 6A7 Oscillator-Modulator, 6B7 I-F Amplifier and AVC, 76 Detector, 76 A-F Amplifier, 42 Output and type 80 Rectifier.

It is a three band receiver and the dial is divided into three sections as follows:

BLACK—540-1625 kilocycles (American Broadcast Band).

GREEN—1625-4700 kilocycles (Police and Amateur Band).

RED—5250-15300 kilocycles (Night High Frequency Band).

The positions on the band selector switch are in the above order, reading from right to left.

MODEL 715, Corsair
Schematic, Socket
Voltage

CROSLEY RADIO CORP.

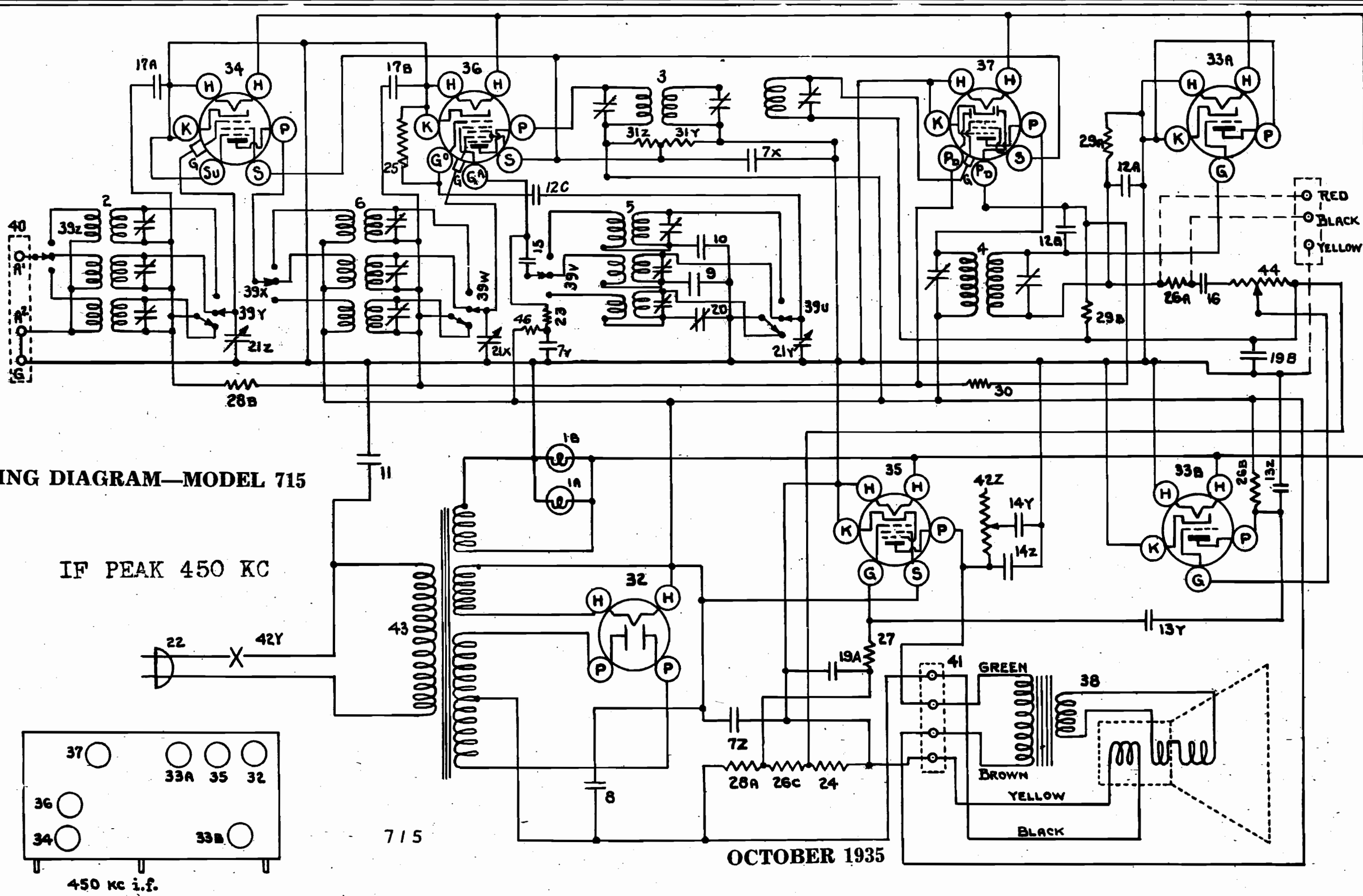


FIG. 1. WIRING DIAGRAM—MODEL 715

IF PEAK 450 KC

OCTOBER 1935

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D.C. voltmeter (except filaments) with the receiver in operating condition and no signal input. Readings may vary plus or minus 10% of values given. Filament readings are taken with a low range A.C. voltmeter.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	G	K	Go	Ga
6D6	R-F Amplifier	6.3	315	110	0	−3	0	—	—
6A7	Osc.-Mod.	6.3	315	110	—	−3	0	−5 to −15	185
6B7	I-F Amp. & AVC	6.3	315	110	0	−3	0	—	—
76	Detector	6.3	—	—	—	—	0	—	—
76	A-F Amplifier	6.3	35	—	—	−3	0	—	—
42	Output	6.3	300	245	0	−16	0	—	—
80	Rectifier	5.0	320	—	—	—	—	—	—

Measured on 117.5 Volt Line—60 Cycles A.C.

Power Consumption Approximately 60 Watts

MODEL 715,Corsair
Chassis,Parts

CROSLEY RADIO CORP.

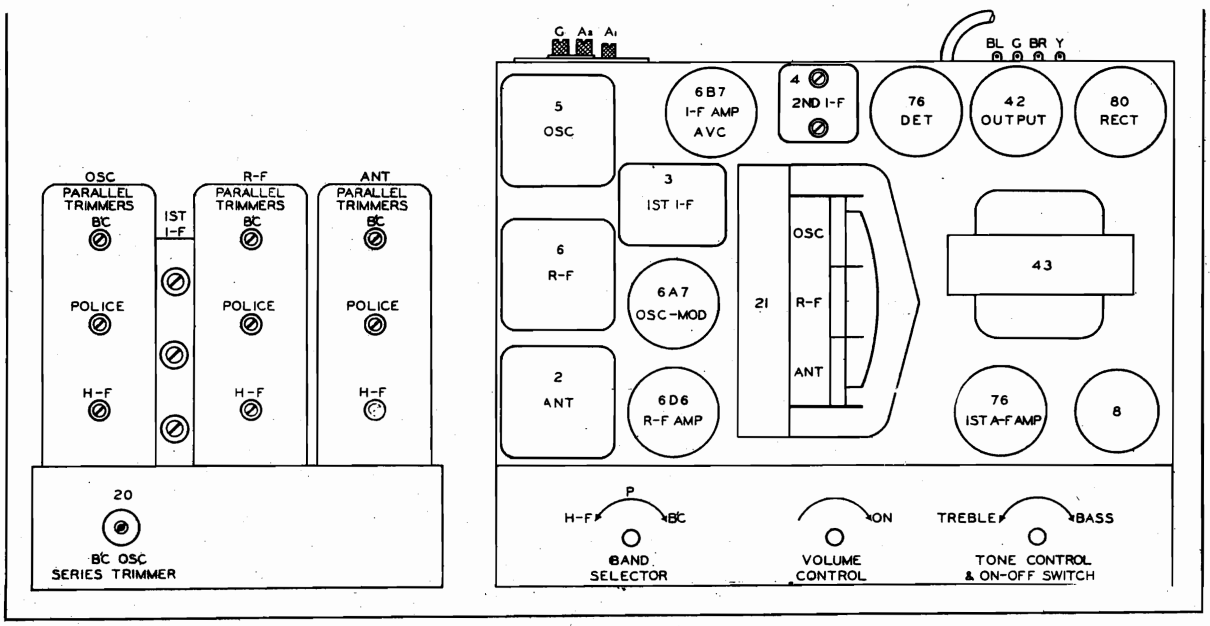


Fig. 2. Side And Top Views 715

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1A	G4 —27134	Dial Light Bracket Assembly.
1B	G4 —27134	Dial Light Bracket Assembly.
2	G50—32000	Ant. Coil Assembly complete.
	G44—32000	Ant. Coil Broadcast Band.
	G45—32000	Ant. Coil Police Band.
	G46—32000	Ant. Coil S. W. Band.
	W —36032	Trimmer Condenser.
	G6 —36031	Support Base Assembly.
	G4 —36031	Coil Shield Assembly.
3	G47—32004	1st. I. F. Trans. Assembly.
4	G46—32004	2nd. I. F. Trans. Assembly.
5	G42—32002	Osc. Coil Assembly complete.
	G36—30202	Osc. Coil B. C. Band.
	G37—32002	Osc. Coil Police Band.
	G38—32002	Osc. Coil S. W. Band.
	W —36032	Trimmer Condenser.
	G7 —36031	Support Base Assembly.
	G5 —36031	Coil Shield Assembly.
6	G29—32001	R. F. Coil Assembly complete.
	G23 32001	R. F. Coil B. C. Band.
	G24—32001	R. F. Coil Police Band.
	G25—32001	R. F. Coil S. W. Band.
	W —36032	Trimmer Condenser.
	G6 —36031	Support Base Assembly.
	G4 —36031	Coil Shield Assembly.
7Z		Condenser, 8 Mfd. 450 Volt.
7Y	W —36056	Condenser, 4 Mfd. 350 Volt.
7X		Condenser, 4 Mfd. 250 Volt.
8	W —36055	Condenser, 35 Mfd. 450 Volt.
9	G7 —34000	Condenser, 0.00145 Mfd.
10	G12—34000	Condenser, 0.004725 Mfd.
11	W —30805	Condenser, 0.01 Mfd., 400 Volt.
12A	G2 —34002	Condenser, 100 Mmf.
12B	G2 —34002	Condenser, 100 Mmf.
12C	G2 —34002	Condenser, 100 Mmf.
13Z	W —25537A	Condenser, 0.001 Mfd., 400 Volt..
13Y		Condenser, 0.03 Mfd., 400 Volt.
14Z	W —31052	Condenser, 0.004 Mfd., 400 Volt.
14Y		Condenser, 0.05 Mfd., 400 Volt.
15	W —32378	Condenser, 0.01 Mfd., 400 Volt.
16	W —23191A	Condenser, 0.01 Mfd., 400 Volt.
17A	W —32379	Condenser, 0.02 Mfd., 200 Volt.
17B	W —32379	Condenser, 0.02 Mfd., 200 Volt.
18	See 19B	
19A	W —30321	Condenser, 1.0 Mfd., 160 Volt.
19B	W —30321	Condenser, 1.0 Mfd., 160 Volt.
20	G10—33005	Trimmer Condenser, 5 plate.
21Z		
21Y	G33—33002	Var. Tuning Condenser, 3 Gang.
21X		
	MG21—36045	Dial Drive Assembly.
	W —37198	Dial Pointer only.
	W —32293	Dial Pointer Nut (2 used).
	C —36088	Dial Indicator Plate.
22	B —30375A	Cord and Plug.

Item No.	Part No.	Description
23	—22831	Resistor, 15,000 Ohms.
24	—22196	Resistor, 20,000 Ohms.
25	W —21875	Resistor, 100,000 Ohms.
26A	—23403	Resistor, 150,000 Ohnms.
26B	—23403	Resistor, 150,000 Ohms.
26C	—23403	Resistor, 150,000 Ohms.
27	—21455	Resistor, 300,000 Ohms.
28A	—23785	Resistor, 500,000 Ohms.
28B	—23785	Resistor, 500,000 Ohms.
29A	—21454	Resistor, 1 Megohm.
29B	—21454	Resistor, 1 Megohm.
30	—26577	Resistor, 3 Megohm.
31Z	W —35963	Resistor, 8,500 Ohm.
31Y		Resistor, 25,000 Ohm.
32	G6 —28807	Socket, 80.
33A	G80—28807	Socket, 76.
33B	G80—28807	Socket, 76.
34	G75—28807	Socket, 6D6.
	W —35774	Tube Shield Base.
	W —35772	Tube Shield Half.
	W —35773	Tube Shield Cap.
35	G25—28807	Socket, 42.
36	G47—28807	Socket, 6A7.
	W —35774	Tube Shield Base.
	W —35772	Tube Shield Half.
	W —35773	Tube Shield Cap.
37	G48—28807	Socket, 6B7.
	W —35774	Tube Shield Base.
	W —35772	Tube Shield Half.
	W —35773	Tube Shield Cap.
38	318–BL–18 518–CL–22	Speaker.
39 UtoZ	—36058B	Band Change Switch
40	G27—26719	Ant.-Grd. Terminal.
41	G5 —31128	Speaker Terminal.
	W —34627	Terminal Board Insulator.
	W —34628	Terminal Board Cover.
42Z	—36062	Tone Control.
42Y		On-Off Switch.
43	G6 —30745	Power Transformer, 60 Cy., 110 V.
	G7 —30745	Power Transformer, 25 Cy., 110 V.
	G8 —30745	Power Transformer, 25 Cy., 220 V
44	—36060	Volume Control.
45	See 12C	
46	—21876	Resistor, 10,000 Ohms.
	W —34678B	Knob, Band Change.
	W —31585B	Knob, Controls.
	B —33528C	Escutcheon.
	W —33984	Escutcheon Gasket.
	W —36312	Band Change Switch Plate.
	W —36309	Band Change Indicator, Celluloid.
	W —36313	Tone Control Plate.
	—35922	Grille Cloth, 5N Cabinet.
	—35863	Grille Cloth, 5D Cabinet.

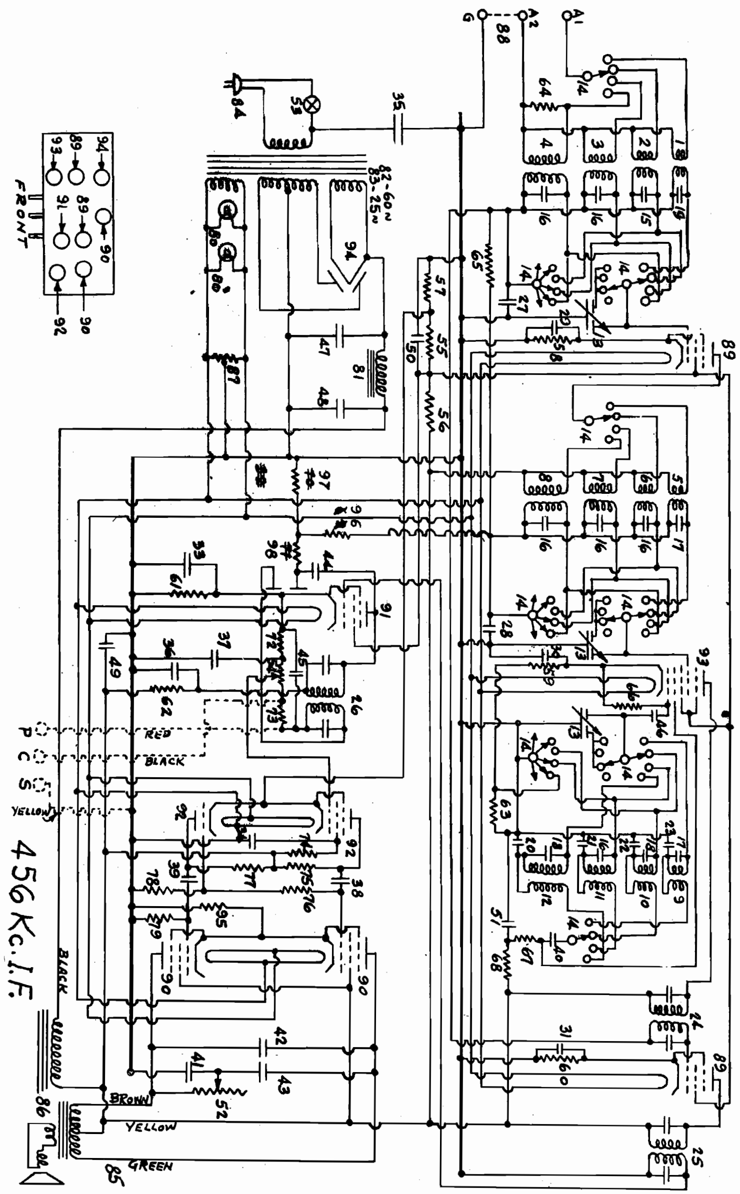
MODEL 814
Schematic, Socket
Parts

CROSLEY RADIO CORP.

Parts List Model 814

Figures in first column correspond to figures in diagram

1	G30	—32000	Ant. Coil (10.0-22.0 Mc)
2	G29	—32000	Ant. Coil (4.0-10.0 Mc)
3	G4	—32000	Ant. Coil (1.5-4.0 Mc)
4	G3	—32000	Ant. Coil (Broadcast)
5	G16	—32001	Inter. Coil (10.0-22.0 Mc)
6	G15	—32001	Inter. Coil (4.0-10.0 Mc)
7	G8	—32001	Inter. Coil (1.5-4.0 Mc)
8	G2	—32001	Inter. Coil (Broadcast)
9	G23	—32002	Osc. Coil (10.0-22.0 Mc)
10	G22	—32002	Osc. Coil (4.0-10.0 Mc)
11	G3	—32002	Osc. Coil (1.5-4.0 Mc)
12	G17	—32002	Osc. Coil (Broadcast)
13	G24	—33002	Variable Condenser
14	B	—34083-A	Band Change Switch
15	G17	—33009	Padding Condenser
16	G7	—33009	Padding Condenser
17	G6	—33009	Padding Condenser
18	G5	—33009	Padding Condenser
19	G17	—33006	Padding Condenser
20	G16	—33006	Trimmer Condenser
21			Trimmer Condenser
22	G2	—34000	3104 Mmfd.
23	G1	—34000	1647 Mmfd.
24	G25	—32004	1st I. F. Transformer
25	G23	—32004	2nd I. F. Transformer
26	G24	—32004	3rd I. F. Transformer
27	W	—32379	0.02 Mfd. 200 Volt
28	W	—32379	0.02 Mfd. 200 Volt
29	W	—28621	0.02 Mfd. 200 Volt
30	W	—28621	0.02 Mfd. 200 Volt
31	W	—28621	0.02 Mfd. 200 Volt
32			
33	W	—28621	0.02 Mfd. 200 Volt
34	W	—23142	0.02 Mfd. 400 Volt
35	W	—30805	0.01 Mfd. 400 Volt
36	W	—23191-A	0.01 Mfd. 400 Volt
37	W	—30321	1.0 Mfd. 160 Volt
38	W	—23615	0.05 Mfd. 400 Volt
39	W	—23615	0.05 Mfd. 400 Volt
40	W	—23635	0.006 Mfd. 400 Volt
41	W	—30270	0.001 Mfd. 400 Volt
42	W	—31052	0.004 Mfd. 400 Volt
43			0.05 Mfd. 400 Volt
44	W	—32741-A	0.0005 Mfd.
45	W	—31937	0.0001 Mfd.
46	W	—30741	0.00025 Mfd.
47	W	—26194-B	12 Mfd. 475 Volt
48			8 Mfd. 450 Volt
49	W	—29097-D	8 Mfd. 450 Volt
50			8 Mfd. 250 Volt
51	W	—32258	8 Mfd. 300 Volt
52	W	—32063	Tone Control
53			Switch
54	W	—33378	Level Control
55	W	—32301	15,000 Ohms
56			10,000 Ohms
57	W	—30127	450 Ohms Flex.
58	W	—25937	275 Ohms Flex.
59	W	—27503	1,400 Ohms Flex.
60	W	—27503	1,400 Ohms Flex.
61	W	—30127	450 Ohms Flex.
62	W	—22514	750 Ohms Flex.
63	W	—29585	600 Ohms Flex.
64		31094	4,500 Ohms
65		21455	300,000 Ohms
66		21875	100,000 Ohms
67		24814	7,000 Ohms
68		24814	7,000 Ohms
69			
70			
71			
72		21876	10,000 Ohms
73		23785	500,000 Ohms
74		23785	500,000 Ohms
75		21237-A	60,000 Ohms
76		23785	500,000 Ohms
77		23403	150,000 Ohms
78		21237-A	60,000 Ohms
79		23785	500,000 Ohms
80	W	—4099-A	6.3 V. Dial Lamp
81	G1	—24628	Filter Choke
82	G37	—25669	60 Cy. Power Trans.
83	G38	—25669	25 Cy. Power Trans.
84	B	—33906-A	Cord & Plug
85	W	—31007-A	Speaker Cable
86		68C	Speaker
87	W	—32337	10 Ohms-10 Ohms
88	G14	—26719	Ant.-Gnd. Term.
89	G75	—27975	6D6 Socket
90	G25	—27975	42 Socket
91	G48	—27975	6B7 Socket
92	G49	—27975	6F7 Socket
93	G2	—33070	6A7 Socket
94	G6	—27975	80 Socket
95	W	—22873	220 Ohms
96		26577	3 Megohm
97		23785	500,000 Ohms
98		23785	500,000 Ohms



MODEL 1014, Centurion
Schematic, Socket, Parts

CROSLEY RADIO CORP.

MARCH 1935

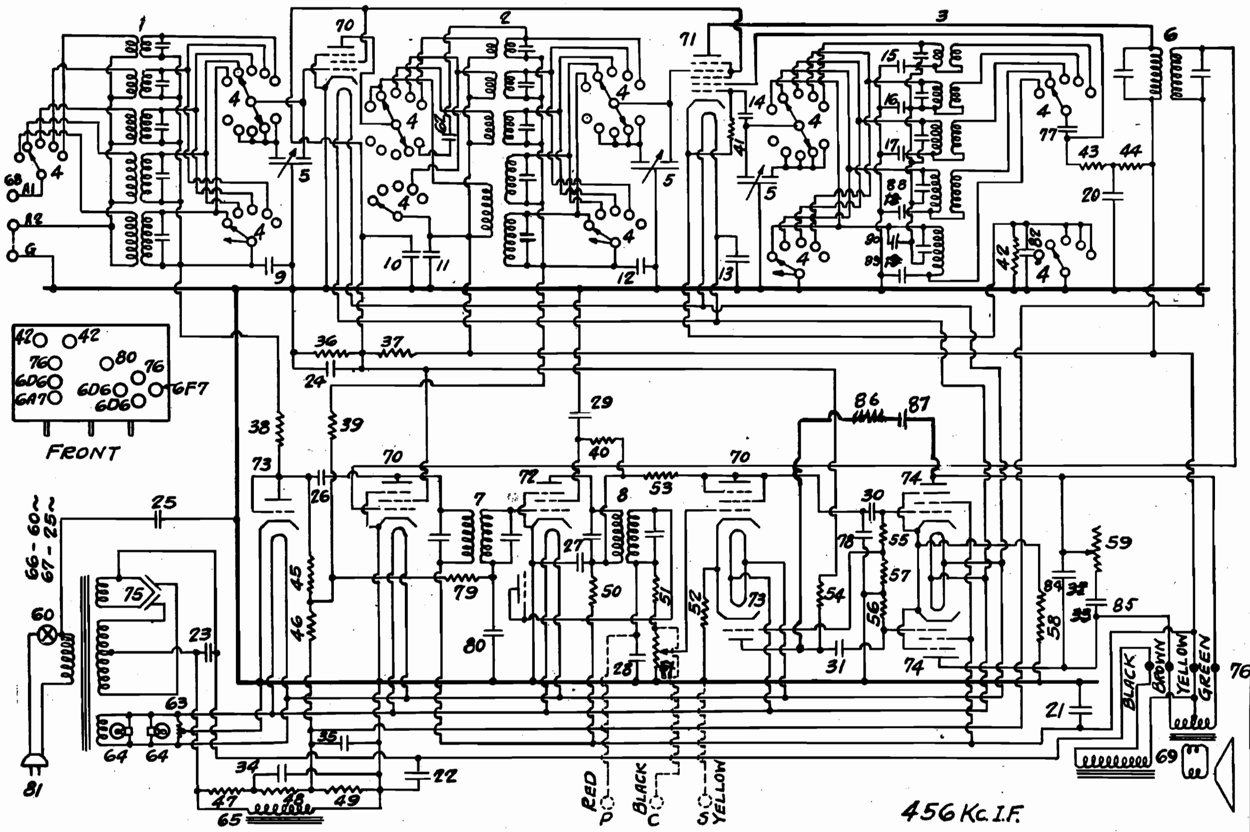


Fig. 1—Wiring Diagram of Model 1014 "Centurion"

PARTS LIST—MODEL 1014 "CENTURION"

Figures in first column refer to parts shown in diagrams.

Item No.	Part No.	Description
1	G32—32000	Ant. Trans. Assembly
	G6 —34593	Ant. Coil Assembly Only
	G4 —34593	Ant. Coil Shield Assembly Only
	W —34683	Aligning Condenser Assembly Only
2	G20—32001	Inter. Trans. Assembly
	G7 —34593	Inter. Coil Assembly Only
	G5 —34593	Inter Coil Shield Assembly Only
	W —34683	Aligning Condenser Assembly Only
3	G25—32002	Osc. Trans. Assembly
	G8 —34593	Osc. Coil Assembly Only
	G5 —34593	Osc. Coil Shield Assembly Only
	W —34683	Aligning Condenser Assembly Only
	G6 —34002	.000025 Mfd. Condenser
4	B —34646	Band Change Switch
5	G28—33002	Variable Condenser Assembly
	G20—32086	Dial Drive Assembly
	W —34657A	Dial Hand
	W —34655B	Band Spread Pointer.
	G4 —27134	Dial Light Bracket Assembly
	W —32128	Light Diffuser
	W —32244	Diffuser Retainer
6	G27—32004	1st I. F. Trans. Assembly
7	G28—32004	2nd I. F. Trans. Assembly
8	G29—32004	3rd I. F. Trans. Assembly
9	W —32379	0.02 Mfd. 200 V. Condenser
10	W —32378	0.01 Mfd. 400 V. Condenser
11	G8 —34000	1500 MMfd. Condenser
12	W —32380	0.05 Mfd 200 V. Condenser
13	G1 —34002	0.00025 Mfd. Condenser
14	G1 —34002	0.00025 Mfd. Condenser
15	G1 —34000	1647 Mmfd. Condenser
16	G2 —34000	3104 Mmfd. Condenser
17	G10—34000	1050 Mmfd. Condenser
18	See Item 88	
19	See Item 89	
20		.6. Mfd. 300 Volt
21	W —34596	8. Mfd. 475 Volt Condenser
22		8. Mfd. 475 Volt
23	W —26194B	12. Mfd. 475 Volt Condenser
24	W —23615	0.05 Mfd. 400 Volt Condenser
25	W —30805	0.01 Mfd. 400 Volt Condenser
26	G1 —34005	0.00025 Mfd. Condenser
27	W —23191A	0.01 Mfd. 400 Volt Condenser
28	G2 —32004	0.0001 Mfd. Condenser
29	W —23191A	0.01 Mfd. 400 Volt Condenser
30	W —23615	0.05 Mfd. 400 Volt Condenser
31	W —23615	0.05 Mfd. 400 Volt Condenser
32	See Item 84	
33	See Item 85	
34	W —29910A	0.25 Mfd. 400 Volt Condenser
35	W —29910A	0.25 Mfd. 400 Volt Condenser
36	W —32301	15,000 Ohms
37		10,000 Ohms Resistor
38	—26577	3 Megohm Resistor
39	—26577	3 Megohm Resistor
40	—23403	150,000 Ohms Resistor
41	—21875	100,000 Ohms Resistor
42	W —27503	1,400 Ohms Flex. Resistor
43	—24814	7,000 Ohms Resistor
44	—24814	7,000 Ohms Resistor
45	—21455	300,000 Ohms Resistor
46	—21455	300,000 Ohms Resistor
47	—21455	300,000 Ohms Resistor
48	—23403	150,000 Ohms Resistor
49	—21237A	60,000 Ohms Resistor
50	W —30127	450 Ohms Flex. Resistor
51	—21455	300,000 Ohms Resistor
52	—31093	2,700 Ohms Resistor
53	—23403	150,000 Ohms Resistor
54	—23403	150,000 Ohms Resistor
55	—23785	500,000 Ohms Resistor
56	—23785	500,000 Ohms Resistor
57	—21237A	60,000 Ohms Resistor
58	W —22873	220 Ohms Flex. Resistor
59	W —25594B	Tone Control
60		On-Off Switch
61	See Item 83	
62	G1 —34005	0.00025 Mfd. Condenser
63	W —32337	10-10 Ohms Resistor
64	See Item 5	Dial Light
65	G1 —24628	Filter Choke
66	G40—25669	Power Trans. 60 Cy 110 Volt
67	B —35007	25 Cy. Power Trans.
68	G16—26719	Ant. Gnd. Terminal
69	—68CL	Speaker (Console)
	—48CL	Speaker (Table)
70	G75—28807	Socket 6D6
	B—26009D	Tube Shield
	W —27981A	Tube Shield Base
71	G2 —33007	Socket 6A7
	W —33072	Socket Cushion
	W —28623A	Tube Shield
	G1 —34672	Tube Shield Base
72	G49—28807	Socket 6F7
	W —28623A	Tube Shield
	W —27981A	Tube Shield Base
73	G80—28807	Socket 76
	W —26231B	Tube Shield
	W —27981A	Tube Shield Base
74	G25—28807	Socket 42
75	G6 —28807	Socket 80
76	G5 —31128	Speaker Terminal Board
	W —34628	Terminal Board Cover
	W —34627	Terminal Board Insulator
77	W —34647	0.0006 Mfd. 400 Volt Condenser
78	G1 —34005	0.00025 Mfd. Condenser
79	—26577	3 Megohm Resistor
80	W —28621	0.02 Mfd. 200 Volt Condenser
81	B —33906A	Cord and Plug
82	W —32379	.02 Mfd. 200 Volt Condenser
83	W —28552	Level Control (1 Megohm)
84	W —35139	0.004 Mfd. 400 Volt Condenser
85	W —23615	0.05 Mfd. 400 Volt Condenser
86	—35140	350,000 Ohm Resistor
87	G6 —34005	0.0002 Mfd. 300 Volt Condenser
88	G26—33006	Osc. Trimmer Condenser
89		Osc. Trimmer Condenser
90	G6 —34002	0.00025 Mfd. Condenser
	W —34678B	Switch Knob
	W —31585B	Volume Control Knob
	W —31585B	Tone Control Knob
	W —33994A	Station Selector Knob
	W —33995A	Vernier Knob
	B —33708B	Escutcheon
	W —34307	Escutcheon Lens
	W —33985	Escutcheon Gasket
	W —34680	Band Change Plate
	W —34681	Volume Control Plate

MODEL 1014,Centurion
Chassis,Trimmers
Voltage,Data

CROSLEY RADIO CORP.

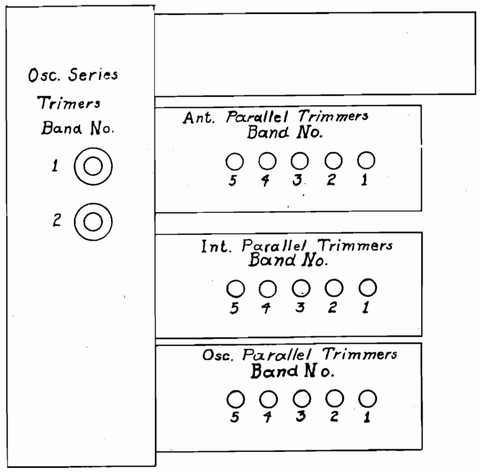


Fig.3 End.View

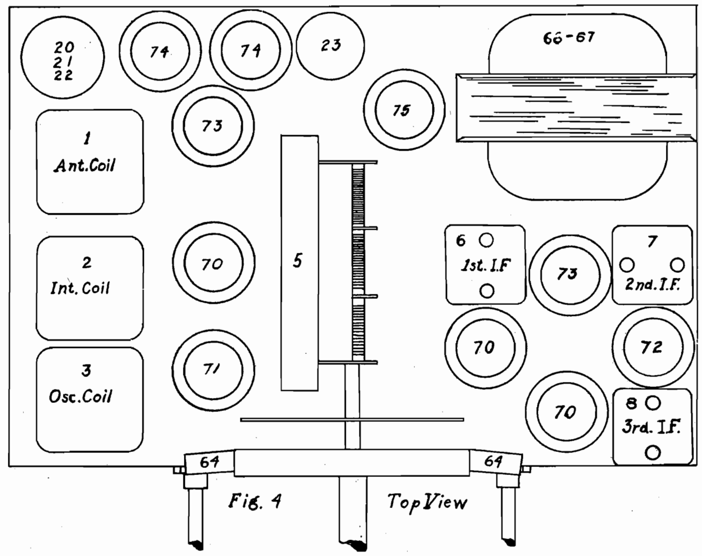


Fig. 4 Top View

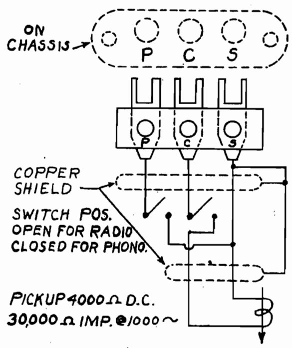


Fig.5- Phono. Connections

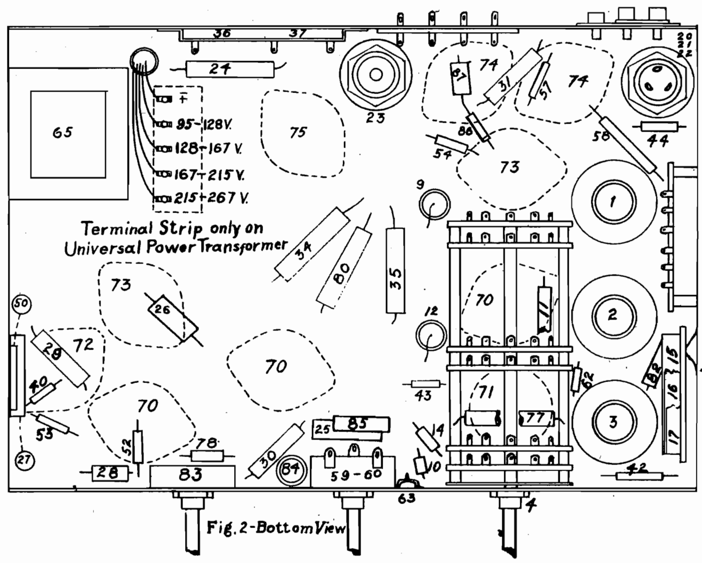


Fig. 2-Bottom View

TUBES AND VOLTAGE LIMITS

The following are the tubes and voltages measured from the tube contact to chassis with a 500,000 ohm 500-Volt voltmeter with receiver in operating condition but with no signal to the antenna, and with a line voltage of 117.5 volts 60 cycle. Voltage limits are plus or minus 10% of values given.

TUBE VOLTAGES—MODEL 1014 "CENTURION"

Type	Where Used	Ef	Ek Bands 1-2	Ek Bands 3-4-5	Eg	Esg	Esup.	Ep	Es1	Ep1
6D6	R. F. Amp.	6.3	0	0	x	100	0	250	—	—
6A7	Osc. Mod.	6.3	11.0	0	x	100	0	250	—	—
6D6	1st I. F.	6.3	0	0	x	100	0	250	—	—
6F7	2nd I. F. & Det.	6.3	0	0	x	75	—	240	0	0
76	A. V. C.	6.3	0	0	x	—	—	x	—	—
6D6	1st A. F. Amp.	6.3	4	4	0	40	40	40	—	—
76	Phase Inv.	6.3	4	4	0	—	—	50	—	—
(2) 42	Output	6.3	16	16	0	250	—	245	—	—
80	Rect.	5.0	—	—	—	—	—	—	—	—

VOLTAGE DROP ACROSS FILTER CHOKE 20 VOLTS
VOLTAGE DROP ACROSS FIELD COIL 65 VOLTS

x IN ABOVE TABLE INDICATES HIGH RESISTANCE IN CIRCUIT WHICH PREVENTS ACCURATE MEASUREMENT-

ALL Measurements Made With A 1000 Ohms Per Volt Voltmeter From Chassis

(The power consumption at 117.5 volts is approximately 95 watts.)

MODEL 1014, Centurion
Alignment, Data

CROSLEY RADIO CORP.

MODEL 1014 "CENTURION"

SPECIFICATIONS

The Crosley Model 1014 is a ten tube superheterodyne all wave receiver designed for A.C. operation. It may be obtained for 110 volts, 60 cycles, or with a universal transformer for other voltages and frequencies. (See Universal Power Transformer). It is designed for five band operation covering the following frequencies:

Band 1. 150-350 Kilocycles.
Band 2. 540-1500 Kilocycles.
Band 3. 1500-4000 Kilocycles.
Band 4. 4000-10000 Kilocycles.
Band 5. 10000-22000 Kilocycles.

Bands 1 and 2 are calibrated on the dial in Myriacycles (10 Kc.). Bands 3, 4 and 5 are calibrated in Megacycles (1000 Kc.). It employs a retroactive automatic volume control together with level control, continuously variable tone control, class "A" audio amplification and band spread dial pointer, 36 to 1 ratio.

CIRCUIT DESCRIPTION

The circuit consists of one stage of R.F. amplification, an oscillator-detector, two stages of I.F. amplification, automatic volume control, second detector, two stages of A.F. amplification and power supply. The R.F. stage employs a Type 6D6 tube. A Type 6A7 tube is used as an oscillator-detector. The first I.F. stage employs a Type 6D6 tube and the second stage uses a Type 6F7 tube which also serves as a second detector. A Type 76 tube is used in the A.V.C. circuit and is actuated by the output of the first I.F. stage. The first A.F. stage uses a Type 6D6 tube, connected as a variable mu triode, which is used in conjunction with a Type 76 tube in a phase inverter circuit to drive a pair of Type 42 tubes in push-pull. A Type 80 Tube is used in the power supply.

UNIVERSAL POWER TRANSFORMER

The Model 1014 chassis for use on other than 110 volts, 60 cycles, is supplied with a universal power transformer designed to operate on 25 cycles and up. When leaving the factory it is wired for the voltage indicated on the name plate. It is possible however by a slight wiring change in power transformer circuit to adapt the set to a different voltage anywhere from 95 to 265 volts. To adapt the set to a different line voltage it is necessary to remove the chassis from the cabinet, remove bottom from chassis and locate the terminal strip on the bottom of the power transformer. Fig. 2. After careful measurement of the maximum and minimum values of line voltage and determining the average value, unsolder the wire of the A.C. line cord and solder it to the terminal which most nearly represents the line voltage at which the set is to be operated.

PHONOGRAPH PICKUP

Chasses equipped with a universal power transformer also have three terminals on the back for connecting a phonograph pickup. These terminals are marked P.C.S. and the pickup is connected through a double pole—single throw switch to these terminals as shown in Fig. 5.

PEAKING PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and will not need readjustment unless some coil or condenser has been replaced. Do not change the setting of any trimmer condenser unless it is definitely known that the adjustment is necessary. If re-alignment is found necessary, the circuits can be properly adjusted only with the use of a modulated test oscillator and output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate of one of the Type 42 tubes and the other terminal to the plate of the other Type 42 tube. Looking at the bottom of the tube with the filament prongs toward you the plate prong will be the first to the left of the filament prongs. Be sure that the meter is protected from D.C. by connecting a condenser. (.1 mfd. or larger—not electrolytic) in series with one of the leads.

PEAKING I. F. STAGES AT 456 Kc.

I. Connect the ground lead of the test oscillator to the chassis frame. Connect a .1 mfd., or larger, condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .1 mfd. condenser is necessary to prevent a short circuit which would remove the bias voltage.

II. Set the test oscillator at 456 kilocycles.

III. Turn the volume control of the receiver on full. Turn the station selector until the tuning condenser plates are completely meshed and set the band switch to band No. 5.

IV. (a) Peak both tuning condensers located on top of the first I.F. transformer shown on Fig. 4. NOTE: Be sure to use the lowest oscillator output that will give a reasonable scale deflection on the output meter. 30 to 90 volts output is satisfactory.

(b) Peak both tuning condensers located on top of the 2nd I. F. transformer shown on Fig. 4.

(c) Peak both tuning condensers located on top of the 3rd. I.F. transformer shown on Fig. 4.

V. Repeat IV to insure accurate adjustment of the I.F. tuning condensers.

PEAKING R. F. CIRCUITS

I. Connecting test oscillator to receiver: It is necessary to connect a dummy antenna in series with the test oscillator and the antenna terminal of the receiver. On bands 1 and 2 this consists of a .0002 mfd. *mica* condenser. On bands 3, 4 and 5 it consists of a *carbon* resistor of approximately 400 ohms. With the tuning condenser plates completely meshed make certain that the dial pointer is exactly horizontal. If not, loosen nut and set pointer horizontal and tighten nut again. The setting of the band spread pointer is not important.

II. To Peak Band No. 1. NOTE: Be sure to use the lowest oscillator output that will give a reasonable scale deflection on the output meter. 30 to 90 volts output is satisfactory.

(a) Set test oscillator at 350 Kc. Tune station selector to 350 Kc. (35 on dial). Then adjust oscillator parallel trimmer condenser, Fig. 3, for maximum output.

(b) With same dial settings peak the interstage and antenna parallel trimmer condenser for Band No. 1.

(c) (1) Set test oscillator at 150 Kc.

(2) Tune station selector in the region of 15—Band No. 1—on dial for maximum reading on the output meter.

(3) Close the oscillator series trimmer condenser for Band No. 1, Fig. 3, 1/8 turn and re-tune station selector to 150 Kc. signal for maximum output, noting reading on output meter.

(4) If meter reads higher after operation (3) repeat the operation again and again until no further improvement in the reading of the output meter can be obtained. If meter reads lower after operation (3) open the oscillator series trimmer condenser 1/8 turn and re-tune station selector to 150 Kc. signal, noting reading on output meter as above and repeat as many times as necessary to obtain the highest meter reading. Do not reset the parallel trimmer condensers at this frequency.

(d) Repeat operations (a) and (b) for more accurate adjustments.

III. To Peak Band No. 2.

(a) Set test oscillator at 1400 Kc. Tune station selector to 1400 Kc. (140 on dial). Then adjust oscillator parallel trimmer condenser for Band No. 2 for maximum output.

(b) With same dial settings peak the interstage and antenna parallel trimmer condensers for Band No. 2.

(c) (1) Set test oscillator at 600 Kc.

(2) Tune station selector in the region of 60—Band No. 2—on dial for maximum reading on the output meter.

(3) Close the oscillator series trimmer condenser for Band No. 2, Fig. 3, 1/8 turn and re-tune station selector to 600 Kc. signal for maximum output, noting reading on output meter.

(4) If meter reads higher after operation (3) repeat the operation again and again until no further improvement in the reading of the output meter can be obtained. If meter reads lower after operation (3) open the oscillator series trimmer condenser 1/8 turn and re-tune station selector to 600 Kc. signal, noting reading on output meter as above and repeat as many times as necessary to obtain the highest meter reading. Do not reset the parallel trimmer condensers at this frequency.

(d) Repeat operations (a) and (b) for more accurate adjustments.

IV. To Peak Band No. 3.

(a) Be sure to change dummy antenna as described in I under Peaking R.F. Circuits.

(b) Set test oscillator at 4 megacycles. Tune the station selector to 4 megacycles (4.0—Band No. 3 on dial). Then adjust oscillator parallel trimmer condenser for Band No. 3 for maximum output.

(c) With the same dial settings peak the interstage and antenna parallel trimmer condensers for Band No. 3.

V. To Peak Band No. 4.

(a) Set test oscillator at 10 megacycles.

(b) Tune station selector to 10 megacycles (10—Band No. 4 on dial).

(c) Open oscillator parallel trimmer condenser for Band No. 4 about 3 turns from closed.

(d) Close the interstage parallel trimmer condenser for Band No. 4 and open 1/8 turn.

(e) Close the antenna parallel trimmer condenser for Band No. 4 and then open 1/2 turn.

(f) Peak the oscillator parallel trimmer condenser on the first signal heard when closing the condenser. As a check on the adjustment set the station selector to approximately 9 on the dial and try to tune in the 10 megacycle signal from the test oscillator. If a signal is heard the oscillator has been aligned on the correct frequency.

(g) Re-tune to 10 megacycles and peak the antenna parallel trimmer condenser for maximum output.

(h) Open the interstage parallel trimmer condenser another 1/8 turn and re-tune the station selector to the 10 megacycle signal.

(i) Repeat operation (h) as many times as necessary to obtain the highest reading on the output meter on first peak obtained when opening trimmer condenser from closed position.

(j) Repeat operation (g) above.

VI. To Peak Band No. 5.

(a) Set test oscillator at 21 megacycles.

(b) Tune station selector to 21 megacycles (21—Band No. 5 on dial).

(c) Open oscillator parallel trimmer condenser for Band No. 5 about 3 turns from closed.

(d) Close the interstage parallel trimmer condenser for Band No. 5 and open 1/8 turn.

(e) Close the antenna parallel trimmer condenser for Band No. 5 and then open 1/2 turn.

(f) Peak the oscillator parallel trimmer condenser on the first signal heard when closing the condenser. As a check on the adjustment set the station selector to approximately 20 on the dial and try to tune in the 21 megacycle signal from the test oscillator. If a signal is heard the oscillator has been aligned on the correct frequency.

(g) Re-tune to 21 megacycles and Peak the antenna parallel trimmer condenser for maximum output.

(h) Open the interstage parallel trimmer condenser another 1/8 turn and re-tune the station selector to the 21 megacycle signal.

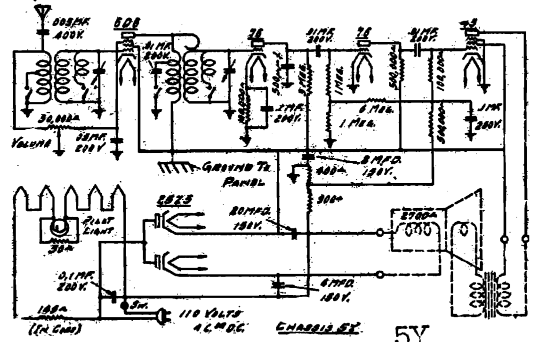
(i) Repeat operation (h) as many times as necessary to obtain the highest reading on the output meter on first peak obtained when opening trimmer condenser from closed position.

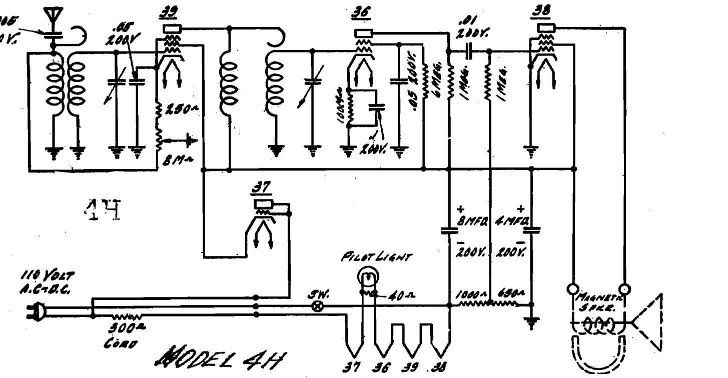
(j) Repeat operation (g) above.

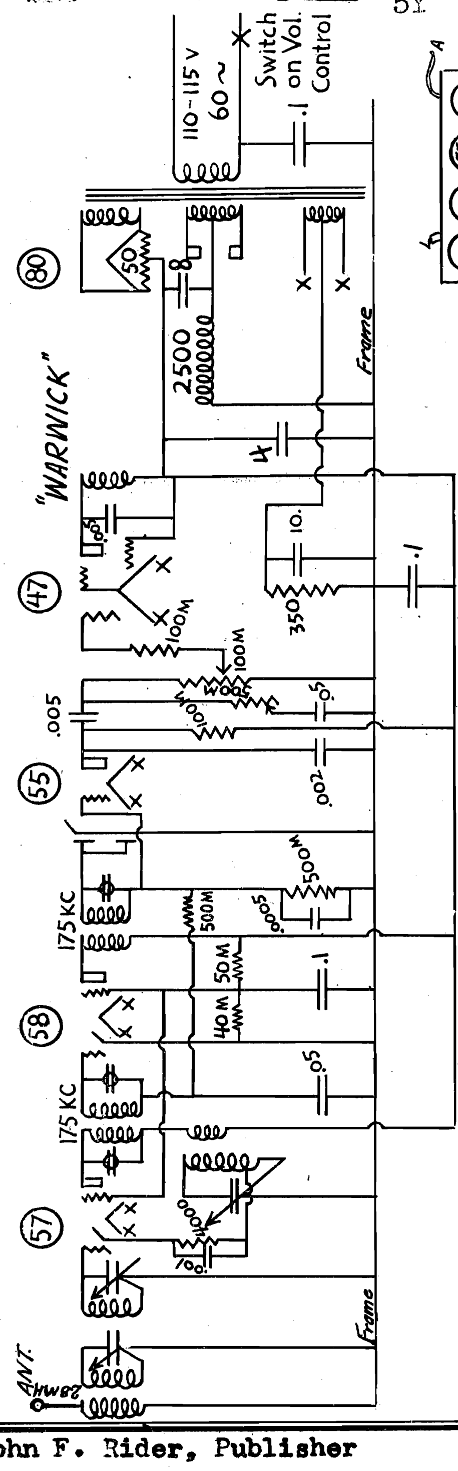
MODEL 5Y
MODEL 48
MODEL Warwick

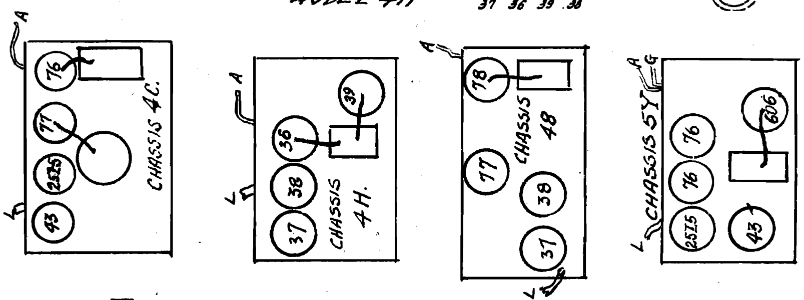
DETROLA RADIO CORP.

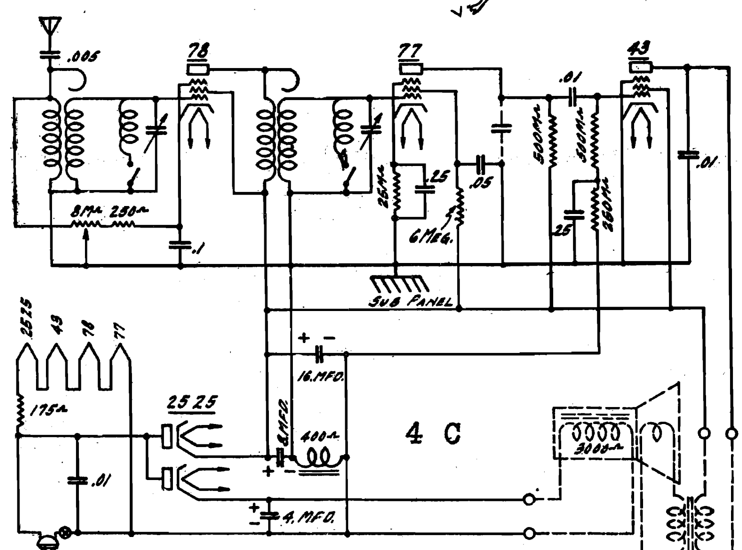
MODEL 4C
MODEL 4H
Schematics, Socket

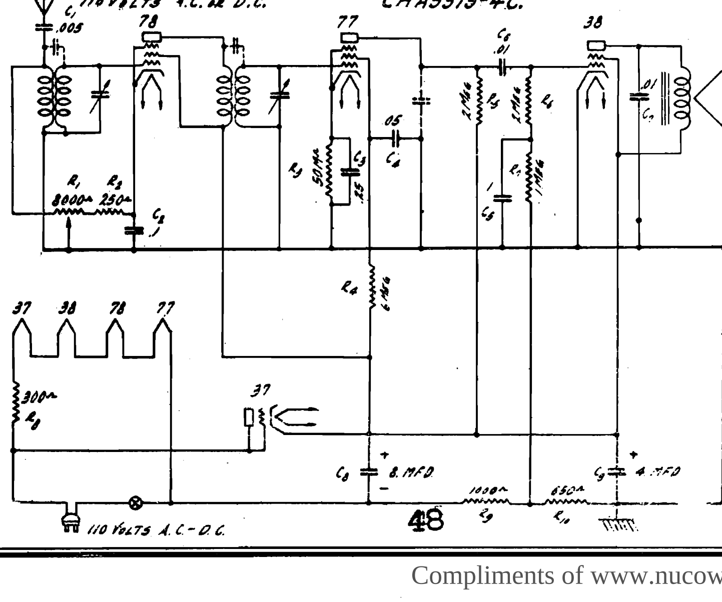






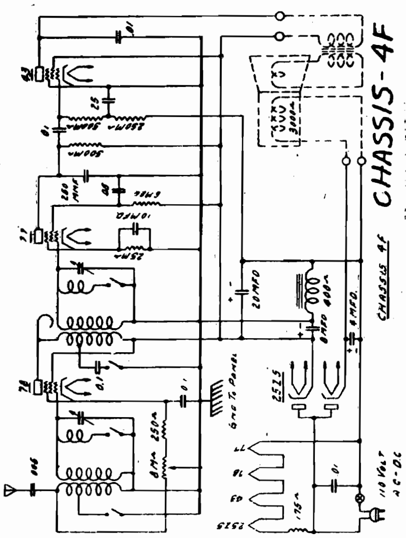


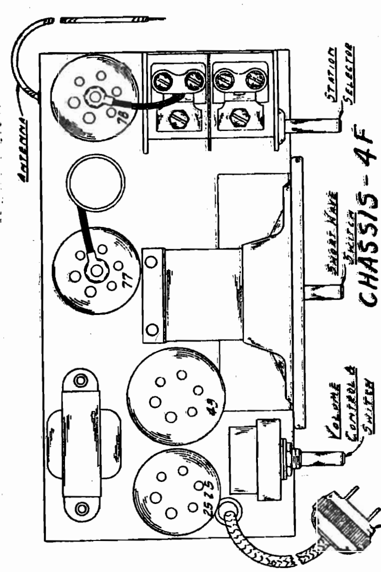


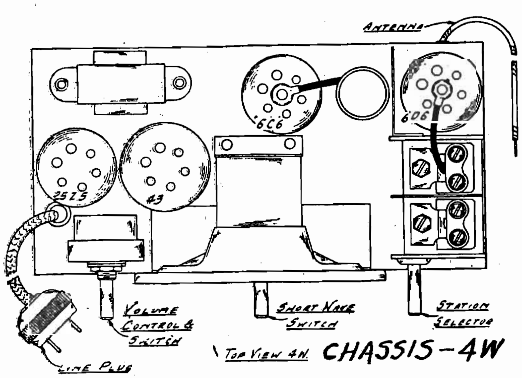


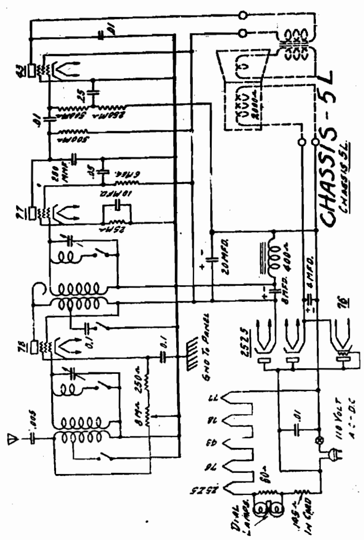
MODEL 4F
MODEL 4J
MODEL 4W
MODEL 4Y
MODEL 5L
Schematic, Socket

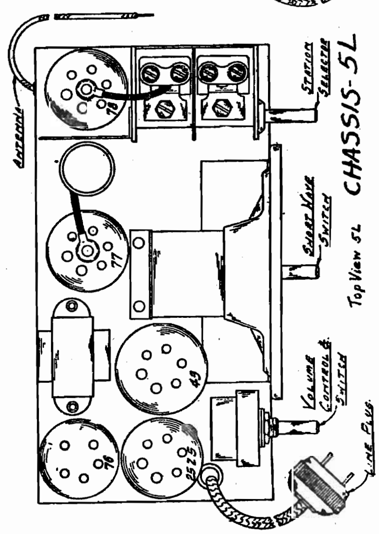
DETROLA RADIO CORP.

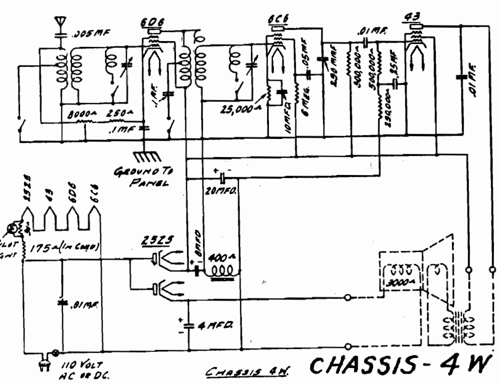


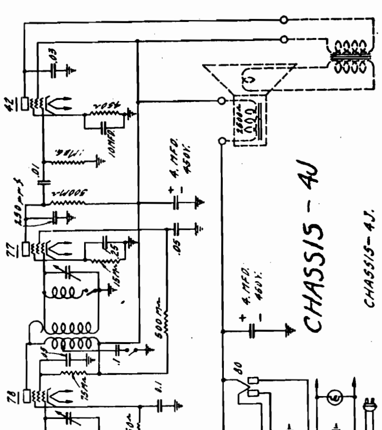


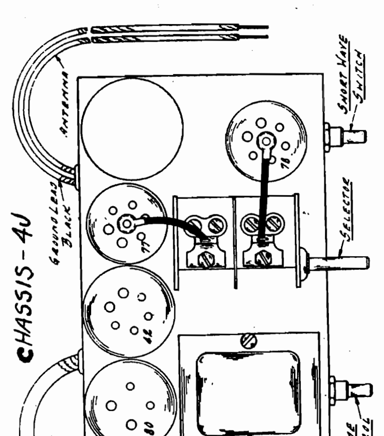


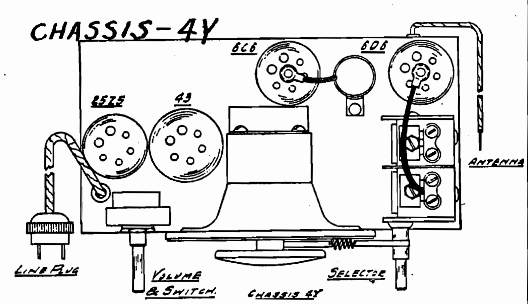


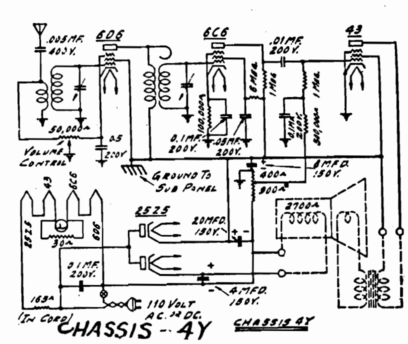






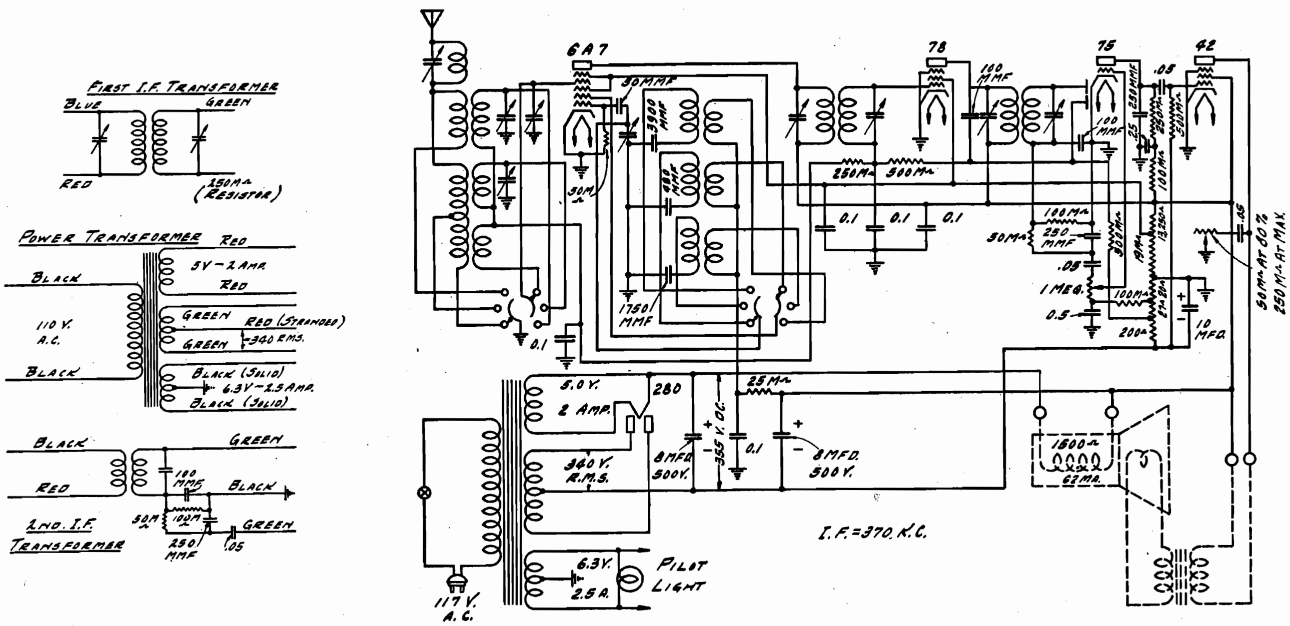




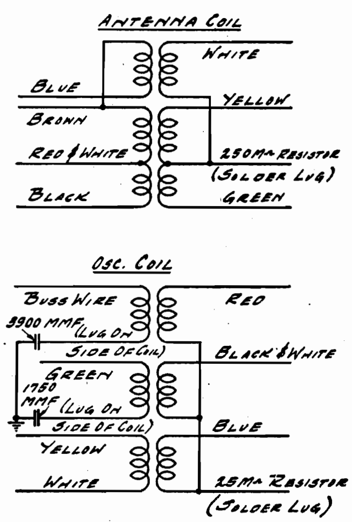


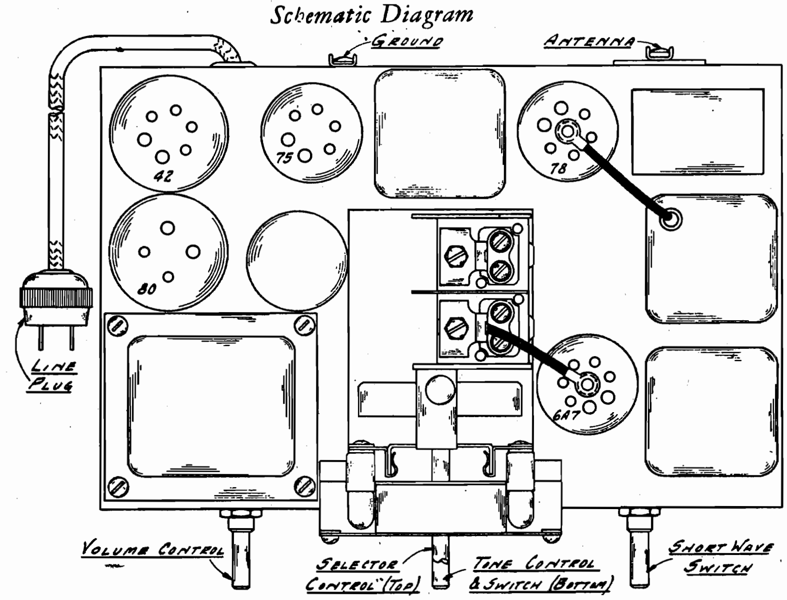
MODEL 5B
Schematic, Voltage
Socket, Data

DETROLA RADIO CORP.



Schematic Diagram





TUBE SOCKET VOLTAGES

Tube No.	Control Grid to Cathode	Screen to Cathode	Plate to Cathode	Plate M. A.	Tube Socket Voltages Heater or Filament Voltage
6A7 1st Det.	* 3	100	250	4	6.3
OSC.	* 4	...	90	4	...
78—I. F.	* 3	100	250	7	6.3
75—2nd Det. A. V. C.	** 1.5	...	75	.8	6.3
42—Audio	***16	250	235	34	6.3
80—Rect.	....	...	...	29 per plate	5.0

All voltage readings taken with 1000 ohm per volt voltmeter using test leads.
*10 volt scale, voltage from ground to terminal on candohm with 500M on resistor.
**10 volt scale, voltage readings from ground to terminal on candohm with single black wire.
***250 volt scale, voltage readings from ground to terminal on candohm connected to filter condenser.

MODEL 5B
Alignment
Parts List

SERVICE NOTES

for

Detrola 5-B All Wave Receiver

The Detrola 5-B is a five-tube, three-band, all-wave, superheterodyne receiver designed for the reception of frequencies from 540 to 16000 KC. The broadcast band covers frequencies from 540 to 1700 KC; the Police band covers frequencies from 1.6 to 5.5 MC and the Foreign band covers frequencies from 5.4 to 16 MC.

The 5-B employs the following tubes, used in their respective circuits: 1 type 6A7 first detector and oscillator; 1 type 78 intermediate amplifier; 1 type 75 delayed AVC, second detector and first audio; 1 type 42 final audio stage; 1 type 80 double wave rectifier.

RF and IF ALIGNMENT

The RF and IF circuits of the 5-B are properly aligned and tested and should need no further adjustment. Should it become necessary, however, to check the adjustment the following equipment will be necessary: 1 calibrated oscillator calibrated for all the frequencies used in this receiver, both IF and RF, and a sensitive output meter.

In order to prevent the AVC from operating and giving a false reading on the output meter the following procedure should be followed: The oscillator should be loosely coupled to the receiver so that only a small deflection will show on the output meter with the volume control of the receiver on the maximum position. This applies to both IF and RF adjustments.

IF ALIGNMENT—To align the intermediate transformer, adjust the test oscillator to 370 KC and couple to the control grid of the first detector and adjust the trimmer condensers on the intermediate transformers for the maximum reading on the output meter.

RF ALIGNMENT—To align the RF circuit: (1) Set pointer on tuning chart to 1400 KC with band switch in broadcast position. (2) Adjust oscillator to 1400 KC and connect to antennae terminal on chassis. (3) Adjust trimmer on tuning condenser for maximum reading. (4) Reset dial pointer and test oscillator to 600 KC and adjust 600 KC padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment. (5) Reset dial pointer and oscillator to 1400 KC and readjust trimmer on tuning condenser for maximum reading.

SHORTWAVE ALIGNMENT— (1) Set dial pointer on 3.5 MC and band switch on center position. (2) Adjust oscillator to approximately 3.5 MC or for maximum reading on output meter. (3) Adjust 3.5 MC padding condenser for further increase on the output meter. (4) Set band switch on right hand position. (5) Set dial pointer to 15 MC. (6) Readjust test oscillator to approximately 15 MC or for maximum reading on output meter and adjust 15 MC padding condenser for further increase on output meter.

ADJUSTMENT OF WAVE TRAP

To adjust wave trap to prevent the reception of commercial code signals from stations operating on or about 370 KC, connect test oscillator to antennae terminal on chassis and set to 370 KC and adjust wave trap padding condenser for minimum signal on output meter.

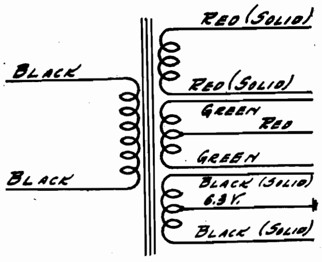
The high and low frequency padding condensers are mounted on the right hand end of the chassis in the following order from front to back: 3.5 MC, 15 MC, 600 KC, and wave trap.

RELACEMENT PARTS MODEL 5-B

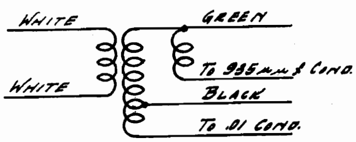
Part No.	DESCRIPTION	List Price	Part No.	DESCRIPTION	List Price
563	.05 mf—400 volt tubular condenser	$0.15	1392	By-pass condenser block	1.30
572	.1 mf—200 volt tubular condenser	.15	1393	2 gang variable condenser	2.40
575	.1 mf—400 volt tubular condenser	.15	1396	Antenna coil can—natural finish	.20
578	Electrolytic condenser, 10 mfd, 30 volts	.65	1397	Oscillator coil can—natural finish	.20
589	50 mmf mica condenser, type "W"	.15	1398	Electrolytic condenser, 8-8 mfd, 450 volts	2.10
590	250 mmf mica condenser, type "W"	.15	1399	Power transformer	3.20
602	250,000 ohm carbon resistor, 1/5 watt	.15	1400	Candohm resistor	.60
603	100,000 ohm carbon resistor, 1/5 watt	.15	1401	All-wave switch	2.20
615	500,000 ohm carbon resistor, 1/5 watt	.15	1402	Single stage padder	.40
631	50,000 ohm carbon resistor, 1/5 watt	.15	1404	7 prong socket No. 6A7	.10
934	Attachment cord—6 feet	.30	1410	Dial chart	.40
936	4 prong socket No. 80	.10	1412	1750 mmf mica condenser, type "W"	.30
937	6 prong socket No. 42	.10	1413	3900 mmf mica condenser, type "W"	.40
939	6 prong socket No. 78	.10	1414	25,000 ohm carbon resistor, 1 watt	.15
1028	6 prong socket No. 75	.10	1415	6" speaker	6.30
1083	Tone control with A. C. switch, 250,000 ohms	1.00	1423	Knobs	.10
1084	Volume control, 1 megohm	.70	1427	Cabinet	5.40
1096	Tube shield (aluminum), natural finish	.15	1441	Oscillator coil	1.00
1097	Tube shield cap (aluminum)	.15	1442	Antenna coil	1.00
1098	Tube shield base (aluminum)	.10	1443	Wave trap	.90
1107	550 mmf mica condenser, type "W"	.20	1444	1st IF transformer	1.60
1199	Pointer	.10	1445	2nd IF transformer	2.40
1274	Escutcheon plate	.40			

MODEL 5D
Schematic, Voltage
Socket, Data

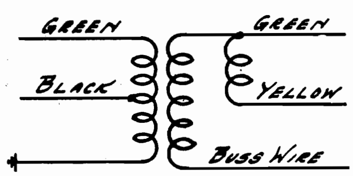
DETROLA RADIO CORP.



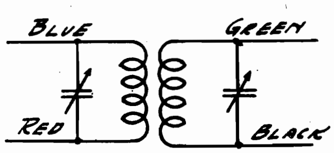
POWER TRANS.



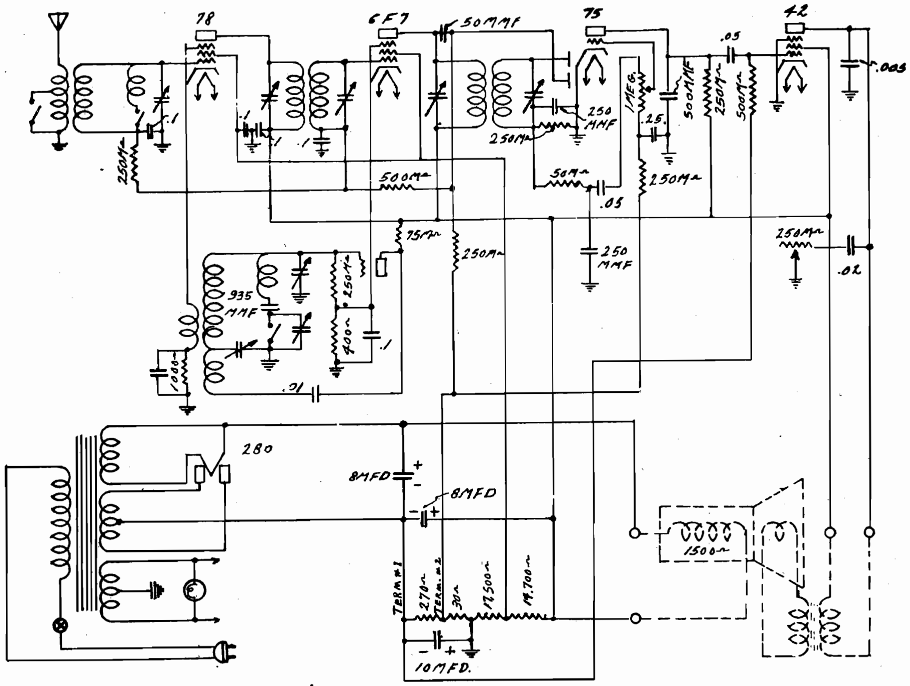
OSC. COIL



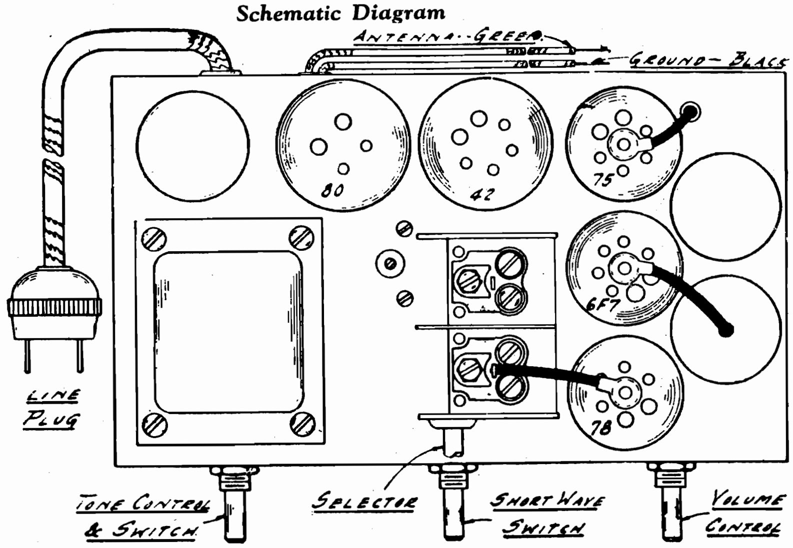
ANTENNA COIL



1ST AND 2ND I.F. TRANS.



Schematic Diagram



Top View of Chassis

TUBE SOCKET VOLTAGES

Tube No.		Cathode to Heater Voltage	Cathode to Screen Voltage	Cathode to Plate Voltage	Cathode to Control Grid Voltage	Plate M.A.	Heater Voltage
78—1st Det.		4.5	100	230	* 6.5	4.25	6.3
6F7	Pentode I. F.	3	100	235	* 4.5	6.0	6.3
	Triode OSC.			80	4.75	2.0	
75—2nd Det.		...	...	220	* 1.75	.4	6.3
42—2nd Audio		...	235	220	**16.5	28.	6.3
80—Rect.		...	...	...	.....	27 per plate	5.0

*Voltage from cathode to terminal No. 2 on the voltage divider.
**Voltage from cathode to terminal No. 1 on the voltage divider.
All voltage readings taken with high resistance Volt Meter (1000 ohms per volt) using test leads, all tubes in sockets, antenna grounded to chassis, no signal.

MODEL 5D
Alignment
Parts List

SERVICE NOTES

for

Detrola 5-D Dual-Band Receiver

The Detrola 5-D is a five tube superheterodyne, dual-wave receiver covering broadcast frequencies of 550 to 1500 kilocycles and short-wave frequencies of 1.5 to 4.75 megacycles.

It employs the following tubes: Type 78, first detector; type 6F7, intermediate stage and oscillator (the pentode section being used for the intermediate stage, and the triode for the oscillator); type 75, delayed AVC, second detector, and first audio (one diode being used for the AVC and the other for the detector, triode being used for the first audio stage); type 42, final amplifier; type 80, rectifier.

R. F. and I. F. ALIGNMENT

The R. F. and I. F. circuits are properly aligned at the factory with a crystal control oscillator and should require little or no attention. Should it become necessary, however, to check the alignment, an output meter and a calibrated oscillator will be necessary. The automatic volume control in the receiver will defeat the purpose of the output meter unless the following precautions are taken:

I. F. ALIGNMENT—To align the intermediate frequency transformers (1) adjust test oscillator to 455 kilocycles and couple to the control grid of first detector (reduce coupling so that only small deflection is obtained on output meter with volume control in the maximum position). (2) Adjust I. F. trimmers for maximum reading on output meter.

R. F. ALIGNMENT—To align the R. F. circuits (1) set the pointer on the tuning chart to 1400 kilocycles and adjust test oscillator to the 1400 kilocycles. (2) Connect oscillator to antenna connection of chassis, reducing coupling as outlined in I. F. adjustments and adjust trimmer on front of chassis for maximum reading. The above procedure should be repeated at 600 kilocycles adjusting ONLY THE LOW FREQUENCY TRIMMER ON TOP OF CHASSSIS.

The short-wave band may be aligned by setting the test oscillator on 1400 kilocycles and using the 2800 kilocycles harmonic and setting the pointer on the tuning chart to approximately 2.8 megacycles and adjusting trimmers on tuning condenser for maximum reading.

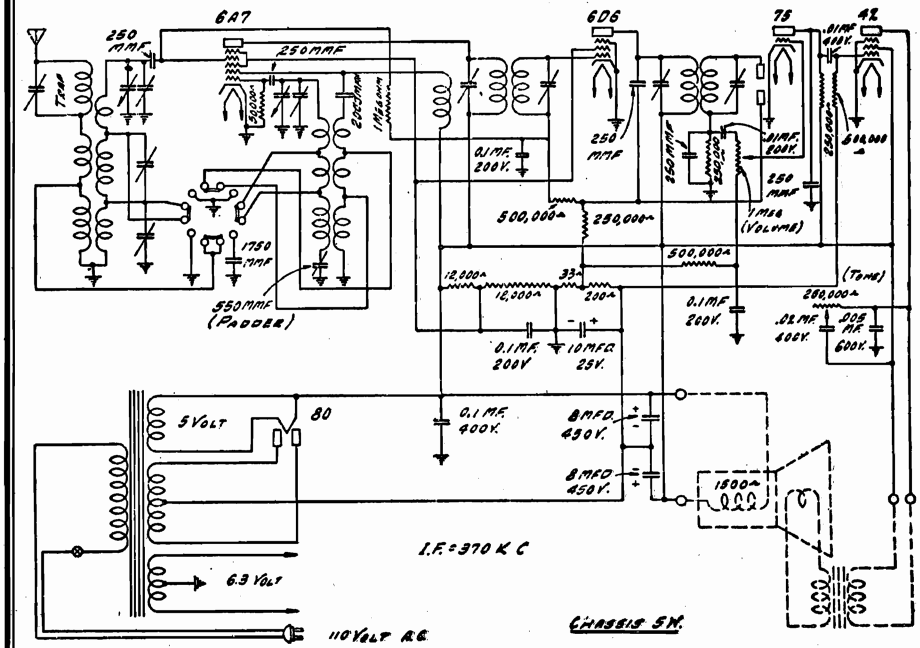
For a more detailed explanation concerning the operation of the delayed automatic volume control used in this receiver and for further service suggestions, refer to the service notes of the Detrola 7-A.

REPLACEMENT PARTS MODEL 5-D

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
532	Knobs	$0.10	937	6 prong socket No. 42	.10
563	.05 mfd 400 volt condenser	.15	939	6 prong socket No. 78	.10
568	.01 mfd 400 volt condenser	.15	993	Oscillator coil shield	.10
572	.1 mfd 200 volt condenser	.15	997	Tube shield base	.15
575	.1 mfd 400 volt condenser	.20	1013	Power transformer	2.90
576	.02 mfd 400 volt condenser	.15	1014	8-8 mfd 450 volt filter condenser	2.05
579	.25 mfd 200 volt condenser	.20	1015	Short wave switch	.80
580	.05 mfd 200 volt condenser	.15	1016	.00002 padder condenser	.30
581	.005 mfd 600 volt condenser	.15	1017	.0005 padder condenser	.40
589	50 mmf mica condenser	.15	1018	1st IF transformer	1.60
590	.00025 mica condenser	.15	1019	2nd IF transformer	1.50
595	10 mfd 35 volt condenser	.65	1022	Cabinet	4.60
602	250,000 ohm resistor, 1/5 watt	.15	1027	4 prong socket No. 6F7	.10
612	75,000 ohm resistor, 1/2 watt	.15	1028	6 prong socket No. 75	.10
615	500,000 ohm resistor	.15	1034	Speaker	6.90
631	50,000 ohm resistor	.15	1038	Pyralin diffuser—blue	.10
791	Tube shield	.10	1042	Escutcheon plate	.30
912	Station selector dial	.25	1052	Candohm resistor, 1000 ohms	.20
919	Volume control	.70	1054	935 mmf mica condenser	.20
921	Tone control with A.C. switch	.90	1079	Candohm resistor, 350 ohms	.20
922	Candohm resistor, 32,500 ohms	.65	1124	Antenna coil	.50
926	Tuning condenser	2.20	1126	Oscillator coil	.50
934	Power cord	.30	1128	Pyralin diffuser—red	.10
936	4 prong socket No. 80	.10	1168	Pilot light socket	.15

DETROLA RADIO CORP.

MODEL 5W
Schematic
Voltage
Parts List



For Alignment, see Index

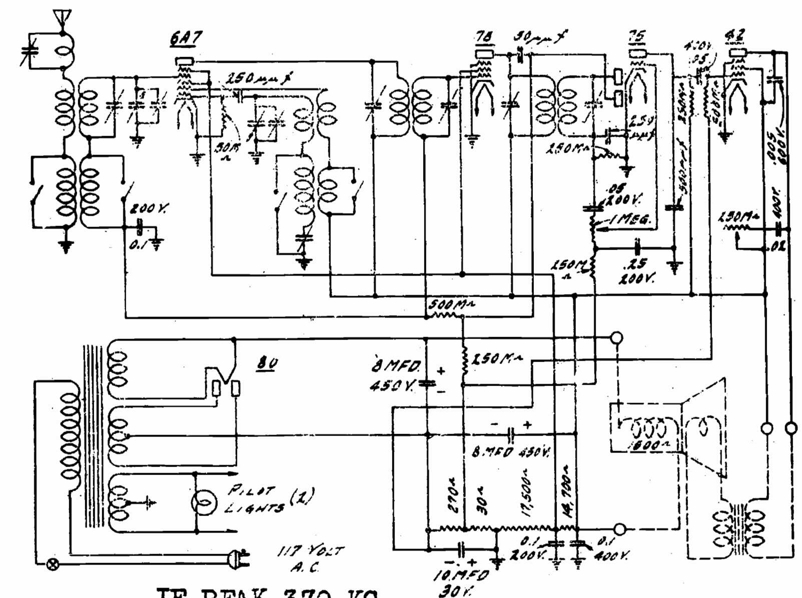
TUBE SOCKET VOLTAGES

Tube Number		Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltages Heater or Filament Voltage
6A7	1st Det.	*2	80	210	3.	6.3
	OSC.			200	4.	6.3
6D6—I. F.		2	80	210	7.	6.3
75—2nd Det.		2		100	.5	6.3
42—2nd Audio		**15	210	190	32.	6.3
80—Rect.						
					25 Per Plate	

*Terminal No. 5 on candohm to ground.
**Terminal No. 6 on candohm to ground.

Stock No.	DESCRIPTION
565	.01 mf. 200 volt tubular condenser
568	.01 mf. 400 volt tubular condenser
572	.1 mf. 200 volt tubular condenser
575	.1 mf. 400 volt tubular condenser
581	.005 mfd. 600 volt tubular condenser
576	.02 mf. 400 volt tubular condenser
590	250 mmf. Mica condenser plus-minus 10%
602	250,000 ohm carbon resistors, 1/5 watt
615	500,000 ohm carbon resistors, 1/5 watt
624	1 megohm carbon resistors, 1/5 watt
631	50,000 ohm carbon resistors, 1/5 watt
791	Goat tube shields with ring
936	4-prong tube socket, marked No. 80
937	6-prong tube socket, marked No. 42
1013	Power transformer
1034	6" dynamic speaker
1199	Pointer
1203	Tension spring
1277	Dial cable
1402	Single padder condenser
1404	7-prong tube socket, marked 6A7
1412	1750 mmf. Mica Condenser
1527	Escutcheon ring
1572	Volume control
1573	Tone control and AC switch
1597	Glass crystal
1611	Midget trimmer condenser, bakelite base
1626B	2-gang variable condenser
1715	Candohm resistor
1716	3-way, 12 point switch
1720	6-prong socket, marked 6D6
1721	7-prong tube socket, marked 75
1724	2000 mmf. Mica condenser
1733	Cabinet
1762	Dial
1646	1st I. F. Transformer
1647	2nd I. F. Transformer
1763	B. C. Antenna coil
1764	Short wave antenna coil
1765	Oscillator coil

MODEL 5X
Schematic, Voltage
Parts List



IF PEAK 370 KC.

Tube Number		Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltages Heater or Filament Voltage
6A7	1st Det.	*1.75	92	225	4	6.3
	OSC.	0	0	225	4	6.3
78—I. F.		*1.75	92	225	7	6.3
75—2nd Det.		*1.75	0	**110	.8	6.3
42—2nd Audio		***17	225	212	34	6.3
80—Rect.						

For Alignment, see Index

***Voltage from No. 1 terminal on voltage divider to ground using 250 volt scale.

**Voltage from plate to ground using 250 volt scale.

*Voltage from ground to second terminal on voltage divider using 10 volt scale.

The above voltage readings were taken with 1,000 ohm per volt Volt Meter.

The Detrola 5-X is a 5 tube superheterodyne designed for receivers on frequencies from 540 to 1500 KC and from 5300 to 17,000 KC,

Stock No.	DESCRIPTION
563	.05 mf. 400 volt tubular condenser
572	.1 mf. 200 volt tubular condenser
575	.1 mf. 400 volt tubular condenser
576	.02 mf. 400 volt tubular condenser
578	10 mfd. 30 volt tubular electrolytic condenser
579	.25 mf. 200 volt tubular condenser
580	.05 mf. 200 volt tubular condenser
581	.005 mf. 500 volt tubular condenser
588	500 mmf. mica condenser, type "W"
589	50 mmf. mica condenser, type "W"
590	250 mmf. mica condenser, type "W"
602	250,000 ohm carbon resistor, 1/5 watt
615	500,000 ohm carbon resistor, 1/5 watt
631	50,000 ohm carbon resistor, 1/5 watt
922	Candohm resistor (per dwg.)
934	Attachment cord
1013	Power transformer
1017	Padder condenser, 500 mmf.
1028	6-prong tube socket
1034	6" dynamic speaker
1168	Pilot light socket assembly
1199	Pointer
1404	7-prong tube socket, marked 6A7
1526	Bakelite knob
1527	Escutcheon plate
1571	Dual wave switch
1572	Volume control
1573	Tone control and A.C. switch
1611	Midget trimmer condenser
1624	Elect. condenser 8-8 mfd. 450 volt
1625	Wave trap shield can
1626	2-gang variable condenser
1629	Dial chart
1627	Cabinet
1646	1st I. F. transformer assembly
1647	2nd I. F. transformer assembly
1648	Oscillator coil assembly
1649	Short wave antenna coil
1540	Broadcast antenna coil assembly
1650	Wave trap
1640	8" dynamic speaker

DETROLA RADIO CORP.

Service Notes

MODELS 5X & 6X

I. F. ALIGNMENT

To align the intermediate transformer the test oscillator should be adjusted to 370 KC and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT

The R.F. circuits: (1) Set pointer on tuning chart to 1400 KC with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 KC and connect to antennae terminal on chassis. (3) Adjust trimmer on tuning condenser for maximum reading. (4) Reset dial pointer on test oscillator to 600 KC. (5) Reset test oscillator to 600 KC. (6) Adjust 600 KC padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment. (7) Reset dial pointer and test oscillator to 1400 KC and readjust trimmer on tuning condenser for maximum reading on output meter. (The 600 KC padding condenser is the right hand condenser mounted on the rear of the chassis.)

SHORT WAVE ALIGNMENT

(1) Set dial pointer on 10 MC and band switch on short wave postion. (2) Adjust test oscillator to approximately 10 MC or for maximum reading on output meter. (3) Adjust 10 MC padding condenser mounting on top of chassis near turning condenser for a further increase reading on output meter. (The wave trap trimmer condenser is the left hand condenser on the rear of the chassis.)

WAVE TRAP ADJUSTMENT

(1) To adjust wave trap to prevent reception of commercial code signals from stations operating on or about 370 KC, connect test oscillator to antennae terminal on chassis. (2) Adjust test oscillator to 370 KC. (3) Adjust wave trap condenser mounted on right hand end of the chassis for *minimum* signal on output meter.

POWER SUPPLY:

The 6-X is designed to operate on 110 volts A. C. or D. C. current.
The Model 5-D-X may be supplied for operation on different sources of power supply; namely, 110 volts, 25 cycles; 110 volts, 60 cycles; and 200 volts, 60 cycles.

MODELS 5W & 6W

I. F. ALIGNMENT:

To align the intermediate transformer, the test oscillator should be adjusted to 370 K. C. and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT:

To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K. C. with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 K. C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K. C. (5) Adjust 600 K. C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K. C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K. C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K. C. (14) Set band change switch in broadcasting position and adjust 1400 K. C. trimmer for maximum reading (the 1400 K. C. trimmer is mounted under the chassis directly over the antenna coil).

WAVE TRAP ADJUSTMENT:

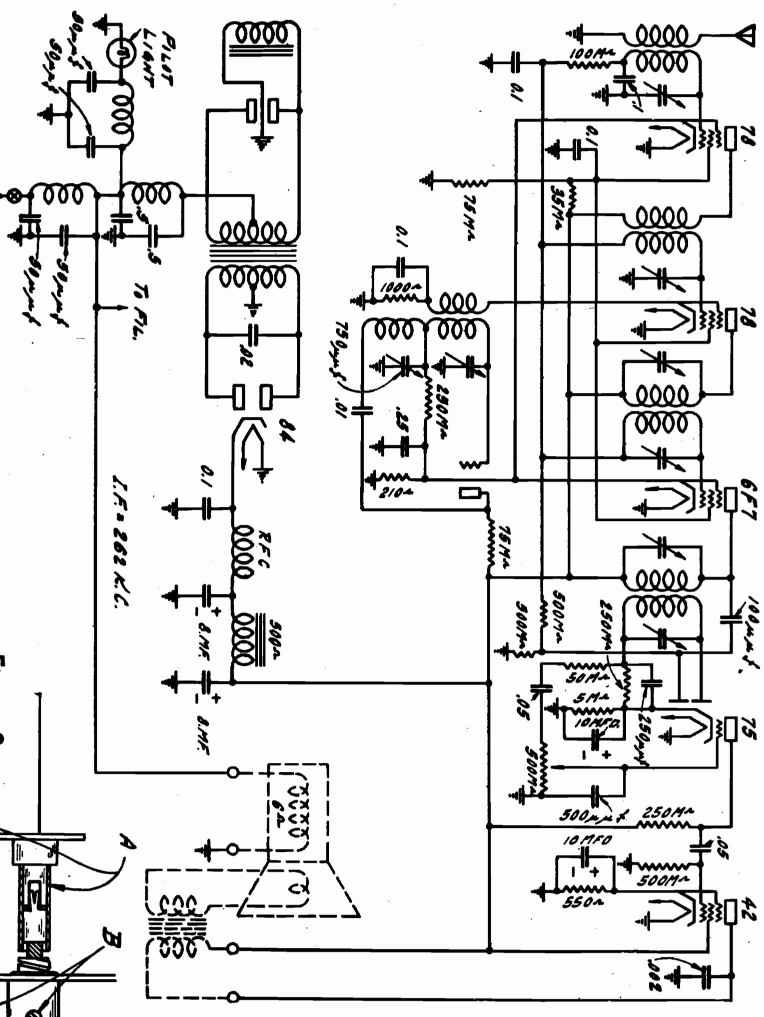
This receiver is designed with a wave trap to prevent interference from commercial code stations operating on or about 370 K. C. To adjust the wave trap, set test oscillator on 370 K. C. and connect to antenna lead on chassis and adjust wave trap trimmer condenser for minimum signal on the output meter (the wave trap is mounted on the rear left end of the chassis).

POWER SUPPLY:

The 5-W is designed for operation on different sources of power supply: namely, 110 volts, 25 cycles; 110 volts, 60 cycles, and 220 volts, 60 cycles.

MODEL 6A
Schematic, Voltage
Alignment

DETROLA RADIO CORP.



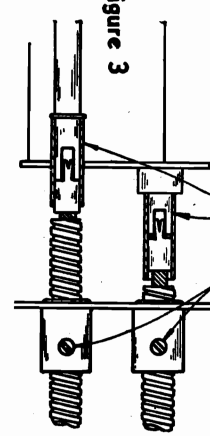


Figure 3

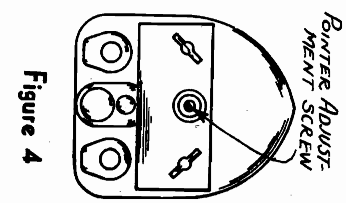


Figure 4

Service Data

Type and Number of Tubes Used:
2 Type 78 — 1 Type 6f7 — 1 Type 75
1 Type 42 — 1 Type 84

Total Battery Current .... 6.5 Amps.
Undistorted Output .... 3 Watts
Speaker Field Current .... 1 Amp.
Rectifier Output Voltage 250
Total Plate Current .... 50 M.A.

Plate Supply Unit

This receiver uses a vibrator type inverter and tube rectifier to provide a source of direct current voltage as plate and grid supply for all the tubes This unit is very accurately adjusted at the factory, and service adjustment should not be attempted.

Low Volume

Low volume may be caused by weak or defective tubes (replace with set of tubes known to be in good condition), or antenna grounded or shielded due to wire netting not cut loose from the metal construction of the top.

Low Voltage

Low voltage may be caused by 84 rectifier, shorted filter or bypass condenser, defective power transformer or vibrator unit.

Excessive Hum

Excessive hum may be caused by defective 84 tube, or defective vibrator unit. In cases where the vibrator unit proves to be defective no adjustment should be attempted, the unit should be replaced with a new or replacement unit.

Continuity Test

By referring to the schematic diagrams in figures 5 and 6 a complete continuity test for open and short circuits can be made for all parts of the receiver. A suitable continuity test can be made by using 0 to 50 volt voltmeter and a 45 volt B battery. More accurate readings can be obtained by using a calibrated ohm meter.

R. F. and I. F. Adjustments

The trimmers on the tuning condenser and the intermediate transformers are very accurately adjusted with a crystal control oscillator before the receiver leaves the factory and should need little or no attention; however, to check the adjustments the following procedure should be followed.

I. F. Adjustments

In order to make the I. F. adjustments it is necessary to remove the top and bottom cover of the receiver case and proceed as follows, adjust test oscillator at 262 kilocycles, place the receiver in operation and connect the oscillator output to the grid of the first detector tube and connect the output meter across the voice coil of the loud speaker. Then connect the antenna lead to the ground of the chassis and adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output coupling until a small deflection is obtained at the output meter. Unless this is done the action of the A. V. C. will make it impossible to obtain a correct adjustment. Adjust trimmers for maximum reading on output meter.

R. F. Adjustments

The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the padder condenser adjusted at 600 kilocycles respectively. Proceed as follows, adjust the test oscillator at 1400 kilocycles and couple to the antenna off the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1550 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 750 M. M. F. padder condenser (mounted on the chassis near the loud speaker) for maximum reading.

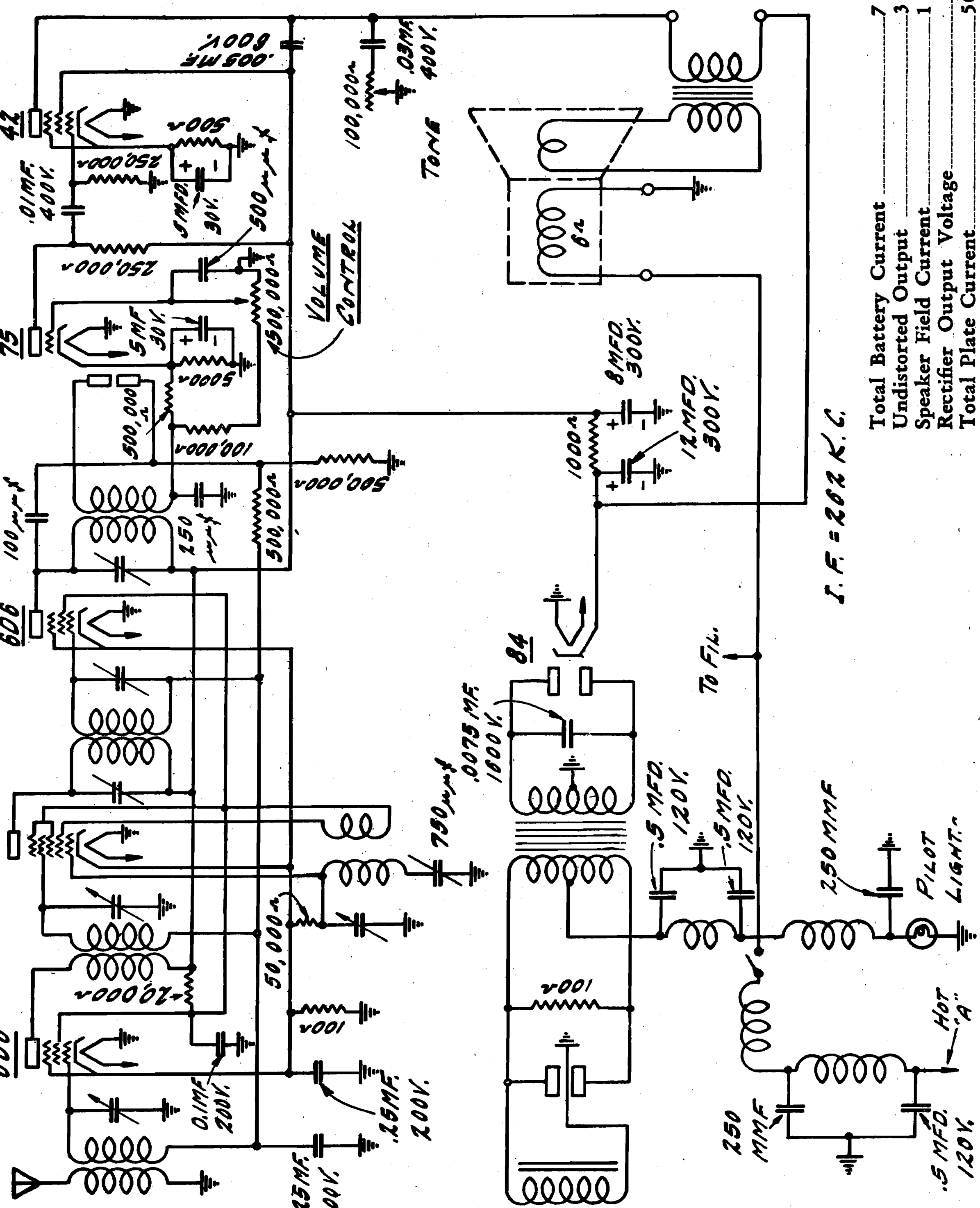
TUBE SOCKET VOLTAGES

6.3 Volt Battery

Tube No.		Cathode to Ground	Cathode to Screen Volts	Cathode to Plate Volts	Plate Current M. A.
78	R. F.	*3.5	100	250	6.0
78	First Detector	*5.	100	250	4.0
6F7	Pentode I. F.	*3.5	100	250	6.0
	Triode OSC.		00	100	2.5
75	Second Detector A. V. C. First Audio	*1.7	00	**150	.3
42	Second Audio	*17.5	250	245	27.0
84	Rectifier				25 M.A. Per Plate

All the above voltage readings were taken by a high resistance volt meter (1000 ohms per volt) using test leads, all tubes in sockets no signal. (**750 volt scale) (*250 volt scale).

MODELS 6M, 6R
Schematic



Total Battery Current .... 7 Amps.
Undistorted Output .... 3 Watts
Speaker Field Current .... 1 Amp.
Rectifier Output Voltage 240
Total Plate Current .... 50 M.A.

Schematic Diagram for Model 6-M.

Model 6R is the same as Model 6M, but it has no tone control and uses a 5-inch speaker.

MODELS 6M, 6R
Installation Data
Voltage, Alignment
Parts List

DETROLA RADIO CORP.

Drilling Template

Packed in each receiver package is a drilling template, which contains the exact location of the mounting hole. This template is furnished as an aid in locating mounting hole for the chassis, doing away with the necessity of one man holding the chassis while another locates the hole. However, in using this template we wish to utter a word of caution: Do not overlook any rods, wires or units mounted on the dash, which might not interfere with the location of the template, but which would prohibit the mounting of the set. In this way, unnecessary drilling of holes will be avoided.

Antenna Lead-in Connection

An antenna lead-in shield is furnished in the receiver package. The antenna lead wire should be run through this shield, and the shield extended up to where the lead-in leaves the corner post in order to shield the entire length of the lead-in wire, the other end of the lead-in wire should be soldered to a small ferrule which makes connection with a spring socket on the inside of the chassis. At the other end of the shield there is a small piece of braid which should be securely grounded to the dash of the car. (See Fig. No. 2.)

Caution: Clean surface thoroughly where shield braid is fastened to the dash, in order to insure a good ground.

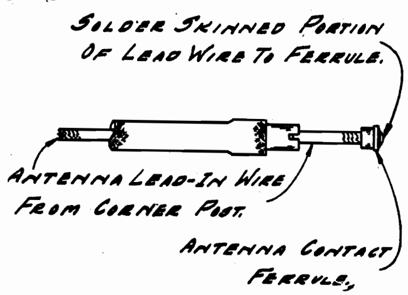


Figure 2

III. The Control Unit

The control unit is a combined Station Selector Dial (marked in kilocycles), tuning cable, volume control and switch cable, all assembled in one unit.

The control unit is designed to be fastened to the "flange" of the instrument panel by means of two thumb screws.

In locating the position for the control unit, it is advisable to leave this operation until the receiver has been located and mounted. Then the best position for the control unit can be determined which will not only allow easy accessibility for the driver, but will also allow for the least possible bend in the "Control Cables" which will ensure as smooth as possible operation of those controls, with a minimum possibility of the cables binding due to an extremely sharp bend.

Connecting Drive Cables and Casing to Control Unit

We would suggest that the "Drive Cables" be connected to the "Control Unit" before it is permanently fastened to the instrument panel. The cable connections to the receiver should be made on the bench, before the set is installed and it should not be necessary to remove these cables in making the installation.

The cable which enters the receiver at the top is the volume control and is connected to the volume control shaft by a slot milled in the end of the shaft and held in place by metal sleeve (A). See Fig. 3. The lower shaft is the tuning control and is connected in the same manner as the volume control.

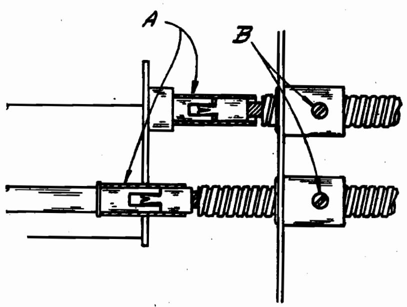


Figure 3

Adjusting the Dial Pointer

To adjust the dial pointer for the correct kilocycle reading, tune the receiver to a station of known frequency and adjust pointer with a screw driver by turning the adjusting screw on the back of the control head. (See Fig. No. 4.)

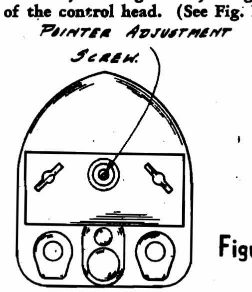


Figure 4

Tube No.		Cathode to Ground	Cathode to Screen Volts	Cathode to Plate Volts	Plate Current M. A.
6D6	R. F.	*1.2	70	230	1.2
6A7	First Detector	*1.2	70	230	1.
	OSC.	***1.8		70	2.2
6D6	I. F.	*1.2	70	230	1.2
75	Second Detector AVC. First Audio	*1.2		**70	.3
42	Second Audio	15	230	235	28
84	Rectifier.				25 M.A. Per Plate

All the above voltage readings taken with a 1,000 ohm per volt voltmeter using test leads all tubes in socket no signal.
*6 volts scale.
**250 volt scale.
***Voltage across 50,000 ohm oscillator grid leak (6 volt scale).

R. F. and I. F. Adjustments

The trimmers on the tuning condenser and the intermediate transformers are very accurately adjusted with a crystal control oscillator before the receiver leaves the factory and should need little or no attention; however, to check the adjustments the following procedure should be followed.

I. F. Adjustments

In order to make the I. F. adjustments it is necessary to remove the top and bottom cover of the receiver case and proceed as follows, adjust test oscillator at 262 kilocycles, place the receiver in operation and connect the oscillator output to the grid of the first detector tube and connect the output meter across the voice coil of the loud speaker. Then connect the antenna lead to the ground of the chassis and adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output coupling until a small deflection is obtained at the output meter. Unless this is done the action of the A. V. C. will make it impossible to obtain a correct adjustment. Adjust trimmers for maximum reading on output meter.

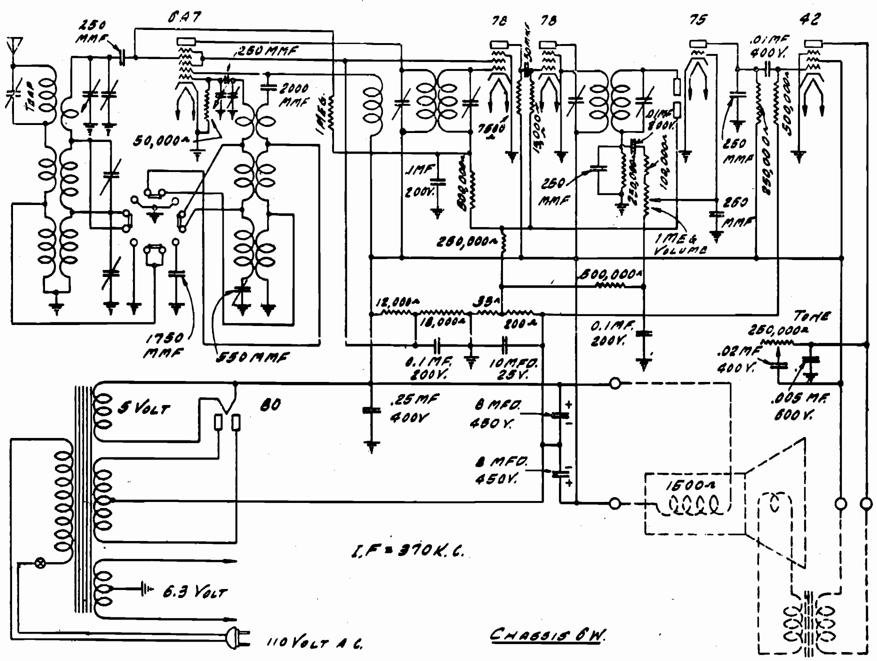
R. F. Adjustments

The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the padder condenser adjusted at 600 kilocycles respectively. Proceed as follows, adjust the test oscillator at 1400 kilocycles and couple to the antenna of the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1550 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 750 M. M. F. padder condenser (mounted on the chassis near the loud speaker) for maximum reading.

Stock No.	DESCRIPTION	List Price
557	Carriage bolt and nut	$0.20
564	Distributor suppressor	.50
565	.01 mfd. 200-volt tubular condenser	.15
568	.01 mfd. 400-volt tubular condenser	.20
569	.5 mfd. 200-volt interference condenser	.30
572	.1 mfd. 200-volt tubular condenser	.15
575	.1 mfd. 400-volt tubular condenser	.20
579	.25 mfd. 200-volt tubular condenser	.20
581	.005 mfd. 600-volt tubular condenser	.20
588	500 mmf. Mica condenser, type W	.20
589	50 mmf. Mica condenser, type W	.15
602	250,000 ohm carbon resistor, 1/5 watt	.15
603	100,000 ohm carbon resistor, 1/5 watt	.15
613	20,000 ohm carbon resistor, 1 watt	.15
614	5,000 ohm carbon resistor, 1/5 watt	.15
615	500,000 ohm carbon resistor, 1/5 watt	.15
631	50,000 ohm carbon resistor, 1/5 watt	.15
791	Goat tube shields with ring	.10
937	6-prong tube socket, marked No. 42	.10
1028	6-prong tube socket, marked No. 75	.10
1052A	Candohm resistor, 1,000 ohm	.20
1225	Antenna and detector aluminum shield can	.20
1235	Power transformer	2.80
1238	Vibrator unit	4.20
1241	"A" battery lead assembly	.60
1249	5-prong tube socket, marked No. 84	.10
1272	Low power factor condenser, .5 mfd., 120-volt	.40
1285	100 mmf. mica condenser	.15
1286	250 mmf. mica condenser	.15
1292	Shaft coupling tubing	.10
1296	Shielded antenna loom	.60
1299	Antenna connector socket	.20
1404	7-prong tube socket, marked No. 6A7	.10
1720	6-prong tube socket, marked No. 6D6	.10
1727	Goat tube shield bases	.10
1869	.015 mfd. 300-volt tubular condenser	.20
1870	750 mmf. variable padder condenser	.30
1871	100 ohm carbon resistor, 1/5 watt	.15
1872	500 ohm carbon resistor, ½ watt	.15
1875	Oscillator shield can	.20
1880	3-gang variable condenser	3.60
1881	Volume control and switch	1.00
1882	Electrolytic condenser	1.95
1883	6" dynamic Jensen speaker	5.85
1887	.0075 mfd. 1,600-volt buffer condenser	.65
1888	Toggle switch S. P. S. T. (tone control)	.20
1233A	First I. F. transformer	1.60
1904	Second I. F. transformer	1.60
1910	Remote control unit	4.00
1914	Pilot light lead	.60
1915	1 mfd. 120-volt low-power factor condenser	.30
1949	Volume control shaft	1.50
1950	Tuning control shaft	1.50
1951	Antenna coil	.75
1952	Detector coil	.75
1953	Oscillator coil	.80

DETROLA RADIO CORP.

MODEL 6W
Schematic
Voltage
Parts List



TUBE SOCKET VOLTAGE

Tube Number		Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Heater Voltage
6A7	1st Det.	*2	85	210	3.	6.3
	OSC.			210	4.	
78—1st I. F.		*2	85	150	7.	6.3
78—2nd I. F.		*2	85	210	4.	6.3
75—2nd Det.		*2		110	.5	6.3
42—2nd Audio		**15	210	190	32.	6.3
80—Rect.					25 Per Plate	5.

*Terminal No. 5 on candohm to ground.

**Terminal No. 6 on candohm to ground.

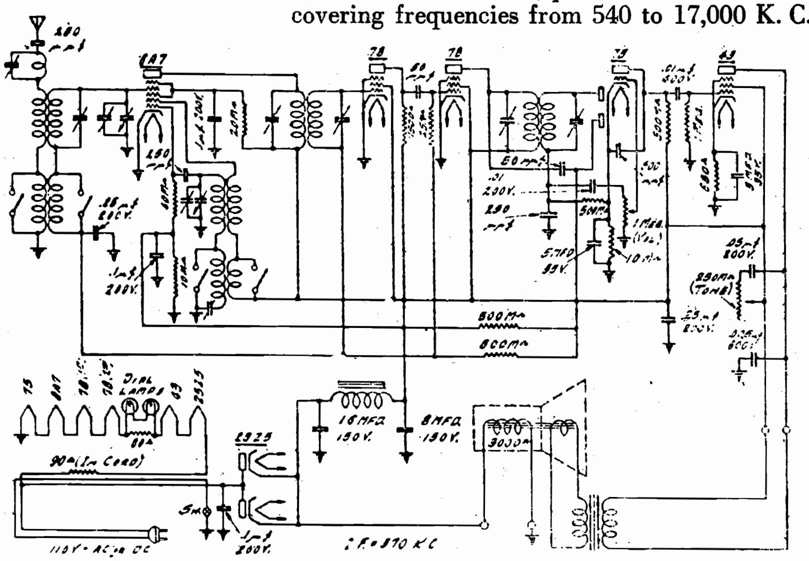
For Alignment, see Index

Stock No.	DESCRIPTION
565	.01 mf. 200 volt condenser
568	.01 mf. 400 volt condenser
572	.1 mf. 200 volt condenser
575	.1 mf. 400 volt condenser
578	10 mfd. 30 volt electrolytic condenser
576	.02 mf. 400 volt condenser
581	.005 mf. 600 volt condenser
589	50 mmf. Mica condenser
590	250 mmf. Mica condenser
602	250,000 ohm carbon resistor, 1/5 watt
603	100,000 ohm carbon resistor, 1/5 watt
609	15,000 ohm carbon resistor, 1/5 watt
610	7,500 ohm carbon resistor, 1/5 watt
615	500,000 ohm carbon resistor, 1/5 watt
624	1 megohm carbon resistor, 1/5 watt
631	50,000 ohm carbon resistor, 1/5 watt
936	4-prong tube socket, marked 80
937	6-prong tube socket, marked 42
939	6-prong tube socket, marked 78
1013A	Power transformer
1028	6-prong tube socket, marked 75
1034	6" dynamic speaker
1277	Dial cable
1402	Single padder condenser
1404	7-prong tube socket, marked 6A7
1412	1750 mmf. Mica condenser
1572	Volume control
1573	Tone control and AC switch
1597	Glass crystal
1624A	8-8 mfd. 450 volt electrolytic condenser
1714	Dial chart
1715	Candohm resistor
1716A	3-way, 12 point switch
1727	Goat shield bases
1724	2000 mmf. Mica condenser
1733	Cabinet
1741	Wave band escutcheon plate
1742	Wave band pointer knob
1745	Dual midget trimmer
1768	1st I. F. transformer
1769	2nd I. F. transformer
1770	Wave trap
1765	Oscillator coil
1764	Short wave antenna coil
1763	B. C. antenna coil

MODEL 6X
Schematic
Voltage
Parts List

DETROLA RADIO CORP.

The Model 6-X is a 6-tube superheterodyne receiver designed for receptions on standard broadcast, police and amateur and European short wave broadcast, covering frequencies from 540 to 17,000 K. C.



Stock No.	DESCRIPTION
532	Bakelite knobs, K. K.
565	.01 mf. 200 volt tubular condenser
568	.01 mf. 200 volt tubular condenser
572	.1 mf. 200 volt tubular condenser
579	.25 mf. 200 volt tubular condenser
580	.05 mf. 200 volt tubular condenser
588	500 mmf. Mica condenser
589	50 mmf. Mica condenser
590	250 mmf. Mica condenser
600	10,000 ohm carbon resistor, 1/5 watt
610	7,500 ohm carbon resistor, 1/5 watt
615	500,000 ohm carbon resistor, 1/5 watt
617	20,000 ohm carbon resistor, 1/5 watt
621	25,000 ohm carbon resistor, 1/5 watt
624	1 megohm carbon resistor, 1/5 watt
636	40,000 ohm carbon resistor, 1/5 watt
1666	Candohm resistor, 60 ohms
1667	Filter choke
1675	Volume control with hex. nut
1676	Tone and A. C. switch with hex. nut
1677	Dual wave switch and hex. nut
1678	Elec. cond., 16-8-5-5 mfd.
1679	A. C. - D. C. cord, 90 ohms
1680	Double stage trimmer
1683	450 ohm carbon resistor, ½ watt
1687	6-prong tube socket, marked 43
1688	6-prong tube socket, marked 25z5
1690	2-gang variable condenser
1693	5″ dynamic Rol-a-speaker
1646	1st I. F. transformer assembly
1647	2nd I. F. transformer assembly
1649	Short wave antenna coil
1540	Broadcast antenna coil
1707	Oscillator coil
1711	Wave trap

For Alignment, see Index

TUBE SOCKET VOLTAGES

Tube Number		Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M. A. Plate	Tube Socket Voltages Heater or Filament Voltage
6A7	1st Det.	0	50	95	1.5	6.3
	OSC.	2		95	3.	
78—1st I. F.		0	95	50	2.5	6.3
78—2nd I. F.		0	95	95	5.	6.3
75—2nd Det.		1.		30	.25	6.3
43—2nd Audio			95	75	20	25.
25z5—Rect.						25.

MODEL 7A
Schematic
Voltage

DETROLA RADIO CORP.

Tube No.	Heater to Cathode Voltage	Control Grid to Cathode Voltage	Screen to Cathode Voltage	Plate to Cathode Voltage	Plate MA	Heater or Fil. Voltage
1—R. F.	0	4.5*	100	250	6.0	6.3
2—1st Det.	0	4 5*	100	250	6 0	6.3
3—I. F.	0	4.5*	100	250	6.0	6.3
4—2nd Det. AVC	0	2.0**	0	125	.75	6.3
5—Osc.	0	2.6	0	95	5 5	6.3
6—Audio	0	20.0	250	225	31.0	6.3
7—Rect.	0				32 per plate	5.0

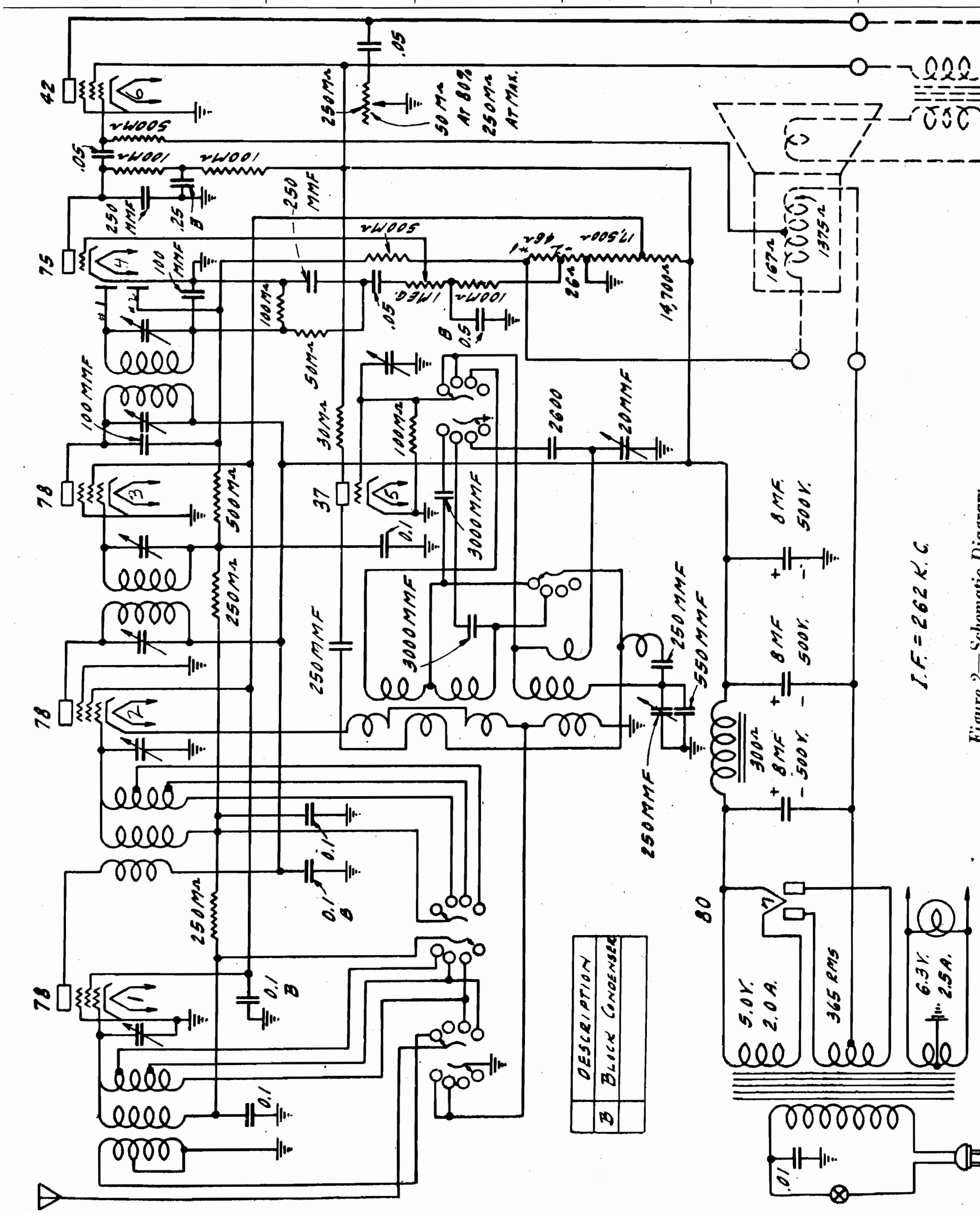


Figure 2—Schematic Diagram

Voltage reading taken with 1000 ohm per volt meter using test prods. All tubes in sockets, Ant. ground to chassis, no signal.
*Voltage from ground to terminal No. 1 ON THE VOLTAGE DIVIDER.
**Voltage from ground to terminal No. 2 ON THE VOLTAGE DIVIDER.

MODEL 7A
Alignment
Parts List

DETROLA RADIO CORP.

SERVICE NOTES for

Detrola 7-A All-Wave Receiver

The Detrola- 7A is a seven tube all-wave super-heterodyne receiver, covering broadcast frequencies 550-1520 kilocycles and short-wave frequencies 1.5-4 megacycles, 3.6-10 megacycles, 8-10 megacycles.

Other outstanding features of this receiver are:—78 triple grid super-control tubes in the R. F. first detector and I. F. stages; 37 oscillator; 75 double diode triode, operating as a delayed AVC, second detector and first audio; and the 42 super-power amplifier, delivering 3 watts of undistorted output to the speaker. The location and functioning of each tube is shown in Fig. 1. (Photo on back.)

The 78 tube operating in the R. F. and first detector and I. F. will handle large signal voltages and reduce cross modulation and modulation distortion to a minimum. The 37 tube, operating as an independent oscillator generating the correct oscillator voltage on all bands, greatly adds to the over-all sensitivity of the receiver. Due to the fact that a separate oscillator is used in the receiver, rather than an electron coupled oscillator, the receiver will be found to be extremely free from back ground noises on high frequency bands. This gives the listener the impression that the receiver is not as sensitive as sets using other types of oscillators with the accompanying hiss. The real test for the receiver is to try it on a good antenna in a residential district away from the shielding effect of steel buildings.

The 75 tube operating as a diode detector delayed AVC and first audio has several outstanding advantages. Diode No. 1 operating as a second detector rectifies the signal input voltage of the I. F. amplifier into pulsating DC voltage. This results in a more close approximation of the actual signal broadcast by the transmitting station than may be obtained by other types of detectors which cause considerable distortion in handling high signal voltages. Diode No. 2 operates as a delayed automatic volume control. This type of volume control has an advantage over a quick acting volume control inasmuch as it does not start to operate until the signal voltages have reached approximately 50 microvolts. This makes the receiver very sensitive to weak signals. This is especially desirable on short-wave reception as it allows a good audio output on weak signals, and at the same time reduces fading to a minimum.

AUTOMATIC VOLUME CONTROL

A word about the operation of the automatic volume control at this time may be in order. Diode No. 2 is coupled to the plate of No. 3 tube through a 100 mmf. R. F. bypass condenser impressing the R. F. carrier voltage on the diode at which point a rectifying action takes place and produces a DC voltage drop across the 500,000 ohm resistor in series with the diode and the cathode of the 75 tube, the circuit being completed through 72 ohms of the 32, 372 ohm voltage divider and the ground of the chassis. The voltage drop across the 72 ohms of the voltage divider, which is in series with the negative of the high voltage supply, furnishes a fixed bias of 4.5 volts for the control grids of tubes No. 1, 2 and 3. Refer to Fig. 2, it will be noted that the grid return of tubes No. 1, 2 and 3 return through isolating resistors to the end of the 500,000 ohm resistor that connects the No. 2 diode. When a strong signal is impressed upon the diode, the voltage across the 500,000 ohm resistor increases, thus increasing the control grid bias on the grids of No. 1, 2 and 3 tubes and lowering the sensitivity of the receiver. A weak signal will cause a lower voltage drop across the 500,000 ohm resistor, will decrease the control grid voltage, and will increase the sensitivity of the receiver, thus reducing fading of weak signals and blasting of powerful local stations.

WAVE BAND CHANGE SWITCH

The wave band change switch has four positions. The band on which the switch is set will be indicated by the illuminated chart on the airplane dial.

SERVICE SUGGESTIONS

(1) NOISY RECEPTION. Noisy reception may be checked by disconnecting the antenna from the receiver. If the noise completely stops or dimishes in volume it is an indication that it is being picked up by the antenna, and is not a fault of the receiver. However, if this does not effect the noise it is an indication that it may be in the receiver and is usually caused by defective tubes and can be found by tapping lightly on the tubes or other parts of the receiver which may be defective.

(2) LOW VOLUME. This trouble may be caused by weak or defective tubes (replace with set of tubes known to be in good condition), antenna disconnected from the receiver or highly shielded location.

(3) LOW VOLTAGE. Low voltage may be caused by defective 80 rectifier, shorted filter or bypass condenser, defective power transformer or low line voltage.

(4) DISTORTED REPRODUCTION. Failure of the automatic volume control to operate may be caused by defective 75 tube, shorted or open 500,000 ohm resistor in No. 2 diode circuit, open 250,000 ohm R. F. and I. F. isolating resistor, shorted .1 mfd condensers in grid return of I. F. and R. F. stages. This may be checked by tuning the receiver to a powerful local station and measuring the voltage from No. 2 diode to No. 1 terminal on the voltage divider with high resistance voltmeter. The voltage should be approximately 2 volts and should return to zero when the receiver is tuned off the station. This is not a true voltage reading but will serve to indicate whether or not the automatic volume control is operating.

(5) OSCILLATION. Oscillation may be caused in the R. F. or I. F. stages by open bypass or filter condenser; improper shielding, caused by tube shields not making proper contact with their bases; grid wires out of their proper position. Open bypass condensers may be checked by using a test condenser equipped with test leads and connected to terminals of condenser under test.

(6) HUM. Excessive hum may be caused by defective 80 tube. (Replace with tube known to be in good condition). Open filter condenser (any one of the filter condensers being open would cause an excessive hum), or by defective speaker field coil. The speaker field coil is part of the filter system and shorted turns or grounded coil may cause hum. Shorted or grounded filter reactor may also cause excessive hum.

(7) R. F. and I. F. ALIGNMENT. The trimmer on the tuning condensers and the intermediate stages are very accurately adjusted before the receiver leaves the factory and should need little or no attention. To check adjustments the following procedure should be followed:

The action of the automatic volume control will defeat the purpose of an output meter. To overcome this, it will become necessary to reduce the coupling between the oscillator and the receiver so that only a small reading is obtained on the output meter with the volume control set for maximum volume. This will allow the output meter to work correctly. Adjust the test oscillator to 262 kilocycles and couple to the control grid of No. 2 tube and adjust trimmers on I. F. stage for maximum reading on the output meter.

R. F. ALIGNMENT. Couple oscillator to the antenna (reduce coupling as outlined in I. F. adjustment). Set pointer on tuning chart to 1400 kilocycles with wave band control switch in broadcast position. Adjust test oscillator to 1400 kilocycles. Adjust trimmers on No. 1 and 2 section of tuning condenser for maximum reading. The trimmer of No. 3 section of the tuning condenser should be set for minimum capacity, and the high frequency trimmer on back of chassis (left viewing chassis from back) should be adjusted for maximum read-

DETROLA RADIO CORP.

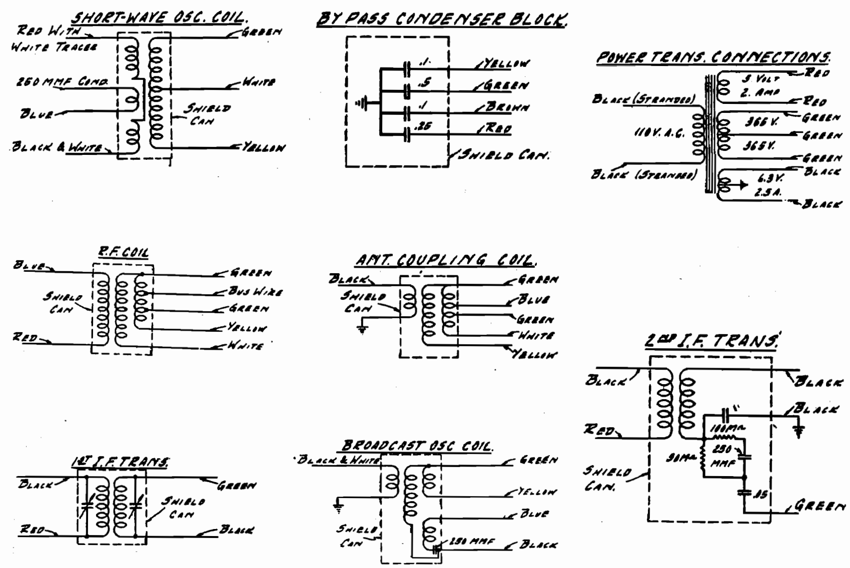


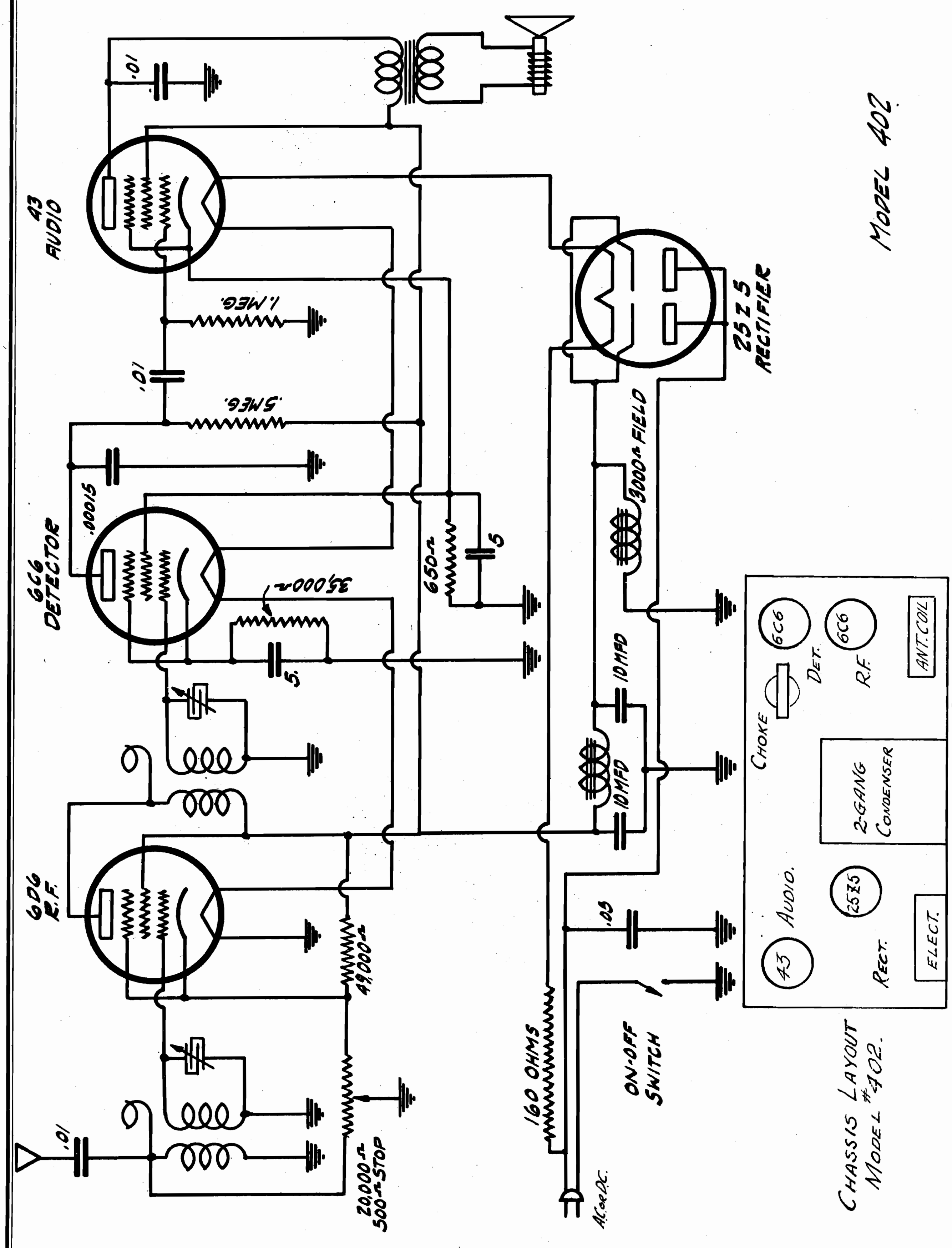
Figure 3

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
1084	Volume control	$0.70	937	6 prong socket No. 42	.10
1083	Tone control and A.C. switch	1.00	1028	6 prong socket No. 75	.10
1063	Short wave switch	2.95	936	4 prong socket No. 80	.10
1062	Tuning condenser for sets with full vision dial	3.20	1098	Tube shield base	.05
1273	Tuning condenser for sets with airplane dial	3.40	1097	Tube shield cap	.10
1059	Filter choke	1.15	1096	Tube shield	.15
934	A. C. cord	.30	1066	8" speaker	9.35
1092	Pilot light socket	.15	1061	Power transformer	3.40
580	.05—200 volt condenser	.10	1014	8-8, 450V filter condenser	2.10
563	.05—400 volt condenser	.15	1085	8—450 filter condenser	1.25
572	.1—200 volt condenser	.15	1175	1st IF transformer	1.55
1088	100 mmf condenser	.15	1176	2nd IF transformer	1.80
590	250 mmf condenser	.15	1060	Bypass condenser block	1.20
1107	550 mmf condenser	.20	1082	Double padder condenser	.40
1105	2600 mmf condenser	.35	568	.01—400 volt condenser	.15
1106	3000 mmf condenser	.40	1104	Dial—Complete full vision	1.20
631	50,000 ohm resistor—½ watt	.15	1179	Antenna coil	.50
603	100,000 ohm resistor—½ watt	.15	1181	Detector coil	.50
602	250,000 ohm resistor—½ watt	.15	1182	Broadcast oscillator coil	.50
615	500,000 ohm resistor—½ watt	.15	1184	Short wave oscillator coil	.50
1087	30,000 ohm resistor—1 watt	.15	1274	Escutcheon plate—Airplane dial	.40
1101	Cabinet for full vision dial	7.00	1275	Pyralin escutcheon window	.20
531	Knobs	.05	1203	Drive cable spring	.10
1136	Escutcheon plate for full vision dial	.40	1209	Dial chart	.10
1282	Cabinet—airplane dial	7.20	1199	Dial pointer	.05
939	6 prong socket No. 78	.10	1277	Dial drive cable	.05
1086	5 prong socket No. 37	.10			

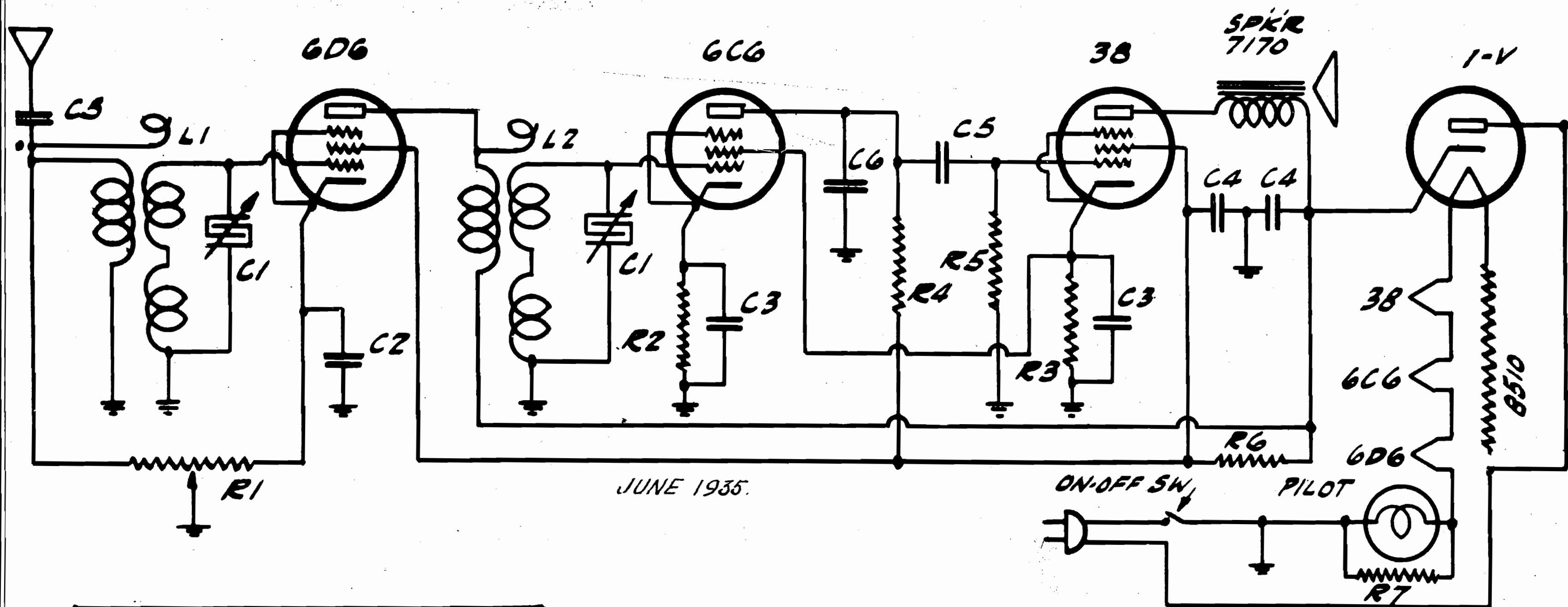
MODEL 402
Schematic
Socket

DEWALD RADIO



MODEL 403-4
Type 1
Schematic

DEWALD RADIO



JUNE 1935.

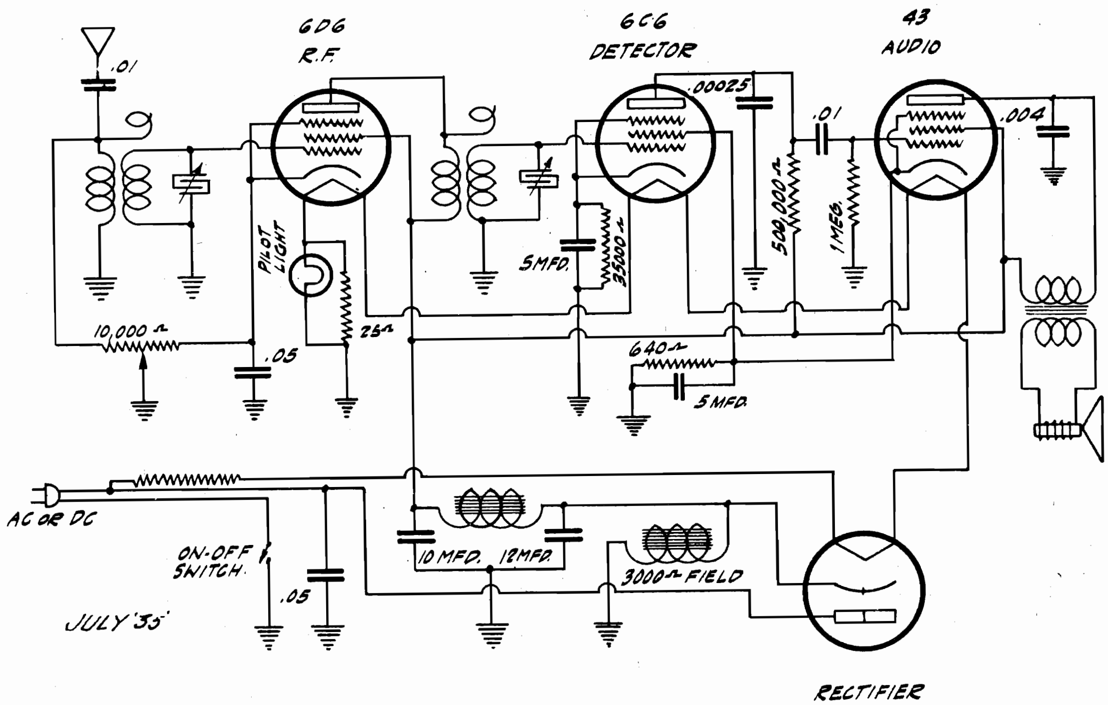
L1 – ANTENNA COIL	1331
L2 – R.F. COIL	1332
C1 – VARIABLE COND.	2284
C2 – .05 COND.	2046
C3 – 4 MFD. COND.	2283
C4 – 8 MFD. COND.	2283
C5 – .01 MFD. COND.	2056
C6 – .00025 MFD. COND.	2047
R1 – VOL. CONT. 25 M. OHMS	8499
R2 – 35,000 OHM. RES.	3261
R3 – 1,700 OHM. RES.	3335
R4 – 500,000 OHMS RES.	3161
R5 – 1 MEGOHM. RES.	3190
R6 – 10,000 OHM. RES	3336
R7 – 25 OHM SHUNT	3313
PILOT LIGHT 6-8 VOLTS	8407
LINE CORD	8510
SPEAKER	7170

SOCKET VOLTAGES

6D6	CATHODE TO GROUND	2.5 VOLTS	A
	PLATE TO CATHODE	120-135 V.	B
	SCREEN TO CATHODE	90-115 V.	B
6C6	CATHODE TO GROUND	.5 VOLTS	A
	PLATE TO CATHODE	20-30 V.	B
38	CATHODE TO GROUND	10-15 V.	B
	PLATE TO CATHODE	115-125 V.	B
	SCREEN TO CATHODE	95-115 V.	B
1-V	CATHODE TO GROUND	120-140 V.	B

ALL READINGS TAKEN WITH VOLUME CONTROL IN MAXIMUM POSITION. USING 1000 OHM-PER-VOLTMETER. FILAMENTS AT RATED VOLTAGES. A = 0-10 V. RANGE. B = 0-250 V. RANGE.

DEWALD RADIO



MODEL 403-4

The Model 403 is a 4 Tube Receiver operating on A.C. or D. C., 110-120 Volts, 25-60 Cycles.

OPERATION Turn set on by turning ON-OFF switch. Allow 30 seconds for tubes to heat, turn volume control knob to middle position and then secure desired station by turning the station selector knob. When tuning in a station, set tuning control carefully to maximum station volume, then adjust with volume control knob to desired volume.

When operated on Direct Current if no reception is heard approximately one minute after set is turned on, reverse plug in Outlet. No ground wire is required with this set.

TUBES 1-6D6, 1-6C6, 1-43, and 1-12Z3

ANTENNA Unwind Antenna and place along baseboard or in any convenient location, the Antenna may also be grounded. For Additional signal strength an outside Antenna may be used.

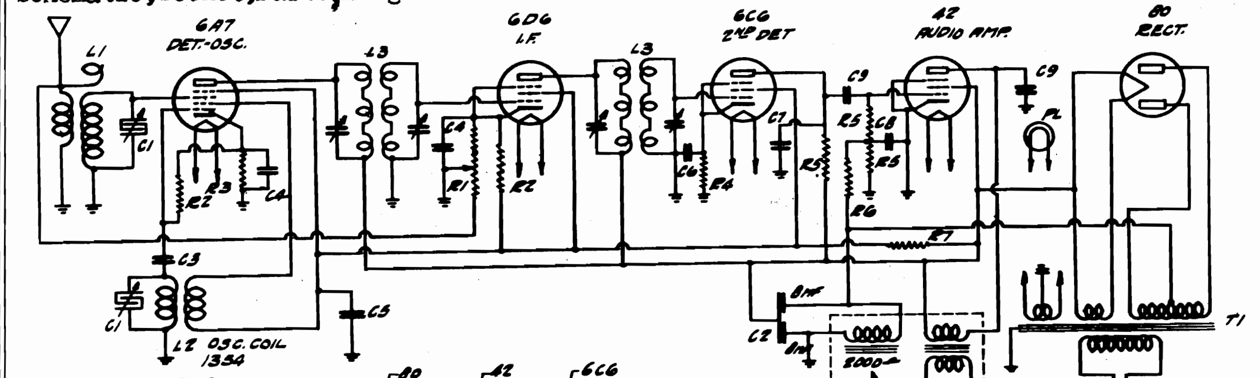
IMPORTANT DO NOT TOUCH GROUND WIRE TO CHASSIS

NUMBERS & LIST PRICES OF REPLACEMENT PARTS

1331	Antenna Coil	.55	2047	.00025 Mica Cond	.35
1332	Detector Coil	.55	7174	Speaker	4.25
2283	Electrolytic Cond.	1.00	8524	Line Cord Resistor	.80
2284	Variable Condenser	2.15	8499	Vol Control	1.00
2056	.01 Cub Cond.	.35	5093	Antenna	.20
2046	.05 " "	.35	8512	Knobs	.20
1344	B Choke	.75			

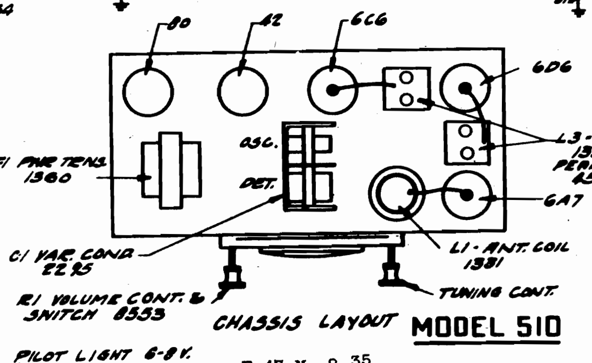
MODEL 505-F
Schematic, Socket, Alignment
MODEL 510
Schematic, Socket, Parts, Alignment

DEWALD RADIO



CONDENSERS		
SYM.	MFD	NO.
C1	VAR. C.	2295
C2	FILTER	2292
C3	.0001	2123
C4	.05	2046
C5	.1	2188
C6	.25	2033
C7	.00025	2047
C8	.1	2022
C9	.01	2056

RESISTORS		
SYM.	OHMS	NO.
R1	VOL. CONT.	8553
R2	50,000	3292
R3	300	3346
R4	35,000	3180
R5	.5 MEG.	3161
R6	2. MEG.	3184
R7	18,000	3347



CHASSIS LAYOUT **MODEL 510**

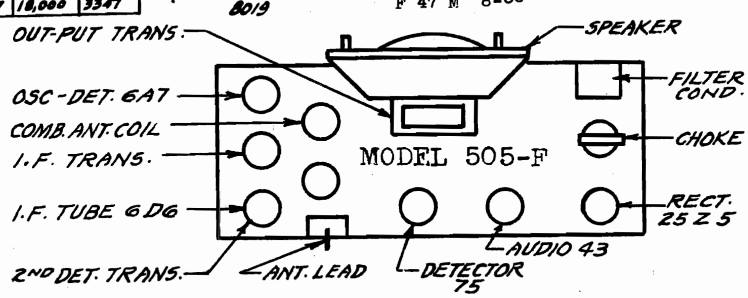
PILOT LIGHT 6-8 V.
8019

F 47 M 8-35

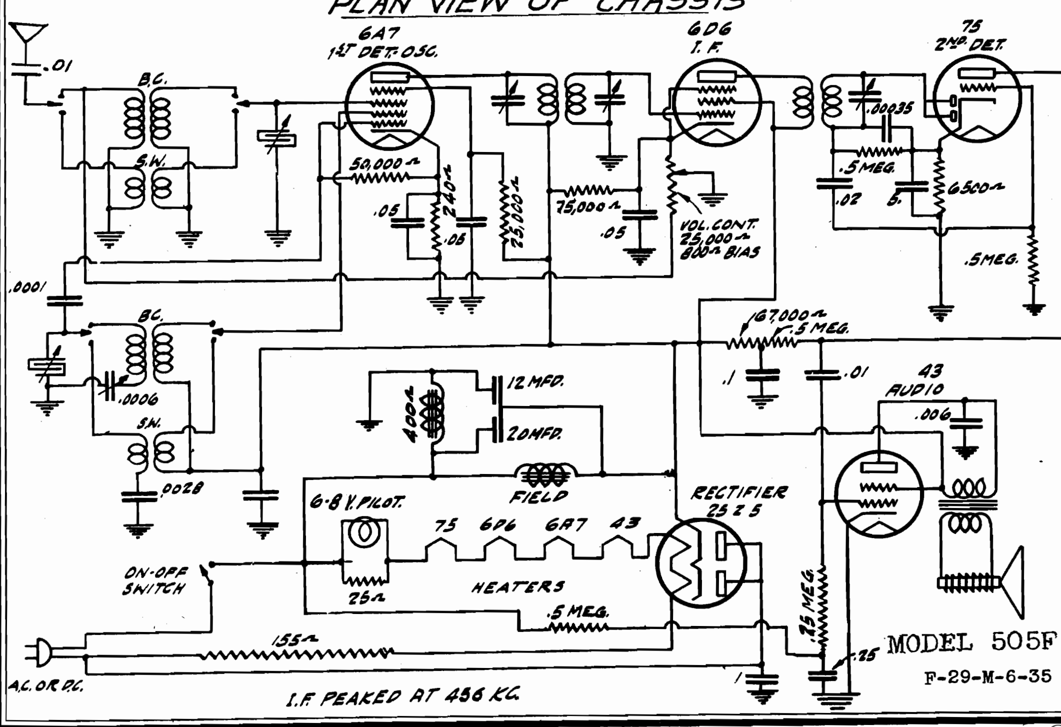
LIST PRICES OF REPLACEMENT PARTS

MODEL 510

1360	Power Transformer	$2.85
1355	I. F. Transformer	1.40
1331	Ant. Coil	.55
1354	Osc. Coil	.55
2295	Variable Condenser	2.10
2292	Combination Electrolytic	1.60
2123	.0001 Mfd. Condenser	.40
2047	.00025 " "	.35
2022	.1 Mfd. 200 V. Cond.	.35
2188	.1 Mfd. 400 V Cond.	.35
2056	.01 " " " "	.35
2046	.05 " 200 V "	.35
2033	.25 " 200 V "	.40
7180	Speaker	4.25
8553	Comb. Vol. Control	1.05
8496	Line Cord	.35
8512	Knobs	.20



PLAN VIEW OF CHASSIS



MODEL 505F

F-29-M-6-35

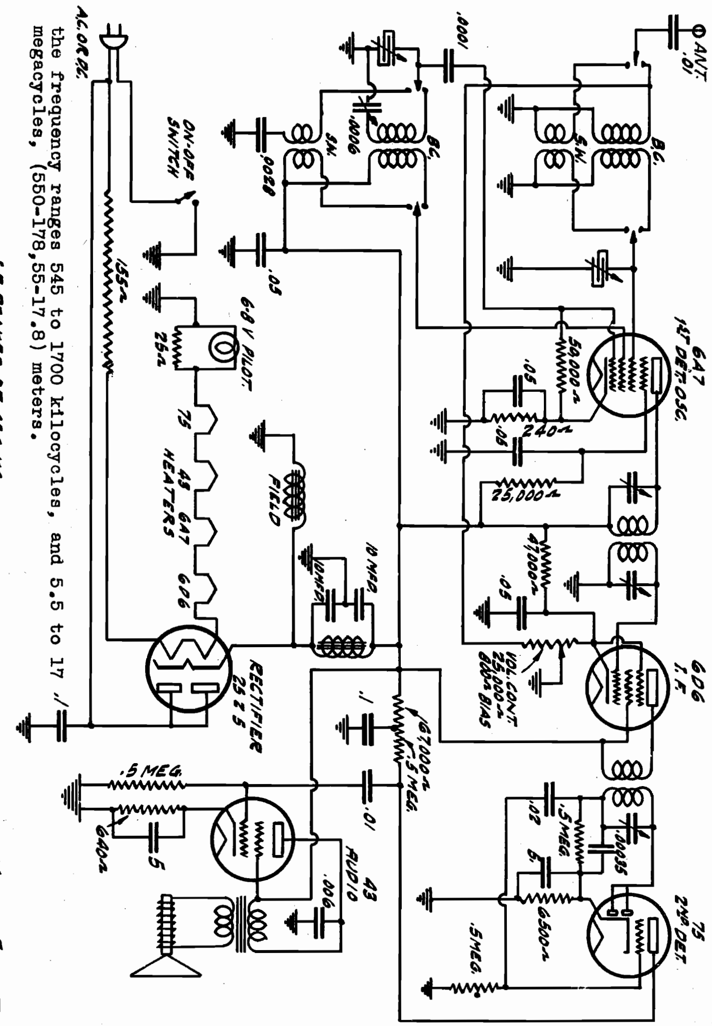
I.F. PEAKED AT 456 KC.

SERVICE NOTES : Should it become necessary to repeak this set, the following procedure should be followed. Set Service Oscillator to 456 K.C. and connect "hot" lead to grid of 6A7 tube. Ground stator of rear (osc.) section of Variable Condenser. Turn volume control for maximum output and repeak intermediate frequency trimmers for maximum gain.

MODEL 510 Remove short from Variable Condenser. Remove Service Oscillator lead from grid of 6A7 and connect same to red lead on rear of set. Adjust service Oscillator and receiver to 1500 K.C. and repeak trimmers on variable condensers for maximum gain. All other frequencies are automatically calibrated when receiver is peaked at 1500 K. C. due to the construction of the cut section of Variable Condenser.

MODEL 505-R
Schematic, Socket
Alignment, Parts

DEWALD RADIO



the frequency ranges 545 to 1700 kilocycles, and 5.5 to 17 megacycles, (550-178, 55-17.8) meters.

505-L I.F. PEAKED AT 456 KC. MODEL 505-R

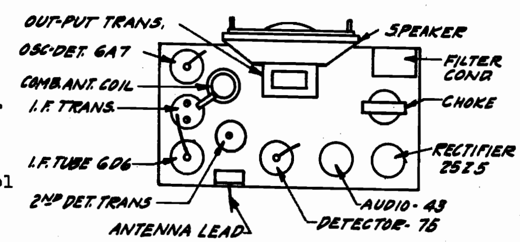
VOLTAGE

This receiver is designed to operate on 110-120 Volts 40-60 cycles, alternating current or 110-120 Volts direct current. When operated on D.C. it is necessary that the line plug be inserted to obtain the correct polarity. If no reception is heard approximately one minute after set has been tuned on, reverse line cord plug in outlet. INT. FREQ. ALIGNMENT. Intermediate frequency peaked at 456 KC. Connect test oscillator to grid of 6A7 and chassis. (Ground stator of front section of variable condenser during this operation.)

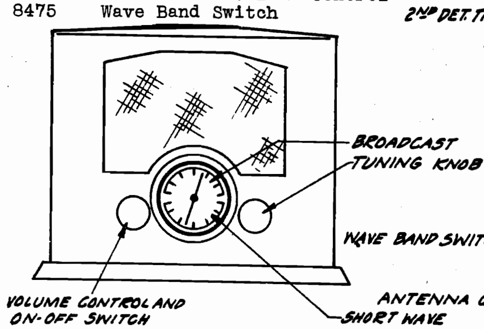
R.F. ALIGNMENT

Connect test oscillator to antenna and chassis and set dial to 1500 KC. and peak variable condensers. For low frequency adjustment set dial at 600 KC. and repeak padding condenser on front of chassis, rocking variable condenser at thesame time. Short wave Calibration is automatically taken care of by repeaking at 1500 KC. The short wave coils are matched carefully for this setting. A fixed Calibrated padder automatically peaks the short waves for the low frequency setting.

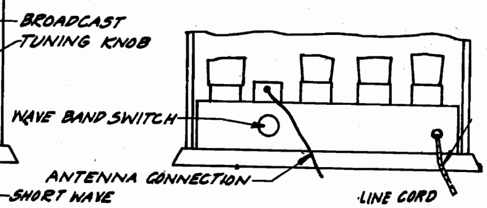
1304	"B" Choke
1305	Combination Antenna Coil
1306	" Oscillator Coil
1319	Dual I.F. Transformer
1320	Second Detector Coil
2007	.006 Mfd. Cub Condenser
2012	.02 Mfd. Cub Condenser
2046	.05 " " "
2056	.01 " " "
2123	.0001 Mfd. Mica"
2135	Dual .05 Mfd. Cub Cond
2188	.1 Mfd. Cub Condenser
2229	Padding Condenser
2233	.00035 Mica Condenser
2253	.0028 " "
2264	2 Gang Variable Condenser
2272	Combination Electrolytic
7160-A	Speaker
8473	Combination Line Cord
8474	" Volume Control
8475	Wave Band Switch



PLAN VIEW OF CHASIS



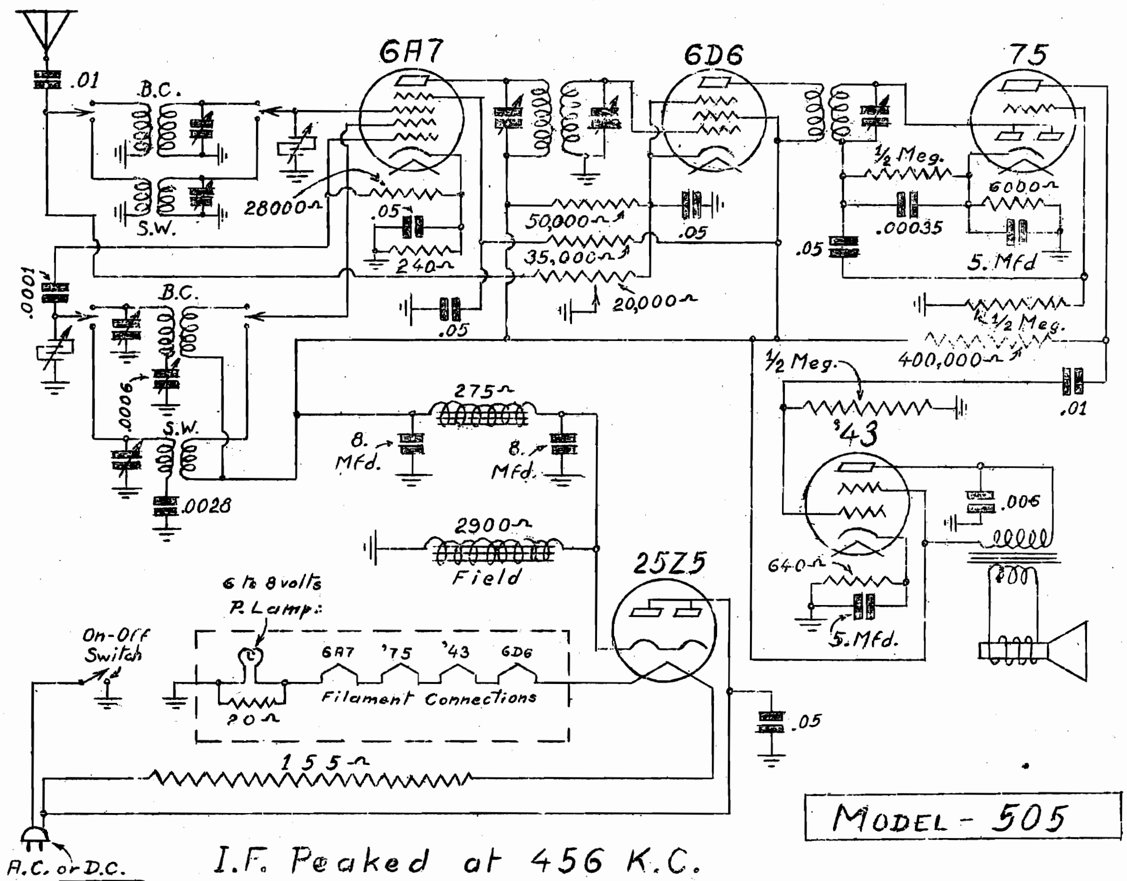
FRONT VIEW



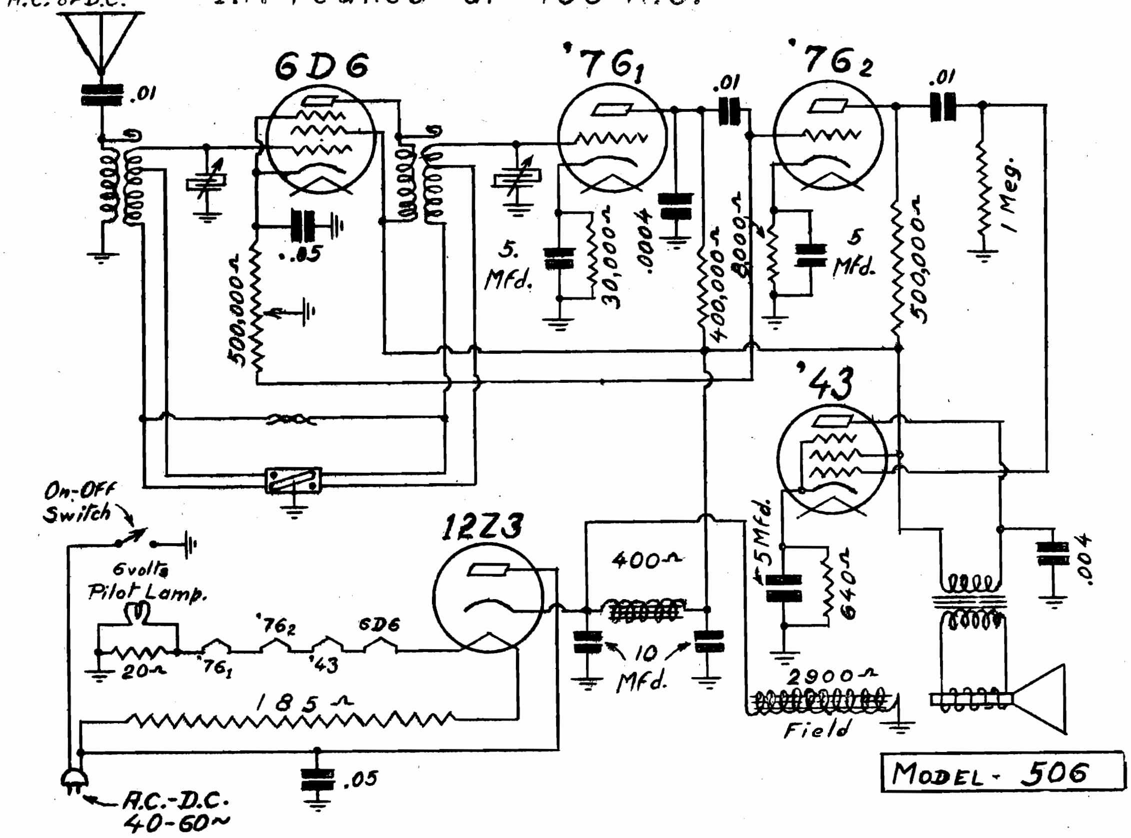
REAR VIEW

MODEL 505
MODEL 506
Schematics

DEWALD RADIO

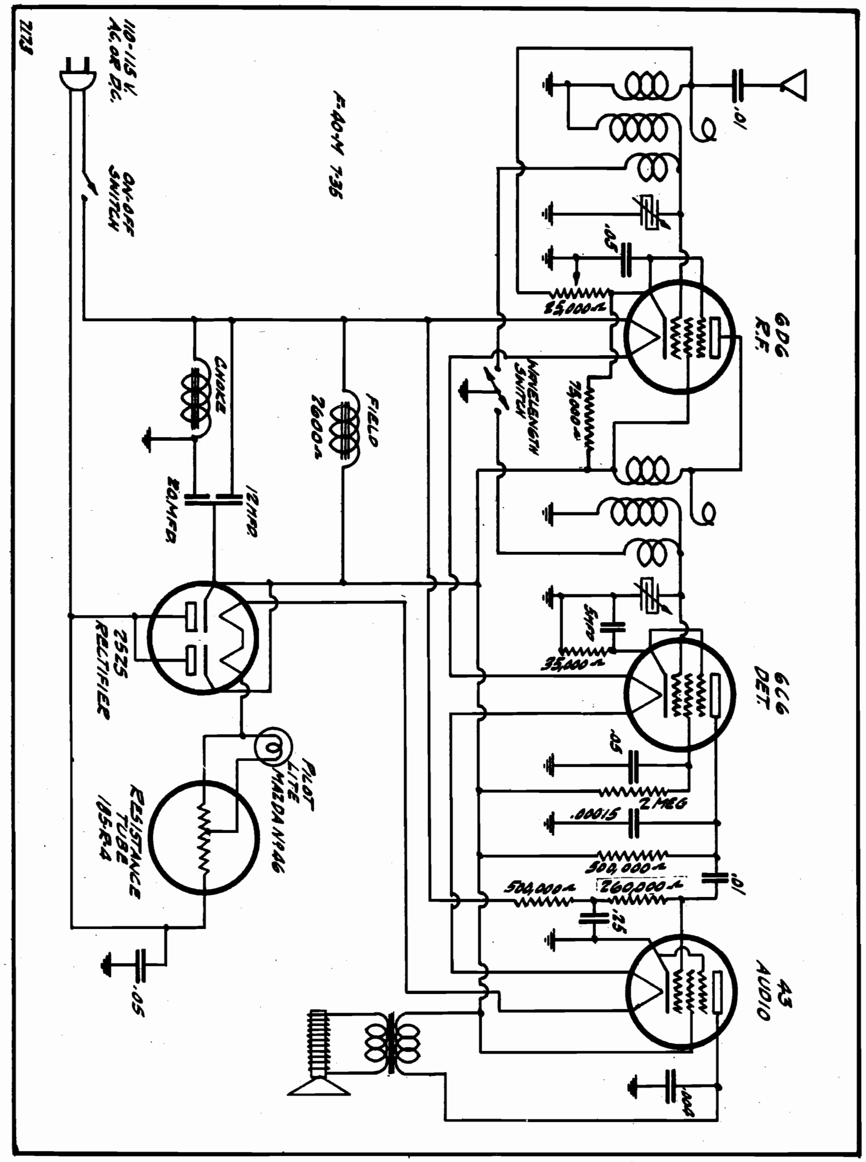


I.F. Peaked at 456 K.C.



MODEL 506-R
Schematic
Notes, Parts

DEWALD RADIO



MODEL 506-R INSTRUCTION SHEET

The Model 506-R receiver is a universal receiver operating on A.C. or D. C. 110-125 volts 40-60 cycles.

With an additional 220 volt ballast plug, set will operate on A.C. or D.C. 210-240 volts, 40-60 cycles.

OPERATION ON 110 A.C. OR D.C. SUPPLY Insert line cord plug into receptacle. On direct current if no reception is heard one minute after switch has been turned on, reverse line plug in receptacle.

TUBES 1-43, 1-6D6, 1-25Z5, and 1-185 R-4,- 1-6C6.

ANTENNA The antenna may be placed along the baseboard, or may be grounded. For additional power, an outside antenna may be used.
NOTE: The antenna must be unwound or the receiver will not operate satisfactorily. No ground wire is necessary for the operation of the set.

IMPORTANT DO NOT TOUCH GROUND WIRE TO CHASSIS.

BROADCAST: Turn wave band switch located in rear of cabinet to broadcast position, locate desired station by turning tuning control.

SHORT-WAVE: Turn wave band switch to the short wave position and turn tuning control as in Broadcast position. Use Band Two for Dial settings.

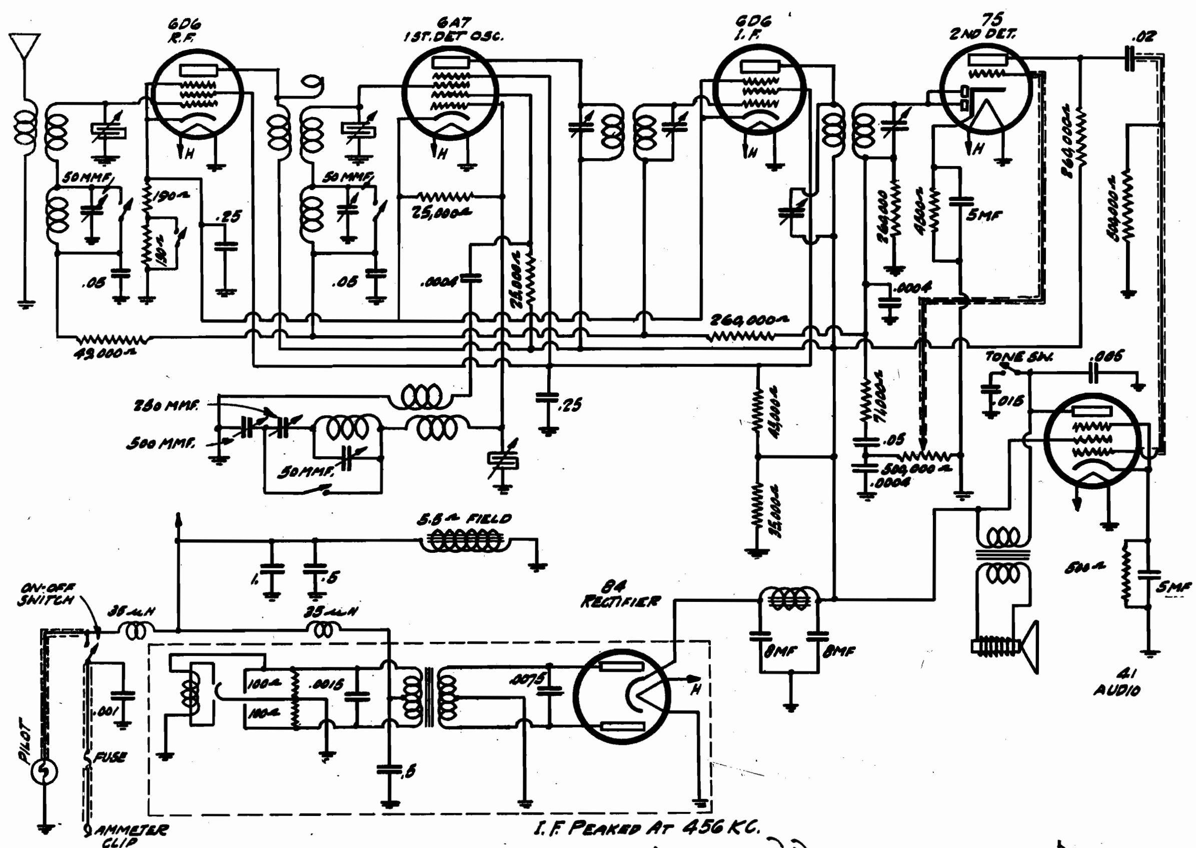
WARRANTY This receiver is guaranteed to be free from defective materials and workmanship for a period of ninety days from date of purchase. We agree to remedy any such defects or to furnish new parts in exchange for any part of any unit of our manufacture which under normal installation or use in service discloses any defects within the stipulated guarantee period. This unit must be delivered by the owner to us or to our representative from whom purchase was made, intact, for our examination. All replacements for defective material will be made providing examination discloses in our judgment that it is thus defective. All transportation charges must be prepaid on merchandise returned to our factory for any cause whatsoever.

REPLACEMENT PARTS PRICE LIST

PART #		PRICE	PART #		PRICE
1326	Ant. Coil	.65	2033	.25 Mfd. Cond.	.40
1327	Det. Coil	.65	2081	.00025 Mfd. Mica Con.	.40
1328	B Choke	.75	7172	Speaker	4.25
2279	Elect. Cond.	1.50	8496	Line Cord	.80
2280	Variable Cond.	2.15	8487	Volume Control	1.05
2199	.05 Mfd. Cond.	.35	5093	Antenna Cable	.20
2054	.004 " "	.35	8521	Wave Band Switch	.45
2056	.01 " "	.35	8512	Knobs	.20

MODEL 607
Schematic, Socket
Trimmers

DEWALD RADIO



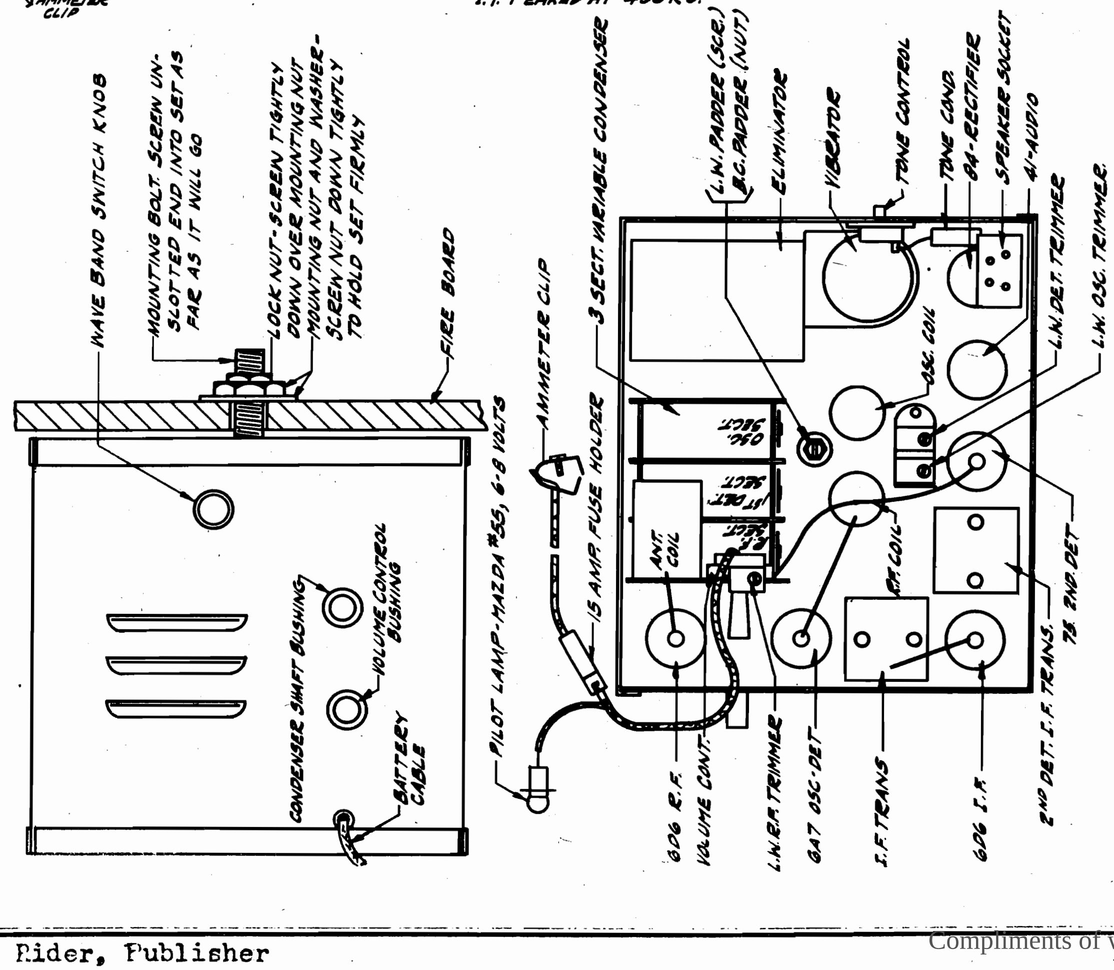
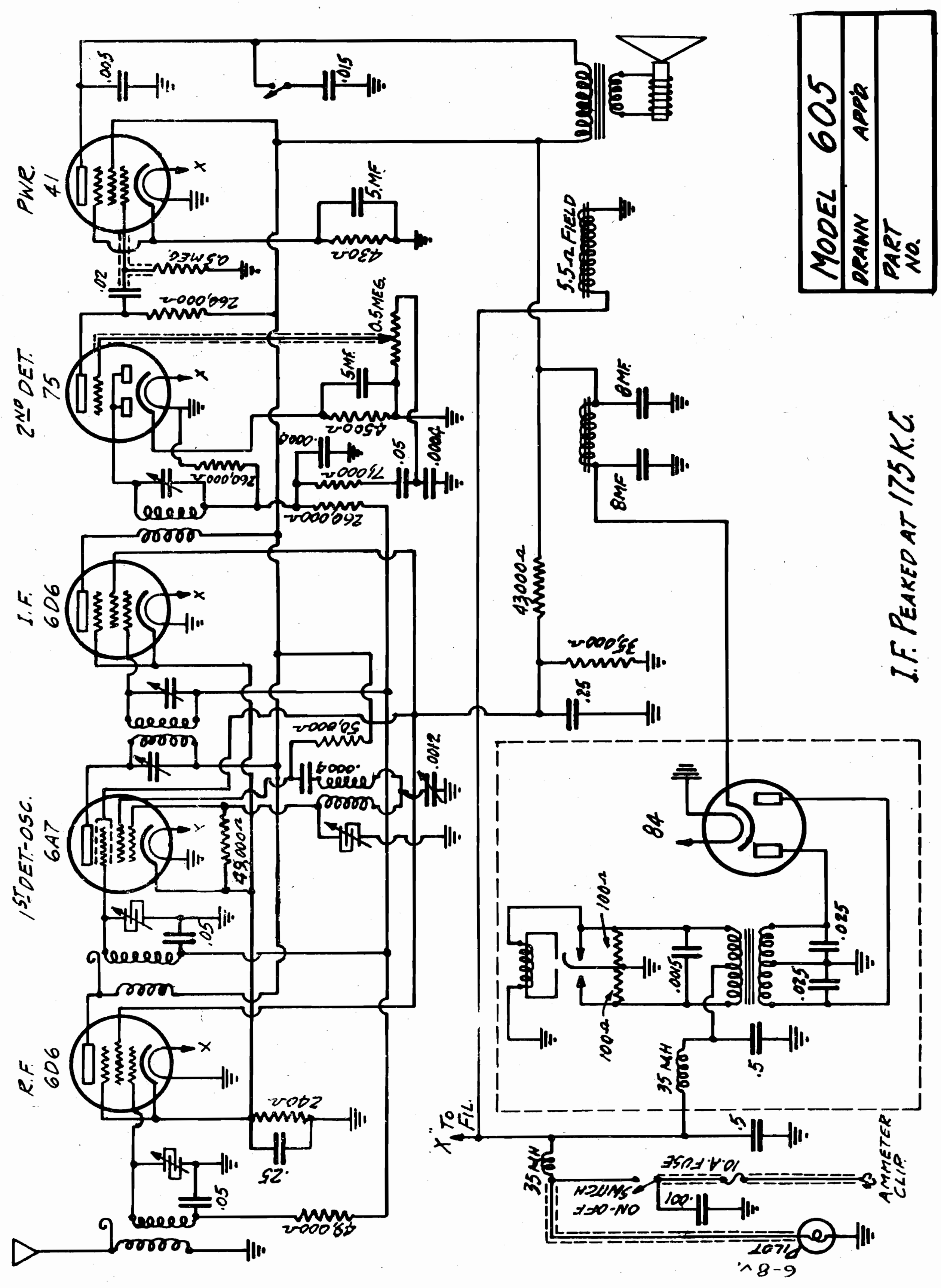


FIG:1

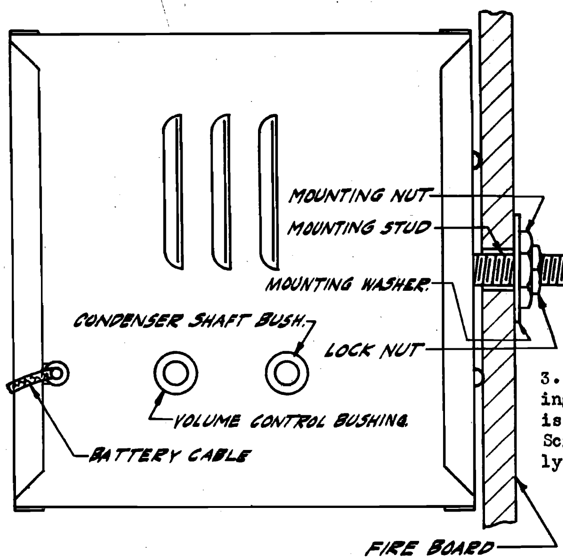
MODEL 605
Schematic

DeWALD RADIO



MODEL 605
Alignment
Socket, Trimmers
Parts Data

DEWALD RADIO



MOUNTING DATA

1. Screw unslotted end of mounting bolt tightly (up to the nicks) into large threaded hole in the rear of receiver case.

2. Determine location of set and drill 1-2 inch hole in the fire-board to pass the mounting bolt.

3. Screw on the mounting nut so that the set is held firmly in place. Screw on lock nut firmly over mounting nut.

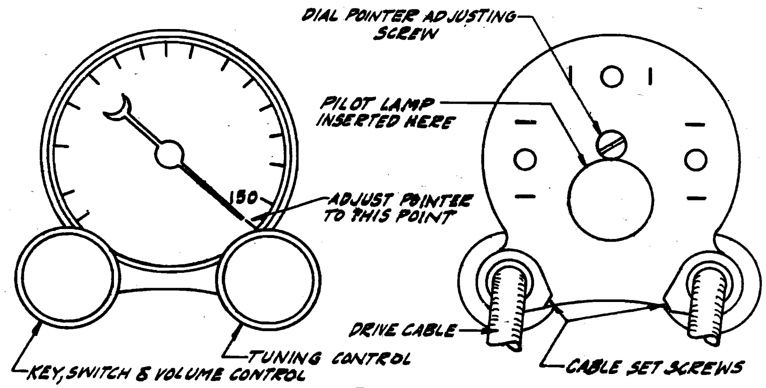


FIG. 2
REMOTE CONTROL UNIT

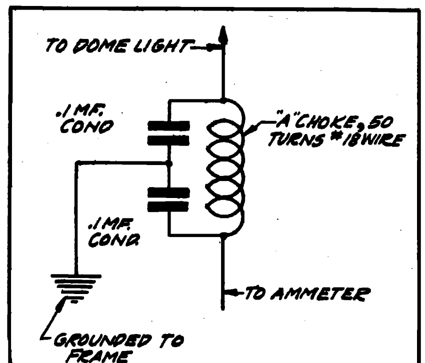


FIG. 3

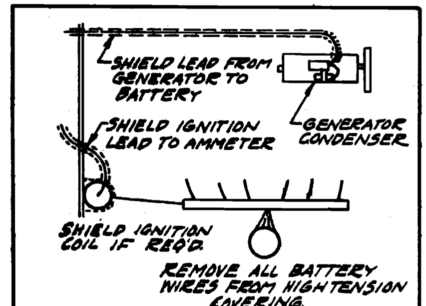
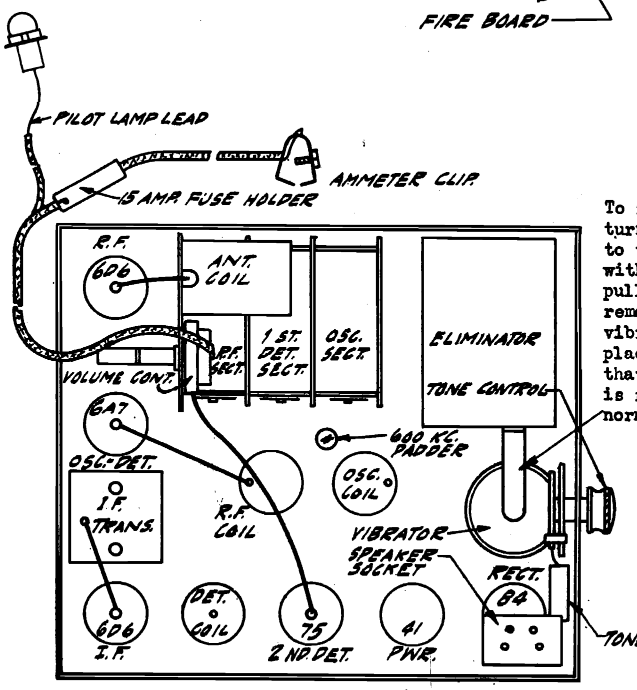


FIG. 4



To replace vibrator, turn tension spring to the left 90°, then with a slight upward pull, vibrator can be removed. After the vibrator has been replaced, make certain that tension spring is returned to its normal position.

FIG. 1

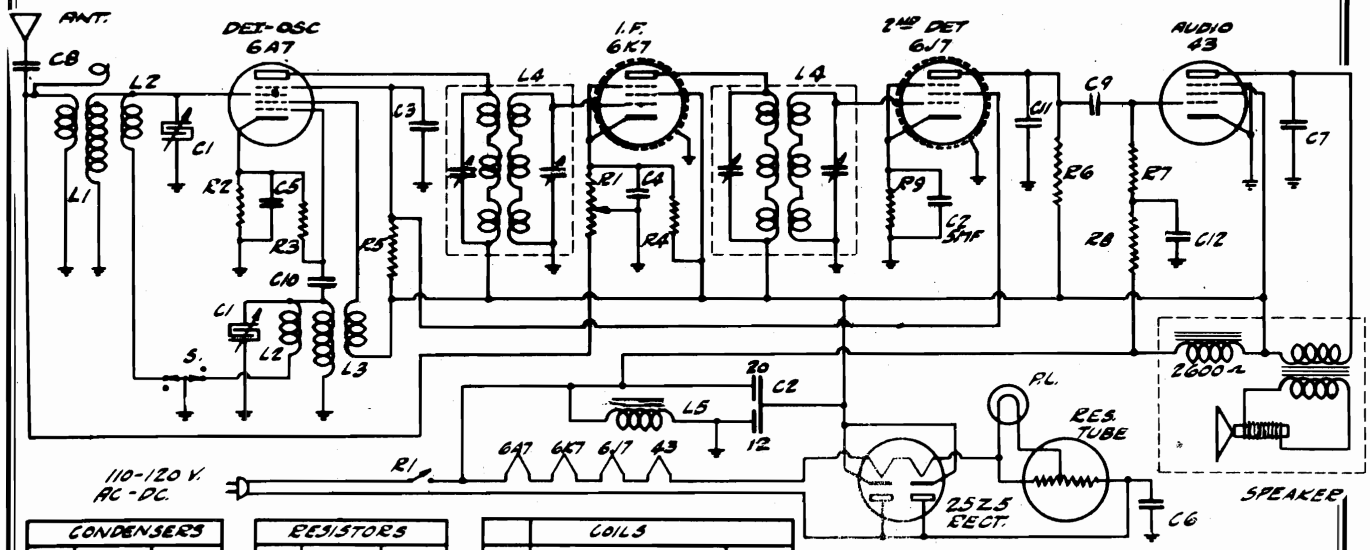
SERVICE NOTES

INT. FREQ. ALIGNMENT — Intermediate frequency peaked at 175 K.C. Connect test oscillator to grid of 6A7 and ground. (Ground stator of oscillator condenser during this operation)

R.F. ALIGNMENT — Connect test oscillator to antenna and ground. Set dial to 1500 K.C. and align trimmer condensers on variable condensers for maximum signal. For low frequency adjustment set dial at 600 K.C. and rock padder to match variable condenser setting of R.F. and 1st Detector.

MODEL 609
Schematic,Data
Parts List

DEWALD RADIO



CONDENSERS		
SYM	MFD.	NO.
C1	VAR.	2295
C2	20-12-5	2294
C3	.05	2046
C4	.05	2046
C5	.05	2046
C6	.05	2046
C7	.004	2054
C8	.02	2191
C9	.02	2191
C10	.0001	2123
C11	.0001	2123
C12	.1	2022

RESISTORS		
SYM	OHMS	NO
R1	VOL.CONT	8474
R2	300	3346
R3	50,000	3292
R4	50,000	3292
R5	35,000	3180
R6	.5 MEG.	3161
R7	.25 MEG.	3145
R8	1. MEG	3190
R9	35,000	3180

	COILS	
SYM	NAME	NO.
L1	ANT. COIL	1331
L2	SHUNT COIL	1353
L3	OSC. COIL	1354
L4	I.F. TRANSFORMER	1355
L5	CHOKE 400Ω	1348
	MISC.	
PL.	PILOT LAMP 6.3V.	8019
R1	VOL. CONT. & SWITCH	8474
S	WAVE BAND SWITCH	8521
	SPEAKER	7172
	LINE CORD	8496

MODEL 609

The Model 609 receiver is a 6 tube superheterodyne receiver operating on A.C. or D.C. 110-125 volts 40-60 cycles.

With an additional 220 volt ballast plug, set will operate on A.C. or D.C. 210-240 volts, 40-60 cycles.

OPERATION ON 110 A.C. OR D.C. SUPPLY — Insert line cord plug into receptacle. On direct current if no reception is heard one minute after switch has been turned on, reverse line plug in receptacle.

TUBES — 1-6A7, 1-6K7, 1-6J7, 1-43, 1-25Z5 and 1 Resistor Tube.

ANTENNA — The antenna may be placed along the base-board, or may be grounded. For additional power, an outside antenna may be used.
NOTE: The antenna must be unwound or the receiver will not operate satisfactorily. No ground wire is necessary for the operation of the set.

IMPORTANT — DO NOT TOUCH GROUND WIRE TO CHASSIS.

BROADCAST: — Turn wave band switch located in rear of cabinet to "Long" position, locate desired station by turning tuning control.

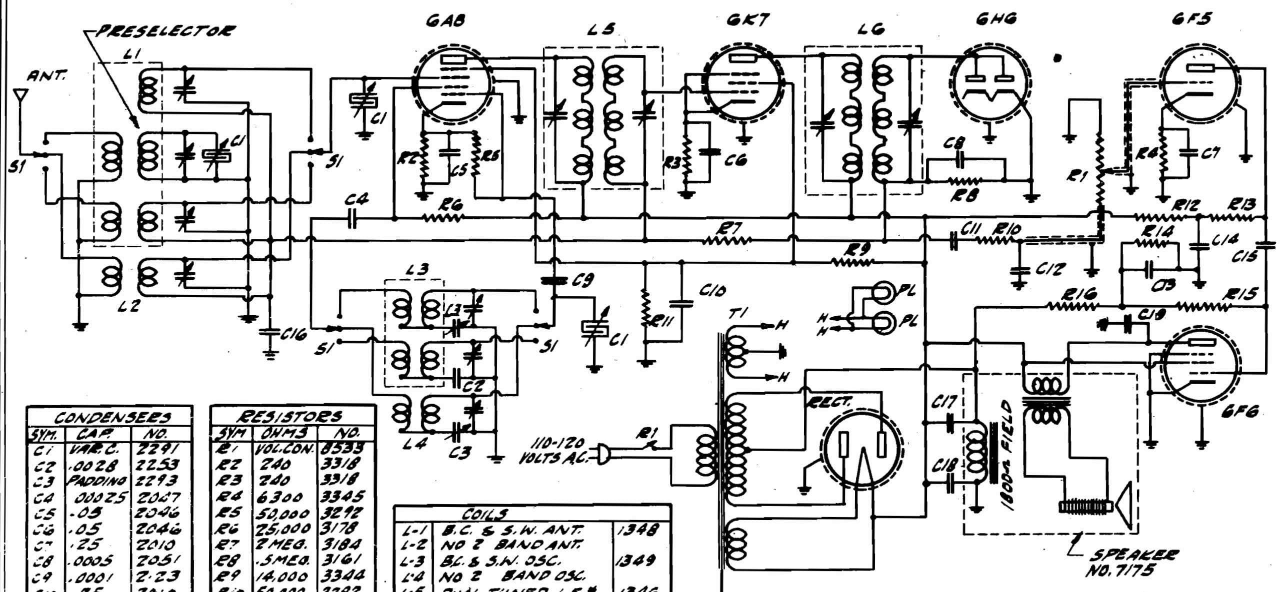
SHORT-WAVE: — Turn wave band switch to the "short" position and turn tuning control as in Broadcast position. Use Band Two for Dial settings.

REPLACEMENT PARTS PRICE LIST

PART #		PRICE	PART #		PRICE
1328	"B" Choke	.75	2022	.1 Mfd. Cub Cond.	.35
1331	Antenna Coil	.55	2295	2 Gang Var. "	2.10
1354	Oscillator Coil	.55	2294	Comb. Elect. "	1.40
1355	Dual I.F. Transformer	1.40	7172	Speaker	4.25
2054	.004 Mfd. cub Cond.	.35	8496	Line Cord	.35
2191	.02 Mfd. Cub Cond.	.35	8474	Switch & Vol. Con.	1.05
2046	.05 " " "	.35	8521	Wave Band Switch	.45
2123	.0001 Mfd. Mica Cond.	.40			

MODELS 610,610-LW
Schematic,Socket
Alignment,Parts

DEWALD RADIO



CONDENSERS		
SYM.	CAP.	NO.
C1	VAR.C.	2291
C2	.0028	2253
C3	PADDING	2293
C4	.00025	2047
C5	.05	2046
C6	.05	2046
C7	.25	2010
C8	.0005	2051
C9	.0001	2123
C10	.25	2010
C11	.02	2191
C12	.0001	2123
C13	.25	2010
C14	.1	2188
C15	.02	2191
C16	.05	2046
C17	8 MFD.	2292
C18	8 MFD.	2292
C19	.004	2054

RESISTORS		
SYM	OHMS	NO.
R1	VOL.CON.	8533
R2	240	3318
R3	240	3318
R4	6300	3345
R5	50,000	3292
R6	25,000	3178
R7	2 MEG.	3184
R8	.5 MEG.	3161
R9	14,000	3344
R10	50,000	3292
R11	30,000	3150
R12	100,000	3182
R13	500,000	3161
R14	100,000	3182
R15	250,000	3145
R16	1 MEG.	3221

COILS		
L-1	B.C. & S.W. ANT.	1348
L-2	NO 2 BAND ANT.	
L-3	B.C. & S.W. OSC.	1349
L-4	NO 2 BAND OSC.	
L-5	DUAL TUNED I.F.*	1346
L-6	D.T. 2ND. DET I.F.*	1347

MISC.		
P.L.	PILOT LAMP 6.3V	8019
R1	ON-OFF SW. & V.C.	8533
S1	WAVE BAND SW.	8534
T1	POWER TRANS.	1345
	SPEAKER	7175

		VOLTAGES
6A8	CATHODE - GROUND	2.4 V.
	SCREEN - CATHODE	100.0
	PLATE - CATHODE	230.0
	OSC. PLT. - CATHODE	160.0
6K7	CATHODE - GROUND	2.4
	SCREEN - CATHODE	100.0
	PLATE - CATHODE	230.0
6F5	CATHODE - GROUND	1.2
	PLATE - CATHODE	65.0
6F6	PLATE TO GROUND	235.0
	SCREEN - GROUND	240.0
80	FIL. TO GROUND	240.0
	VOLT. AT 1ST FILTER	350.0

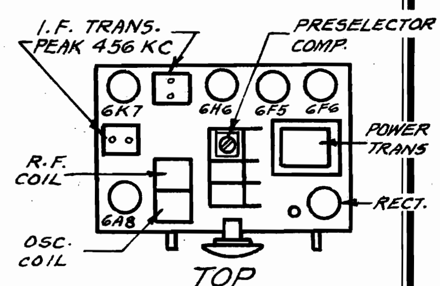
*I.F. PEAKED AT 456 K.C.

MODEL 610

MODEL 610-LW

7177

SERVICE NOTES

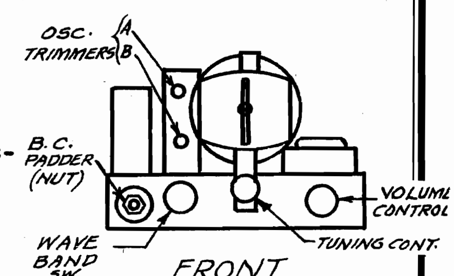


INTERMEDIATE FREQUENCY ALIGNMENT Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6A8 and Chassis. Ground stator of front section of variable Condenser during this operation.

RF. ALIGNMENT Connect test oscillator to antenna and ground connections and set dial to 1500 K.C. and peak trimmers "A" for maximum signal. For low frequency adjustment, set dial at 600 K.C. and repeak padding condenser (Nut on front of chassis). Next readjust at 1500 K.C.

BAND 2 ALIGNMENT Police band adjustments for 610 only. Set test oscillator at 4000 K.C. Repeak the two trimmers located underneath chassis for maximum gain. Next set variable Condenser at 1600 K.C. and repeak padder (screw) on front panel of Chassis. Next readjust trimmers underneath the chassis at 4000 Kilocycles.

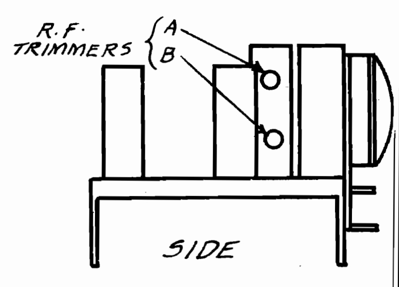
Long wave adjustment for 610 LW only. These adjustments same as police except low frequency setting is 170 K.C. and high frequency setting is 350 K.C.



SHORT WAVE ALIGNMENT Set Variable Condenser to 15 Megacycles and connect test oscillator to Antenna and ground and repeak trimmers "B" for maximum gain. The low frequency setting is automatically taken care of. The Short wave coils are carefully matched for this setting and a fixed calibrated padder peaks the short waves for the low frequency setting.

MODEL 610
NUMBERS AND LIST PRICES OF REPLACEMENT PARTS

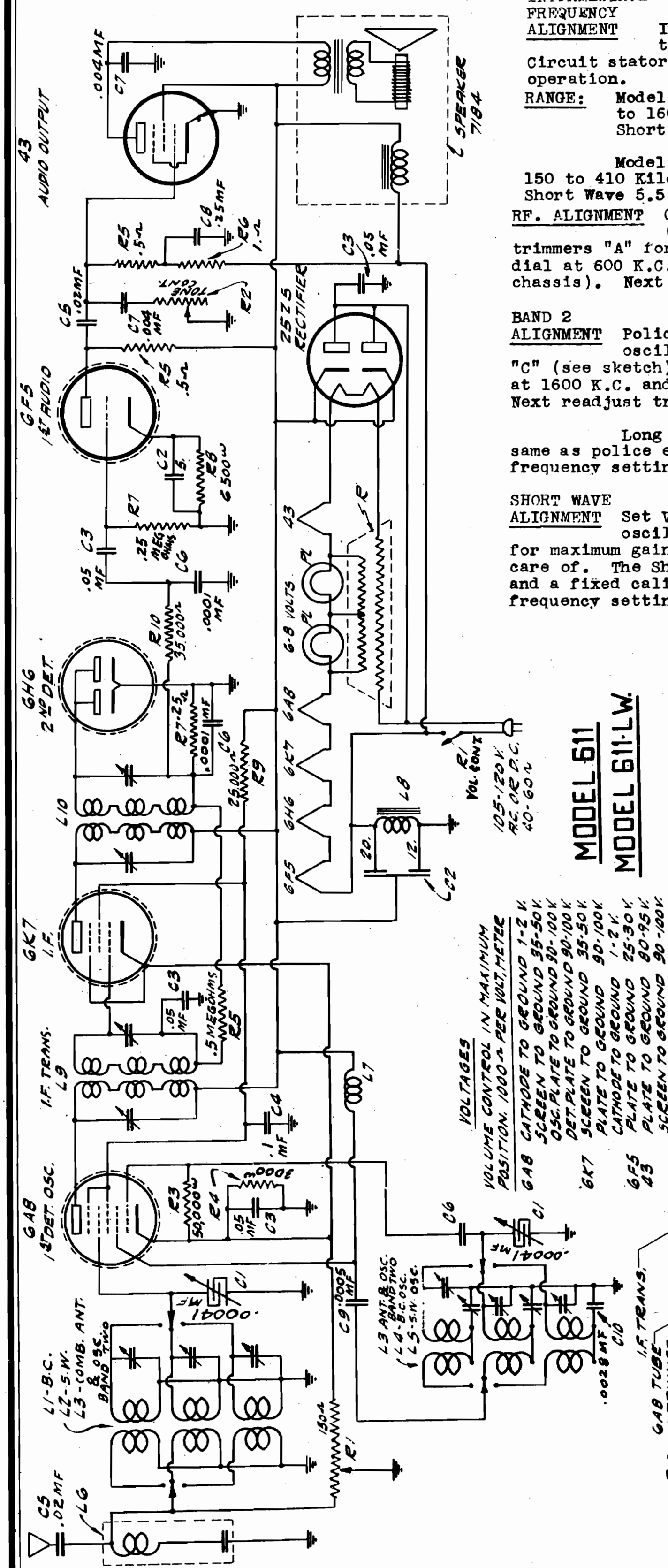
1345	Power Transformer	$4.00	2293	Padding Condenser	.85
1348	Comb. Antenna Coil	2.15	2051	Mica Condenser .0005	.35
1350	Comb. Police Coil	1.50	2291	3 Gang Variable Cond.	4.05
1349	" Oscillator Coil	1.40	2292	Comb. Electrolytic Cond.	1.60
1346	Dual I.F. Transformer	1.50	2230	Dual Trimmer Cond.	.35
1347	Second Detector Coil	1.50	2010	.25 Mfd. Cub "	.65
2054	.004 Mfd. Cub Condenser	.35	8512	Knobs	.20
2191	.02 Mfd. Cub Condenser	.35	7175	Speaker	5.75
2046	.02 " " "	.35	8496	Line Cord	.35
2188	.1 " " "	.35	8533	Volume Control	1.05
2123	.0001 Mfd. Mica "	.40	8534	Wave Band Switch	.65
2253	.0028 Mica Condenser	.45			
2047	.00025 " "	.35			



F - 44 - M 8-35

MODELS 611, 611-LW
Schematic, Socket
Trimmers, Alignment

DEWALD RADIO



SERVICE NOTES

INTERMEDIATE FREQUENCY ALIGNMENT Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6A8 and Chassis. Short Circuit stator of front section of Variable Condenser during this operation.

RANGE: Model 611 covers the following ranges:- Broadcast - 545 to 1600 Kilocycles; Police - 1600 to 4600 Kilocycles and Short Wave - 5.5 to 16.5 Megacycles.

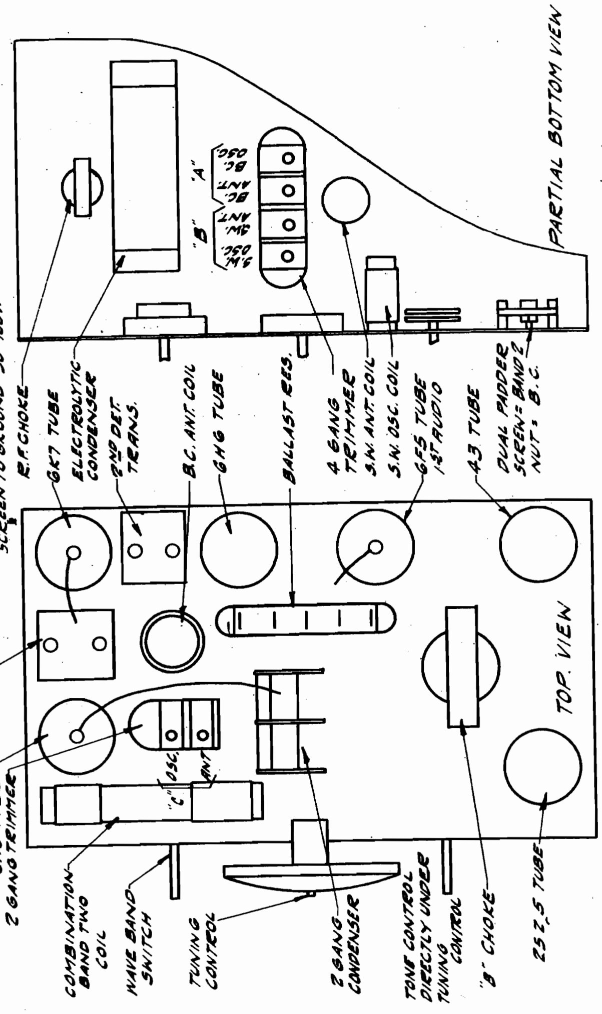
Model 611 L.W. covers the following ranges:- Long Wave - 150 to 410 Kilocycles; Broadcast - 545 to 1600 Kilocycles and Short Wave 5.5 to 16.5 Megacycles.

RF. ALIGNMENT Connect test oscillator to antenna and chassis, (See Sketch) and set dial to 1500 K.C. and peak trimmers "A" for maximum signal. For low frequency adjustment, set dial at 600 K.C. and repeak padding condenser (Nut on front of chassis). Next readjust at 1500 K.C.

BAND 2 ALIGNMENT Police band adjustments for 611 only. Set test oscillator at 4000 K.C. Repeak the two trimmers "C" (see sketch) for maximum gain. Next set Variable Condenser at 1600 K.C. and repeak padder (screw) on front panel of Chassis. Next readjust trimmers at 4000 Kilocycles.

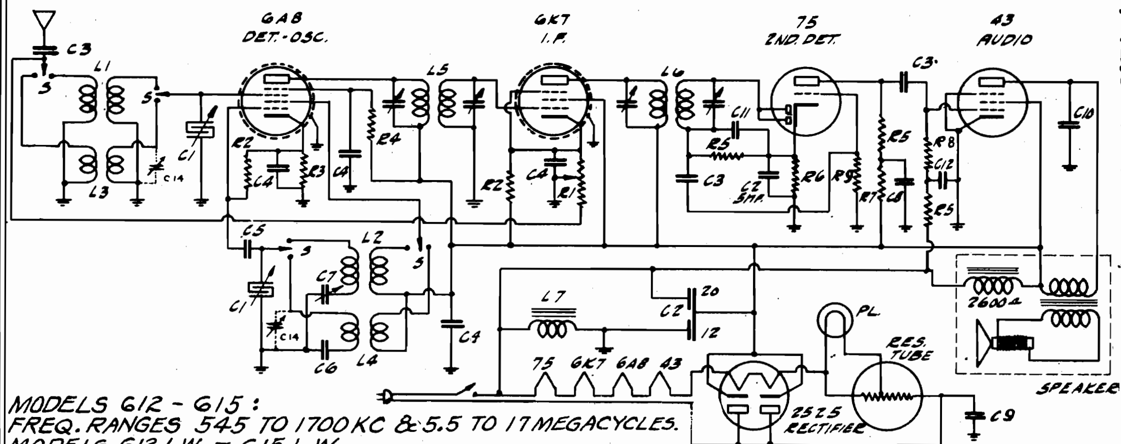
Long Wave adjustment for 611 LW only. These adjustments same as police except low frequency setting is 170 K.C. and high frequency setting is 350 K. C.

SHORT WAVE ALIGNMENT Set Variable Condenser to 15 Megacycles and connect test oscillator to Antenna and ground and repeak trimmers "B" for maximum gain. The low frequency setting is automatically taken care of. The Short Wave coils are carefully matched for this setting and a fixed calibrated padder peaks the short waves for the low frequency setting.



MODELS 612, 612-LW,
615, 615-LW
Schematic, Socket,
Alignment, Parts

DEWALD RADIO



MODELS 612 - 615:
FREQ. RANGES 545 TO 1700 KC & 5.5 TO 17 MEGACYCLES.
MODELS 612 L.W. – 615 L.W.
RANGES 545 TO 1700 KC & 150 TO 353 KC.

MODELS-612-615, 612 LW-615 LW.
ON MODELS - 612 L.W. - 615 L.W. - TRIMMERS
2230 ARE USED. PADDER C6. IS
REPLACED BY C13. COIL L3. REPLACED
BY L8. AND COIL L4 BY L9 –

SERVICE NOTES

INT. FREQ. ALIGNMENT. Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6A8 and chassis. (Ground stator of front section of variable condenser during this operation.)

R. F. ALIGNMENT

Connect test oscillator to antenna and chassis and set dial to 1500 K.C and peak variable condensers. For low frequency adjustment set dial at 600 K.C. and repeak padding condenser on front of chassis, rocking variable condenser at the same time. Short Wave Calibration is automatically taken care of by repeaking at 1500 K.C. The short wave coils are matched carefully for this setting. A fixed Calibrated padder automatically peaks the short waves for the low frequency setting.

LONG WAVE ALIGNMENT ON 612 L.W. - 615 L.W.

Turn wave band switch to "Foreign" position, and align the Long Wave trimmers at 375 K.C. Adjust the Long Wave padder (screw section) at 175 K. C.

CONDENSERS

SYM.	MFD.	NO.
C1	VAR. C.	2280
C2	20-125	2201
C3	.02	2191
C4	.05	2046
C5	.0001	2123
C6	.0028	2253
C7	PADDER	2229
C8	.1-200V.	2022
C9	.1-400V.	2188
C10	.006	2007
C11	.00035	2233
C12	.25	2053
C13	L.W. PAD.	2277
C14	L.W. TR.	2230

RESISTORS

SYM	OHMS	NO.
R1	VOL. CON.	8474
R2	50,000	3269
R3	240	3252
R4	25,000	3228
R5	.5 MEG.	3161
R6	6,500	3319
R7	67,000	3321
R8	260,000	3362
R9	100,000	3182

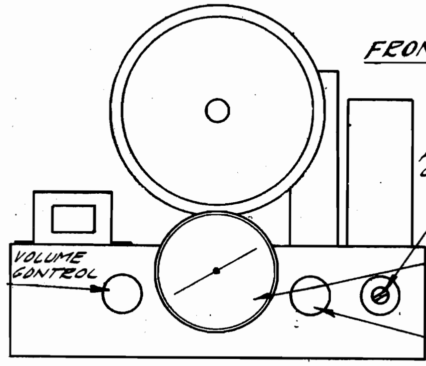
MISC.

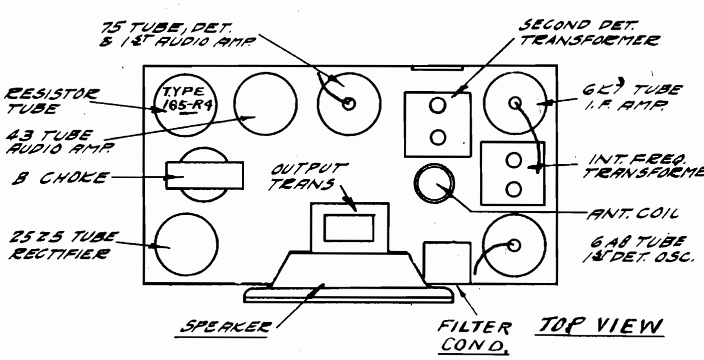
SYM.	NAME	NO.
L1	B.C ANT. COIL.	1363
L2	B.C. OSC. COIL	1357
L3	S.W ANT. COIL	1250
L4	S.W. OSC. COIL	1249
L5	DUAL TUNED I.F.	1355
L6	2ND DET. I.F.	1356
L7	B CHOKE 400Ω	1328
L8	L.W. ANT. COIL	1351
L9	L.W. OSC. COIL	1352
PL	PILOT LITE 6-8 V	8019
R1	VOL. CONT. & SWITH	8474
	SPEAKER	7172
S1	WAVE BAND SW.	8475
	LINE CORD	8496

LIST OF REPLACEMENT PARTS

PART NUMBER		LIST PRICE	PART NUMBER		LIST PRICE
1328	B Choke	.75	2123	.0001 Tubular Cond.	.40
1363	B.C. Ant. Coil	.60	2253	.0028 Mica Condenser	.45
1357	B.C. Oscillator Coil	.55	2233	.00035 " "	.35
1250	S.W. Antenna Coil	.55	2033	.25 " "	.40
1249	S.W. Oscillator "	.55	2229	Padding Condenser	.45
1355	I.F. Transformer	1.40	7172	Speaker	4.25
1356	2nd Det. "	1.40	8496	Line Cord	.35
2280	Variable Cond.	2.45	8474	Volume Control	1.05
2301	Comb. Electrolytic	1.40	8475	Wave Band Switch	.65
			8512	Knobs	.20
2007	.006 Tubular Cond.	.35	1351	L.W. Antenna Coil	1.25
2191	.02 " "	.35	1352	L.W. Oscillator "	1.25
2188	.1 " "	.35	2230	L.W. Trimmer Cond.	.40
2046	.05 " "	.35	2277	L.W. Padding Cond.	.90

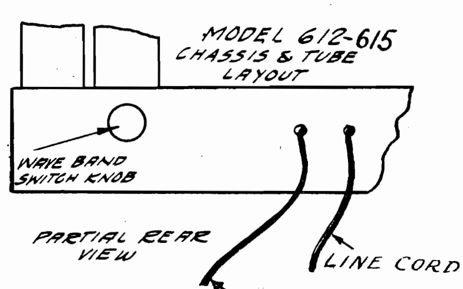
FRONT VIEW





TOP VIEW

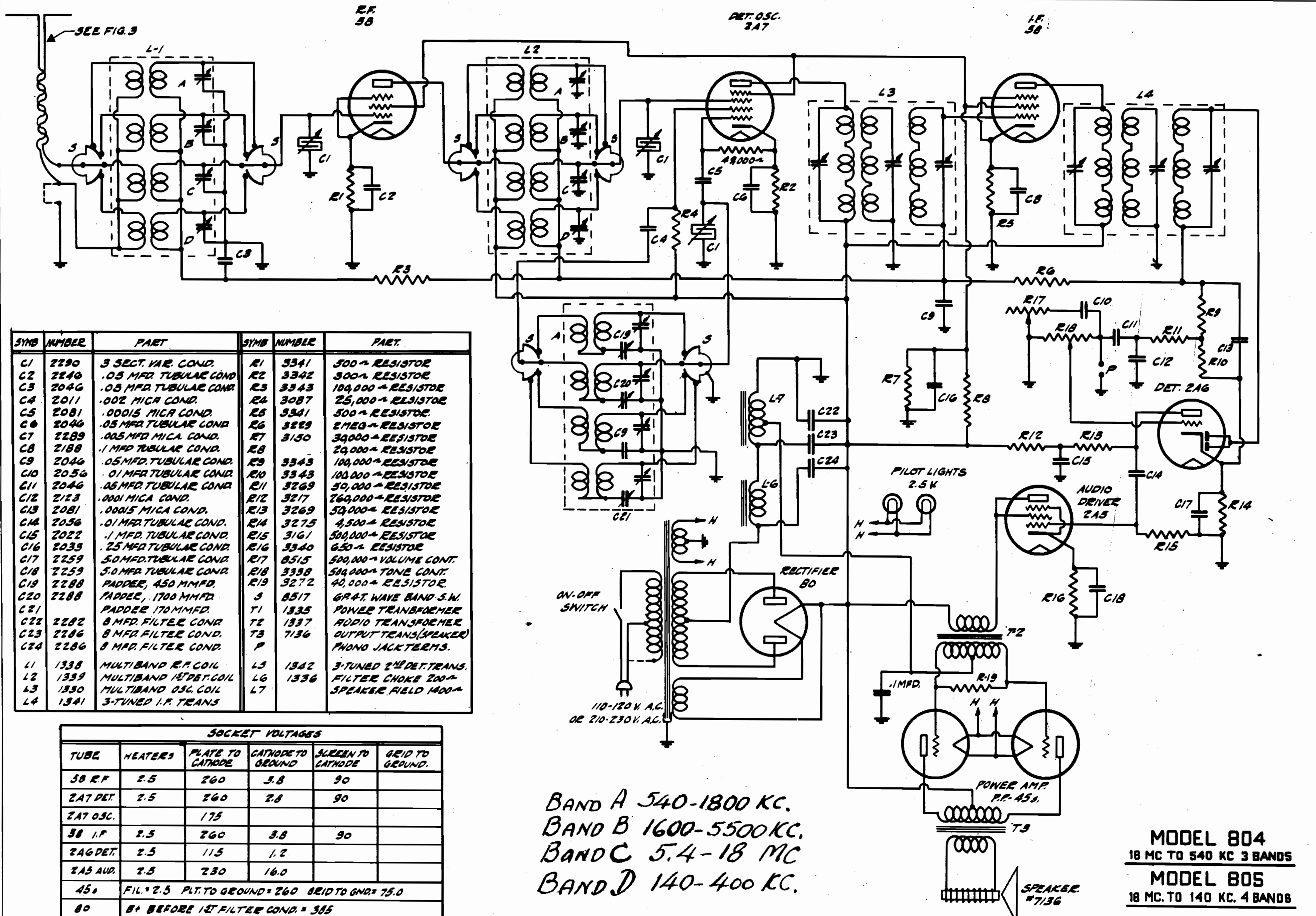
MODEL 612-615
CHASSIS & TUBE
LAYOUT



PARTIAL REAR VIEW

MODELS 804,805
Schematic,Voltage

DEWALD RADIO



MODEL 804
18 MC TO 540 KC 3 BANDS

MODEL 805
18 MC. TO 140 KC. 4 BANDS

BAND A 540-1800 KC.
BAND B 1600-5500 KC.
BAND C 5.4-18 MC
BAND D 140-400 KC.

SYMB	NUMBER	PART	SYMB	NUMBER	PART
C1	2290	3 SECT. VAR. COND.	R1	3341	500 Ω RESISTOR
C2	2246	.05 MFD. TUBULAR COND	R2	3342	300 Ω RESISTOR
C3	2046	.05 MFD. TUBULAR COND.	R3	3343	100,000 Ω RESISTOR
C4	2011	.002 MICA COND.	R4	3087	25,000 Ω RESISTOR
C5	2081	.00015 MICA COND.	R5	3341	500 Ω RESISTOR.
C6	2046	.05 MFD. TUBULAR COND.	R6	3229	2 MEG Ω RESISTOR
C7	2289	.005 MFD. MICA COND.	R7	3150	30,000 Ω RESISTOR
C8	2188	.1 MFD TUBULAR COND.	R8		20,000 Ω RESISTOR
C9	2046	.05 MFD. TUBULAR COND.	R9	3343	100,000 Ω RESISTOR
C10	2056	.01 MFD. TUBULAR COND.	R10	3343	100,000 Ω RESISTOR
C11	2046	.05 MFD. TUBULAR COND.	R11	3269	50,000 Ω RESISTOR
C12	2123	.0001 MICA COND.	R12	3217	260,000 Ω RESISTOR
C13	2081	.00015 MICA COND.	R13	3269	50,000 Ω RESISTOR
C14	2056	.01 MFD. TUBULAR COND.	R14	3275	4,500 Ω RESISTOR
C15	2022	.1 MFD. TUBULAR COND.	R15	3161	500,000 Ω RESISTOR
C16	2033	.25 MFD. TUBULAR COND.	R16	3340	650 Ω RESISTOR
C17	2259	5.0 MFD. TUBULAR COND.	R17	8515	500,000 Ω VOLUME CONT.
C18	2259	5.0 MFD. TUBULAR COND.	R18	3338	500,000 Ω TONE CONT.
C19	2288	PADDER, 450 MMFD.	R19	3272	40,000 Ω RESISTOR.
C20	2288	PADDER, 1700 MMFD.	S	8517	GR.4T. WAVE BAND S.W.
C21		PADDER 170 MMFD.	T1	1335	POWER TRANSFORMER
C22	2282	8 MFD. FILTER COND.	T2	1337	AUDIO TRANSFORMER
C23	2286	8 MFD. FILTER COND.	T3	7136	OUTPUT TRANS (SPEAKER)
C24	2286	8 MFD. FILTER COND.	P		PHONO JACK TERMS.
L1	1338	MULTIBAND R.F. COIL	L5	1342	3-TUNED 2ND DET. TRANS.
L2	1339	MULTIBAND 1ST DET. COIL	L6	1336	FILTER CHOKE 200 Ω
L3	1330	MULTIBAND OSC. COIL	L7		SPEAKER FIELD 1400 Ω
L4	1341	3-TUNED I.F. TRANS			

SOCKET VOLTAGES

TUBE	HEATERS	PLATE TO CATHODE	CATHODE TO GROUND	SCREEN TO CATHODE	GRID TO GROUND.
58 R.F	2.5	260	3.8	90	
2A7 DET.	2.5	260	2.8	90	
2A7 OSC.		175			
58 I.F	2.5	260	3.8	90	
2A6 DET.	2.5	115	1.2		
2A5 AUD.	2.5	230	16.0		
45s	FIL. = 2.5 PLT. TO GROUND = 260 GRID TO GND. = 75.0				
80	B+ BEFORE 1ST FILTER COND. = 385 B+ AT 2ND FILTER COND. = 370 B+ AT OUT PUT OF FILTER = 260				

MODELS 804,805
Socket,Trimmers,
Alignment,Data

DEWALD RADIO

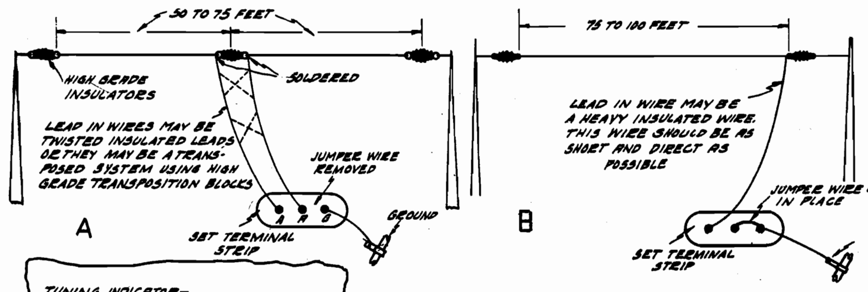
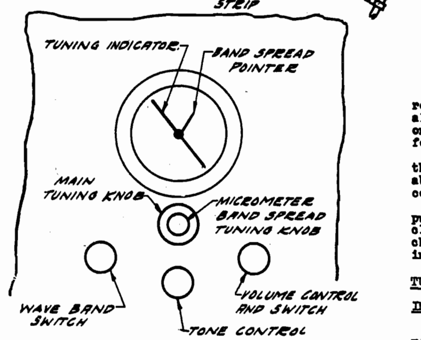


FIG. 3



VIEW OF FRONT PANEL
FIG.4

SERVICE NOTES

REALIGNMENT The procedure outlined below should be followed should the receiver require realignment. For location aligning trimmers and padders, see Fig. 2.

I. F. ALIGNMENT To align the Intermediate Frequency stages, first place the Wave Band Switch in Pos. "A" and Short Circuit the Oscillator Section of the Variable Condenser. Set the test Oscillator to 456 K.C. and connect its output through A .00025 MFD fixed Condenser to the grid cap of the 2A7 Tube and chassis ground. Adjust the six I. F. Compensators (Three on each I.F. Transformer) for Max Signal. (Volume Control must be in maximum position during all adjustments. Use the least possibe input to the receiver to prevent broadening of the resonance peaks.)

BAND "A" (BROADCAST) ALIGNMENT After the Intermediate Frequency stages have been completely aligned, connect external test oscillator to the Antenna and Ground binding posts of the set. See Fig. 3-A. Set the band switch to "A" position. Set test Oscillator to 1500 K.C. and adjust the three band A Compensators for maximum gain. Next, set dial at 600 K.C. and adjust Band "A" Paddler for maximum signal, rocking Variable Condenser at the same time. Now repeat repeaking operation at 1500 K. C.

BAND "B" ALIGNMENT Turn Wave Band Switch to "B" Position and set Variable Condenser to 5000 K. C. Adjust test oscillator to this frequency and adjust 3 Band "B" Trimmers for maximum gain. Next set dial at 1900 K. C. and adjust band "B" Paddler for maximum signal. Now repeat repeaking operation at 5000 K. C.

BAND "C" (SHORT WAVE) ALIGNMENT Turn Wave Band Switch to "C" position and set Variable Condenser to 16 megacycles. Adjust test oscillator to this frequency and adjust three band "C" Trimmers.

BAND "D" (LONG WAVE) ALIGNMENT Turn wave Band Switch to "D" position and align Trimmers on long wave coils at 375 K.C. Adjust Band "D" Padder at 160 K. C.

The Models 804 and 805 are all wave superheterodyne receivers designed to operate on 110-120 or 210-230 volts, alternating current, 50-60 cycles only. The primary tap on top of the power transformer must be connected properly for the voltage to be used.

Before plugging into the power line, make sure that the line voltage and current frequency agree with the above. If doubt exists regarding the exact power line conditions, cosult your local power Company.

Check the tubes to be certain that they are securely pushed into their respective sockets, and that the grid clips on top of the tubes are firmly in place. Also check the speaker plug to see that it is securely pushed into its socket at the rear of the Chassis.

TUBES 2-58s, 1-2A7, 1-2A6, 1-2A5, 2-45s, 1-80

INSTALLATION This receiver is arranged for a "Doublet" Antenna system, or an ordinary single wire system. For connections of either type see Fig. #3a & 3B. A good Antenna is essential for the correct operation of this receiver, especially where distant reception is expected. The flat top portion of the Antenna should be placed as high as possible above the ground and surrounding objects. No. 14 solid or stranded wire may be used for the flat top portion and well insulated semi-flexible wire for the lead-in section. The Antenna should be equipped with good insulators wherever they are required. Material such as pyrex, glass, Bakelite, and high grade porcelain are well suited for radio installations. The lead-in wire should be kept away from all nearby wires and should be run at right angles to power or trolley lines wherever possible. It should be brought into the house at the nearest point convenient to the receiver in order to avoid picking up noise from home electrical devices. The ground wire should be as short as possible and must be a good connection to water or other grounded pipe.

BAND SPREAD DIAL This receiver is provided with a dual station selector drive, to permit micrometer tuning which is especially valuable on the short waves where band spreading or its equivalent, high ratio tuning, becomes necessary for easy and rapid registering of foreign programs.
The large knob of the main selector drive is the low ratio control with a normal ratio of 24 to 1 in 360°. The small knob on the same shaft controls the high ratio control with a tuning ratio of 125 to 1 in 360°. Bands "A" and "B" are calibrated in kilocycles and Band "C" in megacycles. The Small Band Spread Indicator may be used to make fine adjustments not obtainable from the larger scale.

PHONOGRAPH PICKUP It is also possible to use this receiver with an electric phono pickup attachment for the reproduction of disc. recordings. For this purpose, a Phono Jack is located at the rear of the Chassis. The volume Control will control the strength of signals for phonograph reproduction (any high impedance pickup of high quality may be used with this receiver.)

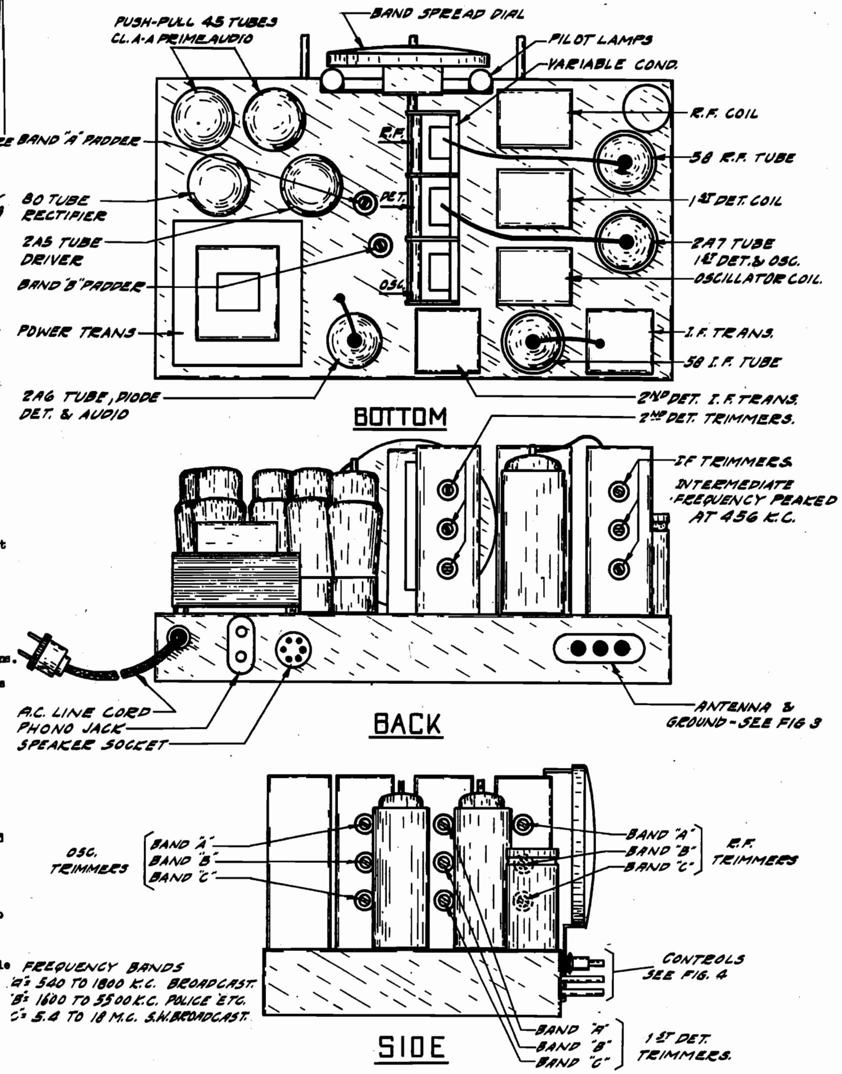
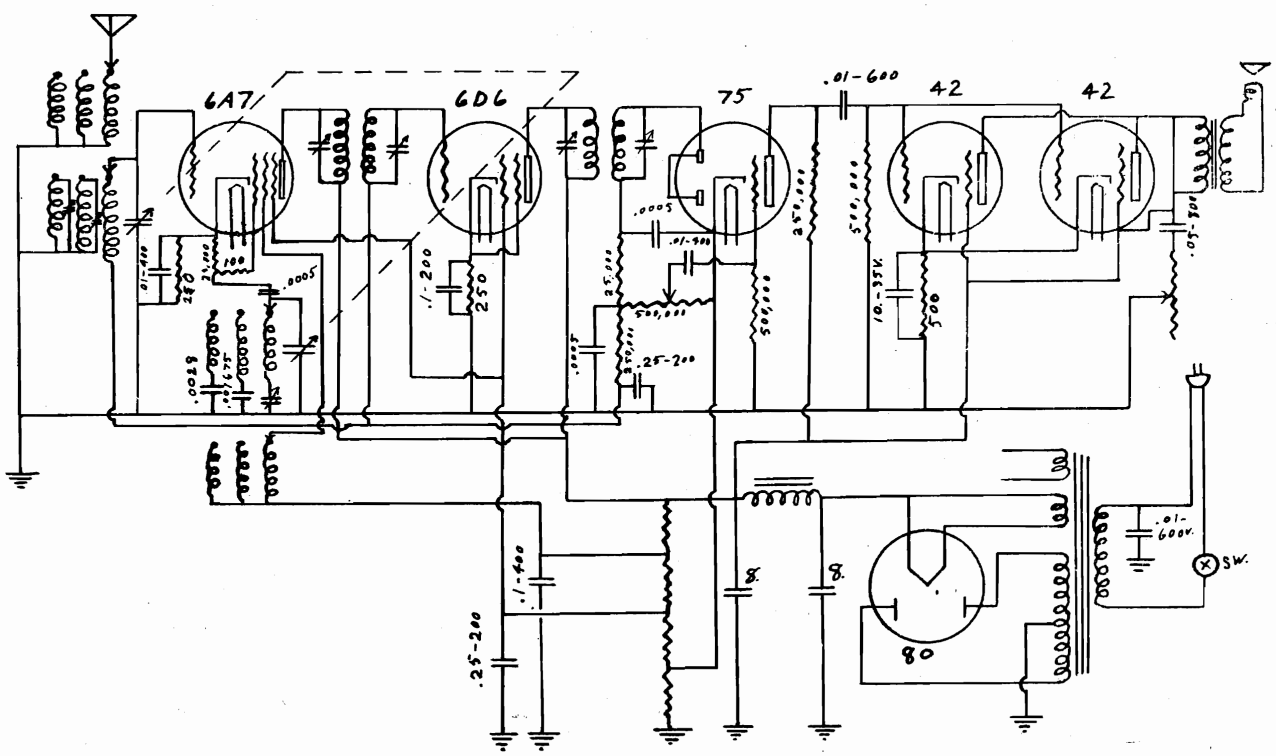
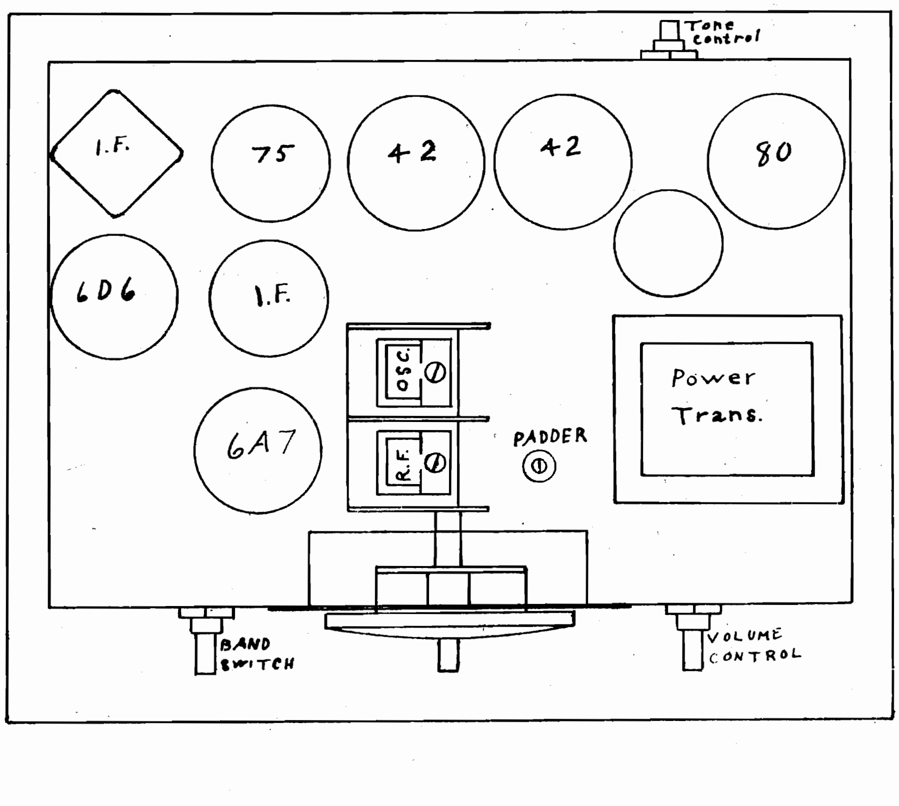


FIG. 2

MODELS 139,139C
Schematic, Socket
Trimmers

ECHOPHONE RADIO MFG. CO.





ECHOPHONE RADIO MFG. CO.

SERVICE MANUAL

MODELS #139 - #139C

This receiver is a six tube superheterodyne, designed to operate on 105 to 120 volts alternating current, 60 cycle and can also be furnished for 25 cycle.

Tube complement:
1 - 6A7 - first detector and oscillator
1 - 6D6 - I F amplifier
1 - 75 - second detector-AVC- 1st audio
2 - 42 - in parallel - power output
1 - 80 - rectifier

This receiver covers the following three wave bands:
540 - 1720 kilocycles
1720- 5000 kilocycles
5.5- 16 megacycles

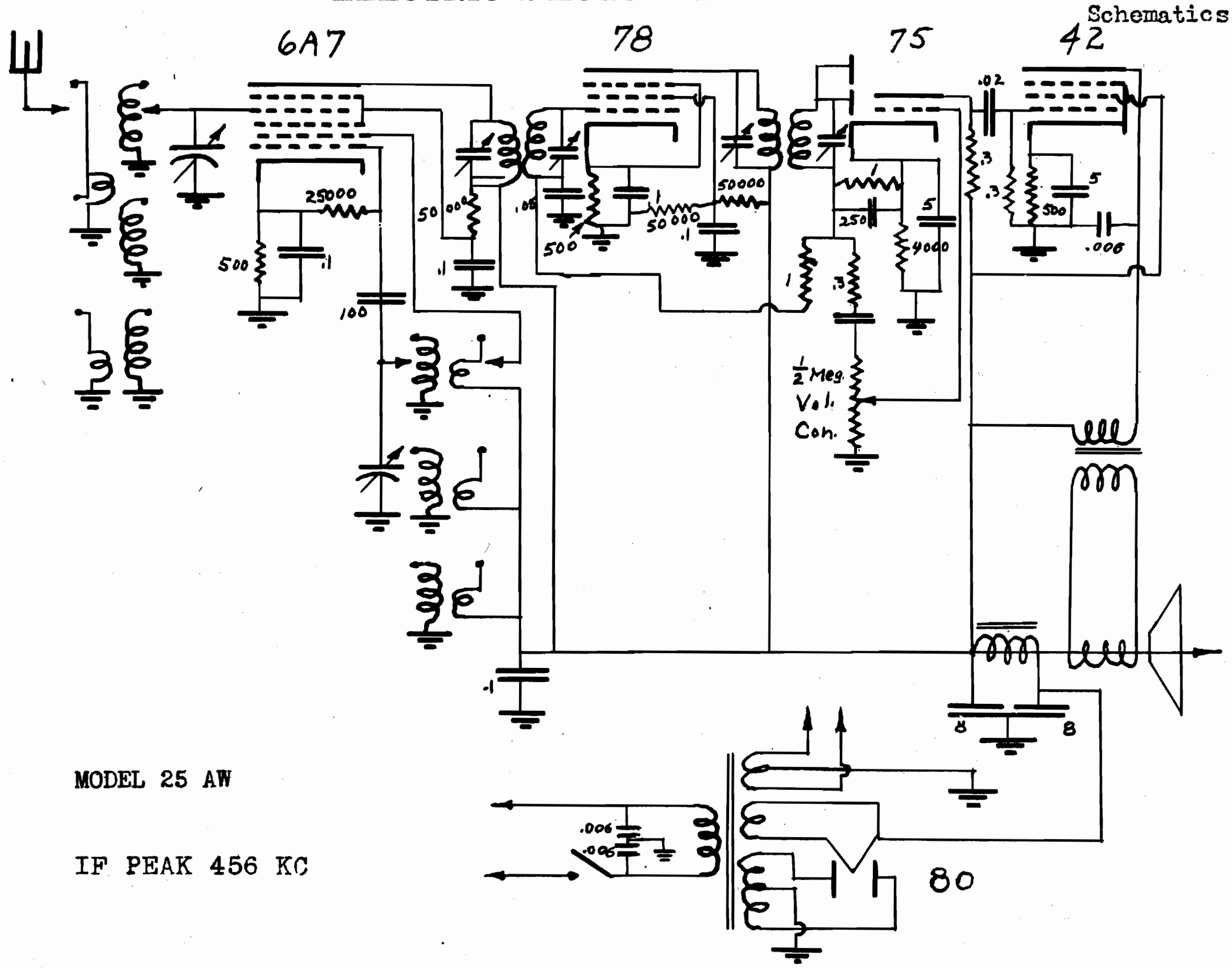
Very satisfactory results should be obtained with an antenna of from 40 to 75 feet long, well insulated and erected well up above ground and at least ten feet away from surrounding objects.

To align receiver, proceed as follows:

1 - Apply 456 KC note to control grid of 6A7 and peak I F transformers for maximum gain.
2 - Apply 4000 KC note to antenna wire; set band switch to second band and align trimmer on oscillator section of variable condenser to track with 4000 KC on dial.
3 - Turn band switch to broadcast band; apply 1500 KC note to antenna wire, adjust trimmer on RF section of variable condenser for maximum gain.
4 - Apply 600 KC note to antenna, adjust padder condenser for maximum gain, swinging condenser back and forth across 600 KC signal.
5 - Check 1400 KC signal for alignment.
6 - Turn band switch to second band; check 4000 KC signal for alignment and adjust trimmer on antenna coil for greatest gain at 4000 KC.
7 - Turn band switch to last band and adjust trimmer on antenna coil for greatest noise on 12 megacycles.

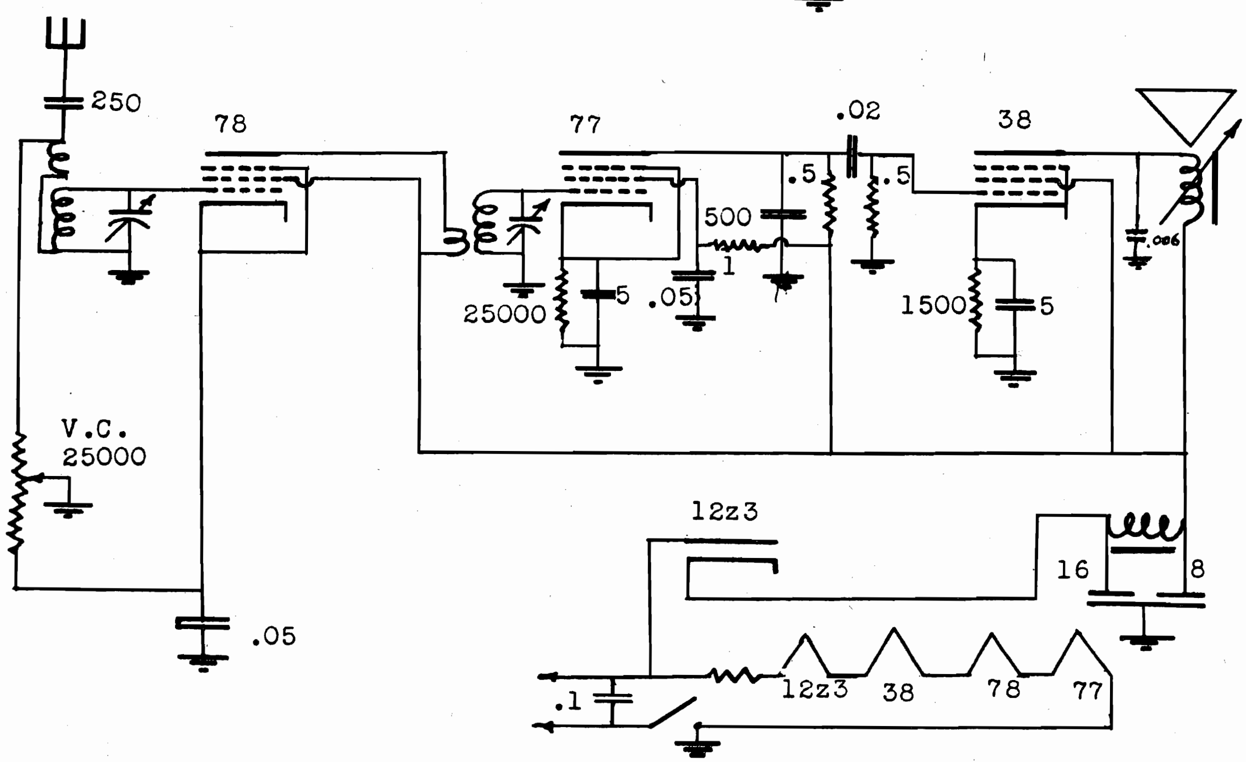
MODEL 4M
MODEL 25-AW
Schematics

ELECTRIC & AUTOMOTIVE PROD. CO.



MODEL 25 AW

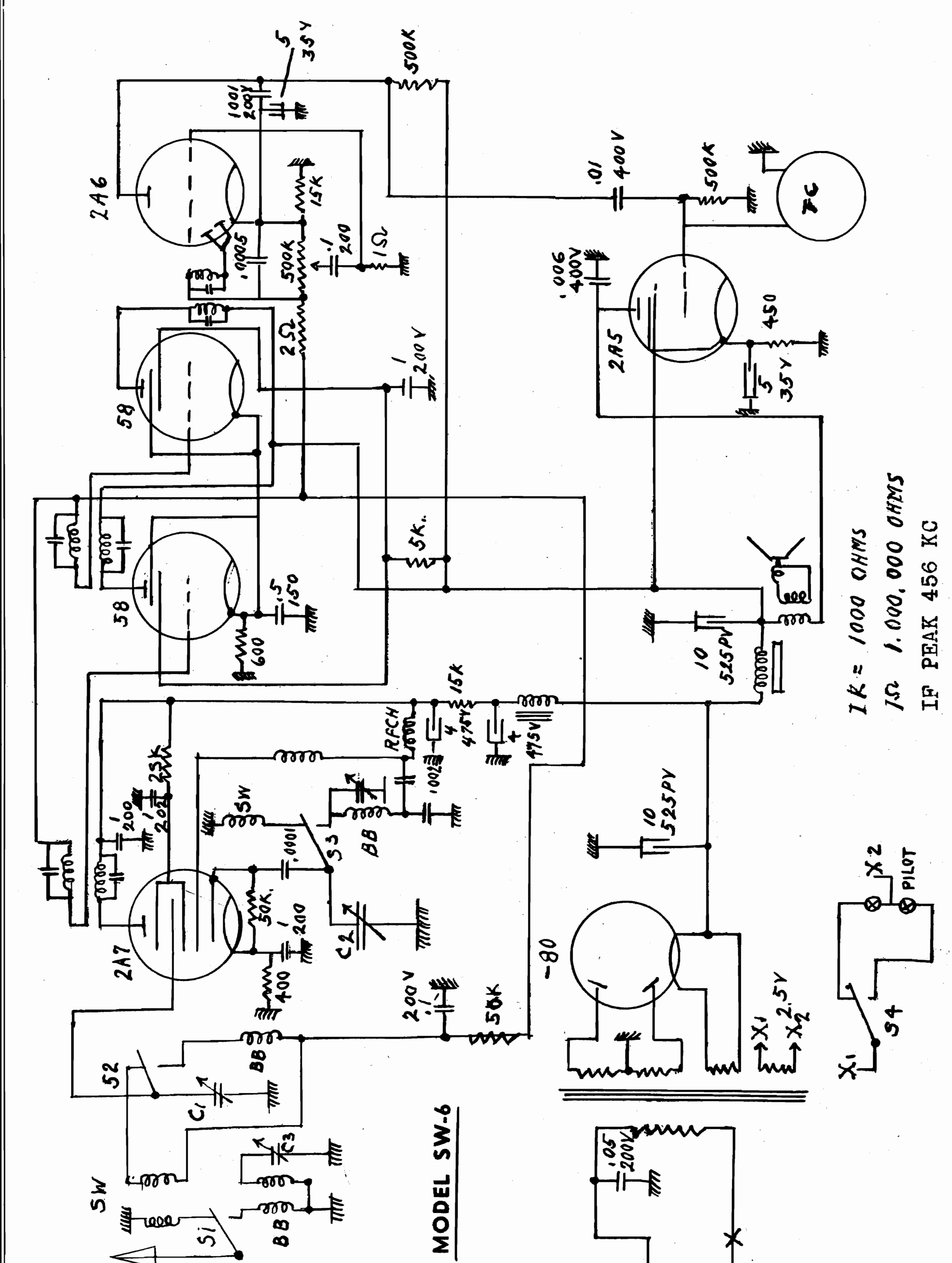
IF PEAK 456 KC



MODEL 4M.

MODEL SW-6
Schematic

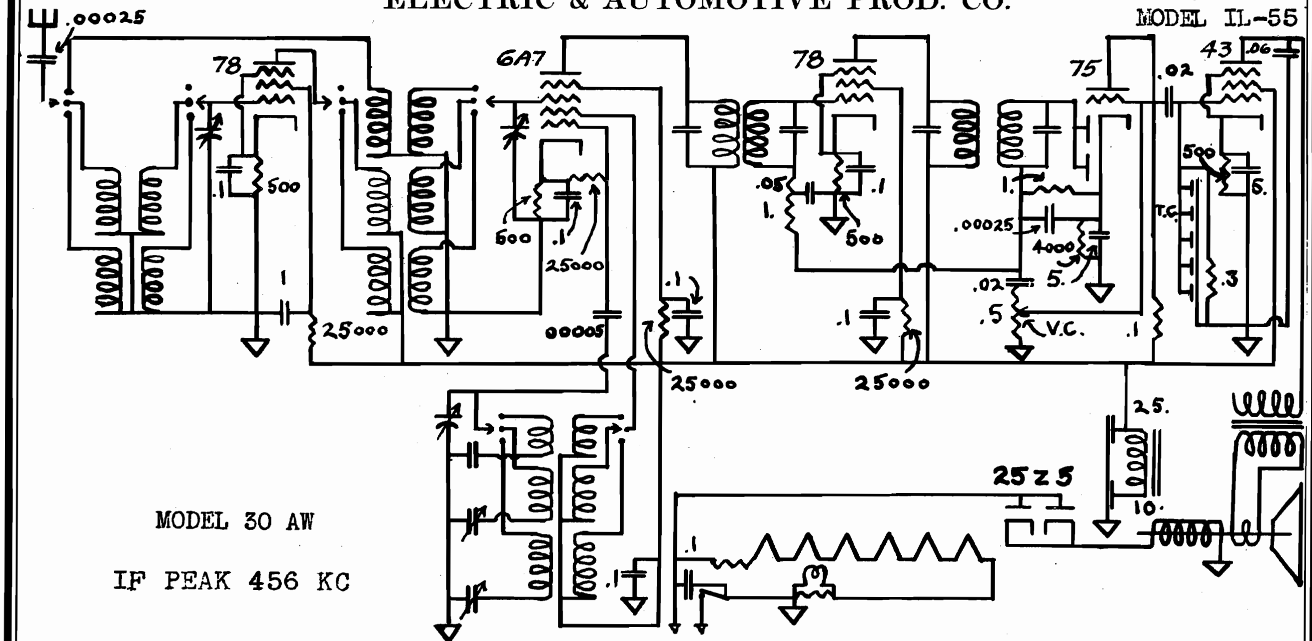
ELECTRIC & AUTOMOTIVE PROD. CO.

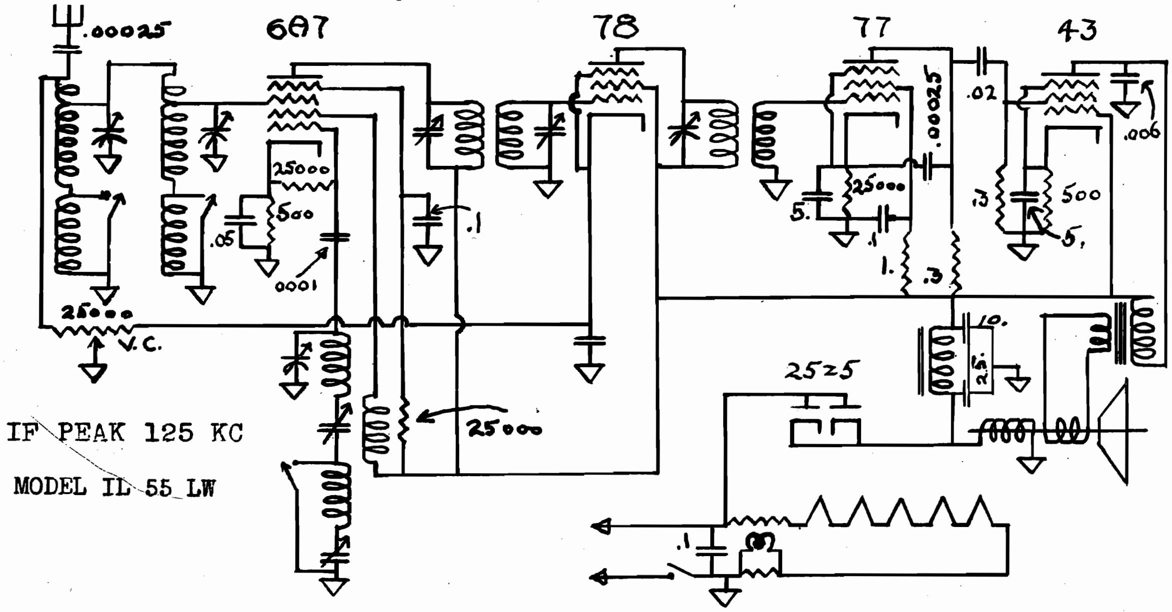


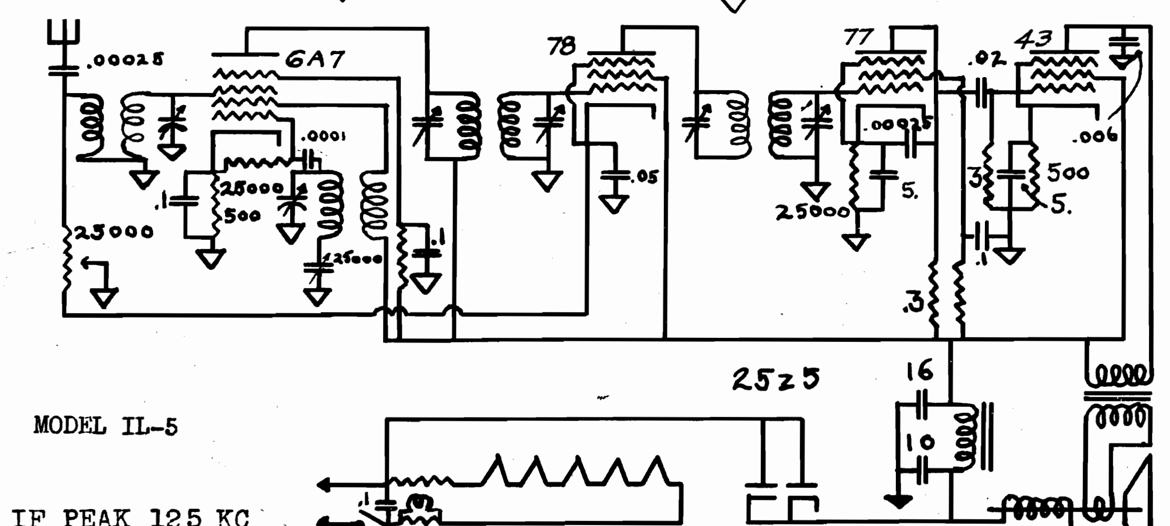
Schematics

ELECTRIC & AUTOMOTIVE PROD. CO.

MODEL IL-5
MODEL 30-AW
MODEL IL-55

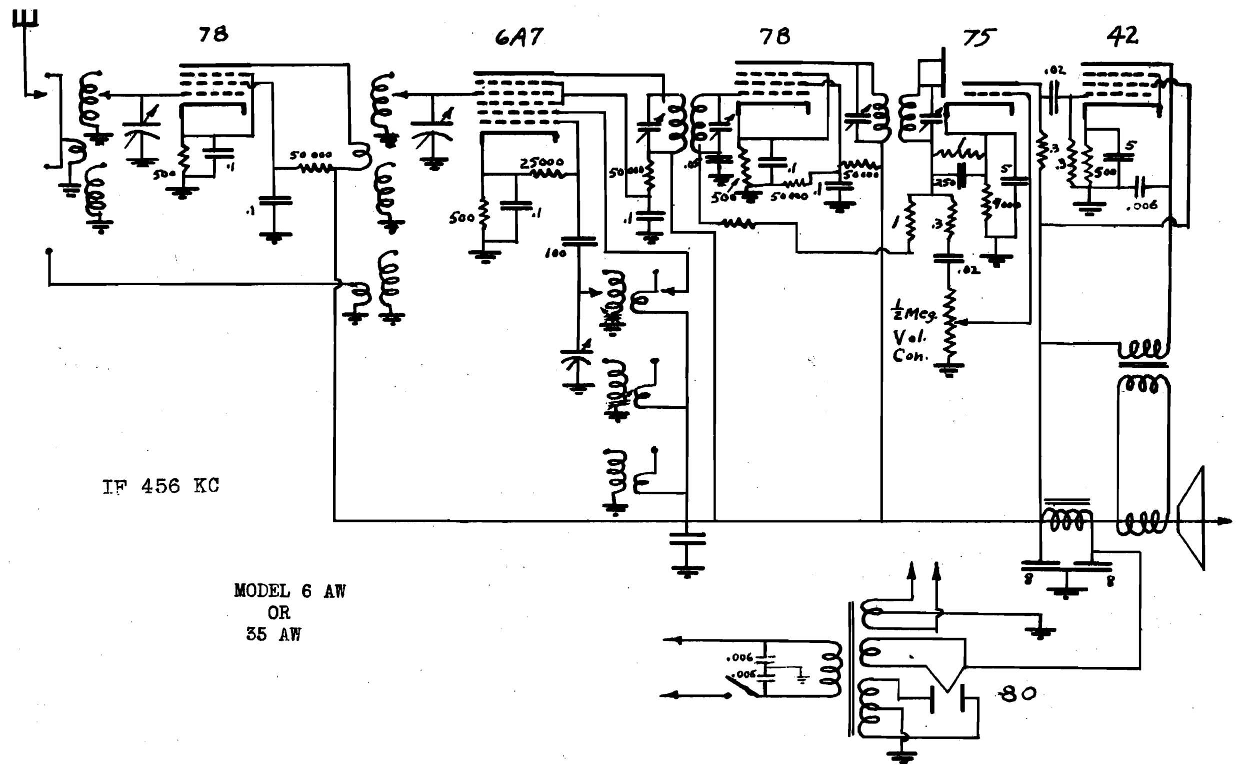


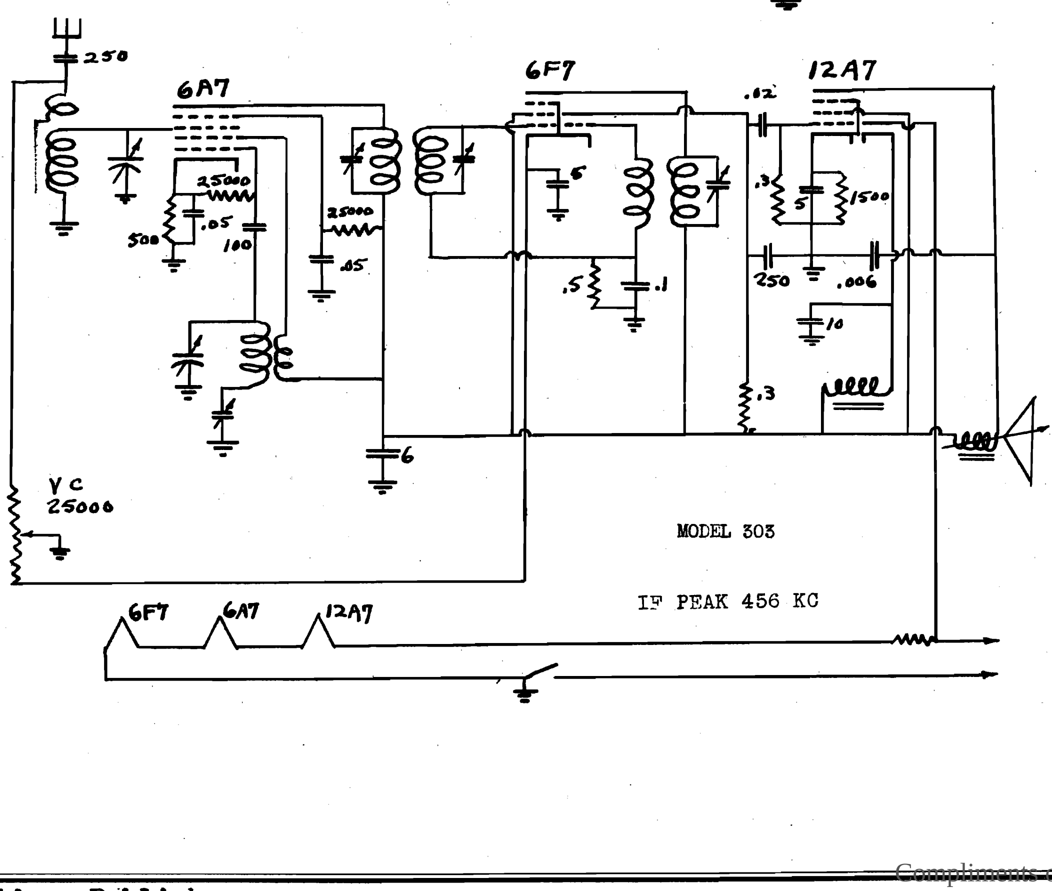




MODEL 6-AW,35-AW
MODEL 303
Schematics

ELECTRIC & AUTOMOTIVE PROD. CO.



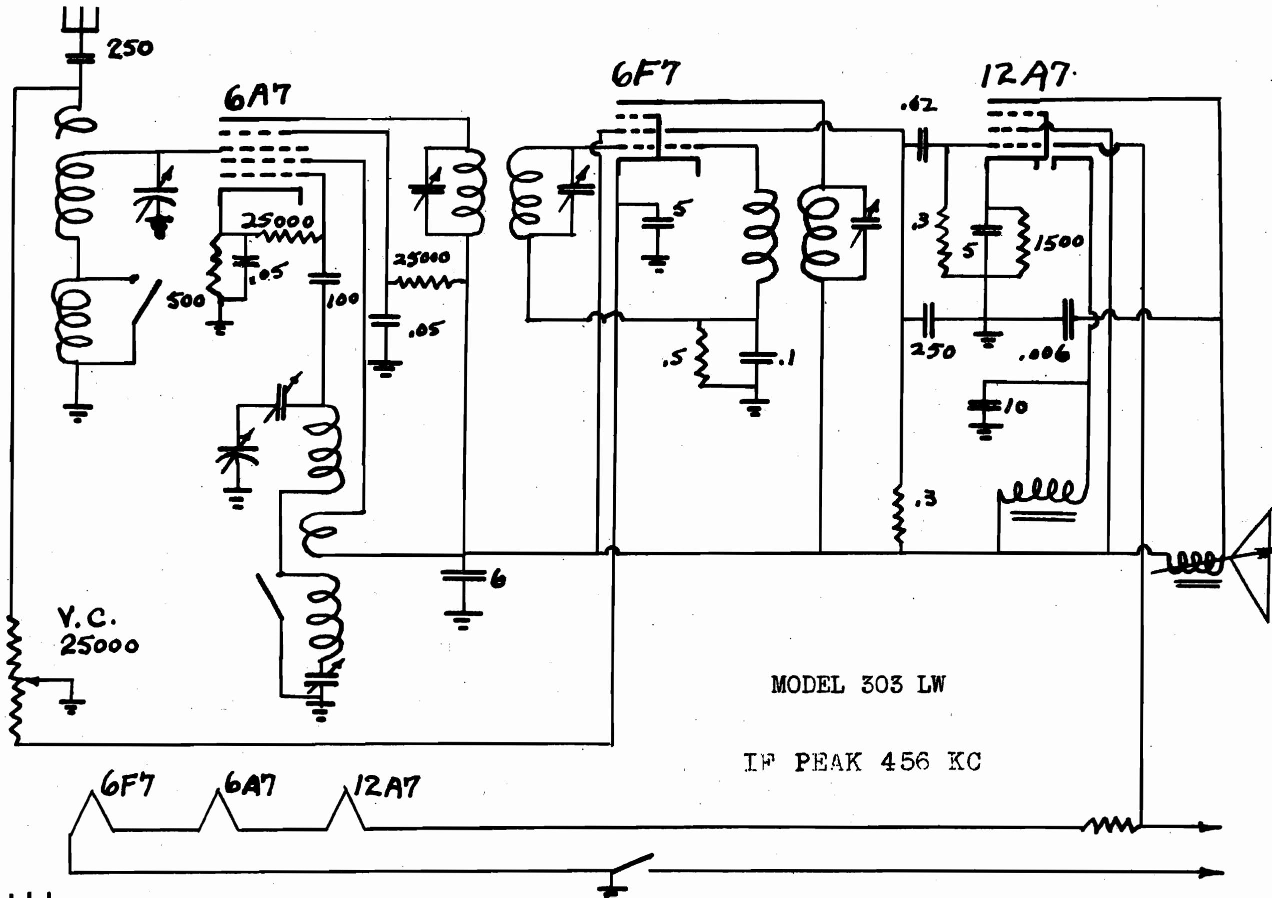


MODEL 303

IF PEAK 456 KC

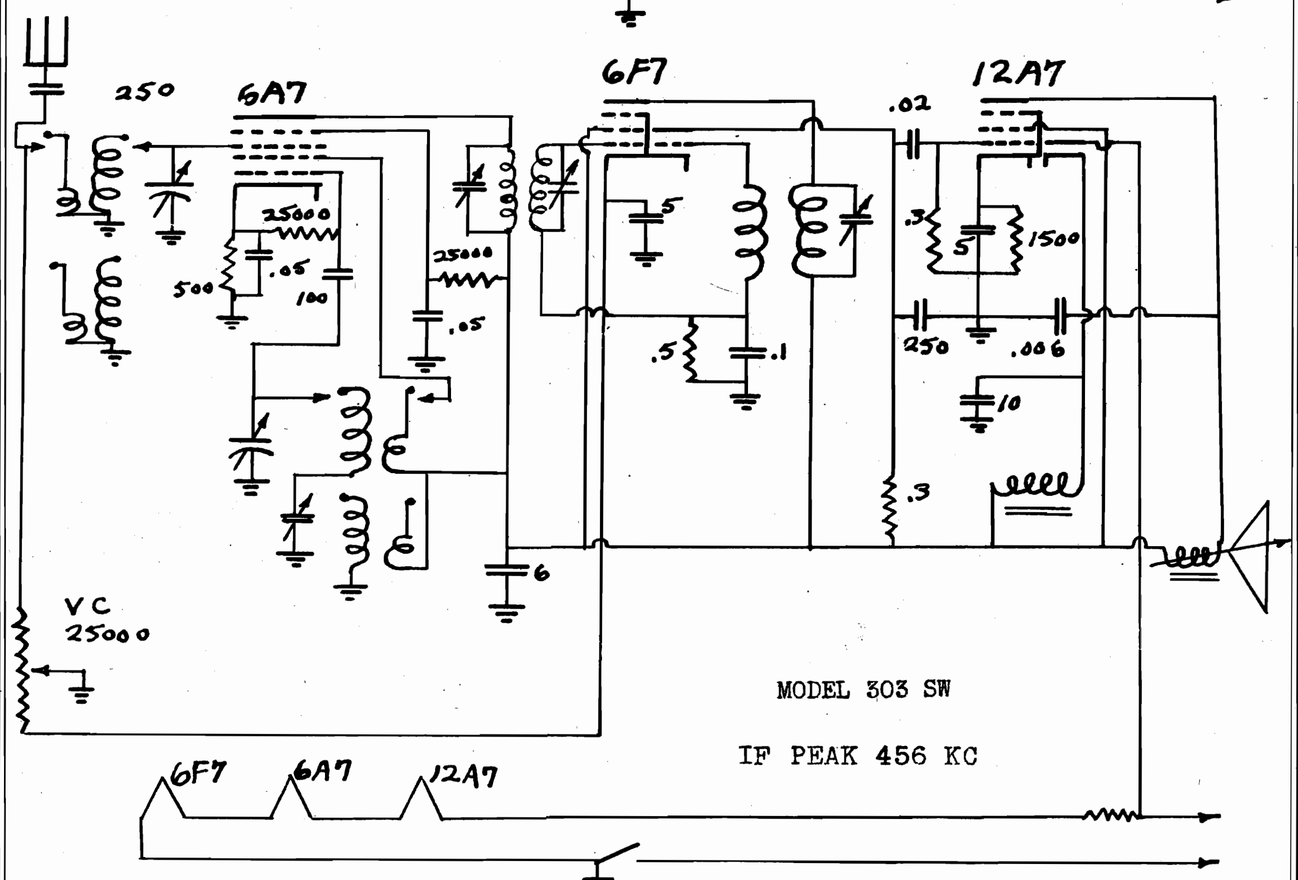
MODEL 303-LW
MODEL 303-SW
Schematics

ELECTRIC & AUTOMOTIVE PROD. CO.



MODEL 303 LW

IF PEAK 456 KC

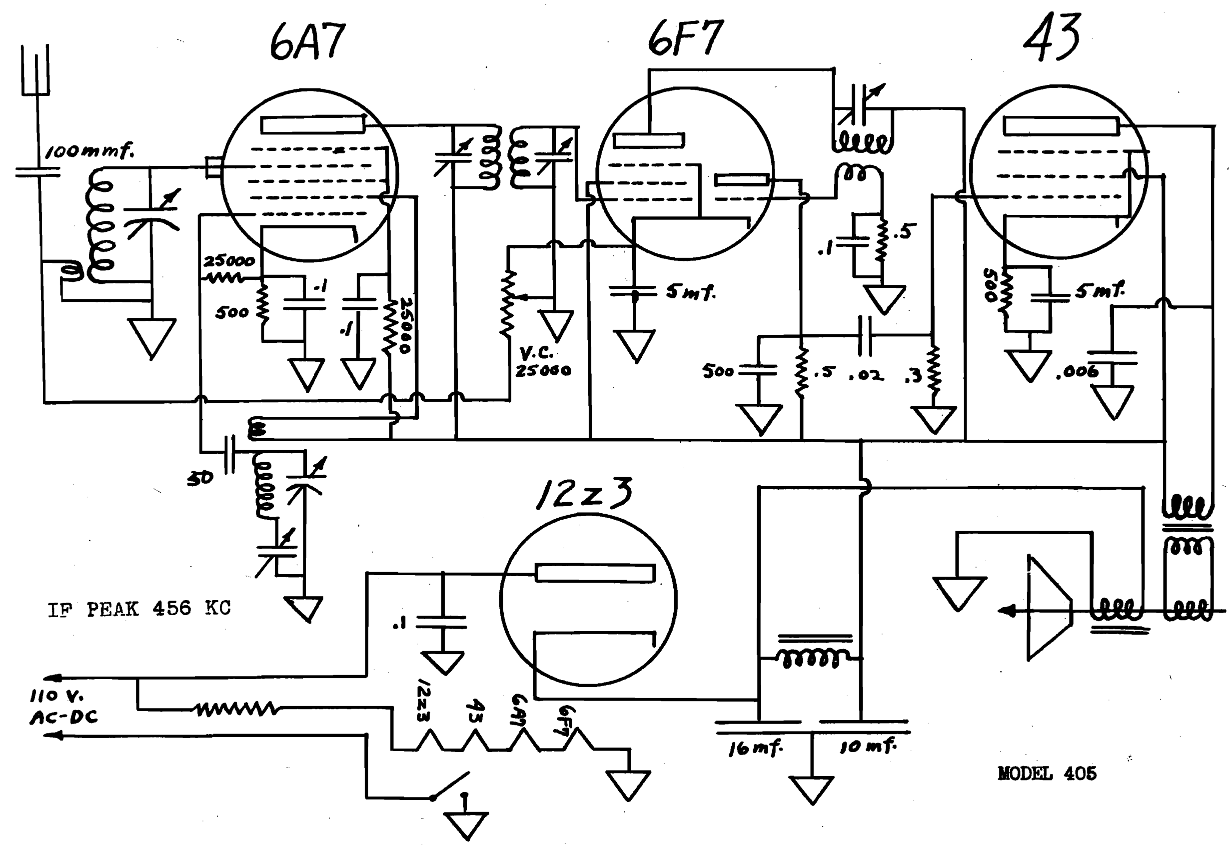


MODEL 303 SW

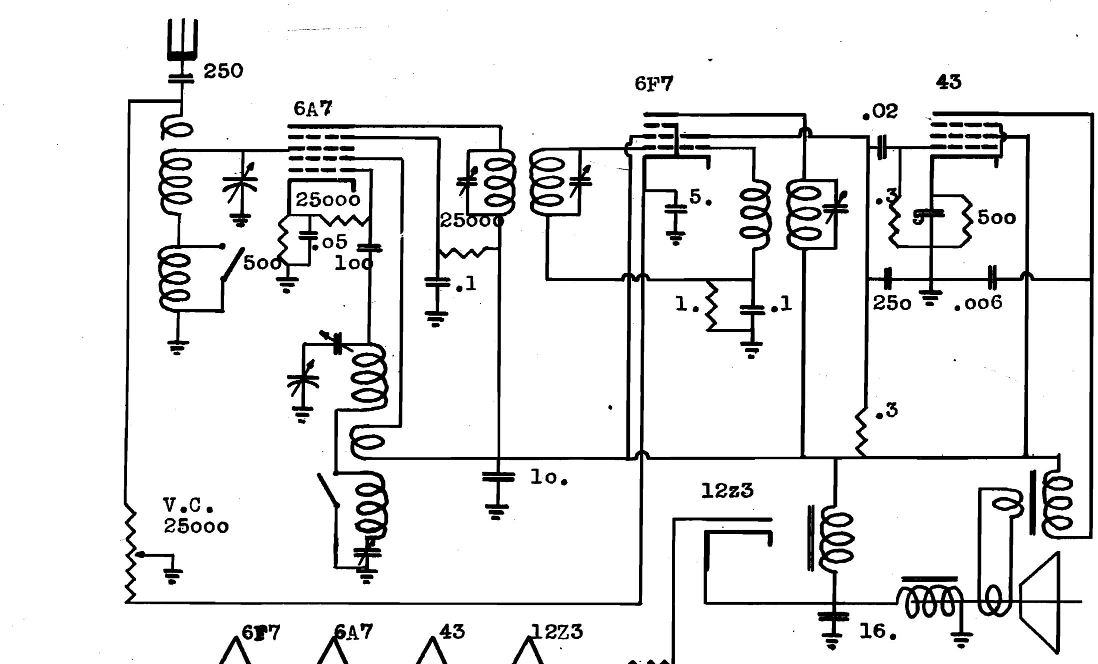
IF PEAK 456 KC

MODEL 405
MODEL 405-LW
Schematics

ELECTRIC & AUTOMOTIVE PROD. CO.



MODEL 405

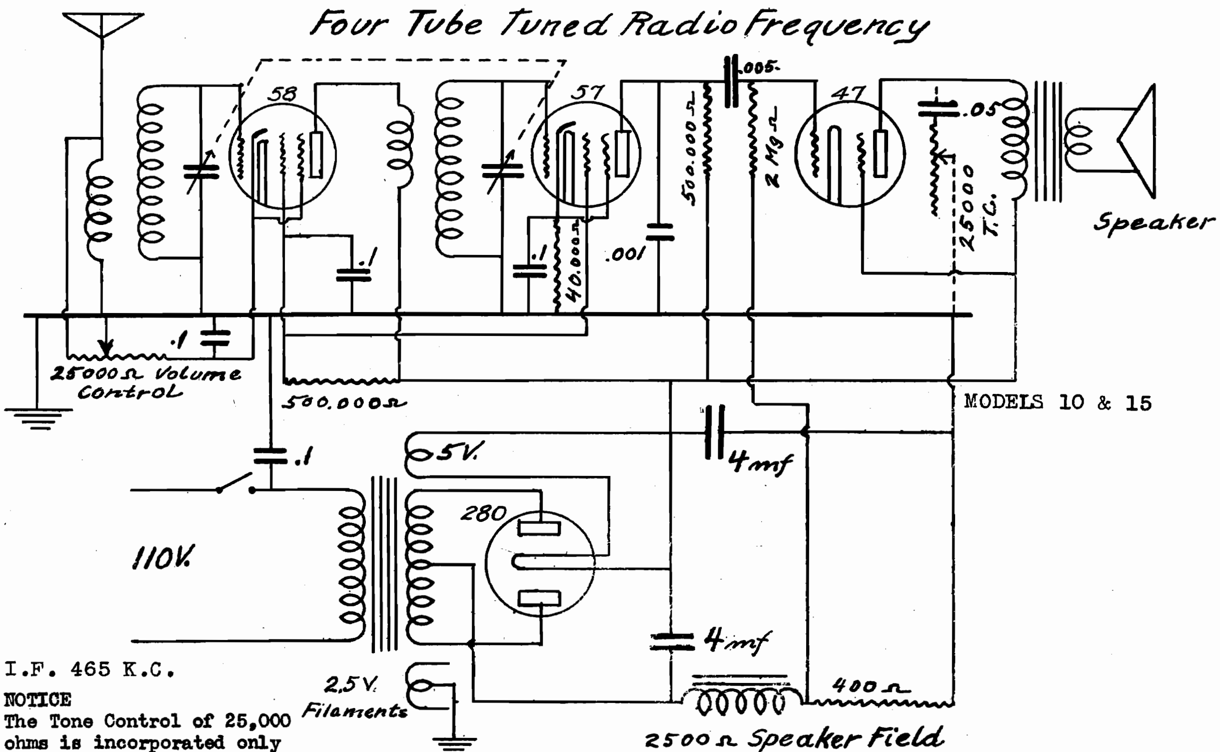


IF PEAK 456 KC

MODEL #405 LW

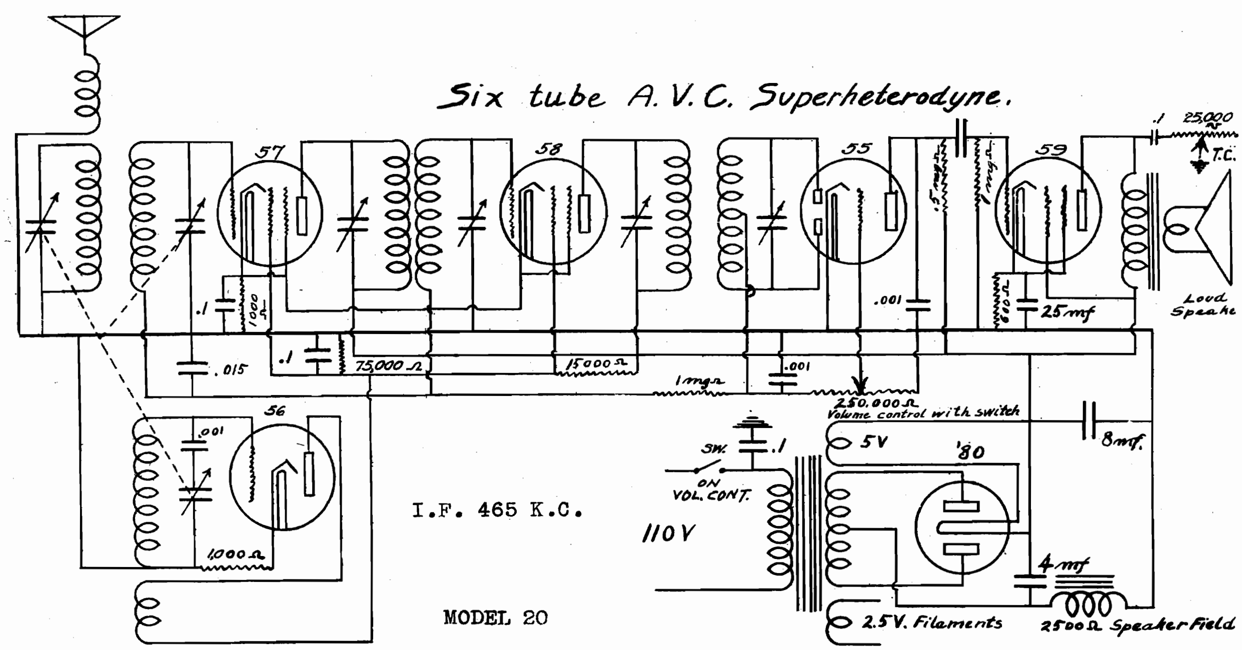
EL-REY RADIO MFG. CO.

MODELS 10,15
MODEL 20
Schematics



I.F. 465 K.C.

NOTICE
The Tone Control of 25,000 ohms is incorporated only in Model 15.

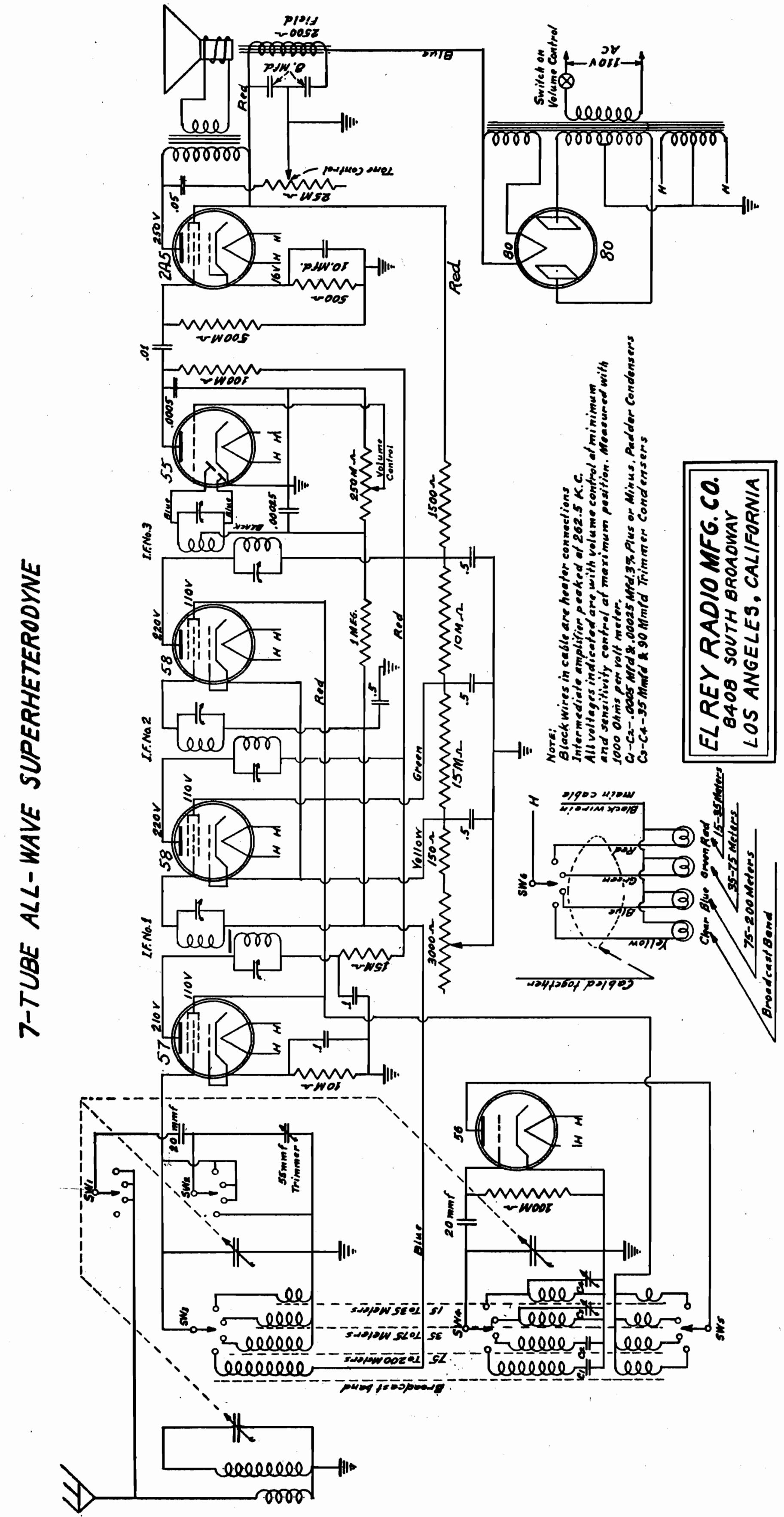


I.F. 465 K.C.

MODEL 20

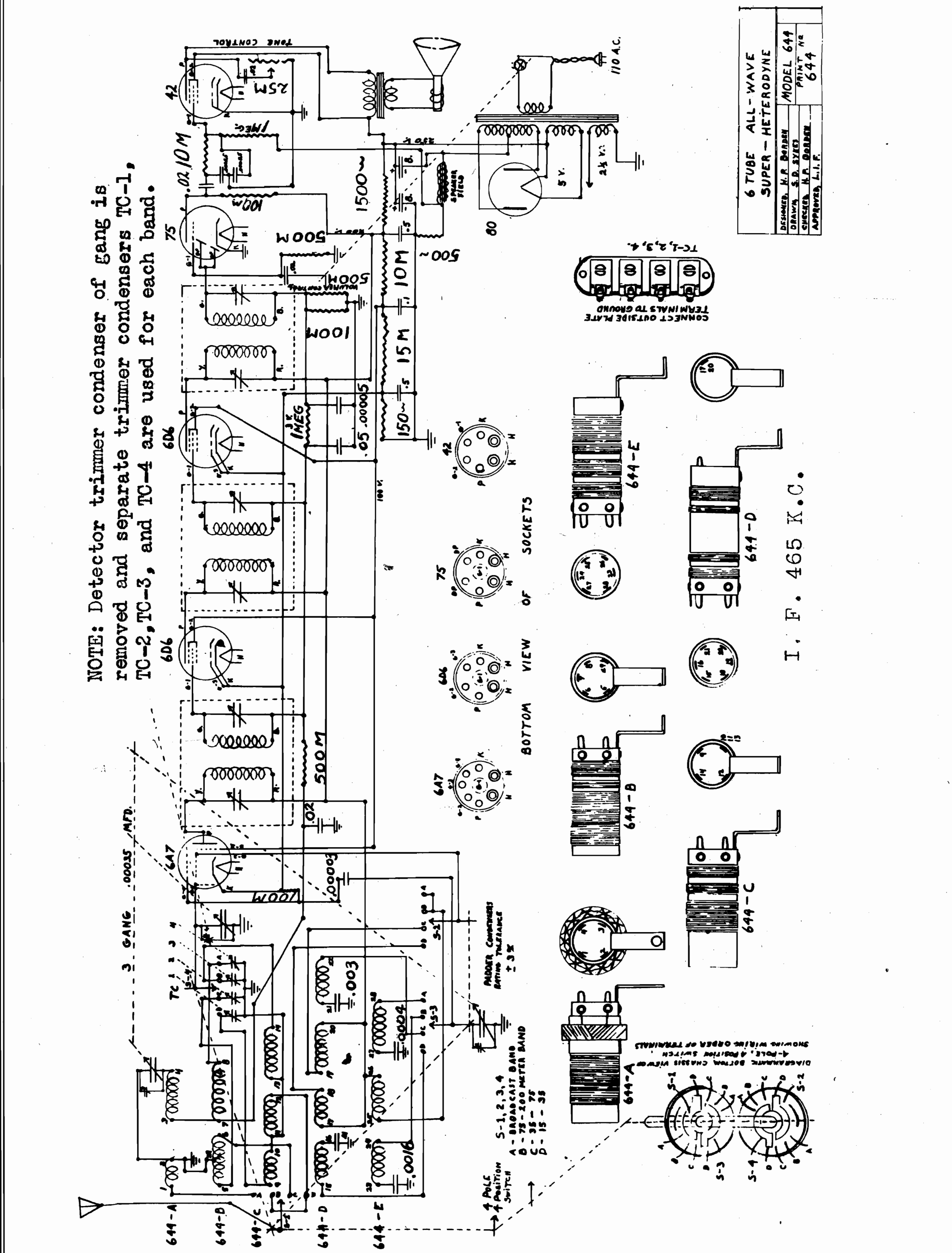
MODEL 7-Tube A-W. Superhet. Schematic

EL-REY RADIO MFG. CO.



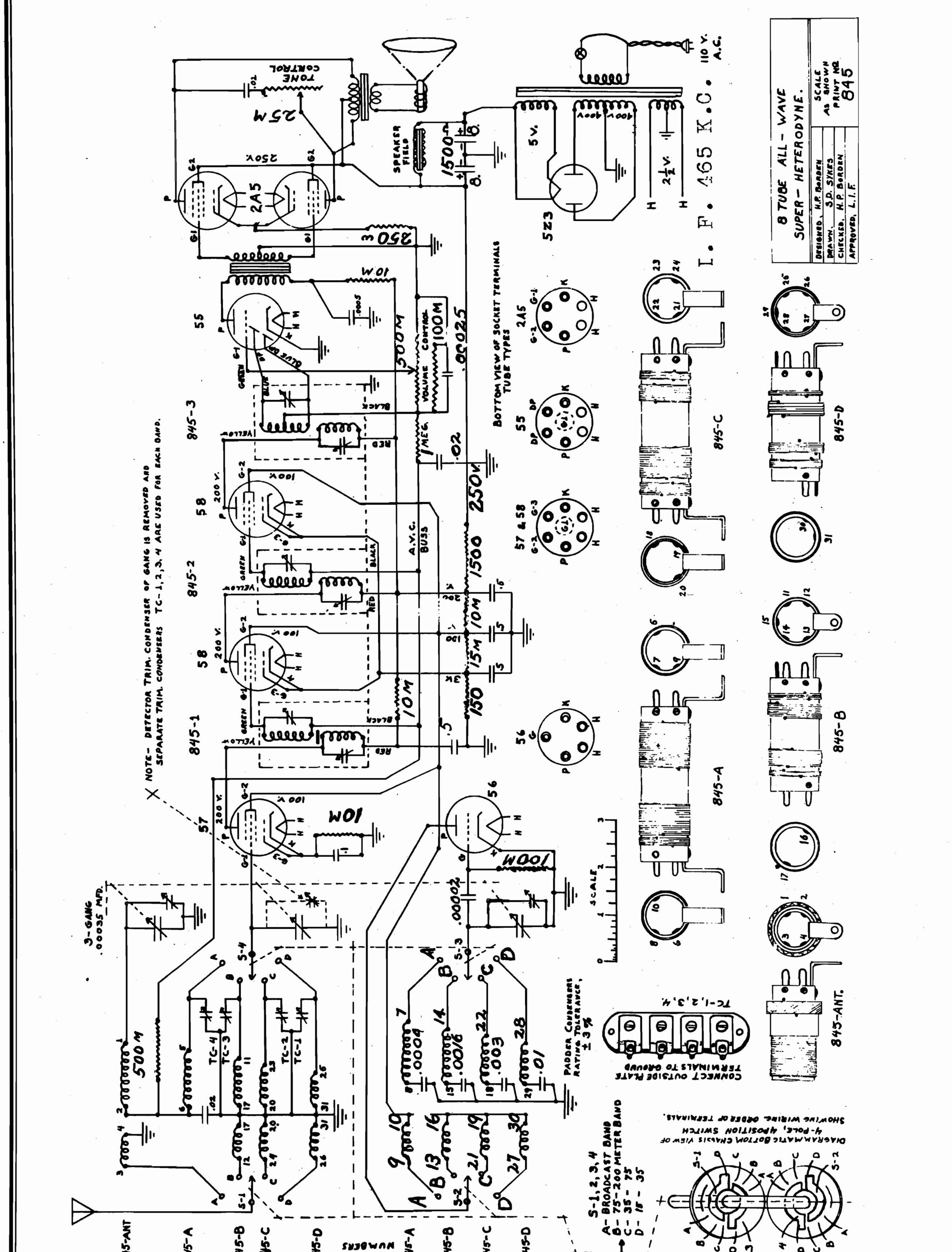
MODEL 644
Schematic

EL-REY RADIO MFG. CO.



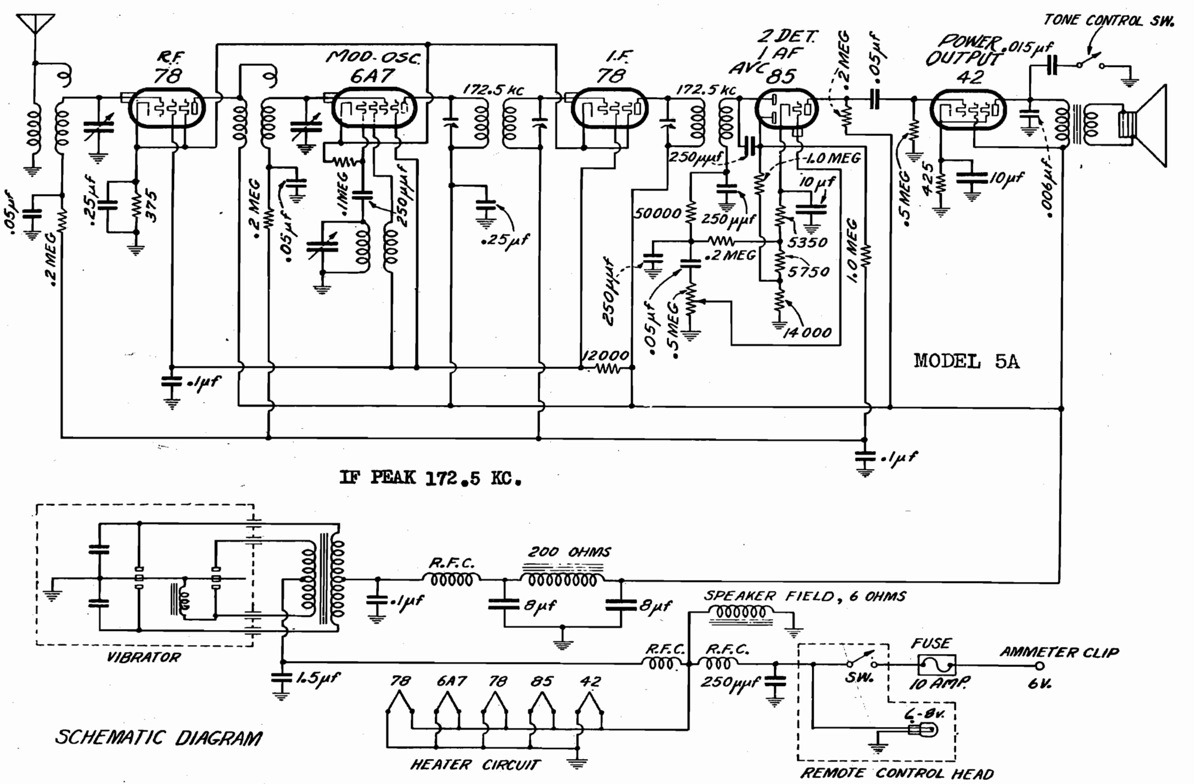
MODEL 845
Schematic

EL-REY RADIO MFG. CO.

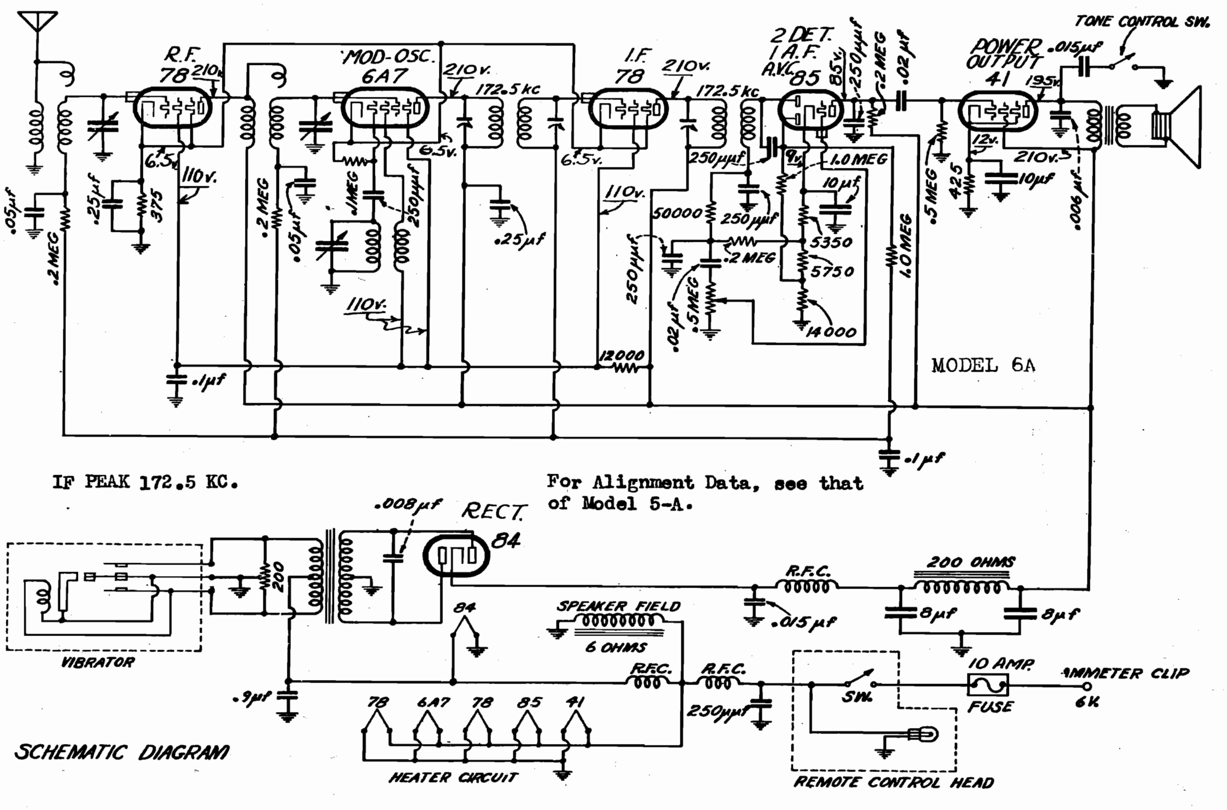


MODEL 5A
Schematic
MODEL 6A
Schematic, Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION



IF PEAK 172.5 KC.



IF PEAK 172.5 KC.

For Alignment Data, see that of Model 5-A.

MODEL 5A
Alignment, Voltage
MODEL 6A
Alignment

EMERSON RADIO AND PHONOGRAPH CORPORATION

Remove bottom cover. See that all tubes are pushed down in their sockets, and that the grid clips are in place. Remove clamp holding vibrator in socket by removing screw fastening it to transformer case. Note whether vibrator is polarized correctly (i.e., if receiver is to be installed in car having the negative side of the battery grounded, the red arrow on transformer case should point to (—) on top of the vibrator). The polarity may be changed by removing the vibrator from socket, turning the complete unit until correct polarity sign is indicated by arrow, and then re-inserting into socket. The polarity must be correct, otherwise serious damage might be incurred to both vibrator and receiver. Replace the clamp over the vibrator after this has been chrecked.

Below is a list of cars and their correct polarization:

Positive Ground

Auburn	Ford	Nash
Austin	Graham	Packard
Cadillac	Hudson	Pierce Arrow
Chrysler	Hupmobile	Plymouth
De Soto	La Fayette	Studebaker
Dodge	La Salle	Terraplane

Negative Ground

Buick	Lincoln	Reo
Chevrolet	Oldsmobile	Stutz
Duesenberg	Pontiac	Willys

Intermediate Transformers

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ kc. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer, or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

Radio Frequency and Oscillator

To align the r.f. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency near 1400 kc. Set the dial to the frequency selected. Adjust trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned on broadcast signals. Tune in a weak station between 1350 and 1450 kc. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

Voltage Analysis:

NOTE: All "B" and "C" voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

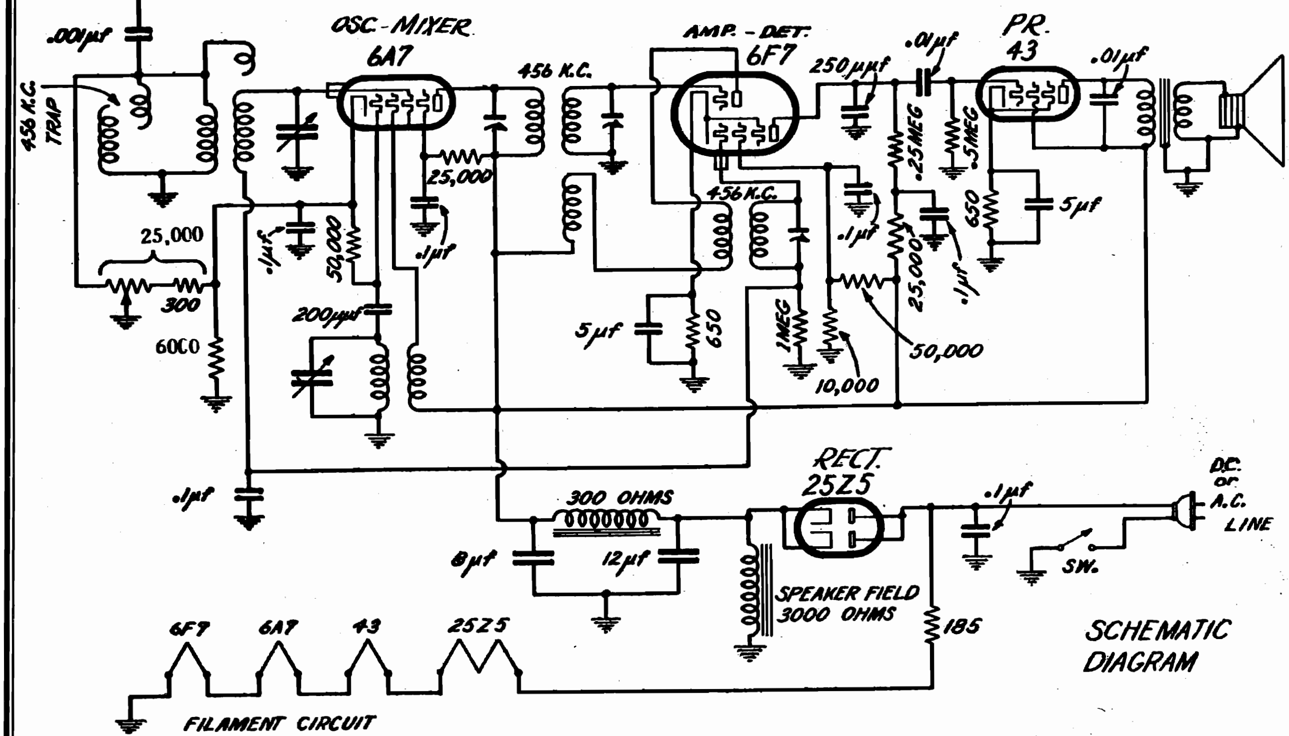
Battery volts—6.3, voltage across heaters—5.5, voltage across speaker field—5.5:

Tube	*Plate*	*Screen*	*Cathode*	*Suppressor*	*Osc. Plate*
78	215	110	10	10	—
6A7	215	110	10	—	110
78	215	110	10	10	—
85	95	—	9.5	—	—
42	205	215	12.5	—	—

MODEL 19
Chassis UV4
Schematic
Voltage,Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

I.F. 456 K.C.



CAUTION—UNDER NO CIRCUMSTANCE ALLOW A GROUND WIRE TO COME IN CONTACT WITH THE METAL PARTS OF THIS RECEIVER.

Voltage Readings:

Measurements should be made with the volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements are given from the point indicated to ground, with an input power line voltage of 117.5 volts, 60 cycles.

	Plate	Screen	Cathode	Osc. Plate
6A7 Oscillator-mixer	105	53	1.5	100
6F7 Triode	105	—	2.5	—
6F7 Pentode	50	15	2.5	—
43 Power pentode	95	100	14	—

Voltage across speaker field, 112 volts, d-c.

For operation on power line voltages other than 105 to 130 volts special ballast resistors may be secured.

REPLACEMENT PARTS

KKT-134	Antenna Coil	KKC-142	Two-gang variable condenser
KKT-135	Oscillator Coil	KKC-143	12 and 8 mf dry electrolytic filter condenser
KKT-136	First i-f transformer assembly.	KKC-145	Dual 5 mf, 25 volt, dry electrolytic by-pass condenser
KKT-137A	Second i-f transformer assembly	KS-38B	5" dynamic speaker
KKT-138	Iron-core filter choke	KKW-46A	185 ohm, 17 watt, resistor line cord
KKR-134A	Volume control		

MODEL 32
Chassis U5S
Schematic
Voltage, Parts

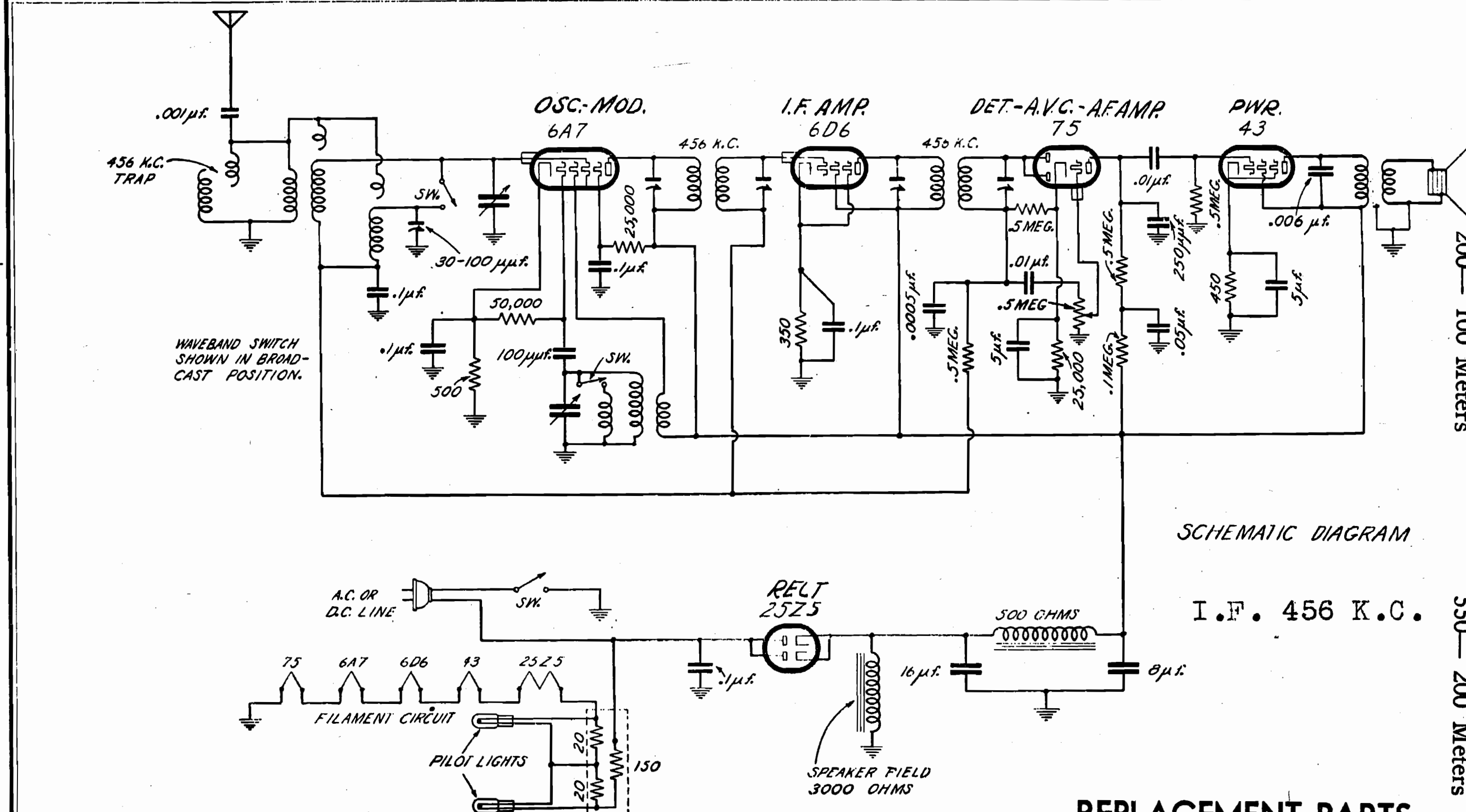
EMERSON RADIO AND PHONOGRAPH CORPORATION

FIVE-TUBE SUPERHETERODYNE RECEIVER

A.C.-D.C. . . . 105-130 Volts . . . 25-70 Cycles

Short-Wave Range
1500—3000 Kilocycles
200— 100 Meters

Broadcast Range
540—1500 Kilocycles
550— 200 Meters



REPLACEMENT PARTS

Part No.	Description
GGT-130	Antenna coil ....
GGT-131	Oscillator coil ....
GGT-132	First i-f transformer .
GGT-133	Second i-f transformer
KT-40	Filter choke ....
GGR-143	Volume control ......
GGR-128	Ballast resistor ......
GGC-136A	Variable condenser ....
SC-81	Single padding condenser ...
GGC-137	Combination by-pass and filter condenser.
KS-42	Wave band selector switch ..
KS-38A	5" Dynamic speaker ....
KL-6	Pilot light ....

CAUTION—UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH THE METAL CHASSIS OF THIS RECEIVER.

Voltage Readings:

Readings should be taken with volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements given are for a line voltage of 117.5 volts, 60 cycles and are measured from point indicated to ground with the antenna grounded to the metal chassis.

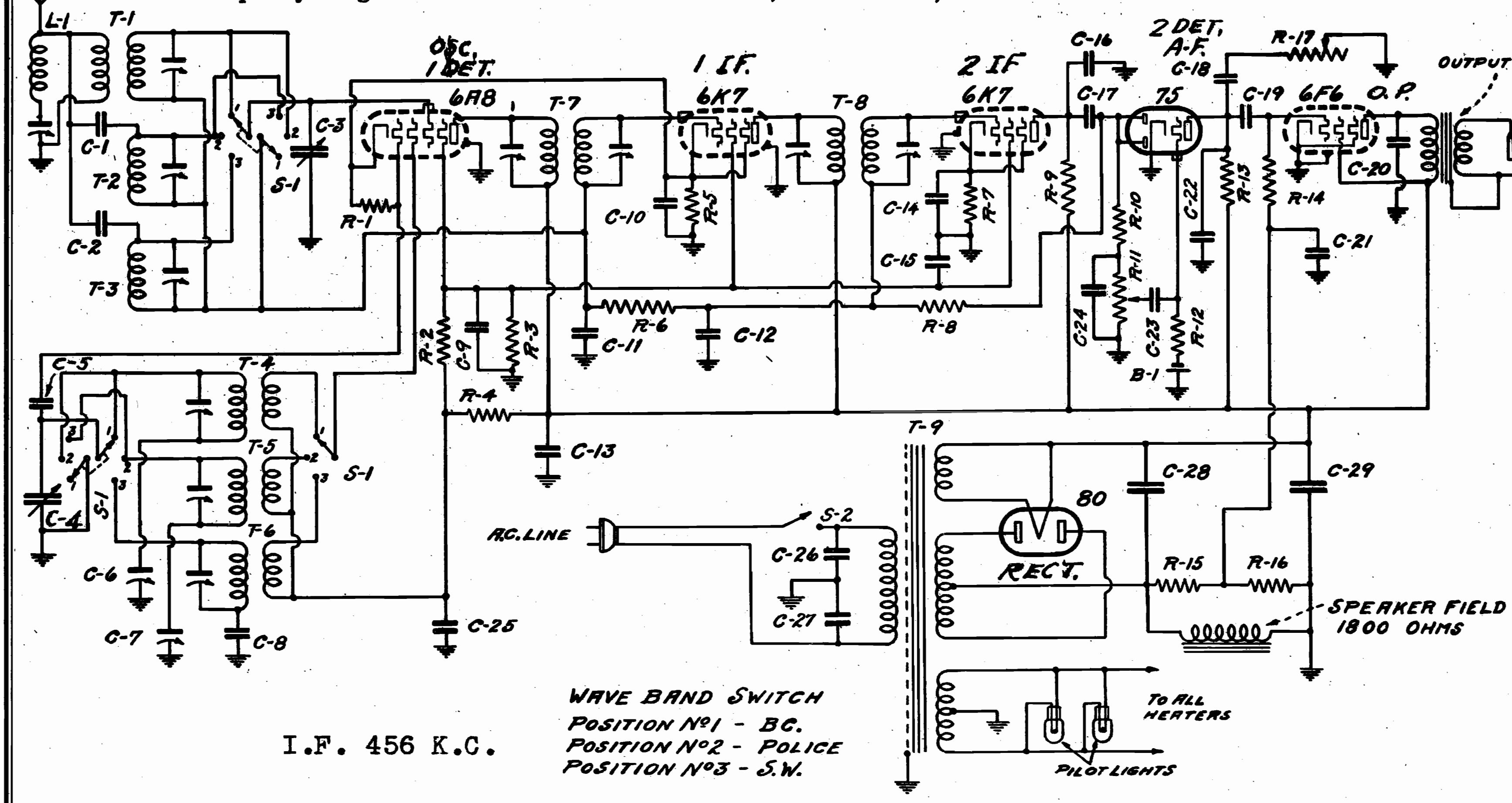
	Plate	Screen	Cathode	Suppressor	Osc. Plate
6A7 Oscillator-modulator	100	55	3	—	100
6D6 I.f.	100	100	3	3	—
75 A.f.	30	—	1.5	—	—
43 Output	80	100	11	—	—

Voltage across speaker field, 125 volts.

MODELS 34C,101
Chassis C6,D6
Schematic
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

Frequency range ....540-1715 kc., 1670-4740 kc., 5.5-16 mc.



I.F. 456 K.C.

WAVE BAND SWITCH
POSITION Nº1 - BC.
POSITION Nº2 - POLICE
POSITION Nº3 - S.W.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 v., a.c., 60 cycles.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil*
6A8	250	75	160	5	6.3 a-c
6K7 1st i-f	250	75	—	5	6.3 a-c
6K7 2nd i-f	145	75	—	5	6.3 a-c
75	100	—	—	0	6.3 a-c
6F6	225	250	—	0	6.3 a-c

B plus at 80 filament—355 volts.
Voltage across speaker field—105 volts.

MODELS 34C,101
Chassis C6,D6
Alignment,Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

ADJUSTMENTS

This receiver was carefully aligned and adjusted at the factory. *No one but a serviceman experienced with short-wave receivers should attempt to realign the receiver.*

An oscillator with frequencies of 456, 600, 1600, 1800, 4500 and 15,000 kc. should be used. In addition, an output meter should be used across the voice coil or output transformer for indicating maximum response.

Alignment Procedure:

1. Set variable condenser to minimum and turn wave-band switch to broadcast (clockwise). Introduce a 456 kc. signal on grid of the 6A8 tube. Adjust both trimmers of each of the two i-f transformers for maximum deflection on the output meter (maximum response). Repeat the process.
2. Remove 456 kc. signal from 6A8 grid and feed it through the antenna. Adjust the 456 kc. interference trap trimmer for *minimum response.* The trap trimmer is at the rear wall beneath the chassis deck.
3. With pointer at 600 feed 600 kc. through the antenna and adjust the broadcast series padder (headless set-screw, closest to front) for maximum response. Move pointer to 1600, feed 1600 kc., and align the broadcast oscillator (on left row, nearest front) and then the antenna (on right row, furthest from front). Return to 600 kc. and readjust padder, rocking the variable condenser for maximum response. Return to 1600 kc. again and check. (See General Instructions below).
4. Set switch at police-band (central position) and pointer at 1800. Feed 1800 kc. and align police-band series padder (headless set-screw, furthest from front). Move pointer to 4500, feed 4500 kc., and align oscillator (middle one at left) and antenna (middle one at right). Return to 1800 kc. and readjust series padder, rocking for maximum response. Return again to 4500 kc. and check.
5. Set switch at short-wave (counter-clockwise) and pointer at 15 megacycles (the thin line on the dial marking the edge of the 19 meter band). Feed 15,000 kc. and align the short-wave oscillator (furthest from front at left), choosing the minimum capacity peak, and then the antenna (nearest front at right) choosing the maximum capacity peak. The receiver is now completely aligned.

General Instructions

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 42 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). Do not put a voltmeter across this bias cell. Check it by temporarily replacing with a new cell or some other one-volt source and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup. The cell assembly is mounted on a bakelite strip on the inside of the right-hand chassis wall. On replacing the cell be sure the clip makes good contact.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial **and unscrewing** the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from hitting the cabinet, otherwise microphonism will result.

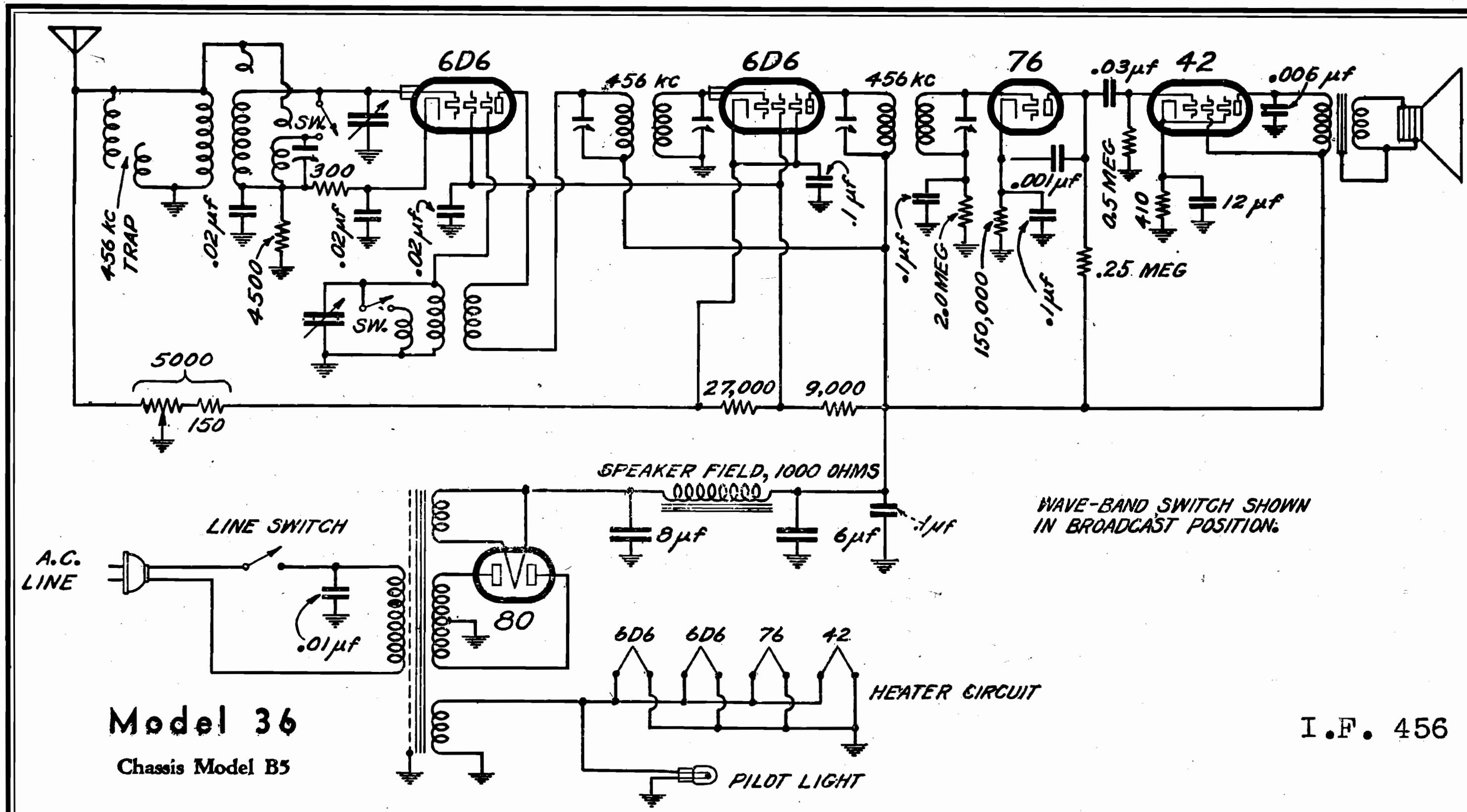
REPLACEMENT PARTS

*ITEM	PART NO.	DESCRIPTION
L1	MMT-149	456 kc tunable wave trap
T1, T2, T3	XXT-186	Three band antenna coil assembly
T4, T5, T6	XXT-187	Three band oscillator coil assembly
T7	XXT-188A	456 kc 1st i-f transformer
T8	XXT-189A	456 kc 2nd i-f transformer
T9	XXT-190	Power transformer
R11	XXR-185A	Volume control—.25 megohm
R17, S2	XXR-186A	Tone control with switch—.25 megohm
R7	KR-51	2,500 ohm—¼ watt carbon resistor
R1, R9	KR-53	50,000 " " " " "
R10, R14	KR-54	100,000 " " " " "
R13	LR-61	200,000 " " " " "
R16	XXR-202	210,000 " " " " "
R6	KR-55	250,000 " " " " "
R12	KR-56	500,000 " " " " "
R8	KR-57	1 meg. " " " " "
R15	XXR-203	1.1 " " " " " "
R5	FFR-126	500 ohm wire-wound resistor—½ watt
R2, R3, R4	XXR-194	30,000 ohm metal clad wire-wound tapped resistor R2=10,400 ohms—1 watt R3=13,000 ohms—1 watt R4= 6,600 ohms—1¼ watt
C3, C4	XXC-187	Two-gang variable condenser
C28, C29	XXC-188	Dual 8 mf dry electrolytic condenser
C6, C7	JJC-144D	Dual padding condenser C6—250 to 600 mmf. C7—800 to 1600 mmf.
C1, C2, C16	IIC-133A	.000025 mf mica condenser
C5	EC-24A	.0001 mf mica condenser
C17	AC-7A	.00025 mf mica condenser
C22, C24	IC-47	.0005 mf mica condenser
C8	XXC-197	.0038 mf mica condenser
C18	XXC-207	.005 mf-400 v. tubular condenser
C20	ZC-115	.006 mf-1000 v. tubular condenser
C23	CCC-127	.01 mf-200 v. tubular condenser
C19	KC-58	.01 mf-400 v. tubular condenser
C11, C12	BC-12	.05 mf-200 v. tubular condenser
C26, C27	XXC-220	Dual .01 mf, 250 volt condenser
C9, C14 C10, C15	AC-6	.1 mf-200 v. tubular condenser
C13, C25	EEC-132	.1 mf-400 v. tubular condenser
C21	BC-13	.25 mf-200 v. tubular condenser
	XXS-127	6" dynamic speaker
	2BS-130	10" dynamic speaker
S1	XXS-117A	Wave-band switch
	KL-6	Pilot light, 6-8 volt, .15 amp
	XXD-25B	Airplane dial
	XXZ-195	Escutcheon with crystal
B1	XXZ-213	Bias cell

When Ordering Replacement Parts Specify Part Number

*Item number locates the article on the Schematic Diagram.

EMERSON RADIO AND PHONOGRAPH CORPORATION



WAVE-BAND SWITCH SHOWN IN BROADCAST POSITION.

I.F. 456 K.C.

Model 36

Chassis Model B5

115-120 Volts...A.C....60 Cycle

Broadcast Range	Short-Wave Range
540 to 1530 kilocycles	1500 to 3200 kilocycles
(550 to 195 meters)	(200 to 93 meters)

Readings are to be taken with all the tubes in their places, volume control turned on full and antenna wire grounded to chassis.

The d-c voltmeter used should be 1000 ohms per volt, or over. The readings tabulated below were taken at an a-c line voltage of 117.

	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode
6D6 Osc. 1st Det.	6.3 a.c.	220 d.c.	120 d.c.	35.0 d.c.
6D6 I-f Amplifier	6.3 a.c.	220 d.c.	120 d.c.	3.0 d.c.
76 2nd Detector	6.3 a.c.	120 d.c.	——	9.5 d.c.
42 Output	6.3 a.c.	210 d.c.	220 d.c.	13.0 d.c.
80 Rectifier	5.0 a.c.	——	——	——

Voltage across speaker field, 60.

Description:

The Model 36 is a five-tube superheterodyne radio receiver bringing in regular broadcast stations, and, in addition, stations on the short-wave band down to 100 meters.

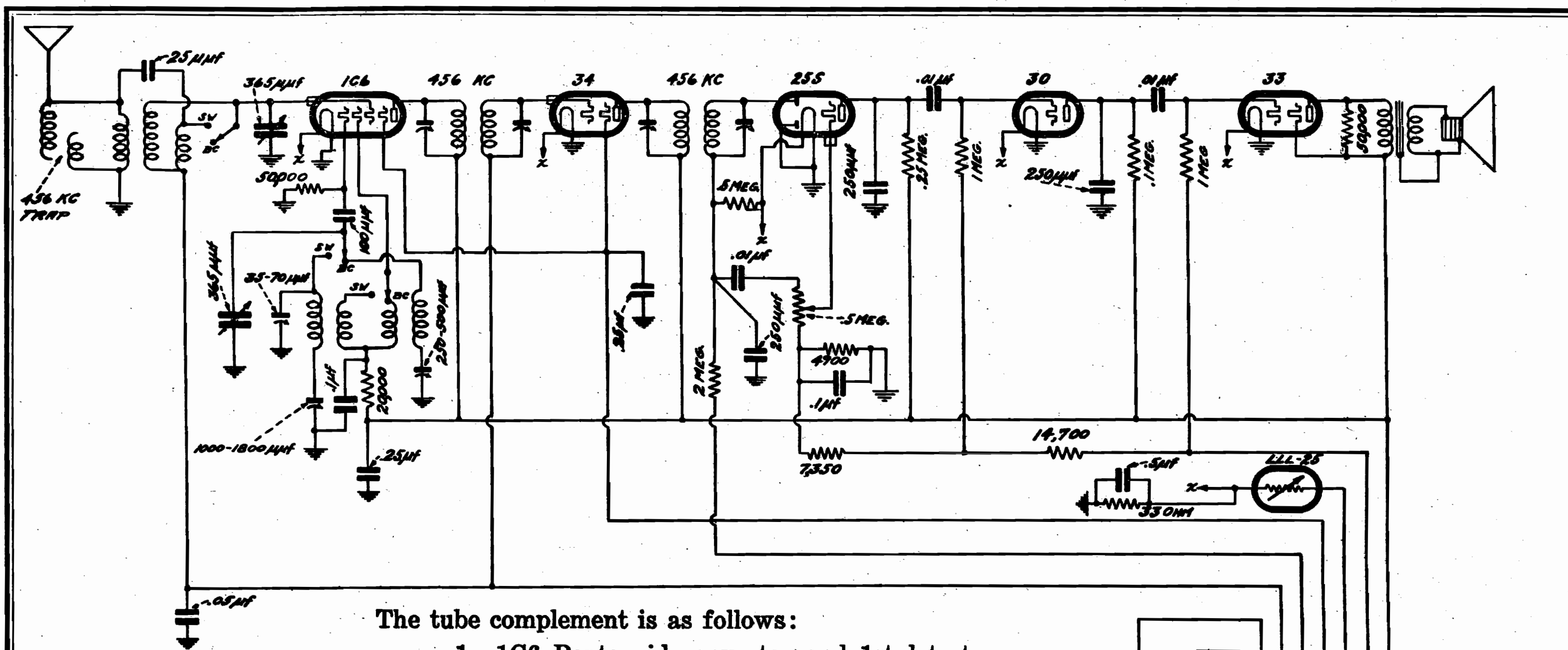
The following tubes are employed:

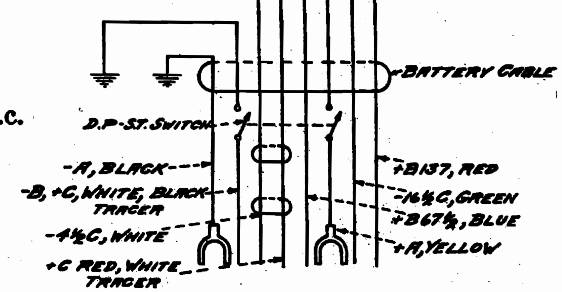
1 — 6D6 R.F. Pentode (1st Detector-Oscillator)
1 — 6D6 I.F. Amplifier
1 — 76 Triode (2nd Detector)
1 — 42 Output-Pentode
1 — 80 Rectifier

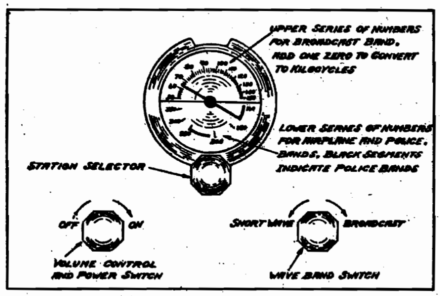
Unless marked otherwise, this receiver is designed to operate on 105-125 volts, 50-60 cycles, alternating current only.

MODEL 103
Chassis F5
Schematic
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION







The tube complement is as follows:

1—1C6 Pentagrid converter and 1st detector.
1—34 Pentode i-f amplifier.
1—25S Duplex diode-triode 2nd detector and a.v.c.
1—30 Audio amplifier.
1—33 Pentode output.
1—LLL-25 Ballast tube for 3-volt operation.

CHASSIS MODEL F5

MODEL 103

BROADCAST RANGE
540 to 1700 kilocycles
(555 to 176 meters)

SHORT-WAVE RANGE
1620 to 3950 kilocycles
(185 to 76 meters)

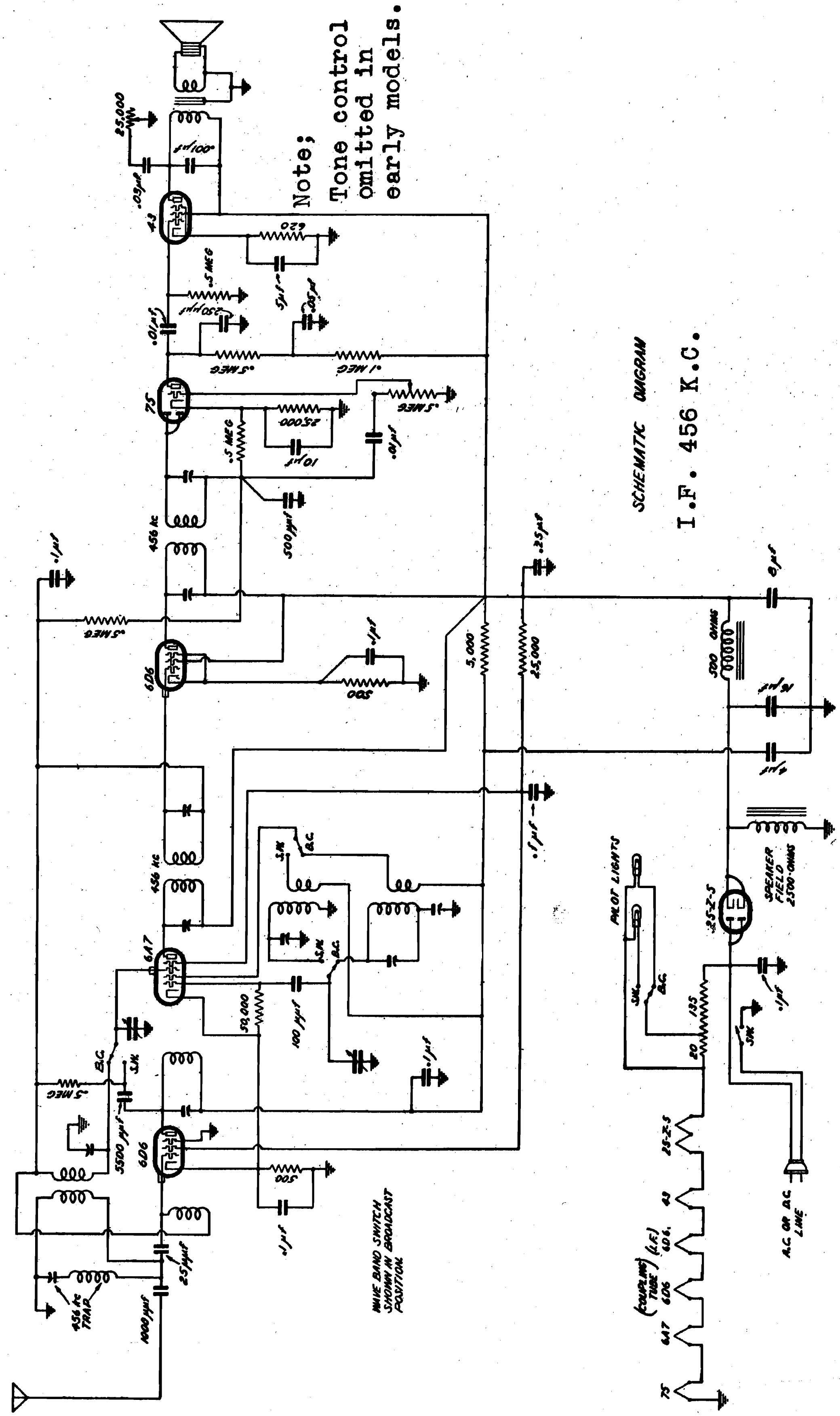
Readings should be taken with 1000 ohms-per-volt voltmeter with 135 volts of "B" battery and 3 volts of "A" battery. Voltages listed below are from point indicated to ground.

I.F. 456 K.C.

Tube	*Plate*	*Screen*	*Bias*	*Osc. Plate*
33	135	135	—16.5	—
30	90	—	—3.0	—
25S	80	—	—1.5	—
34	135	67.5	0	—
1C6	135	67.5	0	80

MODELS 38,42,49
Chassis U6
Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODELS 38,42,49
Chassis U6
Alignment,Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

Alignment Procedure:

1. Short circuit the oscillator stator of the variable condenser to ground.
2. Introduce a 456 kc signal on the grid of the 6A7 tube.
3. Adjust both trimmers of each of the two i-f transformers for maximum response on the output meter. Repeat the process.
4. Remove the short circuit from the oscillator stator of the variable condenser.
5. Remove the 456 signal from 6A7 grid and connect to the antenna.
6. Set the range switch to the broadcast band.
7. Set the pointer at the low frequency end of the dial.
8. Adjust the 456 kc interference trap trimmer *for minimum response.* The trap trimmer is across the ½ inch coil form just behind the speaker.
9. Make sure that the pointer on the dial reaches its extreme positions at both ends of the broadcast band when the gang condenser is at the maximum and minimum positions. If it does not, loosen the set screws on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the pointer of the dial, by means of the selector knob, to its extreme position at the 550 kc end of the broadcast band. Tighten the set screws securely and proceed to re-align the set.
10. Set the pointer to 1600 kc on the dial.
11. Introduce a 1600 kc signal into the antenna.
12. Adjust the oscillator trimmer (the one farthest from the chassis, on the oscillator coil) and the antenna trimmer (at the bottom of the large antenna coil on top of the chassis) for maximum response. The oscillator coil is on the underside of the chassis.
13. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and, at the same time, adjust the series padding condenser for maximum output. Leave the series padder set at the point of maximum sensitivity. The series padder is on the front of the chassis.
14. Repeat steps 12 and 13 until no further readjustment of the trimmer and padder is necessary.
15. Throw the range switch to the short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
16. Set the dial to 15 mc. Adjust the short-wave oscillator trimmer for maximum response. If two peaks are evident, the correct one is at the maximum capacity end. The short-wave oscillator trimmer is the one nearest the chassis on the oscillator coil beneath the chassis.
17. Connect an outside antenna to the set antenna lead and adjust the interstage coil trimmer for maximum noise when the pointer on the dial is set at 14 mc. Two peaks may be noticed. The correct peak is the one nearest the minimum capacity end. The interstage coil is on top of the chassis immediately behind the large antenna coil.
18. Set range switch to broadcast band and set pointer to 600 kc. Feed 456 to antenna and again adjust the interference trap trimmer *for minimum response.*
19. The set is now ready for operation.

Voltage Analysis:

Readings should be taken with a 1000 ohms per volt meter.

Voltages listed below are from the point indicated to ground.

	Plate	*Screen*	*Suppressor*	*Cathode*
6D6 R.f.	80	45.	0	3
6A7 Oscillator-Modulator	100	45	—	3
6D6 I.f.	100	100	4.0	4.0
75 A.f.	35	—	—	1
43 Output	95	100	—	13.5

The pilot light used is Mazda No. 40, 6-8 volts and .15 ampere, brown bead.

Voltage across field—120 volts, d.c. Line voltage—117.5 volts a.c.

MODEL 105
Chassis All
Schematic

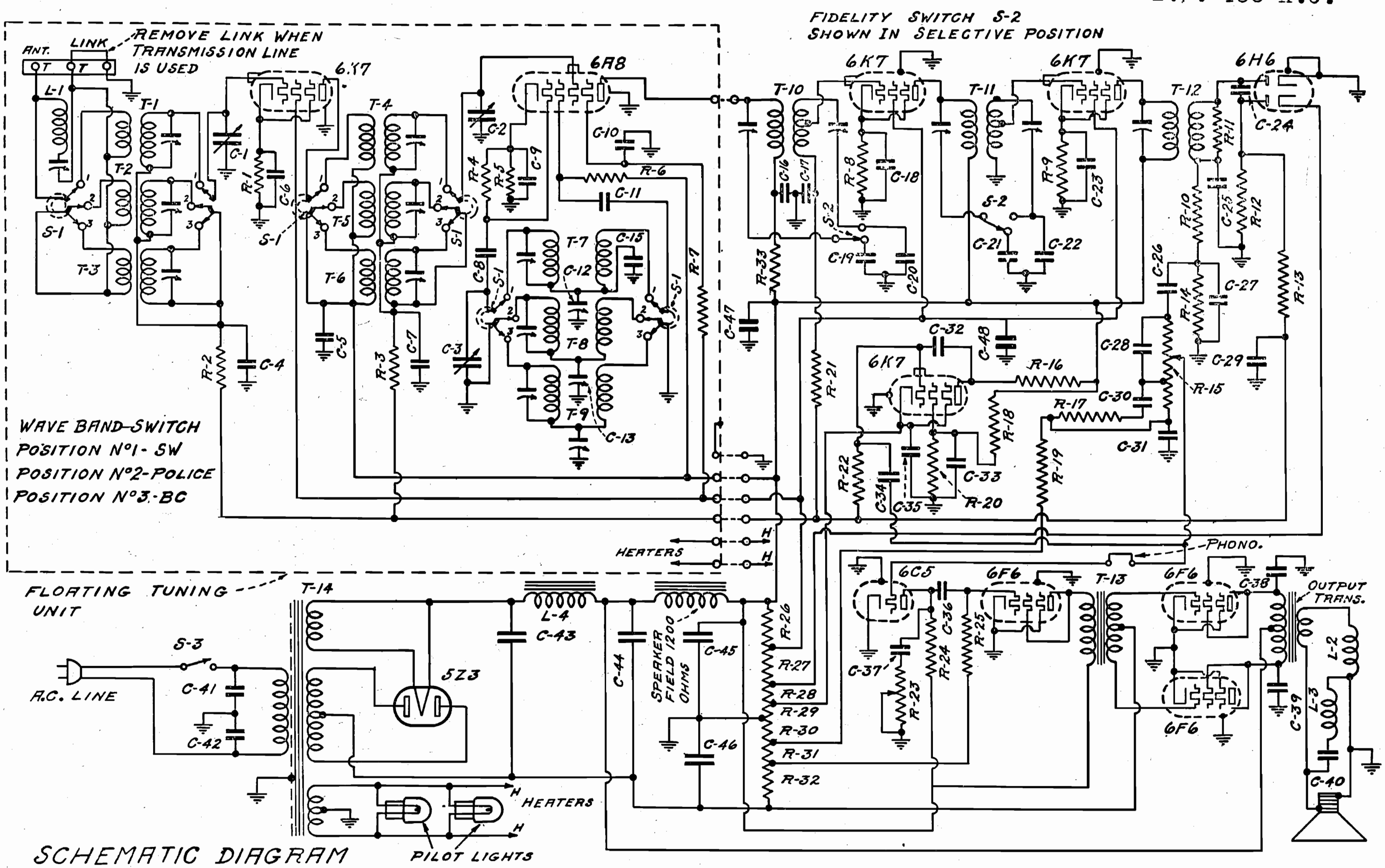
EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 105
Chassis Model A11

Voltage rating	110-120 volts a-c
Current drain	1.15 amps.
Frequency ranges	540 to 1800 kc, 1710 to 5950 kc, 5.5 to 19.0 megacycles

The tube complement is as follows:
1—6K7 (metal)—R-f amplifier
1—6K7 (metal)—1st i-f amplifier
1—6K7 (metal)—2nd i-f amplifier
1—6K7 (metal)—Automatic tone control and interstation noise suppressor
1—6A8 (metal)—Pentagrid oscillator-modulator
1—6H6 (metal)—Diode detector and automatic volume control
1—6C5 (metal)—1st audio amplifier
1—6F6 (metal)—Class "A B" driver
2—6F6's (metal)—Push-pull output
1—5Z3 (glass)—Full-wave rectifier.

I.F. 456 K.C.



MODEL 105
Chassis All
Alignment
Voltage, Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

GENERAL NOTES

1. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high impedance type. A separate potentiometer type volume control is required, the overall resistance to be determined by the type of pickup chosen. The pickup leads should be connected to the two outside terminals of the volume control with the ground lead of the pickup on the right-hand terminal (looking at front with terminals at top) of the control. A lead from this terminal should be plugged into the hole in the phono jack nearest the center of the chassis. A lead from the center terminal of the volume control should be plugged into the other hole in the jack (grid side of jack). Ends of leads to be plugged in jack should be fitted with tips. The volume control in the receiver should be turned to the extreme counter-clockwise (low) position when operating phonograph. Since the phono jack is of the shorting type signals cannot be received by the set when the leads are plugged into the jack. The leads should be removed before attempting to receive broadcast stations.
2. The receiver should never be turned on with the speaker plug or the 6F6 tubes out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condenser.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.
4. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
5. The color coding of the power transformer leads is as follows:

Primary—two green leads	6.3 v. sec. (Fil.)—two blue leads
Electrostatic shield—bare stranded wire	6.3 v. sec. center tap—yellow lead
High voltage sec.—two black leads	5 v. sec.—two red leads.
High voltage sec. center tap—yellow lead	

ADJUSTMENTS

The receiver was carefully aligned and checked at the factory by means of an oscillograph, and it is strongly recommended that servicemen use one for realignment.

An oscillator with frequencies of 456, 600, 1600, 1800, 5500, 6000 and 17,000 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Checking High-Fidelity Operation

On the oscillograph screen the peak of the selectivity curve (i-f response curve with fidelity-selectivity switch in selective position, clockwise) should appear in a position midway between the two peaks of the high-fidelity curve (i-f response curve with fidelity-selectivity switch in fidelity position, counter-clockwise). In other words the central vertical axis of the selectivity curve should be coincident on the screen with the central vertical axis of the high-fidelity curve.

An approximate check of the high-fidelity operation can be made with the use of the oscillator and output meter. First, the i-f's should be very carefully peaked at 456 kc *with the fidelity-selectivity switch in the selective position.* Turn the switch to the fidelity position, counter-clockwise, and vary the frequency of the oscillator. Two peaks should be observed on the output meter, approximately 7 kc on each side of the selectivity peak.

Alignment Procedure:

IMPORTANT: All adjustments should be made with the fidelity-selectivity switch in the selective position, clockwise.

I-f Alignment

The i-f transformers 2AT-203, 2AT-204 and 2AT-205 are located on extreme left side of chassis. Set wave-band switch at position A (clockwise) and condenser at minimum. Feed 456 kc to grid of 6A8 tube. Adjust the five i-f trimmers carefully for maximum response. Feed 456 kc through antenna and adjust 456 kc wave-trap for *minimum response.* This wave-trap is located at bottom rear of set, directly under the antenna binding post.

Broadcast Alignment

The three broadcast coils are in separate cans on top of tuner unit. (The tuner unit is the separate chassis section floated on rubber in center of chassis base). All trimmers for these coils are located at bottoms of cans and are available from bottom of chassis. NNT-150 is antenna coil, NNT-151 is detector coil and NNT-152 is oscillator coil. The oscillator coil has two adjusting screws; the one painted red is the series padder and the other is the trimmer. The antenna and detector coils have one trimmer each.

Set switch at A and pointer to 600 on dial. Feed 600 kc to antenna and adjust broadcast oscillator padder (red screw at bottom front of tuner unit, left-hand corner) for maximum response. Set pointer at 1600, feed 1600 kc to antenna and adjust oscillator trimmer beside red padder for maximum response, and then adjust r-f trimmer (through hole at about center of tuner unit), and antenna trimmer (through hole at rear of unit). Reset the pointer to 600, feed 600 kc to antenna and rock the variable condenser while resetting the oscillator padder for maximum response. Return to 1600, and check alignment. If readjustment is necessary, return to 600 and repeat entire procedure.

Police Alignment

The three police-band coils are the smaller ones located on the bottom side of the tuner unit, in row at left of wave-band switch (same side of switch as antenna binding post). The antenna coil is the one furthest from front of chassis, detector coil in center, and oscillator coil nearest front of chassis. The dual padder mounted on bottom, right-hand side of tuner unit has one padder for police-band oscillator coil and one for short-wave oscillator coil. The padder nearest wave-band switch is for the police band. Each of the three trimmers for the police-band coils is located on top of its respective coil.

Set switch at B (central position) and pointer to 1800 (2 divisions below 200 mark). Feed 1800 kc to antenna. Adjust oscillator series padder nearest to switch in right-hand corner for maximum response. Set pointer to 5500 and feed 5500 kc to antenna. First adjust oscillator trimmer (front one on row of smaller coils) for maximum response. If two peaks are obtained, select the *minimum capacity* peak. (See General Instructions below). Then adjust the antenna (rear) and detector (center) trimmers for maximum response. If two peaks are obtained, select the *maximum capacity* peak. Return pointer to 1800, feed 1800 kc to antenna, and rock variable condenser while adjusting police band oscillator padder for maximum response. Return to 5500 and check alignment. If a readjustment is necessary return to 1800 and repeat entire procedure.

Short-Wave Alignment

The three short-wave coils are the larger ones located on bottom side of tuner unit in row at right of wave-band switch. The antenna coil is the one furthest from front of chassis, detector coil in center and oscillator coil nearest front of chassis. On dual padding condenser the padder furthest from wave-band switch is for short-wave oscillator coil. Each of the three trimmers for the short-wave coils is located on top of its respective coil.

Set switch at C (counter-clockwise) and pointer at 6 megacycles. Feed 6000 kc to antenna. Adjust short-wave oscillator padder (furthest from switch on dual unit) for maximum response. Set pointer to 17 megacycles and feed 17000 kc to antenna. First adjust oscillator trimmer (front) for maximum response. If two peaks are obtained, select the *minimum capacity* peak. Then adjust the antenna (rear) and detector (center) trimmers for maximum response. If two peaks are obtained, select the *maximum capacity* peak. Return pointer to 6 mc, feed 6000 kc to antenna and rock variable condenser while adjusting the oscillator padder for maximum response. Return to 17 mc. Feed 17000 kc to antenna and check alignment.

Check the receiver on all three bands for dead spots which indicate incorrect alignment.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

Readings should be taken with a 1000-ohms-per-volt meter. Voltages listed below are from point indicated to ground with no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Control Grid*	*Fil.*
6K7 r-f amp.—on tuner unit	237	87	2.6	—	0	6.3 a.c.
6K7 1st i-f—left front corner	237	87	2.6	—	0	6.3 a.c.
6K7 2nd i-f—second from front at left	237	87	2.6	—	0	6.3 a.c.
6K7 tone control—beside 6C5	4	11	1.0	—	0	6.3 a.c.
6A8 1st det. osc.	237	85	3.0	175	0	6.3 a.c.
6H6 diode det.	—	—	7.8	—	0	6.3 a.c.
6C5 1st audio	95	—	0	—	—3	6.3 a.c.
6F6 driver—furthest left	225	225	0	—	—7	6.3 a.c.
6F6 output	350	350	0	—	—33	6.3 a.c.
6F6 output	350	350	0	—	—33	6.3 a.c.

Voltage at 5Z3 fil.—373

Voltage across speaker field—120

Voltage across choke—12

Voltages, to chassis, measured along voltage divider, starting at end near the 5Z3 tube. (The voltage divider is the long wire-wound tapped resistor on the rear chassis wall.)

Tap 1 (near 5Z3), 237 v.	Tap 5 (grounded), 0 v.
Tap 2, 87 v.	Tap 6, —5.3 v.
Tap 3, 7.8 v.	Tap 7, —20 v.
Tap 4, 1.0 v.	Tap 8, —33 v.

Item	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L1	MMT-149	456 kc tunable wave trap	$ .35
L2	2AT-208	10 kc filter choke—720 microhenries	.95
L3	2AT-209	10 kc filter choke—320 microhenries	.85
L4	2AT-206	Iron-core filter choke—90 ohms	2.50
T1	NNT-158	Short-wave antenna coil	.55
T2	NNT-155	Intermediate band antenna coil	.50
T3	NNT-150	Broadcast antenna coil	.90
T4	NNT-159	Short-wave detector coil	.60
T5	NNT-156	Intermediate band detector coil	.50
T6	NNT-151	Broadcast detector coil	.90
T7	NNT-160	Short-wave oscillator coil	.55
T8	NNT-157	Intermediate band oscillator coil	.50
T9	NNT-152	Broadcast oscillator coil	.90
T10	2AT-203	456 kc first i-f transformer	1.45
T11	2AT-204	456 kc second i-f transformer	1.45
T12	2AT-205	456 kc third i-f transformer	1.15
T13	2AT-210	Audio transformer	2.75
T14	2AT-211	Power transformer	6.00
R1, R5, R8, R9	CCR-140	350 ohm wire-wound resistor	.16
R2, R3, R18, R19, R21, R24, R25	KR-54	100,000 ohm ¼ watt carbon resistor	.16
R4	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R6	YR-97	15,000 ohm ½ watt carbon resistor	.16
R7, R33	GR-85	2,000 ohm ¼ watt carbon resistor	.16
R10	OR-73	25,000 ohm ¼ watt carbon resistor	.16
R11, R14	LLR-154	75,000 ohm ¼ watt carbon resistor	.16
R12	KR-56	0.5 megohm ¼ watt carbon resistor	.16
R13, R16, R22	KR-57	1 megohm ¼ watt carbon resistor	.16
R15	NNR-156	Volume control—1.2 megohms	.70
R17, R20	LR-64	5,000 ohm ¼ watt carbon resistor	.16
R23, S3	2AR-198	Tone control with line switch—0.5 megohms	.80
R26, R27, R28, R29, R30, R31, R32	2AR-199A	5,469 ohm wire-wound resistor (voltage divider) R26—3100 ohms, 3 watts; R27—1920 ohms, 5 watts; R28—155 ohms, 0.5 watts; R29—23 ohms, 0.1 watts; R30—36 ohms, 1 watt; R31—107 ohms, 2.5 watts; R32—128 ohms, 2.5 watts	1.30
C1, C2, C3	NNC-153	Three gang variable condenser	3.25
C4, C7	NNC-158	0.05 mf, 200 volt tubular condenser with mounting strap	.16
C5, C10	EEC-132	0.1 mf, 400 volt tubular condenser	.16
C6, C9	AC-6	0.1 mf, 200 volt tubular condenser	.16
C8, C25, C27	EC-24A	0.0001 mf mica condenser	.16
C11	AAC-114	0.001 mf mica condenser	.16
C12, C13	NNC-154A	Dual padding condenser C12, C13—800 to 1400 mmf	.75
C15	NNC-131	0.0015 mf mica condenser	.16
C16, C18, C23, C29, C33, C35, C47, C48	2AC-210	Eight-section condenser block C16—0.1 mf, 400 v.; C18—0.1 mf, 200 v.; C23—0.1 mf, 200 v.; C29—0.05 mf, 200 v.; C33—0.1 mf, 200 v.; C35—0.1 mf, 200 v.; C47—0.5 mf, 400 v.; C48—0.25 mf, 400 v.	2.00
C17	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C19, C20, C21, C22	2AC-216	0.004 mf mica condenser	.16
C24, C28, C32	AC-7A	0.00025 mf mica condenser	.16
C26, C36	LC-65	0.02 mf, 400 volt tubular condenser	.16
C30	LC-64	0.05 mf, 400 volt tubular condenser	.16
C31	IC-48	5 mf, 25 volt electrolytic tubular condenser	.60
C34, C37	KC-58	0.01 mf, 400 volt tubular condenser	.16
C38, C39	NNC-214	0.002 mf, 1000 volt tubular condenser	.16
C40	2AC-215	0.7 mf filter condenser in metal container	.80
C41, C42	XXC-220	Dual 0.01 mf, 250 v. tubular condenser in metal container	.30
C43, C44, C45, C46	2AC-209A	10 mf and triple 8 mf electrolytic filter and by-pass condenser block C43—8 mf, 450 v.; C44—8 mf, 450 v.; C45—8 mf, 450 v.; C46—10 mf, 50 v.	3.20
	2AS-135	12" dynamic high-fidelity speaker	18.00
S1	NNS-95	Wave-band switch with shields	2.40
S2	2AS-137	Fidelity-selectivity switch	.70
	KL-6	Pilot light, 6-3 volt, .15 amp. Mazda No .40	.15
	NND-28	Airplane dial	5.25
	NNZ-205	Escutcheon with crystal	.50

MODEL 106 (2 Types)
Chassis U6B
Below Serial 636901
Above Serial 636901
Schematics

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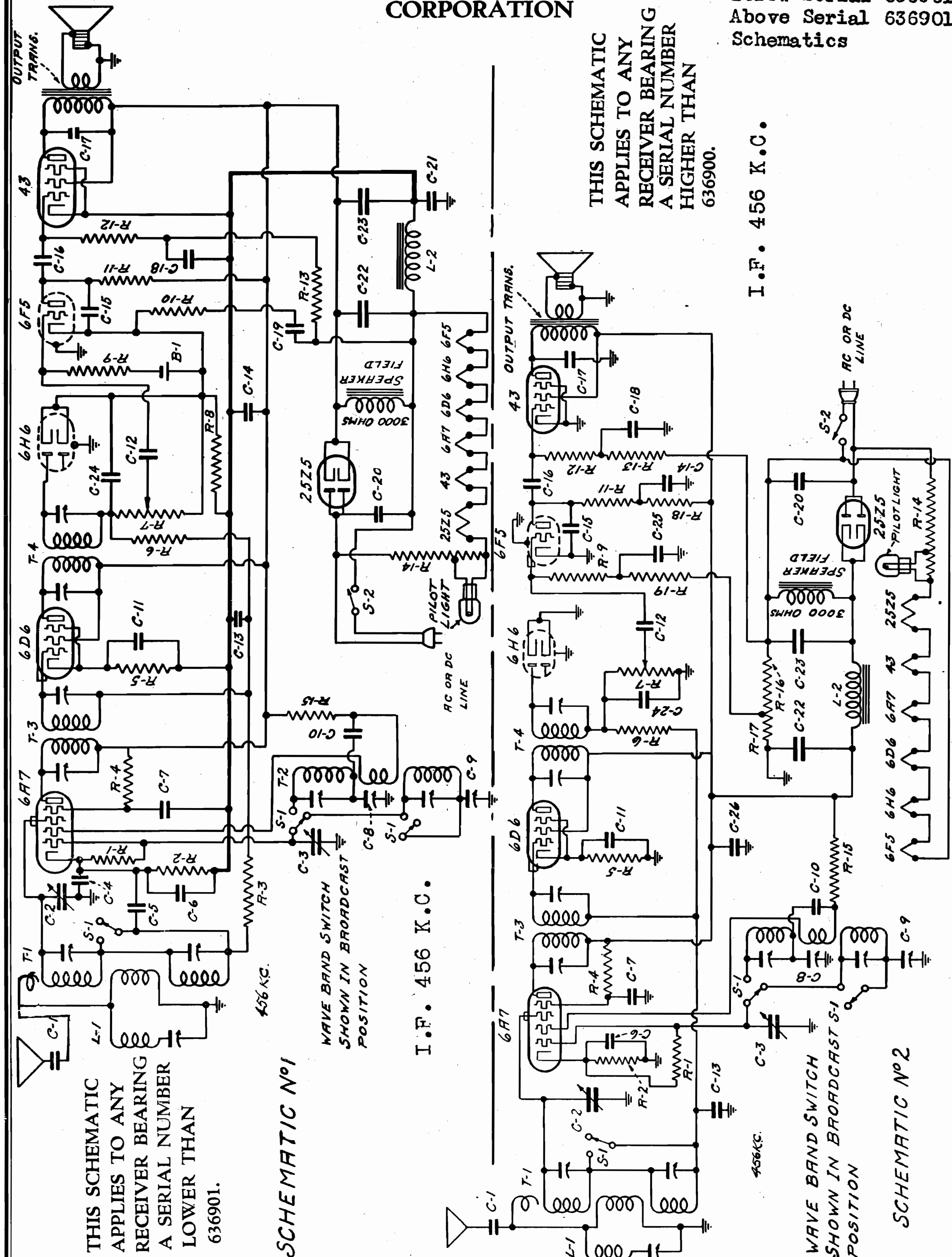

MODEL 106 (2 Types)
Chassis U6B
Alignment, Parts
Voltage

EMERSON RADIO AND PHONOGRAPH CORPORATION

GENERAL NOTES

1. To take the chassis out of the cabinet first remove the knobs (knobs are of push-on type), and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis towards the back and lift out of cabinet.
2. If replacements are made or the wiring disturbed in the r-f section of the circuit the receiver should be carefully realigned.
3. On early production runs bias for the grid of the 6F5 tube is obtained by means of a very small one-volt battery (bias cell). The cell assembly is mounted on a bakelite strip on the inside of the left-hand chassis wall. Do not put a voltmeter across this bias cell. Check it by temporarily replacing with a new cell, or some other one-volt source, and noting results. To remove the bias cell simply pull up on the spring clip and lift the cell from its cup. On replacing cell be sure the clip makes good contact.
4. If adjustment of the sliding scale dial is necessary, loosen the two slotted hexagon-head guides at the top edge of the scale. These guides are held in place by nuts on the inside of the chassis. Adjust the guides by moving them either up or down in the slotted holes in the chassis. Do not bring them so far down that the pinion gear binds on the rack. The scale should move freely and smoothly without appreciable vertical movement.

   After replacing a dial scale care should be taken to align it properly with respect to the variable condenser. To do this rotate the variable condenser to maximum capacity, loosen the set-screw on the hub of the pinion gear and slide the scale so that the extreme right-hand mark (near 55) is in line with the center of the speaker. With scale and condenser in these positions tighten the set-screw.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1425, 1600 and 3600 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

I-f and Wave-Trap Alignment

The i-f coils are located in cans on the top of the chassis. The second i-f transformer is the one directly behind the speaker. The four trimmers, two for each transformer, are located at the tops of the cans.

Turn the wave-band switch to the broadcast position, clockwise. Rotate the variable condenser to the minimum position and feed 456 kc to grid of 6A7 tube. Adjust the four i-f trimmers for maximum response. Feed 456 kc through the antenna lead and adjust the 456 kc wave-trap trimmer for *minimum response*. This trimmer will be found on the small wave-trap which is mounted on the bracket extending vertically from the right-hand chassis wall.

Location of Coils

The broadcast antenna coil and the short-wave antenna coil are wound on one form, mounted on the vertical bracket at the right-hand side of the chassis. The trimmers for these coils are mounted on the same assembly facing outward, and are available through two holes in the bracket. The lower trimmer is for the short-wave antenna coil and the upper for the broadcast antenna coil.

The broadcast oscillator coil and short-wave oscillator coil are wound on one form mounted below the chassis deck. The trimmers are mounted on the same assembly, facing outward, and are accessible through two holes in the right-hand chassis wall. The front one is for the short-wave oscillator coil and the rear one for the broadcast oscillator coil.

The dual padding condenser for the oscillator coils is mounted on the inside of the front chassis wall. The two adjusting screws are available through two holes in the front wall of the chassis. The upper screw is for the broadcast padder and the lower for the short-wave padder.

Broadcast Alignment

Turn wave-band switch to clockwise position (broadcast), set dial to 600 (use center of speaker as reference point), and feed 600 kc through the antenna. Adjust the broadcast oscillator padder (upper screw on front chassis wall) for maximum response. Set the dial to 1425 and feed 1425 kc through the antenna. Adjust the broadcast oscillator trimmer (rear screw on right-hand side of chassis), for maximum response and then adjust the broadcast antenna trimmer (upper screw on vertical bracket) for maximum response. Reset dial to 600 and rock variable condenser (rotate back and forth through small arc) while realigning the broadcast oscillator padder.

Short-Wave Alignment

Turn wave-band switch to counter-clockwise position (short-wave), set dial to 570 and feed 1600 kc through antenna. Adjust the short-wave oscillator padder (lower screw on front chassis wall) for maximum response. Set dial to 1280 and feed 3600 kc through the antenna. Adjust the short-wave oscillator trimmer (front screw on right-hand chassis wall) for maximum response and then adjust the short-wave antenna trimmer (lower screw on vertical bracket) for maximum response. Reset dial to 570, feed 1600 kc and rock variable condenser while readjusting the short-wave oscillator padder.

TUBE DATA

The tube complement is as follows:

1—6H6 (metal)—Diode detector and a.v. c.
1—6F5 (metal)—Audio amplifier.
1—43 (glass)—Power pentode output.
1—25Z5 (glass)—Dual half-wave rectifier.
1—6A7 (glass)—Pentagrid oscillator-modulator.
1—6D6 (glass)—I-f amplifier.

MODEL 106

Voltage rating ....105-130 volts
Current drain ....0.48 amps
Frequency ranges ....530 to 1530 kc, 1490 to 4800 kc.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to 43 cathode (B minus). Line voltage for these readings was 117.5 volts, 60 cycles, a-c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	105	55	1.7	100	6 a-c
6D6	105	105	2.75	—	6 a-c
6H6	—	—	0	—	6 a-c
6F5	55	—	0	—	6 a-c
43	100	105	0	—	24 a-c

Voltage across choke (B minus to line switch)—20 volts.

Voltage across speaker field (25Z5 cathode to line switch)—125 volts.

PRODUCTION CHANGES

Schematic No. 1 illustrates the circuit used in receivers bearing a serial number lower than 636901. Minor parts changes made in this circuit are as follows:

C10 originally 0.0001 mf mica condenser.
R15 added. C1 added. R4 originally ½ watt carbon resistor.
Speaker changed from part No. 2CS-181B to part No. KS-38B (price $3.50).
C21 removed and B minus grounded to chassis as indicated by dotted lines in schematic.

Schematic No. 2 illustrates the revised circuit used in all receivers bearing a serial number higher than 636900.

To convert the circuit in schematic No. 1 to the circuit in schematic No. 2 the following changes in parts were necessary:

L2, filter choke, changed from part No. ZZT-196 to 2CT-207, 200 ohm choke (price 60c).
R10 removed. R3 removed. R8 removed.
R9 changed from 1 megohm resistor to 0.5 megohm ¼ watt carbon resistor, part No. KR-56 (price 16c).
R13 changed from 0.5 megohm resistor to 50,000 ohm ¼ watt carbon resistor, part No. KR-53 (price 16c).
R18 added. R18 is 100,000 ohm ¼ watt carbon resistor, part No. KR-54 (price 16c).
R19 added. R19 is 0.5 megohm ¼ watt carbon resistor, part No. KR-56 (price 16c).
R16, R17 added, 250 ohm wire-wound metal clad tapped resistor, part No. 2CR-211. R16—230 ohms. R17—20 ohms (price 25c).
C22, C23 changed from multiple 8 and 16 mf electrolytic condenser to dual 12 mf electrolytic condenser, part No. 2CC-222 (price $1.65).
C19 removed. C5, C4 removed.
C25, C26 added, 0.1 mf, 200 volt tubular condensers, part No. AC-6 (price 16c).
B1, bias cell, removed.

In later production runs of this second series the pilot light was changed to part No. XL-9, Mazda No. 46.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION
L1	MMT-149	456 kc adjustable wave trap
L2	ZZT-196	Filter choke—500 ohms
T1	2CT-197	Two-band antenna coil assembly
T2	2CT-198	Two-band oscillator coil assembly
T3	CCT-118C	456 kc first i-f transformer
T4	CCT-119B	456 kc second i-f transformer
R1	KR-53	50,000 ohm, ¼ watt carbon resistor
R2	CCR-140	350 ohm, ½ watt wire-wound resistor
R3	LR-61	200,000 ohm, ¼ watt carbon resistor
R4, R10	ZZR-196	30,000 ohm, ¼ watt carbon resistor
R5	AAR-119	300 ohm, ½ watt wire-wound resistor
R6, R9	KR-57	1 megohm, ¼ watt carbon resistor
R7, S2	2CR-195	Volume control with line switch—0.5 megohm
R8	FFR-126	500 ohm, ½ watt wire-wound resistor
R11	KR-55	250,000 ohm, ¼ watt carbon resistor
R12, R13	KR-56	500,000 ohm, ¼ watt carbon resistor
R14	ZZR-192A	Wire-wound ballast resistor—130 ohms
R15	GR-85	2,000 ohm, ¼ watt carbon resistor
C1	AAC-114	0.001 mf mica condenser
C2, C3	2CC-198	Two-gang variable condenser
C4, C5	BC-12	0.05 mf, 200 v. tubular condenser
C6, C7, C11, C13	2CC-196	Four-section condenser block (Each section is 0.1 mf, 200 v.)
C8, C9	JJC-144C	Dual adjustable padding condenser C8—800 to 1400 mmf. C9—250 to 550 mmf.
C10	IC-47A	0.0005 mf mica condenser
C12, C16, C19	CCC-127	0.01 mf, 200 v. tubular condenser
C14, C17, C18, C20	2CC-195	Four-section condenser block C14—0.25 mf, 200 v. C17—0.01 mf, 400 v. C18—0.1 mf, 200 v. C20—0.1 mf, 200 v.
C15, C24	AC-7A	0.00025 mf mica condenser
C21	2CC-208	0.2 mf, 200 v. tubular condenser
C22, C23	2CC-194	8 and 16 mf electrolytic filter condenser block C22—16 mf, 150 v. C23—8 mf, 150 v.
	2CS-181B	5" dynamic speaker
S1	2CS-182	Wave-band switch
	KL-6	Pilot light, 6-8 volt, 0.15 amp.

MODELS 107,111
Chassis U6A
Schematic
Voltage

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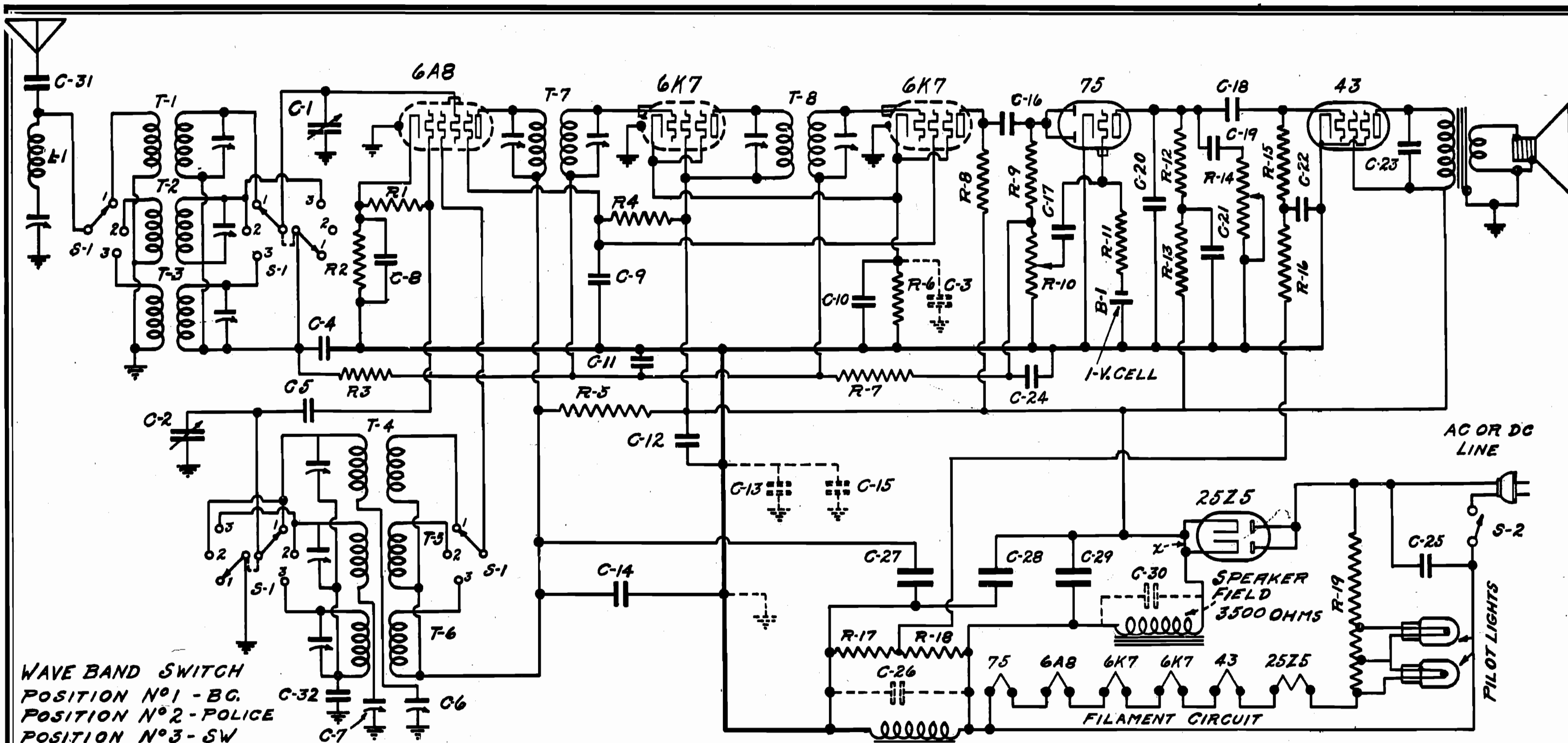

MODELS 107 and 111

Chassis Model U6A

Voltage rating ....105-130 volts.
Current drain .....0.43 amps.
Frequency ranges 540-1660 kc, 1580-4750 kc, 5.5—16 mc.

I.F. 456 K.C.

These service notes apply only to chassis model U6A. Different service notes are available for chassis model U6F also used in the models 107 and 111 cabinets. The chassis model number for this receiver is the group of symbols before the dash in the serial number printed on the license plate.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (cathode of 43 tube). Line voltage for these readings was 117.5 volts, a.c., 60 cycles.

Tube	Plate	Screen	Cathode	Osc. Plate
6A8	82	50	2	82
6K7 1st i-f	107	107	5	—
6K7 2nd i-f	65	50	5	—
75	50	—	0	—
43	95	107	0	—

Voltage across speaker field (25Z5 cathode to line switch) — 107 volts.

Voltage across choke (43 cathode to line switch) — 22 volts.

The tube complement is as follows:

Fil.	
6	1—6A8 (metal) Pentagrid oscillator-modulator.
6	1—6K7 (metal) 1st i-f amplifier.
6	1—6K7 (metal) 2nd i-f amplifier (adjacent to 75).
6	1—75 (glass) 2nd detector—a-f amplifier—a.v.c.
24	1—43 (glass) Power output pentode.
	1—25Z5 (glass) Half-wave rectifier.

MODELS 107,111
Chassis U6A
Alignment,Parts
Changes

EMERSON RADIO AND PHONOGRAPH CORPORATION

GENERAL NOTES

1. To take the chassis out of the Model 107 cabinet first remove the knobs (knobs are of push-on type), and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis towards the back and lift out of cabinet.

2. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.

3. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). The cell assembly is mounted on a bakelite strip in the front corner of the chassis near the volume control. Do not put a voltmeter across this bias cell. Check it by temporarily replacing with a new cell, or some other one-volt source, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1700, 4500 and 15,000 kc should be used. In addition, an output meter should be used across the voice coil or output transformer for observing maximum response.

I-f Alignment

The i-f transformers ZZT-194 and ZZT-195 are located on the top of the chassis. The four trimmers, two for each i-f transformer, are located at the tops of the cans. Set the wave-band switch to broadcast (extreme clockwise position) and rotate variable condenser to minimum. Feed 456 kc to grid of the 6A8 tube and adjust the four i-f trimmers for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for *minimum response*. The trimmer is on the wave-trap, which is located on top of the chassis behind the speaker.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis to the right of the speaker. The three trimmers for these coils are mounted on a bakelite strip above the tubing. The trimmer nearest the speaker is for the short-wave antenna coil. The center trimmer is for the police antenna coil and the trimmer furthest from speaker is for the broadcast antenna coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck on the right-hand wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the broadcast oscillator coil, the central trimmer is for the police oscillator coil and the trimmer furthest from front is for the short-wave oscillator coil.

The adjusting screws for the dual padder are also available at the right-hand chassis wall. The screw closer to the front is for the broadcast band and the other is for the police band. The short-wave band has no adjustable padder.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padder (lower row on right wall, closest to front) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (top row on right wall, closest to front) for maximum response, and then the broadcast antenna trimmer (on antenna coil, furthest from speaker). Return pointer to 600 and rock the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padder (furthest from front on right wall, lower row) for maximum response. Set pointer to 4500 and feed 4500 kc. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below), then adjust police band antenna trimmer (central one on top) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padder for maximum response. Realign at 4500 if necessary.

Short-Wave Alignment

Set wave-band switch to counter-clockwise (short-wave) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity.

Check all three bands for dead spots or incorrect image responses.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this, always keep re-tuning the variable condenser.

REPLACEMENT PARTS

* Item No.	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 Price
L1	MMT-149	456 kc adjustable wave-trap	$ .35
L2	ZZT-196	Filter choke—500 ohms	.60
T1, T2, T3	ZZT-192A	Three-band antenna coil assembly	1.80
T4, T5, T6	ZZT-193	Three-band oscillator coil assembly	1.80
T7	ZZT-194	456 kc first i-f transformer	1.15
T8	ZZT-195	456 kc second i-f transformer	1.15
R1, R8	KR-53	50,000 ohm, 1/4 watt carbon resistor	.16
R2	FFR-126	500 ohm, 1/2 watt wire-wound resistor	.16
R3, R7, R11	KR-57	1 megohm, 1/4 watt carbon resistor	.16
R4	ZZR-196	30,000 ohm, 1/4 watt carbon resistor	.16
R5, R17	LR-65	10,000 ohm, 1/4 watt carbon resistor	.16
R6	ZZR-197	850 ohm, 1/2 watt wire-wound resistor	.16
R9, R13	KR-54	100,000 ohm, 1/4 watt carbon resistor	.16
R10, S2	ZZR-190A	Volume control with line switch—0.5 megohms	.75
R12	LR-61	200,000 ohm, 1/4 watt carbon resistor	.16
R14	ZZR-191A	Tone control—0.25 megohms	.55
R15, R16	KR-56	500,000 ohm, 1/4 watt carbon resistor	.16
R18	LR-64	5,000 ohm, 1/4 watt carbon resistor	.16
R19	ZZR-192A	Wire-wound ballast resistor—130 ohms	.40
C1, C2	ZZC-184	Two-gang variable condenser	1.80
C3, C4, C21, C22, C25	AC-6	0.1 mf, 200 volt tubular condenser	.16
C5	EC-24A	0.0001 mf mica condenser	.16
C6, C7	JJC-144C	Dual adjustable padding condenser C6—250 to 550 mmf. C7—800 to 1400 mmf.	.60
C8, C9, C10, C11, C12, C13, C14	ZZC-191B	Seven-section condenser block C8—0.1 mf, 200 v. C12—0.1 mf, 200 v. C9—0.1 mf, 200 v. C13—0.1 mf, 200 v. C10—0.2 mf, 200 v. C14—0.1 mf, 200 v. C11—0.05 mf, 200 v.	1.05
C15	ZZC-205	0.02 mf, 200 v. tubular condenser	.16
C16, C20, C24	AC-7A	0.00025 mf mica condenser	.16
C17, C18	CCC-127	0.01 mf, 200 v. tubular condenser	.16
C19	ZZC-213	0.006 mf, 200 v. tubular condenser	.16
C23, C31	AAC-114	0.001 mf mica condenser	.16
C26	BC-13	0.25 mf, 200 v. tubular condenser	.16
C27, C28, C29	ZZC-192A	4, 8 and 16 mf electrolytic filter condenser block C27—4 mf, 150 v. C29—16 mf, 150 v. C28—8 mf, 150 v.	2.25
C30	YC-98A	Tubular 4 mf, 150 v. electrolytic condenser	.70
C32	ZZC-206	0.005 mf mica condenser	.16
	ZZS-128A	5" dynamic speaker	8.75
S1	ZZS-129A	Wave-band switch	1.05
	KL-6	Pilot light, 6-8 volt, .15 amp.	.15
	ZZD-26A	Airplane dial	.85
B1	XXZ-213	Bias cell, one volt	.15
	ZZZ-209	Escutcheon with crystal	.20

When ordering replacement parts specify part number.

Production Changes

In early production runs C3 was a 0.03 mf, 200 v. condenser. Later it was changed to a 0.1 mf, 200 v. condenser and subsequently removed entirely from the circuit.

In later production runs, the following changes were made:
C30 added and circuit broken at X; 25Z5 cathodes separated (see schematic). C26 removed.
B minus grounded to chassis. C15 and C13 removed. C22 placed in the condenser block.
R11 changed from 1 megohm carbon resistor to 0.5 megohm, 1/4 watt carbon resistor, our part KR-56.
R16 changed from 0.5 megohm carbon resistor to 0.25 megohm, 1/4 watt carbon resistor, our part KR-55.

* Item number locates the article on the schematic diagram.

MODELS 108,110
Chassis U5A
Schematic
Socket,Trimmers

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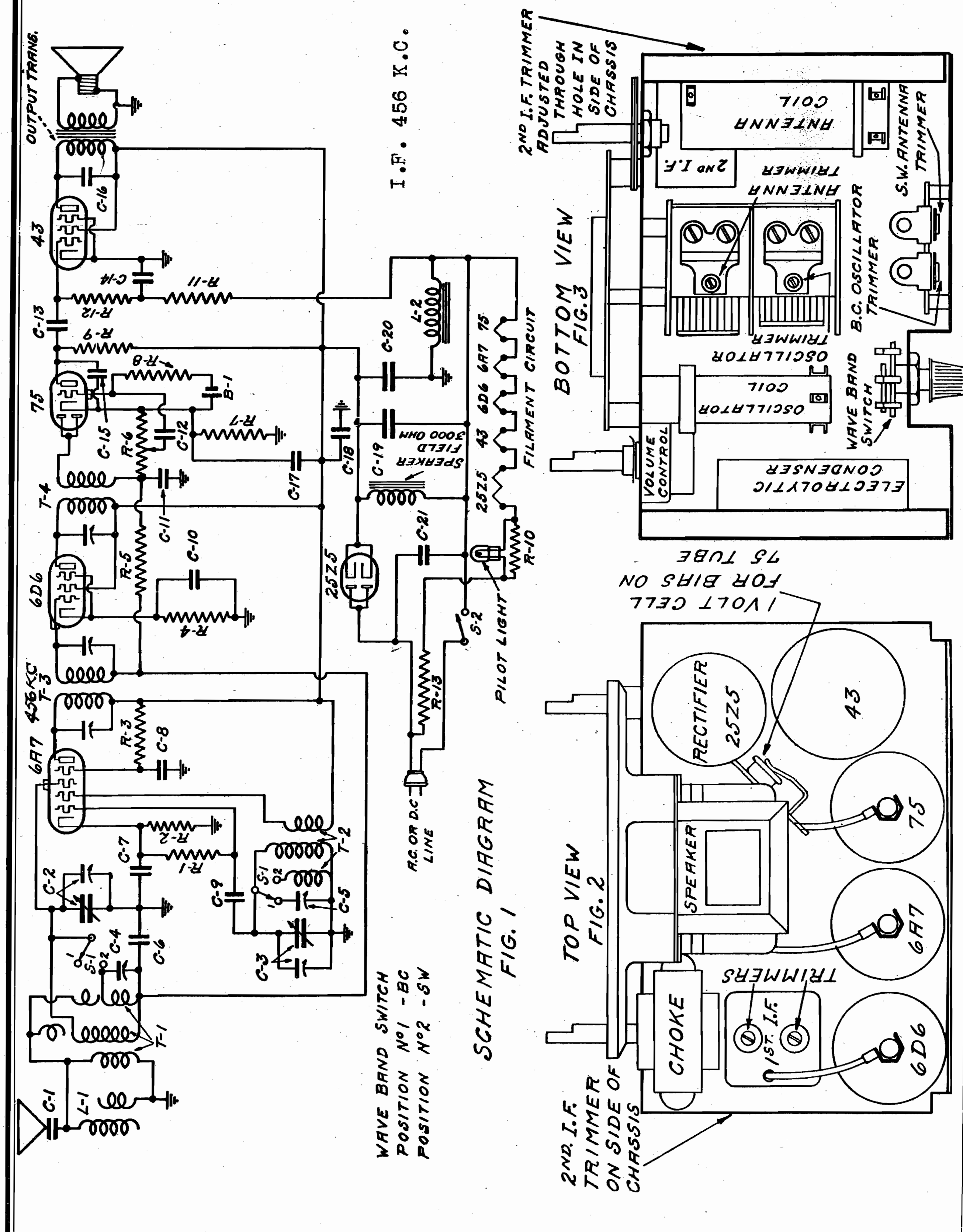


MODELS 108,110
Chassis U5A
Alignment
Voltage,Parts

EMERSON RADIO AND PHONOGRAPH CORPORATION

MODELS 108 and 110

Chassis Model U5A

Voltage rating	105-130 volts
Current drain	0.4 amp.
Frequency ranges	530-1550 kc, 1500-3800 kc.

GENERAL NOTES

1. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). The cell assembly is mounted on a bakelite strip on top of the chassis. Do not put a voltmeter across this bias cell. If the set distorts, check the cell by temporarily replacing with a new cell, or some other one-volt source, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup. On replacing it be sure the clip makes good contact.
2. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
3. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
4. The filament dropping resistor, (R13—see schematic), is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
5. In operating the receiver on d-c it may be necessary to reverse the line plug for correct polarity.
6. The color coding of the i-f transformer leads is as follows:

Grid—green; Plate—blue
Grid return—black; B plus—red.

ADJUSTMENTS

The diagrams, Fig. 2 and Fig 3, on the second page illustrate the location of the trimmers on the chassis. Note that the first i-f transformer part No. 2DT-201, has two trimmers, located at the top of the can. The second i-f transformer is mounted on the inside of the right-hand chassis wall and has one trimmer, accessible through a hole in the chassis.

Two trimmers are mounted on the metal strap at the rear of the chassis. The trimmer nearest the wave-band switch is for the broadcast oscillator coil. The trimmer furthest away from the wave-band switch is for the short-wave antenna coil. The antenna stage trimmer will be found on the front section of the variable condenser and the oscillator stage trimmer on the rear section.

Alignment Procedure:

An oscillator with frequencies of 456, 1425, 2500 and 3600 kc should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

1. Turn the wave-band switch clockwise, to the broadcast position, and rotate the variable condenser to minimum.
2. Feed a 456 kc signal to the grid of the 6A7 tube.
3. Adjust the three i-f trimmers for maximum response.
4. Turn the wave-band switch counter-clockwise, to the short-wave position.
5. Set the dial pointer to 3600 and feed 3600 kc through the antenna lead.
6. Adjust the variable condenser oscillator trimmer (rear) for maximum response.
7. Turn wave-band switch to broadcast position and set the dial pointer to 1425.
8. Feed 1425 kc through the antenna and adjust the broadcast oscillator trimmer (on rear dual-trimmer strip, nearest band switch) for maximum response. Then adjust the antenna (front) section of variable condenser for maximum response.
9. Turn the wave-band switch counter-clockwise to the short-wave position. Set the dial pointer to 2500 and feed 2500 kc through the antenna.
10. Adjust the short-wave antenna trimmer (on rear strip, furthest from band switch) for maximum response.

TUBE DATA

The tube layout is illustrated in a diagram on the next page, Fig. 2. The complement of tubes and their functions are as indicated in the following table:

1—6A7—Pentagrid oscillator-modulator.
1—6D6—I-f amplifier.
1—75—Diode detector, audio amplifier, automatic volume control.
1—43—Pentode power output.
1—25Z5—Dual half-wave rectifier.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	105	55	1.6	105	6
6D6	105	105	3.0	—	6
75	45	—	0	—	6
43	100	105	0	—	24

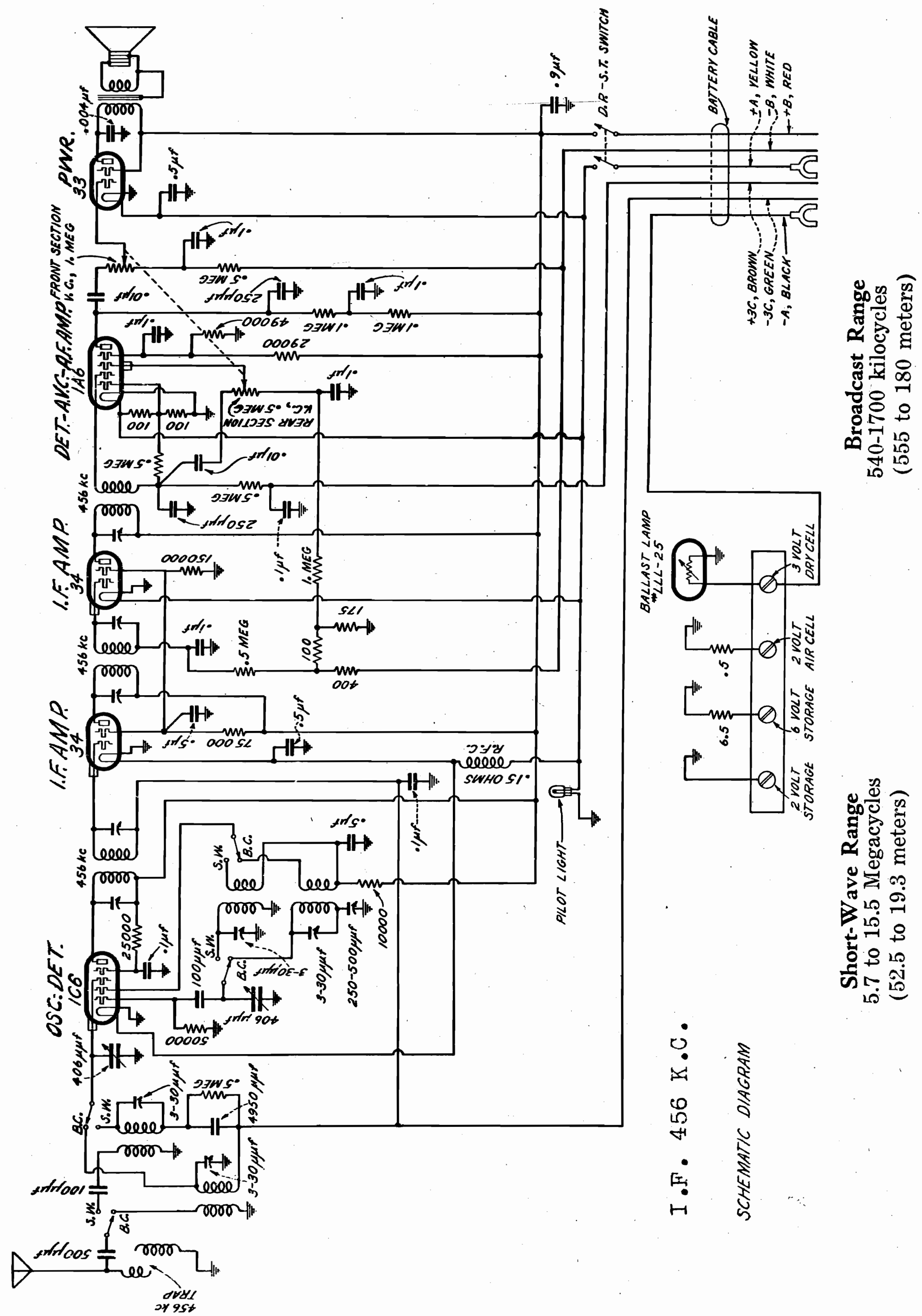
Voltage across speaker field (25Z5 cathode to line switch)—125 volts.
Voltage across choke (chassis to line switch)—20 volts.

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION
L2	ZZT-196	Filter choke—500 ohms
T1, L1	2DT-199	Two-band antenna coil with 456 kc wave trap
T2	2DT-200	Two-band oscillator coil
T3	2DT-201	456 first i-f transformer
T4	2DT-202A	456 kc second i-f transformer
R1	KR-53	50,000 ohm 1/4 watt carbon resistor
R2	CCR-140	350 ohm 1/2 watt wire-wound resistor
R3	ZZR-196	30,000 ohm 1/4 watt carbon resistor
R4	AAR-119	300 ohm 1/2 watt wire-wound resistor
R5, R8	KR-57	1 megohm 1/4 watt carbon resistor
R6, S2	2DR-169	Volume control with line switch—0.5 megohm
R7	PR-79	1,000 ohm 1/4 watt carbon resistor
R9, R11, R12	KR-56	0.5 megohm 1/4 watt carbon resistor
R10	2DR-200	25 ohm wire-wound metal clad resistor
R13	2DW-62	145 ohm, 15 watt resistor wire in line cord
C1, C11	IC-47A	0.0005 mf mica condenser
C2, C3	2DC-202	Two gang variable condenser
C4, C5	2DC-212	Dual trimmer on bakelite strip 3 to 30 mmf—each trimmer
C6, C14, C21	AC-6	0.1 mf, 200 volt tubular condenser
C7, C8, C10	BC-12	0.05 mf, 200 volt tubular condenser
C9	EC-24A	0.0001 mf mica condenser
C12, C13	CCC-127	0.01 mf, 200 volt tubular condenser
C15	AC-7A	0.00025 mf mica condenser
C16	HC-34	0.006 mf, 600 volt tubular condenser
C17	EC-19	0.5 mf, 200 volt tubular condenser
C18	BC-13	0.25 mf, 200 volt tubular condenser
C19, C20	2DC-208	Multiple 8 and 16 mf electrolytic filter condenser. C19—16 mf, 150 volts. C20—8 mf, 150 volts.
B1	XXZ-213	Bias cell, one volt
S1	2DS-102A	Wave-band switch
	KS-38B	5" dynamic speaker
	KL-6	Pilot light, 6-8 volt, .15 amp.
	2DW-62	Line cord with built-in resistor wire (R-13)
		Dial Assembly consists of:
	2DD-21A	Dial scale and bracket
	2DD-21B	Pyralin drive disc
	2DD-21C	Vernier friction drive
	2DD-21D	Dial crystal
	2DD-21E	Dial pointer

MODEL 280
Chassis F6D
Schematic

EMERSON RADIO AND PHONOGRAPH CORPORATION



MODEL 280
Chassis F6D
Alignment,Parts
Voltage, Data

EMERSON RADIO AND PHONOGRAPH CORPORATION

DESCRIPTION

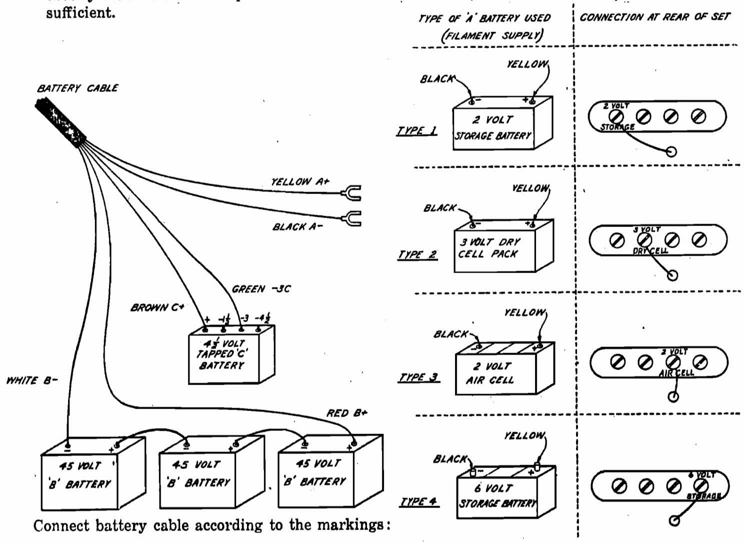
The following batteries are required:

For filament supply, one of the following: 2 volt storage battery, 2½ volt aircell, 3 volt dry cell pack or 6 volt storage battery.

High voltage: either 135 or 180 volts of B batteries.

Bias: either 3 or 4½ volts of C Battery (3 volts if 135 volt B is used, 4½ volts if 180 volt B is used).

Use of 180 volts (four 45 volt blocks) of B Battery is justified only when an unusually loud volume is required. For home use 135 volts (three 45 volt blocks) is sufficient.



Connect battery cable according to the markings:

yellow	A+	to	positive (+) side of filament supply. (A battery)
black	A—	to	negative (—) side of filament supply
white	B—	to	— side of B battery
brown	C+	to	+ side of 4½ volt tapped C battery
red	B+180 B+135	to	+ 180 or + 135 B
green	C—4½ C—3	to	— 4½ if 180 volt B is used, — 3 if 135 volt B is used.

Voltage Analysis:

Reading should be taken with 1000 ohms-per-volt voltmeter with 135 volts of B battery and 3 volts of C battery. Voltages are from points listed to ground.

Tube	*Plate*	*S. G.*	*Bias*	*Osc. plate*
1C6	118	60-70	—3 to +3C	85
34	118	45-50	—3 to +3C	
34	118	45-50	—6	
1A6	70	32-38	—3.8	
33	116	118	—15	

Measure bias voltage along resistor series circuit below chassis. Pilot light is 2 volt .06 amp. No other should be used. Set should not be operated without it.

The ballast (voltage regulator) tube is used *only* when a 3 volt dry cell pack is employed for filament supply. With a new dry cell unit the filament voltage on the tubes should not exceed 2.2 volts as measured with an *accurate* 1000 ohms-per-volt voltmeter. When the dry cell voltage has dropped to 2.2 volts, the filament voltage should not be less than 1.8 volts. A dry cell pack showing less than 2.2 volts with load should be discarded.

ADJUSTMENTS

This instrument was carefully aligned and adjusted at the factory. No one but a service man experienced with short-wave receivers should attempt to re-align the receiver. If it becomes necessary, the following procedure may be accurately followed:

An oscillator with frequencies of 456, 550, 1600 and 15000 kc (15 mc) should be used. In addition, an output meter should be used across the voice coil for the precise results necessary.

Alignment Procedure:

1. Set the range switch to the broadcast band.
2. Short circuit oscillator stator of the variable condenser to ground. (Front section.)
3. Introduce the 456 kc signal on the grid of 1C6 tube.
4. Adjust the single-tuned i-f transformer for maximum response on the output meter.
5. Adjust both trimmers on first two i-f transformers for maximum response.
6. Remove 456 kc signal from 1C6 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Make sure that the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the dial does not do this, loosen the set screws on the hub and rotate the gang condenser to maximum capacity. Then rotate the dial (by means of the selector knob) to ts extreme position at the 550 kc end of the broadcast band. Tighten the set-screws securely and proceed to re-align the set.
9. Set the dial to 1600 kc.
10. Introduce a 1600 kc signal into the antenna.
11. Adjust broadcast oscillator trimmer (on universal-wound oscillator coil under chassis) for maximum response.
12. Adjust trimmer on top of b.c. detector coil (long coil on top of chassis) for maximum response.
13. Introduce a 550 kc signal into the antenna. Rock the gang condenser back and forth around the 550 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series padder set to the point of maximum sensitivity. The series padder is on the front of the chassis.
14. Return to 1600 kc and repeat 11 and 12.
15. Now throw the range switch to short-wave position and introduce a 15 megacycles (mc) signal into the antenna.
16. Set the dial to 15 mc.
17. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is on the heavy-wire coil beneath the chassis.
18. Connect an outside antenna to the set and adjust the s. w. detector coil trimmer for maximum noise at 15 mc. The s. w. detector coil is the heavy-wire coil on top of the chassis. Before starting the adjustment turn the trimmer out so as to have minimum capacity, and then gradually increase it. A peak will be noticed and then as the capacity is increased the noise diminishes and disappears. When the capacity is increased further, the noise may increase again. The correct peak is the one at the minimum capacity end.

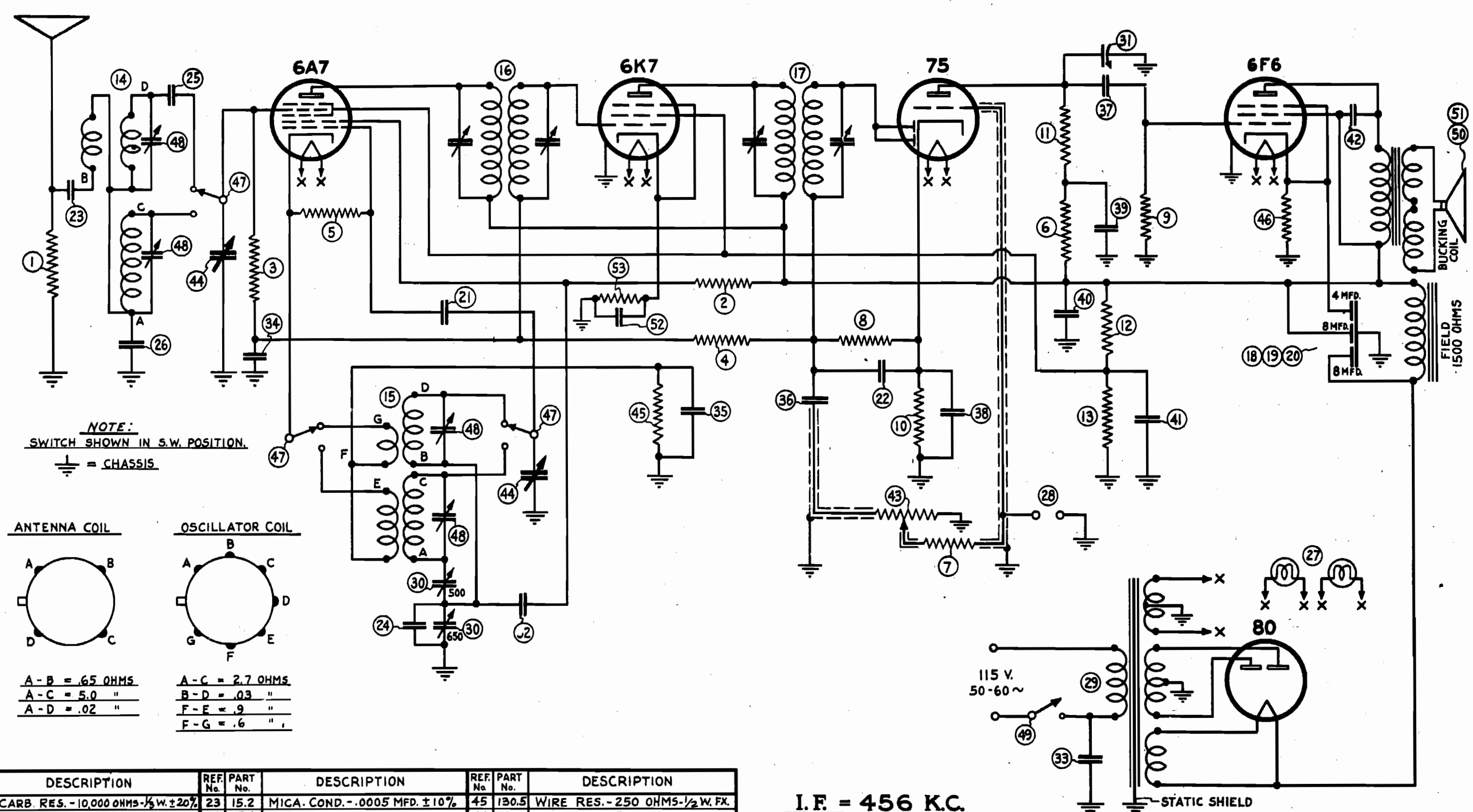
SERVICE PARTS

Part No.	*Description*		
LLT-139	Broadcast antenna coil	LLC-148A	Multiple condenser bank
LLT-140	Short-wave antenna coil	BBC-131	.9 mf tubular condenser
LLT-141	Broadcast oscillator coil	LLC-149	.00495 mf (4950 mmf) mica condenser
LLT-142	Short-wave oscillator coil	LLS-85	33 socket
LLT-143A	Filament r-f choke coil	LLS-86	34 socket
LLT-144	Dual tuned first i-f transformer	LLS-87	1A6 socket
DDT-121	Dual tuned second i-f transformer	LLS-88	1C6 socket
LLT-145	Single tuned third i-f transformer	LLS-89	LLL-25 socket (for ballast)
LLR-144	Volume control	LLS-90	Wave-band switch
LLR-145	.5 ohm aircell resistor	LLS-91	6" permanent magnet speaker
LLR-146	6.5 ohm 3 watt resistor (for 6 volt operation)	LLL-24	6 volt .06 amp. pilot light
EC-19	.5 mf 200 volt tubular condenser	LLW-49	Battery cable
LLC-147	Variable condenser	LLZ-142	Battery terminal strip
BBC-121	Adjustable padding condenser	LLD-19A	Vernier dial and scale

MODEL 150 (2 Types)
Schematic

FADA RADIO & ELECTRIC CORP.

NOTE: In some receivers 6D6 is used instead of 6K7 and a 42 is used in place of the 6F6.



NOTE:
SWITCH SHOWN IN S.W. POSITION.
⏚ = CHASSIS

ANTENNA COIL	OSCILLATOR COIL
A-B = .65 OHMS	A-C = 2.7 OHMS
A-C = 5.0 "	B-D = .03 "
A-D = .02 "	F-E = .9 "
	F-G = .6 "

I.F. = 456 K.C.

1ST I.F. TRANS.	2ND I.F. TRANS.
PRI. - 14.5 OHMS	PRI. - 14.5 OHMS
SEC. - 14.5 "	SEC. - 14.5 "

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODEL 150	
DRAWN BY JD	DATE 7-10-35
CHECKED BY JB	APP. RFG

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.31	CARB. RES. - 10,000 OHMS - 1/3 W. ±20%	23	15.2	MICA. COND. - .0005 MFD. ±10%	45	130.5	WIRE RES. - 250 OHMS - 1/2 W. FX.
2	30.31	" " 10,000 " " " " "	24	15.4	" " .001 " " "	46	130.6	" " 500 " " " "
3	30.22	" " 1 MEG. " " " "	25	15.5	" " .002 " " 3%	47	45.1	BAND SWITCH
4	30.22	" " 1 " " " " "	26	15.6	" " .0025 " " "	48		MIN. ADJ. ON COILS
5	30.3	" " 50,000 " " " " 10%	27	120.3	PILOT LIGHTS - 6-8 V. .15 A.	49		ON-OFF SW. ON VOL. CONT. (43)
6	30.26	" " 50,000 " " " " 20%	28	125.1	PHONO. JACK	50	105.4	SPEAKER - (150 T)
7	30.26	" " 50,000 " " " " "	29	40.4	POWER TRANSFORMER	51	105.20	" (150 C)
8	30.23	" " 500,000 " " " " "	30	25.1	PADDING COND. - 650-500 MMF.	52	10.5	TUBULAR COND. - .05 MFD. - 200 V.
9	30.23	" " 500,000 " " " " "	31	55.1	TONE CONTROL	53	130.2	WIRE RES. - 350 OHMS - 1/2 W. FX.
10	30.12	" " 4,000 " " " " 10%	32	10.7	TUBULAR COND. - .05 MFD. - 400 V.			
11	30.20	" " 250,000 " " " " 20%	33	10.7	" " .05 " " "			
12	30.13	" " 20,000 " 1 " " 10%	34	10.5	" " .05 " 200 "			
13	30.14	" " 50,000 " 1/2 " " "	35	10.5	" " .05 " " "			
14	2026	ANTENNA COIL	36	10.4	.01 " " "			
15	3116	OSCILLATOR "	37	10.10	" " .01 " 400 "			
16	3B79	1ST I.F. "	38	10.1	" " .35 " 200 "			
17	3B80	2ND I.F. "	39	10.9	" " .1 " 400 "			
18	20.8	ELECTRO. COND. BLOCK - 8 MFD. 450 W.V.	40	10.9	" " .1 " " "			
19	20.8	" " " 8 " 450 " "	41	10.9	" " .1 " " "			
20	20.8	" " " 4 " 25 " "	42	10.3	" " .006 " " "			
21	15.3	MICA COND. - .0001 MFD. ±10%	43	50.1	VOLUME CONTROL - 1/2 MEG.			
22	15.1	" " .00025 " " "	44	25.20A	VARIABLE COND.			

NOTE: In sets using 6D6, the cathode of 6D6 joins resistor 45 and units 52 and 53 are not used. In these receivers 35 is .01 MFD. and 36 is .25 MFD.

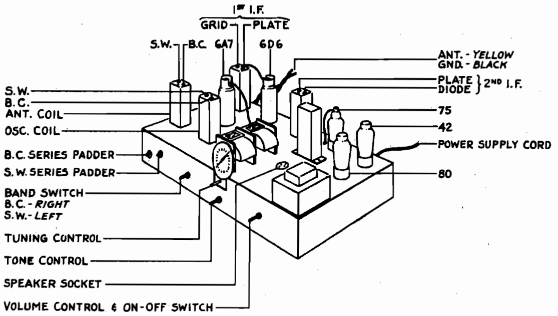
MODEL 150
Alignment, Trimmers
Socket, Voltage

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR MODEL 150 SERIES

In order to adjust accurately the various aligning condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.



ADJUSTMENT OF THE I.F. CONDENSERS

The four (4) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Disconnect the control grid lead from the 6A7 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

1st - Remove the signal generator connection from the control grid of the 6A7 tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 15 MC.

4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.

5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in." To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting, even with a greater signal generator output, the S.W. oscillator shunt compensator has been improperly adjusted and it will be necessary to return the dial to 15 MC and adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC on the receiver dial. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original (fundamental) signal frequency.

6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. detector shunt compensator for maximum signal output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES PADDER

1st - Adjust the carrier frequency output of the signal generator to 6 MC.

2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.

3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series padder (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum output signal.

4th - Having determined the maximum peak of the S.W. oscillator series padder, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC and re-adjust S.W. oscillator shunt compensator, and then S.W. detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to the right - broadcast position.

3rd - Adjust the carrier frequency to 1500 KC.

4th - Set the calibrated dial of the receiver to read 1500 KC.

5th - Adjust the BC oscillator shunt compensator for maximum signal output.

6th - Adjust the BC detector shunt compensator for maximum signal output.

ADJUSTMENT OF BC OSCILLATOR SERIES PADDER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - With the aid of a bakelite type screw driver, adjust the BC oscillator series padder (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the BC oscillator series padder, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust the BC oscillator shunt and the BC detector shunt compensators for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON MODEL 150 SERIES

Line Voltage 118 - Input Current .45 amp.
No Signal Input - Wave Band Switch - Right.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Det.-Osc.	182	1.9	4.0	80
6D6	Int. Freq.	182	5.5	4.0	80
75	2nd Det.	---	---	---	---
	1st Aud.	82*	0.3	1.5	---
42	2nd Aud.	166	20.0	13.0	173
80	Rectifier	---	42.0 TOTAL	---	---

6A7 Osc. Anode voltage -- 132 and Current -- 4.8 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER

1st section	2nd section
338	186

Voltage across speaker field .... 152 volts
" " 20,000 ohm 1 watt resistor .... 102 "
" " 50,000 " 1/2 " " .... 84 "

D.C. RESISTANCE VALUES

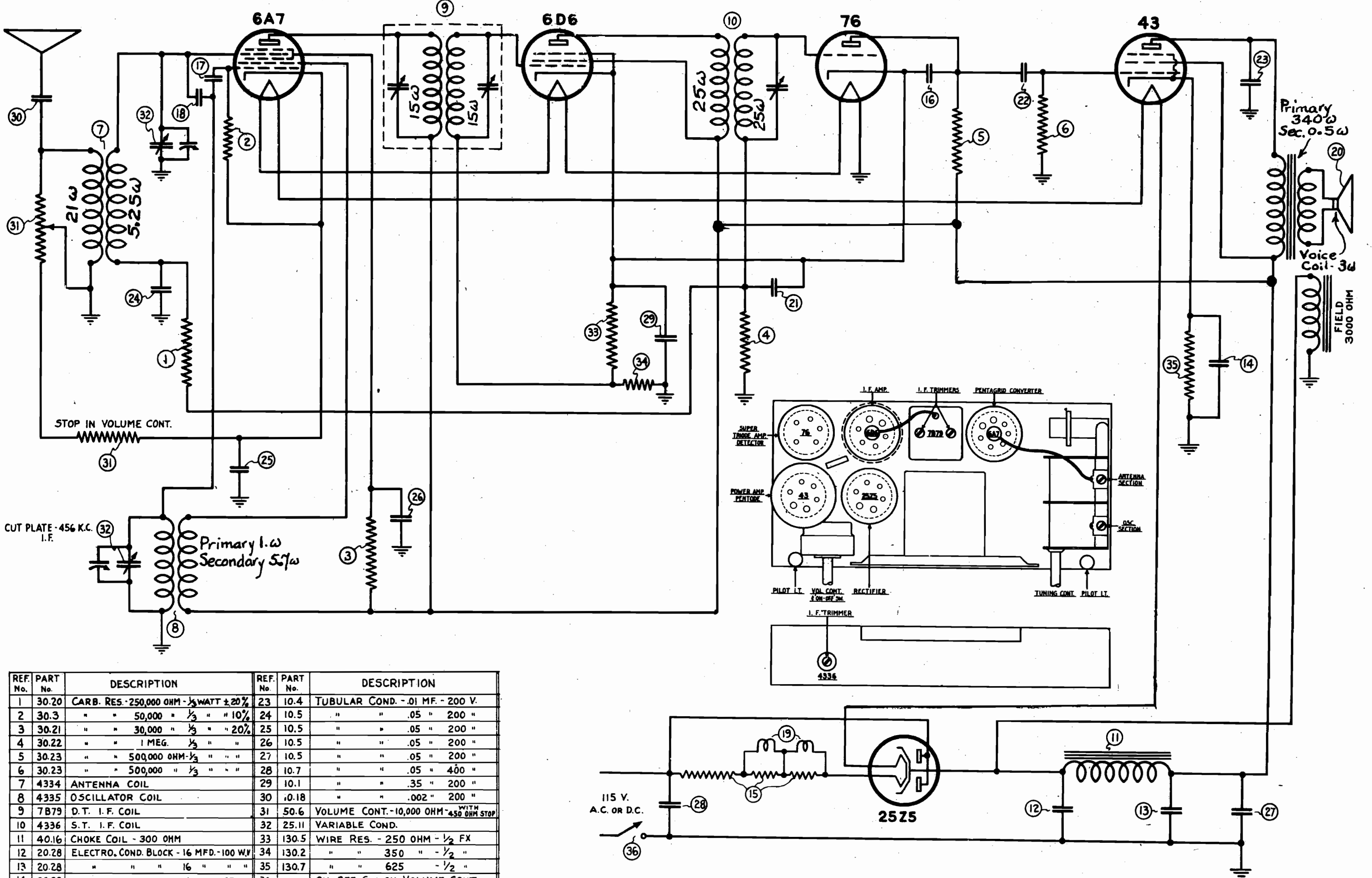
	PRIMARY	SECONDARY
Speaker input transformer	550. ohms	.335 ohms
" field coil	1,520. "	
" voice coil	2.9 "	
" bucking coil	.345 "	

FORM S-2147
July 1, 1935

SERVICE DIVISION

MODEL 155
Schematic, Socket Trimmers

FADA RADIO & ELECTRIC CORP.



REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.20	CARB. RES. - 250,000 OHM - ⅓ WATT ±20%	23	10.4	TUBULAR COND. - .01 MF. - 200 V.
2	30.3	" " 50,000 " ⅓ " " 10%	24	10.5	" " .05 " 200 "
3	30.21	" " 30,000 " ⅓ " " 20%	25	10.5	" " .05 " 200 "
4	30.22	" " 1 MEG. ⅓ " "	26	10.5	" " .05 " 200 "
5	30.23	" " 500,000 OHM - ⅓ " " "	27	10.5	" " .05 " 200 "
6	30.23	" " 500,000 " ⅓ " " "	28	10.7	" " .05 " 400 "
7	4334	ANTENNA COIL	29	10.1	" " .35 " 200 "
8	4335	OSCILLATOR COIL	30	10.18	" " .002 " 200 "
9	7B79	D.T. I.F. COIL	31	50.6	VOLUME CONT. - 10,000 OHM - WITH 450 OHM STOP
10	4336	S.T. I.F. COIL	32	25.11	VARIABLE COND.
11	40.16	CHOKE COIL - 300 OHM	33	130.5	WIRE RES. - 250 OHM - ½ FX
12	20.28	ELECTRO. COND. BLOCK - 16 MFD. - 100 W.V.	34	130.2	" " 350 " - ½ "
13	20.28	" " " 16 " " "	35	130.7	" " 625 - ½ "
14	20.28	" " " 4 " 25 "	36		ON-OFF SW. ON VOLUME CONT.
15	115.7	LINE RESISTOR - 140 - 38 - 38 OHMS	37		
16	15.1	MICA COND. - .00025 MF. ±10%	38		
17	15.3	" " .0001 " " "	39		
18	15.16	" " 3. MMF. " ± ½ MMF.	40		
19	120.1	PILOT LIGHTS - 6.8 V. 250 MA.	41		
20	105.21	SPEAKER	42		
21	10.4	TUBULAR COND. - .01 MF. - 200 V.	43		
22	10.4	" " .01 " 200 "	44		

VOLTAGE ACROSS ELECTROLYTIC COND.
1ST Section 120 V.
2ND " 109 V.
VOLTAGE ACROSS SPKR. FLD - 120 V.
" " FILTER CHOKE - 11 V.

NOTE: ⏚ = CHASSIS
I.F. = 456 K.C.

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 155
DRAWN BY [signature] DATE 4-8-35
CHECKED [signature] APP. [signature]

MODEL 155
Alignment
Voltage

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 155

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC and 1500 KC.

This receiver is equipped with an automatic overload control which necessitates setting the manual volume control of the receiver to the maximum position, to assure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

NOTE: Do not remove knobs, screws or chassis from the cabinet before removing the line cord plug from the power line socket. If the above precaution is not followed a severe electric shock, or damage to the receiver, may result.

ADJUSTMENT OF I.F. CONDENSERS

The three (3) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Turn the rotor plates of the ganged variable condenser to a position where no broadcast station carrier is heard. If this is not possible, the oscillator stator section (see sketch) of the ganged variable condenser may be short circuited to chassis.

2nd - Disconnect the control grid lead from the 6A7 oscillator-modulator tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 oscillator-modulator tube, and the low potential lead to the receiver chassis.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the three (3) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw driver.

1st - Remove signal generator connection from control grid of 6A7 oscillator-modulator tube and replace control grid lead.

2nd - Connect the antenna wire of the receiver to the high potential lead of the signal generator through a 250 mmfd. condenser.

3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

4th - Set the dial of the receiver to read 1500 KC.

5th - Starting with the compensator nearest the front of the receiver, adjust each compensator (as indicated on sketch) for maximum signal output. Do not disturb the setting of the gang condenser during these operations.

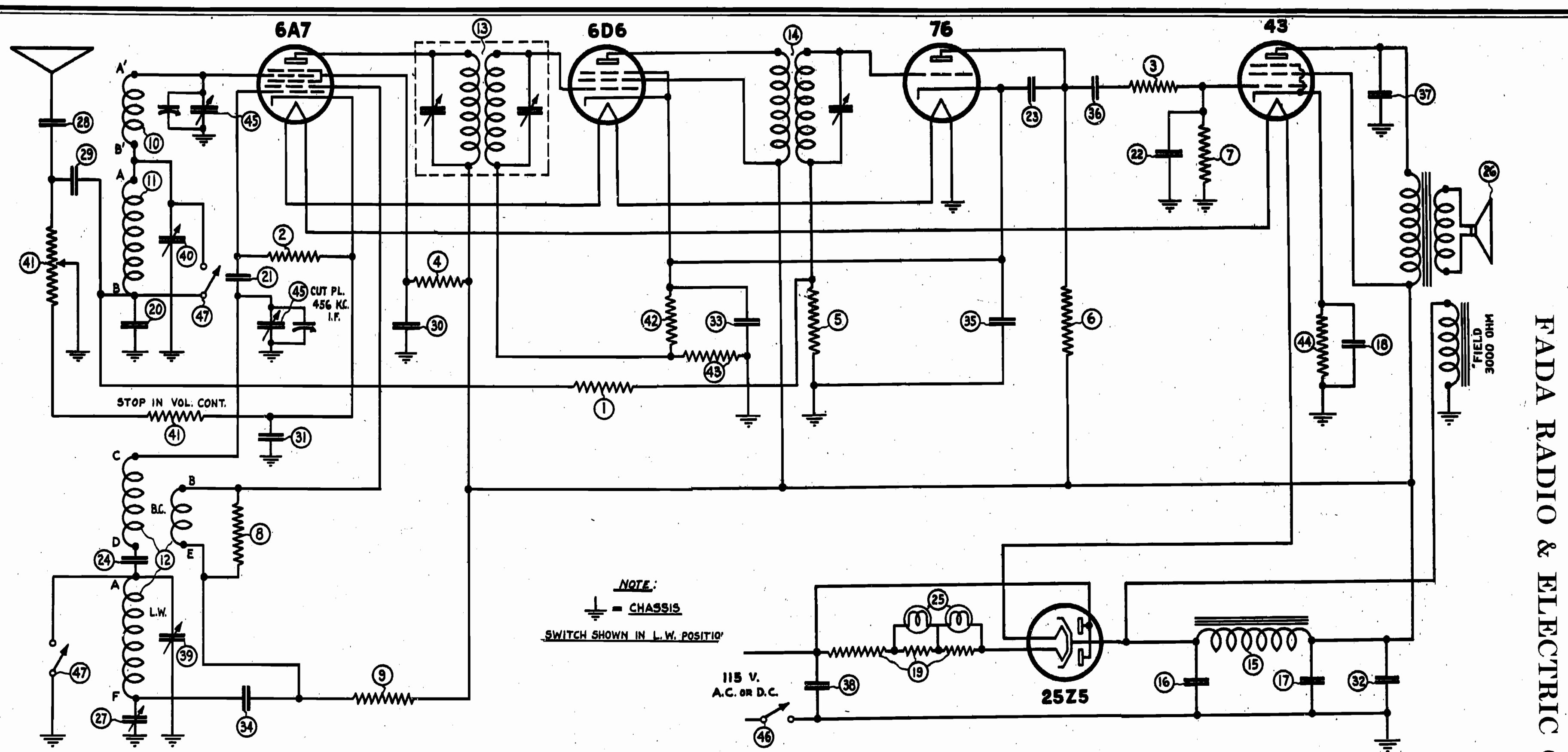
TYPE OF TUBES	POSITION OF TUBES	PLATE VOLTS	PLATE MA CURRENT	CONTROL GRID VOLTS	SCREEN GRID VOLTS
6A7	1st Det. Osc.	107	1.0	2.0**	48
6D6	Int. Freq.	102	8.0	2.6	102
76	2nd Det.	34*	0.1	6.5**	
43	Pwr. Pentode	89	18.0	14.0**	95
25Z5	Rectifier		76. TOTAL		

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

** Correct readings cannot be obtained at control grid, due to series resistors. To be measured across each respective bias resistor.

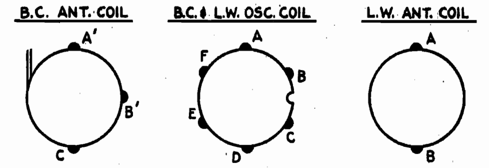
FADA RADIO & ELECTRIC CORP.

MODEL 156
Schematic



NOTE:
= CHASSIS
SWITCH SHOWN IN L.W. POSITIO

I.F. = 456 K.C.



A'-B' = 4.9 OHMS

A-F = 13.4 OHMS
B-E = 1.8 "
C-D = 6.7 "

A-B = 18.5 OHMS

1ST I.F. TRANS.
PRI. = 16 OHMS
SEC. = 15.5 "

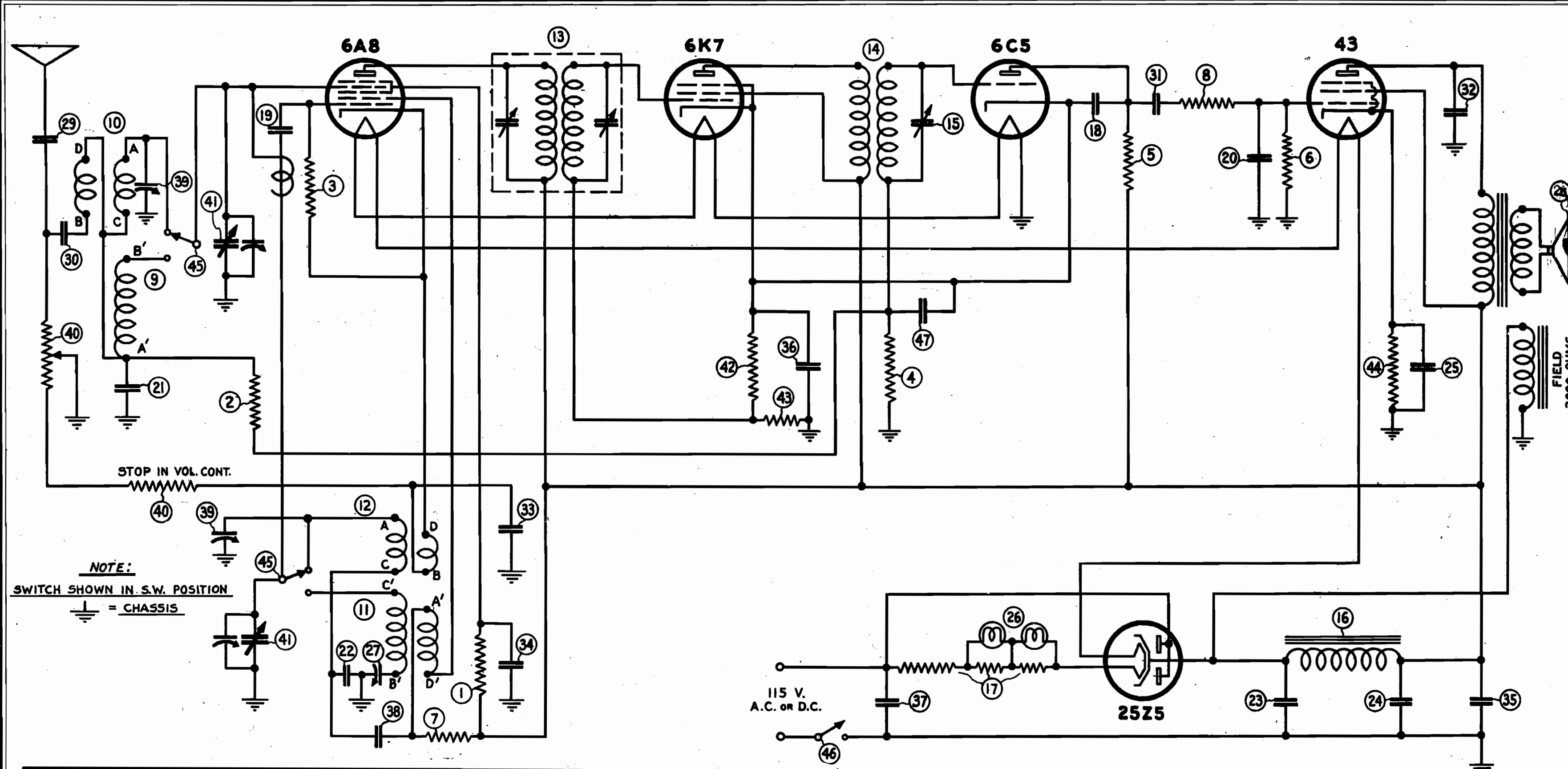
2ND I.F. TRANS.
PRI. = 24.5 OHMS
SEC. = 24.5 "

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.20	CARB. RES. - 250,000 OHM 1/3 W. ±20%	23	15.2	MICA COND. - .0005 MFD. ± 10%	45	25.11	VARIABLE COND.
2	30.3	" " 50,000 " " " " 10%	24	15.17	" " .0015 " " 3%	46		ON-OFF SW. ON VOLUME CONT.
3	30.3	" " 50,000 " " " " "	25	120.1	PILOT LIGHTS 6-8 V. .25 A.	47	45.8	BAND SWITCH
4	30.21	" " 30,000 " " " " 20%	26	105.21	SPEAKER - 3000 OHM			
5	30.22	" " 1 MEG " " " " "	27	25.41	PADDING COND. - 400 MMF.			
6	30.23	" " 500,000 " " " " "	28	10.18	TUBULAR COND. - .002 MMF. 200 V.			
7	30.23	" " 500,000 " " " " "	29	10.18	" " .002 " " "			
8	30.1	" " 5,000 " " " " 10%	30	10.5	" " .05 " " "			
9	30.1	" " 5,000 " " " " "	31	10.5	" " .05 " " "			
10	4574	BROADCAST ANTENNA COIL	32	10.5	" " .05 " " "			
11	4576	LONG WAVE " "	33	10.1	" " .35 " " "			
12	4575	B.C. & L.W. OSCILLATOR "	34	10.4	" " .01 " " "			
13	7B79	D.T. I.F. COIL	35	10.4	" " .01 " " "			
14	4336	S.T. I.F. "	36	10.4	" " .01 " " "			
15	40.16	CHOKE COIL - 300 OHM	37	10.4	" " .01 " " "			
16	20.28	ELECTRO. COND. BLOCK - 16 MFD. 100 W.V.	38	10.7	" " .05 " 400 "			
17	20.28	" " " 16 " " " "	39	25.38	TRIMMER - 10-60 MMF.			
18	20.28	" " " 4 " 25 " "	40	25.14	" 3-30 "			
19	115.7	LINE RESISTOR - 140-38-38 OHM	41	50.6	VOLUME CONT. - 10,000 OHM WITH 450 OHM STOP			
20	15.5	MICA COND. - .002 MFD. ± 3%	42	130.5	WIRE RES. - 250 OHM - 1/2 FX.			
21	15.3	.0001 " " 10%	43	130.2	" " 350 " " "			
22	15.3	.0001 " " "	44	130.1	" " 625 " " "			

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 156
DRAWN BY JD DATE 6-29-35
CHECKED BY JS APP. RES

MODEL 157
Schematic

FADA RADIO & ELECTRIC CORP.

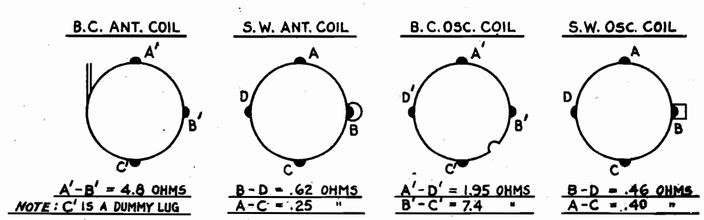


REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.21	CARB. RES. - 30,000 OHMS - 1/3 W. ±20%	23	20.35	ELECTRO. COND. BLOCK - 8 MFD. 100 W.V.	45	45.8	BAND SWITCH
2	30.20	" " 250,000 " " " "	24	20.35	" " " 8 " 100 "	46		ON-OFF SW. ON VOL. CONT. (40)
3	30.3	" " 50,000 " " " 10%	25	20.35	" " " 4 " 25 "	47	10.4	TUBULAR COND. - .01 MFD. - 200 V.
4	30.22	" " 1 MEG. " " 20%	26	120.1	PILOT LIGHTS 6-8 V. .25 A.			
5	30.23	" " 500,000 " " " "	27	25.8	PADDING COND. - 500 MMF.			
6	30.23	" " 500,000 " " " "	28	105.21	SPEAKER - 3000 OHMS			
7	30.36	" " 5,000 " " " "	29	10.18	TUBULAR COND. - .002 MFD. - 200 V.			
8	30.26	" " 50,000 " " " "	30	10.18	" " .002 " " "			
9	4681	B.C. ANTENNA COIL	31	10.4	" " .01 " " "			
10	4683	S.W. " "	32	10.4	" " .01 " " "			
11	4682	B.C. OSCILLATOR "	33	10.5	" " .05 " " "			
12	4680	S.W. " "	34	10.5	" " .05 " " "			
13	7879	D.T. I.F. "	35	10.5	" " .05 " " "			
14	4684	S.T. I.F. "	36	10.1	" " .35 " " "			
15	4686	S.T. I.F. TRIMMER	37	10.7	" " .05 " 400 "			
16	40.16	CHOKE COIL - 300 OHMS	38	10.23	" " .006 " 200 "			
17	115.7	LINE RESISTOR - 140-38-38 OHMS	39	25.14	TRIMMERS - 3-30 MMF.			
18	15.2	MICA COND. - .0005 MFD. ± 10%	40	50.6	VOLUME CONT. - 10,000 OHM - WITH 450 OHM STOP			
19	15.3	" " .0001 " "	41	25.47	VARIABLE COND.			
20	15.3	" " .0001 " "	42	130.5	WIRE RES. - 250 OHMS - 1/2 W. FX.			
21	15.6	" " .0025 " 3%	43	130.2	" " 350 " " " "			
22	15.26	" " .000825 " "	44	130.1	" " 625 " " " "			

I.F. = 456 K.C.

1ST I.F. TRANS.
PRI. = 16. OHMS
SEC. = 15.5 "

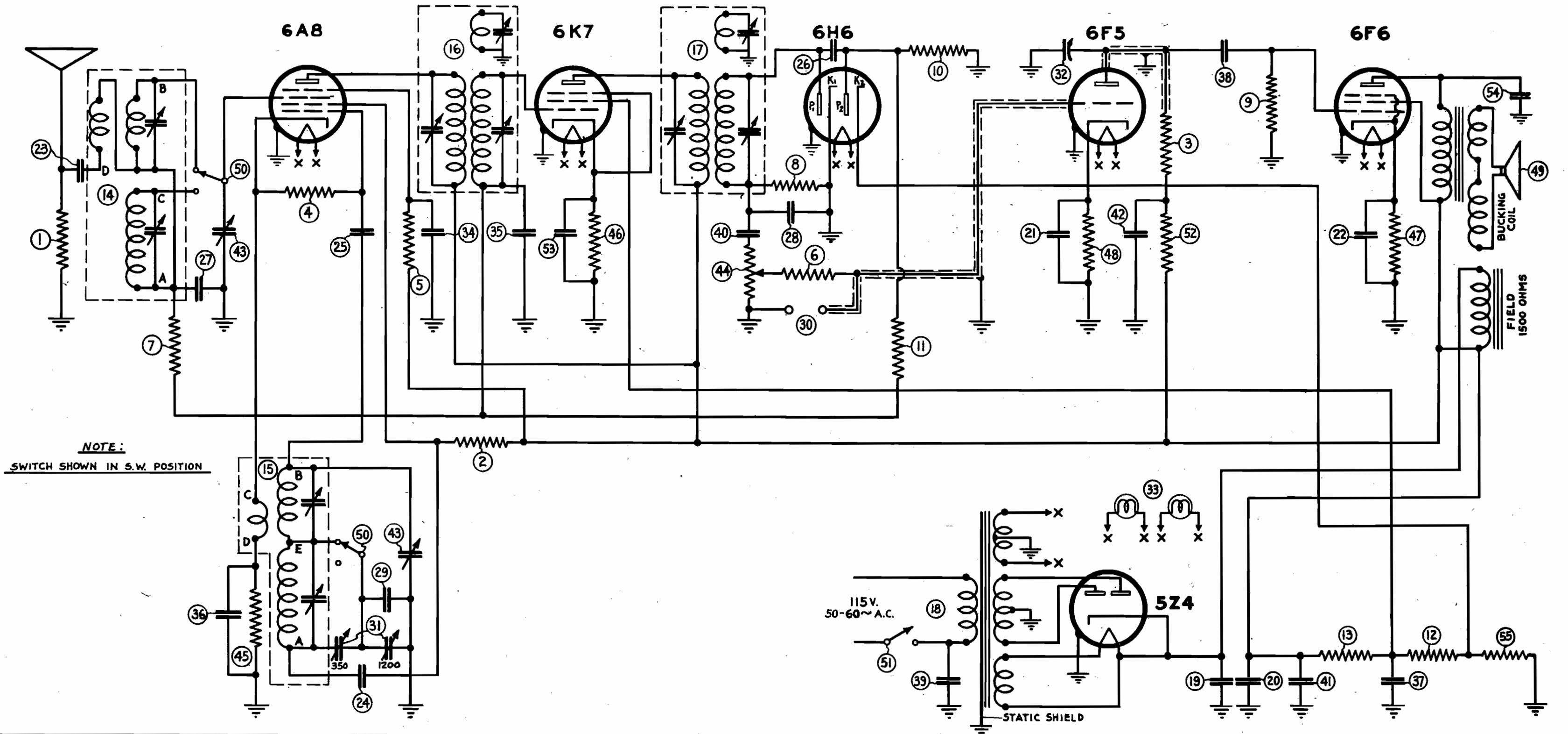
2ND I.F. TRANS.
PRI. = 24.5 OHMS
SEC. = 24.5 "



FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 157
DRAWN BY
DATE 7-12-35
CHECKED BY
APP.

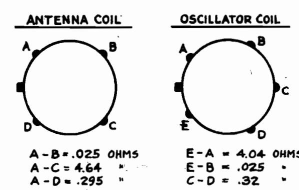
FADA RADIO & ELECTRIC CORP.

MODEL 160 Series
Schematic



NOTE: ⏚ = CHASSIS

I. F. = 456 K.C.



1ST I.F. TRANS.
PRI. = 8.5 OHMS
LINK = 13.0 "
SEC. = 13.0 "

2ND I.F. TRANS.
PRI. = 8.5 OHMS
LINK = 13.0 "
SEC. = 13.0 "

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 160
DRAWN BY JD — DATE 6-29-35
CHECKED BY — APP. RFS

REF. No.	PART No.	DESCRIPTION
1	30.31	CARB. RES. - 10,000 OHMS - 1/3 W. ± 20%
2	30.31	" " 10,000 " " " " "
3	30.4	" " 250,000 " " " " 10%
4	30.3	" " 50,000 " " " " "
5	30.26	" " 50,000 " " " " 20%
6	30.26	" " 50,000 " " " " "
7	30.20	" " 250,000 " " " " "
8	30.20	" " 250,000 " " " " "
9	30.5	" " 500,000 " " " " 10%
10	30.5	" " 500,000 " " " " "
11	30.22	" " 1 MEG. " " " 20%
12	30.38	" " 30,000 " 1/2 " " 10%
13	30.37	" " 35,000 " 1 " " "
14	4579	ANTENNA COIL - B.C. & S.W.
15	4581	OSCILLATOR " " " "
16	4489A	1ST. I. F. COIL
17	4490A	2ND " " "
18	40.4	POWER TRANS. - 115 V. 50-60 ~
19	20.33A	ELECTRO. COND. BLOCK - 8 MFD. 450 W.V.
20	20.33A	" " " 8 " " " "
21	20.33A	" " " 5 " 25 " "
22	20.33A	" " " 5 " " " "
23	15.7	MICA COND. - .002 MFD. ± 10%
24	15.7	" .002 " " "
25	15.3	" .0001 " " "
26	15.3	" .0001 " " "
27	15.6	" .0025 " " 3%
28	15.2	" .0005 " " 10%
29	15.22	" .004 " " "
30	125.1	PHONO JACK
31	25.43	PADDING COND. 350 - 1200 MFD.
32	55.1	TONE CONTROL
33	120.3	PILOT LIGHTS - 6.8 V. - .15 A.
34	10.7	TUBULAR COND. - .05 MFD. - 400 V.
35	10.5	" " .05 " 200 "
36	10.5	" " .05 " " "
37	10.7	" " .05 " 400 "
38	10.7	" " .05 " " "
39	10.7	" " .05 " " "
40	10.4	" " .01 " 200 "
41	10.9	" " .1 " 400 "
42	10.14	" " .25 " " "
43	25.44	VARIABLE COND.
44	50.13	VOLUME CONT. - 1 MEG.
45	130.5	WIRE RES. - 250 OHMS - 1/2 W. FX.
46	130.6	" " 500 " " " "
47	130.6	" " 500 " " " "
48	130.14	" " 2000 " " " "
49	105.4	SPEAKER - 1500 "
50	45.1	BAND SWITCH
51		ON-OFF " ON VOL. CONT.
52	30.26	CARB. RES. - 50,000 OHMS - 1/3 W. ± 20%
53	10.2	TUBULAR COND. - .1 MFD. - 200 V.
54	10.13	" " .002 " 400 "
55	30.39	CARB. RES. - 6,000 OHMS - 1/3 W. ± 10%

MODEL 160 Series
Socket, Trimmers
Alignment, Voltage

FADA RADIO & ELECTRIC CORP.

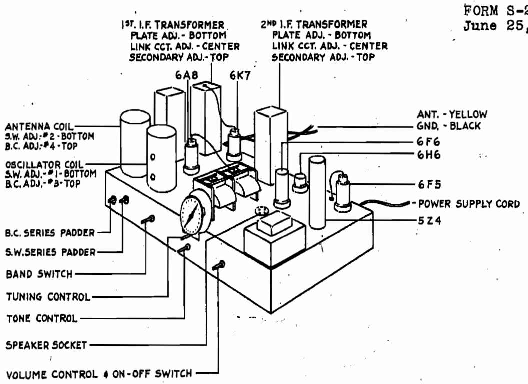
COMPENSATING INSTRUCTIONS FOR

MODEL 160 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

FORM S-2138
June 25, 1935



ADJUSTMENT OF THE I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.
2nd - Disconnect the control grid lead from the 6A8 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance; adjusting first the I.F. condenser across the secondary winding of the 2nd I.F. transformer and then each in turn, ending with the adjustment of the condenser across the primary winding of the 1st I.F. transformer.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

1st Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.

2nd Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd Adjust the carrier frequency output of the signal generator to 15 MC.

4th Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.

5th Adjust the S.W. oscillator shunt compensator (#1 on sketch) for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting even with a greater signal generator output, the S.W. shunt compensator (#1) has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original signal frequency output reading.

6th Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator (#1) adjust the S.W. detector shunt compensator (#2) for maximum output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES TRIMMER

1st Adjust the carrier frequency output of the signal generator to 6 MC.

2nd Turn the calibrated dial of the receiver to pick up this 6 MC signal.

3rd With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator (#1), and then, S.W. detector shunt compensator (#2) for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC. SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to the right - broadcast position.

3rd - Adjust the carrier frequency to 1500 KC.
4th - Set the calibrated dial of the receiver to read 1500 KC.

5th - Adjust the BC. oscillator shunt compensator (#3) for maximum signal output.

6th - Adjust the BC. detector shunt compensator (#4) for maximum signal output.

ADJUSTMENT OF BC. OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - With the aid of a bakelite type screw driver, adjust the BC. oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the BC. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust BC. oscillator shunt compensator (#3) and BC. detector shunt compensator (#4) for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 160 SERIES

Line Voltage 118 - Input Current .52 Amp.
No Signal Input - Wave Band Switch - Right.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8	1st Det.-Osc.	250	2.9	4	92
6K7	Int. freq.	249	6.4	5	96
6H6	2nd Det.	---	---	--	--
	A.V.C.	---	---	18	--
6F5	1st Aud.	103*	.3	1	--
6F6	2nd Aud.	222	29.0	18	236
5Z4	Rectifier	---	55.9 TOTAL	--	---

6A8 Osc. Anode Voltage -- 202 and current -- 4.1 ma.
* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER (#20.33A)
1st section 350 — 2nd section 254

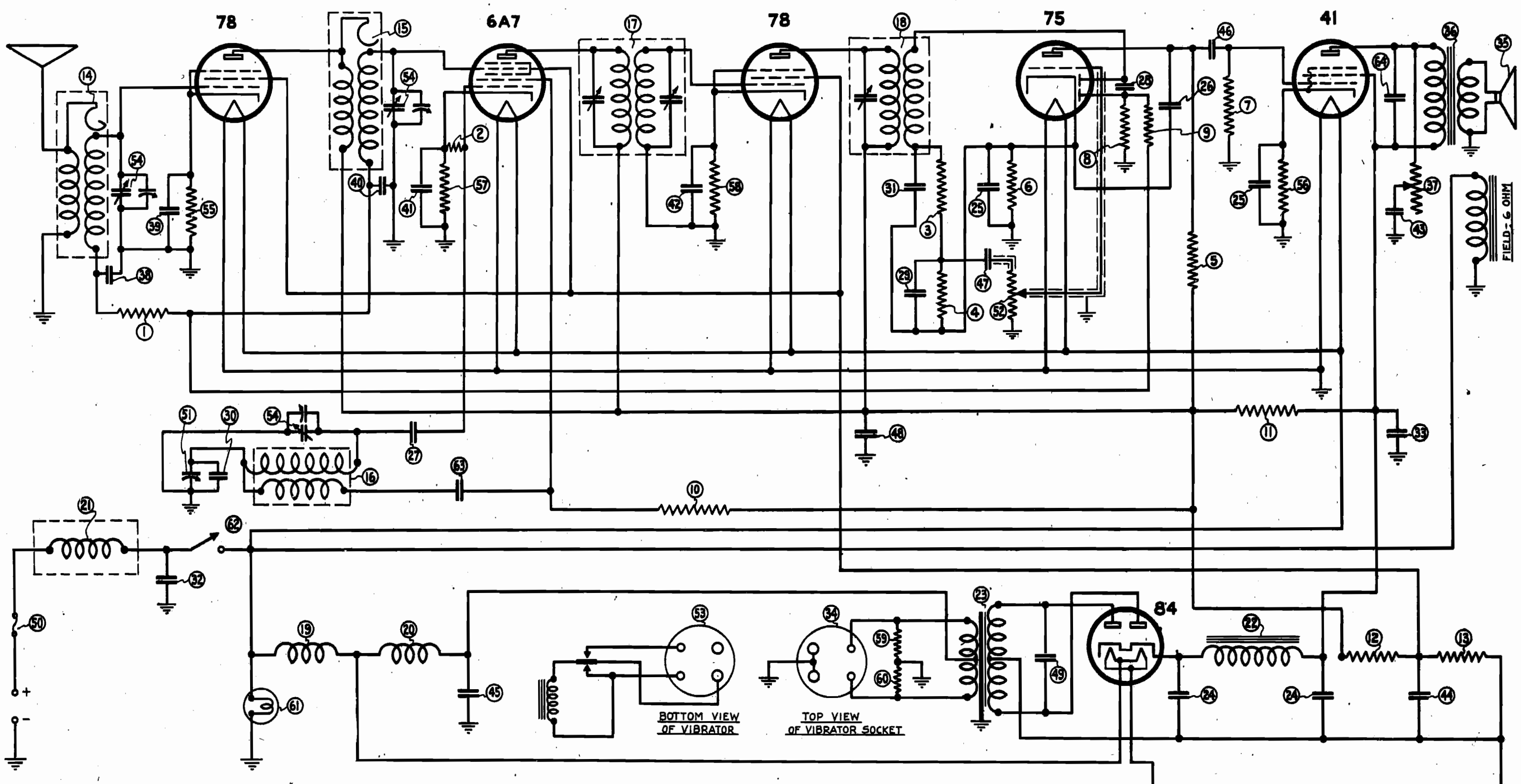
Voltage across speaker field...................... 96 volts
" " 35,000 ohm resistor (#30.37)...... 150 "
" " 30,000 " " (#30.38)...... 87 "
" " 6,000 " " (#30.39)...... 18 "

D.C. RESISTANCE VALUES

	PRIMARY	SECONDARY
Speaker input transformer	550 ohms	.335 ohms
" field coil	1,520 "	
" voice coil	2.9 "	
" bucking coil	.345 "	

FADA RADIO & ELECTRIC CORP.

MODEL 166, Motoset
Schematic



I.F. = 175 K.C.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.20	CARB. RES.-250,000 OHM - 1/3 WATT ± 20%	23	40.15	POWER TRANSFORMER	45	10.21	TUBULAR COND.-.5 MFD. 120 V			
2	30.3	" " 50,000 " 1/3 " ± 10%	24	20.29	ELECTRO COND. - DUAL - 8 MFD. - 350 W.V.	46	10.10	TUBULAR COND.-.01 " 400 "			
3	30.3	" " 50,000 " 1/3 " "	25	20.30	" " " 4 " 25 W.V.-TUB.	47	10.4	" " .01 " 200 "			
4	30.24	" " 100,000 " 1/3 " ± 20%	26	15.7	MICA COND.-.002 MFD. ± 10%	48	10.14	" " .25 " 400 "			
5	30.24	" " 100,000 " 1/3 " "	27	15.3	" " .0001 " "	49	10.20	" " .01 " 1000 "			
6	30.1	" " 5,000 " 1/3 " ± 10%	28	15.3	" " .0001 " "	50	90.13	FUSE - 10 AMP.			
7	30.23	" " 500,000 " 1/3 " ± 20%	29	15.3	" " .0001 " "	51	25.34	PADDING COND.-.000650 MFD.			
8	30.23	" " 500,000 " 1/3 " "	30	15.11	" " .0004 " "	52	50.8	VOLUME CONTROL - 1 MEG.			
9	30.23	" " 500,000 " 1/3 " "	31	15.2	" " .0005 " "	53	90.17	VIBRATOR			
10	30.11	" " 25,000 " 1/3 " ± 10%	32	15.10	" " .00005 " "	54	25.33	VARIABLE COND. - .000367 MFD.			
11	30.25	" " 5,000 " 2 " ± 20%	33	15.4	" " .001 " "	55	130.12	WIRE RES. - 750 OHM - 1/2 F.X.			
12	30.13	" " 20,000 " 1 " ± 10%	34	65.20	VIBRATOR SOCKET	56	130.1	" " 625 " 1/2 "			
13	30.26	" " 50,000 " 1/3 " ± 20%	35	105.22	LOUD SPEAKER	57	130.8	" " 1000 " 1/2 "			
14	4303	ANTENNA COIL	36	40.22	OUTPUT TRANSFORMER	58	130.8	" " 1000 " 1/2 "			
15	4304	R.F. COIL	37	55.4	TONE CONT. RES. - 100,000 OHM	59	130.13	" " 100 " - 1 WATT			
16	4422	OSCILLATOR COIL	38	10.5	TUBULAR COND.-.05 MFD. - 200 V.	60	130.13	" " 100 " 1 "			
17	717	D.T. I.F. COIL	39	10.5	" " .05 " 200 "	61	90.31	PILOT LIGHT - MAZDA # 51			
18	4423	S.T. I.F. COIL	40	10.5	" " .05 " 200 "	62		ON-OFF SW. ON VOL. CONT. (52)			
19	4414	R.F. CHOKE	41	10.5	" " .05 " 200 "	63	15.4	MICA COND.-.001 MFD. ± 10%			
20	4414	R.F. CHOKE	42	10.5	" " .05 " 200 "	64	10.3	TUBULAR " -.006 MFD. - 400 V.			
21	4424	SHIELDED CHOKE (SPARK FILTER CHOKE)	43	10.7	" " .05 " 400 "	65					
22	40.1	AUDIO CHOKE COIL - 300 OHM	44	10.7	" " .05 " 400 "	66					

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 166 • MOTOSET
DRAWN BY | DATE 4-13-35
CHECKED BY | APP. CHIEF ENG.

MODEL 166, Motoset Alignment, Socket Trimmers, Data

FADA RADIO & ELECTRIC CORP.

SERVICE DIVISION

COMPENSATING INSTRUCTIONS FOR

MOTOSET - MODEL 166

In order to adjust accurately the various trimmer condensers of the MOTOSET in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 175 KC, 600 KC and 1500 KC.

The MOTOSET is equipped with an automatic volume control which necessitates setting the manual volume control of the MOTOSET to its maximum position to insure accuracy in alignment. To control the signal output of the MOTOSET it will be necessary to use the attenuator control of the signal generator.

The following adjustments can be made without removing the MOTOSET chassis from its housing; it is only necessary to remove the front housing cover. The speaker cable should remain connected to the MOTOSET chassis.

ADJUSTMENT OF I.F. CONDENSERS

The three (3) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Turn the rotor plates of the ganged variable condenser to a position where no broadcast station carrier is heard. If this is not possible, the oscillator stator section (see sketch) of the ganged variable condenser may be short circuited to chassis.

2nd - Disconnect the control grid lead from the 6A7 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 pentagrid converter tube, and the low potential lead to the shielding on the antenna cable.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 175 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the three (3) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER

Turn the ganged variable condenser until the rotor plates are fully meshed. Pull out the pilot light socket from the rear of the remote control head and insert a small screw driver. Turn the adjusting screw so that the dial pointer reads on the last division below 550 KC. This procedure aligns the remote control calibration scale to the ganged variable condenser. To hold this alignment it will be necessary to prevent any shifting of the remote control head or its cables in relation to the MOTOSET.

The compensators are located at the top of their respective tuning condenser section and can be adjusted with the aid of a screw driver.

1st - Remove the signal generator connection from the control grid of the 6A7 pentagrid converter tube and replace control grid lead.

2nd - Connect the antenna cable of the MOTOSET to the high potential lead of the signal generator through a 250 mmfd. condenser.

3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

4th - With the aid of the remote control unit, turn the ganged variable condenser to pick up this 1500 KC signal.

5th - Starting with the oscillator compensator, adjust each compensator for maximum signal output. Do not disturb the setting of the ganged variable condenser during these operations.

ADJUSTMENT OF OSCILLATOR SERIES CONDENSER

The oscillator series condenser can be adjusted through the hole in the chassis as indicated in the sketch.

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the remote control unit until the 600 KC signal is tuned in.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 166 MOTOSET

(No signal input)
Battery supply voltage 6.0 volts
Battery current drain 5.6 amperes

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTAGE	PLATE CURRENT	CONTROL GRID VOLTAGE	SCREEN GRID VOLTAGE
78	R.F. Amp.	162	3.0	2.7**	68
6A7	1st Detector	160	.7	5.5**	66
	Oscillator	90*	2.7	---	--
78	I.F. Amp.	162	2.9	3.2	68
75	2nd Det.& 1st A.F.	107*	.3	1.1**	--
41	Power Pentode	226	19.0	15.0**	236
84	Rectifier		37.0 TOTAL		

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

** Correct readings cannot be obtained at control grid due to series resistors. To be measured across each respective bias resistor.

VOLTAGE ACROSS ELECTROLYTIC FILTER CONDENSER (20.29)

1st section	2nd section
250 volts	236 volts

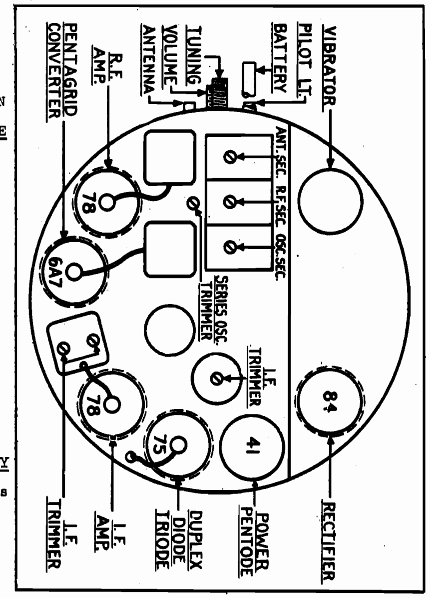
D.C. RESISTANCE VALUES

PART NO.	DESCRIPTION	PRIMARY	SECONDARY
4303	Antenna coil	30.0 ohms	4.9 ohms
4304	R.F. coil	70.0 "	4.8 "
4422	Oscillator coil	1.7 "	3.5 "
717	1st I.F. transformer	80.0 "	80.0 "
4423	2nd I.F. transformer	80.0 "	80.0 "
40.15	Power transformer	.213 "	540.0 "
40.22	Audio output transformer	485.0 "	.2 "
4414	R.F. choke	.024 "	
4424	Spark filter choke	.022 "	
40.1	Filter choke	300.0 "	
105.22	Speaker field coil	6.0 "	
105.22	Speaker voice coil	3.0 "	

3rd - With the aid of a bakelite type screw driver, adjust the oscillator series compensator until a maximum output signal is indicated on the output meter. To insure perfect adjustment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the oscillator series compensator, readjust the carrier frequency of the signal generator to 1500 KC. Turn the ganged variable condenser to 1500 KC, and readjust all variable condenser compensators as outlined in the foregoing instructions.

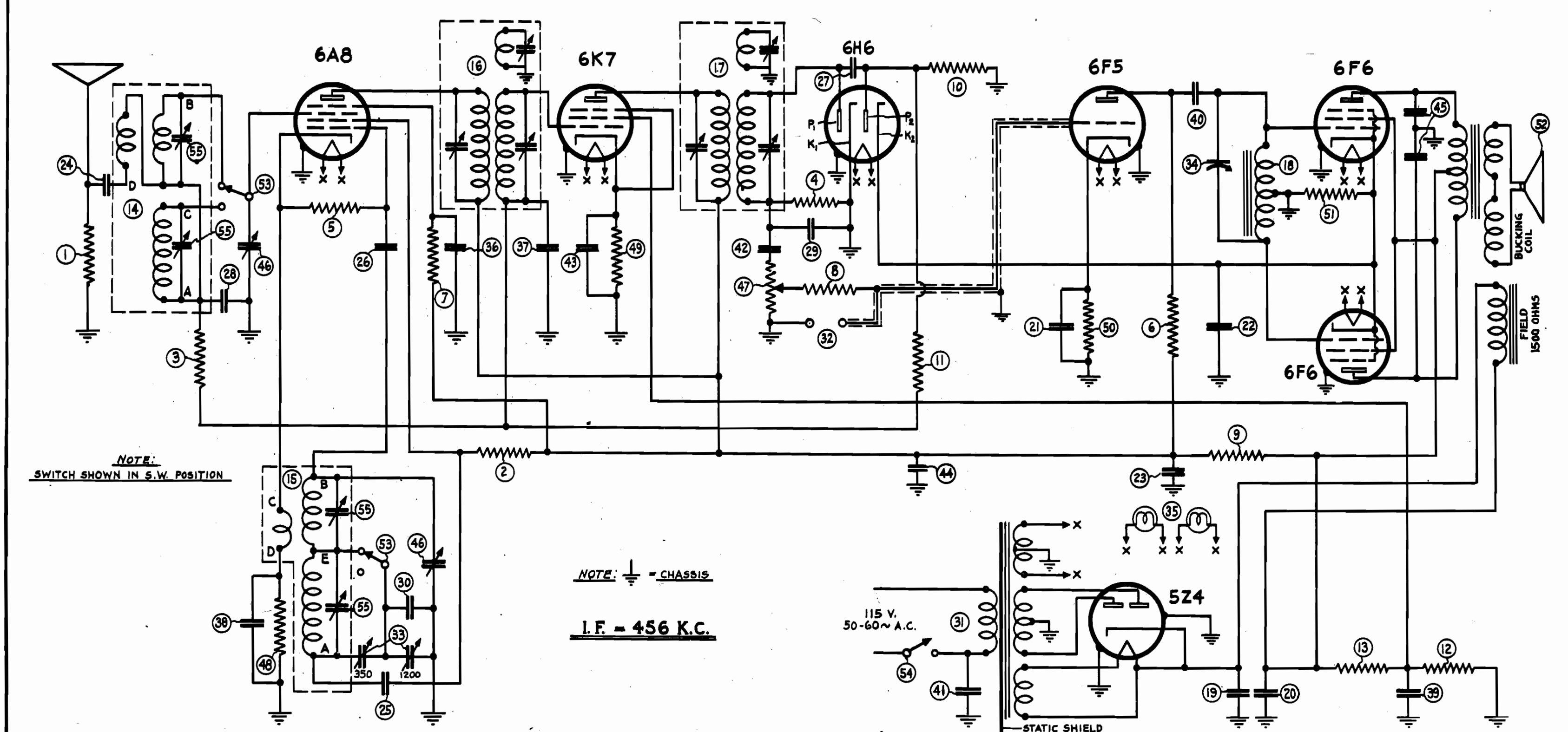
CHASSIS LAYOUT

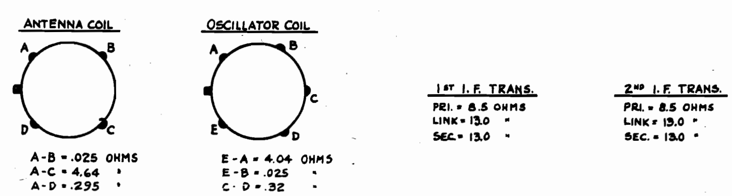


FORM S-2136
MAY 21, 1935
MM/ls

MODEL 170
Schematic

FADA RADIO & ELECTRIC CORP.





REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.31	CARB. RES. - 10,000 OHMS - 1/3 W. ± 20%	23	20.34	ELECTRO COND. - 6 MFD. 450 W.V.	45	10.17	TUBULAR COND. - DUAL - .001 - .001 MFD. 600 V.
2	30.31	" " 10,000 " " " " "	24	15.7	MICA COND. .002 MFD. + 10%	46	25.45	VARIABLE COND.
3	30.20	" " 250,000 " " " " "	25	15.7	" " .002 " " "	47	50.14	VOLUME CONT. - 1 MEG.
4	30.20	" " 250,000 " " " " "	26	15.3	" " .0001 " " "	48	130.5	WIRE RES. - 250 OHMS - 1/2 W. FX.
5	30.3	" " 50,000 " " " " 10%	27	15.3	" " .0001 " " "	49	130.6	" " 500 " " " "
6	30.3	" " 50,000 " " " " "	28	15.6	" " .0025 " " 3%	50	130.12	" " 750 " " " "
7	30.26	" " 50,000 " " " " 20%	29	15.2	" " .0005 " " 10%	51	130.9	" " 315 " 1 " "
8	30.26	" " 50,000 " " " " "	30	15.22	" " .004 " " "	52	105.7	SPEAKER - 1500 "
9	30.36	" " 5,000 " " " " "	31	40.10	POWER TRANS. - 115 V. 50-60~	53	45.13	BAND SWITCH
10	30.5	" " 500,000 " " " " 10%	32	125.1	PHONO JACK	54		ON-OFF " ON VOL. CONT.
11	30.22	" " 1 MEG. " " " " 20%	33	25.43	PADDING COND. - DUAL - 350-1200 MMF.	55		MIN. ADJ. ON COIL
12	30.14	" " 50,000 " 1/2 " " 10%	34	55.5	TONE CONTROL			
13	30.37	" " 35,000 " 1 " " "	35	120.3	PILOT LIGHTS - 6.8 V. - .15 A.			
14	4579	ANTENNA COIL - B.C & S.W.	36	10.7	TUBULAR COND. - .05 MFD. - 400 V.			
15	4581	OSCILLATOR " " "	37	10.5	" " .05 " 200 "			
16	4489	1ST. I. F. COIL	38	10.5	" " .05 " " "			
17	4490	2ND. " " "	39	10.7	" " .05 " 400 "			
18	40.7	AUDIO COUPLING CHOKE	40	10.7	" " .05 " " "			
19	20.33	ELECTRO COND. BLOCK - 8 MFD. 450 W.V.	41	10.7	" " .05 " " "			
20	20.33	" " " 8 " " " "	42	10.4	" " .01 " 200 "			
21	20.33	" " " 5 " 25 " "	43	10.2	" " .1 " " "			
22	20.33	" " " 5 " " " "	44	10.9	" " .1 " 400 "			

FADA RADIO & ELECTRIC CO
LONG ISLAND CITY, N.Y.

MODEL 170

DRAWN: J.D. DATE: 6-29-35
CHECKED BY: APPROVED: RFS

S-2149

MODEL 170
Socket, Trimmers
Alignment, Voltage

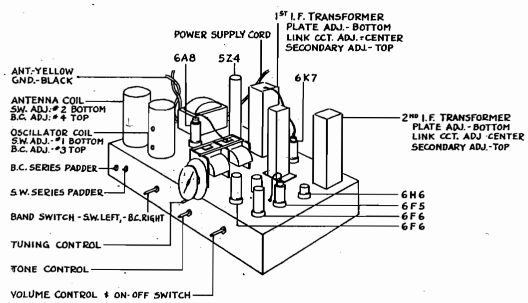
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 170 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.



ADJUSTMENT OF I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Disconnect the control grid lead from the 6A8 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance; adjusting first the I.F. condenser across the secondary winding of the 2nd I.F. transformer and then each in turn, ending with the adjustment of the condenser across the primary winding of the 1st I.F. transformer.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 15 MC.

4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.

5th - Adjust the S.W. oscillator shunt compensator (#1 on sketch) for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting even with a greater signal generator output, the S.W. shunt compensator (#1) has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original signal frequency output reading.

6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator (#1) adjust the S.W. detector shunt compensator (#2) for maximum output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 6 MC.

2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.

3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator (#1), and then, S.W. detector shunt compensator (#2) for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC. SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to the right - broadcast position.

3rd - Adjust the carrier frequency to 1500 KC.

4th - Set the calibrated dial of the receiver to read 1500 KC.

5th - Adjust the BC. oscillator shunt compensator (#3) for maximum signal output.

6th - Adjust the BC. detector shunt compensator (#4) for maximum signal output.

ADJUSTMENT OF BC. OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - With the aid of a bakelite type screw driver, adjust the BC. oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the BC. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust BC. oscillator shunt compensator (#3) and BC. detector shunt compensator (#4) for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 170 SERIES

Line Voltage 118 - Input Current .69 Amp.
No Signal Input - Wave Band Switch - Right

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A8	1st Det.-Osc	252	3.0	2	80
6K7	Int. Freq.	249	6.9	5	109
6H6	2nd Det.	---	---	--	---
	A.V.C.	---	---	19	---
6F5	1st Aud.	156*	1.3	1	---
6F6	P.P. 2nd Aud.	232	24.0	19	235
5Z4	Rectifier	---	77.0 TOTAL	--	---

6A8 Osc. Anode Voltage -- 182 and current 2.9 Ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER (#20.33B)

1st section	2nd section
385	254

Voltage across speaker field	131 volts
" " 35,000 ohm resistor (#30.37)	140 "
" " 50,000 " " (#30.14)	114 "
" " 5,000 " " (#30.36)	33 "

D. C. RESISTANCE VALUES

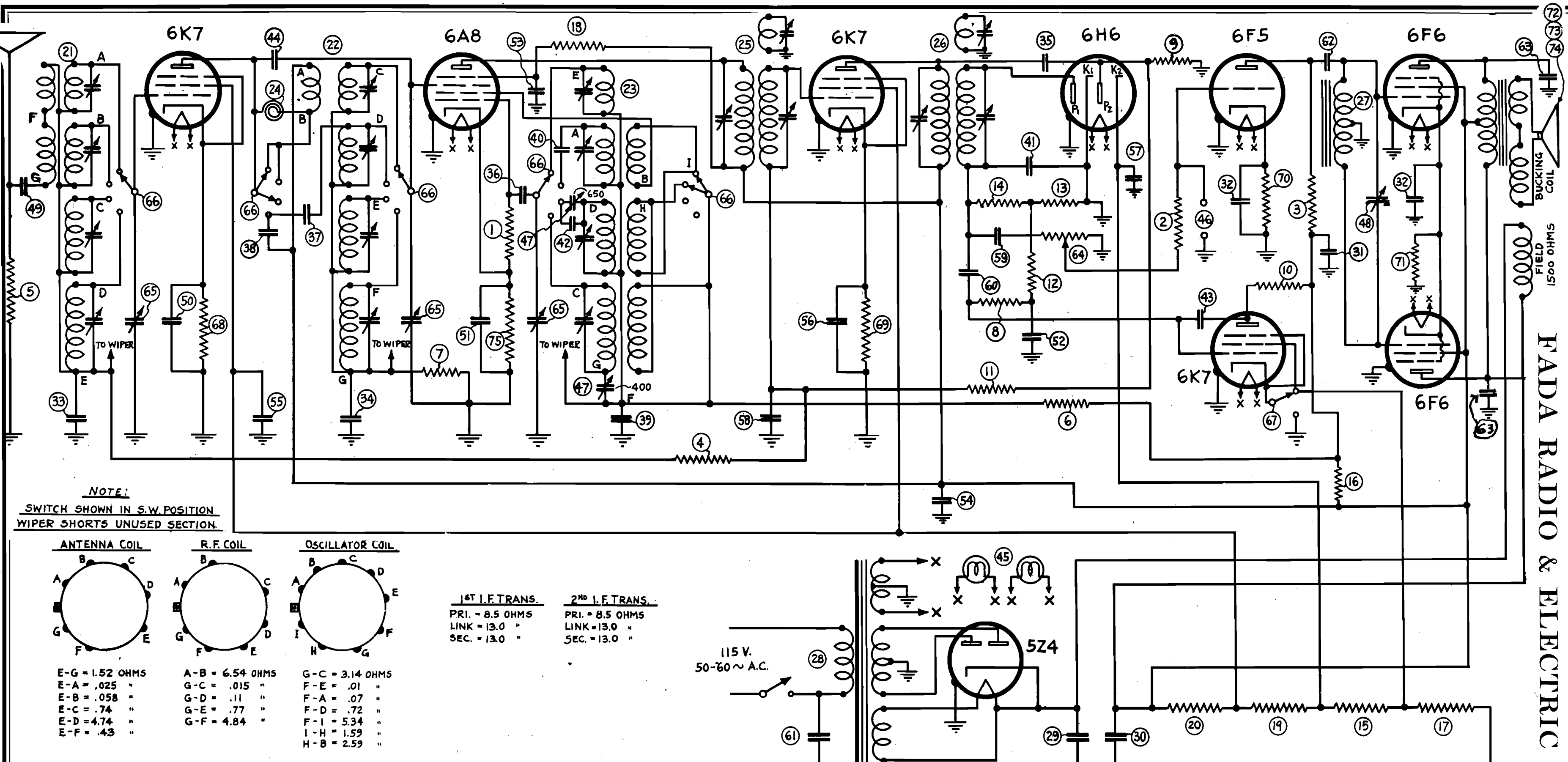
	PRIMARY	SECONDARY
Speaker input transformer	392 ohms	.09 ohms
" field coil	1,540 "	
" voice coil	1.9 "	
" bucking coil	.26 "	
Audio Coupling Choke	2,440 "	

FORM S-2143
June 26, 1935

SERVICE DIVISION

MODEL 190
Schematic

FADA RADIO & ELECTRIC CORP.



NOTE: ⏚ = CHASSIS

I. F. 456 K. C.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.26	CARB. RES. - 50,000 OHMS - 1/3 W. ±20%	23	4650	OSCILLATOR COIL	45	120.3	PILOT LIGHTS 6-8. V. .15 V.	67	45.16	SNAP SWITCH
2	30.26	" " 50,000 " " " " "	24	3216	CHOKE COIL	46	125.1	PHONO JACK	68	130.5	WIRE RES. - 250 OHMS 1/2 FX.
3	30.26	" " 50,000 " " " " "	25	4489C	1ST I.F. COIL	47	25.9	PADDING COND. - DUAL - 400-650 MMF.	69	130.6	" " 500 " " "
4	30.20	" " 250,000 " " " " "	26	4490C	2ND I.F. COIL	48	55.2	TONE CONTROL	70	130.3	" " 1000 " " "
5	30.3	" " 50,000 " " " 10 "	27	40.7	AUDIO CHOKE COIL	49	10.13	TUBULAR COND. - .002 MF. - 400 V.	71	130.9	" " 315 " 1 W.
6	30.2	" " 10,000 " " " " "	28	40.25	POWER TRANS.	50	10.5	" " .05 " - 200 "	72	105.7	SPEAKER - MODEL 190T
7	30.2	" " 10,000 " " " " "	29	20.7	ELECTRO COND. - 12 MFD. - 550 W.V.	51	10.5	" " .05 " " "	73	105.17	" " 190C
8	30.22	" " 1 MEG. " " " 20 "	30	20.4	" " 8 " 450 "	52	10.5	" " .05 " " "	74	105.12	" " 190CK
9	30.22	" " 1 " " " " "	31	20.34	" " 6 " 450. "	53	10.9	" " .1 " 400 "	75	130.5	WIRE RES. - 250 OHMS 1/2 FX
10	30.22	" " 1 " " " " "	32	20.6	" DUAL " 4-4 " 25-25 "	54	10.9	" " .1 " " "			
11	30.28	" " 2 " " " " "	33	15.5	MICA COND. - .002 MF. ±3%	55	10.9	" " .1 " " "			
12	30.23	" " 500,000 " " " " "	34	15.5	" " .002 " " " "	56	10.2	" " .1 " 200 "			
13	30.8	" " 100,000 " " " 10 "	35	15.3	" " .0001 " " 10 "	57	10.2	" " .1 " " "			
14	30.40	" " 150,000 " " " " "	36	15.3	" " .0001 " " " "	58	10.26	" " .02 " " "			
15	30.1	" " 5,000 " " " " "	37	15.14	" " 5. MMF. ± 1/2 MMF.	59	10.4	" " .01 " " "			
16	30.1	" " 5,000 " " " " "	38	15.23	" " 70. " ± 5%	60	10.4	" " .01 " " "			
17	30.15	" " 2,000 " " " " "	39	15.25	" " .0027 MF. " 3 "	61	10.7	" " .05 " 400 "			
18	30.14	" " 50,000 " 1/2 " " "	40	15.24	" " .00135 " " " "	62	10.7	" " .05 " " "			
19	30.41	" " 25,000 " 1/2 " " "	41	[illegible]	" " .0005 " " 10 "	63	10.17	" DUAL " .001 " 600 "			
20	30.33	" " 25,000 " 1 " " "	42	15.2[illegible]	" " .0005 " " " "	64	50.17	VOLUME CONTROL - 1 MEG.			
21	4648	ANTENNA COIL	43	15.13	" " .00075 " " " "	65	25.46	VARIABLE COND.			
22	4649	R.F. COIL	44	15.16	" " 3. MMF. ± 1/2 MMF.	66	45.14	BAND SWITCH			

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.

MODEL 190

DRAWN BY	DATE
JP	6-29-35
CHECKED BY	APPROVED
RLW	RFS

MODEL 190
Socket, Trimmers
Alignment

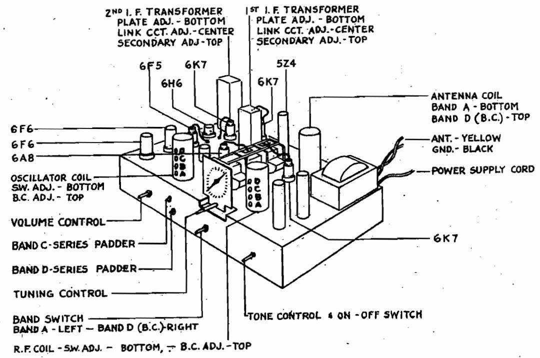
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 190 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 3750 KC, 4 MC, 10 MC and 20 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.



ADJUSTMENT OF I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Disconnect the control grid lead from the 6A8 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier output to 456 KC. Regulate the attenuator of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance. From a fidelity standpoint the best procedure for aligning the I.F. system is to adjust the I.F. condenser connected across the secondary winding feeding into the diode (2nd detector), then the link circuit condenser and finally the primary circuit condenser. The same procedure is to be followed in adjusting the 1st I.F. transformer. Do not adjust the I.F. condensers at random but follow the above procedure of alignment carefully.

ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator.

3rd - Adjust the carrier output of the signal generator to 20 MC.

4th - Turn the wave band selector switch to band "A" - left. Set the calibrated dial of the receiver to read 20 MC.

5th - Adjust the S.W. band "A" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 20.9 MC. If no signal can be heard at this setting, even with a greater signal generator output, the S.W. band "A" oscillator shunt compensator has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting, check to see that the image frequency comes in at 20.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image point should be weaker than the original reading.

6th - Having determined the correct peak, and maximum setting for the S.W. band "A" oscillator shunt compensator, adjust the S.W. band "A" R.F. stage shunt compensator and the S.W. band "A" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (20.9 MC) to determine that both compensators have been adjusted to the correct peak (See paragraph 5 for determining image).

7th - Adjust the carrier frequency output of the signal generator to 10 MC.

8th - Turn the calibrated dial of the receiver to pick up this 10 MC signal and check for sensitivity at this point. There is no variable oscillator series condenser at this frequency to adjust as the receiver employs a fixed oscillator series padder

ADJUSTMENT OF S.W. BAND "B" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Maintaining the same signal generator output (10 MC) turn the wave band selector switch to band "B".

2nd - Turn the calibrated dial of the receiver to 10 MC on wave band "B".

3rd - Adjust the S.W. band "B" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "out." Check for image point on the calibrated dial at approximately 9 MC (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).

4th - Having determined the correct peak and maximum setting, for the S.W. band "B" oscillator shunt compensator, adjust the S.W. band "B" R.F. stage shunt compensator and the S.W. band "B" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (9 MC) to determine that both compensators have been adjusted to the correct peak (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATOR")

5th - Adjust the carrier frequency output of the signal generator to 4 MC.

6th - Turn the calibrated dial of the receiver to pick up this 4 MC signal and check for sensitivity at this point. There is no variable oscillator series condenser to adjust at this frequency as the receiver employs a fixed oscillator series padder.

ADJUSTMENT OF S.W. BAND "C" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Adjust the carrier frequency output of the signal generator to 3.75 MC.

2nd - Turn the calibrated dial of the receiver to 3.75 MC on wave band "C".

3rd - Adjust the S.W. band "C" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "out". Check for image point on the calibrated dial at approximately 2.8 MC (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).

4th - Having determined the correct peak, and the maximum setting, for the S.W. band "C" oscillator shunt compensator adjust the S.W. band "C" R.F. stage shunt compensator and the S.W. band "C" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (2.8 MC) to determine that both compensators have been adjusted to the correct peak (See paragraph 5 under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).

ADJUSTMENT OF S.W. BAND "C" OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 1.5 MC.

2nd - Turn the calibrated dial of the receiver to pick up this 1.5 MC signal.

3rd - Adjust the S.W. band "C" oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the S.W. band "C" oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 3.75 MC. Turn the calibrated dial of the receiver to 3.75 MC and re-adjust S.W. band "C" oscillator shunt compensator, and then, S.W. band "C" R.F. stage shunt compensator and S.W. band "C" detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC BAND "D" SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm carbon resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to band "D" - broadcast position.

3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

4th - Set the calibrated dial of the receiver to 1500 KC.

5th - Adjust the BC band "D" oscillator shunt compensator and then, the BC band "D" R.F. stage shunt compensator and BC detector shunt compensator for maximum signal output.

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ADJUSTMENT OF BC BAND "D" OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - Adjust the BC band "D" oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the oscillator series trimmer, re-adjust the carrier of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and then, re-adjust the BC band "D" shunt compensators as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 190 SERIES

Line Voltage 118 - Input Current .74 Amp.
No Signal Input - Wave Band Switch - Right
A.T.C. Toggle Control Switch "ON"

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6K7	R.F.	229	7.8	3	89
6A8	1st Det.-Osc.	229	3.1	3	78
6K7	Int. Freq.	228	5.8	4	88
6K7	A.T.C.	30*	.15	--	6
6H6	2nd Det.	---	---	--	--
	A.V.C.	---	---	17	--
6F5	1st Aud.	154*	.9	1	--
6F6	P.P. 2nd Aud.	212	22.0	15	217
5Z4	Rectifier	---	80.0 TOTAL	--	--

6A8 Osc. Anode Voltage -- 166 and current -- 3.7 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS
1st (#20.7) 372 2nd (#20.4) 232

Voltage across speaker field	....	140 volts
" " 25,000 ohm 1 watt resistor	(#30.33)..........	133 "
" " 25,000 " 1/2 " "	(#30.41)...........	72 "
" " 5,000 " 1/3 " "	(#30.1)............	14 "
" " 2,000 " 1/3 " "	(#30.15)...........	6 "
" " 5,000 " 1/3 " "	(#30.1) **	22 "

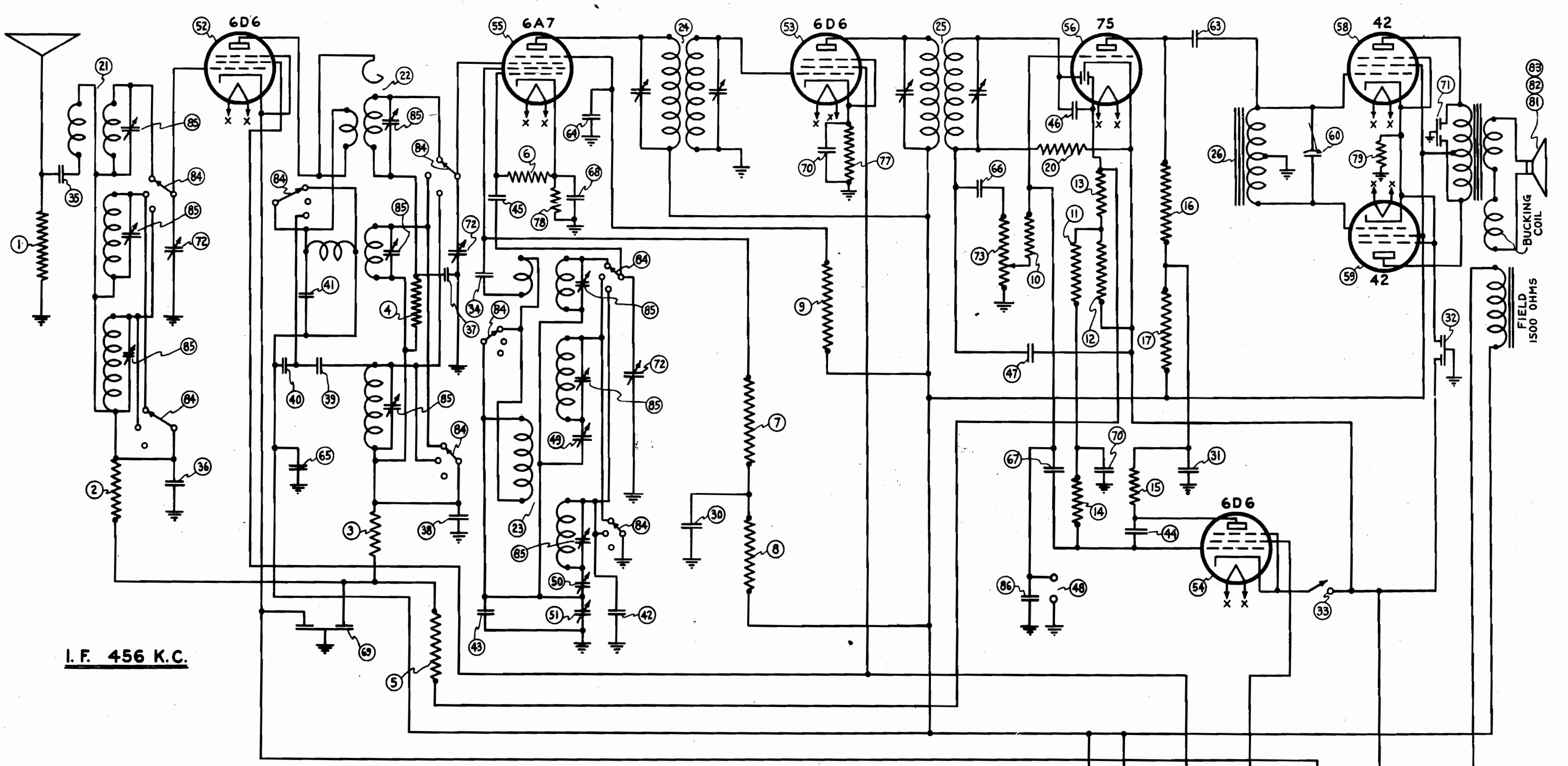
** Resistor in series with Osc. & 1st A.F. "B" Supply

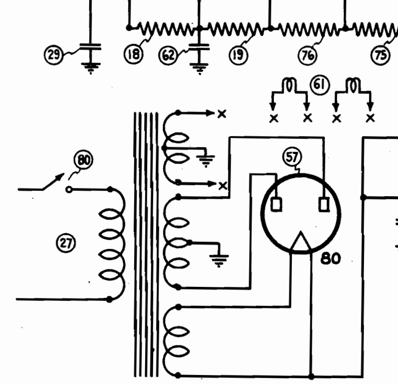
D.C. RESISTANCE VALUES

	PRIMARY	SECONDARY
Speaker input transformer	392 ohms	.09 ohms
" field coil	1,540 "	
" voice coil	1.9 "	
" bucking coil	.26 "	
Audio Coupling Choke (#40.7)	2,440 "	
R.F. plate circuit choke (#3216)	42.5	

MODEL 1583
Schematic

FADA RADIO & ELECTRIC CORP.



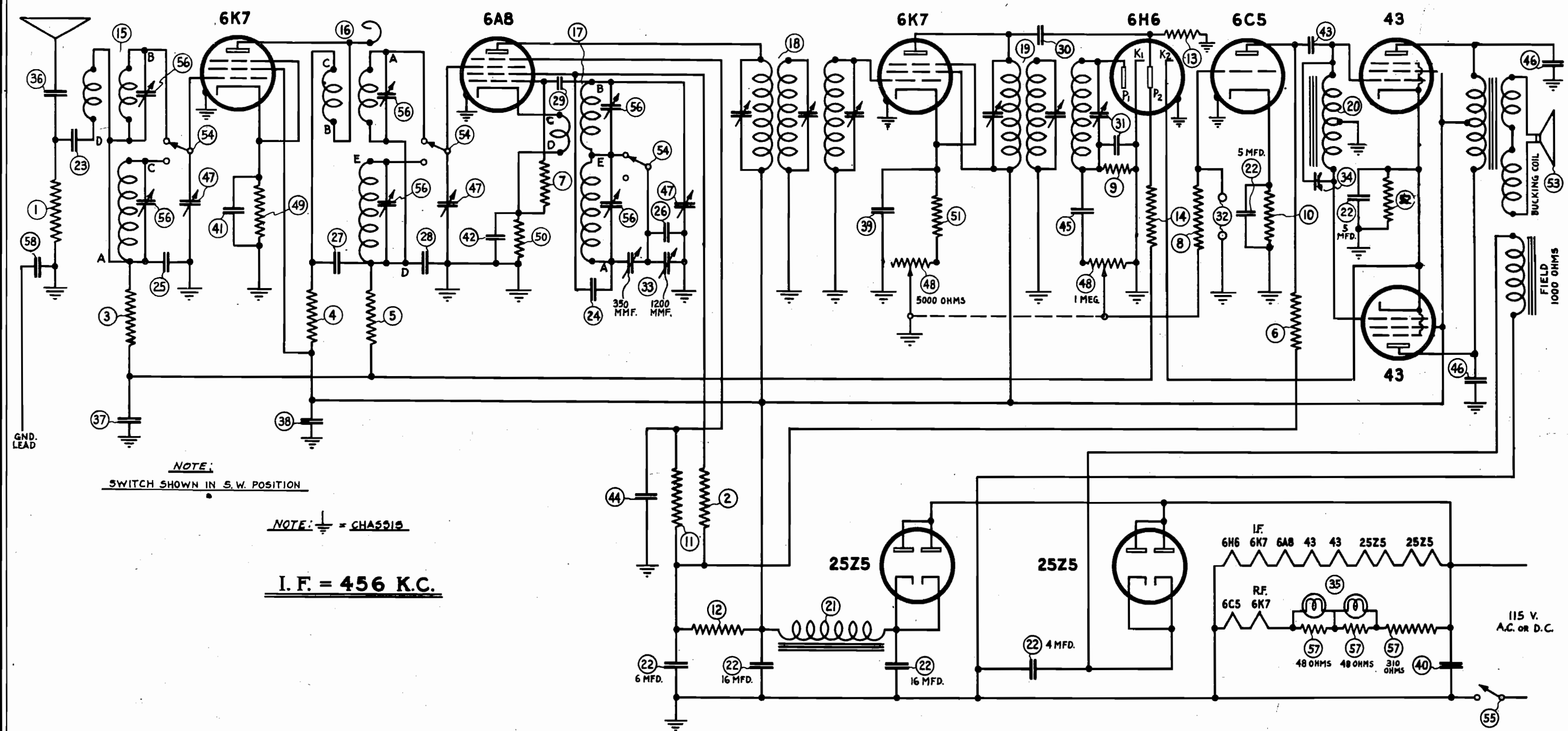


REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.2	CARB. RES. - 10,000 OHM - 1/3 WATT - 10%	23	2033-A	OSCILLATOR COIL	45	15.3	MICA COND. - .0001 MFD. - 10%	67	10.4	TUBULAR COND. - .01 MFD. - 200 V.
2	30.4	" " 250,000 " 1/3 " "	24	6B79	1st. I.F. COIL - 456 K.C.	46	15.3	" " .0001 " "	68	10.5	" " .05 " 200 V.
3	30.4	" " 250,000 " 1/3 " "	25	6B80	2nd. I.F. COIL - 456 K.C.	47	15.1	" " .00025 " "	69	10.6	DUAL " " .05 " 200 V.
4	30.8	" " 100,000 " 1/3 " "	26	40.7	AUDIO COUPLING CHOKE	48	125.1	PHONO JACK	70	10.6	" " " .05 " 200 V.
5	30.6	" " 1 MEG. 1/3 " "	27	40.6	POWER TRANS. - 115 V. 50-60 ~	49	25.7	PADDING COND. - 500 MMF	71	10.17	" " " .001 " 600 V.
6	30.3	" " 50,000 OHM - 1/3 " "	28	20.7	ELECTRO. COND. - 12 MFD. 550 W.V. WET	50	25.7	" " 200 "	72	25.30	VARIABLE COND.
7	30.17	" " 10,000 " 1/2 " "	29	20.4	" " 8 " 450 " " "	51	25.13	" " SINGLE-650 MMF	73	50.7	VOLUME CONTROL - 1 MEG.
8	30.17	" " 10,000 " 1/2 " "	30	20.5	" " 2 " 450 " " DRY	52		TUBES - 6D6	74	130.10	WIRE RES. - 150 OHMS - 10% 1/2 FX
9	30.14	" " 50,000 " 1/2 " "	31	20.5	" " 2 " 450 " " "	53		" 6D6	75	130.11	" " 200 " " "
10	30.3	" " 50,000 " 1/3 " "	32	20.6	DUAL " " 4 " 25 " " "	54		" 6D6	76	130.12	" " 750 " " "
11	30.5	" " 500,000 " 1/3 " "	33	45.5	SNAP SW. - AUTO. TONE REG.	55		" 6A7	77	130.3	" " 1000 " " "
12	30.5	" " 500,000 " 1/3 " "	34	15.7	MICA COND. - .002 MFD. - 10%	56		" 75	78	130.2	" " 350 " " "
13	30.5	" " 500,000 " 1/3 " "	35	15.7	" " .002 " "	57		" 80	79	130.9	" " 315 " 1 WATT
14	30.6	" " 1 MEG. 1/3 " "	36	15.6	" " .0025 " 3%	58		" 42	80		"ON-OFF" SW. ON TONE CONTROL
15	30.6	" " 1 MEG. 1/3 " "	37	15.6	" " .0025 " "	59		" 42	81	105.7	SPEAKER (1583 H)
16	30.11	" " 25,000 OHM 1/3 " "	38	15.6	" " .0025 " "	60	55.2	TONE CONTROL WITH "ON-OFF" SW.	82	105.17	" (1583 J)
17	30.11	" " 25,000 " 1/3 " "	39	15.14	" " 5 MMF. 10%	61	120.3	PILOT LIGHTS	83	105.12	" (1583 JK)
18	30.13	" " 20,000 " 1 " "	40	15.15	" " .0025 MFD. "	62	10.11	TUBULAR COND. - .1 MFD. - 400 V.	84	45.6	BAND SWITCH
19	30.13	" " 20,000 " 1 " "	41	15.8	" " 40 MMF. 5%	63	10.7	" " .05 " 400 V.	85		MIN. ADJ. ON COILS
20	30.19	" " 200,000 " 1/3 " "	42	15.8	" " 40 " "	64	10.7	" " .05 " 400 V.	86	15.3	MICA COND. - .0001 MFD. - 10%
21	2031-C	ANTENNA COIL	43	15.13	" " .00075 MFD. 10%	65	10.14	" " .25 " 400 V.	87		
22	4294	R.F. COIL	44	15.13	" " .00075 " "	66	10.4	" " .01 " 200 V.	88		

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 1583
DRAWN BY JD DATE 3-9-35
CHECKED RLW APP. [illegible] CHIEF ENG.

MODEL 192
Schematic

FADA RADIO & ELECTRIC CORP.

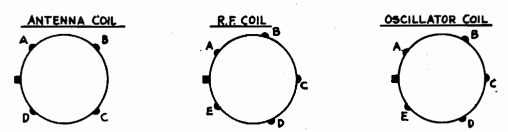


NOTE: SWITCH SHOWN IN S.W. POSITION

NOTE: ⏚ = CHASSIS

I. F. = 456 K.C.

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.2	CARB. RES. - 10,000 OHM - 1/3 W. ±10%	23	15.7	MICA COND. - .002 MFD. -10%	45	10.4	TUBULAR COND. - .01 MFD. - 200 V.			
2	30.2	" " 10,000 " " " " "	24	15.7	" " .002 " " "	46	10.17	" " DUAL - .001 " 600 V.			
3	30.20	" " 250,000 " " " "20%	25	15.6	" " .0025 " " 3%	47	25.46	VARIABLE COND.			
4	30.30	" " 1,400 " " " "10%	26	15.21	" " .003 " " 5%	48	50.12	VOL. CONTROL - DUAL - 5000 OHM - 1 MEG.			
5	30.32	" " 25,000 " " " "20%	27	15.2	" " .0005 " "10%	49	130.5	WIRE RES. - 250 OHMS 10% ½ FX.			
6	30.11	" " 25,000 " " " "10%	28	15.20	" " .00275 " " 3%	50	130.5	" " 250 " " " "			
7	30.3	" " 50,000 " " " " "	29	15.3	" " .0001 " "10%	51	130.6	" " 500 " " " "			
8	30.26	" " 50,000 " " " "20%	30	15.3	" " .0001 " " "	52	130.9	" " 315 " " 1 "			
9	30.5	" " 500,000 " " " "10%	31	15.1	" " .00025 " " "	53	105.19	SPEAKER - 1000 OHMS			
10	30.15	" " 2,000 " " " " "	32	125.1	PHONO JACK	54	45.15	BAND SWITCH			
11	30.10	" " 30,000 " " " " "	33	25.43	PADDING COND. - 350 - 1200 MMF.	55		ON-OFF SW. ON TONE CONT. (34)			
12	30.12	" " 4,000 " " " " "	34	55.2	TONE CONTROL WITH "ON-OFF" SW.	56		MIN. ADJ. ON COILS			
13	30.22	" " 1 MEG " " " "20%	35	120.3	PILOT LIGHTS 6.-8.V. .15 A.	57	115.10	LINE RESISTOR - 48-48-310 OHMS			
14	30.28	" " 2 " " " " "	36	10.18	TUBULAR COND. - .002 MFD. - 200 V.	58	10.23	TUBULAR COND. - .006 - 200 V.			
15	4579	ANTENNA COIL	37	10.26	" " .02 " " "						
16	4580	R. F. COIL	38	10.2	" " .1 " " "						
17	4581	OSCILLATOR COIL	39	10.2	" " .1 " " "						
18	4489C	1ST I. F. COIL	40	10.2	" " .1 " " "						
19	4490C	2ND I. F. COIL	41	10.5	" " .05 " " "						
20	40.7	AUDIO COUPLING CHOKE	42	10.5	" " .05 " " "						
21	40.3	CHOKE COIL - 200 OHMS	43	10.5	" " .05 " " "						
22	20.32	ELECTRO. COND. 6-16-16-4 MFD. 100 W.V. 5-5 MFD. 25 W.V.	44	10.5	" " .05 " " "						



ANTENNA COIL: A-B = .051 OHMS, A-C = 4.785 ", A-D = .341 "

R.F. COIL: D-A = .0875 OHMS, D-E = 4.735 ", B-C = 5.785 "

OSCILLATOR COIL: C-D = .415 OHMS, E-A = 3.915 ", E-B = .045 "

1ST I.F. TRANS.
PRI. = 8.5 OHMS
LINK = 13.0 "
SEC. = 13.0 "

2ND I.F. TRANS.
PRI. = 8.5 OHMS
LINK = 13 "
SEC. = 13 "

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 192
DRAWN BY JB | DATE 6-29-35
CHECKED RLW | APP. FFS

MODEL 192
Socket, Trimmers
Alignment, Voltage

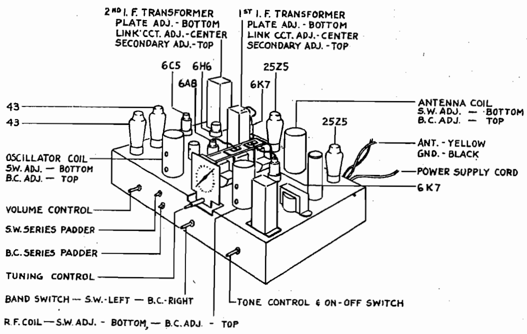
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 192 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.



ADJUSTMENT OF THE I.F. CONDENSERS

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.
2nd - Disconnect the control grid lead from the 6A8 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A8 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier output to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance. From a fidelity standpoint the best procedure for aligning the I.F. system is to adjust the I.F. condenser connected across the secondary winding feeding into the diode (2nd detector), then the link circuit condenser and finally the primary circuit. The same procedure is to be followed in adjusting the 1st I.F. transformer. Do not adjust the I.F. condensers at random but follow the above procedure of alignment carefully.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the signal generator connection from the control grid of the 6A8 tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 15 MC.

4th - Turn the wave band selector switch to the left - short wave position - set the calibrated dial of the receiver to read 15 MC.

5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in". To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting even with a greater signal generator output, the S.W. oscillator shunt compensator has been improperly adjusted and it will be necessary to re-adjust to the proper peak. After re-adjusting, check to see that the image frequency comes in at 15.9 MC. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original reading.

6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (15.9 MC) to determine that both compensators have been adjusted to the correct peak (See Paragraph 5).

ADJUSTMENT OF S.W. OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 6 MC.

2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.

3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator, and then, S.W. RF stage shunt compensator and S.W. detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to the right - broadcast position.

3rd - Adjust the carrier frequency to 1500 KC.

4th - Set the calibrated dial of the receiver to read 1500 KC.

5th - Adjust the BC oscillator shunt compensator for maximum signal output.

6th - Adjust the BC RF stage shunt compensator and the BC detector shunt compensator for maximum signal output.

ADJUSTMENT OF BC OSCILATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - With the aid of a bakelite type screw driver, adjust the BC oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the BC oscillator series trimmer, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust BC oscillator shunt compensator, and then, BC RF stage shunt compensator and BC detector shunt compensator for maximum signal output, as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 192 SERIES

Line Voltage 118 - Input Current .81 Amp.
No Signal Input - Wave Band Switch - Right.

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6K7	R.F.	99	8.8	3	111
6A8	1st Det.Osc.	113	1.0	1	49
6K7	I.F.	107	3.3	7	107
6H6	{ 2nd Det.	---	---	-	---
	{ AVC	---	---	16	---
6C5	1st Aud.	62*	1.2	2	---
43	P.P. 2nd Aud.	91	20.0	16	98
25Z5	"B" Rectifier	---	67.0 TOTAL	--	---
25Z5	Spk.Rectifier	---	77.0 TOTAL	--	---

6A8 Osc. Anode Voltage -- 78 and current -- 1.4 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER (#20.32)

1st section	2nd section
130	114

Voltage across speaker field.................................... 85 volts
" " filter choke (#40.3)............................ 16 "
" " 4,000 ohm resistor (#30.12)........................ 17 "
" " 30,000 ohm resistor (#30.10)...................... 47 "

D.C. RESISTANCE VALUES

	PRIMARY	SECONDARY
Speaker input transformer	710 ohms	.34 ohms
" field coil	1,000 "	
" voice coil	2.05 "	
" bucking coil	.35 "	
Audio coupling choke (#40.7)	2,420 "	

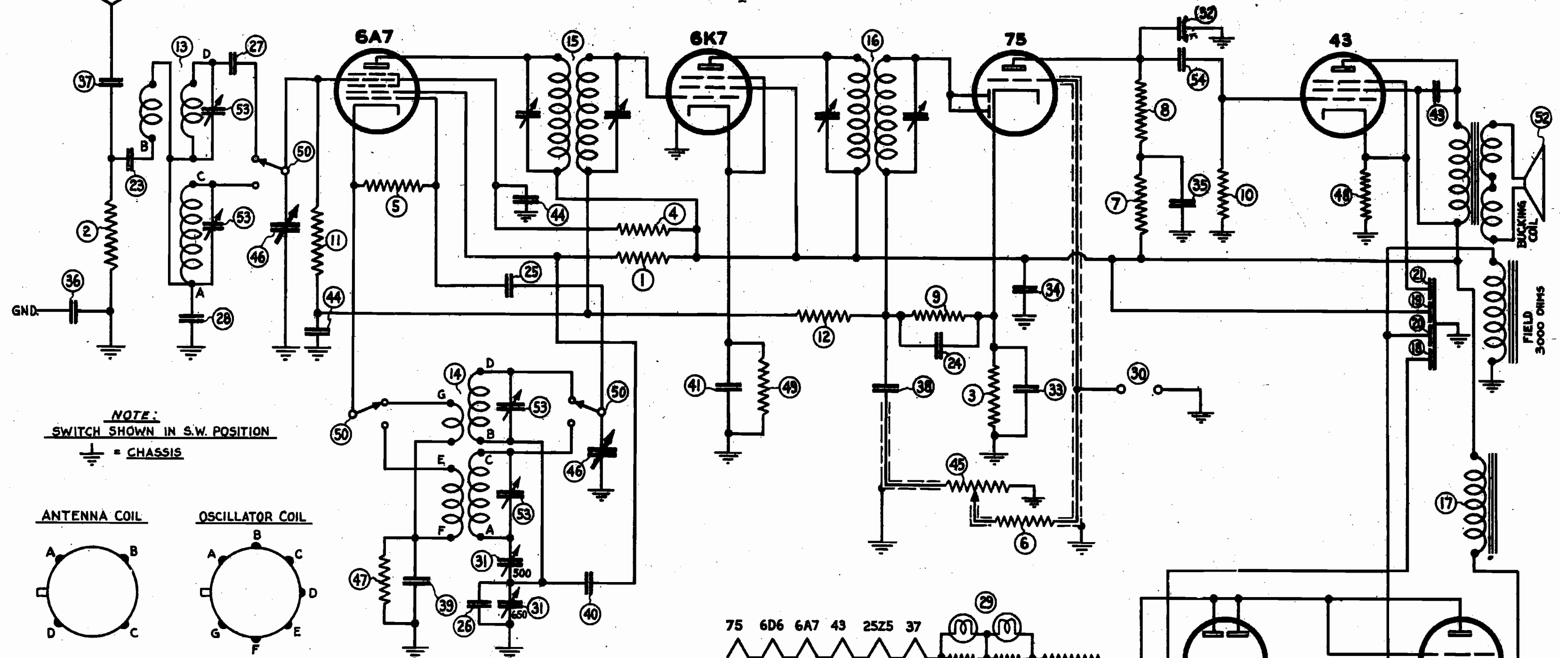
FORM S-2140
JUNE 26, 1935

SERVICE DIVISION

FADA RADIO & ELECTRIC CORP.

MODEL 1462
Two Types
Schematic

NOTE:
In some receivers 6D6 is used instead of 6K7
and 37 is used in place of 6C5.



ANTENNA COIL
A - B = .65 OHMS
A - C = 5.0 "
A - D = .02 "

OSCILLATOR COIL
A - C = 2.7 OHMS
B - D = .03 "
F - E = .9 "
F - G = .6 "

REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.1	CARB. RES. - 5,000 OHMS - 1/3 W. ± 10%	23	15.2	MICA COND. - .0005 MF. ± 10%	45	50.1	VOLUME CONTROL - 1/2 MEG.
2	30.31	" " 10,000 " " " 20%	24	15.2	" " .0005 " "	46	25.2	VARIABLE COND.
3	30.31	" " 10,000 " " " "	25	15.3	" " .0001 " "	47	130.2	WIRE RES. - 350 OHMS 1/2 W. FX.
4	30.7	" " 15,000 " " " 10%	26	15.19	" " .0015 " "	48	130.1	" " 625 " " " "
5	30.3	" " 50,000 " " " "	27	15.5	" " .002 " 3%	49	130.3	" " 1000 " " " "
6	30.26	" " 50,000 " " " 20%	28	15.6	" " .0025 " "	50	45.1	BAND SWITCH
7	30.26	" " 50,000 " " " "	29	120.1	PILOT LIGHTS 6-8 V. .25 A.	51		ON-OFF SW. ON VOL. CONT. (45)
8	30.20	" " 250,000 " " " "	30	125.1	PHONO JACK	52	105.1	SPEAKER - 3,000 OHMS
9	30.23	" " 500,000 " " " "	31	25.1	PADDING COND. - 650 - 500 MMF.	53		MIN. ADJ. ON COILS
10	30.23	" " 500,000 " " " "	32	55.1	TONE CONTROL	54	10.4	TUBULAR COND. - .01 MF. - 200 V.
11	30.22	" " 1 MEG. " " "	33	10.12	TUBULAR COND. - 1.0 MF. - 200 V.			
12	30.22	" " 1 " " " "	34	10.2	" " .1 " " "			
13	2026	ANTENNA COIL	35	10.2	" " .1 " " "			
14	3116	OSCILLATOR "	36	10.3	" " .006 " 400 "			
15	3B79	1ST I. F. "	37	10.4	" " .01 " 200 "			
16	3B80	2ND. I. F. "	38	10.4	" " .01 " " "			
17	40.1	CHOKE " 300 OHMS	39	10.5	" " .05 " " "			
18	20.1	ELECTRO. COND. BLOCK - 16 MF. - 100 WV	40	10.5	" " .05 " " "			
19	20.1	" " " 16 " 100 "	41	10.5	" " .05 " " "			
20	20.1	" " " 4 " 100 "	42	10.5	" " .05 " " "			
21	20.1	" " " 4 " 25 "	43	10.10	" " .01 " 400 "			
22	115.1	LINE RESISTOR - 120 - 38 - 38 OHMS	44	10.6	" " DUAL .05 " 200 "			

1ST I.F. TRANS.
PRI. - 14.5 OHMS
SEC. - 14.5 "

2ND I.F. TRANS.
PRI. - 14.5 OHMS
SEC. - 14.5 "

I.F. = 456 K.C.

FADA RADIO & ELECTRIC CO. LONG ISLAND CITY, N.Y.	
MODEL 1462	
DRAWN BY	DATE 7-17-35
CHECKED BY	APP. RFS

MODEL 1462
Two Types
Socket, Trimmers
Alignment, Voltage

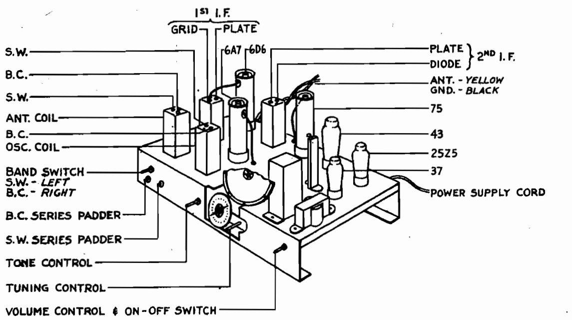
FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR

MODEL 1462 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC, 600 KC, 1500 KC, 6 MC and 15 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position to insure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.



ADJUSTMENT OF THE I.F. CONDENSERS

The four (4) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Disconnect the control grid lead from the 6A7 tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 tube, and the low potential side to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF S.W. SHUNT COMPENSATORS

The compensators are located as indicated on the sketch.

1st - Remove the signal generator connection from the control grid of the 6A7 tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 15 MC.

4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.

5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest "in." To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 15.9 MC. If no signal can be heard at this setting, even with a greater signal generator output, the S.W. oscillator shunt compensator has been improperly adjusted and it will be necessary to return the dial to 15 MC and adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at 15.9 MC on the receiver dial. It is well to bear in mind throughout these adjustments that with the same signal input to the receiver, the image response point should be weaker than the original (fundamental) signal frequency.

6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. detector shunt compensator for maximum signal output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES PADDER

1st - Adjust the carrier frequency output of the signal generator to 6 MC.

2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.

3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series padder (see sketch) until a maximum output signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum output signal.

4th - Having determined the maximum peak of the S.W. oscillator series padder, re-adjust the carrier frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC and re-adjust S.W. oscillator shunt compensator, and then S.W. detector shunt compensator for maximum signal output; checking for image point as outlined in the foregoing instructions.

ADJUSTMENT OF BC SHUNT COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 250 mmfd. mica condenser in its place.

2nd - Turn the wave band selector switch to the right - broadcast position.

3rd - Adjust the carrier frequency to 1500 KC.

4th - Set the calibrated dial of the receiver to read 1500 KC.

5th - Adjust the BC oscillator shunt compensator for maximum signal output.

6th - Adjust the BC detector shunt compensator for maximum signal output.

ADJUSTMENT OF BC OSCILLATOR SERIES PADDER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - With the aid of a bakelite type screw driver, adjust the BC oscillator series padder (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the BC oscillator series padder, re-adjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and re-adjust the BC oscillator shunt and the BC detector shunt compensators for maximum signal output as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 1462 SERIES

Line Voltage 117 - Input Current .45 amp.
No Signal Input - Wave Band Switch - Right

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Det.-Osc.	121	2.4	3	70
6D6	Int. Freq.	117	5.3	7	117
75	1st Aud.	58*	.1	1	---
75	2nd Det.	---	---	--	---
43	2nd Aud.	99	22.0	17	107
37	Spk. Rectifier	---	26.0	--	---
25Z5	"B" Rectifier	---	42.0 TOTAL	--	---

6A7 Osc. Anode Voltage -- 100 and Current -- 3.3 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSER

1st section	2nd section
139	124

Voltage across speaker field.................................. 80 volts
" " filter choke.................................. 15 "

D.C. RESISTANCE VALUES

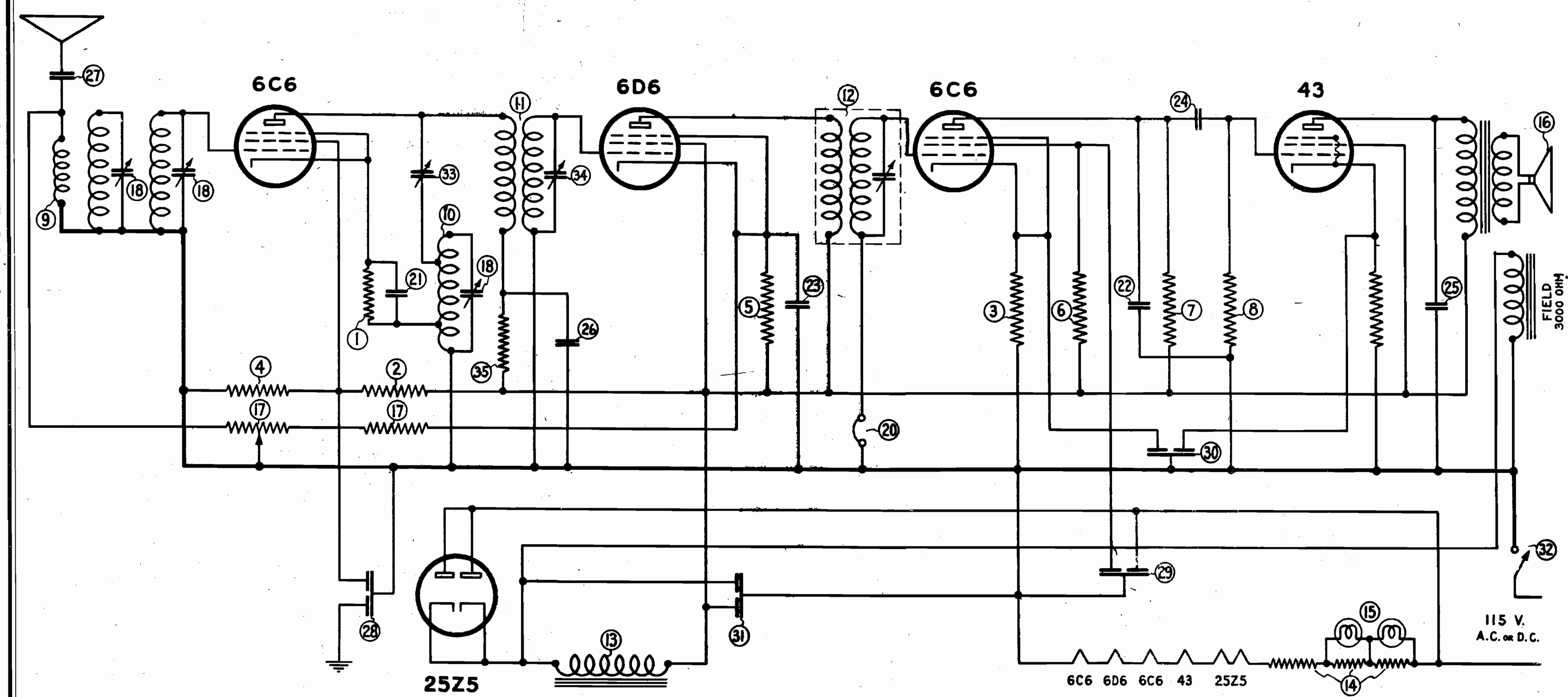
	PRIMARY	SECONDARY
Speaker input transformer	330. ohms	.42 ohms
" field coil	3,000. "	
" voice coil	3. "	
" bucking coil	.38 "	

FORM S-2146
July 1, 1935

SERVICE DIVISION

MODEL 1556
Schematic

FADA RADIO & ELECTRIC CORP.



REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.12	CARB. RES.-4,000 OHM - 1/3 W. ± 10%	23	10.5	TUBULAR COND. - .05 MF. - 200 V.
2	30.10	" " 30,000 " 1/3 W. ± 10%	24	10.4	" " .01 " " "
3	30.11	" " 25,000 " 1/3 W. ± 10%	25	10.4	" " .01 " " "
4	30.8	" " .1 MEG. 1/3 W. ± 10%	26	10.1	" " .35 " " "
5	30.8	" " .1 " 1/3 W. ± 10%	27	'0.25	" " .001 " " "
6	30.6	" " 1. " 1/3 W. ± 20%	28	10.6	" " DUAL .05 " " "
7	30.5	" " .5 " 1/3 W. ± 20%	29	10.6	" " " .05 " " "
8	30.5	" " .5 " 1/3 W. ± 20%	30	20.17	ELECTRO. COND. 2-4 MF.
9	X204-E	ANTENNA COIL (PRESELECTOR)	31	20.22	" " 8-16 "
10	X192-F	OSCILLATOR COIL	'32		ON-OFF SW. ON VOL. CONT.
11	X205	D.T. I.F. COIL	33	25.40	PADDING CONDENSER
12	X194-A	S.T. I.F. COIL	34	25.40	" "
13	40.1	CHOKE COIL - 300 OHMS	35	30.35	CARB. RES.-1000 OHM - 1/3 W. ± 20%
14	115.6	LINE RESISTOR - 140-38-38 OHMS	36		
15	120.1	PILOT LIGHT - 6.8 V. .25 A.	37		
16	105.21	SPEAKER - 3,000 OHMS	38		
17	50.11	VOL. CONT.-35,000 OHMS WITH 220 OHM STOP	39		
18	25.16	VARIABLE COND.	40		
19	130.1	WIRE RES. - 625 OHM - 1/2 F.X.	41		
20	125.1	PHONO. JACK	42		
21	15.7	MICA COND. - .002 MF.	43		
22	15.2	" " .0005 "	44		

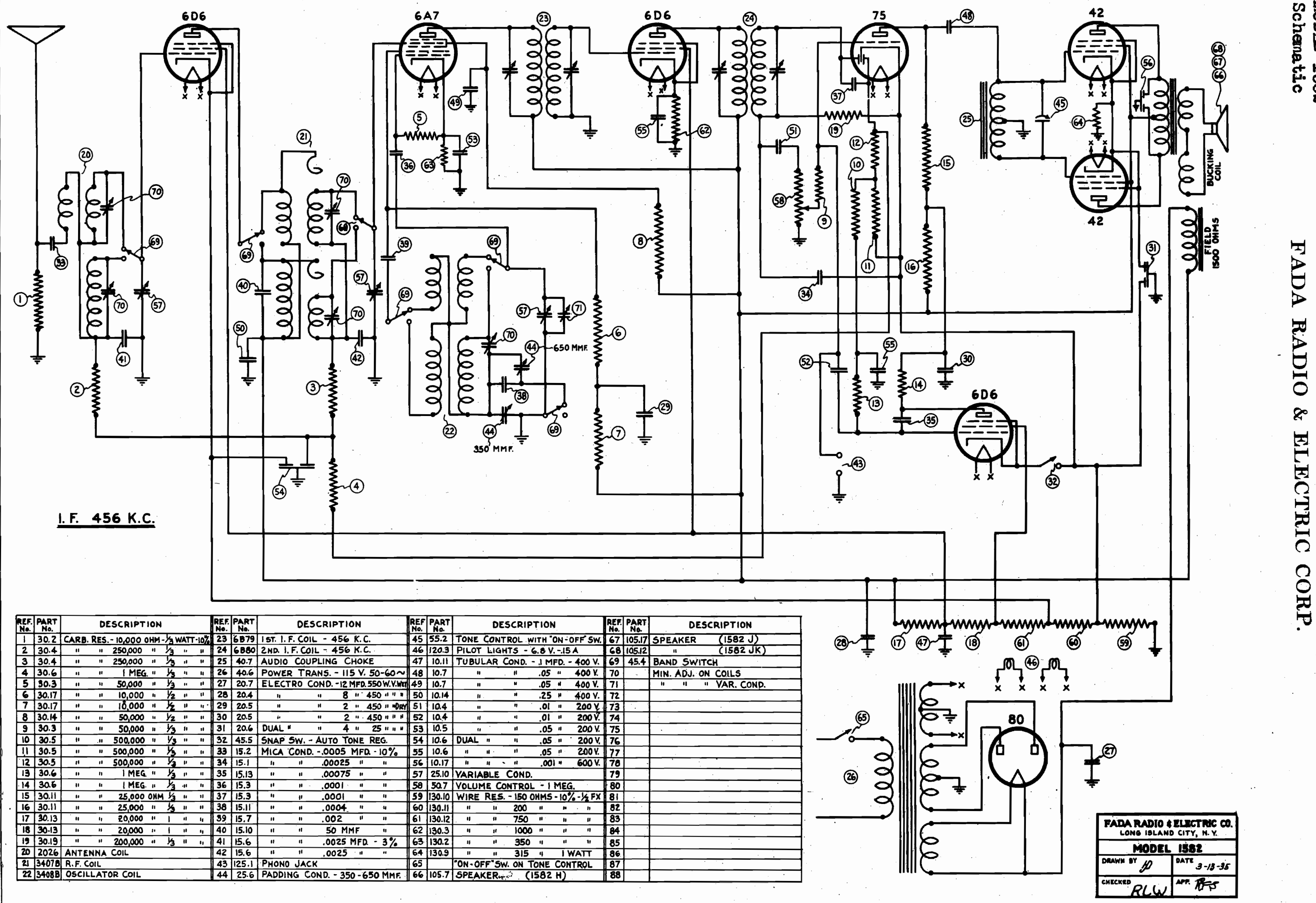
FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.

MODEL 1556

DRAWN BY [illegible] | DATE 5-24-35
CHECKED BY RLW | APPROVED BY R.F.S

MODEL 1582
Schematic

FADA RADIO & ELECTRIC CORP.



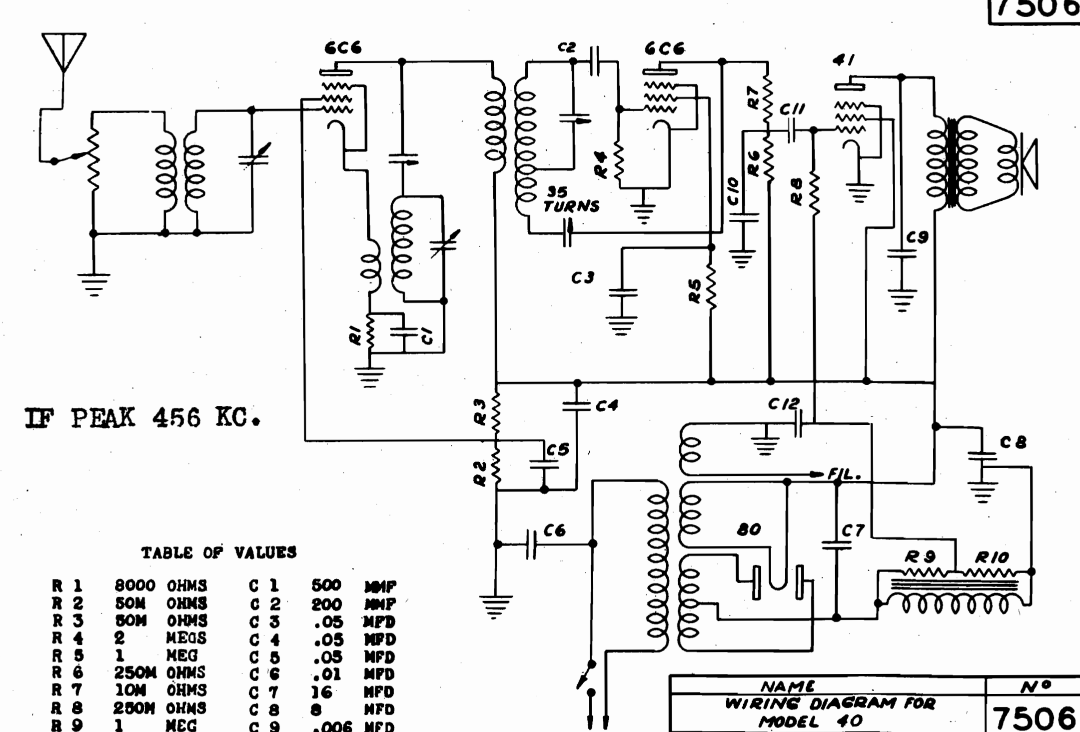
REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION	REF. No.	PART No.	DESCRIPTION
1	30.2	CARB. RES. - 10,000 OHM - 1/3 WATT - 10%	23	6B79	1ST. I.F. COIL - 456 K.C.	45	55.2	TONE CONTROL WITH "ON-OFF" SW.	67	105.17	SPEAKER (1582 J)
2	30.4	" " 250,000 " 1/3 " "	24	6B80	2ND. I.F. COIL - 456 K.C.	46	120.3	PILOT LIGHTS - 6.8 V. - .15 A	68	105.12	" (1582 JK)
3	30.4	" " 250,000 " 1/3 " "	25	40.7	AUDIO COUPLING CHOKE	47	10.11	TUBULAR COND. - .1 MFD. - 400 V.	69	45.4	BAND SWITCH
4	30.6	" " 1 MEG. " 1/3 " "	26	40.6	POWER TRANS. - 115 V. 50-60~	48	10.7	" " .05 " 400 V.	70		MIN. ADJ. ON COILS
5	30.3	" " 50,000 " 1/3 " "	27	20.7	ELECTRO COND. - 12 MFD. 550 W.V. WET	49	10.7	" " .05 " 400 V.	71		" " " VAR. COND.
6	30.17	" " 10,000 " 1/2 " "	28	20.4	" " 8 " 450 " " "	50	10.14	" " .25 " 400 V.	72		
7	30.17	" " 10,000 " 1/2 " "	29	20.5	" " 2 " 450 " " DRY	51	10.4	" " .01 " 200 V.	73		
8	30.14	" " 50,000 " 1/2 " "	30	20.5	" " 2 " 450 " " "	52	10.4	" " .01 " 200 V.	74		
9	30.3	" " 50,000 " 1/3 " "	31	20.6	DUAL " " 4 " 25 " " "	53	10.5	" " .05 " 200 V.	75		
10	30.5	" " 500,000 " 1/3 " "	32	45.5	SNAP SW. - AUTO TONE REG.	54	10.6	DUAL " " .05 " 200 V.	76		
11	30.5	" " 500,000 " 1/3 " "	33	15.2	MICA COND. - .0005 MFD. - 10%	55	10.6	" " " .05 " 200 V.	77		
12	30.5	" " 500,000 " 1/3 " "	34	15.1	" " .00025 " "	56	10.17	" " " .001 " 600 V.	78		
13	30.6	" " 1 MEG. " 1/3 " "	35	15.13	" " .00075 " "	57	25.10	VARIABLE COND.	79		
14	30.6	" " 1 MEG. " 1/3 " "	36	15.3	" " .0001 " "	58	50.7	VOLUME CONTROL - 1 MEG.	80		
15	30.11	" " 25,000 OHM 1/3 " "	37	15.3	" " .0001 " "	59	130.10	WIRE RES. - 150 OHMS - 10% - 1/2 FX	81		
16	30.11	" " 25,000 " 1/3 " "	38	15.11	" " .0004 " "	60	130.11	" " 200 " " "	82		
17	30.13	" " 20,000 " 1 " "	39	15.7	" " .002 " "	61	130.12	" " 750 " " "	83		
18	30.13	" " 20,000 " 1 " "	40	15.10	" " 50 MMF "	62	130.3	" " 1000 " " "	84		
19	30.19	" " 200,000 " 1/3 " "	41	15.6	" " .0025 MFD. - 3%	63	130.2	" " 350 " " "	85		
20	2026	ANTENNA COIL	42	15.6	" " .0025 " "	64	130.9	" " 315 " 1 WATT	86		
21	3407B	R.F. COIL	43	125.1	PHONO JACK	65		"ON-OFF" SW. ON TONE CONTROL	87		
22	3408B	OSCILLATOR COIL	44	25.6	PADDING COND. - 350-650 MMF.	66	105.7	SPEAKER (1582 H)	88		

FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODEL 1582
DRAWN BY JD DATE 3-13-35
CHECKED RLW APP.

MODEL 40
MODEL 41
Schematics

FAIRBANKS-MORSE HOME APP., INC.

7506

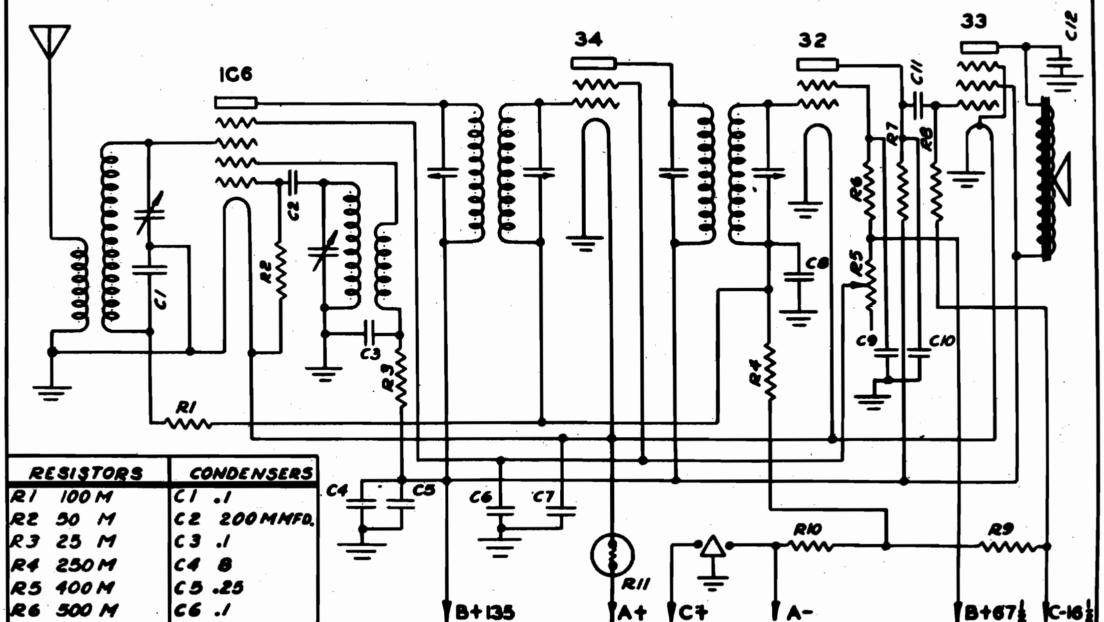


IF PEAK 456 KC.

TABLE OF VALUES

R 1	8000	OHMS	C 1	500	MMF
R 2	50M	OHMS	C 2	200	MMF
R 3	50M	OHMS	C 3	.05	MFD
R 4	2	MEGS	C 4	.05	MFD
R 5	1	MEG	C 5	.05	MFD
R 6	250M	OHMS	C 6	.01	MFD
R 7	10M	OHMS	C 7	16	MFD
R 8	250M	OHMS	C 8	8	MFD
R 9	1	MEG	C 9	.006	MFD
R10	250M	OHMS	C10	.0005	MFD
			C11	.01	MFD
			C12	.1	MFD

NAME			N°
WIRING DIAGRAM FOR MODEL 40			7506
DRAWN BY	CHECKED	SCALE	DATE
AH.	Wm.	X = 1"	6-12-38
FAIRBANKS MORSE HOME APPLIANCES, INC.			



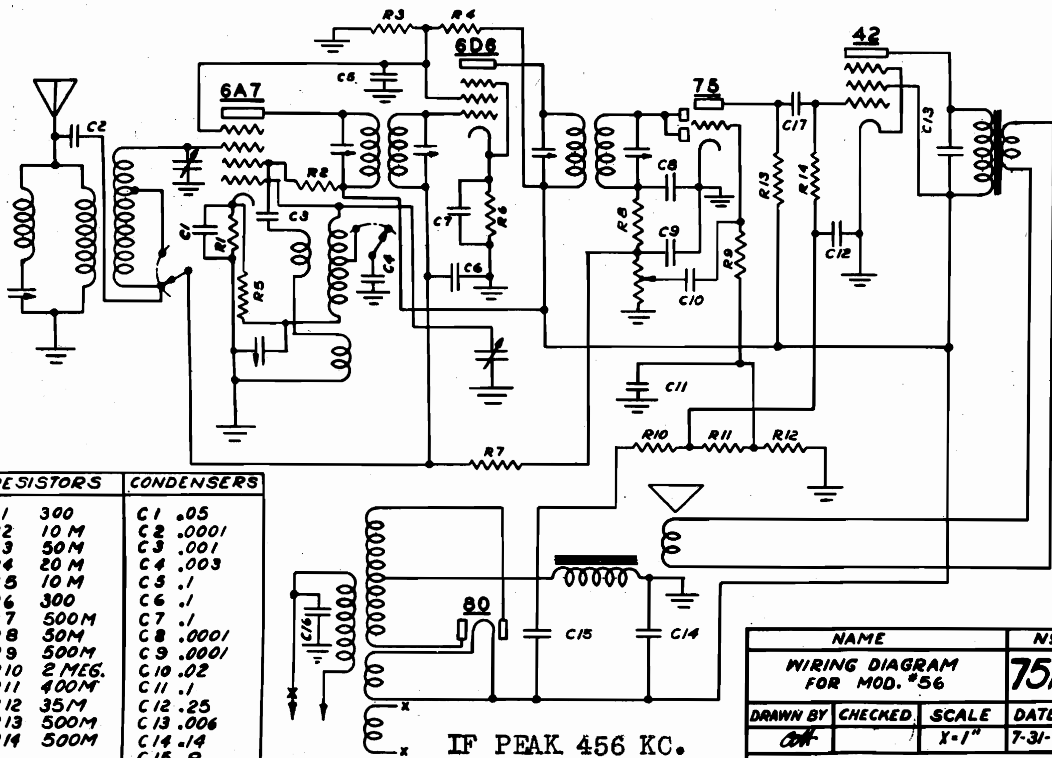
RESISTORS	CONDENSERS
R1 100 M	C1 .1
R2 50 M	C2 200 MMFD.
R3 25 M	C3 .1
R4 250 M	C4 8
R5 400 M	C5 .25
R6 500 M	C6 .1
R7 50 M	C7 .5
R8 500 M	C8 .1
R9 5 M	C9 .05
R10 1000	C10 200 MMFD.
R11 .6	C11 .02
	C12 .02

IF PEAK 456 KC.

NAME			N°
WIRING DIAGRAM FOR MODEL # 41			7521
DRAWN BY	CHECKED	SCALE	DATE
AH.	[illegible]		9-11-35
FAIRBANKS MORSE HOME APPLIANCES, INC.			

MODEL C-6
MODEL 56
Schematics

FAIRBANKS-MORSE HOME APP., INC.



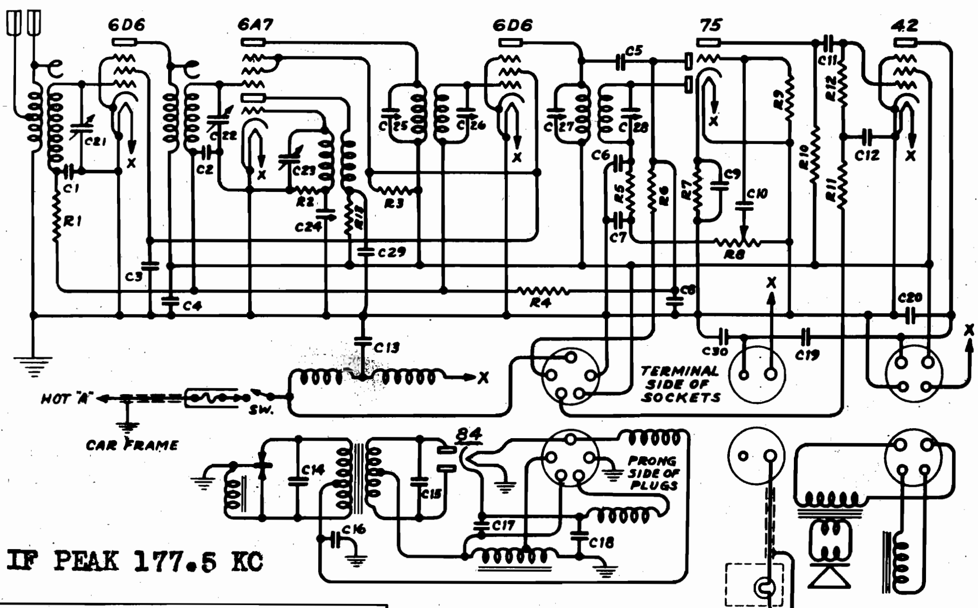
RESISTORS		CONDENSERS	
R1	300	C1	.05
R2	10 M	C2	.0001
R3	50M	C3	.001
R4	20 M	C4	.003
R5	10 M	C5	.1
R6	300	C6	.1
R7	500M	C7	.1
R8	50M	C8	.0001
R9	500M	C9	.0001
R10	2 MEG.	C10	.02
R11	400M	C11	.1
R12	35M	C12	.25
R13	500M	C13	.006
R14	500M	C14	.14
		C15	.8
		C16	.01
		C17	.02

IF PEAK 456 KC.

NAME	NO
WIRING DIAGRAM FOR MOD. #56	7512

DRAWN BY	CHECKED	SCALE	DATE
		X-1"	7-31-35

FAIRBANKS MORSE
HOME APPLIANCES, INC.



IF PEAK 177.5 KC

TABLE OF VALUES

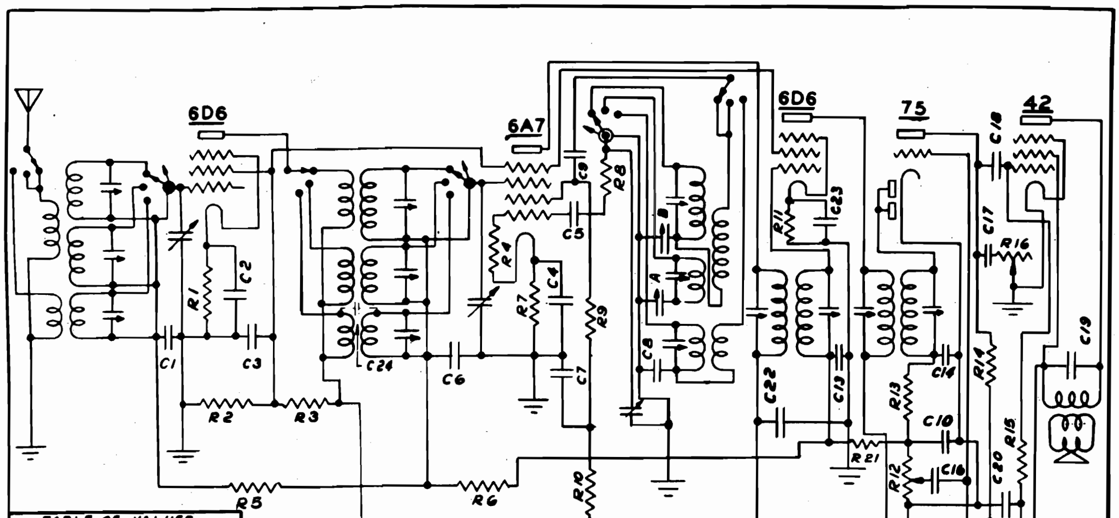
C1 -.05 MFD.	C13 -.5 MFD.	R1 -250 M OHMS
C2 -.05 MFD.	C14 -.25 MFD.	R2 -50 M OHMS
C3 -.1 MFD.	C15 -.02 MFD.	R3 -20 M OHMS
C4 -.25 MFD.	C16 -.25 MFD.	R4 -250 M OHMS
C5 -50 MMFD.	C17 -8 MFD.	R5 -25 M OHMS
C6 -200 MMFD.	C18 -8 MFD.	R6 -250 M OHMS
C7 -200 MMFD.	C19 -.02 MFD.	R7 -6000 OHMS
C8 -500 MMFD.	C20 -.006 MFD.	R8 -250 M OHM V.C.
C9 -.25 MFD	C29 -.01 MFD.	R9 -500 M OHMS
C10 -.01 MFD.	C30 -500 MMFD.	R10 -100 M OHMS
C11 -.01 MFD.		R11 -250 M OHMS
C12 -.1 MFD.	R13 -40 M OHMS	R12 -250 M OHMS

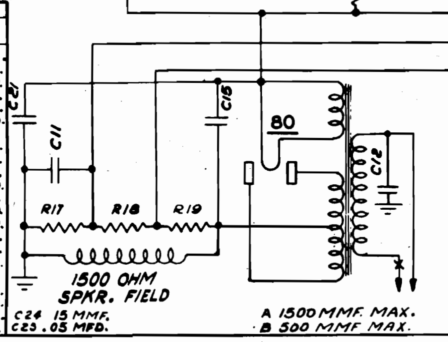
MOD. C-6
AUTO RADIO RECEIVER

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
CHICAGO, U.S.A.
SD-32335

MODEL 63
MODEL 64
Schematics

FAIRBANKS-MORSE HOME APP., INC.





IF PEAK 456 KC.

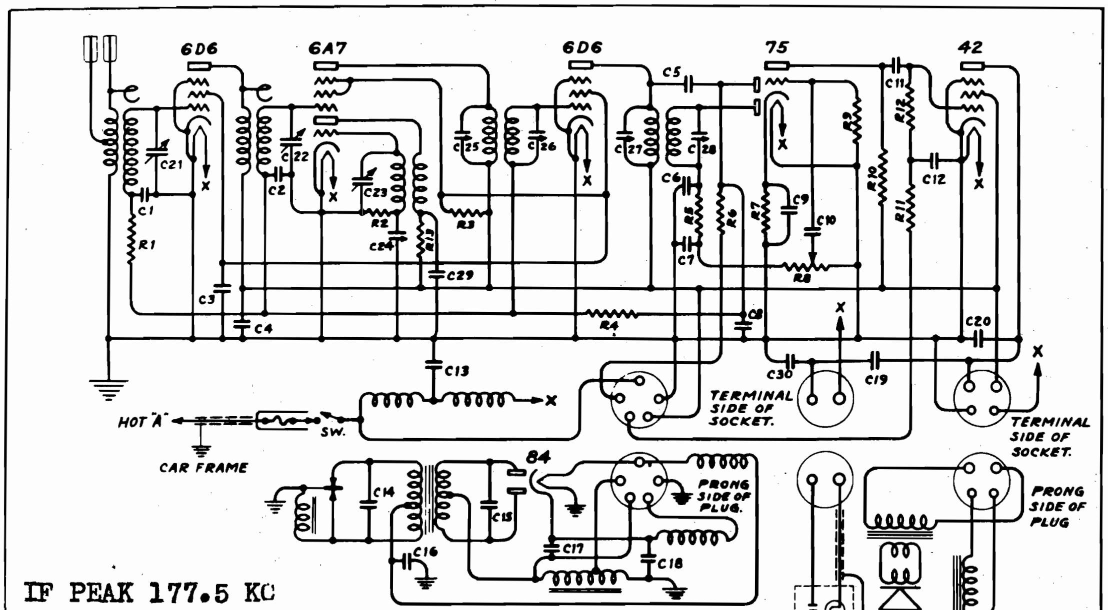
TABLE OF VALUES	
RESISTORS IN OHMS	CONDS.
R1-300-OHMS	C1 .05—MFD.
R2-50M	C2 .05—MFD.
R3-20M	C3 .05—MFD.
R4-50M	C4 .05—MFD.
R5-50M	C5 .0001-MFD.
R6-500M	C6 .05—MFD.
R7-300	C7 [illegible]—MFD
R8 100M	C8 .004-MFD.
R9-10M	C9 .001—MFD.
R10-20M	C10 .0001-MFD.
R11-300	C11 .1—MFD.
R12-500M	C12 .01—MFD.
R13-50M	C13 .05—MFD.
R14-500M	C14 .0001-MFD.
R15-500M	C15 16—MFD.
R16-500M	C16 .02—MFD.
R17-35M	C17 .006—MFD.
R18-400M	C18 .02—MFD
R19-2 MEG	C19 .006-MFD.
R20 500M	C20 .25—MFD.
R21-500M	C21 8—MFD.
	C22 .05—MFD.

C24 15 MMF.
C25 .05 MFD.

NAME		DWG. NO.
WIRING DIAGRAM FOR MOD. 63		7511
DRAWN BY	CHECKED	SCALE	DATE

DRAWN BY	CHECKED	SCALE	DATE
[illegible]		X=1"	7-24-35

FAIRBANKS MORSE
HOME APPLIANCES, INC.



IF PEAK 177.5 KC

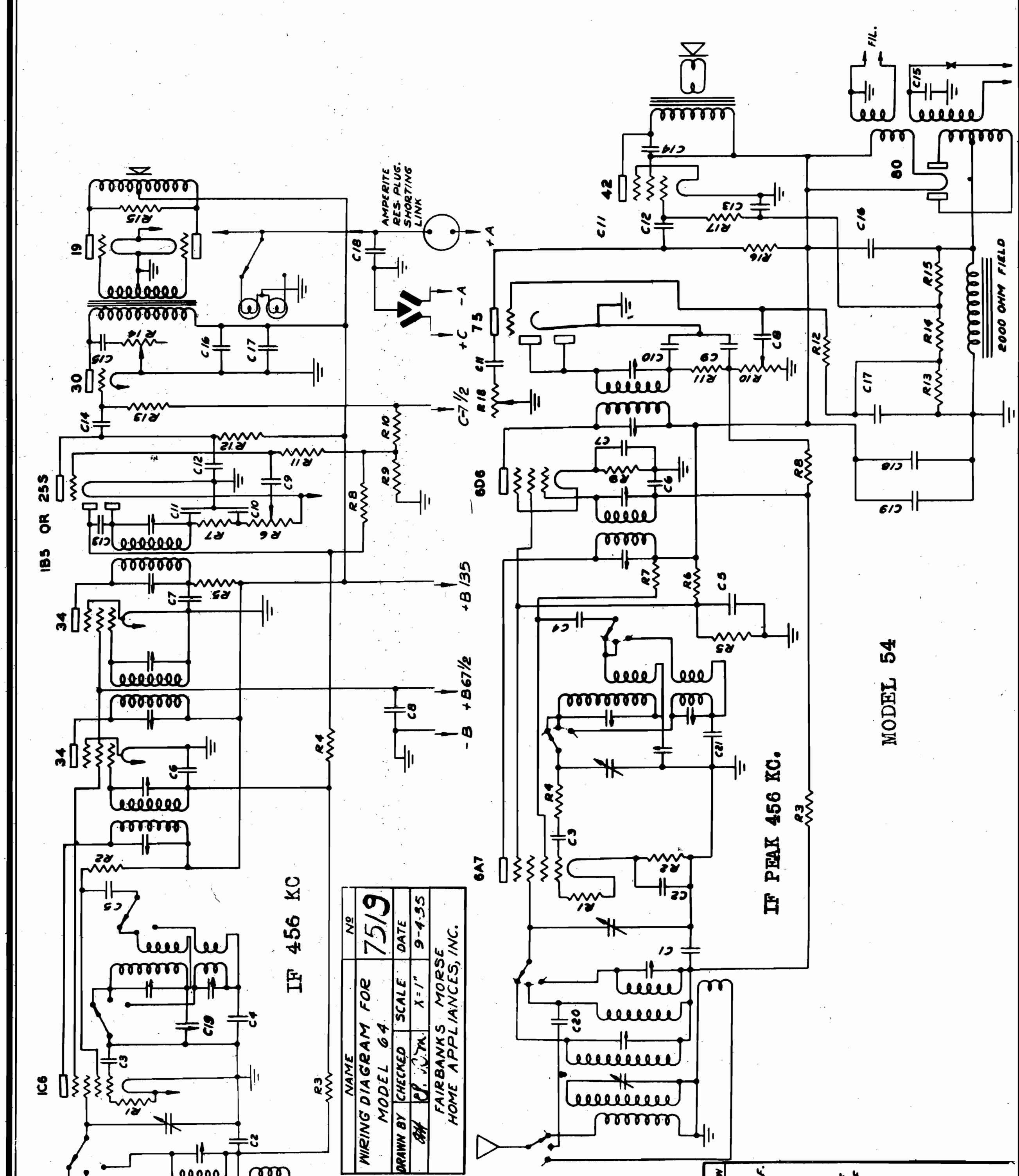
TABLE OF VALUES		
C1 .05 MFD	C13 -.5 MFD	R3-20 M OHMS
C2 .05 MFD	C14 -.25 MFD.	R4-250 M OHMS
C3 1 MFD	C15 -.02 MFD	R5 25 M OHMS
C4 25 MFD.	C16 .25 MFD	R6 250 M OHMS
C5 50 MMFD	C17 8 MFD	R7-6000 OHMS
C6 200 MMFD.	C18 8 MFD	R8-250 M OHM V.C.
C7 200 MMFD.	C19 -.02 MFD.	R9-500 M OHMS
C8 500 MMFD.	C20 -.006 MFD.	R10-100 M OHMS
C9 25 MFD.	C29 -.01 MFD	R11-250 M OHMS
C10 01 MFD	C30 -500 MMFD	R12-250 M OHMS
C11 .01 MFD.	R1 -250 M OHMS	R13-40 M OHMS
C12 .1 MFD.	R2 -50 M OHMS	

MOD. 64
AUTO RADIO RECEIVER

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
CHICAGO, U.S.A.
SD-21235

MODEL 54
MODEL 64
Schematics

FAIRBANKS-MORSE HOME APP., INC.

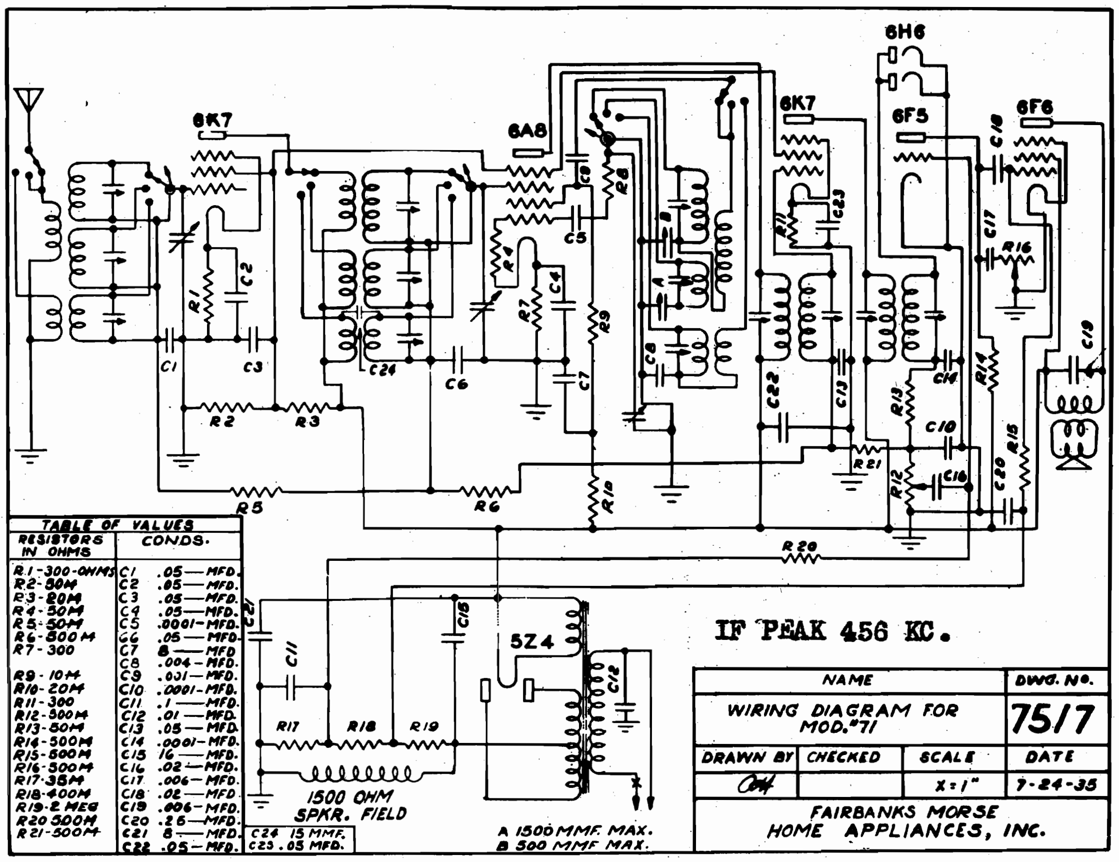


RESISTORS		CONDENSERS	
R1	50M	C1	.10
R2	10M	C2	.05
R3	50M	C3	100
R4	500M	C4	.004
R5	5M	C5	.001
R6	500M	C6	.05
R7	50M	C7	.1
R8	1MEG.	C8	.1
R9	2,500	C9	.02
R10	5M	C10	100
R11	500M	C11	100
R12	100M	C12	500
R13	500M	C13	50
R14	50M	C14	.02
R15	50M	C15	.05
		C16	.25
		C17	8
		C18	.25
		C19	800

RESISTORS		CONDENSERS IN MFD. UNLESS SHOWN	
R1	50M	C1	.05
R2	300	C2	.05
R3	500.	C3	100 MMF.
R4	100	C4	.001
R5	50M	C5	.1
R6	20M	C6	.05
R7	10M	C7	.05
R8	500M	C8	.02
R9	300	C9	100MMF
R10	500M	C10	100MMF
R11	50M	C11	.006
R12	800M	C12	.02
R13	35M	C13	.25
R14	400M	C14	.006
R15	2 MEG	C15	.01
R16	500M	C16	16
R17	500M	C17	.1
R18	500M	C18	18
		C19	.05
		C20	10MMF
		C21	.004

FAIRBANKS-MORSE HOME APP., INC.

MODEL 71
MODEL 74
Schematics



IF PEAK 456 KC.

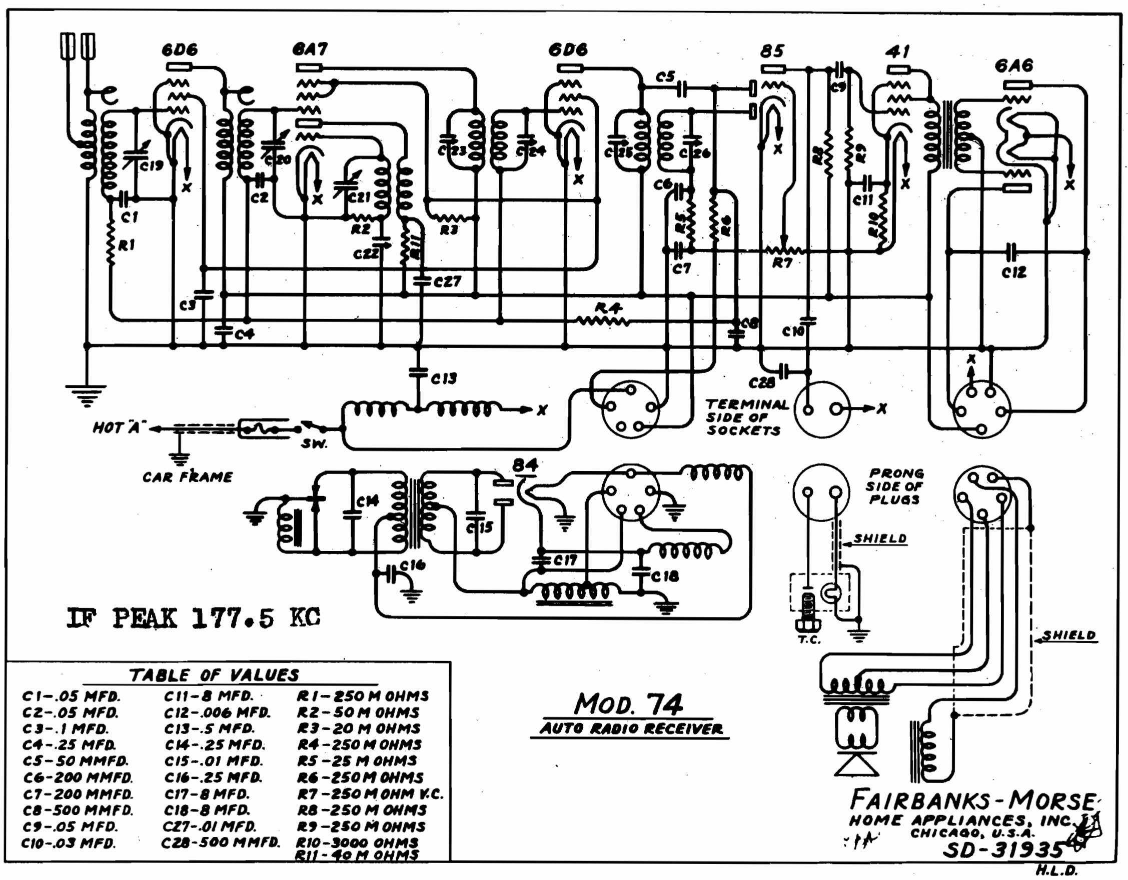
TABLE OF VALUES	
RESISTORS IN OHMS	CONDS.
R1-300-OHMS	C1 .05—MFD.
R2-50M	C2 .05—MFD.
R3-20M	C3 .05—MFD.
R4-50M	C4 .05—MFD.
R5-50M	C5 .0001-MFD.
R6-500M	C6 .05—MFD.
R7-300	C7 8—MFD
	C8 .004-MFD.
R9-10M	C9 .001-MFD.
R10-20M	C10 .0001-MFD.
R11-300	C11 .1—MFD.
R12-500M	C12 .01—MFD.
R13-50M	C13 .05—MFD.
R14-500M	C14 .0001-MFD.
R15-500M	C15 16—MFD.
R16-500M	C16 .02—MFD.
R17-35M	C17 .006-MFD.
R18-400M	C18 .02—MFD
R19-2 MEG	C19 .006-MFD.
R20 500M	C20 .25—MFD.
R21-500M	C21 8—MFD.
	C22 .05-MFD.

C24 15 MMF.
C23 .05 MFD.

NAME	DWG. No.
WIRING DIAGRAM FOR MOD. #71	75/7

DRAWN BY	CHECKED	SCALE	DATE
		X=1"	7-24-35

FAIRBANKS MORSE HOME APPLIANCES, INC.



IF PEAK 177.5 KC

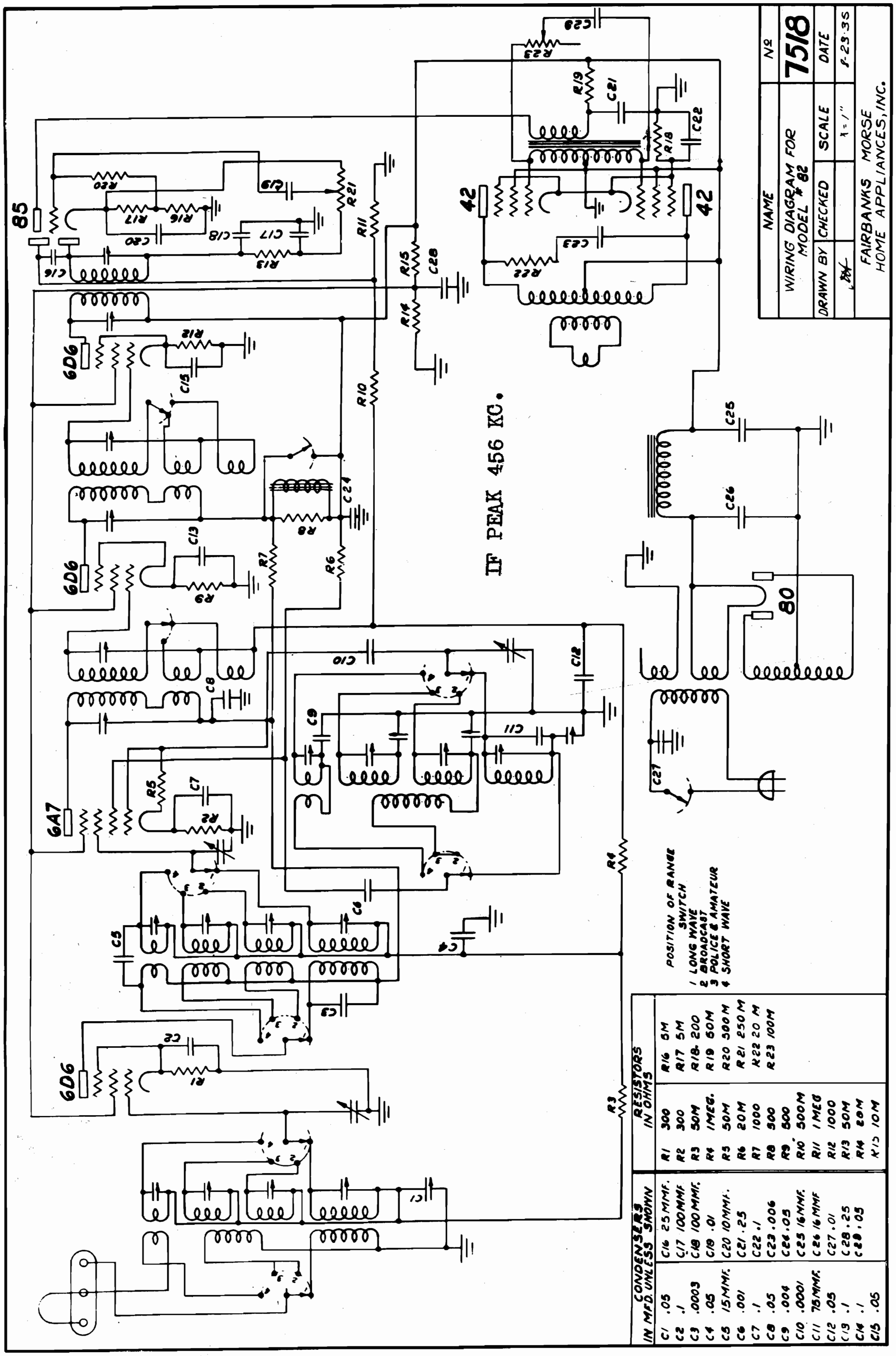
TABLE OF VALUES		
C1-.05 MFD.	C11-8 MFD.	R1-250 M OHMS
C2-.05 MFD.	C12-.006 MFD.	R2-50 M OHMS
C3-.1 MFD.	C13-.5 MFD.	R3-20 M OHMS
C4-.25 MFD.	C14-.25 MFD.	R4-250 M OHMS
C5-50 MMFD.	C15-.01 MFD.	R5-25 M OHMS
C6-200 MMFD.	C16-.25 MFD.	R6-250 M OHMS
C7-200 MMFD.	C17-8 MFD.	R7-250 M OHM V.C.
C8-500 MMFD.	C18-8 MFD.	R8-250 M OHMS
C9-.05 MFD.	C27-.01 MFD.	R9-250 M OHMS
C10-.03 MFD.	C28-500 MMFD.	R10-3000 OHMS
		R11-40 M OHMS

MOD. 74
AUTO RADIO RECEIVER

FAIRBANKS-MORSE
HOME APPLIANCES, INC.
CHICAGO, U.S.A.
SD-31935
H.L.D.

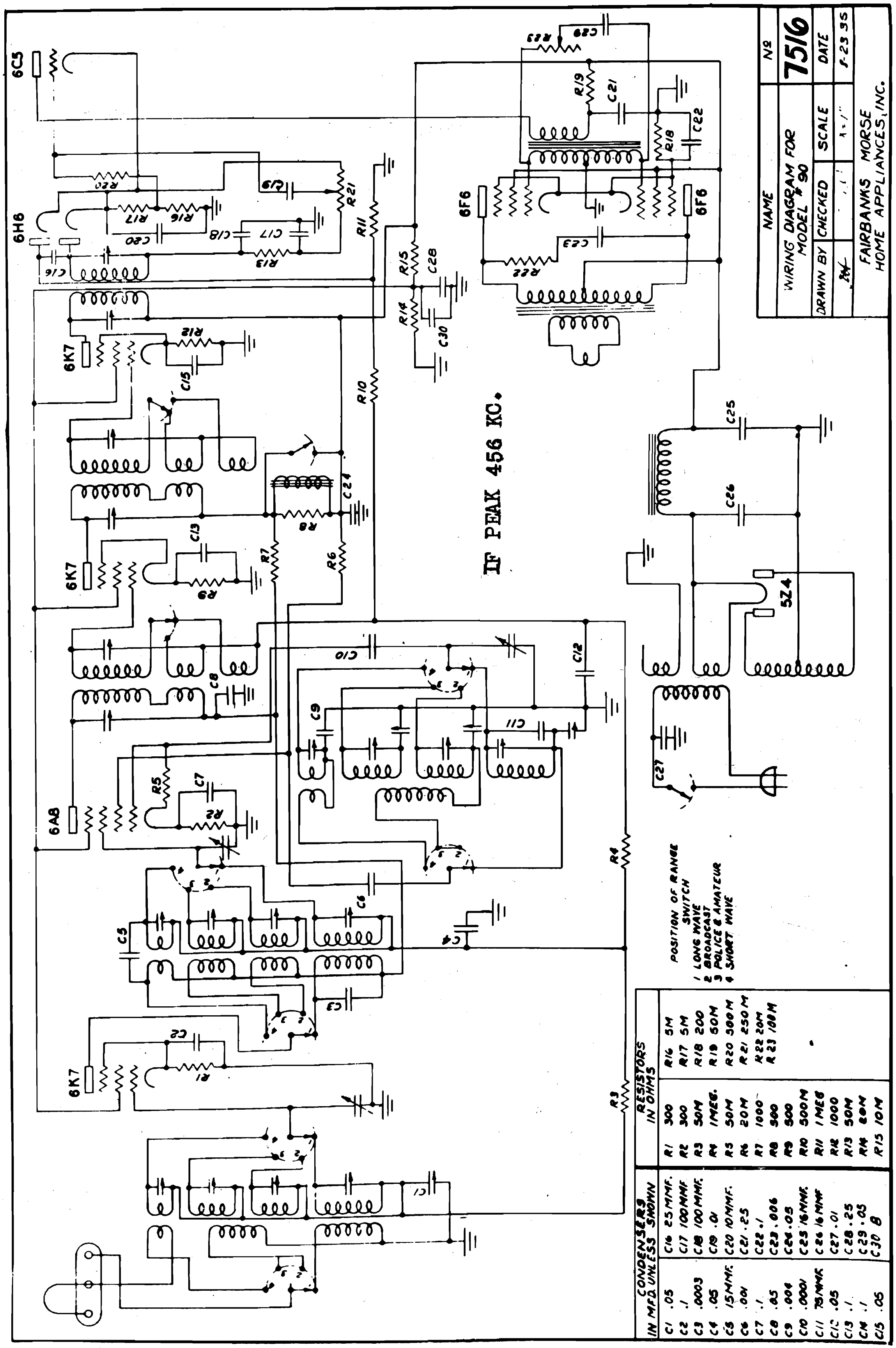
MODEL 82
Schematic

FAIRBANKS-MORSE HOME APP., INC.



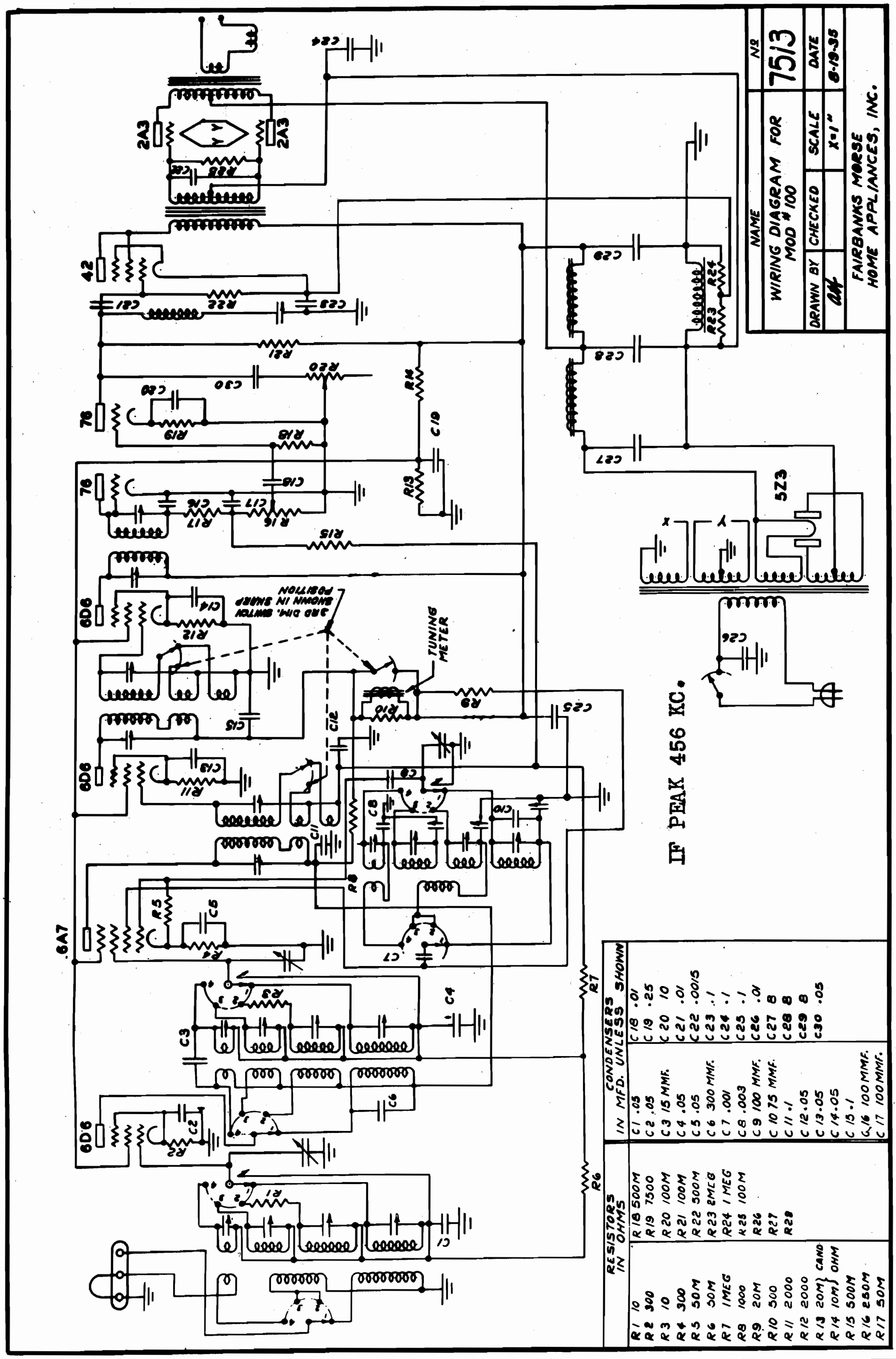
FAIRBANKS-MORSE HOME APP., INC.

MODEL 90
Schematic



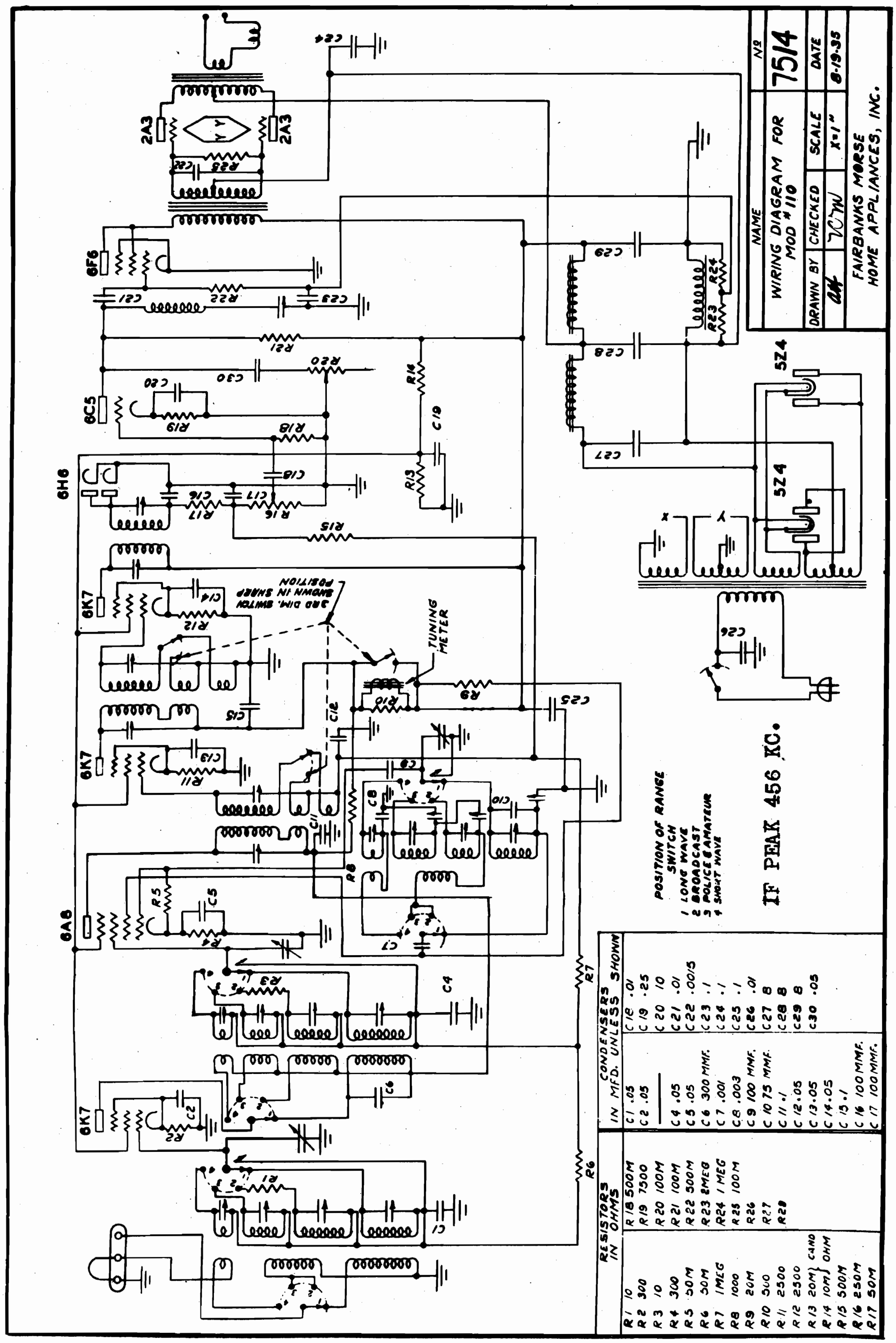
MODEL 100
Schematic

FAIRBANKS-MORSE HOME APP., INC.



MODEL 110
Schematic

FAIRBANKS-MORSE HOME APP., INC.



MODELS 6010, 6044
Chassis 60
Resistance Test
Voltage, Data

FAIRBANKS-MORSE HOME APP., INC.

RESISTANCE TESTS

These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on." The A. C. line plug must be removed from the A. C. outlet.

VOLTAGE TESTS

These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on." The antenna should be disconnected. Tune the set to a point where no signal is received.

RESISTANCE AND VOLTAGE ANALYSIS CHART

LINE VOLTAGE 115

FROM†	TO	Resistance in Ohms	MEASURED VOLTAGE B. C. Band	MEASURED VOLTAGE S. W. Band	**Meter Range in Volts	If Reading Differs More Than 10% plus or minus from Stated Value Check These Units.
6D6 Ant. R. F. Stage						
1. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Fil. Winding; Pilot Light Socket
2. Plate	Ground	55,000	217.5	217.	300	RFC-1; C-2; C-5; C-6; C-31; C-32; R-3; R-4
3. Screen	Ground	40,000	90	80	300	C-2; R-3; R-4
4. Suppressor	Ground	300	2.4	2.2	3	R-1; C-4
5. Cathode	Ground	300	2.4	2.2	3	R-1; C-4
6. Heater	Ground	0	0	0		Defective Ground
7. Grid	Ground	1,251,000				Coil; R-2; R-9; R-10; C-20
6A7 Converter						
8. Heater	Ground	0	0	0		Defective Ground
9. Plate	Ground	55,000	217.5	217	300	Coil; R-3; R-4; C-2; C-31; C-32
10. Screen G-3 G-5	Ground	40,000	90	80	300	C-2; R-3; R-4
11. Osc. Plate G-2	Ground	65,000	165	145	300	Coil; RFC-2; R-7; R-3; R-4; C-2; C-31; C-32
12. Osc. Grid G-1	Ground	50,300	*−5	*1.5	30	R-6; R-5; C-8
13. Cathode	Ground	300	*3	*4.25	30	R-5; C-8
14. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Fil. Winding; Pilot Light Socket
15. Grid	Ground	1,250,000				Switch; Coil; R-9; R-10; C-20
6D6 I. F. Stage						
16. Heater	Ground	.2	6.2 A. C.			Fil. Winding; Pilot Light Socket
17. Plate	Ground	55,000	217.5	217	300	Coil; R-3; R-4; C-2; C-31; C-32
18. Screen	Ground	40,000	90	80	300	C-2; R-3; R-4
19. Suppressor	Ground	300	2.35	2.05	3	R-19; C-19
20. Cathode	Ground	300	2.35	2.05	3	R-19; C-19
21. Heater	Ground	0	0	0		Defective Ground
22. Grid	Ground	1,750,000				Coil; R-8; R-9; R-10; C-18; C-20
6B7 Det. AVC & A. F.						
23. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Fil. Winding; Pilot Light Socket
24. Plate	Ground	305,000	*75	*75	300	R-13; R-3; R-4; C-27; C-2; C-31; C-32
25. Screen	Ground	2,055,000	*22.5	*22.5	300	R-12; R-3; R-4; C-26; C-2; C-31; C-32
26. Diode Plate	Ground	250,000				Coil; R-10; C-20
27. Diode Plate	Ground	0	0	0		Defective Ground
28. Cathode	Ground	0	0	0		Defective Ground
29. Heater	Ground	0	0	0		Defective Ground
30. Grid	Ground	2,004,890				R-11; R-16; C-21; C-33
42 Output						
31. Heater	Ground	.2	6.2 A. C.	6.2 A. C.		Defective Ground
32. Plate	Ground	55,600	205	205	300	Coil; R-3; R-4; C-29; C-30; C-31; C-32; C-2
33. Screen	Ground	55,000	215	215	300	R-3; R-4; C-2; C-31; C-32
34. Grid	Ground	761,000				R-14; R-16; R-17; R-18; C-27; C-28; Field
35. Cathode	Ground	0	0	0		Defective Ground
36. Heater	Ground	0	0	0		Defective Ground
80 Rectifier						
37. Filament	Ground	55,000	215	215	300	Fil. Winding; C-31; C-32; C-2; R-3; R-4
38. Plate	Ground	2,200	−130	−130	300	H. V. Winding; Field
39. Plate	Ground	2,200	−130	−130	300	H. V. Winding; Field
40. Filament	Ground	55,000	215	215	300	C-31; C-32; C-2; R-3; R-4
Miscellaneous						
41. A. C. Line	Ground					Pri. Winding; Switch; C-34
42. A. C. Line	Ground					Pri. Winding; Switch; C-34
43. Ant. (Blue)	Ground	5.7				Coil; C-1
44. Ant. (Blue & Black)	Ground	.02	(OPEN ON B	ROADCAST)		Switch
45. Ground	Ground	0				Defective Ground
41. A. C. Line	42. A. C. Line	8				Switch; Primary; Cord; Plug
38. Plate 80	39. Plate 80	400				H. V. Winding
37. Filament 80	40. Filament 80	.12				Filament Winding

If Resistance Readings are low, try reversing polarity of Ohm-Meter.
*Subject to large variations.
†Figures in the first column refer to socket hole numbers on Figure 3.
**Meter must be 1,000 ohms per volt.

FIRST I. F. TRANSFORMER

Plate .... Blue
Plus "B" .... Red
Grid Return .... Black
Grid (Top) .... Green

SECOND I. F. TRANSFORMER

Plate .... Blue
Plus "B" .... Red
Diode Return .... Black
Diode .... Green

POWER TRANSFORMER

Primary .... Two Brown Leads
6.3 Volt Filament .... Two Black Leads
5. Volt Filament .... Two Yellow Leads
High Voltage .... Two Green Leads
C. T. High Voltage .... Red

STANDARD R M A

Resistor and Condenser Color Code

0 Black, 1 Brown, 2 Red, 3 Orange, 4 Yellow, 5 Green, 6 Blue, 7 Purple, 8 Grey, 9 White

Resistors

The **Body Color** represents the **first figure** of the resistance value.

The **End Color** represents the **second figure** of the resistance value.

The **Dot Color** represents the **number of ciphers** following the first two figures.

Mica Condensers

(Capacity in Micro-Microfarads)

The **First Dot** on the condenser represents the **first figure** of the capacity.

The **Second Dot** on the condenser represents the **second figure** of the capacity.

The **Third Dot** on the condenser represents the **number of ciphers** following the first two figures.

The colors on the condensers should be read from left to right with the condenser in an upright position.

MODELS 6010, 6044
Chassis 60
Schematic, Trimmers
Socket

FAIRBANKS-MORSE HOME APP., INC.

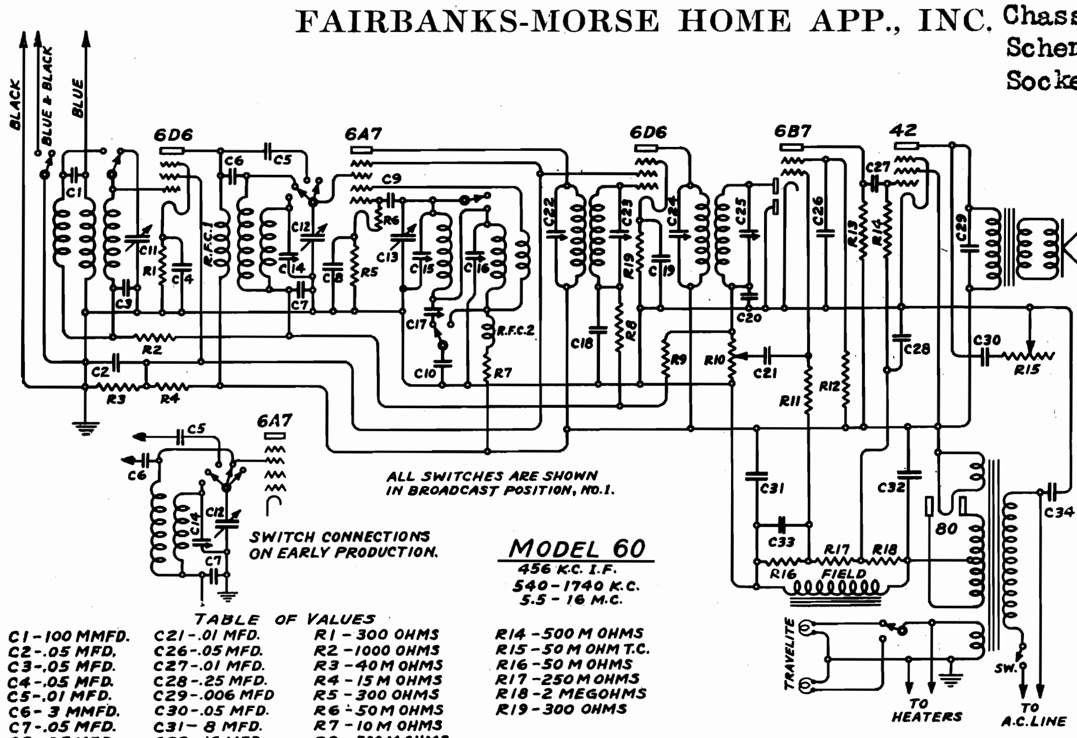


TABLE OF VALUES

C1-100 MMFD.	C21-.01 MFD.	R1 - 300 OHMS	R14 -500 M OHMS
C2-.05 MFD.	C26-.05 MFD.	R2 -1000 OHMS	R15 -50 M OHM T.C.
C3-.05 MFD.	C27-.01 MFD.	R3 -40 M OHMS	R16 -50 M OHMS
C4-.05 MFD.	C28-.25 MFD.	R4 - 15 M OHMS	R17 -250 M OHMS
C5-.01 MFD.	C29-.006 MFD	R5 - 300 OHMS	R18 -2 MEGOHMS
C6- 3 MMFD.	C30-.05 MFD.	R6 - 50 M OHMS	R19 - 300 OHMS
C7-.05 MFD.	C31- 8 MFD.	R7 - 10 M OHMS	
C8-.05 MFD.	C32-16 MFD.	R8 -500 M OHMS	
C9- 50 MMFD.	C33- .1 MFD.	R9 - 1 MEGOHM	
C10-.01 MFD.	C34- .01 MFD.	R10-250 M OHM V.C.	FIELD -2000 OHMS
C18-.05 MFD.		R11 - 1 MEGOHM	R.F.C.1 - R.F. PLATE CHOKE
C19-.05 MFD.		R12-2 MEGOHMS	R.F.C.2 - OSC. PLATE CHOKE
C20-200 MMFD.		R13-250 M OHMS	

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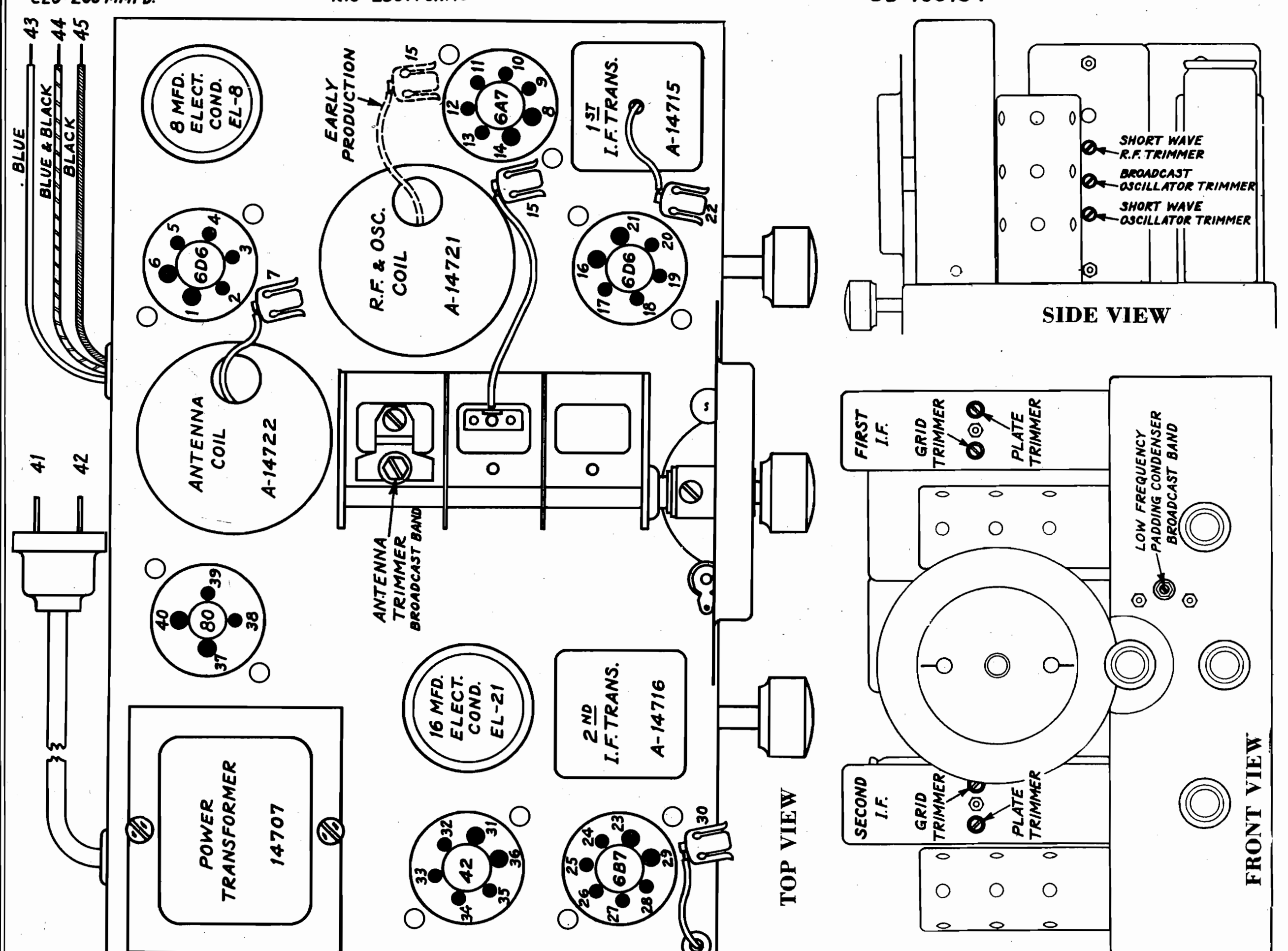


MODELS 6010,6044
Chassis 60
Alignment,Coil Data

FAIRBANKS-MORSE HOME APP., INC.

I. F. ALIGNMENT

All Intermediate Frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 Kilocycle signal from an accurate service oscillator, to the grid of the 6A7 tube. It is advisable to connect a small condenser, about .00005 Mfd. (50 MMFD) in series with the lead from the service oscillator to prevent the characteristics of the service oscillator circuit from affecting the set.

2. Adjust the grid circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The grid circuit trimmer condenser of the first intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).

3. Adjust the plate circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the first intermediate frequency transformer is contolled by the right hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).

4. Adjust the diode circuit trimmer condenser of the second intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The diode plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the right hand adjustment screw located on the front of the intermediate frequency transformer can (Grid Trimmer Figure 4).

5. Adjust the plate circuit trimmer condenser of the second intermediate frequency transformer carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer can (see Figure 4).

6. Much of the sensitivity and selectivity of the receiver depends upon the proper setting of these critical adjustments, for this reason it is necessary to go back over them to make sure they are correct.

R. F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use in aligning the broadcast and short wave bands of the Model 60. The part number of this jig is 14726, it may be obtained through any Fairbanks-Morse jobber.

BROADCAST BAND

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1700 Kilocycles. Supply a 1700 Kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 5) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal while this adjustment is being made to make sure the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R.F. circuit since, in most cases, the R. F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made the travelite disc should be adjusted until the reading is correct.

2. Adjust the broadcast band antenna trimmer (Figure 3) for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Turn the gang condenser to 600 Kilocycles. Adjust the low frequency padding condenser (Figure 4) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.

2. Adjust the short wave R. F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. This is desirable because of the reflected effect of the adjustment of one stage on the other.

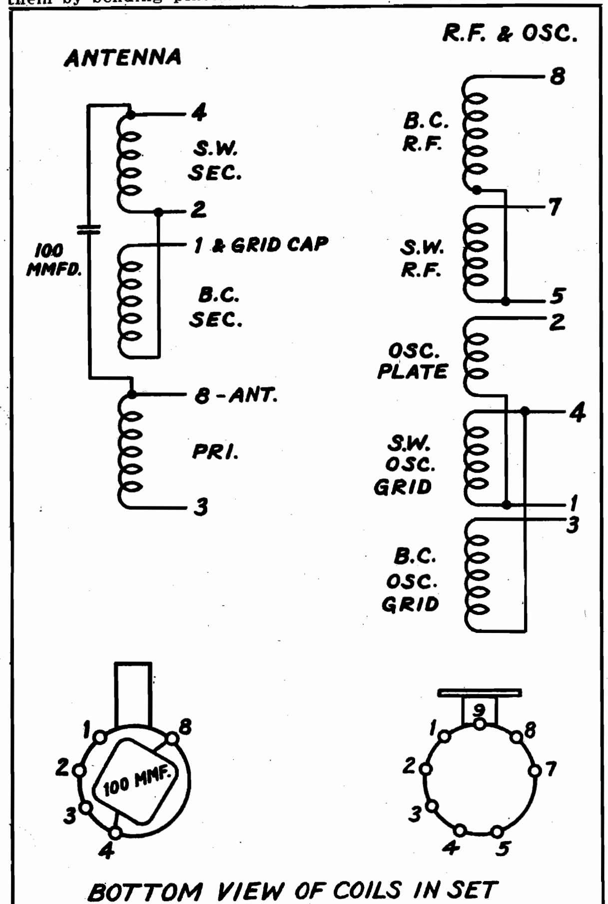
NOTE: After all alignment adjustments have been completed the set should be tuned slowly from one end of the dial to the other, on the short wave band. If a howl or "squak" is heard at any point, the set is "crossing track." To remedy this condition loosen the short wave oscillator trimmer (Figure 5) slowly and carefully to the point where the howl disappears.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

GANG CONDENSER PLATES

The adjustment of the slotted end plates on the gang condenser is very critical since it must be accurate on both bands. These adjustments are made in the factory with precision equipment and under no condition should it be necessary to change them by bending plates.



COIL	FROM	TO	D. C. RESISTANCE
ANTENNA COIL	Lug 3	Lug 8	5.5 Ohms
	Lug 1	Lug 2	4. Ohms
	Lug 2	Lug 4	.5 Ohm
RADIO FREQUENCY AND OSCILLATOR COILS	Lug 3	Lug 4	2.8 Ohms
	Lug 4	Lug 1	.1 Ohm
	Lug 1	Lug 2	.35 Ohm
	Lug 7	Lug 5	.1 Ohm
	Lug 5	Lug 8	4. Ohms
FIRST I. F. TRANS-FORMER	Black	Green	9. Ohms
	Red	Blue	7.25 Ohms
SECOND I. F. TRANS-FORMER	Black	Green	7.5 Ohms
	Red	Blue	4.5 Ohms
OSCILLATOR PLATE CHOKE	B+End	Plate End	12. Ohms
R. F. PLATE CHOKE	B+End	Plate End	75. Ohms
POWER TRANS-FORMER 115 VOLT 60 CYCLE	Brown	Brown	7.5 Ohms
	Black	Black	.12 Ohm
	Yellow	Yellow	.1 Ohm
	Green	Red	185. Ohms
	Green	Red	185. Ohms

MODELS 6210,6244
Chassis 62
Schematic,Parts

FAIRBANKS-MORSE HOME APP., INC.

MODEL NO. 62

A.C.-D.C. RECEIVER 456 K.C. I.F.
18-52 METERS — 5.8-16.5 MEGACYCLES.
197-555 METERS — 540-1600 KILOCYCLES.
810-2000 METERS — 150-370 KILOCYCLES.

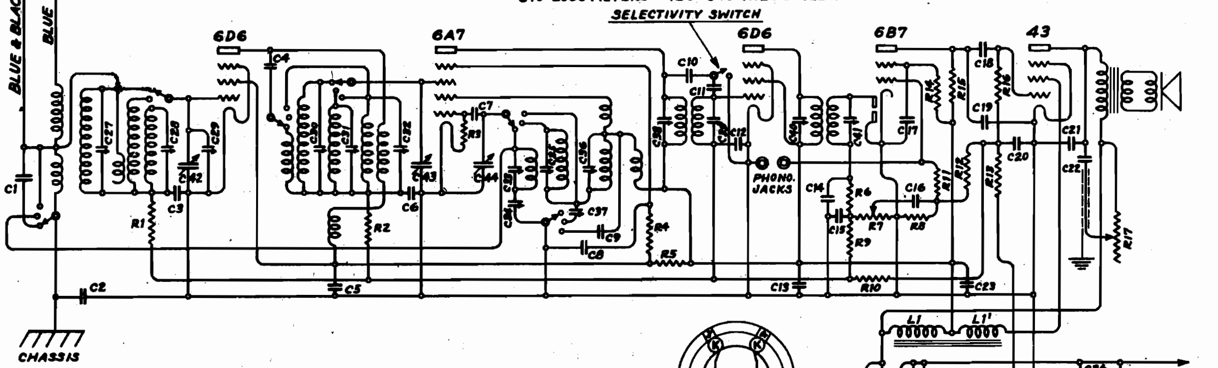
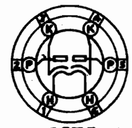
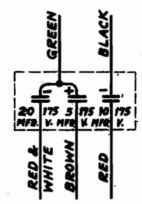


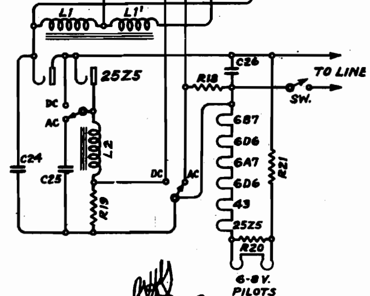
TABLE OF VALUES

C1-1000 MMFD.	C15-200 MMFD.	R1-1000 OHMS	R15-250 M OHMS
C2-.1 MFD.	C16-.05 MFD.	R2-2 MEGOHMS	R16-250 M OHMS
C3-.05 MFD.	C17-.1 MFD.	R3-25 M OHMS	R17-50 M OHMS T.C.
C4-500 MMFD.	C18-.01 MFD.	R4-25 M OHMS	R18-300 OHMS
C5-.1 MFD.	C19-100 MMFD.	R5-300 OHMS	R19-350 OHMS
C6-.05 MFD.	C20-.25 MFD.	R6-20 M OHMS	R20-40 OHMS
C7-50 MMFD.	C21-.006 MFD.	R7-250 M OHMS V.C.	R21-75 OHMS
C8-.1 MFD.	C22-.05 MFD.	R8-1 MEGOHM	
C9-.004 MFD.	C23-10 MFD.	R9-1 MEGOHM	
C10-5 MMFD.	C24-20 MFD.	R10-5 MEGOHMS	L1-350 OHMS
C11-5 MMFD.	C25-5 MFD.	R11-50 M OHMS	L1'-15 OHMS
C12-.05 MFD.	C26-.05 MFD.	R12-5 MEGOHMS	L2-2000 OHMS SPEAKER FIELD.
C13-.1 MFD.		R13-100 M OHMS	
C14-100 MMFD.		R14-1 MEGOHM	


25Z5 BOTTOM VIEW



ELECTROLYTIC CONDENSER



FAIRBANKS-MORSE
HOME APPLIANCES, INC.
SD-11835

PARTS LIST MODEL 62

Part Number	Description	List Price
A-14715	I. F. Transformer, First	$ 2.00
A-14716	I. F. Transformer, Second	2.00
A-14853	Coil Assembly in Can, Antenna	3.00
A-14854	Coil Assembly in Can, Oscillator	3.00
A-14855	Coil Assembly in Can, R. F.	3.00
14851	Choke Coil, Iron Core, Tapped	2.50
14728	Dial Assembly complete	2.50
14729	Dial Drive Roller (small)	.25
14730	Dial Drive Spring	.25
14731	Dial Drive Shaft	.50
14856	Dial Scale, Calibrated	.75
14704	Dial Face, extruded celluloid	.50
14404	Dial Escutcheon	1.00
14720	Pilot Lamp 6-8 Volt Tubular	.10
14849	Pilot Lamp Leads, 2 Conductor Tinsel	.25
K-868	Knob, Inlaid Wood	.20
K-551	Knob, Black Bakelite	.20
X-7220	Screw, Chassis Mounting, 10-24 x 7/8"	.05
X-7228	Screw, Decorative Head, 8-32 x 1"	.05
P-625	Tip Jack with washers	.10
S-5907	Socket, Speaker	.10
S-5918	Socket, 6D6	.10
S-5919	Socket, 6A7	.10
S-5920	Socket, 6B7	.10
S-5922	Socket, 43	.10
S-5923	Socket, 25Z5	.10
S-5819	Shield Base, Vacuum Tube	.05
S-5820	Shield, Vacuum Tube	.15
S-5821	Shield Cap, Vacuum Tube	.05
R-5009	Terminal Strip, Common, Metal Clad	.15
SW-6102	Switch, Selectivity	.30
14852	Switch, Band Selector	3.50
14862	Switch, AC-DC	1.25
14537	Power Cord and Plug, 110-120 Volt	2.00
14864	Adapter Cord and Plugs, 220-240 Volt	1.50

SPEAKER CONES

Speaker cones cannot be supplied. Speakers on which cones have been damaged will be repaired at the following list prices:

6 inch speaker cone repair	$2.50
8 inch speaker cone repair	2.50

Part Number	Description	List Price
V-6507	Tone Control and Switch, 50,000 ohms	1.20
V-6508	Volume Control, 250,000 ohms	.80
R-846	Resistor, 300 ohms ¼ watt	.20
R-1116	Resistor, 25,000 ohms ¼ watt	.20
R-1146	Resistor, 50,000 ohms ¼ watt	.20
R-1191	Resistor, 100,000 ohms ¼ watt	.20
R-1236	Resistor, 250,000 ohms ¼ watt	.20
R-1296	Resistor, 1 Megohm ¼ watt	.20
R-1311	Resistor, 2 Megohm ¼ watt	.20
R-1331	Resistor, 5 Megohm ¼ watt	.20
R-1446	Resistor, 300 ohms ½ watt	.20
R-1451	Resistor, 350 ohms ½ watt	.20
R-1491	Resistor, 1000 ohms ½ watt	.20
R-1701	Resistor, 20,000 ohms ½ watt	.20
R-1716	Resistor, 25,000 ohms ½ watt	.20
R-5010	Resistor, 75 and 40 ohms, metal clad	.50
14702	Condenser, Variable, 3 gang	4.50
C-212	Condenser, trimmer strip, 3 gang	.60
EL-23	Condenser, Dry Electrolytic	2.25
EC-7	Condenser, .25 Mfd., 300 volt, Tubular	.30
EC-5	Condenser, .1 Mfd., 300 volt, Tubular	.25
EC-2	Condenser, .01 Mfd., 400 volt Tubular	.20
EC-4	Condenser, .05 Mfd., 400 volt, Tubular	.20
EC-26	Condenser, .05 Mfd., 300 volt, Tubular	.20
EC-12	Condenser, .006 Mfd., 400 volt, Tubular	.20
C-310	Condenser, 50 Mmfd., Moulded	.20
C-307	Condenser, 100 Mmfd., Moulded	.20
C-305	Condenser, 200 Mmfd., Moulded	.20
C-313	Condenser, .001 Mfd., Moulded	.25
C-320	Condenser, .004 Mfd., Moulded	.25
14863	Alignment Jig	2.25
T-688	Alignment Tool, Insulated	1.50
14857	Dynamic Speaker, 6 Inch, 2000 ohm Field	8.00
14865	Dynamic Speaker, 8 inch, 2000 ohm Field	12.00

We reserve the right to make changes in specifications and prices at any time without incurring any obligation on parts or sets previously sold. All sets are subject to standard RMA or Code guarantee.

MODELS 6210,6244
Chassis 62
Voltage
Alignment

FAIRBANKS-MORSE HOME APP., INC.

Line Voltage 110 Volts AC or DC

Tube	AC or DC	Plate	Screen	Grid	Osc. Plate	Osc. Grid
6D6 R.F.	AC DC	100 80	100 80	-- --		
6A7 Det.Osc.	AC DC	105 85	50 40	-- --	105 85	-5 to 10 -5 to 10
6D6 I.F.	AC DC	105 85	105 85	-- --		
6B7 A.F.	AC DC	25 20	25 20	-- --		
43 A.F.	AC DC	105 85	105 85	-10 -10		
25Z5 Rect.	AC	From P5 to P2 90 V.D.C. From P5 to K3 200 V.D.C. From P2 to K3 115 V.D.C.			See schematic diagram for reference points	

MEASURED VOLTAGES

Model 62

All measurements made from cathode with 1000 ohms per volt meter. 300 volt scale.

ALIGNMENT PROCEDURE

General: To insure the performance the model 62 is capable of delivering the following instructions should be carefully studied before any adjustments are undertaken.

Proper adjustment of the various tuned circuits will only be possible through the use of a reliable all wave, service oscillator and an output meter.

The output meter should be connected across the secondary of the output transformers. The voice coil need not be disconnected but a larger meter indication will be obtained, on a given signal, when the voice coil is disconnected.

All adjustments should be made with the volume control "full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

I. F. ALIGNMENT

General: All intermediate frequency alignments must be made with the band selector switch on the center position. The 197 to 555 meter band.

1. Supply a 456 kilocycle signal, from an accurate service oscillator, to the grid of the 6A7 tube.

2. Adjust the grid and plate circuit trimmer condensers, of the first I. F. transformer from maximum output with minimum input from the service oscillator. The first I. F. transformer is located at the rear center of the chassis.

3. Adjust the grid and plate circuit trimmer condensers of the second I. F. transformer for maximum output with minimum input from the service oscillator. The second I. F. transformer is located at the left of the gang condenser on the front of the chassis.

OSCILLATOR, R.F. and ANTENNA ALIGNMENT

General: The adjustment condensers, or trimmers, for the antenna, R. F., and oscillator stages are located in the same shields that house the coils for these stages. These coils are contained in the three large round shield cans located at the right of the gang condenser on the chassis. Three holes are located in the side of each of these cans, through each of which a trimmer adjusting screw is accessible. The center trimmer adjusting screw on the antenna coil is not used. When adjusting the antenna stage on the 197 to 555 meter band the trimmer located on the front section of the gang condenser should be used.

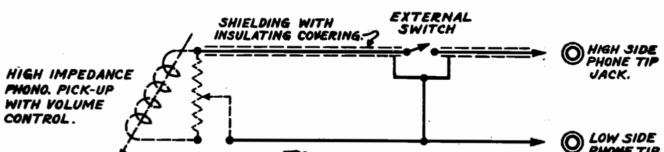


Figure 4

RECOMMENDED PHONO CONNECTIONS.

On each coil can the upper screw is for the 810 to 2000 meter band, the center screw is for the 197 to 555 meter band, and the lower screw is for the 19 to 52 meter band.

The first shield, from the front of the chassis, contains the antenna coils and trimmers, the second or center shield contains the R. F. coils and trimmers, and the third or rear shield contains the oscillator coils and trimmers.

An alignment jig is available for use in aligning the various bands on the model 62. The part number of this jig is given in the parts list. It may be obtained through any Fairbanks-Morse Radio Agency.

The bands must be aligned in the following order: The 197 to 555 meter band first, the 810 to 2000 meter band second, and the 19 to 52 meter band third.

Padding Condensers: A dual padding or low frequency adjusting condenser is located on the left rear of the chassis. The adjustment nut and screw are accessible through a hole in the chassis. The Hexagon nut is the adjustment for the 197 to 555 meter band. The center screw is the adjustment for the 810 to 2000 meter band.

197 to 555 Meter Band:

1. Place the alignment jig on the front of the chassis. Turn the gang condenser all the way out of mesh. Supply a 187 meter (1600 kilocycle) signal to the antenna of the set. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Turn the gang condenser to 220 meters. Supply a 220 meter signal (1360 kilocycles) to the antenna of the set. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.

3. Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator. This trimmer is located on the front section of the gang condenser.

4. Supply a 500 meter (600 kilocycle) signal to the antenna of the set. Tune the gang condenser to 500 meters. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator. The gang condenser should be tuned back and forth, across the signal, while this adjustment is being made. to insure the peak of greatest intensity.

810 to 2000 Meter Band:

1. Supply an 800 meter (375 kilocycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer for maximum output with minimum input from the service oscillator.

2. Supply a 900 meter (333 kilocycle) signal to the antenna of the set. Tune the gang condenser to 900 meters. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.

3. Adjust the antenna trimmer for maximum output with minimum input from the service oscillator.

4. Supply an 1800 meter (167 kilocycle) signal to the antenna of the set. Tune the gang condenser to 1800 meters. Adjust the low frequency padding condenser for maximum output with minimum input from the service oscillator. The gang condenser should be tuned back and forth, across the signal, while this adjustment is being made to insure the peak of greatest intensity.

19 to 52 Meter Band:

1. Supply an 18.7 meter (16 megacycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.

2. Supply a 22 meter (13.6 megacycle) signal to the antenna of the set. Tune the gang condenser to 22 meters. Adjust the R. F. trimmer condenser for maximum output with minimum input from the service oscillator.

3. Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis has been bolted down in the cabinet any differences in calibration can be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

FAIRBANKS-MORSE HOME APP., INC.

MODELS 8110,8141
Chassis 81
Schematic,Parts Trimmers

Voltages measured, from ground, with a 1000 ohm per volt meter. 300 volt scale.

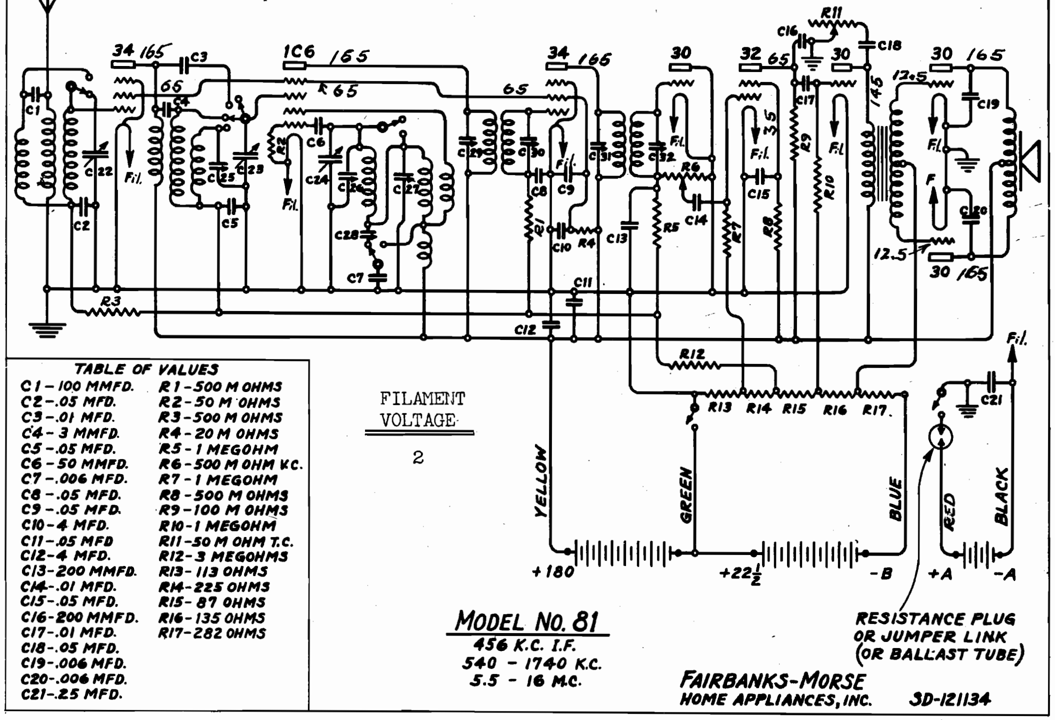


TABLE OF VALUES

C1 - 100 MMFD.	R1 - 500 M OHMS
C2 - .05 MFD.	R2 - 50 M OHMS
C3 - .01 MFD.	R3 - 500 M OHMS
C4 - 3 MMFD.	R4 - 20 M OHMS
C5 - .05 MFD.	R5 - 1 MEGOHM
C6 - 50 MMFD.	R6 - 500 M OHM V.C.
C7 - .006 MFD.	R7 - 1 MEGOHM
C8 - .05 MFD.	R8 - 500 M OHMS
C9 - .05 MFD.	R9 - 100 M OHMS
C10 - 4 MFD.	R10 - 1 MEGOHM
C11 - .05 MFD	R11 - 50 M OHM T.C.
C12 - 4 MFD.	R12 - 3 MEGOHMS
C13 - 200 MMFD.	R13 - 113 OHMS
C14 - .01 MFD.	R14 - 225 OHMS
C15 - .05 MFD.	R15 - 87 OHMS
C16 - 200 MMFD.	R16 - 135 OHMS
C17 - .01 MFD.	R17 - 282 OHMS
C18 - .05 MFD.	
C19 - .006 MFD.	
C20 - .006 MFD.	
C21 - .25 MFD.	

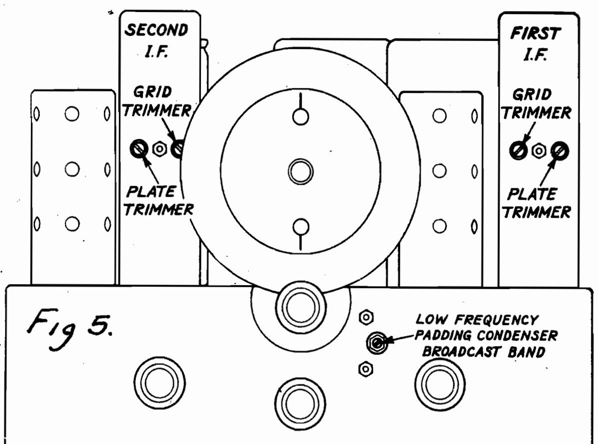


Fig 5.

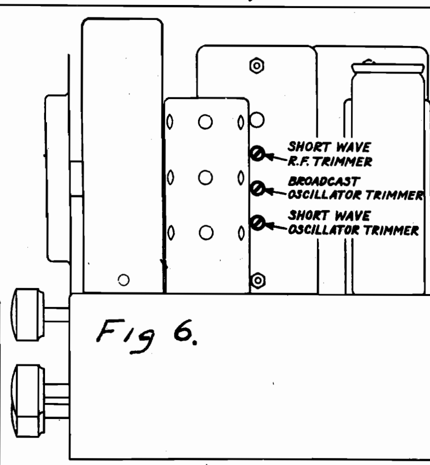


Fig 6.

BATTERY CONNECTIONS

The Model 81 will operate equally well on an Air Cell or a two volt storage battery for filament supply. A three volt dry battery may be used also but an Amperite 6-1 ballast tube must be employed.

Part Number	Description	List Price
14808	First I. F. Transformer (square can)	1.50
14544	First I. F. Transformer (round can)	3.00
14809	Second I. F. Transformer	1.50
14813	R. F. and Osc. Coil Assembly	3.50
A-14722	Antenna Coil Assembly	3.00
A-14465	R. F. Plate Choke Assembly	1.00
A-14550	Osc. Plate Choke Assembly	1.00
14701	Band Selector Switch	1.00
14728	Dial Assembly Complete	2.50
14729	Dial Drive Roller (small)	.25
14730	Dial Drive Spring	.25
14731	Dial Drive Shaft	.50
14719	3 Conductor Dial Light Cable (tinsel)	.30
14404	Escutcheon for Dial	1.00
14708	Calibrated Dial Scale	.75
14704	Extruded celluloid Dial Face	.50
14806	2 Volt Tubular Pilot Lamp .06 AMPS.	.20
S-5907	Speaker Socket	.10
S-5927	30 Tube Socket	.10
S-5928	32 Tube Socket	.10
S-5929	34 Tube Socket	.10
S-5926	1C6 Tube Socket	.10
S-5930	Ballast Socket	.10
S-5819	Tube Shield Base	.05
S-5820	Tube Shield	.15
14807	5 Wire Battery Cable	.75
14802	Class "B" Input Transformer	4.00
X-7220	10-24 x 7/8" Chassis Mounting Screws	.05
X-7228	8-32 x 1" Decorative Head Screws	.05
K 868	Inlaid Wood Knobs	.20
14702	3 Gang Variable Condenser	4.50
C-213	Padding Condenser	1.00
EC-2	.01 Mfd. Tubular Condenser C-3, C-14, C-17	.20
EC-4	.05 Mfd. Tubular Condenser C-9, C-11, C-15, C-18	.20
EC-7	.25 Mfd. Tubular Condenser C-21	.30
EC-12	.006 Mfd. Tubular Condenser C-19, C-20	.20
EC-31	.003 Mfd. Tubular Condenser	.20
C-305	200 MMfd. Moulded Condenser C-13, C-16	.20
C-307	100 MMfd. Moulded Condenser C-1	.20
C-312	50 MMfd. Moulded Condenser C-6	.20
V-6514	Volume Control and Dual Switch R-6	1.50
V-6504	Tone Control R-11	.80
R-1701	20000 Ohms, Carbon Resistor 1/2 Watt R-4	.20
R-1146	50000 Ohms, Carbon Resistor 1/4 Watt R-2	.20
R-1191	100000 Ohms, Carbon Resistor 1/4 Watt R-9	.20
R-1266	500000 Ohms, Carbon Resistor 1/4 Watt R-1, R-3, R-8	.20
R-1296	1 Megohm, Carbon Resistor 1/4 Watt R-5, R-7, R-10	.20
R-1326	3 Megohms, Carbon Resistor 1/4 Watt R-12	.20
R-5008	842 Ohms, Metal Clad Resistor R-13, to R-17	.75
14811	Jumper Link	.05
14805	Resistance Plug .55 Ohm	.30
6-1	Amperite Ballast Tube	1.75
14726	Alignment Jig	2.25
T-688	Insulated Alignment Tool	1.50
14803	6½ Inch Special Class "B" Kinematic Speaker	5.00
14804	8 Inch Special Class "B" Kinematic Speaker	6.00

MODELS 8110,8141
Chassis 81
Alignment, Data

FAIRBANKS-MORSE HOME APP., INC.

ALIGNMENT PROCEDURE

The following instructions should be carefully studied before any alignment adjustments are attempted. All adjustments should be made with volume control "full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

I. F. ALIGNMENT

All Intermediate Frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 kilocycle signal to the grid of the 1C6 tube.
2. Adjust the Grid circuit and the plate circuit trimmer condensers of the first I. F. transformer, carefully, for maximum output with minimum input from the service oscillator (see Figure 6).
3. Repeat Number 2. on the second I. F. transformer.

R. F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use on the Model 81. The part number is 14726, it may be obtained from any Fairbanks-Morse jobber.

BROADCAST BAND

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1400 Kilocycles. Supply a 1400 Kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 5) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal while this adjustment is being made to make sure the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R.F. circuit since, in most cases, the R.F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made the travelite disc should be adjusted until the reading is correct.

2. Adjust the broadcast band antenna trimmer (on gang condenser) for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Turn the gang condenser to 600 Kilocycles. Adjust the low frequency padding condenser (Figure 6) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.

2. Adjust the short wave R. F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. This is desirable because of the reflected effect of the adjustment of one stage on the other.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

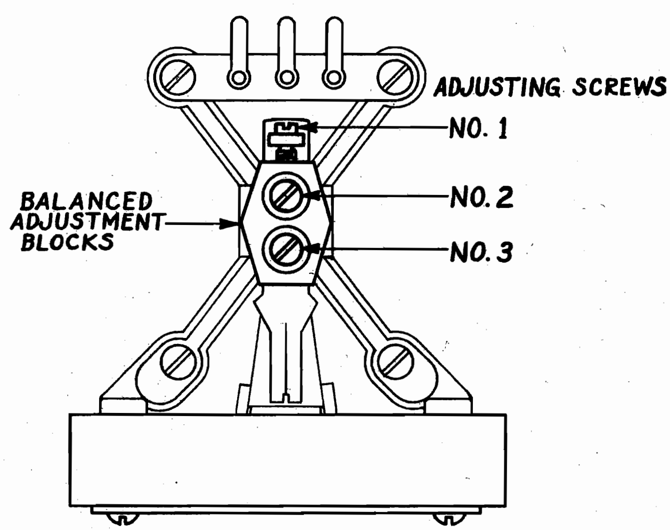
SPEAKER ADJUSTMENT PROCEDURE

1. Loosen adjustment screw number two about one fourth turn (see Figure 4).

2. Turn screw number one (Figure 4) until the correct adjustment is obtained.

3. Tighten screw number two.

In extreme cases it may be necessary to reset the balanced adjustment blocks (see Figure 4). This can be accomplished by turning screws number two and three. Loosen either screw number two or three about one fourth turn. Tighten the other screw the same amount. If this does not correct the condition the procedure should be reversed.



SPEAKER UNIT

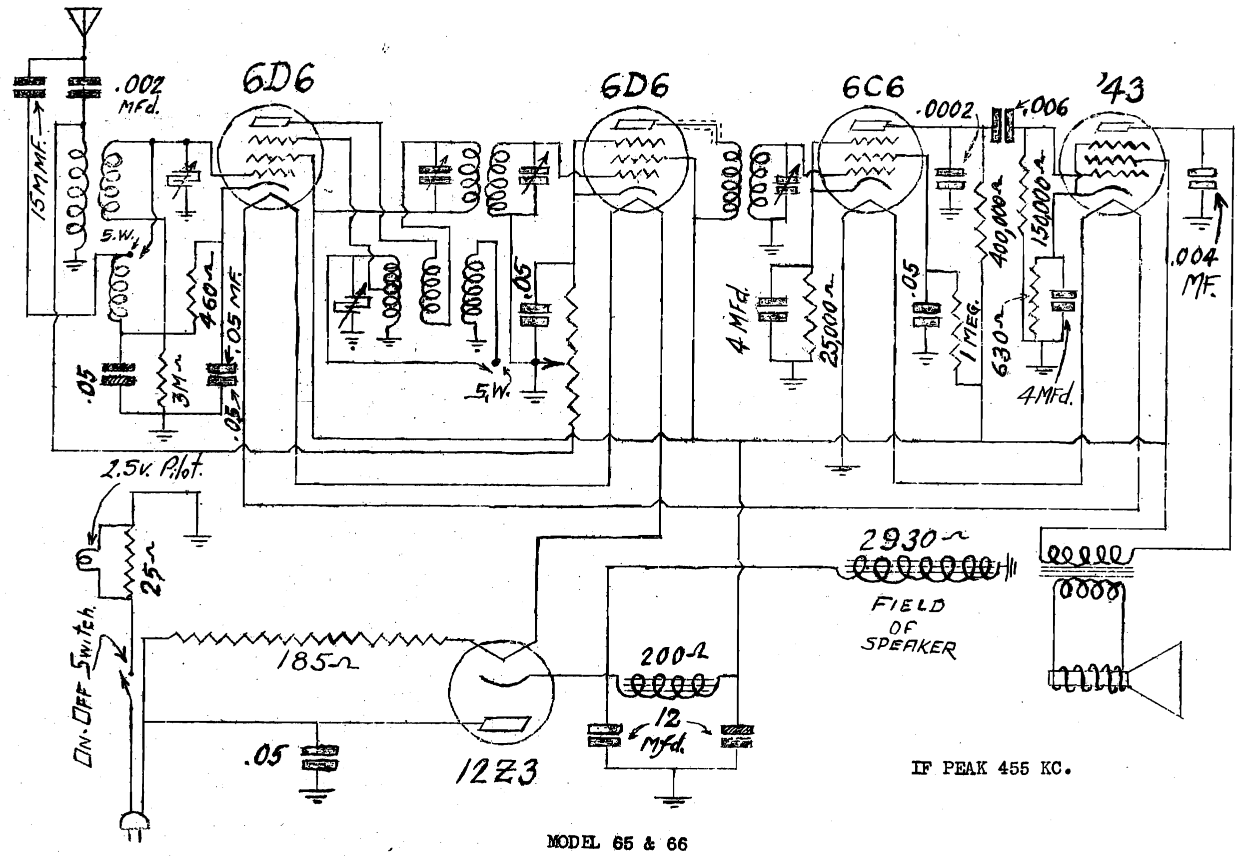
Figure 4

MODEL 81 CHASSIS

The Model 81 is a battery operated, standard and short wave broadcast superheterodyne chassis covering frequency ranges of 540 to 1740 kilocycles and 5.5 to 16 megacycles. Several outstanding battery set developments are incorporated. These include a multipurpose pentagrid converter; full automatic volume control; new type, high efficiency intermediate frequency transformers; individual low loss, radio frequency coils; class "B" output stage; and a new style, high efficiency, speaker.

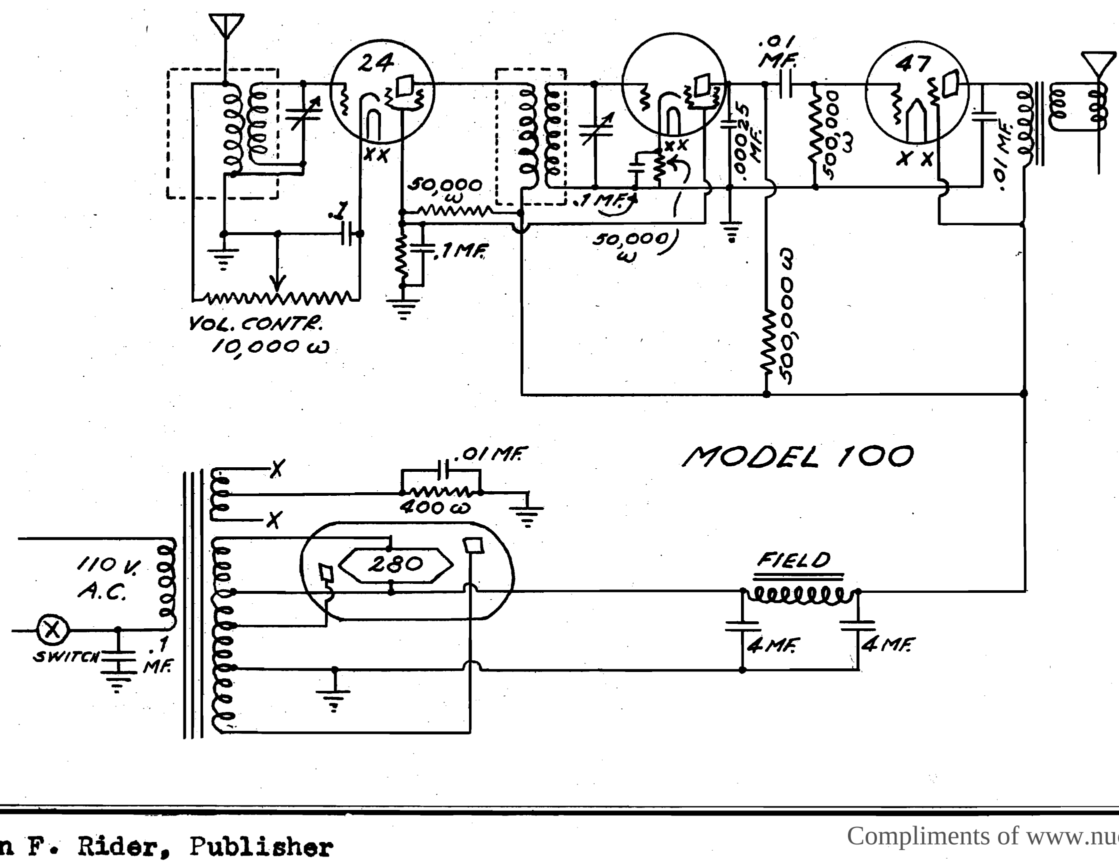
MODELS 65,66
MODEL 100
Schematics

FEDERATED PURCHASER



IF PEAK 455 KC.

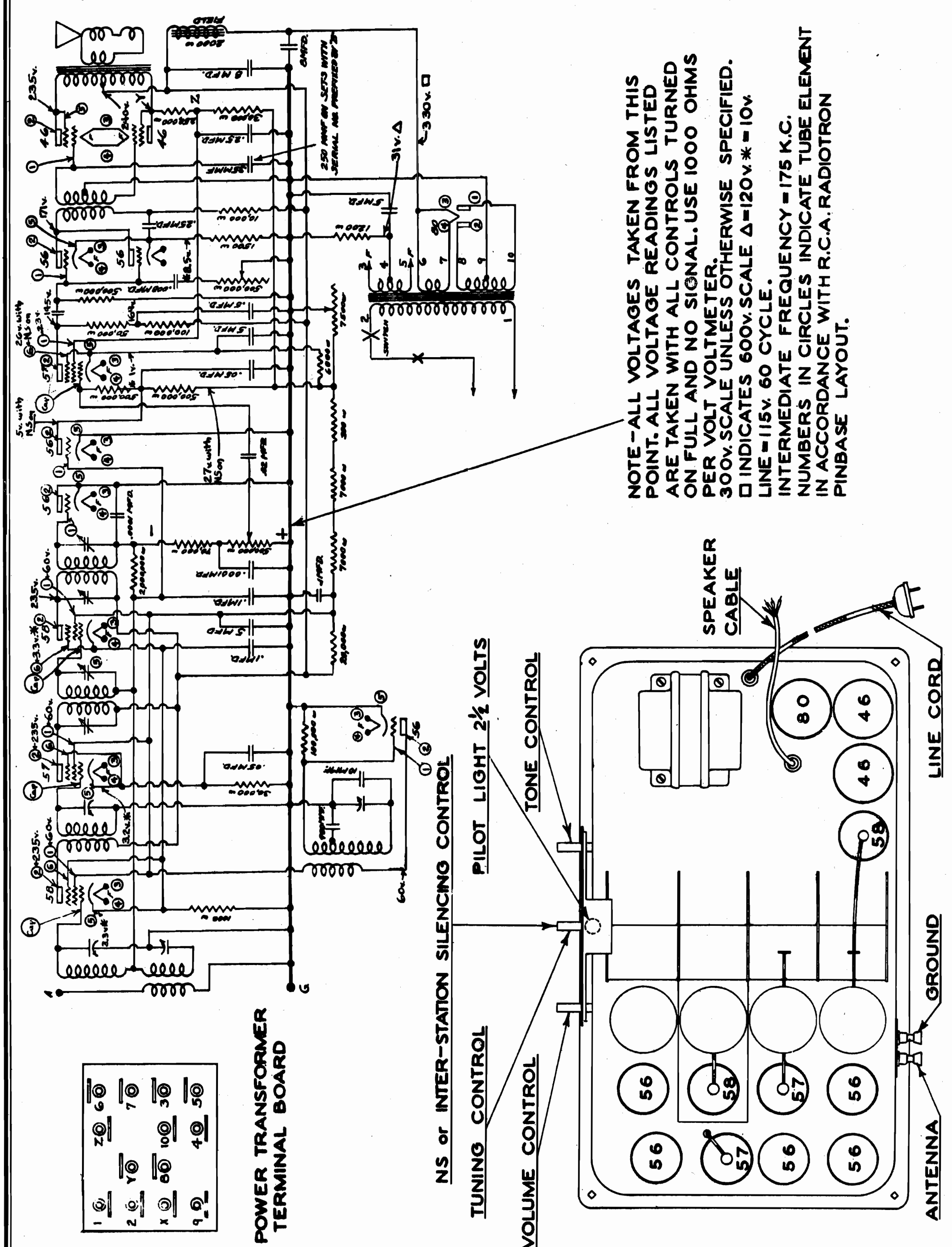
MODEL 65 & 66



MODEL 100

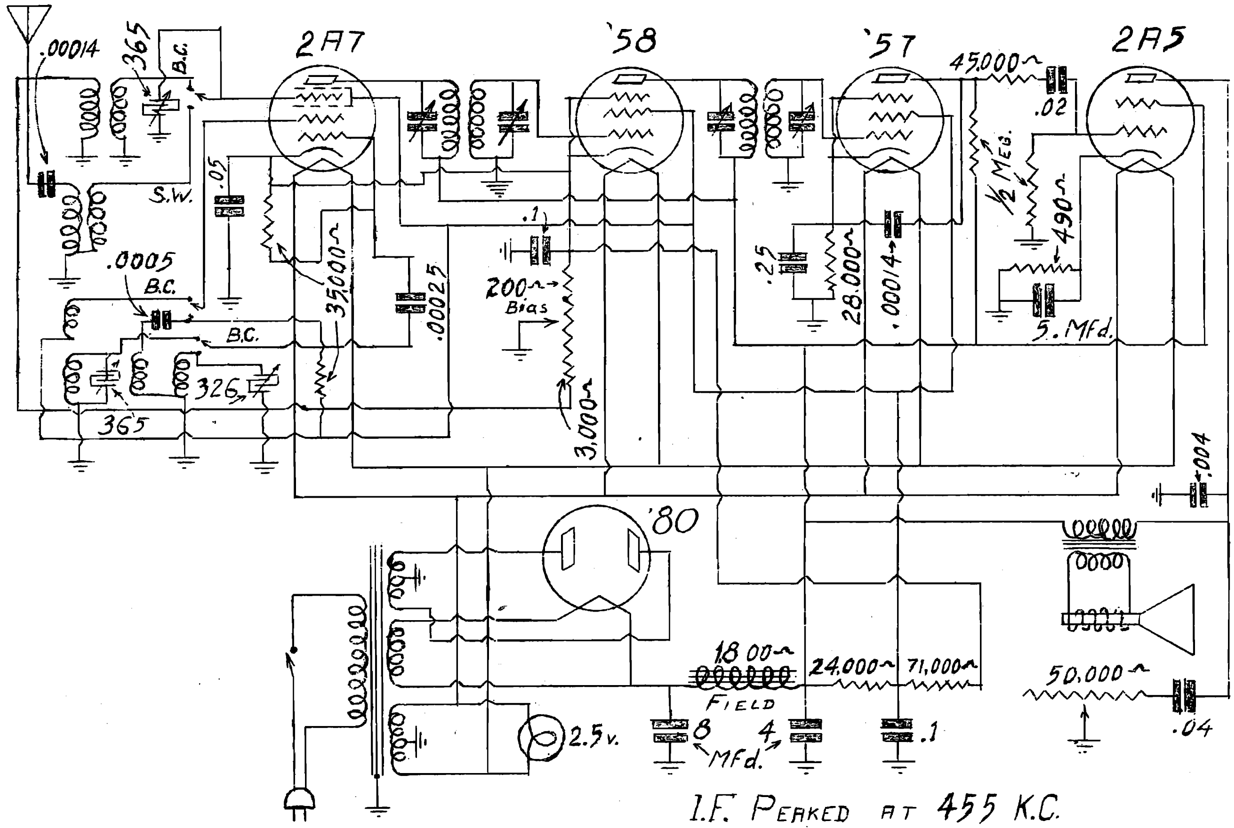
MODELS 79,80
Schematic
Voltage, Socket

FEDERATED PURCHASER



FEDERATED PURCHASER

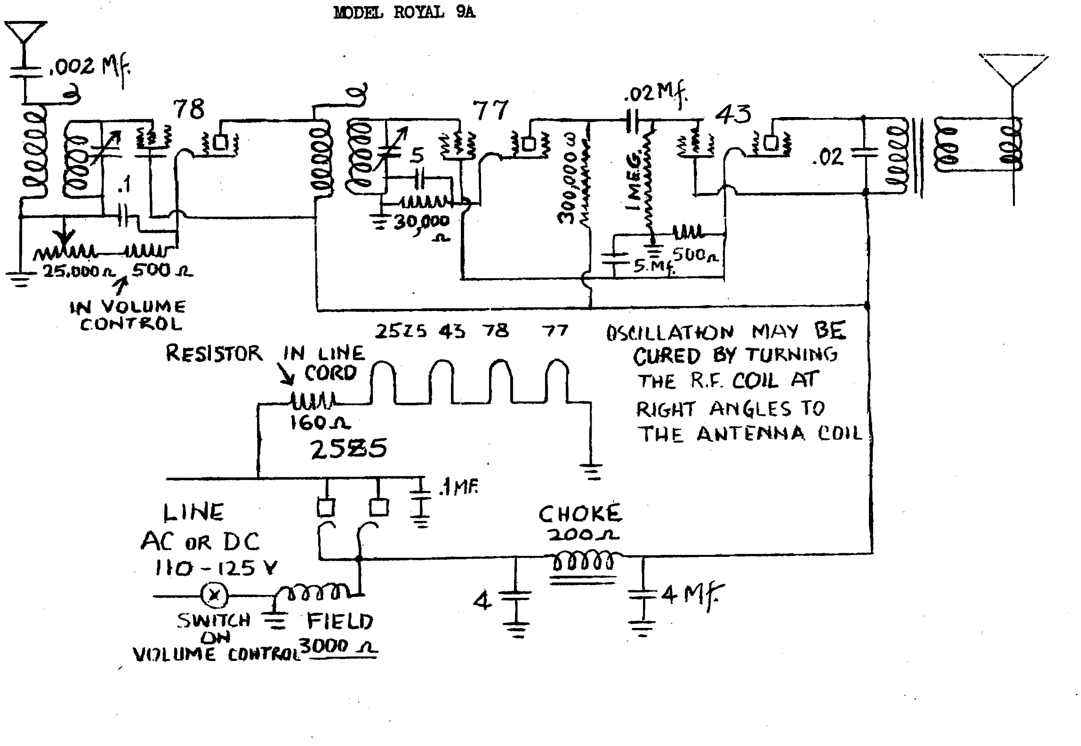
MODEL 88
MODEL Royal 9A
Schematics



MODEL 88

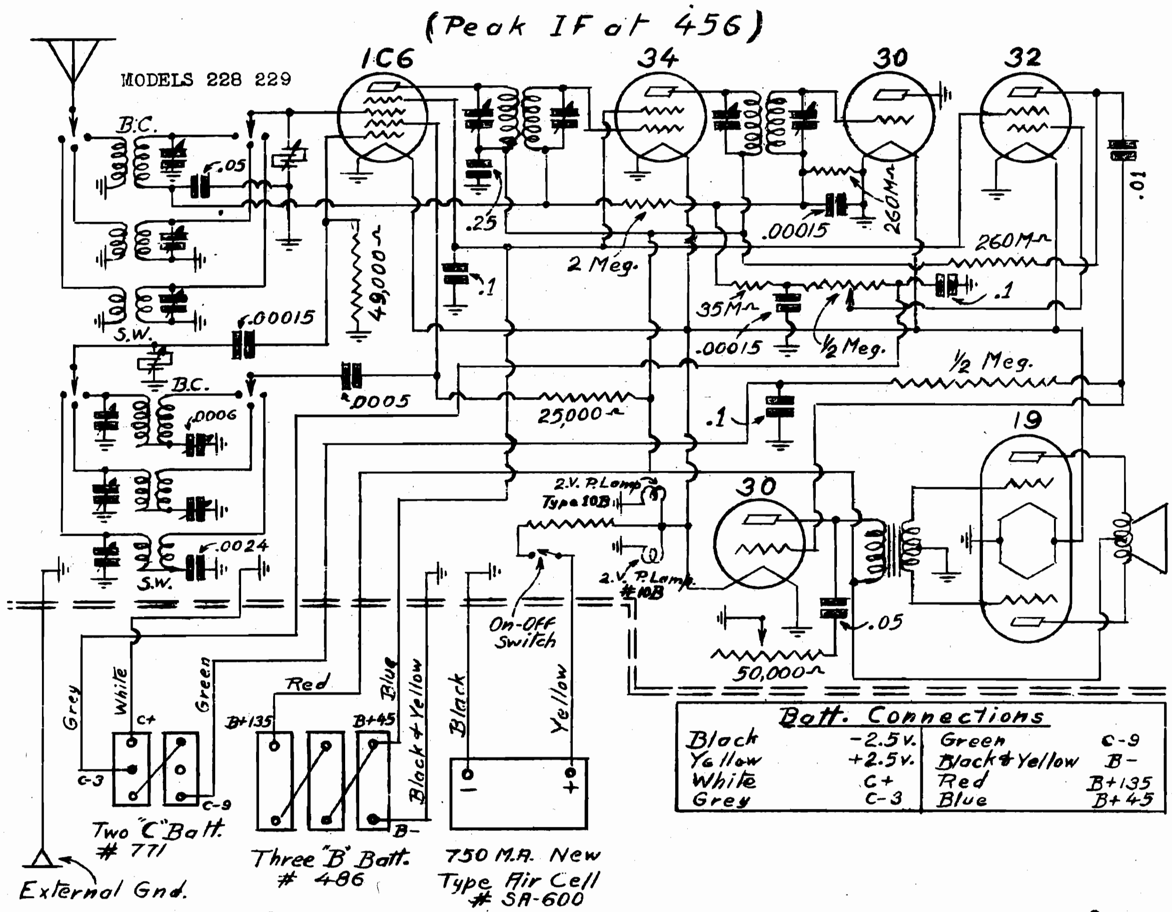
STENCIL 147

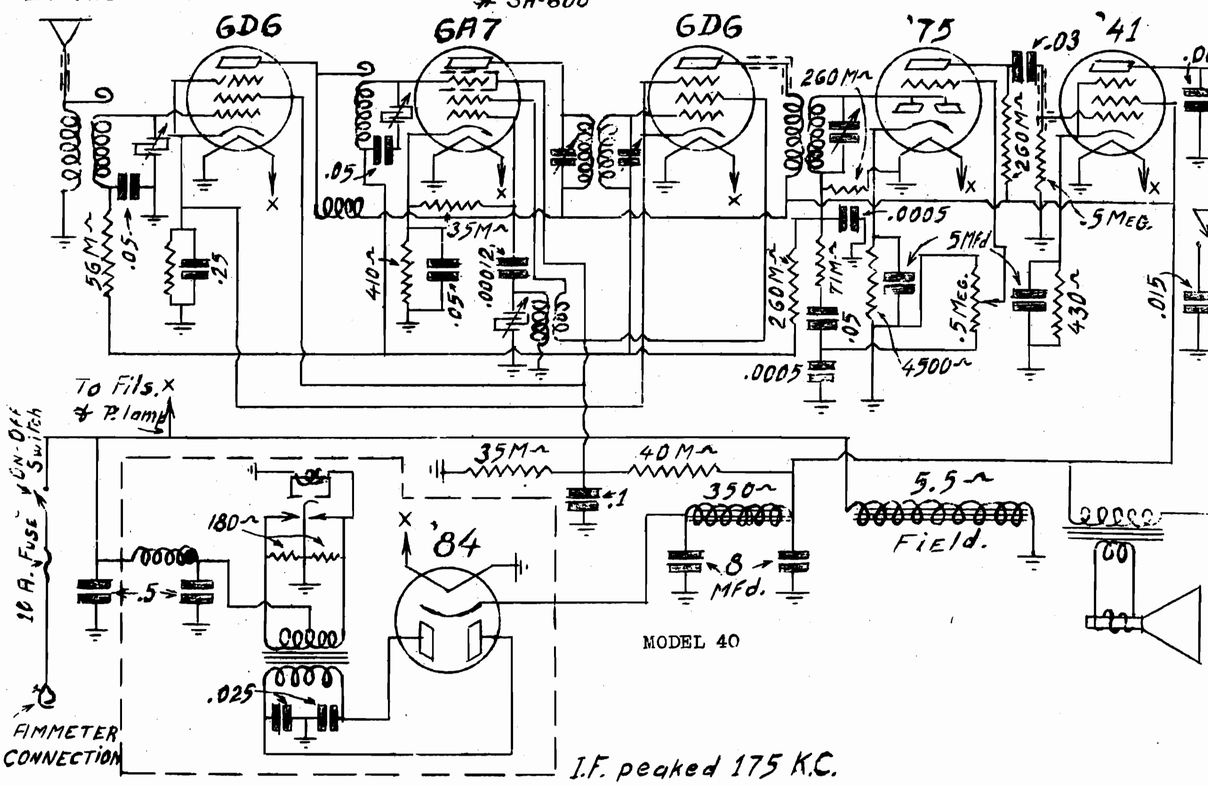
MODEL ROYAL 9A



MODEL 40
MODELS 228,229
Schematics

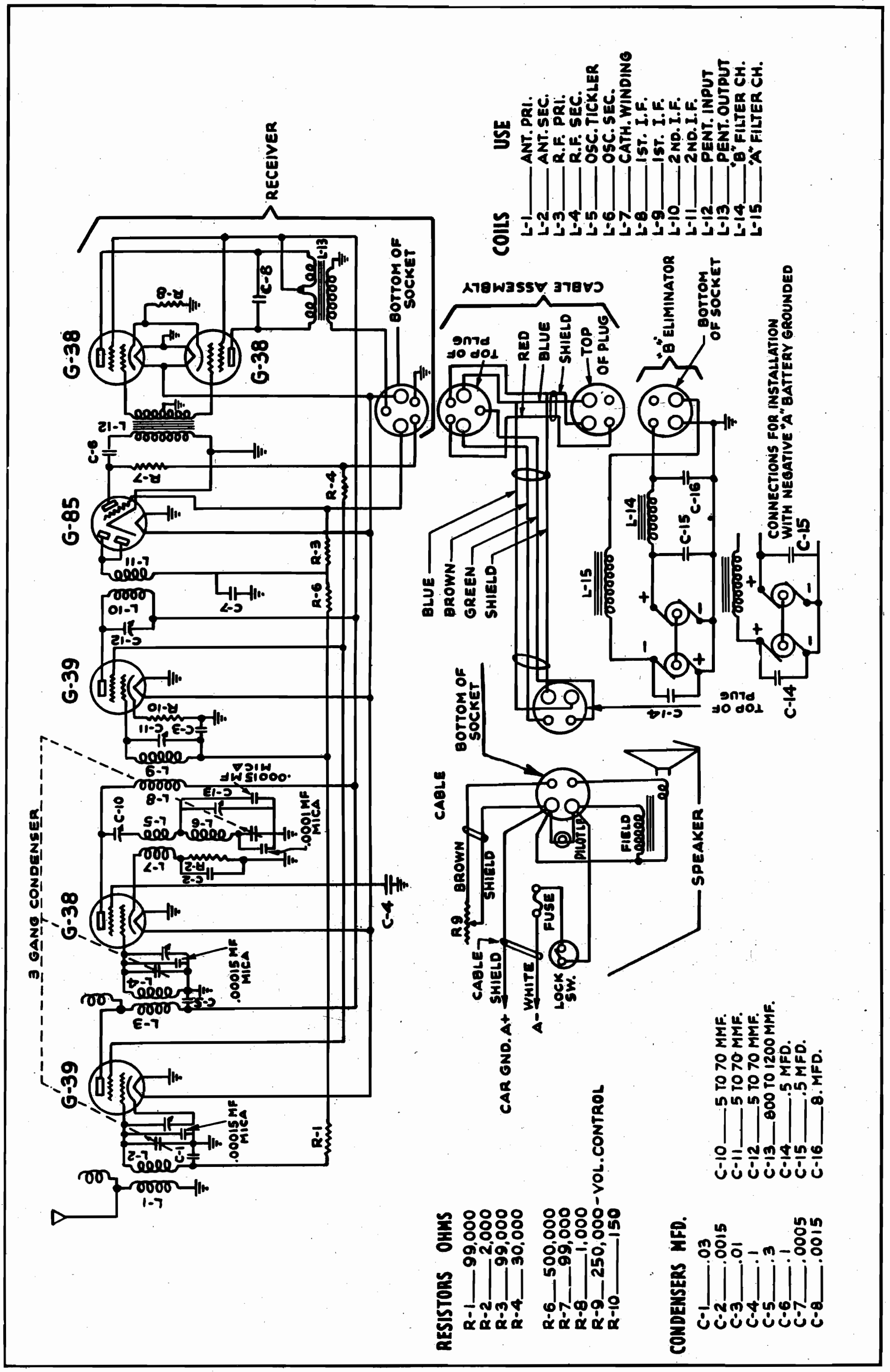
FEDERATED PURCHASER





FORD MOTOR CAR CO.

MODEL Ford Police Auto Radio
Built by Grigsby-Grunow
Schematic



RESISTORS	OHMS
R-1	99,000
R-2	2,000
R-3	99,000
R-4	30,000
R-6	500,000
R-7	99,000
R-8	1,000
R-9	250,000 — VOL. CONTROL
R-10	150

CONDENSERS	MFD.
C-1	.03
C-2	.0015
C-3	.01
C-4	.1
C-5	.3
C-6	.1
C-7	.0005
C-8	.0015
C-10	5 TO 70 MMF.
C-11	5 TO 70 MMF.
C-12	5 TO 70 MMF.
C-13	800 TO 1200 MMF.
C-14	.5 MFD.
C-15	.5 MFD.
C-16	8. MFD.

COILS	USE
L-1	ANT. PRI.
L-2	ANT. SEC.
L-3	R.F. PRI.
L-4	R.F. SEC.
L-5	OSC. TICKLER
L-6	OSC. SEC.
L-7	CATH. WINDING
L-8	1ST. I.F.
L-9	1ST. I.F.
L-10	2ND. I.F.
L-11	2ND. I.F.
L-12	PENT. INPUT
L-13	PENT. OUTPUT
L-14	"B" FILTER CH.
L-15	"A" FILTER CH.

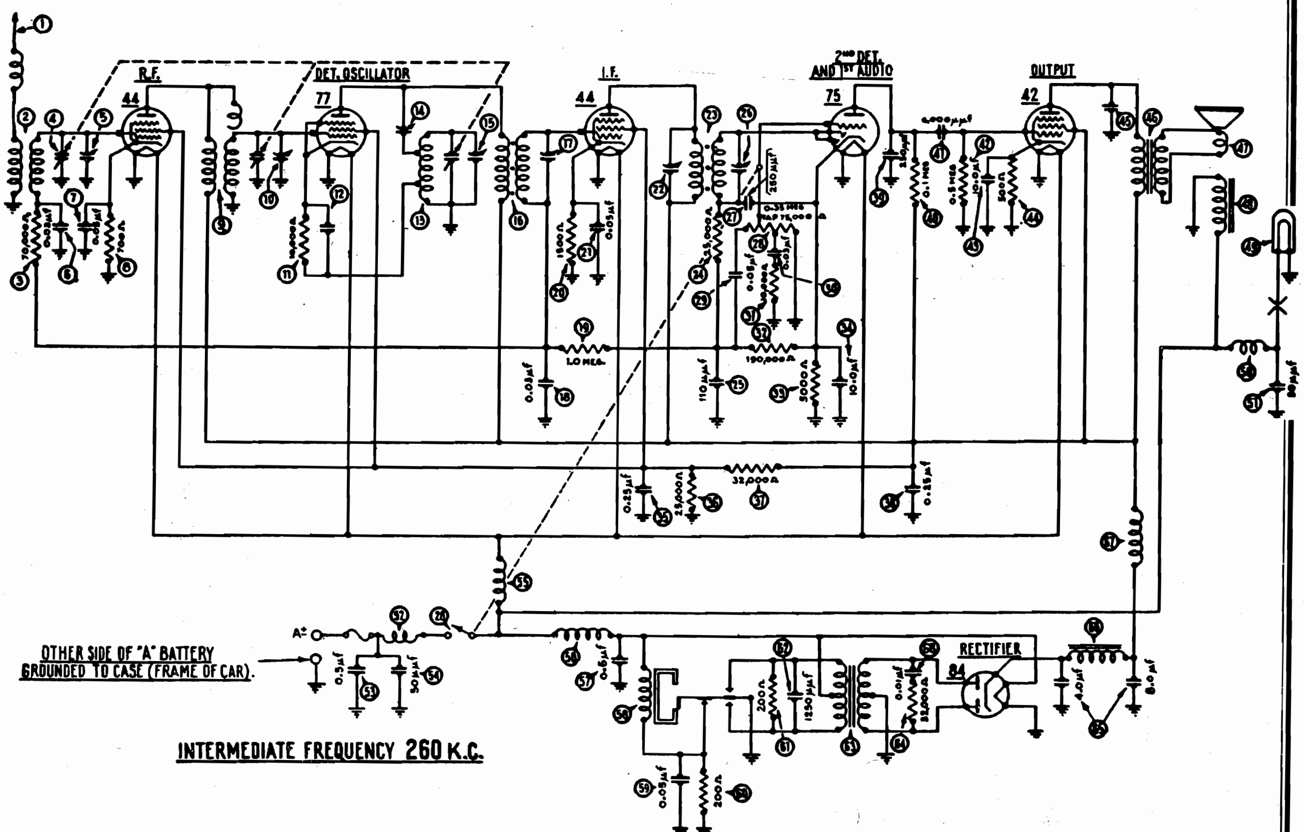
FORD TYPE POLICE AUTO RADIO RECEIVER WITH MOTOR-GENERATOR "B" SUPPLY

Model N, Center Control
Schematic
Parts List

FORD MOTOR CAR CO.

FORD CENTER CONTROL TYPE RADIO

Model N – Schematic Wiring Diagram



Model N Parts List

No. Shown on Schematic	Description	Part No.
1	Antenna Choke	32-1372
2	Antenna Transformer	32-1331
3	Resistor (70,000 ohms)	33-1115
4	Tuning Condenser	31-1166
5	1st Padder (on tun. cond.)	
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	Resistor (700 ohms)	6443
9	R. F. Transformer	32-1332
10	2nd Padder (on tun. cond.)	
11	Resistor (10,000 ohms)	33-1000
12	Condenser (1000 mmfd.)	30-1007
13	Oscillator Transformer	32-1333
14	Padder (Prim. 1st I. F. Tran.)	
15	3rd Padder (on tun. cond.)	
16	First I. F. Transformer	32-1329
17	Padder (Sec. 1st I. F. Trans.)	
18	Condenser (.03 mfd.)	30-4025
19	Resistor (1,000,000 ohms)	33-1096
20	Resistor (2000 ohms)	33-3048
21	Condenser (.05 mfd.)	30-4020
22	Padder (Pri. 2nd I. F. Trans.)	
23	Second I. F. Transformer	32-1237
24	Resistor (25,000 ohms)	33-1013
25	Condenser (110 mmfd.)	30-1031
26	Padder (Sec. 2nd I F. Trans.)	
27	Condenser (250 mmfd.)	30-1032
28	Vol. Con. & Switch Assm.	33-5067
29	Condenser (.05 mfd.)	30-4020
30	Condenser (.03 mfd.)	30-4025
31	Resistor (10,000 ohms)	33-1000
32	Resistor (190,000 ohms)	33-1116
33	Resistor (5000 ohms)	6096
34	Condenser (10 mfd.)	30-2076
35	Condenser (.25-.25 mfd.)	30-4126
36	Resistor (25,000 ohms)	3656
37	Resistor (32,000 ohms)	3525
38	Condenser (.25-.25 mfd.)	30-4126
39	Condenser (250 mmfd.)	30-1032
40	Resistor (100,000 ohms)	6099
41	Condenser (6000 mmfd.)	30-4125
42	Resistor (500,000 ohms)	6097
43	Condenser (10 mfd.)	30-2076
44	Resistor (500 ohms)	33-3031
45	Condenser (4000 mmfd.)	30-4185
46	Output Transformer	32-7019
47	Cone and Voice Coil	02861
48	Field Coil Assembly	36-3097
49	Pilot Lamp	34-2038
50	Interference Choke	32-1374
51	Condenser (50 mmfd.)	30-1029
52	Interference Choke	32-1374
53	Condenser (.5 mfd.)	30-4184
54	Condenser (50 mmfd.)	30-1029
55	"A" Choke	32-1368
56	Vibrator Choke	33-1367
57	Condenser (.5 mfd.)	30-4047
58	Vibrator	38-5036
59	Condenser (.05 mfd.)	30-4039
60	Resistor (200 ohms)	7217
61	Resistor (200 ohms)	7217
62	Condenser (1250 mmfd.)	5886
63	Power Transformer	32-7232
64	Resistor (32,000 ohms)	3525
65	Condenser (4-8 mfd.)	30-2030
66	"B" Choke	32-7233
67	R. F. Choke	32-1078
68	Condenser (.01 mfd.)	30-4051
	4-prong Socket	27-6015

Description	Part No.
5-prong Socket	27-6014
6-prong Socket	6417
Spark Plug Resistor	33-1015
Spark Plug Terminal	28-6179
Interference Cond. (Gen.)	30-4181
Interference Cond. (Dist.)	30-4176
Dial Assembly	42-5166
Knobs	27-4124
Knob Springs	28-1738
Battery Cable	38-5749
Fuse	7227
Fuse Insulator	27-7131
Flex. Control Shaft (Tuning)	28-8241
" " " (Volume)	28-8242
Glass for Control	27-7325
Dial Assembly	42-5166
Pointer	28-1956
Antenna Lead	L-1741
"T" Bolt (set mounting)	28-6161
Nut (set mounting)	W-518A

FORD MOTOR CAR CO.

The New Ford Auto Radio Incorporates: New, advanced principles of circuit and tube design. Six tube Superheterodyne with bass compensation. Rugged, compact, single unit Chassis. Built-in Electro-dynamic speaker. Highly developed automatic volume control. Illuminated, custom-built instrument panel control, mounting in ash tray opening.

Receiver mounts directly above steering column, out of sight and out of the way.

Controls go into ash tray opening. A special drilling template is furnished with each receiver by means of which the receiver can be mounted in cars without ash tray equipment.

These instructions have been carefully prepared for your use in installing the 40-18805-E receiver in Ford 1933 and 1934 cars. Read them carefully in every detail before attempting an installation.

Antenna

Antenna have been built in all closed Ford cars for some time with aerial lead coming down at the rear of the body or the right-hand windshield pillar. Closed cars of recent manufacture have aerial leads coming down the left-hand windshield pillar. (See Fig. 268.)

When installing this radio in a car having the antenna lead-in at the rear of the body, cut this lead-in (40-18812-AR) off as short as possible (taping the end and fastening it securely to prevent shorting the antenna through contact with the metal of the body) and install the new lead-in (40-18812-D). Loosen the front left-hand corner of the head-lining sufficiently to pass the single end of the lead-in through the center of the front L.H. pillar and solder that portion of the lead-in which is stripped to the wire roof netting (after two turns of the lead-in have been made around the netting). See Figure 268 connection "X". The roof netting must be scraped clean of any paint where the lead-in is to be soldered. A braided "pigtail" which is soldered to the male connector at the receiver end of the aerial lead must be grounded to a body brace just at the base of the pillar. This can be soldered or fastened with a sheet metal screw. Scrape the surface of the brace clean with a file to insure a good connection. (See "S" Figure 268.)

The spare wheel antenna, Part No. 40-18812-C should be used on all open cars.

Antenna extension lead, Part No. 40-18818, will have to be used on some cars having lead-in coming down right-hand windshield pillar. For the majority of cars, the lead is long enough to reach without this extension. Connect lead below glove box, then slip up and over top of box. Plug the extension into receiver lead, place it over the top of the glove box and plug it into aerial lead socket at right-hand pillar.

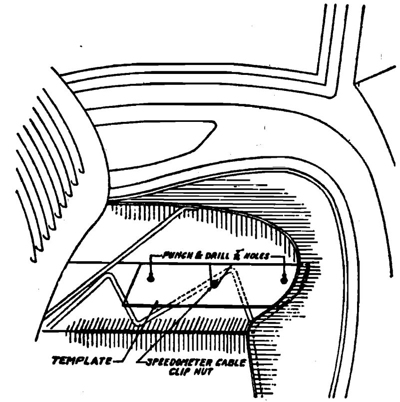


Fig. 269

Radio Location and Installation

Refer to Figure 269 for location of receiver mounting holes.

Place cardboard template on body ledge under left-hand hood as indicated in Figure 269 and prick punch hole locations. Drill 7/16" holes. Assemble T bolts loosely as shown in Figure 270.

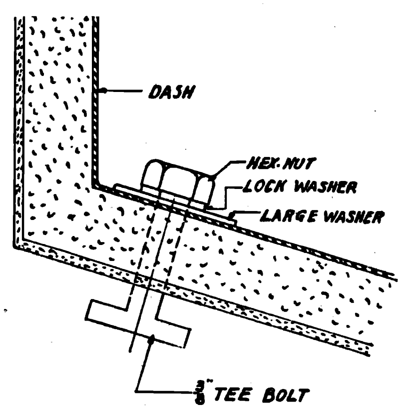


Fig. 270

Remove speedometer cable clip bolt and relocate speedometer cable to the left of the radio receiver. Relocate gas gauge line on the right of the radio receiver.

Install receiver above steering column with speaker facing towards driver and hook the T bolts into the brackets on top of the receiver. Tighten receiver into place. Bring aerial lead around rear of receiver and connect it into male plug on the end of the car antenna.

Ammeter Lead

Place the fuse and fuse insulator in the metal housing and assemble. Now connect the eyelet terminal to the hot (left) side of the fuse block.

Instrument Panel Control

Remove ash receptacle by dropping it forward and bending retaining clips toward the center. See Figure 271.

With a pair of pliers, bend upward ash receptacle back-stop to allow clearance for control head.

Assemble control head and cables in this hole by means of the U-clamp and two wing nuts. Draw up the wing nuts until the cover plate is against the instrument panel. See Figure 272.

The cowl ventilator handle should pass between the two flexible shafts. The shaft on the right with the male end is the station selector and is pushed into the right hand bushing on the receiver (closest to the dash). The left shaft is the switch and volume control. This has a female end and should be pushed into the bushing on the receiver nearest the instrument board. (See Figure 268.) After the shafts are properly seated, tighten the two shaft couplings. Plug the dial light wire into its receptacle close to the switch volume control bushing.

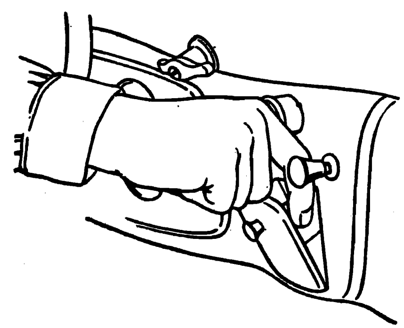


Fig. 271

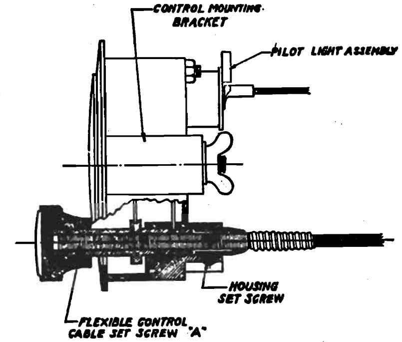


Fig. 272

Installing Dash Controls in Cars Without Ash Receptacle

Place the template on the instrument panel, as indicated in Figure 273.

Be sure that the throttle and choke rods come to the bottom of the slots in the top of the template and that the bottom of the template is flush with the bottom of the instrument panel. With a sharp-pointed instrument score the panel around the opening in the template. Cut out dash to these lines by drilling around inside of mark with a 1/8" drill and filing. Care must be taken not to mar the instrument board or file beyond line during this operation.

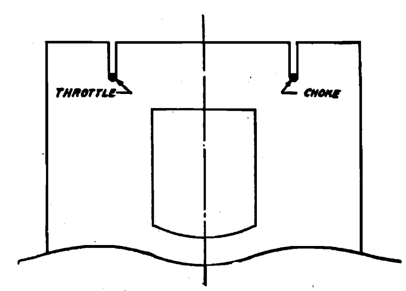


Fig. 273

MODEL N, Center Control Socket, Alignment Service Notes

FORD MOTOR CAR CO.

Dial Calibration

The receiver is calibrated in kilocycles with the last "0" omitted. Turn on receiver by rotating left-hand knob in clockwise direction. It will take a few moments for the tubes to heat up. Tune in a station of known frequency. Remove the right-hand knob by pulling it towards you. This is held in position by a spring clamp. Loosen the set screw on shaft (See "A"—Figure 272) under knob until pointer moves freely. Now turn the pointer to the frequency of the station which is tuned in, tighten set screw and replace knob. Check accuracy of calibration on other stations at different points on the dial and adjust further if necessary.

Spark Noise Elimination

Cut off the eyelet terminals on all spark plug wires at the spark plug and screw on the angle resistors. See Figure 274.

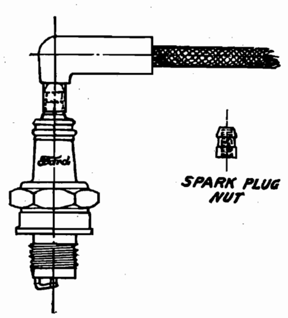


Fig. 274

Remove the round knurled nut and in its place use snap-type nut furnished. Press resistors on snap nuts.

The by-pass condenser with special coil bracket should be mounted on the ignition coil with the condenser wire on the terminal, as shown in Figure 275.

These operations should reduce the interference to a satisfactory level. However, there may be an occasional car which will require an additional B-18827 condenser, either at the ignition switch or at the fuse block.

The condenser to be used at the fuse block can be mounted underneath the bolt which holds the loom adjacent to the fuse block. Connect the wire leading from the condenser to the terminal on either side of the fuse.

If this condenser is to be used at the ignition switch a small hole should be drilled in the instrument board flange just to the right of the steering column, using an 8-32 bolt, nut and lockwasher to mount the condenser. The wire from the condenser should be attached to either terminal at the ignition switch.

If the above operations do not reduce the electrical interference to a satisfactory point, it may be necessary to reduce the clearance between the distributor rotor and the terminal plate electrodes. Remove one distributor cap and terminal plate and clean electrodes with a small file or knife. Build up these contacts with **rosin core solder** about 1/32". Replace terminal plate and cap and revolve motor with crank, leaving ignition switch off. Remove terminal plate and inspect carefully, removing excess solder which may have sheared off.

Repeat this same operation on the other side of the distributor.

Operating Instructions

To turn on the receiver, turn the left-hand knob slightly in a clockwise direction. The balance of the rotation of this knob controls the volume of the radio receiver. This receiver is equipped with a highly developed automatic volume control system which tends to maintain the volume at a constant level. However, there are some places—under viaducts, tunnels, bridges, etc., where the radio signal becomes so weak that it cannot be heard. When driving under trolley lines or in noisy locations, it is advisable to tune in on a strong local station.

Be sure the receiver is tuned in accurately, otherwise distorted reception will result and local electrical interference will be magnified.

When turning off the receiver be sure the left-hand knob is turned counterclockwise until a snap is heard and the dial light goes off; otherwise the receiver will continue to operate and discharge the battery.

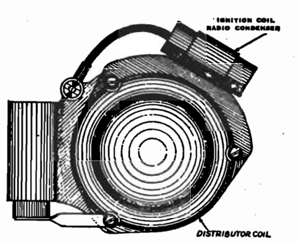


Fig. 275

Generator Interference

Remove generator relay mounting screw and slip condenser bracket under the generator cut-out mounting lug. Re-insert cutout mounting screw and tighten down securely. Connect the condenser wire to the battery terminal of the cutout. See Figure 276.

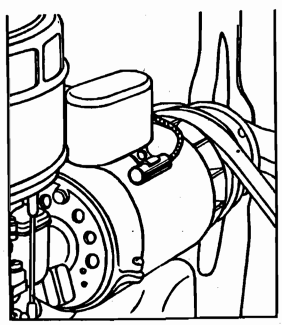
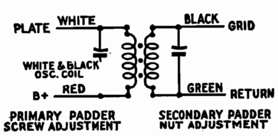


Fig. 276



1st I. F. Transformer

Fig. 277

The following instructions are intended for radio engineers only.

I. F. Transformers and Padders

A new type I. F. transformer complete with padders is used in the Ford center control radio receiver.

The padders are placed in the top of the shield can, one above the other.

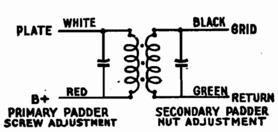
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 280.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 277 and 278.

If replacements are ever necessary, replace the entire coil assembly for the first or second I. F. stage. Neither the coil nor the padders can be obtained separately.

Adjustments

All adjustments have been carefully checked at the factory. If, however, at any time it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter.



2nd I. F. Transformer

Fig. 278

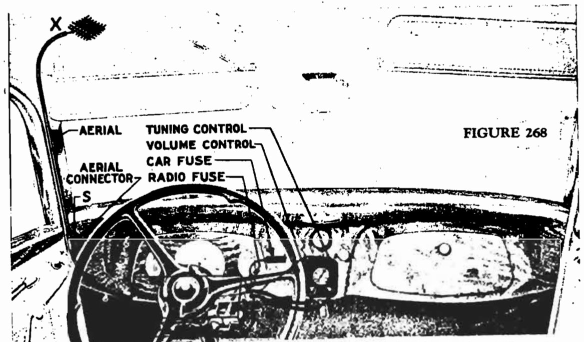
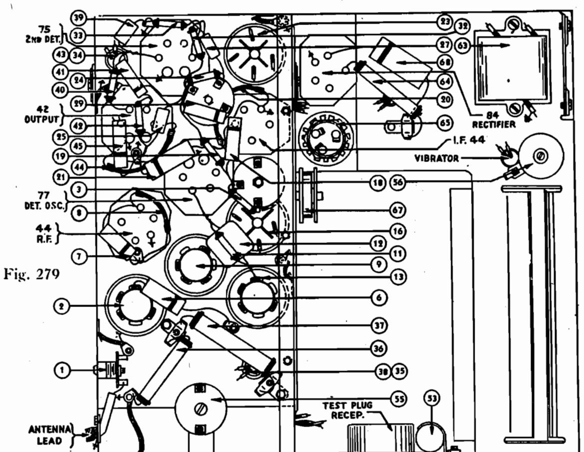


FIGURE 268

The receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the receiver is in good condition except for the padding adjustments.

Remove the lid from the receiver. Remove the grid cap terminal from the 77 tube (for location see Figure 280).

Fig. 279



Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube. (See Figure 280.) The output meter must be connected.

The receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders (22) and (26) are adjusted first (Figure 280). Turn the adjusting screw (22) all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut (26) with a fibre wrench for the maximum reading on the output meter. This applies to the sets to date, but sets of the future, with the broad tuning, the I. F. is close-coupled and will have two peaks, and must be tuned between the two peaks. This requires good judgment and careful adjustment.

Then adjust the screw (22) for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers (14) and (17).

After padding the first I. F. stage, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K.C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Figure 280.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder (15) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K.C., 160 on the dial scale.

Next turn the condenser plates in mesh to 140 on the scale, 1400 K.C., and set the signal generator for 1400 K.C. The R. F. padder (10) and the antenna padder (5) are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver is adjusted properly.

Schematic drawing of the center control type radio is given in Figure 281.

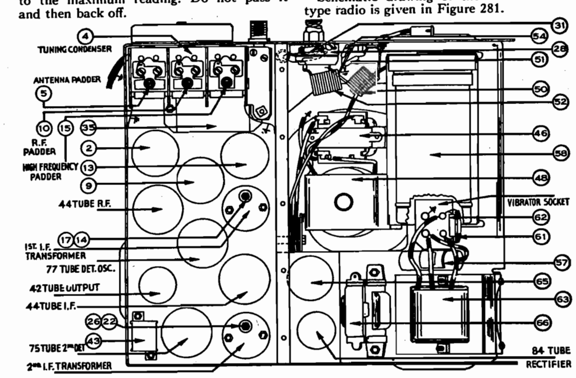
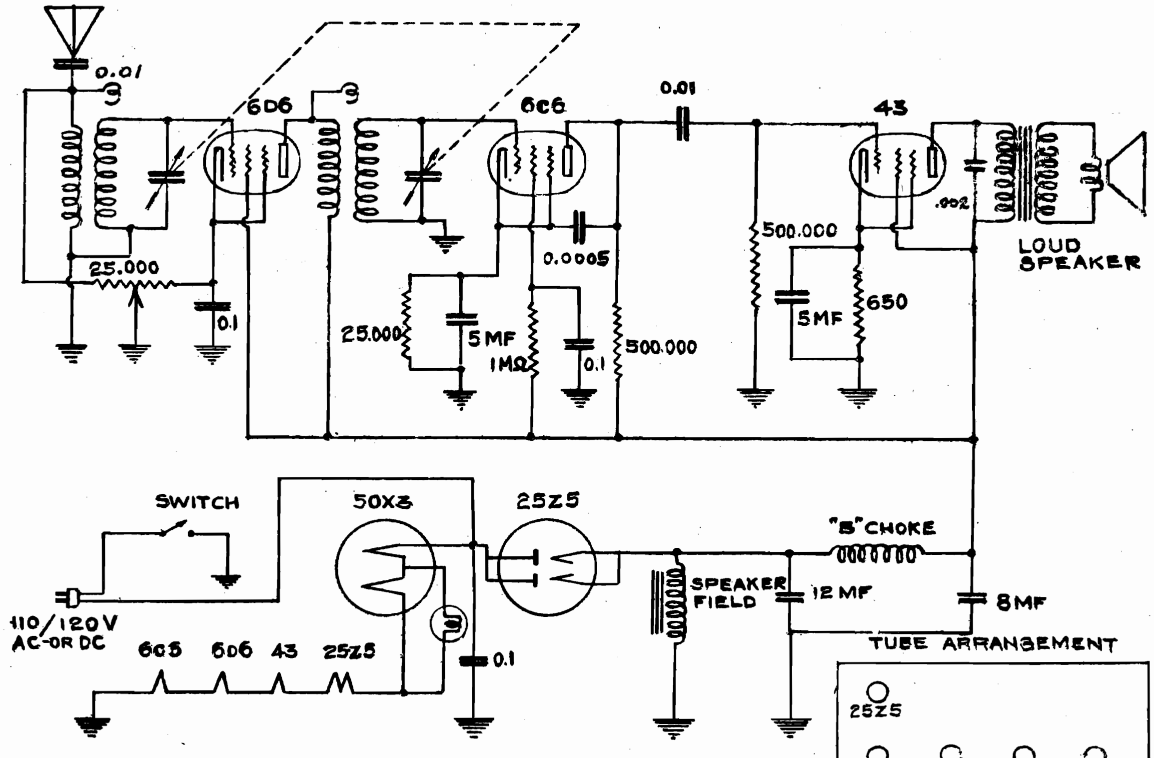


Fig. 280

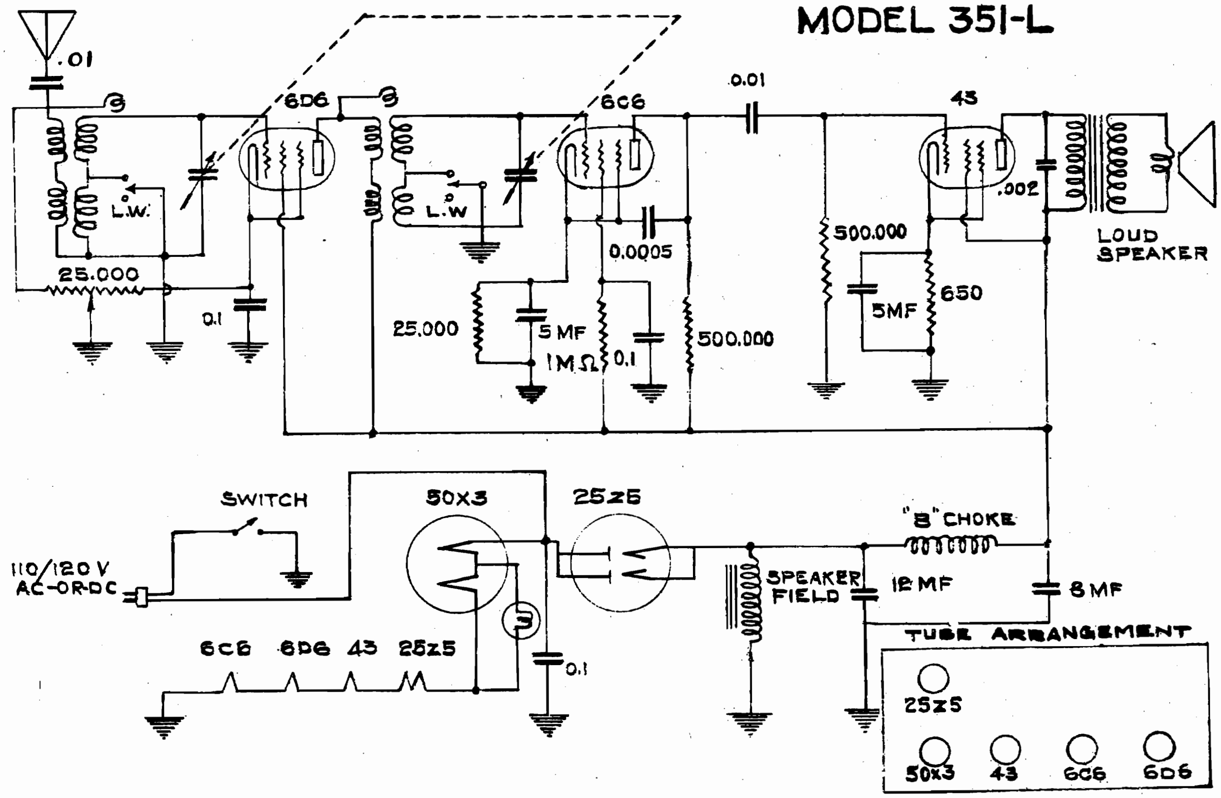
MODEL 351
MODEL 351-L
Schematics
Socket

FREED MFG. CO., INC.



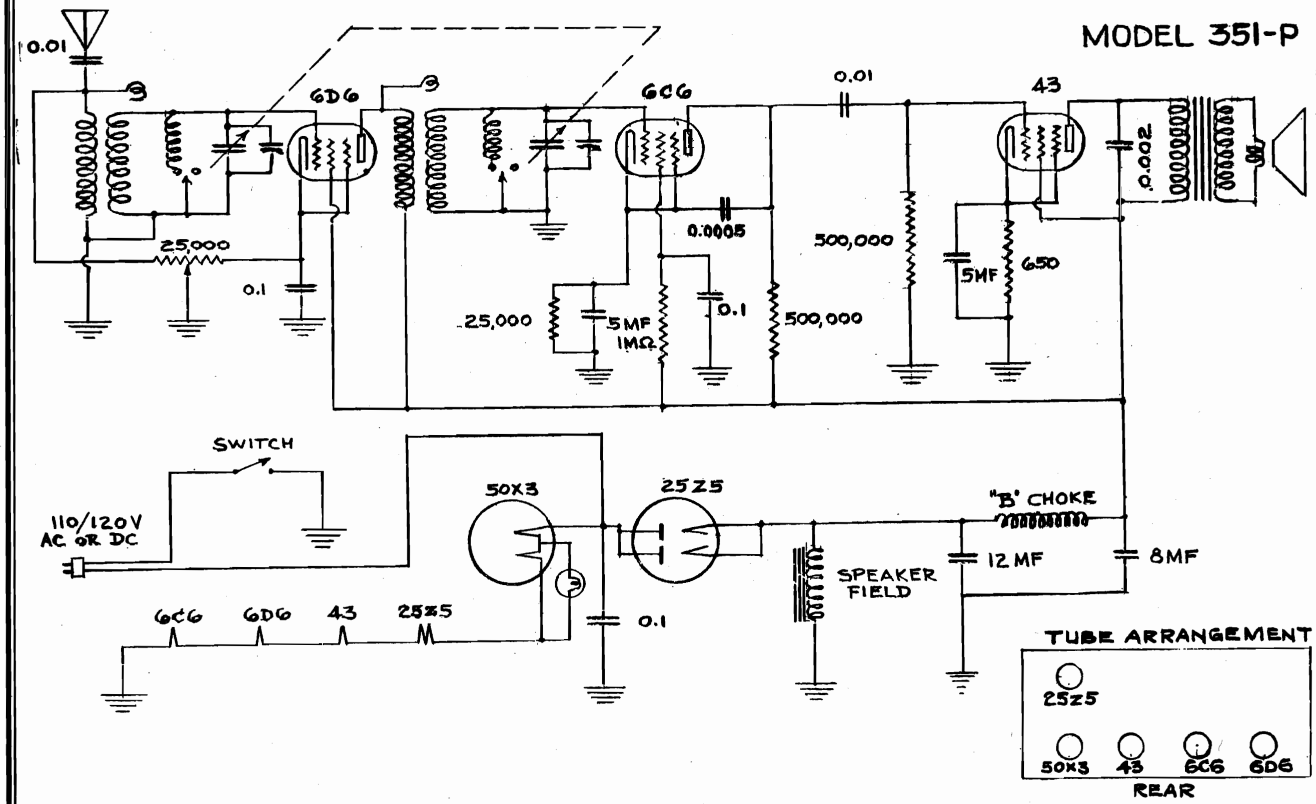
MODEL 351

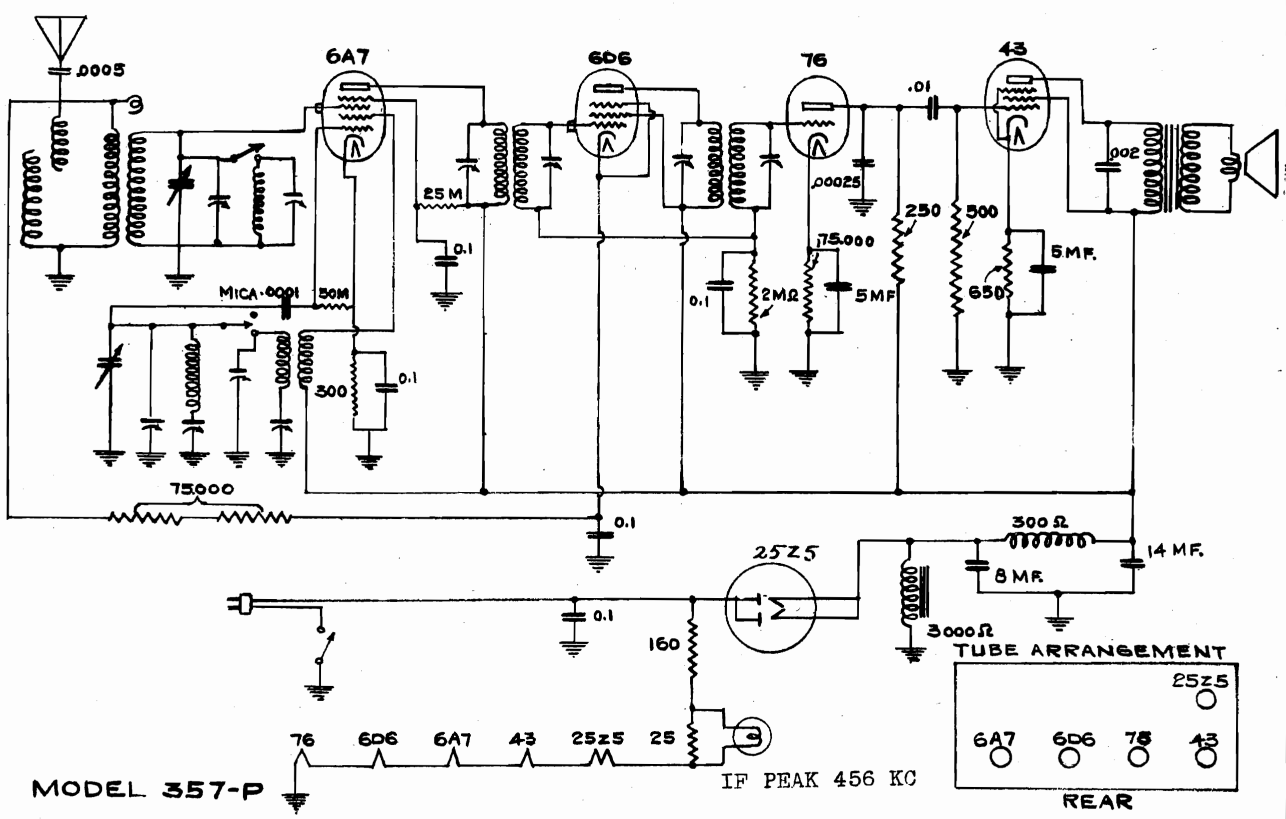
MODEL 351-L



MODEL 351-P
MODEL 357-P
Schematics, Socket

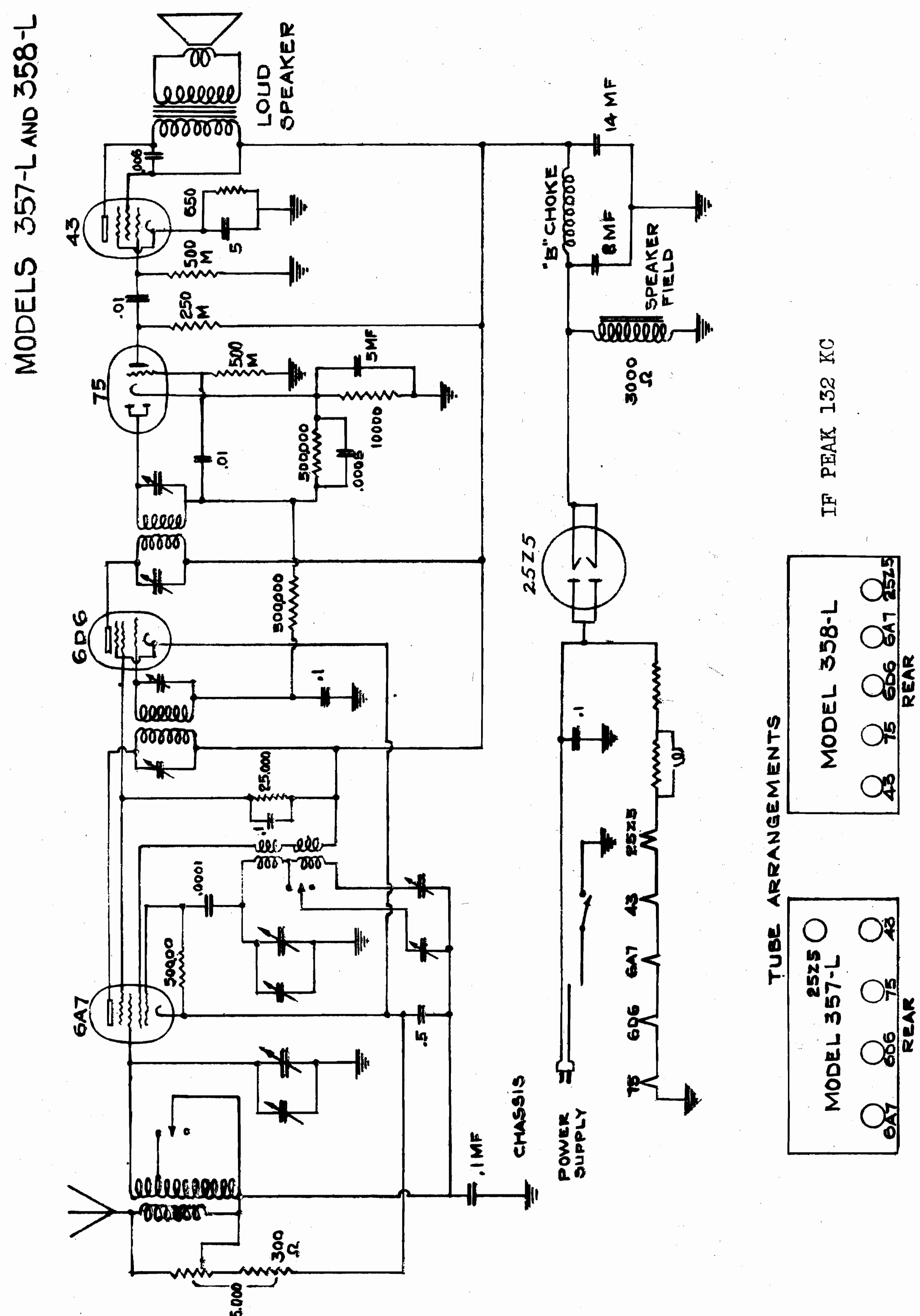
FREED MFG. CO., INC.





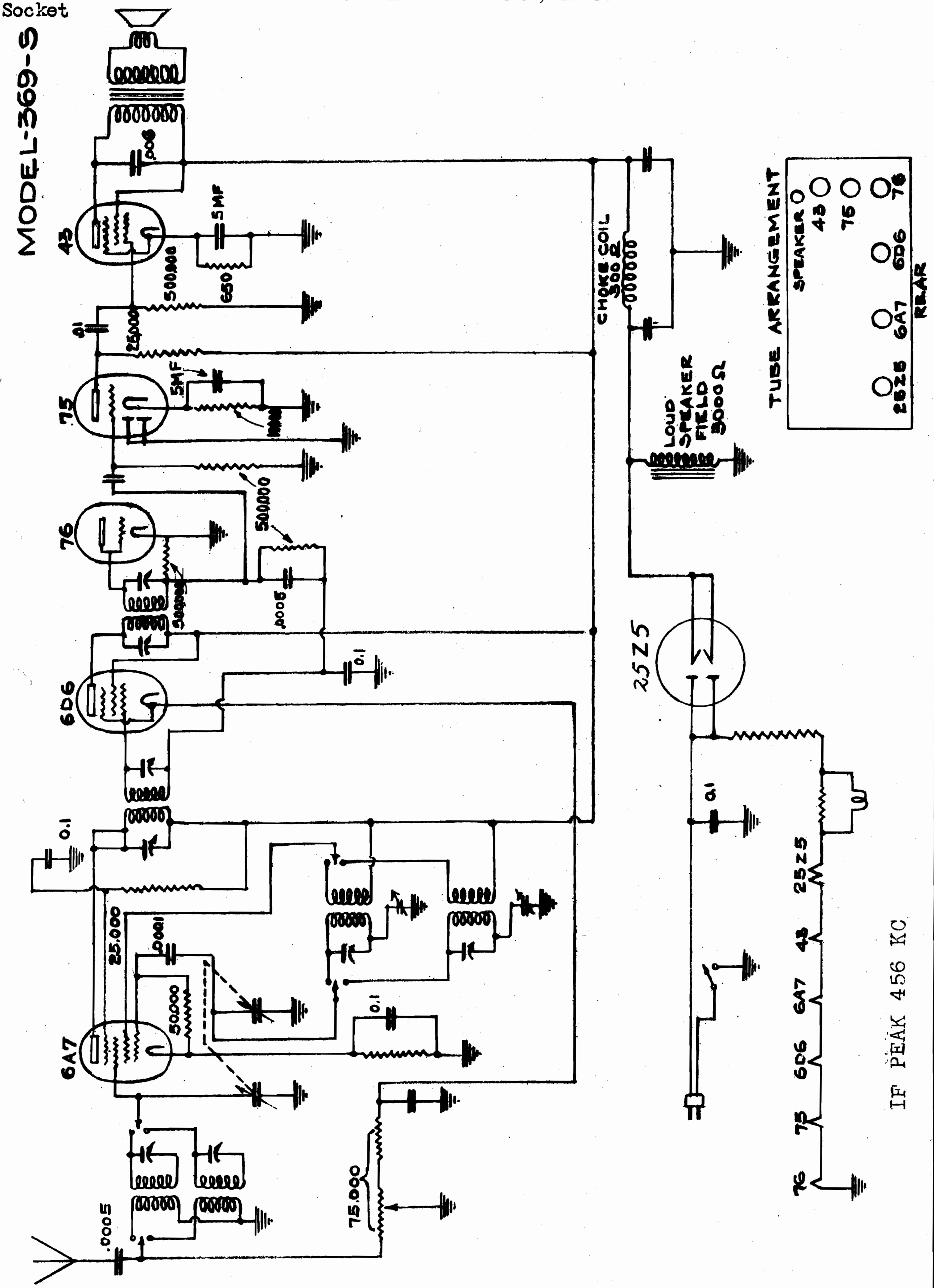
MODELS 357-L,358-L
Schematic,Socket

FREED MFG. CO., INC.



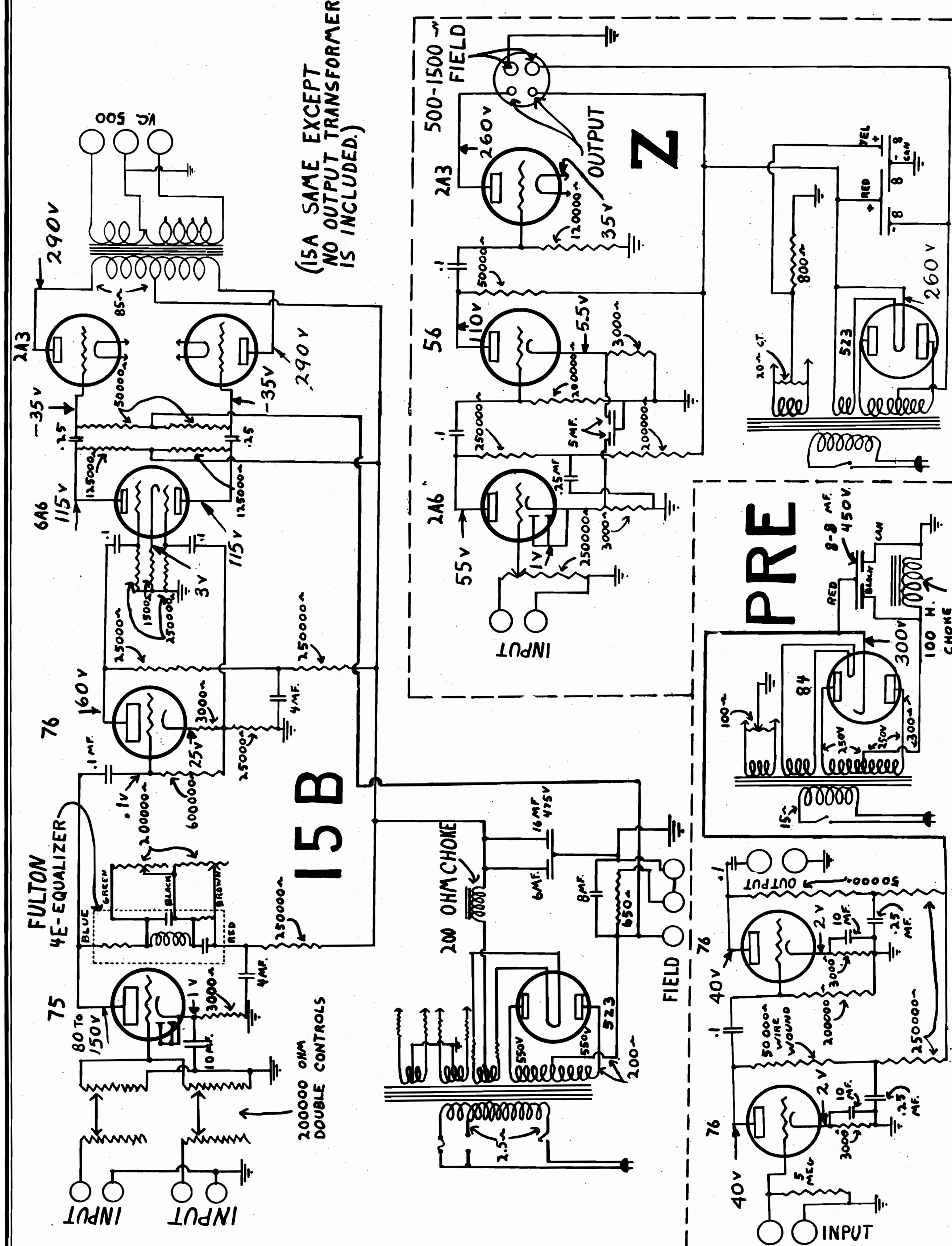
MODEL 369-S
Schematic
Socket

FREED MFG. CO., INC.



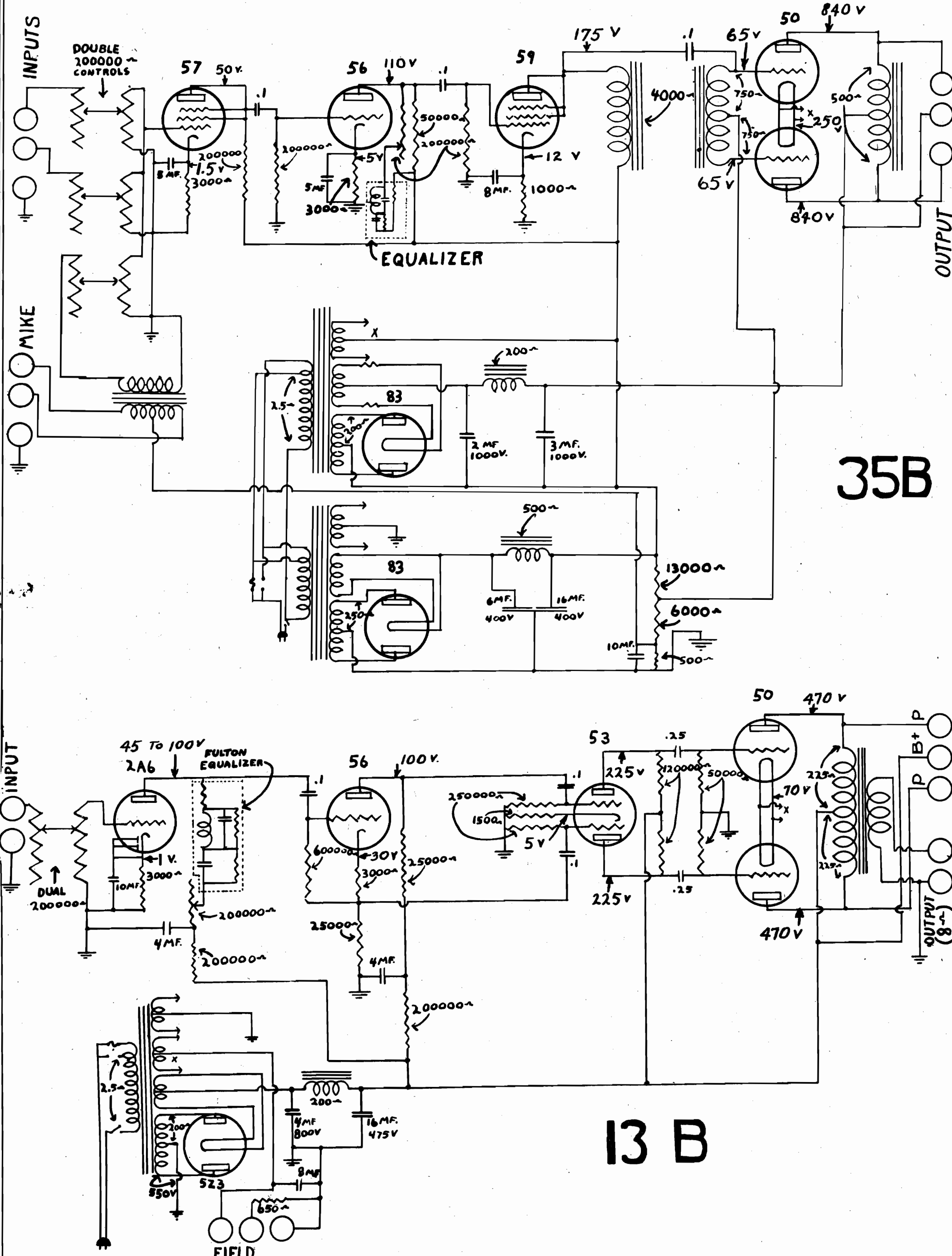
FULTON RADIO CORP.

MODEL Pre
MODEL 15B
MODEL Z
Schematics



MODEL 13B
MODEL 35B
Schematics

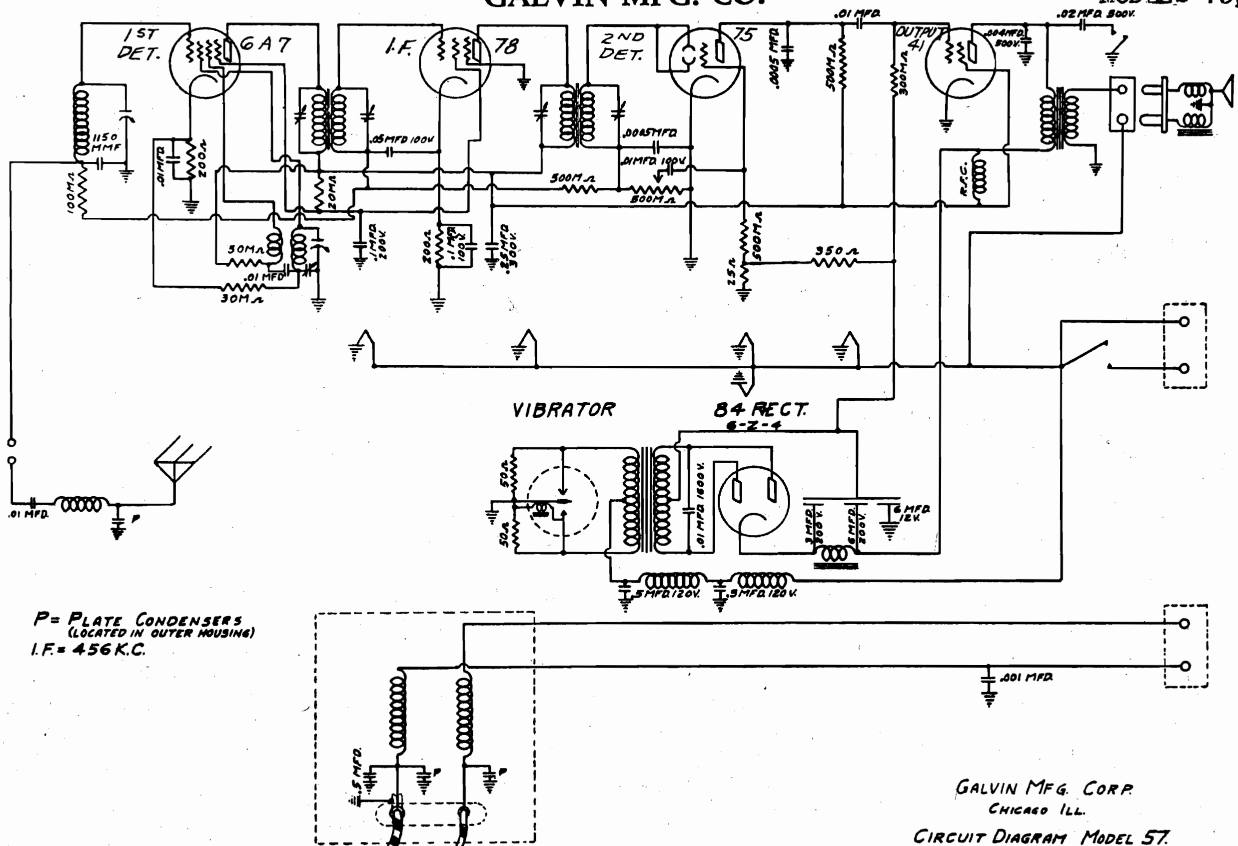
FULTON RADIO CORP.



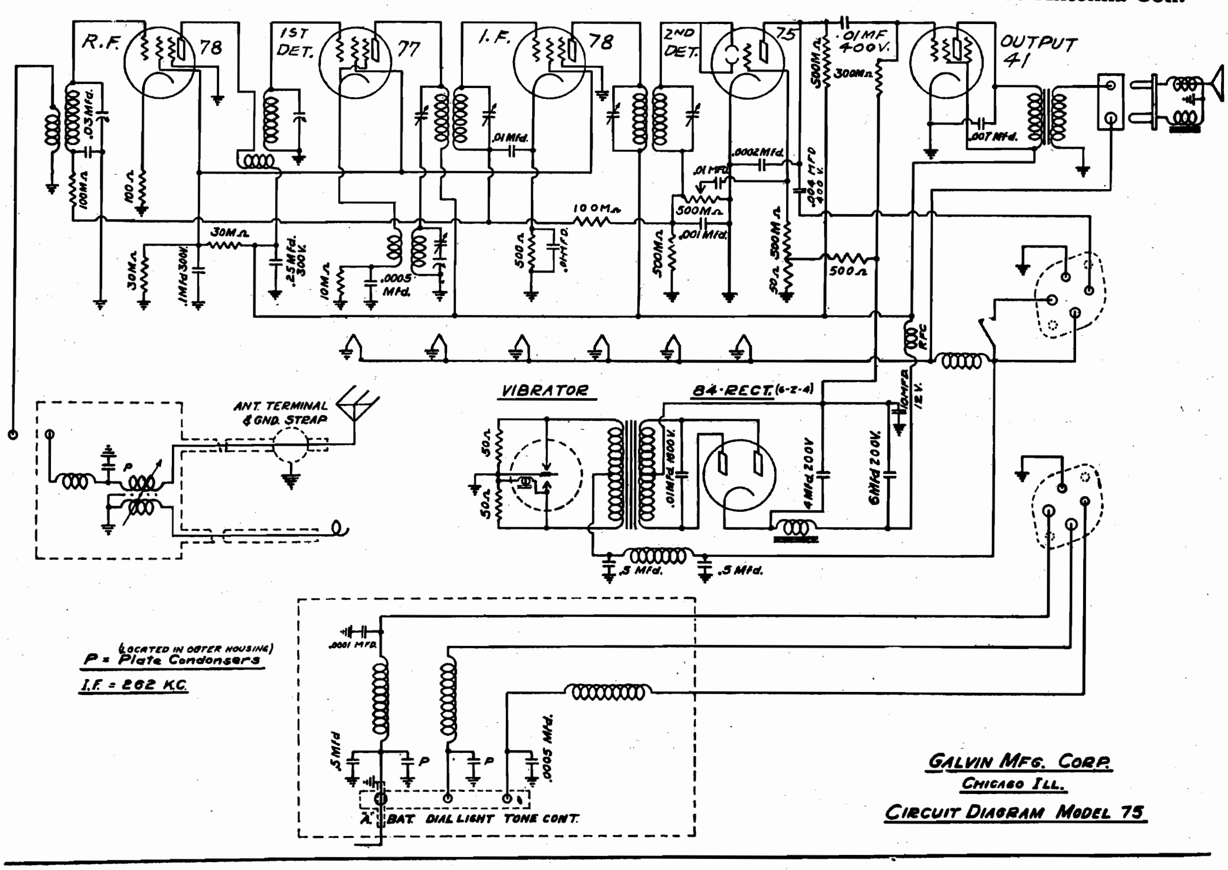
Schematics

MODELS 57,62
MODELS 75,79

GALVIN MFG. CO.



Model No. 62 Circuit is the same as Model No. 57 except that No. 62 uses an Iron Core Antenna Coil.



Model No. 79 Circuit is the same as Model No. 75 except that No. 79 uses an Iron Core Antena Coil.

MODELS 75,79
MODELS 100,110
Alignment,Data

GALVIN MFG. CO.

ALIGNMENT PROCEEDURE

ALIGNMENT OF THE I. F. TRANSFORMERS:

Models No. 75, No. 79, No. 100 and No. 110—Connect the feeder from the oscillator to the grid of the No. 77 autodyne tube. Remove the grid connection and connect a 500 M resistor from grid of the tube to ground.

Rotate the variable condensers to full open position.

Set the oscillator to a frequency of 262 K. C. adjust the I. F. and diode feeder trimmers to obtain maximum reading on the output meter.

Models No. 57 and No. 62—the same procedure as above is followed, with the exception that the service oscillator is set at 456 K. C. and the I. F. and diode feeder trimmers are adjusted to that frequency.

ALIGNMENT OF VARIABLE CONDENSERS:

All Models—connect the feeder from a service oscillator to the antenna lead of the set and adjust the oscillator to 1540 K. C. Next, completely open the condenser, going to minimum capacity, and adjust the oscillator trimmer on the condenser gang for greatest reading on the output meter.

Now set the service oscillator to 1400 K. C. and rotate the variable condenser for a peak reading on the output meter of the signal from the oscillator. Then adjust the R. F. and antenna trimmers on the condenser gang for maximum reading of the output meter.

Next set the service oscillator to 600 K. C. Close the condenser gang until the signal is again tuned in and rotate the condensers back and forth while adjusting the oscillator padder condenser for highest reading on the output meter. The variable condensers should now track perfectly and coincide with the dial calibration.

The Models No. 75 and No. 79 may be placed in operation on the service bench by connecting the hot "A" battery lead to one of the large pins of the 4 contact chassis plug. No. service extension cable is required. The Models No. 57 and No. 62 may be operated by connecting the hot "A" lead into the top connection of the two-way receptacle.

The tuning condensers may also be aligned by using the MOTOROLA alignment gauge. When this is used it is only necessary to insert the gauge between the sections of the variable condenser gang. Set the rotor plates of the condensers to the line marked 1400. Adjust all three trimmers to maximum output. Then reset to the 600 K. C. line and adjust the 600 K. C. padder. The balance of the frequency calibration lines on the gauge may be used for further checking if desired.

BENCH SERVICING OF MODELS No. 57, No. 62, No. 75, No. 79, No. 100 and No. 110:

All of the above models are equipped with plug-in chassis so that they may be removed from the set housing without affecting the original installation in the car.

SERVICING THE CONTROL HEAD:

Should the mechanism within the control head require servicing, it may be reached by prying the bezel ring upward as shown in Figure No. 2. This method of removal prevents damage to the bezel ring and it may be reinserted without difficulty. When inserting NEW rings, use an old control head casting, as a jig, inverted over the face of the control being repaired and tap lightly with a hammer to guide ring in place.

Figure (1) shows the rear view of the chassis of Model No. 100 or No. 110, illustrating the method of connecting the speaker to the set on the test bench, thereby eliminating the use of an extension service cable. The connector pin for the Bat. supply lead may be secured from an old tube base.

MODELS 100 (Type 2),110
Schematic, Data

GALVIN MFG. CO.

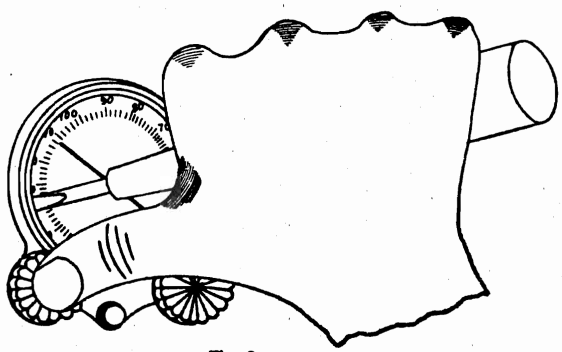


Fig. 2

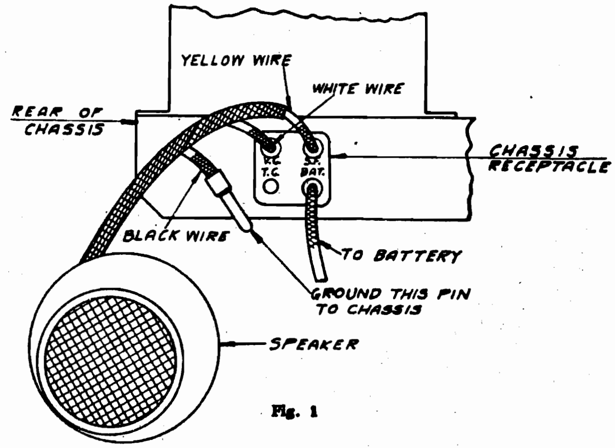
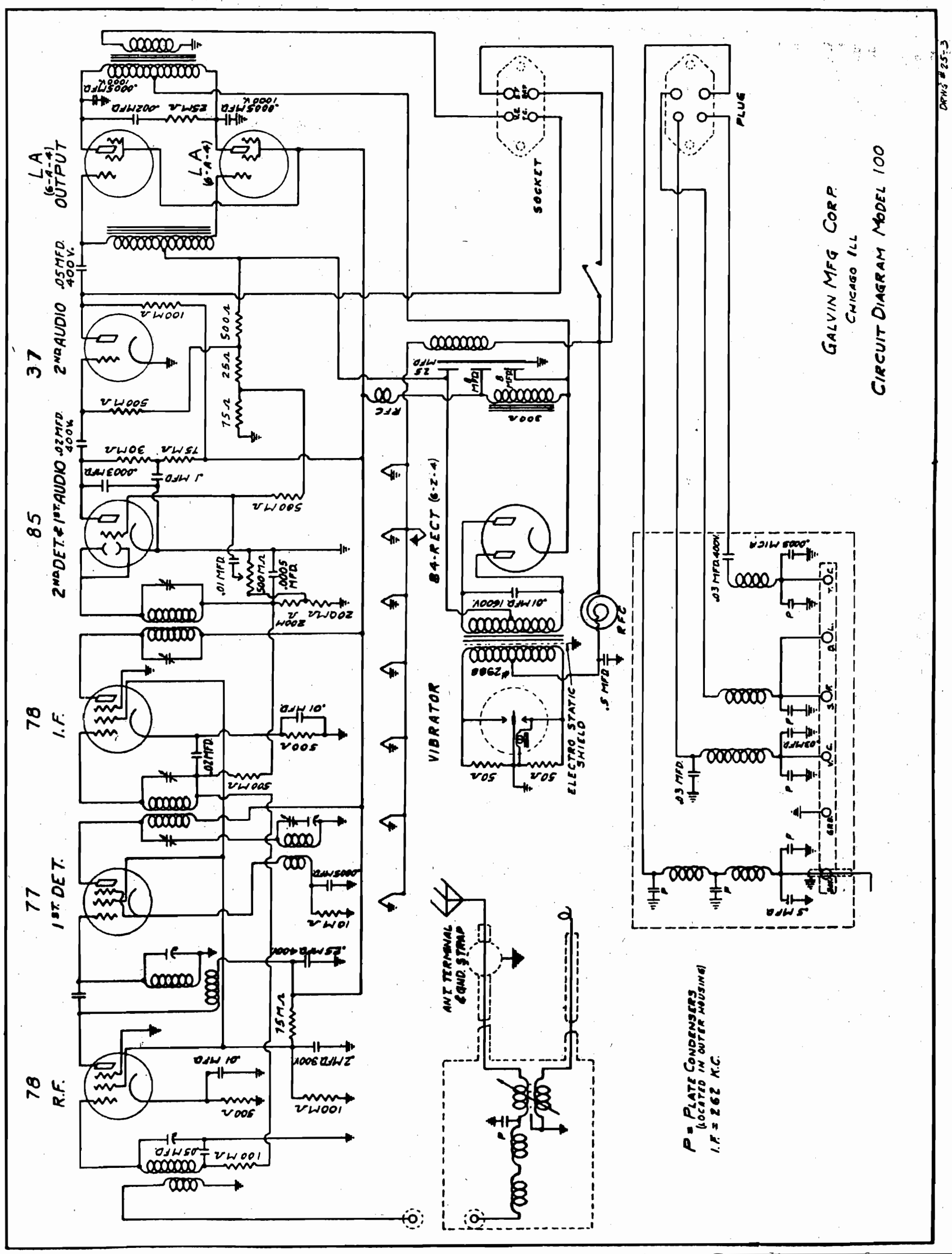


Fig. 1



Model No. 110 Circuit is the same as Model No. 100 except that No. 110 uses an Iron Core Antenna Coil.

MODEL 100
Magic Eliminode Data

GALVIN MFG. CO.

NOTES OF MAGIC ELIMINODE
THEORY OF OPERATION

The Magic Eliminode in the 1935 Motorola consists of a combination of an extremely efficient high frequency filter and balancing system.

In practically every car the Magic Eliminode will completely eliminate ignition interference when the installation of the set is made according to instructions and the intensity of the motor noise is not so great so as to be beyond the range of the Magic Eliminode.

The Magic Eliminode should not be expected to work miracles or to do the impossible, but after analyzing its operation you will find that it works on good, sound and fundamental principles.

The filter used in the Magic Eliminode operates most effectively at the lower broadcast frequencies, therefore, if when tuning the set from about 600 to 550 K.C. no motor noise is heard, it can be assumed that the noise level is within the range of the Magic Eliminode and the noise then heard when tuning toward 1500 K.C. may be easily balanced out with the movable eliminode coil and complete elimination of motor noise secured.

THE MAGIC ELIMINODE WILL WORK IN ANY CAR OF WELDED STEEL BODY CONSTRUCTION WHEN THE INSTALLATION IS MADE ACCORDING TO INSTRUCTIONS AND THE ACCESSORIES SUPPLIED WITH EACH SET ARE PROPERLY USED.

It is not guaranteed to work in extremely old cars in which the joints (not welded) between the various body sections have separated and rusted. It will not work when the interference level is so high as to be entirely beyond the range of the eliminode but if by proper shielding and bonding the level is reduced sufficiently so that the filter will handle it at 600 K.C., the balancer will take care of it over all other portions of the tuning range of the receiver.

In like manner there will be found many cars in which the filter is so effective that it alone completely eliminates all motor noise and balancing is not required. In that case IT IS UNNECESSARY TO EVEN CONNECT THE INTERFERENCE FEEDER TO THE MOTOROLA.

To further acquaint ourselves with the use and operation of the Magic Eliminode, let us follow a step-by-step procedure in the installation of a Motorola Model 100 in a 1934 V-8 Ford car.

The above combination is used because of the great sensitivity of the Model No. 100 and the fact that no distributor suppressor is used in the V-8 gives us a most extreme combination.

1st -- Mount the set near the right center of the dash with the control head if preferred in the instrument panel.

2nd -- Mount the speaker near the steering column on the left side of the dash.

3rd -- Connect the "A" lead to a convenient point on the 6 volt wiring as close to the starter switch as possible. Insert the speaker, dial light, tone control plugs in the receptacles at the right end of the receiver. Dress wires so that their position is remote to steering column and other wiring, control rods and pipes.

4th -- Connect the two flexible control shafts to the radio by inserting them in their respective sockets and turning each approximately a quarter turn to the right.

5th -- Take the small antenna lead-in junction box that has the short piece of shielded loom attached to it and fish the car antenna lead through this loom until the lead extends into the junction box. Now insert the set antenna lead-in through the ferrule in this box so that the two leads may be spliced together within the box and be totally shielded. SPOT THE SHIELD TO THE FERRULE WITH SOLDER TO SECURE A GOOD GROUND. Next mount the junction box on left side of cowl where paint has been removed and mount it up into the corner post. Bolt the box down firmly so as to secure a perfect ground (THIS IS EXTREMELY IMPORTANT).

6th -- Connect the dome light filter in the dome light circuit and ground its case thoroughly to the car body. Connect the generator condenser to the generator cutout. Connect the other condenser supplied, to the primary post of the ignition coil and ground it under a GEAR CASE COVER STUD or connect the armature condenser to the ignition switch, ground it to the instrument panel and connect noise feeder to the point where condenser is grounded. Place the screen under the floor mat on the right side of the toe boards and ground it to car body. Ground both sides of the hood thoroughly at their rear edges.

7th -- Turn on the radio and the car motor and tune the dial across its tuning range to check for interference. IF NO INTERFERENCE IS ENCOUNTERED, the installation is complete and no further work is necessary. DO NOT CONNECT THE INTERFERENCE FEEDER AS IT IS NOT NEEDED.

IF, however, there is no interference at 600 K.C., but it appears when tuning toward 1500 K.C. it will be necessary to use the balancer.

Proceed as follows:

With the set turned on and tuned to about 1200 K.C. remove the volume control shaft bushing from its socket and insert it in the Magic Eliminode socket (located a little to the rear and above volume control socket), and turn volume knob all the way to the left. Next attach the clamp on the free end of the interference feeder to the choke rod, throttle rod or instrument panel. Now turn the volume control knob to the right until the noise is balanced out. If the balancing coil travels its full length before balance is reached, it will be necessary to move the feeder clamp to another spot on the choke or throttle rod or some other point on the car, such as instrument panel, dash, etc., until a point of balance is secured.

If, when the set was first checked for motor noise it was found that the noise could be heard at 600 K.C., it indicates that its level is too high for the filter and it will be necessary to reduce its intensity by a better grounding of all parts of the radio installation, CHANGING POSITION OF LEAD-IN LOOM, bonding instrument panel to dash, etc., or changing the mounting position of the antenna lead junction box to secure a better ground. THIS IS EXTREMELY IMPORTANT and should be determined by trial. As soon as the interference level is brought down within the range of the filter at 600 K.C., the balancer may be employed to eliminate all interference over the rest of the tuning range of the receiver.

When making an installation with the Magic Eliminode be sure to remember the following:

1st ... THAT A GOOD MECHANICAL INSTALLATION AND PERFECT GROUNDING OF EVERY PART OF THE SET IS VERY IMPORTANT. Do not expect a slip-shod installation to give good results.

2nd ... The Magic Eliminode will eliminate interference within reasonable limits only, as encountered in any standard automobile. It cannot be expected to work in cases when, special high voltage ignition coils, spark intensifier, ignition boosters, or ignition wiring changes have been made. Remember it does not work miracles.

3rd ... Use all accessories as supplied with each set and follow instructions carefully.

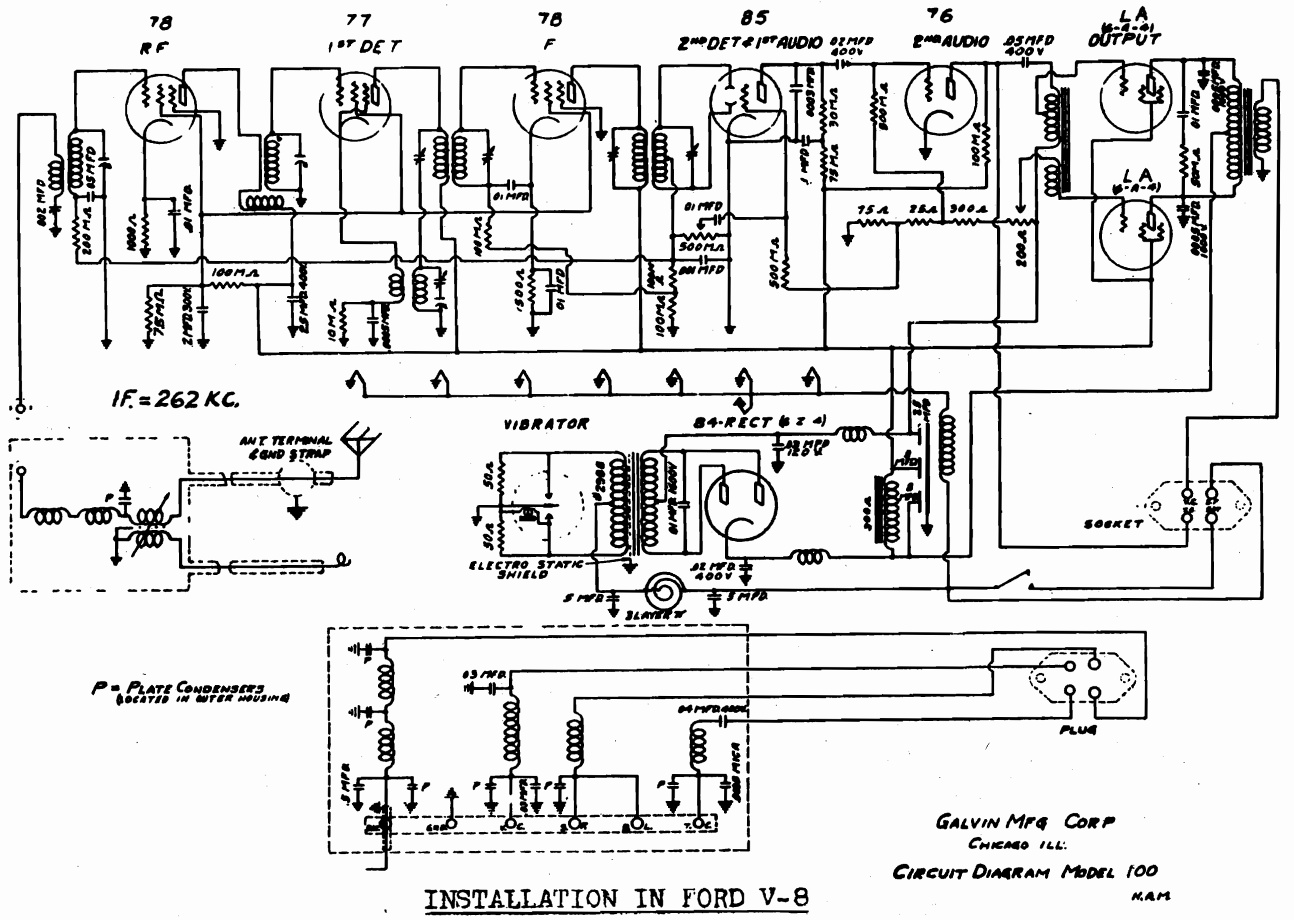
4th ... When balancing out interference keep the hood down and grounded and have the car doors closed.

5th ... Do not connect the interference feeder clamp to its point of interference pickup until after checking the filter only. If the filter is found to be sufficiently effective do not use the interference feeder.

In some cars there may exist a slight trace of interference when accelerating the engine. This may be overcome by connecting a Motorola dome light filter in series with the primary breaker point wire between the coil and distributor and ground it to the engine block.

MODEL 100 (Type 1)
Schematic
Installation Data

GALVIN MFG. CO.



INSTALLATION IN FORD V-8

When mounting the Model #100 in the motor compartment of the V-8 Ford, be sure to mount it at least 5 inches above the rear spark plug of the left motor block.

If it is mounted too close to spark plugs, interference difficulties may occur.

A special accessory package carrying catalog number MF-37 for Ford motor compartment mounting may be secured from your distributor.

This package includes the following:

1 - Mounting bracket of heavy gauge steel
2 - 2/16" x 1½" bolts for fastening bracket to bulkhead
2 - 5/16" x 3/8" studs for fastening set to bracket
1 - Curved padding compression washer
1 - Drilling templet

FORD IGNITION COIL CONDENSER

A specially constructed condenser (catalog Number M-42) for Ford V-8's may be secured from your distributor.

This condenser should be connected to the primary terminal post of the ignition coil and is provided with a bracket for mounting under one of the engine gear case cover studs.
When installing #75 or #100 in V-8's, connect the interference feeder to the lower lip of the instrument panel - directly above the ignition switch, and at the point where the ignition switch by-pass condenser is grounded.

MODEL 100
Mounting Notes
Adjustments

GALVIN MFG. CO.

LOCATION OF THE RADIO SET

The Motorola model 100 should be securely bolted to the dash, and a position for mounting may be selected either in the driver's compartment or in the motor compartment. When selecting a location for the set, consideration should be given to freedom from obstruction and sharp bends in the control shafts that may affect their operation.

Also give consideration to the future servicing of this instrument and mount it in such a position that the chassis may easily be removed for servicing without removal of the complete set housing.

LOCATION OF THE UNIVERSAL AIRPLANE TYPE CONTROL

Fig. 1

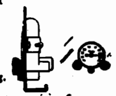


Fig. 2

The Universal Airplane type control head may be mounted on either the right or left side of the steering column with the mounting bracket as in *figure 1*, or in those cases where an opening has been provided in the instrument panel for the radio controls it may be installed by using the special instrument panel medallion plates and mounting brackets as supplied for the various makes of cars. ***These medallion plates to match the design and finish of the instrument panel, may be secured from your Motorola dealer or distributor. BE SURE TO STATE MAKE AND MODEL OF CAR.***

MOUNTING OF THE SET

The Motorola model 100 can be mounted either in the motor or driver's compartment and the following instructions apply to mounting the set in the motor compartment. However, the same general instructions apply when mounting the set in the driver's compartment.

It is especially recommended that extreme care be taken and a good neat mechanical installation be made, particularly to the location of the antenna lead and A lead regarding their proximity to the high tension wire, ignition coils, etc., as this will later help immeasurably in the complete elimination of all ignition interference.

1. Place the cardboard drilling templet in position on the dash and mark the mounting holes for the set.
2. Mark the position for the holes for the shielded aerial lead and the two flexible control shafts, taking care that no sharp bends will occur in the shafts, as this will seriously effect their operation.
3. Locate a suitable position for the speaker, mark the position of the hole for the single speaker mounting stud.

NOTE: To secure the full high fidelity tone designed into this radio set, it is ***EXTREMELY IMPORTANT*** that the speaker be mounted at an angle in the car, as shown in *figure 3*. In every car there is a very definite position in which the speaker may be mounted to take full advantage of the cowl resonance and accoustical properties of the car. This position may be determined by trial, by so locating the position of the speaker mounting hole that the speaker may be revolved to any angle on its Universal mounting stud and then after the set has been placed in operation, tune to a radio station of good tonal quality and adjust the angle of the speaker until full bass note response is secured.

4. Drill all holes with a 3/8" drill.
5. Screw the set mounting studs into the tapped holes at the rear of the set.
6. Mount set and speaker in their respective positions, using the large washers to compress against the padding on the dash.

NOTE: Before placing the set in position on the dash it is EXTREMELY IMPORTANT that the paint be cleaned around each hole and the special lock washers provided allowed to dig into the metal at these points.

7. Mount the control head on the steering column or in the instrument panel, as shown in *figures 1 and 2*.

INSTRUMENT PANEL MOUNTING OF CONTROL

To remove tuning shaft, loosen set screws A, B, and C, *figure 4*. To remove volume control shaft, loosen set screw D.

To remove knobs remove set screws E and F. When replacing shafts in control head, insert them to their limit, then release housing about 1/32" to relieve binding.

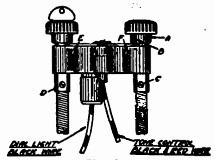


Fig. 4

8. Insert the *volume control* shaft in hole *(A) figure (8)* in the center of the left end of the receiver by placing the tongue of the flexible shaft into the slot in the volume control shaft, then insert the housing bushing. Insert the tuning control shaft in hole *C figure 8* on the left end of the receiver. The shaft fittings are of the self-locking type and may be rigidly secured by turning each approximately a quarter turn to the right. Tighten finger tight only. Do not use wrench or pliers.
9. Insert the plugs on the speaker wires, dial light wire, and tone control wire into their proper receptacles, *figure (5)* located at the rear right end of the receiver.

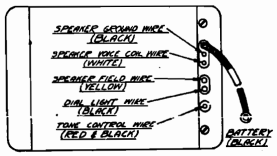
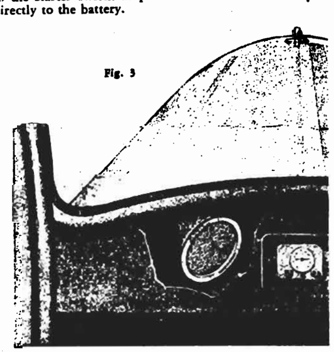


Fig. 5

(a) Insert black speaker wire into 1st receptacle at top marked (G. N. D.) *"ground"*.
(b) White wire into 2nd receptacle marked (V. C.) *"Voice Coil"*.
(c) Yellow wire into 3rd receptacle marked (S. F.) *"Speaker Field"*.
(d) Dial light wire into 4th receptacle marked (D. L.) *"Dial Light"*.
(e) Tone control wire into 5th receptacle marked (T. C.) *"Tone Control"*.

10. Connect the A lead to any convenient 6 volt supply as close to the starter switch as possible. It is not necessary to run it directly to the battery.

Fig. 3


NOTE: Do not connect Interference feeder until after the set has been tried and the necessity for it is apparent.

11. Mount the antenna lead junction box to the car body or a welded member, and ***not to the instrument panel***, then slip the car antenna lead-in through the shielded loom allowing the loom to extend up into the front corner post, as shown in *figure 6*. Insert the antenna lead of the receiver into the ferrule provided in the junction box, solder its shield to the box, splice and insulate the lead-in connection and replace cap on junction box.

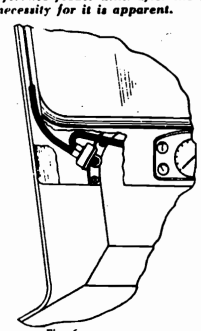


Fig. 6

NOTE: THIS IS THE MOST IMPORTANT POINT IN THE ENTIRE INSTALLATION.

ANTENNA

Practically all automobiles are now equipped with antennas. The lead-in wire will usually be found on the right or left-hand side, behind the instrument panel. If the car is not already equipped, an antenna of nine square feet of screen wire is recommended.

OPERATION

Insert the key in the left-hand control knob. Turn knob slightly to the right until the power switch snaps on. The balance of the revolution controls the volume. The right-hand knob is the station selector. The center knob is the variable tone control. Turn it to the right for bass and to the left for treble.

ADJUSTING THE STATION SELECTOR INDICATOR

Tune in a station of known frequency, preferably about 1000 K.C. Insert a small screw driver in the center rear of the control head and adjust indicator to the frequency of the station being received. *Figure 7.*


Fig. 7

ADJUSTMENT OF TUNING CONDENSER GEAR

The tuning condenser may be adjusted against its drive pinion by simply turning the cam screw, reached through a hole in the left side of the set housing *figure (D) (8)*. This hole is covered by a plug button, easily pried off with a screw driver. Turn the screw to the left until a slight drag is felt on the station selector knob, then back off slightly until free movement is obtained and replace plug button.

BALANCING SET TO THE ANTENNA

After the set is installed ready for operation, it may be necessary to balance the set to the antenna. This is done by ajustment of the antenna trimmer, located under a plug button at the top of the set, which may be removed by prying upward with a screw driver. In making this adjustment, tune in a very weak station between 1000 and 1200 on the dial. Adjust the trimmer with a screw driver until the point of maximum volume is reached.

ELIMINATION OF IGNITION INTERFERENCE

Insert the distributor suppressor in the high tension wire not more than two inches from the distributor.

Mount the generator condenser on the generator frame and connect the pigtail connection to the contact on the generator cut-out.

Connect the ***Motorola Dome Lite Filter*** in the dome light wire at the point where the wire enters the front corner post of the car, making sure that filter case is ***well grounded***.

Connect the Motorola ammeter condenser to one side of the ***Ignition Switch*** and to ground.

Place the Motorola floor board shield on the toe boards on the left side of the car under the floor mat and ground it by removing the toe board screws and replacing them through the screen. Except in those cases as noted on the interference chart.

At this point the set should be turned on, the motor started and checked for ignition interference. Tune the set across its tuning range and if no interference is encountered it is unnecessary to connect the interference feeder or to proceed with balancing.

CONNECTING THE INTERFERENCE FEEDER

The purpose of the interference feeder is to feed into the ***Magic Eliminode*** a sufficient amount of interference to counteract that interference being picked up by the car antenna. Therefore, it is necessary to connect it to some point on the motor or instrument panel, choke rod, oil pipe, electrolock cable, etc., that will give the required result. ***(Refer to first column of enclosed Interference Elimination chart).***

BALANCING PROCEDURE

The balancing of the ***Magic Eliminode*** is a very simple procedure. After the set is completely installed it is only necessary to turn the set on, tune it for greatest motor noise intensity, then remove the plug button from the side of the housing marked ***(B) figure (8)***.

Remove volume control shaft housing from the set by turning its bushing a quarter turn to the left; remove and insert in hole from which plug button was removed. Turn volume control knob either to the right or left, but in the direction in which the interference decreases. Continue until the interference is entirely eliminated or reduced to its lowest point.

If you find that when turning the knob to the ***right*** the interference gradually decreases, but the end of travel is reached before the interference is eliminated, it indicates that there is ***NOT*** a sufficient amount of interference being fed in by the interference feeder. It will be necessary then to move or connect it to a different point on the engine or car body.

If this condition occurs when turning knob to the ***left***, it indicates too much interference being fed in, and another pickup point should be selected that will supply a lower value within the range of the ***Magic Eliminode***.

It is always advisable when balancing out interference with the ***Magic Eliminode*** to clamp the car hood down tight with the hood hasps and to sit in the driver's position in the car, because in some extreme cases the interference may have been entirely balanced out but may again appear when the driver takes his position in the car.

After the interference has been eliminated, the volume control shaft should be returned to its original position and the plug button replaced over the ***Magic Eliminode*** balancing shaft ***(B) fig. (8)***.

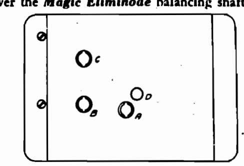


Fig. 8

This adjustment is permanent and will not change unless some change is later made in the car wiring, or the radio set is installed in another car.

MODELS 20C7, 20C8
Schematic, Parts

GAMBLE-SKOGMO, INC.

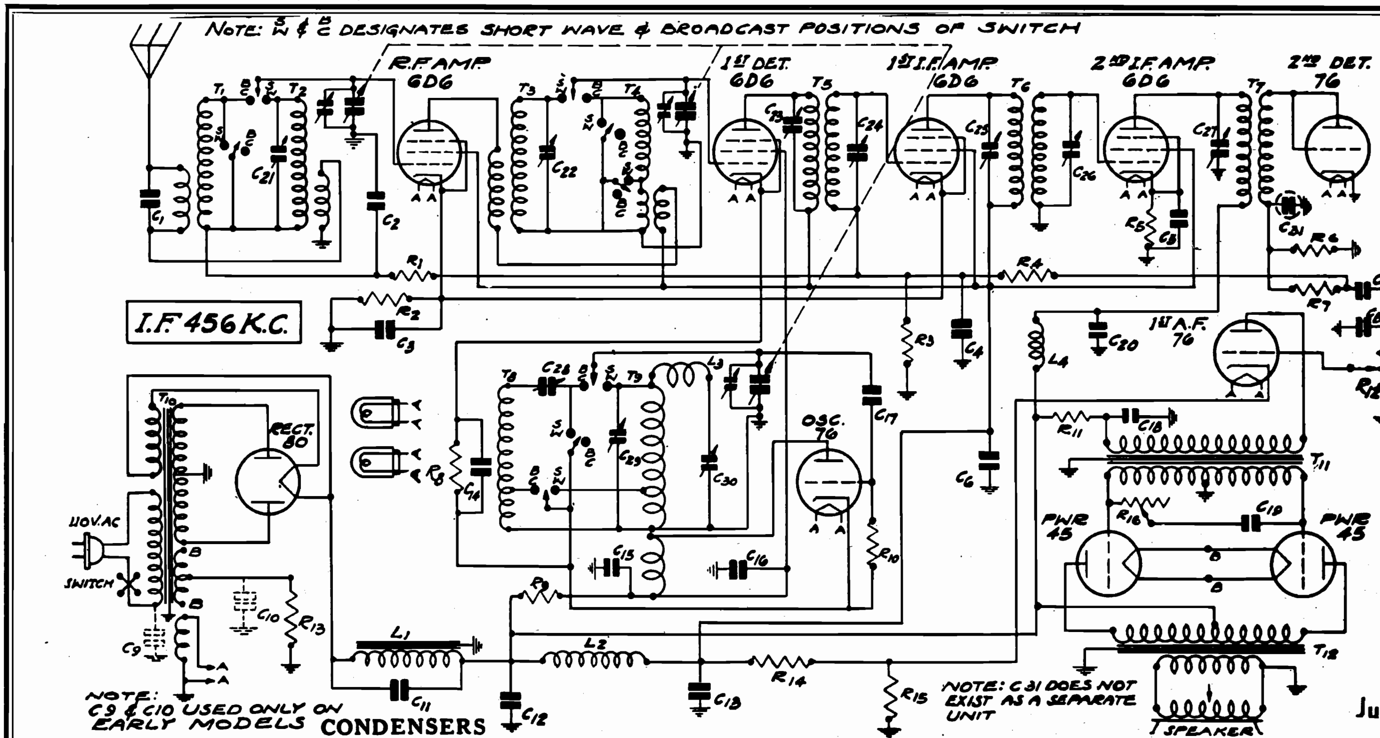


Fig. 1—Schematic Circuit Diagram

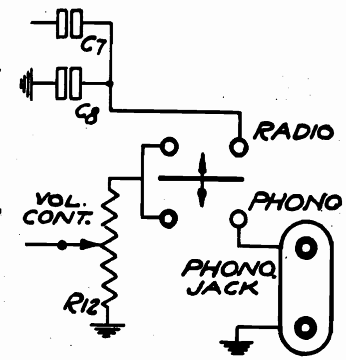


Fig. 5—Phonograph Connections

June, 1934

CONDENSERS

Part No.	Code	Capacity	Volts	Type
P-80919	C1	250 mmfd.		Moulded
P-80862	C2	.05 mfd.	200V.	Tubular
P-80888	C3	.25 mfd.	200V.	Tubular
P-80862	C4	.05 mfd.	200V.	Tubular
P-80862	C5	.05 mfd.	200V.	Tubular
P-80888	C6	.25 mfd.	200V.	Tubular
P-80862	C7	.05 mfd.	200V.	Tubular
P-81005	C8	35 mmfd.	600V.	Moulded
*P-80997	C9	.01 mfd.	600V.	Condenser in metal can
*P-80888	C10	.25 mfd.	200V.	Tubular
P-80985	C11	.15 mfd.	200V.	Tubular
P-81039	C12	16.0 mfd.	400V.	Wet Electrolytic
P-81018	C13	6.0 mfd.	150V.	Dry Electrolytic
	C16	2.0 mfd.	300V.	
	C18	2.0 mfd.	300V.	
P-80862	C14	.05 mfd.	200V.	Tubular
P-80864	C15	.10 mfd.	200V.	Tubular
P-81005	C17	35 mmfd.	600V.	Moulded
P-80863	C19	.004 mfd.	600V.	Tubular
P-81041	C20	.10 mfd.	400V.	Tubular
P-2102	C21	3-40 mmfd.		Ant. S.W. Trimmer
P-2102	C22	3-40 mmfd.		1st Det. S.W. Trimmer
P-2103	C23	200± 50 mmfd.		Dual Trimmer
	C24	200± 50 mmfd.		Part of I.F. Assem.
	C25	200± 50 mmfd.		Dual Trimmer
	C26	200± 50 mmfd.		Part of I.F. Assem.
P-1685	C27	70± 30 mmfd.		3rd I.F. Coil Trimmer
P-2112	C28	300-500 mmfd.		600 K.C. Trimmer
P-2102	C29	3-40 mmfd.		Osc. S.W. Trimmer
P-1685	C30	70± 30 mmfd.		6000 K.C. Trimmer
P-81027		Three Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Watts	Type
P-A95204	R1	200,000 ohm	.2	Carbon
P-98023	R2	150 ohm	.5	Flex. Wire Wound
P-A95105	R3	1 megohm	.2	Carbon
P-A95205	R4	2 megohm	.2	Carbon
P-98024	R5	400 ohm	.5	Flex. Wire Wound
P-A94304	R6	300,000 ohm	.2	Carbon
P-A95104	R7	100,000 ohm	.2	Carbon
P-A94252	R8	2,500 ohm	.2	Carbon
P-98022	R9	30,000 ohm	2.0	Carbon
P-A95104	R10	100,000 ohm	.2	Carbon
P-C94303	R11	30,000 ohm	1.0	Carbon
P-96005	R12	2 megohm		Volume Control and Switch
P-98006	R13	780 ohm	3.0	Armored Wire Wound
	R14	6000 ohm	1.4	
	R15	460 ohm	.2	
P-97003	R16	3 megohm		Tone Control

*Used in Early Models only.

Part No.	Item
P-50638	Power Transformer 115V. 60 cycles T 10
P-50639	Power Transformer 115V. 25 cycles T 10
P-50640	Power Transformer 115-230V. 40-60 cycles T 10
P-50641	Power Choke L 1
P-50642	Audio Output Transformer T 12
P-50643	Audio Input Transformer T 11
P-5176	Antenna R.F. Trans. T 1 and T 2 less can
P-5177	Interstage R.F. Trans. T3 and T4 less can
P-5178	Oscillator Coil Assembly T8 and T9 less can
P-5186	3rd I. F. Coil T7 less can
P-40433	Cans for the above coils
P-5184	1st I.F. Coil & Can Assembly T5
P-5185	2nd I.F. Coil & Can Assembly T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5151	I.F. Plate Isolating Reactor L4
P-70702	A.C. Cord & Plug
P-1421	Single Insulated Terminal Strip
P-1441	Double Insulated Terminal Strip
P-2060	Small Knob
P-2062	Large Knob
P-30342A	Grid Cap only
P-30456	Small Pointer
P-20912	Large Double End Pointer
P-2012	Pilot Light Bulb
P-10272	Rubber Mounting Feet
P-10320	Glass Crystal
P-20875	Crystal Retaining Ring
P-2152	8" Dynamic Speaker Mantel L2
P-1968	10" Dynamic Speaker Console L2
P-2101	Three Position Band Change Switch
P-20905	Condenser Shield
	8" Black Drive Cord (V.C. or T.C. Ind.)
	29" Black Drive Cord (Cond. Drive)
P-2126	Pilot Lamp Socket & Clip Assembly
P-20911	Bottom Shield
P-1011A	Phono-Radio Switch
P-1193	Phono Jack
P-2025	No. 80 Socket
P-1643	No. 45 Socket
P-2022	No. 76 Socket
P-1885	No. 6D6 Socket
P-1637	Speaker Socket
P-40434	Tube Shield—Aluminum (for earlier models)
P-40424	Tube Shield Base—Aluminum (for earlier models)

MODELS 20C7,20C8
Voltage,Socket,Trimmers
Alignment,Resistance Data

GAMBLE-SKOGMO, INC.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

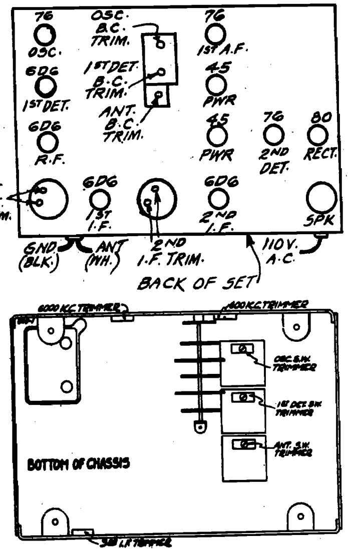


Fig. 2—Tube Arrangement & Location of Trimmers

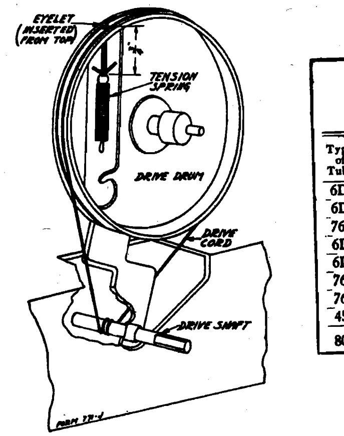


Fig. 4—Drive Cord Replacement

Voltages at Sockets
LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cath.	Cath. to Ground	Normal Plate M. A.
6D6	R. F.	6.3	95	95	2.8	7.0
6D6	1st Det.	6.3	88	95	9.2	2.9
76	Osc.	6.3	110	—	—	5.0
6D6	1st I. F.	6.3	95	95	2.8	7.0
6D6	2nd I. F.	6.3	300	95	3.3	6.0
76	2nd Det.	6.3	—	—	—	—
76	1st Audio	6.3	160	—	9.0	4.0
45	Output	2.5	245	—	48.0	30.0
80	Rectifier	5.0	890 V. A. C. pl. to pl.			58.0 per plate

Phono Connections

Phonograph connections can be made as shown in Fig. 5. A single pole double throw switch and double pin jack are required. These should be mounted on the back panel of the chassis close to the 2nd detector. The connections are made by opening the diode circuit at the point shown in the illustration and completing the connections to the switch and pin jacks as indicated. A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control of the set will regulate the phono volume.

Change in Early Models

In the early models of this receiver the side of the trimmer condenser C27 which is shown in Fig. 1 as connected to ground was connected to the B+ side of the 3rd I. F. coil primary.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans - See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the back panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the back panel.

Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the broadcast band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

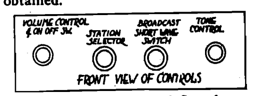


Fig. 3—Arrangement of Controls

D. C. Resistance of Windings

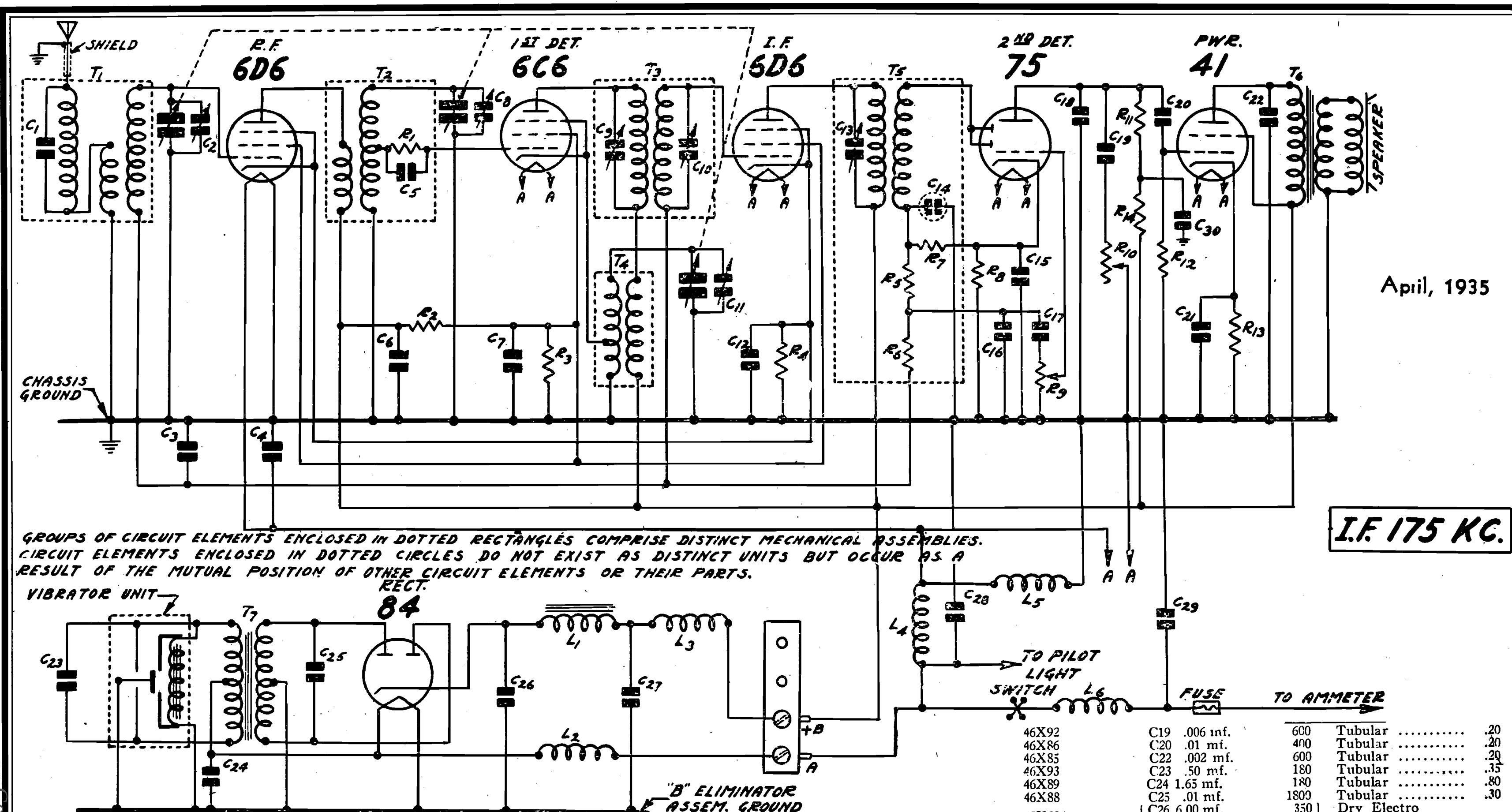
Following are the D.C. resistances of the various windings in the chassis.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5176	S.W. and B.C. Antenna R.F. Transformer Primaries (in series)	T1 T2	27.9
	B.C. Antenna R.F. Transformer Secondary	T1	5.0
	S.W. Antenna R.F. Transformer Secondary	T2	Small
P-5177	S.W. and B.C. Interstage R.F. Transformer Primaries (in series)	T3 T4	2.7
	B.C. Interstage R.F. Transformer Secondary	T4	4.4
	S.W. Interstage R.F. Transformer Secondary	T3	Small
P-5178	S.W. Oscillator Grid Coil	T9	Small
	S.W. Oscillator Plate Coil	T9	.25
	B.C. Oscillator Grid Coil	T8	3.5
P-5190	S.W. Oscillator Tracking Coil	L3	1.27
P-5184	1st I.F. Coil Primary	T5	5.0
	1st I.F. Coil Secondary	T5	5.0
P-5185	2nd I.F. Coil Primary	T6	5.0
	2nd I.F. Coil Secondary	T6	5.0
P-5186	3rd I.F. Coil Primary	T7	9.3
	3rd I.F. Coil Secondary	T7	26.3
P-50643	Audio Input Transformer Primary	T11	2300.
	Audio Input Transformer Secondary Center Tap to Outside	T11	2600.
	Audio Input Transformer Secondary Center Tap to Inside	T11	2000.
P-50642	Audio Output Trafisformer Primary Center Tap to Outside	T12	360.
	Audio Output Transformer Primary Center Tap to Inside	T12	320.
	Audio Output Transformer Secondary	T12	.44
P-1968	Speaker Voice Coil		3.0
	Speaker Field Coil	L2	5000.
P-50641	Filter Choke	L1	150.
P-50638	Power Transformer 115V. 60 Cycles Pri.	T10	5.3
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Outside	T10	120.
	Power Transformer 115V. 60 Cycles H.T. Sec. Center Tap to Inside	T10	110.
	Power Transformer 115V. 60 Cycles Sec. (80 Fil.)	T10	Small
	Power Transformer 115V. 60 Cycles Sec. (AA Fil.)	T10	Small
	Power Transformer 115V. 60 Cycles Sec. (BB Fil.)	T10	Small

GAMBLE-SKOGMO, INC.

MODEL 26S1
Schematic

April, 1935



TRANSFORMERS AND COILS

New Part No.	Old Part No.	Description	Code	List Price
51X17-6S	50632	Output Transformer	T6	1.65
9A368-6S		Antenna Coil Assembly (Less Can)	T1	.90
9A369-6S		R.F. Interstage Coil Assembly (Less Can)	T2	1.25
1A23-6S		Dual-Coil Can Assembly Only (for above two coils)		.30
9A371-6S		1st I.F. Coil & Can Assembly Complete	T3	1.70
9A370-6S		Oscillator Coil & Can Assembly Complete	T4	.60
9A372-6S		2nd I.F. Coil & Can Assembly Complete	T5	2.05
9A375-6S		Pilot Light Choke Assembly	L4	.15
9A373-6S		Motor Noise Choke	L6	.25
9A268-6S	5174	R.F. "B" Choke Coil Assembly	L3	.10
9A374-6S		Filament Reactor	L2	.30
53X72-6S	50633	Power Transformer	T7	3.20
52X27-6S	50637	Filter Choke	L1	.90

CONDENSERS

New Part No.	Old Part No.	Code	Capacity	Voltage	Type	List Price
47X54		C1	.0005 mf.		Moulded	.15
		C2	Antenna Trimmer-Part of Gang Condenser			
46X80		C3	.05 mf.	180	Tubular	.15
47X50		C4	.003 mf.		Moulded	.25
47X53		C5	.000035 mf.		Moulded	.10
46X81		C6	.10 mf.	400	Tubular	.25
46X83		C7	.10 mf.	180	Tubular	.25
		C8	1st Detector Trimmer-Part of Gang Condenser			
*17A32		C9, C10	130-300 mmf., 130-300 mmf.		1st I. F. Trimmer Condensers	.50
†17A33		C9, C10	70-150 mmf., 70-150 mmf.		1st I. F. Trimmer Condensers	.50
		C11	Oscillator Trimmer-Part of Gang Condenser			
46X82		C12	.10 mf.	180	Tubular	.25
17A18	1965	C13	70-140 mmf. 2nd I.F. Trimmer Condenser			.35
		C14	.00025 mf. Part of 2nd I.F. Coil Assembly			
45X203		C15, C21	12.00 mf., 12.00 mf.	25, 25	Dry Electrolytic Block	1.05
4 X52		C16	.00025 mf.		Moulded	.15
46X84		C17	.01 mf.	180	Tubular	.15
4?X52		C18	.00025 mf.		Moulded	.15
46X92		C19	.006 mf.	600	Tubular	.20
46X86		C20	.01 mf.	400	Tubular	.20
46X85		C22	.002 mf.	600	Tubular	.20
46X93		C23	.50 mf.	180	Tubular	.35
46X89		C24	1.65 mf.	180	Tubular	.80
46X88		C25	.01 mf.	1800	Tubular	.30
45X204		C26, C27	6.00 mf., 8.00 mf.	350, 350	Dry Electrolytic Block	2.10
46X93		C28	.50 mf.	180	Tubular	.35
4?X50		C29	.003 mf.		Moulded	.25
46X94		C30	.25 mf.	300	Tubular	.30
14A39			3 Section Gang Condenser			4.20

RESISTORS

New Part No.	Code	Resistance	Wattage	Type	List Price
A95504	R1	500,000 Ohm	0.2	Carbon	.10
B94153	R2	15,000 Ohm	0.5	Carbon	.15
B94203	R3	20,000 Ohm	0.5	Carbon	.15
43X41	R4, R13	450 Ohm, 800 Ohm	0.2, 0.3	Armored Wire Wound	.30
A95503	R5	50 000 Ohm	0.2	Carbon	.10
A95105	R6	1.0 Megohm	0.2	Carbon	.10
A94504	R7	500,000 Ohm	0.2	Carbon	.10
A95752	R8	7,500 Ohm	0.2	Carbon	.10
36X200	R9	2.0 Megohm		Volume Control & Switch	1.15
40X201	R10	300,000 Ohm		Tone Control	.75
*A95201	R11	200,000 Ohm	0.2	Carbon	.10
†A95154	R11	150,000 Ohm	0.2	Carbon	.10
A95504	R12	500,000 Ohm	0.2	Carbon	.10
†A95503	R14	50,000 Ohm	0.2	Carbon	.10

MODEL 26S1
Installation Details

GAMBLE-SKOGMO, INC.

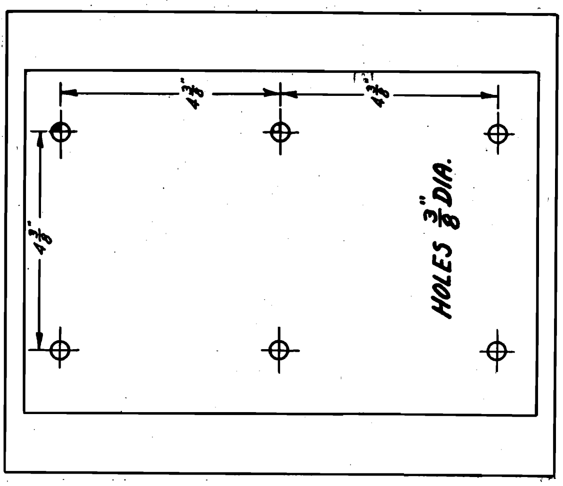


Fig. 2—Location of Mounting Holes

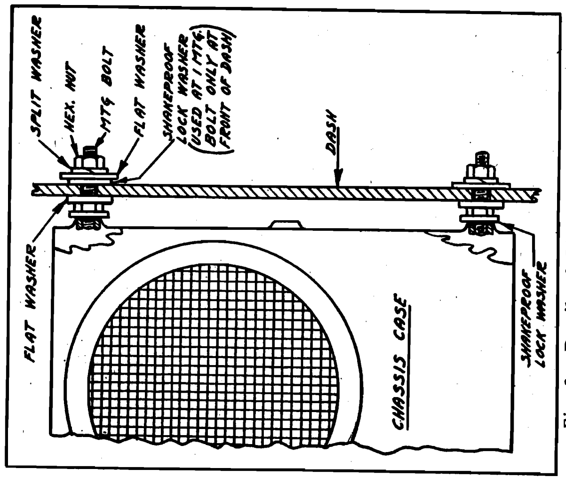


Fig. 3—Details of Chassis Mounting on Dash

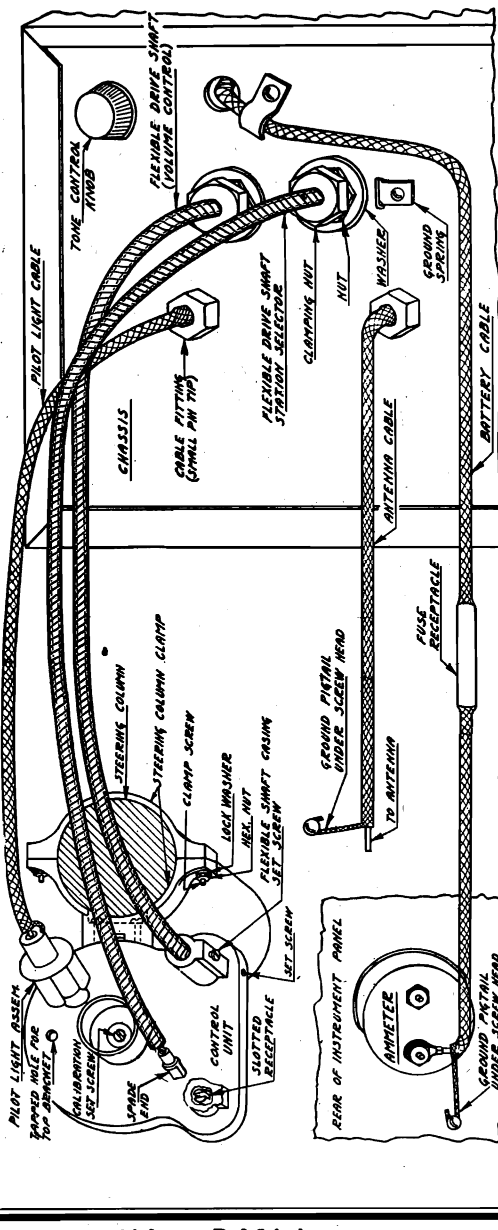


Fig. 4—General Installation View—Control Unit on Steering Column

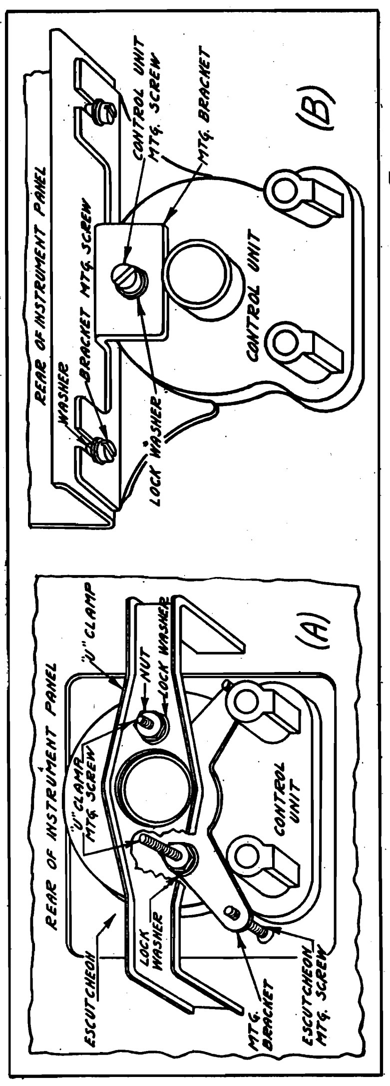


Fig. 5—Mounting Control Unit In and Under the Instrument Panel

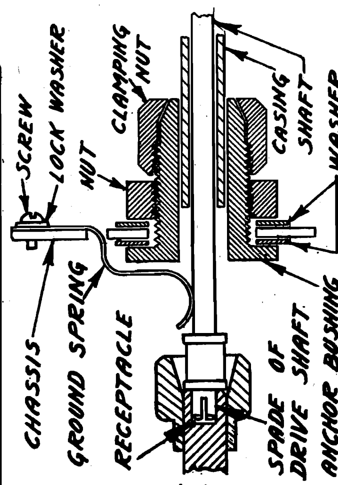


Fig. 6— Details of Flexible Shaft Connection at the Chassis

FORM 785V

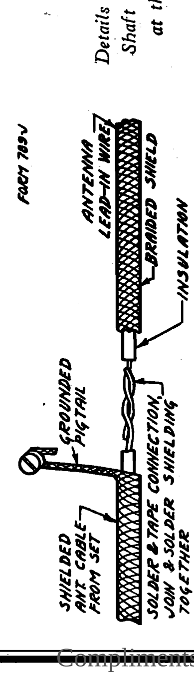


Fig. 7—Extension of Antenna Cable Shield

GAMBLE-SKOGMO, INC.

MODEL 26S1
Voltage, Alignment, Socket
Trimmers, Resistance Data

I. F. Adjustment

Remove chassis from case.

Establish ground connection between chassis and power supply.

Reconnect A and B wires from power supply to chassis.

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector (middle) section of the tuning condenser. This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling off action of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers are shown in Fig. 2.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 K C. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Voltages at Sockets
Antenna Disconnected - Voltage at Battery 6.1

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Normal Plate M.A.
6D6	R. F.	5.8	218	100	5.2	5.8
6C6	1st Det. and Osc.	5.8	218	100		2.0
6D6	I. F.	5.8	218	100	5.2	5.8
75	2nd Det. & 1st A. F.	5.8	160 (1)		1.4	.2.8
41	Output	5.8	210	220	16.0	16.0
84	Rectifier	5.8				20.0 per plate

Speaker Field ..1.15 Amperes — "B" Unit ......3.00 Amperes
Chassis .... 1.50 Amperes — Pilot Lamp ....0.1 Amperes

(1) Measured on 1000 V. Scale (1000 Ohms per volt)

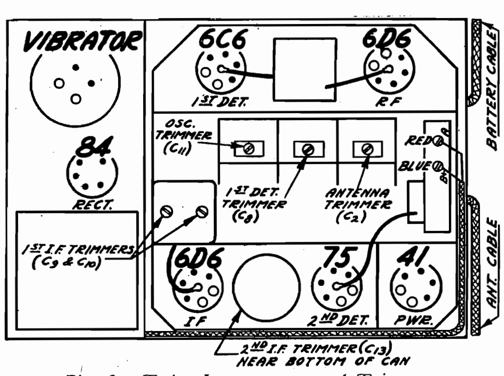


Fig. 2—Tube Arrangement and Trimmers

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

After installing the receiver in the car, it will be necessary to calibrate the control unit. Tune in a station of known frequency at about the center of the dial. At the back of the control unit is a calibration screw—See Fig. 4 in the installation manual enclosed with each receiver. Remove the pilot light assembly.

The calibration screw will be seen at the bottom of the receptacle from which the pilot light assembly is withdrawn. Insert a screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

Voltages At Sockets

On the voltage chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected.

The voltages can be read with the chassis in the case, by means of an analyzer plug.

If the chassis unit is taken out of the case all of the socket terminals can easily be reached under the chassis with test prods.

If the chassis is taken out, a jumper wire must be connected from the chassis base to the metal wall of the "B" power unit, in order to complete the ground circuit.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

New Part No.	ITEM	Code	D. C. Resistance in Ohms
9A368-6S	Antenna Trans. Primaries in Series	T1	6.3
	Antenna Trans. Secondary	T1	2.5
9A369-6S	R.F. Interstage Trans. Pri.	T2	4.5
	R.F. Interstage Trans. Sec.	T2	
	(Center Tap to inside)		1.8
	(Center Tap to ground)		1.3
9A371-6S	1st I.F. Trans. Primary	T3	58.
	1st I.F. Trans. Secondary	T3	58.
9A370-6S	Oscillator Cathode Coil (Total)	T4	3.
	Oscillator Plate Coil	T4	6.
9A372-6S	2nd I.F. Trans. Primary	T5	46.
	2nd I.F. Trans. Secondary	T5	46.
51X17-6S	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in parallel	T6	.4
53X72-6S	Power Trans. Primary	T7	.3
	Power Trans. Secondary	T7	500.
52X27-6S	Filter Choke	L1	300.
9A374-6S	Filament Reactor	L2	Small
9A268-6S	R.F. "B" Choke	L3	3.5
9A375-6S	Pilot Light Choke Assembly	L4	Small
12A62A	Speaker Field	L5	5.
9A373-6S	Motor Noise Choke	L6	Small

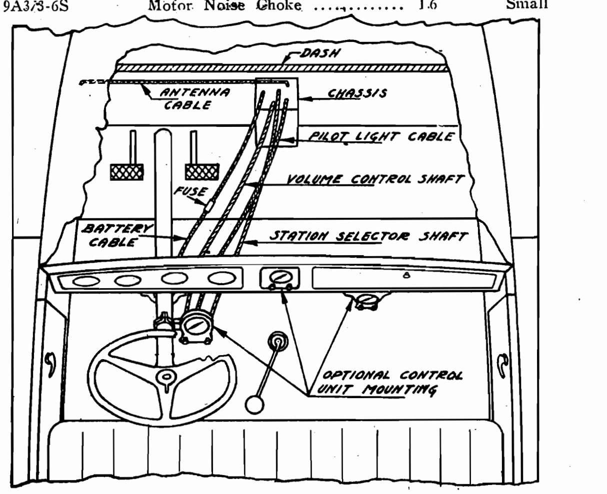
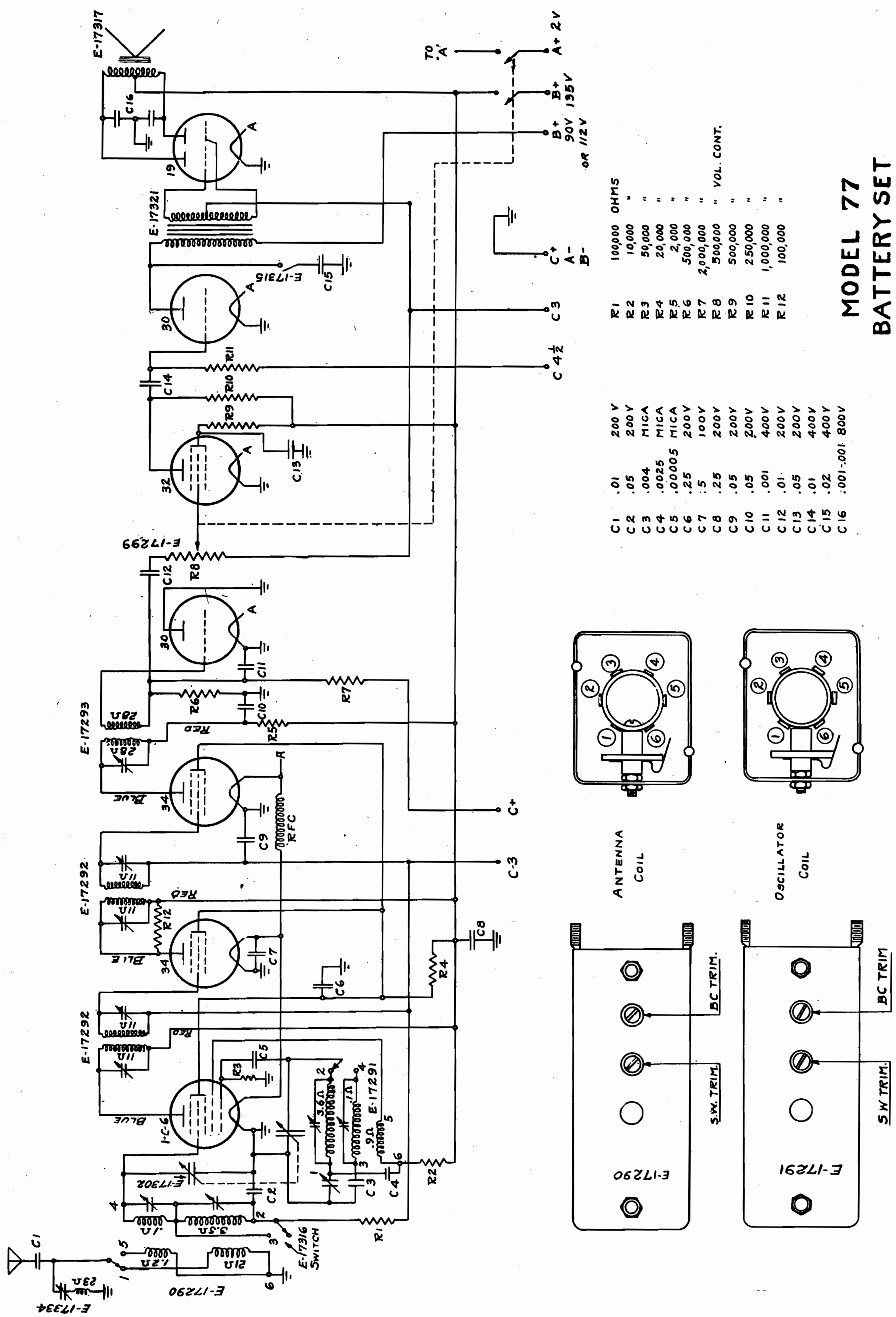


Fig. 1—General Mounting Position

MODEL 77
Schematic

GAMBLE-SKOGMO, INC.



R1	100,000	OHMS
R2	10,000	"
R3	50,000	"
R4	20,000	"
R5	2,000	"
R6	500,000	"
R7	2,000,000	"
R8	500,000	" VOL. CONT.
R9	500,000	"
R10	250,000	"
R11	1,000,000	"
R12	100,000	"

C1	.01	200 V
C2	.05	200 V
C3	.004	MICA
C4	.0025	MICA
C5	.00005	MICA
C6	.25	200V
C7	.5	100V
C8	.25	200V
C9	.05	200V
C10	.05	200V
C11	.001	400V
C12	.01	200V
C13	.05	200V
C14	.01	400V
C15	.02	400V
C16	.001-.001	800V

GAMBLE-SKOGMO, INC.

MODELS 27C1,27C5
Schematic,Voltage Socket,Trimmers,Parts

Voltages at Sockets

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Fila-ment Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A93303	R2	30,000 Ohm	.2	Carbon
P-A95104	R3	100,000 Ohm	2	Carbon
P-A93602	R4	6,000 Ohm	.2	Carbon
P-B93902	R5	9,000 Ohm	.5	Carbon
P-A95505	R6	5 Megohm	.2	Carbon
P- 96012	R7	1 Megohm		Volume Control.
P-A95505	R8	5 Megohm	.2	Carbon
P-A94603	R9	60,000 Ohm	.2	Carbon
P-A95104	R10	100,000 Ohm	.2	Carbon
P-A95104	R11	100,000 Ohm	.2	Carbon

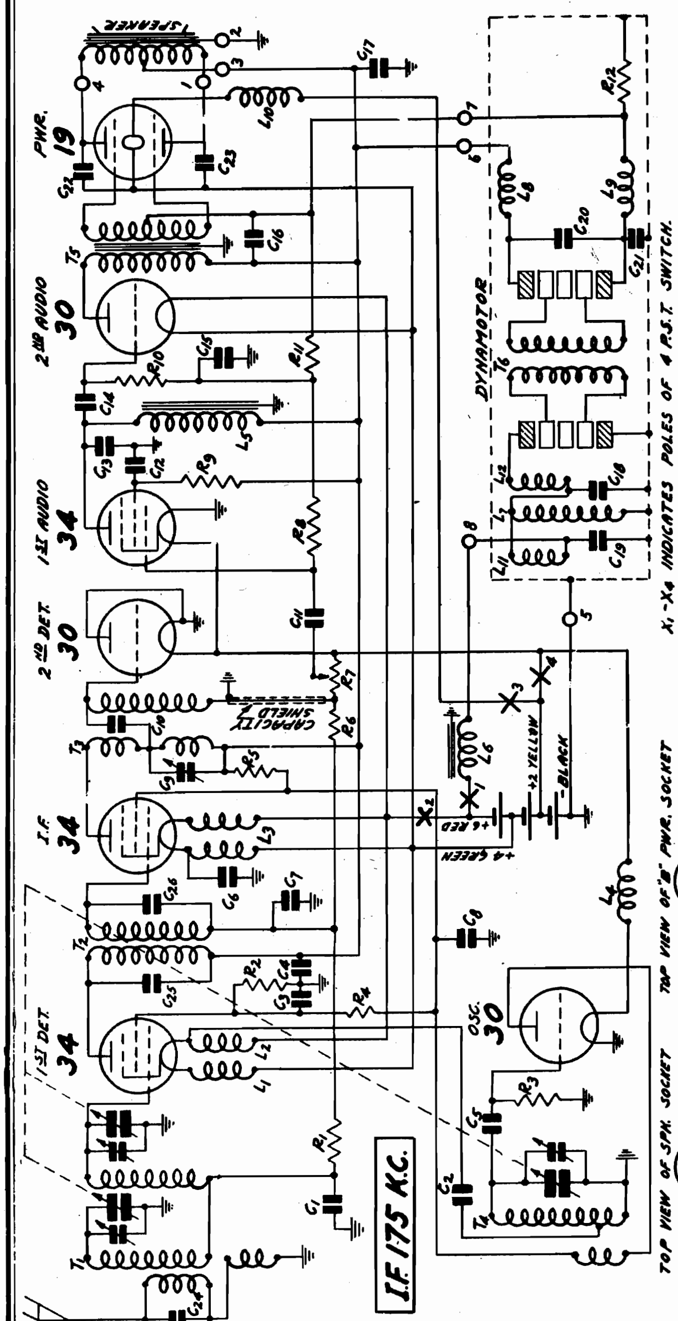


Fig. 1. Schematic Circuit Diagram

CONDENSERS

Part No.	Code	Capacity		Voltage	Type
P-80862	C1	0.050	Mf.	200V	Tubular
P-80862	C2	0.050	Mf.	200V	Tubular
P-80862	C3	0.050	Mf.	200V	Tubular
P-80864	C4	0.100	Mf.	200V	Tubular
P-81801	C5	35	Mmf.	Cap.	Part of Osc. Coil Assem.
P-80888	C6	0.250	Mf.	200V	Tubular
P-80862	C7	0.050	Mf.	200V	Tubular
P-80988	C8	1.500	Mf.	140V	Tubular
P-1965	C9	70-140	Mmf.		Trimmer
P-81800	C10	50	Mmf.	Cap.	Part of 2nd I.F. Coil As.
P-80981	C11	0.010	Mf.	400V	Tubular
P-80888	C12	0.250	Mf.	200V	Tubular
P-80945	C13	500	Mmf.		Moulded
P-80862	C14	0.050	Mf.		Tubular
P-80888	C15	0.250	Mf.	200V	Tubular
P-81014	C16 / C17	16.00 / 16.00	Mf. / Mf.		Electrolytic Block
P-80914	C22	0.002	Mf.	600V	Tubular
P-80914	C23	0.002	Mf.	600V	Tubular
P-81812	C24	200	Mmf.	Cap.	Part of Ant. Assem.
P-81807	C25	70	Mmf.	Cap.	Part of 1st I.F. Coil As.
P-81805	C26	45	Mmf.	Cap.	Part of 1st I.F. Coil As.
P-81015	Three Gang Condenser				

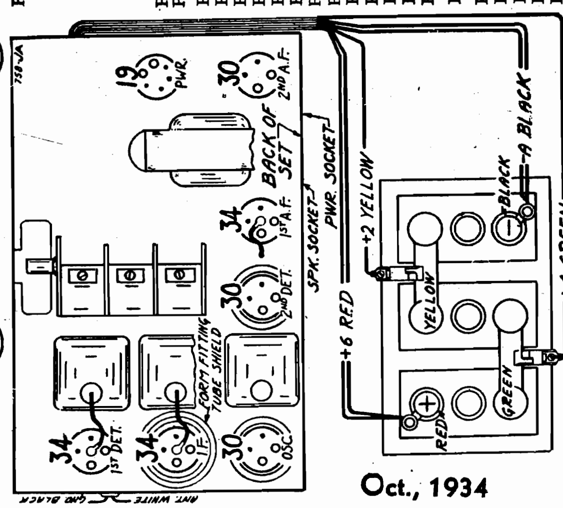


Fig. 2. Location of Tubes and Battery Connections

Oct., 1934

MODELS 27C1,27C5
Drive Cord Adjustment GAMBLE-SKOGMO, INC.
Alignment,Resistance Data

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 KC. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 KC and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 KC padder and no adjustment at this frequency, therefore, is required.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and Off-On switch collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

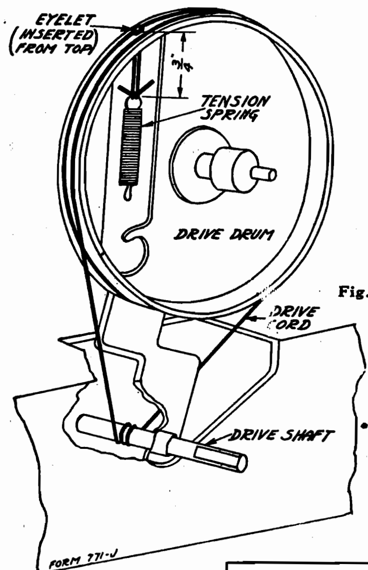


Fig. 4 Drive Cord Replacement.

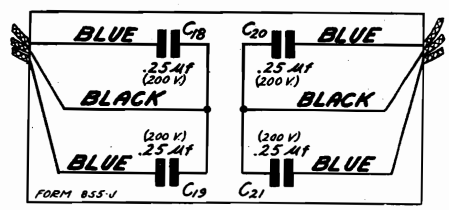


Fig. 3. Four Section Condenser in Power Unit Box

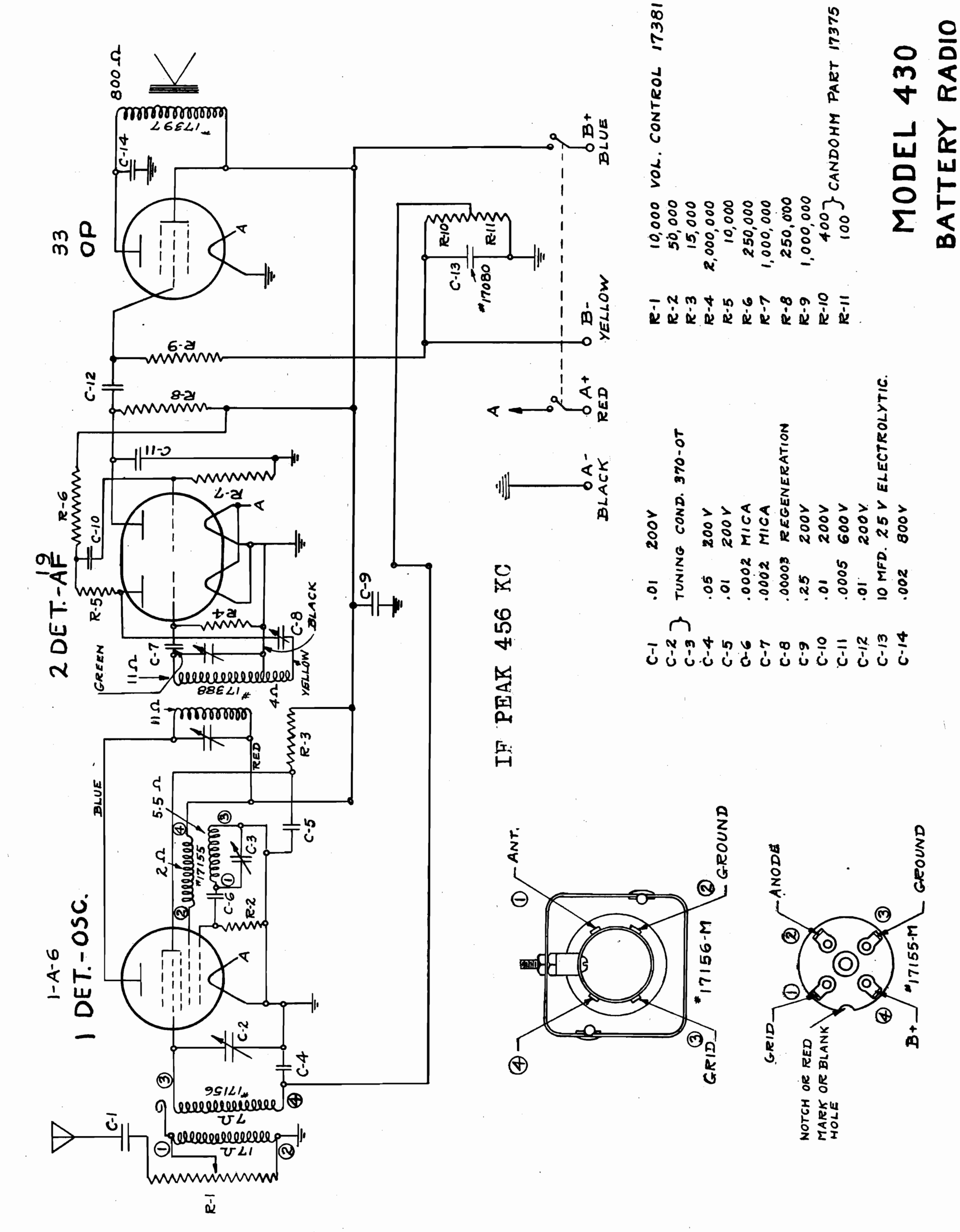
D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5200	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preselector	T1	3.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5169	Oscillator Grid Coil	T4	3.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-5222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1066.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	666.
P-2010	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

MODEL 430
Schematic

GAMBLE-SKOGMO, INC.

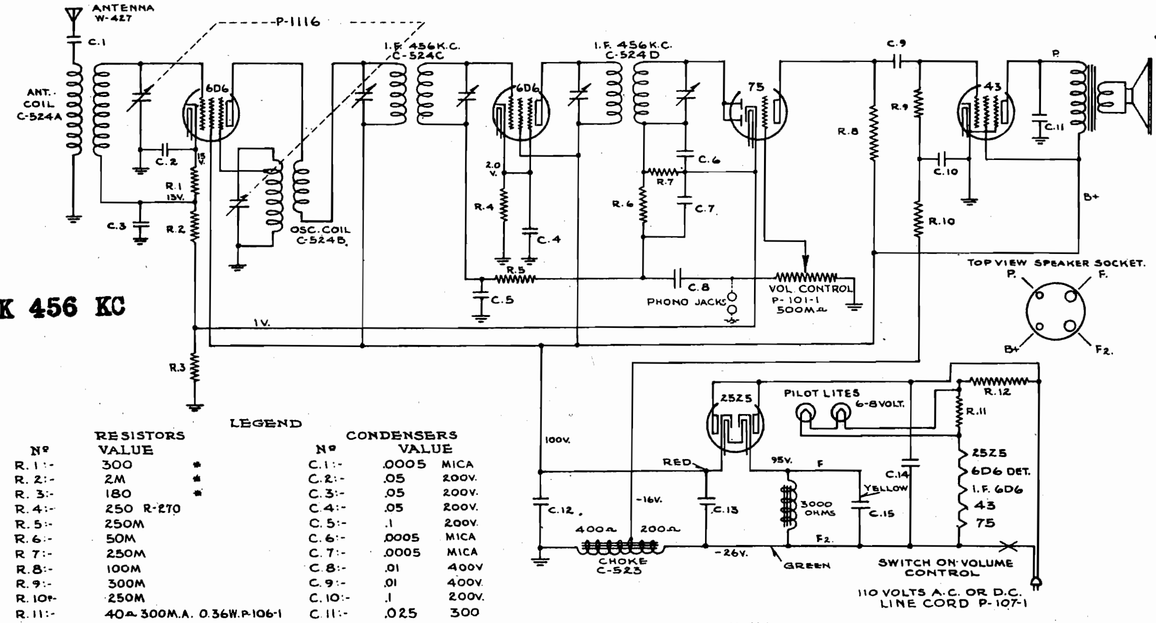


R-1	10,000	VOL. CONTROL 17381
R-2	50,000	
R-3	15,000	
R-4	2,000,000	
R-5	10,000	
R-6	250,000	
R-7	1,000,000	
R-8	250,000	
R-9	1,000,000	
R-10	400	CANDOHM PART 17375
R-11	100	CANDOHM PART 17375

C-1	.01	200V
C-2	TUNING COND. 370-OT	
C-3	TUNING COND. 370-OT	
C-4	.05	200V
C-5	.01	200V
C-6	.0002	MICA
C-7	.0002	MICA
C-8	.00003	REGENERATION
C-9	.25	200V
C-10	.01	200V
C-11	.0005	600V
C-12	.01	200V
C-13	10 MFD. 25 V ELECTROLYTIC.	
C-14	.002	800V

MODEL 540
Schematic, Socket
Alignment, Parts
Voltage

GAMBLE-SKOGMO, INC.



IF PEAK 456 KC

LEGEND

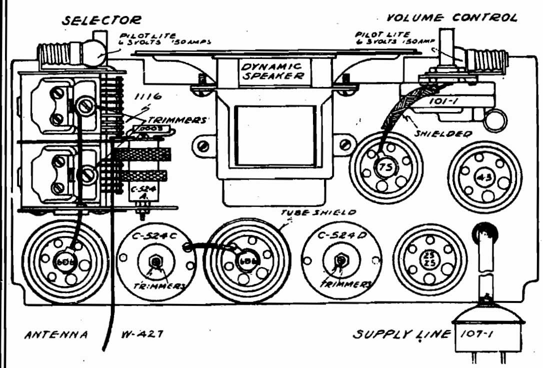
RESISTORS

Nº	VALUE	
R. 1:-	300	*
R. 2:-	2M	*
R. 3:-	180	*
R. 4:-	250 R-270	
R. 5:-	250M	
R. 6:-	50M	
R. 7:-	250M	
R. 8:-	100M	
R. 9:-	300M	
R. 10:-	250M	
R. 11:-	40Ω 300M.A. 0.36W. P-106-1	
R. 12:-	126 IN CORD P107-1	

CONDENSERS

Nº	VALUE	
C. 1:-	.0005	MICA
C. 2:-	.05	200V.
C. 3:-	.05	200V.
C. 4:-	.05	200V.
C. 5:-	.1	200V.
C. 6:-	.0005	MICA
C. 7:-	.0005	MICA
C. 8:-	.01	400V.
C. 9:-	.01	400V.
C. 10:-	.1	200V.
C. 11:-	.025	300
C. 12:-	5.0MFD.	C-525D
C. 13:-	25.0MFD.	*
C. 14:-	.1	400V.
C. 15:-	5.0MFD	*

-: NOTE :-
* R.1, R.2 & R.3 IN ONE UNIT PART NUMBER R-268.
* C.13 AND C.15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT.



Part No.	Description
101-1	Volume Control with Switch
106-1	40 Ohm Resistor-10%
107-1	126 Ohm Special Cord and Plug
C-523	600 Ohm Choke
C-524A	Antenna Coil
C-524B	Oscillator Coil
C-524C	Input I.F. Transformer
C-524D	Output I.F. Transformer
C-525C	5-25 Mfd. Electrolytic Condenser
C-525D	5 Mfd. Electrolytic Condenser
R-268	2480 Ohm Resistor
R-270	250 Ohm Wire Wound Resistor

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

I.F. ALIGNMENT

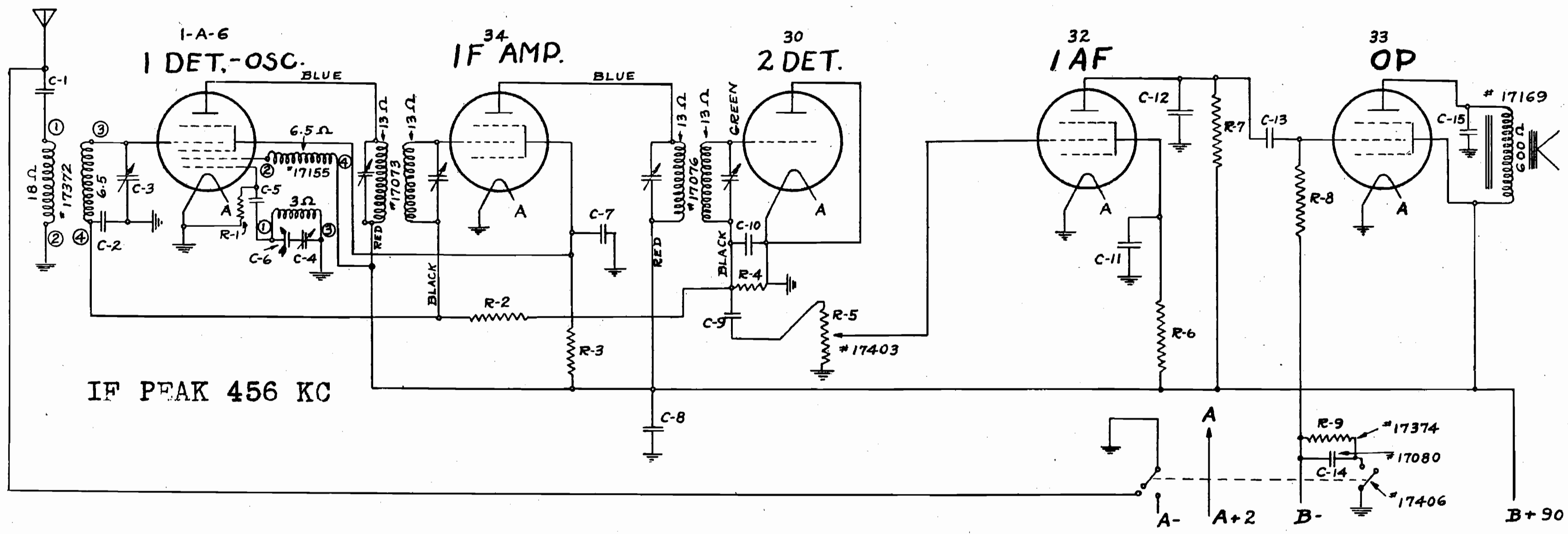
1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

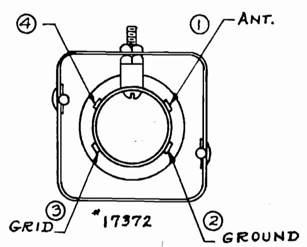
   Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

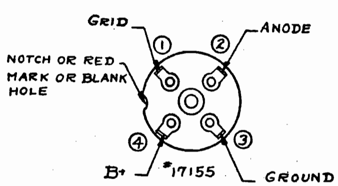
BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

GAMBLE-SKOGMO, INC.







C-1	.01 200V	
C-2	.05 200V	
C-3 } C-4	.00037 TUNING COND.	
C-5	.00002 MICA	
C-6	.0005 PAD	
C-7	.05 200V	
C-8	.25 200V	
C-9	.01 200V	
C-10	.0005 600V	
C-11	.05 200V	
C-12	.0005 600V	
C-13	.01 200V	
C-14	10 MFD. 25V ELECTROLYTIC	
C-15	.002 800V	

R-1	50,000	
R-2	2,000,000	
R-3	15,000	
R-4	500,000	
R-5	500,000	VOL. CONTROL
R-6	500,000	
R-7	250,000	
R-8	1,000,000	
R-9	500	

MODEL 550
BATTERY RADIO

G-10-35 K.R.C

MODEL 575
Schematic, Socket
Voltage, Alignment

GAMBLE-SKOGMO, INC.

Service Notes

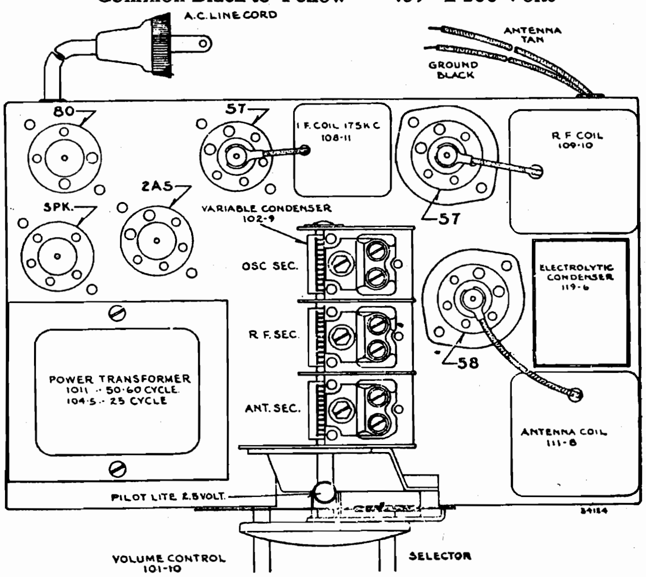
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

Common Black to Brown	—.003	x 600 Volts
Common Black to Green	—.1	x 200 Volts
Common Black to Red	—.1	x 200 Volts
Common Black to Orange	—.25	x 200 Volts
Blue to Blue	—.05	x 400 Volts

Part No. 145-3

Common Black to Brown	—.1	x 200 Volts
Common Black to Green	—.05	x 200 Volts
Common Black to Orange	—.05	x 200 Volts
Common Black to Yellow	—.05	x 200 Volts



Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

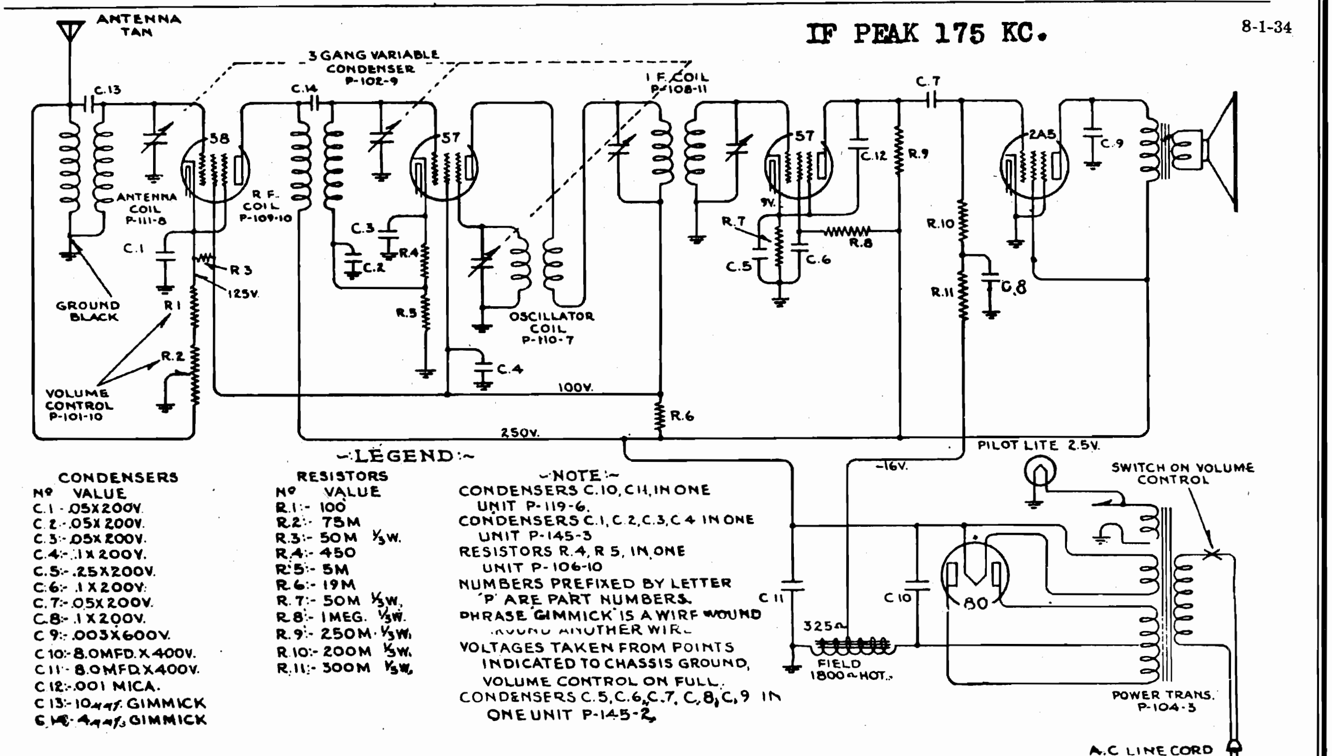
(a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.

(b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.

(c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC.

8-1-34



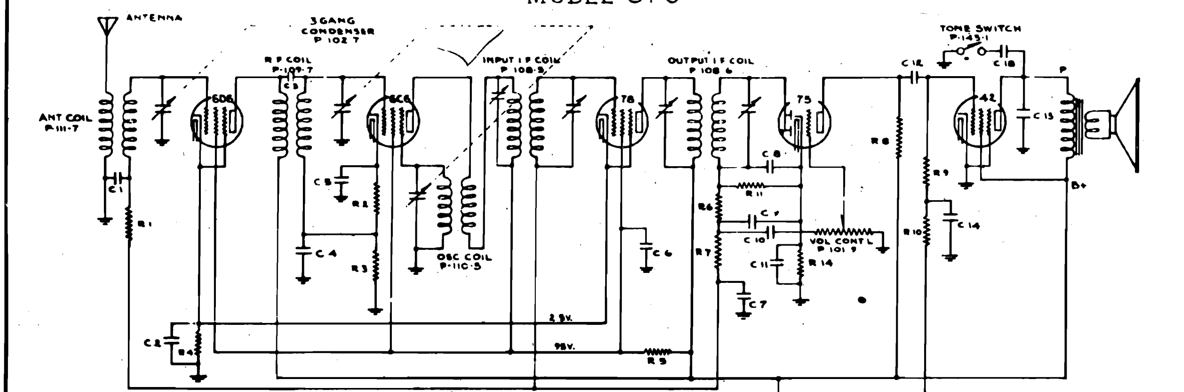
MODEL 670
Schematic, Voltage
Socket, Trimmers

GAMBLE-SKOGMO, INC.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

MODEL 670



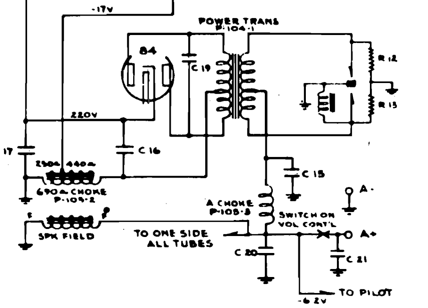
LEGEND

RESISTORS Nº	VALUE
R 1 -	250M ⅓W
R 2 -	450 Ω
R 3 -	5M
R 4 -	150 Ω
R 5 -	.19M
R 6 -	50M ⅓W
R 7 -	250M ⅓W
R 8 -	250M ⅓W
R 9 -	200M ⅓W
R 10 -	300M ⅓W
R 11 -	250M. ⅓W
R 12 -	100 Ω
R 13 -	100 Ω
R 14 -	4M ⅓W
VAR RESISTOR (VOL CONTL)	- 500M

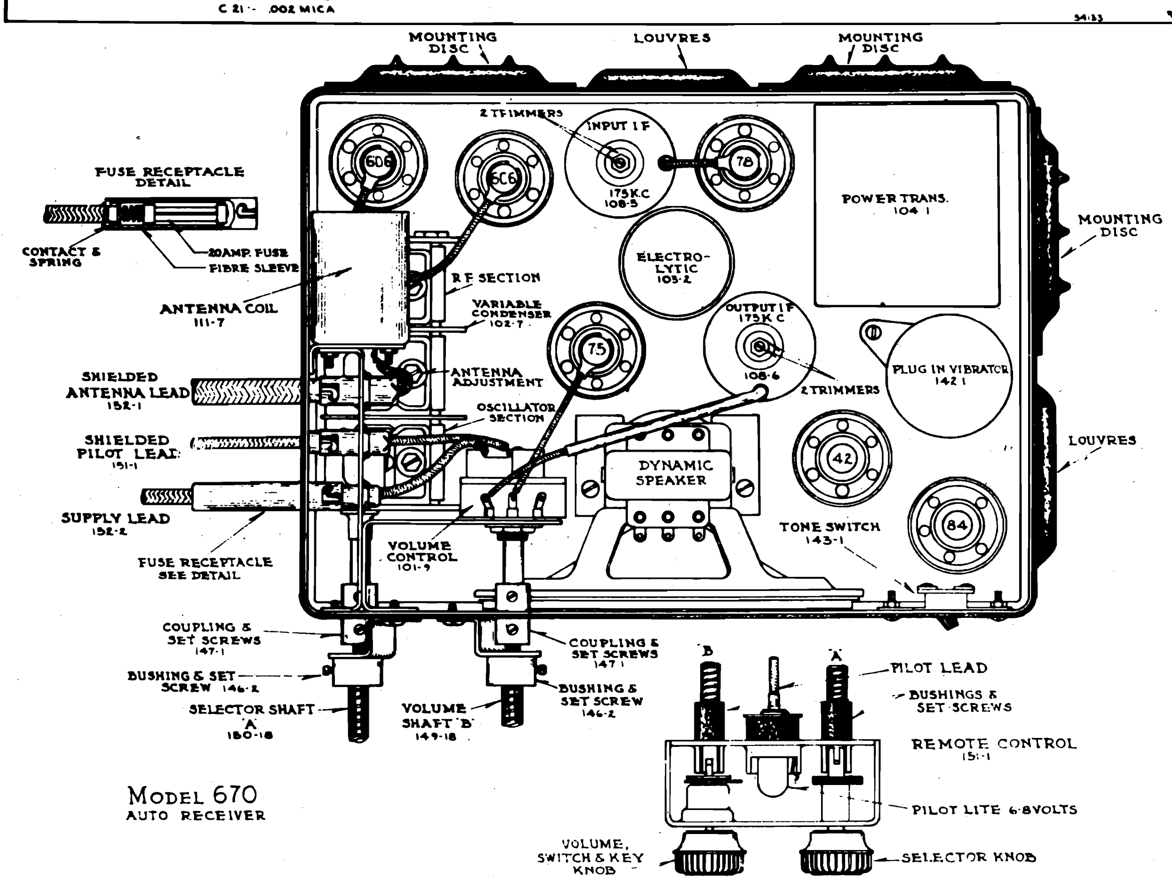
CONDENSERS Nº	VALUE
C 1 -	.05 X 200V
C 2 -	.1 X 200V
C 3 -	11.5 mmf GIMMICK
C 4 -	.05 X 200V
C 5 -	.05 X 200V
C 6 -	.1 X 200V
C 7 -	.1 X 200V
C 8 -	.0005 MICA
C 9 -	.0005 MICA
C 10 -	.01 X 400V
C 11 -	20MFD X 20V
C 12 -	.01 X 400V
C 13 -	.003 X 600V
C 14 -	.1 X 200V
C 15 -	1MFD X 120V
C 16 -	8MFD X 350V
C 17 -	8MFD X 350V
C 18 -	.01 X 400V
C 19 -	.02 X 1000V
C 20 -	1MFD X 120V
C 21 -	.002 MICA

- NOTE -

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL.
THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.
RESISTORS IN ONE UNIT, P-106-3, - R 2, 3, 4, 5.
CONDENSERS IN ONE UNIT, P-105-2 C 16, 17.
CONDENSERS IN DUAL UNIT - C. 2, 7
CONDENSERS IN DUAL UNIT - C 5 6
RESISTORS AND CONDENSERS IN OUTPUT I F. CAN P-108-6, - C 8, 9, 10 AND R 6, 7, 11
CONDENSER, C 1, IN ANT COIL CAN, P 111 7.



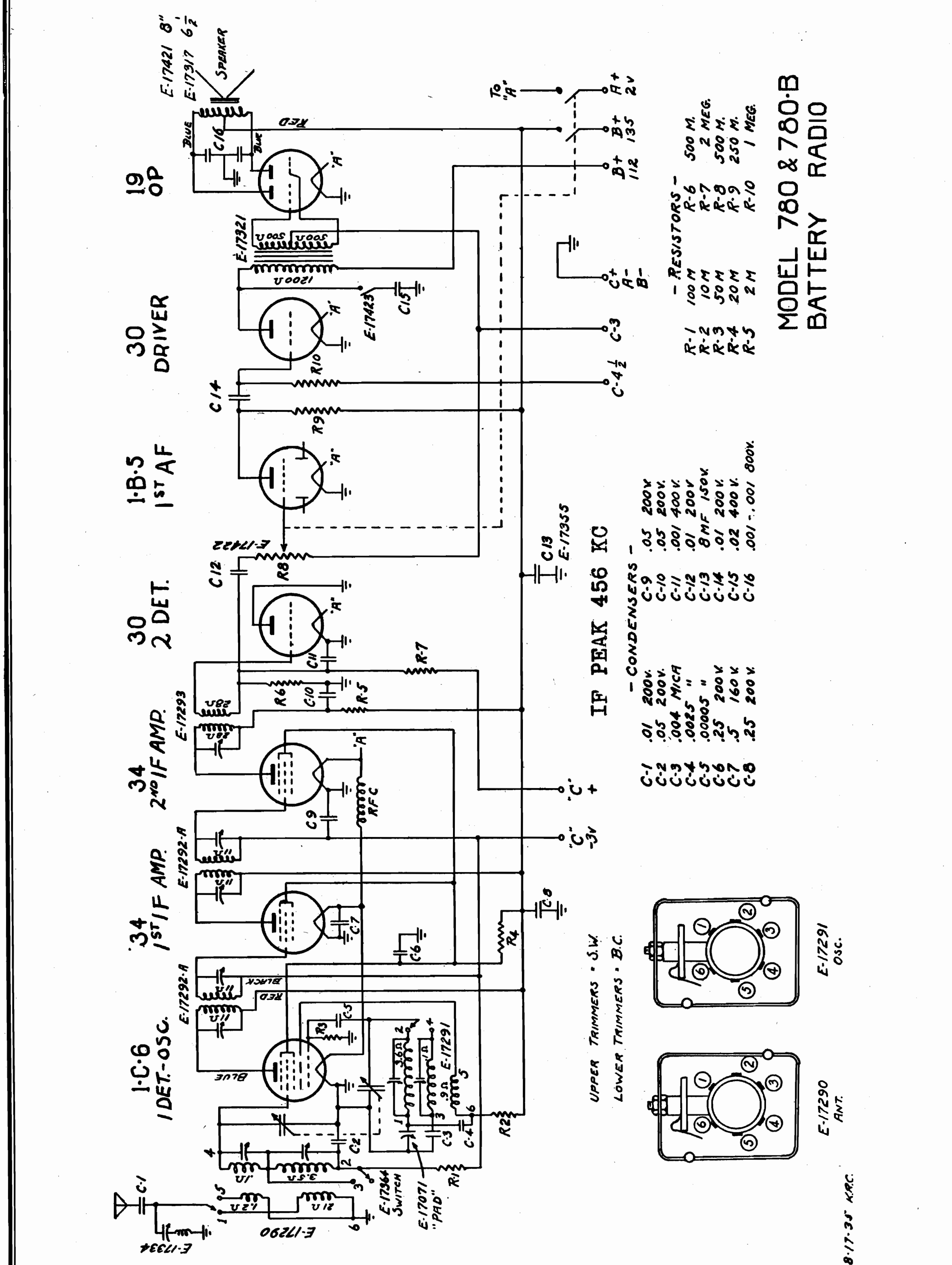
IF PEAK 175 KC.



MODEL 670
AUTO RECEIVER

MODELS 780,780B
Schematic

GAMBLE-SKOGMO, INC.

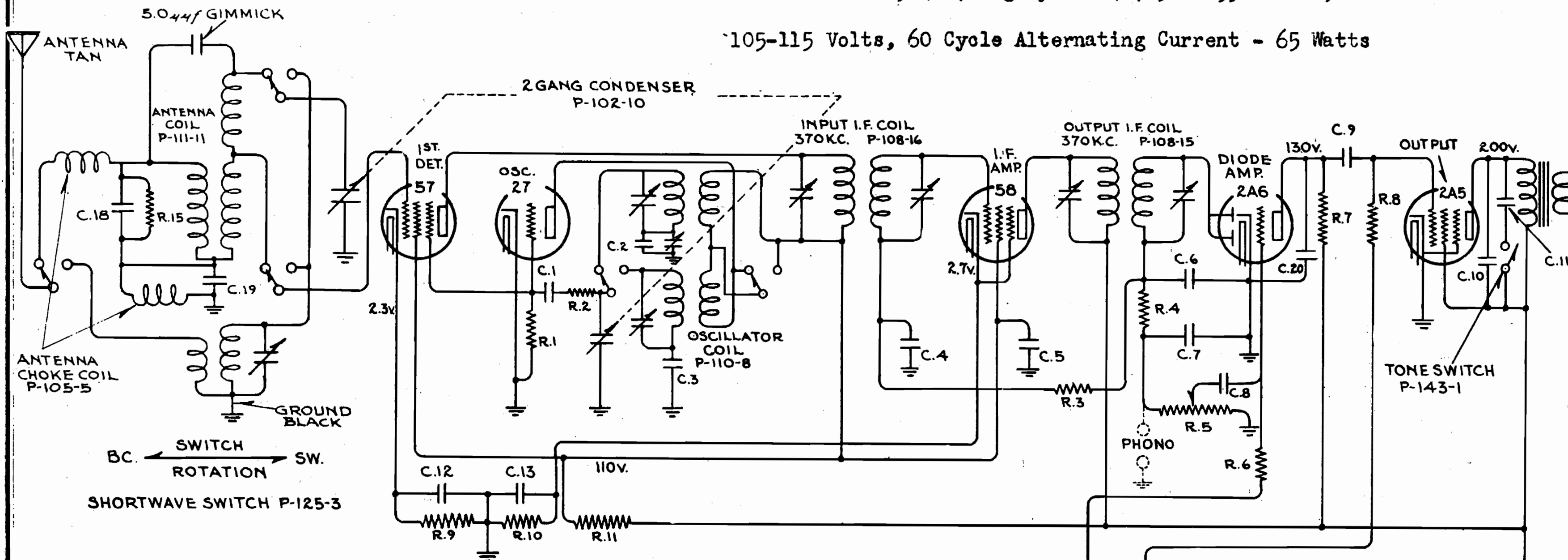


MODEL 675
Schematic, Voltage
Socket, Trimmers

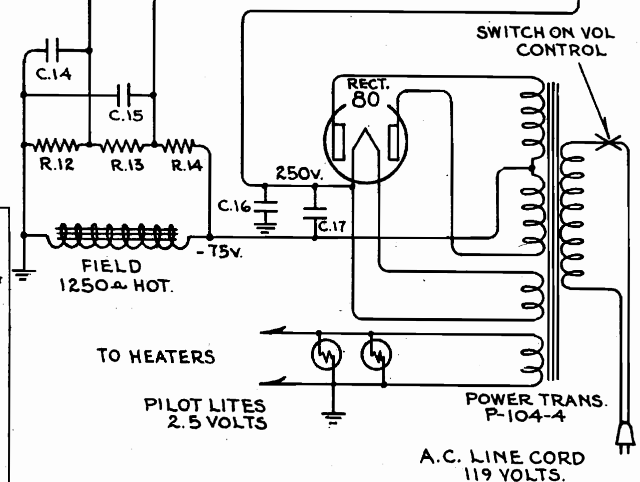
GAMBLE-SKOGMO, INC.

Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts



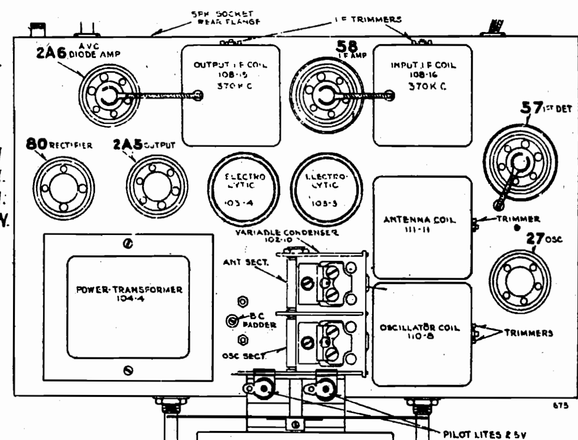
IF PEAK 370 KC.



CONDENSERS Nº	VALUE
C.1:-	50 MICA
C.2:-	490 MICA
C.3:-	5M MICA
C.4:-	.05 X 200V.
C.5:-	.05 X 400V.
C.6:-	100 MICA
C.7:-	100 MICA
C.8:-	.05 X 200V.
C.9:-	.05 X 400V.
C.10:-	.003 X 400V.
C.11:-	.02 X 400V.
C.12:-	.1 X 200V.
C.13:-	.1 X 200V.
C.14:-	.25 X 200V.
C.15:-	.25 X 200V
C.16:-	18MFD. 350V. P-103-3
C.17:-	16MFD 400V. P-103-4
C.18:-	120 μμf.
C.19:-	.01 μμf.
C.20:-	.0005 MICA.

RESISTORS Nº	VALUE	
R.1:-	50M.	1/3W.
R.2:-	50	1/3W.
R.3:-	500M	1/3W.
R.4:-	50M	1/3W.
R.5:-	500M	VOLUME CONTROL P-101-11
R.6:-	500M	1/3W.
R.7:-	250M	1/3W.
R.8:-	250M	1/3W.
R.9:-	1000	
R.10:-	275	
R.11:-	13M	
R.12:-	25M	1/3W
R.13:-	250M	1/3W.
R.14:-	750M	1/3W.
R.15:-	10M	1/3W.

-: NOTE :-
CONDENSERS C.10, C.11 IN DUAL UNIT.
" C.14, C.15 " " "
" C.13, C.4 " " "
RESISTORS R.9, R.10, R.11 IN ONE UNIT. P-106-13.
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.



34265

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

MODEL 675
Alignment

GAMBLE-SKOGMO, INC.

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.
   Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

BROADCAST BAND ALIGNMENT:

1. Shift frequency of external oscillator to 535 kilocycles and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire.
   (a) Set the variable condenser in its maximum capacity position, extreme right of its rotation.
   (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This trimmer is located between the gang condenser and the power transformer (see top view).
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
   (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in the oscillator coil can, part number 110-8.

SHORT WAVE BAND ALIGNMENT:

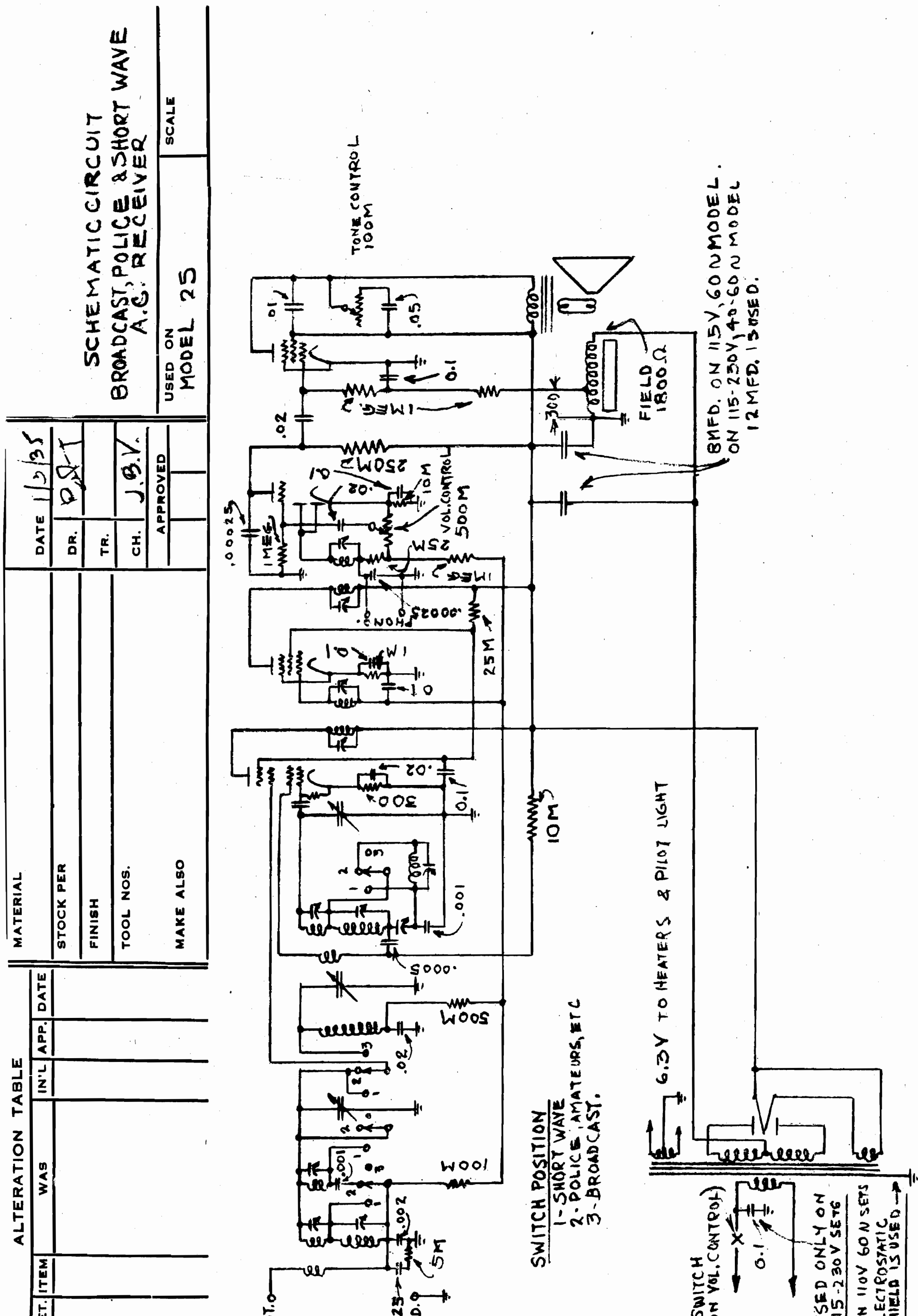
1. Set the wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 15 megacycles.
   (a) Adjust variable condenser with selector knob so that pointer is opposite the 15 megacycle calibration on the dial.
   (b) Adjust the short wave oscillator shunt trimmer to resonance with the signal (use extreme care and make certain that you do not adjust to resonance with the image instead of the signal). This trimmer is the bottom trimmer (closest to the chassis) on the oscillator coil, part number 110-8, and is accessible from the side of the chassis.
   (c) Adjust the short wave antenna trimmer to resonance (single trimmer in antenna can, part number 111-11, accessible from the side of the chassis, between type 27 and 57 tubes).

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31. All of the other dial parts are hardened and should cause no trouble.

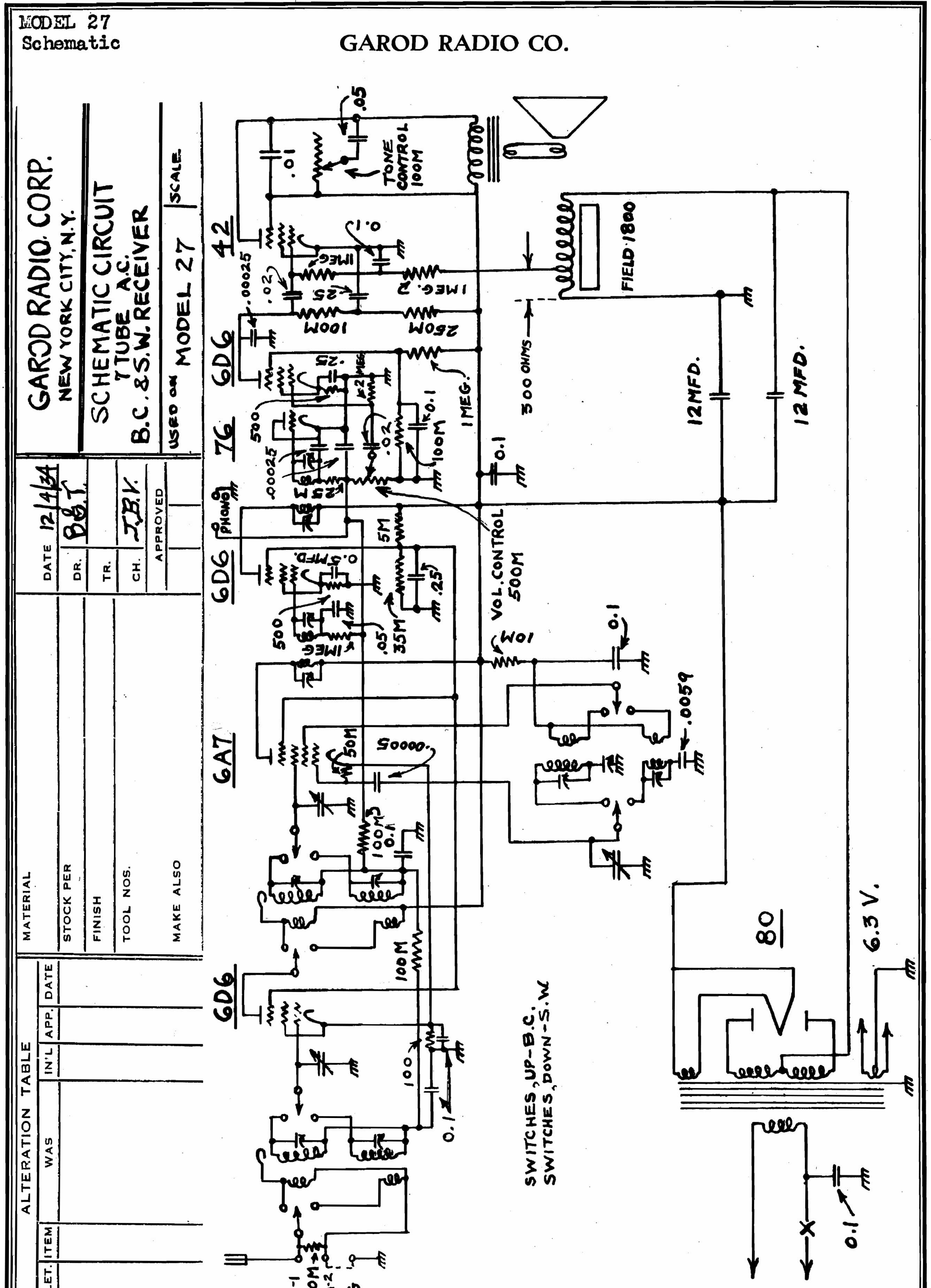
MODEL 25
Schematic

GAROD RADIO CO.



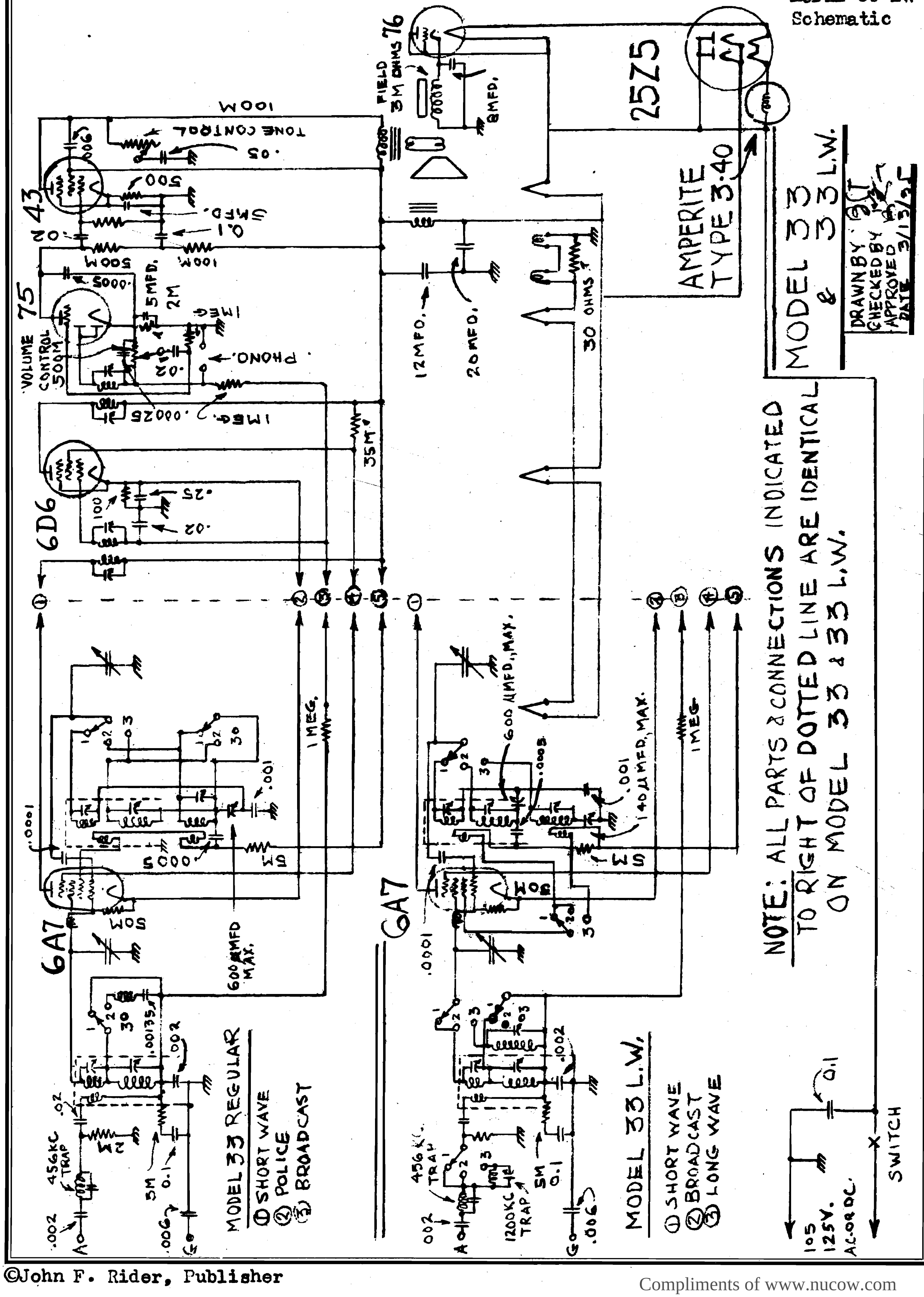
MODEL 27
Schematic

GAROD RADIO CO.



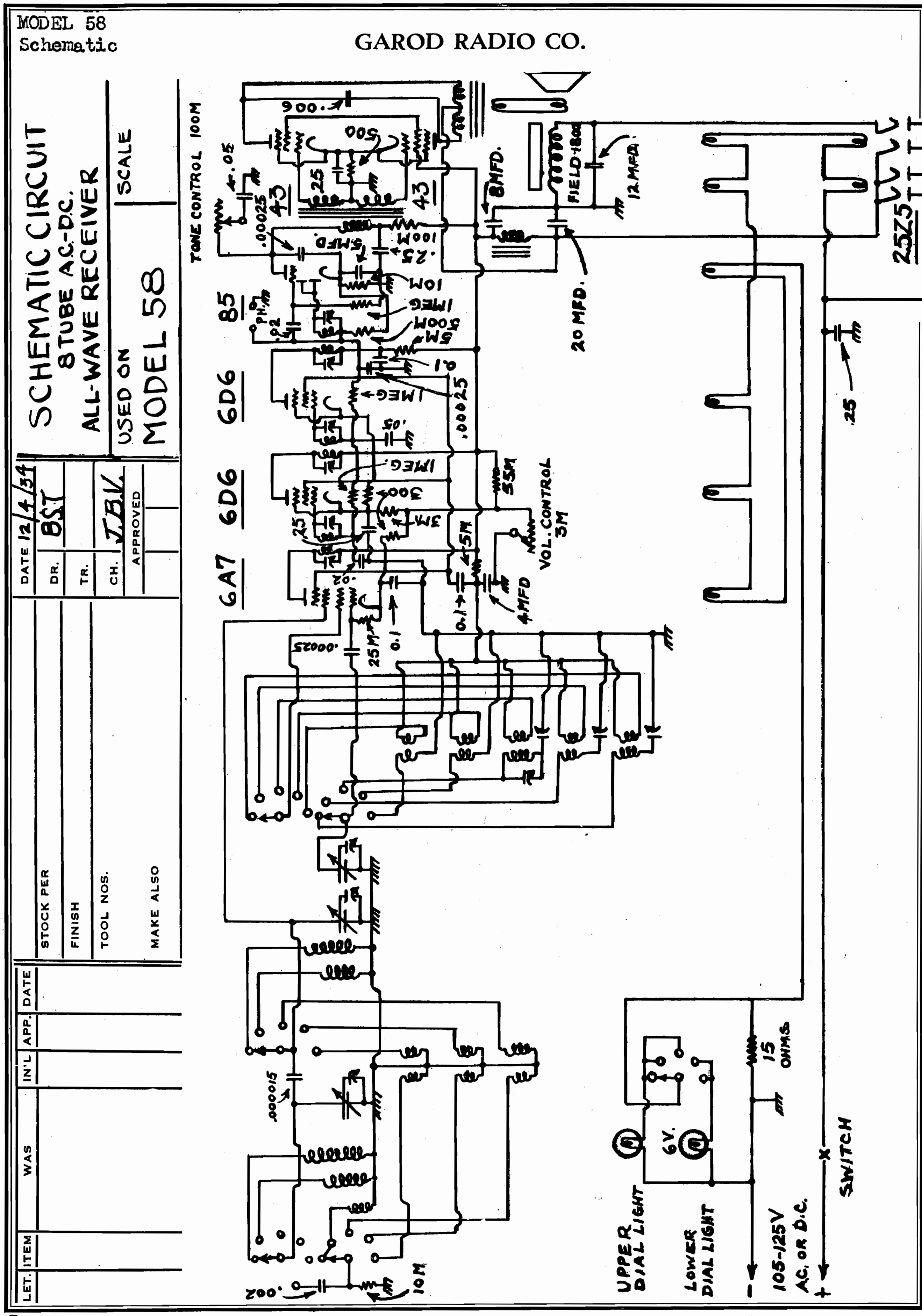
GAROD RADIO CO.

MODEL 33
MODEL 33-LW
Schematic



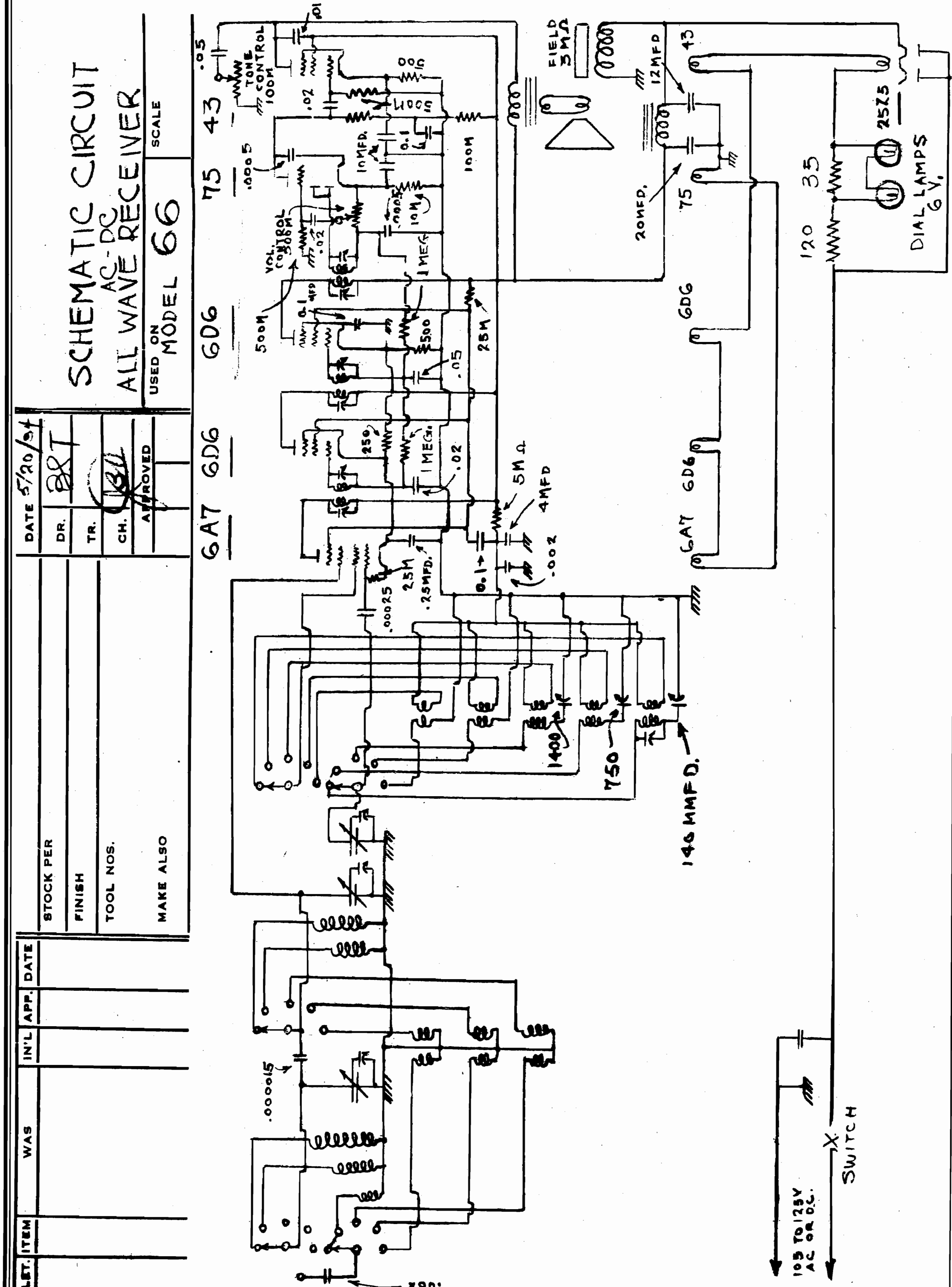
MODEL 58
Schematic

GAROD RADIO CO.



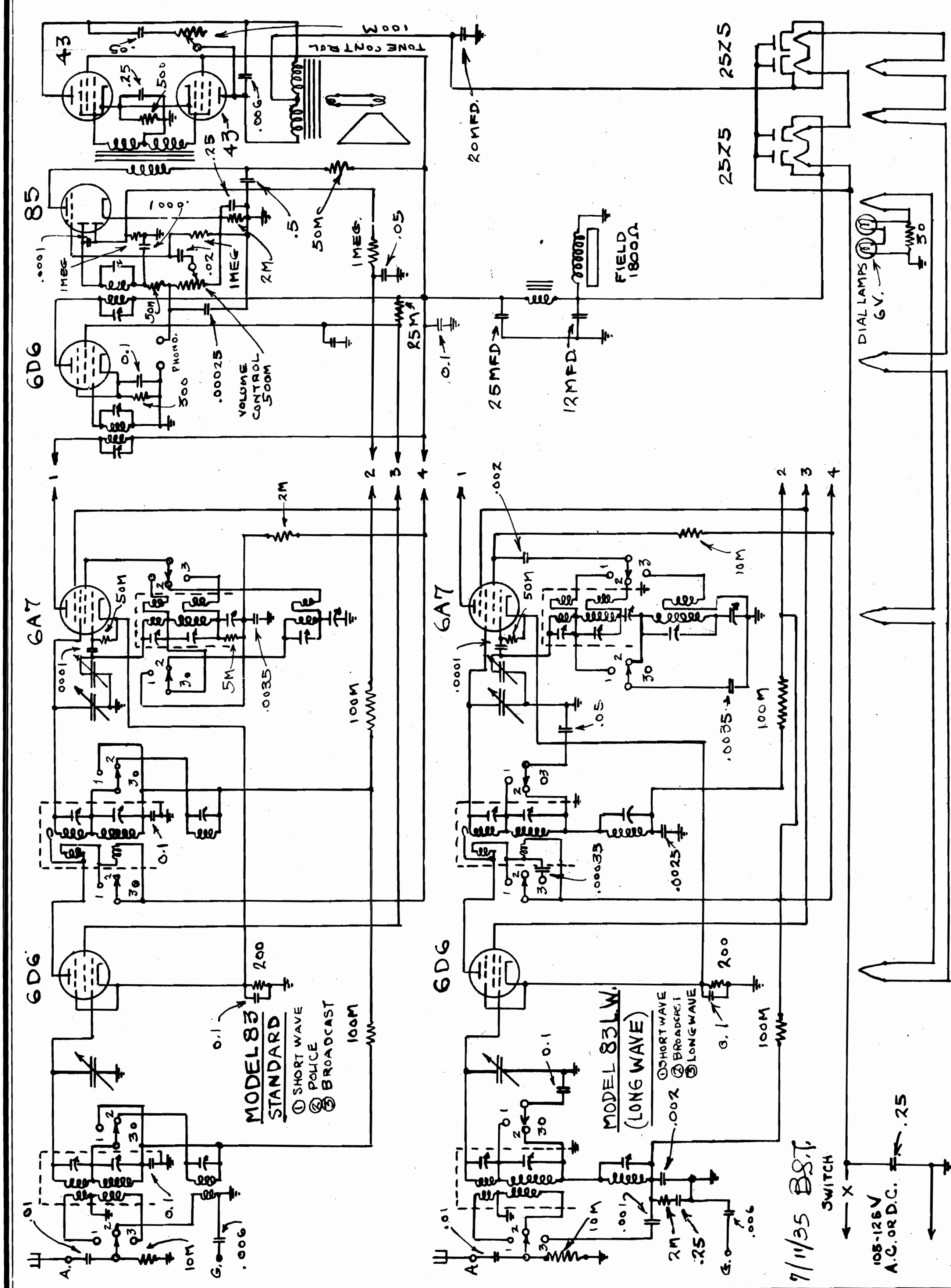
MODEL 66
Schematic

GAROD RADIO CO.



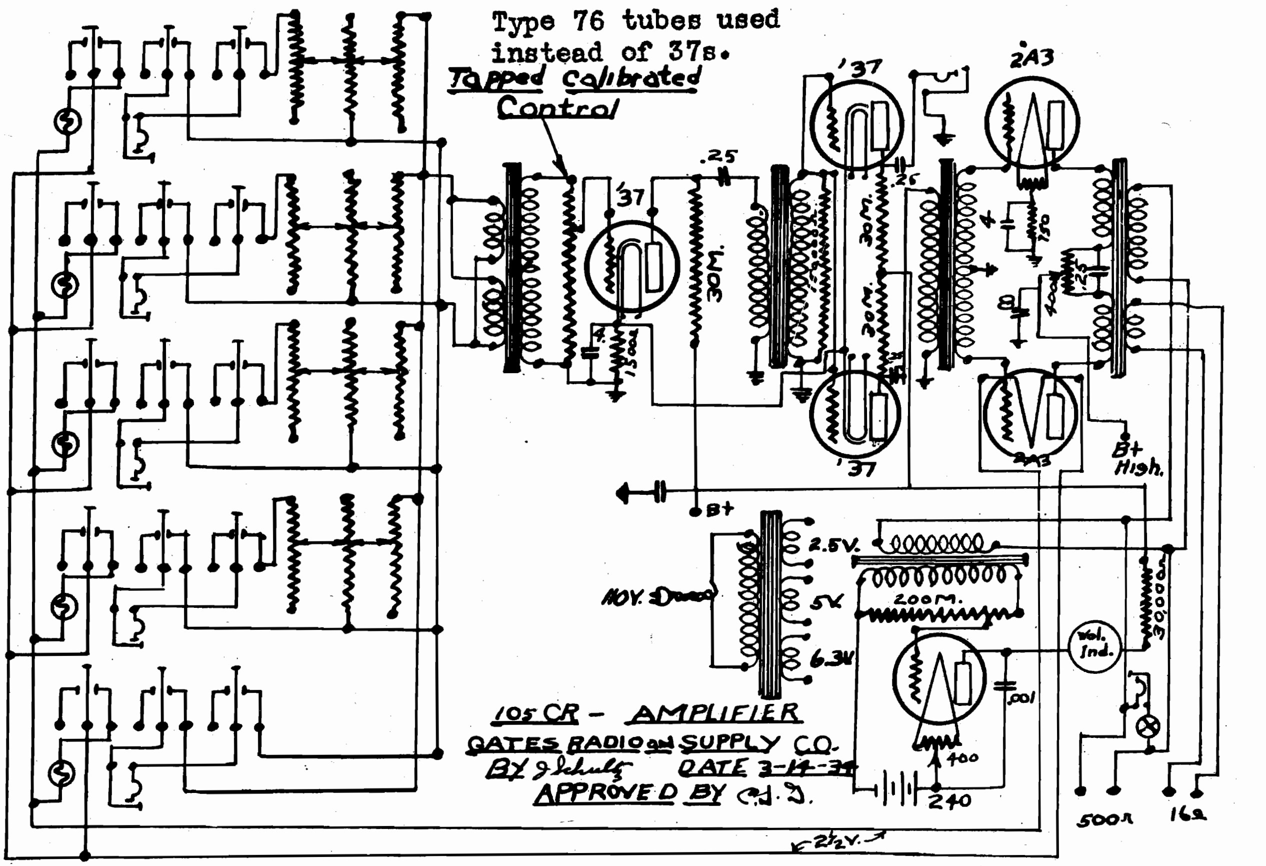
MODEL 83
MODEL 83-LW
Schematics

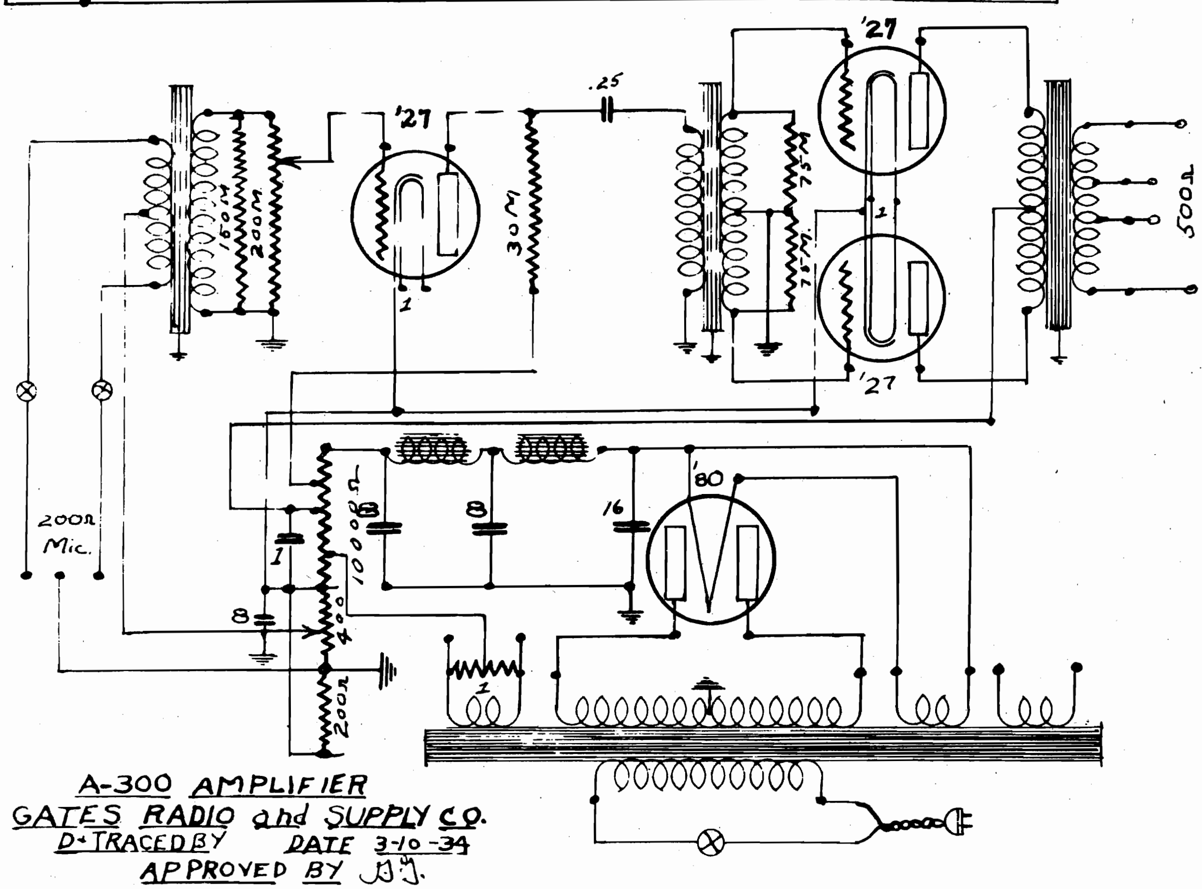
GAROD RADIO CO.



MODEL 105-CR
MODEL A-300
Schematics

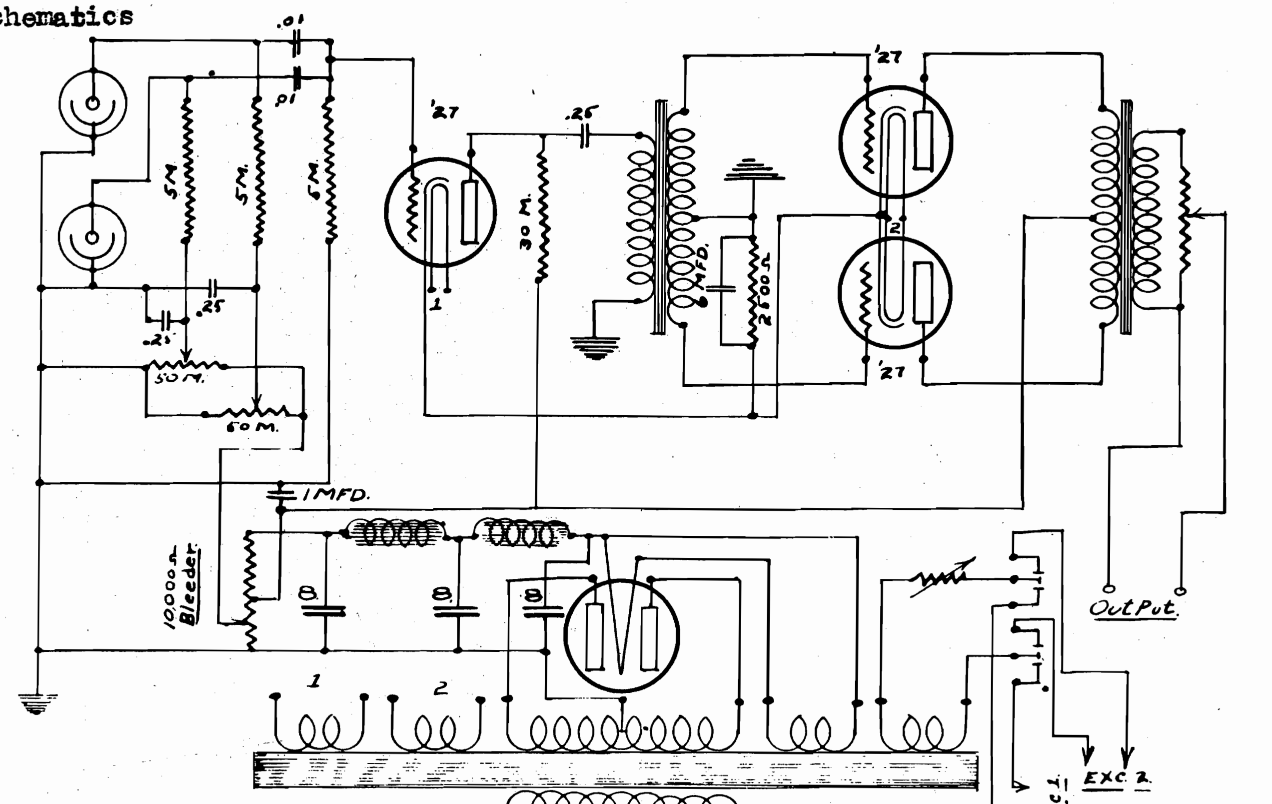
GATES RADIO & SUPPLY CO.





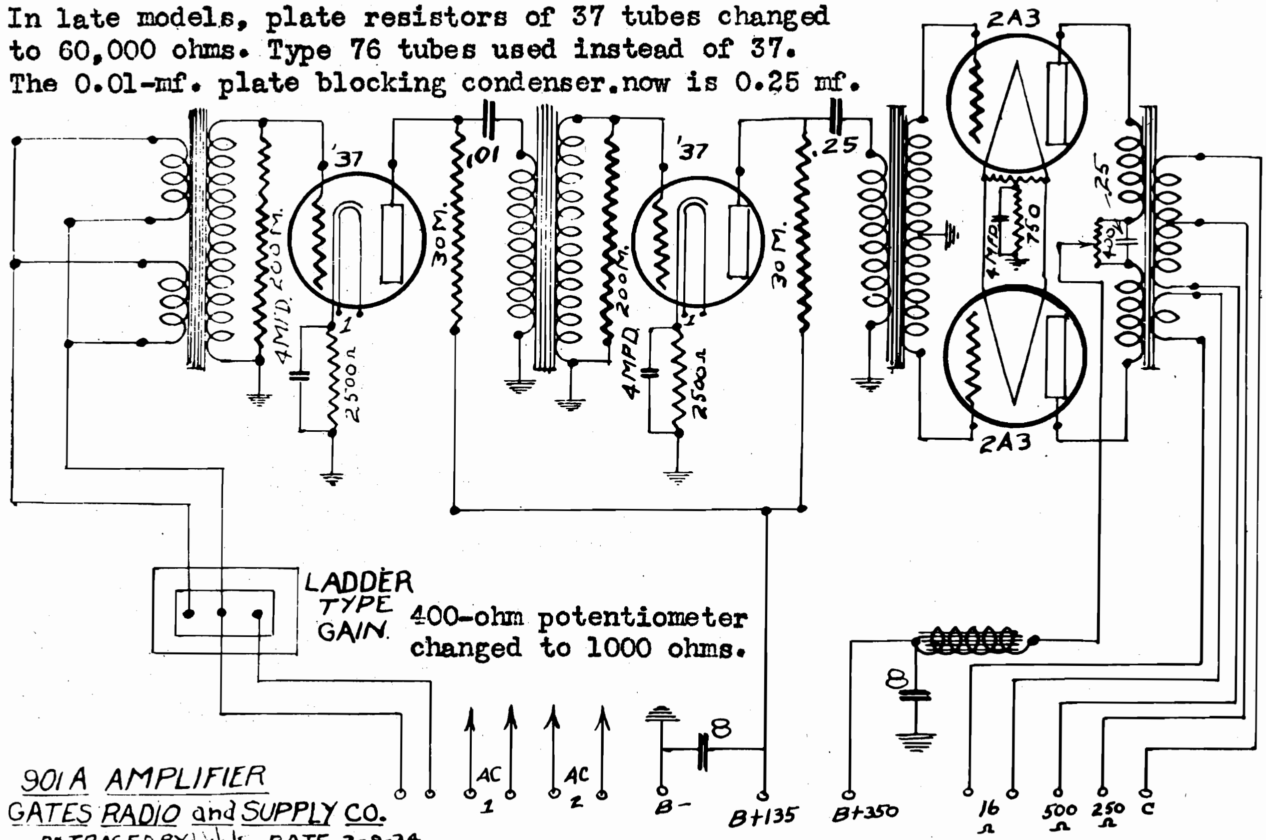
MODEL 500-A
MODEL 901-A
Schematics

GATES RADIO & SUPPLY CO.



MODEL 500A AMPLIFIER
GATES RADIO and SUPPLY CO.
D+TRACED BY   DATE 3-7-34

In late models, plate resistors of 37 tubes changed to 60,000 ohms. Type 76 tubes used instead of 37. The 0.01-mf. plate blocking condenser now is 0.25 mf.



400-ohm potentiometer changed to 1000 ohms.

901A AMPLIFIER
GATES RADIO and SUPPLY CO.
D+TRACED BY   DATE 3-9-34
APPROVED BY

MODEL KV-100
V-Doublet Antenna
Installation, Data

GENERAL ELECTRIC CO.

"V-DOUBLET" ANTENNA SYSTEM

STOCK NO. KV-100
FOR ALL-WAVE RADIO RECEIVERS

Description of System

With the advent of "all-wave" radio receivers, the antenna installation became a fundamental rather than an incidental problem. Short waves are used primarily because of their ability to travel great distances with relatively low transmitting power. Upon reaching the receiver, therefore, these waves are in general far weaker and fade much more severely than those from stations in the standard broadcast band (540 to 1500 kilocycles). Obviously, the antenna must perform very efficiently in the short-wave spectrum; it must be able to transfer signals to the receiver with negligible loss or reliable results will be practically impossible.

Short-wave broadcasting covers a very wide frequency range, being segregated by international agreement into four principal narrow bands located approximately at 19, 25, 31 and 49 meters. For any given length, a conventional antenna will favor certain frequencies and tend to reject others. Antennas of the conventional single wire or conventional doublet type are therefore quite unsatisfactory, for there is no one length which would operate with any degree of uniformity over the required range. The "V-doublet" antenna system, however, serves the purpose admirably.

As its name implies, this system incorporates a doublet, the center portion of which takes the form of a "V." The factor responsible for the non-uniform sensitivity of a conventional single-wire or doublet antenna is the development of standing waves along its length, which results in points of high and low sensitivity at different frequencies. The "V-doublet" reduces these standing waves because the center portion is tapered, which makes the system somewhat aperiodic. The first high-impedance point is thereby extended out to such a high frequency that efficient pick-up is obtained on the antenna proper, and the high impedance point does not have the usual derogation of signal strength experienced with conventional doublets. The result is a doublet of better uniform sensitivity over the short-wave bands.

Signals intercepted by the doublet are fed to the receiver through a balanced, twisted-pair lead-in (hereinafter called the transmission line). A further function of the tapered "V" is to couple efficiently the fairly high impedance antenna to the low impedance transmission line, in which case the taper performs the function of a transformer. The transmission line is coupled to the receiver through a specially constructed receiver-coupling transformer. The length of the transmission line and coupling ratio of the transformer are correct to afford proper *electrical matching* for greatest energy transfer from the antenna to the receiver.

While natural static is almost negligible in the short-wave spectrum, "man-made" interference is often very severe. Such interference usually is of local origin, being radiated by the house-wiring or by external electrical apparatus, including even the ignition systems of passing automobiles. It is "picked up" mainly by the antenna lead-in, and so, little or nothing can be done with ordinary types of antennas to prevent annoyance from that source. Doublet antennas, however, are particularly advantageous from a standpoint of noise reduction since the transmission line does not form an active part of the system, but serves merely to transfer signals from the doublet to the receiver. In this "V-doublet" system, complete rejection of signals picked up along the transmission line is achieved by virtue of the special balanced design of the receiver-coupling transformer.

There is yet another consideration involved. With an all-wave receiver, the antenna must not sacrifice performance in the standard broadcast and other low-frequency bands in order to obtain good short-wave reception. At the lower frequencies, therefore, this antenna system is converted from its "V-doublet" form to one approximating the conventional "T-type" arrangement so that the transmission line acts as part of the effective length. This change-over is accomplished automatically by the special circuit employed in the receiver-coupling transformer.

Installation

The design of the "V-doublet" antenna system is not complicated and its installation is simple. A typical installation is shown in Fig. 1. In order to intercept radio signals most efficiently, the horizontal portion of the antenna should be at least 30 feet above the effective ground. Ordinarily, the antenna will be erected either upon the roof of a building or suspended between that roof and a near-by tree or pole. For the usual dwelling having a roof and framework of non-metallic materials, the height will be measured with respect to the actual surface of the earth. In the case of a building with metal framework or roof such as a modern apartment house or hotel, effective ground is assumed as the roof of such a building.

Interference Considerations

It is also desirable that the doublet be erected as high as conveniently possible so as to place that portion of the system which intercepts the signal at the maximum distance from any source of man-made interference. Interference "picked up" by the transmission line cannot affect the receiver. The doublet, therefore, should be erected well remote from sources of interference such as automobile highways, street-railway lines or motor-driven electrical appliances. In some cases it may be necessary to locate the antenna proper as much as 500 feet distant from the receiver, adding the required length of transmission line to the 100-foot length supplied with the kit. To maintain the correct electrical matching, not less than 100 feet of transmission line should be used in any case. If less than 100 feet is required, the excess amount should be coiled up neatly at the end nearest the receiver. As this line has a definite known impedance, do not use any random twisted-pair lamp cord for additional length; use only the genuine transmission line sold by your dealer. Each conductor of the genuine transmission line is covered with special high-grade white rubber insulation and a covering of waterproofed braid is woven over the twisted pair.

Advantage should also be taken of the directional effect of the horizontal arrangement wherever possible. Least interference will be intercepted by the doublet when the span points toward the source of disturbance. This resource will be particularly helpful when the antenna cannot be removed from the field of interference, as in cases where a radio transmitter (such as an amateur station) is operating in the neighborhood.

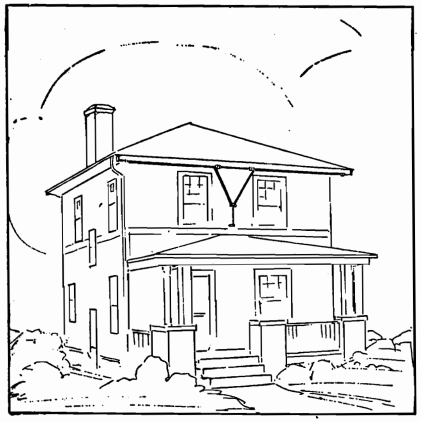


Fig. 2A

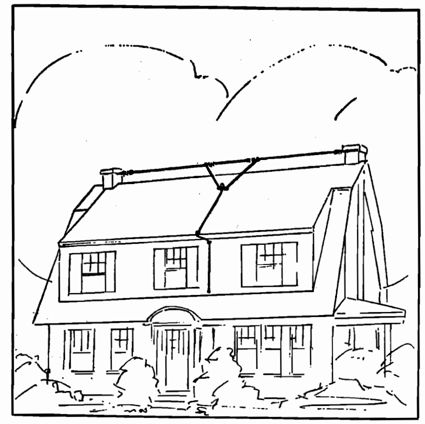


Fig. 2B

Alternative Antenna Arrangements

The geometric design of the "V-doublet" lends itself easily to a variety of methods of suspension besides that shown in Fig. 1. Another possible arrangement is suspension from the eaves of a building as shown in Fig. 2A, providing sufficient span and height above ground can be obtained in this manner and the antenna is not run parallel to a metal rain-gutter. Or, if restrictions make it inadvisable to erect masts, the doublet might be suspended between two chimneys, as shown in Fig. 2B, with the plane of the "V" parallel to the roof. The "V" may be rotated about the horizontal legs as axes, to any position desired, and supported at the apex to which the transmission line is attached.

Highest efficiency is obtained by making the legs of the doublet the recommended length. If sufficient ground space is not available to provide the normal span of 51 feet, the legs may be shortened somewhat. This will result, however, in slightly decreased efficiency in the region of the 49-meter band.

Set-up Procedure

The "V-doublet" antenna system proper, consisting of the doublet wires, glass strain insulators and transmission line, is assembled. Use of a soldering iron is therefore not necessary. The receiver end of the transmission line is stripped for ready connection to the receiver-coupling transformer.

Equipment—The following parts are supplied with the kit:

1 Doublet and transmission line assembly.
1 Receiver-coupling transformer.
5 Nail-on insulators.
1 Entrance-tube insulator.
2 Links (for receiver-coupling transformer).
1 Adapter (for receiver-coupling transformer).

Installation—It is desirable to unpack the kit near the place where the doublet is to be suspended. The doublet wires will be found coiled at the top of the package, with the transmission line coiled below. The receiver-coupling transformer and porcelain insulators are wrapped separately in tissue paper. Connecting links and the adapter for the receiver-coupling transformer will be found in the envelope packed with the kit.

First carefully uncoil and lay out the doublet wires and transmission line to form the "V-doublet"

MODEL KV-100
Installation
Part 2, Parts

GENERAL ELECTRIC CO.

illustrated in Figure 1. Then attach the suspension ropes to the end strain insulators and hang the system as a unit between the masts or intended points of support. If it is necessary to shorten the 20-foot legs of the doublet because of insufficient space, each leg must be shortened by an equal amount. It is important to avoid excessive tension in the doublet or "V" wires or breakage may occur. These wires must not be stretched tightly but should be allowed to sag so that the center portion of the doublet is two or three feet below the end insulators.

Connection to Receiver—The opposite end of the transmission line is brought to the receiver, using the nail-on insulators and entrance-tube insulator at points best suited to the installation. If lightning arresters are desirable or required by local ordinance, two (low-capacity) units should be installed as shown in Fig. 1, Detail "B." Simply remove a small strip of insulation from the transmission line conductors at the lightning arresters, connect the bared portions one to each "antenna" terminal and continue on without cutting the transmission line. The ground terminals of the lightning arresters are made common and connected to a metal stake or pipe driven five to eight feet into the soil.

Fasten the receiver-coupling transformer to the "ANT-GND" terminal board on the receiver chassis, using the two links supplied with the kit. Make certain to install the transformer correctly; the links should be attached to those terminals identified as "A" and "G" on the transformer and the label should face toward the receiver. Connect the end of the transmission line to the terminals marked "T" and "L," leaving any additional length coiled up behind the receiver. Finally, attach a wire from the "GND" terminal to the nearest cold-water pipe as close as possible to the point where the pipe enters the earth, or to some other good ground connection. The latter connection should be as short as possible and preferably made with No. 14 or larger rubber-covered stranded copper wire. On account of the variation in length of lead and type of ground

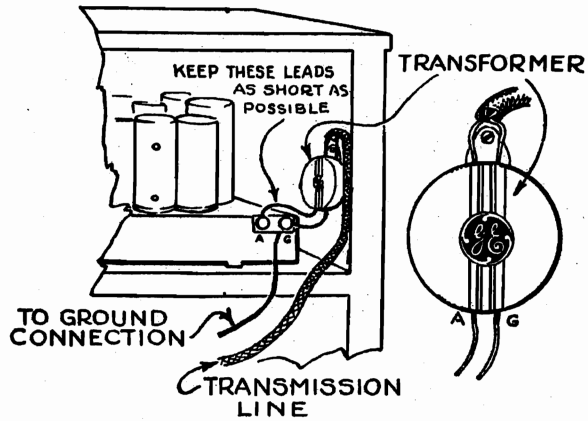


Fig. 3

available, the ground wire and clamp are not furnished with the kit. *The importance of a good ground connection cannot be overestimated,* as the degree of noise reduction obtained will depend to a large extent upon this factor.

In receivers having no "ANT-GND" terminal board, fasten the coupling transformer to the cabinet as near as possible to the chassis, using the adapter supplied with the kit as shown in Fig. 3. To insure most noise elimination, the connection from the "GND" terminal of the transformer should be made directly to the chassis metal with a wire no longer than one inch. The connection from the "ANT" terminal of the transformer to the receiver antenna lead or terminal also should be no longer than necessary and it is important to avoid close proximity of this wire to the dome (grid) clips of the radio tubes.

Installation Service

Although this "V-doublet" antenna system is not difficult to install, many persons nevertheless prefer to have it erected by an experienced radio serviceman. Upon request, your dealer or service engineer will make the complete installation at a nominal charge.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

Stock No.	Description	List Price
KV-101	Wire—Antenna Wire (Roll of 31 feet)	$0.25
KV-102	Wire—Antenna Wire (Roll of 11 feet)	.12
KV-103	Transmission Line (Roll of 100 feet)	3.90
KV-104	Transformer—Receiver-coupling transformer	2.50
KV-105	Link—Connection Link—Connects receiver-coupling transformer to "ANT-GND" terminal board on receiver chassis. Package of 10	.10
KV-106	Adapter—For mounting receiver-coupling transformer on any make of receiver	.10
KV-107	Insulator—Glass Strain Insulator. Package of 5	.50
KV-108	Porcelain Knob—Package of 5	.25
KV-109	Porcelain Tube	.10

March, 1935

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MODEL KV-100
Wiring Details

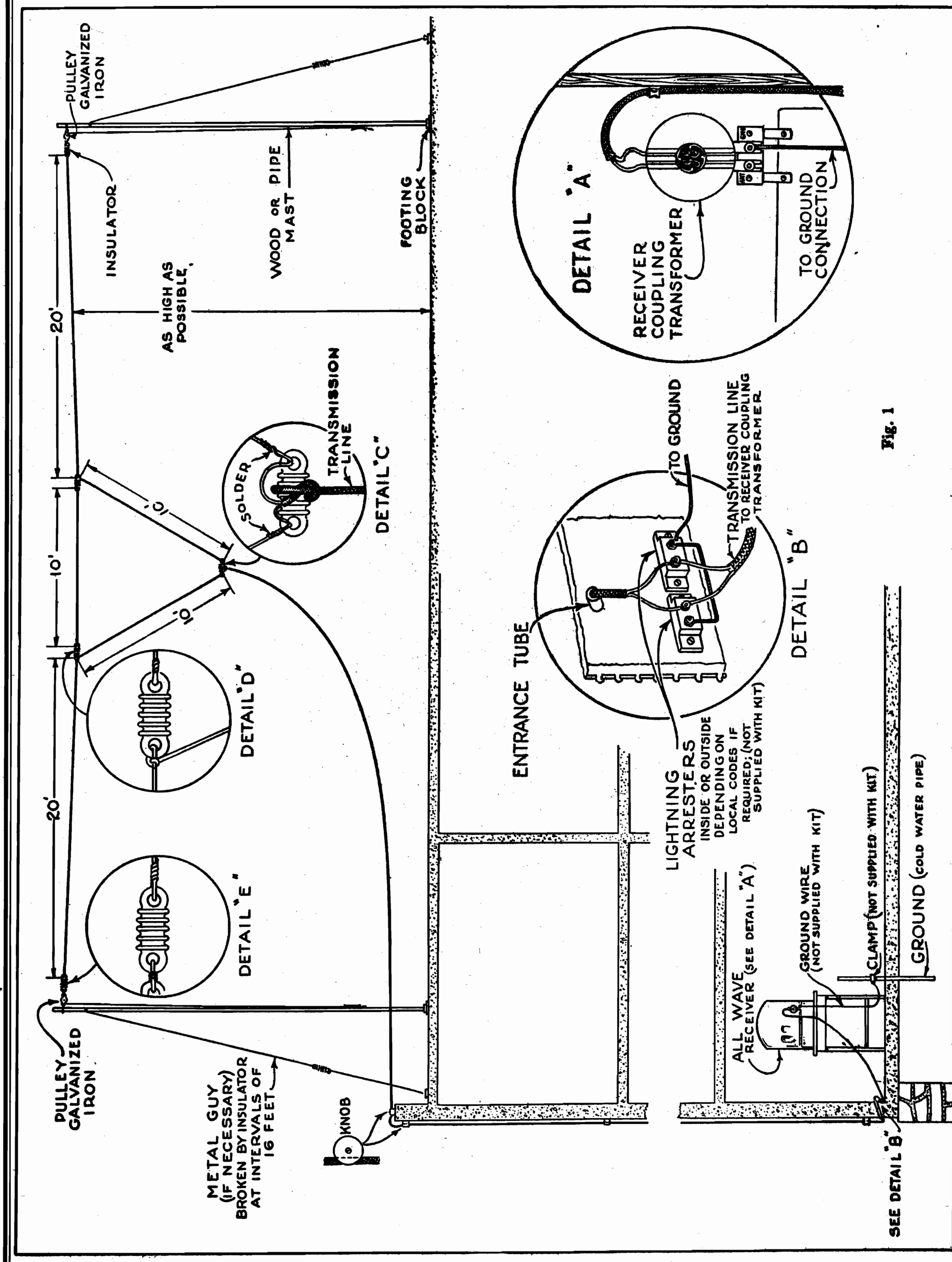

Fig. 1

MODEL A-53
Schematic

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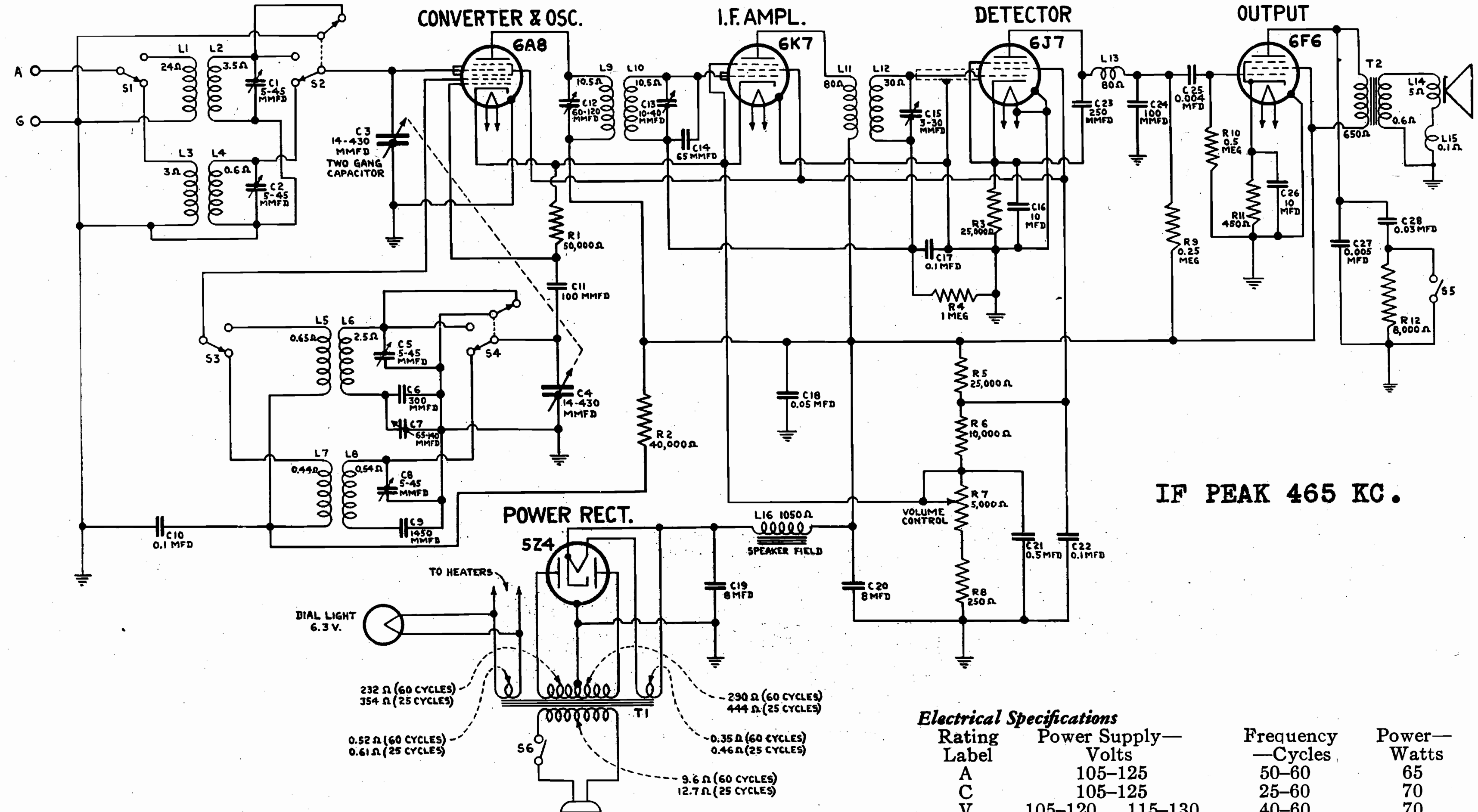
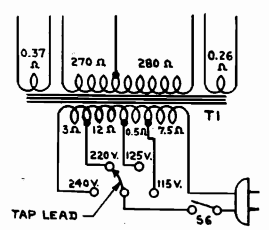


IF PEAK 465 KC.

Fig. 2 Schematic Circuit Diagram



105-250 VOLTS
UNIVERSAL TRANSFORMER

Alignment Frequencies

I. F.	Broadcast	Short-wave
465 kc.	580 kc.	6000 kc.
	1500 kc.	

Electrical Specifications

Rating Label	Power Supply—Volts		Frequency—Cycles	Power—Watts
A	105–125		50–60	65
C	105–125		25–60	70
V	105–120	115–130	40–60	70
	200–230	220–250		

Tuning Frequency Range

Broadcast	540–1600 kc.
Short Wave	2.4–6.8 mc. (2400–6800 kc.)

Control Drive Ratio: 5 to 1

Electrical Power Output

Undistorted	1.5 watts
Maximum	2.5 watts

Loud-speaker—Electrodynamic
Cone: 7 in. overall, 6 in. effective diameter
Cone coil impedance: 5 ohms at 400 cycles

July, 1935

MODEL A-53
Chassis Wiring

GENERAL ELECTRIC CO.

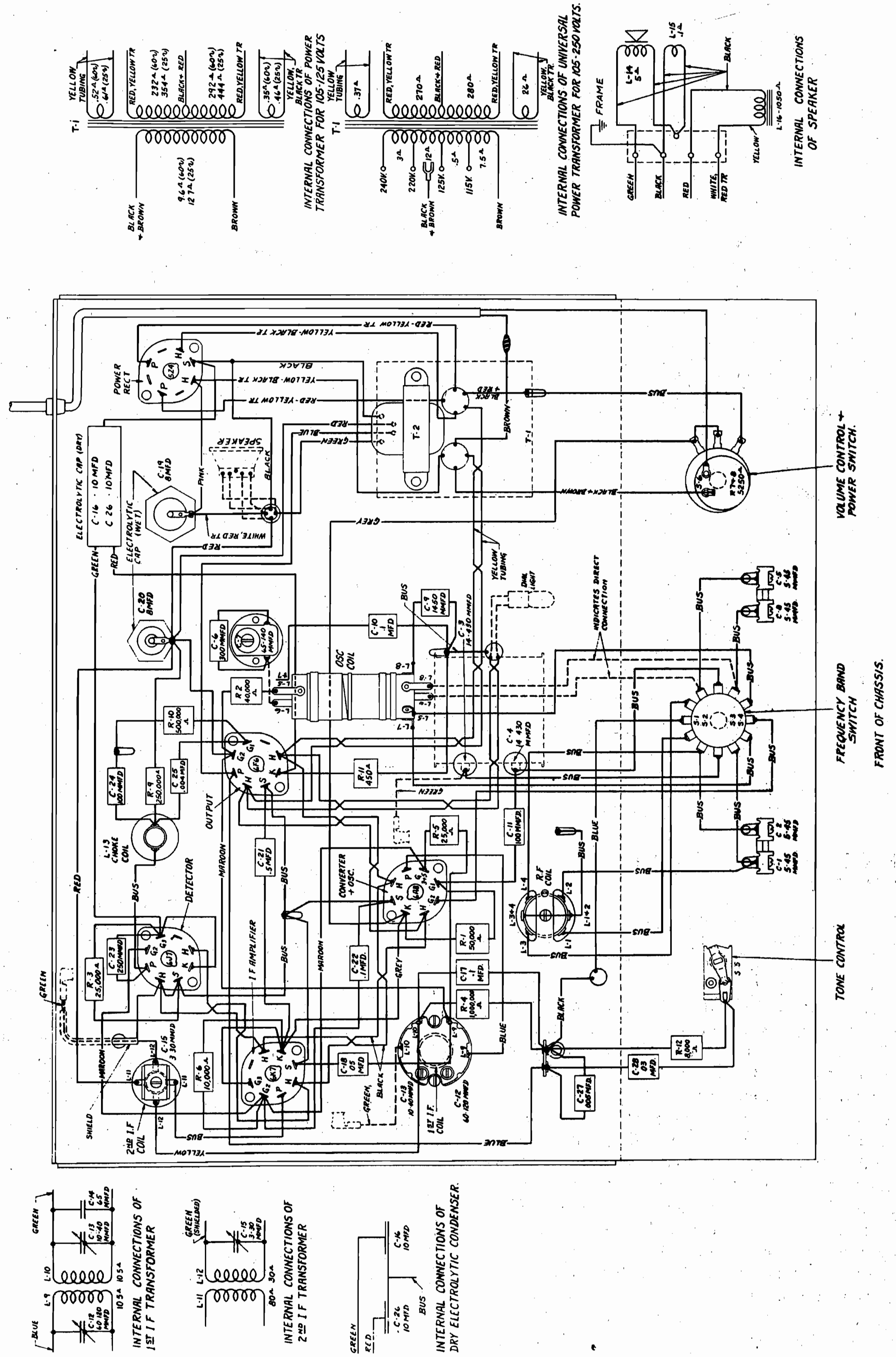


Fig. 3 Chassis Wiring Diagram

Code Interference

In certain localities near to high-powered radiotelegraph stations operating at frequencies in the vicinity of 465 kc., slight code interference may be present on both bands of the receiver. This condition usually occurs over the entire tuning range and is not greatly affected by change of tuning. To overcome this interference, a Wave Trap, such as General Electric Stock No. WT-100, should be installed. The wave trap is connected between the blue and black leads of the receiver, and the antenna lead-in and ground wire, according to the instructions furnished with the trap.

OPERATION

Model A-53 receiver has four controls located as shown below:

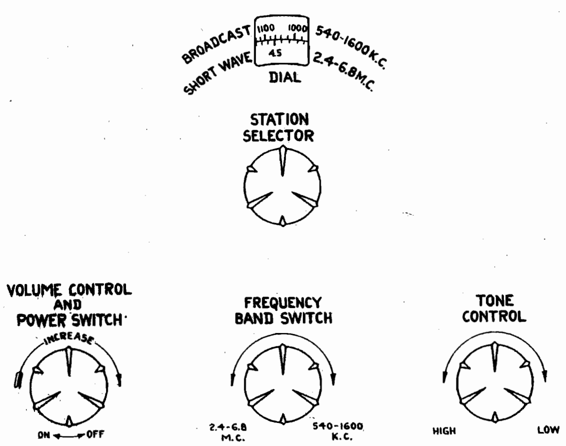


Fig. 1

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6A8 tube through the R.F. coil the secondary of which is tuned to the incoming signal by the rear section of the tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator section of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the tuning condenser in conjunction with the oscillator coil and padding capacitors.

The combination of the two signals produces the intermediate frequency of 465 kc. This particular frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, the first of which has both primary and secondary tuned. The second transformer is unshielded and has only the secondary tuned to 465 kc.

Control of volume is obtained by the use of a variable resistor in the cathode circuits of the 6A8 and 6K7 tubes.

The output of the I. F. amplifier is applied to the grid of the 6J7 tube, used as a biased power detector. This tube has in its grid circuit a 1-megohm resistor, which is also tied to the grid-return of the 6K7 tube. The purpose of this arrangement is to prevent excessive overloading of the 6J7 detector when the volume control is turned up on a strong signal.

The output of the 6J7 detector is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .03-mfd. capacitor which is normally connected from the plate of the 6F6 to ground through a resistor. When it is desired to reduce the high frequency output of the receiver, the resistor is short-circuited by the tone control switch connecting the .03-mfd. capacitor directly from the 6F6 plate to ground.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube and utilizing the loud-speaker field as a filter reactor which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

ALIGNMENT PROCEDURE

Before making any adjustments to the R. F. circuits, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "tuning wand" into the antenna coil. The "tuning wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the antenna coil, the inductance is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in the coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand at the 1500-kc. point or the 6.0-mc. point, a decrease in resonant frequency of that circuit by increasing the antenna trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in antenna trimmer capacity is indicated. In the event that the brass cylinder end causes an increase in output at the 580-kc. point when inserted in the antenna coil, it is necessary to increase the oscillator padder capacity, meanwhile rocking the tuning dial. An increase in output, resulting from inserting the iron-filled end, indicates a decrease in oscillator padder capacity.

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(1) ***I. F. Alignment***

The I. F. amplifier should be tuned to 465 kc.; set the oscillator dial at this frequency. Set the volume control at maximum and short-circuit the antenna and ground leads. Tune the receiver to a point where no signal comes in and ground the chassis.

Connect the test oscillator output between the 6A8 converter tube grid and the chassis. Connect the output meter across the cone coil of the speaker and adjust the oscillator output until a small deflection is observed in the output meter.

The three I. F. trimmers are adjusted in the following sequence:

1. Secondary trimmer on second I. F. transformer.
2. Secondary trimmer on first I. F. transformer.
3. Primary trimmer on first I. F. transformer.

Throughout all adjustments the output should be maintained at a low level by decreasing the test oscillator output as the various stages are brought in line. After these adjustments have been made the same procedure should be repeated as a final check. The I. F. alignment will then be complete.

(2) ***R. F. Alignment***

The R. F. and oscillator transformers are aligned at 580, 1500, and 6000 kc. With the tuning condenser plates fully meshed, line up the pointer and dial by adjusting the dial set screws so that the line at the extreme end of the dial is indicated.

Broadcast Band

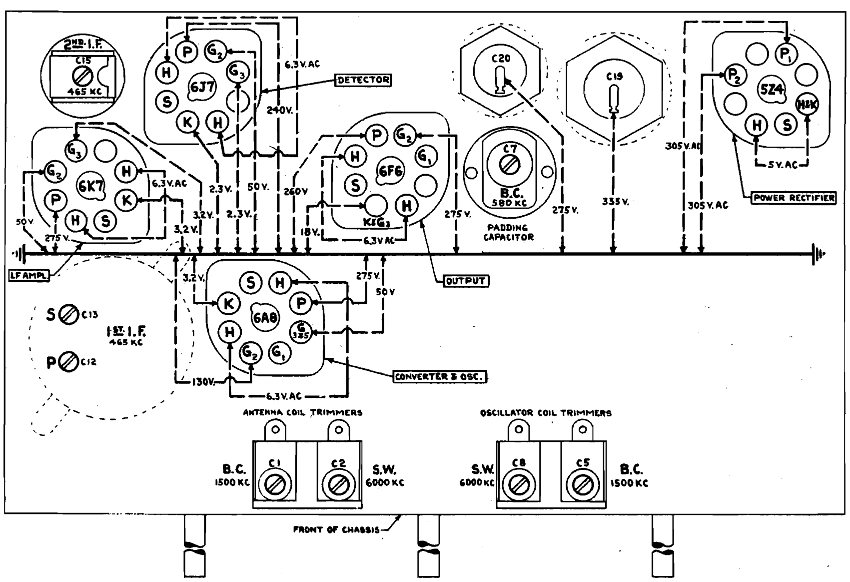
With the band switch in the clockwise position, set the tuning dial to 1500 kc. Set the test oscillator at 1500 kc. and adjust the oscillator trimmer for the broadcast band for maximum output. Next, set the R. F. trimmer for maximum output, taking care that the output from the test oscillator is not high enough to overload any part of the set. After these adjustments, tune the set and the test oscillator to 580 kc. Adjust the broadcast padding capacitor for maximum output while rocking the tuning condenser back and forth until maximum output is obtained. The dial setting after this adjustment may not agree exactly with the frequency, but this is not important.

To complete the broadcast band line-up, repeat the adjustment at 1500 kc. as before.

Short-wave Band

With the frequency band switch in the counter-clockwise position, set the receiver dial to 6.0 mc. Set the test oscillator at 6000 kc. and adjust the short-wave oscillator trimmer for maximum output. Next, set the short-wave R. F. trimmer for maximum output. Repeat these adjustments a second time. After aligning the S. W. band, turn the test oscillator to approximately 6930 kc. with the receiver dial still at 6 mc. Increase the test oscillator output until a signal is heard in the neighborhood of 6930 kc. This is the image frequency and if the set has been properly aligned the sensitivity at this point will be much less than at 6000 kc. In the event the image frequency cannot be found, the alignment should be rechecked at 6.0 mc. It will be noticed that the oscillator trimmer will have two positions at which the signal will give maximum output. The position which gives the lower trimmer capacitance obtained by turning the trimmer screw counterclockwise is the proper adjustment.

When these adjustments have been completed the receiver will be in alignment.



VIEWED FROM UNDERSIDE OF CHASSIS

MODEL A-53
Voltage
Parts

GENERAL ELECTRIC CO.

SOCKET VOLTAGES

Tube	Cathode to Ground Volts	Screen Grid to Ground Volts	Plate to Ground Volts	Plate Current MA	Heater Volts A-c.
6A8 Converter	3.2	50	275	1.5	6.3
Oscillator			130	3.5	
6K7 I. F. Amplifier	3.2	50	275	2.2	6.3
6J7 Detector	2.3	50	*	.12	6.3
6F6 Power Output	18	275	260	33	6.3
5Z4 Rectifier	335		305	27 per plate	5.0

* 6J7 plate voltage is supply voltage (275) minus drop in load resistor.
Measured at 120 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

RECEIVER ASSEMBLIES

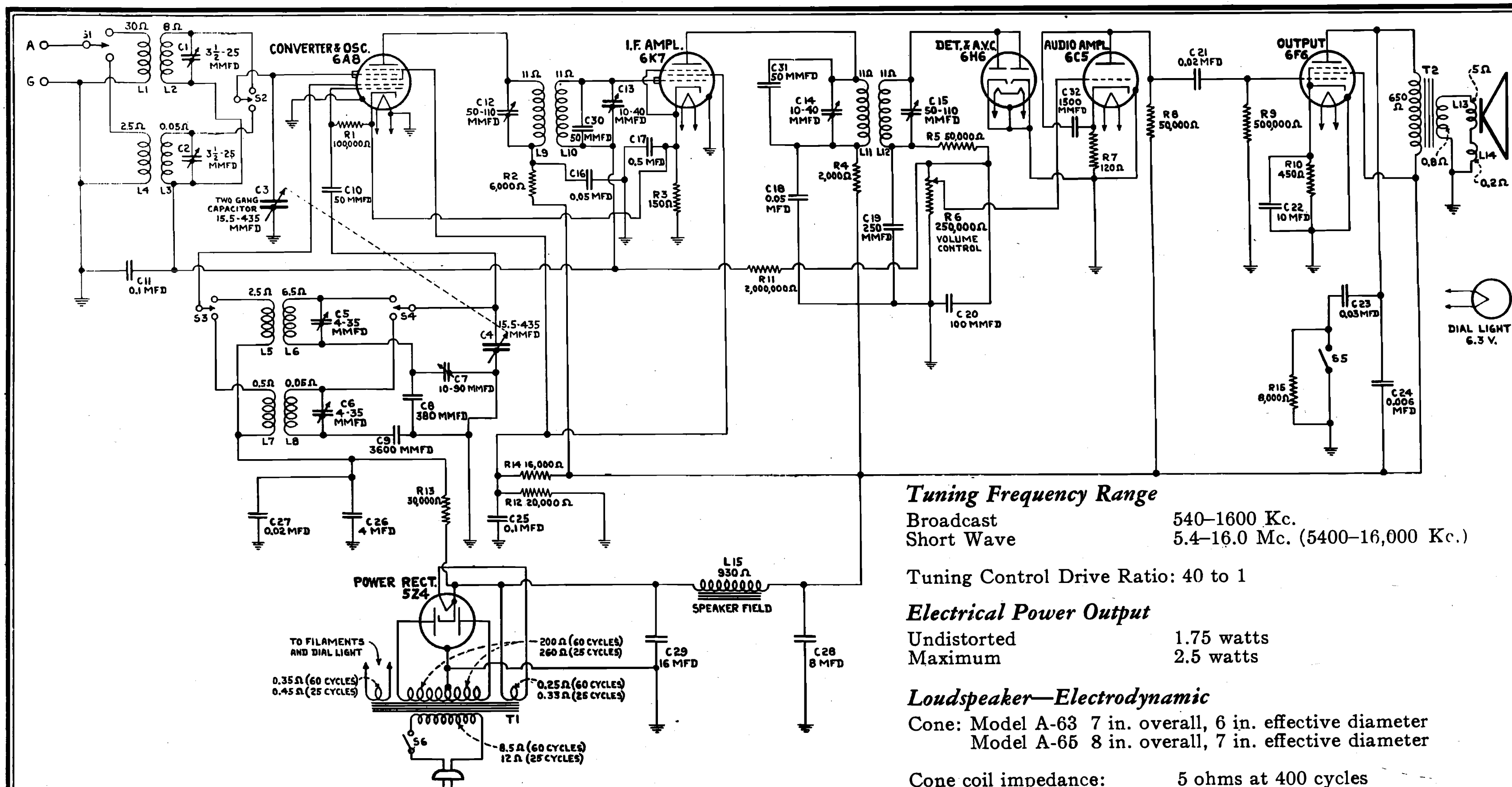
Stock No.	Description	List Price
RB-014	BOARD—Terminal Board	$0.10
RB-113	BRACKET—Lamp Bracket and Indicator	.20
RC-022	CAPACITOR—.004 Mfd, 400 Volts (C-25) Paper Dielectric	.25
RC-029	CAPACITOR—.005 Mfd, 400 Volts (C-27) Paper Dielectric	.30
RC-083	CAPACITOR—.03 Mfd, 400 Volts (C-28) Paper Dielectric	.25
RC-091	CAPACITOR—.05 Mfd, 400 Volts (C-18) Paper Dielectric	.30
RC-096	CAPACITOR—.1 Mfd, 200 Volts (C-17, C-22) Paper Dielectric	.30
RC-123	CAPACITOR—.1 Mfd, 400 Volts (C-10) Paper Dielectric	.35
RC-158	CAPACITOR—.5 Mfd, 200 Volts (C-21) Paper Dielectric	.40
RC-235	CAPACITOR—100 Mmfd, (C-11, C-24) Mica Dielectric	.25
RC-258	CAPACITOR—250 Mmfd, (C-23) Mica Dielectric	.25
RC-267	CAPACITOR—300 Mmfd, (C-6) Mica Dielectric	.25
RC-345	CAPACITOR—1450 Mmfd, (C-9) Mica Dielectric	.35
RC-402	CAPACITOR—8 Mfd, 375 Volts (C-19) Wet Electrolytic	1.10
RC-403	CAPACITOR—8 Mfd, 350 Volts (C-20) Wet Electrolytic	1.00
RC-511	CAPACITOR—Two 10 Mfd, 25 Volts (C-16, C-26) Dry Electrolytic	.80
RC-604	CAPACITOR—Twin 5-45 Mmfd Trimmer Capacitor (C-1, C-2, C-5, C-8)	.45
RC-605	CAPACITOR—65-140 Mmfd Oscillator Padder Capacitor (C-7)	.40
RC-703	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	2.75
RC-850	CORD—Power Cord with Plug	.65
RD-008	DIAL—Dial Scale and Hub Assembly	.55
RE-003	ESCUTCHEON—Dial Escutcheon	.50
RF-004	FOOT—Chassis Mounting Foot with Cushions	.15
RG-001	GRID CAP—Grid Connection Cap, Pkg of 5	.10
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, Pkg. of 5	.50
RL-109	COIL—R. F. Coil Assembly (L-1, L-2, L-3, L-4)	1.25
RL-208	COIL—Oscillator Coil Assembly (L-5, L-6, L-7, L-8)	1.00
RR-027	RESISTOR—25,000 Ohms, ¼ Watt (R-3) Carbon Resistor, Pkg of 5	.70
RR-036	RESISTOR—50,000 Ohms, ¼ Watt (R-1) Carbon Resistor, Pkg of 5	$0.70
RR-062	RESISTOR—250,000 Ohms, ¼ Watt (R-9) Carbon Resistor, Pkg of 5	.70
RR-064	RESISTOR—500,000 Ohms, ¼ Watt (R-10) Carbon Resistor, Pkg of 5	.60
RR-067	RESISTOR—1 Megohm, ¼ Watt (R-4) Carbon Resistor, Pkg of 5	.70
RR-189	RESISTOR—40,000 Ohms, ½ Watt (R-2) Carbon Resistor, Pkg of 5	.80
RR-224	RESISTOR—8000 Ohms, 1 Watt (R-12) Carbon Resistor, Pkg of 5	.85
RR-226	RESISTOR—10,000 Ohms, 1 Watt (R-6) Carbon Resistor, Pkg of 5	1.00
RR-279	RESISTOR—25,000 Ohms, 2 Watts (R-5) Carbon Resistor	.50
RR-339	RESISTOR—450 Ohms, 1 Watt (R-11) Flexible Resistor, Pkg of 5	.70
RS-105	SHIELD—1st I. F. Transformer Shield	.30
RS-200	SOCKET—Eight-pin Tube Socket, Pkg of 5	.75
RS-300	SWITCH—Tone Control Switch (S-5)	.25
RS-304	SWITCH—Frequency Band Switch (S-1, S-2, S-3, S-4)	.75
RT-051	TRANSFORMER—Power Transformer (T-1) 50-60 Cycles, 105-125 Volts (Rating "A")	4.00
RT-052	TRANSFORMER—Power Transformer (T-1) 25-60 Cycles, 105-125 Volts (Rating "C")	6.25
RT-053	TRANSFORMER—Power Transformer (T-1) 40-60 Cycles, 105-130, 200-250 Volts (Rating "V")	7.25
RT-209	TRANSFORMER—First I. F. Transformer (C-12, C-13, C-14, L-9, L-10)	2.00
RT-210	TRANSFORMER—Second I. F. Transformer (C-15, L-11, L-12)	1.10
RT-403	TRANSFORMER—Output Transformer (T-2)	1.50
RV-005	VOLUME CONTROL—Potentiometer, 5250 Ohms (R-8, R-7) and Power Switch (S-6)	1.25
RX-005	SCREW ASSEMBLY—Chassis Mounting Screw Assembly, Pkg of 3	.25

SPEAKER ASSEMBLY

Stock No.	Description	List Price
RC-902	CONE—Speaker Cone and Cone Coil	$1.00
RF-103	FIELD—Field Coil Magnet and Cone Support	4.05
RS-001	SPEAKER—Seven-inch Reproducer Complete	6.10

MODEL A-63, A-65
Schematic
Data

GENERAL ELECTRIC CO.



Tuning Frequency Range

Broadcast	540–1600 Kc.
Short Wave	5.4–16.0 Mc. (5400–16,000 Kc.)

Tuning Control Drive Ratio: 40 to 1

Electrical Power Output

Undistorted	1.75 watts
Maximum	2.5 watts

Loudspeaker—Electrodynamic

Cone: Model A-63 7 in. overall, 6 in. effective diameter
Model A-65 8 in. overall, 7 in. effective diameter

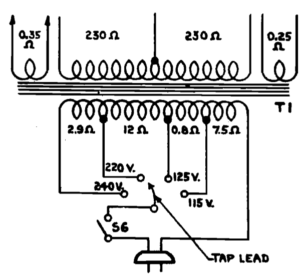
Cone coil impedance: 5 ohms at 400 cycles

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105–125	50–60	75
C	105–125	25–60	80
V	105–120 115–130 200–230 220–250	40–60	80

NOTE: Taps on universal transformers (Rating "V") are accessible by removing the cap cover mounted on the top of the transformer. Schematic and wiring diagrams of the universal transformer are shown in Figures 2 and 3, respectively.

IF PEAK 465 KC



105-250 VOLTS
UNIVERSAL TRANSFORMER

July, 1935

MODELS A-63, A-65
Chassis Wiring

GENERAL ELECTRIC CO.

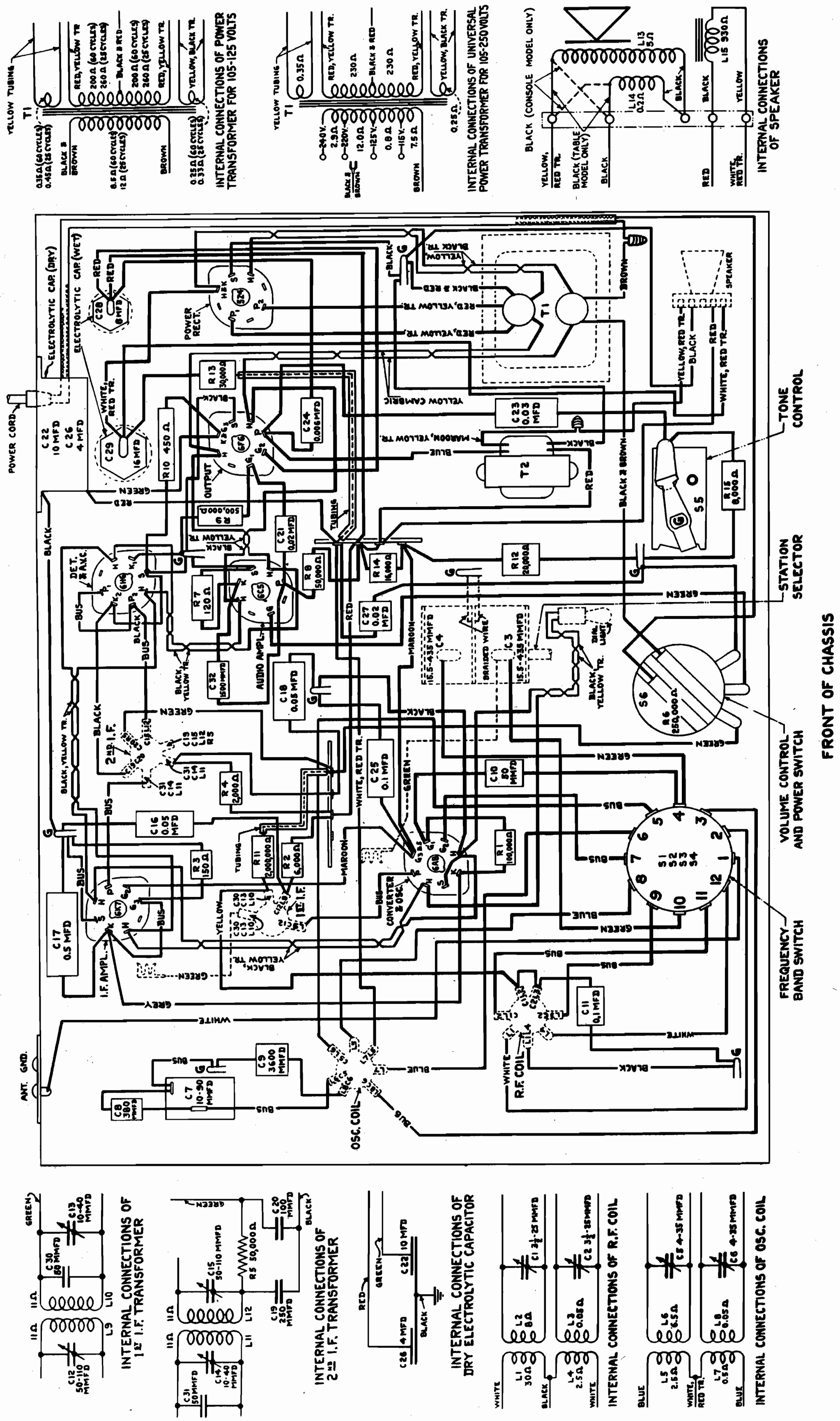


Fig. 3. Chassis Wiring Diagram

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Code Interference

In certain localities near high-powered radio-telegraph stations operating at frequencies in the vicinity of 465 kc., slight code interference may be present on both bands of the receiver. This condition usually occurs over the entire tuning range and is not affected by change of tuning. To overcome this interference, a Wave Trap, such as General Electric Stock No. WT-100, should be installed. Terminals are spaced so that the wave trap may be connected directly to the antenna and ground terminals of the receiver by means of the links supplied. The "V-Doublet" antenna coupling transformer may be mounted directly on top of the wave trap, as the terminal spacing is the same. General Electric Wave Trap, Stock No. WT-100, is available as an accessory from your General Electric Radio Dealer.

Model A-63 and A-65 receivers have four controls located as shown below:

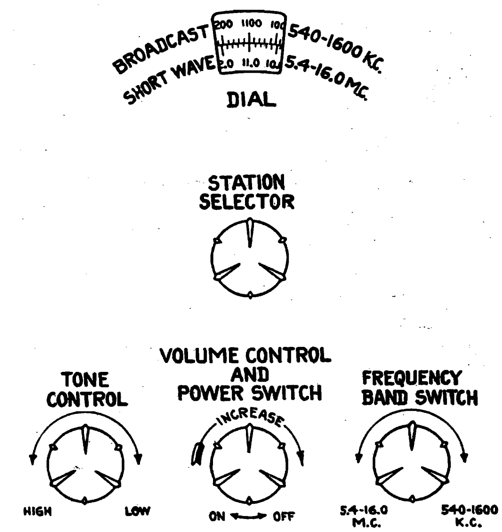


Fig. 1

DESCRIPTION OF ELECTRICAL CIRCUIT

Models A-63 and A-65 employ six metal envelope tubes in a superheterodyne circuit giving the excellent selectivity and sensitivity inherent in this type circuit. Separate groups of coils are used for each frequency band. Ample undistorted output is obtained through diode detection and two audio amplifier stages.

The signal from the antenna is applied to the control grid of the 6A8 tube through the R. F. coil, the secondary of which is tuned to the incoming signal by the first section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator elements of this tube, and the proper frequency difference is maintained throughout the tuning range by the second section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors.

The combination of the two signals produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier, which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-6. This voltage drop provides automatic bias for the converter and I. F. amplifier tubes and so gives automatic volume control action.

The manual volume control selects the amount of audio signal applied to the grid of the 6C5 first audio amplifier and thus regulates the output of the receiver. The output of the 6C5 tube is resistance coupled to the grid of the 6F6 audio power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loudspeaker by means of a step-down output transformer.

The tone control circuit consists of a .03-mfd. capacitor which is normally connected from the plate of the 6F6 to ground through a resistor. When it is desired to reduce the high frequency output of the receiver, the resistor is short-circuited by the tone control switch connecting the .03-mfd. capacitor directly from the 6F6 plate to ground.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube and utilizing the loudspeaker field as a filter reactor which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the center of a particular coil, through the opening provided in the top of the shield, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer adjustment required
Brass cylinder	Decrease	None
Iron filings	Decrease	
Brass cylinder	Increase	Decrease capacity
Iron filings	Decrease	
Brass cylinder	Decrease	Increase capacity
Iron filings	Increase	

In Models A-63 and A-65 the broadcast band R. F. and oscillator coils are located in the upper half of their respective shield cans; the short-wave coils in the lower half.

Alignment Frequencies

I. F.	Broadcast	Short Wave
465 Kc.	600 Kc.	15,000 Kc.
	1500 Kc.	

In order to align these receivers properly, it is necessary to have available a modulated test oscillator capable of producing the above alignment frequencies, a non-metallic alignment screwdriver, and an output meter. The location of all trimmer capacitors as well as socket voltages is shown in Fig. 4.

1. *I. F. Alignment*

Set the frequency band switch of the receiver in the clockwise position, short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and ground the chassis.

The I. F. amplifier is tuned to 465 kc.; set the test oscillator dial at this frequency. Connect the test oscillator output between the converter tube (6A8) control grid and chassis. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed in the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good output indication.

Adjust the secondary trimmer of the second I. F. transformer until a maximum output reading is obtained. Maintain a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer, and lastly, the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

2. *R. F. Alignment*

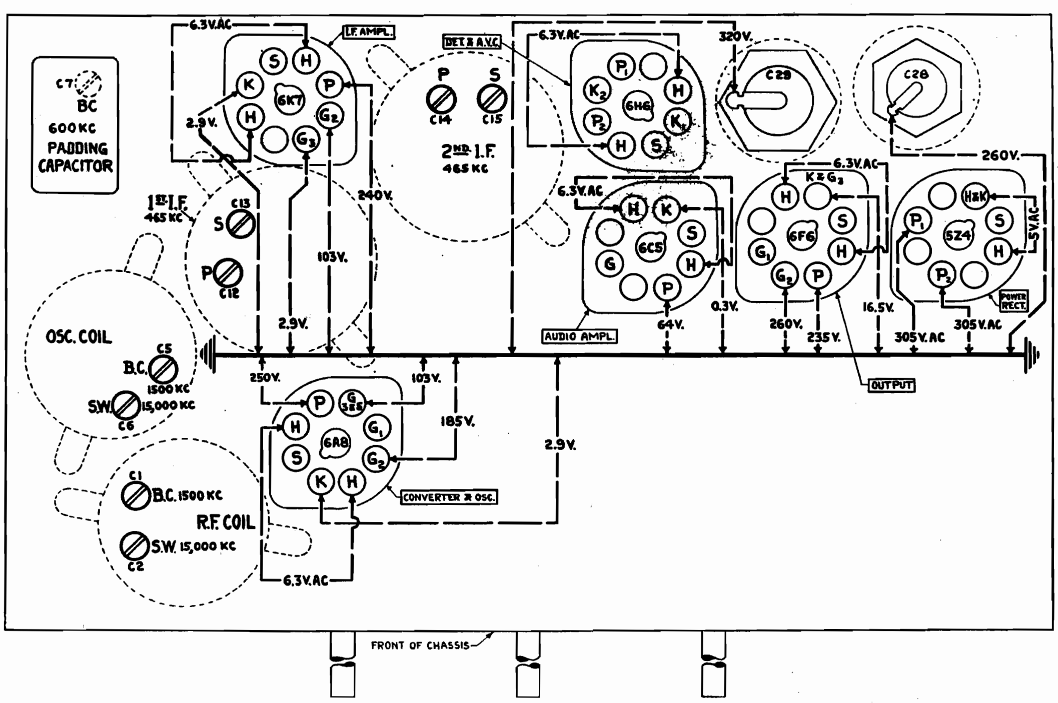
The R. F. and oscillator trimmers are aligned at 600, 1500 and 15,000 kc. Line up the pointer and dial so that with the tuning condenser plates fully meshed, the pointer indicates the mark at the extreme right-hand end of the dial. Make sure the antenna and ground terminals of the receiver are not short circuited and connect to them the output from the test oscillator. Connect the output meter across the speaker cone coil.

Broadcast—With the band switch turned clockwise, set the tuning dial at 1500 kc. Set the test oscillator at this frequency and adjust its output so that with the receiver volume control in its extreme clockwise position, a small deflection is observed on the output meter. Adjust the broadcast oscillator trimmer for maximum output. There, as before, maintain the output meter at a small deflection during the entire alignment process. When optimum adjustment on the broadcast oscillator trimmer is obtained, adjust the broadcast R. F. trimmer for maximum output. Now set the test oscillator and receiver at 600 kc. Adjust the 600 kc. padding capacitor for maximum output while rocking the tuning condenser back and forth through the signal. When this has been done, return to 1500 kc. on the receiver and test oscillator and recheck the alignment for maximum output. When this is done, the broadcast band has been aligned.

Short Wave—Place the band switch in the counterclockwise position and set the receiver and test oscillator at 15,000 kc. Adjust the short-wave oscillator trimmer for maximum output. Next adjust the short-wave R. F. trimmer for maximum output while rocking the tuning condenser back and forth through the signal.

It will be noticed on the short-wave band that the oscillator and R. F. trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance obtained by turning the screw counterclockwise is the proper adjustment for the oscillator, while the position that uses the higher capacitance is proper for the R. F. trimmer.

When these adjustments have been completed, the receiver will be in alignment.



VIEWED FROM UNDERSIDE OF CHASSIS

Fig. 4 Trimmer Locations and Socket Voltages

MODELS A-63, A-65
Voltage
Parts

GENERAL ELECTRIC CO.

SOCKET VOLTAGES

Tube	Cathode to Ground Volts	Screen Grid to Ground Volts	Plate to Ground Volts	Plate Current MA	Heater Volts A-c.
6A8—Converter	2.9	103	250*	3.5	6.3
Oscillator			185*	4.5	
6K7—I. F.	2.9	103	240	8.5	6.3
6H6—Detector and AVC					6.3
6C5—Audio	0.3		64*	3.6	6.3
6F6—Output	16.5	260	235	30.0	6.3
5Z4—Rectifier	320		305 Rms., A. c.	33 per plate	5.0

Measured at 120 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.
* Measured with meter drawing less than 100 microamperes.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

RECEIVER ASSEMBLIES

Stock No.	Description	List Price
RB-001	BOARD—Antenna Terminal Board	$0.10
RB-002	BOARD—Terminal Board	.15
RB-100	BRACKET—Dial Lamp Socket, Bracket and Pointer	.25
RC-030	CAPACITOR—.006 Mfd. 400 Volt (C-24) Paper Dielectric	.25
RC-080	CAPACITOR—.02 Mfd. 400 Volt (C-21, C-27) Paper Dielectric	.25
RC-083	CAPACITOR—.03 Mfd. 400 Volt (C-23) Paper Dielectric	.25
RC-091	CAPACITOR—.05 Mfd. 400 Volt (C-16, C-18) Paper Dielectric	.30
RC-096	CAPACITOR—.1 Mfd. 200 Volt (C-11, C-25) Paper Dielectric	.30
RC-157	CAPACITOR—.5 Mfd. 200 Volt (C-17) Paper Dielectric	.40
RC-210	CAPACITOR—50 mmfd. (C-10) Mica Dielectric Moulded Case	.25
RC-286	CAPACITOR—380 mmfd. (C-8) Mica Dielectric Moulded Case	.25
RC-346	CAPACITOR—1500 mmfd. (C-32) Mica Dielectric Moulded Case	.35
RC-357	CAPACITOR—3600 mmfd. (C-9) Mica Dielectric Moulded Case	.50
RC-403	CAPACITOR—8 mfd. 350 Volt (C-28) Wet Electrolytic	1.00
RC-409	CAPACITOR—16 mfd. 390 Volt (C-29) Wet Electrolytic	1.25
RC-501	CAPACITOR—One 10 mfd. 25 Volt (C-22), one 4 mfd. 450 Volt (C-26) Dry Electrolytic Pack	1.30
RC-600	CAPACITOR—10-90 mmfd. Trimmer Capacitor (C-7)	.50
RC-700	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	3.55
RC-800	CABLE—Loudspeaker Cable	.45
RC-850	CORD—Power Cord with Plug	.65
RD-001	DIAL—Dial Scale and Hub Assembly	.50
RE-001	ESCUTCHEON—Dial Escutcheon	.35
RF-001	FOOT—Chassis Mounting Foot with Cushions	.45
RG-001	GRID CAP—Grid Connection Cap, pkg. of 5	.10
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, pkg. of 5	.50
RL-100	COIL—R.F. Coil Assembly (L-1, L-2, L-3, L-4, C-1, C-2)	1.95
RL-200	COIL—Oscillator Coil Assembly (L-5, L-6, L-7, L-8, C-5, C-6)	1.85
RR-018	RESISTOR—120 ohms ¼ watt (R-7), Carbon Resistor, pkg. of 5	.60
RR-020	RESISTOR—6000 ohms ¼ watt (R-2), Carbon Resistor, pkg. of 5	.60
RR-050	RESISTOR—100,000 ohms ¼ watt (R-1), Carbon Resistor, pkg. of 5	.70
RR-064	RESISTOR—500,000 ohms ¼ watt (R-9), Carbon Resistor, pkg. of 5	.60
RR-068	RESISTOR—2 megohms, ¼ watt (R-11), Carbon Resistor, pkg. of 5	.60
RR-098	RESISTOR—2000 ohms, ⅓ watt (R-4), Carbon Resistor, pkg. of 5	$0.60
RR-192	RESISTOR—50,000 ohms, ½ watt (R-8), Carbon Resistor, pkg. of 5	.70
RR-224	RESISTOR—8000 ohms, 1 watt (R-15), Carbon Resistor, pkg. of 5	.85
RR-239	RESISTOR—20,000 ohms, 1 watt (R-12), Carbon Resistor, pkg. of 5	.85
RR-241	RESISTOR—30,000 ohms, 1 watt (R-13), Carbon Resistor, pkg. of 5	.85
RR-298	RESISTOR—16,000 ohms, 3 watt (R-14), Carbon Resistor	.50
RR-310	RESISTOR—150 ohms, ⅜ watt (R-3), Flexible Resistor, pkg. of 5	.70
RR-339	RESISTOR—450 ohms, 1 watt (R-10), Flexible Resistor, pkg. of 5	.70
RS-100	SHIELD—R.F. Coil Shield	.30
RS-101	SHIELD—First I.F. Transformer Shield	.30
RS-102	SHIELD—Second I.F. Transformer Shield	.30
RS-114	SHIELD—Oscillator Coil Shield	.30
RS-200	SOCKET—Eight-pin Tube Socket pkg. of 5	.75
RS-300	SWITCH—Tone Control Switch (S-5)	.25
RS-301	SWITCH—Frequency Band Switch (S-1, S-2, S-3, S-4)	.75
RT-061	TRANSFORMER—Power Transformer (T-1) 50–60 cycles 105–125 Volts (Rating "A")	5.55
RT-062	TRANSFORMER—Power Transformer (T-1) 25–60 cycles 105–125 Volts (Rating "C")	8.25
RT-063	TRANSFORMER—Power Transformer (T-1) 40–60 cycles 105–130, 200–250 Volts (Rating "V")	9.35
RT-200	TRANSFORMER—First I.F. Transformer (L-9, L-10, C-12, C-13, C-30)	1.90
RT-201	TRANSFORMER—Second I.F. Transformer (L-11, L-12, C-14, C-15, C-19, C-20, C-31, R-5)	2.30
RT-400	TRANSFORMER—Output Transformer (T-2)	1.10
RV-001	VOLUME CONTROL—Potentiometer 250,000 ohms (R-6) and Power Switch (S-6)	1.10
RX-001	SCREW ASSEMBLY—Chassis Mounting Screws and Washers, pkg. of 4	.10
RX-003	CUSHION ASSEMBLY—Tuning Condenser Mounting Nuts, Washers and Cushions, pkg. of 3	.15

SPEAKER ASSEMBLY A-63

Stock No.	Description	List Price
RC-902	CONE—Speaker Cone and Cone Coil	1.00
RF-100	FIELD—Field Coil, Magnet and Cone Support	3.80
RS-012	SPEAKER—Seven-inch Reproducer Unit Complete	6.35

SPEAKER ASSEMBLY A-65

Stock No.	Description	List Price
RC-900	CONE—Speaker Cone and Cone Coil	1.00
RF-101	FIELD—Field Coil Magnet and Cone Support	4.45
RS-010	SPEAKER—Eight-inch Reproducer Unit Complete	6.80

MODELS A-64, A-67
Schematic

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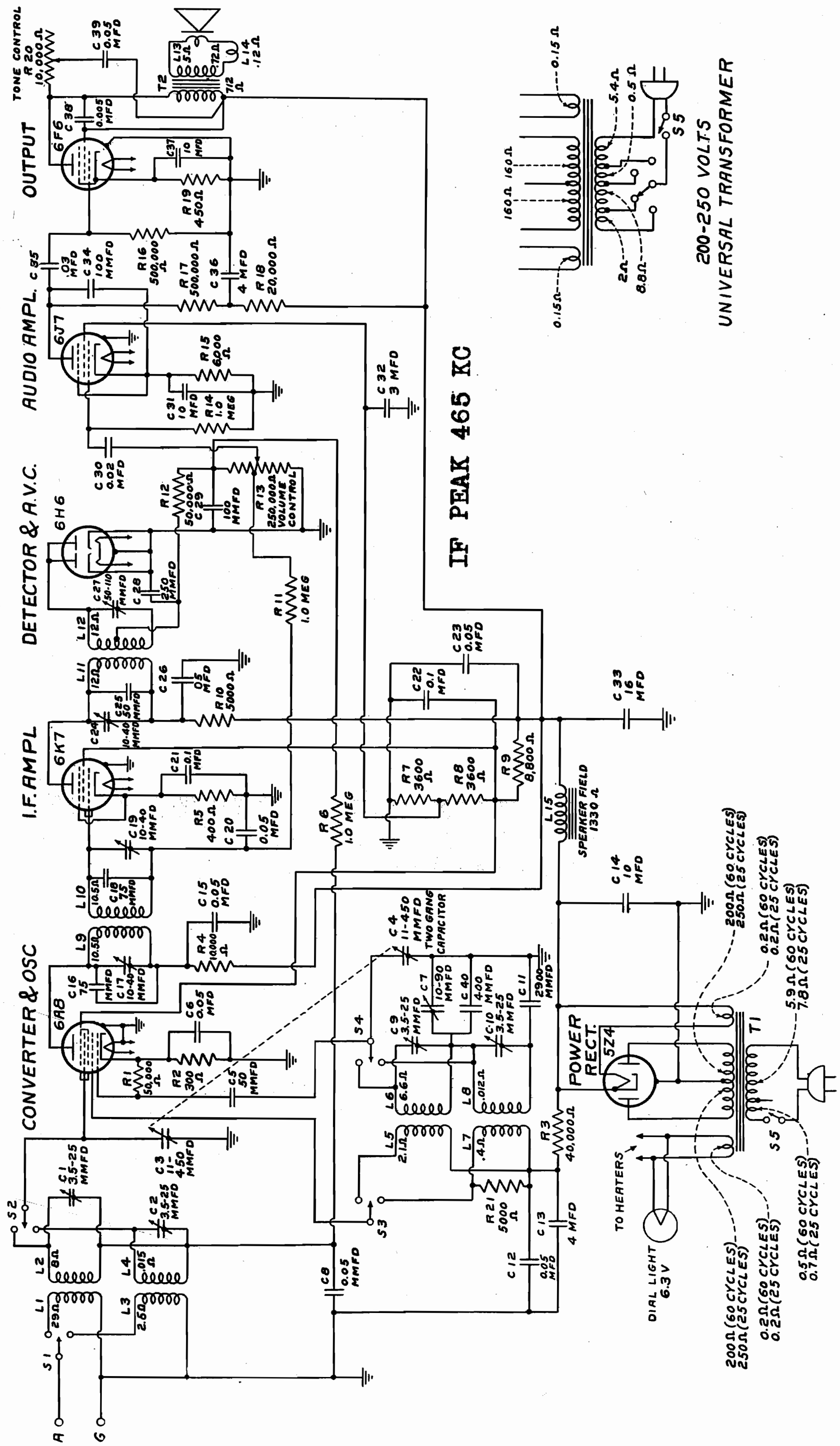

MODELS A-64, A-67
Chassis Wiring

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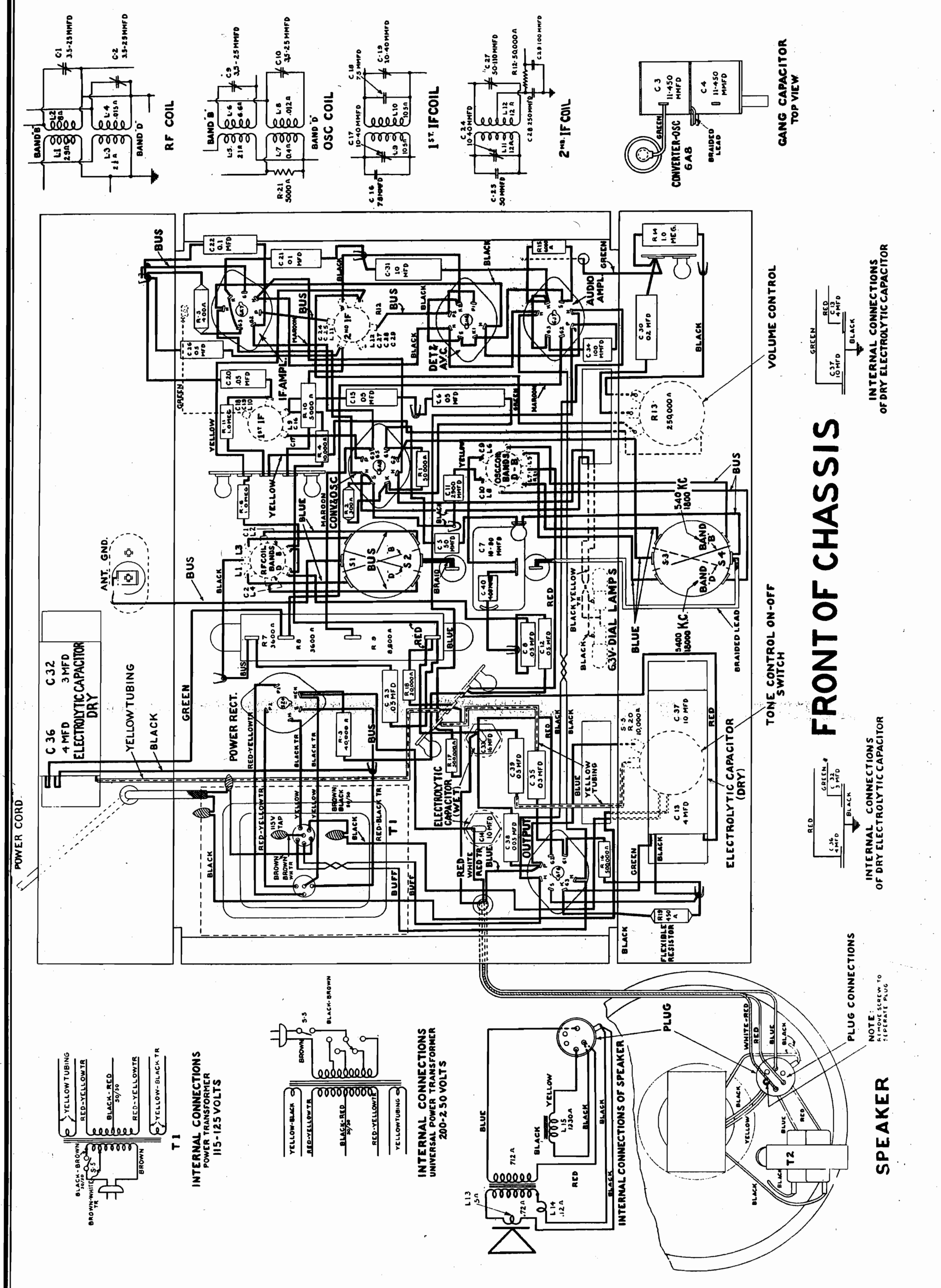

Fig. 3. Chassis Wiring Diagram

MODELS A-64, A-67
Circuit Data, Trimmers
Alignment, Socket

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SERVICE DATA

Physical Specifications

Model	A-64	A-67
Height	19$\frac{11}{16}$ in.	39$\frac{5}{8}$ in.
Width	14 in.	23$\frac{3}{4}$ in.
Depth	10 in.	11$\frac{15}{16}$ in.
Weight Packed	33 lb	65 lb

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105–130	50–60	85
C	105–130	25–60	90
V	105–130 and 200–250	40–60	90

NOTE: Taps on universal transformers (rating "V") are accessible by removing the cap cover mounted on the top of the transformer. Schematic and wiring diagrams of the universal transformer are shown in Figures 2 and 3, respectively.

Tuning Frequency Range
Broadcast.........540-1800 KC
Short Wave.........5.4-18.0 MC (5400-18,000 KC)

Tuning Control Drive Ratio
Fast Tuning.......5½ to 1
Vernier Tuning....55 to 1

Electrical Power Output
Undistorted.......2.0 Watts
Maximum.......3.0 Watts

Loud-speaker—Electrodynamic
Cone: Model A-64 8 in. overall, 7 in. effective diameter
Model A-67 10¼ in. overall, 9¼ in. effective diameter.
Cone Coil Impedance: 5 ohms at 400 cycles.

Tube
Oscillator and Converter..6A8 Pentagrid Converter
I. F. Amplifier..........6K7 Triple-grid Super-control Amplifier
Detector and AVC.......6H6 Twin Diode
First Audio Amplifier.....6J7 Triple-grid Detector Amplifier
Audio Power Amplifier....6F6 Power Amplifier Pentode
Rectifier...............5Z4 Full-wave Rectifier
Dial Lamps............MAZDA No. 46.

DESCRIPTION OF ELECTRICAL CIRCUIT

Models A-64 and A-67 employ six metal envelope tubes in a superhetrodyne circuit giving the excellent selectivity and sensitivity inherent in this type circuit. Separate groups of coils are used for each frequency band. Ample undistorted output is obtained through diode detection and two audio amplifier stages.

The signal from the antenna is applied to the control grid of the 6A8 tube through the R. F. coil, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 KC higher in frequency. The local signal is generated by the oscillator elements of this tube, and the proper frequency difference is maintained throughout the tuning range by the front section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors.

The combination of the two signals produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two I. F. transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier, which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-13. This voltage drop provides automatic bias for the converter and I. F. amplifier tubes and so gives automatic volume control action. Full automatic bias is applied to the converter tube, while a part of this voltage, taken from a tap on R-13, is applied to the I. F. amplifier tube, which handles a somewhat larger signal voltage than the converter tube.

The manual volume control selects the amount of audio signal applied, through coupling capacitor C-30, to the grid of the 6J7 audio amplifier tube, and this regulates the output of the receiver. The output of the 6J7 tube is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .05-mfd capacitor connected in series with a continuously variable 0-10,000 ohm resistance across the primary of the output transformer. When it is desired to reduce the high frequency output of the receiver, resistance is cut out of the circuit by turning the tone control knob counterclockwise.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal to the receiver from the test oscillator at the alignment frequency and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of nonmagnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of either R. F. coil through the opening provided in the top of the coil shield, the inductance of that coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the R. F. circuits are in exact alignment, inserting either end of the tuning wand into the particular R. F. coil being used will result in a decrease in output. When an increase of signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase of signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Metal Ring Iron Filings	Decrease Decrease	None
Metal Ring Iron Filings	Increase Decrease	Decrease capacity
Metal Ring Iron Filings	Decrease Increase	Increase capacity

In Models A-64 and A-67 the broadcast band R. F. and oscillator coils are located in the upper half of their respective shield cans; the short-wave coils, in the lower half.

ALIGNMENT FREQUENCIES

I. F.	Broadcast	Short-wave
465 KC	580 KC 1740 KC	18,000 KC

In order to align these receivers properly it is necessary to have available:

1. A modulated test oscillator capable of producing the above alignment frequencies.
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.

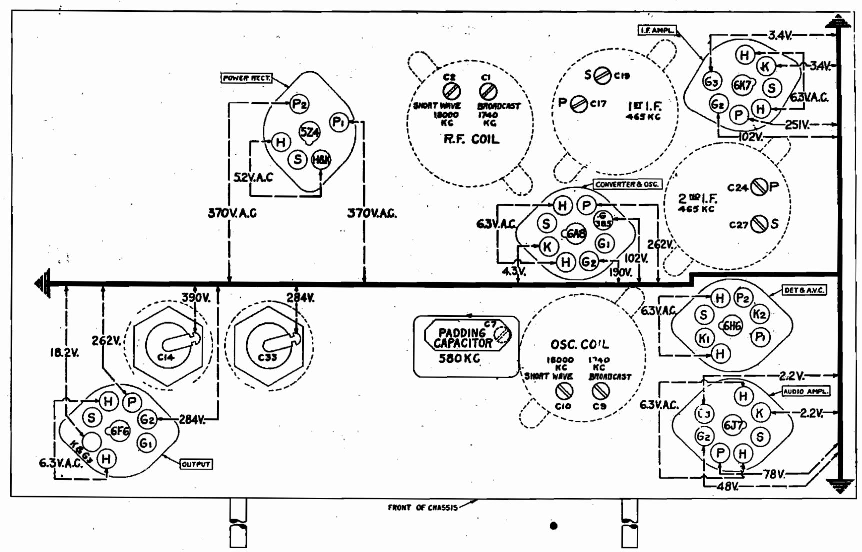
The location of all alignment trimmer capacitors, as well as socket voltages, is shown in Fig. 4.

1. I. F. Alignment

Set the frequency band switch of the receiver to the broadcast position and turn the volume control to maximum (extreme clockwise position). Tune the receiver to some point above 1500 KC so that no signal is heard, short-circuiting the antenna and ground terminals if necessary, and ground the chassis.

Remove the control grid clip (green lead) from the 6A8 tube and connect the test oscillator output between chassis and the dome terminal of the 6A8 tube. The I. F. amplifier is tuned to 465 KC; set the oscillator dial at this frequency. Make sure that a d-c path exists between the output terminals of the test oscillator; if an ohmmeter does not show continuity between the test oscillator terminals, connect a resistor of fairly high resistance between the 6A8 dome terminal and chassis to provide a d-c grid return path.

Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control



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Measured at 125 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

Fig. 4. Trimmer Locations and Socket Voltages

GENERAL ELECTRIC CO.

so that, with the volume control at maximum, a small indication is observed on the output indicator.

Adjust the secondary trimmer of the second I. F. transformer until a peak output reading is obtained. Maintaining a small output indication, adjust next the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer, and lastly, the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

During both I. F. and R. F. alignments, the test oscillator signal should be maintained at the lowest level that will give a good output indication, keeping the receiver volume control at maximum and adjusting the test oscillator output control to give the required indication.

2. R. F. Alignment

The R. F. and oscillator trimmers are aligned at 580, 1740 and 18,000 KC. Check the position of the dial pointer as outlined in the section on adjustment of the dial mechanism. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output from the test oscillator, preferably using a dummy antenna of 250 mmfd. in series with 200 ohms between the test oscillator and receiver antenna terminal. Connect the output indicator across the speaker cone coil.

Broadcast—540-1800 KC.

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 KC and set the dial pointer on the receiver to this frequency. Adjust the broadcast oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the broadcast oscillator trimmer is obtained, adjust the broadcast R. F. trimmer for maximum output.

Now set the test oscillator at 580 KC and tune the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 580 KC padding capacitor for maximum output. When this has been done, return to 1740 KC on the receiver and test oscillator and recheck the alignment for maximum output. The broadcast band should now be in alignment.

Short Wave—5.4-18.0 MC (5400-18,000 KC)

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator at 18,000 KC and set the dial pointer on the receiver to that frequency. Adjust the short-wave oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 17,070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Return the receiver to the correct scale reading (18,000 KC) and reduce the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser back and forth through the 18,000 KC signal, increase the short-wave R. F. trimmer capacitance until a maximum response point is obtained.

It will be noticed on the short-wave band that the oscillator and R. F. trimmers will have two positions at which the signal will give maximum output. The position corresponding to the lower trimmer capacitance obtained by turning the trimmer screw counter-clockwise is the proper adjustment for the oscillator trimmer, while the position corresponding to the higher capacitance is proper for the R. F. trimmer.

When these adjustments have been completed the receiver should be in alignment.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted to the frame of the tuning condenser by means of two removable screws, the complete assembly being rubber-mounted by means of rubber cushions and bushings at points of support. The dial pointer, station selector reduction drive, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch, cylindrical dial scale and switch operating shaft, by gear and toggle assemblies.

1. Position of Drum on Condenser Shaft

With set screws (19) loosened and tuning condenser plates fully engaged, place the drum in the position shown in Fig. 5 so that the top rim of the drum is $\frac{3}{64}$ in. away from the mounting plate. Guide (48) should stop at equal distances from each end of the mounting plate slot.

2. Removing and Replacing Scale

Pry out fastener (39) and remove the scale by lowering that end below the ear and taking the scale out of cap assembly (24), holding parts (24), (11) and (7) in place. Replace, locating tabs of caps (24) and (25) in slots of scale. Replace fastener (39).

3. Locating Scale

Loosen the two gear set screws (16). Rotate the scale upward until there is slight tension on spring (11) with the pointer indicating on the broadcast (Band "B") scale. With the frequency band switch in the broadcast position, place gear (7) in mesh with the gear on part (6) and tighten the two set screws (16).

4. Replacing Drive Cord

The position of the dial scale pointer with respect to the tuning condenser drum is held fixed by means of a special metal braid cable connecting the drum with the guide (48). Tension is maintained on the cable through the drum spring (12) and drive cord. To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (48). Unhook spring (12) from tab (46) to release tension. Unhook the cable or cord from guide (48) and unwind from the pulleys and drum. To replace the cable, rethread to agree with Fig. 5, and rehook drum spring (12) as shown.

5. Replacing Reduction Drive

To replace the reduction drive, unhook spring (12), loosening the drive cord. Unscrew palnut (44) and remove drive. Replace with new drive and rehook drive cord.

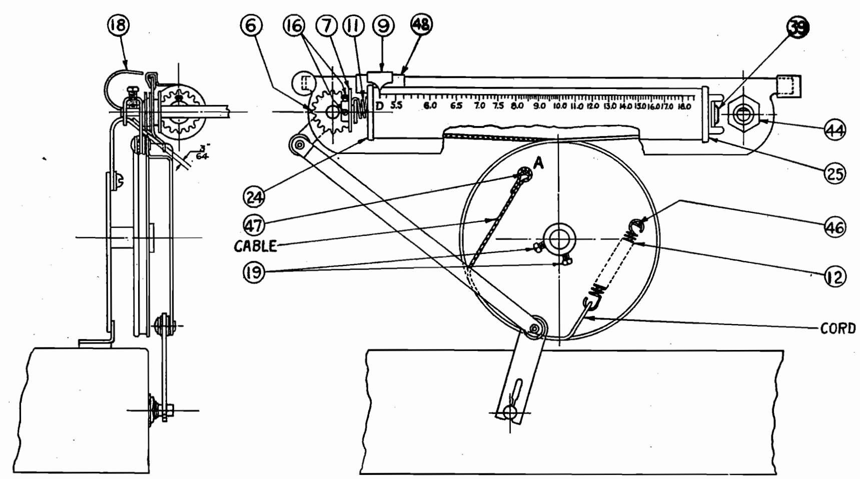

Fig. 5. Dial Mechanism

6. Replacing Toggle Assembly

Loosen the set screw holding the toggle mechanism on shaft (6) and spread the fork on the lower lever arm enough to remove it from the band switch shaft. Replace with new assembly. Rotate shaft (6) clockwise, until there is slight tension on spring (11) with the scale in the Band "B" position. Place upper lever arm in shaft and tighten set screw.

7. Setting Dial Pointer

The dial pointer (9) is soldered to the guide (48). To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate the extreme left-hand line on the Band "D" scale as shown in Fig. 5.

8. Replacing Dial Lamp

Take hold of the terminals of the lamp bracket and push up until the lamps protrude above the opening in reflector (18). Lamps may then be replaced in socket clips. After replacing lamps, slide the socket mounting bracket back into the mounting clip.

SOCKET VOLTAGES

Tube No.		Cathode to Ground Volts D-c	Screen Grid to Ground Volts D-c	Plate to Ground Volts D-c	Cathode Current M.A.	Heater Volts A-c
6A8	Oscillator	...	...	190	...	...
	Converter	4.3	102	262	12.7	6.3
6K7 I. F. Amplifier		3.4	102	251	8.1	6.3
6H6 Detector and AVC		..	...	....	...	6.3
6J7 Audio Amplifier		2.2	48	78*	.38	6.3
6F6 Output		18.2	284	262	38.7	6.3
5Z4 Power Rectifier		...	...	740/370 Rms	76.1	5.2

Measured at 125 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt; measurements taken on highest scale giving accurate readable deflection.

*Measured on 1000-volt scale.

MODELS A-64,A-67
Parts List

GENERAL ELECTRIC CO.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
RB-001	BOARD—Antenna Terminal Board	$0.10
RB-009	BOARD—Terminal Board (Single Terminal)	.15
RB-015	BOARD—Terminal Board (Triple Terminal)	.15
RB-016	BOARD—Terminal Board (For 6J7 Grid Lead)	.10
RB-116	BRACKET—R. H. Front Bracket Assembly	.25
RB-119	BRACKET—L. H. Front Bracket Assembly	.25
RB-200	BRACE—Dial Opening Brace (Model A-64)	.30
RC-029	CAPACITOR—.005 mfd., 400 volts (C-38) Paper Dielectric	.30
RC-046	CAPACITOR—.02 mfd., 200 volts (C-30) Paper Dielectric	.25
RC-072	CAPACITOR—.05 mfd., 200 volts (C-6, C-8, C-20, C-39) Paper Dielectric	.25
RC-083	CAPACITOR—.03 mfd., 400 volts (C-35) Paper Dielectric	.25
RC-091	CAPACITOR—.05 mfd., 400 volts (C-12, C-15, C-23, C-26) Paper Dielectric	.30
RC-096	CAPACITOR—.1 mfd., 200 volts (C-21, C-22) Paper Dielectric	.30
RC-210	CAPACITOR—50 mfd., (C-5) Mica Dielectric	.25
RC-235	CAPACITOR—100 mmfd., (C-34) Mica Dielectric	.25
RC-289	CAPACITOR—400 mmfd., (C-40) Mica Dielectric	.25
RC-352	CAPACITOR—2900 mmfd., (C-11) Mica Dielectric	.40
RC-404	CAPACITOR—10 mfd., 400 volts (C-14) Wet Electrolytic	1.10
RC-407	CAPACITOR—16 mfd., 380 volts (C-33) Wet Electrolytic	1.15
RC-501	CAPACITOR—One 10 mfd., 25 volts (C-37); One 4 mfd., 450 volts (C-13) Dry Electrolytic Pack	1.30
RC-502	CAPACITOR—One 4 mfd., 450 volts (C-36); One 3 mfd., 150 volts (C-32) Dry Electrolytic Pack	1.40
RC-504	CAPACITOR—10 mfd., 25 volts (C-31) Dry Electrolytic	.70
RC-600	CAPACITOR—10-90 mmfd. Trimmer Capacitor (C-7)	.50
RC-704	CONDENSER—Two-gang Tuning Condenser (C-3, C-4)	3.25
RC-804	CABLE—Loud-speaker Cable	.60
RC-853	CORD—Power Cord with Plug	.50
RE-005	ESCUTCHEON—Dial Escutcheon	.80
RF-006	FOOT—Mounting Foot Assembly	.30
RG-001	GRID CAP—Grid Connection Cap, Pkg. of 5	.10
RI-003	INSULATOR—Escutcheon Shaft Insulating Bushing, Pkg. of 10	.40
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, Pkg. of 5	.50
RL-108	COIL—R.F. Coil (C-1, C-2, L-1, L-2, L-3, L-4)	2.10
RL-209	COIL—Oscillator Coil (C-9, C-10, L-5, L-6, L-7, L-8, R-21)	1.95
RN-001	NUT—Escutcheon Mounting Nut, Pkg. of 10	.45
RP-014	PLATE—Escutcheon Mounting Plate, Pkg. of 2	.25
RR-017	RESISTOR—6000 ohms, ¼ watt (R-15) Carbon Resistor, Pkg. of 5	.60
RR-021	RESISTOR—10,000 ohms, ¼ watt (R-4) Carbon Resistor, Pkg. of 5	.60
RR-025	RESISTOR—20,000 ohms, ¼ watt (R-18) Carbon Resistor, Pkg. of 5	.60
RR-035	RESISTOR—50,000 ohms, ¼ watt (R-1) Carbon Resistor, Pkg. of 5	.70
RR-065	RESISTOR—500,000 ohms, ¼ watt (R-16, R-17) Carbon Resistor, Pkg. of 5	.65
RR-067	RESISTOR—1,000,000 ohms, ¼ watt (R-6, R-11, R-14) Carbon Resistor, Pkg. of 5	.70
RR-100	RESISTOR—5,000 ohms, 1-3 watt (R-10, R-21) Carbon Resistor, Pkg. of 5	.60
RR-281	RESISTOR—40,000 ohms, 2 watts (R-3) Carbon Resistor	.30
RR-324	RESISTOR—300 ohms, ⅜ watt (R-2) Flexible Resistor, Pkg. of 5	.60
RR-336	RESISTOR—400 ohms, ⅜ watt (R-5) Flexible Resistor, Pkg. of 5	.65
RR-339	RESISTOR—450 ohms, 1 watt (R-19) Flexible Resistor, Pkg. of 5	$0.70
RR-703	RESISTOR—Tapped Resistor (R-7, R-8, R-9)	.60
RS-102	SHIELD—Second I. F. Transformer Shield	.30
RS-113	SHIELD—R. F. Coil Shield	.30
RS-120	SHIELD—First I. F. Transformer Shield	.30
RS-121	SHIELD—Oscillator Coil Shield	.20
RS-200	SOCKET—Eight-pin Tube Socket, Pkg. of 5	.75
RS-204	SOCKET—Five-pin Tube Socket (5Z4), Pkg. of 5	.75
RS-305	SWITCH—Frequency Band Switch with Mounting Nut (S-1, S-2, S-3, S-4)	1.30
RS-605	SUPPORT—Dial Mechanism Support Post	.20
RT-064	TRANSFORMER—Power Transformer (T-1) 50-60 cycles, 105-120 volts (Rating "A")	5.65
RT-065	TRANSFORMER—Power Transformer (T-1) 25-60 cycles, 105-130 volts (Rating "C")	8.50
RT-066	TRANSFORMER—Power Transformer (T-1) 40-60 cycles, 105-130, 200-250 volts (Rating "V")	7.05
RT-211	TRANSFORMER—First I. F. Transformer (C-16, C-17, C-18, C-19, L-9, L-10)	1.95
RT-212	TRANSFORMER—Second I. F. Transformer (C-24, C-25, C-27, C-28, C-29, L-11, L-12, R-12)	2.35
RT-704	TONE CONTROL—Rheostat 10,000 ohms (R-20) and Power Switch (S-5)	1.60
RV-006	VOLUME CONTROL—Potentiometer 250,000 ohms (R-13)	.95
RW-002	WINDOW—Dial Window	.15
RX-003	CUSHION ASSEMBLY—Tuning Condenser Mounting Nuts, Washers and Cushions	.15
RX-004	SCREW ASSEMBLY—Chassis Mounting Screws and Washers	.10
	SPEAKER ASSEMBLY A-64	
RC-900	CONE—Eight-inch Speaker Cone and Cone Coil (L-13)	1.00
RP-009	PLUG—Speaker Male Plug Connector	.20
RP-012	PLUG—Speaker Female Plug Connector	.20
RS-008	SPEAKER—Eight-inch Loud-speaker Complete with Output Transformer	10.50
RT-405	TRANSFORMER—Output Transformer (T-2)	1.70
	SPEAKER ASSEMBLY A-67	
RC-901	CONE—10¼-in. Speaker Cone and Cone Coil (L-13)	1.45
RP-009	PLUG—Speaker Male Plug Connector	.20
RP-012	PLUG—Speaker Female Plug Connector	.20
RS-006	SPEAKER—10¼-in. Loud-speaker Complete with Output Transformer	12.75
RT-405	TRANSFORMER—Output Transformer	1.70
	DIAL MECHANISM (See Fig. 5)	
RB-117	BRACKET—Dual Lamp Bracket	.25
RC-805	CABLE—Drive Cable, Pkg. of 5	.80
RC-856	CORD—Drive Cord, Pkg. of 5	.65
RC-954	CAP—Scale Cap Assembly (Gear End) (24)	.10
RC-955	CAP—Scale Cap Assembly (Drive End) (25)	.10
RC-958	CUSHION—Rubber Dial Mounting Cushion, Pkg. of 2	.10
RD-011	DIAL—Dial Mechanism Complete	2.50
RD-006	DRIVE—"Automatic Vernier" Reduction Drive	1.00
RD-013	DRUM—Drive Drum Assembly	.35
RD-014	DIAL—Dial Scale	.75
RF-200	FASTENER—Dial Fastener (39), Pkg. of 10	.10
RG-002	GEAR—Dial Gear Assembly (7)	.15
RG-200	GUIDE—Dial Pointer Guide (48), Pkg. of 5	.15
RP-003	POINTER—Dial Pointer (9), Pkg. of 2	.15
RP-004	PULLEY—Drive Cord Idler Pulley, Pkg. of 2	.10
RP-005	PLATE—Dial Mounting Plate Assembled Complete	.50
RS-401	SPRING—Drum Spring (12), Pkg. of 2	.20
RS-403	SPRING—Dial Spring (11), Pkg. of 2	.10
RS-900	SHAFT—Shaft and Gear Assembly (6)	.15
RT-800	TOGGLE—Toggle Assembly	.25

MODELS A-70, A-75
Schematic

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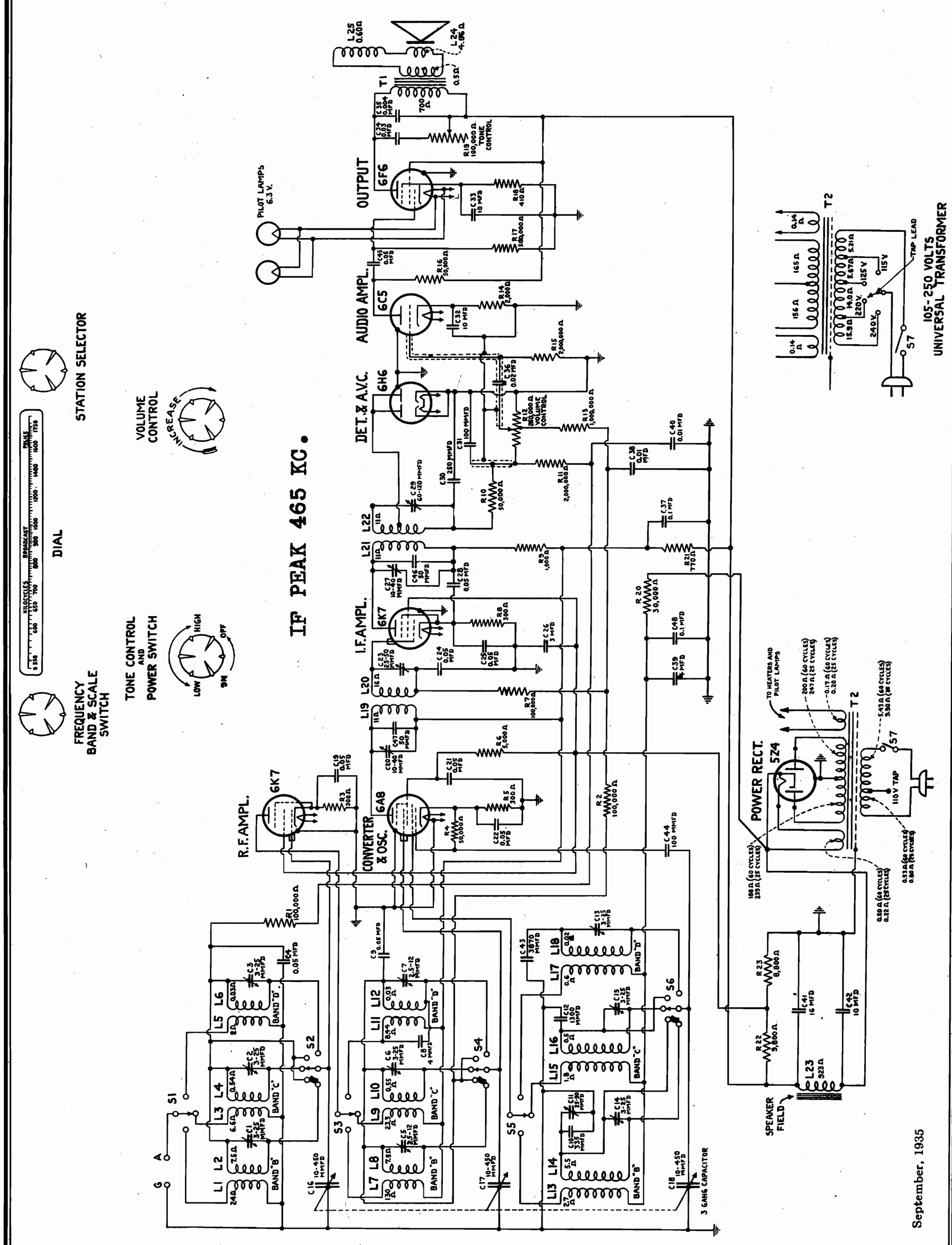

MODELS A-70,A-75
Chassis Wiring

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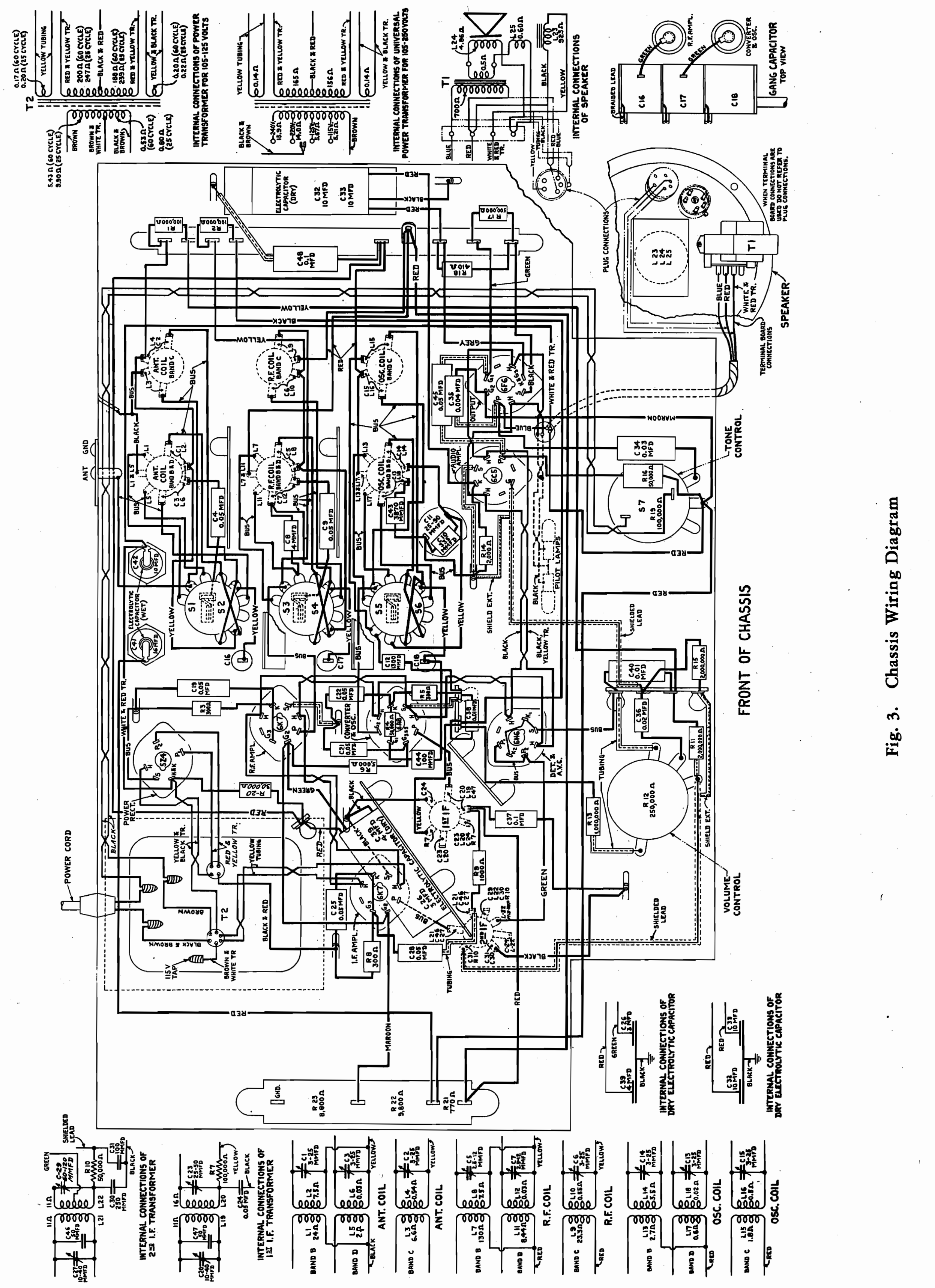


Fig. 3. Chassis Wiring Diagram

MODELS A-70,A-75
Alignment,Trimmers
Socket,Voltage

GENERAL ELECTRIC CO.

ALIGNMENT PROCEDURE

The receiver should first be allowed to run for fifteen minutes in order to reach its approximate normal operating temperature. Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal at the alignment frequency from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the center of a particular coil, through the opening provided in the top of the shield, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the brass cylinder, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer Adjustment Required
Brass cylinder	Decrease	None
Iron filings	Decrease	
Brass cylinder	Increase	Decrease capacity
Iron filings	Decrease	
Brass cylinder	Decrease	Increase capacity
Iron filings	Increase	

Fig. 4 shows the location of the antenna, R. F. and oscillator coils for each of the three frequency bands of Model A-70 and A-75 receivers.

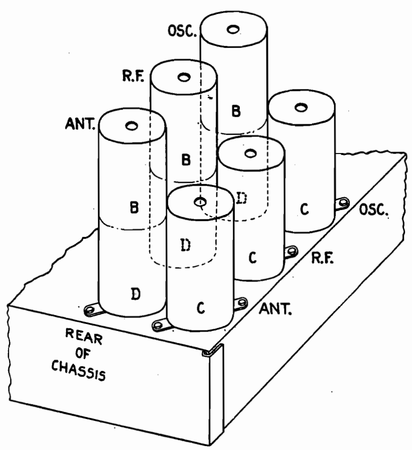


Fig. 4. Coil Locations

ALIGNMENT FREQUENCIES

I. F.	Band "B"	Band "C"	Band "D"
465 kc.	580 kc. 1740 kc.	6000 kc.	18,000 kc.

In order to align these receivers properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 465, 580, 1740, 6000, and 18,000 kc.
2. An output indicator, such as a high resistance a-c. voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp output indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

The location of all trimmer capacitors, as well as socket voltages to chassis, is shown in Fig. 5.

1. I. F. Alignment

Set the frequency band switch of the receiver to Band "B," short-circuit the antenna and ground terminals and tune the receiver at some point above 1500 kc. so that no signal is heard. Set the volume control at its maximum position and ground the chassis.

The I. F. amplifier is tuned to 465 kc.; set the test oscillator dial at this frequency. Connect the test oscillator output between the converter tube (6A8) control grid and chassis. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed in the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the second I. F. transformer until a maximum output reading is obtained. Maintain a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer and lastly the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

2. R. F. Alignment

Band "B" requires four trimmer adjustments, while Band "C" and Band "D" each require three adjustments. Care should be taken to adjust only the trimmers of the band under test. Check the position of the dial pointer as outlined in the section on adjustment of the dial mechanism. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output from the test oscillator, preferably using a dummy antenna of 250 mmfd. in series with 200 ohms between the test oscillator and receiver antenna terminal. Connect the output indicator across the speaker cone coil.

Band "B"—540–1740 kc.

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 kc. and set the dial pointer on the receiver to this frequency. Adjust the Band "B" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the Band "B" oscillator trimmer is obtained, adjust the Band "B" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 580 kc. and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 580-kc. padding capacitor for maximum output. When this has been done, return to 1740 kc. on the receiver and test oscillator and recheck the alignment for maximum output. Band "B" should now be in alignment.

Band "C"—1.75–6.0 mc. (1750–6000 kc.)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 6000 kc. and set the dial pointer on the receiver to this frequency. Adjust the Band "C" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 5070 kc. on the receiver dial. It should be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (6000 kc.) and reduce the test oscillator output to its previous value. Then adjust the Band "C" R. F. and antenna trimmers for maximum output.

Band "D"—6.0–19.5 mc. (6000–19,500 kc.)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 18,000 kc. and set the dial pointer on the receiver to this frequency. Adjust the Band "D" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 17070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (18,000 kc.) and reduce the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser through the 18,000-kc. point, increase the Band "D" R. F. trimmer capacitance until a maximum response point is obtained. The Band "D" antenna trimmer should next be peaked. It is not necessary to rock the tuning condenser while making this last adjustment.

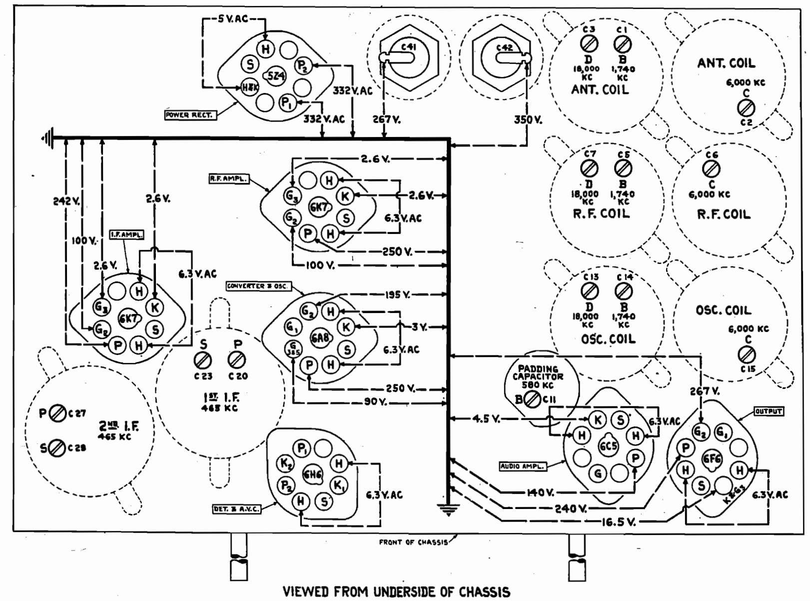


Fig. 5. Trimmer Locations and Socket Voltages

MODELS A-70, A-75
Circuit Data
Dial Data

GENERAL ELECTRIC CO.

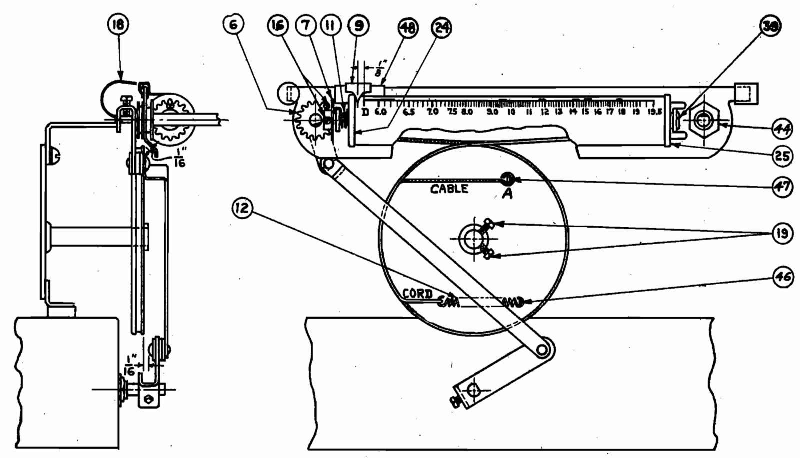


Fig. 6. Dial Mechanism

Adjustment of Dial Mechanism

The dial mechanism is rigidly mounted to the frame of the tuning condenser by means of two removable screws, the complete assembly being rubber-mounted by means of rubber cushions and bushings at points of support. The dial pointer, station selector knob, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch, the cylindrical dial scale and switch knob, by gear and toggle assemblies.

1. Position of Drum on Condenser Shaft

With set screws (19) loosened and tuning condenser plates fully engaged, place the drum in the position as shown in Fig. 6 so that drum spring (12) is approximately horizontal, and the top rim of the drum is $\frac{1}{16}$ in. away from the mounting plate. Guide (48) should stop at equal distances from each end of the mounting plate slot.

2. Removing and Replacing Scale

Pry out fastener (39), and remove the scale by lowering that end below the ear and taking the scale out of cap assembly (24), holding parts (24), (11), and (7) in place. Replace, locating tabs of caps (24) and (25) in slots of scale. Replace fastener (39).

3. Locating Scale

Loosen the two gear set screws (16). Rotate the scale upward until there is slight tension on spring (11) with the pointer indicating on the Band "D" scale. With the frequency band switch in the Band "D" position, place gear (7) in mesh with the gear on part (6) and tighten the two set screws (16).

4. Replacing Drive Cord

The position of the dial scale pointer with respect to the tuning condenser drum is held fixed by means of a special metal braid cable connecting the drum with the guide (48). Tension is maintained on the cable through the drum spring (12) and drive cord. To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (48). Unhook spring (12) from tab (46) to release tension. Unhook the cable or cord from guide (48) and unwind from the pulleys and drum. To replace the cable rethread to agree with Fig. 6, and rehook drum spring (12) as shown.

5. Replacing Reduction Drive

To replace the reduction drive, unhook spring (12), loosening the drive cord. Unscrew palnut (44) and remove drive. Replace with new drive and rehook drive cord.

6. Replacing Toggle Assembly

Loosen the two set screws holding the toggle mechanism on the band change switch and on shaft (6). Replace with new assembly, setting lower lever arm $\frac{1}{16}$ in. away from the condenser drive drum as shown in Fig. 6, and tighten set screw on frequency band switch shaft. Rotate shaft (6) clockwise until there is slight tension on spring (11) with the scale in the Band "D" position. Place upper lever arm in shaft and tighten set screw.

7. Setting Scale Pointer

The scale pointer is soldered to the slider. To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate $\frac{1}{8}$ in. to the left of the extreme left-hand line on the Band "D" scale as shown in Fig. 6.

8. Replacing Dial Lamp

Take hold of terminals of lamp bracket and push up until lamps protrude above the opening in reflector (18). Lamps may then be replaced in socket clips. After replacing lamps, slide the socket mounting bracket back into the mounting clip.

SERVICE DATA

Physical Specifications

Model	A-70	A-75
Height	$20\frac{1}{16}$ in.	$40\frac{3}{8}$ in.
Width	$14\frac{3}{4}$ in.	$23\frac{5}{8}$ in.
Depth	$11\frac{1}{16}$ in. (Knobs project beyond)	$11\frac{1}{2}$ in. (Knobs project beyond)
Weight packed	34 lb.	68 lb.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Consumption (Watts)
A	105–130	50–60	100
C	105–130	25–60	105
V	105–130 and 200–250	40–60	105

NOTE: Taps on universal transformers (Rating "V") are accessible by removing the cap cover mounted on the top of the transformer. Schematic and wiring diagrams of the universal transformer are shown in Fig. 2 and 3, respectively.

Tuning Frequency Range

Band "B"	540–1750 kc.
Band "C"	1.75–6.0 mc. (1750–6000 kc.)
Band "D"	6.0–19.5 mc. (6000–19,500 kc.)

Tuning Control Drive Ratio

Fast Tuning	$5\frac{1}{2}$ to 1
Vernier Tuning	55 to 1

Electrical Power Output

Undistorted	2.0 watts
Maximum	3.0 watts

Loud-speaker—Electrodynamic

Cone: Model A-70 8 in. overall, 7 in. effective diameter
Model A-75 $10\frac{1}{4}$ in. overall, $9\frac{1}{4}$ in. effective diameter
Cone Coil Impedance: 5 ohms at 400 cycles

Tubes

R. F. Amplifier.....6K7 Triple-grid Super-control Amplifier
Converter and Oscillator........6A8 Pentagrid Converter
I. F. Amplifier.....6K7 Triple-grid Super-control Amplifier
Detector and AVC..6H6 Twin Diode
Audio Amplifier.....6C5 Detector Amplifier Triode
Output...........6F6 Power Amplifier Pentode
Power Rectifier.....5Z4 Full-wave Rectifier
Dial Lamps........MAZDA No. 46

DESCRIPTION OF ELECTRICAL CIRCUIT

Models A-70 and A-75 employ seven metal envelope tubes to perform the above functions in a superheterodyne circuit, giving the excellent selectivity and sensitivity inherent in this type circuit. Separate groups of coils are used for each frequency band. Ample undistorted output is obtained through diode detection and two audio amplifier stages.

The signal from the antenna is applied to the control grid of the 6K7 R. F. amplifier tube through the antenna coil, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. The secondary of the coil for the band next lower in frequency to the one in use is short-circuited by the band switch to prevent absorption of energy at its resonant frequency which falls in the next higher band.

The amplified radio frequency signal is impressed on the control grid of the 6A8 converter and oscillator tube through the R. F. coil, the secondary of which is tuned to the signal frequency by the center section of the main tuning condenser. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc. higher in frequency. The local signal is generated by the oscillator elements of this tube and the proper frequency difference is maintained throughout the tuning range by the front section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors. The oscillator section of the main tuning condenser, although of the same capacity as the other two sections, is larger physically to permit wider spacing of the plates, thereby reducing the possibility of microphonic feedback howl.

The combination of the signal frequency with the local oscillator frequency in the converter tube produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier, which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-12. This voltage drop provides automatic bias for the R. F. and I. F. amplifier and converter tubes and so gives automatic volume control action. Full automatic bias voltage is applied to the R. F. amplifier tube, while half this voltage, from the midtap of R-12, is applied to the converter tube and I. F. amplifier, which handle a somewhat larger signal voltage than the R. F. amplifier.

The manual volume control selects the amount of audio signal applied through coupling capacitor C-36 to the grid of the 6C5 audio amplifier tube, and this regulates the output of the receiver. The output of the 6C5 tube is resistance coupled to the grid of the 6F6 power amplifier pentode. The plate circuit of the 6F6 is suitably matched to the loud-speaker by means of a step-down output transformer.

The tone control circuit consists of a .03-mfd. capacitor connected in series with a continuously variable 0-100,000-ohm resistance across the primary of the output transformer. When it is desired to reduce the high frequency output of the receiver, resistance is cut out of the circuit by operating the tone control knob.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

GENERAL ELECTRIC CO.

GEJ-840 Radio Receivers, Models A-70 and A-75

SOCKET VOLTAGES

Tube No.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts D.C.	Plate to Ground Volts D.C.	Cathode Current M.A.	Heater Volts A.C.
6K7 R. F.		2.6	100	250	8.7	6.3
6A8	Oscillator	...	...	195	10.0	6.3
	First Detector	3.0	90	250		
6K7 I. F.		2.6	100	242	8.7	6.3
6H6 Second Detector		...	...	...	...	6.3
6C5 1st A. F.		4.5	...	140	2.2	6.3
6F6 A. F. Power		16.5	267	240	42.5	6.3
5Z4 Power Rectifier		...	...	664/332 R.M.S.	85.0	5.0

Measured at 125 volts supply. No signal input. Volume control maximum. Voltmeter 1000 ohms per volt: measurements taken on highest scale giving accurate readable deflection.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers

RECEIVER ASSEMBLIES

Stock No.	Description	List Price
RB-001	BOARD—Antenna Terminal Board	$0.10
RB-005	BOARD—Terminal Board (Supports C-38, R-5)	.10
RB-006	BOARD—Terminal Board (Supports C-36, C-40, R-11, R-15)	.15
RB-017	BOARD—Terminal Board (Supports R-20)	.10
RB-118	BRACKET—Dial Mechanism Support Bracket	.20
RB-200	BRACE—Dial Opening Brace (Model A-70)	.30
RC-022	CAPACITOR—.004 mfd., 400 volts (C-35) Paper Dielectric	.25
RC-034	CAPACITOR—.01 mfd., 200 volts (C-38, C-40) Paper Dielectric	.25
RC-046	CAPACITOR—.02 mfd., 200 volts (C-36) Paper Dielectric	.25
RC-072	CAPACITOR—.05 mfd., 200 volts (C-4, C-19, C-21, C-22, C-25) Paper Dielectric	.25
RC-083	CAPACITOR—.03 mfd., 400 volts (C-34) Paper Dielectric	.25
RC-091	CAPACITOR—.05 mfd., 400 volts (C-29, C-45) Paper Dielectric	.30
RC-123	CAPACITOR—.1 mfd., 400 volts (C-37) Paper Dielectric	.35
RC-202	CAPACITOR—4 mmfd., (C-8) Mica Dielectric	.25
RC-235	CAPACITOR—100 mmfd., (C-44) Mica Dielectric	.25
RC-277	CAPACITOR—335 mmfd., (C-10) Mica Dielectric	.25
RC-344	CAPACITOR—1300 mmfd., (C-12) Mica Dielectric	.35
RC-361	CAPACITOR—3870 mmfd., (C-43) Mica Dielectric	.50
RC-404	CAPACITOR—10 mfd., 440 volts (C-42) Wet Electrolytic	1.10
RC-407	CAPACITOR—16 mfd., 380 volts (C-41) Wet Electrolytic	1.15
RC-502	CAPACITOR—One 4 mfd., 450 volts (C-39); One 3 mfd., 150 volts (C-26) Dry Electrolytic	1.40
RC-503	CAPACITOR—One 10 mfd., 25 volts (C-32); One 10 mfd., 25 volts (C-33) Dry Electrolytic	$1.10
RC-601	CAPACITOR—Trimmer Capacitor, 25-90 mmfd. (C-11)	.40
RC-701	CONDENSER—Three-gang Tuning Condenser (C-16, C-17, C-18)	4.25
RC-854	CORD—Power Cord with Plug	.60
RE-005	ESCUTCHEON—Dial Escutcheon	.80
RF-002	FOOT—Mounting Foot Assembly	.20
RG-001	GRID CAP—Grid Connection Cap, Pkg. of 5	.10
RI-003	INSULATOR—Escutcheon Shaft Insulating Bushing, Pkg. of 10	.40
RK-001	KNOB—Tuning, Volume, Tone Control or Band Switch Knob, Pkg. of 5	.50
RL-001	COIL—Antenna Coil, Bands B and D (C-1, C-3, L-1, L-2, L-5, L-6)	2.25
RL-002	COIL—Antenna Coil, Band C (C-2, L-3, L-4)	1.60
RL-101	COIL—R. F. Coil, Bands B and D (C-5, C-7, L-7, L-8, L-11, L-12)	2.50
RL-102	COIL—R. F. Coil, Band C (C-6, L-9, L-10)	1.60
RL-201	COIL—Oscillator Coil, Bands B and D (C-13, C-14, L-13, L-14, L-17, L-18)	2.10
RL-202	COIL—Oscillator Coil, Band C (C-15, L-15, L-16)	1.70
RN-001	NUT—Escutcheon Mounting Nut, Pkg. of 10	.45
RP-014	PLATE—Escutcheon Mounting Plate, Pkg. of 2	.25
RR-006	RESISTOR—300 ohms, ¼ watt (R-3, R-5, R-8) Carbon Resistor, Pkg. of 5	.70
RR-013	RESISTOR—2000 ohms, ¼ watt (R-14) Carbon Resistor, Pkg. of 5	70
RR-014	RESISTOR—1000 ohms, ¼ watt (R-9) Carbon Resistor, Pkg. of 5	.70
RR-016	RESISTOR—5000 ohms, ¼ watt (R-6) Carbon Resistor, Pkg. of 5	.70
RR-035	RESISTOR—50,000 ohms, ¼ watt (R-4) Carbon Resistor, Pkg. of 5	.70
RR-049	RESISTOR—100,000 ohms, ¼ watt (R-1, R-2) Carbon Resistor, Pkg. of 5	.70
RR-064	RESISTOR—500,000 ohms, ¼ watt (R-17) Carbon Resistor, Pkg. of 5	$0.60
RR-067	RESISTOR—1,000,000 ohms, ¼ watt (R-13) Carbon Resistor, Pkg. of 5	.70
RR-068	RESISTOR—2,000,000 ohms, ¼ watt (R-11, R-15) Carbon Resistor, Pkg. of 5	.60
RR-192	RESISTOR—50,000 ohms, ½ watt (R-16) Carbon Resistor, Pkg. of 5	.70
RR-211	RESISTOR—410 ohms, 1 watt (R-18) Carbon Resistor, Pkg. of 5	1.10
RR-241	RESISTOR—30,000 ohms, 1 watt (R-20) Carbon Resistor, Pkg. of 5	.85
RR-700	RESISTOR—Candohm Resistor (R-21, R-22, R-23)	1.00
RS-103	SHIELD—Antenna or R. F. Coil Shield, Band C	.20
RS-104	SHIELD—Antenna or R. F. Coil Shield, Bands B and D	.25
RS-105	SHIELD—First I. F. Transformer Shield	.30
RS-117	SHIELD—Second I. F. Transformer Shield	.35
RS-118	SHIELD—Oscillator Coil Shield, Band C	.20
RS-119	SHIELD—Oscillator Coil Shield, Bands B and D	.25
RS-150	SHIELD—R. F. Shield (Short)	.10
RS-151	SHIELD—R. F. Shield (Beneath I. F. Transformer)	.15
RS-152	SHIELD—R. F. Shield (Long)	.15
RS-154	SHIELD—R. F. Shield (Beneath 6H6 Tube)	.15
RS-200	SOCKET—Eight-pin Tube Socket, Pkg. of 5	.75
RS-204	SOCKET—Five-pin Tube Socket (5Z4) Pkg. of 5	.75
RS-302	SWITCH—Frequency Band Switch with Mounting Nut (S-1, S-2, S-3, S-4, S-5, S-6)	3.25
RS-700	STRIP—Terminal Strip	.50
RT-071	TRANSFORMER—Power Transformer (T-2) 50-60 cycles, 105-130 volts (Rating "A")	5.75
RT-072	TRANSFORMER—Power Transformer (T-2) 25-60 cycles, 105-130 volts (Rating "C")	8.75
RT-073	TRANSFORMER—Power Transformer (T-2) 40-60 cycles, 105-130, 200-250 Volts (Rating "V")	7.25
RT-202	TRANSFORMER—First I. F. Transformer (C-20, C-23, C-24, C-47, L-19, L-20, R-7)	2.50
RT-203	TRANSFORMER—Second I. F. Transformer (C-27, C-29, C-30, C-31, L-21, L-22, R-10)	2.50
RT-700	TONE CONTROL—Potentiometer, 100,000 ohms, (R-19) and Power Switch (S-7)	.90
RV-002	VOLUME CONTROL—Potentiometer, 250,000 ohms (R-12)	1.15
RW-002	WINDOW—Dial Window	.15
RX-003	CUSHION ASSEMBLY—Tuning Condenser Mounting Nuts, Washers and Cushions	.15
RX-004	SCREW ASSEMBLY—Chassis Mounting Screws and Washers	.10

SPEAKER ASSEMBLY A-70

Stock No.	Description	List Price
RC-900	CONE—Speaker Cone and Cone Coil (L-24)	$1.00
RP-009	PLUG—Speaker Male Plug Connector	.20
RP-012	PLUG—Speaker Female Plug Connector	.20
RS-009	SPEAKER—Eight-inch Loud-speaker Complete with Output Transformer-speaker Plug Type	9.15
RS-011	SPEAKER—Eight-inch Loud-speaker Complete with Output Transformer—Terminal Strip Type	9.00
RT-402	TRANSFORMER—Output Transformer (T-1) Terminal Strip Type	1.60
RT-405	TRANSFORMER—Output Transformer (T-1) Speaker Plug Type	1.70

SPEAKER ASSEMBLY A-75

Stock No.	Description	List Price
RC-901	CONE—Speaker Cone and Cone Coil (L-24)	1.45
RP-009	PLUG—Speaker Male Plug Connector	.20
RP-012	PLUG—Speaker Female Plug Connector	.20
RS-018	SPEAKER—10¼-inch Loud-speaker Complete with Output Transformer—Terminal Strip Type	11.50
RS-019	SPEAKER—10¼-inch Loud-speaker Complete with Output Transformer—Speaker Plug Type	11.65
RT-402	TRANSFORMER—Output Transformer (T-1) Terminal Strip Type	1.60
RT-405	TRANSFORMER—Output Transformer (T-1) Speaker Plug Type	1.70

DIAL MECHANISM

Stock No.	Description	List Price
RB-117	BRACKET—Dual Lamp Bracket	.25
RC-805	CABLE—Drive Cable, Pkg. of 5	.80
RC-856	CORD—Drive Cord, Pkg. of 5	.65
RC-954	CAP—Scale Cap Assembly (Gear End)	.10
RC-955	CAP—Scale Cap (Drive End)	.10
RC-958	CUSHION—Rubber Dial Mounting Cushion, Pkg. of 2	.10
RD-002	DIAL—Dial Mechanism Complete	2.75
RD-006	DRIVE—"Automatic Vernier" Reduction Drive	1.00
RD-013	DRUM—Drive Drum Assembly	.35
RD-015	DIAL—Dial Scale	.75
RF-200	FASTENER—Dial Fastener, Pkg. of 10	.10
RG-002	GEAR—Dial Gear Assembly	.15
RG-200	GUIDE—Dial Pointer Guide, Pkg. of 5	.15
RP-003	POINTER—Dial Pointer, Pkg. of 2	.15
RP-004	PULLEY—Drive Cord Idler Pulley, Pkg. of 2	.10
RP-006	PLATE—Dial Mounting Plate assembled complete	.50
RS-401	SPRING—Drum Spring, Pkg. of 2	.20
RS-403	SPRING—Dial Spring, Pkg. of 2	.10
RS-900	SHAFT—Shaft and Gear Assembly	.15
RT-801	TOGGLE—Toggle Assembly	.25

MODELS A-82, A-87
Schematic

GENERAL ELECTRIC CO.

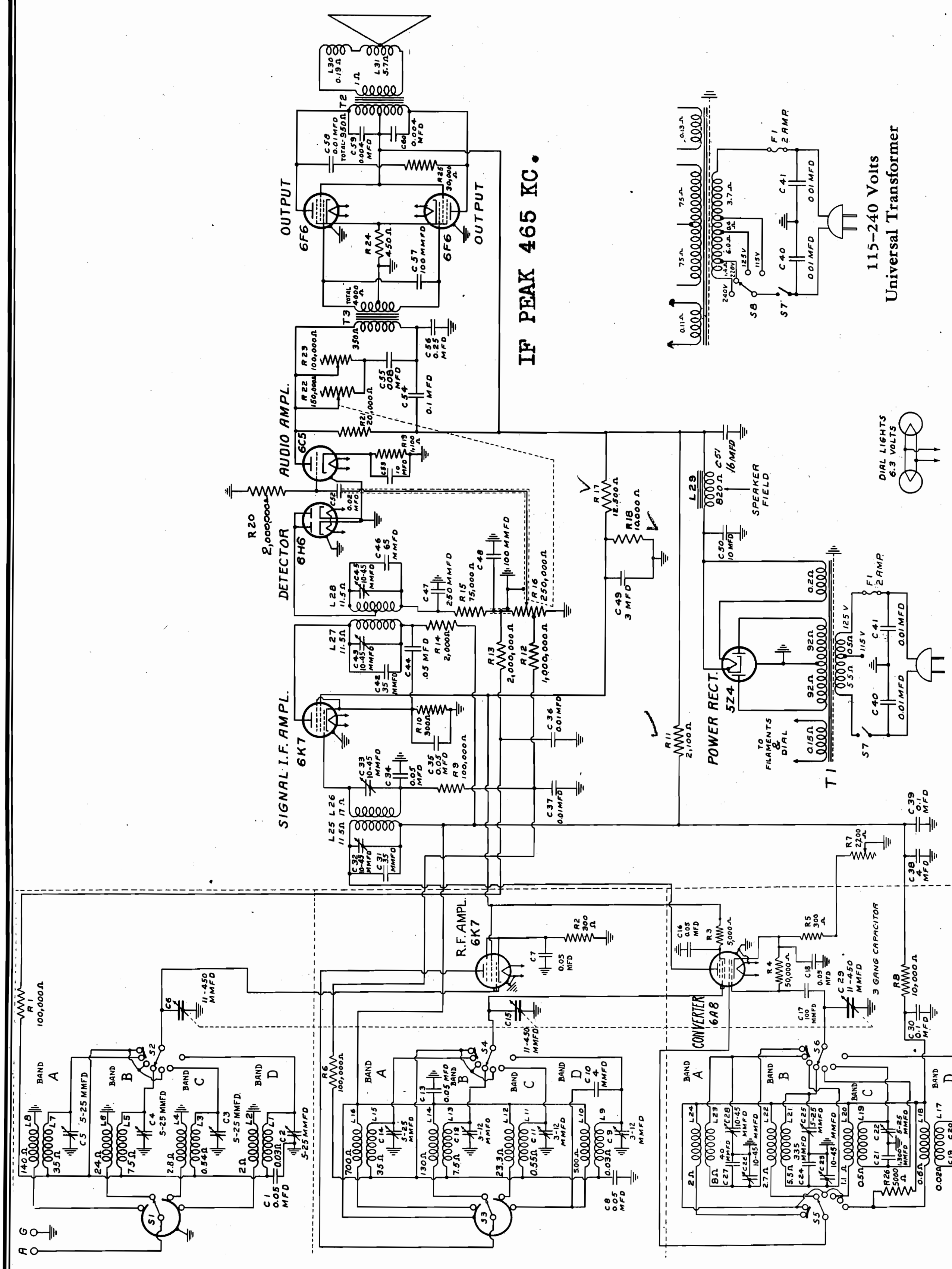


Fig. 2 Schematic Circuit Diagram

September 1935

MODELS A-82, A-87
Chassis Wiring

GENERAL ELECTRIC CO.

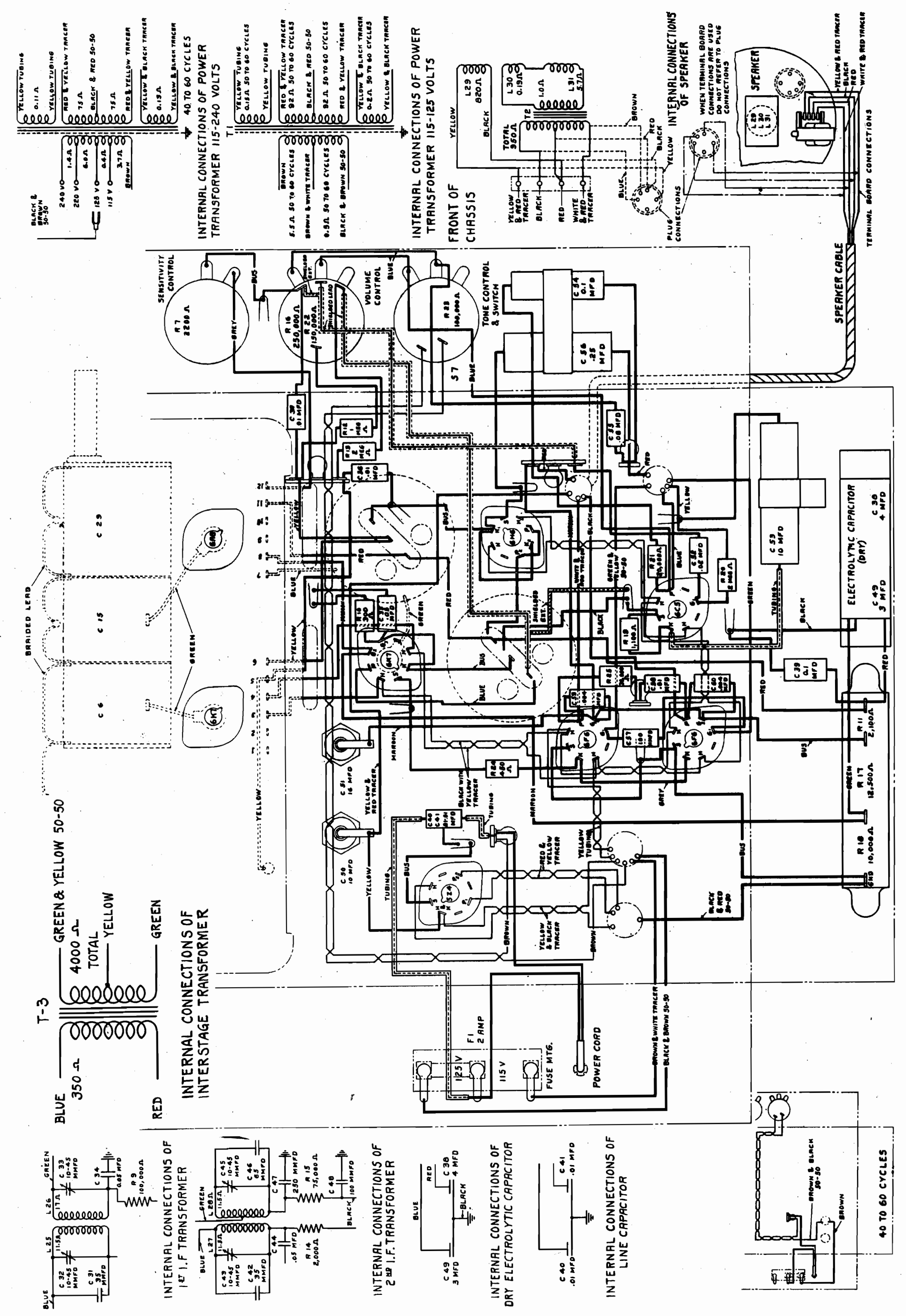
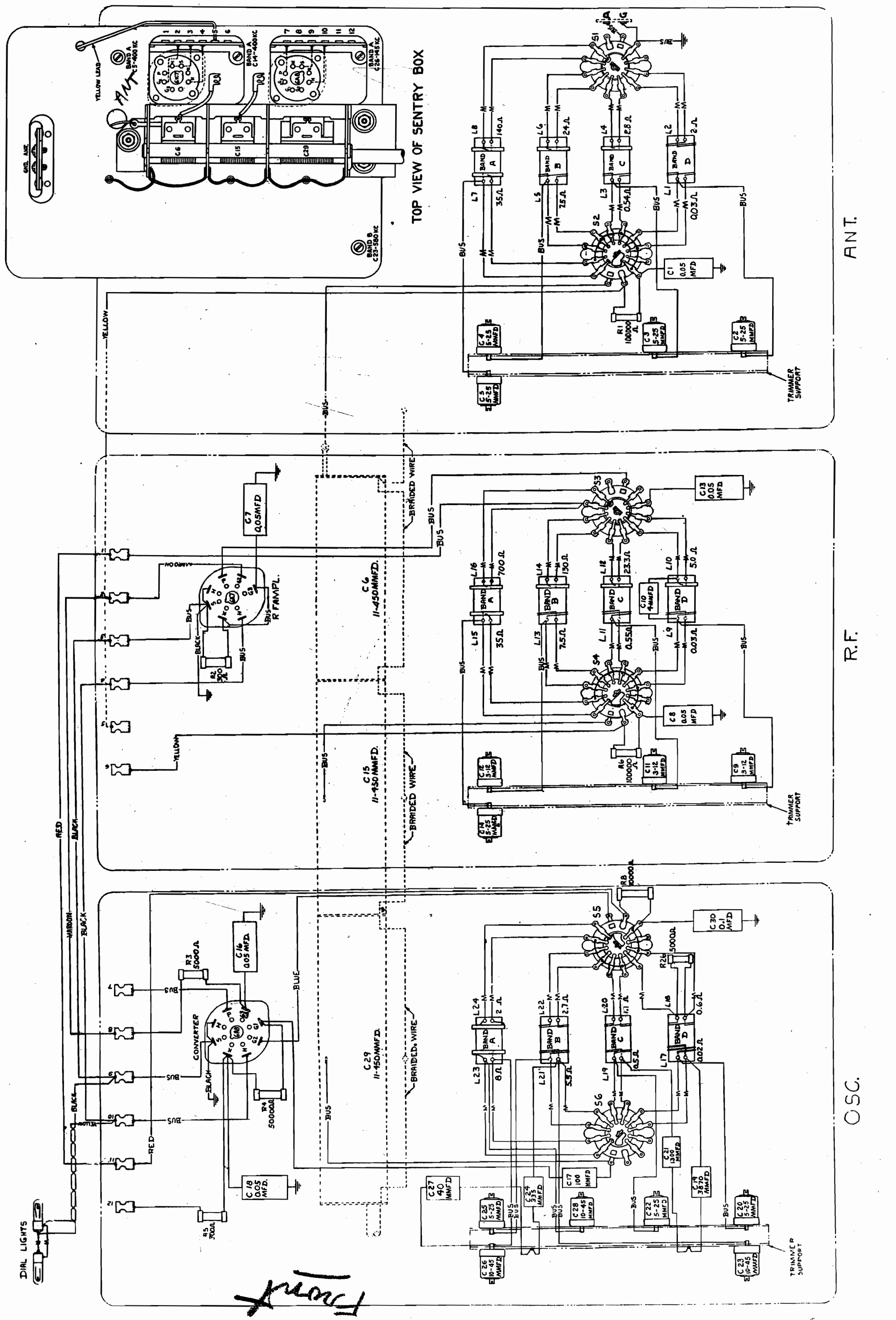


Fig. 3 Chassis Wiring Diagram

(Rating "V" Receivers)

MODELS A-82, A-87
Sentry Box
Chassis Wiring

GENERAL ELECTRIC CO.



NOTE - ALL CONNECTIONS MARKED 'M' ARE MADE DIRECT

Fig. 4 "Sentry Box" Wiring Diagram

GENERAL ELECTRIC CO.

Electrical Specifications

Rating Label	Power Supply (Volts)	Frequency (Cycles)	Power Con-sumption (Watts)
A	105–130	50–60	105
C	105–130	25–60	110
V	105–130 and 220–250	40–60	110

NOTE—Taps on universal transformers (Rating "V") are accessible by removing the cap cover on the top of the transformer.

Tuning Frequency Range

Band "A"	140–410 kc
Band "B"	540–1750 kc
Band "C"	1.75–6.0 mc (1750–6000 kc)
Band "D"	6.0–19.5 mc (6000–19,500 kc)

Tuning Control Drive Ratio

Fast Tuning	5½ to 1
Vernier Tuning	55 to 1

Electrical Power Output

Undistorted	5.0 watts
Maximum	7.0 watts

Loud-speaker—Electrodynamic

Cone: Model A-82 10¼ in. overall, 9¼ in. effective diameter
Model A-87 10¼ in. overall, 9¼ in. effective diameter
Cone Coil Impedance: 5 ohms at 400 cycles

DESCRIPTION OF ELECTRICAL CIRCUIT

The signal from the antenna is applied to the control grid of the 6K7 R. F. amplifier tube through the antenna coil, the secondary of which is tuned to the incoming signal by the rear section of the main tuning condenser. The secondary of the coil for the band next lower in frequency to the one in use is short-circuited by the band switch to prevent absorption of energy at its resonant frequency, which falls in the next higher band. The primaries of all coils not in use are also short-circuited by the band switch.

The amplified radio frequency signal is impressed on the control grid of the 6A8 converter and oscillator tube through the R. F. coil, the secondary of which is tuned to the signal frequency by the center section of the main tuning condenser. The sensitivity control consists of a variable resistor in the cathode circuit of the 6A8 converter tube. In the 6A8 tube the incoming signal is combined with the local oscillator signal which is 465 kc higher in frequency. The local signal is generated by the oscillator elements of this tube and the proper frequency difference is maintained throughout the tuning range by the front section of the main tuning condenser in conjunction with the oscillator coil and padding capacitors. The oscillator section of the main tuning condenser, although of the same capacity as the other two sections, is larger physically to permit wider spacing of the plates, thereby reducing the possibility of microphonic feedback howl.

The combination of the signal frequency with the local oscillator frequency in the converter tube produces the intermediate frequency of 465 kilocycles. This particular intermediate frequency is chosen to reduce image response and improve short-wave performance. The intermediate frequency amplifier consists of a 6K7 tube and two transformers, each with two tuned circuits.

The output of the I. F. amplifier is applied to the 6H6 diode rectifier, which is a combined detector and automatic volume control tube. The direct current component of the rectified signal produces a voltage drop across R-16. This voltage drop provides automatic bias for the R. F. and I. F. amplifier tubes and converter tube and so gives automatic volume control action. Full automatic bias is applied to the R. F. amplifier tube, while a part of this voltage, from a tap on R-16, is applied to the converter tube and I. F. amplifier, which handle somewhat larger signal voltage than the R. F. amplifier.

The manual volume control selects the amount of audio signal applied through coupling capacitor C-52 to the grid of the 6C5 audio amplifier tube, and thus regulates the output of the receiver. This is a dual control, the second or lo-note compensation section acting to preserve proper balance between high and low audio frequencies as the volume is changed, by means of a variable 150,000-ohm resistance (R-22) in series with a capacitor (C-55) across the primary of the interstage audio transformer. The tone control consists of a variable 100,000-ohm resistor (R-23) connected in parallel with the lo-note compensation section of the volume control, so as to permit attenuation of the higher audio frequencies as desired.

The output of the 6C5 tube is coupled to the grids of the push-pull 6F6 output pentodes by means of a resistance capacity network working into the interstage audio transformer. The plate circuits of the 6F6 output pentodes are suitably matched to the loud-speaker by means of a step-down output transformer.

Plate and grid voltages for all tubes are supplied by the power supply system employing a 5Z4 full-wave rectifier tube which, together with a suitable network of resistors and capacitors, supplies the required voltages and filtering action.

ALIGNMENT PROCEDURE

Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal from the test oscillator to the receiver and inserting a "Tuning Wand" into the coil involved. The "Tuning Wand" consists of a rod of insulating material having a ring of nonmagnetic metal attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the metal ring end into the center of a particular coil through the openings provided in the "Sentry Box" compartment shields, the inductance of the coil is lowered, increasing its resonant frequency. Inserting the iron-filled end into the coil raises its inductance, lowering its resonant frequency. If the circuits are in exact alignment, inserting either end of the tuning wand in any coil will result in a decrease in output. When an increase in signal is obtained with the iron-filled end of the wand, a decrease in resonant frequency of that circuit by increasing its trimmer capacity is indicated. When an increase in signal is obtained with the metal ring, a decrease in trimmer capacity is indicated.

Changes Indicated by Wand

Wand	Signal	Trimmer adjustment required
Metal Ring Iron filings	Decrease Decrease	None
Metal Ring Iron filings	Increase Decrease	Decrease capacity
Metal Ring Iron filings	Decrease Increase	Increase capacity

Fig. 6 shows the location of the antenna, R. F. and oscillator coils for each of the four frequency bands of Models A-82 and A-87 receivers. Openings are provided in the coil shields for insertion of the tuning wand into the antenna or R. F. coil of any band. No provision is made for checking the alignment of the oscillator circuits, as this is easily determined by noting the dial calibration.

Alignment Frequencies

I. F.	Band "A"	Band "B"	Band "C"	Band "D"
465 kc	140 kc	580 kc	6000 kc	18,000 kc
	410 kc	1740 kc		

In order to align these receivers properly, it is necessary to have available the following test equipment:

1. A modulated test oscillator with frequencies available of 140, 410, 465, 580, 1740, 6000, and 18,000 kc
2. An output indicator, such as a high resistance a-c voltmeter with a maximum scale reading of 3 to 5 volts, or a neon lamp indicator.
3. An alignment tool consisting of an insulating shaft with a small screwdriver blade.
4. A tuning wand.

The location of all trimmer capacitors is shown in Fig. 5. *It should be noted that on all "Permaliner" trimmer capacitors, clockwise rotation of the adjusting screw decreases capacity while counterclockwise rotation increases capacity.*

1. *I. F. Alignment*

Set the frequency band switch of the receiver to Band "B," short-circuit the antenna and ground terminals and tune the receiver at some point above 1500 kc so that no signal is heard. Set the volume control and sensitivity control at maximum (extreme clockwise position) and ground the chassis.

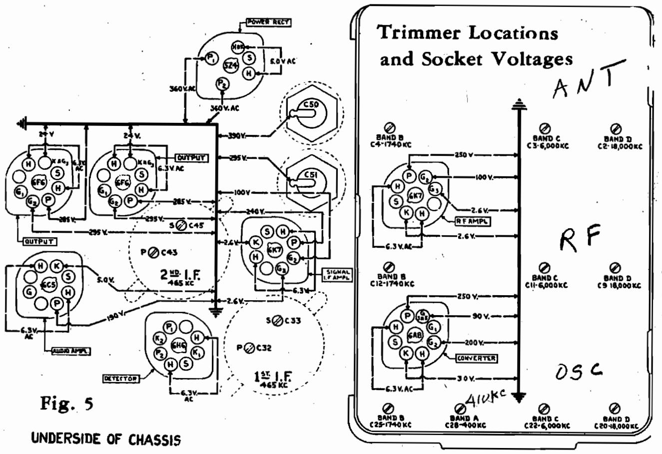


Fig. 5

UNDERSIDE OF CHASSIS

The I. F. amplifier is tuned to 465 kc; set the test oscillator dial at this frequency. Make sure that a d-c path exists between the output terminals of the test oscillator, then remove the control grid clip (green lead) from the 6A8 tube and connect the test oscillator output between chassis and the dome terminal of the 6A8 tube. Connect the output meter across the cone coil of the speaker and adjust the test oscillator output control so that, with the receiver volume control at maximum, a small deflection is observed on the output meter. During both I. F. and R. F. alignment, the test oscillator signal should be maintained at the lowest level that will give a good readable output indication.

Adjust the secondary trimmer of the second I. F. transformer until a maximum output reading is obtained, maintaining a small deflection on the output meter throughout alignment by adjusting the test oscillator output. Next, adjust the primary trimmer of the second I. F. transformer for maximum output. Continue this procedure, adjusting the secondary trimmer of the first I. F. transformer and lastly the primary trimmer of the first I. F. transformer. After completing this procedure, repeat it a second time for final alignment. The I. F. alignment will then be complete.

2. *R. F. Alignment*

Bands "A" and "B" each require four trimmer adjustments, while Bands "C" and "D" each require three adjustments. Care should be taken to adjust only the trimmers of the band under test. Check the position of the dial pointer with the tuning condenser plates fully engaged as outlined in the section on adjustment of the dial mechanism. Make sure the antenna and ground terminals of the receiver are not short-circuited and connect to them the output from the test oscillator, preferably using a dummy antenna of 250 mmfd in series with 200 ohms between the test oscillator and the receiver antenna terminal. Connect the output indicator across the speaker cone coil.

Band "A," 140-410 kc

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 410 kc, and turn the dial pointer on the receiver to this frequency. Adjust the Band "A" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small deflection on the output indicator. When optimum adjustment on the Band "A" oscillator trimmer is obtained, adjust the Band "A" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 140 kc and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 140-kc padding capacitor for maximum output. When this has been done, return to 410 kc on the receiver and test oscillator and recheck the alignment for maximum output. This completes alignment of Band "A."

Band "B," 540-1750 kc

Set the frequency band switch to the position where the dial indicates the above range. Tune the test oscillator to 1740 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "B" oscillator trimmer for maximum output, keeping the receiver volume control at its extreme clockwise position and adjusting the test oscillator output to maintain a small reading on the output indicator. When optimum adjustment on the Band "B" oscillator trimmer is obtained, adjust the Band "B" R. F. and antenna trimmers for maximum output.

Now tune the test oscillator to 580 kc and set the receiver to that frequency. Slowly rocking the tuning condenser back and forth through the signal, adjust the 580-kc padding capacitor for maximum output. When this has been done, return to 1740 kc on the receiver and test oscillator and recheck the alignment for maximum output. Band "B" should now be in alignment.

Band "C," 1.75-6.0 mc (1750-6000 kc)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 6000 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "C" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum.

Check for the image signal which should be received at about 5070 kc on the receiver dial. It should be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (6000 kc) and adjust the test oscillator output to its previous value. Then adjust the Band "C" R. F. and antenna trimmers for maximum output.

Band "D," 6.0-19.5 mc (6000-19,500 kc)

Set the band switch to the position where the dial indicates the above range. Tune the test oscillator to 18,000 kc and set the dial pointer on the receiver to this frequency. Adjust the Band "D" oscillator trimmer for maximum output, using the first peak obtained when increasing the capacitance from minimum to maximum

Check for the image signal which should be received at about 17,070 on the receiver dial. It may be necessary to increase input to the receiver from the test oscillator for this check. Retune the receiver to the correct scale reading (18,000 kc) and adjust the test oscillator output to its previous value.

Reduce the capacitance of the R. F. trimmer to a minimum. While slowly rocking the tuning condenser through the 18,000-kc point, increase the Band "D" R. F. trimmer capacitance until a maximum response point is obtained. The Band "D" antenna trimmer should now be peaked. It is not necessary to rock the tuning condenser while making the last adjustment.

When these adjustments have been completed, the receiver will be in alignment.

METHOD OF SERVICE PROCEDURE— SENTRY BOX

The "Sentry Box" assembly includes the tuning condenser and dial mechanism as well as the coil and switch compartments. The complete unit may be dismounted from the chassis by removing the side-fastening bolts, unscrewing the dial mechanism anchoring nut and unsoldering the leads to the chassis from the terminal strips.

In order to remove the coil shield cans it is necessary to take out the frequency band switch shaft. With the "Sentry Box" dismounted from the chassis the dial gears may be disengaged and the switch shaft removed merely by lifting the reduction drive end of the dial assembly, allowing the switch shaft gear to pass the dial scale cap shaft. With the "Sentry Box" mounted in place, removal of the switch shaft requires removing the dial scale gear and cap shaft.

Each compartment shield can houses a bracket assembly comprising the coils, band switch and other component parts associated with that particular circuit. With the band

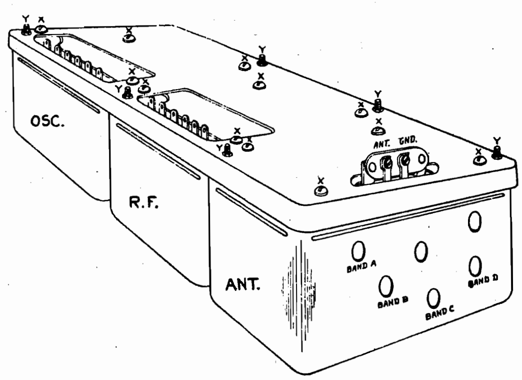


Fig. 6 "Sentry Box" Coil Locations and Assembly

switch shaft out, any shield can be easily removed by unscrewing the two mounting stud nuts ("Y," Fig. 6).

In most cases, coils or Permaliner trimmer capacitors may be replaced merely by removing their particular shield can. It is an easy matter, however, to remove each complete bracket assembly by taking out the mounting bolts ("X," Fig. 6) and unsoldering the bus or braid connections to the tuning condenser. In the case of the R. F. or oscillator units it will also be necessary to unsolder the external leads to the respective terminal boards of these units.

Permaliner trimmers are replaced by unsoldering the bus lead from the trimmer terminal, and then unsoldering the Permaliner case from its mounting cup. The latter operation may require the use of two soldering irons.

Coils are replaceable by merely unsoldering the coil lugs from the switch lugs. If it is necessary to replace a section of the band switch, however, it will be found expedient to remove the complete bracket and coil assembly for easy access to the switch lugs.

ADJUSTMENT OF DIAL MECHANISM

The dial mechanism is rigidly mounted at one end to the tuning condenser frame by two removable screws and anchored to the chassis deck at the other end by a rubber-cushioned nut. The dial pointer, station selector knob, and tuning condenser drive drum are interconnected by means of the drive cord and drive cable; the frequency band switch and cylindrical scale by the switch shaft and scale gears.

1. *Position of Drum on Condenser Shaft*

With set screws (5) loosened and tuning condenser plates fully engaged, place the drum in the position shown in Fig. 7. The drum should be located on the tuning condenser shaft so as to be in line with the drive cord pulleys ($\frac{1}{16}$ in. from the dial mechanism mounting bracket), and so that, with condenser plates fully engaged, guide (38) occupies the position shown in Fig. 7.

2. *Removing and Replacing Scale*

Pry out fastener (40) and remove the scale by lowering the fastener end below the mounting ear. Take the scale out of cap assembly (29). Replace by placing tabs of caps (29) and (30) in slots of scale. Replace fastener (40).

3. *Removing and Replacing Band Switch Shaft*

To remove the band switch shaft with the "Sentry Box" assembled in place, the dial scale cap and gear must be removed. This is done by removing the cylindrical scale as in

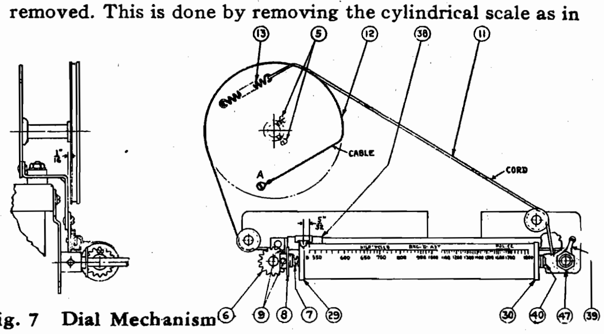


Fig. 7 Dial Mechanism

paragraph 2. Then loosen set screws (9) and remove cap (29), spring (7) and gear (8).

When replacing the switch shaft, note that the shaft will fit the switch gang slots in only one position; turn the shaft before inserting so that the locating button will pass through the keyed side of the slots. Note also that the brass bearing just behind the switch shaft gear determines the forward position of the gear. Insert the bushing just far enough into the index plate hub so that the shaft gear meshes snugly with the scale gear, then tighten the set screw.

4. *Locating Scale*

Loosen the two gear set screws (9). Rotate the scale backward until there is slight tension on spring (7) with the pointer indicating on the Band "A" scale. With the frequency band switch in the Band "A" position, place gear (8) in mesh with the gear on part (6) and tighten the two set screws (9).

5. *Replacing Drive Cord and Drive Cable*

The position of the dial scale pointer with respect to the tuning condenser drum is held fixed by a special metal braid cable (12) connecting the drum with guide (38). Tension is maintained on the cable through the drum spring (13) and drive cord (11). To replace either the drive cable or the drive cord, remove the dial scale for convenient access to guide (38). Unhook spring (13) from its drum tab to release tension. Unhook the cable or cord from guide (38) and unwind from the pulleys and drum. To replace the cable or cord, rethread to agree with Fig. 7, and rehook drum spring (13) as shown.

6. *Replacing Reduction Drive*

To replace the reduction drive, unhook spring (13), loosening the drive cord. Unscrew pal nut (47) and remove drive. Replace with new drive and rehook drive cord.

7. *Setting Scale Pointer*

The scale pointer is soldered to the slider. To set the pointer mechanically, turn the tuning condenser rotor so that the plates are fully engaged, and solder the pointer to indicate a point $\frac{3}{32}$ in. to the left of the extreme left-hand mark on the scale on Band "B."

8. *Replacing Dial Lamp*

The dial lamp sockets are easily accessible by lifting them clear of the dial mechanism. Lamps may then be replaced in their sockets. After replacing lamps, slide the socket clip back onto the mounting bracket.

MODELS A-82,A-87
Voltage,Parts

GENERAL ELECTRIC CO.

CIRCUIT ANALYSIS—SENTRY BOX

A table of socket voltages is shown below. If it is found desirable to check voltages at the sockets mounted in the "Sentry Box," only the shield can for the socket measured should be off while measurements are being taken.

MODELS A-82 AND A-87

Voltages at Tube Sockets

Fuse in 125 V. Clip—125 Volts A-C Line—

Maximum Volume and Sensitivity—No Signal

Tube No.	Cathode to Ground Volts D-c	Screen Grid to Ground Volts D-c	Plate to Ground Volts D-c	Cathode Current M.A.	Heater Volts A-c
6K7 R. F.	2.6	100	250	8.7	6.3
6A8 Oscillator	....	....	195		
6A8 Converter	3.0	90	250	10.0	6.3
6K7 I. F.	2.6	100	242	8.7	6.3
6H6 Detector	....	....	....	....	6.3
6C5 A. F.	5.0	....	195	5.0	6.3
6F6 A. F. Power	24	295	285	26.5	6.3
6F6 A. F. Power	24	295	285	26.5	6.3
5Z4 Rectifier	....	....	720/360 Rms	96.0	5.0

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

RECEIVER CHASSIS ASSEMBLIES

Stock No.	Description	List Price
RB-007	BOARD—Fuse board. Rating "V" Receivers	$0.40
RB-008	BOARD—Terminal Board (Double terminal)	.10
RB-009	BOARD—Terminal Board (Single terminal)	.15
RB-011	BOARD—Fuse board, Rating "A" or "C" Receivers	.30
RB-200	BRACE—Dial Opening Brace (Model A-82)	.30
RC-022	CAPACITOR—.004 Mfd. 400 Volt (C-59, C-60) Paper Dielectric	.25
RC-034	CAPACITOR—.01 Mfd. 200 Volt (C-36, C-37) Paper Dielectric	.25
RC-040	CAPACITOR—.01 Mfd. 400 Volt (C-58) Paper Dielectric	.25
RC-046	CAPACITOR—.02 Mfd. 200 Volt (C-52) Paper Dielectric	.25
RC-072	CAPACITOR—.05 Mfd. 200 Volt (C-35) Paper Dielectric	.25
RC 094	CAPACITOR—.08 Mfd. 400 Volt (C-55) Paper Dielectric	.25
RC-123	CAPACITOR—.1 Mfd. 400 Volt (C-39, C-54) Paper Dielectric	.35
RC-150	CAPACITOR—.25 Mfd. 400 Volt (C-56) Paper Dielectric	.35
RC-235	CAPACITOR—100 mmfd. (C-57) Mica Dielectric Moulded Case	.25
RC-405	CAPACITOR—10 Mfd. 480 Volt (C-50) Wet Electrolytic	1.15
RC-408	CAPACITOR—16 Mfd. 470 Volt (C-51) Wet Electrolytic	1.15
RC-502	CAPACITOR—One 4 Mfd. 450 Volt (C-38), one 3 Mfd. 150 Volt (C-49) Dry Electrolytic Pack	1.40
RC-504	CAPACITOR—10 Mfd. 25 Volt (C-53) Dry Electrolytic	.80
RC-750	CAPACITOR—Line Capacitor, Two .01 Mfd. (C-40, C-41)	.50
RC-801	CABLE—Speaker Cable	$0.50
RC-851	CORD—Power Cord with Plug	.60
RC-951	CLAMP—For mounting C-54 and C-56	.10
RC-952	CLAMP—For mounting C-53	.10
RE-005	ESCUTCHEON—Dial Escutcheon	.80
RF-003	FOOT—Chassis Mounting Foot with Cushions, pkg. of 2	.30
RI-003	INSULATOR—Escutcheon Shaft Insulator Bushing, pkg. of 10	.40
RK-002	KNOB—Tuning, Volume, Tone, Sensitivity or Band Switch, pkg. of 5	.25
RN-001	NUT—Escutcheon Mounting Nut, pkg. of 10	.45
RP-002	PLATE—Fuse Cover Plate	.15
RP-014	PLATE—Escutcheon Mounting Plate, pkg. of 2	.25
RP-016	PLATE—Dial Mechanism Mounting Plate Assembly	.15
RR-006	RESISTOR—300 ohms ¼ watt (R-10) Carbon Resistor, pkg. of 5	.70
RR-009	RESISTOR—1100 ohms ¼ watt (R-19) Carbon Resistor, pkg. of 5	1.05
RR-067	RESISTOR—1 megohm ¼ watt (R-12) Carbon Resistor, pkg. of 5	.70
RR-068	RESISTOR—2 megohms ¼ watt (R-13, R-20) Carbon Resistor, pkg. of 5	.60
RR-239	RESISTOR—20,000 ohms 1 watt (R-21) Carbon Resistor, pkg. of 5	.85
RR-242	RESISTOR—30,000 ohms 1 watt (R-25) Carbon Resistor, pkg. of 5	.85
RR-250	RESISTOR—450 ohms 2 watt (R-24) Carbon Resistor	.50
RR-701	RESISTOR—Tapped Resistor (R-11, R-17, R-18)	.95
RR-900	REFLECTOR—Dial Lamp Reflector	.15
RS-110	SHIELD—Second I. F. Transformer Shield	.30
RS-115	SHIELD—First I. F. Transformer Shield	.35
RS-200	SOCKET—Eight-pin Tube Socket, pkg. of 5	.75
RS-204	SOCKET—Five-pin Tube Socket, pkg. of 5	.75

REPLACEMENT PARTS (Continued)

Insist on genuine factory-tested parts, which may be purchased from authorized dealers.

Stock No.	Description	List Price
RS-800	SENSITIVITY CONTROL—Rheostat 2200 ohms (R-7)	$0.85
RT-081	TRANSFORMER—Power Transformer (T-1) 50-60 cycles, 105-130 volts (Rating "A")	6.75
RT-082	TRANSFORMER—Power Transformer (T-1) 25-60 cycles, 105-130 volts (Rating "C")	9.70
RT-083	TRANSFORMER—Power Transformer (T-1) 40-60 cycles, 105-130, 200-250 volts (Rating "V")	8.25
RT-204	TRANSFORMER—First I. F. Transformer (C-31, C-32, C-33, C-34, L-25, L-26, R-9)	2.95
RT-205	TRANSFORMER—Second I. F. Transformer (C-42, C-43, C-44, C-45, C-46, C-47, C-48, L-27, L-28, R-14, R-15)	3.30
RT-500	TRANSFORMER—Interstage Audio Transformer (T-3)	2.25
RT-701	TONE CONTROL—Rheostat 100,000 ohms (R-23) and Power Switch (S-7)	1.25
RV-003	VOLUME CONTROL — Potentiometer 250,000 ohms (R-16) and Rheostat 150,000 ohms (R-22)	1.70
RW-002	WINDOW—Dial Window	.15
RX-002	CUSHION ASSEMBLY—Tuning Condenser Mounting Cushions, Nuts and Washers	.10
RX-004	SCREW ASSEMBLY—Chassis Mounting Screws and Washers	.10

"SENTRY BOX" ASSEMBLIES

Stock No.	Description	List Price
RA-001	ASSEMBLY—Antenna Compartment Assembly Complete	$9.00
RA-101	ASSEMBLY—R. F. Compartment Assembly Complete	12.50
RA-201	ASSEMBLY—Oscillator Compartment Assembly Complete	14.75
RB-010	BOARD—R. F. or Oscillator Compartment Terminal Board	.10
RB-012	BOARD—Antenna Terminal Board	.15
RB-103	BRACKET—Antenna Bracket Assembly	.75
RB-104	BRACKET—Oscillator Bracket Assembly	.95
RB-105	BRACKET—R. F. Bracket Assembly	.95
RC-072	CAPACITOR—.05 Mfd. 200 Volt (C-1, C-7, C-8, C-16, C-18) Paper Dielectric	.25
RC-091	CAPACITOR—.05 Mfd. 400 Volt (C-13) Paper Dielectric	.30
RC-096	CAPACITOR—.1 Mfd. 200 Volt (C-30) Paper Dielectric	.30
RC-202	CAPACITOR—4 mmfd. (C-10) Mica Dielectric Moulded Case	.25
RC-235	CAPACITOR—100 mmfd. (C-17) Mica Dielectric Moulded Case	.25
RC-209	CAPACITOR—40 mmfd. (C-27) Mica Dielectric Moulded Case	.25
RC-274	CAPACITOR—335 mmfd. (C-24) Mica Dielectric Moulded Case	.30
RC-344	CAPACITOR—1300 mmfd. (C-21) Mica Dielectric Moulded Case	.35
RC-361	CAPACITOR—3870 mmfd. (C-19) Mica Dielectric Moulded Case	.50
RC-602	CAPACITOR—Permaliner Trimmer Capacitor 10-45 mmfd. (C-23, C-26, C-28)	.50
RC-603	CAPACITOR—Permaliner Trimmer Capacitor 5-25 mmfd. (C-2, C-3, C-4, C-5, C-14, C-20, C-22, C-25)	.50
RC-606	CAPACITOR—Permaliner Trimmer Capacitor 3-12 mmfd. (C-9, C-11, C-12)	.50
RC-702	CONDENSER—Three-gang Tuning Condenser (C-6, C-15, C-29)	4.25
RC-953	CUP—Permaliner Trimmer Capacitor Mounting Cup	.10
RG-001	GRID CAP—Grid Connection Cap, pkg. of 5	.10
RG-100	GUARD—Terminal Strip Guard	.15
RI-001	INDEXING PLATE—Frequency Band Switch Indexing Plate	$0.60
RL-003	COIL—Antenna Coil, Band A (L-7, L-8)	1.00
RL-004	COIL—Antenna Coil, Band B (L-5, L-6)	.70
RL-005	COIL—Antenna Coil, Band C (L-4, L-3)	.65
RL-006	COIL—Antenna Coil, Band D (L-1, L-2)	60
RL-103	COIL—R. F. Coil, Band A (L-15, L-16)	1.60
RL-104	COIL—R. F. Coil, Band B (L-13, L-14)	.85
RL-105	COIL—R. F. Coil, Band C (L-11, L-12)	.70
RL-106	COIL—R. F. Coil, Band D (L-9, L-10)	.70
RL-204	COIL—Oscillator Coil, Band D (L-17, L-18)	.55
RL-205	COIL—Oscillator Coil, Band C (L-19, L-20)	.60
RL-206	COIL—Oscillator Coil, Band B (L-21, L-22)	.65
RL-207	COIL—Oscillator Coil, Band A (L-23, L-24)	.70
RR-006	RESISTOR—300 ohms ¼ watt (R-2, R-5) Carbon Resistor, pkg. of 5	.70
RR-015	RESISTOR—5000 ohms ¼ watt (R-3, R-26) Carbon Resistor, pkg. of 5	.70
RR-036	RESISTOR—50,000 ohms ¼ watt (R-4) Carbon Resistor, pkg. of 5	.70
RR-049	RESISTOR—100,000 ohms ¼ watt (R-1, R-6) Carbon Resistor, pkg. of 5	.70
RR-183	RESISTOR—10,000 ohms ½ watt (R-8) Carbon Resistor, pkg. of 5	.70
RS-106	SHIELD—Oscillator Compartment Shield Can	.90
RS-107	SHIELD—R. F. Compartment Shield Can	.90
RS-108	SHIELD—Antenna Compartment Shield Can	.90
RS-200	SOCKET—Eight-pin Tube Socket, pkg. of 5	.75
RS-303	SWITCH—Antenna or R. F. Band Switch (S-1, S-2, S-3, S-4)	1.20
RS-306	SWITCH—Oscillator Band Switch (S-5, S-6)	1.20
RS-901	SHAFT—Band Switch Shaft and Gear	.25

DIAL MECHANISM ASSEMBLIES

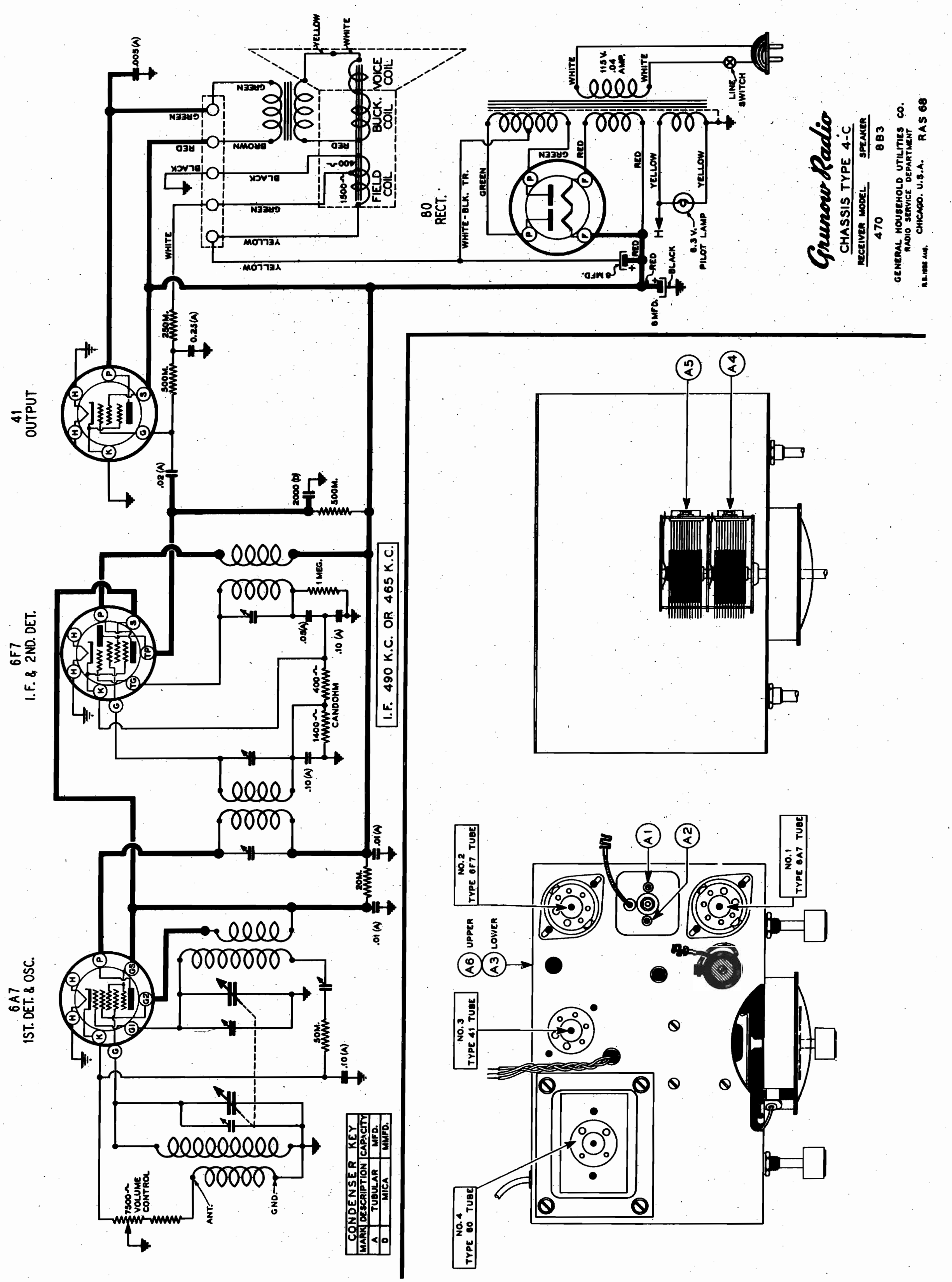
Stock No.	Description	List Price
RB-107	BRACKET—Mounting Bracket Assembly	$0.50
RB-108	BRACKET—Dial Lamp Bracket	.55
RC-802	CABLE—Metal Braid Dial Cable, pkg. of 5	.55
RC-856	CORD—Dial Cord, pkg. of 5	.65
RC-954	CAP—Scale Cap Assembly, Gear End	.10
RC-955	CAP—Scale Cap, Drive End	.10
RD-003	DIAL MECHANISM—Dial Mechanism Complete	2.30
RD-005	DIAL SCALE—Cylindrical Dial Scale	.75
RD-006	DRIVE—Differential Reduction Drive	1.00
RD-013	DRUM—Tuning Condenser Drive Drum	.35
RF-200	FASTENER—Dial Fastener, pkg. of 10	.10
RG-002	GEAR—Dial Gear and Set Screws	.15
RG-200	GUIDE—Dial Pointer Guide, pkg. of 5	.15
RP-003	POINTER—Dial Pointer, pkg. of 2	.15
RS-401	SPRING—Drum Spring, pkg. of 2	.20
RS-403	SPRING—Dial Scale, pkg. of 2	.10

SPEAKER ASSEMBLIES—MODELS A-82 AND A-87

Stock No.	Description	List Price
RC-901	CONE—Speaker Cone and Cone Coil (L-31)	$1.45
RP-012	PLUG—Speaker Female Plug Connector	.20
RP-015	PLUG—Speaker Male Plug Connector	.20
RS-016	SPEAKER—10¼-in. Loud-speaker Complete with Output Transformer—Speaker Plug Type	12.50
RS-017	SPEAKER—10¼-in. Loud-speaker Complete with Output Transformer—Terminal Strip Type	12.35
RT-401	TRANSFORMER—Output Transformer—Terminal Strip Type (T-2)	1.90
RT-406	TRANSFORMER—Output Transformer—Speaker Plug Type (T-2)	1.90

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 470
Chassis 4C
Schematic
Socket, Trimmers



MODEL 470
Chassis 4C
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE INSTRUCTIONS GRUNOW 4 C
BROADCAST SUPERHETERODYNE REDEIVER
MODEL - 470
SPEAKER - 8B3

Coupling Condensers of .25 Mfd. and 200 Mmf. should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2 - DIAL SETTING:

Turn dial pointer until condensers are full meshed. The dial pointer should be on the horizontal line of the dial.

3 - I.F. ALIGNMENT:

(A) Connect signal lead of oscillator through .25 Mfd. condenser to grid of 6A7 (1st Detector Tube) located on front right hand corner of Chassis. Connect the ground lead to the Chassis.

(B) Place oscillator in operation at 465 or 490 K.C., (see note below) and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter.)

(C) Align three I.F. trimmers (A1 - A2 - A3) located on top of I.F. Transformers. Two on top of 1st I.F. Can and 1 (A3) on rear of Chassis, being the bottom of the two at this position.

4 - 1400 K. C. ALIGNMENT.

(A) Connect signal lead of oscillator to antenna lead (the blue wire leading from rear of Chassis) through 200 Mmf. Condenser.

(B) Set Dial at 1400 K.C. and place oscillator in operation at 1400 K.C.

(C) Align oscillator trimmer (A4), which is the first of the two on the variable condenser as you face Chassis.

(D) Align Antenna Trimmer (A5), which is the second trimmer on variable condenser as you face chassis.

5 - 600 K.C. ALIGNMENT.

(A) Place oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at the 600 K.C. dial setting).

(C) Adjust the 600 K.C. trimmer (A6 - located on rear face of Chassis, being the top of the two at this position) in direction of signal increase and at the same time rock the tuning condenser back and forth through resonance. Continue this procedure until maximum signal is obtained on the output meter.

(D) This should be performed with great care so that the alignment is the best that can be obtained, otherwise the selectivity of the set will suffer.

(E) Recheck adjustment on 1400 K.C. antenna trimmer.

NOTE:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 455 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

The I.F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F. peaking, it is only necessary to apply a variable I.F., signal to the I.F. Amplifier, and maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

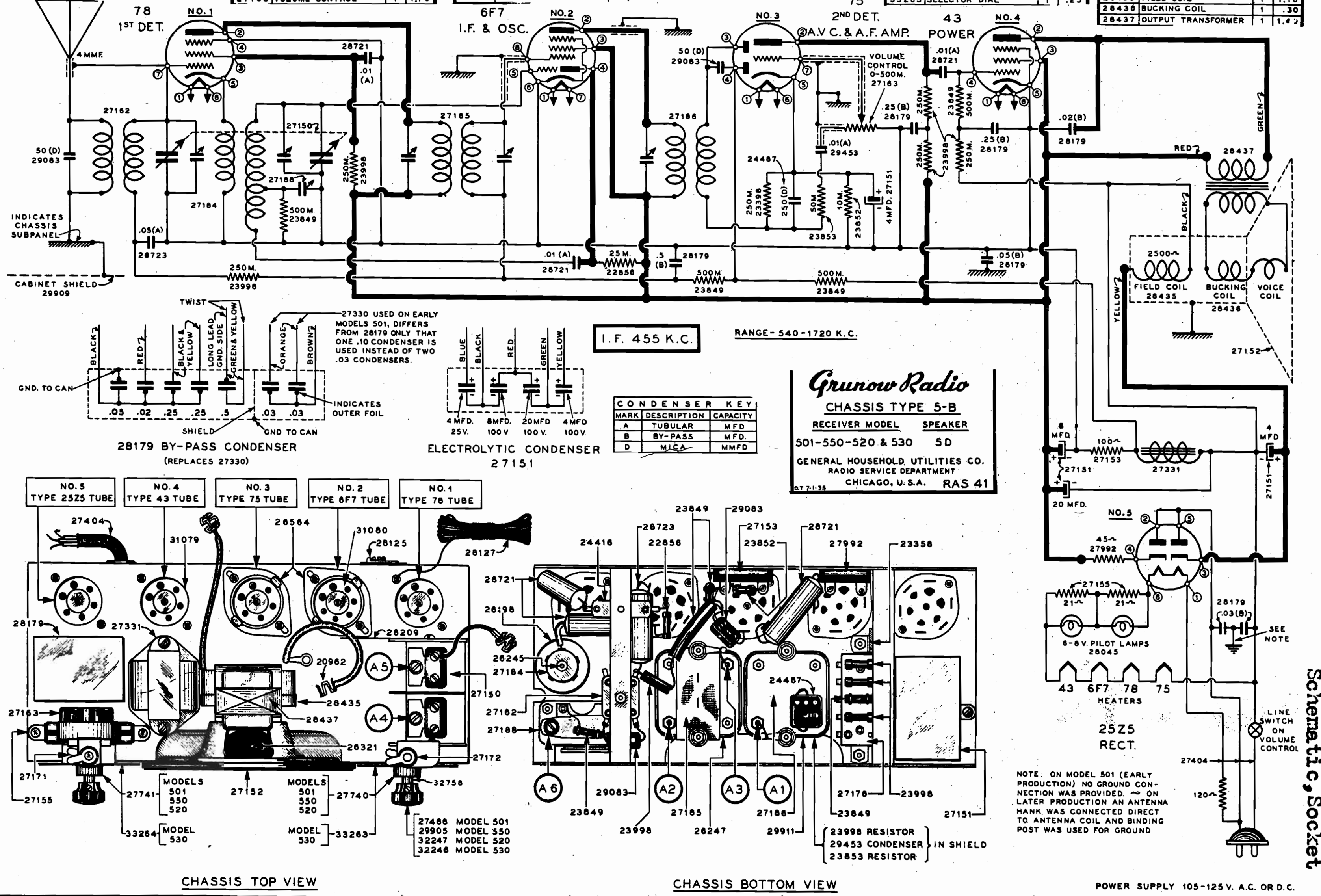
GENERAL HOUSEHOLD UTILITIES CO

MODELS 501, 520, 530, 550
Chassis 5B, Trimmers Schematic, Socket

PARTS PRICE LIST			
PART NO.	DESCRIPTION	REQ.	PRICE
20962	GRID CAP	3	.02
22856	RESISTOR 25M. OHMS	1	.20
23358	INSULATED TERMINAL	1	.05
23849	RESISTOR 500M. OHMS	4	.20
23852	RESISTOR 10M OHMS	1	.20
23853	RESISTOR 50M. OHMS	1	.20
23998	RESISTOR 250M. OHMS	6	.20
24416	INSULATED TERMINAL	1	.03
24487	MICA CONDENSER 250MF	1	.20
26198	OSC. COIL SHIELD	1	.10
26209	INSULATOR, VAR. COND.	1	.03
26245	OSC MOUNTING STRIP	1	.05
26247	1ST I.F. SHIELD	1	.15
26564	TUBE SHIELD BASE	2	.10
27150	VARIABLE CONDENSER	1	2.70
27151	ELECTROLYTIC COND.	1	2.80
27153	CANDOHM 100 OHMS	1	.20
27155	CANDOHM 21-21 OHMS	1	.25
27162	ANTENNA COIL	1	1.00
27183	VOLUME CONTROL	1	1.10
27171	PILOT LAMP SOCKET	1	.20
27172	PILOT LAMP SOCKET	1	.15
27178	RESISTOR PANEL	1	.20
27184	OSCILLATOR COIL	1	.50
27185	1ST I.F. COIL COMPLETE	1	1.30
27188	2ND I.F. COIL COMPLETE	1	1.75
27188	TRIMMER CONDENSER	1	.35
27331	FILTER CHOKE	1	1.10
27404	ATTACHMENT CORD	1	.70
27486	KNOB-MODEL 501	2	.25
27740	SELECTOR DIAL	1	.25
27741	VOLUME CONTROL DIAL	1	.25
27992	CANDOHM 45 OHMS	1	.20
28045	PILOT LAMP	2	.15
28125	GND. BINDING POST	1	.10
28127	ANTENNA HANK	1	.30
28179	BYPASS CONDENSER	1	2.00
28721	TUB. CONDENSER .01 MFD	3	.25
28723	TUB. CONDENSER .05 MFD	1	.25
29083	MICA CONDENSER 50 MMF.	2	.20
29087	TUBE SHIELD	2	.10
29453	TUB CONDENSER 01 MFD.	1	.20
29903	GRILL-MOD 550-520	1	1.00
29904	ESCUTCHEON-MODEL 550	2	.40
29905	KNOB-MODEL 550	2	.20
29909	CABINET SHIELD ASSEM.	1	.25
29911	2ND I.F. SHIELD	1	.25
31079	TUBE SOCKET-6 PRONG	4	.15
31080	TUBE SOCKET-7 PRONG	1	.15
32246	KNOB-MODEL 530	2	.25
32247	KNOB-MODEL 520	2	.25
32758	CONDENSER SHAFT	1	.10
32759	CONDENSER BALL RACE	1	.20
32760	BALL BEARING	3	.02
33263	SELECTOR DIAL	1	.25
33264	VOLUME CONTROL DIAL	1	.25
33484	ESCUTCHEON 520-530	2	.40
33487	GRILL-MODEL 530	1	1.00
62521	SCREW-CABINET SHIELD	2	.01
62522	SCREW-CABINET BACK	6	.01
62570	SCREW-CHASSIS MOUNT'G	4	.01
63847	WASHER-CHASSIS, MT'G	4	.01
SPEAKER PARTS			
26321	CONE HEAD ASSEMBLY	1	2.70
27152	SPEAKER COMPLETE	1	5.50
28435	FIELD COIL	1	1.10
28436	BUCKING COIL	1	.30
28437	OUTPUT TRANSFORMER	1	1.40

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT.



CONDENSER KEY		
MARK	DESCRIPTION	CAPACITY
A	TUBULAR	MFD
B	BY-PASS	MFD.
D	MICA	MMFD

MODELS 501,520,
530,550
Chassis 5B
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

JUNE, 1935

SERVICE NOTES AND PARTS LIST

Grunow Radio

Chassis 5B

Models 501-520-530-550

GENERAL HOUSEHOLD UTILITIES COMPANY

31557-2 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis Type 5D:

This model is a 5-tube Super-Heterodyne Broadcast (550 to 1720 K.C.) Receiver using 1-78 tube as a 1st Detector, 1-6F7 tube as an I.F. Amplifier and Oscillator. 1-75 (Duplex-diode high mu triode) tube is used as a 2nd Detector or Signal Rectifier, delayed Automatic Volume Control (AVC) and high gain audio Amplifier. The 43 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. The rectifier tube is a 25Z5, the output of which is well filtered through the action of the speaker field and the 4, 8, and 20 mfd. electrolytic condensers.

This receiver operates on either A.C. (alternating current) or D.C. (direct current) of 105 to 125 volts.

ALIGNMENT PROCEDURE CHASSIS 5B

Do not attempt to align the 5B Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

A—Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C., 600 K.C. and 1400 K.C. is necessary for alignment of the 5B Chassis.

B—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection so that extremely strong signals may be read.

C—Coupling Means.

Coupling Condensers of 200 Mmf., 25 Mfd., should be used when coupling oscillator to receiver during alignment as specified in following paragraphs.

2. I. F. ALIGNMENT.

A—Connect signal lead of oscillator through .25 Mfd. condenser to grid of 78 tube (1st Detector Tube). The ground lead to ground post on rear of Chassis.

B—Place oscillator in operation at 455 K.C. and turn receiver volume control to maximum. (Volume Control should remain at maximum during entire alignment procedure and signal should be attenuated at oscillator to lowest value consistent with obtaining a readable indication on output meter).

C—Align three I.F. trimmers (A1—A2—A3) located on under side of Chassis at base of I.F. Coils.

3. DIAL CALIBRATION.

A—With condensers fully meshed dial pointer should be directly over end mark on dial.

B—When Chassis is removed from cabinet it will be necessary to simulate dial escutcheon which incorporates dial pointer.

4. 1400 K.C. ALIGNMENT.

A—Connect signal lead of oscillator through 200 Mmf. Condenser to antenna leading from Chassis.

B—Turn dial to 140 (1400 K.C.) and align 1400 K.C. oscillator trimmer (A4), located forward on variable condenser.

C—Align Antenna Trimmer (A5) which is the second trimmer on variable condenser.

5. 600 K.C. ALIGNMENT.

A—Place oscillator in operation at 600 K.C. Tune in signal (this does not have to be exactly on 600 Dial Setting).

B—Adjust 600 K.C. trimmer (A6) located on under side of Chassis directly under variable condenser) in direction of signal increase. Rocking dial knob through resonance until maximum output is obtained.

C—Recheck dial calibration: Over several points on dial.

GENERAL HOUSEHOLD UTILITIES CO.

MODEL 560
Chassis 5E
Schematic, Voltage
Socket, Trimmers
Parts, Chassis Layout

VOLTAGE READINGS ARE TAKEN FROM CHASSIS GROUND TO BOTTOMS OF TUBE SOCKETS WITH A 1000 OHM PER VOLT VOLTMETER (WITH TUBES IN SOCKETS.)

RESISTANCE READINGS ARE TAKEN WITH A STANDARD OHMMETER (POWER CORD DISCONNECTED)

LINE VOLTAGE 115V. 50-80 CYCLES A.C.

VOLUME CONTROL FULL ON

RANGE SWITCH ON BROADCAST (TURN TO [illegible])

DIAL POINTER TO BE SET OFF STATION.

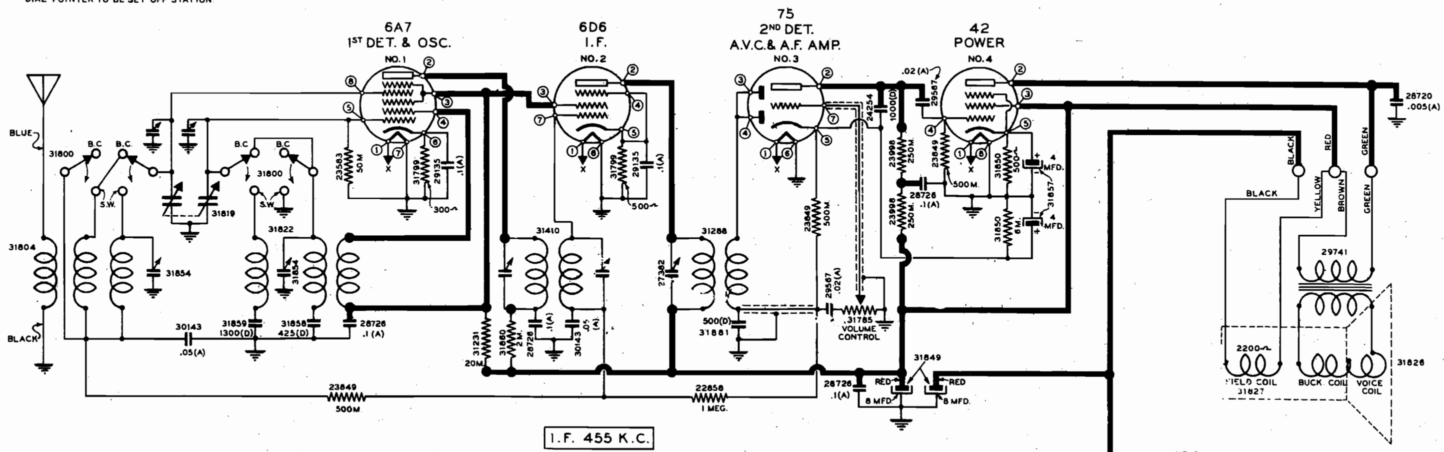
Prong	NO.1 Voltage	NO.1 Resistance	NO.2 Voltage	NO.2 Resistance	NO.3 Voltage	NO.3 Resistance	NO.4 Voltage	NO.4 Resistance
1	6V AC	NONE	6V A.C.	NONE	6V AC	NONE	6V A.C.	NONE
2	250+	250M	250+	250M	60+	250M	240+	250M
3	90+	350M	90+	350M	NONE	.5MEG.	260+	250M
4	90+	350M	4.5+	500	NONE	.5MEG.	NONE	5MEG
5	NONE	50M	4.5+	500	6	6M.	16	500
6	3.5+	300	NONE	NONE	NONE	NONE	NONE	NONE
7	NONE	NONE	NONE	1.5 MEG.	NONE	.5MEG.		
8	NONE	2 MEG						
	SEE NOTE 2	SEE NOTE 1	SEE NOTE 2	SEE NOTE 1	SEE NOTE 2	SEE NOTE 1	SEE NOTE 2	SEE NOTE 1

NOTES

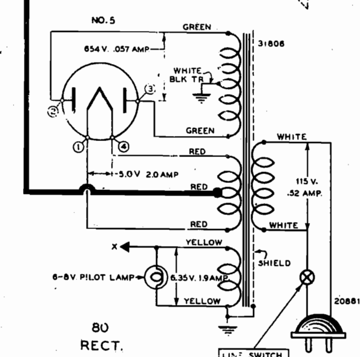
1. D C RESISTANCE OF ELECTROLYTIC CONDENSERS.
2. ONE SIDE OF TRANSFORMER IS GROUNDED

ALL CONTACTS SHOWN ON B.C. RANGE 540-1500 K.C.
(SHORT WAVE RANGE 1500K.C. TO 4.0 M.C.)

TUBE SOCKETS SHOWN BOTTOM VIEW.



I.F. 455 K.C.



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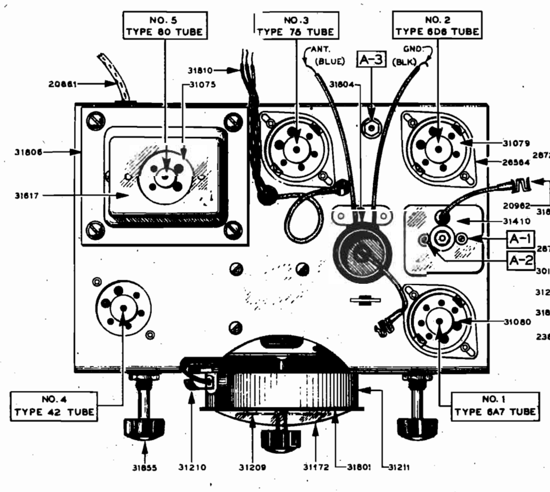
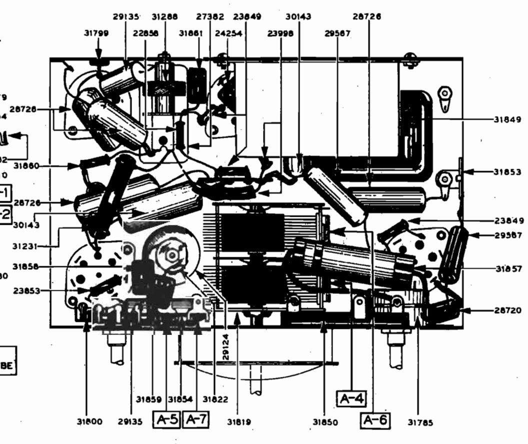
RECT.

Prong	NO.5 Voltage	NO.5 Resistance
1	350+	250M
2	355A.C.	230
3	355A.C.	[illegible]
4	350+	250M
		SEE NOTE 1

CONDENSER KEY		
MARK	DESCRIPTION	CAPACITY
A	TUBULAR	M F
D	MICA	MMF



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW

PARTS PRICE LIST

PART NO.	DESCRIPTION	NO REQ	PRICE
20861	ATTACHMENT CORD	1	.35
20962	GRID CAP	2	02
22858	RESISTOR 1 MEG.	1	20
23849	RESISTOR 500M.	3	.20
23853	RESISTOR 50 M.	1	.20
23998	RESISTOR 250 M.	2	20
24254	1000 MMF MICA COND.	1	20
28270	250M TURBO ASSEM.	1	25
28564	TUBE SHIELD BASE	3	10
28764	TERM INSULATOR	1	.02
27382	TRIMMER CONDENSER	1	35
28366	OSC COIL MTG STRIP	1	05
28720	TUB COND .005 MFD 700V.	1	25
28726	TUB COND .1 MFD. 400 V	4	30
29087	TUBE SHIELD	2	.10
29124	OSC COIL SHIELD	1	10
29135	TUB COND .1 MFD. 100 V	2	30
29567	TUB COND .02 MFD 400 V.	2	25
29575	TUBE SHIELD	1	.10
30143	TUB COND. 05MFD 100 V.	2	.20
31075	4 PRONG SOCKET	1	.10
31079	6 PRONG SOCKET	3	.15
31080	7 PRONG SOCKET	1	.15
31172	DIAL WINDOW	1	.20
31209	DIAL POINTER	1	.15
31210	PILOT LIGHT ASSEM	1	.10
31211	REFLECTOR & DIAL MTG.	1	.25
31219	4 TERM. JUNC. BOARD	1	.05
31231	RESISTOR. 20 M.	1	.25
31288	2ND I.F. TRANSFORMER	1	1.65
31410	1ST I F. COIL & SHIELD	1	4.00
31785	VOLUME CONTROL	1	1.10
31799	CANDOHM 300Ω-500Ω	1	.25
31800	RANGE SWITCH	1	.75
31801	DIAL CHART	1	.25
31804	ANTENNA COIL ASSEM.	1	1.35
31806	POWER TRANS. 115V 50-60~	1	6 50
31810	SPEAKER CABLE	1	25
31817	MTG BRACKET & SOCKET	1	35
31819	VARIABLE CONDENSER	1	3 50
31822	OSC COIL ASSEM	1	1.25
31831	SOCKET INSULATOR	1	.03
31849	ELEC COND. DUAL 8MFD.	1	2.25
31850	CANDOHM 500Ω-6M.Ω	1	.40
31853	4 LUG VERT TERM. ASSEM.	1	.10
31854	TRIM COND DUAL 5-25MF	1	35
31855	KNOB	3	.20
31857	ELEC COND DUAL 4 MFD.	1	1.00
31858	425 MMF MICA COND.	1	.30
31859	1300 MMF MICA COND.	1	.30
31860	RESISTOR 2 M.	1	.15
31861	500 MMF MICA COND.	1	.20
31862	JUNC. TERM. BOARD	1	.05

SPEAKER PARTS

PART NO.	DESCRIPTION	NO REQ	PRICE
28844	YOKE & POLE PIECE ASS'Y.	1	1.10
29038	CONE MTG GASKET	1	.10
29047	TERM STRIP ASS'Y.	1	.20
29051	TERM STRIP COVER	1	.15
29741	OUTPUT TRANSFORMER	1	1.75
29769	CLAMP RING	1	.05
31355	CONE & VOICE COIL ASS'Y.	1	3.10
31826	COMPLETE SPEAKER	1	10.00
31827	FIELD COIL	1	2.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT.

Grunow Radio

CHASSIS TYPE 5-E

RECEIVER MODEL	SPEAKER
560	8B6

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT.
RAS 47 CHICAGO U.S.A.

MODEL 560
Chassis 5E
Alignment

GENERAL HOUSEHOLD UTILITIES CO.
November 1934

SERVICE NOTES AND PARTS LIST

Grunow Radio

CHASSIS TYPE 5E
Receiver Model 560
Speaker Type 8B6

GENERAL HOUSEHOLD UTILITIES COMPANY
31568-1 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 5E:

This model is a 5 tube Super-Heterodyne Dual Wave (540 to 1500 K.C. and 1500 to 4000 K.C.) Receiver using 1-6A7 tube as a 1st Detector and Oscillator, 1-6D6 tube as an I.F. Amplifier, 1-75 tube as a Diode Detector, delayed Automatic Volume Control (AVC) and high gain audio Amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the two 8 mfd. electrolytic condensers.

The tuning range is divided into two bands or divisions, one covering the band of 540 to 1500 K.C. and the other 1500 to 4000 K.C. In both bands the following three variable circuits are used: R.F. input, detector or mixer input and oscillator. These circuits are tuned by a 2 gang variable condenser of rugged construction.

The remainder of the circuit is typical and has been designed along lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

CONTINUITY AND VOLTAGE

Continuity and voltage readings should be taken from the underside of the chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range switch is a simple four pole double throw switch.

ALIGNMENT PROCEDURE

Do not attempt to align the 5E Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C.—1400 K.C., and 3700 K.C. is necessary for alignment of the 6A Chassis.

b. Non-metallic screw driver (all bakelite or fibre) about 6 inches long.

c. Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d. Coupling Means.

Coupling condensers of 200 Mmf., and .25 Mfd. should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed.

3. I.F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the Chassis.

b. Set dial pointer to 140 and range switch on broadcast position.

c. Place test oscillator in operation at 455 K.C. Turn receiver volume control to maximum.

d. Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

e. Adjust the three I.F. trimmers (A1-A2-A3) until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 3700 K.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post of Chassis.

b. Connect the ground lead to ground terminal of Chassis.

c. Set range switch to S.W. range.

d. Place test oscillator in operation at 3700 K.C. and set dial pointer on 3700 K.C.

e. Adjust oscillator trimmer (A4) (located on variable condenser).

5. 1400 K.C. ALIGNMENT.

a. Turn range switch to broadcast position.

b. Place test oscillator in operation at 1400 K.C. and set dial pointer at 140.

c. Adjust the 1400 K.C. trimmer (A5) located on the front face of the Chassis, the upper right of the two at this location.

d. Adjust the second and third trimmers (A6 and A7)

e. Repeat the 1400 K.C. alignment at least twice.

GENERAL HOUSEHOLD UTILITIES CO.

MODELS 570,571
Chassis 5D
Schematic,Voltage Socket,Trimmers,Parts

VOLTAGE READINGS ARE TAKEN FROM CHASSIS GROUND TO BOTTOM OF TUBE SOCKETS WITH A 1000 OHM PER VOLT VOLTMETER. (WITH TUBES IN SOCKETS)

RESISTANCE READINGS ARE TAKEN WITH A STD. OHM-METER (POWER CORD DISCONNECTED.)

LINE VOLTAGE 115V 50-60 CYCLES A.C.
RANGE SWITCH ON BROADCAST. (TURN TO LEFT)
VOLUME & TONE CONTROL FULL ON.
DIAL POINTER SET OFF STATION.

VOLTAGE	NO.1	RESISTANCE
1	6V. A.C.	NONE
2	280+	5 M
3	100+	30 M
4	220+	5 M.
5	NONE	50.3M.
6	4+	300~
7	NONE	NONE
8	NONE	OPEN

SEE NOTE 3 — SEE NOTE 2 — SEE NOTE 1

VOLTAGE	NO.2	RESISTANCE
1	6V. A.C.	NONE
2	280+	5 M
3	100+	30 M.
4	4+	300
5	4+	300
6	NONE	NONE
7	NONE	1.25 MEG

SEE NOTE 2 — SEE NOTE 1

VOLTAGE	NO.3	RESISTANCE
1	6V A.C.	NONE
2	90+	250M
3	NONE	500M.
4	NONE	500M.
5	1.5+	6 M.
6	NONE	NONE
7	NONE	1 MEG

SEE NOTE 2 — 75 — SEE NOTE 1

VOLTAGE	NO.4	RESISTANCE
1	6V. A.C	NONE
2	260+	5M.
3	280+	4M
4	.8−	1 MEG
5	NONE	NONE
6	NONE	NONE

SEE NOTE 2 — SEE NOTE 1

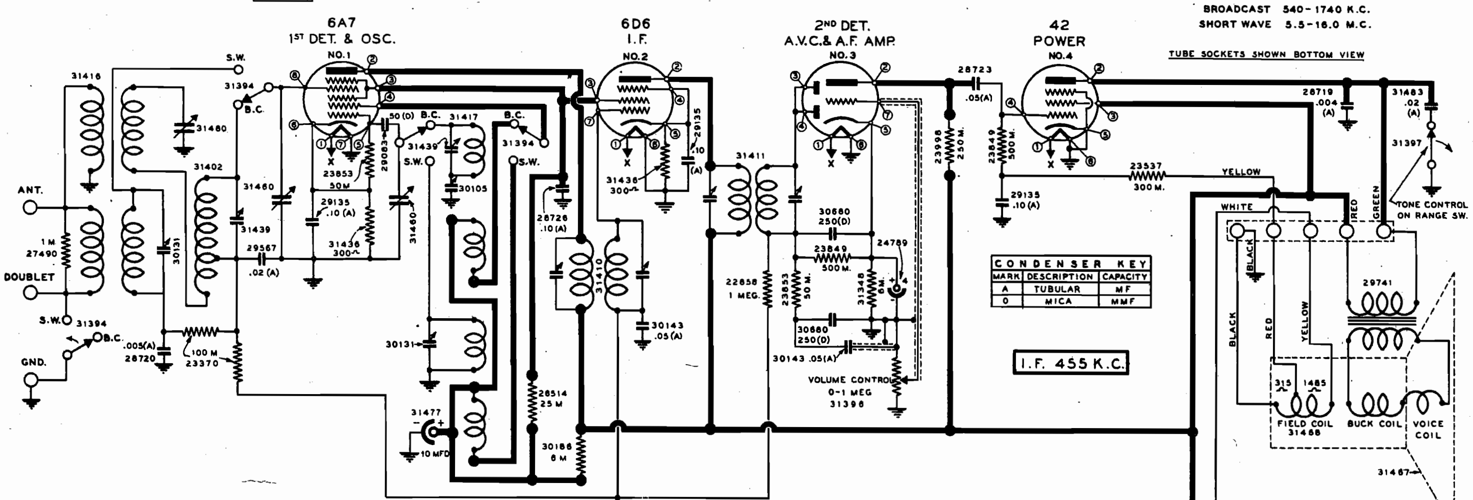
NOTES

1. D.C. RESISTANCE OF ELECTROLYTIC CONDENSERS
2. ONE SIDE OF TRANSFORMER IS GROUNDED.
3. SMALL READING EITHER A.C. OR D.C MAY OCCUR DUE TO SIGNAL

RANGE

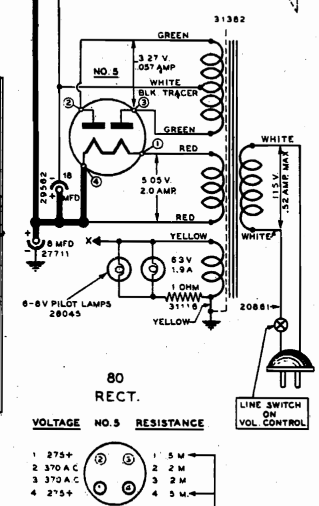
BROADCAST 540-1740 K.C.
SHORT WAVE 5.5-16.0 M.C.

TUBE SOCKETS SHOWN BOTTOM VIEW



CONDENSER KEY		
MARK	DESCRIPTION	CAPACITY
A	TUBULAR	MF
O	MICA	MMF

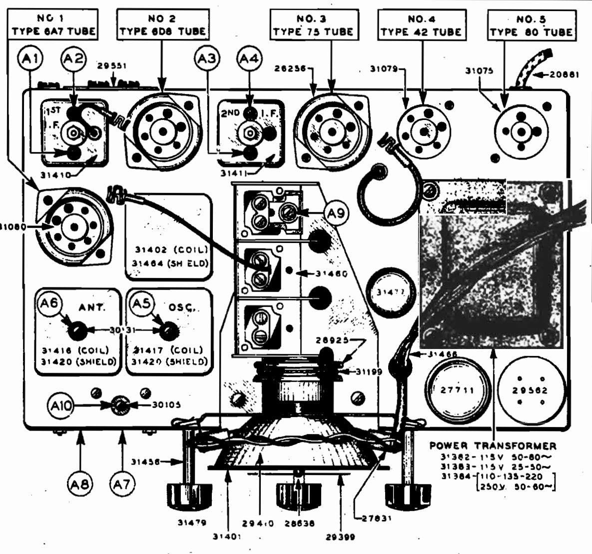
I.F. 455 K.C.



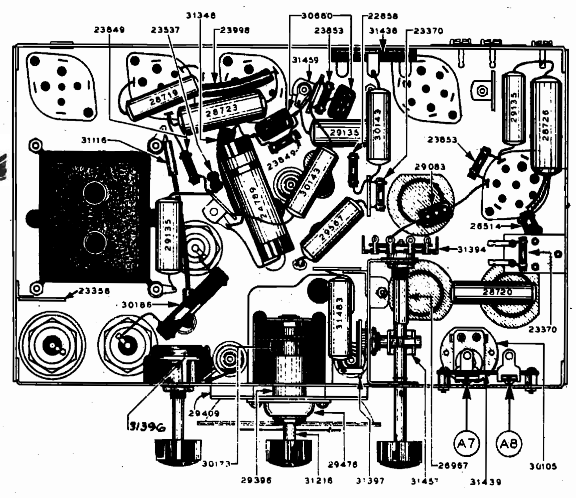
80
RECT.

VOLTAGE	NO.5	RESISTANCE
1	275+	5 M
2	370 A.C	2 M
3	370 A.C	2 M
4	275+	5 M.

SEE NOTE 1



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW

PARTS PRICE LIST

PART NO.	DESCRIPTION	REQ.	PRICE
20861	ATTACHMENT CORD	1	.35
20962	GRID CAP	3	.02
22858	RESISTOR 1 MEG.	1	.20
23370	RESISTOR 100M.	2	.20
23537	RESISTOR 300 M.	1	.20
23849	RESISTOR 500M.	2	.20
23853	RESISTOR 50M.	2	.20
23998	RESISTOR 250M.	1	.20
24769	4 MFD. ELECT. CONDENSER	1	.60
26514	RESISTOR 25M.	1	.20
26987	RANGE SW. DRIVE SLEEVE	1	.05
27490	RESISTOR 1 M.	1	.20
27711	8 MFD. ELEC CONDENSER	1	1.10
28638	POINTER SCREW	1	.02
28719	TUB. CONDENSER .004 MFD	1	.25
28720	TUB CONDENSER .005 MFD.	1	.25
28723	TUB. CONDENSER .05 MFD.	1	.25
28726	TUB. CONDENSER .10 MFD.	1	.30
28925	DRIVE DRUM ASSEMBLY	1	.35
29083	MICA COND. 50MMF.	1	.20
29135	TUB. CONDENSER .10 MFD.	3	.30
29396	DRIVE SLEEVE	1	.35
29399	POINTER	1	.05
29410	REFLECTOR & BRACKET	1	.20
29476	BALL RACE	1	.10
29485	DR. SHAFT THRUST SPRING	1	.05
29522	11/32" BALL	4	.02
29551	ANTENNA BINDING POST	1	.10
29542	18 MFD. ELEC. CONDENSER	1	1.25
29567	TUB CONDENSER .02 MFD.	2	.25
29932	WINDOW	1	.15
29933	WINDOW RETAIN. RING	1	.10
29934	ESCUTCHEON	1	.40
29947	ESCUTCHEON SPRING	1	.15
30105	PADDER COND 600 K.C.	1	.40
30131	TRIMMER	2	.35
30143	TUB. CONDENSER .05 MFD.	2	.20
30173	DRIVE SHAFT (INNER)	1	.10
30177	DRIVE SPRING	1	.02
30186	RESISTOR 6M.	1	.20
30680	MICA CONDENSER 250	2	.20
31075	4 PRONG SOCKET	1	.10
31079	6 PRONG SOCKET	3	.15
31080	7 PRONG SOCKET	1	.15
31116	RESISTOR 1 OHM OHMITE	1	20
31199	DRIVE STRING & EYELET	1	.10
31216	DRIVE SHAFT (OUTER)	1	.35
31348	RESISTOR 6 M	1	.20
31359	WINDOW GASKET	1	.05
31382	TRANSFORMER 115V 50-60~	1	6.00
31394	RANGE SWITCH	1	.75
31396	VOLUME CONTROL	1	1.30
31397	TONE CONTROL SWITCH	1	.40
31401	DIAL CHART	1	.50
31402	INTERSTAGE COIL	1	1.00
31410	1ST I.F COIL & SHIELD	1	4.00
31411	2ND I.F. COIL & SHIELD	1	3.85
31416	ANT. COIL ASS'Y.	1	2.25
31417	OSC. COIL ASS'Y.	1	1.80
31420	SHIELD OSC. & ANT. COIL	2	.40
31436	CANDOHM 300-300~	1	.30
31439	TRIMMER DUAL 25 MMF.	1	.50
31456	RANGE SWITCH SHAFT	1	.25
31457	OPERATING ARM	1	.20
31460	VARIABLE CONDENSER	1	4.15
31464	SHIELD	1	.40
31466	SPEAKER CABLE	1	.55
31477	ELECT. COND 10 MFD.	1	1.25
31479	TUNING & CONTROL KNOB	3	.25
31483	TUB. CONDENSER .02 MFD.	1	.25

SPEAKER PARTS

PART NO.	DESCRIPTION	REQ.	PRICE
28844	YOKE & POLE PIECE ASS'Y.	1	1.10
29038	CONE GASKET	1	.10
29041	BASKET & FRONT PLATE	1	1.00
29047	TERMINAL STRIP ASS'Y	1	.20
29051	TERMINAL STRIP COVER	1	.15
29741	OUTPUT TRANSFORMER	1	1.75
29769	CLAMP RING	1	.05
31468	FIELD COIL	1	2.75
31355	CONE & VOICE COIL	1	3.10
31467	884 SPEAKER COMPLETE	1	10.00

Grunow Radio

CHASSIS TYPE 5-D

RECEIVER MODELS	SPEAKER
570 & 571	884

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
RAS 49 CHICAGO U.S.A.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE
COMPLETE SPEAKERS MAY NOT BE RETURNED FOR CREDIT

MODELS 570,571
Chassis 5D
MODELS 570X,571X
Chassis 5DX
MODELS 570Z,571Z
Chassis 5DZ
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

November 1934

SERVICE NOTES AND PARTS LIST

Grunow Radio

CHASSIS TYPE 5D	CHASSIS 5DX	CHASSIS 5DZ
115 volt, 50-60 cycle	115 volt, 25-50 cycle	110-135-220-250 volt, 50-60 cycle
Receiver Models 570-571	Model 570X	Model 570Z
Speaker Types 8B4	Model 571X	Model 571Z

GENERAL HOUSEHOLD UTILITIES COMPANY

31558-1 CHICAGO, U. S. A.

INTRODUCTION

The following characteristics apply to the Grunow Radio—Chassis Type 5D:

This model is a 5-tube Super-Heterodyne Broadcast and Short Wave (550 to 1720 K.C. and 5.5 to 16.00 M.C.) Receiver using 1-6A7 (Pentagrid converter) tube as a 1st Detector and Oscillator. 1-6D6 (Triple-grid super-control) tube as an I.F Amplifier. 1-75 (Duplex-diode high mu triode) tube is used as a Diode Detector or Signal Rectifier, delayed Automatic Volume Control (AVC) and high gain audio amplifier. The 42 output tube is a power amplifier pentode and is capable of producing large power output with a relatively small signal input. This tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the action of the speaker field and the 8, 10 and 18 mfd. electrolytic condensers.

The tuning range is divided into two bands or divisions, one covering the band of 550 to 1720 K.C. and the other 5.5 to 16.00 M.C.

ALIGNMENT PROCEDURE

Do not attempt to align the 5D Chassis without the proper equipment Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1 EQUIPMENT.

a. Test Oscillator

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C —1400 K.C and 15 M.C. is necessary for alignment of the 5D Chassis.

b. Non-metallic screw driver (all bakelite or fibre) about 6 inches long.

c Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d. Coupling Means.

Coupling condensers of 200 Mmf., .25 Mfd , and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

e. The receiver should be aligned in a location free from local interference (man made static)---as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I.F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7 (first detector tube) through a .25 Mfd. condenser. Connect the ground lead to the Chassis.

b. Set dial pointer to 1400 K.C. and range switch on broadcast position.

c. Place test oscillator in operation of 455 K.C. Turn receiver volume control to maximum.

d. Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

e. Adjust the four I.F. trimmers (A1-A2-A3-A4) located on the top side of Chassis, until maximum output is obtained. During alignment maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 15 M.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 400 ohm resistor to antenna binding post of Chassis.

b. Connect the ground lead to ground terminal of Chassis.

c. Set range switch to S.W. range.

d. Place test oscillator in operation at 15 M.C. and set dial pointer on 15 M.C.

e. Adjust trimmer (A5) on top of oscillator coil, trimmer (A6) on top of the antenna coil—to maximum output—(the oscillator and antenna coils are located on left hand side on top of the Chassis).

f. On oscillator alignment use the lower of the images for the oscillator alignment point. It will be noted that there are two settings at which the signal will be received. Use the setting giving most capacity, that is, the setting at which the trimmer screw is farthest in. While adjusting the oscillator and antenna coil trimmers, rock the variable condensers back and forth through resonance until maximum output is obtained.

5. 1400 K.C. ALIGNMENT.

a. Turn range switch to broadcast position.

b. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

c. Place test oscillator in operation at 1400 K.C and set dial pointer on 1400 K.C.

d. Adjust the two trimmers (A7 Oscillator and A8 Detector) located at the left front end of Chassis and trimmer (A9) on 3rd section of variable condensers to maximum output

6. RECHECK OPERATION No. 4.
(15 M.C. Alignment.)

7. 600 K.C. ALIGNMENT.

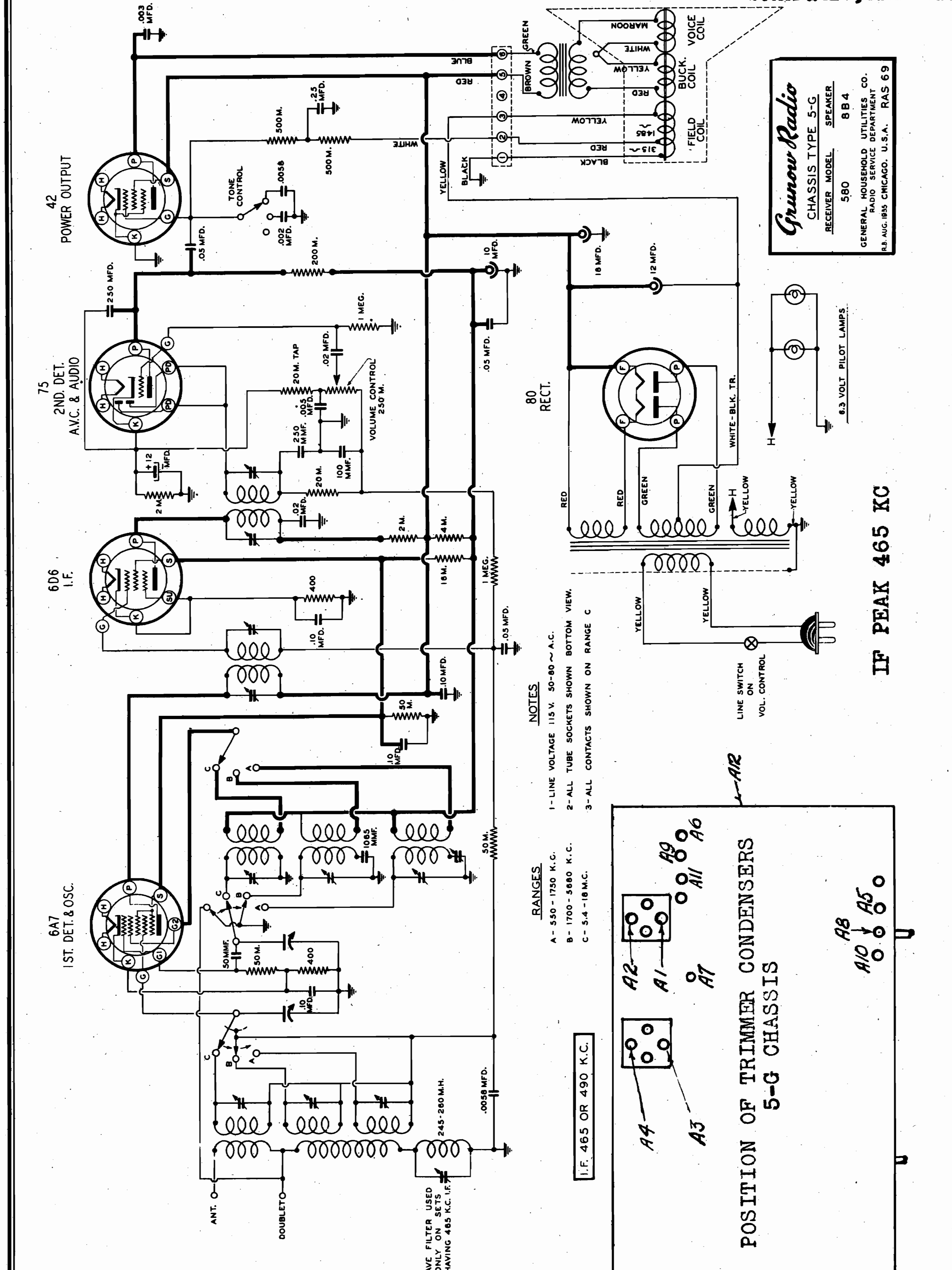
a Place test oscillator in operation at 600 K.C.

b. Tune in signal to maximum. (This point does not have to be exactly at 600 K.C. dial setting.)

c. Adjust the 600 K.C. padding condenser (A10) (this is the upper of the two trimmers located at the left front end of Chassis), in direction of signal increase; at the same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

MODEL 580,581
Chassis 5G
Schematic,Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



MODELS 580,581
Chassis 5G
Alignment

GENERAL HOUSEHOLD UTILITIES CO

SERVICE INSTRUCTIONS GRUNOW CHASSIS 5 G
BROADCAST and SHORT WAVE RECEIVER
MODELS 580 - 581
SPEAKERS 8B4 - 8B4

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K.C. (A), one the band from 1700 to 5680 K.C. (B), and the other from 5.4 to 18 megacycles (C).

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 5 G Chassis without proper equipment. Alignment condensers are shown in the accompanying illustrations, - I.F. Condensers on top of the I.F. Transformers.

1 - EQUIPMENT:

(A) Test Oscillator
A modulated Oscillator capable of producing signals at the I.F., Broadcast and Short-Wave frequencies is necessary for alignment of the 5 G Chassis.
(B) Insulated Screw Driver - (all bakelite or fibre) about 6" long.
(C) Output Meter.
This may be any of the standard Output Meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.
(D) Coupling Means.
Coupling Condensers of 200 mmf., .25 mfd., and a 400 Ohm resistor should be used when coupling oscillators to receiver during alignment as specified in the procedure.
(E) The Receiver should be aligned in a location free from local interference (interference caused by motors - flashers - automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.

2 - DIAL SETTING:

Turn dial knob until condensers are fully meshed. The dial pointer (Hour hand) should be on the horizontal line of the dial, pointing to 9 and 3 O'clock. The minute hand should be at 12 O'clock or in a vertical position.

3 - I. F. ALIGNMENT:

Connect signal lead of test oscillator to grid of 6A7 (1st detector tube) through .25 mfd., condenser. Connect the ground lead to the Chassis.
(A) Set Dial pointer to 1400 K.C. and range switch on position "A".
(B) Place test Oscillator in operation at 490 K.C. or 465 K.C. (see note below.) Turn receiver volume control and tone control to maximum.
(C) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.
(D) Adjust four I.F. Trimmers, A1, A2, A3, A4, located on the I.F. Transformers on top of Chassis. Fig. (1), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4 - 1400 K. C. ALIGNMENT:

(A) Connect signal lead of test oscillator through 200 mmf., condenser to antenna binding post.
(B) Connect the test oscillator ground lead to the ground post of Chassis.
(C) Place test oscillator in operation at 1400 K.C.
(D) Turn dial pointer to 1400 K.C.
(E) Turn range switch to range "A".
(F) Adjust broadcast oscillator trimmer A5, Fig. (1), to maximum output.
(G) Adjust 1st Det. Trimmer (A6), Fig. (1), to maximum output.

5 - 600 K.C. ALIGNMENT:

(A) Place test oscillator in operation at 600 K.C.
(B) Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).
(C) Adjust the 600 K.C. Padding Condenser (A7), Fig. (1), (which is on top of Chassis to the rear of variable condenser) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6 - RECHECK 1400 K.C. ALIGNMENT

7 - 5 M. C. ALIGNMENT:

(A) Set Range switch at "B".
(B) Place test Oscillators in operation at 5 M.C.
(C) Turn Dial Pointer to 5 M.C.
(D) Adjust Set Oscillator Trimmer (A8), Fig. (1), to maximum output.
(E) Adjust Detector Trimmer (A9) Fig. (1) to maximum output.
(F) Check Dial Setting at 1800 K.C.

8 - 18 M.C. ALIGNMENT:

(A) Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.
(B) Connect the ground lead to ground terminal of chassis.
(C) Set Range Switch to range "C" and turn dial pointer to 18 M.C.
(D) Place Test Oscillator in operation at 18 M.C.
(E) Adjust set Oscillator Trimmers (A10), Fig. (1), to maximum output.
(F) Adjust Detector Trimmers (A11), Fig. (1), to maximum output.
(G) On the 18 M.C. Alignment it will be noted that there are two settings at which the signal will be received. Use the lower of the images for alignment point, that is, the setting giving most capacity or the point at which the trimmer screw is farthest in. Check dial setting at 6 M.C.

NOTE:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 455 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

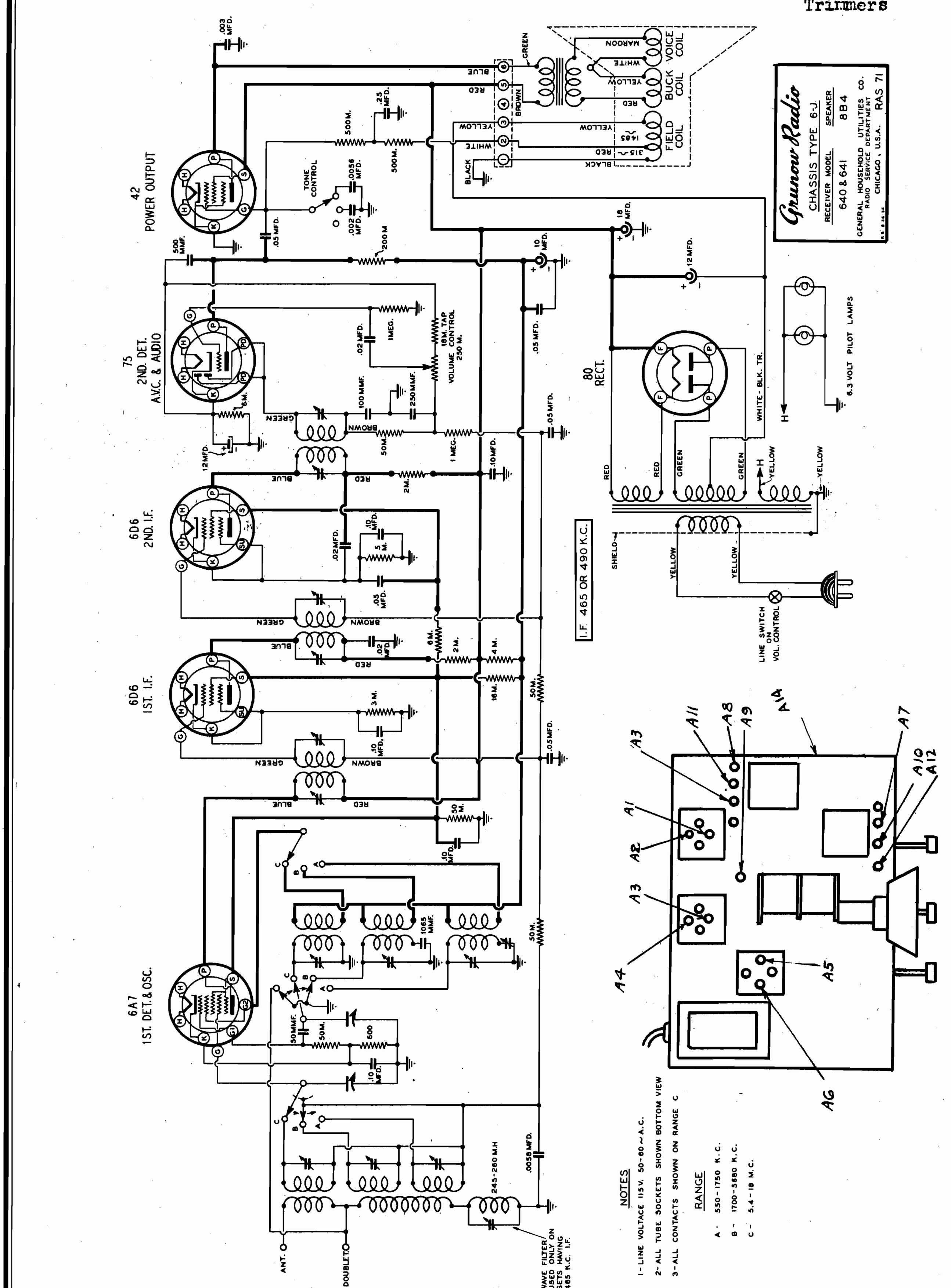
The I. F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F., peaking, it is only necessary to apply a variable I.F., signal to the I.F.Amplifier, and maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

To further overcome this form of interference, sets peaked at 465, also incorporate a wave filter in the Antenna circuit. This filter should be tuned to the same frequency as the I.F. Transformers. Tuning is accomplished after the set has been completely aligned by applying the I.F. Frequency signal through to a .0002 Mfd., condenser to the Antenna binding post of the Receiver, and tuning the wave filter condenser, (A12) (located on the right hand side of the Chassis) so that the incoming signal is at minimum output.

In other words, apply a strong 465 K.C. signal to the Receiver Antenna Post thru the .0002 Mfd., Condenser, and tune wave filter so that the output meter indicates minimum.

MODELS 640,641
Chassis 6J
Schematic
Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



MODELS 640, 641
Chassis 6J
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE INSTRUCTIONS GRUNOW CHASSIS 6 J
BROADCAST and SHORT WAVE RECEIVER
MODELS 640 - 641
SPEAKERS 8B4 -8B4

GENERAL:

The GRUNOW 6 J Chassis is a six tube, 115 V - 50-60 cycle A.C., three band receiver with A.V.C., Tone Control and a "Band Spread" dial. The tubes used are: 6A7 1st Detector and Oscillator, 6D6 1st I.F. Amplifier, 6D6 2nd I.F. Amplifier, 75 2nd Detector, A.V.C., and 1st Audio Amplifier, 42 Power Output tube and an 80 Rectifier tube.

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K.C. (A), one the band from 1700 to 5680 K.C. (B), and the other from 5.4 to 18 megacycles (C).

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 6 J Chassis without proper equipment. Alignment condensers are shown in the accompanying illustrations, - I.F. Condensers on top of the I.F. Transformers.

1 - EQUIPMENT:

(A) Test Oscillator

A modulated Oscillator capable of producing signals at the I.F. Broadcast and Short-Wave frequencies is necessary for alignment of the 6 J Chassis.

(B) Insulated Screw Driver - (all bakelite or fibre) about 6" long.

(C) Output Meter.

This may be any of the standard Output meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.

(D) Coupling Means.

Coupling Condensers of 200 mmf., .25 mfd., and a 400 Ohm resistor should be used when coupling oscillators to receiver during alignment as specified in the procedure.

(E) The Receiver should be aligned in a location free from local interference (interference caused by motors - flashers - automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted.
(A screen room is to be recommended.)

2 - DIAL SETTING:

Turn dial knob until condensers are fully meshed. The dial pointer (Hour hand) should be on the horizontal line of the dial, pointing to 9 and 3 O'clock. The minute hand should be at 12 O'clock or in a vertical position.

3 - I. F. ALIGNMENT:

Connect signal lead of test oscillator to grid of 6A7 (1st detector tube) through .25 mfd., condenser. Connect the ground lead to the Chassis.

(A) Set Dial pointer to 1400 K.C. and range switch on position "A".

(B) Place test Oscillator in operation at 490 K.C. or 465 K.C. (see Note 1.) Turn receiver volume control and tone control to maximum.

(C) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.

(D) Adjust six I.F. Trimmers, A1, A2, A3, A4, A5, A6, located on the I.F. Transformers on top of Chassis. Fig. (2), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4 - 1400 K. C. ALIGNMENT:

(A) Connect signal load of test oscillator through 200 mmf., condenser to Antenna binding post.

(B) Connect the test oscillator ground lead to the groun post of Chassis.

(C) Place test oscillator in operation at 1400 K.C.

(D) Turn dial pointer to 1400 K.C.

(E) Turn range switch to range "A".

(F) Adjust broadcast oscillator trimmer A7, Fig. (2), to maximum output.

(G) Adjust 1st Det. Trimmer (A8), Fig. (2), to maximum output.

5 - 600 K. C. ALIGNMENT:

(A) Place test oscillator in operation at 600 K.C.

(B) Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

(C) Adjust the 600 K.C. Padding Condenser (A9), Fig. (2), (which is on top of Chassis to the rear of variable condenser) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6 - RECHECK 1400 K.C. ALIGNMENT

7 - 5 M. C. ALIGNMENT:

(A) Set Range switch at "B".

(B) Place test Oscillators in operation at 5 M.C.

(C) Turn Dial Pointer to 5 M.C.

(D) Adjust Set Oscillator Trimmer (A10), Fig. (2), to maximum output.

(E) Adjust Detector Trimmer (A11) Fig. (2) to maximum output.

(F) Check Dial Setting at 1800 K.C.

8 - 18 M. C. ALIGNMENT:

(A) Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

(B) Connect the ground lead to ground terminal of chassis.

(C) Set Range Switch to range "C" and turn dial pointer to 18 M.C.

(D) Place Test Oscillator in operation at 18 M.C.

(E) Adjust set oscillator Trimmers (A12) Fig. (2) to maximum output.

(F) Adjust Detector Trimmers (A13), Fig. (2), to maximum output.

(G) On the 18 M.C. Alignment it will be noted that there are two settings at which the signal will be received. Use the lower of the images for alignment point, that is, the setting giving most capacity or the point at which the trimmer screw is farthest in. Check dial setting at 6 M.C.

NOTE:-

Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 455 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

The I.F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F. peaking, it is only necessary to apply a variable I.F., signal to the I.F. Amplifier, and maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

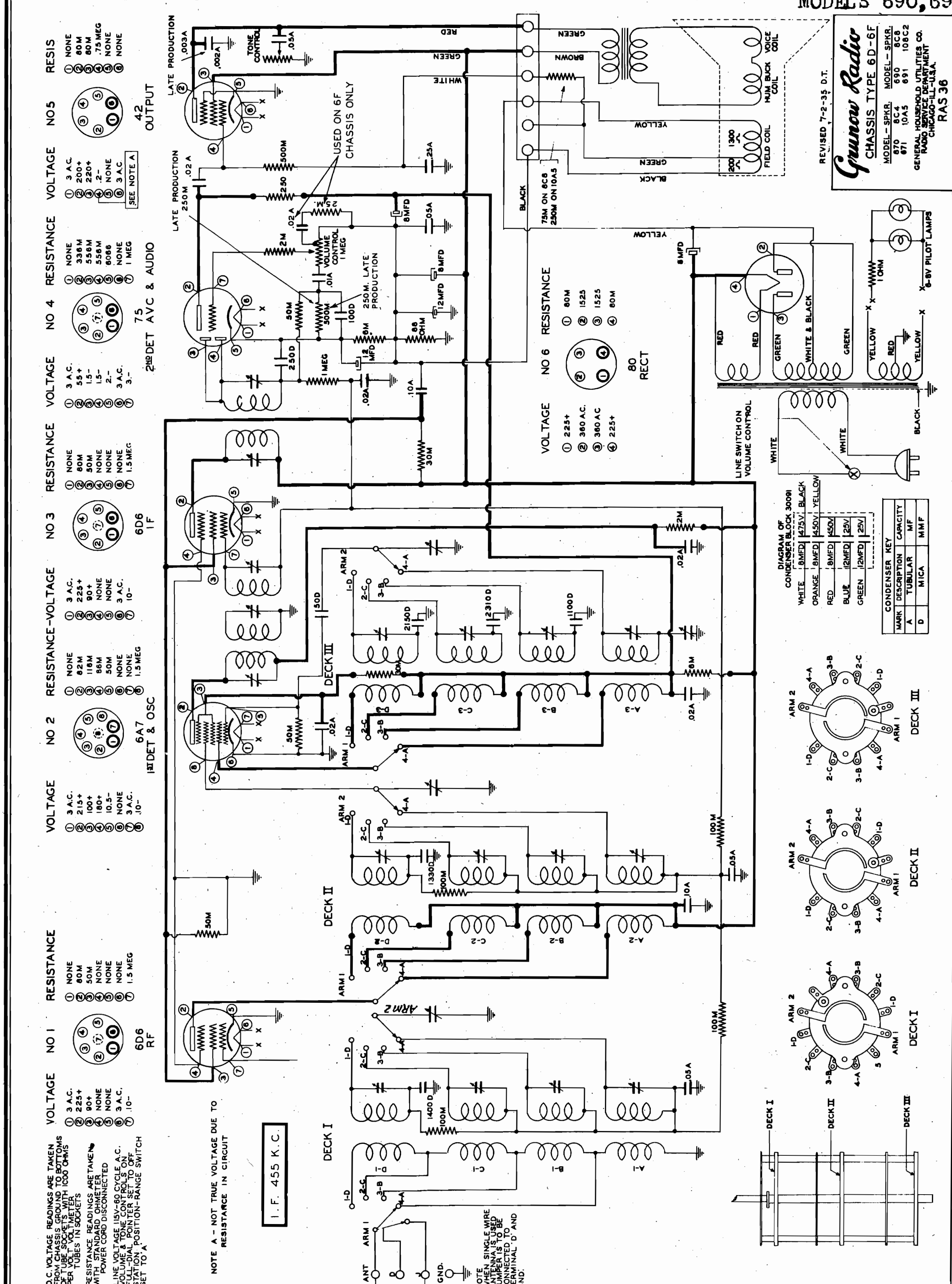
To further overcome this form of interference, sets peaked at 465, also incorporate a wave filter in the Antenna circuit. This filter should be tuned to the same frequency as the I.F. Transformers. Tuning is accomplished after the set has been completely aligned by applying the I.F. Frequency signal through to a .0002 Mfd., condenser to the Antenna binding post of the Receiver, and tuning the wave filter condenser, (A14) (located on the right hand side of the Chassis) so that the incoming signal is at minimum output.

In other words, apply a strong 465 K.C. signal to the Receiver Antenna Post thru the .0002 Mfd., Condenser, and tune wave filter so that the output meter indicates minimum.

Chassis 6F
Schematic, Voltage

GENERAL HOUSEHOLD UTILITIES CO.

MODELS 670, 671
Chassis 6D
MODELS 690, 691



MODELS 690,691
Chassis 6F
Alignment,Parts

GENERAL HOUSEHOLD UTILITIES CO.

Supplement to
6D SERVICE NOTES AND PARTS LIST
31561-2

Grunow Radio

CHASSIS TYPE 6-F

Receiver Model 690-691

Speaker Model 8C8-108C2

GENERAL HOUSEHOLD UTILITIES COMPANY

RADIO SERVICE DEPT. CHICAGO, U. S. A.

31561-2 SUP.

JANUARY, 1935

The Grunow Model 6F is identical to the 6D except for the dial arrangement and a slight change in the audio circuit as shown on the schematic diagram on the back of this sheet. Use the alignment procedure as outlined for the 6D and excepting for the few additional parts listed below, the 6D parts list may also be used.

For Alignment of Chassis 6D, see Index

SUPPLEMENTARY PARTS USED ON CHASSIS 6F AND NOT ON CHASSIS 6D

Part No.	Description	No. Used	List Price
22856	Resistor—25M Ohm 1/4 Watt	1	$0.20
28728	Condenser—.25 Mfd. Tubular	1	.30
29621	Tone Control Knob	1	.20
29623	Volume Control Knob	1	.20
29818	Condenser—.003 Mfd. Tubular	1	.25
30100	Drive String and Spring Assembly	1	.15
31119	Range Switch Knob	1	.25
31350	Tuning Knob	1	.30
31710	Drive Drum, Hub and Gear Assembly	1	1.10
31714	Gear Tension Spring	1	.05
31723	Pointer and Pinion Assembly	1	.40
31726	Pinion, Gear and Adjusting Plate Assembly	1	.55
31962	Pointer	1	.10
31987	Variable Condenser	1	4.15
31997	Dial Chart	1	.65

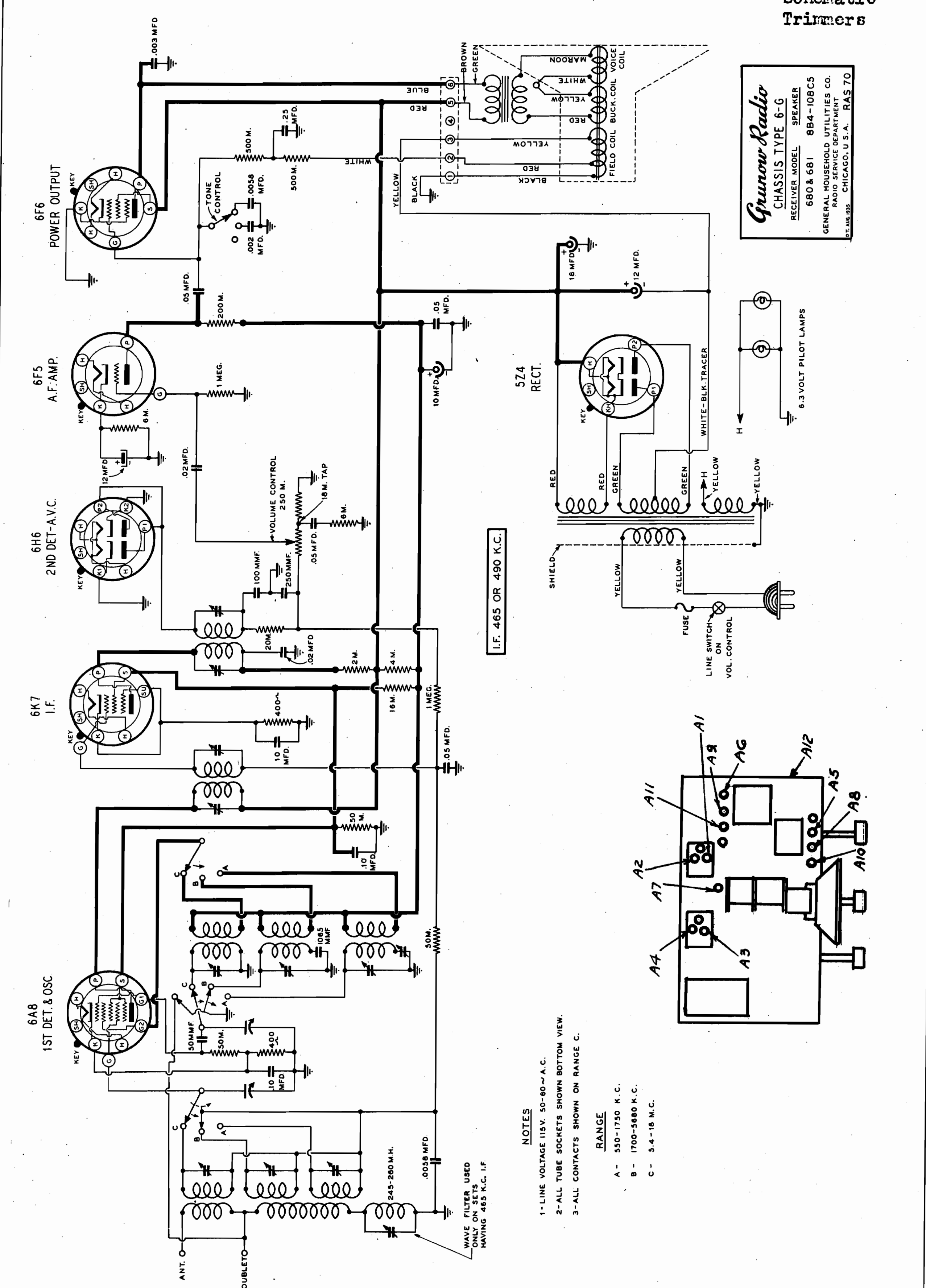
SPEAKER PARTS

29732	Output Transformer (8C8 and 108C2)	$ 1.75
31309	Cone and Voice Coil Assembly (8C8)	3.10
31995	8C8 Speaker Complete	10.50
31996	108C2 Speaker Complete	11.50
32003	Field Coil (108C2)	3.50
32004	Field Coil (8C8)	2.75
32008	Cone and Voice Coil Assembly (108C2)	3.10

(ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE)

MODELS 680,681
Chassis 6G
Schematic
Trimmers

GENERAL HOUSEHOLD UTILITIES CO.



MODELS 680,681
Chassis 6G
Alignment,Notes

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE INSTRUCTIONS GRUNOW CHASSIS 6G
BROADCAST and SHORT WAVE RECEIVER
MODELS 680 - 681
SPEAKERS 8B4 - 10805

GENERAL:

The GRUNOW 6 G Chassis is a six tube, 115 V - 50-60 cycle A.C., three band receiver with A.V.C., Tone Control and a "Band Spread" dial. The tubes used are: 6A8 1st Detector and Oscillator, 6K7 1st I.F. Amplifier, 6H6 2nd Detector and A.V.C., 6F5 1st Audio Amplifier, 6F6 Power Output tube and a 5Z4 Rectifier Tube.

The frequency range is divided into three bands or divisions, one covering the band of 550 to 1750 K.C. (A), one the band from 1700 to 5680 K.C. (B), and the other from 5.4 to 18 megacycles (C)

CIRCUIT ALIGNMENT PROCEDURE

Do not attempt to align the 6 G Chassis without proper equipment. Alignment condensers are shown in the accompanying illustrations, - I.F. Condensers on top of the I.F. Transformers.

1 - EQUIPMENT:
(A) Test Oscillator
A modulated Oscillator capable of producing signals at the I.F., Broadcast and Short-Wave frequencies is necessary for alignment of the 6 G Chassis.
(B) Insulated Screw Driver - (all bakelite or fibre) about 6" long.
(C) Output Meter.
This may be any of the standard Output Meters, but should be sufficiently sensitive to provide a good deflection at low signal strength.
(D) Coupling Means.
Coupling Condensers of 200 mmf., .25 mfd., and a 400 Ohm resistor should be used when coupling oscillators to receiver during alignment as specified in the procedure.
(E) The receiver should be aligned in a location free from local interference (interference caused by motors - flashers - automobile ignition, etc.) as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2 - DIAL SETTING:
Turn dial knob until condensers are fully meshed. The dial pointer (Hour hand) should be on the horizontal line of the dial, pointing to 9 and 3 O'clock. The minute hand should be at 12 O'clock or in a vertical position.

3 - I. F. ALIGNMENT:
Connect signal lead of test oscillator to grid of 6A8 (1st detector tube) through .25 mfd., condenser. Connect the ground lead to the Chassis.
(A) Set Dial pointer to 1400 K.C. and range switch on position "A".
(B) Place test Oscillator in operation at 490 K.C. or 465 K.C. (see note below.) Turn receiver volume control and tone control to maximum.
(C) Attenuate test Oscillator output to lowest value, consistent with obtaining a readable indication on output meter.
(D) Adjust Four I.F. Trimmers, A1, A2, A3, A4, located on the I.F. Transformers on top of Chassis. Fig. (1), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4 - 1400 K.C. ALIGNMENT
(A) Connect signal lead of test oscillator through 200 mmf., condenser to Antenna binding post.
(B) Connect the test oscillator ground lead to the ground post of Chassis.
(C) Place test oscillator in operation at 1400 K.C.
(D) Turn dial pointer to 1400 K.C.
(E) Turn range switch to range "A".
(F) Adjust broadcast oscillator trimmer A5, Fig. (1), to maximum output.
(G) Adjust 1st Det. Trimmer (A6), Fig. (1), to maximum output.

5 - 600 K.C. ALIGNMENT:
(A) Place test oscillator in operation at 600 K.C.
(B) Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting.)
(C) Adjust the 600 K.C. Padding Condenser (A7), Fig. (1), (which is on top of Chassis to the Rear of variable condenser) in directing of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6 - RECHECK 1400 K.C. ALIGNMENT

7 - 5 M. C. ALIGNMENT:
(A) Set Range switch at "B".
(B) Place test Oscillators in operation at 5 M. C.
(C) Turn Dial Pointer at 5 M.C.
(D) Adjust Set Oscillator Trimmer (A8), Fig. (1), to maximum output.
(E) Adjust Detector Trimmer (A9) Fig. (1) to maximum output.
(F) Check Dial Setting at 1800 K.C.

8 - 18 M. C. ALIGNMENT:
(A) Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.
(B) Connect the ground lead to ground terminal of chassis.
(C) Set Range Switch to range "C" and turn dial pointer to 18 M.C.
(D) Place Test Oscillator in operation at 18 M.C.
(E) Adjust set oscillator Trimmers (A10) Fig. (1) to maximum output.
(F) Adjust Detector Trimmers (A11), Fig. (1), to maximum output.
(G) On the 18 M.C. Alignment it will be noted that there are two settings at which the signal will be received. Use the lower of the images for alignment point, that is, the setting giving most capacity or the point at which the trimmer screw is farthest in. Check dial setting at 6 M.C.

NOTE:-

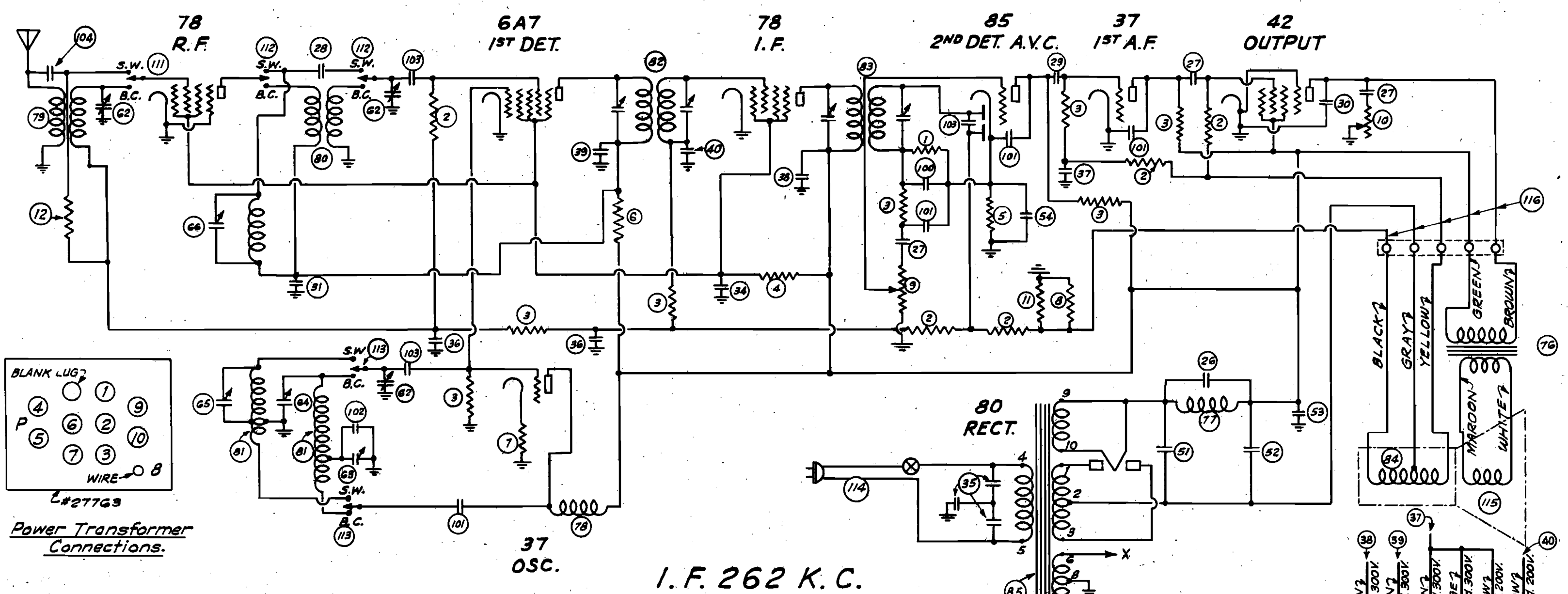
Due to interference caused by commercial code stations in some locations, it has been necessary to use two I.F. Frequencies on this Receiver, one of 490 K.C. where code interference is in the neighborhood of 455 K.C. and the other where the interfering stations are operating in the 500 K.C. band, we use an I.F. of 465 K.C.

The I. F. Frequencies of the Receiver is stamped on the rear of the Chassis, and if there is any doubt as to I.F. peaking, it is only necessary to apply a variable I.F., signal to the I.F. Amplifier, and Maximum output will indicate resonance or frequency at which the I.F.'s were peaked.

To further overcome this form of interference, sets peaked at 465, also incorporate a waver filter in the Antenna circuit. This filter should be tuned to the same frequency as the I.F. Transformers. Tuning is accomplished after the set has been completely aligned by applying the I.F. Frequency signal through to a .0002 Mfd., condenser to the Antenna binding post of the Receiver, and tuning the wave filter condenser, (A12) (located on the right hand side of the Chassis) so that the incoming signal is at minimum output.
In other words, apply a strong 465 K.C. signal to the Receiver Antenna Post thru the .0002 Mfd., Condenser, and tune wave filter so that the output meter indicates minimum.

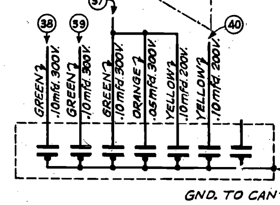
MODEL 821
Chassis 8B
Schematic, Trimmers
Socket, Parts

GENERAL HOUSEHOLD UTILITIES CO.

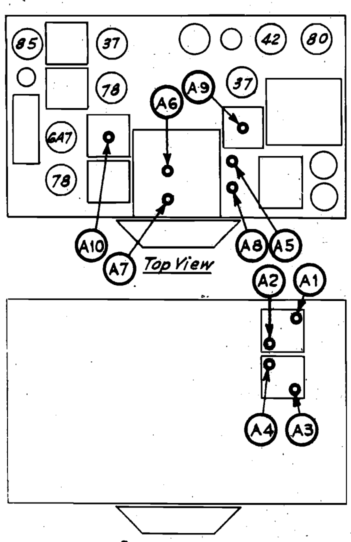


Power Transformer Connections.

I.F. 262 K.C.



Detail Of By-Pass Condenser #27815



LOCATION OF TRIMMER CONDENSERS

RESISTORS

Item	Part No.	Description	No. Req.	Price
1	22858	1 Meg. ±20% ¼ Watt	1	.20
2	23849	500,000 Ohm ±20% ¼W.	5	.20
3	23853	50,000 Ohm ±20% ¼W.	7	.20
4	23850	16,000 Ohm ±10% 1 W.	1	.20
5	22857	10,000 Ohm ±10% 1 W.	1	.20
6	28118	1,000 Ohm ±10% 1 W.	1	.20
7	27784	400 Ohm ±10% ¼ W.	1	.20
8	31515	80 Ohm ±10% 1 W.	1	.20
9	27687	Vol. Control 1 Meg.	1	1.10
10	27646	Tone Control	1	.75
11	27446	Candohm	1	.80
12	21348	100,000 Ohm ±20% 1W.	1	.25

TRANSFORMERS & CHOKES

Item	Part No.	Description	No. Req.	Price
76	27591	Output Transformer	1	1.50
77	27387	Filter Choke	1	1.50
78	29539	R.F. Choke	1	.60
79	31494	Ant. Coil	1	1.00
80	31488	Det. Coil	1	.80
81	31498	Osc. Coil	1	1.75
82	28094	1st I.F. Assy.	1	2.50
83	31511	2nd I.F. Diode Assy.	1	2.90
84	27214	Speaker Field	1	2.75
85	27763	Power Transformer	1	8.00

PAPER CONDENSERS

Item	Part No.	Description	No. Req.	Price
26	28726	0.1 Mfd. 400 Volt	1	.25
27	28723	0.05 Mfd. 400 Volt	3	.25
28	29567	0.02 Mfd. 400 Volt	1	.25
29	28721	0.1 Mfd. 500 Volt	1	.25
30	28717	0.002 Mfd. 700 Volt	1	.25
31	28725	0.08 Mfd. 400 Volt	1	.25
34	28138	1 Mfd. Can	1	1.25
35	28043	3-.01 Mfd. Bathtub	1	.80
36	27524	2-.10 Mfd. 200 V.	1	.75
37	27815	0.25 Mfd. 200 V.	1	2.00
38		0.10 Mfd. 300 V.	1	
39		0.10 Mfd. 300 V.	1	
40		0.10 Mfd. 200 V.	1	

MISCELLANEOUS

Item	Part No.	Description	No. Req.	Price
111	31502	Range Switch, Deck I	1	2.75
112		Range Switch, Deck II	1	
113		Range Switch, Deck III	1	
114	20861	Line Cord	1	.35
115	31526	10A6 Speaker	1	11.50
116	27562	Speaker Cable	1	.45

ELECTROLYTIC CONDENSERS

Item	Part No.	Description	No. Req.	Price
51	27414	8 Mfd. 500 V.	1	1.50
52	27413	8 Mfd. 500 V.	1	1.50
53	29562	18 Mfd. 300 V.	1	1.25
54	27668	8 Mfd. 25 V.	1	.75

ADJUSTABLE CONDENSERS

Item	Part No.	Description	No. Req.	Price
62	31532	Variable Condenser	1	4.50
63	27542	Osc. Trimmer (600K.C.)	1	.60
64	27382	B.C. Osc. Trimmer (1400 K.C.)	1	.35
65	30131	S.W. Osc. Trimmer	1	.35
66	30131	S.W. Det. Trimmer	1	.35

MICA CONDENSERS

Item	Part No.	Description	No. Req.	Price
100	24251	100 Mmf. ± 20%	1	.15
101	24487	250 Mmf. ±10%	4	.20
102	24255	500 Mmf. ±10%	1	.25
103	29083	50 Mmf. ±20%	3	.20
104	29597	600 Mmf	1	.25

Grunow Radio
CHASSIS TYPE 8-B

RECEIVER MODEL	SPEAKER
821	10A6

GENERAL HOUSEHOLD UTILITIES CO.
RADIO SERVICE DEPARTMENT
CHICAGO, ILL.
RAS-35

D.T. 11-7-34

MODEL 821
Chassis 8B
Alignment

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE NOTES AND PARTS LIST

Grunow Radio

CHASSIS TYPE 8B
Receiver Model 821
Speaker Type 10A6

GENERAL HOUSEHOLD UTILITIES COMPANY

31563-1 Chicago, U. S. A.

INTRODUCTION

The following characteristics apply to the GRUNOW Radio—Chassis 8B.

This model is an 8 tube Super-Hetrodyne Broadcast and Short Wave (550 to 1550 KC and 6.0 to 13 M.C.) Receiver using 1-78 tube as an R.F. amplifier, 1-6A7 tube as a 1st detector, 1-37 tube as an oscillator, 1-78 tube as an I.F. amplifier, 1-85 tube as a Diode detector and delayed Automatic Volume Control (AVC)., 1-37 tube as 1st A.F. amplifier, resistance coupled to the 42 output tube. The 42 tube receives its bias through the voltage drop produced in the tapped speaker field. The rectifier tube is an 80, the output of which is well filtered through the action of the tuned choke, speaker field, the two 8 and one 18 mfd. Electrolytic Condensers.

The tuning range is divided into two bands or divisions, one covering the band of 550 to 1500 K.C., and the other 6.0 to 13 M.C.

ALIGNMENT PROCEDURE

Alignment condensers are shown on the accompanying diagram and are numbered in order of procedure.

1. EQUIPMENT.

a. Test Oscillator.
A modulated oscillator capable of producing signals at 262 K.C.—600 K.C.—1400 K.C. and 12 M.C. is necessary for alignment of the 8B Chassis.

b. Output Meter.
This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength.

c. Coupling Means.
Coupling Condensers of 200 Mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

d. The receiver should be aligned in a location free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the last mark on the low frequency end of the dial.

3. I. F. ALIGNMENT.

a. Connect signal lead of test oscillator to grid of the 6A7—(1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

b. Set Dial pointer to 1400 K.C. and range switch to Broadcast Position.

c. Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

d. Attenuate test oscillator output to lowest value consistent with obtaining a readable indication on output meter.

e. Adjust four I. F. Trimmers, A1-A2-A3-A4, located on under side of Chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

4. 1400 K.C. ALIGNMENT.

a. Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

b. Connect the test oscillator ground lead to the ground post of Chassis.

c. Place test oscillator in operation at 1400 K.C.

d. Turn dial pointer to 1400 K.C.

e. Turn Range Switch to Broadcast Range.

f. Adjust 1400 K.C. padding condenser, A5, which is located on top of Chassis on the right of gang condenser toward rear.

g. Adjust 1st Detector Trimmer, A6, which is the center on top of variable condenser.

h. Adjust R.F. Trimmer, A7, which is the first on top of varible condenser.

5. 600 K.C. ALIGNMENT.

a. Place test oscillator in operation at 600 K.C.

b. Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

c. Adjust the 600 K.C. Padding Condenser A8 (which is on top of Chassis on right of gang condenser toward front), in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

6. 12 M.C. ALIGNMENT.

a. Connect signal lead of test oscillater through 400 Ohm resistor to Antenna binding post of chassis.

b. Connect the ground lead to ground terminal of Chassis.

c. Set Range Switch to Short Wave Range and turn dial pointer to 12 M.C.

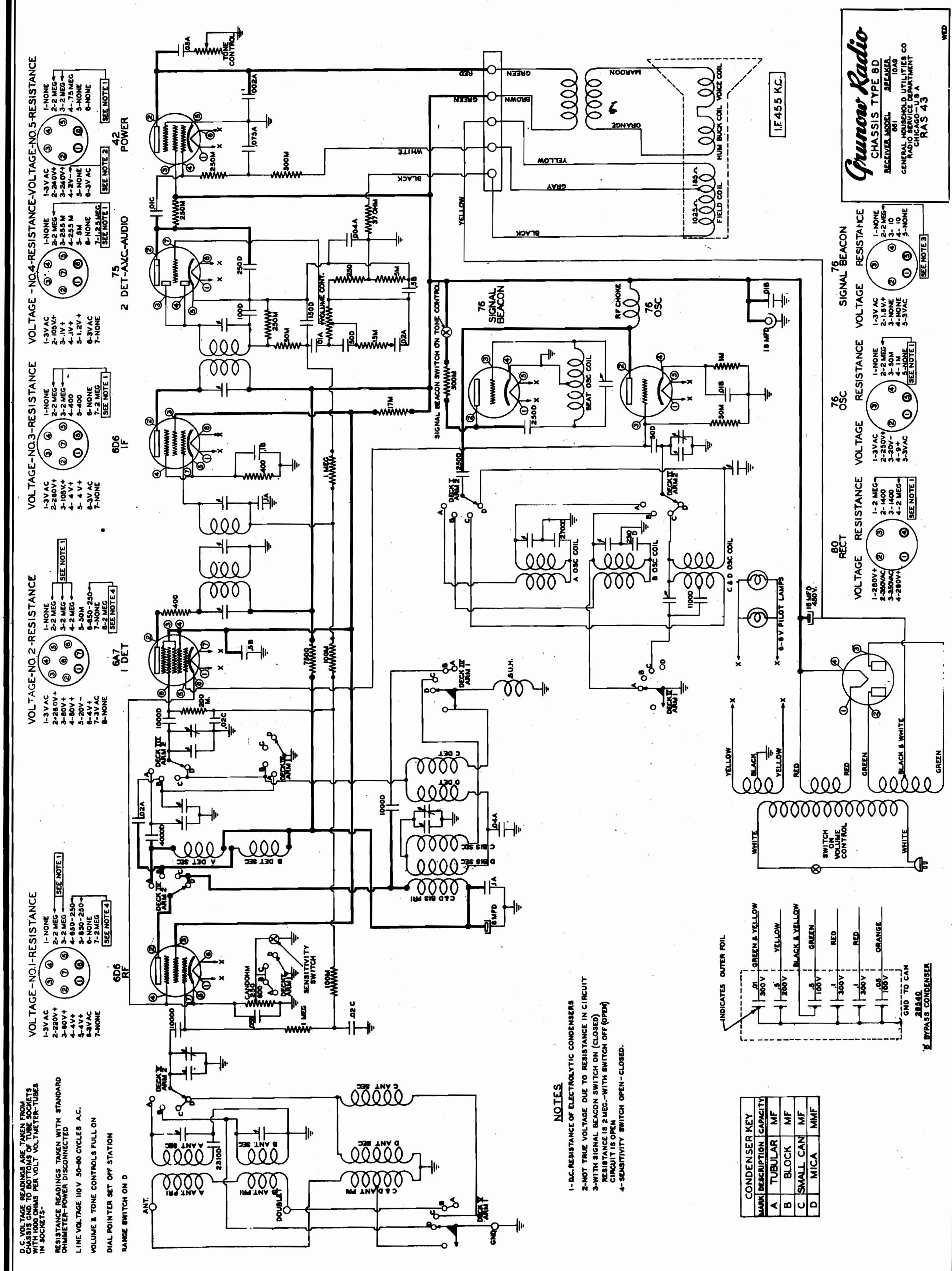
d. Place test oscillator in operation at 12 M.C.

e. Adjust set oscillator trimmer A9 through hole in oscillator transformer shield located on right side of variable condenser on top of Chassis.

f. Adjust detector trimmer A10 through hole in Detector Transformer Shield located on left side of variable condenser on top of Chassis.

GENERAL HOUSEHOLD UTILITIES CO.

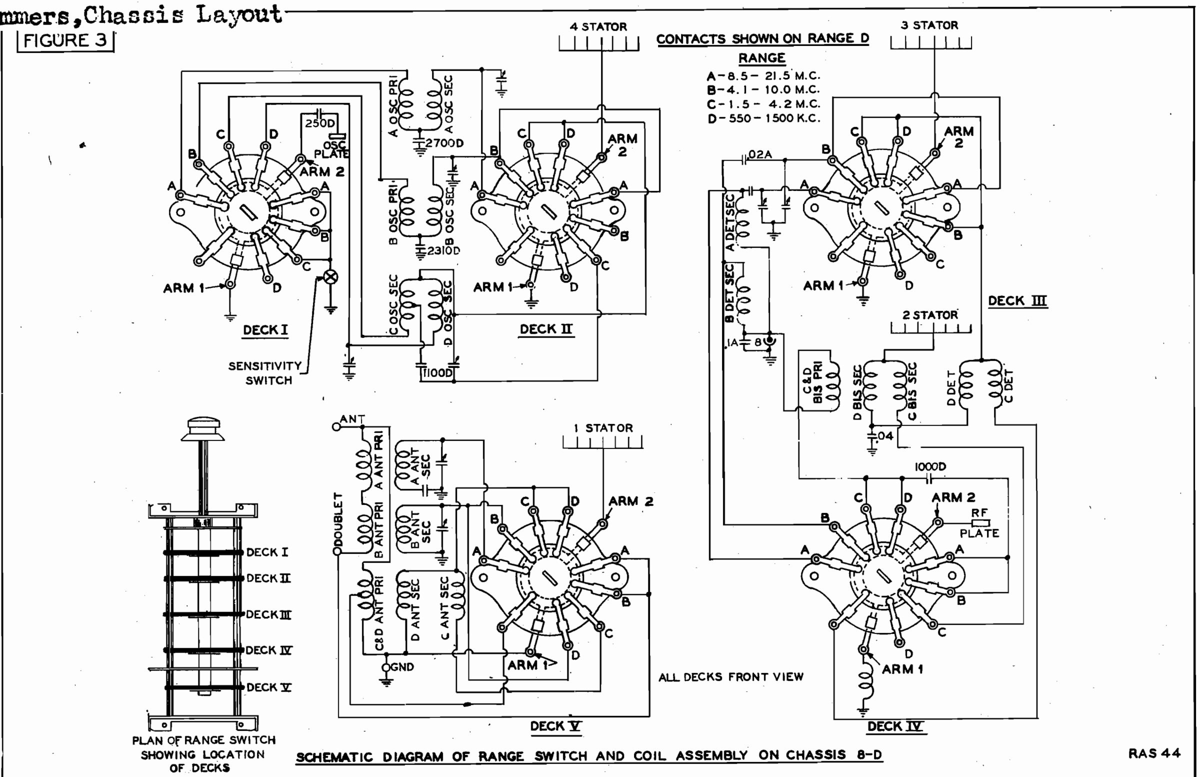
MODEL 861
Chassis 8D
Schematic
Voltage



MODEL 861
Chassis 8D
Switch & Coil Assembly
Trimmers, Chassis Layout

GENERAL HOUSEHOLD UTILITIES CO.

FIGURE 3



SCHEMATIC DIAGRAM OF RANGE SWITCH AND COIL ASSEMBLY ON CHASSIS 8-D

RAS 44

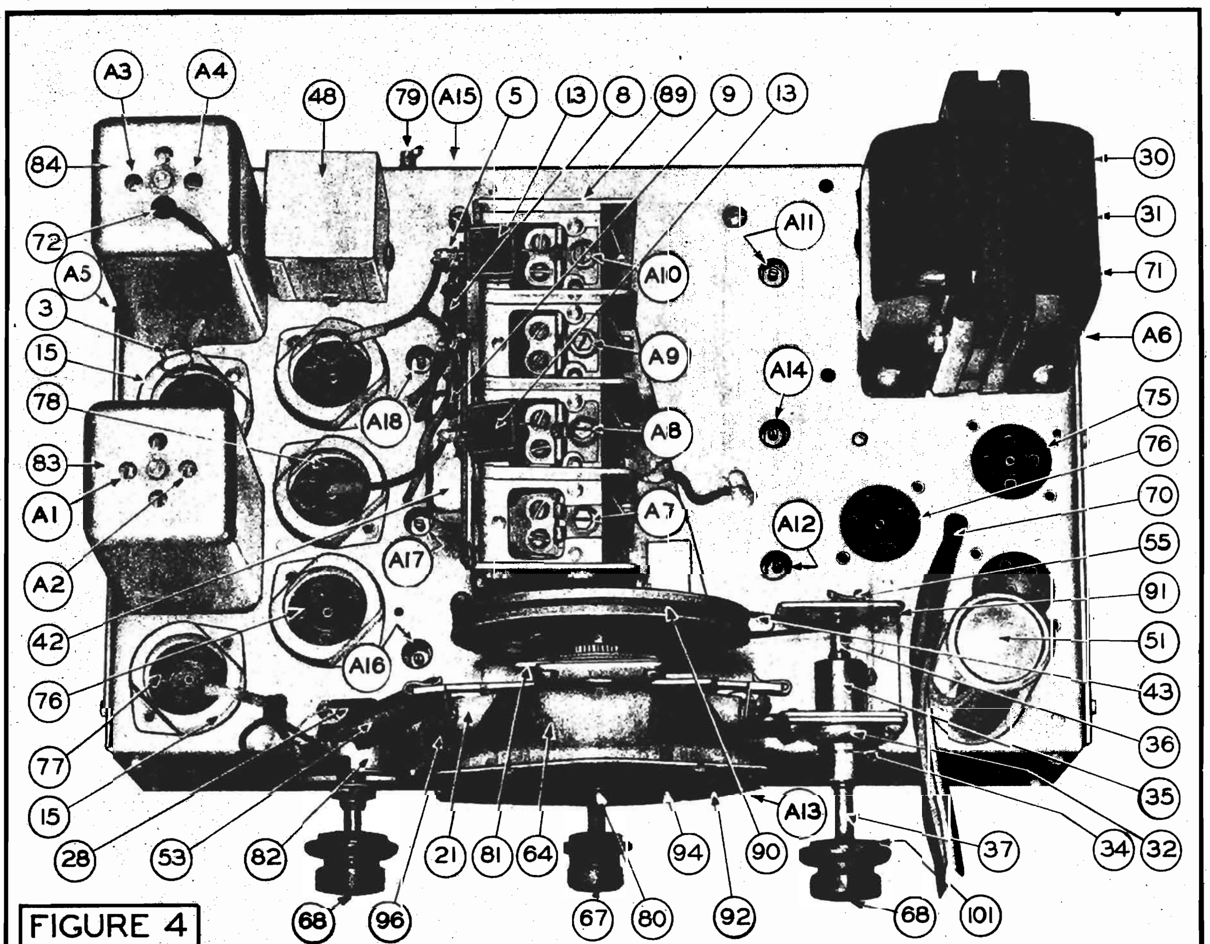


FIGURE 4

MODEL 861
Chassis 8D
Circuit Data
Socket Layout

GENERAL HOUSEHOLD UTILITIES CO.

January, 1935

Service Notes and Parts List

Grunow Radio

CHASSIS TYPE 8D

Receiver Model 861 — Speaker Model 10A9

GENERAL HOUSEHOLD UTILITIES COMPANY
RADIO SERVICE DEPT. — CHICAGO, U. S. A.

31567-1

Chassis 8D —115 volt 50-60 cycle
Chassis 8DX—115 volt 25-50 cycle
Power Consumption 75 watts.

Chassis 8DZ { 110—135—220—250 volt; 50-60 cycle }
Tubes—2-6D6, 1-6A7, 1-75, 1-42, 2-76, 1-80

INTRODUCTION

The following characteristics apply to the Grunow Radio—Chassis Type 8D:

This model is an 8 tube Super-Heterodyne All Wave (550 to 21,000 KC) Receiver, using 1-6D6 tube as an R. F. Amplifier, 1-6A7 tube as a 1st Detector or mixer—being electronicly coupled to a 76 Oscillator tube, 1-6D6 tube as an I.F. amplifier with the 1st I.F. Transformer of the Bi-Selector type and both 1st and 2nd transformers tuned to 455 K. C. A 75 tube (double diode high mu Triode) is used as a diode detector, delayed Automatic Volume Control (AVC) and a high gain audio amplifier. The 42 output tube receives its bias through the voltage drop produced in the tapped speaker field. A type 76 tube is used as a Signal Beacon or beat oscillator. Plate voltage to the Signal Beacon being applied by closing the switch on the tone control. The rectifier tube is an 80, the output of which is well filtered through the choke action of the speaker field and the 8, 16 and 18 mfd. electrolytic condensers.

The broadcast section of the receiver consists of the following 4 variable tuned circuits: R.F. input, bi-selector, mixed input and oscillator. These circuits are tuned with a 4-gang variable condenser of rugged construction.

The short wave section of the receiver consists of 3 variable tuned circuits, the bi-selector being cut out to prevent losses when the receiver is working at the higher frequencies.

The Signal Beacon is a beat oscillator using a 76 tube, and is a feature of the 8D chassis. When this tube is brought into operation it acts as a local oscillator, with a frequency of 455 K.C. The signal of this oscillating circuit is fed into the I.F. circuit through a short lead that acts as a radiator and beats against the incoming signal at the I.F. frequency. The presence of a station's signal will be indicated by a high pitched "whistle," becoming lower in pitch as "resonance" or exact tuning is approached. The Signal Beacon is also used to receive telegraph or continuous wave signals.

A sensitivity Control is incorporated in the 8D chassis and consists of a switch on the rear of the Chassis. This switch when in position No. 1 reduces the sensitivity by allowing the total resistance of 850 Ohms to be used as a grid bias on the 6D6 R.F. tube and the 6A7 1st Det. tube. When on position No. 2, the bias is changed to 250 Ohms by grounding out the 600-Ohm section and increasing the sensitivity of the receiver. It will be noted by referring to schematic diagram that this control is effective only on the "D" or broadcast range.

The remainder of the circuit is typical and has been designed along the lines of what is considered the best engineering practice to date. Parts are all oversize and of the finest quality.

SERVICE DATA

The Chassis frame is built in such a way that the end plates may be disconnected, allowing easy inspection of the underside of the Chassis assembly. (Fig. 6.)

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7.) The removal of this assembly necessitates the unsoldering of 14 wire leads. These leads and the position to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H, I, J, K, L, M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-selector transformer to the No. 2 stator of the variable condenser.

Lead "K" connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the variable condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.

Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation.)

Lead "N" connects contacts A-B-C of Arm 1 on Deck 1 to the sensitivity control switch and the 250-Ohm bias resistor.

Lead "P" connects the plate of the signal Beacon to an insulator, acting as a pick-up lead.

Continuity and Voltage

Continuity and voltage readings should be taken from the underside of the Chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the Chassis Constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range Switch

In servicing the 8D Receiver consider the radio frequency end as four different and distinct radios:

One working from 550 to 1500 K.C. (D Range)
One working from 1500 to 4200 K.C. (C Range)
One working from 4100 to 10000 K.C. (B Range)
One working from 8500 to 21500 K.C. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 K.C. are connected into the three tuned circuits of the receiver; one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 K.C. coils are put into operation.

On position "C" the 1500 to 4200 K.C. coils are shunted across the 550 to 1500 K.C. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four-tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

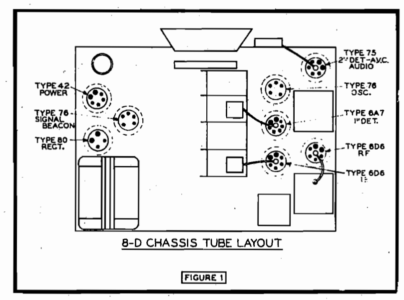


Fig. 1

MODEL 861
Chassis 8D
Alignment, Parts

GENERAL HOUSEHOLD UTILITIES CO.

PARTS AND PRICE LIST

PART NUMBERS ARE GIVEN ON THE ILLUSTRATION AND THE NUMBERS ARE BROUGHT DOWN IN NUMERICAL ORDER FOR CONVENIENCE

Index No.	Part No.	DESCRIPTION	Quantity Required	Price
1	20678	Ground Terminal	1	$ .02
2	20861	Line Cord and Plug	1	.35
3	20962	Grip Cap	4	.02
4	21598	Rubber Grommet	10	.02
5	22858	Resistor, 1 Megohm, Carbon, ¼ Watt	3	.20
6	23284	Bakelite Washer	13	.02
7	23358	Insulated Terminal Assy. (single)	3	.10
8	23370	Resistor, 100,000 Ohm, Carbon, ¼ Watt	3	.20
9	23538	Resistor, 200,000 Ohm, Carbon, ¼ Watt	1	.20
10	23849	Resistor, 500,000 Ohm, Carbon, ¼ Watt	3	.20
11	23853	Resistor, 50,000 Ohm, Carbon, ¼ Watt	2	.20
12	23998	Resistor, 250,000 Ohm, Carbon, ¼ Watt	4	.20
	24251	Condenser, 100 MMF, Mica (2nd I.F.)	1	.15
13	24254	Condenser, 1000 MMF, Mica	3	.20
14	24487	Condenser, 250 MMF, Mica	3	.20
15	26256	Tube Shield Base	5	.05
16	27382	Trimmer Condenser Assy.	5	.35
	27455	Tube Shield	1	.15
17	27490	Resistor, 1000 Ohm, Carbon, ¼ Watt	1	.20
18	27520	Condenser, 2310 MMF, Mica	1	.45
19	27784	Resistor, 400 Ohm, Carbon, ¼ Watt	2	.20
20	27801	Rubber Grommet	3	.05
	27802	Cup Washers	6	.02
21	27831	Pilot Light Socket, Insulated	2	.15
	28045	Pilot Light Bulb	2	.15
22	28183	Resistor, 7500 Ohm, Carbon, 1 Watt	1	.20
23	28573	Short Wave Coil Shield Assy.	1	.75
24	28638	Dial Pointer Screw	1	.02
25	28717	Condenser, Tubular, .002 Mfd., 700 Volt	1	.25
26	28723	Condenser, Tubular, .05 Mfd., 400 Volt	1	.25
27	28726	Condenser, Tubular, .1 Mfd., 400 Volt	1	.25
28	29083	Condenser, 50 MMF, Mica	2	.20
29	29135	Condenser, Tubular, .1 Mfd., 100 Volt	1	.25
30	29414	Power Transformer, 115 Volt, 50-60 Cycles	1	6.00
31	29416	Power Transformer, 115 Volt, 25-50 Cycles	1	7.25
	29453	Condenser, Tubular, .01 Mfd., 400 Volt (2nd I.F.)	1	.25
32	29476	Ball Race	1	.10
33	29482	Broad Cast Coil Shield Assy.	1	.80
34	29483	Drive Shaft-Stop Spring	1	.05
	29485	Drive Shaft Thrust Spring	1	.05
35	29486	Drive Sleeve	1	.50
36	29487	Drive Shaft, Inner	1	.50
37	29488	Drive Shaft, Outer	1	.75
38	29490	Range Switch	1	4.00
39	29496	Antenna Transformer (Broadcast)	1	1.75
40	29498	1st Detector Transformer (Broadcast)	1	1.25
41	29501	1st Detector Transformer (Short Wave), Black	1	1.25
	29515	Resistor Panel Assy. (includes 29518)	1	1.25
42	29518	Condenser, Small Can, .02-.02 Mfd.	1	.75
43	29520	Drive Cable Assy.	1	.10
	29521	3/16" Ball Bearing	1	.01
	29522	11/32" Ball Bearing	4	.02
	29523	Condenser Mounting Bearing	1	.10
	29524	Cable Tension Spring	1	.10
44	29533	Resistor, Candohm, 5000-37 Ohms	1	.40
45	29534	Condenser, Small Can, .01 Mfd.	1	.60
46	29537	Tone Control, 500,000 Ohms	1	1.15
47	29539	Oscillator Plate Choke	1	.60
48	29540	By-Pass Condenser Block	1	2.50
49	29551	Antenna and Doublet Binding Posts Assy.	1	.10
	29552	Escutcheon Window	1	.15
	29553	Window Retaining Ring	1	.10
	29554	Escutcheon	1	.60
50	29558	Condenser, Dry Electrolytic, 16 Mfd., 450 Volt	1	1.90
51	29562	Condenser, Wet Electrolytic, 18 Mfd., 300 Volt	1	1.25
52	29564	Condenser, Tubular, .075 Mfd., 100 Volt	1	.30
53	29567	Condenser, Tubular, .02 Mfd., 400 Volt	1	.25
	29580	Signal Beacon Trimmer Condenser	1	.75
54	29584	Signal Beacon Shield	1	.30
55	29596	Drive Leaf Spring	2	.05
56	29611	Coupling Inductance Coil	1	.25
	29612	Escutcheon Retaining Spring	1	.20
57	29613	Condenser, 4000 MMF, Mica	1	.50
58	29616	Insulated Terminal Assy. (Single)	5	.10
59	29617	Insulated Terminal Assy. (Double)	1	.15
60	29628	Insulated Terminal (4)	1	.10
61	29812	Condenser, Tubular, .04 Mfd., 500 Volt	1	.30
62	29813	Condenser, Tubular, .004 Mfd., 700 Volt	1	.25
	29832	Tube Shield Body	4	.15
63	29836	Trimmer Condenser Assy.	1	.25
64	29893	Reflector Assembly	1	.50
65	29900	Trimmer Condenser Assy.	1	.50
66	29952	Knob (Range Switch)	1	.30
67	29953	Knob (Tone Control)	1	.20
68	29954	Knob (Tuning and Volume)	2	.20
69	29990	Condenser, Tubular, .02 Mfd., 400 Volt	1	.20
70	29997	Speaker Cable	1	.95
71	30006	Power Transformer (110-135-220-250 Volt, 50-60 Cycle)	1	7.50
	30030	Rubber Mtg. Washer, Upper, Black	3	.05
	30031	Rubber Mtg. Washer, Upper, Red	1	.05
	30032	Rubber Mtg. Washer Lower Black	4	.02
72	30104	Grommet (Rubber)	2	.02
	30169	Trimmer Condenser (I.F.)	1	.40
73	30198	Condenser, 1100 MMF, Mica	1	.25
74	31052	Condenser, Dry Electrolytic, 8 Mfd., 350 Volt	1	1.25
75	31075	4 Prong Socket	1	.10
76	31078	5 Prong Socket	2	.10
77	31079	6 Prong Socket	4	.15
78	31080	7 Prong Socket	1	.15
	31215	Tube Shield Cap	4	.10
	31360	Window Gasket	1	.05
79	31363	Sensitivity Switch	1	.40
80	31723	Pointer and Pinion Assy.	1	.40
81	31726	Pinion, Gear and Adj. Plate Assy.	1	.55
82	31910	Volume Control	1	1.30
83	31911	1st I.F. Coil and Shield Assy.	1	4.10
84	31912	2nd I.F. Coil and Shield Assy.	1	3.30
	31914	Range Switch and Coil Assy.	1	26.50
85	31916	Trimmer Condenser	1	.35
86	31918	Oscillator Transformer (Broadcast)	1	1.50
87	31919	Oscillator Transformer (Short Wave), Green	1	1.50
88	31936	Signal Beacon Assy.	1	2.25
	31937	Signal Beacon Coil Assy.	1	1.25
89	31942	Variable Condenser, 4 Gang	1	7.50
90	31945	Drive Drum, Hub, and Gear Assy.	1	1.10
91	31947	Mounting Bracket and Bearing Assy.	1	.60
92	31952	Dial Chart	1	.50
93	31958	Resistor, Candohm, 250-600 Ohm	1	.40
94	31962	Pointer	1	.10
95	31964	Resistor, 17,000 Ohm, Carbon, 2 Watt	1	.25
96	31966	Resistor, 15,000 Ohm, Carbon, ¼ Watt	1	.20
97	31967	Vertical Term. Assy., 4 Lug	1	.15
98	32096	Antenna Transformer (Short Wave), Red	1	1.75
	32102	Condenser, 150 MMFD, Mica (2nd I.F.)	1	.20
99	32300	Bi-Selector Transformer (Broadcast)	1	1.50
100	32301	Vertical Insulated Terminal	1	.10
	62578	Chassis Mtg. Screw	4	.02
	62582	Chassis Shipping Screw	2	.02
	63001	Drive Drum Set Screw	2	.02
	63011	Drive Sleeve Set Screw	2	.01
	63838	Felt Knob Washer, 15/16" Dia.	2	.01
	63839	Felt Knob Washer, 3/4" Dia.	2	.01
	63863	Chassis Mtg. Steel Washer	4	.01

SPEAKER PARTS—TYPE 10A9

Part No.	Description	Price
20010	Speaker Pot and Pole Piece Assy.	$ 1.15
20041	Speaker Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
27240	Cone Gasket	.10
27591	Output Transformer	1.75
28755	Cone and Voice Coil Assy.	3.30
29964	Field Coil Assembly	3.30
31961	Speaker (Complete)	11.50

ALIGNMENT PROCEDURE

Do not attempt to align the 8D Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT

A—Test Oscillator.

A modulated oscillator capable of producing signals at 455 K.C.—600 K.C.—1400 K.C.—3700 K.C.—10 M.C. and 18 M.C. is necessary for alignment of the 8D Chassis.

B—Insulated screw driver—(All bakelite or fibre) about 6" long.

C—Output Meter.

This may be any of the standard output meters on the market, but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

D—Coupling Means.

Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

E—The receiver should be aligned in a location free from local interference (man-made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended.)

2. DIAL SETTING

Turn dial knob until condensers are fully meshed. The dial pointer (hour hand) should be on the horizontal line of the dial, pointing to 9 and 3 o'clock. The minute hand should be at 12 o'clock or in a vertical position.

3. I. F. ALIGNMENT

Connect signal lead of test oscillator to grid of the 6A7 (1st Detector Tube) through .25 Mfd Condenser. Connect the ground lead to the chassis.

A—Set Dial pointer to 1400 K.C. and range switch on position D.

B—Place test Oscillator in operation at 455 K.C. Turn receiver volume control and tone control to maximum.

C—Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

D—Adjust five I.F. Trimmers, A1-A2-A3-A4-A5 (Fig 4), located on the I.F. transformers on top of chassis (2 trimmers are on top of each transformer and one, the Bi-Selector, is at the lower side of the 1st I.F. Transformer), until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

E—Turn the tone control counter clockwise until the Signal Beacon switch snaps on.

F—Adjust Signal Beacon trimmer A6 (Fig. 4), which is located on right hand face of Chassis, to zero beat with the 455 K.C. incoming signal.

4. 1400 K. C. ALIGNMENT

A—Place test oscillator in operation at 1400 K.C.

B—Turn dial pointer to 1400 K.C.

C—Turn range switch to range D.

D—Adjust broadcast oscillator trimmer A7, which is on the variable condenser section nearest the dial to maximum output. (It may be necessary to reduce the capacity of the 600 K.C. padder (A11) to about half its capacity, before the oscillator will peak at 1400 K.C.)

E—Adjust 1st Det. Trimmer A8 (Fig. 4), which is the second from front on top of variable condenser.

F—Adjust Bi-Selector Trimmer A9 (Fig. 4), which is the third from front on top of variable condenser.

G—Adjust Antenna Trimmer A10 (Fig. 4), which is the fourth from the front on top of variable condenser.

5. 600 K. C. ALIGNMENT

A—Place test oscillator in operation at 600 K.C.

B—Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

C—Adjust the 600 K.C. Padding Condenser A11 (Fig. 4) (which is on top of chassis on right-hand side third from front as you face chassis) in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

D—Readjust Oscillator Trimmer (A7) for maximum output with pointer and signal set at 1400 K.C. (see 1400 K.C. Alignment).

6. 3700 K. C. ALIGNMENT

A—Connect signal lead of test oscillator through 200 Mmf. condenser to antenna binding post.

B—Connect the test oscillator ground lead to the ground post of chassis.

C—Turn range switch to range "C" and set dial pointer to 3700 K.C.

D—Adjust the 3700 K.C. Oscillator Trimmer A12 (Fig. 4) (which is the first of the three located on top of chassis on the right-hand side as you face it) in direction of signal increase. At same time work the tuning condenser back and forth through resonance while adjusting trimmer condenser until maximum output is obtained.

7. 10 M. C. ALIGNMENT

A—Connect signal lead of test oscillator through 400 Ohm resistor to antenna binding post of chassis.

B—Connect the ground lead to ground terminal of chassis.

C—Set range switch to range "B" and turn dial pointer to 10 M.C.

D—Place Test Oscillator in operation at 10 M.C.

E—Adjust Set Oscillator Trimmer A13 (Fig. 4), (located on front face of chassis).

F—Adjust Detector Trimmer A14 (Fig. 4), (located on right-hand side on top of chassis, second from front).

G—Adjust Antenna Trimmer A15 (Fig. 4), (located on rear face of chassis).

8. 18 M. C. ALIGNMENT

A—Set Range Switch on Range "A".

B—Place Test Oscillator in operation at 18 M.C.

C—Turn Dial Pointer to 18 M.C.

D—Adjust Set Oscillator Trimmer A16 (Fig. 4), (located on top of chassis on left of gang condenser, first from front).

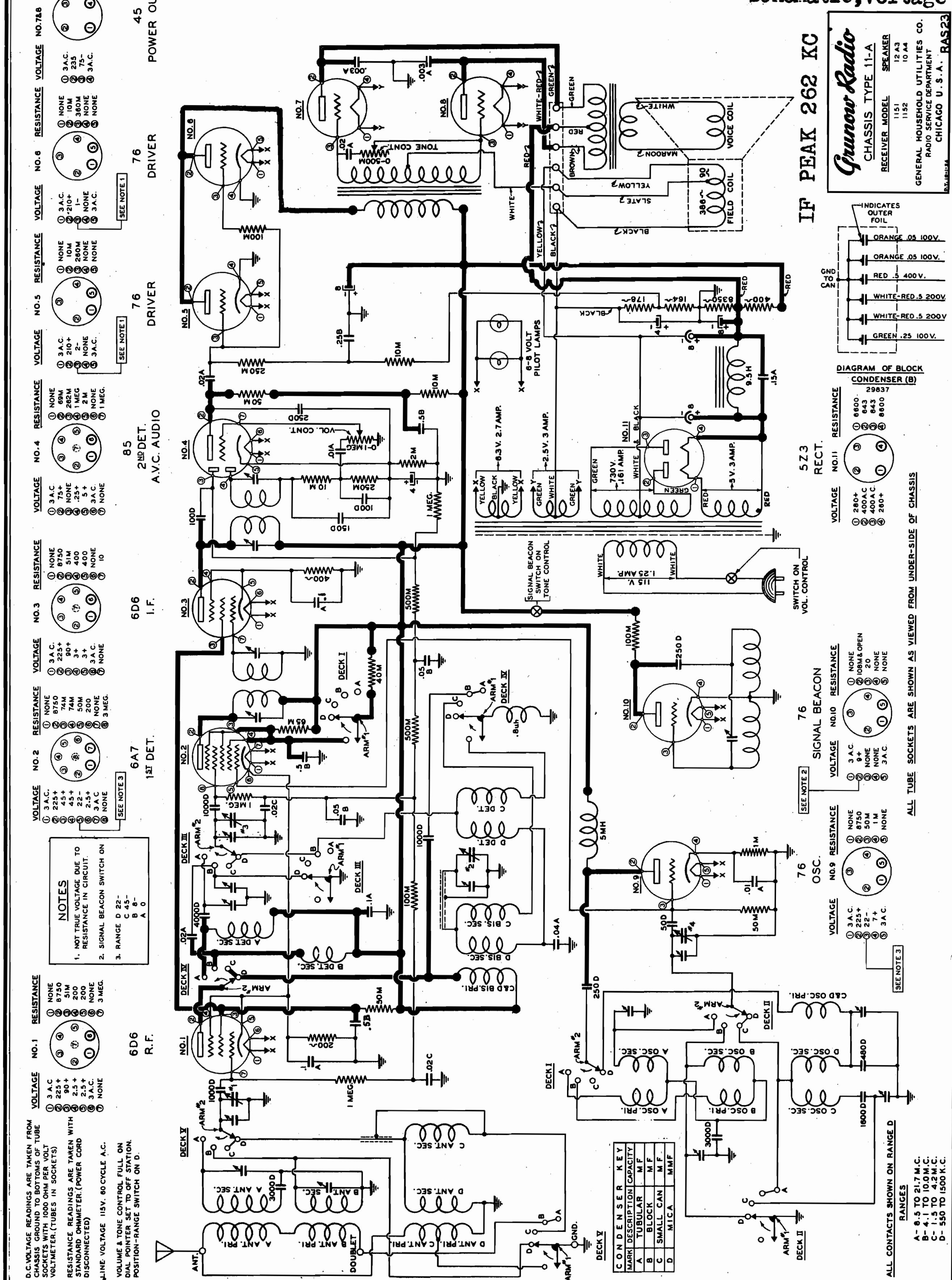
E—Adjust Detector Trimmer A17 (Fig. 4), (located second from front on top of chassis on left-hand side).

F—Adjust Antenna Trimmer A18 (Fig. 4), (located third from front on top of chassis on left-hand side).

G—It may be necessary to rock the variable condenser back and forth through resonance while adjusting the Detector (A17) and the Antenna (A18) for maximum output.

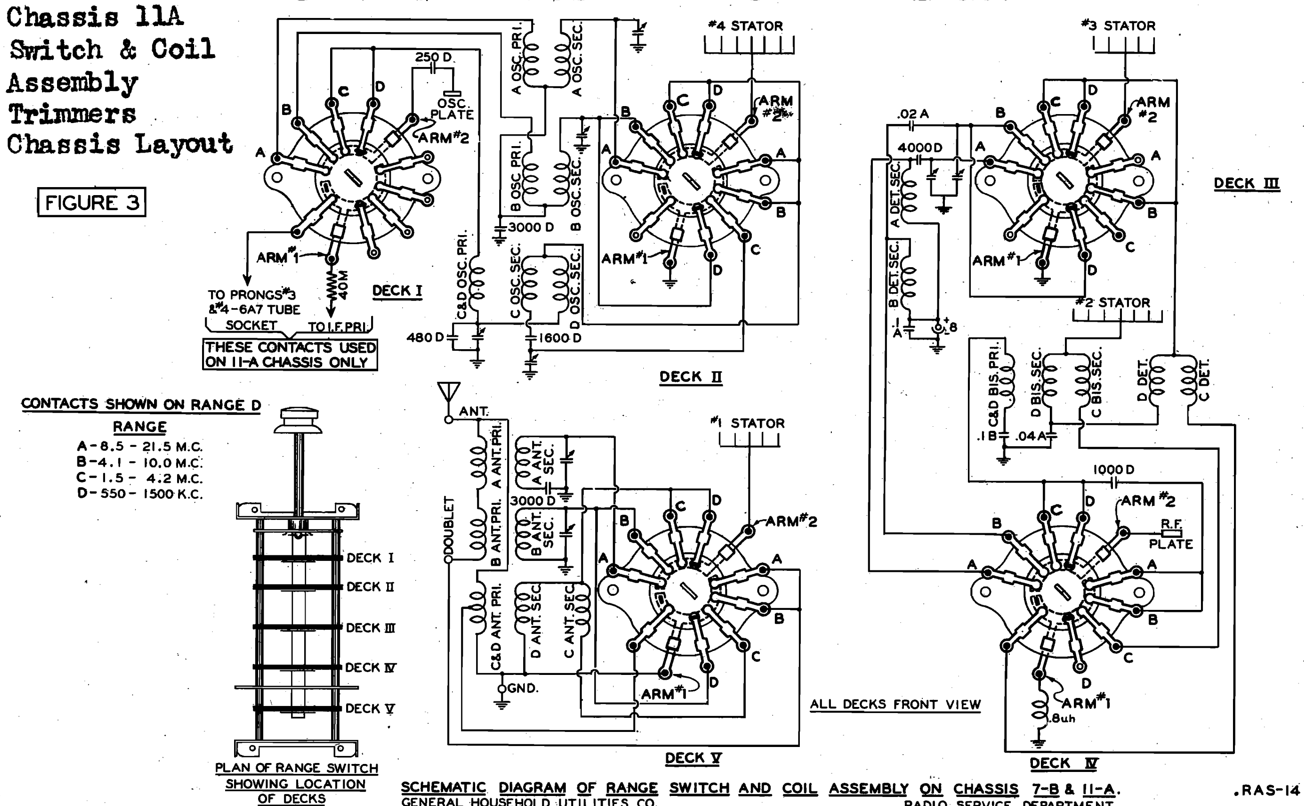
GENERAL HOUSEHOLD UTILITIES CO.

MODELS 1151,1152 Chassis 11A (Final Schematic,Voltage



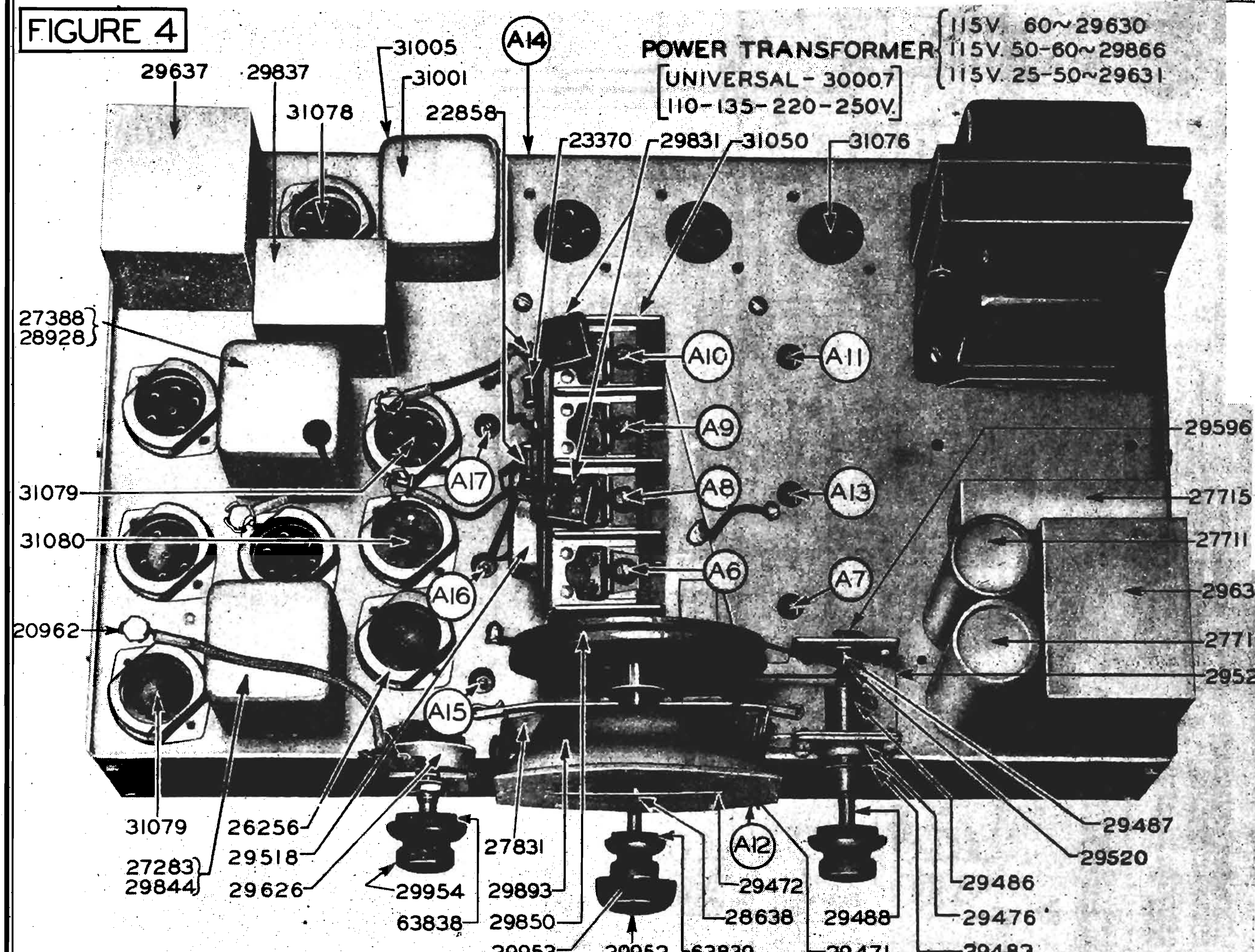
MODELS 1151,1152 GENERAL HOUSEHOLD UTILITIES CO.
Chassis 11A
Switch & Coil
Assembly
Trimmers
Chassis Layout

FIGURE 3



SCHEMATIC DIAGRAM OF RANGE SWITCH AND COIL ASSEMBLY ON CHASSIS 7-B & 11-A.
GENERAL HOUSEHOLD UTILITIES CO. RADIO SERVICE DEPARTMENT .RAS-14

FIGURE 4



MODELS 1151,1152
Chassis 11A (Final)
Switch Data, Socket

GENERAL HOUSEHOLD UTILITIES CO.

SERVICE DATA

The chassis frame is built in such a way that the end plates may be disconnected allowing easy inspection of the underside of the chassis assembly. (Fig. 6).

The range switch and coil assembly is made up in a unit and may be removed for inspection or repair. (Fig. 7). The removal of this assembly necessitates the unsoldering of 15 wire leads. These leads and the positions to which they are connected are marked on the illustrations with letters. The leads A-B-C on the Coil Assembly (Fig. 7) are attached to the points marked A-B-C on the Chassis Assembly (Fig. 5). The leads marked D-E-F-G on the Coil Assembly (Fig. 7) are attached to the points of corresponding letters on the Chassis Assembly (Fig. 6). Leads H-I-J-K-L-M on Coil Assembly are connected as follows:

Lead "H" connects the ground side of the short wave antenna transformer (Red) to the rotor ground of the variable condenser.

Lead "I" connects Arm 2 of Deck 5 to the No. 1 stator of the variable condenser.

Lead "J" is the shielded lead connecting the bi-selector transformer to the No. 2 stator of the variable condenser.

Lead "K" connects Arm 2 of Deck 3 to the No. 3 stator of the variable condenser.

Lead "L" connects the switch assembly ground to the variable condenser rotor ground.

Lead "M" connects Arm 2 of Deck 2 with No. 4 stator of the variable condenser.

Leads "N" and "O" connect Arm 1 of Deck 1 to the 5th contact on the range switch—shunting a 40,000 ohm resistor when the "C" range is in operation.

Lead "P" connects the plate of the Signal Beacon to an insulator, acting as a pick-up lead. Care should be exercised in making these connections. (A soldering iron with a bent point should be used in this operation).

Continuity and Voltage

Continuity and voltage readings should be taken from the underside of the Chassis. The values given on the schematic diagram are average and allow the service man to make a quick check of the chassis constants. The socket layouts given on the schematic diagram show each socket from the underside.

The Range Switch

In servicing the 11A Receiver, consider the radio frequency end as four different and distinct radios:

One working from 550 to 1500 k.c. (D Range)
One working from 1500 to 4200 k.c. (C Range)
One working from 4100 to 10,000 k.c. (B Range)
One working from 8500 to 21,500 k.c. (A Range)

These four radios are put into operation as desired by means of the Range Switch.

When on position "A" the short wave coils covering the range from 8,500 to 21,500 k.c. are connected into the three tuned circuits of the receiver, one coil as an R.F. Transformer, one as the Detector Coupler, and one as the Oscillator Transformer.

On position "B" the 4100 to 10,000 k.c. coils are put into operation.

On "C" position, the 1500 to 4200 k.c. coils are shunted across the 550 to 1500 k.c. coils in such a manner as to lower the total inductance of the combined coils and reduce the losses caused by open end coils.

On both the "C" and "D" positions, four coil sets are put into the circuit and the receiver operates as a four tuned circuit radio. On all four ranges the receiver works at maximum sensitivity and selectivity. All coils and condensers are of such construction that atmospheric and temperature changes have minimum effect.

Each circuit is completely shielded from each other, and the complete range switch and coil assembly may be removed for inspection or repair.

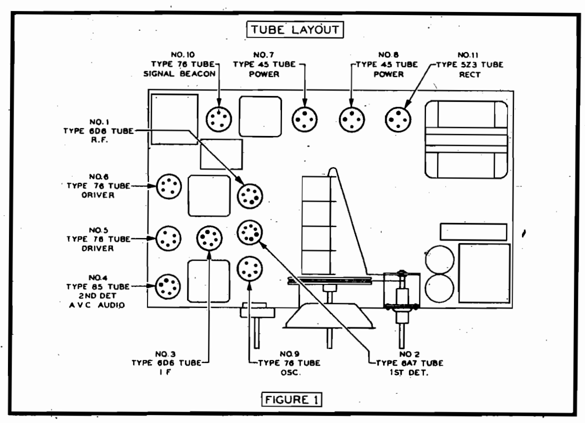


Fig. 1

MODELS 1151,1152
Chassis 11A (Final
Alignment,Parts

GENERAL HOUSEHOLD UTILITIES CO.

PARTS AND PRICE LIST

PART NUMBERS ARE GIVEN ON THE ILLUSTRATION AND THE NUMBERS ARE BROUGHT DOWN IN NUMERICAL ORDER FOR CONVENIENCE

Part No.	Description	No. used	List Price
20678	Ground Terminal	1	$ .02
20861	Attachment Cord	1	.35
20929	Resistor, 50,000 Ohm Carbon, 1 Watt	2	.20
20962	Grid Cap	4	.02
21598	Rubber Grommet	16	.02
22858	Resistor, 1 Meg. Carbon, 1/4 watt	3	.20
23284	Bakelite Washer	13	.02
23358	Insulated Terminal, Single	3	.05
23370	Resistor, 100,000 ohm Carbon, 1/4 watt	3	.20
23849	Resistor, 500,000 ohm Carbon, 1/4 watt	2	.20
23852	Resistor, 10,000 ohm Carbon, 1/4 watt	3	.20
23853	Resistor, 50,000 ohm Carbon, 1/4 watt	1	.20
23998	Resistor, 250,000 ohm Carbon, 1/4 watt	2	.20
24251	Condenser, 100 Mmf. Mica	3	.15
24487	Condenser, 250 Mmf. Mica	3	.20
24789	Condenser, 4 Mfd. 25 Volt Dry Electrolytic	1	.60
26256	Tube Shield Base	8	.05
27033	Insulated Terminal, Double	2	.05
27283	2d I. F. Transformer Shield	1	.35
27382	Trimmer Condenser	5	$ .35
27388	1st I. F. Transformer Shield	1	.30
27422	Electrolytic Step Washer	2	.02
27455	Tube Shield—76	4	.15
27477	Electrolytic Plain Washer	2	.02
27478	Electrolytic Ground Terminal	2	.02
27490	Resistor, 1000 ohm Carbon 1/4 watt	1	.02
27710	Condenser, 8 Mfd. 475 Volt Wet Electrolytic (Chrome)	1	1.15
27711	Condenser, 8 Mfd. 475 Volt Wet Electrolytic	1	1.10
27715	Condenser, 4 Mfd. 350 Volt—8 Mfd. 100 Volt Dry Electrolytic	1	1.90
27784	Resistor, 400 ohm Carbon 1/4 watt	1	.20
27801	Rubber Grommet	3	.05
27802	Cup Washer	6	.02
27831	Pilot Lamp Socket, Insulated	2	15
28045	Pilot Lamp, 6-8 Volt	2	.15
28184	Electrolytic Lock Washer	1	.02
28421	Resistor, 2,000 ohm Carbon, 1/4 watt	1	.20
28573	Short Wave Coil Shield Assembly	1	$ .75
28638	Dial Pointer Screw	1	.02
28726	Condenser, .1 Mfd. 400 Volt tubular	1	.25
28876	Condenser, .02 Mfd. 400 Volt tubular	1	.25
28928	1st I. F. Transformer (Includes 27388)	1	2.90
29011	Resistor, 40,000 ohm Carbon, 1 watt	1	.20
29074	Condenser, 250-100 Mmf. Mica	1	.30
29083	Condenser, 50 Mmf. Mica	1	.20
29135	Condenser, .1 Mfd. 100 Volt tubular	2	.25
29453	Condenser, .01 Mfd. 100 Volt tubular	2	.20
29471	Dial Chart—for General Instrument Condenser only—see 30033	1	.50
29472	Dial Pointer	1	.05
29476	Ball Race	1	.10
29482	Broadcast Coil Shield Assembly	1	.80
29483	Drive Shaft Stop Spring	1	.05
29486	Drive Sleeve	1	.50
29487	Drive Shaft—Inner	1	.50
29488	Drive Shaft—Outer	1	.75
29496	Antenna Transformer—Broadcast	1	1.75
29497	Bi-Selector Transformer—Broadcast	1	1.50
29498	1st Detector Transformer—Broadcast	1	1.25
29499	Oscillator Transformer—Broadcast	1	1.50
29500	Antenna Transformer—Short Wave	1	1.75
29501	1st Det. Transformer—Short Wave	1	1.25
29502	Oscillator Transformer—Short Wave	1	1.50
29508	Trimmer Condenser Assembly — Includes 29989	1	.75
29509	Range Switch and Coil Assembly	1	26.50
29515	Resistor Panel Assembly — Includes 29518	1	1.25
29518	Condenser, .02-.02 Mfd. (Small Can)	1	.75
29520	Drive Cable with Eyelets	1	.10
29521	Ball Bearing, 3/16"	1	.01
29522	Ball Bearing, 11/32"	4	.02
29524	Cable Tension Spring	1	.10
29526	Condenser Mounting Bracket Ass'bly	1	.60
29539	Oscillator Plate Choke	1	.60
29551	Antenna and Doublet Binding Post Assembly	1	.10
29552	Escutcheon Window	1	.15
29553	Window Retaining Ring	1	.10
29554	Escutcheon	1	.60
29563	Resistor, 65,000 ohm Carbon, 1/2 watt	1	.20
29566	Condenser, 1,600 Mmf. Mica	1	.30
29567	Condenser, .02 Mfd. 400 Volt tubular	1	.25
29580	Signal Beacon Trimmer Condenser	1	.75
29582	Signal Beacon Coil Assembly	1	1.25
29596	Drive Leaf Spring	2	.05
29611	Coupling Inductance Coil	1	.25
29612	Escutcheon Retaining Spring	1	.20
29613	Condenser, 4,000 Mmf. Mica	1	.50
29616	Insulated Terminal—Single	1	.10
29617	Insulated Terminal—Double	1	.15
29626	Volume Control	1	1.30
29627	Tone Control	1	1.15
29628	Insulated Terminal (4)	3	.10
29630	Power Transformer, 115 Volt, 60 Cycles only	1	8.85
29631	Power Transformer, 115 Volt, 25-50 Cycles only	1	11.50
29632	Condenser, 8 Mfd. 300 Volt Dry Electrolytic	1	1.15
29636	Filter Choke	1	2.60
29637	Audio Input Transformer	1	4.10
29640	Resistor, 200 ohm Carbon, 1/4 watt	1	.20
29641	Resistor, Candohm	1	1.10
29652	Condenser, 150 Mmf. Mica	1	.15
29662	Condenser, .15 Mfd. 200 Volt tubular	1	.30
29812	Condenser, .04 Mfd. 500 Volt tubular	1	.30
29813	Condenser, .004 Mfd. 700 Volt tubular	1	$ .25
29818	Condenser, .003 Mfd. 700 Volt tubular	2	.25
29830	Condenser, 3,000 Mmf. Mica	2	.40
29831	Condenser, 1,000 Mmf. Mica	2	.30
29832	Tube Shield Body	4	.15
29836	Trimmer Condenser Assembly	1	.25
29837	Bypass Condenser Block	1	2.70
29844	2d I. F. Transformer Assembly	1	3.60
29850	Drive Drum Assembly	1	1.10
29866	Power Transformer 115 Volt, 50-60 Cycles	1	9.50
29893	Reflector Assembly	1	.50
29896	Speaker Cable	1	.95
29900	Trimmer Condenser Assembly	1	:50
29952	Knob—Range Switch	1	.30
29953	Knob—Tone Control	1	.20
29954	Knob—Selector or Volume Control	2	.20
29957	Decalcomania—"A, B, C, D"	1	.10
29989	Condenser, 480 Mmf. Mica	1	.30
29990	Condenser, .02 Mfd. 400 Volt tubular	1	.20
30007	Power Transformer 110-135-220-250 Volt, 50-60 Cycles	1	12.90
30030	Chassis Mounting Washer — Upper (Black)	3	.05
30031	Chassis Mounting Washer — Upper (Red)	1	.05
30032	Chassis Mounting Washer—Lower	4	.02
30033	Dial Chart—for Reliance Condenser only	1	.50
30034	Tuning Condenser, 4 Gang, Reliance	1	7.50
31001	Signal Beacon Assembly	1	2.25
31005	Signal Beacon Shield Can	1	.30
31050	Tuning Condenser, 4 Gang—General Instrument	1	7.50
31076	Tube Socket—4 Prong	3	.10
31078	Tube Socket—5 Prong	4	.10
31079	Tube Socket—6 Prong	3	.15
31080	Tube Socket—7 Prong	1	.15
31215	Tube Shield Cap	4	.10
62571	Chassis Mounting Screw	4	.02
62572	Chassis Shipping Screw	2	.02
63001	Drive Drum Set Screw	2	.02
63011	Drive Sleeve Set Screw	2	.01
63838	Felt Knob Washer—15/16" Dia.	2	.01
63839	Felt Knob Washer—3/4" Dia.	2	.01
63863	Steel Chassis Mounting Washer	4	.01

SPEAKER PARTS

Part No.	Description	List Price
	TYPE 10A4	
20010	Pot and Pole Piece Assembly	$ 1.15
20041	Pot Clamp	.10
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
27240	Cone Mtg. Gasket	.10
28755	Cone and Voice Coil Assembly	3.30
29781	Output Transformer	2.00
29783	Field Coil	3.30
31166	Speaker Comp.	11.50
	SPEAKER TYPE 12A3	
20045	Terminal Strip Cover	.15
20047	Terminal Strip	.10
27208	Pot and Pole Piece Assembly	1.60
27242	Cone Mtg. Gasket	.10
26979	Speaker Comp.	14.50
29753	Output Transformer	2.00
29758	Field Coil	4.25
31310	Cone and Voice Coil Assembly	4.00

ALIGNMENT PROCEDURE

Do not attempt to align the 11A Chassis without the proper equipment. Alignment condensers are shown in the accompanying illustrations and are numbered in order of procedure.

1. EQUIPMENT.

a—Test Oscillator.

A modulated oscillator capable of producing signals at 262 K.C.—600 K.C.—1400 K.C.—3700 K.C.—10 M.C. and 20 M.C. is necessary for alignment of the 11A chassis.

b—Insulated screw driver—(All bakelite or fibre) about 6" long.

c—Output Meter.

This may be any of the standard output meters on the market but should be sufficiently sensitive to provide a good deflection at low signal strength, and should also incorporate an adjustable shunt so that extremely strong signals may be read.

d—Coupling Means.

Coupling Condensers of 200 mmf., .25 Mfd., and a 400 Ohm resistor should be used when coupling oscillator to receiver during alignment as specified in the following paragraphs.

e—The receiver should be aligned in a location, free from local interference (man made static)—as high frequency disturbances will cause difficulties when the short wave section is being adjusted. (A screen room is to be recommended).

2. DIAL SETTING.

Turn dial knob until condensers are fully meshed. The dial pointer should be on the horizontal line of the dial.

3. I. F. ALIGNMENT.

Connect signal lead of test oscillator to grid of the 6A7—(1st Detector Tube) through .25 Mfd. Condenser. Connect the ground lead to the Chassis.

a—Set Dial pointer to 1400 K.C. and range switch on position D.

b—Place test Oscillator in operation at 262 K.C. Turn receiver volume control and tone control to maximum.

c—Attenuate test oscillator output to lowest valve consistent with obtaining a readable indication on output meter.

d—Adjust four I. F. Trimmers, A1-A2-A3-A4 Fig. 6, located on under side of chassis, until maximum output is obtained. During alignment, maintain as low a value of signal as will allow obtaining of accurate adjustment.

e—Turn the tone control counter clockwise until the Signal Beacon switch snaps on.

f—Adjust Signal Beacon trimmer, A5, Fig. 6, located on under side of Chassis to zero beat with the 262 K.C. incoming signal.

4. 3700 K.C. ALIGNMENT.

a—Connect signal lead of test oscillator through 200 Mmf condenser to Antenna binding post.

b—Connect the test oscillator ground lead to the ground post of Chassis.

c—Turn range switch to range "C" and set dial pointer to 3700 K.C.

d—Align Set Oscillator or front trimmer A6, Fig. 4, on variable condenser. It may be necessary to approximate adjustment of the other three trimmers on variable condenser to obtain sufficient sensitivity to make 3700 K.C. adjustment.

5. 1400 K.C. ALIGNMENT.

a—Place test oscillator in operation at 1400 K.C.

b—Turn dial pointer to 1400 K.C.

c—Turn Range Switch to range D.

d—Adjust 1400 K.C. padding condenser, A7. Fig. 4, which is the first of three located on top of Chassis on the right hand side as you face it.

e—Adjust 1st Det. Trimmer A8, Fig. 4, which is the second from front on top of variable condenser.

f—Adjust Bi-selector trimmer A9, Fig. 4, which is the third from front on top of variable condenser.

g—Adjust Antenna Trimmer A10, Fig. 4, which is the fourth from the front on top of variable condenser.

6. 600 K.C. ALIGNMENT.

a—Place test oscillator in operation at 600 K.C.

b—Tune in signal to maximum (this point does not have to be exactly at 600 K.C. dial setting).

c—Adjust the 600 K.C. Padding Condenser A11, Fig. 4, (which is on top of Chassis on right hand side third from front as you face Chassis), in direction of signal increases. At same time rock the tuning condenser back and forth through resonance while adjusting padding condenser until maximum output is obtained.

7. 10 M.C. ALIGNMENT.

a—Connect signal lead of test oscillator through 400 Ohm resistor to Antenna binding post of Chassis.

b—Connect the ground lead to ground terminal of Chassis.

c—Set Range Switch to Range "B" and turn dial pointer to 10 M.C.

d—Place test oscillator in operation at 10 M.C.

e—Adjust set oscillator trimmer A12, Fig. 4, (located on front face of chassis).

f—Adjust detector ttimmer A13, Fig. 4, (located on right hand side on top of Chassis second from front).

g—Adjust antenna trimmer A14, Fig. 4, (located on rear face of Chassis).

8. 20 M.C. ALIGNMENT.

a—Set Range Switch on Range A.

b—Place Test Oscillator in operation at 20 M.C.

c—Turn Dial Pointer to 20 M.C.

d—Adjust Set Oscillator trimmer A15, Fig. 4, (located on top of Chassis on left of gang condenser, first from front).

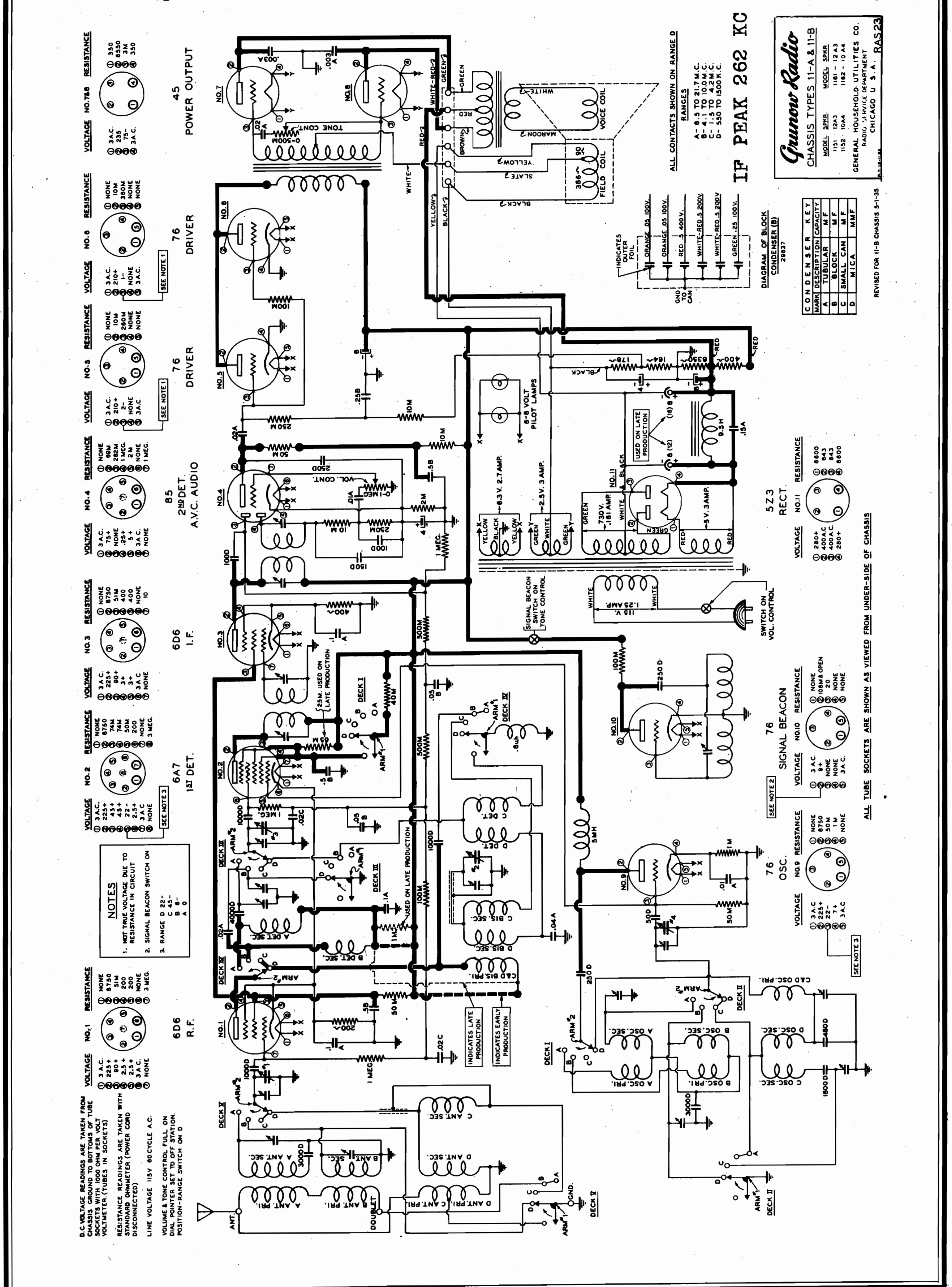
e—Adjust Detector trimmer A16, Fig. 4, (located second from front on top of Chassis on left hand side).

f—Adjust Antenna trimmer A17, Fig. 4, (located third from front on top of Chassis on left hand side).

MODELS 1151, 1152, 1161, 1162
Chassis 11A (Type 2)

GENERAL HOUSEHOLD UTILITIES CO.

Chassis 11B
Schematic, Voltage, Data



MODELS 1151,1152
1161,1162
Chassis 11A,11B
Parts List

GENERAL HOUSEHOLD UTILITIES CO.

11-A & 11-B
TYPE 2

JANUARY 1935

Supplement to
Service Notes and Parts List
31565-2

Grunow Radio

CHASSIS TYPE 11-A AND 11-B

Receiver Model	Speaker Model
1151	12A3
1152	10A4
1161	12A3
1162	10A4

GENERAL HOUSEHOLD UTILITIES COMPANY

RADIO SERVICE DEPT. CHICAGO, U. S. A.

31565-2 SUP.

Chassis 11A —115 volt, 60 cycle
Chassis 11AW—115 volt, 50-60 cycle
Chassis 11AX —115 volt, 25-50 cycle
Chassis 11B —115 volt, 50-60 cycle
Power Consumption 145 watts.

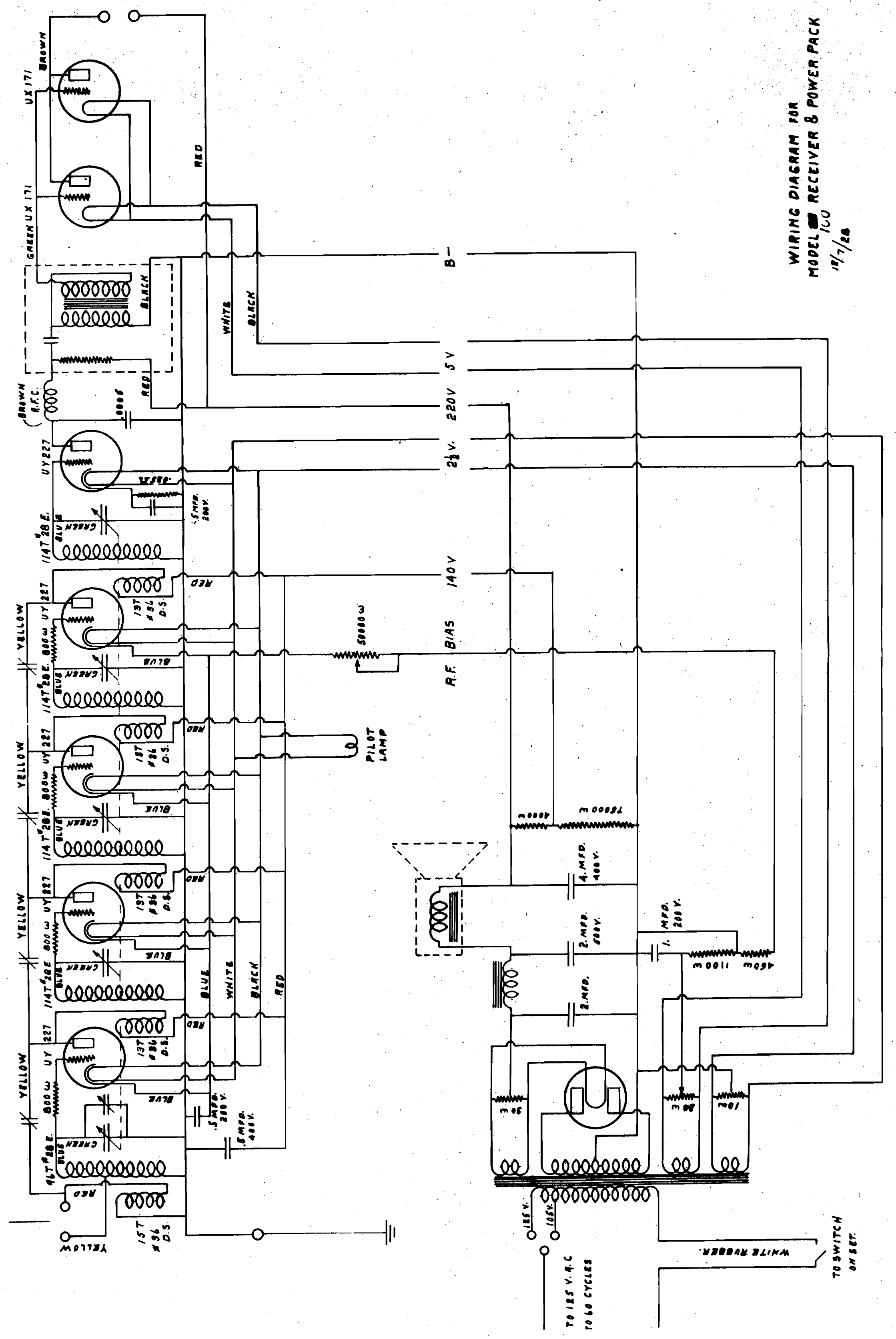
Chassis 11AZ {110-135-220-250 volt, 50-60 cycle}
Chassis 11BZ {110-135-220-250 volt, 50-60 cycle}
Tubes: 1-6D6, 1-6A7, 1-6D6, 1-85, 4-76, 2-45, 1-5Z3

SUPPLEMENTARY PARTS USED ON LATE PRODUCTION OF CHASSIS 11A AND ALSO ON CHASSIS 11B

Part No.	Description	No. Used	List Price
20705	25,000 Ohm Carbon Resistor 1 Watt	1	$0.20
24254	1,000 Mmf. Mica Condenser	3	.20
29485	Drive Shaft Thrust Spring	1	.05
29621	Tone Control Knob	1	.20
29622	Range Switch Knob	1	.25
29623	Tuning or Volume Control Knob	2	.20
31205	Electrolytic Insulator	1	.05
31360	Window Gasket	1	.02
31483	02 Mfd. 500 Volt Tubular Condenser	1	.25
31629	16 Mfd. 350 Volt Wet Elec. Condenser	1	1.25
31723	Pointer and Pinion Assembly	1	.40
31726	Pinion Gear and Plate Assembly	1	$0.55
31743	12 Mfd. 450 Volt Wet Elec. Condenser	1	1.35
31860	2,000 Ohm Carbon Resistor, ¼ Watt	1	.20
31942	4-Gang Tuning Condenser	1	7.50
31945	Drive Drum and Gear Assembly	1	1.10
31947	Condenser Mounting Bracket	1	.75
31962	Pointer—Large	1	.05
32292	Dial Chart	1	.50
63325	Elec. Condenser Nut	2	.03
63578	Chassis Mounting Screw	4	.01
63582	Chassis Shipping Screw	2	.01
64334	Elec. Condenser Lockwasher	2	.01

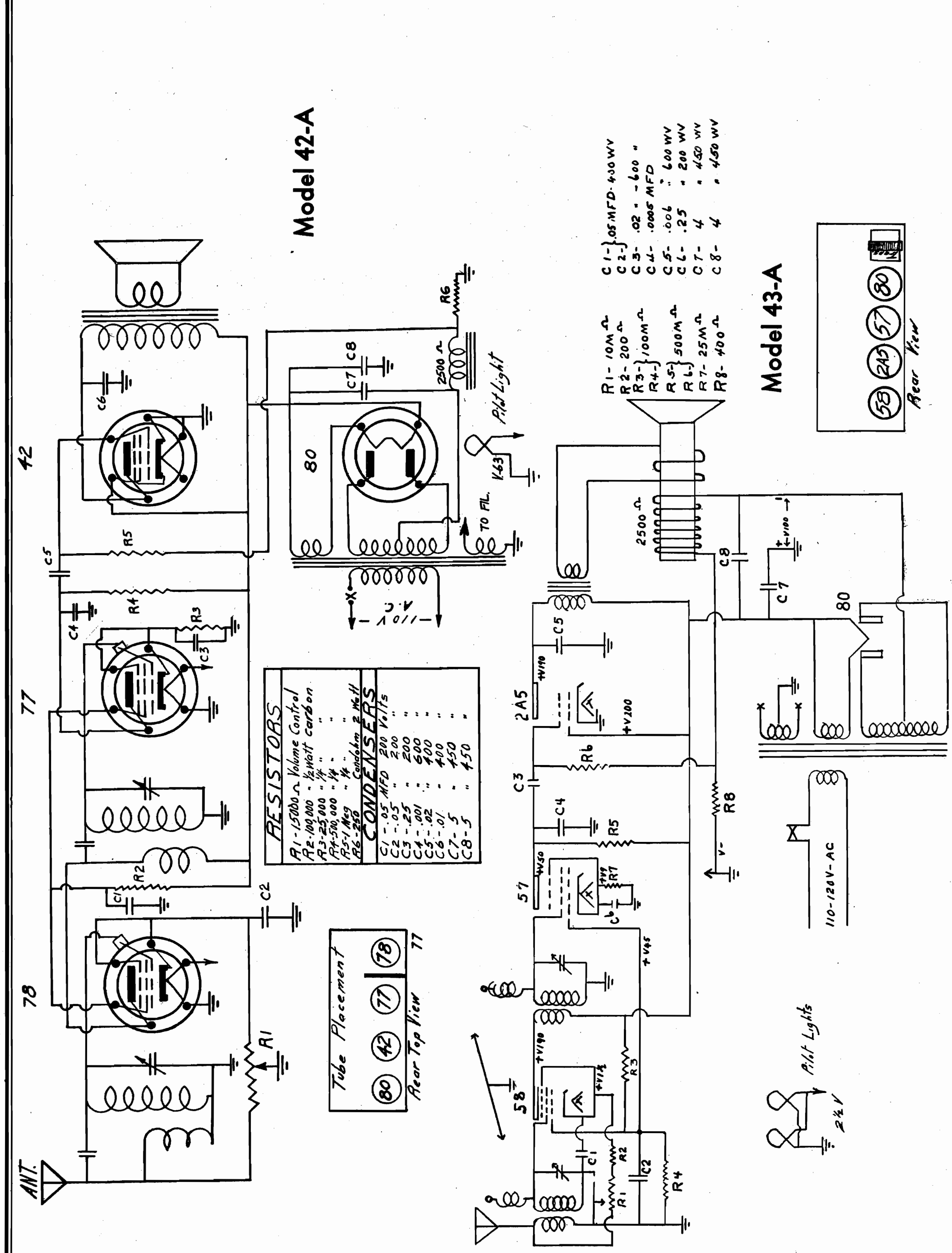
GILFILLAN BROS., INC.

MODELS 35,100
With PP. 71s
Schematic



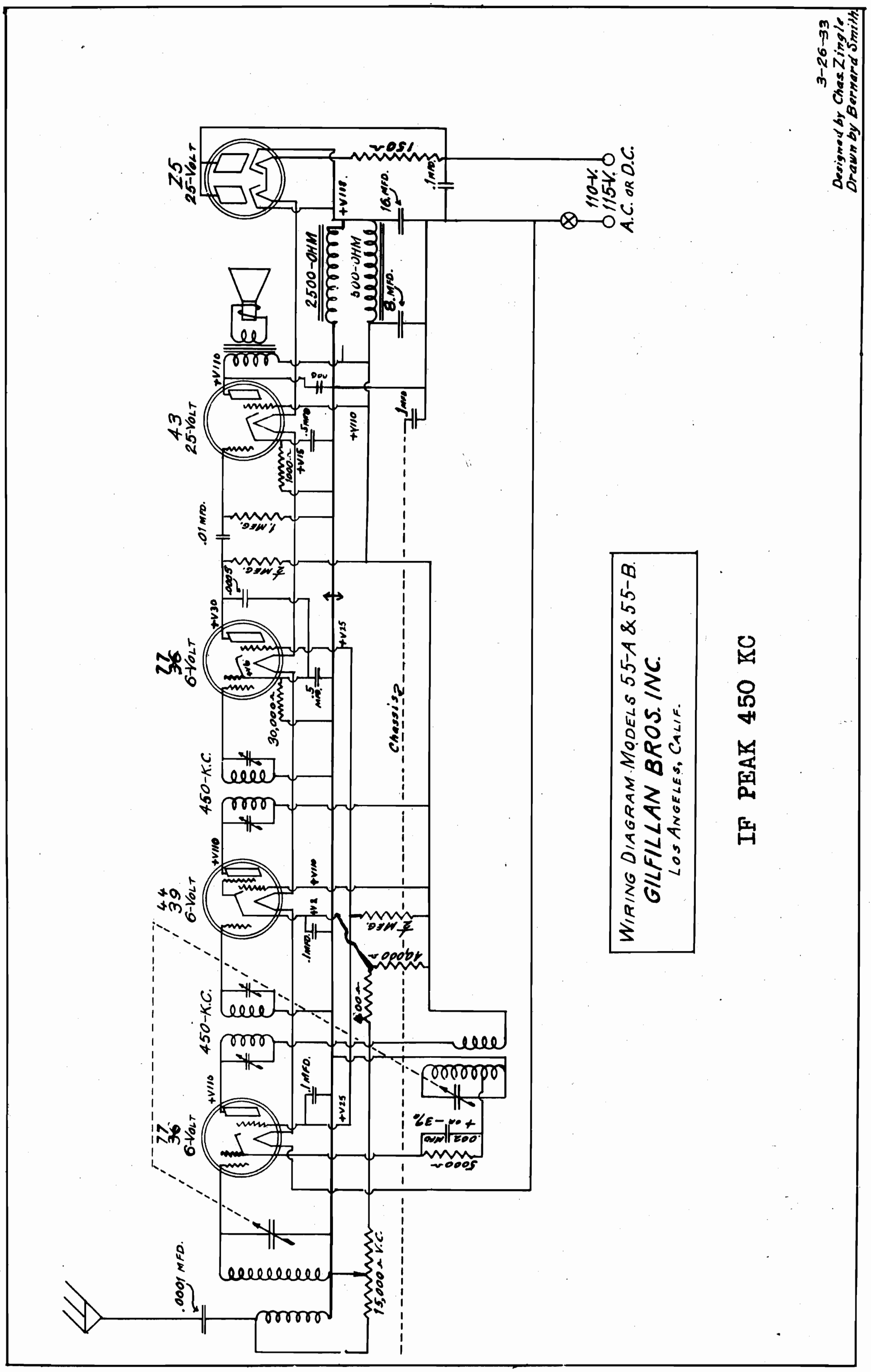
MODEL 42A
MODEL 43A
Schematic, Socket

GILFILLAN BROS., INC.



MODELS 55A, 55B
Schematic

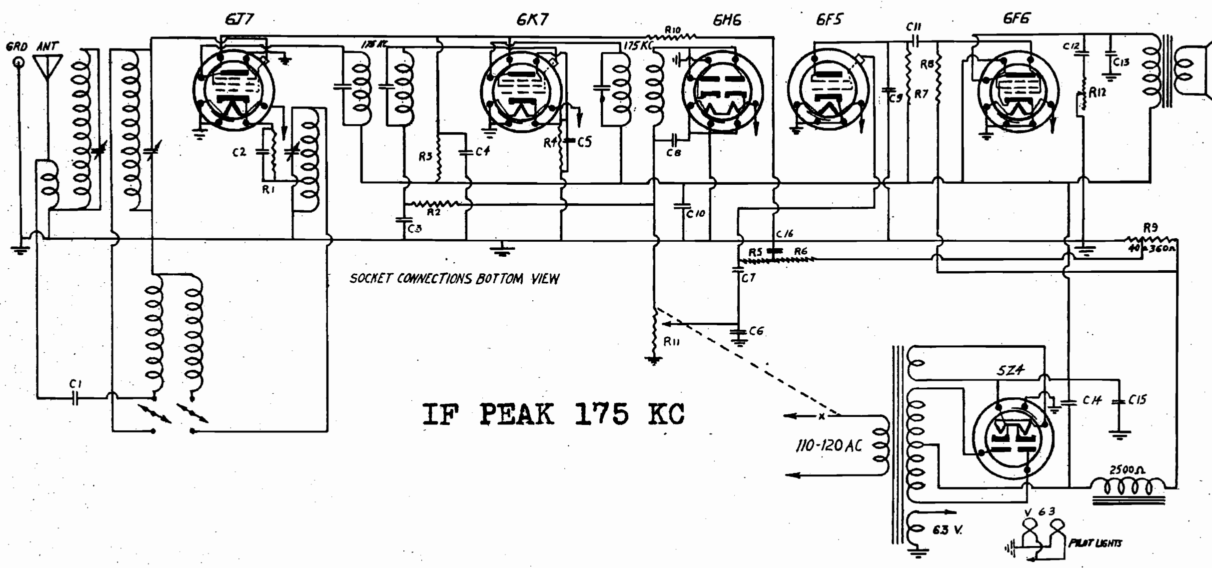
GILFILLAN BROS., INC.



MODEL 62B-X
MODELS 63B,63X
Schematics
Socket

GILFILLAN BROS., INC.

Model 62 B-X



RESISTORS			
R1 5000	OHM	¼ WATT	CARBON
R2 2 MEG	"	" "	"
R3 50,000	"	1 "	"
R10 "	"	" "	"
R4 100	"	" "	WIRE WOUND
R6 100,000	"	¼ "	" "
R5 1 MEG	"	½ "	CARBON
R7 100,000	"	¼ "	"
R8 1 MEG	"	¼ "	"
R9 400	"	2 "	CANDOHM
R11 500,000	"	VARIABLE CONTROL	
R12-50,000	"	"	"

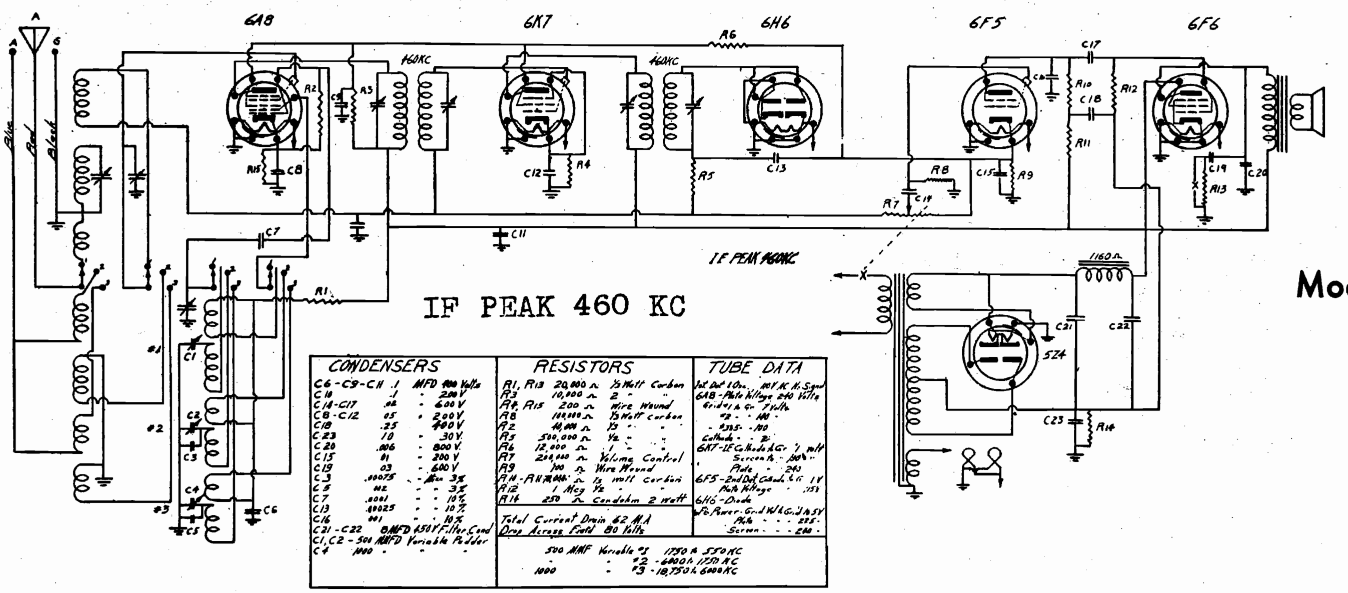
CONDENSERS			
C16 1	MFD	200 W.V.	TUBULAR
C3 1	MFD	400 W.V.	TUBULAR
C4 1	"	" "	"
C5 1	"	" "	"
C10 1	"	" "	"
C7 02	"	" "	"
C8 .0001	"	MICA 10 %	
C11 01	"	600 WV	"
C12 05	"	400 "	"
C13 .006	"	800 "	"
C1 .000022	MFD	10%	MICA
C2 .002	"	"	"
C6 00025	"	"	"
C9 .0003	"		"
C14 4	"	450 WV	
C15 8	"	"	"

TUBE DATA (110V AC)

TUBE NO	CATHODE TO GRD	S GRID TO GRD	PLATE TO GRD	PLATE CURRENT MA.	HEATER VOLTS AC
COMPOSITE 6J7 1st Det & Osc	-49	60V	185V	2	6.1
1st IF 6K7	-3	60V	185V	1	6.1
2nd Det 6F5	0	185V	95V	1.5	6.1
POWER 6F6	0	185V	170V	28	6.1
6H6	0	0			6.1
5Z4			190V		4.9

Tube Socket Placement
6H6
6J7 6K7 6F5 6F6 5Z4
Rear View

Model 63B-63X (AC)



CONDENSERS			
C6-C9-C11	.1	MFD	400 Volts
C10	.1	"	200V
C14-C17	.02	"	600V
C8-C12	.05	"	200V
C18	.25		400V
C23	10	"	30V
C20	.006	"	800V
C15	.01	"	200V
C19	.03	"	600V
C3	.00075	"	Mica 3%
C5	.002	"	" 3%
C7	.0001	"	" 10%
C13	.00025	"	" 10%
C16	.001	"	" 10%
C21-C22	8 MFD 450V Filter Cond		
C1, C2 - 500 MMFD Variable Padder			
C4	1000	"	" "

RESISTORS			
R1, R13	20,000 Ω	⅓ Watt	Carbon
R3	10,000 Ω	2 "	"
R4, R15	200 Ω	Wire Wound	
R8	100,000 Ω	⅓ Watt	carbon
R2	40,000 Ω	⅓ "	"
R5	500,000 Ω	½ "	"
R6	12,000 Ω	1 "	"
R7	200,000 Ω	Volume Control	
R9	100 Ω	Wire Wound	
R11-R11	70,000 Ω	⅓ watt	carbon
R12	1 Meg	½ "	"
R14	250 Ω	Candohm	2 watt

Total Current Drain 62 M.A.
Drop Across Field 80 Volts

TUBE DATA
1st Det 1 Osc. 110V AC No Signal
6A8 - Plate Voltage 240 Volts
Grid #1 & Gn 7 Volts
#2 - " 100 "
" #3 & 5 - " 100
Cathode " " 2
6K7 - I.F. Cathode & Gr 1 volt
Screen " - 100 "
Plate " 240
6F5 - 2nd Det Cathode & Gr 1V
Plate Voltage " 75V
6H6 - Diode
6F6 Power - Grid V & Grid & 5V
Plate " " " 225
Screen " " " 240

500 MMF Variable #1 1750 to 550 KC
" " #2 - 6000 to 1750 KC
1000 " #3 - 18,750 to 6000 KC

Tube Placement
6A8
6K7 6H6 6F5 6F6 5Z4
Rear-Top View

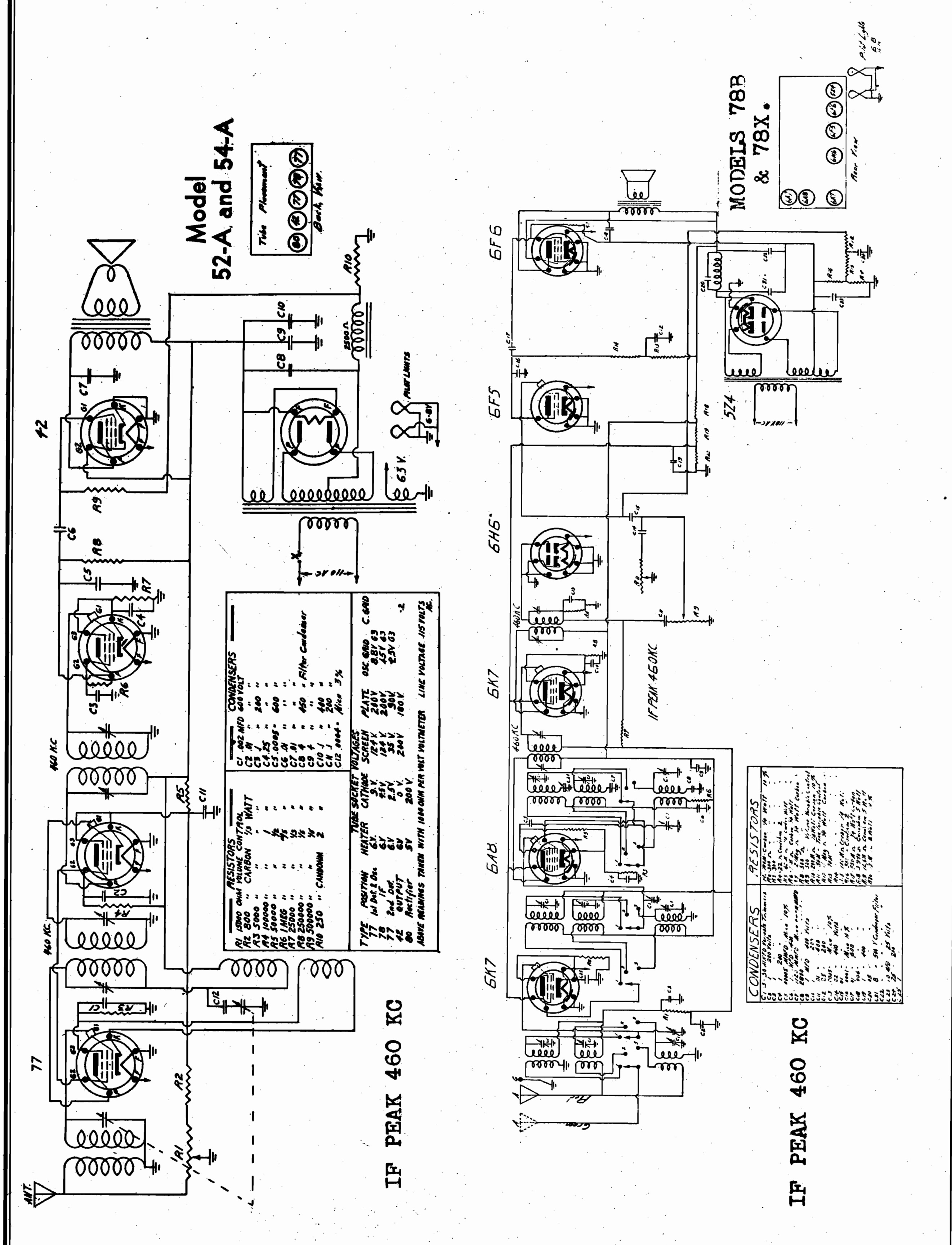
AERIAL and GROUND INSTRUCTIONS

If regular straight wire aerial is used connect **green** wire to aerial and **red** and **white** wires both to ground.

For doublet antenna system connect **white** to short doublet lead and **green** to long doublet lead and **red** to ground.

MODELS 52A, 54A
MODELS 78B, 78X
Schematics, Socket

GILFILLAN BROS., INC.



RESISTORS			
R1 15000 OHM	VOLUME CONTROL	1/3	WATT
R2 800 "	CARBON	"	"
R3 5000 "	"	"	"
R4 100000 "	"	1	"
R5 50000 "	"	1/3	"
R6 1 MEG "	"	1/5	"
R7 25000 "	"	1/3	"
R8 250000 "	"	1/3	"
R9 500000 "	"	1/4	"
R10 250 "	CANDOHM	2	"

CONDENSERS			
C1 .002 MFD	600 VOLT		
C2 .01 "	"	"	
C3 .1 "	200	"	
C4 .25 "	"	"	
C5 .0005 "	600	"	
C6 .01 "	"	"	
C7 .01 "	"	"	
C8 4 "	450	"	Filter Condenser
C9 4 "	"	"	"
C10 .1 "	400	"	
C11 .1 "	200	"	
C12 .0004 "	Mica	3%	

TUBE SOCKET VOLTAGES

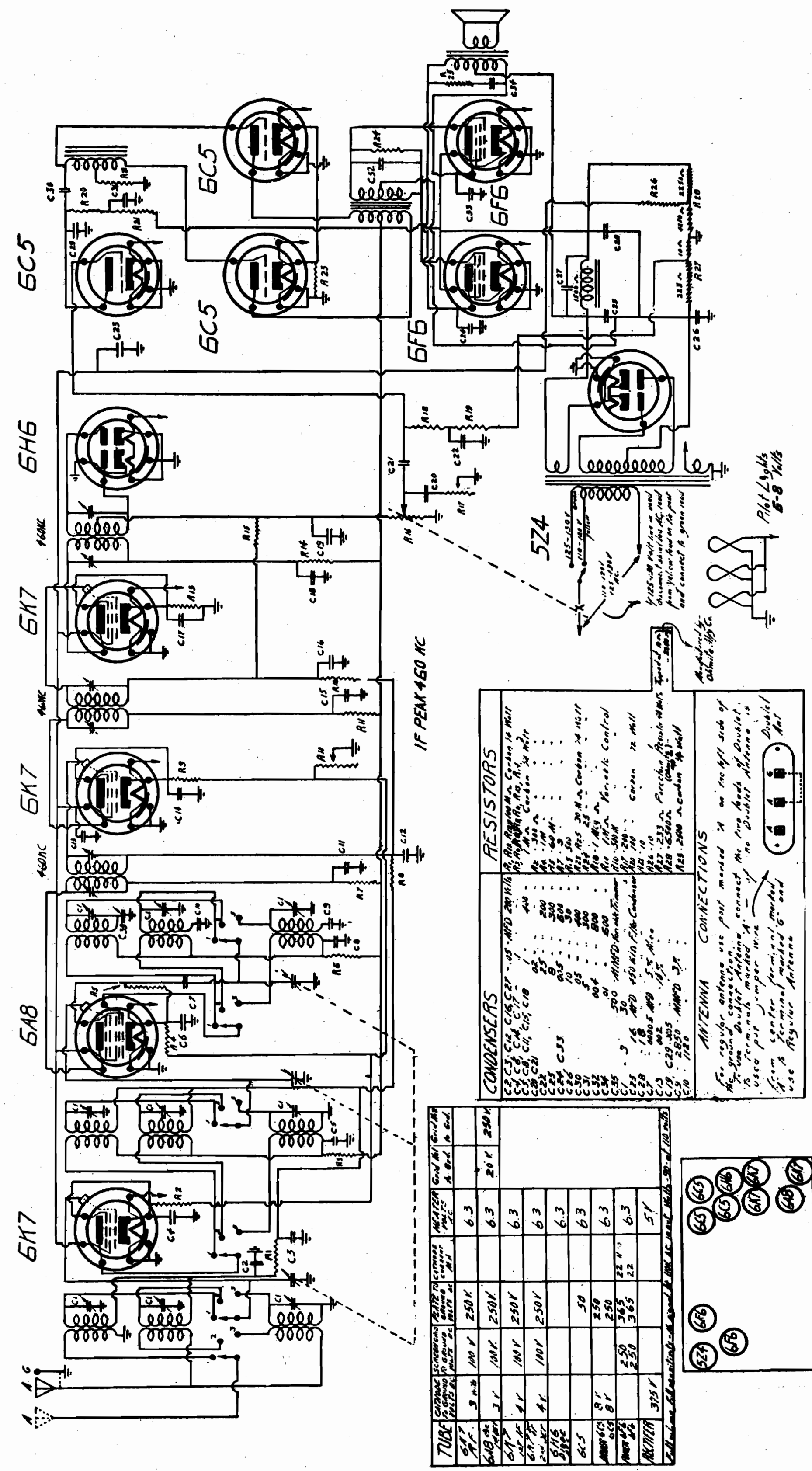
TYPE	POSITION	HEATER	CATHODE	SCREEN	PLATE	OSC. GRID	C. GRID
77	1st Det. & Osc.	6V.	9 V.	124 V.	240V.	8.8V G3	
78	IF	6V.	4.5V.	124 V.	200V.	4.5V G3	
77	2nd Det.	6V.	2.5V.	35 V.	90V.	2.5V G3	
42	OUTPUT	6V	0 V.	200V	180 V.		-2
80	Rectifier	5V	200 V.				

ABOVE READINGS TAKEN WITH 1000 OHM PER VOLT VOLTMETER LINE VOLTAGE 115 VOLTS AC.

MODELS 116B,116X
MODELS 117B,117X
Schematic,Socket
Voltage

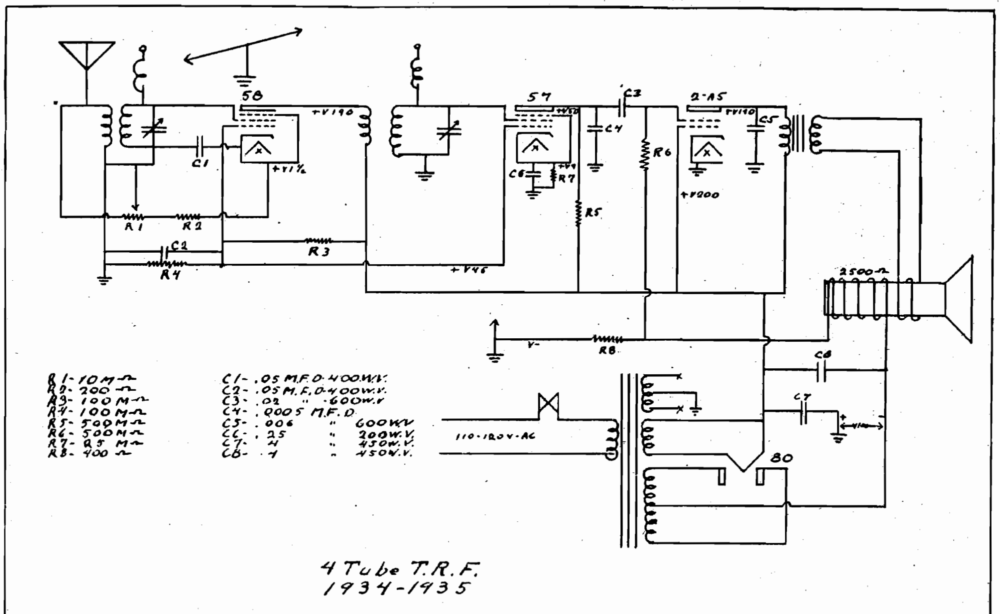
GILFILLAN BROS., INC.

Models 116B-116X & 117B-117X (AC)

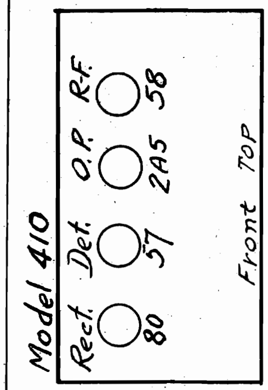


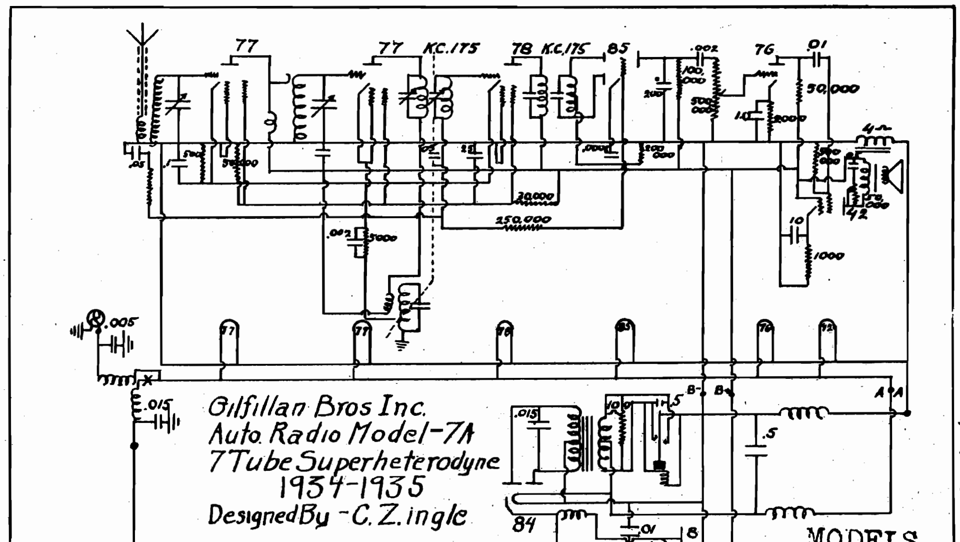
GILFILLAN BROS., INC.

MODELS 7A, 700
MODEL 410
Schematics
Socket



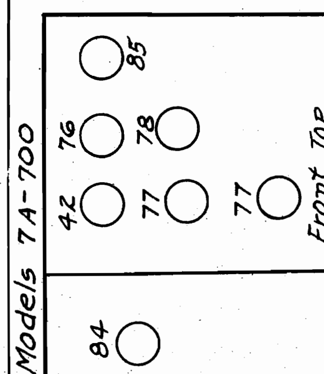
MODEL 410





IF PEAK 175 KC

MODELS
7A&
700



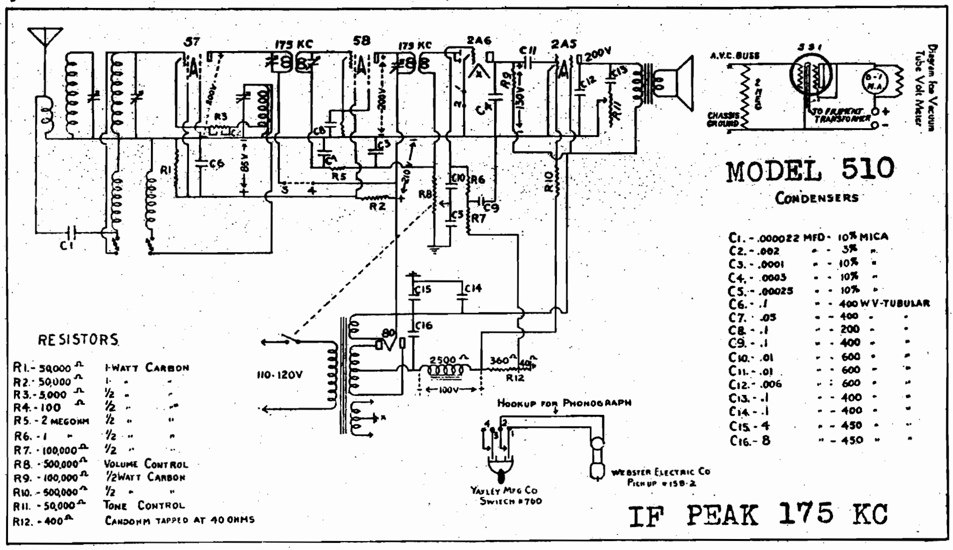
Locate convenient space under automobile dash for mounting of chassis and speaker. Triangle chassis mounting plate will serve as template for the drilling of the necessary holes. Bolt in the plate, then hook chassis on to plate and fasten with thumb screw. Drill hole for speaker and fasten up with nut. Install remote control to steering post or convenient position on dash and connect drives to set. Connect "A" lead to 'Hot side' of generator or to + battery lead. Other small lead goes to pilot lamp in remote control head and heavy shielded lead to aerial.

Install spark plug supressors and cut-outs if needed.

To set dial pointer, spin drive knob to right until it can go no further and then turn back to left as far as possible. Pointer will then be set in exact calibration to condenser gang.

MODELS 510,520
Schematic, Socket
Alignment, Data

GILFILLAN BROS., INC.



MODEL 510

CONDENSERS

C1. - .000022	MFD -	10%	MICA	
C2. - .002	" -	3%	"	
C3. - .0001	" -	10%	"	
C4. - .0003	" -	10%	"	
C5. - .00025	" -	10%	"	
C6. - .1	" -	400	W V -	TUBULAR
C7. - .05	" -	400	"	"
C8. - .1	" -	200	"	"
C9. - .1	" -	400	"	"
C10. - .01	" -	600	"	"
C11. - .01	" -	600	"	"
C12. - .006	" -	600	"	"
C13. - .1	" -	400	"	"
C14. - .1	" -	400	"	"
C15. - 4	" -	450	"	"
C16. - 8	" -	450	"	"

RESISTORS

R1. - 50,000 Ω	1-Watt Carbon
R2. - 50,000 Ω	1 " "
R3. - 5,000 Ω	½ " "
R4. - 100 Ω	½ " "
R5. - 2 megohm	½ " "
R6. - 1 "	½ " "
R7. - 100,000 Ω	½ " "
R8. - 500,000 Ω	Volume Control
R9. - 100,000 Ω	½ Watt Carbon
R10. - 500,000 Ω	½ " "
R11. - 50,000 Ω	Tone Control
R12. - 400 Ω	Candohm tapped at 40 ohms

IF PEAK 175 KC

SERVICE DATA, FIVE TUBE SUPER-HETERODYNE, 1934-1935

All models have automatic volume control of the diode type, controlling the first detector as well as the high frequency amplifier tubes. This A.V.C. makes it impossible to service and rebalance without a meter of the type to be described. This meter will work on any make or type of A.V.C., provided care is used. It can not be damaged by improper connection of the leads.

PARTS REQUIRED FOR VACUUM TUBE VOLT METER

1—O to 1 or O to 1.5 milliampmeter.
1—Bell ringing transformer with secondary of 6-10 volts.
1—5 prong socket.
1—551 tube.
1—2 megohn grid leak.
1—10 ohm rheostat.
1—45 volt B battery.
Clips, Box, Cord, Hookup Wire.

USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 175 K.C. oscillator to the first detector grid (No. 57 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube volt meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 175 K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

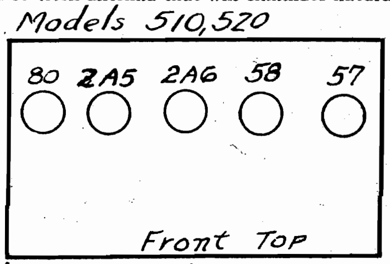
NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle R.F. pickup. This is most prominent on low frequency. Replace with a good tube.

In many cases it is found that the noise cannot be eliminated by servicing the receiver. Noise may enter into the light lines or via the antenna. The only way to check the source is to turn off one after another all electrical apparatus in the vicinity of the set.

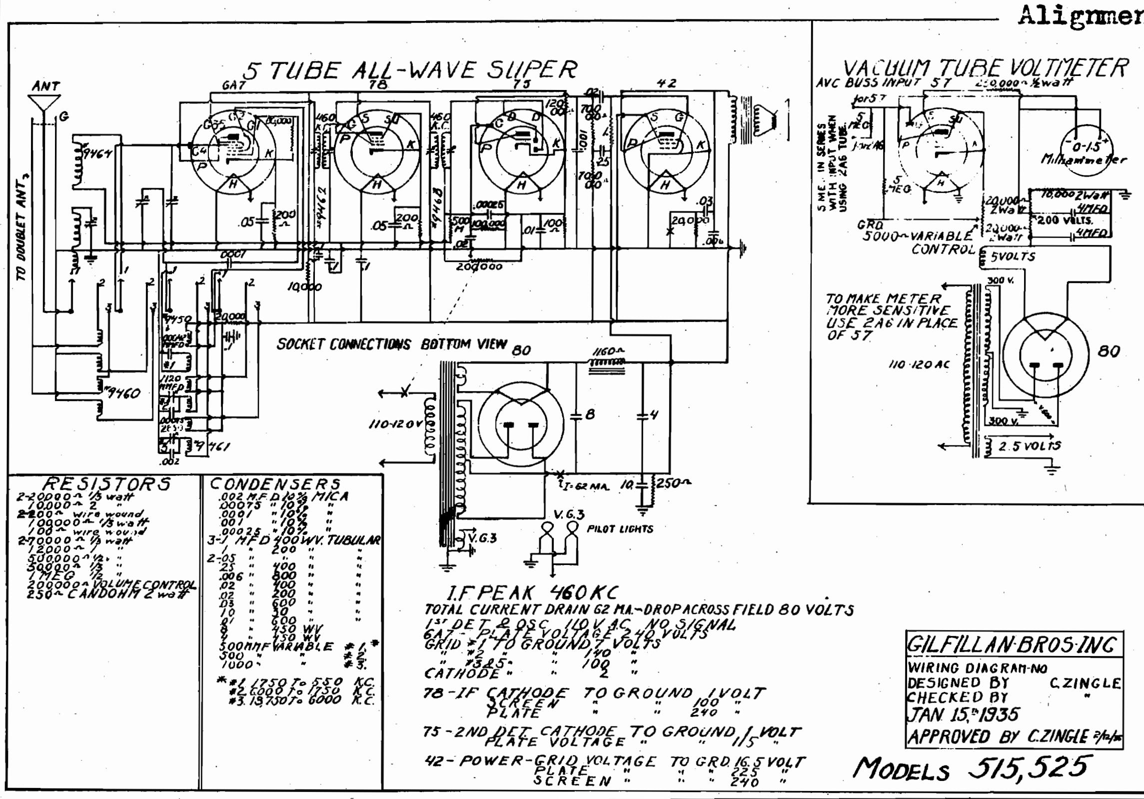
There is no freak or trick antenna that will eliminate natural static.

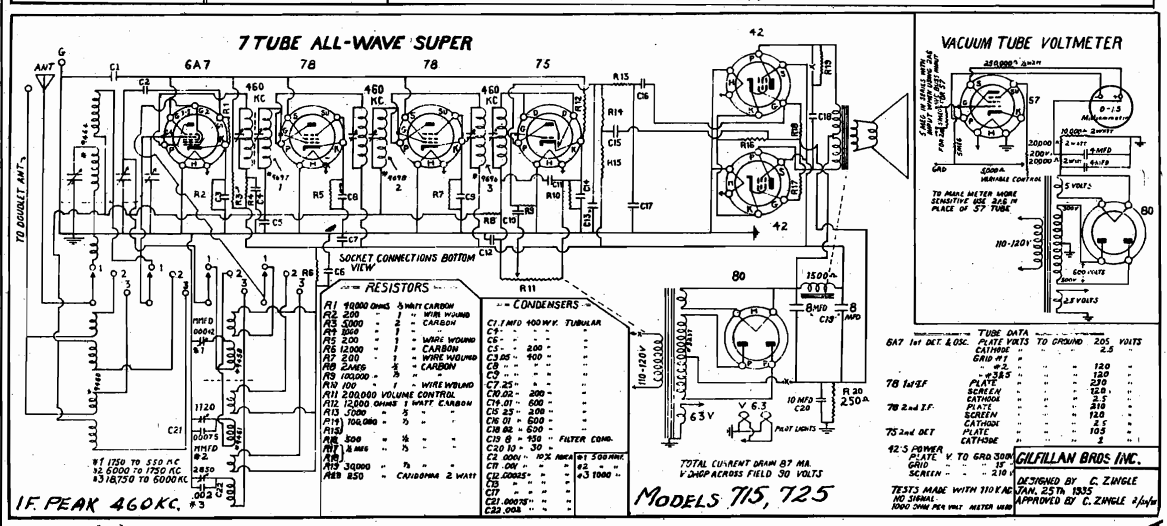
Models 510,520



MODELS 515,525
MODELS 715,725
Schematics, Socket
Alignment, Data

GILFILLAN BROS., INC.

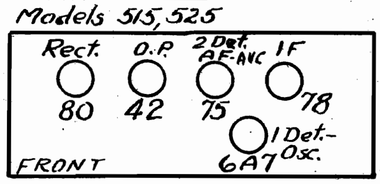




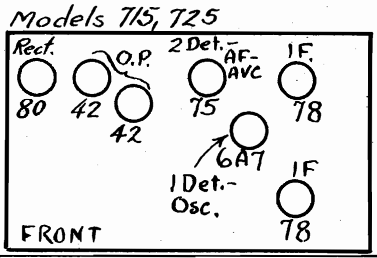
VACUUM TUBE VOLT METER

First adjust variable control so meter shows full scale reading. Connect input to A.V.C. buss tie post in chassis. Black leads from I.F.'s are a.v.c. leads. Maximum signal peak is indicated by meter swing toward O. Strength of carrier waves from broadcast and short wave stations will show on meter.

Models 515, 525



Models 715, 725



INTERMEDIATES

I.F. frequency is 460 K.C. To check I.F.'s, connect up vacuum tube volt meter as described. Turn dial till variable condenser plates are out. Make sure your oscillator is on 460 K.C., connect out-put of oscillator to grid of 6A7, leave grid cap in place and adjust trimmer screws on top of Intermediates for maximum gain (Minimum reading on meter).

NOISY OPERATION (Not Static)

A defective tube will cause a sharp 60 cycle r.f. pickup. Tube with loose elements will show up by lightly tapping the top of the tube with the eraser on a pencil.

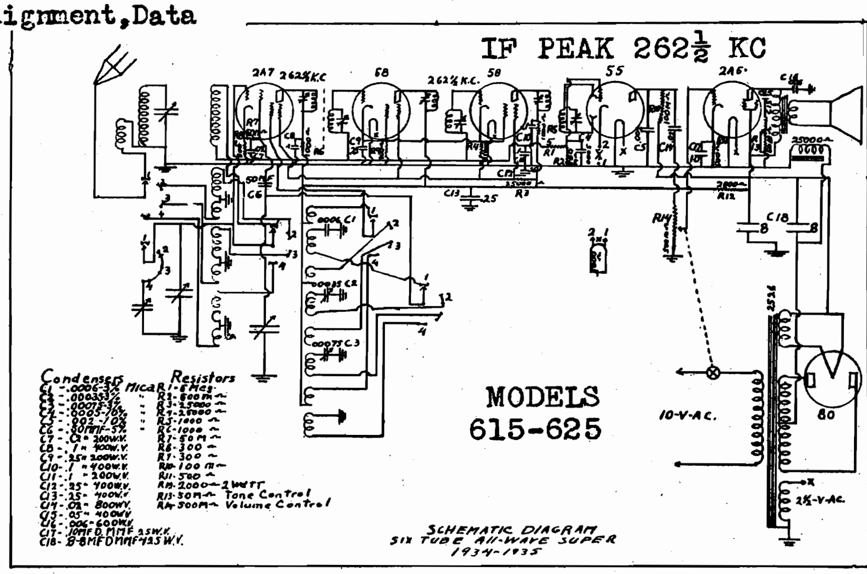
To determine if a 6A7 is oscillating on all bands, check each band by touching lug of ocsillator (center) section on variable with finger, a dull click will be heard if tube is oscillating properly.

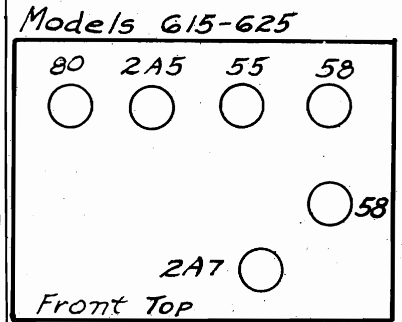
DOUBLET ANTENNA

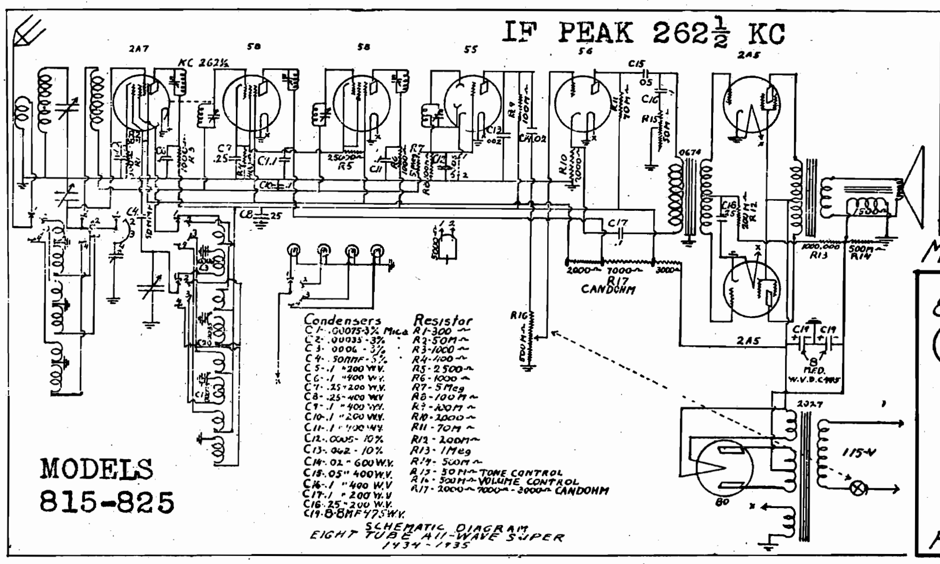
When using a doublet antenna the green lead goes to the long doublet lead and the white lead to the short doublet lead. Red always goes to ground. When set is on broadcast band the switch selects the long doublet lead and short one is not used. When doublet system is not employed white and red leads go to ground, and green lead to the antenna.

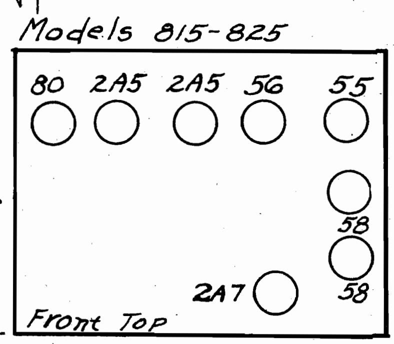
MODELS 615,625
MODELS 815,825
Schematics,Socket
Alignment,Data

GILFILLAN BROS., INC.









USING VACUUM TUBE VOLT METER

The cathode clip is connected to the cathodes of the tubes controlled by the A.V.C. The buss clip is connected to the A.V.C. buss in front of the isolating resistor.

Adjust rheostat shunt until meter shows full scale reading.

All balancing is done with maximum peak indicated by the meter swing toward O. Sensitivity of various receivers can be checked by the swing of meter from a known station. Short Wave fading can be seen by tuning in the station with meter connected to set.

REBALANCING

Do not rebalance a set until you are sure it requires it. 99 per cent of the sets do not need it. We do not find one case in one hundred that really should be rebalanced.

INTERMEDIATES

Connect a 262½ K. C. oscillator to the first detector grid (No. 2-A 7 tube) leaving grid cap in place. Set dial at 1400 K.C. Hook up vacuum tube meter as described and carefully adjust 3 screws on top of Intermediates for maximum gain (minimum reading of meter). Don't flat top any stages. Have all shields in place. Keep volume control at lowest level.

CONDENSER GANG

Set dial at 1400 K.C. when gang is at minimum position and tighten dial set screws. Tune in a station (or use an oscillator) to a known frequency signal around 1400 K.C. Carefully adjust oscillator section of gang until frequency is correct on dial.

If the intermediates are balanced on 262½ K.C., the dial will now track within 5 K.C. over the entire dial.

Adjust first detector section for maximum gain and follow by adjusting band pass trimmers.

Don't bend any condenser plates unless absolutely necessary.

OVERLOADING—OR POOR QUALITY AT LOW VOLUME

The chief cause of this trouble is too long an antenna. A powerful local station will cause the R. F. tubes to block. Check this by disconnecting the antenna on the station causing the trouble. If too close to a powerful station, installing a switch in the aerial circuit helps this. In rare cases the set seems to overload and the A.V.C. works too quickly on all stations.

Check the following:

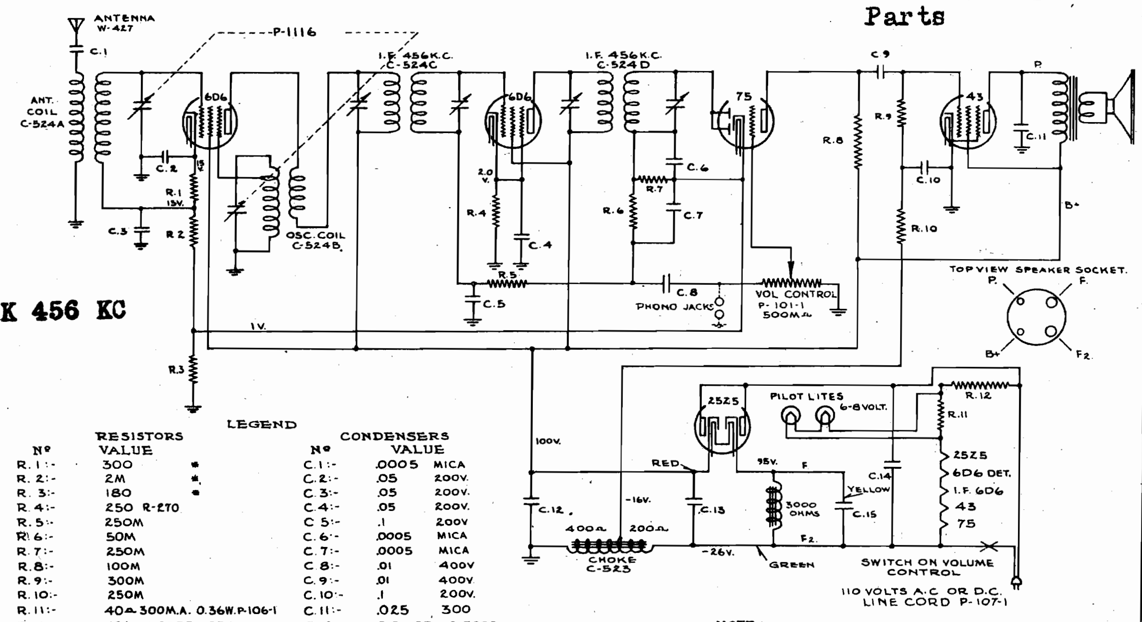
Disconnect 2 meg. resistor from A.V.C. buss at tie point. Have all tubes cold. Use high voltage, high resistance ohmmeter capable of reading 25 megohms and test from ground to A.V.C. buss for leakage. After condensers have charged, no leakage should be shown. This must read around 100 megohms to ground.

If slight leakage is observed, disconnect bypass condensers from buss until defective one is found. Sometimes moisture is found on coil terminals. Scrape this clear.

GOODYEAR SERVICE

MODEL 540
Schematic, Voltage Socket, Alignment Parts

IF PEAK 456 KC



LEGEND

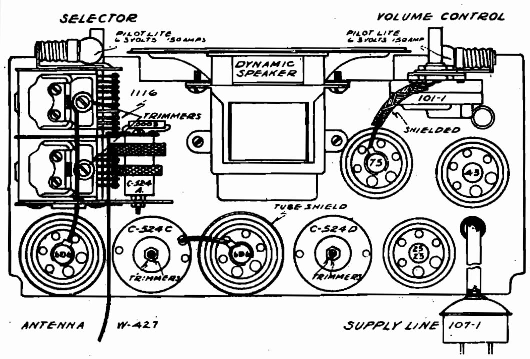
RESISTORS

Nº	VALUE	
R. 1:-	300	*
R. 2:-	2M	*
R. 3:-	180	*
R. 4:-	250 R-270	
R. 5:-	250M	
R. 6:-	50M	
R. 7:-	250M	
R. 8:-	100M	
R. 9:-	300M	
R. 10:-	250M	
R. 11:-	40Ω 300M.A. 0.36W. P-106-1	
R. 12:-	126 IN CORD P107-1	

CONDENSERS

Nº	VALUE	
C. 1:-	.0005	MICA
C. 2:-	.05	200V.
C. 3:-	.05	200V.
C. 4:-	.05	200V.
C. 5:-	.1	200V
C. 6:-	.0005	MICA
C. 7:-	.0005	MICA
C. 8:-	.01	400V
C. 9:-	.01	400V
C. 10:-	.1	200V.
C. 11:-	.025	300
C. 12:-	5.0 MFD.	C-525D
C. 13:-	25.0 MFD.	*
C. 14:-	.1	400V.
C. 15:-	5.0 MFD	*

-: NOTE :-
* R.1, R.2 & R.3 IN ONE UNIT PART NUMBER R-268.
* C. 13 AND C. 15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT.



Part No.	Description
101-1	Volume Control with Switch
106-1	40 Ohm Resistor-10%
107-1	126 Ohm Special Cord and Plug
C-523	600 Ohm Choke
C-524A	Antenna Coil
C-524B	Oscillator Coil
C-524C	Input I.F. Transformer
C-524D	Output I.F. Transformer
C-525C	5-25 Mfd. Electrolytic Condenser
C-525D	5 Mfd. Electrolytic Condenser
R-268	2480 Ohm Resistor
R-270	250 Ohm Wire Wound Resistor

SERVICE NOTES

Should it be at any time necessary to rebalance this set, the correct procedure is as follows:

1. Volume control on full during all alignment.
2. Variable condenser in minimum capacity position, plates open, at start of all aligning.

I.F. ALIGNMENT

1. To peak I.F. transformers, connect oscillator set at 456 kilocycles to the grid of the 6D6 tube directly in back of the variable condenser and adjust the trimming condensers of the I.F. transformers to resonance (Maximum deflection on an output meter connected across the primary of the speaker input transformer).

   Each I.F. trimmer has two adjustments, one nut and one screw, both of which are adjustable from the top.

BROADCAST BAND ALIGNMENT

1. Disconnect antenna wire and connect oscillator in series with a 75 mmfd. condenser to the antenna coil. With the variable condenser set at its minimum capacity position, at the extreme right of its rotation, and with an oscillator output adjusted to 1720 kilocycles, adjust trimmer of oscillator section of variable condenser (rear section) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer). Next adjust the trimmer condenser of the front section of the variable condenser to resonance.
2. Check alignment at 1400-1200-1000-800-600-530 kilocycles, bending the slotted plates of the front section of the variable condenser only if absolutely necessary.

MODEL 575
Schematic, Voltage
Socket, Trimmers
Alignment

GOODYEAR SERVICE

Service Notes

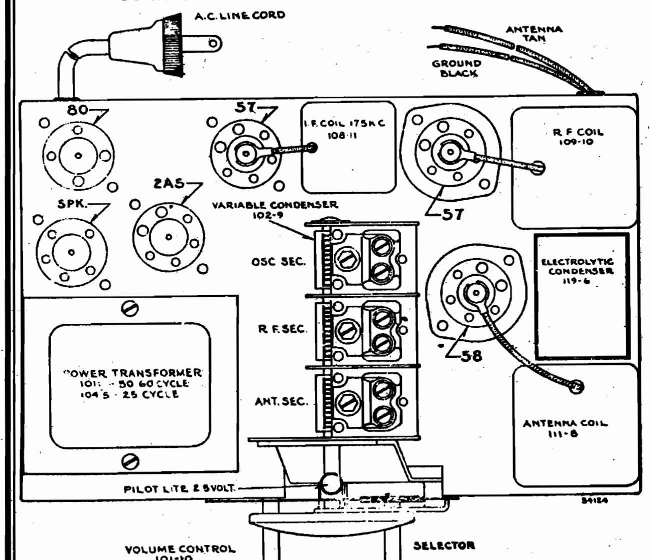
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

Common Black to Brown	—.003	x 600 Volts
Common Black to Green	—.1	x 200 Volts
Common Black to Red	—.1	x 200 Volts
Common Black to Orange	—.25	x 200 Volts
Blue to Blue	—.05	x 400 Volts

Part No. 145-3

Common Black to Brown	—.1	x 200 Volts
Common Black to Green	—.05	x 200 Volts
Common Black to Orange	—.05	x 200 Volts
Common Black to Yellow	—.05	x 200 Volts



Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

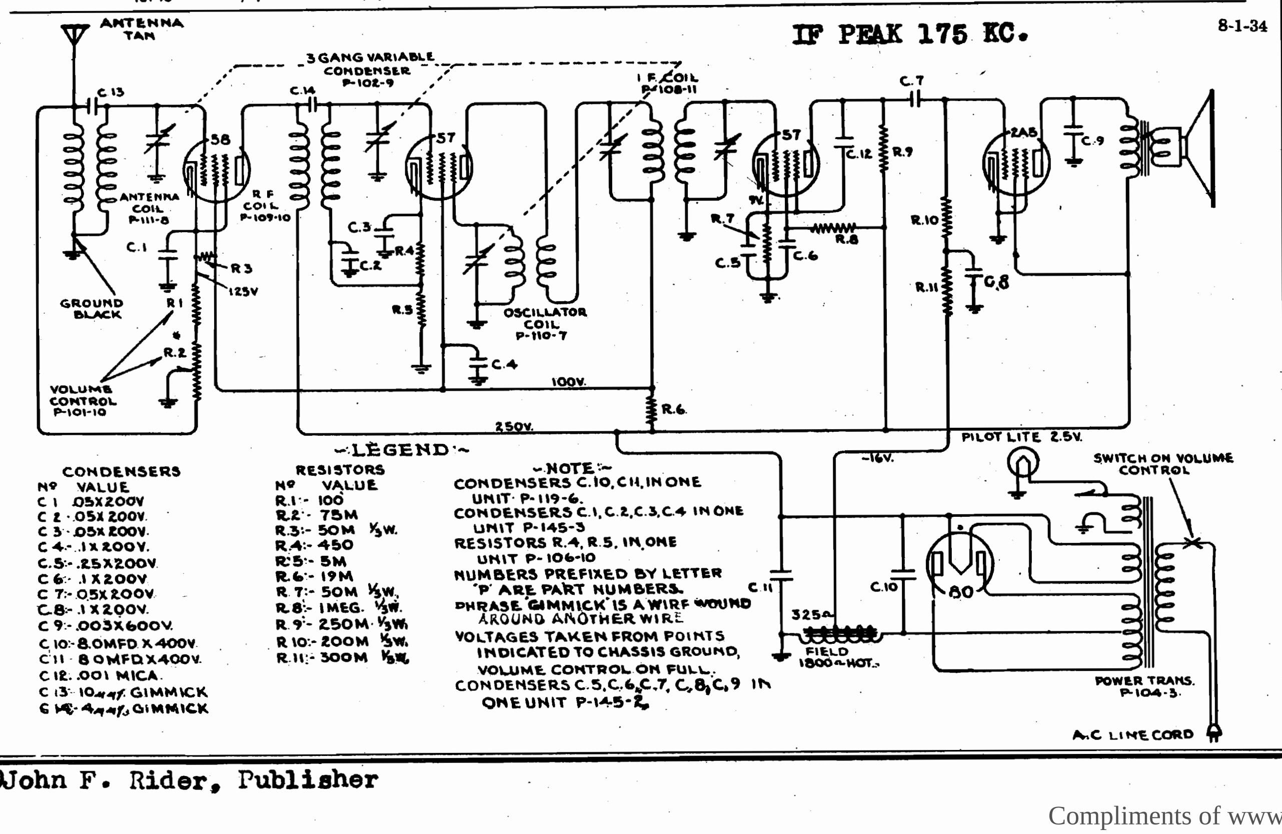
(a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.

(b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.

(c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

IF PEAK 175 KC.

8-1-34



~LEGEND~

CONDENSERS

Nº	VALUE
C 1	.05X200V
C 2	.05X200V.
C 3	.05X200V.
C 4	.1X200V.
C 5	.25X200V
C 6	.1X200V
C 7	.05X200V
C 8	.1X200V.
C 9	.003X600V.
C 10	8.0MFD X 400V
C 11	8.0MFD X 400V.
C 12	.001 MICA.
C 13	10 μμf. GIMMICK
C 14	4 μμf. GIMMICK

RESISTORS

Nº	VALUE
R.1	100
R.2	75M
R.3	50M ⅓W.
R.4	450
R.5	5M
R.6	19M
R.7	50M ⅓W.
R.8	1MEG. ⅓W.
R.9	250M ⅓W.
R.10	200M ⅓W.
R.11	300M ⅓W.

~NOTE~

CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3
RESISTORS R.4, R.5, IN ONE UNIT P-106-10
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.
PHRASE "GIMMICK" IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.

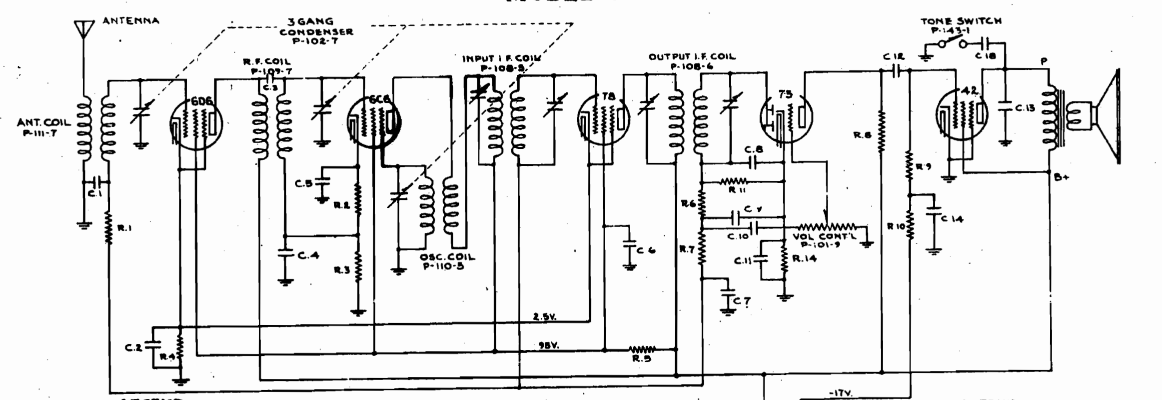
MODEL 670
Schematic, Voltage Socket, Trimmers

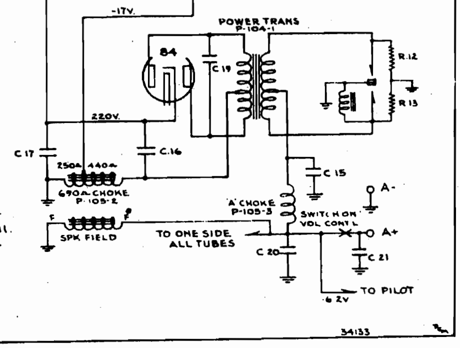
GOODYEAR SERVICE

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

MODEL 670





LEGEND

RESISTORS Nº	VALUE
R.1:-	250M 1/3W.
R.2:-	450Ω
R.3:-	5M
R.4:-	150Ω
R.5:-	19M
R.6:-	50M 1/3W.
R.7:-	250M 1/3W.
R.8:-	250M 1/3W.
R.9:-	200M 1/3W.
R.10:-	300M 1/3W.
R.11:-	250M. 1/3W.
R.12:-	100Ω
R.13:-	100Ω
R.14:-	4M 1/3W
VAR. RESISTOR (VOL CONT'L)	500M

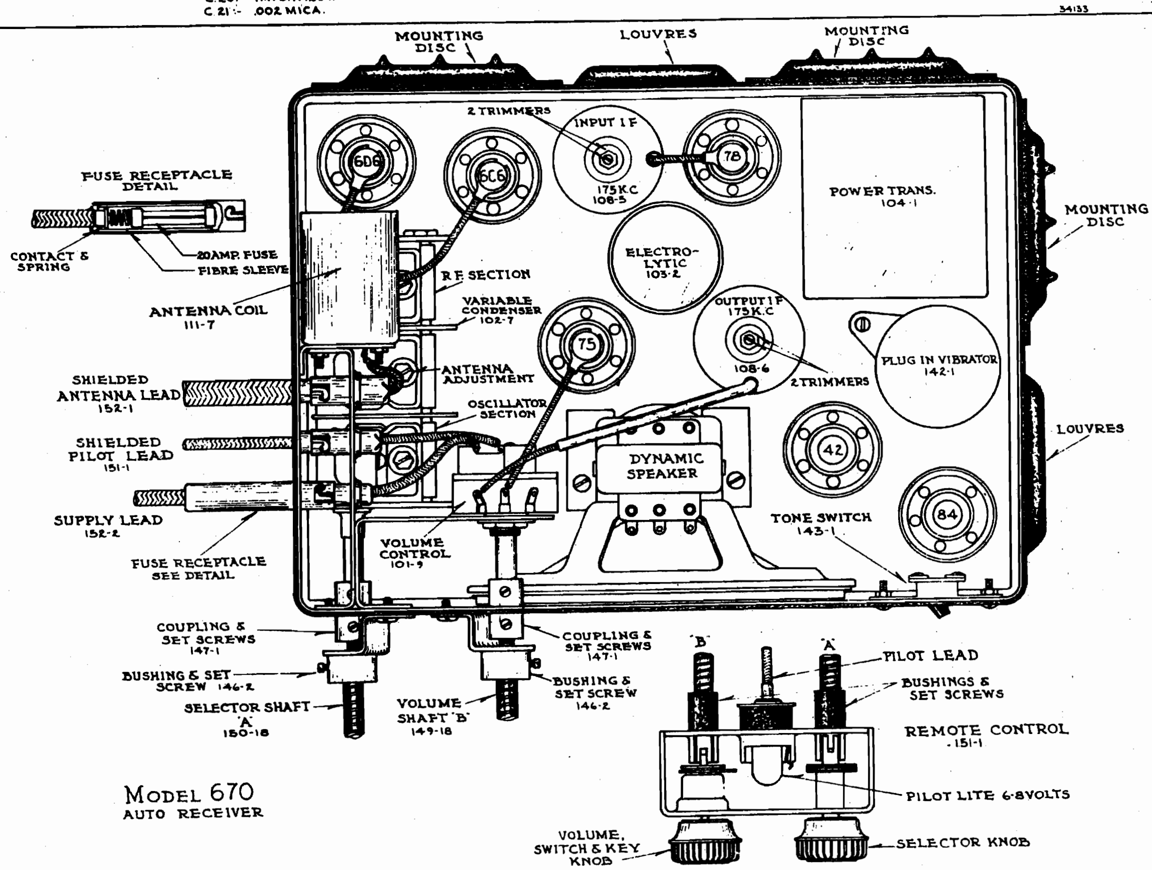
CONDENSERS Nº	VALUE
C.1:-	.05 X 200V.
C.2:-	.1 X 200V.
C.3:-	11.5 $\mu\mu f$ GIMMICK
C.4:-	.05 X 200V.
C.5:-	.05 X 200V.
C.6:-	.1 X 200V.
C.7:-	.1 X 200V.
C.8:-	.0005 MICA
C.9:-	.0005 MICA
C.10:-	.01 X 400V.
C.11:-	20 MFD. X 20V.
C.12:-	.01 X 400V.
C.13:-	.003 X 600V.
C.14:-	.1 X 200V.
C.15:-	1 MFD. X 120V.
C.16:-	8 MFD. X 350V.
C.17:-	8 MFD. X 350V.
C.18:-	.01 X 400V
C.19:-	.02 X 1000V.
C.20:-	1 MFD. X 120V.
C.21:-	.002 MICA.

NOTE

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND VOLUME CONTROL ON FULL.
THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.
RESISTORS IN ONE UNIT, P-106-3, - R. 2, 3, 4, 5.
CONDENSERS IN ONE UNIT, P-103-2 - C 16, 17.
CONDENSERS IN DUAL UNIT:- C. 2, 7.
CONDENSERS IN DUAL UNIT - C 5, 6
RESISTORS AND CONDENSERS IN OUTPUT I.F. CAN, P-108-6, - C. 8, 9, 10 AND R. 6, 7, 11.
CONDENSER, C 1, IN ANT COIL CAN P-111-7.

IF PEAK 175 KC.

34133



MODEL 670
AUTO RECEIVER

MODEL 670
Alignment
Elimination Notes

GOODYEAR SERVICE

ELIMINATION OF MOTOR NOISE:

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 148-1, is connected to generator side of cutout. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 148-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield and ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted breaker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (148-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

SERVICE NOTES

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number [illegible] and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

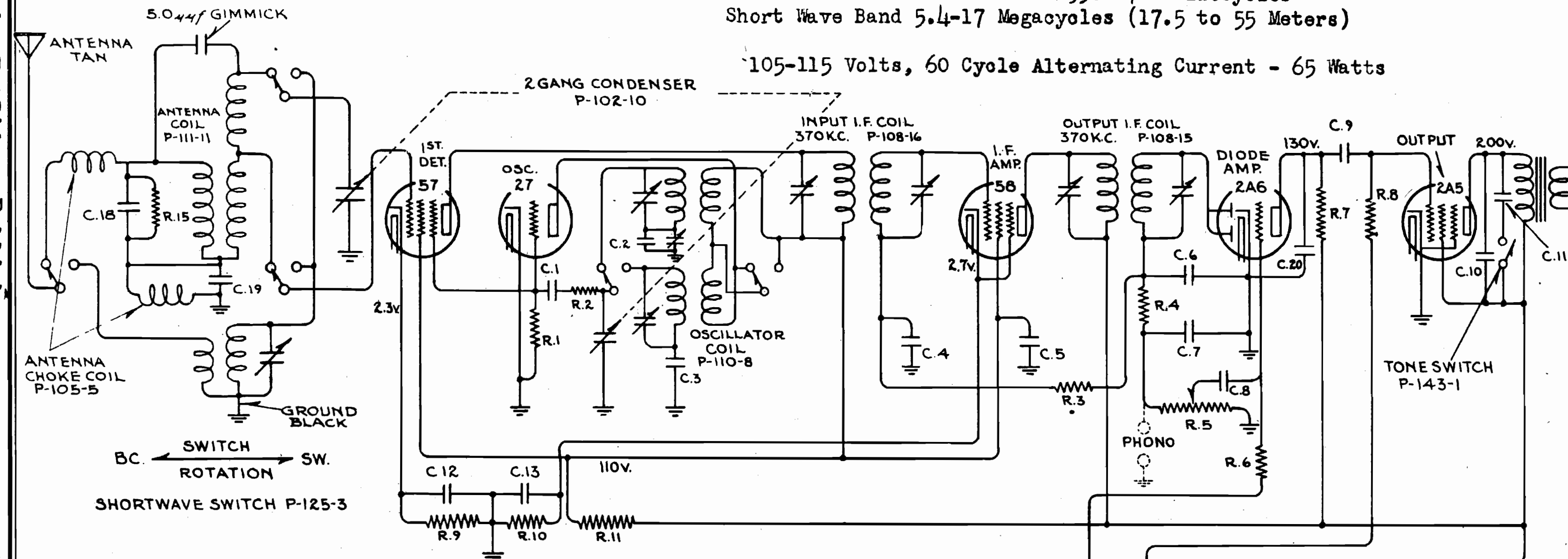
NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

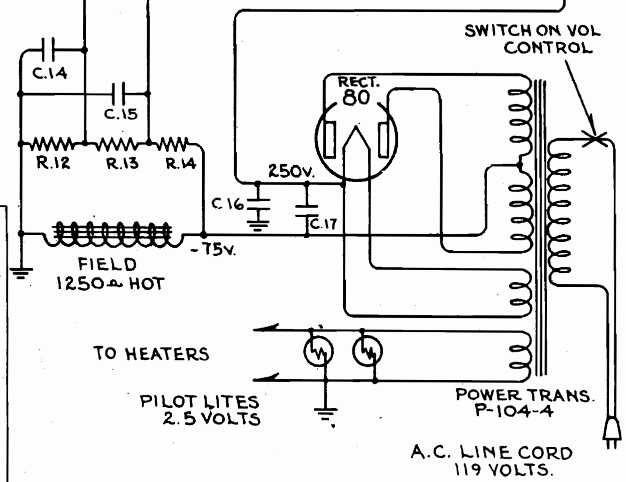
GOODYEAR SERVICE

MODEL 675
Schematic, Voltage
Socket, Trimmers

Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts



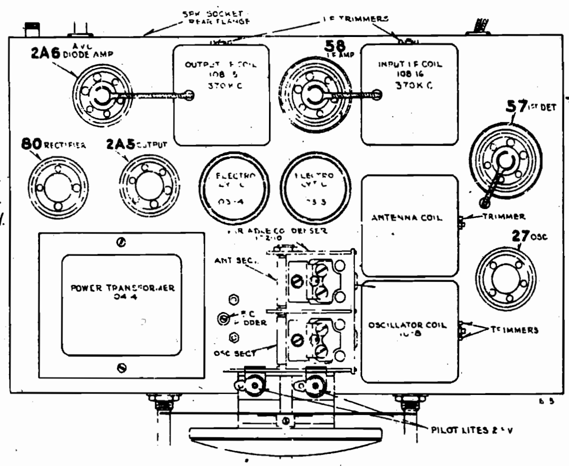


IF PEAK 370 KC.

CONDENSERS Nº	VALUE
C.1:-	50 MICA
C.2:-	490 MICA
C.3:-	5M MICA
C.4:-	.05 X 200V
C.5:-	.05 X 400V.
C.6:-	100 MICA
C.7:-	100 MICA
C.8 -	.05 X 200V.
C.9:-	.05 X 400V.
C.10:-	.003 X 400V.
C.11:-	.02 X 400V.
C.12:-	.1 X 200V.
C.13:-	.1 X 200V.
C.14:-	.25 X 200V.
C.15:-	.25 X 200V
C.16:-	18MFD. 350V. P-103-3
C.17:-	16MFD 400V. P-103-4
C.18:-	120 μμf.
C.19:-	.01 μμf.
C.20:-	.0005 MICA.

RESISTORS Nº	VALUE	
R.1:-	50M.	1/3W.
R.2:-	50	1/3W.
R.3:-	500M	1/3W.
R.4:-	50M	1/3W.
R.5:-	500M	VOLUME CONTROL P-101-11
R.6:-	500M	1/3W.
R.7:-	250M	1/3W.
R.8:-	250M	1/3W.
R.9:-	1000	
R.10:-	275	
R.11:-	13M	
R.12:-	25M	1/3W
R.13:-	250M	1/3W.
R.14:-	750M	1/3W.
R.15:-	10M	1/3W.

-: NOTE.-
CONDENSERS C.10, C.11 IN DUAL UNIT
" C.14, C.15 " " "
" C.13, C.4 " " "
RESISTORS R 9, R.10, R.11 IN ONE UNIT P-106-13
NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.



34265

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL
RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

MODEL 675
Alignment

GOODYEAR SERVICE

SERVICE NOTES

Voltages taken from different points of the circuit are measured with a voltmeter having a resistance of 1000 ohms per volt and are made between the points indicated and the chassis pan. These voltages are indicated on the circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNMENT:

No aligning adjustments should be made until the set has been thoroughly checked for all other possible causes of trouble, such as poor installations, low line voltages, defective tubes, condensers and resistors.

ALIGNING I.F. TRANSFORMERS:

1. With volume control full on, at the extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, extreme left of its rotation, plates entirely out of mesh, adjust the I.F. transformers (parts number 108-15 and 108-16) in the following manner:
   (a) Connect an external oscillator which has been adjusted to 370 kilocycles, in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube (see diagram and chassis).
   (b) Adjust trimming condensers of both I.F. transformers (Parts number 108-15 and 108-16) to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between plate and screen terminals of type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

   Note: The two adjustments on each transformer are accessible through holes in the transformer cans from the back of the chassis.

BROADCAST BAND ALIGNMENT:

1. Shift frequency of external oscillator to 535 kilocycles and connect in series with a 200 mmfd. condenser to the tan antenna wire and the black ground wire.
   (a) Set the variable condenser in its maximum capacity position, extreme right of its rotation.
   (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This trimmer is located between the gang condenser and the power transformer (see top view).
2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, extreme left of its rotation, plates entirely out of mesh.
   (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in the oscillator coil can, part number 110-8.

SHORT WAVE BAND ALIGNMENT:

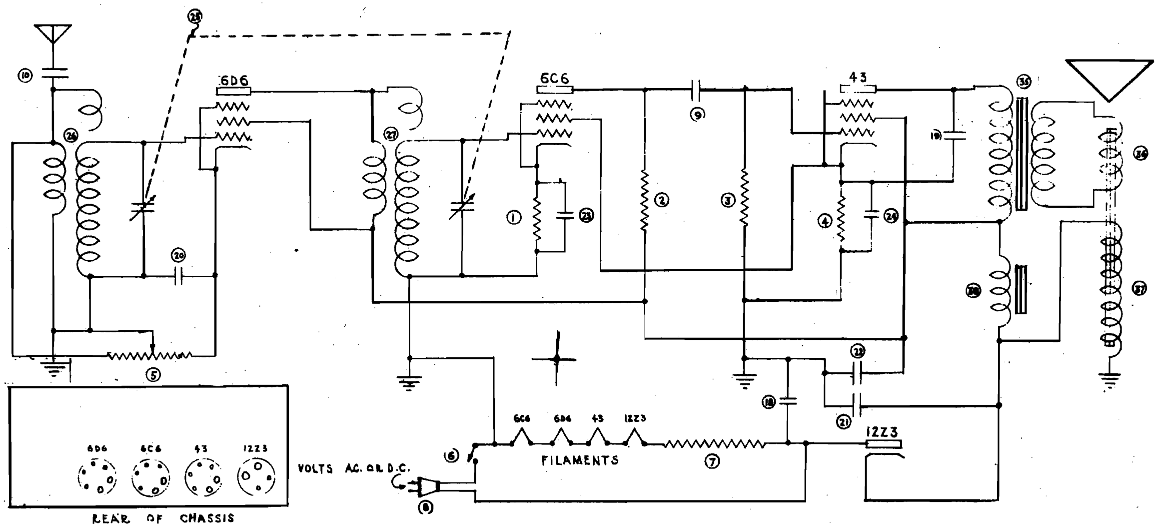
1. Set the wave changing switch in the short wave position, extreme right of its rotation, and change external oscillator frequency to 15 megacycles.
   (a) Adjust variable condenser with selector knob so that pointer is opposite the 15 megacycle calibration on the dial.
   (b) Adjust the short wave oscillator shunt trimmer to resonance with the signal (use extreme care and make certain that you do not adjust to resonance with the image instead of the signal). This trimmer is the bottom trimmer (closest to the chassis) on the oscillator coil, part number 110-8, and is accessible from the side of the chassis.
   (c) Adjust the short wave antenna trimmer to resonance (single trimmer in antenna can, part number 111-11, accessible from the side of the chassis, between type 27 and 57 tubes).

NOTES:

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is 112-31, All of the other dial parts are hardened and should cause no trouble.

MODEL 45
MODEL 52
Schematic, Socket

HALSON RADIO MFG. CO.

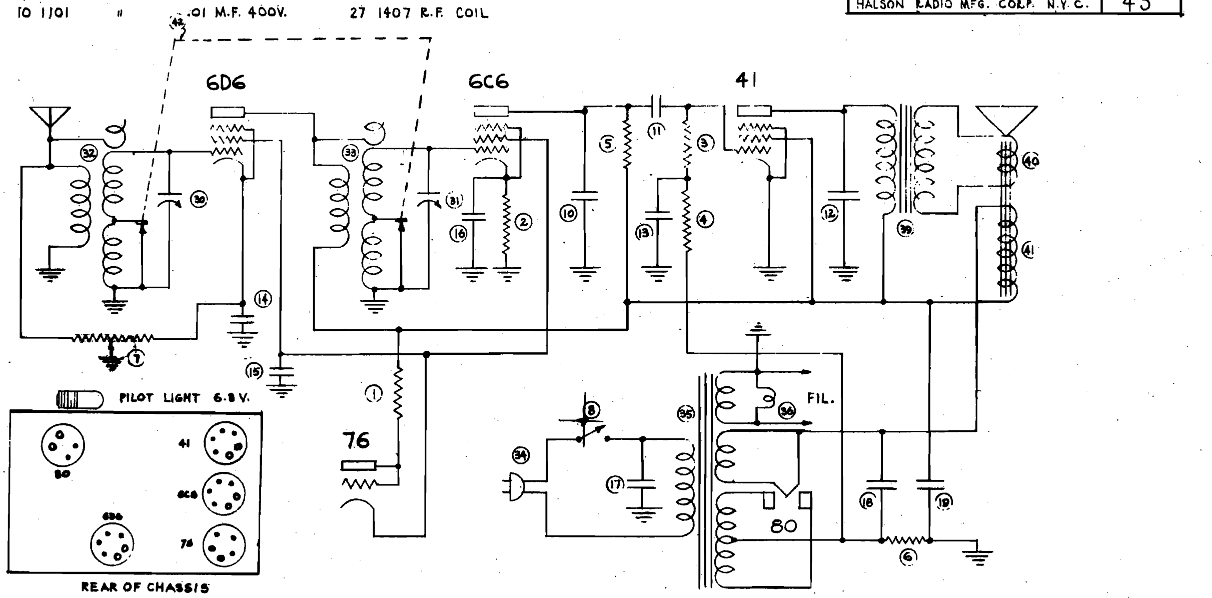


1 1413 RESISTOR 29000ω ¼ WATT
2 1414 " 490,000ω "
3 1415 " 990,000ω "
4 1412 " 610ω ½ WATT
5, 6 1405 { VOL. CONTROL 25,000ω / LINE SWITCH
7, 8 1417 { RESISTANCE 220ω / LINE CORD & PLUG
9 1416 CONDENSER .001 M.F. 600V.
10 1101 " .01 M.F. 400V.

18 1102 CONDENSER .02 M.F. 400V.
19 " " " " "
20 1040 " .05 M.F. 200V.
21 1408 ELEC. COND. 16 M.F. 150V.
22 1408 " " 8 M.F. 150V.
23 1408 " " 5 M.F. 35V.
24 1408 " " 5 M.F. 35V.
25 1404 VARIABLE COND. 370 M.M.F.
26 1406 ANTENNA COIL
27 1407 R.F. COIL

35, 36, 37 1418 SPK'R. ASSY { OUTPUT TRANS. / VOICE COIL / FIELD COIL 3,500ω (HOT)
38 1281 FILTER CHOKE 400ω

CIRCUIT DIAGRAM		MODEL 45	
DRAWN BY 11-5-34	CHECKED BY	APPROVED BY	HALSON NUMBER 45
HALSON RADIO MFG. CORP. N.Y.C.			



1 1158 RESISTOR 110,000ω 1 WATT
2 1160 " 51,000ω ¼ "
3 1165 " 260,000ω " "
4 " " " " "
5 1029 " " 1 "
6 1292 " 400ω 1 "
7, 8 1209 { VOLUME CONTROL 25,000ω / LINE SWITCH
10 1098 CONDENSER 510 M.M.F. MICA

11 1101 CONDENSER .01 M.F. 400V.
12 1385 " " " 600V.
13 1040 " .05 " 200V.
14 " " " " "
15 1036 " .1 " "
16 1103 " .25 " "
17 1102 " .02 " 400V.
18 1437 ELECTROLYTIC COND. 8 M.F. 500V.
19 " " " " "

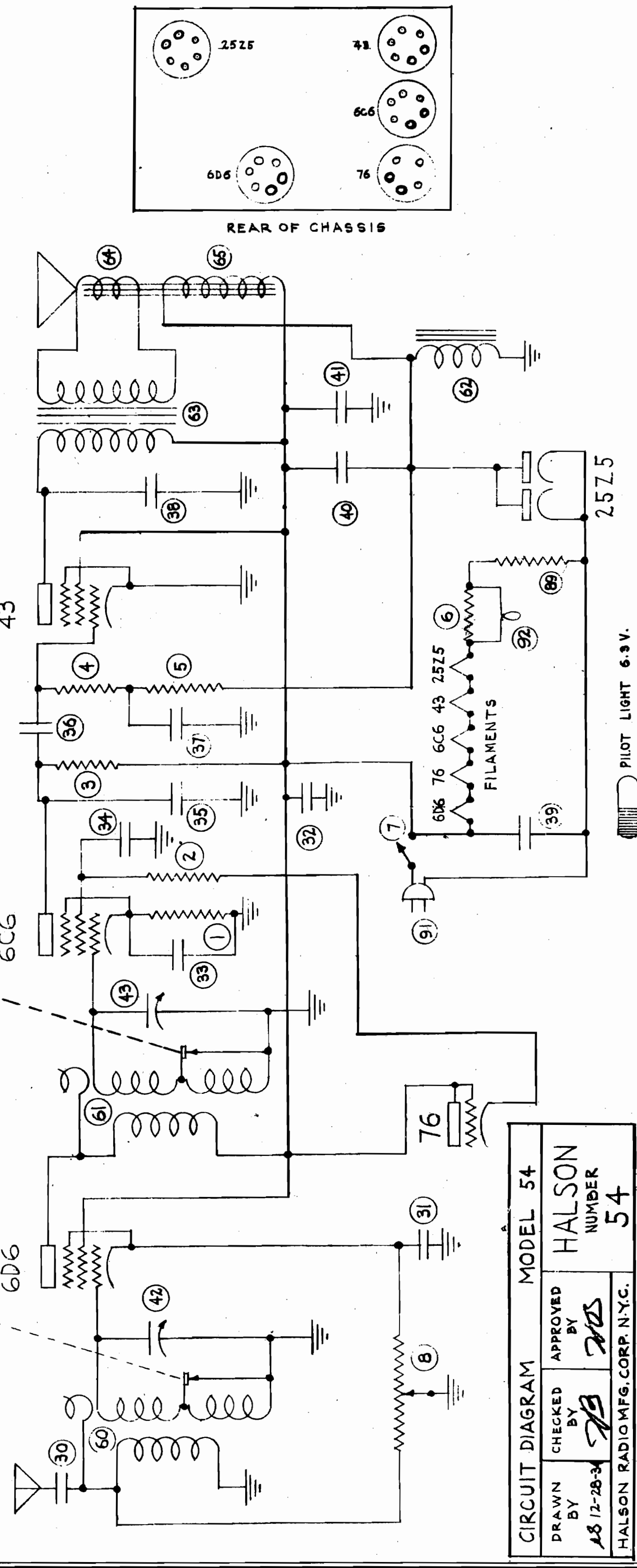
30 1432 VARIABLE COND. 370 M.M.F.
31 " " " " "
32 1433 ANTENNA COIL
33 1438 R.F. COIL
34 1115 LINE CORD & PLUG
35 1434 POWER TRANSFORMER
36 1086 PILOT LIGHT 6.3 V.

39, 40, 41 1431 SPKR. ASSY. { OUTPUT TRANS. / VOICE COIL / FIELD COIL 2000ω
42 1439 WAVE CHANGE SWITCH

CIRCUIT DIAGRAM		MODEL 52	
DRAWN BY AS 12-8-34	CHECKED BY	APPROVED BY	HALSON NUMBER 52
HALSON RADIO MFG. CORP. N.Y.C.			

MODEL 54
Schematic
Socket

HALSON RADIO CORP.



1	1027	RESISTOR	31,000Ω	1/4 WATT
2	1094	"	1.1 MEG Ω	" "
3	1029	"	260,000Ω	1 "
4	1165	"	"	1/4 "
5	"	"	"	" "
6	1016	"	20Ω	2 "
7	1209	LINE SWITCH		
8	1209	VOLUME CONTROL 25,000Ω		
30	1101	CONDENSER	.01 M.F.	400V.
31	1040	"	.05 "	200V.
32	1036	"	.1 "	"
33	1103	"	.25 "	"
34	1036	"	.1 "	"
35	1098	"	510 M.M.F MICA	
36	1101	"	.01 M.F.	400V.
37	1103	"	.25 "	200V.
38	1102	CONDENSER	.02 M.F.	400V.
39	"	"	"	"
40	1440	ELEC. COND.	16 M.F.	150V.
41	1440	"	"	"
42	1432	VARIABLE COND.	370 M.M.F	
43	1432	"	"	
60	1433	ANTENNA COIL		
61	1438	R.F. COIL		
62	1281	FILTER CHOKE	430Ω	
63	1441	OUTPUT TRANS.		
64	SPKR ASSY	VOICE COIL		
65	SPKR ASSY	FIELD COIL	2300Ω (HOT)	
89	1394	RESISTANCE	140Ω	
91	1394	LINE CORD & PLUG		
92	1086	PILOT LIGHT	6.3V.	
93	1439	WAVE CHANGE SWITCH		

MODEL 66-AW
Schematic, Socket
Notes, Parts

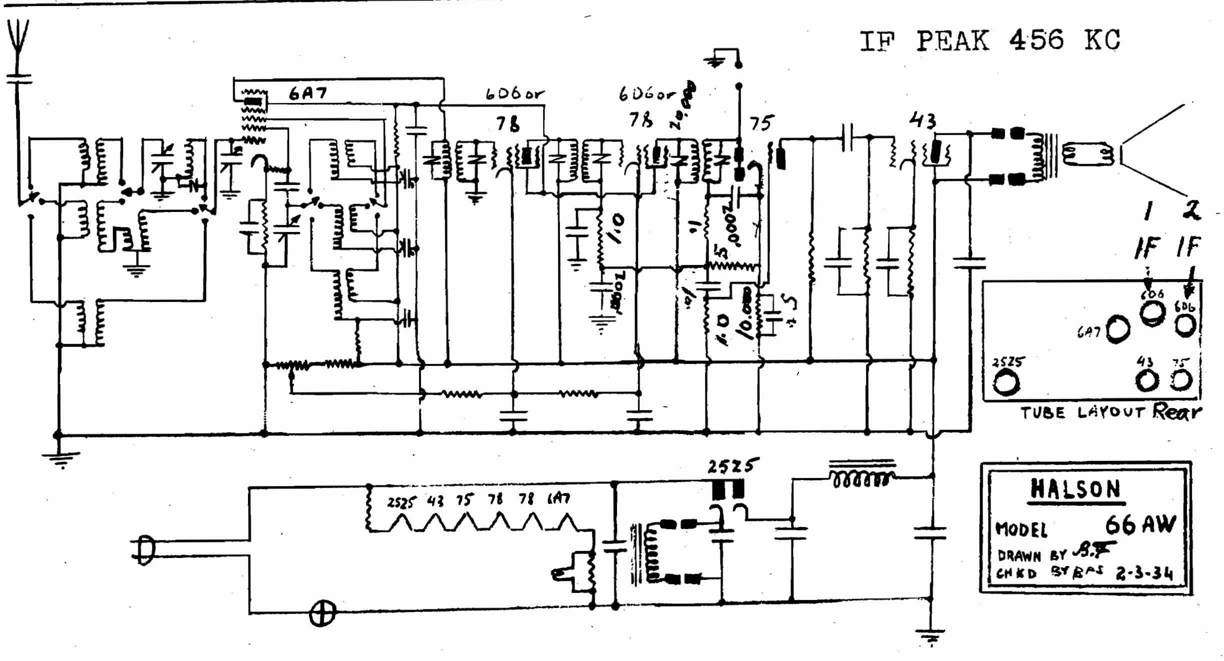
HALSON RADIO CORP.

Halson Model 66-AW is a six tube superheterodyne radio operating either on AC or DC. The wave bands are divided in three distinct steps, namely: No. 1 from 15 to 55 meters, No.2 from 180 to 550 meters, and No. 3 from 1000 to 2000 meters. Unless otherwise specified, all stock sets are designed to operate on any 110 volts lighting outlets.

INSTALLATION The set as furnished is complete in every detail for efficient operation. Connect the line and resistor cord to any convenient outlet, unroll the antenna wire and stretch same around the room. (Note) If operated on DC current, should the tubes light and no reception can be heard, reverse the outlet plug for correct polarization.
Make sure that all tubes are inserted in the right socket, the diagram herein shown, gives you the tube lay-out. Some locations differ from others, the self enclosed antenna is generally sufficient for local and near-by broadcastings, also under auspicious weather conditions for short-wave, but we recommend a short outside antenna well insulated for more efficient long distance receptions.

OPERATION The left hand knob controls the switch and volume control. Turn it clockwise to start receiver, adjust the volume to the desired degree. For short-wave operation, turn volume control till the set begins oscillation, short-wave reception best can be heard with least disturbances and noises slightly back of the oscillation point.
Center knob marked 1. 2. 3. indicates the three different wave-bands the set has been designed to operate. No. 1 is the short-wave, No. 2 the Broadcast, No. 3 the Long Wave. (Note) This knob automatically changes the positions of the dial readings for each individual wave-band.
The right hand knob is the station selector and operates the dial, which is calibrated in megacycles for the short-wave band and in kilocycles for the broadcast and long-wave band. TO SHUT OFF THE SET - turn the left knob counterclockwise (to the left) until the switch can be heard to snap off.

MINOR REASONS FOR FAILURE OF SET TO PROPERLY FUNCTION Defective tubes, grid caps off tubes, volume control not fully turned on, tubes not properly inserted in their respective sockets, shorted aerial, defective plug, or wiring connection loose in socket.

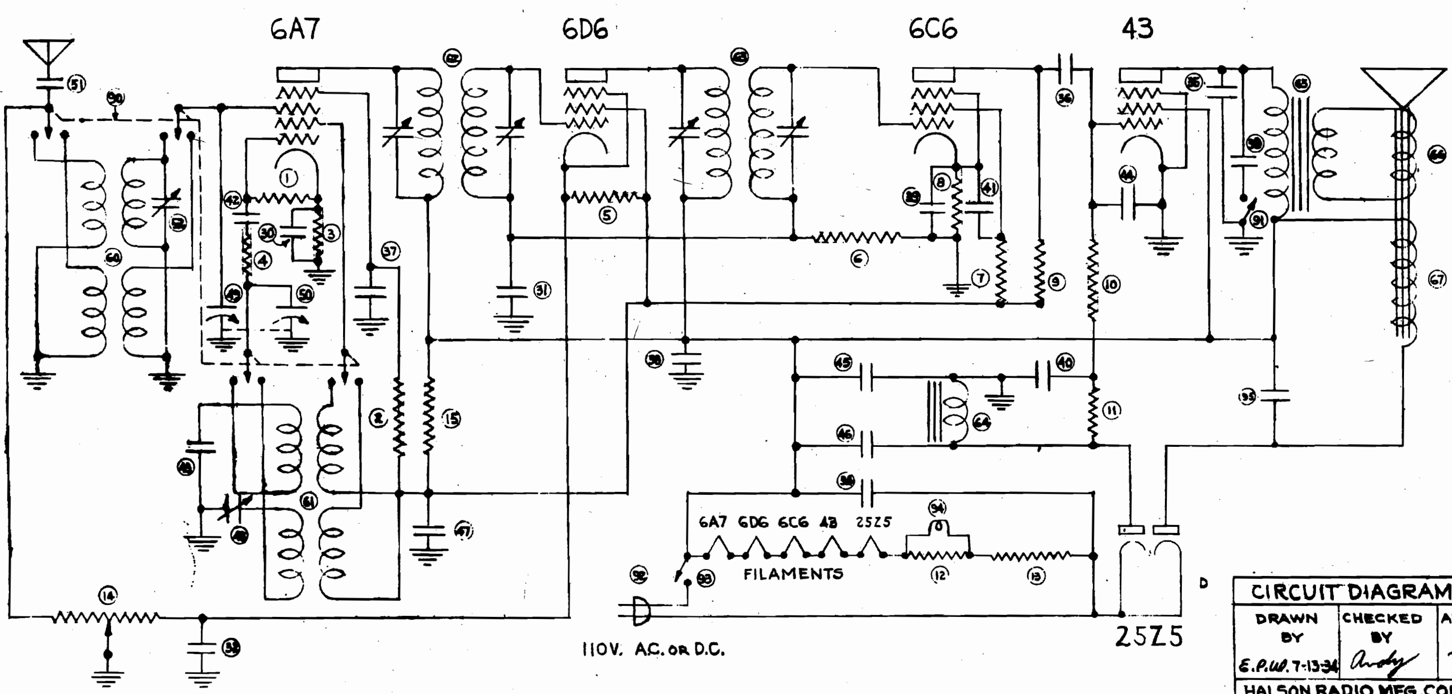


REPLACEMENT PARTS LIST.

6601 Volume Control
6602 6" Dynamic Speaker
6603 Replacement Coils per set
6604 Choke
6605 3 sections switch
6606 Electrolitic Condenser
6607 (Tubular Condenser (from 1 mfd. to .002 mfd.
6608 Mica Condensers from 0002 to 0025
6609 Resistors 11/3 W
6610 Line Cord and Resistor
6611 5 mfd. Condenser
6612 1 watt resistor
6613 20 W. Resistor
6614 Set of extra tubes

MODEL 535
Schematic, Socket
Parts List

HALSON RADIO CORP.



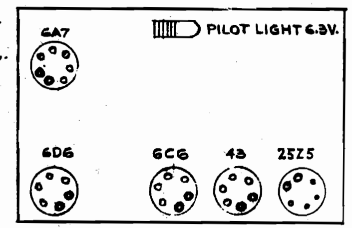
REVISIONS

LTR	WAS	DATE	NAME
A	1313	8-14	E.R.W.
B	1316	9-14	E.R.W.
C	21000ω	9-21	E.R.W.
D	RECTIFIER CIRCUIT WAS 1223	11-19	[illegible]
E	1320	"	[illegible]
F	8M.F.150V.	"	[illegible]
G	ADDED	"	[illegible]
H	.05-200V.	"	[illegible]
J	9096-2500 M.M.F	"	[illegible]
K	190ω	"	[illegible]
L	1278	"	[illegible]
M	1270	"	[illegible]
N	4500ω	"	[illegible]

CIRCUIT DIAGRAM		MODEL 535	
DRAWN BY	CHECKED BY	APPROVED BY	HALSON NUMBER 535
E.P.W. 7-13-34	Andy	HOS	
HALSON RADIO MFG. CORP. N.Y.C.			

C 1 1092 RESISTOR 110,000ω ½ WATT	K13 — RESISTANCE 140ω WITH 92	37 1040 CONDENSER .05 M.F. 200V.	49, 50 1206 VARIABLE COND. 370 M.M.F.
2 1242 " 21,000ω "	14 1209 VOLUME CONT. 25,000ω WITH 93	38 1036 " .1 " "	51 1101 CONDENSER .01 M.F. 400V.
3 1243 " 260ω "	15 1315 RESISTOR 5100ω ½ WATT	39 1103 " .25 " "	52 1107 ANT. TRIMMER COND. 5-30 M.M.F.
4 1276 " 110ω "	30 1040 CONDENSER .05 M.F. 200V.	40 " " " " "	60 1211 ANTENNA COIL
5 1245 " 51,000ω ½ WATT	H 31 " " .1 M.F. "	41 1036 " .1 " "	61 1212 OSCILLATOR COIL
6 1094 " 1.1 MEG.ω ½ WATT	32 " " .05 " "	42 1099 " 260 M.M.F. MICA	A 62 1070 I.F. TRANSFORMER 456 K.C.
7 " " " "	33 " " " " "	J 43 1393 " 2000 " "	B 63 1070 I.F. TRANSFORMER 456 K.C.
8 1027 " 31,000ω "	34 1102 " .02 " 400V.	44 1098 " 510 " "	64 1281 FILTER CHOKE
9 1029 " 260,000ω 1 WATT	35 1101 " .01 " "	E 45 1392 " ELEC. 8 M.F. 150V.	M 65 1396 SPKR. ASSY. OUTPUT TRANS. 4300ω
10 1030 " 510,000ω ½ WATT	36 " " " " "	46 " " " " "	66 1396 SPKR. ASSY. VOICE COIL
11 1165 " 260,000ω "		F 47 " " " 16 M.F. "	N 67 1396 SPKR. ASSY. FIELD COIL 2300ω HOT
12 1016 " 20ω 2 WATT		48 1104 PADDING COND. 250-400 M.M.F.	

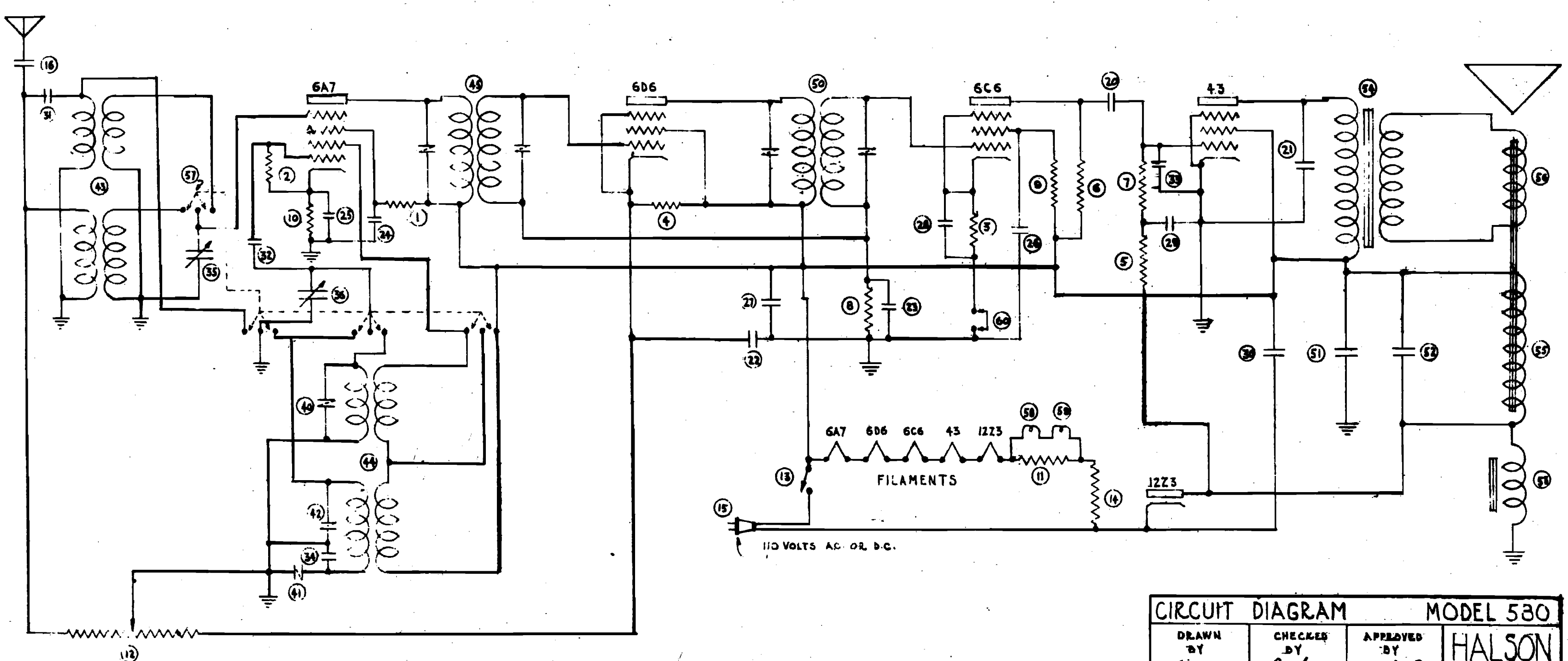
90 1210	WAVE CHANGE SWITCH
91 1203	TONE CONTROL SWITCH
L 92 1394	LINE CORD & PLUG WITH 13
93 —	LINE SWITCH WITH 14
94 1086	PILOT LIGHT BULB 6.3V.
G 95 1392	ELEC. COND. 4 M.F. 150V.



REAR OF CHASSIS

MODEL 580
Schematic, Socket
Parts List

HALSON RADIO CORP.



CIRCUIT DIAGRAM — MODEL 580

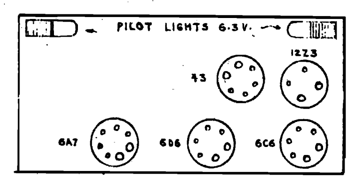
DRAWN BY	CHECKED BY	APPROVED BY	HALSON NUMBER
ab 11-6-34	Andy	[signature]	580

HALSON RADIO MFG. CORP. N.Y.C.

1	1267	RESISTOR	11,000 Ω ¼ WATT
2	1242	"	21,000 Ω "
3	1027	"	31,000 Ω "
4	1245	"	51,000 Ω ½ WATT
5	1165	"	260,000 Ω ¼ WATT
6	"	"	" "
7	1030	"	510,000 Ω "
8	1094	"	1,100,000 Ω "
9	"	"	" "
10	1243	"	260 Ω "
11	1374	"	40 Ω 4 WATT
12	1366	VOLUME CONTROL	25,000 Ω
13	1366	LINE SWITCH	
14	1376	RESISTANCE	170 Ω
15	1376	LINE CORD & PLUG	
16	1101	CONDENSER	.01 M.F. 400V.

20	1101	CONDENSER	.01 M.F. 400V.
21	"	"	" " "
22	1040	"	.05 M.F. 200V.
23	"	"	" " "
24	"	"	" " "
25	"	"	" " "
26	1036	"	.1 M.F. 200V.
27	"	"	" " "
28	1103	"	.25 M.F. 200V.
29	"	"	" " "
30	"	"	" " "
31	1097	"	110 M.M.F. MICA
32	1099	"	260 " "
33	1098	"	510 " "
34	1389	"	150 " "
35	1368	VARIABLE COND	370 M.M.F.
36	1368	" "	250 M.M.F.

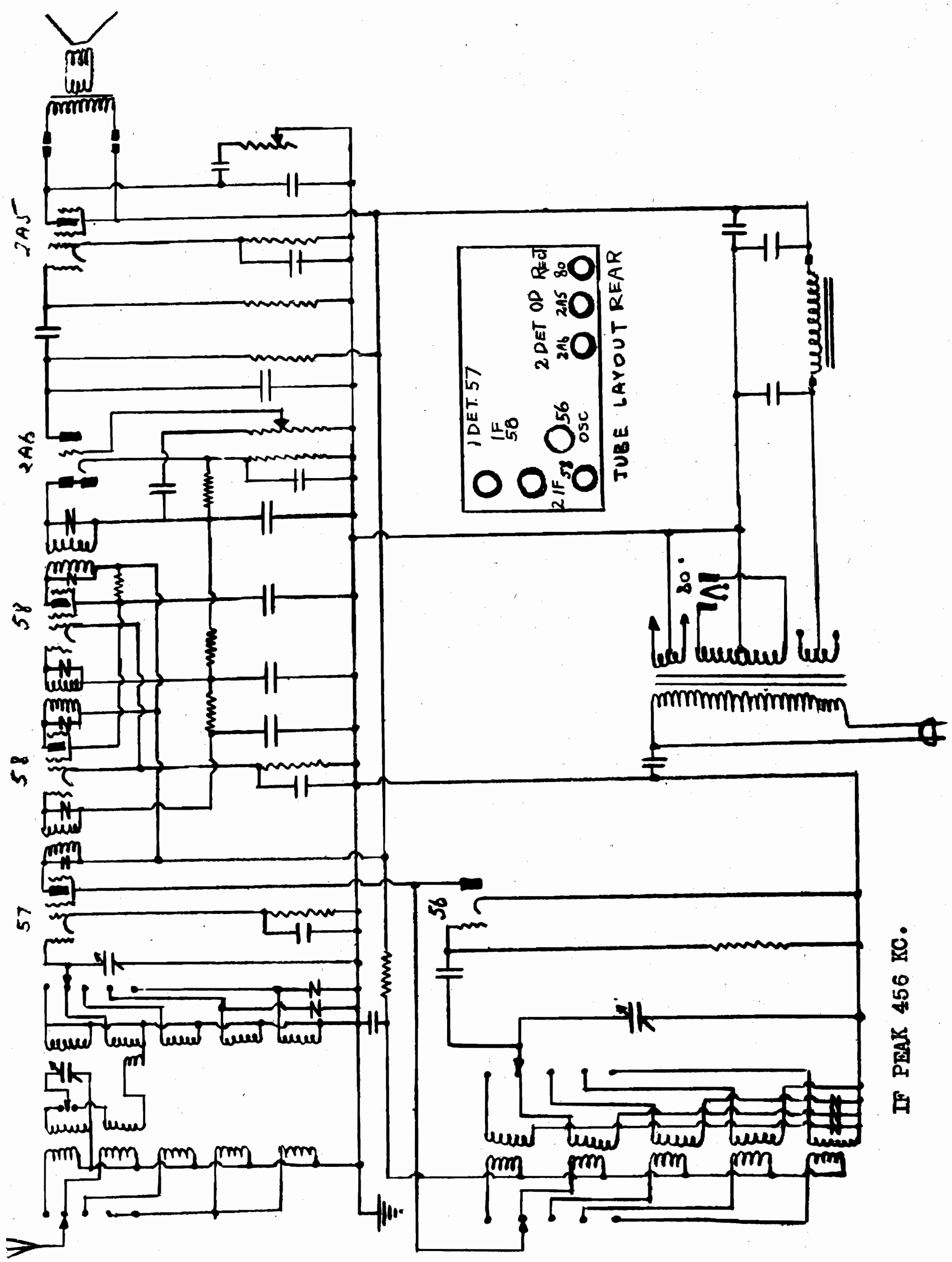
40	1107	B'C'ST TRIMMER COND.	5-30 M.M.F.
41	1262	L.W. PADDING COND.	50-120 M.M.F.
42	1262	L.W. TRIMMING COND.	5 30 M.M.F.
43	1390	ANTENNA COIL	
44	1391	OSCILLATOR COIL	
45	1070	I.F. TRANSFORMER	1st 456 K.C.
50	"	" "	2nd " "
51	1381	ELEC. CONDENSER	16 M.F. 150V.
52	1381	" "	8 " "
53	1281	FILTER CHOKE	400 Ω
54	1369 SPKR. ASS'Y	OUTPUT TRANS.	4300 Ω
55	1369 SPKR. ASS'Y	FIELD COIL	4500 Ω
56	1369 SPKR. ASS'Y	VOICE COIL	
57	1362	WAVE CHANGE SWITCH	
58	1086	PILOT BULB	6.3 VOLTS
59	"	" "	" "
60	1325	PHONO JACK	



REAR OF CHASSIS

MODEL 770-AW
Schematic
Socket

HALSON RADIO CORP.



MODEL 22 (2Types)
Schematic,Voltage

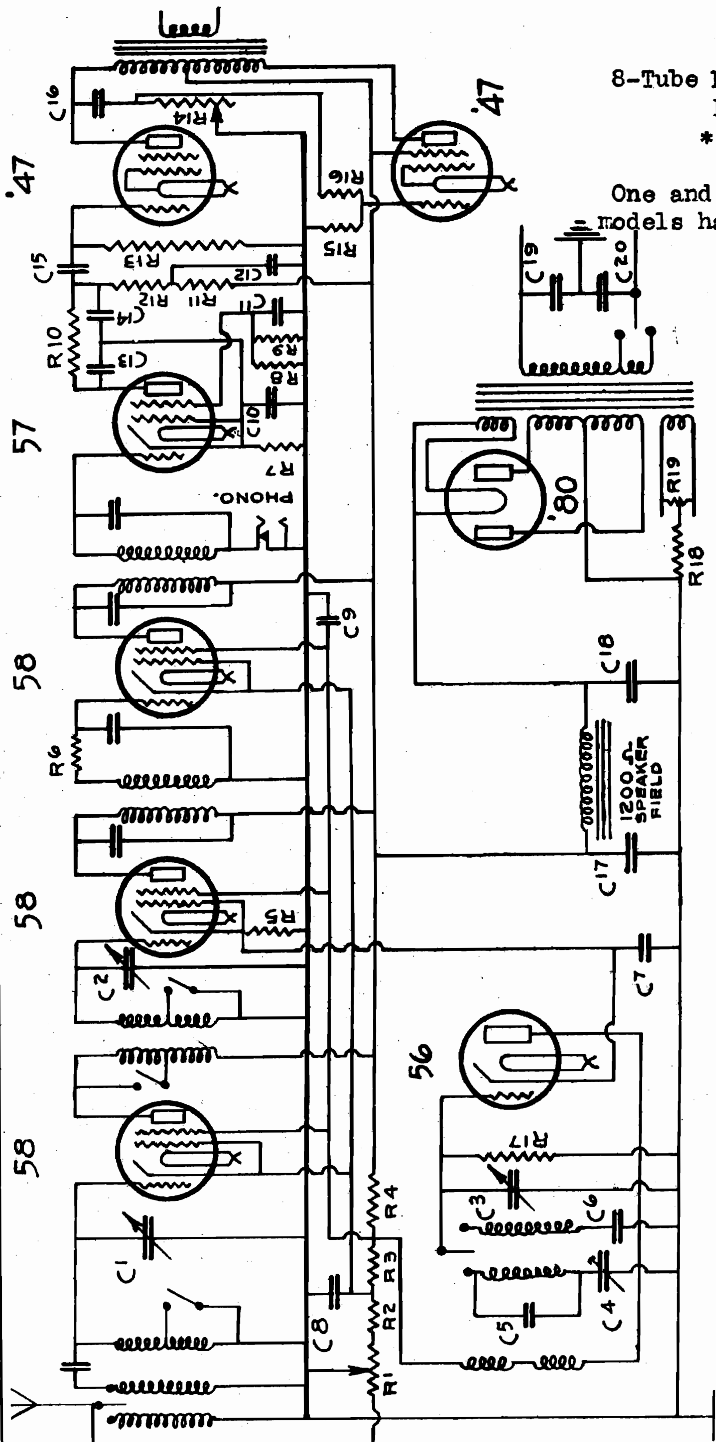
HETRO ELECTRICAL INDUSTRIES, INC.

VOLTAGE TESTS. All voltage tests made with volume control on full and no signal in set; "SS" means single-speaker models; "DS" means two-speaker models. Plates of 58 to ground SS 225-235 v.,DS 240-250 v. Screen of 58 to ground, SS 70-80 v.,DS 75-85 v. Cathode of RF and IF, 1-2 v. all models. Cathode 1st Det. and Osc. 2-3 v. all models. Plate of 56 to ground, SS 70-80 v. DS 75-85 v. Plate of 57 to ground 10-12 all models. Screen of 57 to ground 11-13 v. all models. Cathode of 57 to ground 3-4 v. all models. Plates of 47s to ground SS 220-230 v., DS 230-240 v. Across speaker field 120-130 v. for SS; DS 170-180 v. All heaters 2.4-2.6 v. all models. Filament 80 tube 4.8-5.2 v. Center tap of heaters to ground SS 17-18 v., DS 18-19 v. Plate of 80 to ground SS 350-370 v. AC, DS 400-420 v. AC.

8-Tube Long-Wave (200-2000 Meters)
Model 22

* * * * * * * *

One and two-speakers models. Two-speaker models have two 4000-ohm speakers in parallel.



IF PEAK 115 KC.

C1, C2, C3 -	.00036 VARIABLE
C4 -	450 MMF "
C5 -	50 MMF
C6 -	.002 MICA +-3%
C7 -	.001 MICA
C8 -	.1 200V.
C9 -	.1 200V.
C10 -	.5 200V.
C11 -	.1 200V.
C12 -	.1 400V.
C13 -	.00025 MICA
C14 -	.00025 "
C15 -	.006, 400V.
C16 -	.05 400V.
C17 -	8.MF 450V.
C18 -	8.MF 450V.
C19 -	.01 400V.
C20 -	.01 400V.

R1	12000 Ω	VOL. CONTROL } COMBINED
R2	200 Ω	FIXED BIAS } COMBINED
R3	25000 Ω	1 WATT
R4	20000 Ω	2 "
R5	450 Ω	1 "
R6	300 Ω	1/3 "
R7	50000 Ω	1/2 "
R8	.5 MEG.	1/2 "
R9	1. MEG.	1/2 "
R10	150000	1/2 "
R11	.25 MEG.	1/2 "
R12	.5 MEG.	1/2 "
R13	.5 "	1 "
R14	20000 Ω	TONE CONTROL
R15	10000 Ω	1/2 WATT
R16	.25 MEG.	1/2 "
R17	.25 "	1/2 "
R18	250 Ω	2 "
R19	20 Ω	CENTER TAPPED

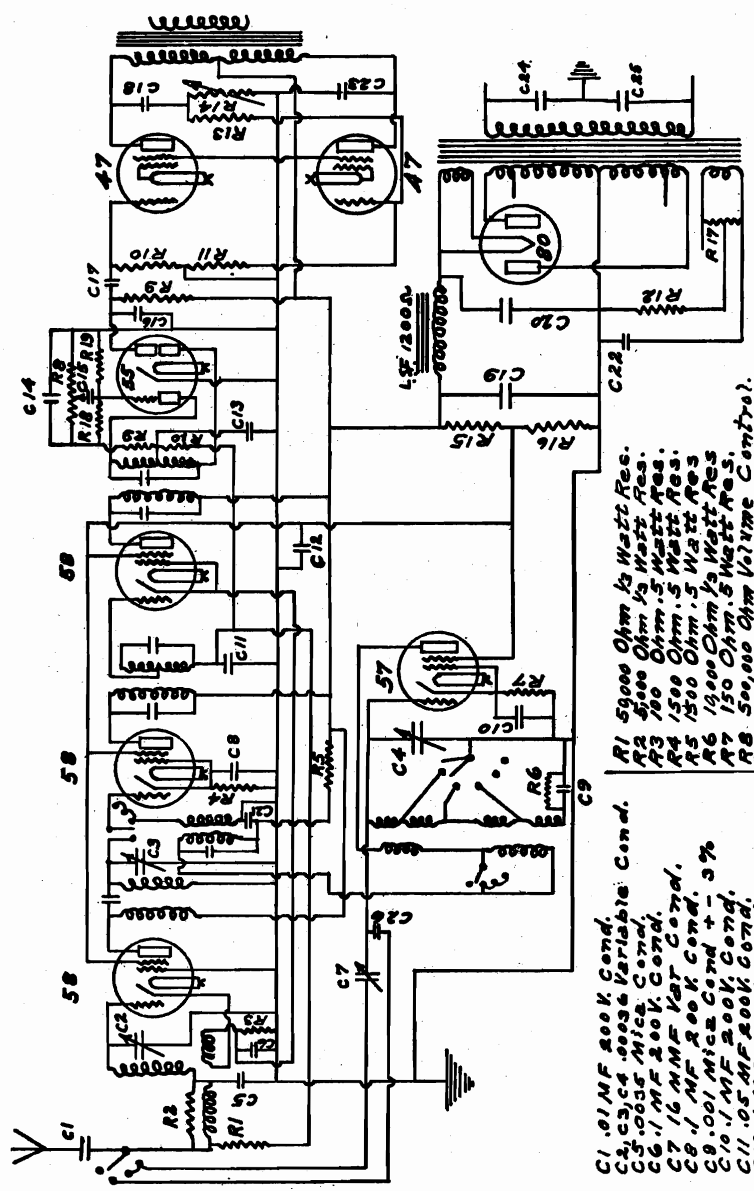
ALL CONDENSERS & RESISTORS ± 10% UNLESS OTHERWISE SPECIFIED

MODEL 31 (2Types)
Schematic, Voltage

HETRO ELECTRICAL INDUSTRIES, INC.

VOLTAGE TESTS. Taken from places named to Ground. Plates of 58 tubes single speaker 225-235 v. double speaker 240-250 v. Screen grid 58 tubes 90-100 and 95-105 v. Cathode RF and IF tubes 1 to 2 v. Cathode 1st Det. 6 to 8 v. Plate Osc. tube 210-220 v., single speaker; 215-225 v. double speaker. Screen grid Osc. tube 90-100 single speaker; 95-105 double speaker. Cathode Osc. tube 1 v. Audio plate of 55 tube 20-30 v. Plates of 247 tubes 220-230 v. single speaker; 230-240 v. double speaker. Across speaker field 120-130 v. single speaker; 170-180 v. double speaker. All heaters 2.4 to 2.6 v. Filament 280 tube 4.8 to 5.2 v. Center tap of heaters to ground 17-18 v. single models; 18-19 v. double models. 280 plate to ground 350-370 v. AC, single speaker models and 400-420 v. AC, double speaker models.

OCT. 1933



IF PEAK 175 KC

Note- 2 SPEAKER MODELS HAVE 2-4000 Ω SPEAKER FIELDS IN PARALLEL.

C1 .01 MF 200V. Cond.
C2, C3, C4 .00036 Variable Cond.
C5 .0035 Mica Cond.
C6 .1 MF 200V. Cond.
C7 16 MMF Var Cond.
C8 .1 MF 200V. Cond + - 3%
C9 .001 Mica Cond.
C10 .1 MF 200V. Cond.
C11 .05 MF 200V. Cond.
C12 .1 MF 200V. Cond.
C13 .0005 Mica Cond.
C14 .00025 Mica Cond.
C15 .1 MF 200V. Cond.
C16 .0005 Mica Cond.
C17 .01 MF 400V. Cond.
C18 .05 400V. Cond.
C19 8 MF 500V. Cond.
C20 8 MF 500V. Cond.
C21 .1 MF 400V. Cond.
C22 .1 MF 200V. Cond.
C23 .006 MF 400V. Cond.
C24 .01 MF 400V. Cond.
C25 .01 MF 400V. Cond.
C26 30 MMF Mica Cond.

R1 50000 Ohm 1/3 Watt Res.
R2 5000 Ohm 1/3 Watt Res.
R3 100 Ohm .5 Watt Res.
R4 1500 Ohm .5 Watt Res.
R5 1500 Ohm .5 Watt Res.
R6 10,000 Ohm 1/3 Watt Res.
R7 150 Ohm .5 Watt Res.
R8 500,000 Ohm Volume Control.
R9 100,000 Ohm .5 Watt Res.
R10 .5 Meg .5 Watt Res.
R11 10,000 Ohm .5 Watt Res.
R12 400 Ohm 3 Watt Res.
R13 .25 Meg .5 Watt Res.
R14 20,000 Ohm Tone Control.
R15 15,000 Ohm 3 Watt Res.
R16 25,000 Ohm 1 Watt Res.
R17 20 Ohm C. Tapped Res.
R18 2 Meg .5 Watt Res.
R19 2 Meg .5 Watt Res.

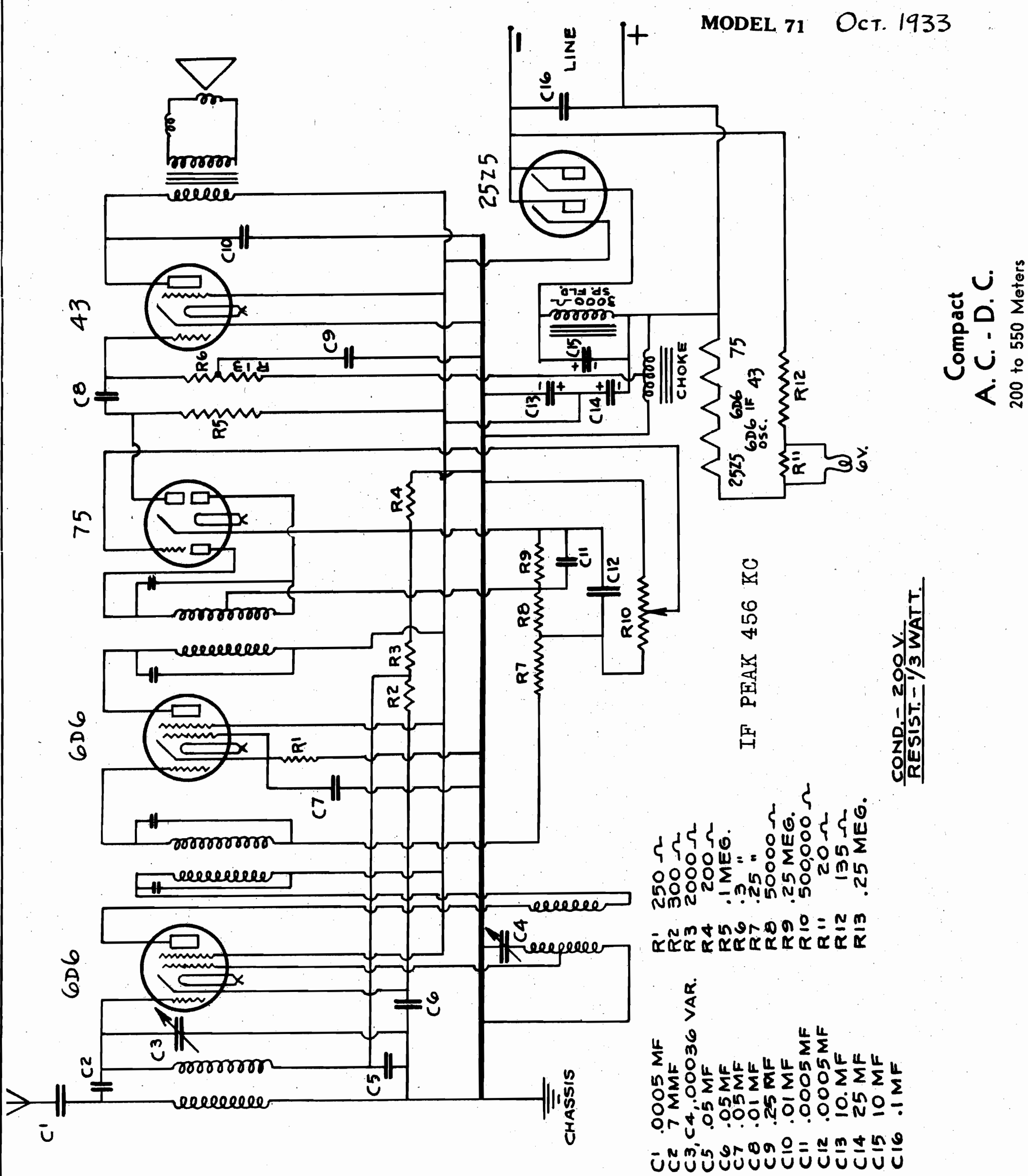
All Condensers & Resistors +-10% Unless Otherwise Spec.

8 Tube Super-Hetro-Dyne Chassis —Schematic Diagram
15 to 550 Meters — Short - Medium Wave
MODEL 31

MODEL 71
Schematic
Voltage

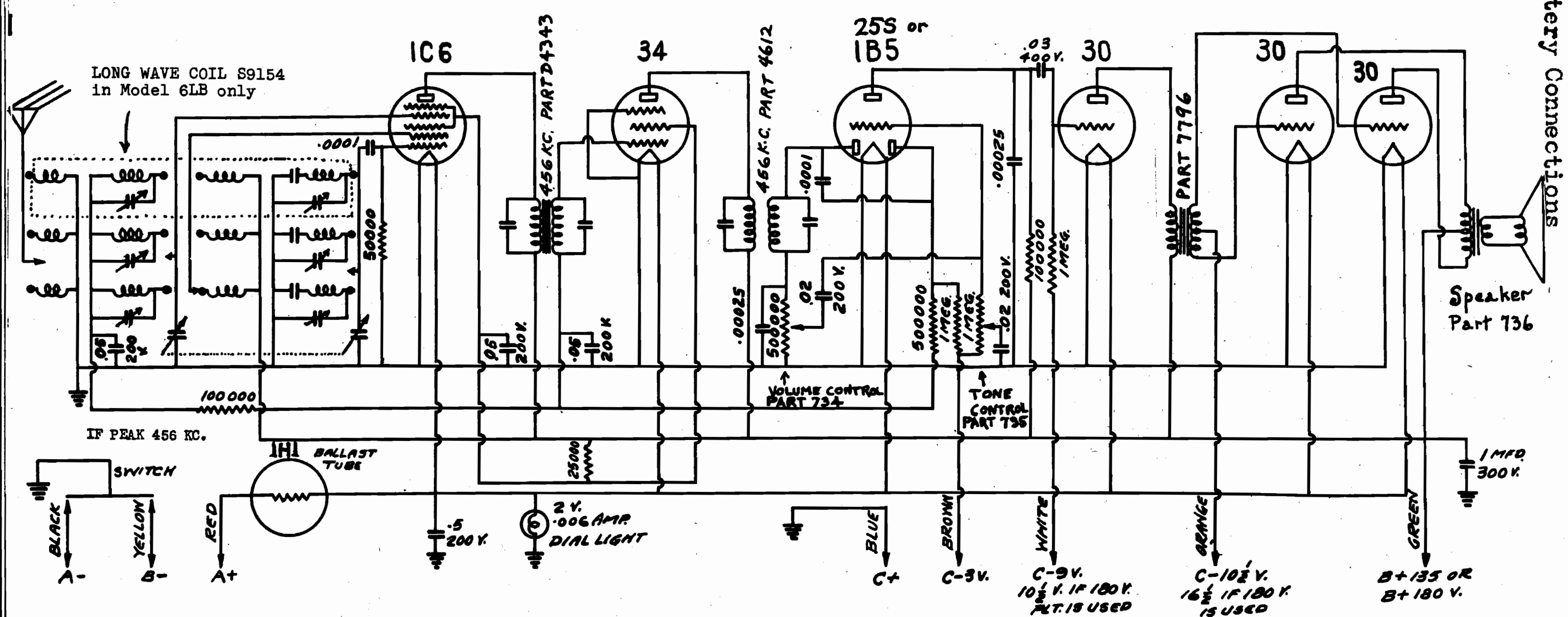
HETRO ELECTRICAL INDUSTRIES, INC.

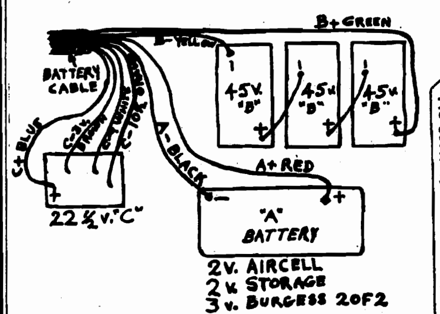
All D. C. voltages given were tested on 250 volt 1000 ohms per volt meter, tests made with volume control on full and no signal in receiver. Plates of 6D6 tubes to chassis 110-115 volts. Screen of 6D6 tubes to chassis 112-117 v. Cathode oscillator tube to chassis 18-20 v. Suppressor grid of oscillator 15-17 v. Cathode 6D6, 2-3 v. Plate of 75, 40-45 v. Cathode of 75, 1-2 v. Plate of 43 100-105 v. Across speaker 100-105 v. Control grid 43, 4-6 v. negative. Heaters to chassis 30-35 v. HEATERS OF ALL TUBES IN SERIES. If one tube burns out the receiver will not operate.

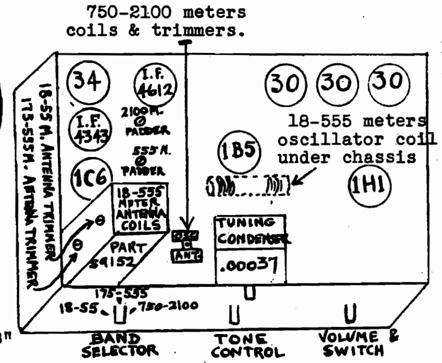


MODELS 6LB,6SB
Schematic,Socket
Trimmers,Alignment
Battery Connections

HETRO ELECTRICAL INDUSTRIES, INC.







Battery equipment: 135 or 180 volts "B"
22 1/2 volts "C"
2 or 3 volts "A"

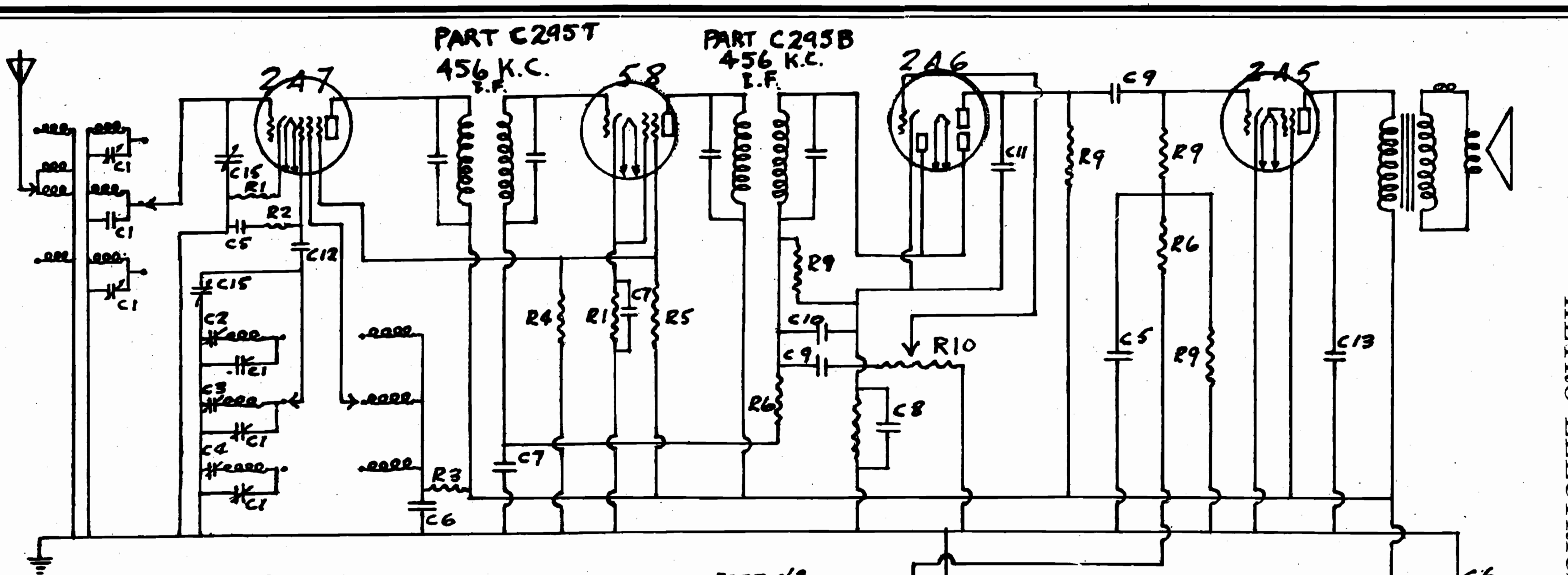
7 TUBE BATTERY RECEIVERS
Model 6SB 18-52 175-555 meters.
Model 6LB 18-52 175-555 750-2100 meters.

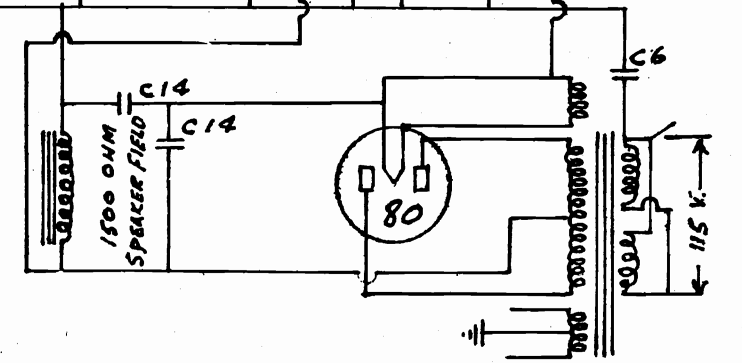
JULY -1935

Before connecting the batteries be sure that the switch is in the "off" position, volume control knob must be all the way to left.
Check all the battery connections very carefully or serious damage to the tubes may result. Make sure that all the tubes are firmly inserted in their sockets. Use a good antenna from 75 to 100 ft. long and a good ground for best results.
In battery operated receivers the two most common causes of low volume are run down batteries and defective tubes. Test your batteries from time to time. If no tube tester is available, procure a new set of tubes, or a set that is operating satisfactorily in another receiver. Insert these in the chassis one at the time and note any difference in performance. Misalignment or poor tracking of tuning condenser may also be the cause, but do not try to align the receiver in case of low volume unless other causes have first been investigated.
The aligning of the I.F. transformers is done in the regular manner. The I.F. frequency is 456 K.C. The first I.F. has iron core and the selectivity and sensitivity of the receiver are greatly affected by its alignment. Alignment of the Short Wave band should be done at about 19 meters, the broad cast band at 1500 K.C. and the long wave band at about 350 K.C. If no signal generator is available these adjustments may be effected with a transmitting signal, but anyone without some technical knowledge should not attempt to align the set. All receivers are carefully adjusted before leaving the factory. The oscillator trimmers seldom need attention.

MODELS 207,257
Schematic,Parts

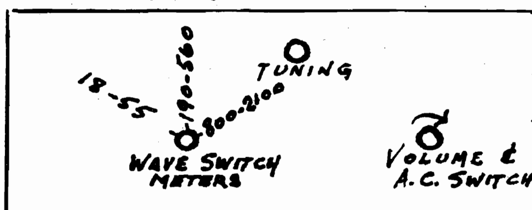
HETRO ELECTRICAL INDUSTRIES, INC.



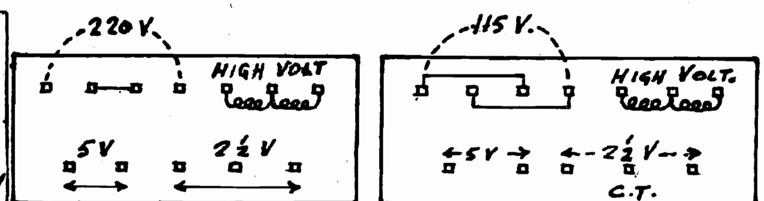


		Part No
C1 - TRIMMER COND.		C821
C2 - PADDER 95-275 MMF.		C-200
C3 - " 260-500 MMF.		C-201
C4 - " 260-500 MMF		C-201
C5 - .1 - 200 V		26
C6 - .05 - 400		125
C7 - .05 - 200		17
C8 - 10 MFD 25 V		490
C9 - .01 - 400 V		221
C10 - .00025 MICA		29
C11 - .00025 "		103
C12 - .0001 "		73
C13 - .006 400 VOLT		126
C14 - 8 MFD. ELEC. COND		623
C15 - 370 M.M.F.		605
C16 - .002 MICA		628

		Part No
R1 — 250 OHM	1/3 WATT	680
R2 — 50000 "	" "	31
R3 — 25000 "	" "	471
R4 — 25000 —	1/2 WATT	438
R5 — 20000	1 WATT	625
R6 — 1 MEG	1/3 "	34
R7 — 1000	1/3 "	107
R8 — "	" "	107
R9 — 250,000	1/3 "	305
R10 — 500,000 OHM VOLUME CONTROL AND SWITCH		84



PANEL LAYOUT

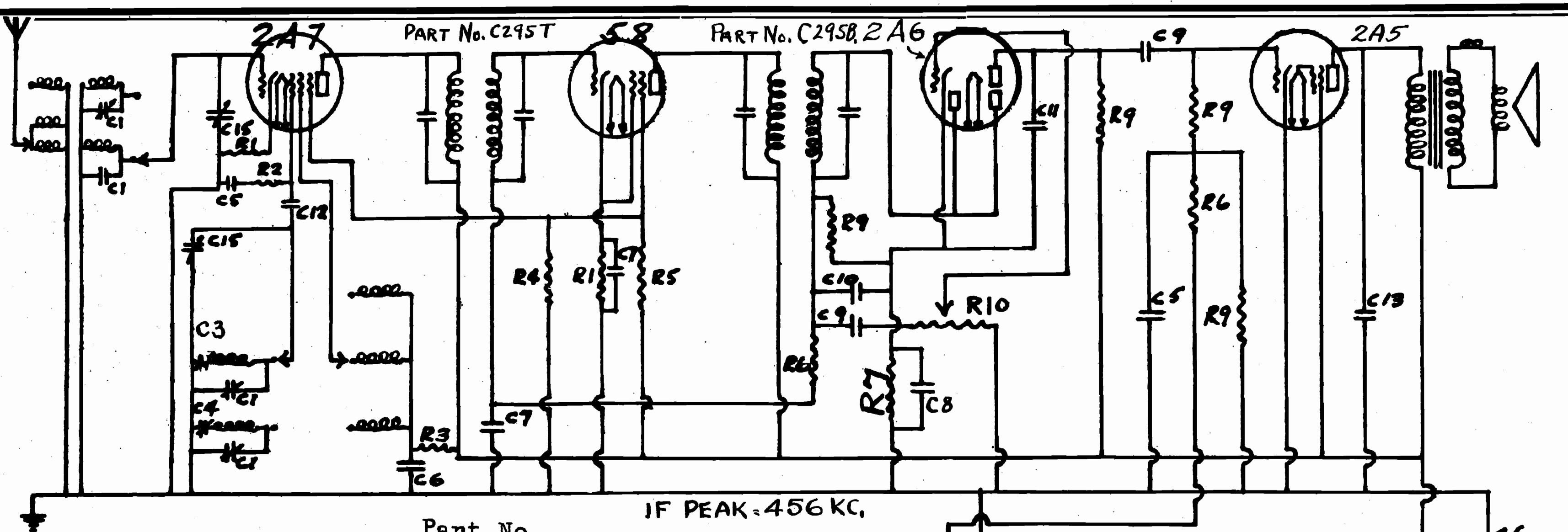


POWER TRANSFORMER CONNECTIONS FOR 220 & 115 V.

5 TUBE A.C.
18-55 190-560 750-2100 METERS
· AUG. 1934 ·
MODEL 207-257

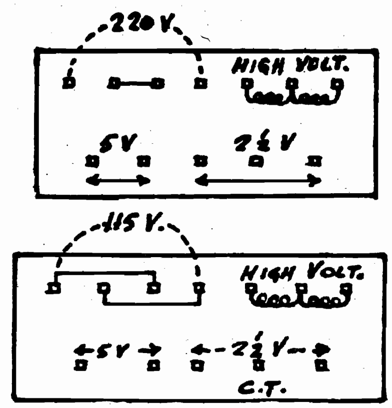
MODELS 209,259
Schematic,Parts

HETRO ELECTRICAL INDUSTRIES, INC.



IF PEAK-456 KC.

		Part No.
C1	Trimmer Condenser	C821
C3	Padder 260-500 MMf.	C201
C4	" " " "	C201
C5	.1 200 v. Condenser	26
C6	.05 400 v. "	125
C7	.05 200 v. "	17
C8	10 Mfd. 25 v. "	490
C9	.01 400 v. "	221
C10	.00025 mica "	29
C11	.0005 " "	103
C12	.0001 " "	73
C13	.006 400 v. "	126
C14	8 mfd. electrolytic	623
C15	370 MMf. Var. cond.	605
C16	.002 mica cond.	628
R1	250 ohm 1/3 watt	680
R2	50.000 ohm 1/3 watt	31
R3	25.000 " " "	471
R4	25.000 " 1/2 "	438
R5	20.000 " 1 "	625
R6	1 megohm 1/3 "	34
R7 R8	1000 ohm " "	107
R9	250.000 " " "	305
R10	500.000 " volume control and A.C. switch	84

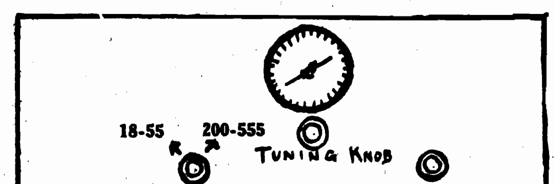


POWER TRANSFORMER CONNECTIONS
FOR 200 & 115 volts A.C.

5 Tube A. C.

18 to 55 – 200 to 555 meters

MODEL 209-259



Panel Layout

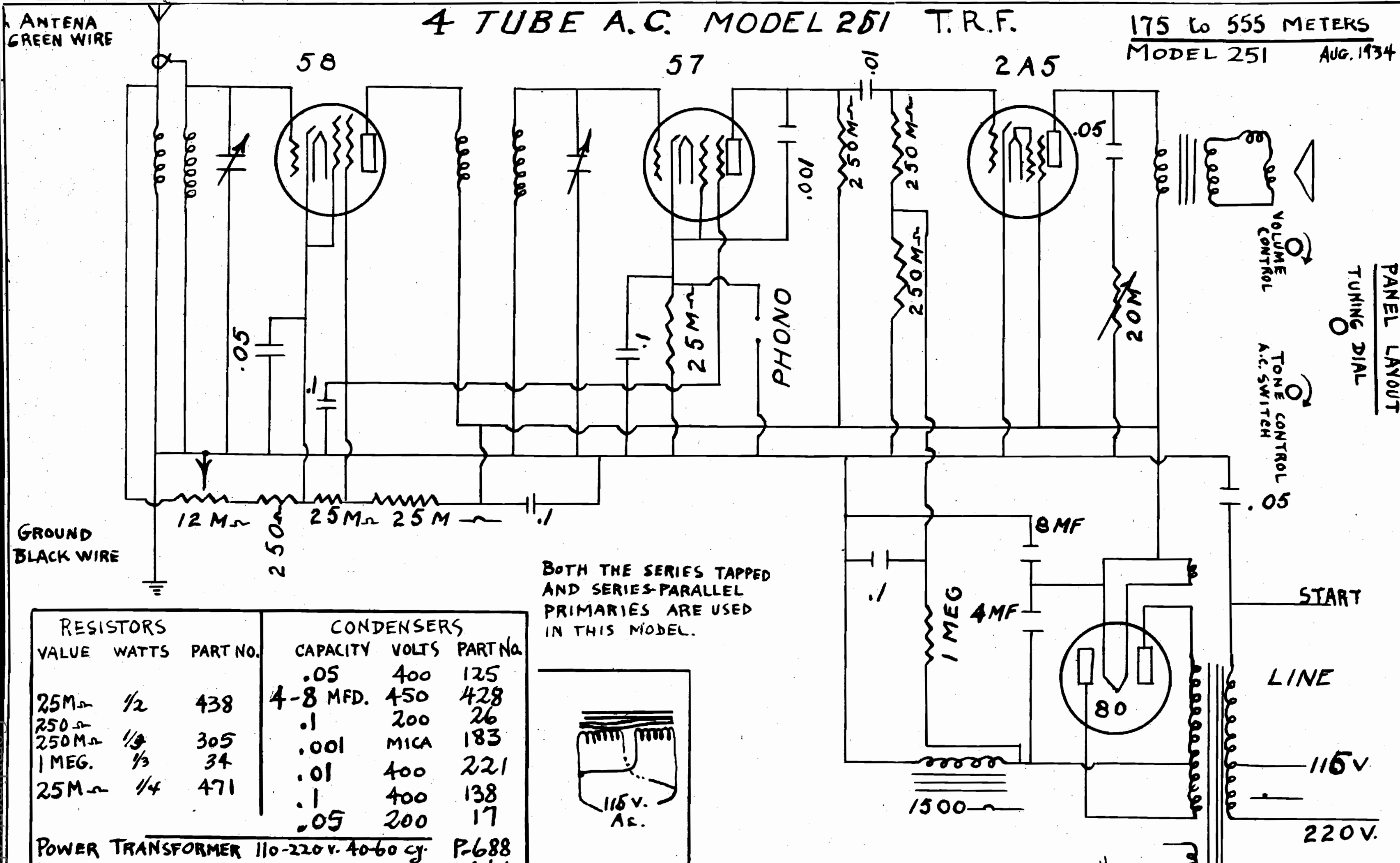
AUG. 1934

MODEL 251
Schematic

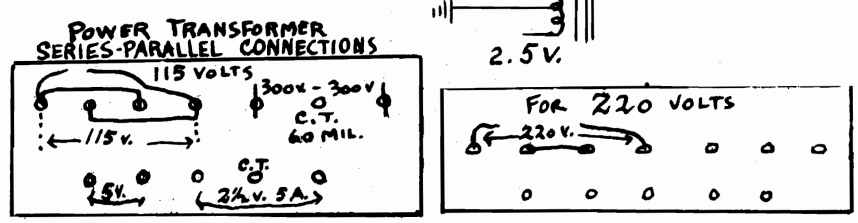
HETRO ELECTRICAL INDUSTRIES, INC.

4 TUBE A.C. MODEL 251 T.R.F.

175 to 555 METERS
MODEL 251 AUG. 1934



BOTH THE SERIES TAPPED AND SERIES-PARALLEL PRIMARIES ARE USED IN THIS MODEL.



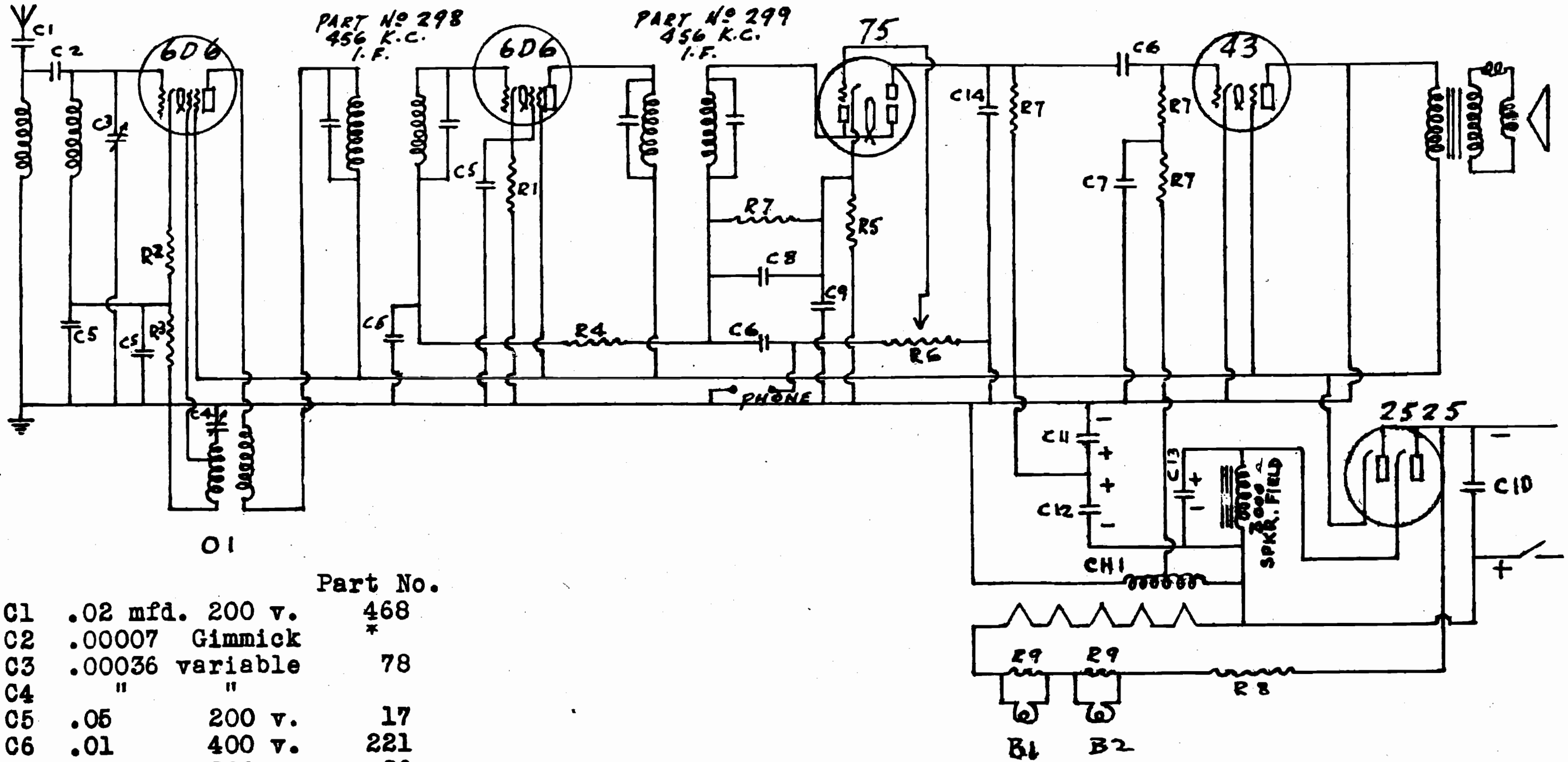
RESISTORS VALUE	WATTS	PART NO.
25 MΩ	½	438
250 Ω		
250 MΩ	⅓	305
1 MEG.	⅓	34
25 MΩ	¼	471

CONDENSERS CAPACITY	VOLTS	PART No.
.05	400	125
4-8 MFD.	450	428
.1	200	26
.001	MICA	183
.01	400	221
.1	400	138
.05	200	17

POWER TRANSFORMER 110-220 V. 40-60 cy.	P-688
12 MΩ 200 Ω BIAS VOLUME CONTROL	161
TONE CONTROL WITH SWITCH	155
SPEAKER (COMPLETE (1500 Ω FIELD)	606
ANTENA COIL	536
R.F. COIL	537
2½ VOLT DIAL LIGHT	206

MODEL 295
Schematic
Parts

HETRO ELECTRICAL INDUSTRIES, INC.



			Part No.
C1	.02 mfd.	200 v.	468
C2	.00007	Gimmick	*
C3	.00036	variable	78
C4	"	"	
C5	.05	200 v.	17
C6	.01	400 v.	221
C7	.1	200 v.	26
C8	.00025	Mica	29
C9	10. mfd.	25 v.	490
C10	.1	400 v.	138
C11	10 Mfd.	Filter	
C12	25 "	Block	466
C13	5 "		
C14	.0005	Mica	103
R1	250	1/3 Watt	680
R2	300	" "	180
R3	3M	" "	549
R4	1 Megohm	" "	34
R5	5M	" "	361
R7	250M	" "	305

*The phrase gimmick designates a wire wound around another wire

	Part No.
R6 500.000 ohms volume control & switch	84
R8 Service cord & plug with 120 ohm restr.	726
R9 40 ohm, 10 watt center tapped resistor	718
Complete speaker 3000 ohm field	79
CH1 600 ohm choke tapped at 200 ohms	733
A1 antenna coil	302
O1 Oscillator coil	303
B1, B2, 6 volt dial bulbs	13

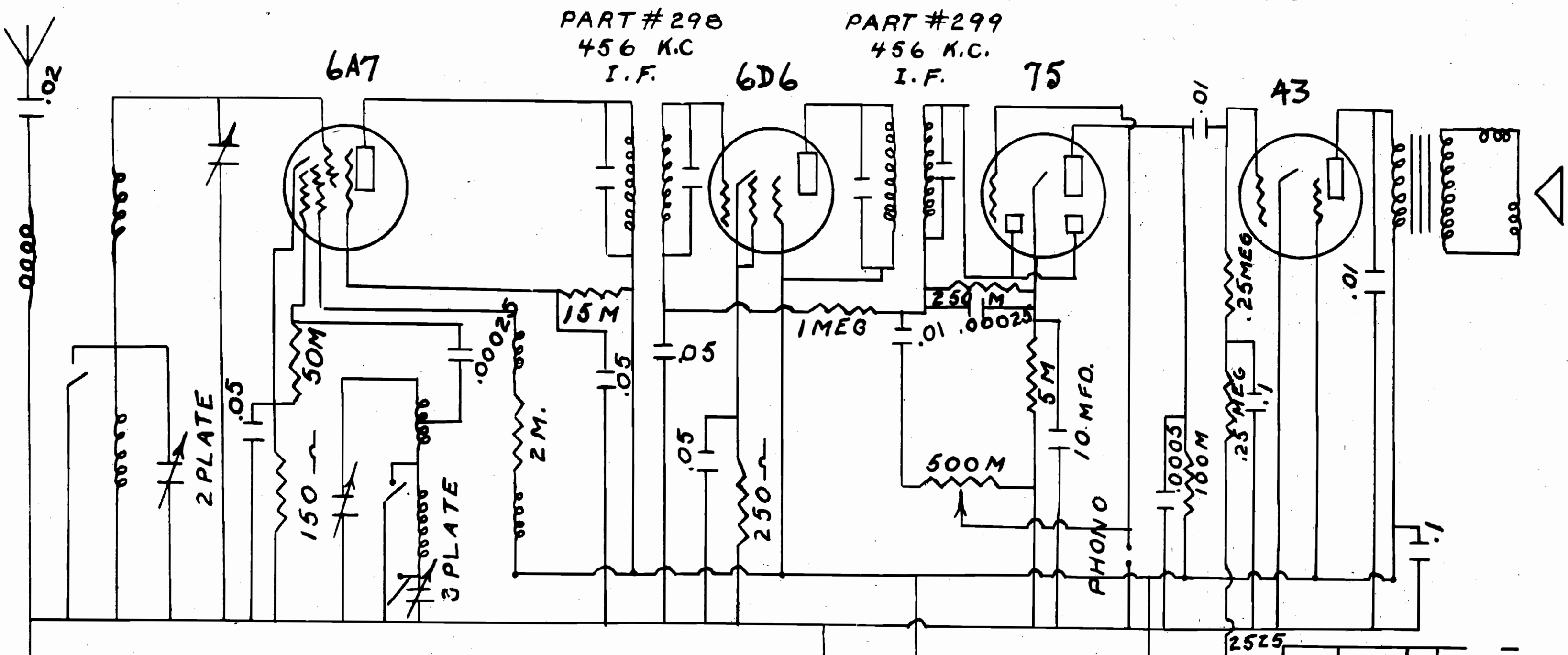
5 TUBE A.C.D.C.
·175-555 METERS·
AUG.-1934.
MODEL 295

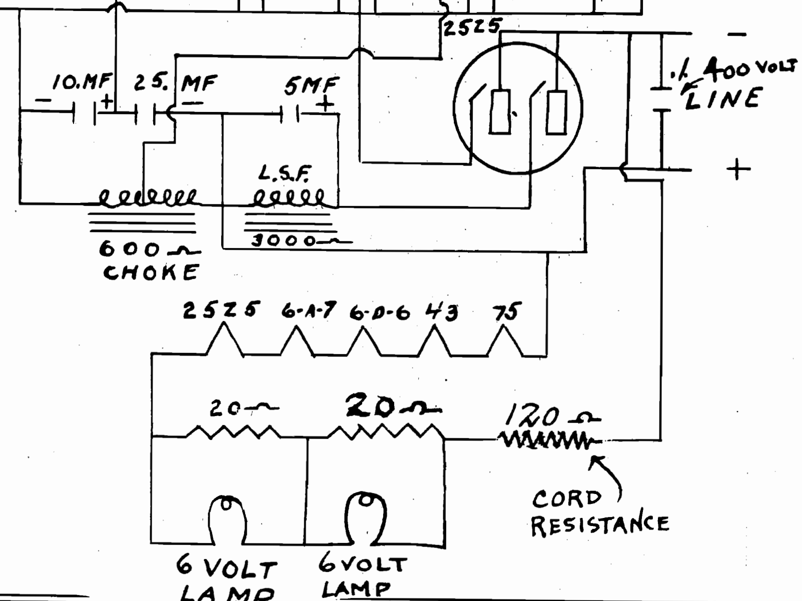
PRINTED IN U. S. A.

MODEL 297
Schematic
Parts

HETRO ELECTRICAL INDUSTRIES, INC.

MODEL 297 5 TUBE A.C.D.C. 200-2200 METERS AUG. 1934





RESISTORS Value	Watts	Part No.
150	1/3	468
250	1/3	680
2M	1/3	35
5M	1/3	361
15M	1/3	439
50M	1/3	31
100M	1/3	306
1 Meg.	1/3	34
250M	1/3	305
20-20	10	718

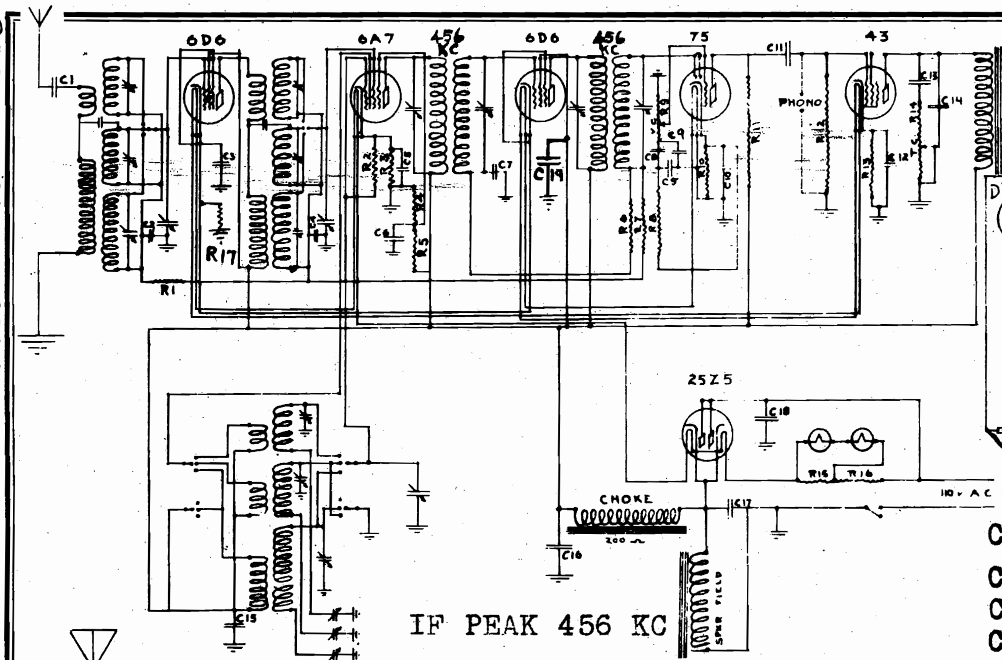
CONDENSERS Capacity	Volts	Part No.
.02 Mfd.	200	102
.05 "	200	17
.01 "	400	221
.1 "	200	26
.1 "	400	138
.00025	Mica	29
.0005	"	103
10 Mfd.	25	490
Filter block 10-25-5 Mfd.		466

Complete speaker 3000 ohm field	79
600 ohm choke tapped at 200 ohms	733
6 volt dial bulb	13
500M volume control with A.C. switch	84
Cord and pulg with 120 ohm resistance	726
Antena & oscillator coil	463
Long wave double trimmer condenser	464

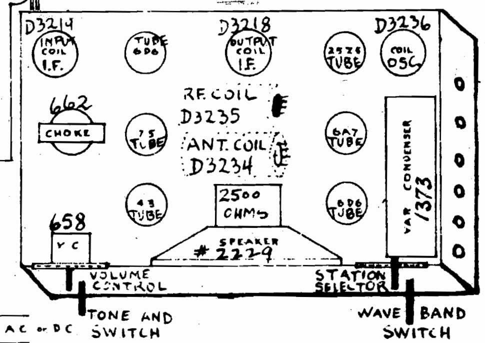
MODEL 412
MODEL 466
Schematic, Socket

HETRO ELECTRICAL INDUSTRIES, INC.

6 tube AC-DC 18-50, 200-555 and 800-2200 metres. #412-466



IF PEAK 456 KC



TRIMMERS

Metres	
200-550 18-50	OSC.
200-550 18-50	R.F.
200-550 18-50	ANT.

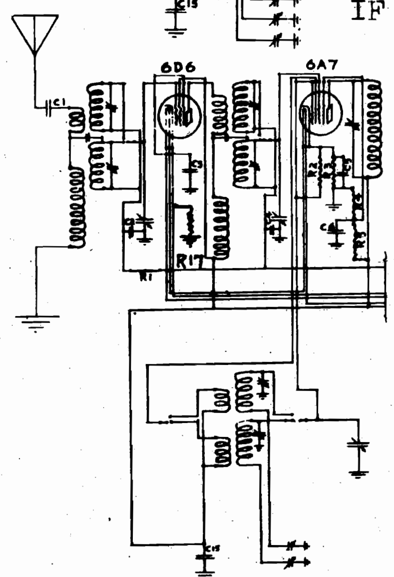
Speaker, 2500 ohm field,
43 out-put; Part #2229.
Volume control Part #658
Tone control Part #657
Filter choke Part #662
Wave band switch #663
Trimmer strip #D3538
Input I.F. transformer D3219
Output " " D3218

TUNING COILS

ANT.	18-550 meters	#D3234
OSC.	" " "	#D3236
R.F.	" " "	#D3235
ANT.	200-2200 "	#D4324
OSC.	" " "	#D4326
R.F.	" " "	#D4325

CONDENSERS		VOLTS
C 1	.006	400
C 2	.05	200
C 3	.25	200
C 4	.05	200
C 5	.1	200
C 6	.1	200
C 7	.1	200
C 8	.006	200
C 9	.0001	Mica
C10	10.0	25
C11	.02	200
C12	10.0	200
C13	.02	200
C14	.006	200
C15	.1	200
C16	16.0	200
C17	24.0	200
C18	.05	200
C19	.5	200

RESISTORS		WATTS
R 1	250M ohm	1/3
R 2	25M "	"
R 3	250 "	"
R 4	10M "	"
R 5	4M "	"
R 6	1 MEG."	"
R 7	1 "	"
R 8	100M "	"
R 9	500M Volume Control	
R10	10M ohm	1/3
R11	250M "	"
R12	500M "	"
R13	500 "	"
R14	100M Tone Control	
R15	53 } Line	
R16	115 } Filament	
R17	250 ohm	1/3



R.F AND OSCILLATOR SECTION

#412 18-50 200-550 metres
Balance of circuit same as #466

Condensers 3,5,6,7,15 in one container #C8056
Condensers 12,16,17 in one container #C2092
Resistors 15.16 are one unit. Part #659

HETRO ELECTRICAL INDUSTRIES, INC.

MODEL 6-Tube AC
Schematic, Voltage
Socket, Trimmers
Alignment

APROXIMATE NORMAL TUBE VOLTAGES MEASURED WITH A 0-300 VOLT, 1000 OHM PER VOLT D.C. VOLTMETER WITH VOLUME CONTROL IN FULL POSITION

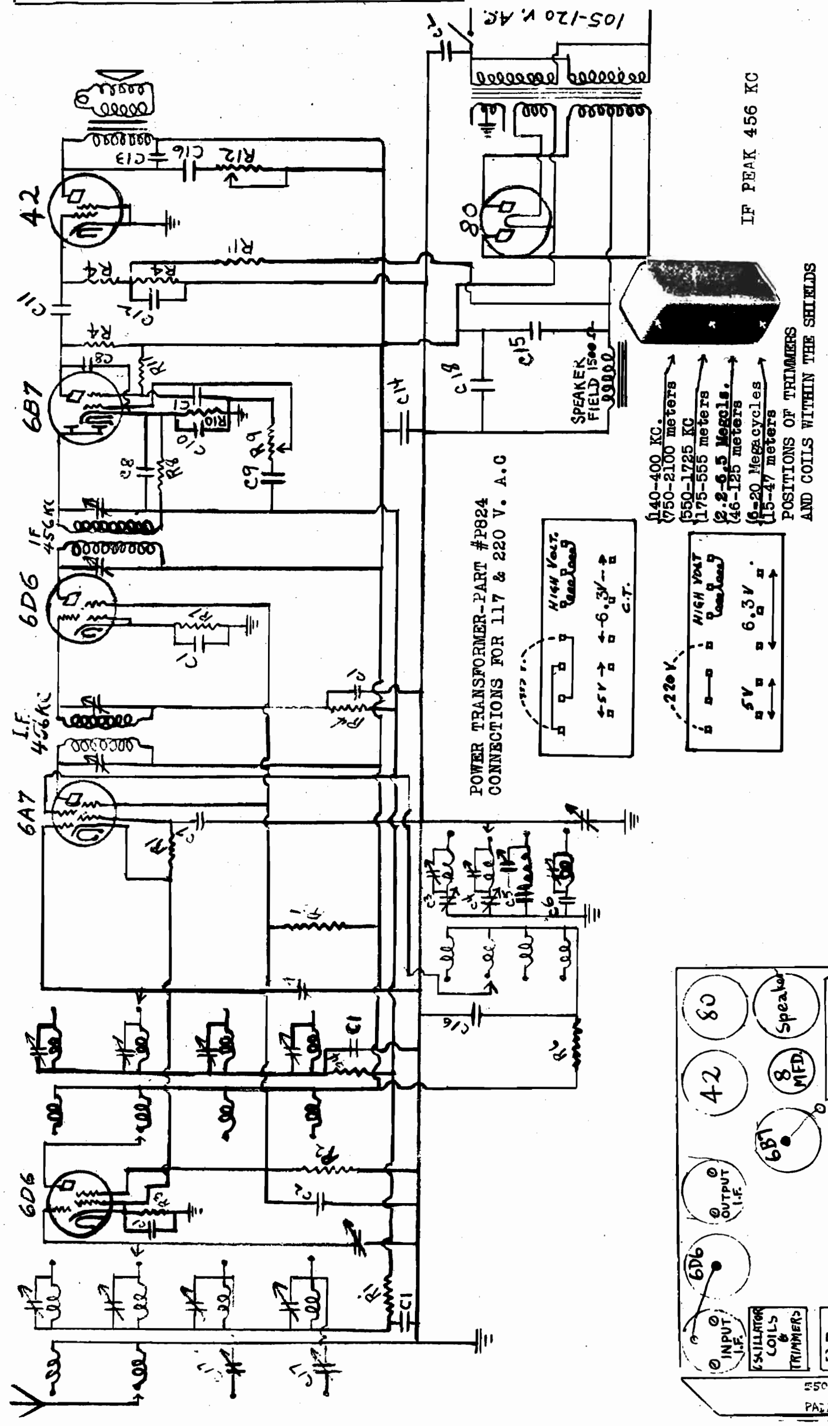
Tubes	Plate	Screen	Cathode	Grid
42	225-235	230-240	0	1 to 2
6B7	35-45	25-35	3½-4½	
6D6 IF.	230-240	70-80	3½-4½	
6D6 RF.	230-240	70-80	3½-4½	
6A7 Det.	230-240	70-80	3½-4½	
6A7 Osc.	155-165	- -	- -	

Across speaker field 85-95 negative.

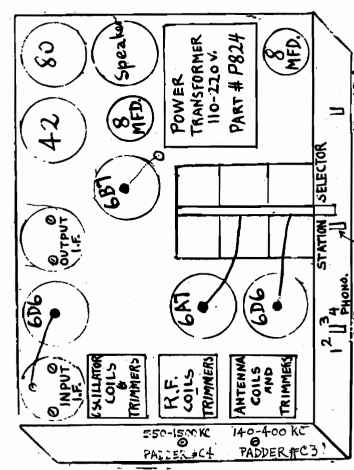
CONDENSERS
C 1 .05 Mfd. 200 volts
C 2 .1 " 400 "
C 3 3 plate padder
C 4 5 plate padder
C 5 .003 mica
C 6 .005 "
C 7 .0005 "
C 8 .00025 "
C 9 .01 Mfd. 400 volts
C10 10. " 25 "
C11 .02 " 400 "
C12 .1 " 200 "
C13 .006 " 400 "
C14 .5 " 400 "
C15 8. " Electrolytic
C16 .05 " 400 volts
C17 30 mmfd. trimmers
C18 30. Mfd. Electrolytic

RESISTORS
R 1 50.000 ohms 1/3 watt
R 2 25.000 " 1/2 "
R 3 250 " 1/3 "
R 4 50.000 " " "
R 5 15.000 " " "
R 6 20.000 " " "
R 7 500 " " "
R 8 300.000 " " "
R 9 500.000 " volume with A.C. switch
R10 5.000 ohms 1/3 watt
R11 1 megohm " "
R12 40.000 ohms tone control

6 Tube A.C.
15-2100 Meters



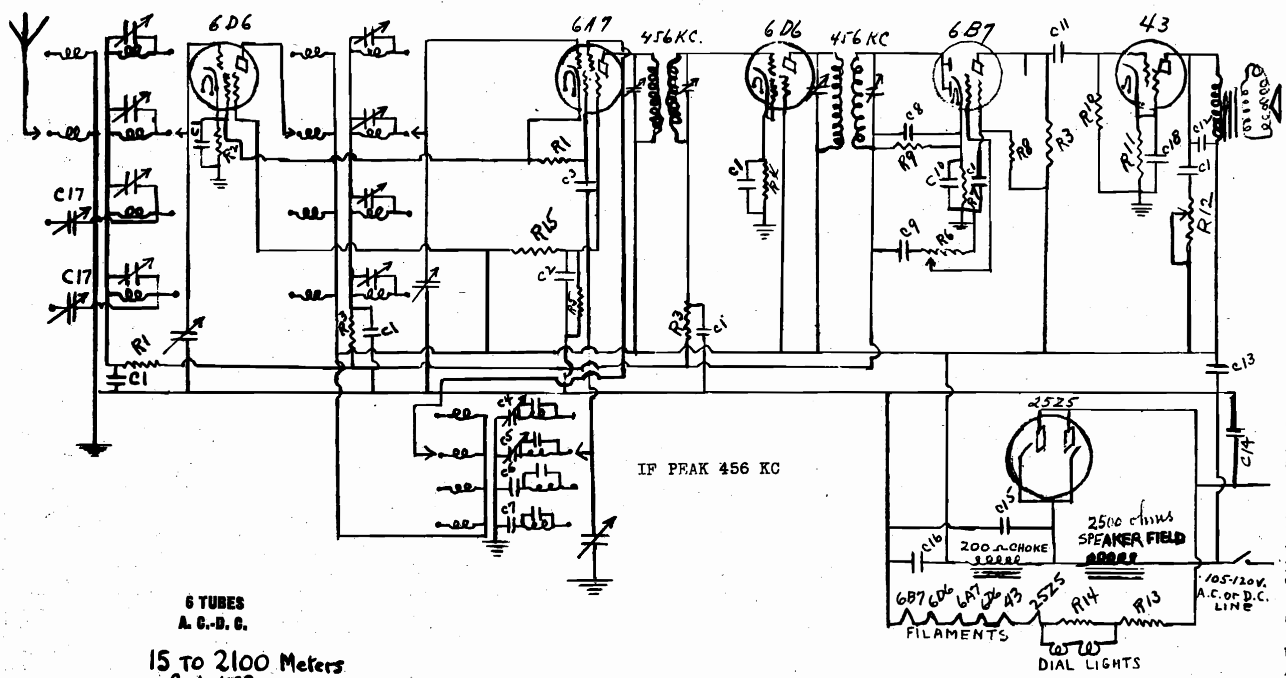
ALIGNMENT: The use of a service oscillator or signal generator is imperative.
I.F. TRANSFORMERS: Connect the signal generator to the grid of the 6A7 tube through a .05 mfd. or smaller capacity condenser, set the rotor plates of the tuning condenser completely out and adjust the trimmers on top of the I.F. transformers to a 456 KC signal from the generator. Volume control must be at maximum and the signal from the generator attenuated to a minimum so that no action is obtained from the automatic volume control.
ANTENNA, R.F., and OSCILLATOR stages. Connect the antenna and ground leads of the generator to the antenna and ground of the receiver. To align first short wave band set the generator and the receiver at 16 megacycles, adjust the trimmers of this band to maximum output. The same procedure is to be followed in aligning the other bands and adjustments should be made at the following frequencies: Second short-wave band at 6 megacycles (6000 KC.); Medium-wave #3 at 1500 KC.; Extra long-wave #4 at 300 KC. See diagram for trimmer and coil positions inside of shields. The OSCILLATOR trimmers will affect the dial setting and should not be changed unless absolutely necessary.
CAUTION: DO NOT ATTEMPT TO ALIGN THE RECEIVER UNLESS YOU HAVE SOME EXPERIENCE. IF THE RECEIVER PERFORMS WELL DO NOT RE-ALIGN. Signal generators usually emit a harmonic signal of slightly higher frequency than the fundamental and in adjusting the lower setting should be used. All adjustments should be made with a minimum input signal from the generator.



BAND SELECTOR SWITCH POSITIONS
1-Short waves 6 to 20 megacycles 15-47 meters
2-Short Waves 2.2 to 6.5 " 46-125 "
3-Medium waves-Broadcast 550-1725 KC. 175-555 M.
4-Extra long waves 140-400 KC. 750-2100 meters
Extreme right position for phonograph operation

MODEL 6-Tube AC-DC
Schematic, Voltage
Socket, Trimmers
Alignment

HETRO ELECTRICAL INDUSTRIES, INC.



6 TUBES
A. C.-D. C.

15 TO 2100 Meters
Sept. 1935

These models should not be used with currents higher than 125 volts without an external voltage reducer. Do not remove tubes or speaker while the receiver is operating. Do not use a ground connection unless in series with a condenser of at least 400 volts test. If after the set has been connected to D.C. for 1 minute fails to operate, reverse the plug in the current outlet.

ALIGNMENT: The use of a service oscillator or signal generator is imperative.

I.F. transformers. Connect signal generator to grid of 6A7 through a .05 mfd. condenser, with the rotor plates of the tuning condenser completely out, adjust the trimmer on top of the transformers to a 456 KC signal from the generator. Volume control at maximum, attenuate signal so that automatic volume control action is not obtained.

To align the ANTENNA, RF, and OSCILLATOR stages, the antenna and ground leads of the signal generator should be connected to the antenna and ground connections of receiver.

ANTENNA, R.F., and OSCILLATOR stages are adjusted with the trimmers located inside of the shields. See diagram for positions. 1st Short wave band should adjusted with a signal of 16 megacycles. 2nd Short Wave band at 6 megacycles (6000 cycles). Medium wave No. 3 at 1500 kilocycles. Long Waves No. 4, at 300 kilocycles.

The OSCILLATOR trimmers will affect the dial settings and should not be changed unless absolutely necessary.

CAUTION; DO NOT ATTEMPT TO ALIGN THE SET UNLESS YOU HAVE SOME EXPERIENCE AND IS ABSOLUTELY NECESSARY.

CONDENSERS

C 1 .05 mfd. 200 volts
C 2 .1 " " "
C 3 .0005 mica
C 4 3 plate padder
C 5 5 " "
C 6 .003 mica
C 7 .005 "
C 8 .00025 "
C 9 .01 mfd. 400 volts
C10 10 " 25 "
C11 .02 " 400 "
C12 .006 " " "
C13 .5 " 200 "
C14 .05 " 400 "
*C15 24. " 200 "
*C16 16. " " "
C17 30 mmfd. Trimmer
*C18 10. mfd. 25 volts.
*C15, C16, C18 are in one container. Part #C2092

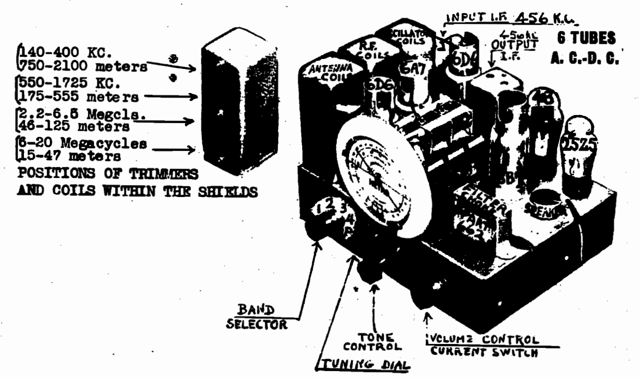
RESISTORS

R 1 50.000 ohms 1/3 watt
R 2 200 " " "
R 3 250.000 " " "
R 4 250 " " "
R 5 10.000 " " "
R 6 500.000 " volume control with line switch.
R 7 3.000 ohms 1/3 watt
R 8 1 megohm " "
R 9 300.000 ohms " "
R10 500.000 " " "
R11 500 " " "
R12 40.000 " Tone control
*R13 115 " One unit
*R14 53 "
R15 4.000 " 1/3 watt
*R13, R14 are in a single unit Candohm. Part #659

APROXIMATE NORMAL TUBE VOLTAGES MEASURED WITH A 0-300 VOLT, 1000 OHM PER VOLT DC. VOLTMETER, VOLUME CONTROL IN FULL POSITION.			
Tubes	Plate	Screen	Cathode
43	90 to 100	95 to 105	13 to 15
6B7	15 to 20	10 to 15	$\frac{1}{2}$ to $1\frac{1}{2}$
6D6 IF.	95 to 105	95 to 105	$2\frac{1}{2}$ to $3\frac{1}{2}$
6D6 RF.	95 to 105	95 to 105	3 to 4
6A7 Det.	95 to 105	60 to 70	3 to 4
6A7 Oscillator plate voltage 95 to 105			
Across speaker field 95 to 105 volts D.C.			

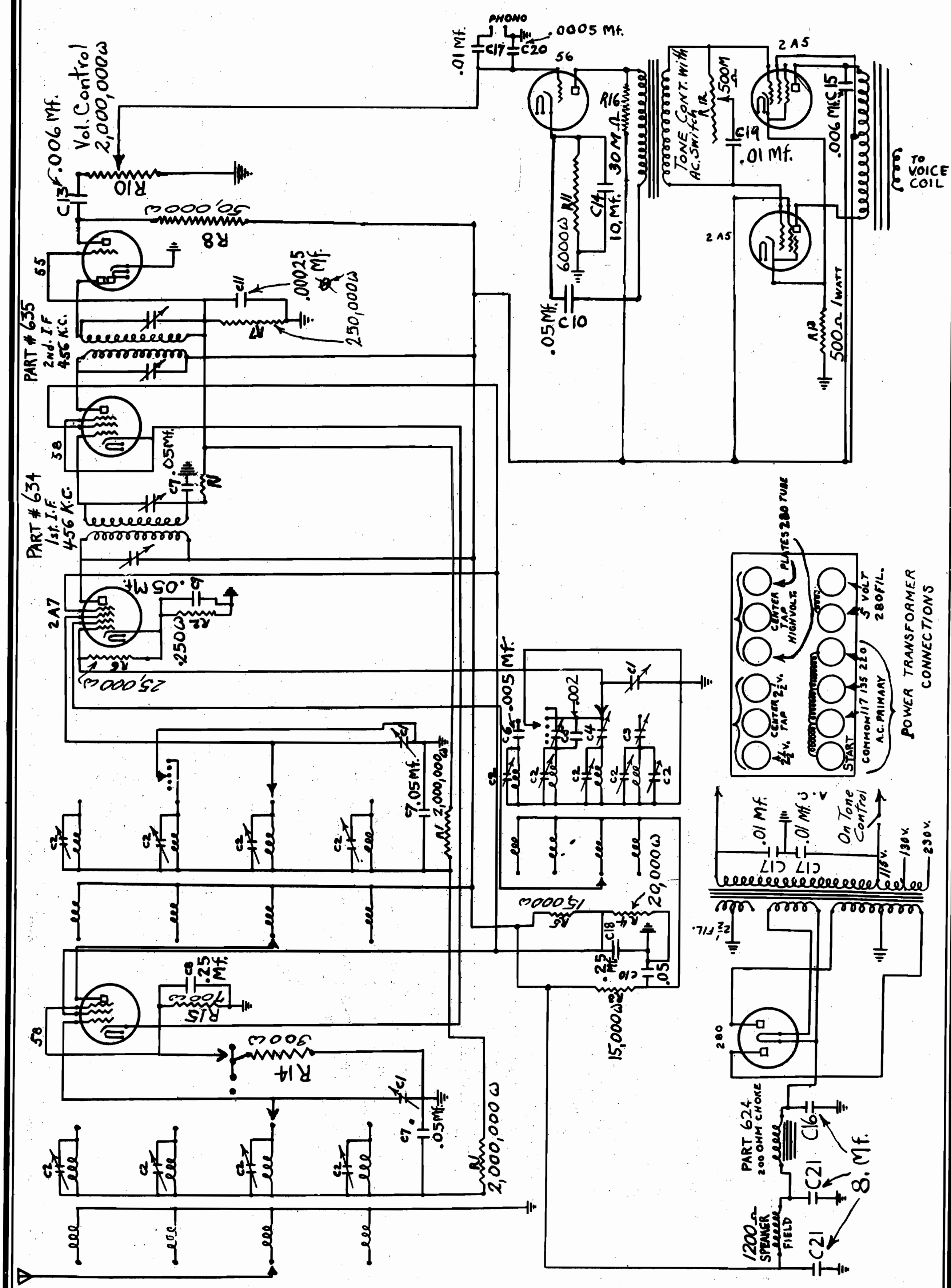
BAND SELECTOR SWITCH POSITIONS

1-Short waves 6 to 20 megacycles 15-47 meters
2-Short waves 2.2 to 6.5 " 46-125 "
3-Medium waves-Broadcast 550-1725 KC. 175-555 M.
4-Extra long waves 140-400 KC. 750-2100 meters
Extreme right position for phonograph operation



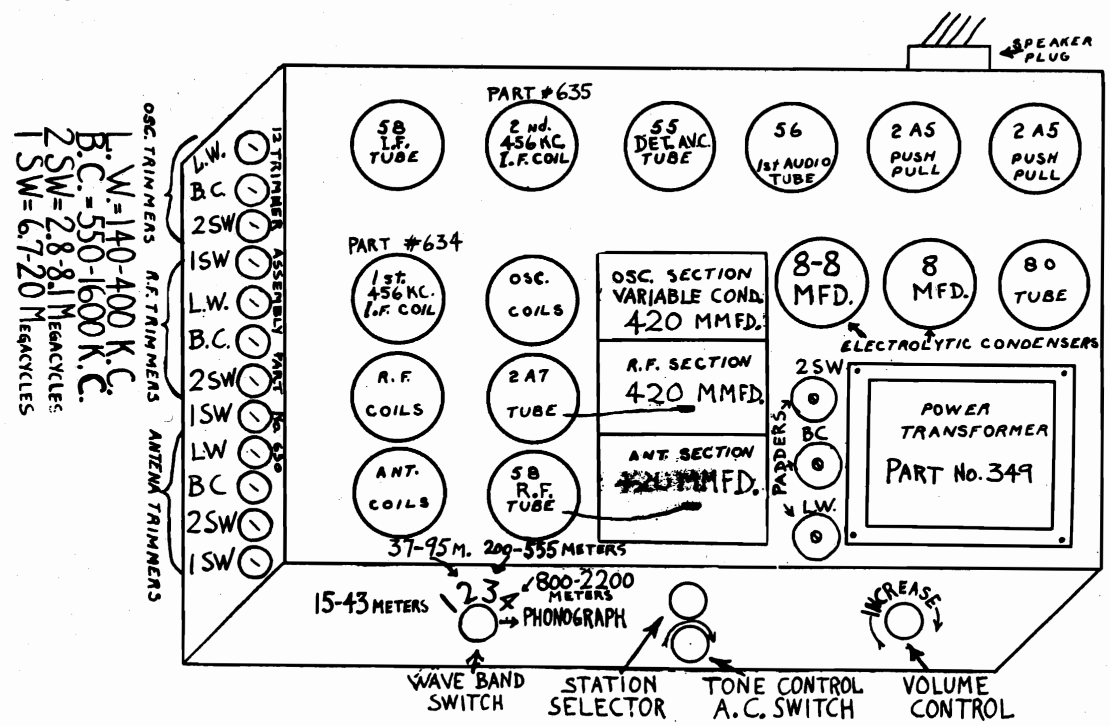
MODEL 8-Tube Superhet. Schematic

HETRO ELECTRICAL INDUSTRIES, INC.



MODEL 8-Tube Superhet. Voltage, Socket Trimmers, Parts

HETRO ELECTRICAL INDUSTRIES, INC.



CHASSIS LAYOUT

8 TUBE SUPERHETERODYNE
Tuning Ranges

15 to 100, 200 to 555, 800 to 2100 Meters

SWITCH POSITIONS:

No. 1 - 15 to 43 Meters - 20 - 6.7 Megacycles
No. 2 - 37 to 95 Meters - 8.1- 2.8 Megacycles
No. 3 -200 to 555 Meters -1600 - 550 Kilocycles
No. 4 -800 to 2100 Meters - 140 - 400 Kilocycles

TUBE - SOCKET - VOLTAGES - 115 VOLT A.C. LINE

Tubes	Screen Grid to Ground	Plate to Ground	Cathode to Ground	Filament Heater-Volts
55 2nd. Det. A.V.C.	-	30-40	-	2.3-2.5 A.C.
56 A.F. Driver	-	225-235	10-12	2.3-2.5 A.C.
58 I.F.	70-80	225-235	2½-4	2.3-2.5 A.C.
58 R.F.	70-80	225-235	2½-4	2.3-2.5 A.C.
2A5 Push-Pull	230-245	225-235	18-22	2.3-2.5 A.C.
2A7 Det. Sec.	70-80	225-235	2-3	2.3-2.5 A.C.
" Osc. Sec.	-	150-160	-	2.3-2.5 A.C.

80 Rectifier Filament to Ground 335 to 350 Volts
Across Filament 4.8 to 5 Volts A.C.
Voltage drop across Speaker Field 95 to 105 Volts.
Voltage drop across Filter Choke 14 to 16 Volts.
All voltages taken with 250-500 Volt, 1000 ohms per volt meter.
Volume control on full and no signal in Receiver.

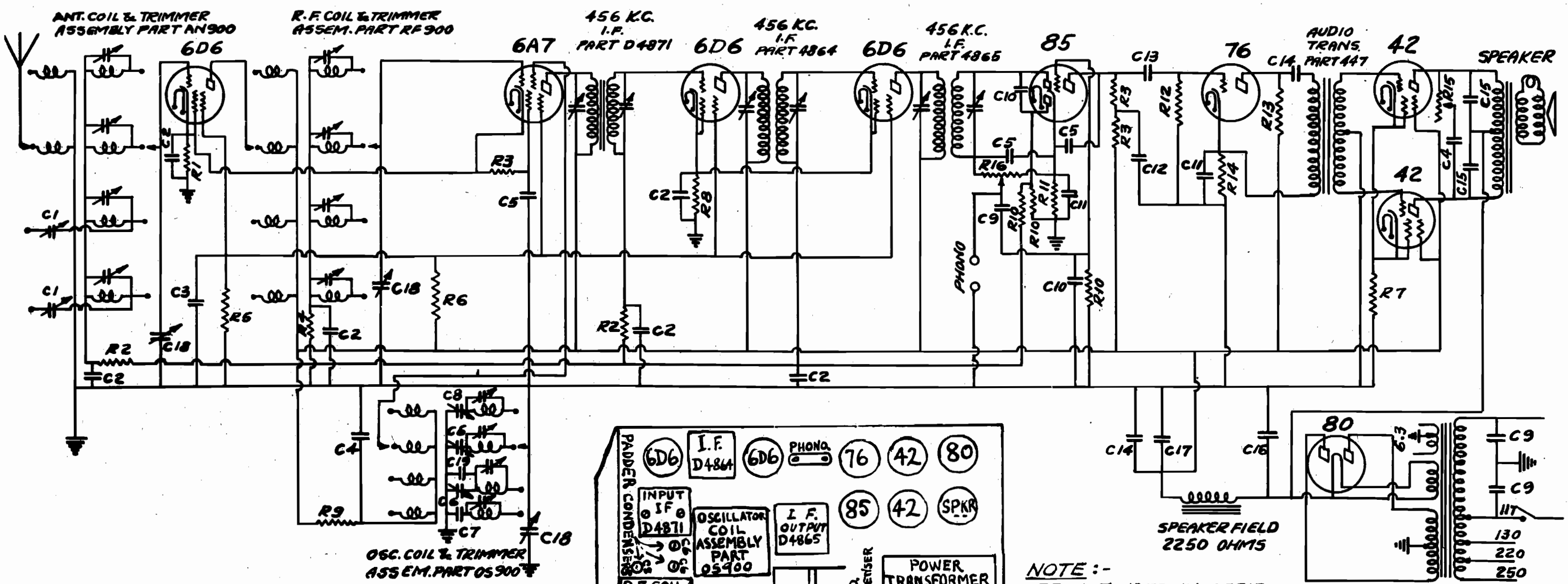
CONDENSERS	Part No.	
C 1 .00042 var.	425	
C 2 Trimmers	630	2 plates
C 3 Padders	629	5 plates
C 4 "	629	
C 5 " ,002 mica	629	
C 6 .005 mica	627	
C 7 .05 200 volts	17	
C 8 .25 200 "	442	
C 9 .05 200 "	17	
C10 .05 400 "	125	
C11 .00025 mica	29	
C13 .006 400 volts	126	
C14 10 Mfd. 25 volts	490	
C15 .006 400 volts	126	
C16 8 Mfd. 600 volts	622	
C17 .01 400 volts	221	
C18 .25 200 "	442	
C19 .01 400 "	221	
C20 .0005 mica	103	
C21 8-8 Mfd. 500 volt	604	

RESISTORS	PART NO.
R 1 2 Megohm 1/4 watt	33
R 2 250 ohm 1/4 "	567
R 3 15M " 1/4 "	439
R 4 20M " 1 "	625
R 5 15M " 3 "	389
R 6 25M " 1/4 "	471
R 7 250M " 1/4 "	305
R 8 50M " 1/4 "	31
R11 6M " 1/4 "	656
R13 500 " 1 "	626
R10 2Meg. volume control	410
R12 500M ohm tone control and A.C. Switch	418
R14 300 ohm 1/3 watt	180
R15 700 ohm 1/3 "	548
R16 30M ohm 1.3 "	487

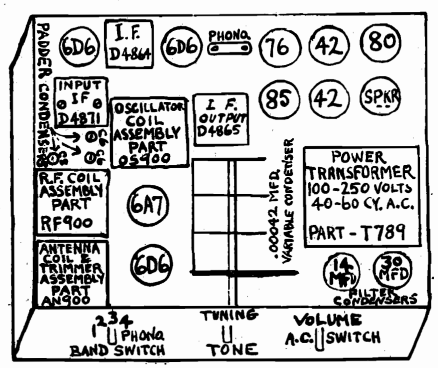
OCT. 1934

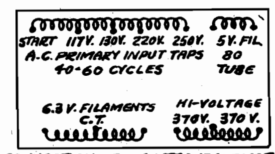
HETRO ELECTRICAL INDUSTRIES, INC.

MODEL 9-Tube
Air-Ace
Schematic, Socket
Trimmers, Voltage



NOTE:-
R7 NOT USED IN SERIES 6B5. SERIES 6B5 USED 6B5 TUBES INSTEAD OF TYPE 42 OUTPUT TUBES AND 5Z3 INSTEAD OF TYPE 80 RECTIFIER.





CONNECTIONS POWER TRANSFORMER PART No. T789

9 TUBE AIR-ACE
15-2100 METERS
100-250 V. A.C.

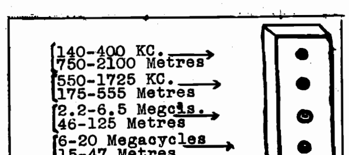
CONDENSERS

C 1 Trimmers 30 mmf.
C 2 .05 mfd. 200 volts
C 3 .25 " 200 "
C 4 .05 " 400 "
C 5 .0005 mica
C 6 5 plate padder
C 7 .005 mfd. mica
C 8 3 plate padder
C 9 .01 mfd. 400 volts
C10 .0001 mfd. mica
C11 10. mfd. 25 volts
C12 .5 " 300 "
C13 .02 " 400 "
C14 .1 " 400 "
C15 .004 " 600 "
C16 30 mfd. Electrolytic
C17 14 mfd. "
C18 420 mmf. variable
C19 .0015 mfd. mica.

RESISTORS

R 1 250 ohms 1/3 watt
R 2 250.000 ohms 1/3 watt
R 3 50.000 " " "
R 4 250.000 " " "
R 5 4.500 } Candhom type
R 6 5.500 } "F" voltage
R 7 600 } Divider
R 8 700 ohms 1/3 watt
R 9 2.500 " " "
R10 1 megohm " "
R11 5.000 ohms " "
R12 500.000 " " "
R13 100.000 " " "
R14 6.000 " " "
R15 40.000 " Tone control #TC900
R16 500.000 " Volume control with A.C. Switch. Part S341N

Band switch positions.
1-Short wave 6 to 20 megacycles. 15-48 M.
2-Short wave 2.2 to 6.5 " 46-125 M.
3-Medium wave-Broadcast 550-1725 KC. 175-555 M.
4-Extra long wave 140-400 KC. 750-2100 M.
Extreme right position for phonograph switch.



Positions of trimmers and coils within shields.

TUBE SOCKET VOLTAGES

Tubes	Screen Grid to ground	Plate to Ground	Cathode to Ground	Filament Heater
85	------	75 to 85	5 to 7	6.3
76	------	95 - 105	5 - 7	6.3
6D6 I.F.	85-95	235-245	4 - 6	6.3
6D6 R.F.	85-95	235-245	3 - 4	6.3
6A7 Detector	85-95	235-245	3 - 4	6.3
" Oscillator	85-95	145-155	3 - 4	6.3
42	235-245	360-370	21-23	6.3

Voltage drop across speaker 125 volts. Voltage from filament of 80 tube to ground 360-370 volts. All voltages taken with volume on full and no signal in receiver. 1000 ohms per volt meter used.

MODEL 9-Tube
Air-Ace
Alignment

HETRO ELECTRICAL INDUSTRIES, INC.

OPERATION

CONTROLS: The Four control knobs in the front of the cabinet serve the following purposes.

WAVE BAND SWITCH: (Left hand knob) Has 5 positions. #1 corresponds with (1) on the dial and covers 15-48 meters (6 to 20 megacycles); #2 corresponds with (2) on the dial and covers 46-125 meters (2.2 to 6.5 megacycles); #3 corresponds with (3) on the dial and covers 175-555 meters (1725 to 550 kilocycles); #4 corresponds with (4) on the dial and covers 750-2100 meters (130 to 410 kilocycles). The 5 position is for phonograph reproduction.

STATION SELECTOR: (Upper Middle Dual Knob) Large knob has a 9 to 1 tuning speed. Small knob has a speed of 45 to 1 for finer tuning.
POWER SWITCH AND VOLUME CONTROL: (Right hand knob).
TONE CONTROL: (Lower middle knob).

PROCEDURE: Remove all carton and packing from inside of cabinet. Make sure that tubes and tube shields are well inserted. Connect Antenna to screw marked "A" and Ground to screw marked "G" in back of the chassis. Attach the power cord to the electrical outlet, first making sure that the available current is alternating and the voltage within 10% of the voltage specified in the rating tag supplied with the receiver. The actual operation is simple. However, the full possibilities of any short-wave receiver cannot be attained until the user has become familiar with the handling of the different controls.
(1) Set the Band switch for the desired range. (2) Turn the power switch clockwise, this will illuminate the dial. Allow one minute for the tubes to heat. (3) Advance volume control half way and with the large selector knob turn the black pointer to frequency or wavelength of the desired station. With the small selector knob rotate very slowly the Band Spread (Red) pointer over a 15 point radius on each side of the setting, advancing the volume control and repeating the tuning process if necessary, until the signal is heard. (4) After receiving the signal, turn Volume Control to low level. Readjust the station selector to the very exact point where the quality of the tone is best. This setting minimizes the background noise. (5) Adjust the Volume Control to the desired level. (6) Adjust tone control to desired bass response by turning clockwise, further advance in this direction decreases treble response and noise interference. (7) When through operating, turn the Volume Control knob to its extreme counter-clockwise position to switch "off" the power. (8) For phonograph operation the Band Switch should be turned to the extreme clockwise position and the magnetic pickup terminals should be inserted in the receptacle marked "PHONO" located near the rear of the chassis. (Phonograph combinations are supplied with a switch to connect or disconnect the pickup from the set). (9) The Volume and Tone controls in the set also regulate the phonograph reproduction, but an additional Volume Control in the pickup is helpful.
Do not remove the speaker or tubes from their sockets while the set is in operation.

SERVICING

If the receiver does not oscillate in the high frequencies, try another 6A7 tube. Check all plate and screen voltages. The power transformer is practically universal and by simply moving one connection in the primary, the receiver may be operated with any A.C. current from 100 to 260 volts. Make sure that the tuning dial does not touch the cabinet or the dial escutcheon and that the chassis is mounted on the rubber supports provided. The screws holding the chassis to the cabinet should be fairly loose. This will prevent microphonic noises caused by the speaker vibration, particularly while receiving short waves.
ALIGNMENT and ADJUSTMENT: The I.F. frequency is 456 KC. and the I.F. transformers are adjusted in the usual manner through the trimmers located on the top side. If necessary to align the I.F. amplifier, place the Band Switch on position #3 and start with the output I.F. stage, then the interstage and finally the input I.F. which is an iron core transformer. Use an Oscillator or Signal Generator and be sure that the signal is very weak in order that the Automatic Volume Control remains inactive. If the peak is correct, rotating the variable condenser should not change the signal output.

THE ALIGNMENT OF THE ANTENNA, R.F. AND OSCILLATOR tuning coils has been greatly simplified by having the trimmers and coils connected together and mounted within the same shields. Proceed as follows: BAND No. 1: Set Band Switch at No. 1 and adjust again. With a Signal Generator, generate an 18 megacycles signal and tune the receiver to it. Then adjust to maximum output the trimmers of the Antenna, R.F. and Oscillator stages in #1 band (6 to 20 megacycles) located at the bottom of each coil assembly. (2) Also set the Signal Generator at 9 or 10 megacycles. If no Signal Generator is available, the signal from a 16 or 19 meter short wave station may be used while the receiver is tuned to it. BAND No. 2: Set the Band Switch at No. 2 position. Set the Signal Generator at 6 megacycles, tune the set to the signal, adjust to maximum output the trimmers of the Antenna, R.F. and Oscillator stages in #2 band (2.2-6.5 megacycles) located second from the bottom in all coil assemblies. Set the Signal Generator at 2000 KC. and adjust the padder condenser C6 nearest to the back of the chassis to maximum output. Check again at 6 megacycles. If Signal Generator is not available a 47 or 49 meter short wave station may be used. BAND No. 3: Place Band Switch in No. 3 position, set the Signal Generator at 1500 KC., tune the set to the signal. If a Signal Generator is not available, tune in a station at about this frequency and adjust to maximum output the Antenna, R.F. and Oscillator coil trimmers (550-1725 KC.) third from the bottom in all coil assemblies; set the Signal Generator at 600 KC., tune the receiver to the signal and adjust the padder condenser in this band, (the other C6) to maximum output, then tune again to 1500 KC. and reset.
BAND No. 4: With Band Switch in No. 4 position, set the Signal Generator to 350 KC tune the set to the signal and adjust trimmers of the 140 to 400 KC. band, (located at the top of the coil assemblies) to maximum output, set the Signal Generator at 150 KC., tune the receiver to the signal and adjust the padder C8 to maximum volume, turn the set to 350 KC. and recheck.
This completes the alignment. All sets are carefully adjusted before leaving the factory and will require little or no adjustment, particularly the Oscillator trimmers and the padder condensers, which should not be touched unless absolutely necessary. The alignment should be done preferably with a Signal Generator or Oscillator and by someone with some experience. Variation of the Oscillator trimmers and the padder condensers will vary the dial calibration. All adjustments should be done very slowly. A 1/2 turn of the screws should be sufficient in most cases. CAUTION: If the receiver is not performing correctly, before attempting to re-align the receiver be sure that the Antenna is not touching the ground, that all tubes are good and that the grid caps are not "shorted" to the shields. If the receiver performs well, do not re-align. When aligning use an insulated screw driver. All adjustments should be made with a minimum input signal. Signal generators usually emit a harmonic signal of slightly higher frequency than the fundamental and in adjusting the lower of the settings should be used. When adjusting the R.F. rotate slightly the receiver dial and reset again to the generator signal because the latter is often changed by the R.F.

NOTES ON SHORT-WAVE RECEPTION

Antenna and Ground—The efficiency of any antenna varies greatly with the frequency of incoming radio waves, a given length being excellent at certain frequencies and comparatively poor at others.

From a practical standpoint, however, very good results will be obtained using two antennas of different length, one 24-29 feet for short-wave reception and the other 50-100 feet for reception in the long-wave, standard broadcast

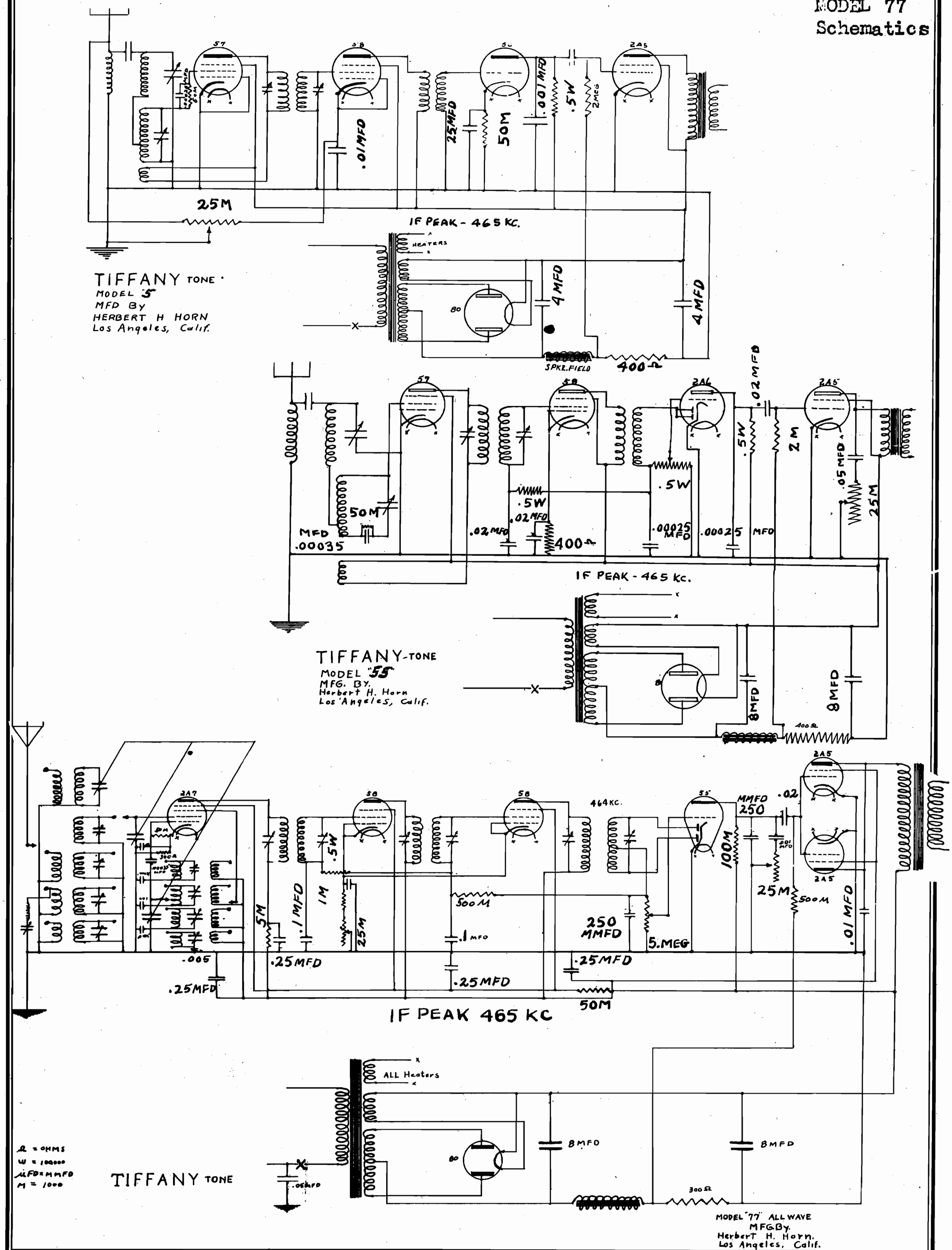
The shorter antenna may be used alone if preferred but probably will not be satisfactory for receiving distant or low-power stations in the standard broadcast band. Further, no advantage will be gained by its use on the shorter wavelengths unless it can be installed so that the majority of its length is unshielded (not contained in a building of metallic construction) and sufficiently remote from sources of man-made interference (such as housewiring, power lines, street-railways and passing automobiles) to prevent excessive noise. If these conditions cannot be fulfilled, it will be preferable to erect a single antenna of compromise length (100-105 feet overall) which, in addition to providing excellent results in the standard broadcast band, will also favor reception in the short-wave broadcast bands located at 49 31 25 and 19 meters.

Good reception in many installations will be obtained without connecting the instrument to an external ground since the power line characteristics often render a separate radio ground unnecessary. In any case, however, best results will be insured by grounding the set in the conventional manner to a water-pipe or radiator or to a metallic pipe or stake driven from five to eight feet into the soil. The ground lead when used should be short, preferably not more than 15 feet in length, and connected to a clean portion of the pipe or stake surface by means of an approved ground clamp.

PRINTED IN U.S.A.

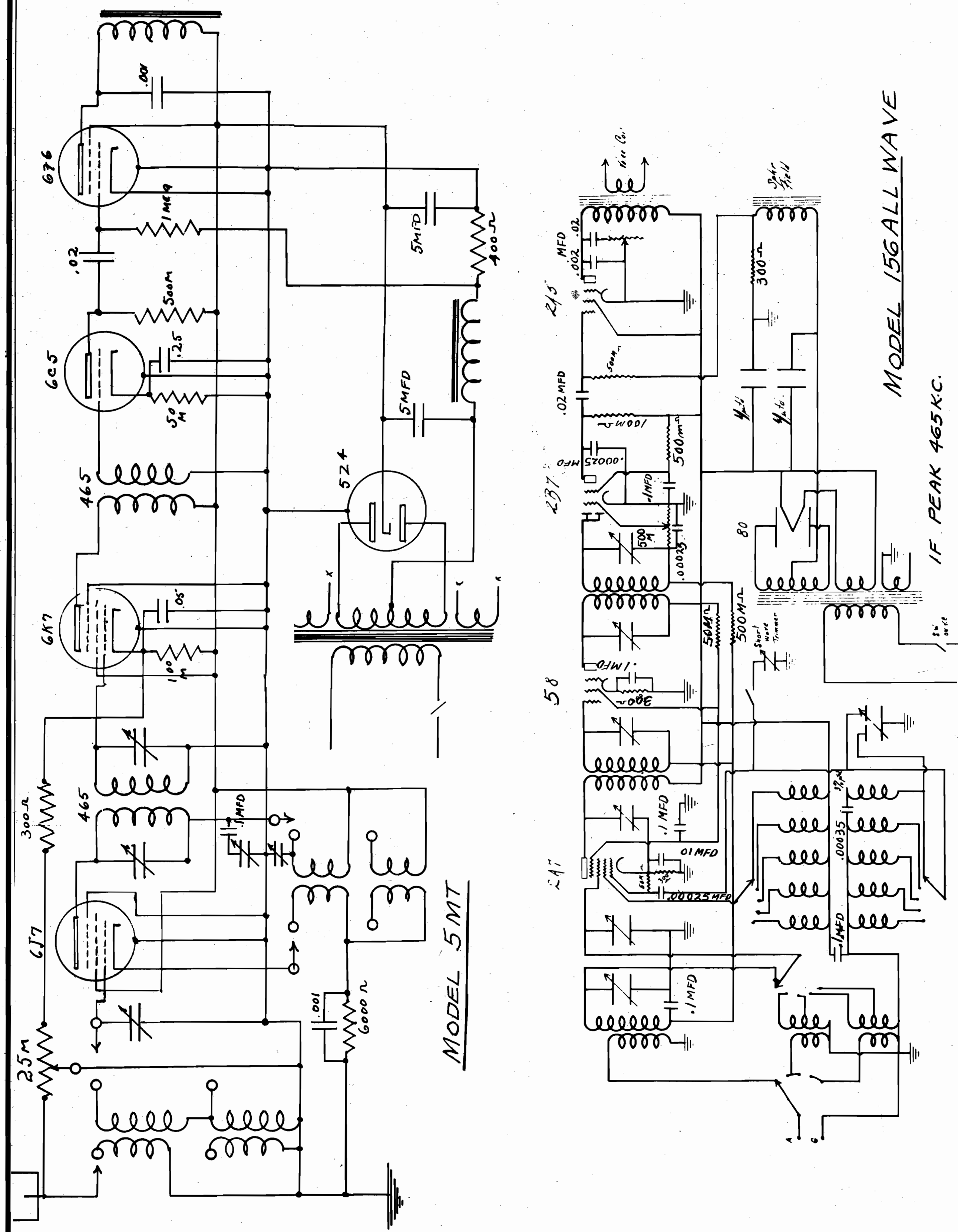
MODEL 5
MODEL 55
MODEL 77
Schematics

HERBERT H. HORN



MODEL 5MT
MODEL 156 AW
Schematics

HERBERT H. HORN



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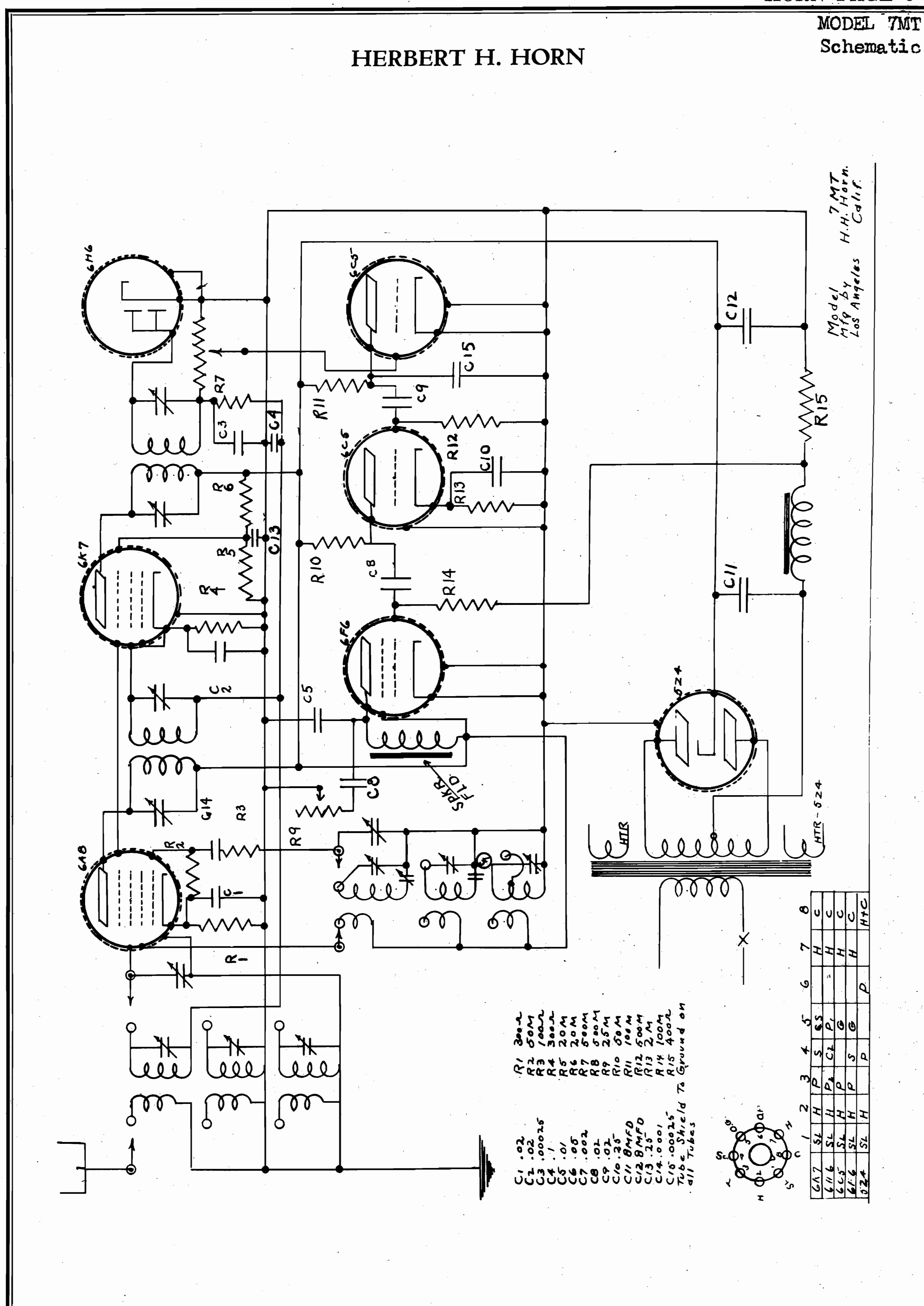
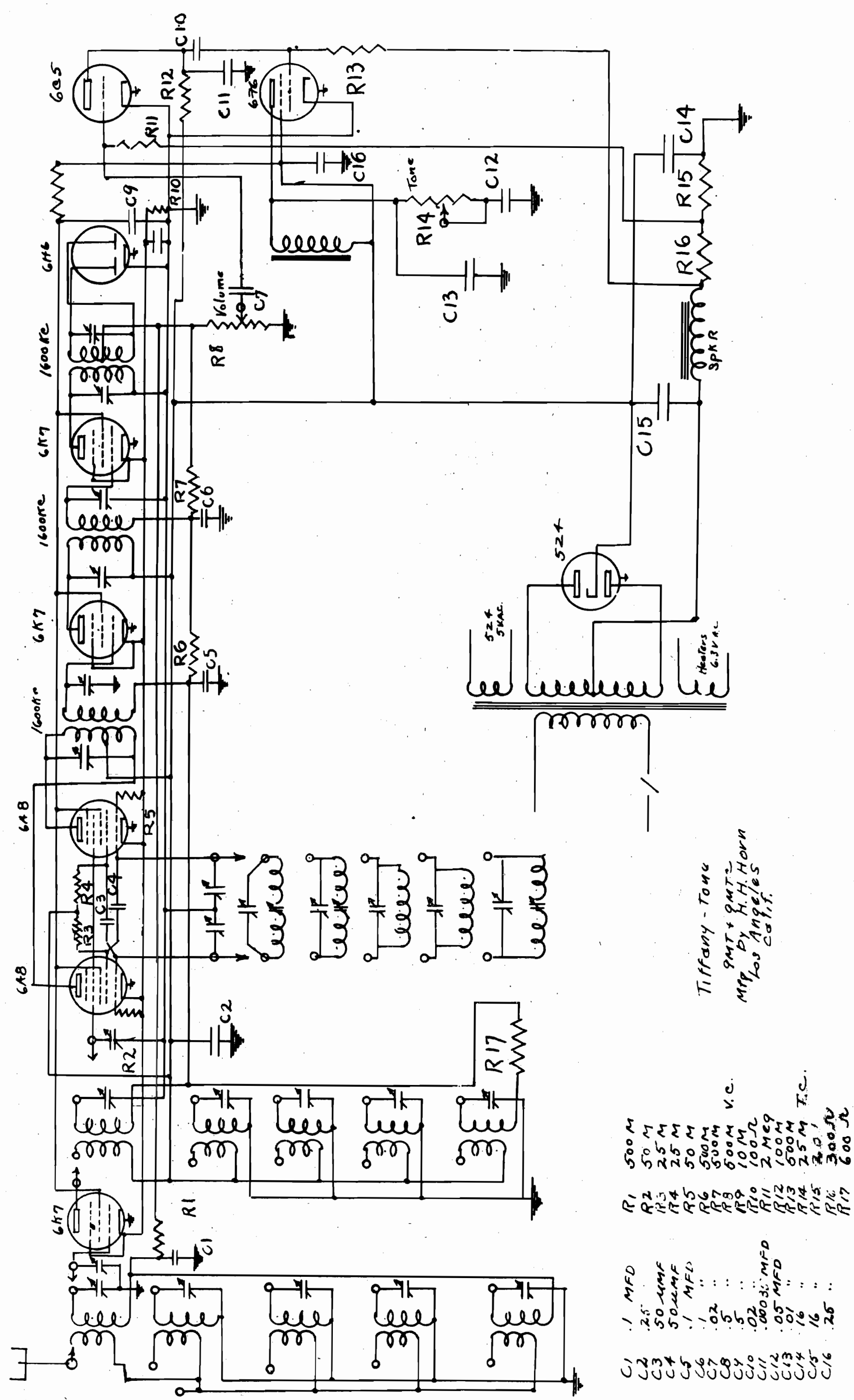


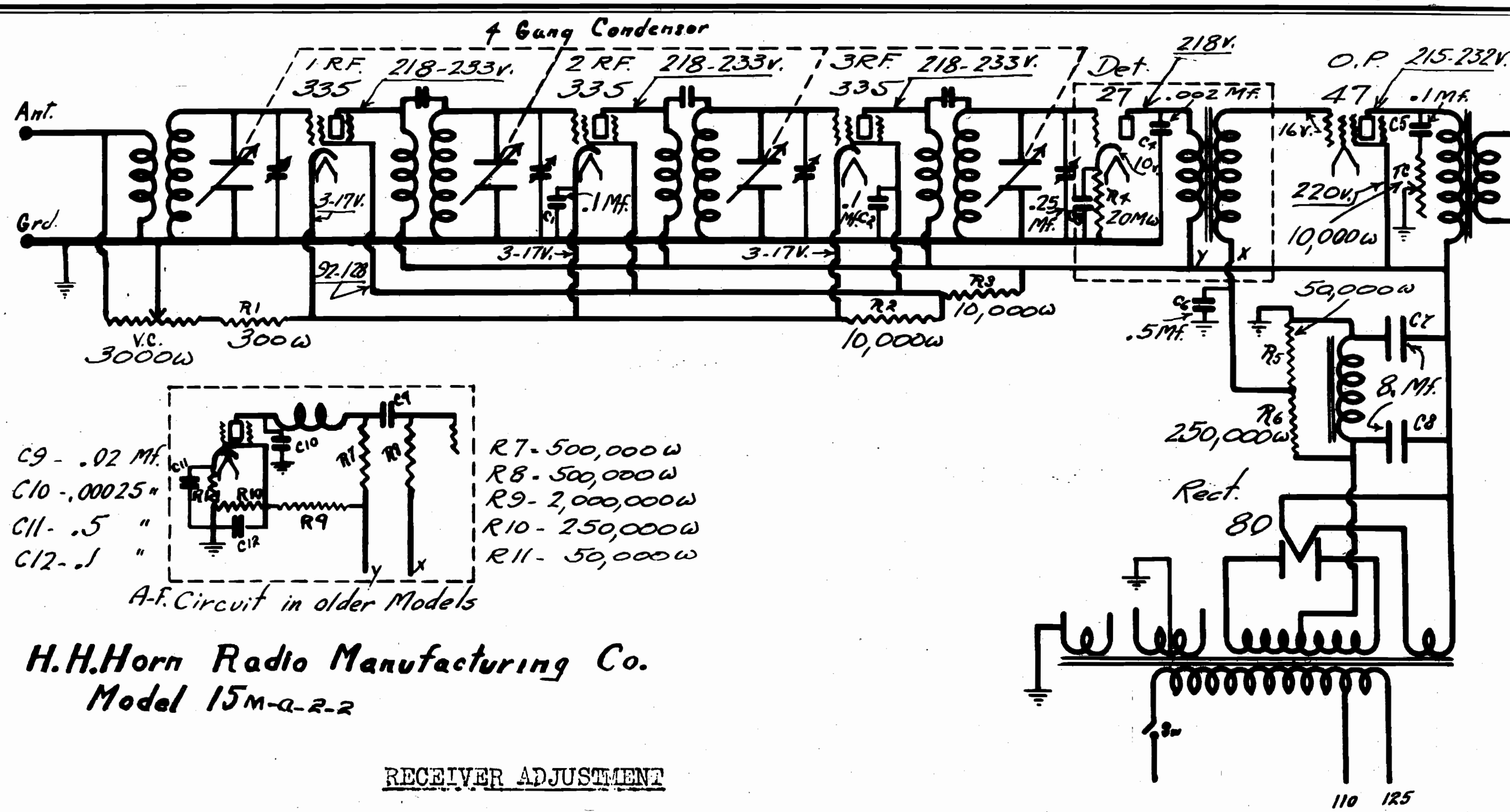
MODELS 9MT, 9MTC
Schematic

HERBERT H. HORN

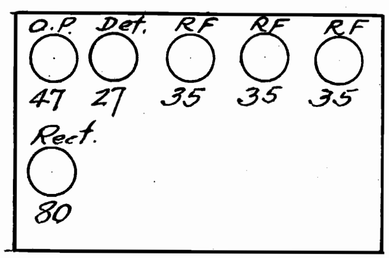


MODEL 15M
Schematic,Voltage
Socket,Notes

HERBERT H. HORN



H.H.Horn Radio Manufacturing Co.
Model 15M-a-2-2



RECEIVER ADJUSTMENT

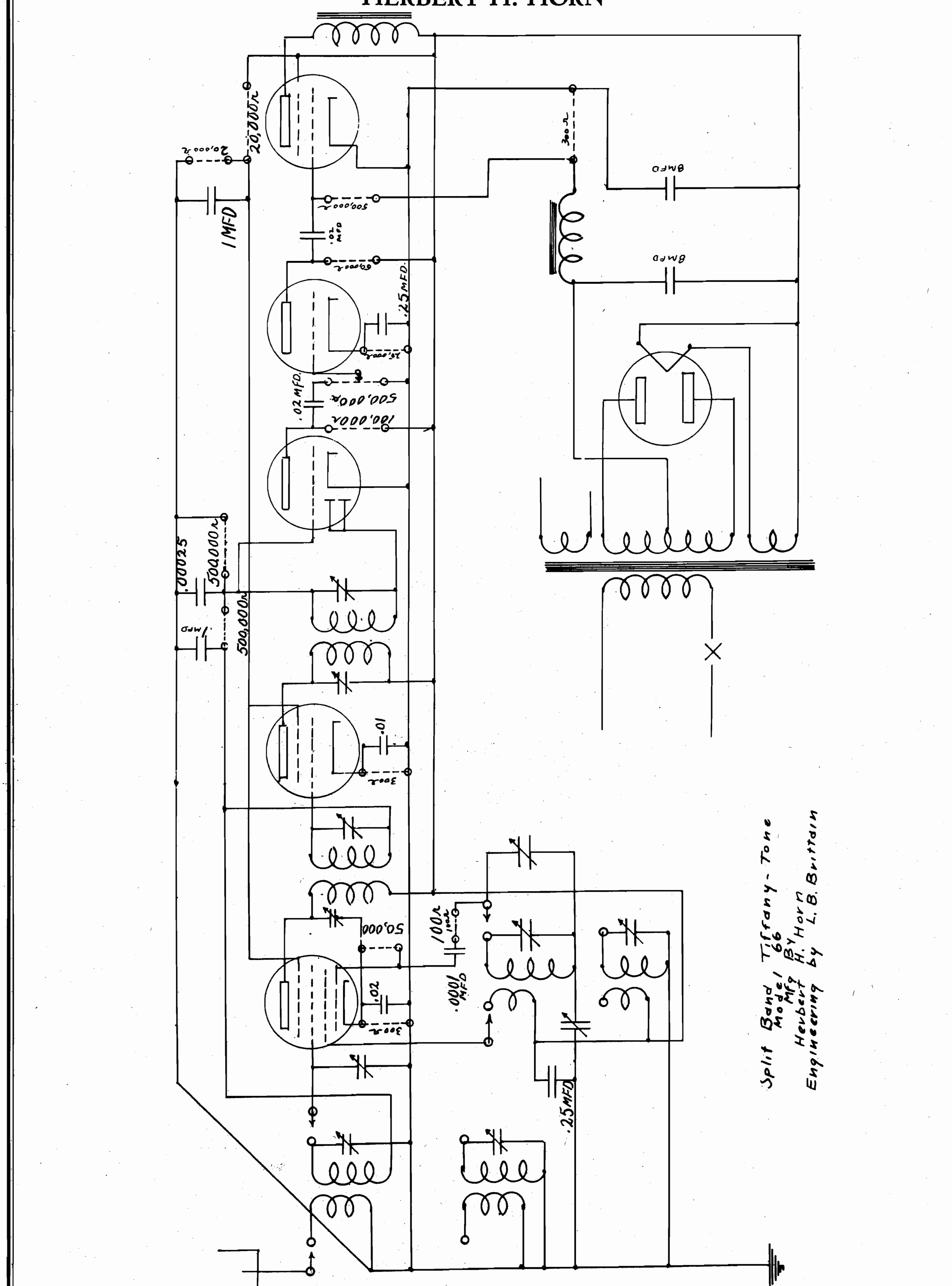
A modulated oscillator variable over the broadcast frequencies should be used in the alignment of the receiver. The use of an output meter will insure accuracy where the ear might tend to be inaccurate.

Turn the capacitators on R.F. coils to maximum and turn one half turn back. This adjustment should not vary except on a long aerial which may necessitate unscrewing them further.

The condenser trimmers should be adjusted at approximately 1300 K.C. The maximum sensitivity for the rest of the band should be obtained by spreading the split rotor plates. It may be necessary to go over the trimmers and plate spreading several times before the gang is properly balanced. Time expended in properly adjusting a receiver is well spent.

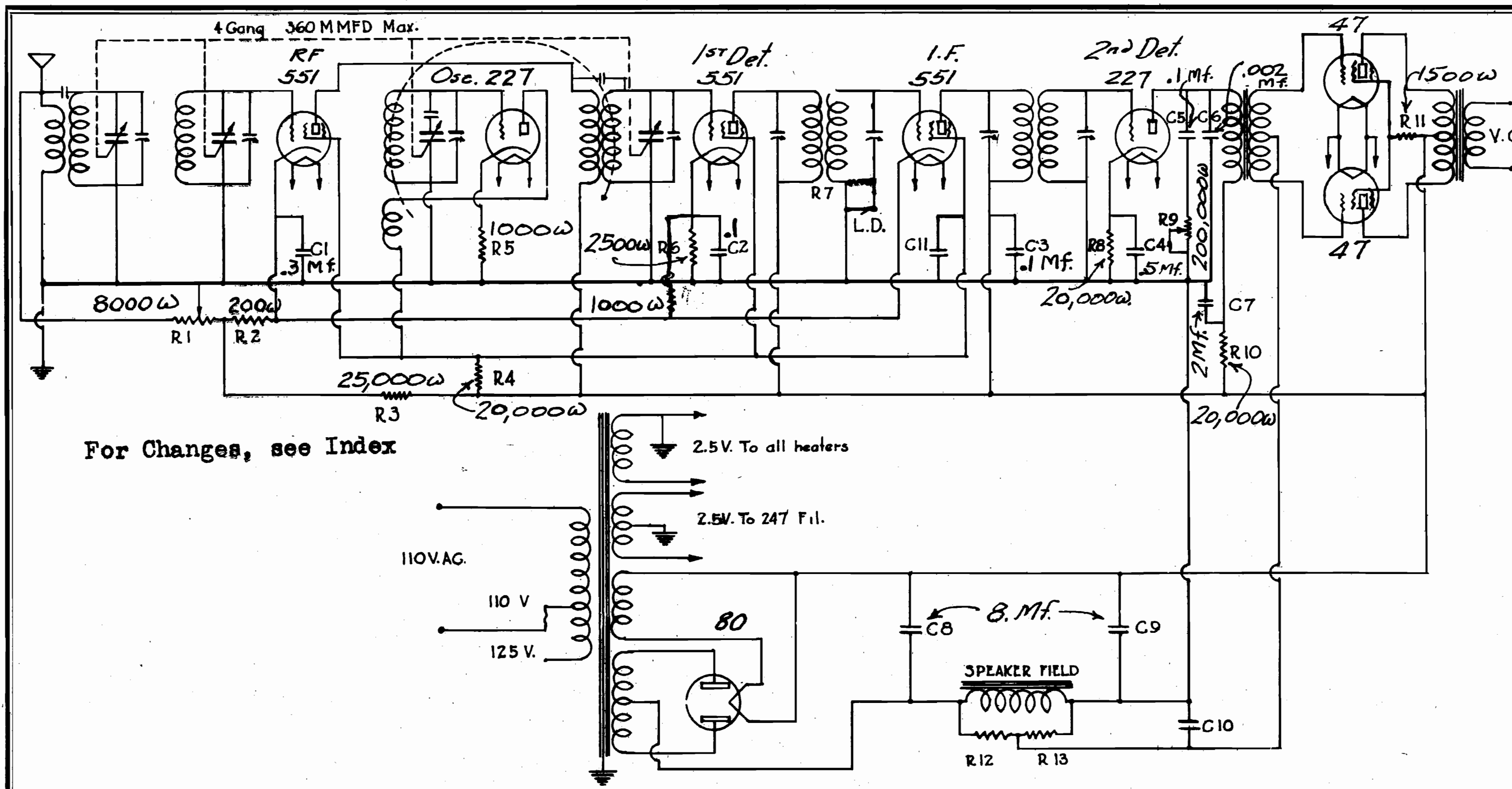
MODEL 66
Schematic

HERBERT H. HORN

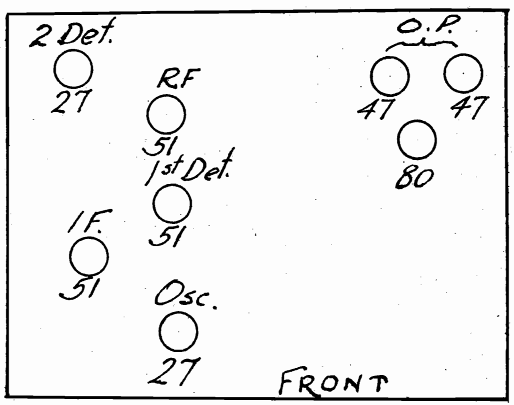


MODELS 79,99,109
Schematic
Voltage
Socket

HERBERT H. HORN



For Changes, see Index



VOLTAGES

	VOLUME CONTROL AT MAXIMUM			VOLUME CONTROL AT MINIMUM		
TUBE	PLATE	SCREEN	CATHODE	PLATE	SCREEN	CATHODE
51 RF.	225	94	3.5*	250	112	33*
27 Osc.	94	---	4.0*	112	---	5*
51 1 Det.	225	94	3.5*	250	112	33*
51 IF.	225	94	3.5*	250	112	33*
27 2 Det.	180	---	20.0*	195	---	22*
47 O.P.	225	215	16.5*	243	235	17.5*

*Voltmeter resistance 50,000 ohms. All other voltages measured with 250,000 ohm-meter. Filament voltage 2.1, except for 47s which is 2.3 volts.

MODELS 79,99,109
Alignment,Changes

HERBERT H. HORN

ADJUSTMENT OF INTERMEDIATE FREQUENCY CONDENSERS.

There are two intermediate frequency transformers. Both the grid a and plate circuits of each must be tuned sharply to 175 kilocycles. The condenser adjustments are accessible from the under side of the chassis, there being two slotted screws protruding through the insulated base of each intermediate.

A modulated oscillator, accurately calibrated to 175 kilocycles, and some form of output meter is necessary. Connect the output of the oscillator to the control grid cap of the translator tube, removing the normal grid lead. The ground terminal of the oscillator must be connected to the ground terminal of the set. Connect the output meter as specified by its manufacturer. Turn the set on, adjust the volume control of the set and the output control of the oscillator until the oscillator signal is audible in the speaker and indicated on the output meter.

Be sure that the "local-distance" switch on the set is in the "distance" position. Then adjust the four intermediate condenser screws for maximum output, reducing the oscillator output when necessary to keep the indicating meter within its scale range. Go over the four adjustments twice to make sure that they are peaked as closely as possible. This completes the I.F. tuning adjustments.

* * * * * * * * *

LINE-UP ADJUSTMENTS OF THE GANG CONDENSER

The four sections of the tuning condenser function as follows: The first section, looking at the rear of the chassis, tunes the selector stage. The second section tunes the grid circuit of the R.F. amplifier. The third section tunes the grid circuit of the translator tube, and the fourth section (nearest the front of the chassis) tunes the oscillator. The first three must track together at signal frequency, while the oscillator circuit must maintain a frequency 175 kilocycles higher than the signal frequency.

A modulated oscillator variable over the broadcast frequencies and accurately calibrated must be used in connection with an output meter. It should be equipped with a dummy antenna and attenuator.

Connect the output of the oscillator through the dummy antenna to the antenna and ground posts of the receiver. Connect the output meter as before. Set the oscillator at 1200 KC and the dial on the set at 1200 KC. Then adjust the oscillator section trimmer, translator, R.F., and pre-selector output. Do not again change the trimmers but establish resonance over the tuning range by bending the vanes of the split rotor plates as necessary.

The following changes have been made on all current production sets:

The tone control, composed of a 200,000 ohm variable resistor in series with a .1 MFD condenser is shunted from one power tube grid to ground. This control is R9 and C5 on the diagram placed in the new position.

The speaker field which is used as the filter choke has been shifted from the negative side of the power supply to the positive making a conventional brute force filter.

The resistors #12 and #13 have been omitted and the grid return of the pentode tubes has been run direct to ground. The bias for the pentode tubes has been run direct to ground. The bias for the pentode tubes is now obtained by the drop across a 300 ohm resistor in series with the pentode filament center tap and ground making the filament 16½ volts positive in relation to the grid return to ground. With this type of circuit it is possible to secure a correct reading of the bias with a standard set analyzer.

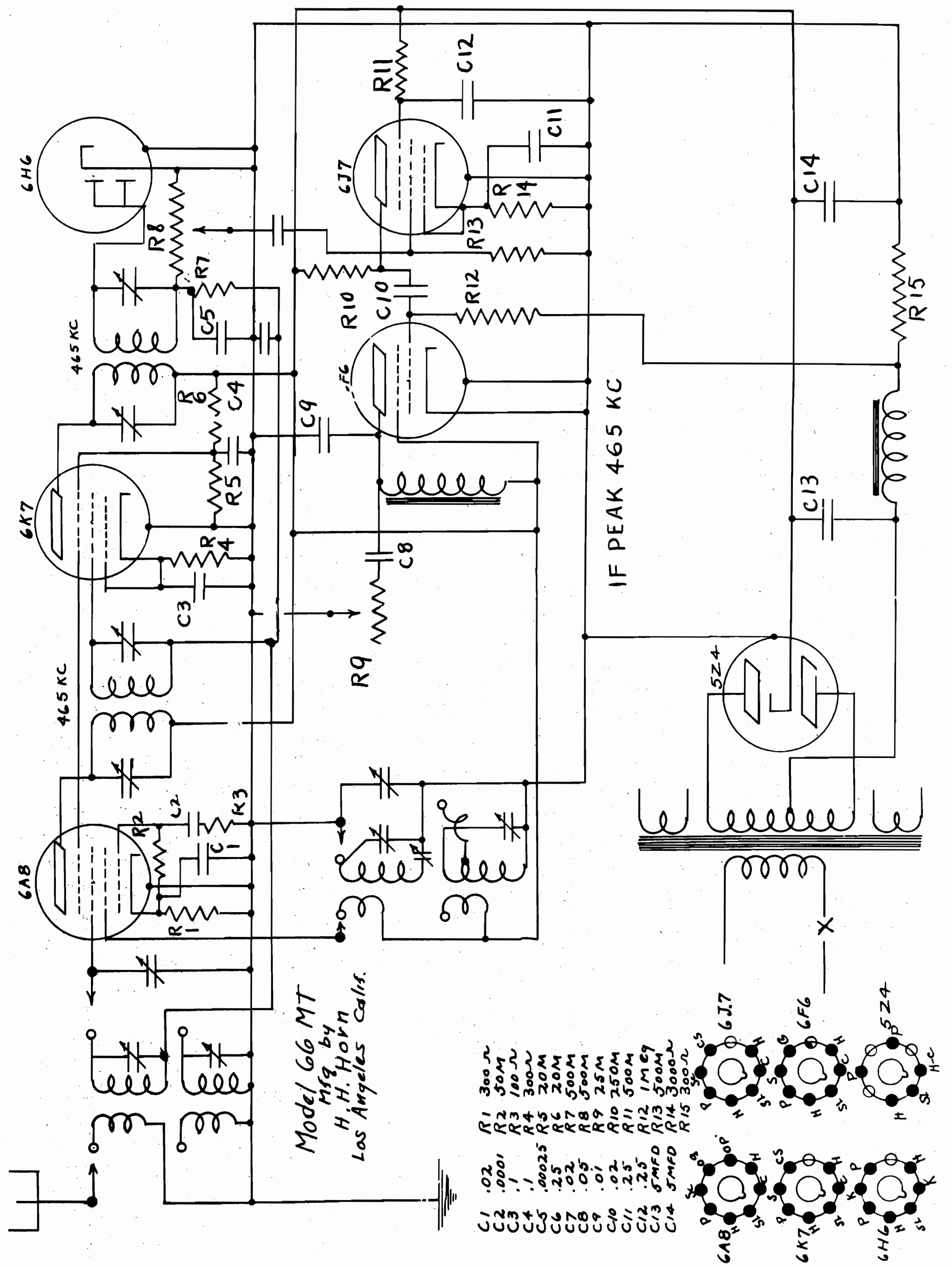
The circuit and other data in this manual applies to both the 8 and 10 tube models. The two tubes in the 10 tube model are connected in the following manner:

One 27 tube is used in parallel with the 27 second detector shown on diagram. This tube is added at this point to increase the voltage output capacity of the second detector stage, consequently increasing the overload point to a considerably greater level than it is possible to obtain with a single tube.

One 27 tube is used as a ballast tube on the cathode supply to the R.F. tubes, thus enabling the volume control to smoothly control the volume on powerful local stations. The plate of this tube is run to the high voltage, the grid to the point between R1 and R2, and the cathode through a 2,000 ohm resistor to the cathode side of R2.

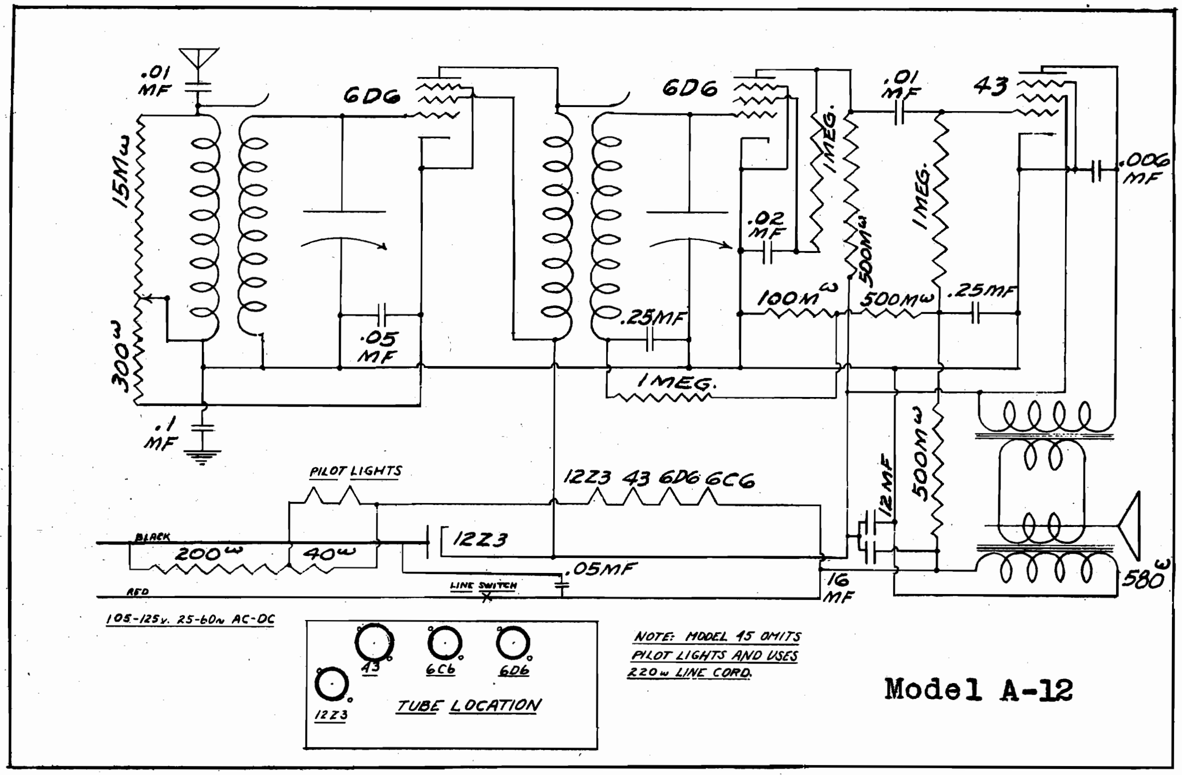
MODEL 66MT
Schematic

HERBERT H. HORN

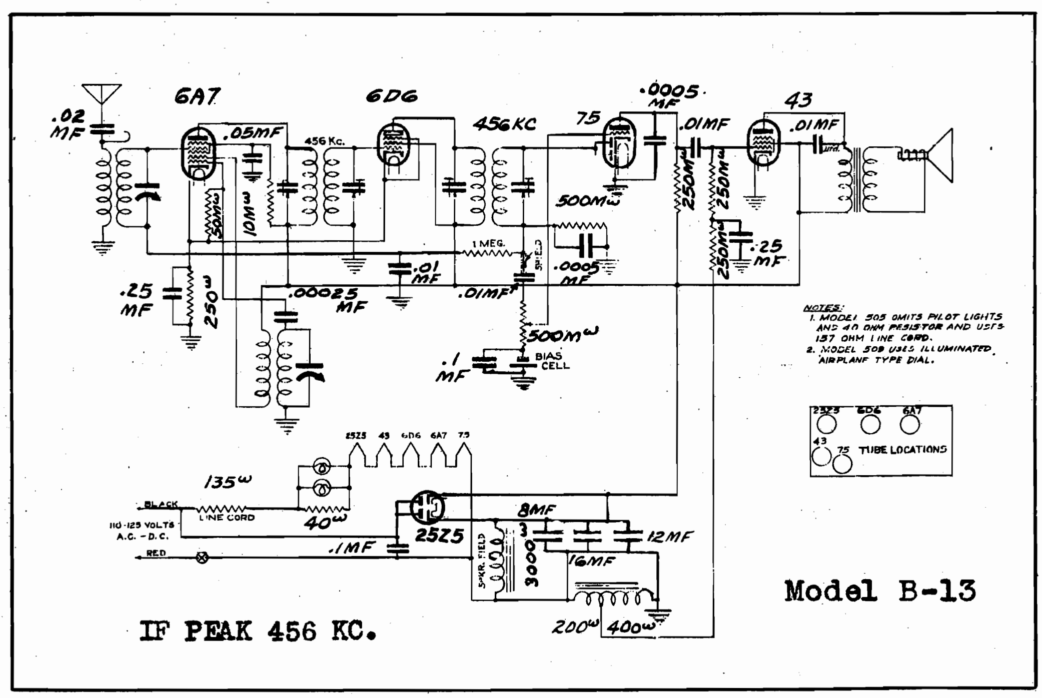


MODEL A-12
MODEL B-13
Schematics
Socket

HOWARD RADIO CO.



Model A-12

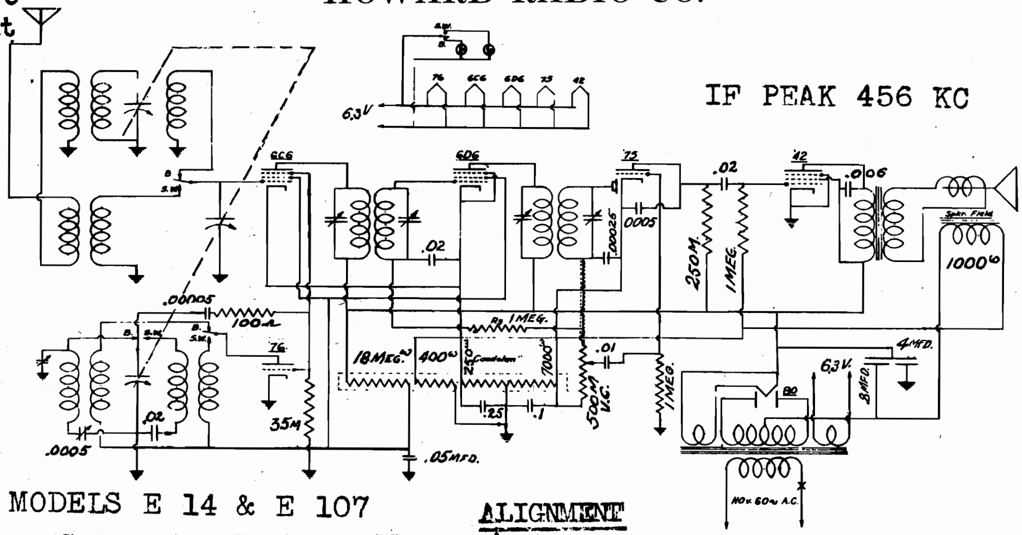


Model B-13

IF PEAK 456 KC.

MODELS E-14, E-107
Schematic
Alignment

HOWARD RADIO CO.



MODELS E 14 & E 107

ALIGNMENT

APPARATUS NEEDED: Test oscillator (capable of covering three bands: 456-465 K.C., 540-1700 K.C. and 6-15 megacycles), and an output meter or 0-3 AC voltmeter placed in parallel with speaker voice coil.

PROCEDURE: The I.F. circuits must first be aligned. Remove oscillator tube (76) from set, set test oscillator to 456 K.C., and connect test oscillator to grid of first detector tube (6C6). Deflection on output meter should then be adjusted to maximum by adjusting the trimmer screws on the I.F. transformers. It may be that during this and subsequent procedure, the output meter may go off scale, but this may be corrected by reducing oscillator output until the needle on output meter is again on scale.

NOTE: Although these receivers are adjusted to 456 K.C. I.F. frequency at the factory, it may be advisable to use 465 K.C. I.F. frequency, instead, in order to reduce code interference in some parts of the country. It is entirely feasible to use 465 K.C. I.F. frequency without changing either I.F. transformers, R. F. or oscillator coils.

The R.F. and oscillator circuits must now be aligned. Replace the oscillator tube in set chassis and connect test oscillator to the antenna and ground leads. Set test oscillator to 1700 K.C., and after turning band switch to broadcast position, rotate tuning knob until dial scale on chassis reads 1700. The oscillator trimmer condenser, found by turning chassis upside down, is then adjusted for maximum deflection on output meter, after which, the trimmer condensers located on the main tuning condenser are also rotated until output meter again reads maximum deflection.

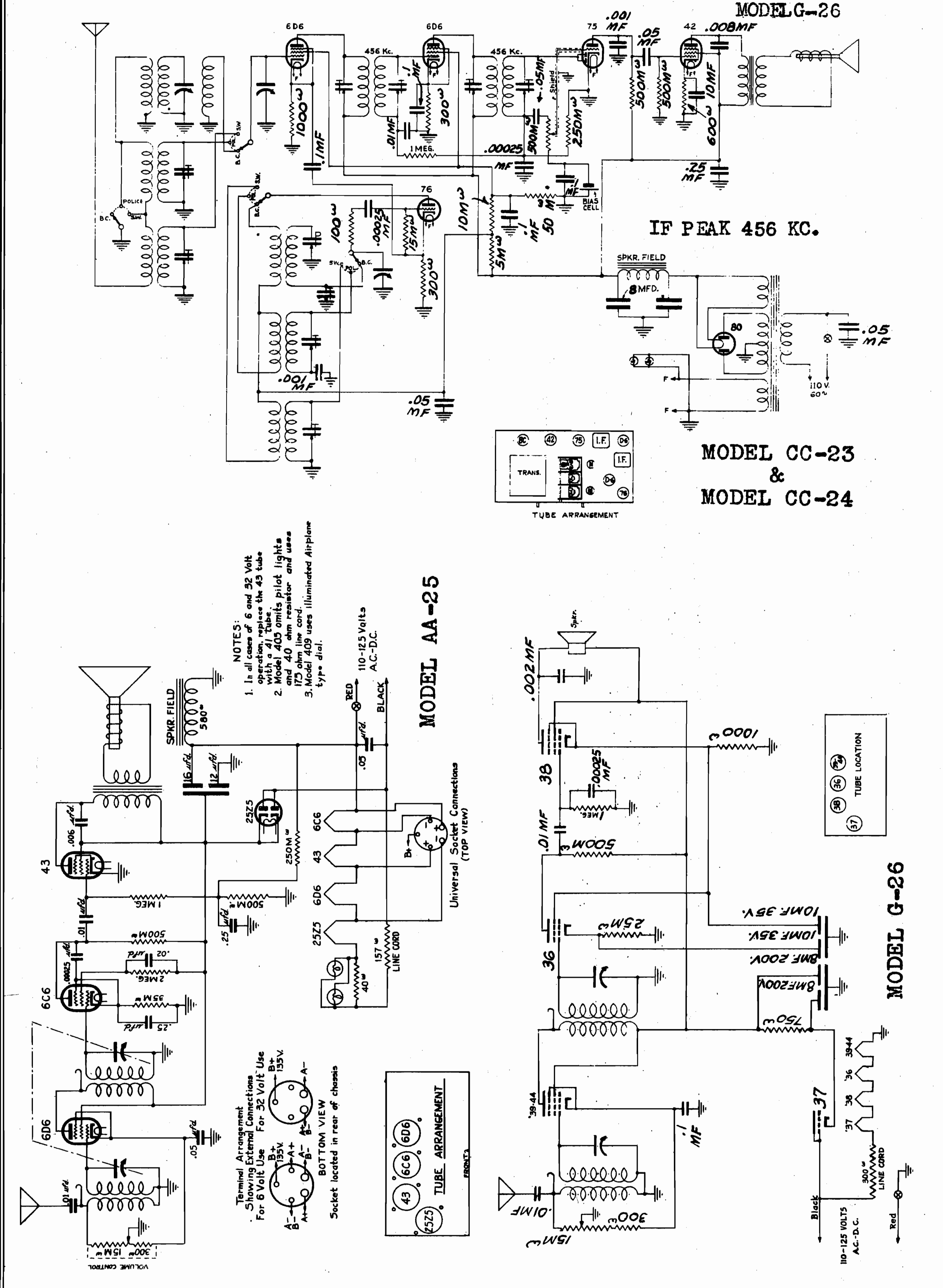
To finish alignment of broadcast band, set test oscillator to 550 K.C., and adjust the pad condenser found on the top and right hand side of the chassis. For best results in aligning the 550 K.C. end of the broadcast band, the tuning condenser should be "rocked" back and forth across the signal, and the padding condenser adjusted at the same time, until maximum deflection is gained on the output meter. The 1700 K.C. position should then be re-checked, as adjusting the padding condenser often throws off the high frequency alignment.

By rotating the band change switch to the short wave position and setting the dial scale to read 15 megacycles the set is ready to adjust on the short wave band. Set test oscillator to 15 megacycles and adjust the oscillator trimming condenser, located on front short wave coil, until output meter reads maximum. Lastly, adjust trimming condenser on back short wave coil to read maximum deflection on output meter, and the set is completely aligned and ready for best reception.

Schematics, Socket

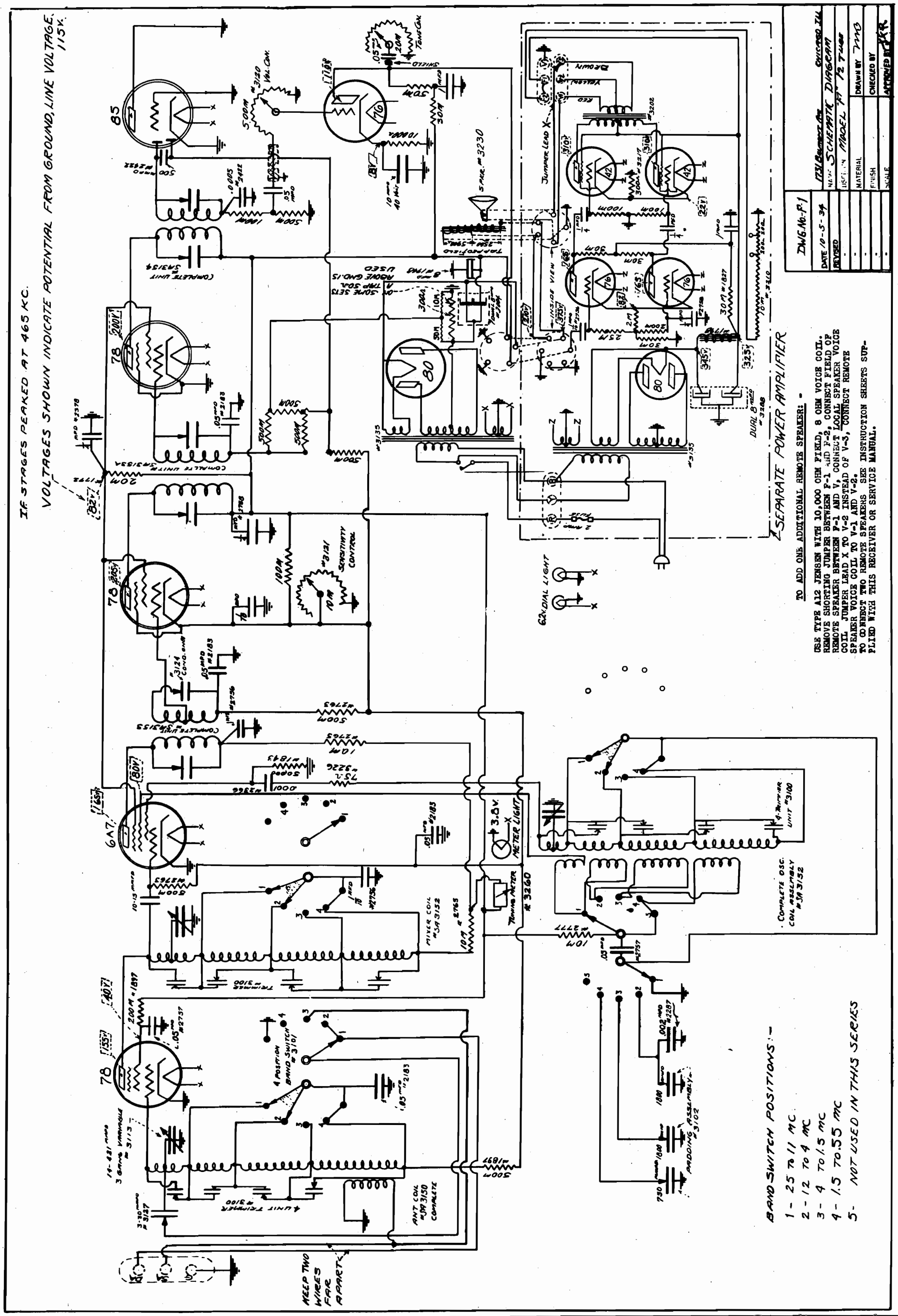
HOWARD RADIO CO.

MODELS CC-23, CC-24
MODEL AA-25
MODEL G-26



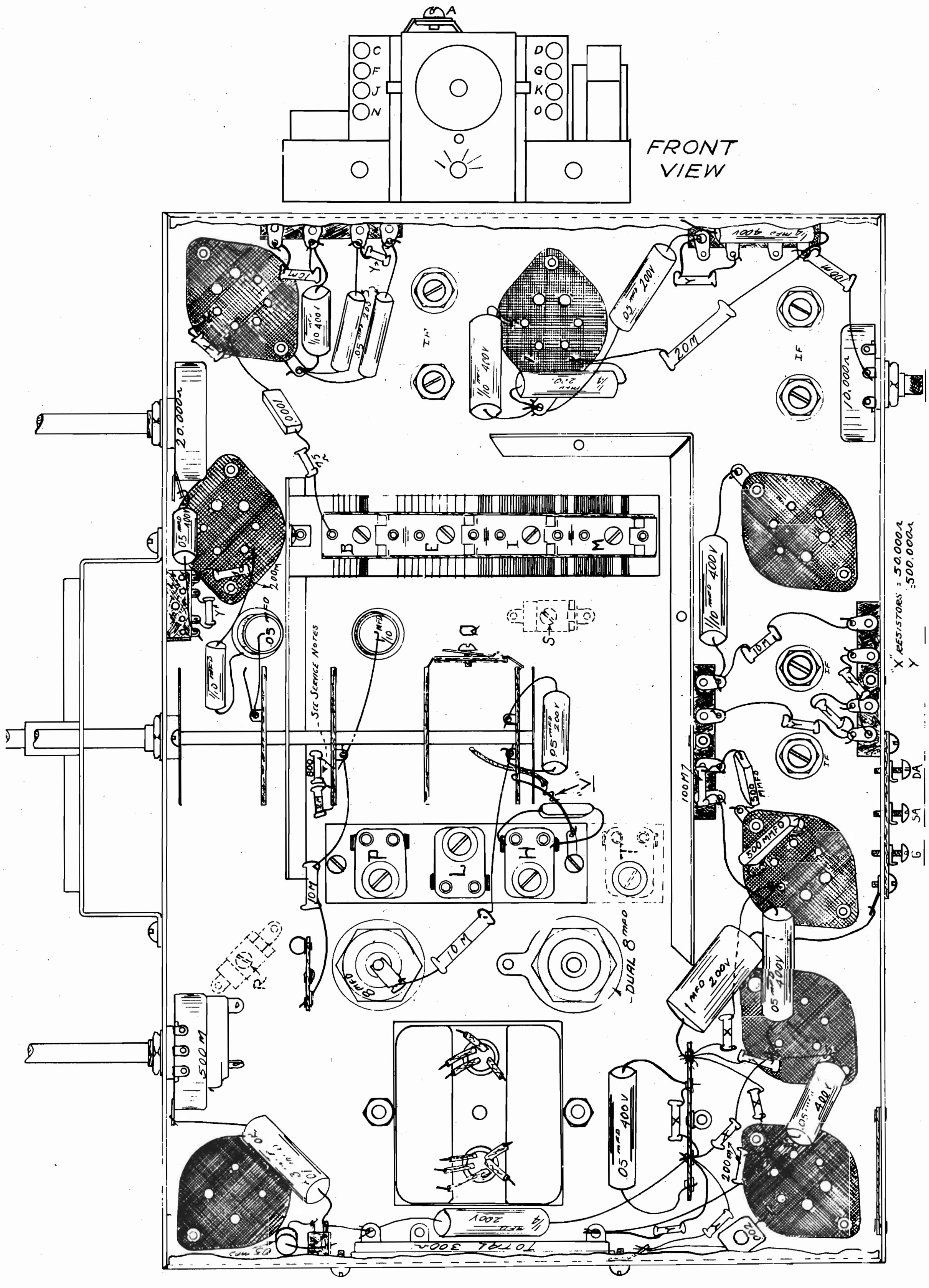
MODEL F
Schematic, Voltage

HOWARD RADIO CO.



MODELS D,F
Chassis Wiring

HOWARD RADIO CO.



MODELS D,F
Alignment

HOWARD RADIO CO.

THE PROCEDURE TO ALIGN THE I.F. STAGES

The IF's are aligned in the usual system of feeding the intermediate frequency of 465 KC into the grid of the 6A7 1st Detector tube.

Make certain that the sensitivity adjustment (which is the knurled shaft extending from the back of the chassis) is turned all the way to the right when gaining the IF, RF or Oscillator circuits.

The two trimmers in each of the three IF Coil Cans should be very carefully tuned to resonance as they are very critical and will greatly affect the performance of the receiver.

The sensitivity of the IF stages should be between 10 and 20 Microvolts.

On some of the models the trimmer screws extend through the bottom of the chassis as per pictorial view. On other styles the trimmers are reached through the top of each IF shield can.

3. NOTES ON ALIGNING THE R.F. AND OSCILLATOR CIRCUITS

(a) After the IF's are aligned, the various circuits may be aligned in the order given below.

(b) Keep the sensitivity adjustment all the way on to the right as before.

(c) It is not necessary that the oscillator be taken out of its socket when aligning any of the RF circuits.

(d) Always adjust the oscillator stage before the RF in any particular band.

(e) Before adjusting any band, make certain that the pointer of the station indicator is set on the last line when the dial is turned all the way to the right, on above 560 - at this point the variable condenser should be all the way in to maximum capacity. See pictorial.

(f) The plates on the variable condenser should be bent to make the KC readings on the dial line up ONLY on the Broadcast Band.

(g) Always seal the trimmers with wax or collidon after their adjustment.

(h) After the high frequency adjustments have been made on short wave bands, the test oscillator or generator should be advanced to 930 KC higher in frequency - the output voltage of generator advanced considerably and notice of the image signal of receiver oscillator falls at this point. In case this signal is not heard, the adjustment of the receiver oscillator has been incorrectly made. As an example:-

After the third short wave band has been adjusted at 20 M.C. it should be possible to move the test oscillator to 20 + 930 KC and hear the signal.

(i) Before starting with the alignment adjust antenna series condenser A - without the use of the signal generator - by turning the screw all the way down to maximum capacity, and then unloosen the screw about one half turn.

(j) Start with the third (highest frequency). Short wave band as follows:-

4. THIRD SHORT WAVE BAND

Refer to the pictorial views of the chassis.

Rotate band switch all the way to left to 25-11 Megacycle setting.

Set dial hand to 24 Megacycles.

Peak trimmer B to 24 Megacycles from the signal generator fed into the antenna.

If the set is far out of alignment, it may be necessary to use a heavy input from the generator and also vary the Antenna Coil and Mixer Coil Trimmers C and D until the heavy signal is not necessary. Make the final adjustment on C and D after the oscillator B trimmer is set.

Next, set the dial hand to 12 Megacycles on the same band and with a 12 Megacycle signal, resonance may be checked and corrected by shifting the ground lead at "V" (see pictorial) by sliding it in either direction as necessary along the bare ground wire for the greatest gain.

As mentioned above in paragraph three - the image signal may be checked to determine if the adjustments have been made on the correct signal.

5. SECOND SHORT WAVE BAND

Rotate band switch to 12-4 Megacycles.

Set dial hand to 12 Megacycles.

Peak trimmer E at 12 Megacycles.

Peak Trimmers F and G in the RF circuits on the same frequency.

Set dial hand to 4½ Megacycles on the same band.

Adjust padding condenser H to the 4½ Megacycle signal.

6. FIRST SHORT WAVE BAND

Rotate band switch to 4-1.5 Megacycles.

Set dial hand to 4 Megacycles.

Peak Trimmer I to 4 Megacycles.

Peak Trimmers J and K in the R.F. circuits to the same frequency.

Set dial hand to 1.5 Megacycles.

Adjust Padding Condenser L to resonance with 1.5 Megacycles.

7. BROADCAST BAND

Rotate band switch to "B" position.
Set dial hand to 1500 Kilocycles.

Peak Trimmer M to 1500 Kilocycles.

Peak Trimmers N and O to 1500 Kilocycles.

Set dial to 550 Kilocycles.

Adjust Padding Condenser P to resonance with 550 Kilocycles.

Recheck dial at 1500 Kilocycles.

Check the middle of the dial at 950 Kilocycles for example and bend the plates of the variable condenser if necessary to line up with the calibration.

8. THE LONG WAVE

This adjustment applies to sets that have the extra band from 150 Kilocycles to 350 Kilocycles attached.

The alignment trimmers are shown in dotted lines on the Pictorial Diagram.

Rotate band switch to its fifth position - all the way to the right.

Set dial hand to 350 Kilocycles.

Peak Trimmer Q to 350 Kilocycles from the signal generator.

Peak Trimmers R and S in the RF circuits to the same frequency.

Set dial hand to 150 Kilocycles.

Adjust Padding Condenser T at 150 Kilocycles.

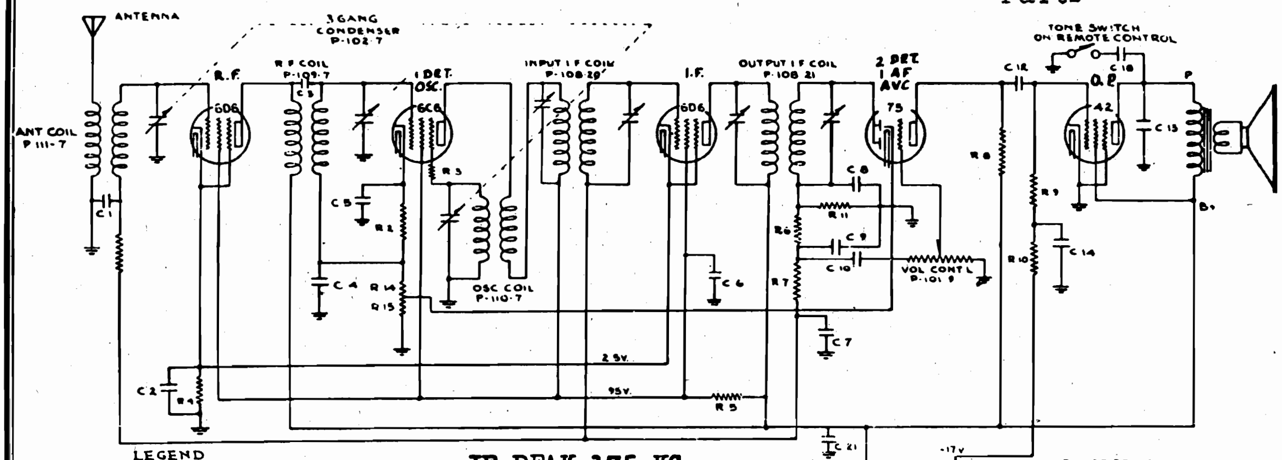
9. NOTES

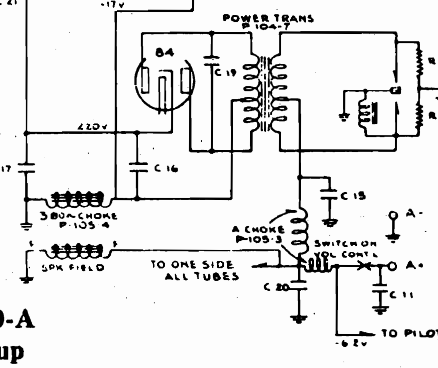
(a) On some series the two resistors - 800 and 2000 ohm, have been added.

(b) Refer to schematic #4903 showing changes, if any, that have been made since sets were in production.

MODELS 670-A, HA-1
Schematic, Voltage
Parts

HOWARD RADIO CO.





LEGEND

RESISTORS

Nº	VALUE
R 1 -	250M ⅓W
R 2 -	450Ω
R 3 -	1500Ω
R 4 -	150Ω
R 5 -	25M 1W
R 6 -	50M ⅓W
R 7 -	250M ⅓W
R 8 -	250M ⅓W
R 9 -	200M ⅓W
R 10 -	300M ⅓W
R 11 -	250M ⅓W
R 12 -	100Ω
R 13 -	100Ω
R 14 -	5M
VAR RESISTOR (VOL CONT'L)	500M
R 15 -	200Ω

CONDENSERS

Nº	VALUE
C 1 -	05 x 200V.
C 2 -	1 x 200V.
C 3 -	11.5 mmf GIMMICK
C 4 -	05 x 200V.
C 5 -	05 x 200V
C 6 -	1 x 200V.
C 7 -	1 x 200V.
C 8 -	0005 MICA
C 9	0005 MICA
C 10	01 x 400V
C 11 -	002 MICA
C 12 -	01 x 400V.
C 13 -	003 x 600V.
C 14 -	1 x 200V.
C 15 -	5 MFD. x 120V.
C 16 -	8 MFD. x 350V.
C 17 -	8 MFD. x 350V
C 18 -	01 x 400V.
C 19 -	015 x 1400V
C 20 -	5 MFD. x 120V.
C 21 -	01 x 400V

IF PEAK 175 KC.

NOTE

NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL
THE PHRASE GIMMICK MEANS A WIRE WOUND AROUND ANOTHER WIRE
RESISTORS IN ONE UNIT. P-106-14, - R 2, 4, 14, 15
CONDENSERS IN ONE UNIT. P-119-4 C 16, 17
CONDENSERS C 2, C 4, C 5, C 6, C 7 ARE IN ONE UNIT P-145-5
RESISTORS AND CONDENSERS IN OUTPUT I F CAN. P-108-21, - C 8, 9, 10 AND R 6, 7, 11
CONDENSER, C 1, IN ANT COIL CAN P-111-12
CONDENSERS C 15, - C 20 IN ONE UNIT P-148-4

PARTS LIST—MODEL 670-A
Serial No. 4D-502501 and up

When ordering parts, always specify part and model number as well as serial number of chassis.

Part No.	Description
101-9	Volume Control with Switch
101-12	Tone Control Assembly, complete
102-7	Three Gang Geared Variable Condenser
104-6	Vibrator Transformer
105-3	"A" Choke—40T—No. 16E—½" Dia.
105-4	380 Ohm Filter Choke
106-6	200 Ohm Center Tapped Resistor
106-14	5800 Ohm Metal Clad Resistor
108-20	Input I. F. Transformer completely assembled in can (175 K. C.)
108-21	Output I. F. Transformer complete with can, but less resistor and Condenser Assembly (175 K. C.)
	Resistor and Condenser Assembly for 108-21
109-7	R. F. Coil
110-7	Osc Coil & bracket
111-7	Antenna Coil
112-43	Volume Control Shaft complete with knob
115-18	Special partition shield
115-22	Tube shield
116-5	6-8 Volt T-50 pilot lamp
116-6	Pilot light assembly, complete, less bulb
119-4	8-8 Mfd. x 350 Volt Electrolytic Filter Condenser
142-1	Plug-In Vibrator
145-5	.4 Mfd. By-Pass Block
146-14	Special bracket including battery antenna, pilot light and tone control cable fittings, but less antenna coil volume control
148-4	Dual .5 Mfd. 120 Volt Condenser
161-1	20 Ampere fuse
147-1	Selector Control Coupling
147-2	Bushing and bracket complete
147-11	Volume control coupling
135-5	⅜x3" carriage bolt
140-3	Container complete with top and bottom
148-1	.5 Mfd. Generator Condenser
148-3	.5 Mfd. Ammeter Condenser
149-18	Volume Control Shaft—18"
149-24	Volume Control Shaft—24"
150-18	Selector Shaft—18"

Part No.	Description
150-24	Selector Shaft—24"
151-2	Remote Control Head, less flexible shafts, less tone control and pilot assemblies, but with knobs and mounting hardware
152-1	Antenna cable
152-2	Battery cable
131-5	Black bakelite remote control knobs
146-8	Die Cast Remote Control Mounting Bracket
146-12	Steering Column Strap
168-1	Spark-plug type suppressor
168-2	Distributor plug-type suppressor
168-3	Cable type suppressor
168-4	Special Ford spark-plug suppressor
	Unless otherwise listed, all Carbon Resistors
	Unless otherwise listed, all Single Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Dual Section Tubular Paper By-Pass Condensers
	Unless otherwise listed, all Molded Mica Condensers
	All Sockets
167-1	Dynamic Speakers
	Plate antenna (clamps to frame of car)

Note: Part No. 145-5 consisting of five separate sections can be replaced with tubular single section condensers at 25c each. It will not be necessary to replace the entire unit should any section thereof fail.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

We cannot supply speaker cones only. We can replace a speaker on which a cone has been damaged for $1.50, if defective speaker is returned, transportation charges prepaid.

MODEL 670-A, HA-1
Alignment, Notes

HOWARD RADIO CO.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

I. F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.

2. Adjust trimming condensers of both input and output I. F. transformers, parts number 108-20 and 108-21 (see top view of chassis) to resonance with an oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer or between the plate and screen terminals of the type 42 output tube. The connection to the tube can be made by means of an adapter. Maximum deflection on the output meter indicates resonance.

Note: Each I. F. transformer has two adjustments, both of these adjustments on both transformers are accessible through holes located in the back of the case between the two mounting plates and directly under the louvres.

R. F. ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (Front shaft end) to resonance.

2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna (center section) and R. F. (rear section) trimmers to resonance.

3. Check alignment at 1500-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.

4. Bend slotted plates of antenna and R. F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a voltmeter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

Case rattles may be due to one or more of the following:

Loose screws in top or bottom covers. Loose elements in tubes. Loose tube shield. Loose R. F. coil shield. Loose grill cloth.

RECEIVER INSTALLATION:

Determine most satisfactory or desirable mounting position. In most cases it will be found that the receiver can be mounted on the car bulk head, above and to the right of the steering post.

Use the cardboard template which is the same size as set and mark location for two mounting bolts, if mounted on the long side and one bolt if on the short side.

Then drill two (2) one-half inch (½") holes, making certain that the paint around the hole on the engine side of fire wall or bulk head is scraped clean to insure a good ground connection between receiver and the frame of the car. Assemble brackets number 146-2 to case with self-tapping screws.

Insert bolts through dash, assemble plain, lockwashers and nuts on engine side, then hang receiver over bolt heads and tighten nuts securely.

Mount the remote control unit on steering column by means of mounting bracket or attach to instrument panel or under dash (see illustration).

Two flexible shafts are furnished, one with a slotted fitting on one end, which is the volume control shaft (number 149-18), the other is the selector shaft, with key fitting at one end (number 150-18).

Make certain that the outer casings of flexible shafts go into remote control bushings for approximately five-sixteenths of an inch and tighten set screws to secure cables. If cables are pushed too far into remote control head, shafts will not turn freely. Always try to install drive shafts in as straight a line as possible from remote control to set. AVOID SHARP BENDS IN CABLES.

IMPORTANT—READ CAREFULLY:

We are prepared to exchange, without charge, our standard number 149-18 and 150-18, eighteen inch cables for twenty-four inch cables, number 149-24 and 150-24. You will find that 99% of the installations can be made with the standard eighteen inch cables, and bear in mind that the shorter the cable, the smoother the drive.

DIAL ADJUSTMENT:

Mount control head to steering column by means of bracket and strap or under dash by means of bracket or to instrument panel (see illustrations). Attach cables as above. Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then with a screw driver adjust the slotted screw on back of the control head, and in that way adjust the dial pointer to the correct frequency setting.

CONNECTIONS TO BATTERY:

The battery cable, number 152-2, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 148-3, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before inserting in receiver (see illustration). All bypass leads should be as short as possible.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.

PILOT LIGHT:

Pilot light assembly, part number 116-6, a shielded cable, plugs into the set and to the rear of the remote control unit (see illustrations).

TONE CONTROL:

The tone control assembly, part number 101-12, attaches to the back of the remote control head by means of a special screw and plugs into the set (see illustrations).

ANTENNA CONNECTION:

The antenna is connected to the receiver by means of the antenna cable, number 152-1. The antenna wire is the single black wire projecting from the end of the cable. Splice this wire to the roof antenna lead and ground the pig-tail shielding as close to the corner post of the car as possible.

OPERATION:

Place key (knob) in lock of left hand control of the remote control unit. After waiting approximately 45 seconds for tubes to heat up, rotate station selector, right hand knob, until a desirable program is heard. De-tuning will very seriously affect the tone quality of this receiver. Tone control knob located between two black knobs (see illustrations) is a BASS and TREBLE switch, it is not a variable tone control. Turning it to the right makes the BASS connection, turning it to the left makes the TREBLE connection. You will note that the BASS position assists materially in reducing interference from static, street car lines and other high pitched disturbances.

MOTOR NOISE SUPPRESSION:

The ignition system of every automobile generates high frequency electrical interference. This high frequency interference arising from the ignition coil, the distributor and the spark plugs must be properly suppressed in order to obtain satisfactory reception. Each car will present more or less an individual problem but there is a definite procedure to follow which holds true in every case.

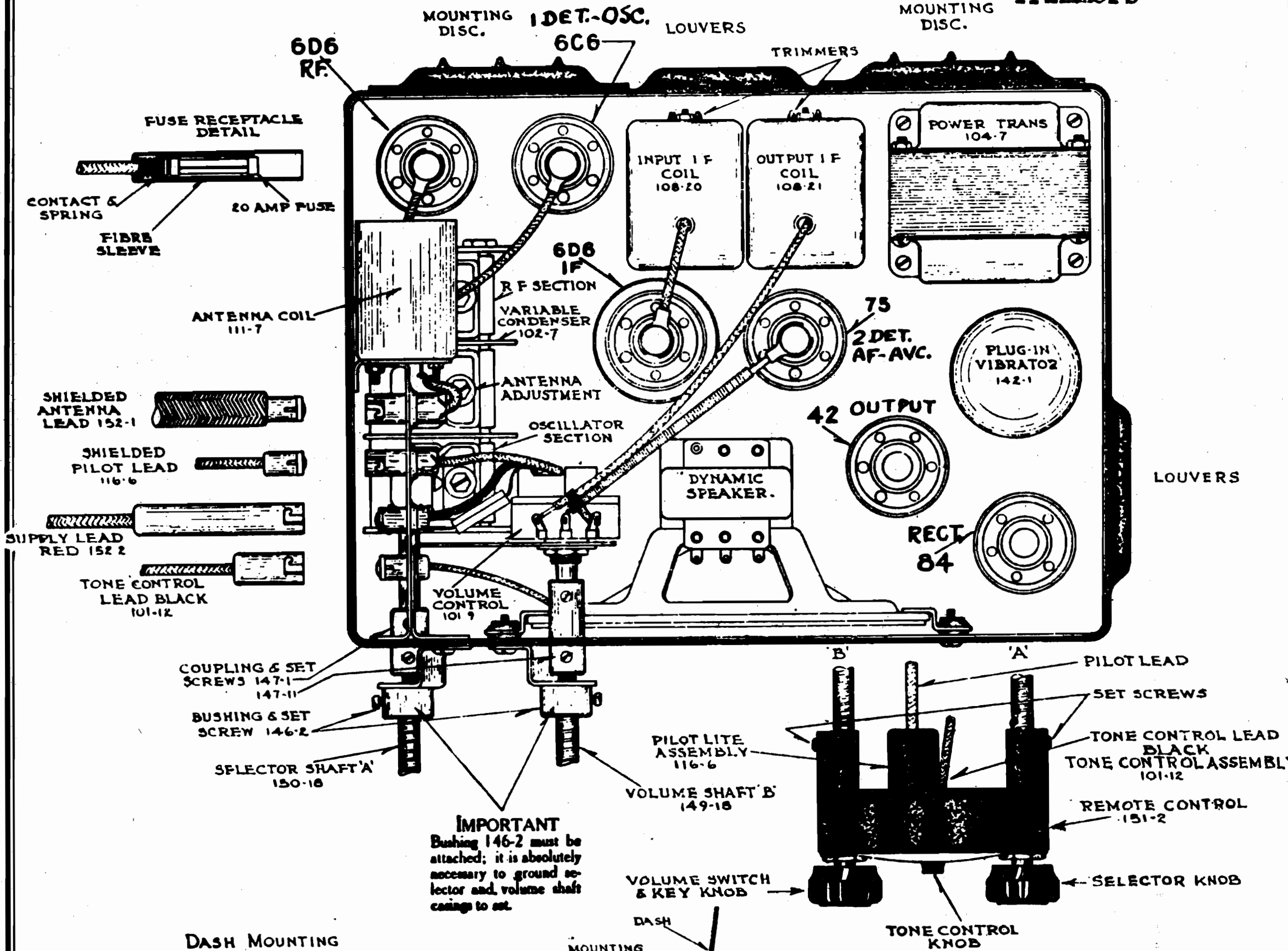
This first essential procedure is to disconnect the high tension leads to the spark plugs and attach the spark plug suppressors (168-1) (for V 8 Fords 168-4) the special distributor type suppressor (168-2) which is inserted in the center contact of the distributor as indicated in the illustration of a typical installation. (NOTE V 8 FORD USES NO DISTRIBUTOR SUPPRESSOR.) For cap type distributor, exchange the standard plug type distributor suppressor (168-2) for a special cable type suppressor (168-3) from your dealer. In some few cases, such as Buicks it is sometimes necessary to use cable type (168-3) suppressors. This type of suppressor is inserted in the leads running from the distributor to the spark plugs and which are concealed underneath the metal plate which covers the spark plugs.

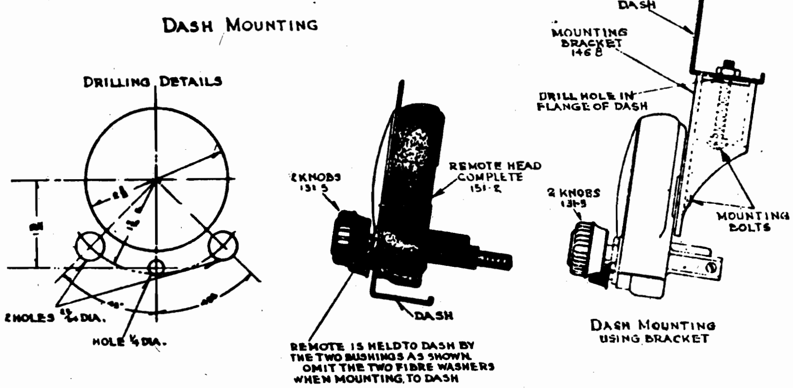
After the spark and distributor suppressors have been properly fastened the next in importance is the generator condenser (148-1), this filters a high pitched whining noise which would otherwise be heard as the motor is accelerated.

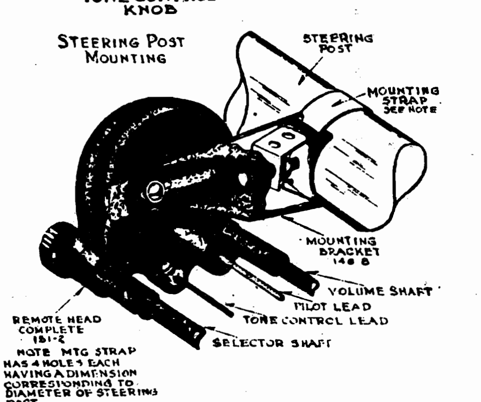
It is sometimes necessary in cars where the ignition coil is located under the dash, to use an additional capacitor (148-1) obtainable from your dealer. It must be installed between the battery side of the ignition coil and the frame of the car. Next connect capacitor (148-3) from the battery side of ammeter to frame of car. This is necessary in practically every installation and a good connection to the frame of the car is of utmost importance.

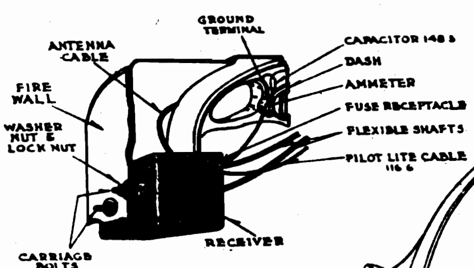
HOWARD RADIO CO.

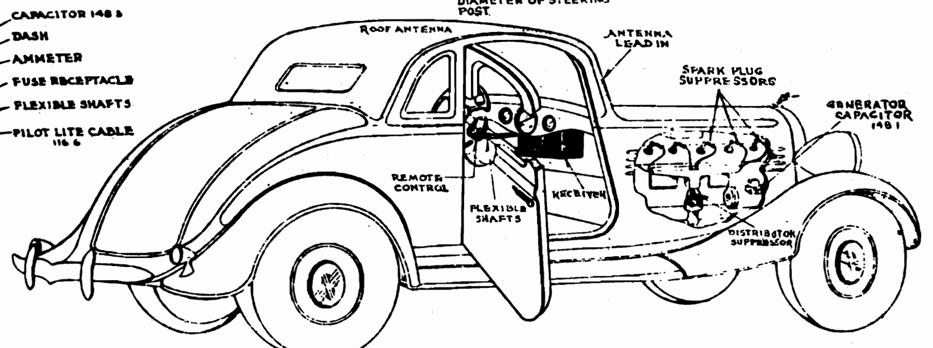
MODEL 670-A, HA-1
Socket Layout
Parts Details
Trimmers







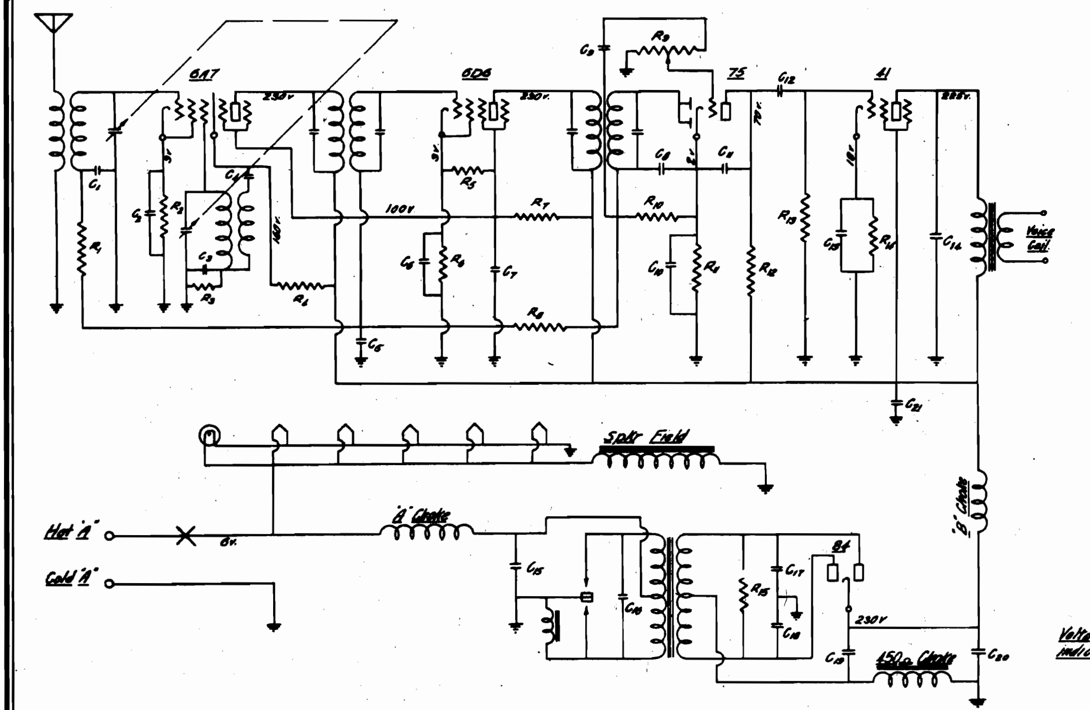




MODELS 52, 502, HA-2
Schematic, Socket

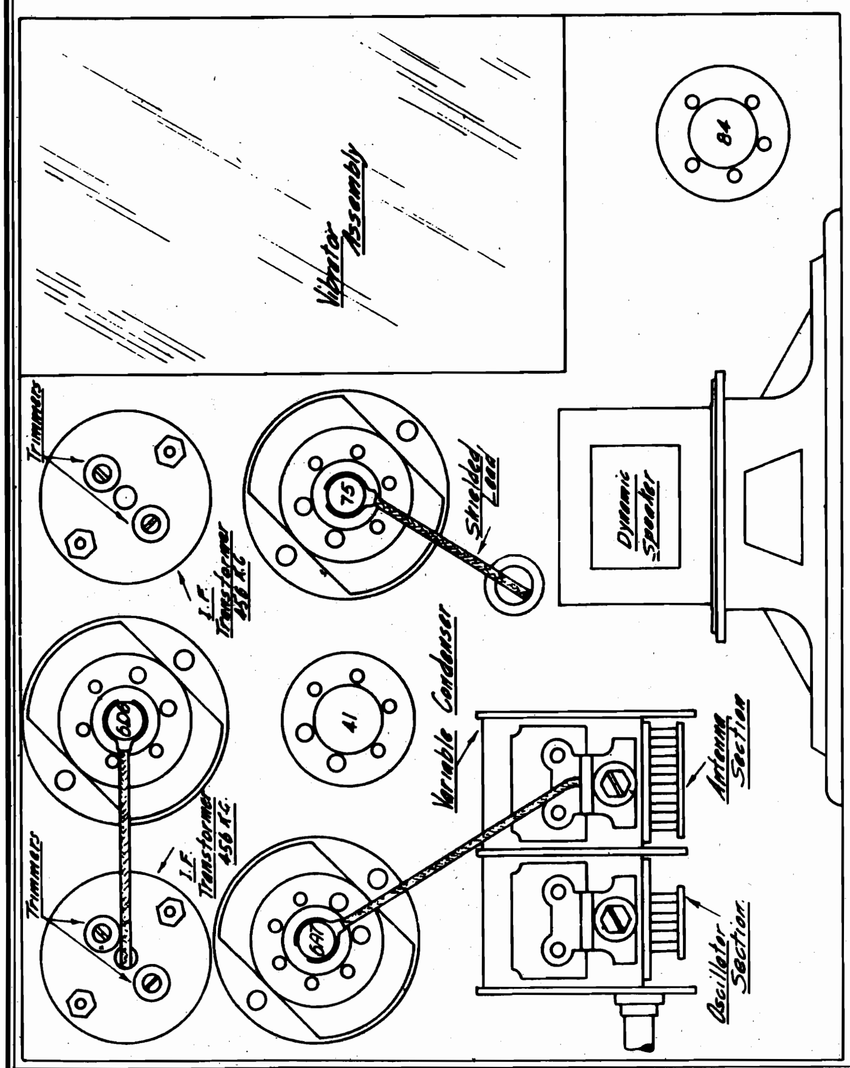
HOWARD RADIO CO.

Trimmers, Notes



CIRCUIT DATA			
R.	Ω	C.	MFD.
1.	500M.	1.	.05
2.	250	2.	.1
3	50M.	3.	.01
4.	15M.	4.	.002
5	35M	5.	.05
6.	250	6.	.1
7.	15M.	7.	.1
8	1 Meg.	8.	.0005
9.	500M.V.C.	9.	.02
10.	250M.	10	10MF 25V.
11.	5M	11.	.0005
12.	250M	12	.02
13	250M.	13.	10MF 25V
14	750	14.	.005
15	500M.	15.	.5
4-30-34		16	.5
		17.	.008
		18.	.008
Drawing No. 105		19	8.
		20	8.
		21	.25
Model 502 Auto Receiver.			
Drawn By		Chkd By	

Voltages taken from points indicated to chassis ground

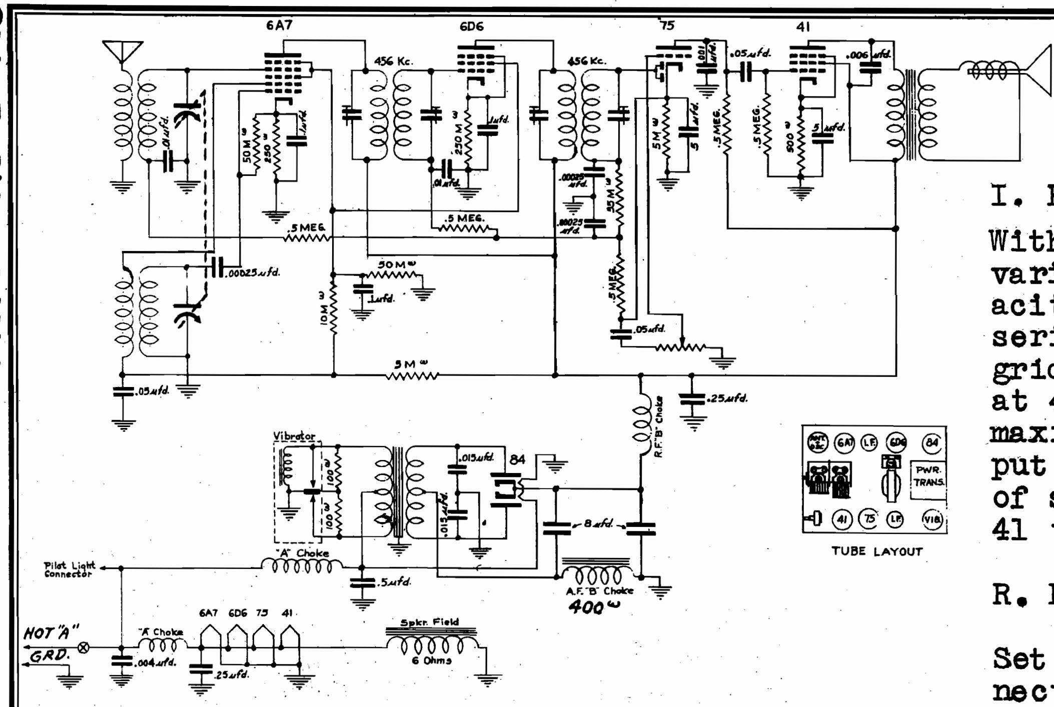


DIAL ADJUSTMENT:

After the control unit and cables have been connected to the set the dial pointer must be adjusted. To do this, rotate the tuning control knob slowly to either right or left until a definite stop is reached; do not force the knob after the stop, as this will damage the control mechanism. Now rotate the knob slowly in the opposite direction until another stop is reached. The pointer will usually come to the end of the dial strip before the stop is reached. It is in this manner that the dial is automatically adjusted to indicate the correct frequency to which the receiver is tuned.

MODEL HA-3
Schematic, Socket
Alignment, Notes

HOWARD RADIO CO.



IF PEAK 456 KC.

I. F. Alignment:

With volume control turned on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a 250 mmf. condenser to grid of 6A7 tube. Set test oscillator at 456 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speaker or from plate and screen of 41 tube.

R. F. Alignment:

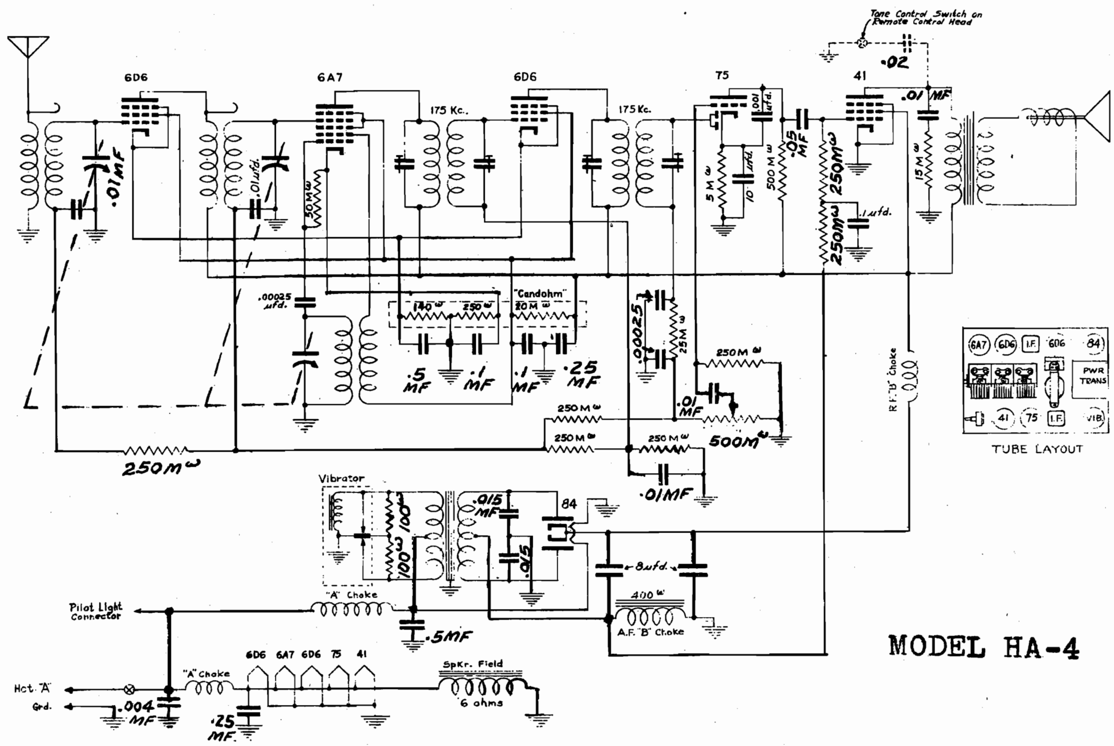
Set test oscillator at 1500 KC and connect to antenna of receiver. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (first section from shaft end) to resonance indicated by maximum output. Re-set test oscillator at 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna (rear section) to resonance. Check alignment at 1400, 1000, 600, and 550 kilocycles by setting test oscillator to these frequencies and rotate condenser until signal is picked up. Off tracking at 1000 and 600 kilocycles may be compensated for by slightly bending the slotted plates of the antenna section of the gang condenser. DO NOT BEND PLATES OF OSCILLATOR SECTION.

DIAL ADJUSTMENT:

After the control unit and cables have been connected to the set the dial pointer must be adjusted. To do this, rotate the tuning control knob slowly either right or left until a definite stop is reached; do not force the knob after the stop, as this will damage the control mechanism. Now rotate the knob slowly in the opposite direction until another stop is reached. The pointer will usually come to the end of the dial strip before the stop is reached. It is in this manner that the dial is automatically adjusted to indicate the correct frequency to which the receiver is tuned.

MODEL HA-4
Schematic, Socket
Alignment

HOWARD RADIO CO.



MODEL HA-4

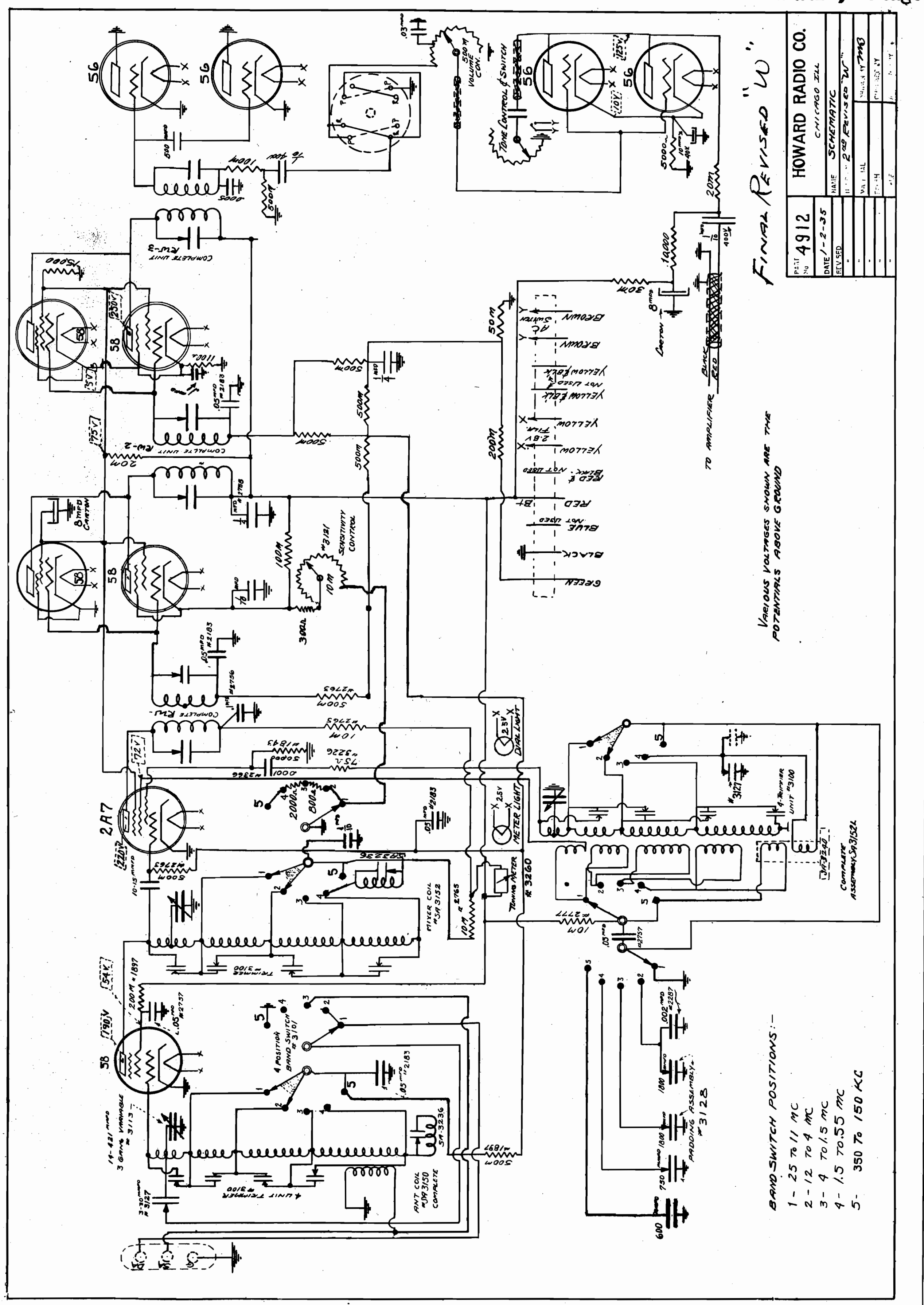
IF Peak 175 kc.

I. F. Alignment:
With volume control turned on full and variable gang condenser at maximum capacity, attach test oscillator lead in series with a 250 mmf. condenser to grid of 6A7 tube. Set test oscillator at 175 KC and adjust I.F. trimmers for maximum output as indicated on an output meter connected across voice coil of speaker or from plate and screen of 41 tube.

R. F. Alignment:
Set test oscillator at 1550 KC and connect to antenna of receiver. Rotate variable gang condenser to minimum capacity and back off slightly. Adjust trimmer on oscillator section of gang condenser (first section from shaft end) to resonance indicated by maximum output. Re-set test oscillator of 1400 KC and rotate variable condenser until oscillator signal is picked up. Adjust antenna trimmer (rear section) and R. F. trimmer (center section) to resonance. Check alignment at 1400, 1000, 600, 550 kilocycles by setting test oscillator to these frequencies and rotate condenser until signal is picked up. Off tracking at 1000 and 600 kilocycles may be compensated for by slightly bending the slotted plates of the antenna and R. F. section of the gang condenser. DO NOT BEND PLATES OF OSCILLATOR SECTION. DIAL ADJUSTMENT:
To correctly adjust dial pointer, tune set to a station of known frequency or turn selector knob to end of tuning range in either direction and adjust screw in back of remote head until dial pointer reaches correct frequency setting.

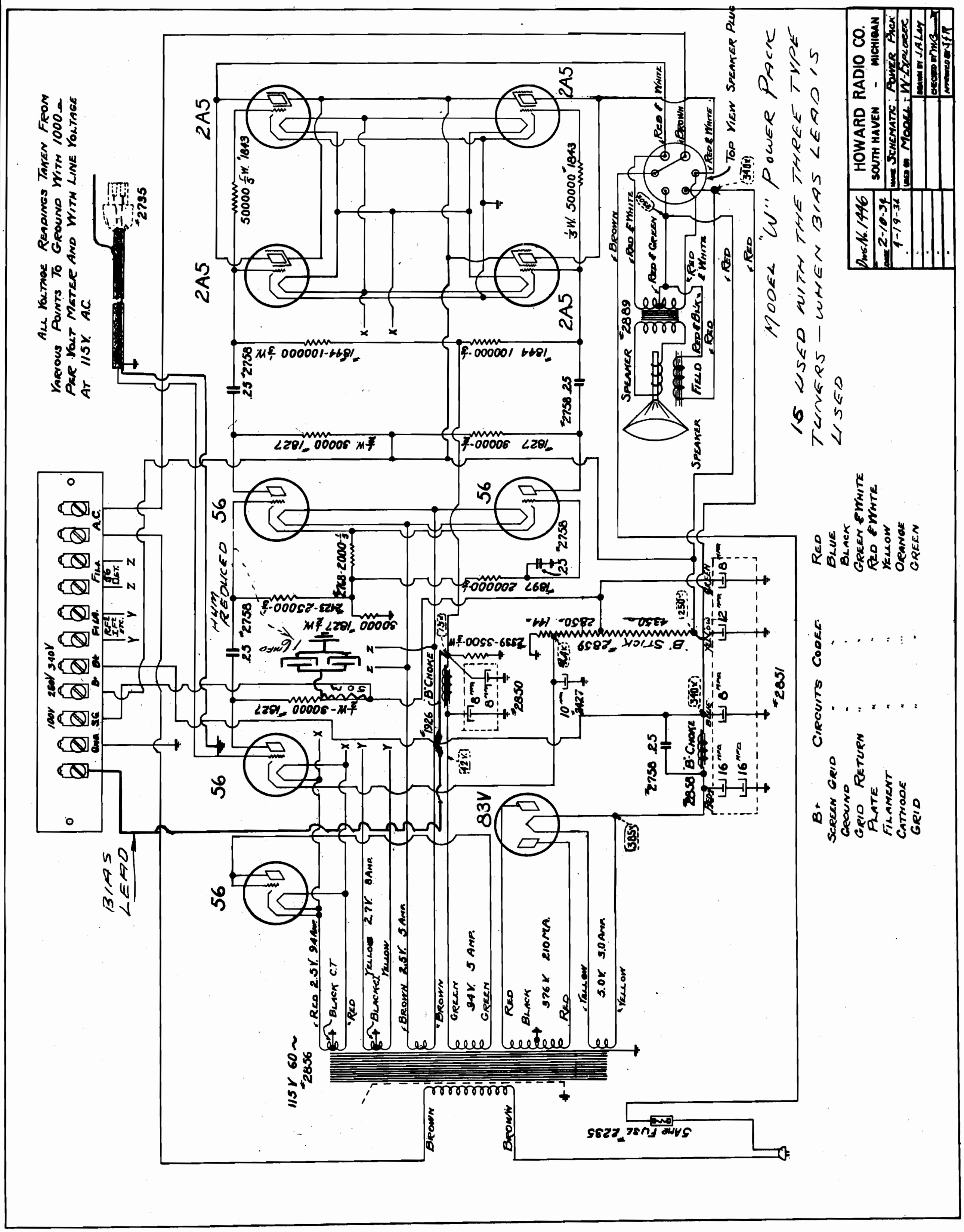
MODEL W, Explorer
Final Revised
Schematic, Voltage

HOWARD RADIO CO.



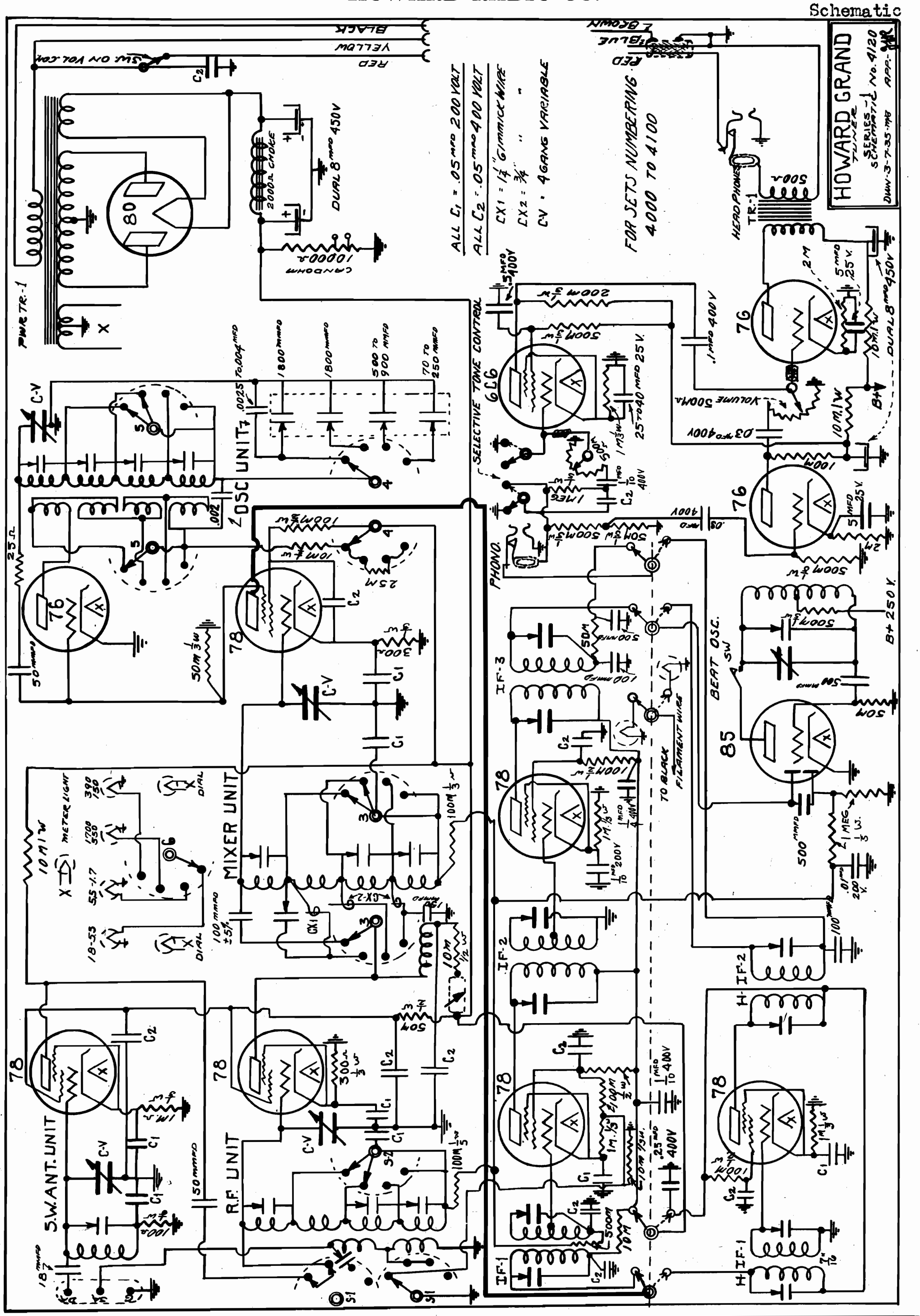
MODEL W, Explorer
Final Revised.
Power Power Schematic

HOWARD RADIO CO.



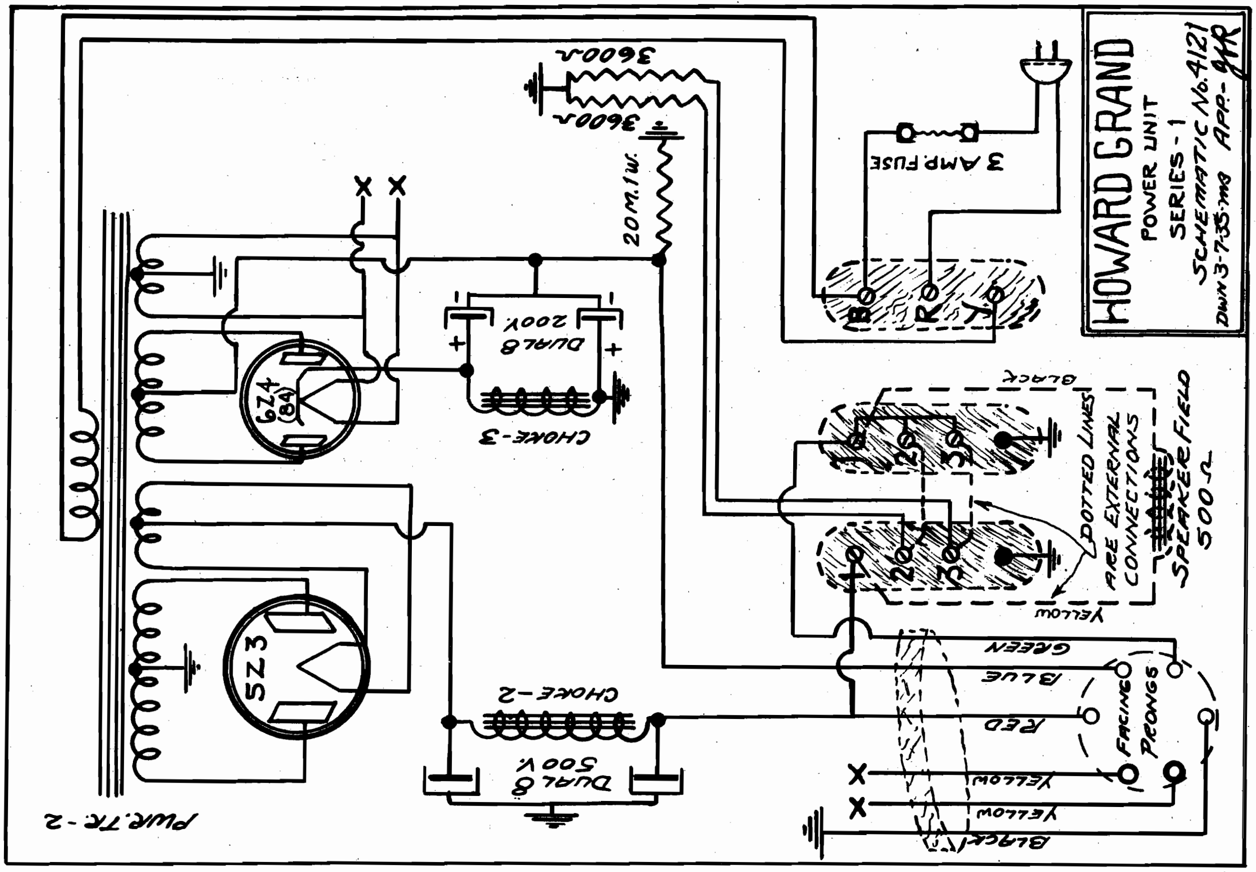
MODEL Grand
Series 1
Schematic

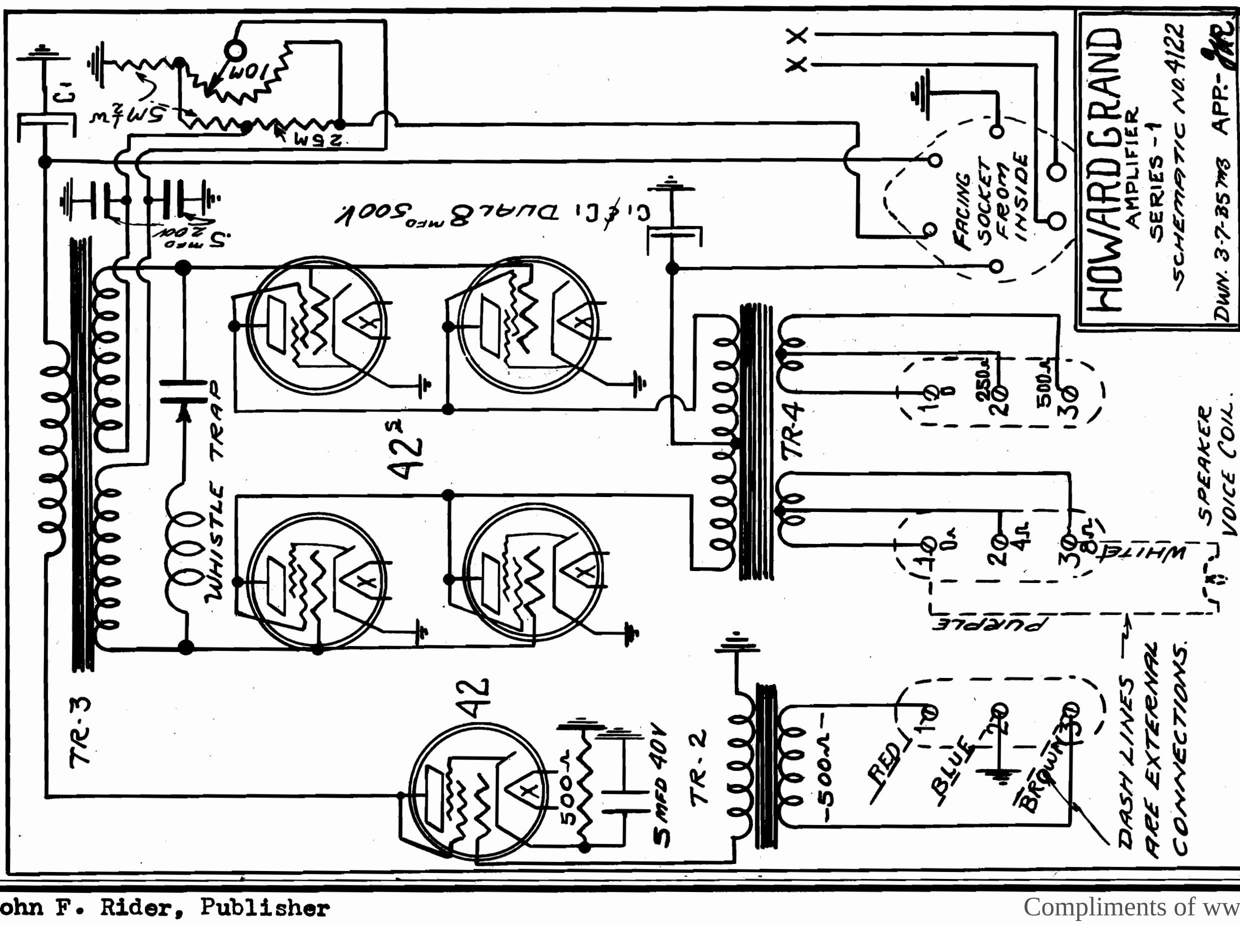
HOWARD RADIO CO.



MODEL Grand, Series 1
Amplifier & SPU Schematics

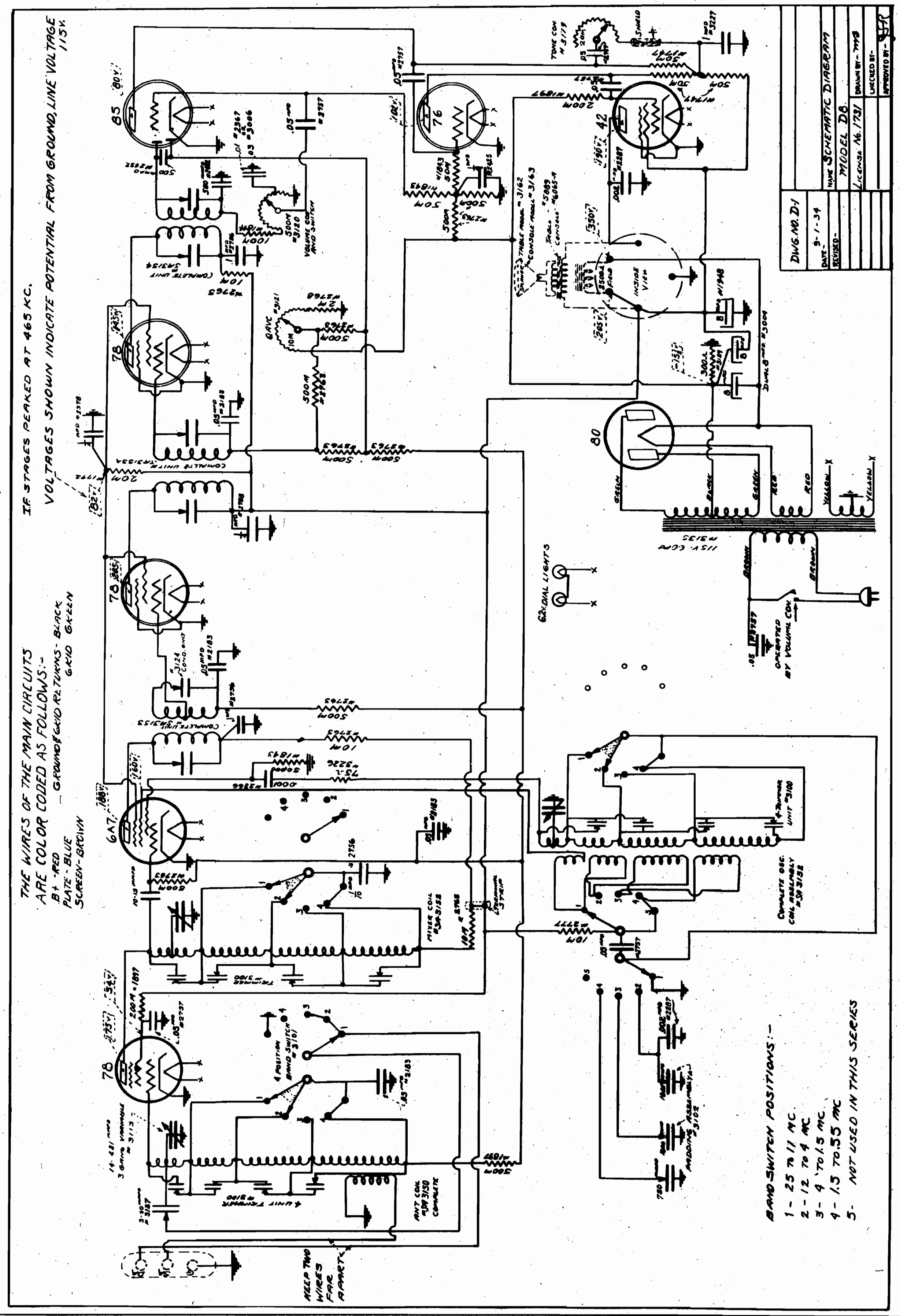
HOWARD RADIO CO.





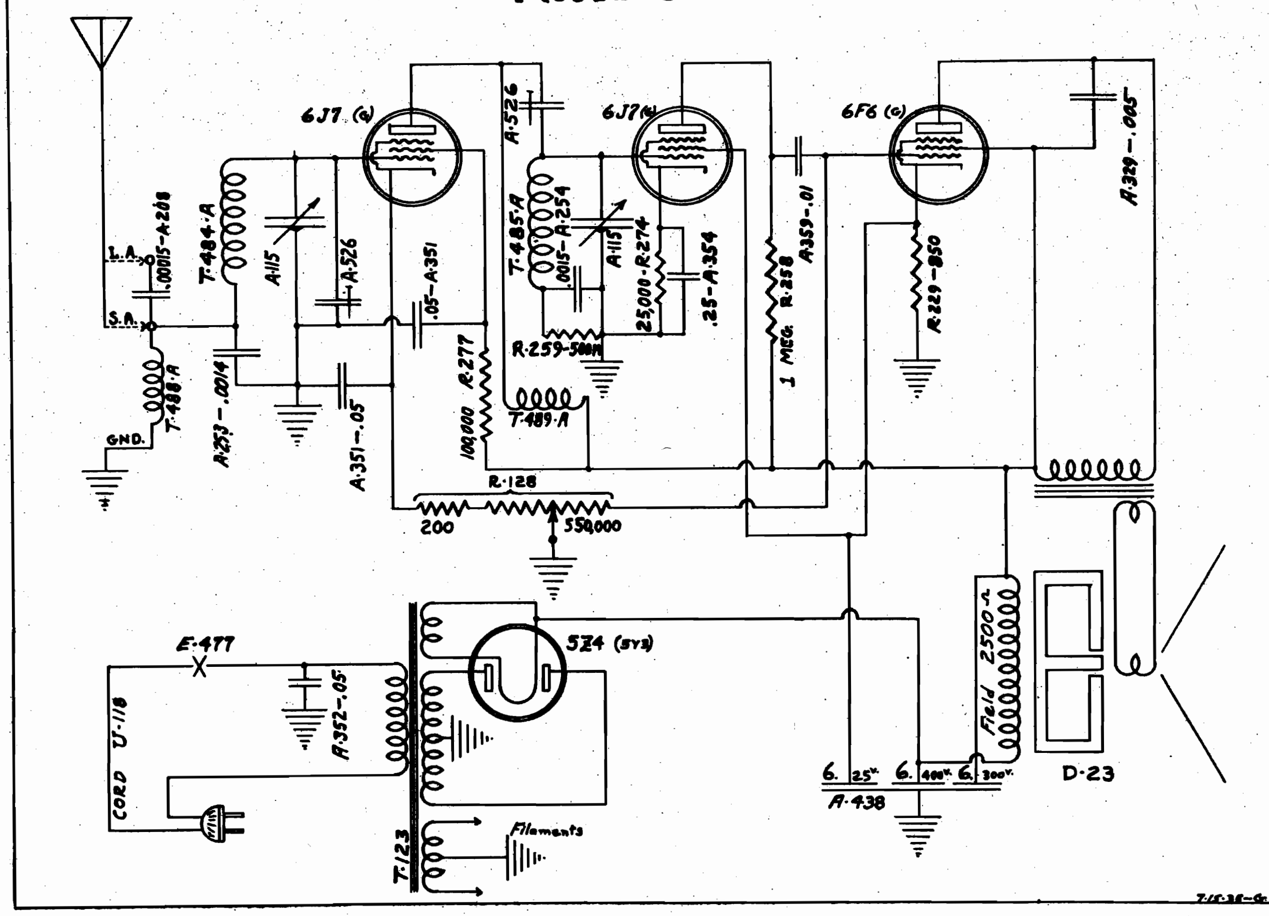
MODEL D-8
Schematic, Voltage

HOWARD RADIO CO.



MODELS 26,226
Schematic
Parts List

INTERNATIONAL RADIO CORP.



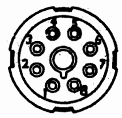
PARTS LIST

Part No.	Description	List Price
A-115	2 gang tuning condenser	$1.85
A-208	150 mmf. mica condenser	.20
A-253	1400 mmf. mica condenser	.20
A-254	1500 mmf. mica condenser	.20
A-329	.005 mf., 600 v. paper condenser	.15
A-351	.05 mf., 200 v. paper condenser	.15
A-352	.05 mf., 300 v. paper condenser	.15
A-354	25 mf., 25 v. paper condenser	.20
A-359	.01 mf., 400 v. paper condenser	.15
A-438	Electrolytic filter condenser block	1.35
A-526	Semi-variable trimmer condenser	.15
D-23	Dynamic speaker	3.50
E-157	1" knob	.15
E-158	13/16" knob	.15
E-259	Dial pointer	.05
E-267	Dial scale	.25
E-472	6-8 volt pilot light bulb	.15
E-476	Antenna-ground binding post strip	.10
E-477	A.C. power switch	.25
E-483	Pilot light socket	.10
H-53	6J7 tube socket	.10
H-56	6F6 tube socket	.10
H-57	5Y3 tube socket	.10
R-128	Volume control	.55
R-229	850 ohm, 1/2 w. carbon resistor	.20
R-258	1 megohm, 1/3 w. carbon resistor	.20
R-259	500M ohm, 1/3 w. carbon resistor	.20
R-274	25M ohm, 1/3 w. carbon resistor	.20
R-277	100M ohm, 1 w. carbon resistor	.20
T-123	Power transformer	2.35
T-484A	Antenna coil	.75
T-485A	Detector coil	.75
T-488A	Choke	.20
T-489A	Choke	.20
U-118	A.C. cord and plug	.30
U-207	4 wire speaker cable	.20
X-341	Cabinet (model 26)	5.30
X-348	Cabinet (model 226)	5.30

SEPTEMBER, 1935. *Prices subject to change without notice*

INTERNATIONAL RADIO CORP.

AVERAGE SOCKET VOLTAGES



Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

	POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6J7	R. F	Shell	HTR.	250	95	0	—	HTR.	7
6J7	Det.	Shell	HTR.	25	20	10	—	HTR.	10
6F6	A. F.	Shell	HTR.	240	250	0	—	HTR.	20
5Z4	Rect.	Shell	345	—	A.C.	—	A.C.	—	345

Line 118 volts. Volume Control Full On. 10% Variation Allowable.

This chassis is a four tube tuned-radio-frequency receiver designed to operate from 115 volts, 60 cycle A.C. power lines. It tunes the band of 1760 to 540 kilocycles. The following tubes are employed:

6J7 (metal) or 6J7G (glass) Radio frequency
6J7 (metal) or 6J7G (glass) Detector
6F6 (metal) or 6F6G (glass) Pentode output
5Z4 (metal) or 5Y3 (glass) Rectifier

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance.

ANTENNA LENGTH

S. A. binding post accommodates antenna of 25 to 60 feet including lead-in.
L. A. binding post, over 60 feet (useful in remote sections).

ALIGNMENT DATA

The rear section of the 2 gang condenser tunes the R. F. stage; the front section the detector. The R. F. section only, has a trimmer condenser connected across it. The small semi-adjustable condenser attached to the detector section is the coupling condenser connected between the R. F. tube plate and Detector control grid.

Alignment may be accomplished using either a signal generator or weak broadcast signals although the signal generator is preferable. An output meter should be connected from the plate of the 6F6 tube to ground (blue and black speaker wires).

Set signal generator at 1400 kilocycles and feed signal to antenna binding post. Keep the output from signal generator as low as possible. Tune in signal on radio and make adjustments for maximum output. Rock the tuning condenser back and forth across the signal while adjusting the R. F. trimmer for resonance.

Next check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicates too great a capacity for the section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

After checking the alignment at 1000 Kc. repeat the process at 600 Kc.

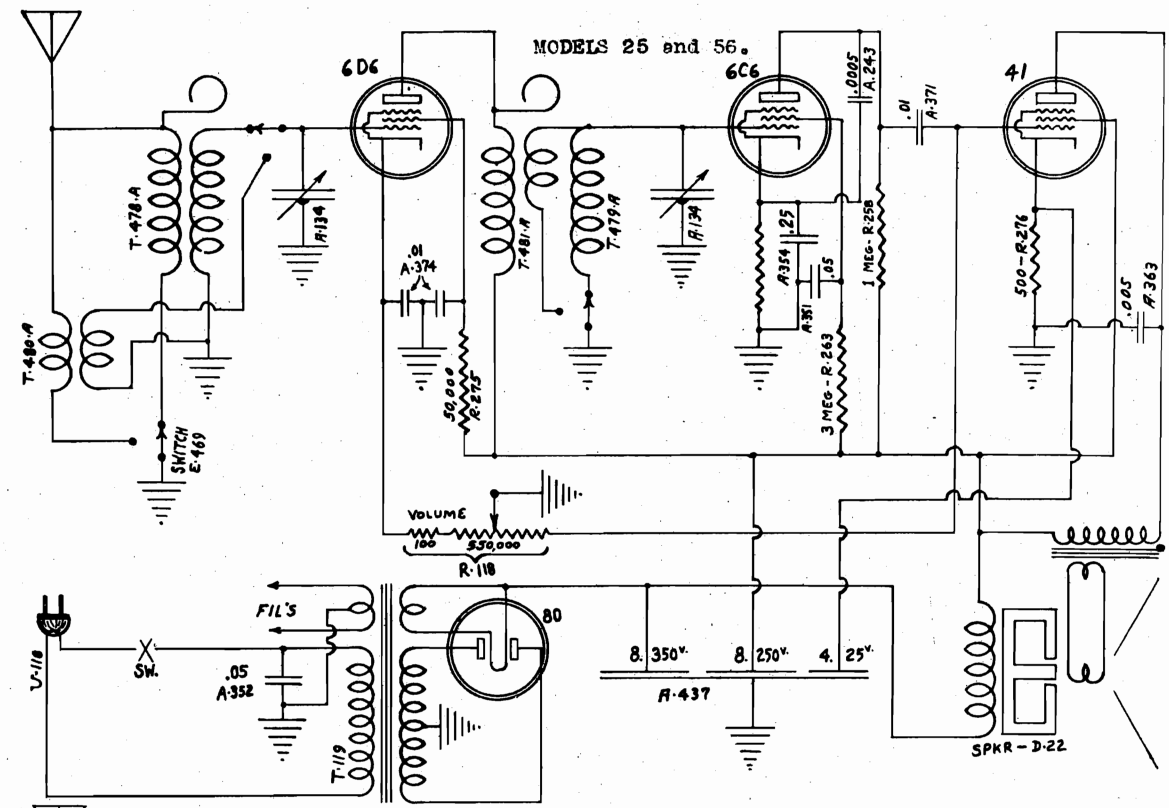
INTERSTAGE COUPLING CONDENSER

The interstage coupling condenser connected between the plate of the R.F. tube and control grid of the detector should be adjusted so there is slight oscillation at the high frequency end of the band when the volume control is in full on position. Slight oscillation may be noticed also at the low frequency end.

MODELS 25,56
MODEL ES-25
Schematics

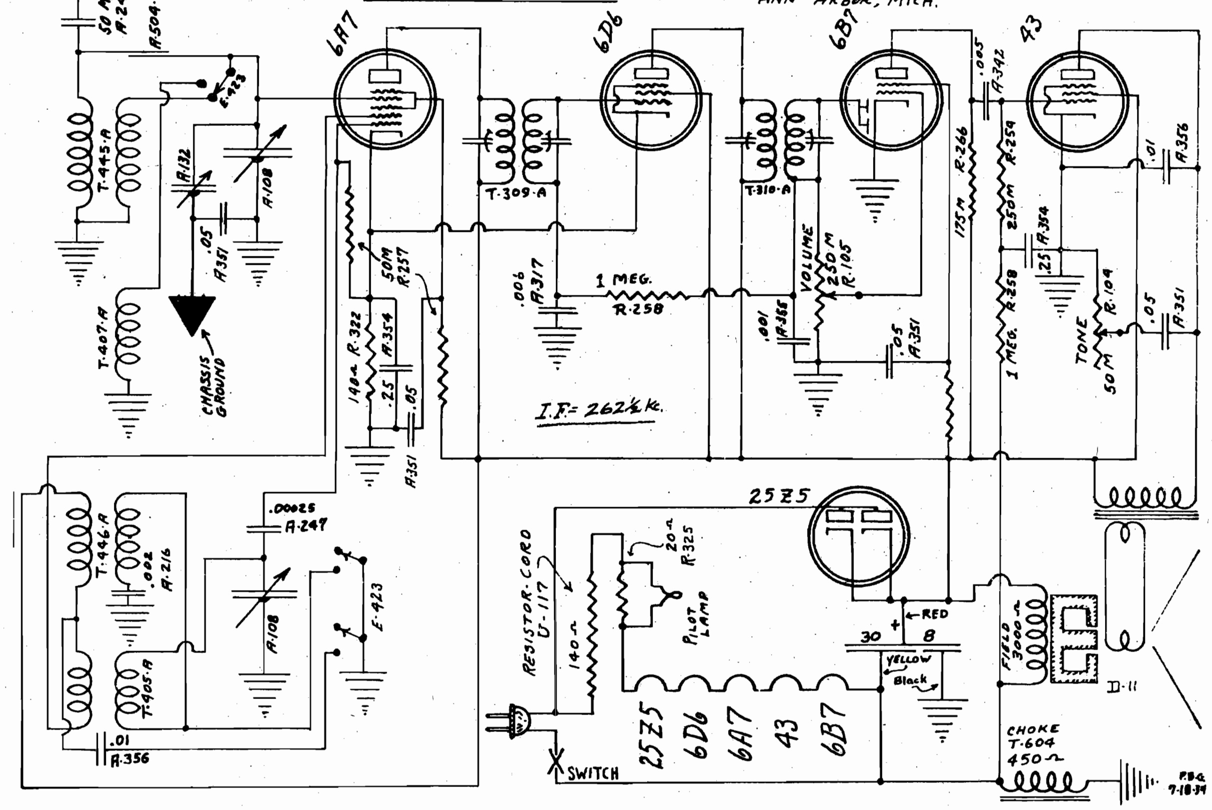
INTERNATIONAL RADIO CORP.

MODELS 25 and 56.



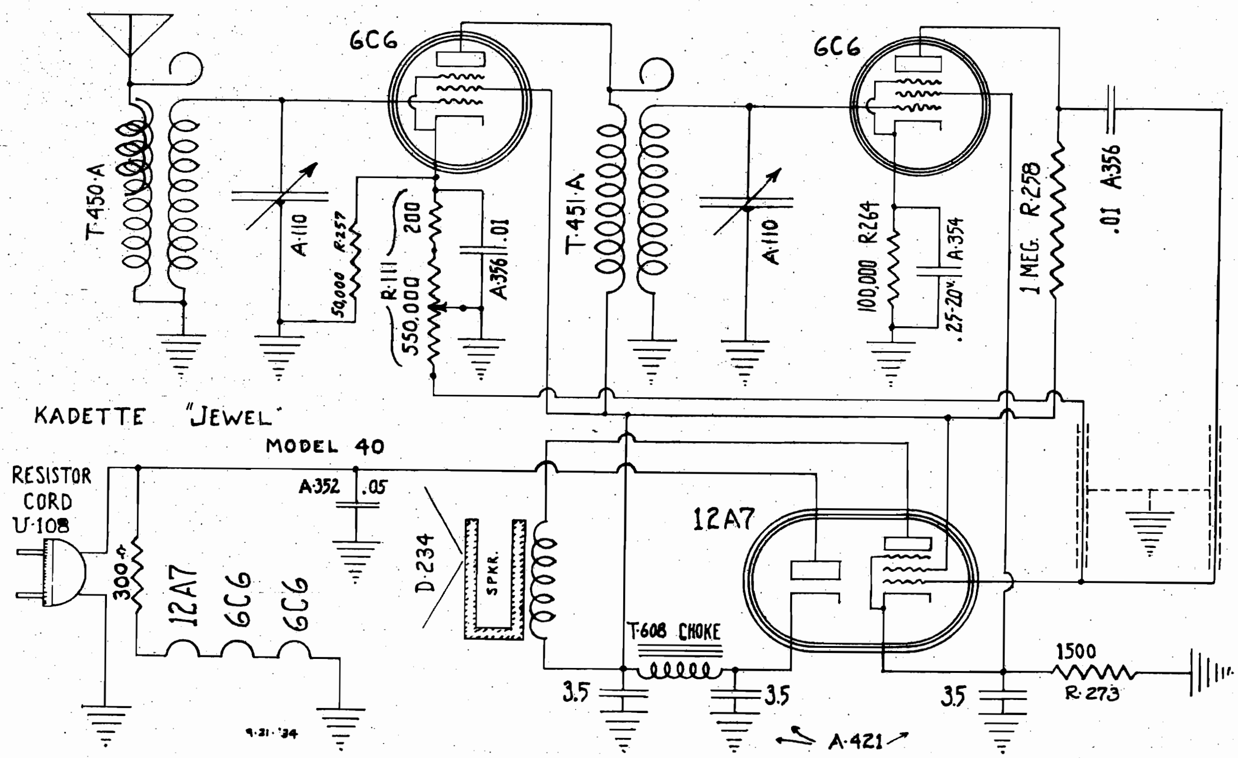
CHASSIS MODEL ES-25

INTERNATIONAL RADIO CORPORATION
ANN ARBOR, MICH.

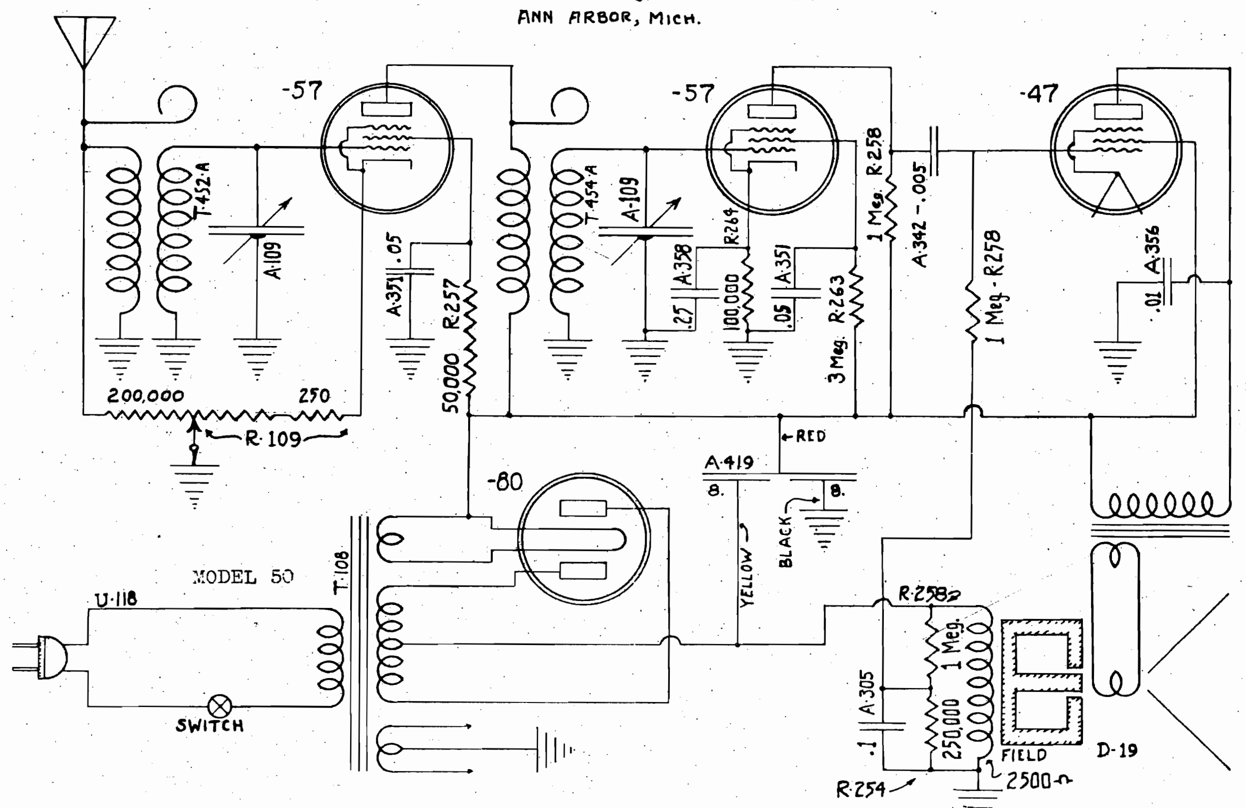


MODEL 40, Jewel
MODEL 50
Schematics

INTERNATIONAL RADIO CORP.

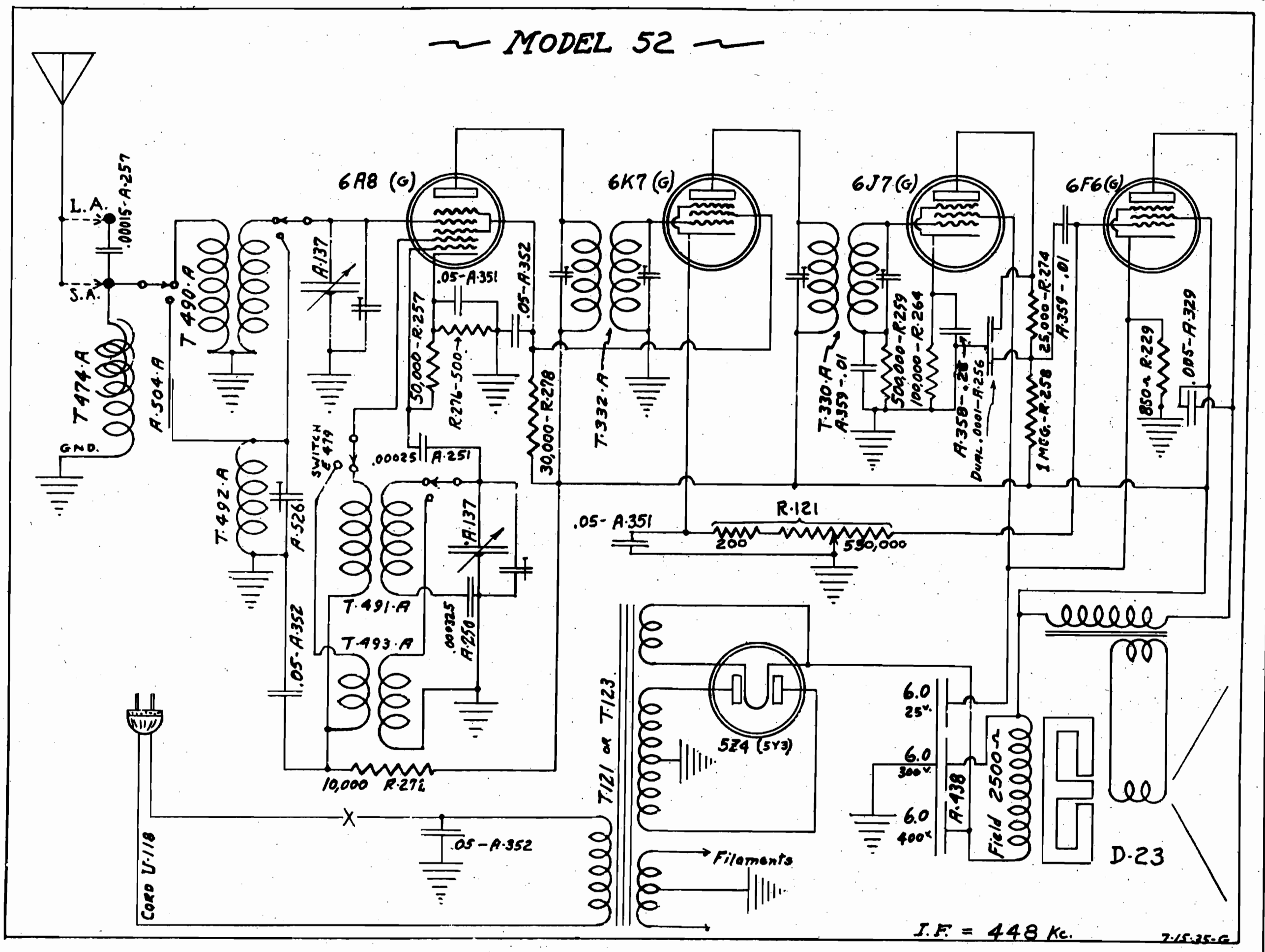


INTERNATIONAL RADIO CORPORATION
ANN ARBOR, MICH.



MODEL 52
Schematic
Parts

INTERNATIONAL RADIO CORP.



PARTS LIST

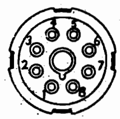
Part No.	Description	List Price
A-137	2 gang tuning condenser	$1.65
A-208	150 mmf. mica condenser	.20
A-250	325 mmf. mica condenser	.20
A-251	.00025 mf. mica condenser	.20
A-256	Dual .0001 mf. mica condenser	.20
A-329	.005 mf., 600v. paper condenser	.15
A-351	.05 mf., 200v. paper condenser	.15
A-352	.05 mf., 300v. paper condenser	.15
A-358	.25 mf., 120v. paper condenser	.20
A-359	.01 mf., 400v. paper condenser	.15
A-438	6-6-6 mf. electrolytic filter condenser	1.35
A-526	Semi-variable trimmer condenser	.15
D-29	5 inch dynamic speaker	3.50
E-157	Black and silver knobs	.15
E-160	Black and silver knob with yellow and red dots	.15
E-265	Dial assembly	1.50
E-472	Pilot light bulbs 6-8 volts	.15
E-476	Antenna and ground strip	.10
E-479	Wave band switch	.45
H-49	6A8 tube socket	.10
H-53	6J7 tube socket	.10
H-54	6K7 tube socket	.10
H-56	6F6 tube socket	.10
H-57	5Y3 tube socket	.10
R-121	Volume control with power switch	.75
R-229	850 ohm, 1/2 w. carbon resistor	.20
R-257	50M ohm, 1/3 w. carbon resistor	.20
R-258	1 megohm, 1/3 w. carbon resistor	.20
R-259	500M ohm, 1/3 w. carbon resistor	.20
R-264	100M ohm, 1/3 w. carbon resistor	.20
R-272	10M ohm, 1/3 w. carbon resistor	.20
R-274	25M ohm, 1/3 w. carbon resistor	.20
R-276	500 ohm, 1/3 w. carbon resistor	.20
R-278	30M ohm, 1 w. carbon resistor	.20
S-102	Goat tube shield	.10
T-121	Power transformer	2.35
T-330A	2nd I.F. transformer	1.25
T-332A	1st I.F. transformer	1.25
T-474A	448 Kc. wave trap	.35
T-490A	Broadcast detector coil	1.00
T-491A	Broadcast oscillator coil	1.00
T-492A	Short wave detector coil	.35
T-493A	Short wave oscillator coil	.35
U-118	A.C. cord and plug	.30
U-206	4 wire speaker cable	.20
X-343	Cabinet	5.70

SEPTEMBER, 1935 *Prices Subject to Change Without Notice*

MODEL 52
Voltage
Alignment

INTERNATIONAL RADIO CORP.

AVERAGE SOCKET VOLTAGES



Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

	POSITION	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8
6A8	Det.-Osc.	Shell	HTR.	195	70	—10	140	HTR.	3
6K7	I. F.	Shell	HTR.	210	90	1.5	—	HTR.	1.5
6J7	2nd Det.	Shell	HTR.	50	15	4	—	HTR.	.4
6F6	A. F.	Shell	HTR.	200	210	0	—	HTR.	15
5Z4	Rect.	Shell	300	—	A.C.	—	A.C.	—	300

Line 118 volts. Switch on Broadcast Position. Volume Control Full On. 10% Variation Allowable.

Model 52 is designed to operate from 115 volts, 60 cycle alternating current power lines. It is a two band receiver covering the American broadcast and Foreign short wave bands.

The following tubes are employed:

6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator
6K7 (metal) or 6K7G (glass) I.F. Amplifier
6J7 (metal) or 6J7G (glass) 2nd Detector
6F6 (metal) or 6F6G (glass) Pentode output
5Z4 (metal) or 5Y3 (glass) Rectifier

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. The 6J7G tube should be shielded but shielding may be omitted when using the all metal 6J7.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate (pin No. 3) of the 6F6 to ground. The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The intermediate frequency used is 448 Kc. On the broadcast band the oscillator frequency is 448 Kc. higher than the signal frequency. On the short wave band it is 448 Kc. lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band 1400 and 600 kilocycles; Short wave band 12 and 6 megacycles.

It is permissible to bend condenser plates when aligning the broadcast band but not the short wave band.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result.

BROADCAST BAND: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer (on condenser gang) for maximum reading.

There is no adjustable padder condenser in this model so resonance on the low frequency end is accomplished by bending plates on the tuning condensers.

SHORT WAVE BAND: There is a separate trimmer condenser across the short wave detector coil. It is mounted on the bottom of the chassis at the end. Adjustment should be made at 12 megacycles. Instead of bending condenser plates at 6 megacycles, alignment is accomplished by spreading or crowding turns on the short wave detector coil. If much crowding or spreading is necessary it is advisable to go back and recheck at 12 megacycles.

MICROPHONIC HOWL

The tuning condenser is cushion mounted to eliminate vibration. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

INTERNATIONAL RADIO CORP.

Models 53 & 553

This chassis is designed to operate from 115 volt, 60 cycle, alternating current power lines. It is a three band receiver covering the American broadcast, police and airport, and Foreign shortwave bands. The following tubes are employed:

6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator
*6J7 (metal) or 6J7G (glass) 2nd Detector
6F6 (metal) or 6F6G (glass) Pentode output
6K7 (metal) or 6K7G (glass) I. F. Amplifier
* 75 (glass) 2nd Detector, A.V.C. and 1st A.F.
5Z4 (metal) or 5Y3 (glass) Rectifier

*6J7 or 6J7G used in first production; 75 used in later production.

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. Glass counterpart types should be shielded. The metal tubes need not be. Shielding provisions are provided. The 75 tube must be shielded at all times.

TWO CIRCUITS

It will be noted by referring to the circuit diagram that sets of early production did not incorporate A.V.C. In later production the 6J7 tube has been replaced with a 75 and A.V.C. added. In other respects the two circuits are identical.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate (pin No. 3) of the 6F6 to ground. Tone control should be turned "high." The signal from the signal generator *must be kept at a very low level.*

ESSENTIAL DATA: The intermediate frequency employed is 448 Kc. On the broadcast and middle bands the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band, 1,400 and 600 Kc.; Middle band, 6,000 and 2,400 Kc.; Short wave band 15 megacycles.

Do not bend tuning condenser plates when aligning or it will be impossible to make all three bands track correctly.
The front section of the two gang condenser is the oscillator section, the rear section the first detector.

INTERMEDIATES: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I. F. oscillation may result.

BROADCAST BAND: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a very weak 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer (see sketch) for maximum reading. Although a trimmer is provided for the Broadcast detector coil it will be found not connected in many sets as it is not necessary in obtaining correct balance.

Turn dial and signal generator to 600 Kc. and rock the padder into correct adjustment. This is accomplished by very slowly adjusting the padder condenser and at the same time turning the dial slightly back and forth across 600 Kc. until an adjustment is obtained producing maximum output. Go back to 1400 Kc. and readjust the oscillator trimmer slightly if necessary. Then recheck padder at 600 Kc.

MIDDLE BAND: Turn the band change switch to the middle position and tune radio and signal generator to 6000 Kc. Adjust the oscillator trimmer and then the detector trimmer for maximum output.

Rock in the padder condenser at 2400 Kc. Then recheck at 6000 Kc. and 2400 Kc.

SHORT WAVE BAND: Turn band change switch to short wave band. Tune radio and signal generator to 15 megacycles and adjust trimmers. No padder condenser is used on the short wave band so no other adjustments are necessary. On this band the oscillator frequency is 448 Kc. lower than the signal frequency

MICROPHONIC HOWL

The 2 gang condenser is cushion mounted to eliminate vibration of the plates. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

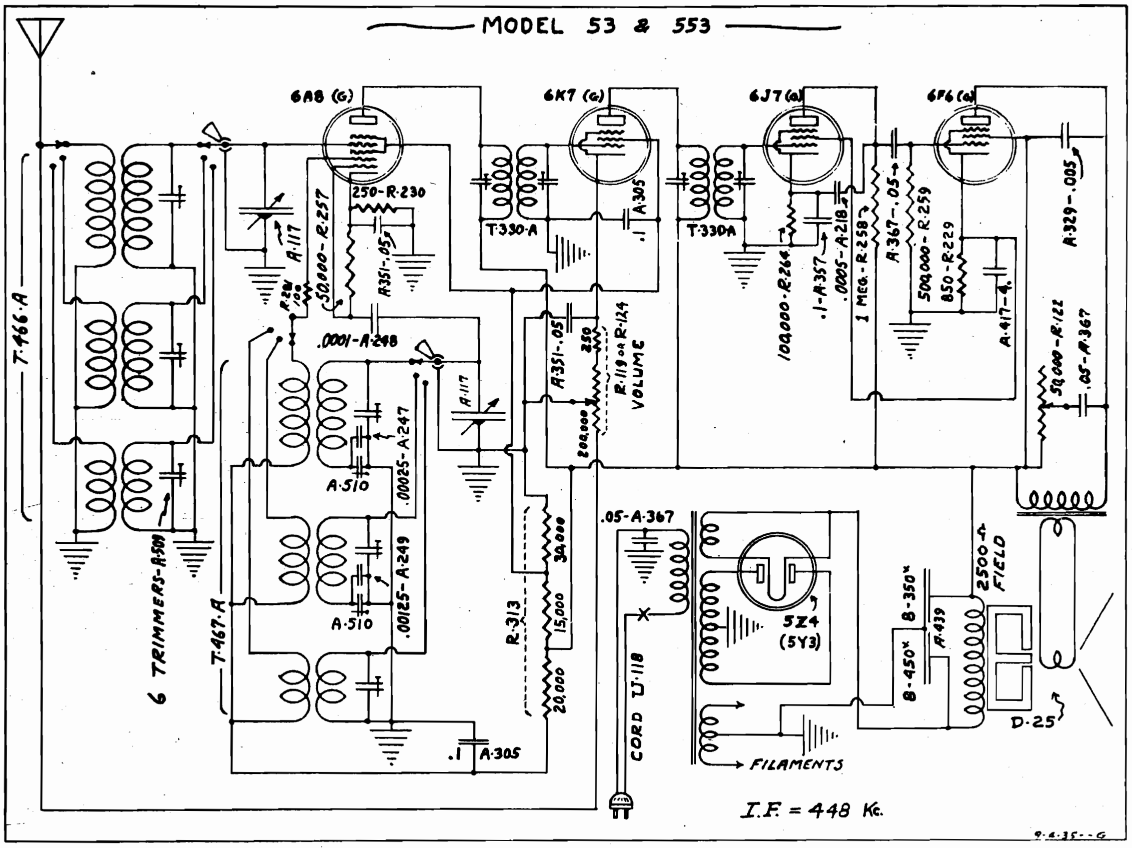
LONG WAVE-EXPORT MODEL

Model 53 is also built with a four position switch (part number E-482) and an extra set of coils tuning the foreign long wave band. The order of band change switch positions is broadcast, mid-band, short wave, long wave band. Alignment—adjust long wave trimmers at 350 Kc. and rock in long wave padder at 160 Kc. See sketch for location of coils and condensers.

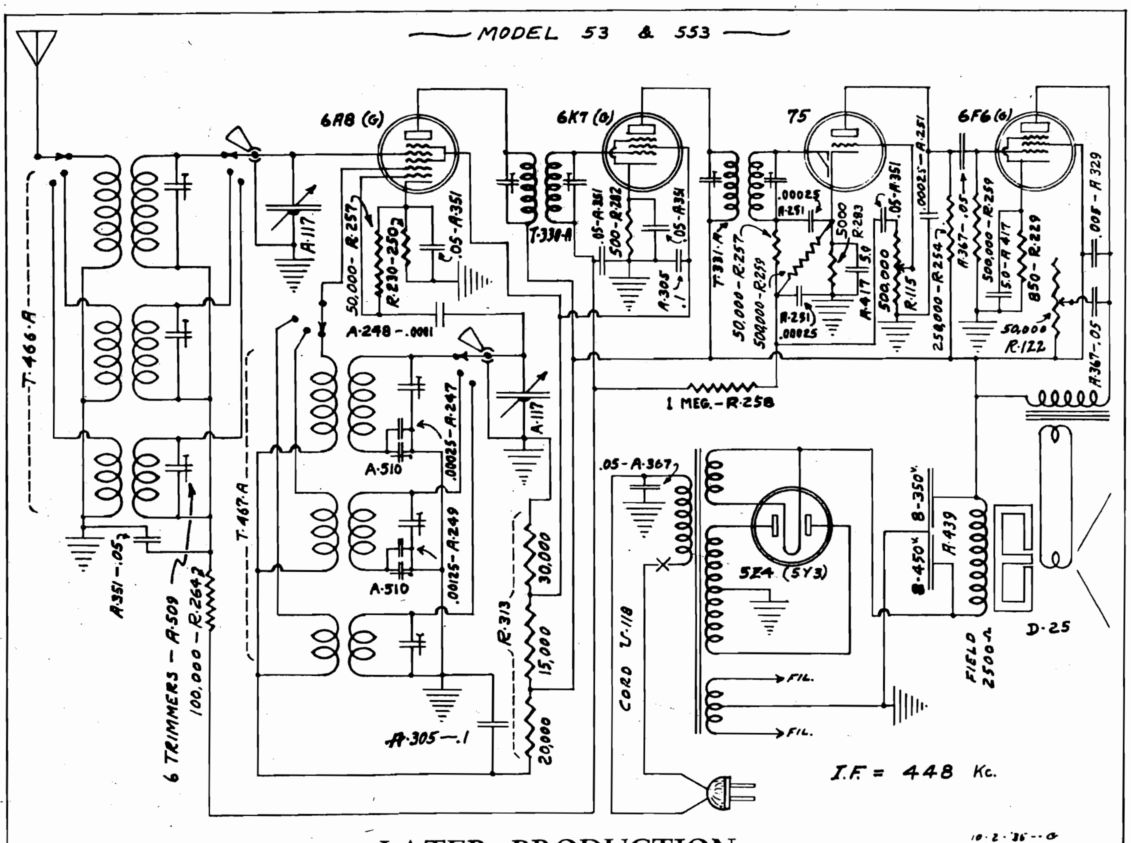
Some export sets also contain a 25 cycle power transformer (part number T-502) which has a tapped primary winding allowing operation from 125, 150 or 250 volt A.C. power lines The tap switch is made available by removing part of the cover of the power transformer. 25 cycle sets may be used on 60 cycle although the converse is not true.

MODELS 53,553
Early and Late
Schematics

INTERNATIONAL RADIO CORP.



FIRST PRODUCTION



LATER PRODUCTION

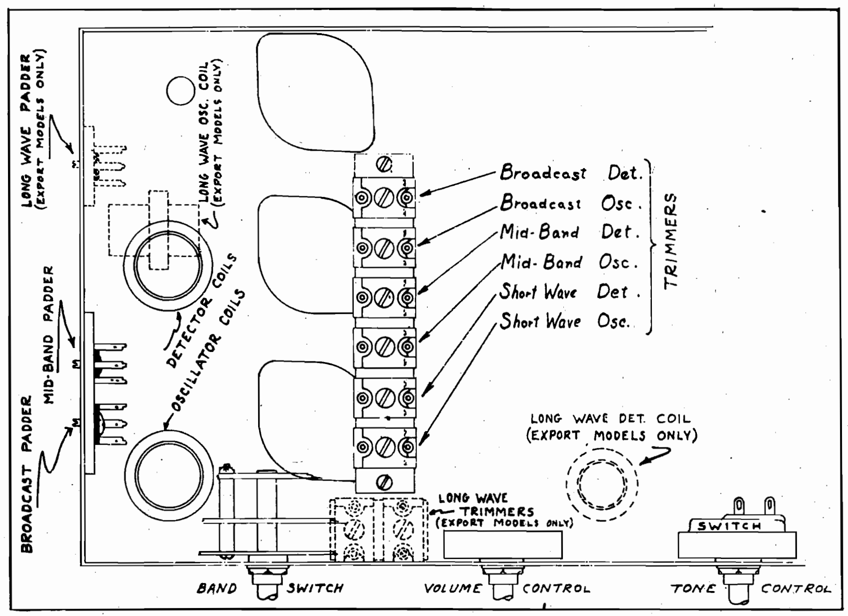
MODELS 53, 553
Trimmers, Parts
Voltage

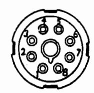
INTERNATIONAL RADIO CORP.

PARTS PRICE LIST

MODELS 53 & 553

Part No.	Description	List Price
A-117	2 gang tuning condenser	$2.00
A-218	.0005 mf. mica condenser	.20
A-247	.00025 mf. mica condenser	.20
A-248	.0001 mf. mica condenser	.20
A-249	.00125 mf. mica condenser	.20
A-251	.00025 mf. mica condenser	.20
A-305	.1 mf., 200 v. paper condenser	.15
A-329	.005 mf., 600 v. paper condenser	.15
A-351	.05 mf., 200 v. paper condenser	.15
A-357	.1 mf., 25 v. paper condenser	.15
A-367	.05 mf., 400 v. paper condenser	.15
A-417	4 mf., 25 v. electrolytic condenser	.55
A-439	Electrolytic filter condenser	1.30
A-509	6 gang trimmer condenser	.55
A-510	Dual padder condenser	.45
A-515	Single padder (long wave model only)	.25
A-527	Dual trimmer condenser (long wave model only)	.20
D-25	Dynamic speaker	4.35
E-155	1 inch knob	.15
E-156	13/16 inch knob	.15
E-159	1 inch knob with colored dots	.20
E-269	Dial assembly	1.65
E-271	Dial assembly (for Long wave model)	1.65
E-472	Pilot lamps, 6-8 volt	.15
E-480	3 position band change switch	1.00
E-482	4 position band change switch—(long wave model)	1.50
E-484	Antenna-ground binding post strip	.10
H-25	75- tube socket	.10
H-49	6A8 tube socket	.10
H-53	6J7 tube socket	.10
H-54	6K7 tube socket	.10
H-56	6F6 tube socket	.10
H-57	5Z4 tube socket	.10
R-115	Volume control	.55
R-119 or R-124	Volume control	.60
R-122	Tone control with power switch	.70
R-229	850 ohm. 1/2 w. carbon resistor	.20
R-230	250 ohm, 1/3 w. carbon resistor	.20
R-254	250M ohm. 1/3 w. carbon resistor	.20
R-257	50M ohm, 1/3 w. carbon resistor	.20
R-258	1 megohm. 1/3 w. carbon resistor	.20
R-259	500M ohm, 1/3 w. carbon resistor	.20
R-264	100M ohm, 1/3 w. carbon resistor	.20
R-281	100 ohm, 1/3 w. carbon resistor	.20
R-282	500 ohm, 1/3 w. carbon resistor	.20
R-283	5000 ohm, 1/3 w. carbon resistor	.20
R-313	Candohm resistor. 20M-15M-30M ohms	.55
S-102	Goat tube shield	.10
T-122	Power transformer (60 cycle)	2.50
T-330A	IF transformer	1.25
T-466A	Detector coil	1.75
T-467A	Oscillator coil	1.75
T-468A	L. W. Detector coil (long wave model only)	.85
T-469A	L. W. Oscillator coil (long wave model only)	.85
T-502	Power transformer 25 cycle, tapped-primary (Export models only)	6.50
U-118	A. C. cord and plug	.30
U-206	4 wire speaker cable	.20
X-311	Cabinet (Model 53)	7.50
X-319	Cabinet (Model 553)	7.25





Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

	Position	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
6A8	Det.-Osc.	Shell	HTR.	265	98	—5	138	HTR.	1
6K7	I. F.	Shell	HTR.	265	98	1	—	HTR.	1
*6J7	2nd Det.	Shell	HTR.	55	20	5	—	HTR.	5
6F6	A. F.	Shell	HTR.	255	265	0	—	HTR.	20
5Z4	Rect.	Shell	390	—	A.C.	—	A.C.	—	390

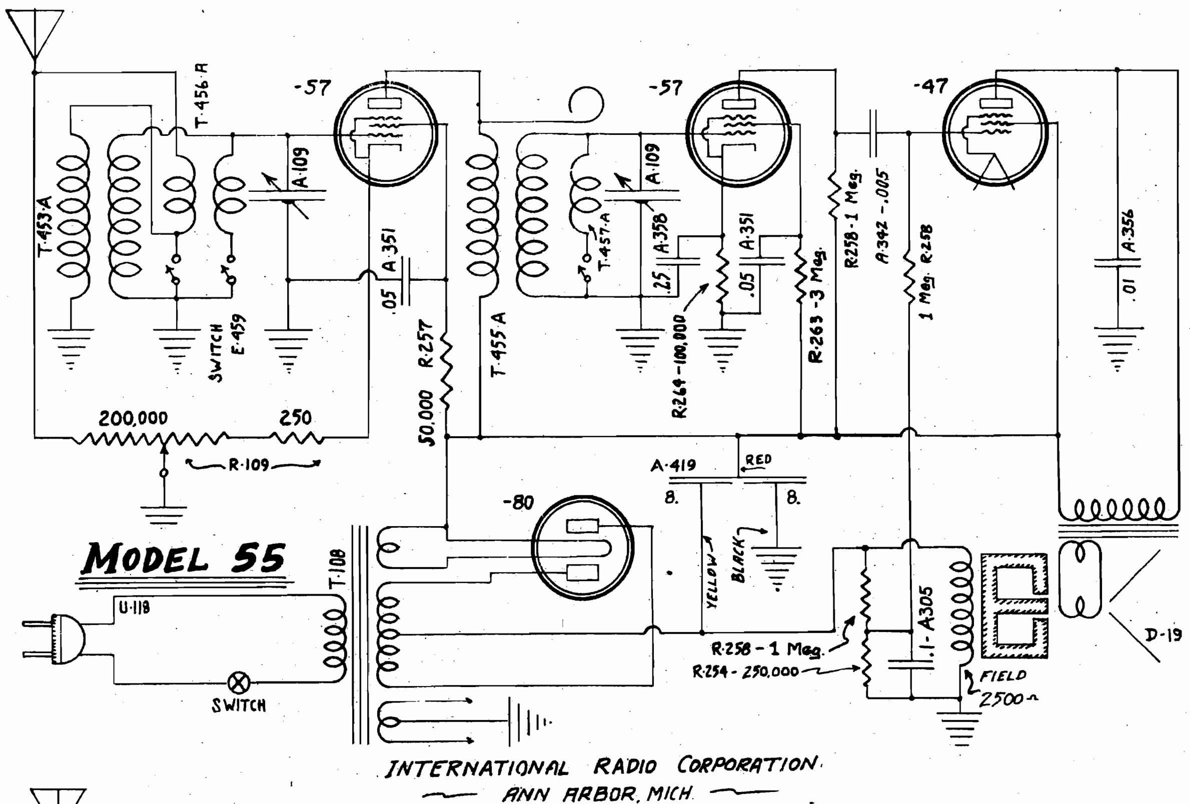
	Position	E_K	E_P	E_{DP}
*75	2nd Det.	1.5	95	0

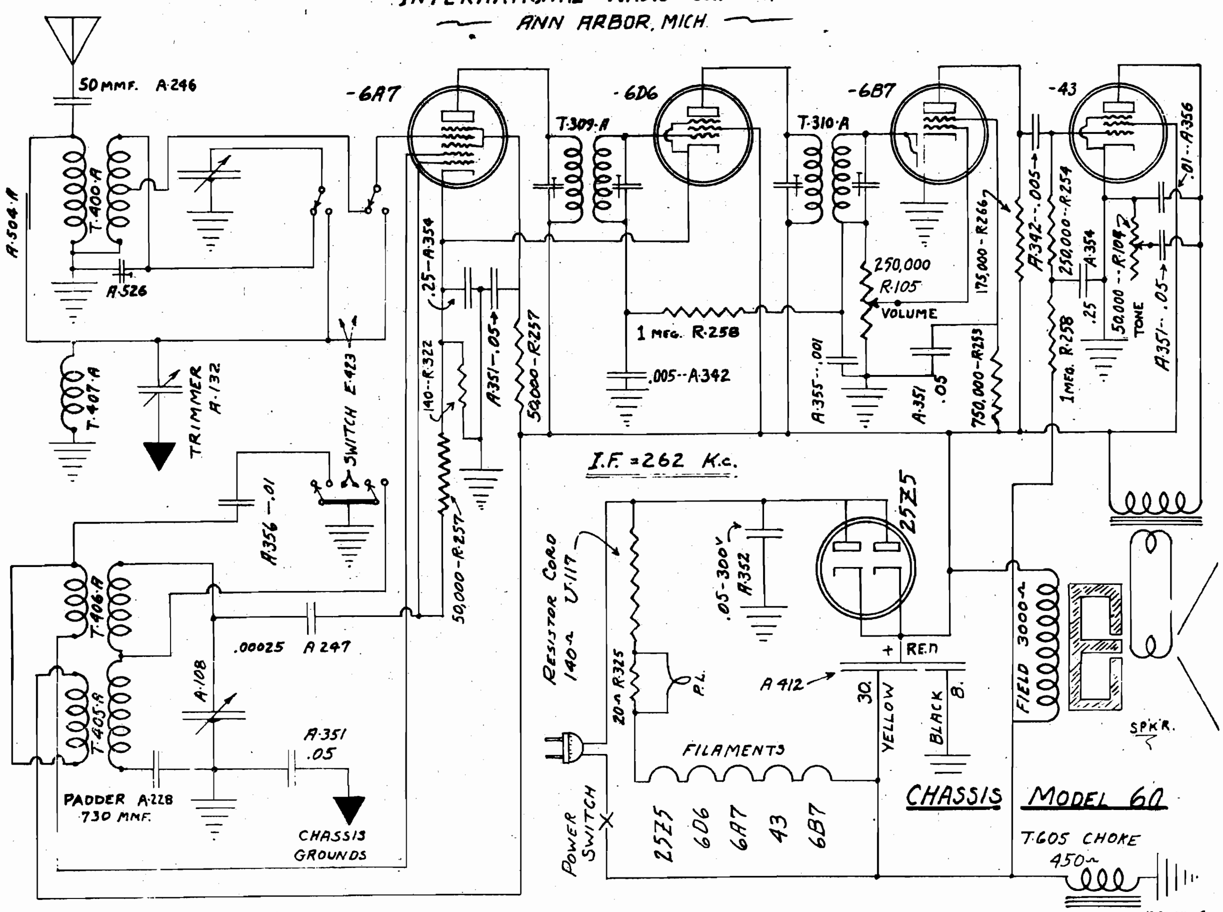
Line 118 Volts. Switch On Broadcast Position. Volume Control Full On. 10% Variation Allowable.

*6J7 used in early production—75 in later production.

MODEL 55
MODEL 60
Schematics

INTERNATIONAL RADIO CORP.



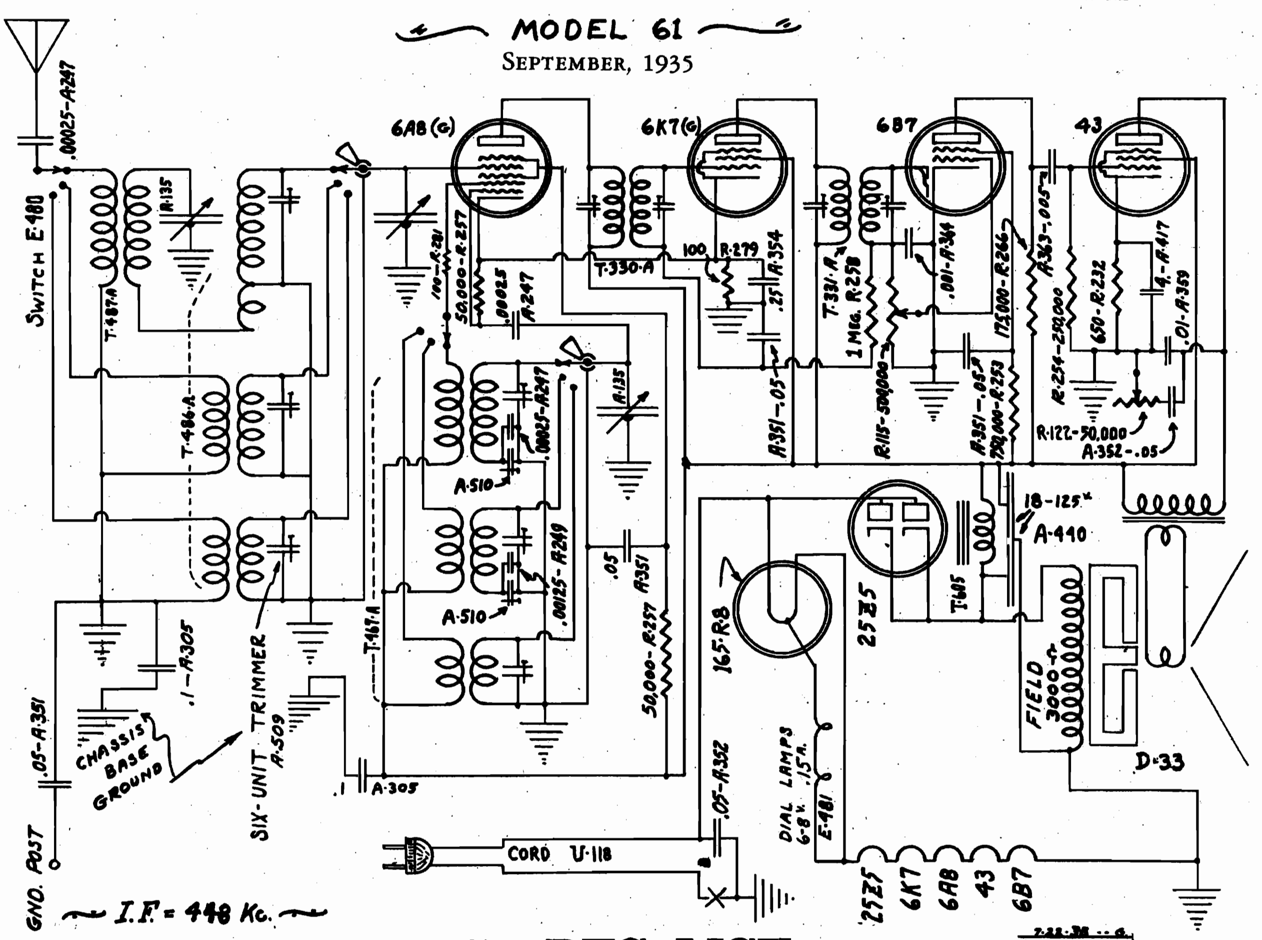


MODEL 61, 661
Schematic
Parts

INTERNATIONAL RADIO CORP.

MODEL 61

SEPTEMBER, 1935



PARTS LIST

PART NO.	DESCRIPTION	LIST PRICE
A-135	3 gang tuning condenser	$2.80
A-247	.00025 mf. mica condenser	.20
A-249	.00125 mf. mica condenser	.20
A-305	.1 mf., 200 v. paper condenser	.15
A-351	.05 mf., 200 v. paper condenser	.15
A-352	.05 mf., 300 v. paper condenser	.15
A-354	.25 mf., 25v. paper condenser	.20
A-359	.01 mf., 400 v. paper condenser	.15
A-363	.005 mf., 400 v. paper condenser	.15
A-364	.001 mf., 400 v. paper condenser	.15
A-417	5 mf., 25 v. electrolytic condenser	.55
A-440	Electrolytic filter condenser	1.25
A-509	6 gang trimmer condenser	.55
A-510	Dual padder condenser	.45
A-515	Single padder (long wave model only)	.25
A-527	Dual trimmer condenser (long wave model only)	.20
D-33	Dynamic speaker	3.50
E-155	1 inch knob	.15
E-156	13/16 inch knob	.15
E-159	1 inch knob with colored dots	.20
E-269	Dial assembly	1.65
E-271	Dial assembly (for long wave model)	1.65
E-460	Antenna-ground binding post strip	.10
E-480	3 position band change switch	1.00
E-481	Special pilot lamps 6-8 v., .15 amperes	.15
E-482	4 position band change switch (long wave model)	1.50
H-18	25Z5 tube socket	.10
H-20	6B7 tube socket	.10
H-21	43 tube socket	.10
H-49	6A8 tube socket	.10
H-54	6K7 tube socket	.10
H-58	165R8 tube socket	.10
R-115	Volume control	.55
R-122	Tone control with power switch	.70
R-232	650 ohm, 1/2 w. carbon resistor	.20
R-253	750M ohm, 1/3 w. carbon resistor	.20
R-254	250M ohm, 1/3 w. carbon resistor	.20
R-257	50M ohm. 1/3 w. carbon resistor	.20
R-258	1 megohm, 1/3 w. carbon resistor	.20
R-266	175M ohm, 1/3 w. carbon resistor	.20
R-279	100 ohm, 1/3 w. carbon resistor	.20
R-281	100 ohm, 1/3 w. carbon resistor	.20
S-102	Goat tube shield	.10
T-330A	1st I.F. transformer	1.25
T-331A	2nd I.F. transformer	1.25
T-467A	Oscillator coil	1.75
T-468A	L. W. Detector coil (long wave model only)	.85
T-469A	L. W. Oscillator coil (long wave model only)	.85
T-486A	Detector coil	1.75
T-487A	Antenna coil	1.00
T-605	Filter choke	.65
U-118	A.C. cord and plug	.30
U-206	Four wire speaker cable	.20
X-345	Cabinet (Model 61)	8.50
X-350	Cabinet (Model 661)	8.00

MODELS 61, 661
Voltage, Trimmers
Alignment

INTERNATIONAL RADIO CORP.

This chassis is designed to operate from 115 volt power lines, either alternating or direct current. It is a three band receiver covering the American broadcast; police and airport, and Foreign short wave bands.

The following tubes are employed:

6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator
6K7 (metal) or 6K7G (glass) I.F. amplifier
6B7 (glass) 2nd detector, A.V.C. and 1st A.F
43 (glass) Pentode output
25Z5 (glass) Rectifier
165R8 (glass) Regulator

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. Glass counterpart types should be shielded, the metal tubes need not be. Shielding provisions are provided.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate of the 43 tube to ground. Tone control should be turned "high". The signal from the signal generator *must be kept at a very low level.*

Essential Data: The intermediate frequency employed is 448 Kc. On the broadcast and middle bands the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band, 1400 and 600 Kc.; Middle band, 6000 and 2400 Kc.; Short wave band 15 megacycles.

In aligning on broadcast band it is permissible to bend plates on the *band pass section only* of the three gang condenser. Do not bend plates when aligning the middle and short wave bands.

The front section of the three gang condenser is the oscillator section; the middle section, first detector; the rear section, band pass. The band pass is in circuit only on the broadcast band.

Intermediates: To align the IF circuits first remove the grid clip from the 6A8 tube and connect a 1/2 meg. resistance from the 6A8 grid (top of tube terminal) to ground. Set the signal generator to 448 Kc. and feed its modulated signal direct to the grid of the 6A8 through a 100 mmf. condenser. Adjust the first IF transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second IF transformer. If adjustments are not made accurately selectivity will be poor and IF may oscillate.

Broadcast Band: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer (see sketch) and band pass trimmer (on condenser gang) for maximum reading. Although a trimmer is provided for the Broadcast detector coil it will be found not connected on many sets as it is not necessary in obtaining correct balance.

Turn dial and signal generator to 600 Kc. and rock the padder into correct adjustment. This is accomplished by very slowly adjusting the padder condenser and at the same time turning the dial slightly back and forth across 600 Kc. until an adjustment is obtained producing maximum output. Go back to 1400 Kc. and readjust the oscillator trimmer slightly if necessary. Then recheck padder at 600 Kc. It is permissible to bend plates on the band pass section only in resonating circuits.

Middle Band: Turn the band change switch to the middle position and tune radio and signal generator to 6000 Kc. Adjust the oscillator trimmer and then the detector trimmer for maximum output.

Rock in the padder condenser 2400 Kc. Then recheck at 6000 Kc. and 2400 Kc.

Short Wave Band: Turn band change switch to short wave band. Tune radio and signal generator to 15 megacycles and adjust trimmers. No padder condenser is used on the short wave band so no other adjustments are necessary. On this band the oscillator frequency is 448 Kc. lower than the signal frequency.

PILOT LAMPS

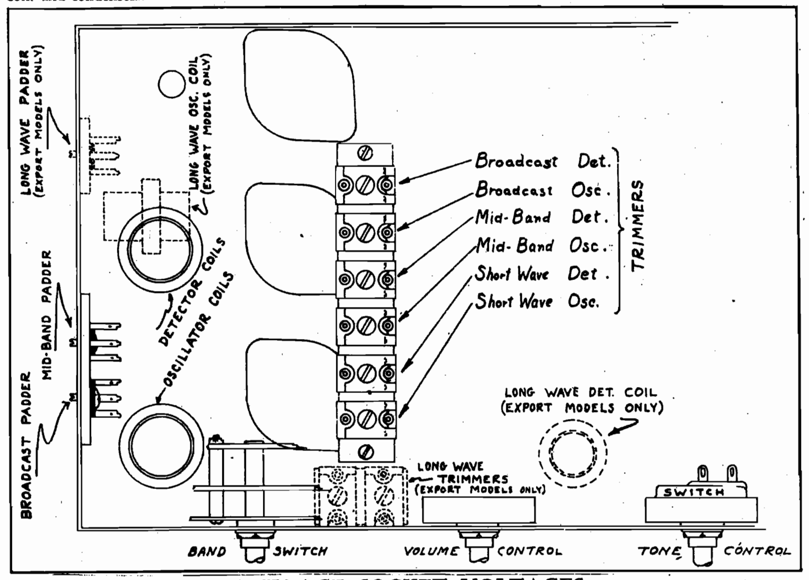
The pilot lamps are special 6-8 volt drawing only .15 amperes. It is necessary lamps of this rating only be used. In ordering specify our part number E-481.

MICROPHONIC HOWL

The tuning condenser is cushion mounted to eliminate vibration. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

LONG WAVE-EXPORT MODEL

Model 61 is also built with a four position switch (part number E-482) and an extra set of coils tuning the foreign long wave band. The order of band change switch positions is broadcast, mid-band, short wave, long wave band. Alignment—adjust long wave trimmers at 350 Kc. and rock in long wave padder at 160 Kc. See sketch for location of coils and condensers.



AVERAGE SOCKET VOLTAGES

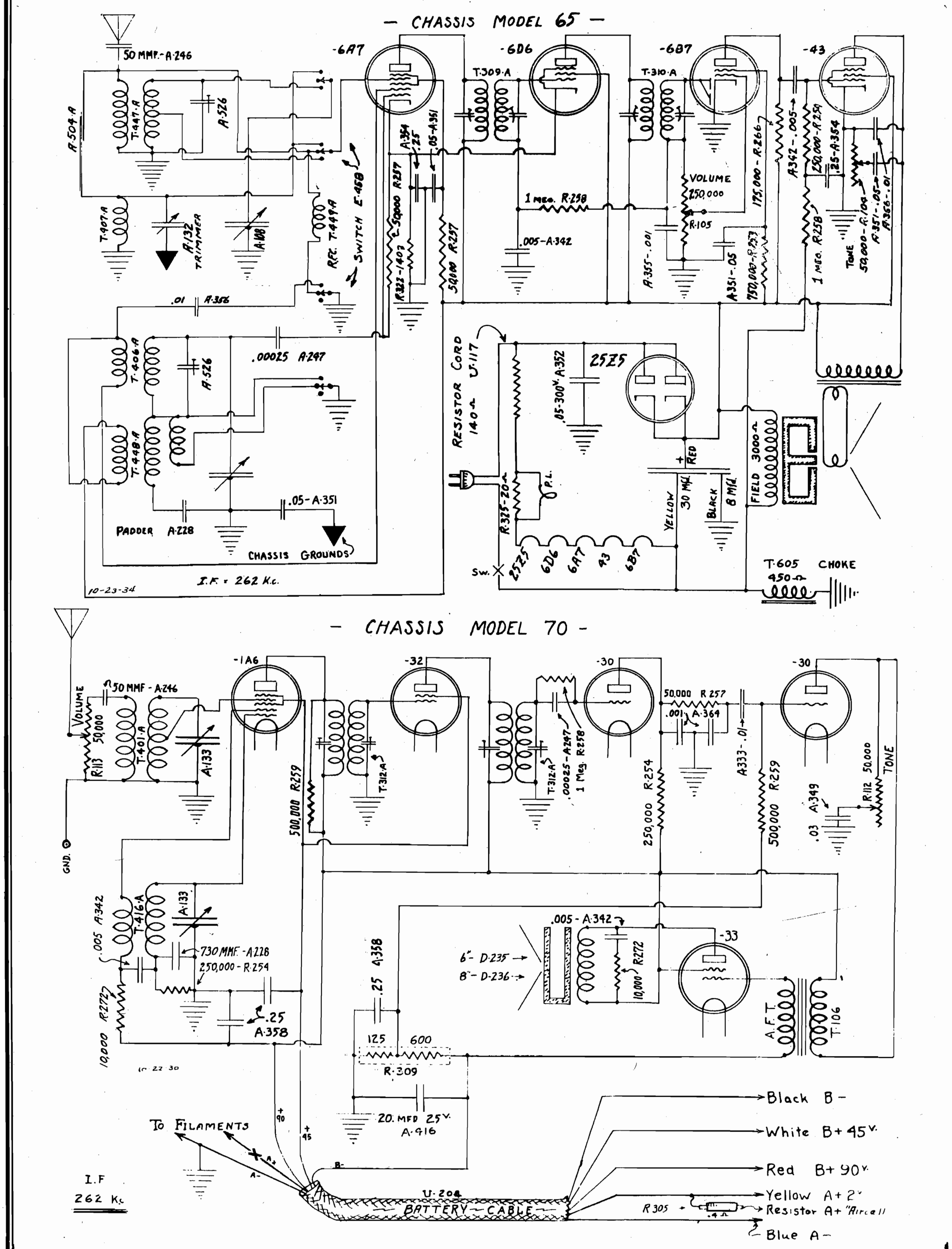
Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

	Position	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
6A8	Det.-Osc.	Shell	HTR.	90	27	0	90	HTR.	0
6K7	I. F.	Shell	HTR.	90	90	0	—	HTR.	0
		E_K	E_{G2}	E_P	E_{DP}				
6B7	2nd Det.	0	7	12	0				
43	A. F.	12	90	85	—				
25Z5	Rect.	105	—	A.C.	—				

Line 118 Volts. Switch On Broadcast Position. Volume Control Full On. 10% Variation Allowable.

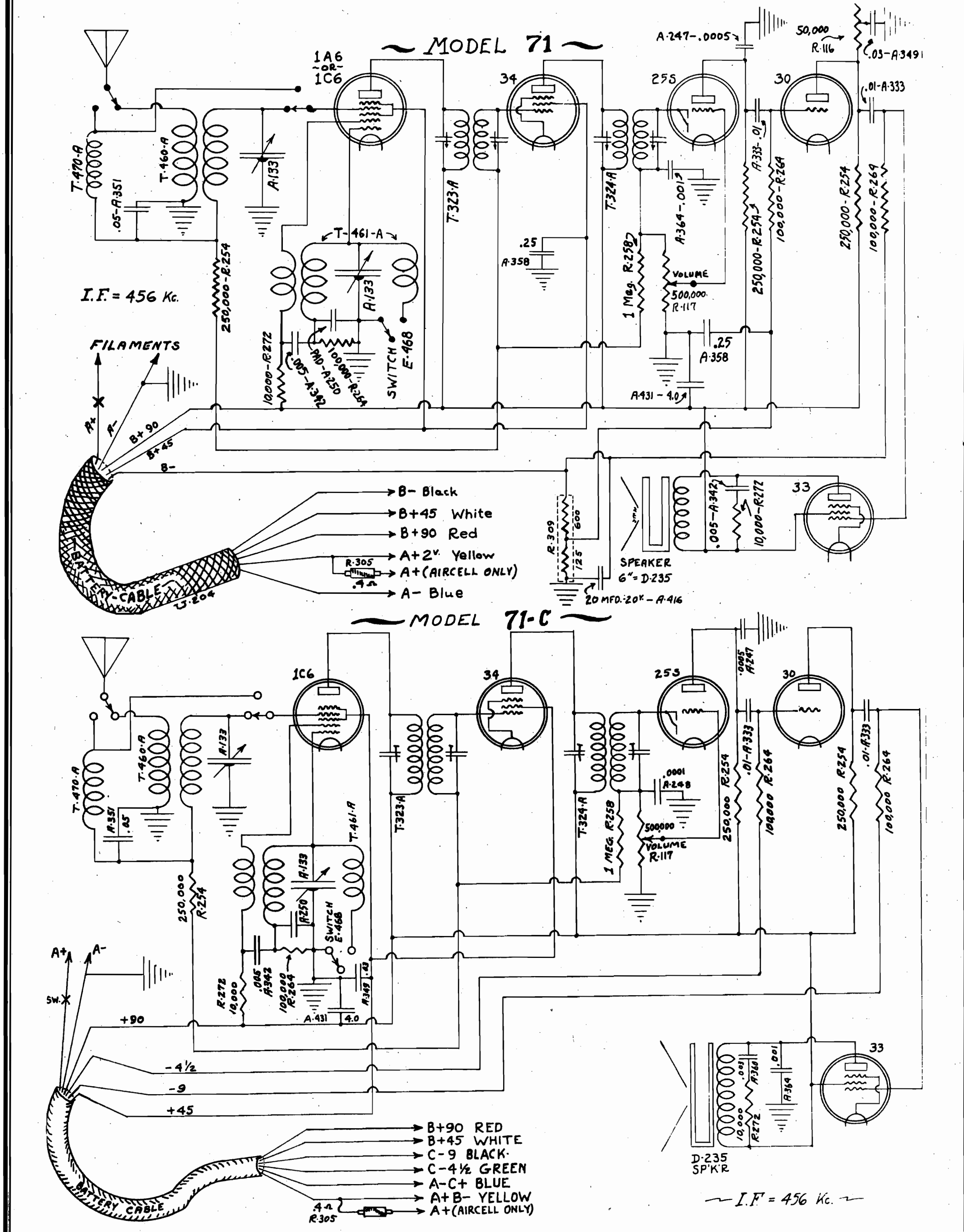
MODEL 65
MODEL 70
Schematics

INTERNATIONAL RADIO CORP.

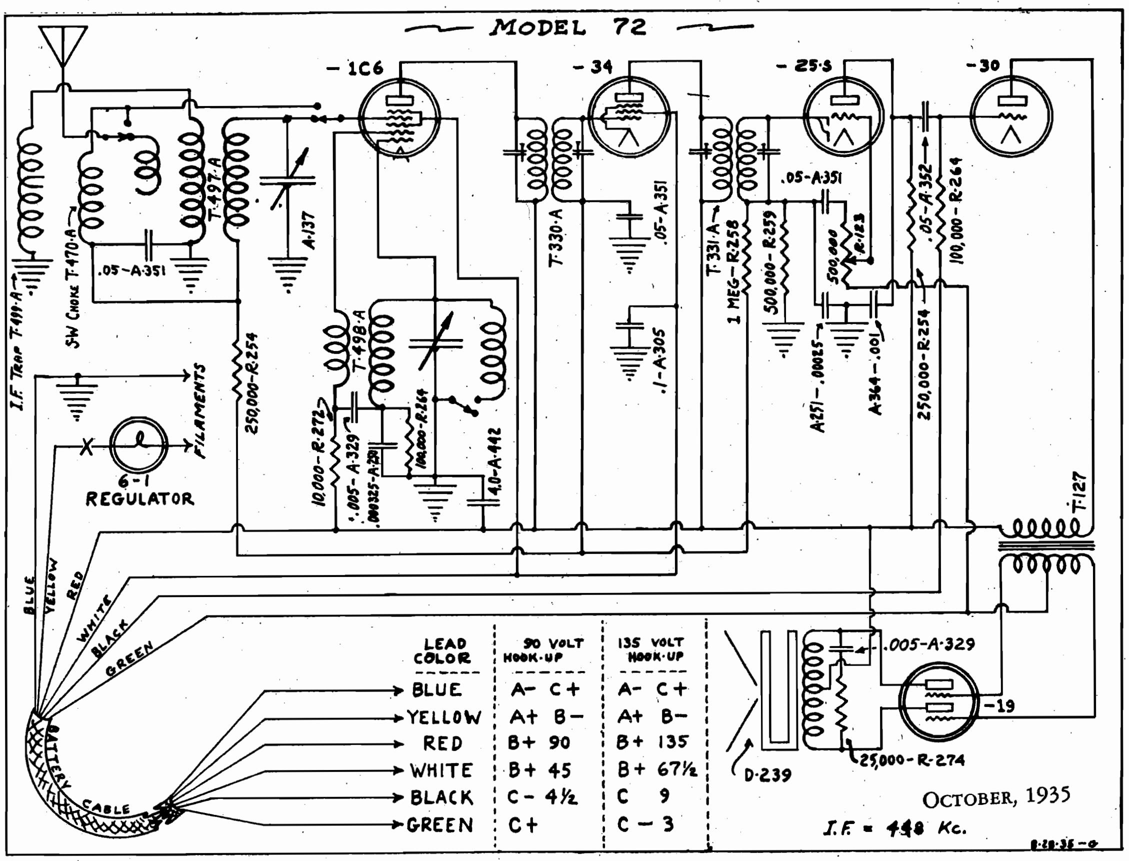


MODEL 71
MODEL 71C
Schematics

INTERNATIONAL RADIO CORP.



INTERNATIONAL RADIO CORP.



Essential Data: The intermediate frequency employed is 448 Kc. On the broadcast band the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

The rear section of the two gang condenser is the oscillator section; the front section, first detector,

Intermediates: To align the I.F. Circuits, set the signal generator to 448Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the two gang condenser. Adjust the first I. F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result. Due to the I.F. trap in the antenna circuit a strong signal is necessary.

Broadcast Band: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the broadcast oscillator trimmer for maximum reading. On most sets the detector trimmer has its adjusting screw purposely removed.

There is no adjustable padder condenser in this model so resonance on the low frequency end is accomplished by bending plates on the tuning condensers. Check the alignment at 1000 Kc. Insert a thin bakelite, celluloid or mica feeler strip between the plates of the variable condensers to determine whether the circuits are properly matched. The action is this—the dielectric constant of the celluloid feeler strip being higher than that of the air it displaces, results in an increase of capacity. Open the variable condenser just enough to indicate two or three points below maximum signal. As the feeler is inserted the meter reading should indicate increasing signal and then decreasing as the feeler is inserted farther. This procedure should be followed on both sections. Should the meter fail to show an increase in signal as the strip is inserted in one section this indicates too great a capacity for that section. This may be corrected by bending the outside rotor plates out at the point where they begin to mesh with the stator.

After checking the alignment at 1000 Kc. repeat the process at 600 Kc.

Shortwave Band: No alignment necessary due to untuned detector circuit.

MODEL 72
Parts List

INTERNATIONAL RADIO CORP.

PARTS PRICE LIST

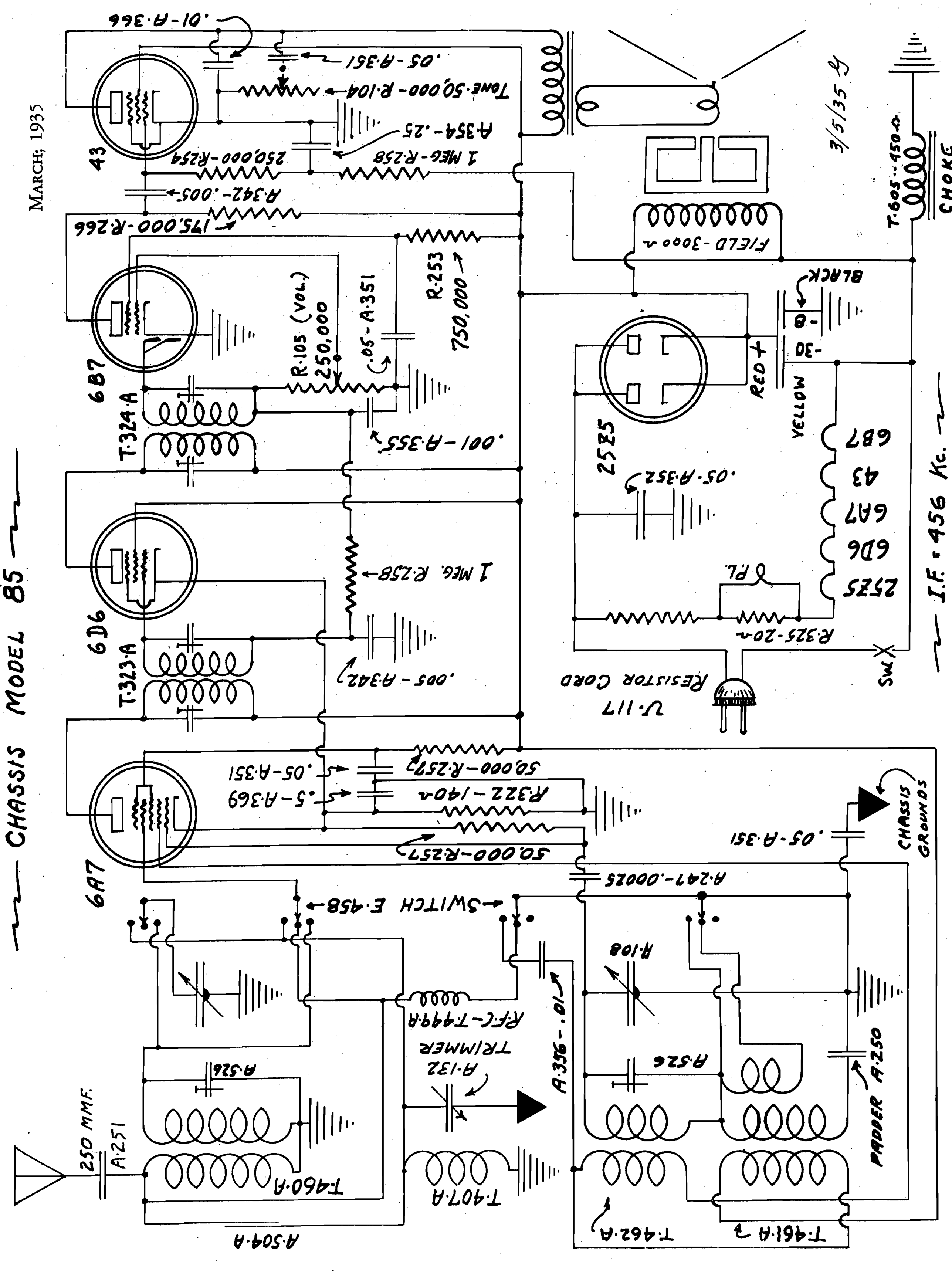
MODEL 72

PART NO.	DESCRIPTION	LIST PRICE
A-137	2 gang tuning condenser	$1.65
A-250	325 mmf. mica padder condenser	.20
A-251	250 mmf. mica condenser	.20
A-305	.1 mf., 200 v. paper condenser	.15
A-329	.005 mf., 600 v. paper condenser	.15
A-351	.05 mf., 200 v. paper condenser	.15
A-352	.05 mf., 300 v. paper condenser	.15
A-364	.001 mf., 400 v. paper condenser	.15
A-442	4 mf. electrolytic condenser	.65
D-239	Magnetic speaker	5.00
E-157	Large knob	.15
E-160	Small knob	.15
E-270	Dial assembly	1.50
E-479	Wave band switch	.45
E-486	Antenna-ground binding post strip	.10
H-33	30 tube socket	.10
H-45	25S tube socket	.10
H-46	34 tube socket	.10
H-58	6-1 regulator socket	.10
H-59	1C6 tube socket	.10
H-60	19 tube socket	.10
R-123	Volume control and switch	.65
R-254	250M ohm carbon resistor	.20
R-258	1 megohm carbon resistor	.20
R-259	500M ohm carbon resistor	.20
R-264	100M ohm carbon resistor	.20
R-272	10M ohm carbon resistor	.20
R-274	25M ohm carbon resistor	.20
S-102	Goat tube shield	.10
T-127	Push pull class B audio transformer	1.10
T-330A	1st I.F. transformer	1.25
T-331A	2nd I. F. transformer	1.25
T-470A	Short wave choke	.50
T-497A	Detector coil	1.00
T-498A	Oscillator coil	1.00
T-499A	I. F. trap	.35
U-208	Battery cable	.60
X-353	Cabinet	8.25

Prices Subject to Change Without Notice

MODEL 85
Schematic

INTERNATIONAL RADIO CORP.



MODEL 85
Alignment
Voltage, Parts

INTERNATIONAL RADIO CORP.

MODEL 85 is an AC-DC receiver designed to operate from 110-volt power lines. It tunes the American broadcast band, police band and Foreign short wave bands.

INTERMEDIATE FREQUENCY

Sets bearing serial numbers under 185499 use an intermediate frequency of 262KC.

Sets bearing serial numbers over 185498 use an intermediate frequency of 456KC.

ALIGNMENT

The standard type of AC output meter should be used to indicate signal strength. It should be connected from the plate of the 43 tube to the circuit ground (variable condenser frame). The signal from the test oscillator must be kept at a very low level to get below the A.V.C. action.

A microammeter may be used to indicate signal strength if preferred (see Manual of General Service Information). One lead from the meter should be attached to the circuit ground and the other to the terminal of the volume control to which is connected a 1 megohm resistor.

To adjust 262KC IF circuits set the test oscillator to 262KC and couple it to the antenna wire of the set (wave band switch should be on B/C position). Short out oscillator section of 2 gang tuning condenser (rear section). Adjust IF transformers for maximum meter reading. Go over adjustments at least twice for accuracy. Use fibre screw driver.

To adjust 456KC IF circuits first remove grid clip from 6A7 tube and connect a 500M ohm resistance from the 6A7 grid (top of tube terminal) to ground. Set test oscillator to 456 KC and feed its signal direct to the grid of the 6A7. Short out oscillator section of 2 gang tuning condenser and proceed as in above paragraph.

Before aligning RF circuits see that the dial is correctly adjusted. With the 2 gang condenser all the way out of mesh the dial pointer should be on the 5000 KC mark.

Place band change switch on B/C position. The trimmer across the B/C antenna coil is located on the bottom of the chassis at the end. It should be set at approximately minimum capacity. Set the test oscillator to 1500 KC and couple to the antenna wire of the set. With the dial pointer on 1500 KC adjust the oscillator trimmer (on 2 gang condenser) for maximum signal. Shift the 2 gang condenser slightly to one side or the other of 1500 KC and continue adjustments for maximum signal. The correct balance between oscillator and antenna circuits will be found very close to the 1500 KC mark on the dial.

Check alignment at 1000 and 600KC (see Manual of General Service Information).

Turn wave band switch to extreme left and turn dial to about 19 meters, adjust test oscillator so it is producing a signal at approximately 19 meters. Turn tuning condenser slightly back and forth, at the same time adjusting the short wave oscillator trimmer (mounted beside S/W oscillator coil) for maximum signal. The two plate vernier condenser on top of the chassis should be out of mesh while this is being done.

Tune test oscillator and radio to about 49 meters and check for resonance. Do not bend condenser plates to align but spread or crowd together turns on the short wave antenna coil (see Manual of General Service Information.) The two plate vernier condenser on top of the chassis should be in mesh while this is being done.

AVERAGE TUBE OPERATING VOLTAGES

Position	Tube	Ek	Eg1	Eg2	Eg3	Ep	Edp
1st Det-Osc.	6A7	.8	Det. 0 Osc. 0	50	—	Det. 110 Osc. 110	—
IF Amp.	6D6	.8	*	110	.8	110	—
2nd Det-AVC	6B7	0	.4	45	—	80	*
Power Amp.	43	0	.2	110	—	110	—
Rectifier	25Z5	110	—	—	—	—	—

k—Cathode; g^1—Control grid; g^2—Screen grid; g^3—Suppressor grid; p—Plate; dp—Diode plates; *—Depends on applied signal strength. All voltages measured from indicated points to circuit ground. Line voltage 115 volts.

PARTS PRICE LIST--Model 85

Part No.	Description	List Price
A-132	Trimmer condenser	$ .75
A-133	2 gang tuning condenser	1.75
*A-288	.00073 mfd. mica padder condenser	.25
*A-246	50 mmfd mica condenser	.20
A-247	.00025 mfd. mica condenser	.20
**A-250	.000325 mfd. mica padder condenser	.25
**A-251	250 mmfd. mica condenser	.20
A-342	.005 mfd. paper condenser 200 volt	.15
A-351	.05 mfd. paper condenser 200 volt	.15
A-352	.05 mfd. paper condenser 400 volt	.15
A-354	.25 mfd. paper condenser 100 volt	.15
A-355	.001 mfd. paper condenser 200 volt	.15
A-356	.01 mfd. paper condenser 200 volt	.15
A-412	8-30 mfd. electrolytic filter condenser	1.65
A-526	Semi-variable trimmer condenser	.15
D-11	Dynamic speaker 6-inch	5.50
E-114	Large tuning knob	.15
E-115	Small knob	.15
E-256	Dial	1.85
E-405	Pilot light	.15
E-458	3 position band change switch	1.00
H-17	6A7 tube socket	.10
H-18	25Z5 tube socket	.10
H-19	6D6 tube socket	.10
H-20	6B7 tube socket	.10
H-21	43 tube socket	.10
I-306	Speaker terminal strip	.20
R-104	50M ohm tone control	.50
R-105	250M ohm volume control with switch	.75
R-253	750M ohm resistor	.20
R-254	250M ohm resistor	.20
R-257	50M ohm resistor	.20
R-258	1 meg. resistor	.20
R-266	175M ohm resistor	.20
R-322	140 ohm flexible resistor	.20
R-325	20 ohm "Candohm" resistor	.25
S-102	Goat tube shield	.15
*T-315A	1st IF coil assembly	1.25
*T-316A	2nd IF coil assembly	1.25
**T-323A	1st IF coil assembly	1.25
**T-324A	2nd IF coil assembly	1.25
*T-406A	S. W. oscillator coil	.30
T-407A	S. W. antenna coil	.25
*T-447A	B. C. antenna coil	.85
*T-448A	B. C. oscillator coil	.90
T-449A	R. F. C.	.25
**T-460A	B. C. antenna coil	.85
**T-461A	B. C. oscillator coil	.90
**T-462A	S. W. oscillator coil	.30
T-605	Filter choke	.65
U-117	Power cord	.55
	Cabinet complete	7.00

*Serial numbers under 185499 intermediate frequency is 262 Kc.
**Serial numbers above 185498 intermediate frequency is 456 Kc.

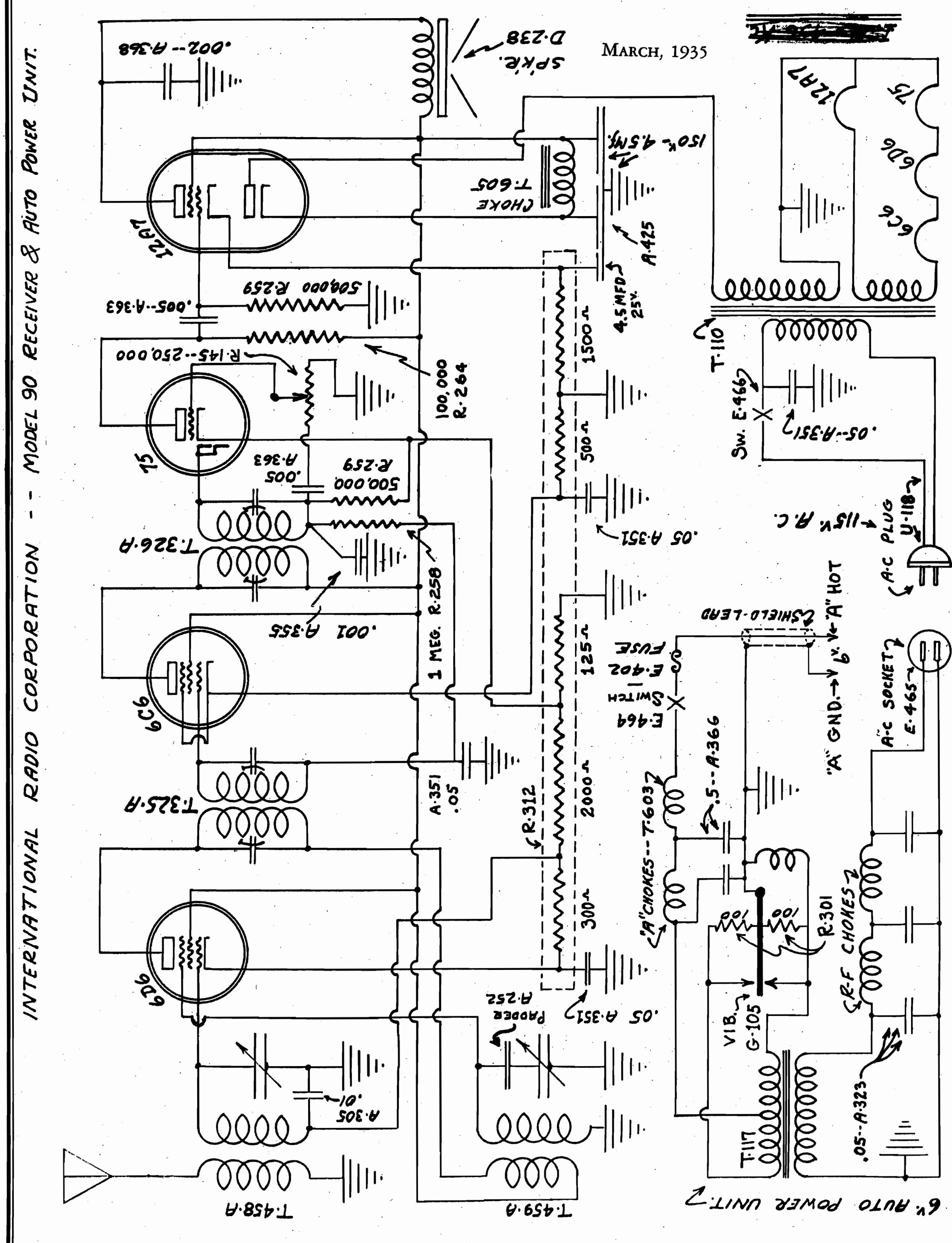
Prices subject to change without notice

ALWAYS ORDER BY PART NUMBER

MODEL 90
Schematic

INTERNATIONAL RADIO CORP.

MARCH, 1935



MODEL 90
Alignment
Voltage, Parts

INTERNATIONAL RADIO CORP.

PARTS PRICE LIST

MODEL 90 AUTO POWER UNIT

Part No.	Description	List Price
A-323	.05 mfd. tubular paper condenser, 400v.	.15
A-366	.5-.5 mfd. special filter condenser, 160v.	.60
B-166	metal case with top and bottom	1.00
E-402	15 amp. fuse	.05
E-464	toggle switch	.50
E-465	A.C. outlet	.70
F-6	fuse holder	.10
F-19	ammeter clip	.05
G-105	vibrator	3.25
H-43	vibrator socket	.10
R-301	200 ohm wire wound center tapped resistor	.15
T-117	power transformer	2.00

MODEL 90 32-VOLT UNIT

Parts same as auto power unit with following exceptions

Part No.	Description	List Price
G-106	vibrator	$3.25
T-118	power transformer	2.20

MODEL 90 RADIO

Part No.	Description	List Price
A-113	2 gang tuning condenser	$1.85
A-228	730 mmfd. Mica padder condenser	.25
*A-248	.0001 mfd. Mica antenna series condenser	.20
A-305	.1 mfd. tubular condenser, 200v.	.15
A-351	.05 mfd. tubular condenser, 200v.	.15
A-352	.05 mfd. tubular condenser, 300v.	.15
A-355	.001 mfd. tubular condenser, 200v.	.15
A-363	.005 mfd. tubular condenser, 400v.	.15
A-368	.002 mfd. tubular condenser, 300v.	.15
A-425	4.5-4.5-4.5 mfd. electrolytic filter condenser	.90
D-238	5 inch speaker	4.25
E-133M	large tuning knob	.10
E-148G	small knob	.10
E-466	rotary power switch	.35
H-19	6D6 tube socket	.10
H-25	75 tube socket	.10
H-41	6C6 tube socket	.10
H-42	12A7 tube socket	.10
R-145	250M ohm volume control	.50
R-254	250M ohm carbon resistor	.20
R-258	1 megohm carbon resistor	.20
R-259	500M ohm carbon resistor	.20
R-264	100M ohm carbon resistor	.20
R-312	special candohm resistor	.45
S-114	goat tube shield	.15
T-110	power transformer	1.75
*T-317A	1st IF coil assembly	1.25
*T-318A	2nd IF coil assembly	1.25
**T-325A	1st IF coil assembly	1.25
**T-326A	2nd IF coil assembly	1.25
**T-458A	antenna coil assembly	.85
**T-459A	oscillator coil assembly	.90
*T-463A	antenna coil assembly	.85
*T-464A	oscillator coil assembly	.90
T-605	filter choke	.65
U-118	A.C. cord and plug	.30
WL20	antenna wire 22 ft.	.10
	cabinet (less back)	2.00
	back only	1.00

*Serial numbers under 6500 use 262IF
**Serial numbers over 6501 use 456IF

Prices subject to change without notice

INTERMEDIATE FREQUENCY

Sets bearing serial numbers under 6500 use an intermediate frequency of 262 K.C.

Sets bearing serial numbers over 6501 use an intermediate frequency of 456 K.C.

ALIGNMENT

The standard type of AC output meter should be used to indicate signal strength. It should be connected from the plate prong of the 12A7 amplifier section to ground. The signal from the test oscillator must be kept at a very low level to get below the A.V.C. action.

To adjust IF circuits first turn the tuning condenser to a setting approximating 600KC. Do not short out the oscillator section of the 2 gang condenser. Set test oscillator to correct intermediate frequency and attach to antenna of set. Adjust primary and secondary of 1st IF transformer for maximum reading on meter. Repeat with 2nd IF transformer and then go over all adjustments a second time. Fibre screw driver and socket wrench are necessary for accuracy.

Next set the test oscillator to 1500 KC. Turn the 2 gang condenser so the plates are just slightly meshed (about 1/8 inch). Adjust trimmers on both sections for maximum signal.

If coils have been changed it may be necessary to bend plates at 1000 KC and 550 KC. See Manual of General Service Information for instructions. Do not bend plates on the oscillator section (rear) unless absolutely necessary.

SPEAKER ADJUSTMENT

To adjust speaker remove cover plate from speaker unit. Two screws will be found at each end of the unit within the magnets. When adjusting either pair of screws, one is to be loosened slightly and the other tightened. You will notice this moves the armature slightly to one side. The air gap on both sides of the armature should be the same.

6 VOLT POWER UNIT

The power unit should deliver between 110 and 120 volts AC under the load of the set. Low output usually indicates a poor vibrator or the set may be drawing an abnormal amount of current.

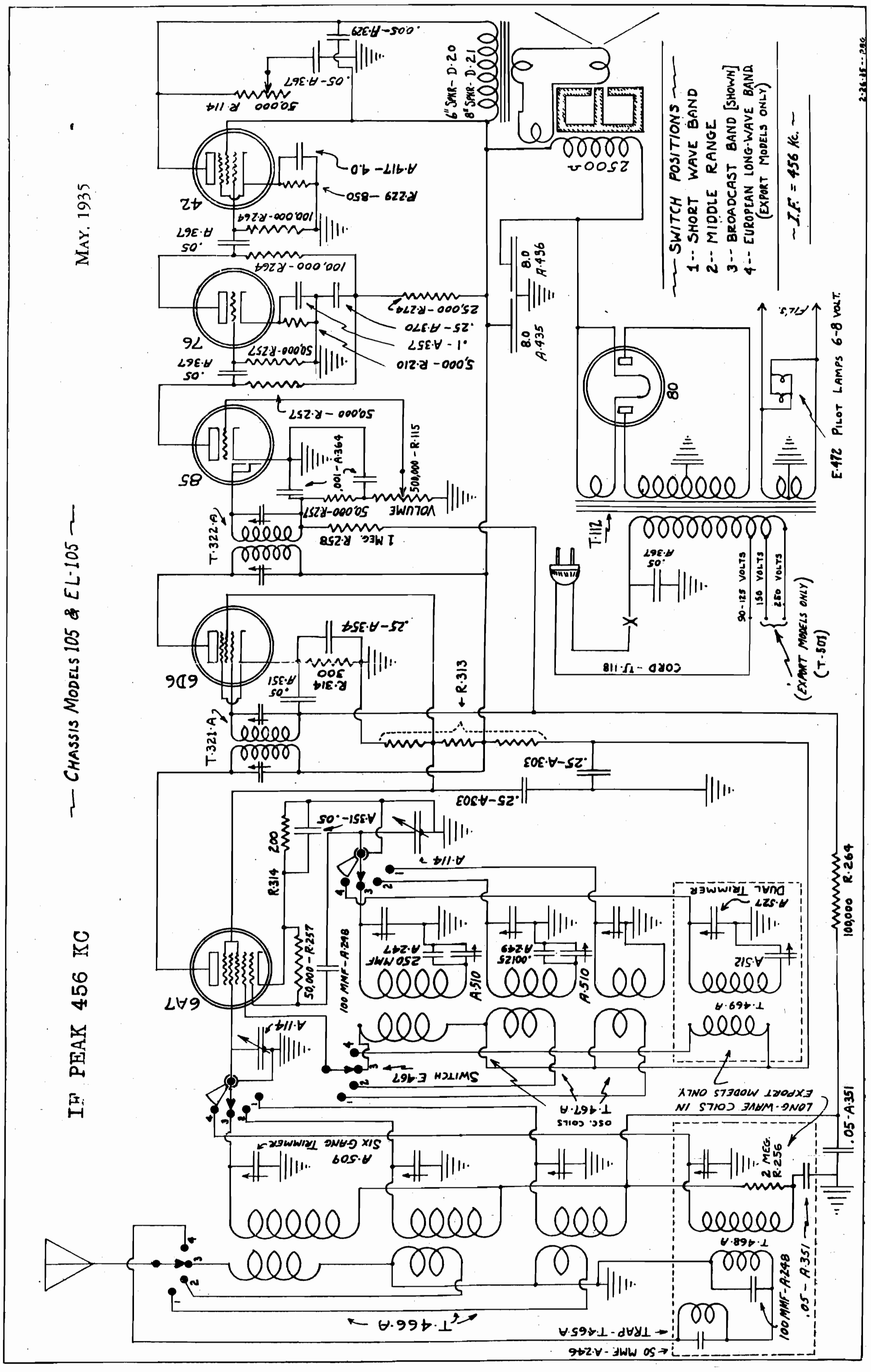
AVERAGE TUBE OPERATING VOLTAGES

Position	Tube	Ek	Eg^1	Eg^2	Eg^3	Ep	Edp
1st Det-Osc.	6D6	18	15	110	0	110	—
IF amp.	6C6	2.7	*	110	2.7	110	—
2nd Det-AVC	75	1	0	—	—	75	*
Rect Pwr. amp.	12A7	Amp. 11 Rect. 120	0	115	—	Amp. 110 Rect 120AC	—

K—Cathode; g^1—Control grid; g^2—Screen grid; g^3—Suppressor grid; p—Plate; dp—Diode plates; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Line voltage 115 volts.

MODELS 105, EL-105
1050
Schematic

INTERNATIONAL RADIO CORP.



MODELS 105,1050
Alignment,Voltage
Trimmers, Parts

INTERNATIONAL RADIO CORP.

Models 105 and 1050 are A.C. receivers designed to operate from 115 volt power lines. They tune the American broadcast band, police and airport bands, and Foreign short wave bands. The models built for export also tune the European long wave band and because of the tapped power transformer in these models they may be operated on A.C. lines up to 250 volts. (See circuit diagram. Switch is available by removing part of cover of power transformer.)

ALIGNMENT

The standasd type of AC output meter should be used to indicate signal strength. It should be connected from the plate of the 42 tube to ground. Tone control should be turned "high." The signal from the test oscillator *must be kept at a very low level.*

To align the IF circuits first remove the grid clip from the 6A7 tube and connect a 50,000 ohm resistance from the 6A7 grid (top of tube terminal) to ground. Short out both sections of the 2 gang tuning condenser. Set the test oscillator to 456KC. and feed its modulated signal direct to the grid of the 6A7. Adjust the first IF transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second IF transformer. If adjustments are not made accurately selectivity will be poor and IF may oscillate.

Before aligning RF circuits see that the dial is correctly adjusted. With the 2 gang condenser at full mesh the pointer should be on 540 Kc.

BROADCAST BAND

Place the band change switch on Broadcast position. Turn the dial to 2000 KC. and feed a *very weak* 2000 KC. modulated signal from your test oscillator to the antenna. Adjust the broadcast oscillator trimmer (see sketch) for maximum reading. Usually no trimmer is needed across the broadcast antenna coil.

Turn dial and test oscillator to 600 KC. and rock the padder into correct adjustment. This is accomplished by very slowly adjusting the padder condenser and at the same time turning the dial slightly back and forth across 600 KC. until an adjustment is obtained producing maximum output. Go back to 2000 KC. and readjust the oscillator trimmer slightly if necessary. Then recheck padder at 600 KC.

MIDDLE BAND

Turn the band change switch to the middle position and tune radio and test oscillator to 6000 KC. Adjust the oscillator trimmer and then the antenna trimmer for maximum output.

Rock in the padder condenser at 2400 KC. Then recheck at 6000 KC. and 2400 KC.

SHORT WAVE BAND

Turn band change switch to short wave band. Tune radio and test oscillator to 16.5 megacycles and adjust trimmers. Generally the oscillator trimmer will be very loose. No padder condenser is used on the short wave band so no other adjustments are necessary.

EUROPEAN LONG WAVE BAND

Alignment instructions are same as for broadcast band. Align at 350 and 160 KC.

MICROPHONIC HOWL

The 2 gang condenser is cushion mounted to eliminate vibration of the plates. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

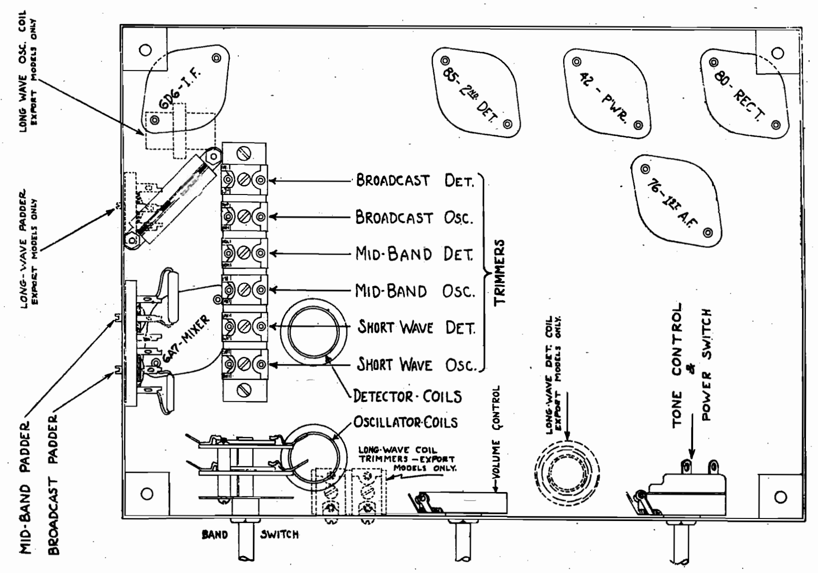
PILOT LIGHTS

In sets built prior to publication of this bulletin the pilot lights were wired in series and 3.8 volt bulbs were used (our part number E-405). If they burn out in an unreasonably short time it is suggested that the sockets be rewired to parallel connection and the number E-472, 6-8 volt bulbs be used.

AVERAGE TUBE OPERATING VOLTAGES

Position	Tube	Ek	Eg¹	Eg²	Eg³	Ep	Edp
1st Det-Osc.	6A7	2	Det. * Osc.-1	100	—	Det. 230 Osc. 145	—
IF Amp.	6D6	2	*	100	2	230	—
2nd Det-AVC	85	0	0	—	—	40	*
1st AF Amp.	76	5	0	—	—	65	—
Power Amp.	42	20	0	230	--	215	—
Rectifier	80	Fil. 270	—	—	--	—	—

k—Cathode; g^1—Control grid; g^2—Screen grid; g^3—Suppressor grid; p—Plate; dp—Diode plates; *—Depends on applied signal strength. All voltages measured from indicated points to ground using 1000 ohm per volt D.C. voltmeter. Line voltage 115 volts.



PARTS PRICE LIST--Models 105 & 1050

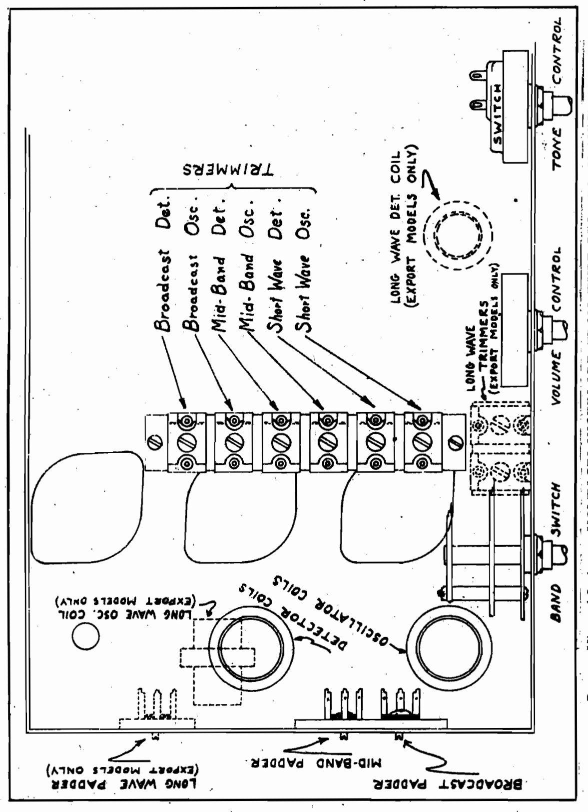
Part No.	Description	Price
A-114	Two gang tuning condenser	$1.90
A-247	.00025 mfd. mica condenser	.20
A-248	.0001 mfd. mica condenser	.20
A-249	.00125 mfd. mica condenser	.20
A-303	.25 mfd. tubular condenser, 200 volt	.15
A-329	.005 mfd. tubular condenser, 600 volt	.15
A-351	.05 mfd. tubular condenser, 200 volt	.15
A-354	.25 mfd. tubular condenser, 25 volt	.15
A-357	1 mfd. tubular condenser, 25 volt	.15
A-364	.001 mfd. tubular condenser, 400 volt	.15
A-367	.05 mfd. tubular condenser, 400 volt	.15
A-370	.25 mfd. tubular condenser, 300 volt	.15
A-417	4 mfd. (or larger) electrolytic condenser, 25 v	.50
A-435	8 mfd. electrolytic filter condenser	.75
A-436	8 mfd. electrolytic filter condenser	.75
A-509	Six gang trimmer condenser unit	.60
A-510	Dual padder condensers	.45
D-20	Six inch dynamic speaker for Model 105	4.85
D-21	Eight inch dynamic speaker for Model 1050	5.60
E-114	Large tuning knob	.15
E-115	Small knob with gold line	.15
E-116	Large knob with gold line	.15
E-257	Dial assembly	1.85
E-405	Pilot lamps, 3.8 volts for series connection	.15
E-460	Antenna and ground binding post strip	.20
E-467	Wave band switch (3 position)	1.25
E-471	Wave band switch (4 position, export models)	1.35
E-472	Pilot lamps, 6-8 volt for parallel connection	.15
H-17	6A7 tube socket	.10
H-19	6D6 tube socket	.10
H-26	76 tube socket	.10
H-29	85 tube socket	.10
H-36	42 tube socket	.10
H-40	80 tube socket	.10
H-44	Speaker connection socket	.10
R-114	Tone control with power switch, 50M ohms	.70
R-115	Volume control, 500M ohms	.50
R-210	5M ohm carbon resistor, 1/3 Watt	.20
R-229	850 ohm carbon resistor, ½ Watt	.20
R-257	50M ohm carbon resistor, 1/3 Watt	.20
R-258	1 megohm carbon resistor, 1/3 Watt	.20
R-264	100M ohm carbon resistor, 1/3 Watt	.20
R-274	25M ohm carbon resistor, 1/3 Watt	.20
R-313	Candohm resistor, 20M ohm-15M ohm-30M ohm	.50
R-314	Candohm resistor, 200 ohm-300 ohm	.25
S-102	Goat tube shield	.15
S-116	Coil shield	.15
T-112	Power transformer	2.75
T-321A	1st IF transformer	1.25
T-322A	2nd IF transformer	1.25
T-466A	Antenna coil assembly	1.50
T-467A	Oscillator coil assembly	1.50
T-468A	Long wave antenna coil (export models only)	.70
T-469A	Long wave oscillator coil (export models only)	.70
T-501	Power transformer (export models only)	6.35
U-118	A.C. power cord and plug	.30
X-335	Model 105 cabinet	9.50
X-336	Model 1050 cabinet	25.75

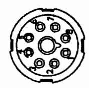
Prices subject to change without notice

ALWAYS ORDER BY PART NUMBER

INTERNATIONAL RADIO CORP.

MODELS 120,1200,2200
Schematic, Trimmers
Voltage

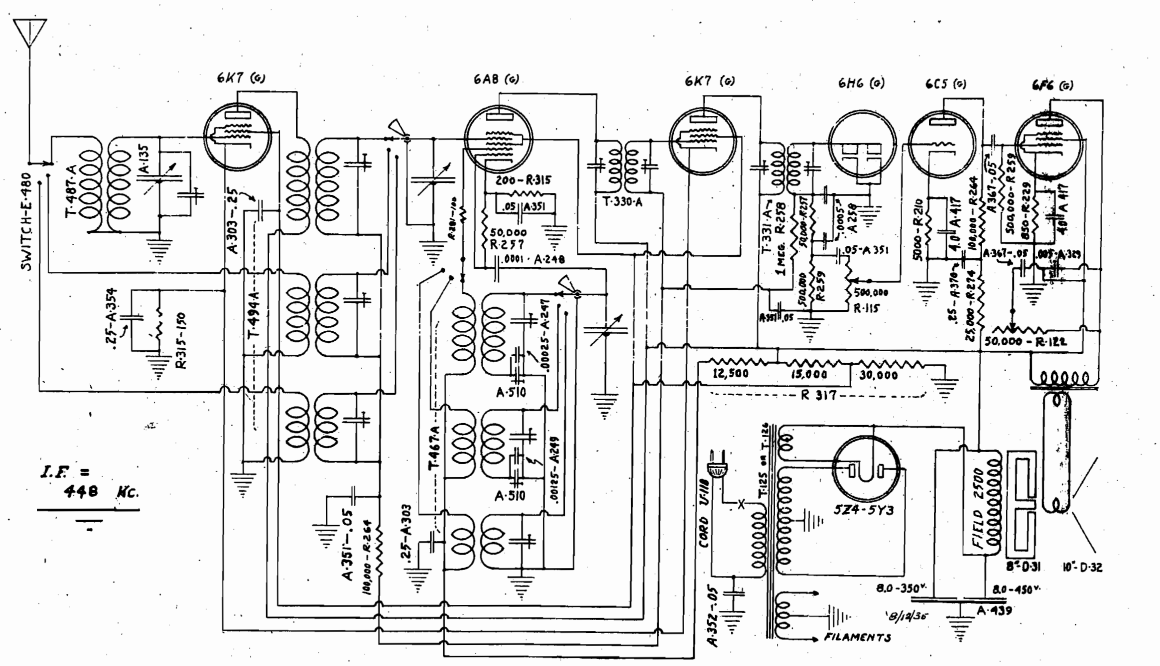




Bottom View of Socket. VOLTAGES SHOWN ARE FROM TUBE PINS TO GROUND

	Position	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
6K7	R. F.	Shell	HTR.	210	80	1.5	—	HTR.	1.5
6A8	Det.-Osc.	Shell	HTR.	210	80	0	150	HTR.	1.5
6K7	I. F.	Shell	HTR.	210	80	1.5	—	HTR.	1.5
6H6	2nd Det.	Shell	HTR.	0	0	0	—	HTR.	0
6C5	1st A.F.	Shell	HTR.	80	—	0	—	HTR.	3
6F6	2nd A.F.	Shell	HTR.	200	210	0	—	HTR.	15
5Z3	Rect.	Shell	345	—	A.C.	—	A.C.	—	345

Line 118 Volts. Switch on Broadcast Position. Volume Control Full On. 10% Variation Allowable.



MODELS 120,1200
2200
Alignment,Parts

INTERNATIONAL RADIO CORP.

This chassis is designed to operate from 115 volt, 60 cycle, alternating current power lines. It is a three band receiver covering the American broadcast, police and airport, and Foreign short wave bands.

The following tubes are employed:

6K7 (metal) or 6K7G (glass) R.F. amplifier
6A8 (metal) or 6A8G (glass) 1st Detector-Oscillator
6K7 (metal) or 6K7G (glass) I.F. amplifier
6H6 (metal) or 6H6G (glass) Diode detector
6C5 (metal) or 6C5G (glass) A.F. amplifier
6F6 (metal) or 6F6G (glass) Pentode output
5Z4 (metal) or 5Y3 (glass) Rectifier

The metal and glass tubes are interchangeable but when changing from one type to the other it is advisable to realign for perfect resonance. Glass counterpart types should be shielded, the metal tubes need not be. Shielding provisions are provided.

ALIGNMENT

The standard type of output meter should be used to indicate signal strength. It should be connected from the plate (pin No. 3) of the 6F6 to ground. Tone control should be turned "high". The signal from the signal generator *must be kept at a very low level.*

Essential Data: The intermediate frequency employed is 448 Kc. On the broadcast and middle bands the oscillator frequency is 448 kilocycles higher than the signal frequency. On the short wave band it is 448 kilocycles lower than the signal frequency.

Aligning should be done on the following frequencies: Broadcast band, 1400 and 600 Kc.; Middle band, 6000 and 2400 Kc.; Short wave band 15 megacycles.

In aligning on broadcast band it is permissible to bend plates on the *R. F. section only* of the three gang condenser. Do not bend plates when aligning the middle and short wave bands.

The front section of the three gang condenser is the oscillator section; the middle section, first detector; the rear section, R.F. amplifier. The R.F. amplifier is in circuit only on the broadcast band.

Intermediates: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Short out the oscillator section of the three gang condenser. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I.F. transformer. If adjustments are not made accurately, selectivity will be poor and I.F. oscillation may result.

Broadcast Band: Place the band change switch on Broadcast position. Turn the dial to 1400 Kc. and feed a *very weak* 1400 Kc. modulated signal from your signal generator to the antenna. Adjust the Broadcast oscillator trimmer (see sketch) and R.F. stage trimmer (on condenser gang) for maximum reading. Although a trimmer is provided for the Broadcast detector coil it will be found not connected on many sets as it is not necessary in obtaining correct balance.

Turn dial and signal generator to 600 Kc. and rock the padder into correct adjustment. This is accomplished by very slowly adjusting the padder condenser and at the same time turning the dial slightly back and forth across 600 Kc. until an adjustment is obtained producing maximum output. Go back to 1400 Kc. and readjust the oscillator trimmer slightly if necessary. Then recheck padder at 600 Kc. It is permissible to bend plates on the R.F. section only in resonating circuits.

Middle Band: Turn the band change switch to the middle position and tune radio and signal generator to 6000 Kc. Adjust the oscillator trimmer and then the detector trimmer for maximum output.

Rock in the padder condenser at 2400 Kc. Then recheck at 6000 Kc. and 2400 Kc.

Short Wave Band: Turn band change switch to short wave band. Tune radio and signal generator to 15 megacycles and adjust trimmers. No padder condenser is used on the short wave band so no other adjustments are necessary. On this band the oscillator frequency is 448 Kc. lower than the signal frequency.

MICROPHONIC HOWL

The tuning condenser is cushion mounted to eliminate vibration. Do not allow the dial to touch the escutcheon plate on the cabinet or a microphonic condition will be created.

LONG WAVE-EXPORT MODELS

These models are also built with a four position switch (part number E-482) and an extra set of coils tuning the foreign long wave band. The order of band change switch positions is broadcast, midband, short wave, long wave band. Alignment—adjust long wave trimmers at 350 Kc. and rock in long wave padder at 160 Kc. See sketch for location of coils and condensers.

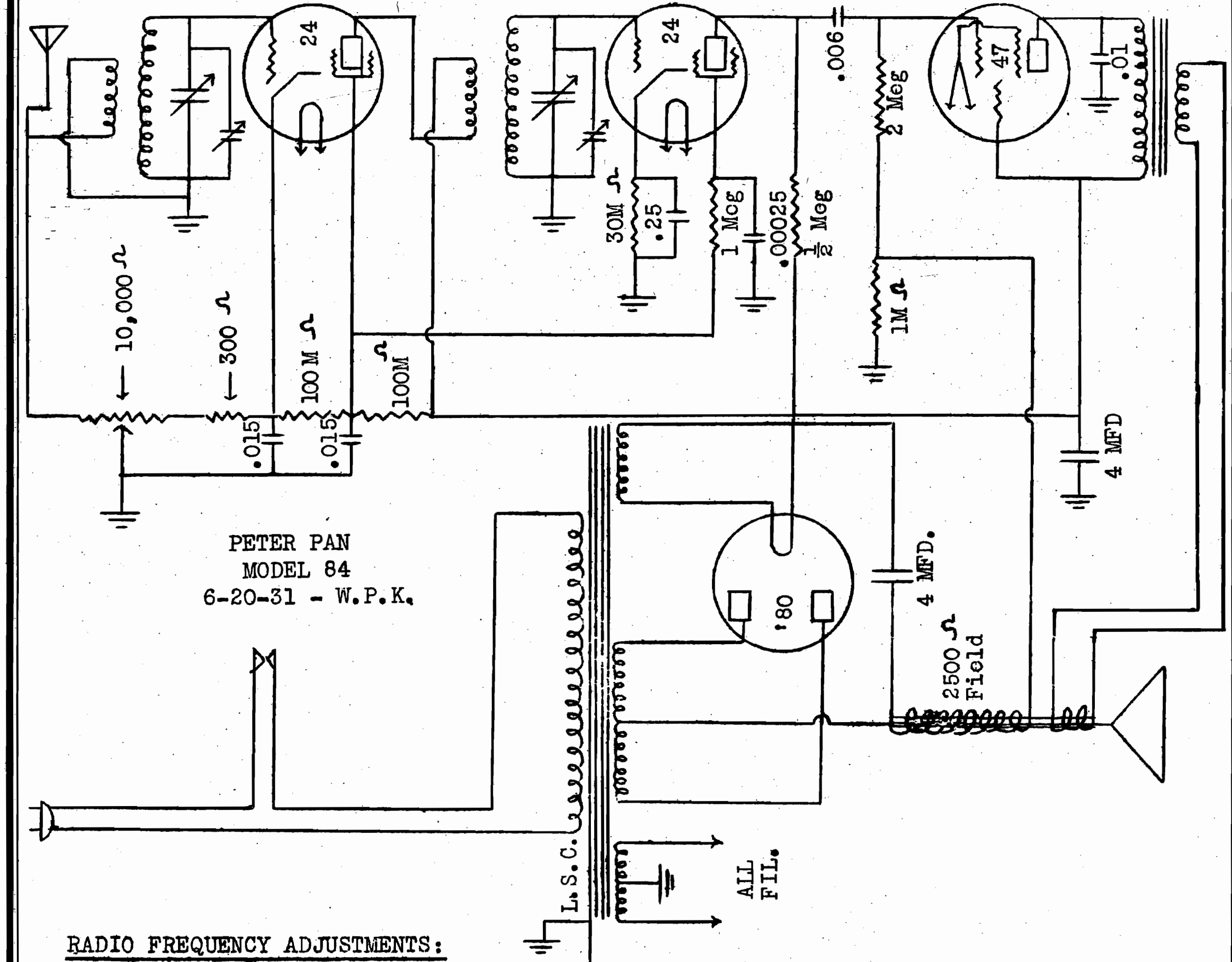
Some export sets also contain a 25 cycle power transformer (part number T-502) which has a tapped primary winding allowing operation from 125, 150 or 250 volt A.C. power lines. The tap switch is made available by removing part of the cover of the power transformer. 25 cycle sets may be used on 60 cycle although the converse is not true.

PARTS LIST

Part No.	Description	
A-135	3 gang tuning condenser	$2.80
A-247	.00025 mf. mica condenser	.20
A-248	.001 mf. mica condenser	.20
A-249	.00125 mf. mica condenser	.20
A-258	.0005 mf. mica condenser	.20
A-303	.25 mf., 200 v. paper cond	.20
A-329	.005 mf., 600 v. paper cond	.15
A-351	.05 mf., 200 v. paper cond	.15
A-352	.05 mf., 300 v. paper cond	.15
A-354	.25 mf., 25 v. paper cond	.20
A-367	.05 mf., 400 v. paper cond	.15
A-370	.25 mf., 300 v. paper cond	.20
A-417	5 mf., 25 v. electrolytic cond	.55
A-439	Electrolytic filter condenser	1.30
A-509	6 gang trimmer condenser	.55
A-510	Dual padder condenser	.45
A-515	Single padder (long wave Mod.	.25
A-527	Dual trimmer condenser	.20
D-31	8 inch Dynamic speaker #120	4.50
D-32	10 inch Dynamic speaker	7.50
E-154	Duo dial knob	.20
E-155	1 inch knob	.15
E-156	13/16 inch knob	.15
E-159	1 inch knob with colored dots	.20
E-266	Dial assembly	2.50
E-272	Dial assembly (long wave models	2.50
E-460	Antenna-ground binding post strip	.10
E-472	Pilot lamps, 6-8 volt	.15
E-480	3 position band change switch	1.00
E-482	4 position band change switch	1.50
H-49	6A8 tube socket	.10
H-50	6C5 tube socket	.10
H-52	6H6 tube socket	.10
H-54	6K7 tube socket	.10
H-56	6F6 tube socket	.10
H-57	5Z4 tube socket	.10
R-115	Volume control	.55
R-122	Tone control with power switch	.70
R-210	5M ohm, 1/3 w. carbon resistor	.20
R-229	850 ohm, 1/2 w. carbon res	.20
R-257	50M ohm, 1/3 w. carbon res	.20
R-258	1 megohm, 1/3 w. carbon res	.20
R-259	500M ohm, 1/3 w. carbon res	.20
R-264	100M ohm, 1/3 w. carbon resis	.20
R-274	25M ohm, 1/3 w. carbon resistor	.20
R-281	100 ohm, 1/3 w. carbon resistor	.20
R-315	Candohm resistor 150-200 ohms	.25
R-317	Candohm resistor, 12,500-15M-30	.55
S-102	Goat tube shield	.10
T-126	Power transformer (60 cycle)	2.50
T-330A	1st I.F. transformer	1.25
T-331A	2nd I.F. transformer	1.25
T-467A	Oscillator coil	1.75
T-468A	L. W. Detector coil (long w.m.	.85
T-469A	L. W. Oscillator coil (long w.	.85
T-487A	Antenna coil	1.00
T-494A	Detector coil	1.75
T-502	Power transformer, 25~ export	6.50
U-118	A.C. cord and plug	.30
U-206	4 wire speaker cable	.20

MODEL 84
Schematic
Voltage, Alignment

JACKSON-BELL CO., LTD.



RADIO FREQUENCY ADJUSTMENTS:

Should it become necessary to resonate the radio frequency circuit, proceed as follows:

Set the tuning dial to read about 5° - then with a modulated oscillator and output meter (or a grid dip meter) resonate the two circuits at this point by means of the trimmer condensers on the main tuning condenser, then check for resonance at the end of each split plate in the condenser, bending plates where necessary. When properly resonated, and using about 50 feet of antenna, the set should oscillate, with volume control at maximum, up to 700 kilocycles.

VOLTAGE AND CURRENT VALUES

With the volume control at maximum, the following readings should be obtained, with an allowable 10% variation:-

Detector Plate Current	0.15 M.A.	Line Voltage	110 V.
Pentode Plate Voltage	190 V.	R.F. Plate Voltage	200 V.
Pentode Screen Voltage	200 V.	R.F. Screen Voltage	60 V. *
Pentode Grid Voltage	13 V.	R.F. Cathode Bias	1.5 V.
Pentode Plate Current	24.0 M.A.	R.F. Plate Current	2.2 M.A.
R.F. Filament	2.2 V.	Detector Plate Voltage	80 V.
Detector Filament	2.2 V.	Detector Screen Voltage	60 V.
Pentode Filament	2.2 V.	Detector Cathode	5 V.
Rectifier Filament	4.1 V.		

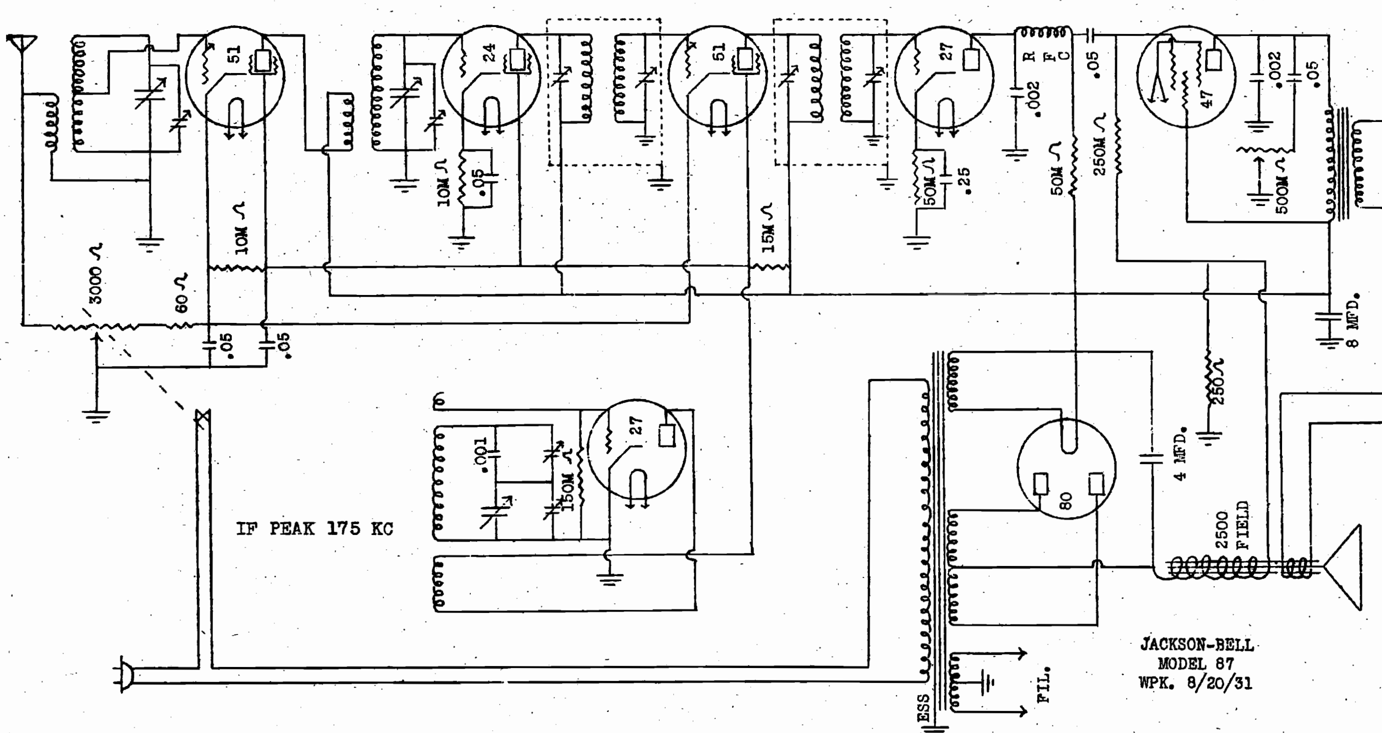
*These readings made with the 300,000 ohm voltmeter in a Jewel 199 Set Analyzer are not true readings, due to the high resistances in the receiver circuit.

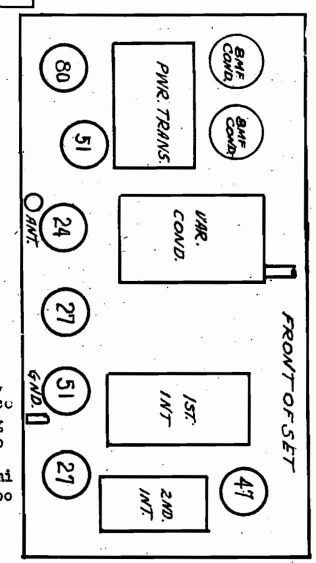
MODEL 87
Schematic, Socket
Voltage, Alignment

JACKSON-BELL CO., LTD.

RESISTOR CODE

60	OHM	WIRE WOUND
250	"	100 M.A.
10M	"	BROWN, ORANGE, BLACK END
15M	"	" " GREEN "
50M	"	GREEN, " BLACK "
150M	"	BROWN, GREEN, YELLOW "
250M	"	RED, " " "





CIRCUIT ALIGNMENT:

The first step in alignment of the receiver is to align the intermediate amplifier. This must be done with a test oscillator set at exactly 175 kilocycles, and an output indicating device. Remove the oscillator tube from the receiver and connect the test oscillator to the grid of the first detector tube. The trimming condensers for the intermediate circuit are adjusted by means of the screws accessible thru the holes in the sides of the intermediate transformer shield covers. The volume control should be in the maximum or full-on position. Rotate the adjusting screws until maximum response is shown in the output meter.

ALIGNMENT OF THE SIGNAL FREQUENCY CIRCUIT:

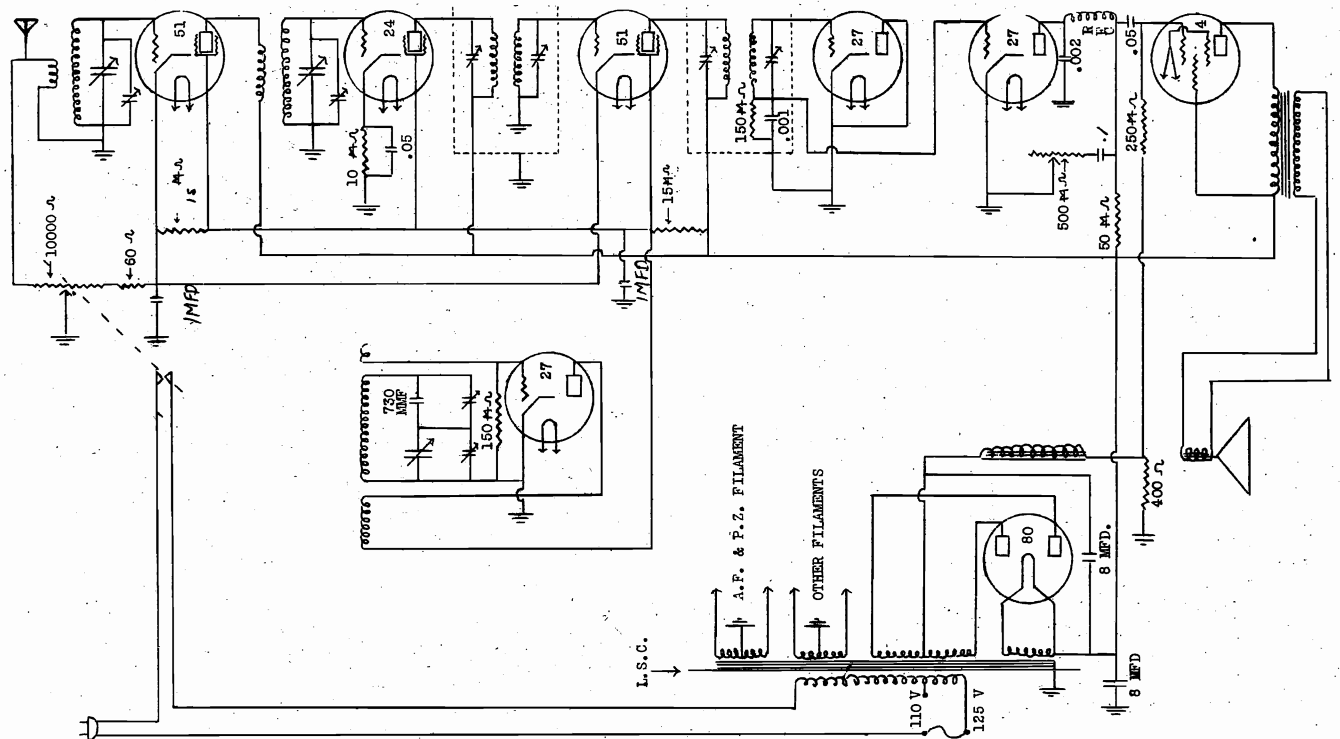
For this operation, a modulated test oscillator covering the broadcast band is required, or stations of known frequency may be used. In order to properly resonate the signal frequency circuit of this receiver, turn the dial to some known frequency on the high end of the band, adjust the oscillator trimming condenser of the tuning condenser, until the greatest response is shown in the output meter. Then adjust the first detector section and next the first R.F. circuit section of the tuning condenser. Now move up to the next known frequency, preferably located at the next split section of the condenser. The alignment from here on is accomplished by bending the split sections of the condenser plates to give the maximum alignment indicated by the output meter. If condenser plates have to be bent apparently too much at the low end of the band, it is advisable to start at the beginning and compensate the difference by bending the plates on the high frequency end. Or, also by shifting the dial and re-aligning so as to eliminate unnecessary bending of the plates to get the proper alignment. It is not advisable to bend the plates in, especially in the oscillator section, as this may cause a microphonic howl in the receiver due to the vibration of those plates if too close together.

AVERAGE VOLTAGES & CURRENTS:

	FIL. VOLTS	PLATE VOLTS	SCREEN VOLTS	VOLUME CONTROL MAXIMUM GRID VOLTS	CATHODE VOLTS	PLATE CURRENT
R.F. Tubes	2.25	195.	95	0	1.5	3.25 MILLS
First Detector Tube	2.25	195.	95	0	3.	.5 "
First I.F. Tube	2.25	195.	95	0	1.5	3.25 "
Second Detector Tube	2.25	145.	--	0	12.5	.5 "
Oscillator Tube	2.25	65.	--	0	--	3. "
Output Tube	2.25	185.	195	11	--	24. "
Rectifier Tube	4.5	260.	--	--	--	45. "

MODEL 88
Schematic, Voltage
Alignment

JACKSON-BELL CO., LTD.



JACKSON-BELL SUPERHETERODYNE
MODEL 88 IMPROVED
W.P.K. 6/8/31

CHECK VOLTAGES WITH VOLUME CONTROL AT MAXIMUM

R-f.Plate	200 v.
R-f.Screen	75 v.
R-f.Cathode	1.5 v.
R-f. Filament	2 v.
I-f. Plate	200 v.
I-f. Screen	75 v.
I-f. Cathode	1.5 v.
I-f. Filament	2 v.
Detector Plate	0 v.
Detector Grid	.5 v.
Detector Cathode to Gnd.	0 v.
Detector Filament	2.25v.
Trans.Plate	200 v.
Trans. Screen	75 v.
Trans.Cathode	5.25 v.
Trans. Filament	2 v.
Osc. Plate	75 v.
Osc. Grid	.25 v.
Osc.Cathode to Gnd.	0 v.
1st A-f.Plate	40 v.
1st A-f. Grid	.5 v.
1st A-f. Cathode to Gnd.	0 v.
P.Z. or 47 Space Chg.Grid	200 v.
P.Z. or 47 Plate	195 v.
P.Z. or 47 Grid	16 v.
P.Z. or 47 Filament	2.25 v.
80 Filament	4.5 v.
80 Plate Drain per plate	25 m.a.

RADIO FREQUENCY CIRCUIT ADJUSTMENT:

The first operation in aligning the radio frequency circuit should be the tuning of the intermediate frequency transformers. First, remove the oscillator tube and connect a modulated oscillator tuned exactly to 175 kilocycles between the grid of the first detector and the chassis. Remove the first audio tube and insert an adapter in this socket with leads long enough so that the two may be placed in a position to make accessible the two holes in the I.F. transformer shield so that the adjusting screws may be turned. This adaptor need contain simply a five prong socket at one end, and a five prong plug at the other end with about six or eight inches of flexible wire connecting the two. The top condensor of the second I.F. transformer, which is the one behind the '27 first audio tube, will be broad and uncritical in its adjustment. The bottom condensor which is the primary, should be sharp. Both coils will peak, but a little juggling may be necessary as the coupling is so close that one condensor will tend to tune both coils, so it may be necessary to back up on one to make the other balance and then rebalance the other.

Repeat this operation with the other transformer located behind the Pentode tube and adjust all screws for maximum reading on an output meter, which should be connected when these adjustments are being made.

When the I.F. circuit has been accurately adjusted to 175 kilocycles, the oscillator tube should be replaced and a test modulated oscillator connected to the antenna terminal of the receiver. Factory alignment of these receivers is started at 1720 kilocycles, in order to be able to cover the bands used by police broadcast stations. Should the test oscillator reach this frequency, then the dial should be adjusted to about 3 when alignment is made at this point.

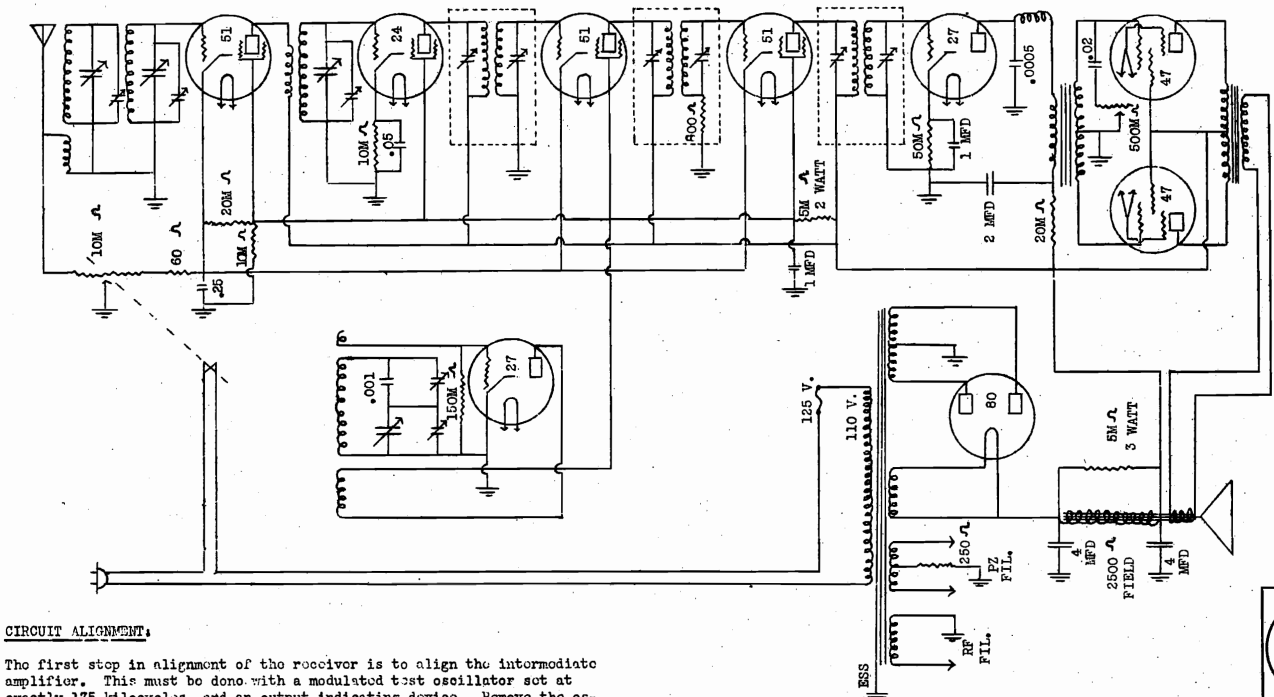
If unable to test at 1720 kilocycles, the first alignment operation may be made at 1500 kilocycles, with the dial set so that the 1500 kilocycle mark is directly above the center of the condenser shaft. With the dial set in the position corresponding to the highest frequency which is used in the preliminary alignment, rotate the compensator screw on the center section of the variable condenser until maximum response is noted in the output meter. This center section tunes the oscillator circuit. Without changing the adjustment of either the oscillator or the receiver dial, adjust the antenna compensator, (the one nearest the front of the chassis) for maximum response. This should then be followed by the first detector, and when resonance is approached with the first detector compensator, the main tuning dial of the receiver should be rocked back and forth slightly at the same time that the compensator is rotated slowly until the highest output indication is obtained.

Best results will be obtained when a dummy antenna is used between the oscillator and the receiver when the three gang condensor is being aligned. This can consist of a .00025 condenser, a 20 ohm resistor, and about 25 turns of small magnetic wire wound on a one inch form, carried in series between the antenna terminal of the receiver and the output terminal of the oscillator. The alignment operation may then be completed at the lower frequencies by the customary bending of the split rotor plates.

For aligning the oscillator circuit, at 550 kilocycles, the variable padding condenser located under the chassis and accessible thru a hole to the left of the center section of the tuning condenser should be used in preference to bending plates. This may be done immediately after the 1500 kilocycle alignment, and then the set should be re-checked at 1500 kilocycles, and alignment continued from that point back to 550.

MODEL 89-A
Schematic, Socket
Voltage, Alignment

JACKSON-BELL CO., LTD.

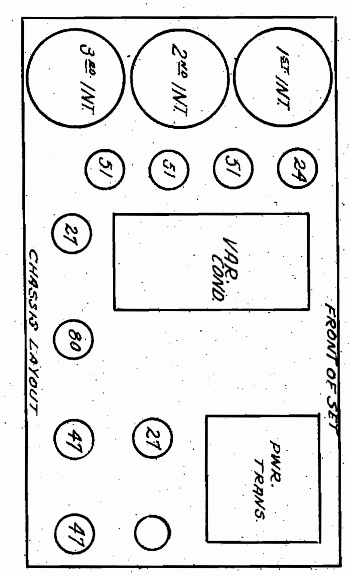


JACKSON-BELL SUPER
MODEL 89A
W.P.K. 6-15-31

IF PEAK 175 KC

RESISTOR CODE

60	OHM WIRE WOUND
250	" " " 100MA
5000	" GREEN, BLACK, RED DOT
10000	" BROWN, " ORANGE DOT
20000	" RED, " " "
50000	" GREEN, " " "
150000	" BROWN, GREEN, YELLOW "



CIRCUIT ALIGNMENT:

The first step in alignment of the receiver is to align the intermediate amplifier. This must be done with a modulated test oscillator set at exactly 175 kilocycles, and an output indicating device. Remove the oscillator tube from the receiver (see chassis drawing No. 1) and connect the test oscillator to the grid of the first detector tube. The six tuning condensers for the intermediate circuit are adjusted by means of the screws accessible thru the holes in the sides of the intermediate transformer shield covers. The volume control should be in the maximum or full-on position. Rotate the adjusting screws until maximum response is shown in the output meter.

Oscillation in the intermediate amplifier may be caused by:-

1) Open by-pass condensor.
2) Improper alignment.
3) Shorted suppressor resistor in the second intermediate transformer.
4) Defective tube.

ALIGNMENT OF THE SIGNAL FREQUENCY CIRCUIT:

For this operation, a modulated test oscillator covering the broadcast band is required. In order to properly resonate the signal frequency circuit of this receiver, the pre-selector and radio frequency amplifier circuits must be eliminated from the preliminary alignment operation, and a difference of 175 kilocycles must be established between the first detector and oscillator tuning condensers.

a) Short circuit that section of the main tuning condensor which is connected to the grid of the radio frequency amplifier tube. Couple the test oscillator to the first detector tube by placing the lead from the test oscillator near (but not touching) the grid terminal. Set the main tuning dial at 1500 kilocycles, and adjust the test oscillator to 1500 kilocycles.

b) Rotate the adjusting screws of the oscillator and first detector sections of the tuning condensor until maximum response is attained in the output meter.

c) Remove the short from the radio frequency amplifier section of the tuning condensor and connect the test oscillator to the antenna terminal of the receiver. Now adjust the compensating condensor for the band selector and radio frequency section to give maximum response.

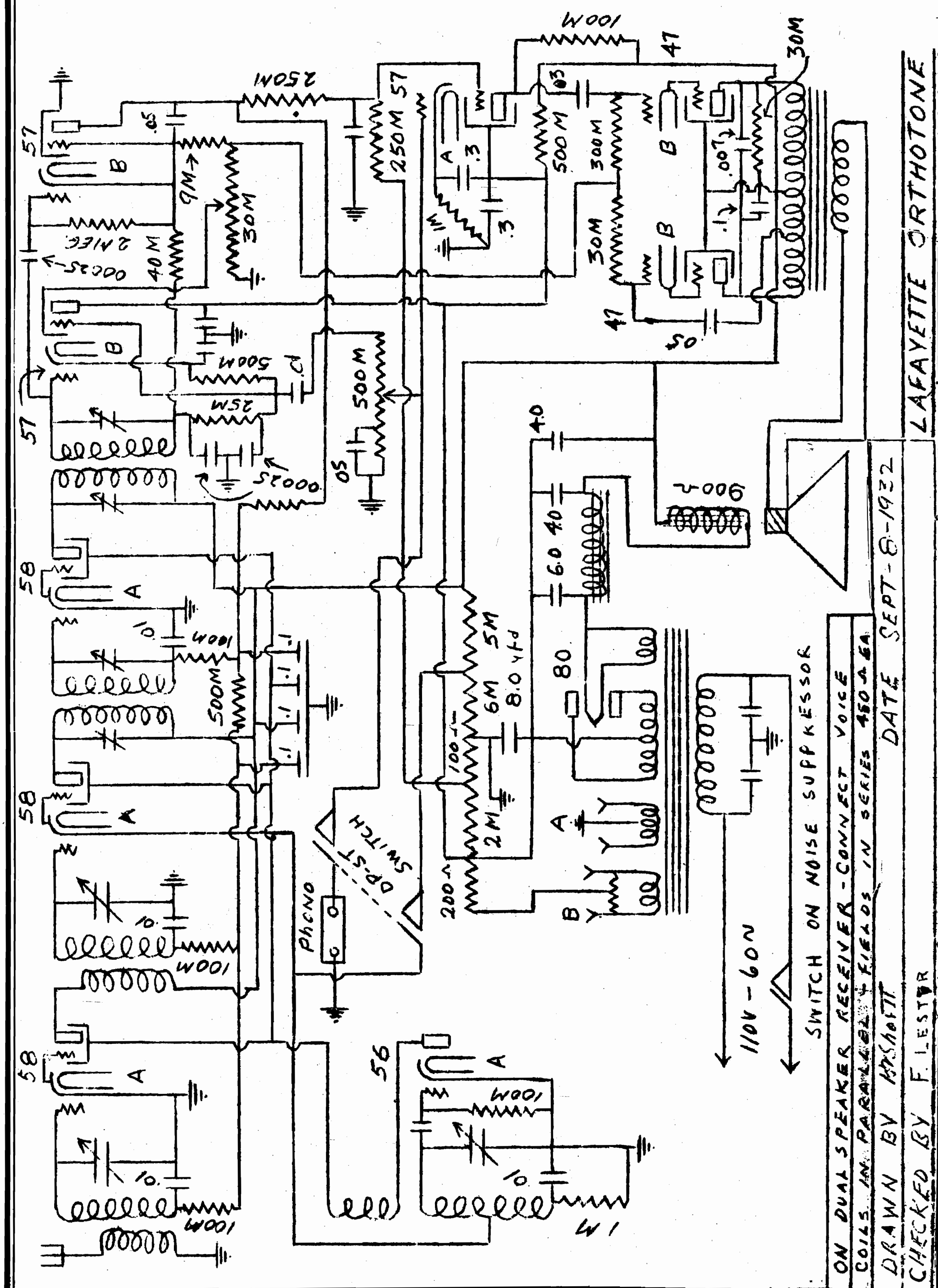
From this point on the alignment is the same as with a T.R.F. circuit, except the oscillator section. After bending the plates, where necessary, of the three signal frequency section of the tuning condensor for maximum response, bend the oscillator plate in and out while "rocking" the condensor shaft, and note for maximum response. It is recommended that a check of alignment be made at each split section of the rotor plates of the tuning condensor.

AVERAGE VOLTAGES & CURRENTS:

	FIL. VOLTS	PLATE VOLTS	SCREEN VOLTS	GRID VOLTS	CATHODE VOLTS	PLATE CURRENT
R.F. Amplifier Tube	2.3	200	100	0	2.0	3.5
First Detector Tube	2.3	200	100	0	4.0	.5 MA
First I. F. Tube	2.3	200	100	0	2.0	3.5
Second I. F. Tube	2.3	200	100	0	2.0	3.5
Second Detector Tube	2.3	180	---	-	8	.2 MA
Oscillator Tube	2.3	100	---	0	0	6 MA
Output Tube (1)	2.3	185	200	16	-	20 MA
Output Tube (2)	2.3	185	200	16	-	20 MA
Rectifier Tube	5.0	375	---	-	-	35 PER PLATE

LAFAYETTE RADIO MFG. CO.

MODEL Orthotone
Schematic



MODEL 10C10
Condenser Data, Notes
Parts (Early Model)

LAFAYETTE RADIO MFG. CO.

Bypass Condenser Block

The key number, capacity, and lead colors of the sections of the original bypass condenser block used in the early models are shown in the following list. The key numbers refer to Fig. 3.

Key No.	Capacity	Lead Color	Lead Color
C22	.5 mfd.	Yellow	Yellow
C16	.5 mfd.	Red	Common Black
C4	.5 mfd.	Blue	Common Black
C8	.5 mfd.	Brown	Common Black
C5	.1 mfd.	White, Green Tr.	Common Black
C2	.1 mfd.	White, Green Tr.	Common Black
C7	.1 mfd.	White, Red Tr.	Common Black
C6	.1 mfd.	Black, White Tr.	Black, White Tr.
C13	.1 mfd.	White	White

Referring to sections C6 and C13 in the above list, it will be noted that these have two leads each with the same color code. This was changed in a later model to one lead each, the other lead of each section being connected to the common black lead.

At a later date, two further changes in this condenser block were made. Section C6 which bypassed the grid return of the first I.F. tube to ground was discontinued and section C4 was changed to .25 mfd. These changes bring the block up to date.

The key numbers (C5, etc.) in the above description of the condenser block refer to the key numbers as shown in the schematic circuit diagram of the early chassis, Fig. 3. The key numbers of the condenser block as shown in the parts list in the foregoing service manual conform with the key numbers as shown in the schematic of the present chassis, Fig. 1. As explained at the beginning of this supplement, the two sets of key numbers do not coincide.

Resonance Meter

In the early model receivers, the resonance meter was in the plate lead of the R.F., first detector, and first I.F. tubes. In the present receivers the resonance meter is in the plate lead of the R.F. tube only. The meter is not the same in both cases.

Voltage Divider Resistor

In the early models a "Candohm" armored wire wound voltage divider resistor was used. This was replaced in the later models by a vitreous enamel voltage divider. It will be noted that there are ten lugs on the "Candohm" resistor while there are only six resistor sections, which would ordinarily call for seven lugs. The extra three lugs are blank lugs not connected with the resistance element and used for wiring purposes only. Starting with the high potential end of the resistor, the blank lugs are the second, fourth and ninth. In ordering a new voltage divider resistor for the ten tube chassis be sure to order the correct type.

Speaker

The early models in this series of receivers used a single speaker and not the dual speakers as mentioned in the foregoing manual. The single speaker field resistance is 450 ohms.

Supplementary Parts List for Early Models

The parts in this list replace the corresponding parts as shown in the parts list in the foregoing service manual.

Stock No.	Name
P-1363	Interstage Transformer Assembly
P-90954-B	250,000 ohm Resistor (R3, R4)
P-90956-A	30,000 ohm Resistor (R12)
P-90977-B	Tone Control and On-Off Switch (R14)
P-80867	.0005 mfd. Condenser (C14)
P-80861-B	Bypass Condenser Block
P-1367	Shielded 1st I.F. Transformer Assembly
P-1364	Shielded 2nd I.F. Transformer Assembly
P-1365	Shielded 3rd I.F. Transformers Assembly
P-1349	Resonance Meter
P-1366	Shielded Oscillator Unit Assembly
P-90974-C	"Candohm" Voltage Divider Resistor
*P-1351	Drive Bracket and Bearing Assembly
*P1197	Friction Drive Shaft Assembly
*P-1356	Dial Strip and Disc Assembly
*P-1177	Dial Light Bracket Assembly, less socket and bulb.

*Asterisk refers to friction drive parts used on early models.

LAFAYETTE RADIO MFG. CO.

MODEL 10C10 (Early)
Schematic, Data

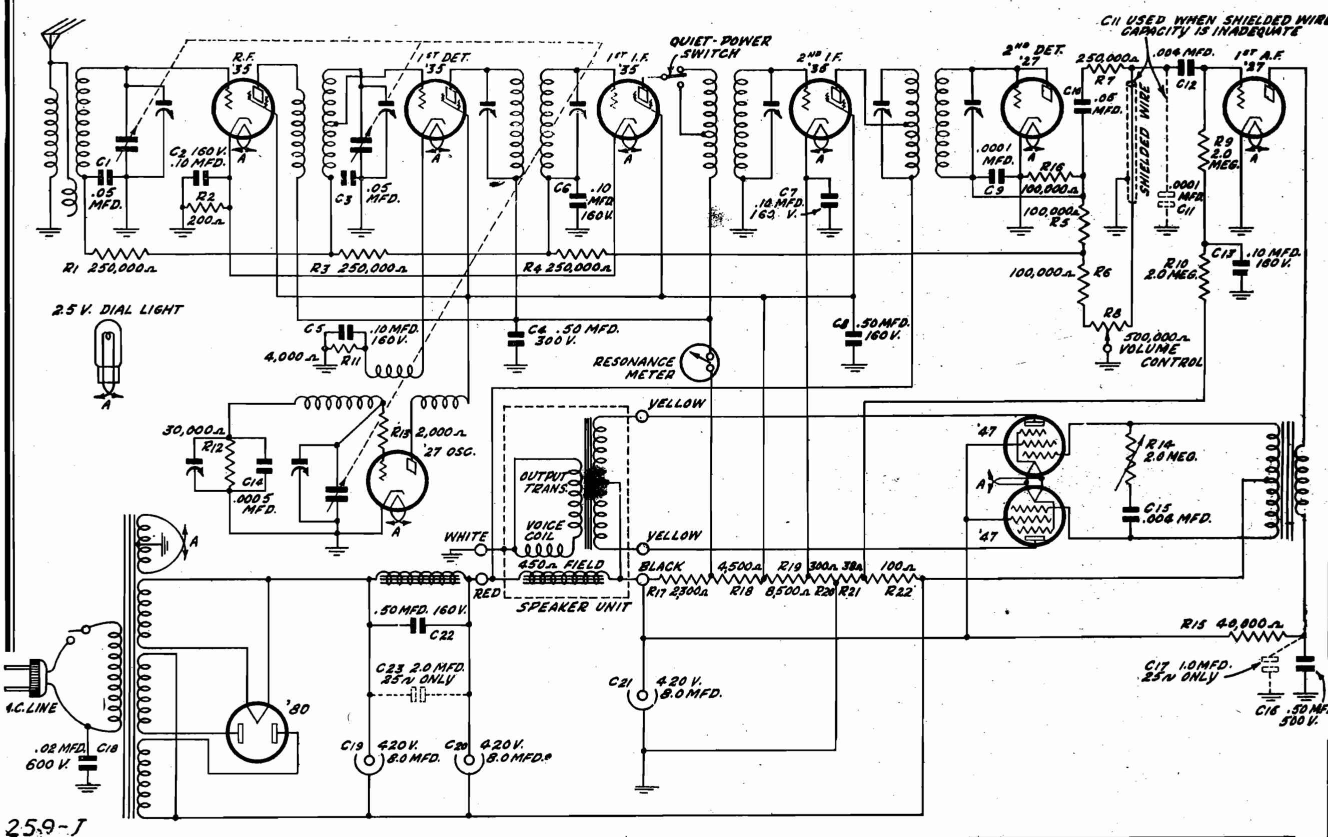


Fig. 3. Schematic Circuit Diagram of Early Model

Data on Earlier Models in This Series

The foregoing service manual describes the chassis of this series as it is manufactured at the present time. However, when the model was first brought out it was slightly different mechanically and electrically than the present model.

In this supplement, the changes of importance from a servicing standpoint from the first models to the present are discussed. This section should be gone over carefully by the service technician, as it is of importance both in servicing the set and when ordering replacement parts. The changes described were not all made at the same time. Investigation of the chassis will show which of the changes are incorporated. One way of eliminating error in replacing parts is to return the old part when ordering a new one.

Key Numbers

In Fig. 3 is shown the schematic circuit diagram of the original model. In the changes as described below, reference will be made both to this diagram and to the schematic circuit diagram of the present model Fig. 1. Note that the key numbers of the resistors and condensers in Figs. 1 and 3 do not coincide.

Interstage Transformer

The interstage R.F. transformer of the original sets contained a 250,000 ohm isolating resistor shown in Fig. 3 as R3. This is replaced by the present type of interstage R.F. transformer with no resistor.

Isolating Resistors

Isolating resistor R3, as shown in Fig. 3 is omitted and isolating resistor R4, 250,000 ohms, is changed in the later models to 500,000 ohms.

Tone Control and On-Off Switch

The early models in this series used a combination tone control and On-Off switch. In the later models these units are separate.

I.F. Transformer Assemblies

The old I.F. assemblies were in square cans and the condenser adjusting screws were reached from the top of the chassis. The new assemblies as used on the present models are in round cans and the adjusting screws are reached from the bottom of the chassis through holes in the sub-panel.

Oscillator Assembly

The oscillator assembly as used in the early models had the 600 K.C. tracking condenser in the same can as the balance of the assembly. In the new assembly as used in the present models, the 600 K.C. trimmer is mounted separately under the sub-panel. The adjusting screw for this condenser is reached from the top of the chassis. It is just in back of and to the side of the oscillator coil can.

Condenser C14, Fig. 3, .0005 mfd., is not used in the later models in which the afore-mentioned change in the oscillator assembly is made.

Resistor R12, 30,000 ohms, is changed to 40,000 ohms in the models in which the afore-mentioned oscillator assembly change is made.

MODEL 10C10
Alignment, Parts
Data

LAFAYETTE RADIO MFG. CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 175 K.C. and accurately calibrated signals over the broadcast band, and an output indicating meter are necessary. The procedure is as follows:

Set the signal generator for 175 K.C. Disconnect the grid cap from the first detector tube. Connect the antenna lead from the signal generator to the grid terminal of this tube. The ground lead goes to the ground connection. Then adjust the five intermediate frequency condensers for maximum output. The adjusting screws for these condensers are reached from the bottom of the chassis.

Next, set the signal generator for a signal of 1400 K.C. The input in this instance is made to the antenna lead of the receiver. Replace the grid cap on the first detector tube. Set the dial pointer on the 1400 K.C. mark on the dial scale and adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator trimmer first.

Then, set the signal generator for a signal of 600 K.C. The oscillator 600 K. C. trimmer condenser is underneath the chassis but the adjusting screw is reached from the top of the chassis and is adjacent to the oscillator coil can. Adjust this oscillator 600 K.C. trimmer condenser for maximum output, turning the rotor slowly back and forth over the 600 K.C. setting until highest output is obtained. A recheck may then be made of the alignment at 1400 K.C.

Replacing Rubber Drive

You will note that the Vernier tuning drive on this chassis uses a rubber pinion. Under normal operating conditions this rubber will last for a number of years. Should it become worn it can be readily replaced by loosening the set screw of the brass bushing located next to the rubber pinion and pulling out the station selector shaft. Place a new bushing in position, slip the station selector shaft in place and tighten the set screw.

Replacing R. F. Transformers and Oscillator Unit

The first and second R.F. transformers and oscillator assembly are matched. If one of these units is replaced, it is essential that the new one be of the correct value. At the bottom of the unit assembly a spot of paint will be seen. Be sure when ordering one of these assemblies to indicate in your order the color of the spot of paint.

Dual Speaker Connections

Two speakers are used in this model, one designed to give best response on the higher audio frequencies and the other designed to give best response on the lower frequencies. The fields of the two speakers are connected in series, and the voice coils in parallel. The resistance of the two fields in series is 450 ohms.

Part No.	Name
P-1464	'35 Tube Socket
P-1468	'47 Tube Socket
P-1474	'80 Tube Socket
P-1462	'27 Tube Socket
P-1422	Antenna Transformer Assembly (No Shield)
P-1423-A	Interstage Transformer Assembly (No Shield)
P-1400-A	Oscillator Unit Assembly (No Shield)
P-1433	Shielded 1st I. F. Transformer Assembly
P-1425	Shielded 2nd I. F. Transformer Assembly
P-1426	Shielded 3rd I. F. Transformer Assembly
P-50533	Pushpull Audio Input Transformer
P-20408	Tube Shield Base
P-1193	Laminated Phono Jack
P-50532	Power Transformer, 60 Cycle
P-50536	Power Transformer, 25 Cycle
P-5053	Power Transformer, 220 V., 40-60 Cycle
P-20461	Condenser Shield
P-1326	Aluminum Antenna Coil Shield with Bracket, (Rectangular)
P-1327	Aluminum Interstage Coil Shield with bracket (Rectangular)
P-70702	Attachment Cord and Plug
P-1355	Speaker Cable Terminal Strip
P-70716	Speaker Cable
P-1385-B	Oscillator 600 K. C. Trimmer Condenser
P-20406	Tube Shield
P-1273	Dial Light Bulb, 2.5 volts
P-1011	S. P. D. T. Switch (Quiet-Power or Phono)
P-1384	Resonance Meter
P-50534	Power Supply Choke
P-10180	Rubber Chassis Support (Large)
P-10181	Rubber Chassis Support (Small)
P-1146	Terminal Strip (Large)
P-1173	Terminal Strip (Small)
P-20422	Chassis Mounting Stud
P-20286	Resistor Spring Mtg. Bracket
P-1054	On-Off Toggle Switch
P-80889	3 Gang Condenser less drive for rubber pinion drive only
P-1383-B	Drive Bracket & Bearing Assembly.
P-30365	Bushing for rubber pinion
P-10182	Rubber pinion
P-20473	Drive Shaft
P-1394	Dial Strip & Bracket Assembly
P-1382	Drive Disc Hub & Fulcrum Assembly
P-1393	Indicator Assembly
P-80866	3 Gang Condenser less drive for friction drive models
*P-1128	Drive Bracket & Bearing Assembly
*P-1197-B	Friction Drive Shaft Assembly
*P-1340	Dial Strip
*P-20283	Dial Drum

*Asterisk refers to parts used on drum dial models.

RESISTORS

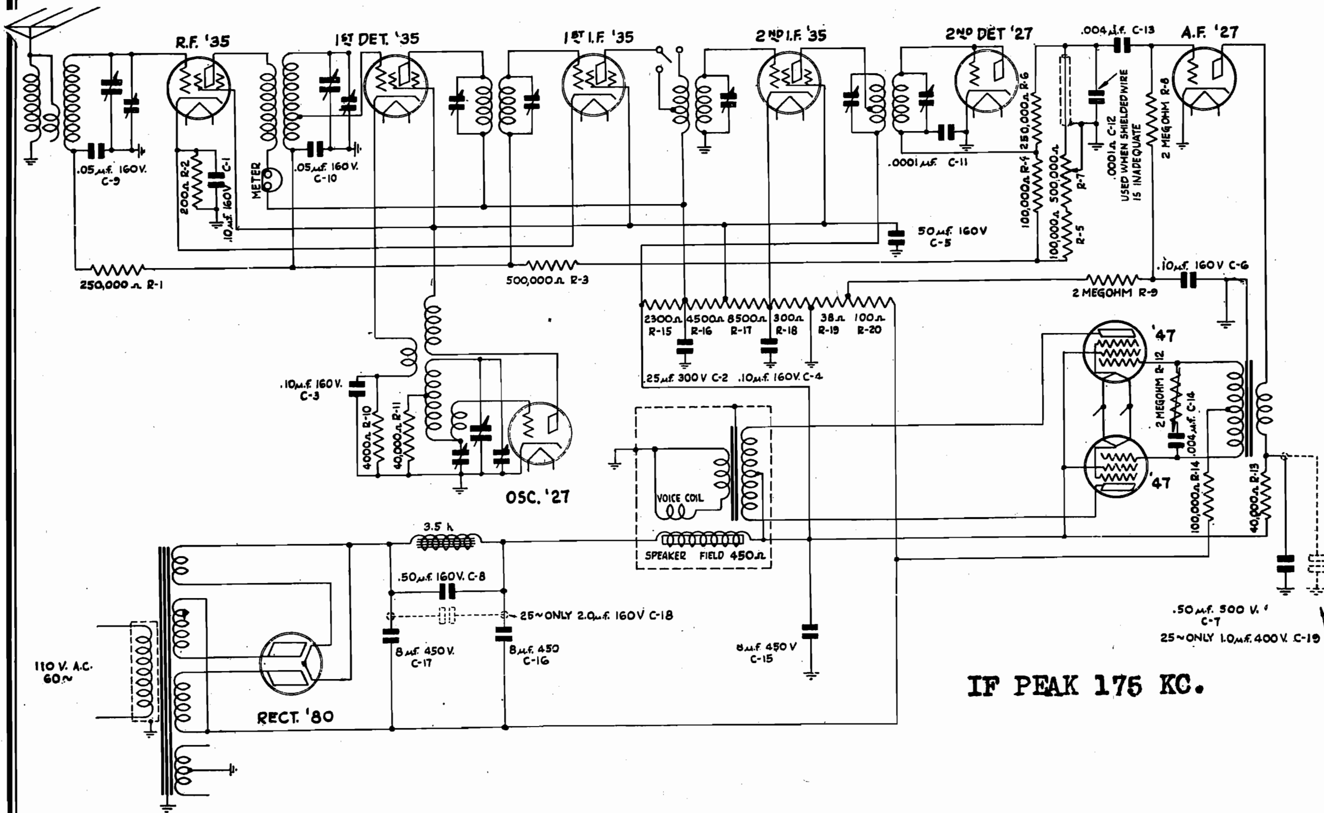
Part No.	Key No.	Resistance	Type
P-90954-B	R1	250,000	Carbon
P-90935-A	R2	200	Carbon
P-90938	R3	500,000	Carbon
P-90912-A	R4	100,000	Carbon
P-90912-A	R5	100,000	Carbon
P-90954-B	R6	250,000	Carbon
P-90980	R7	0—500,000	Volume Control
P-90923-A	R8	2 meg.	Carbon
P-90923-A	R9	2 meg.	Carbon
P-90947	R10	4,000	Carbon
P-90916	R11	40,000	Carbon
P-90986-B	R12	0—2 meg.	Tone Control
P-90945	R13	40,000	Carbon
P-90912-A	R14	100,000	Carbon
P-91000	R15	2,300	Vitreous Enamel Resistor
	R16	4,500	
	R17	8,500	
	R18	300	
	R19	38	
	R20	100	

CONDENSERS

Part No.	Key No.	Capacity	Type	Voltage Rating		
P-80862	C9	.05	Tubular	160 V.		
P-80862	C10	.05	Tubular	160 V.		
P-80865	C11	.0001	Molded			
P-80865	C12	.0001	Molded			
P-80863	C13	.004	Tubular			
P-80863	C14	.004	Tubular			
P-80901	C15	8.0	Electrolytic	450 V.		
P-80900	C16	8.0	Electrolytic	450 V.		
P-80900	C17	8.0	Electrolytic	450 V.		
P-80861-F (Block)	C1	.1	Block	160 V.	White, Green Tr.	Common Black Lead
	C2	.25		300 V.	Blue	
	C3	.1		160 V.	White, Green Tr.	
	C4	.1		160 V.	White, Red Tr.	
	C5	.5		160 V.	Brown	
	C6	.1		160 V.	White	
	C7	.5		500 V.	Red	
	C8	.5		160 V.	Yellow (2 Leads)	
P-80879	C18	2.0	Block	160 V.	25 cy. only	
	C19	1.0		400 V.	25 cy. only	

LAFAYETTE RADIO MFG. CO.

MODEL 10C10 (Late)
Schematic, Socket Voltage



IF PEAK 175 KC.

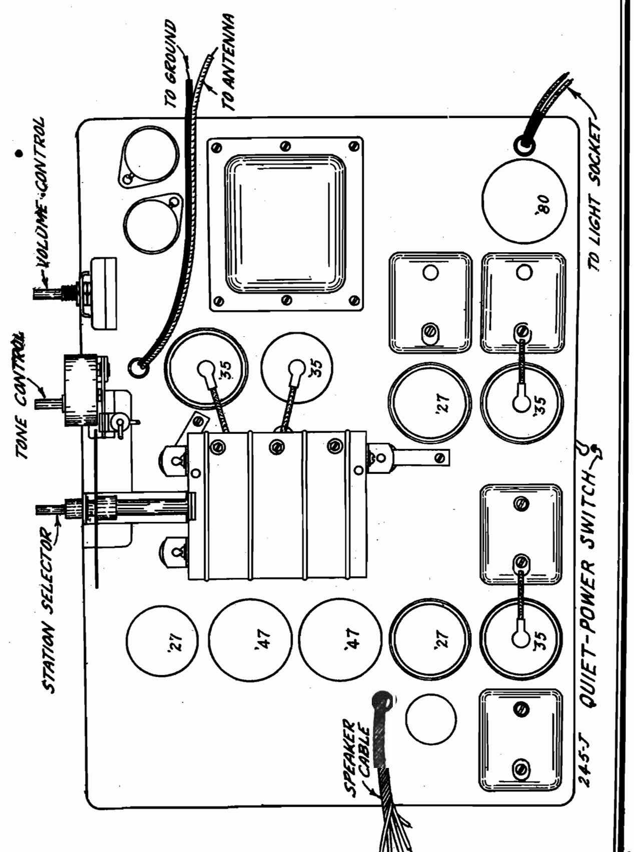
Voltages at Sockets

LINE VOLTAGE 115—VOLUME CONTROL AT MAXIMUM—SECOND DETECTOR TUBE REMOVED FROM SOCKET

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'35	R.F.	2.2	180	92	3(1)	6.2
'35	1st. Det.	2.2	178	85	10(1)	2.2
'27	Oscil.	2.2	94		6(2)	4.0(2)
'35	1st. I.F.	2.2	180	92	3(1)	6.0
'35	2nd. I.F.	2.2	260(5)	90	6	5.5
'27	1st. Audio	2.2	105		5(3)	4.2
'47	2nd. Audio	2.2	245	260	17(4)	31.
'80	Rect.	4.8	725 volts plate to plate			66 per plate

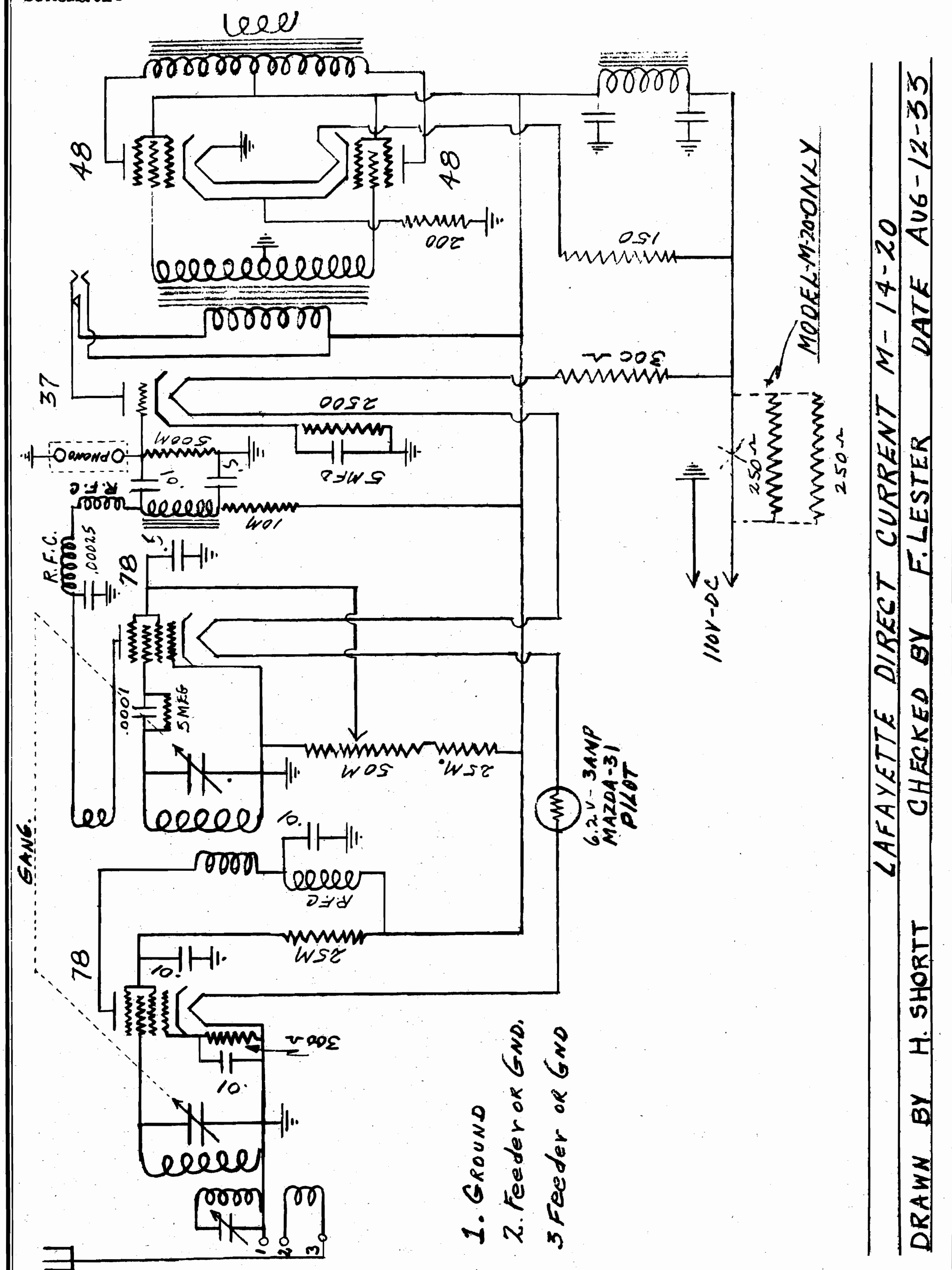
(1) Read from cathode to ground.
(2) Subject to variation with dial setting.
(3) Read across 38 ohm section of voltage divider resistor.
(4) Read across 38 and 100 ohm sections of voltage divider.
(5) Changes to 178 volts in latest models.

NOTE:—All readings, except heater, for second detector tube are zero.



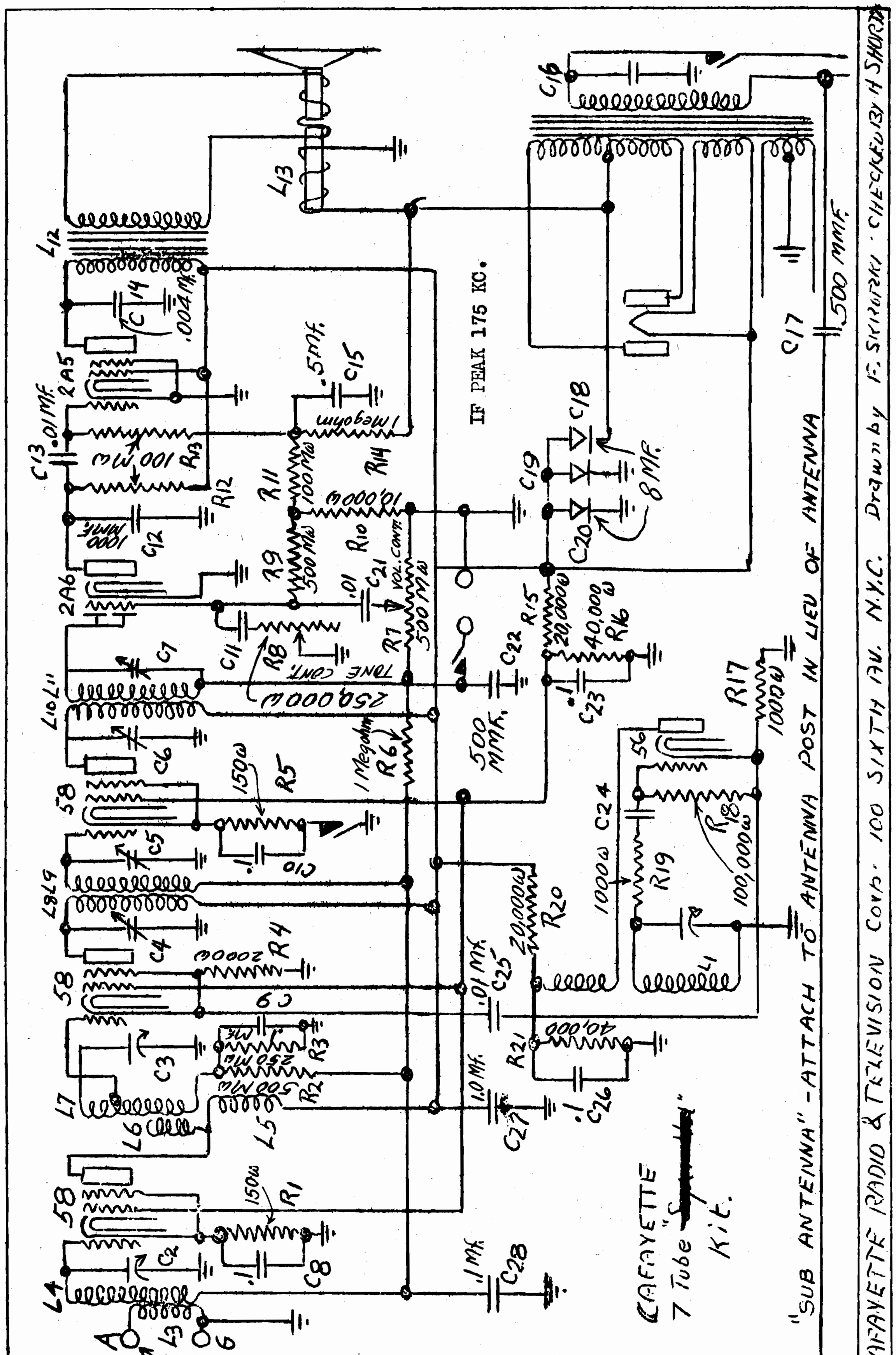
MODELS M-14-20
Schematic

LAFAYETTE RADIO MFG. CO



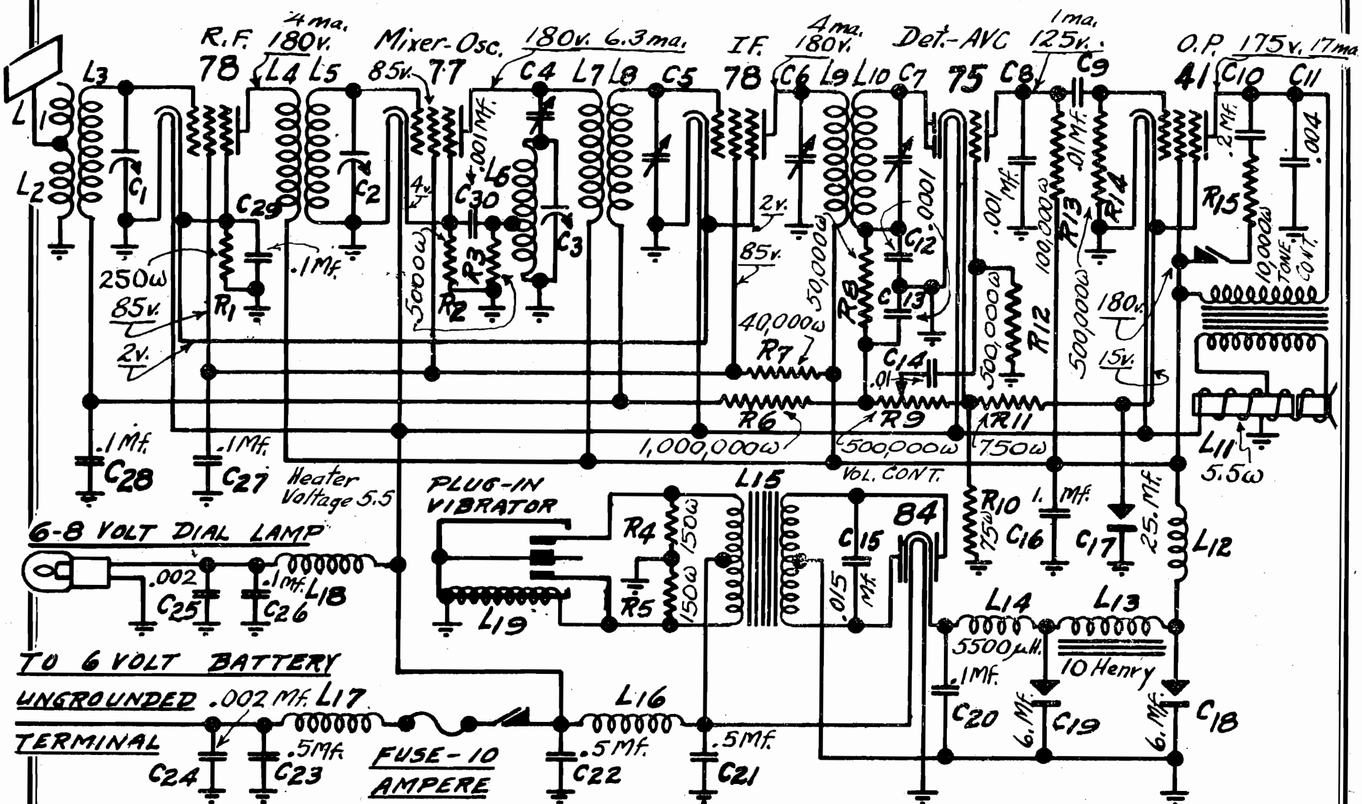
MODEL A-20
Schematic

LAFAYETTE RADIO MFG. CO.



MODEL AM-20
Schematic, Voltage
Alignment

LAFAYETTE RADIO MFG. CO.



The three R. F. trimming condensers are adjusted at 1400 K. C.. Proceed as follows: Procure a modulated oscillator giving a signal at 1400 K.C..

Remove the chassis from case, couple the output of the oscillator from antenna to ground, set the dial at 1400 and the oscillator at 1400 K.C..

Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is heard in the loudspeaker when the volume control is at its maximum position.

Then adjust the trimming condensers starting with C 3, C 2 and then C 1 until maximum output is obtained. Readjust a second time as there is a slight interlocking of adjustments.

A more accurate adjustment can be made with an output meter.

I. F. Adjustment:

The four I. F. trimming condensers are adjusted at 175 K.C.. Proceed as follows: Procure a modulated oscillator giving a signal at 175 K.C., a non-metallic screw driver and an output meter.

Connect the oscillator output between the first detector grid and ground. Connect output meter.

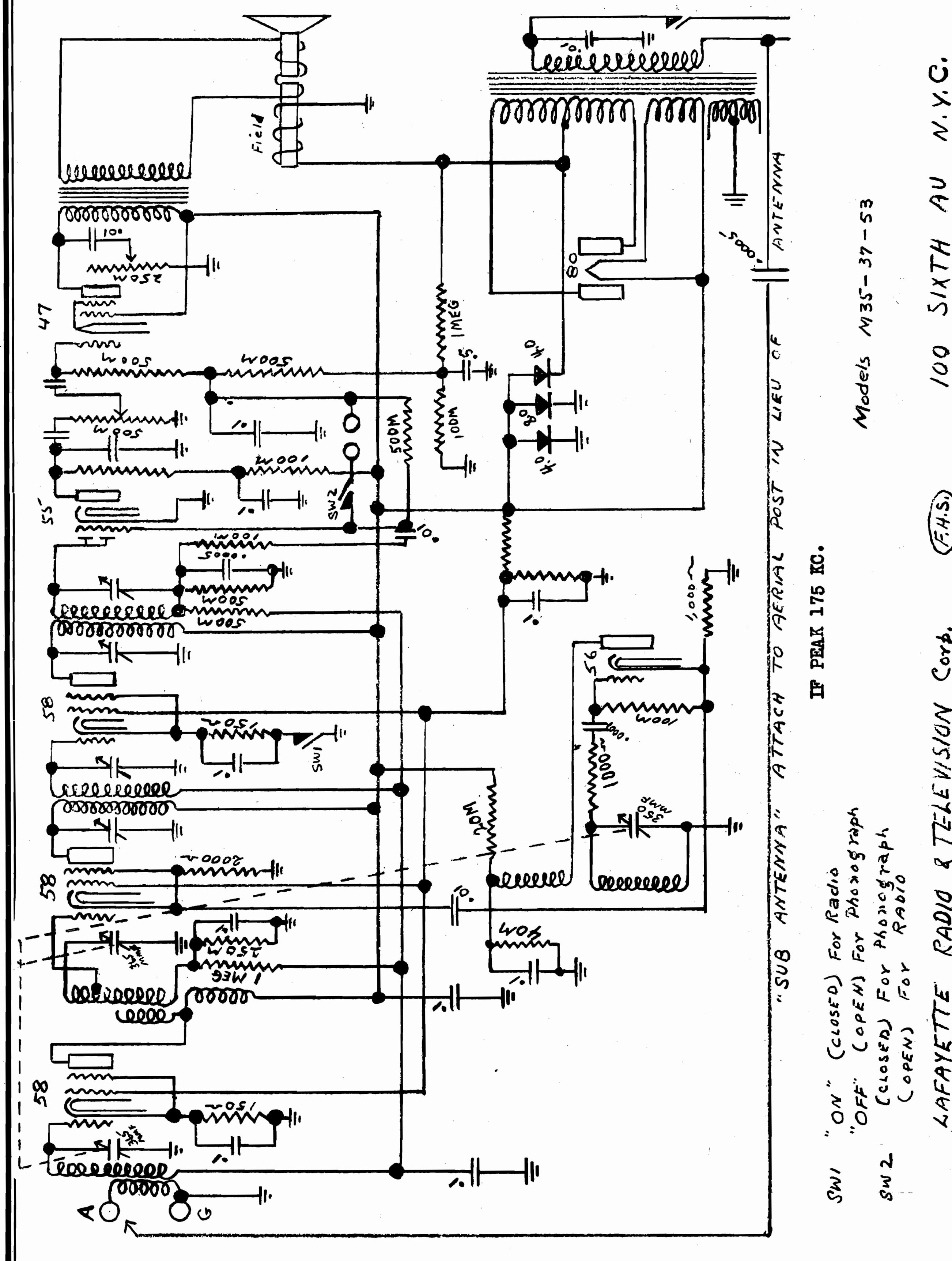
IF PEAK 175 KC.

Adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the oscillator output until a small deflection is obtained. Unless this is done the action of the AVC will make it impossible to obtain correct adjustments.

Trim in order C 4, C 5, C 6 and C 7, repeat adjustments and then follow with the R. F. adjustments.

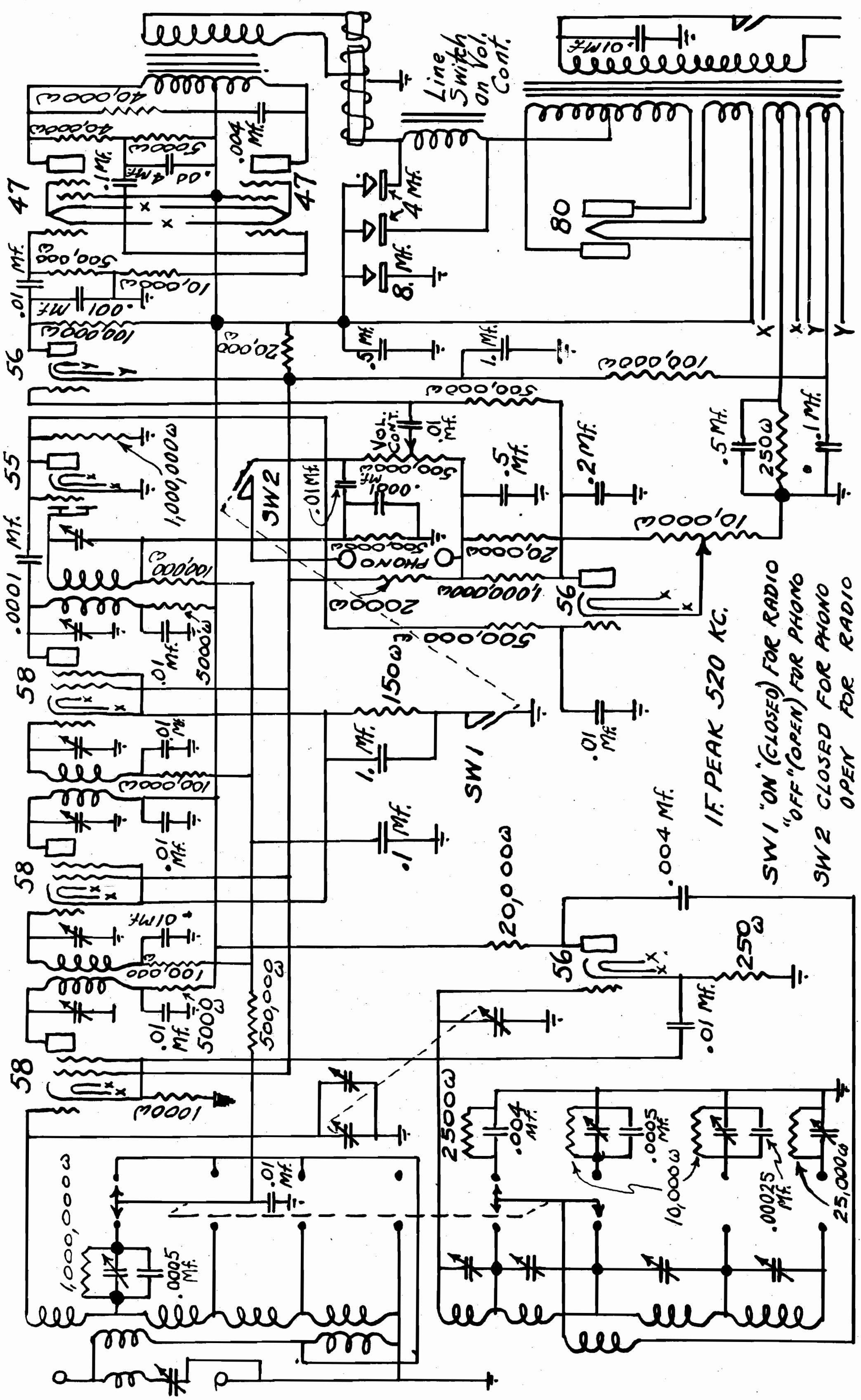
MODELS M-35,37,53
Schematic

LAFAYETTE RADIO MFG. CO.



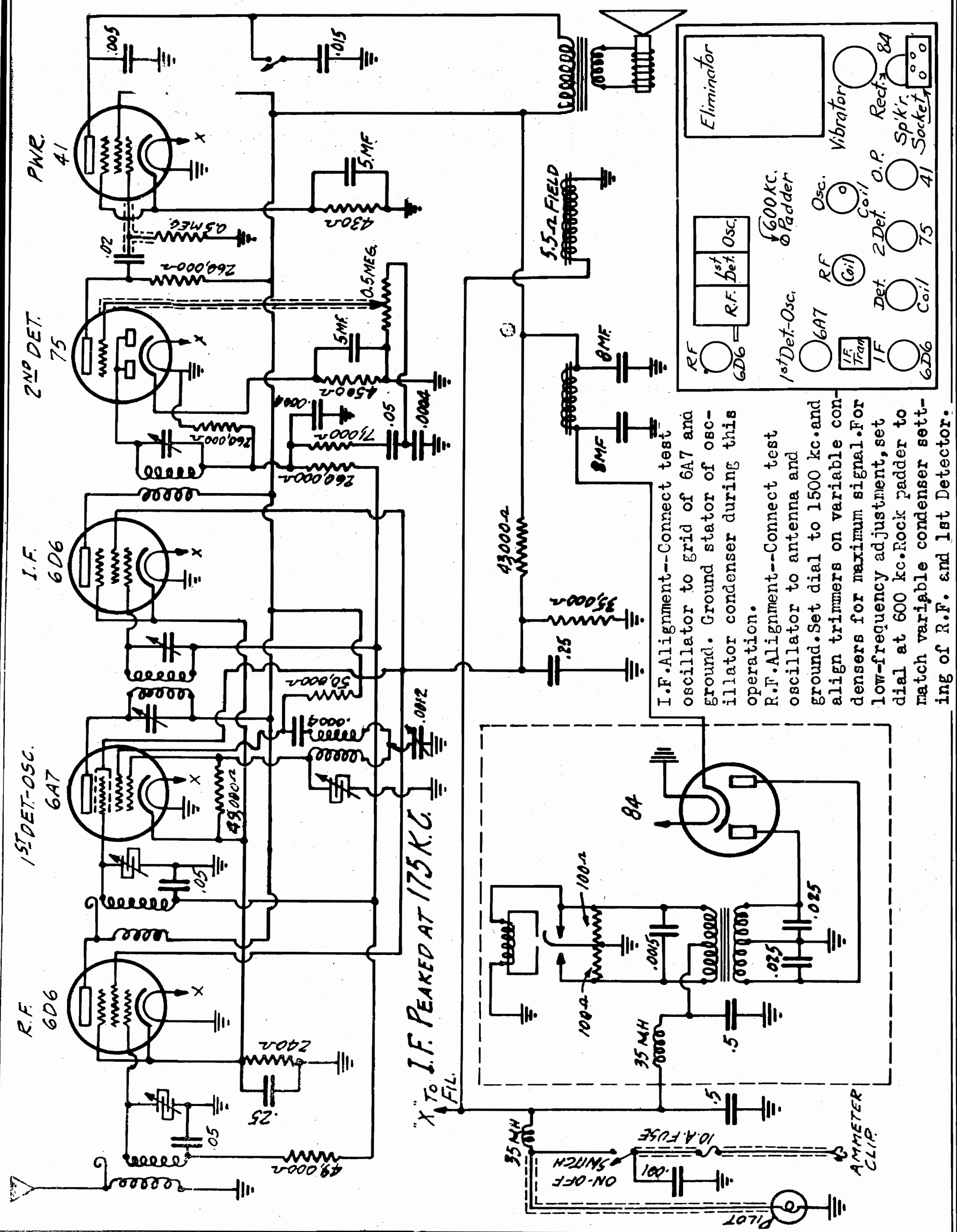
MODEL M-47
Schematic

LAFAYETTE RADIO MFG. CO.



LAFAYETTE RADIO & TELEVISION CORP.

MODEL C-60
Schematic
Socket, Alignment



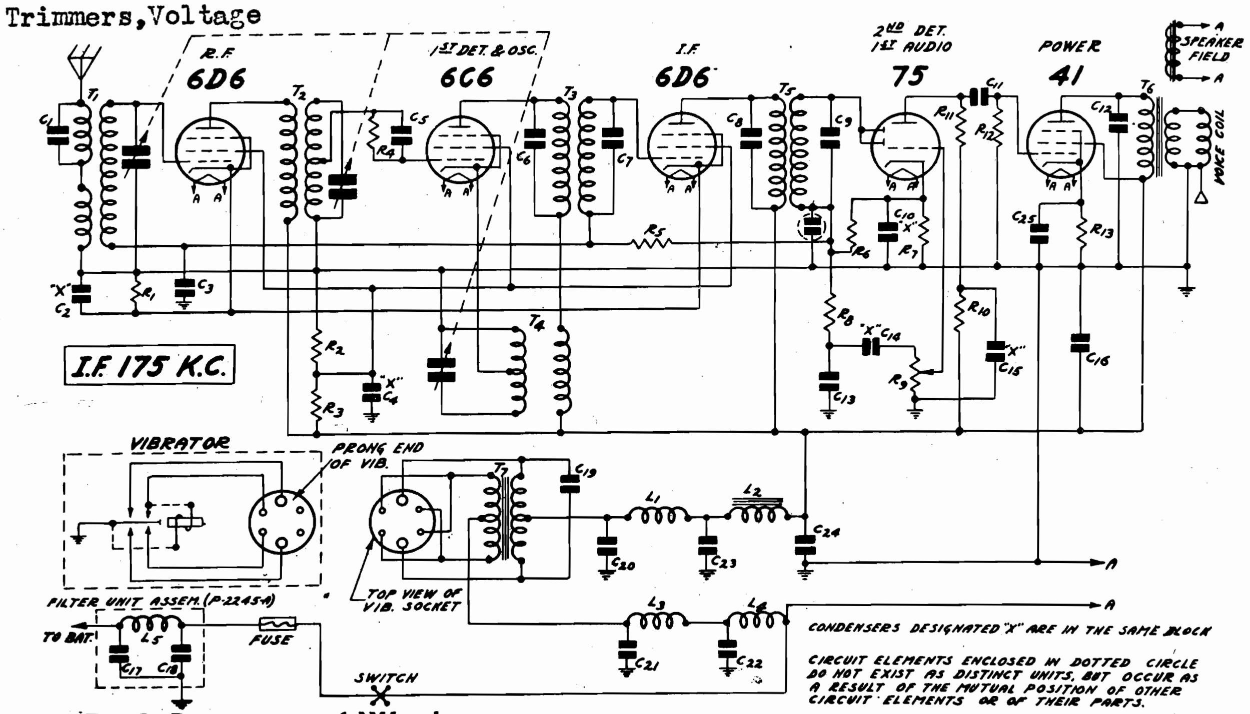
I.F.Alignment--Connect test oscillator to grid of 6A7 and ground. Ground stator of oscillator condenser during this operation.

R.F.Alignment--Connect test oscillator to antenna and ground.Set dial to 1500 kc.and align trimmers on variable condensers for maximum signal.For low-frequency adjustment,set dial at 600 kc.Rock padder to match variable condenser setting of R.F. and 1st Detector.

MODEL B-62
Schematic, Socket
Trimmers, Voltage

LAFAYETTE RADIO & TELEVISION CORP.

Resistance Test



CONDENSERS DESIGNATED "X" ARE IN THE SAME BLOCK

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLE DO NOT EXIST AS DISTINCT UNITS, BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR OF THEIR PARTS.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

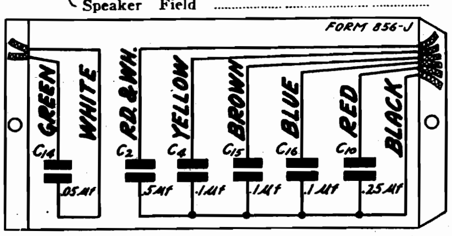
Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec.	T2	
	(Center Tap to Inside)		3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.		Part of Antenna Coil Assembly)
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.		Part of 2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	[In Choke Condenser Unit]
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500	Gang Condenser			

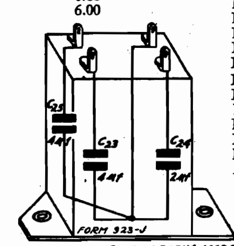
RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound



COND. C16 REMOVED FROM BLOCK IN LATER MODELS

Condenser Block Internal Wiring

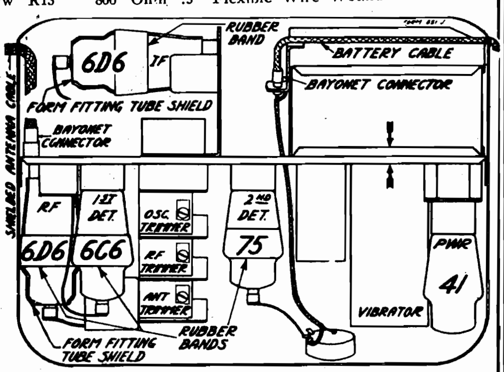


COND. C24 WAS 8 MF IN EARLY MODELS

Electrolytic Block Internal Wiring

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

VOLTAGES AT SOCKETS
Input 6.3 volts
Antenna disconnected at connector.



Location of Tubes and Vibrator

MODEL 80-M
2 Types
Schematics

LAFAYETTE RADIO MFG. CO.

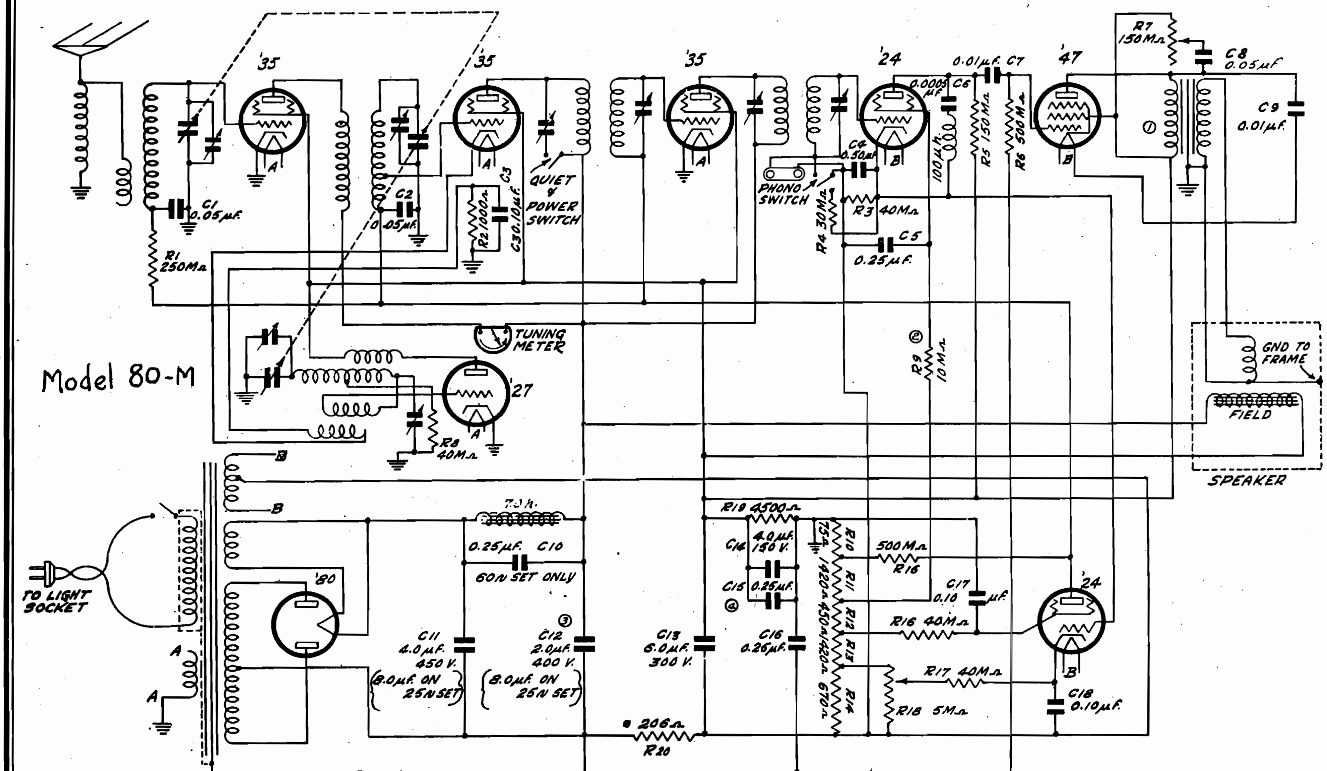


Fig.1

IF PEAK 175 KC.

The blue lead on the filter block is common for condensers C4, C5, and C18, and the black lead is common for condensers C3, C15, C16, and C17. The second detector plate filter choke is also contained in the block and is connected by two yellow leads, C8, (white-red leads) and C10 (red leads) are connected as shown in Fig. 1 schematic

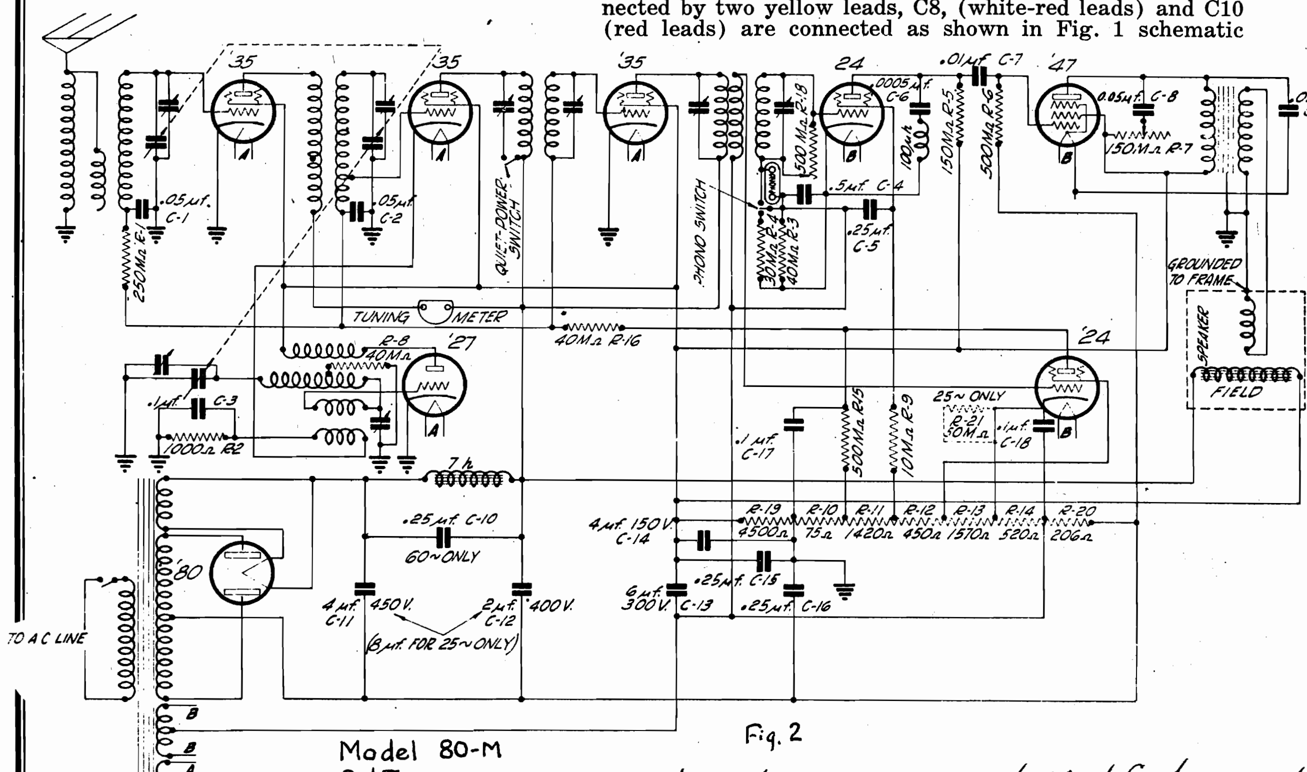


Fig. 2

Model 80-M
2nd Type

The 2nd Type has a GREEN paint identification mark on the left rear corner of the chassis, near speaker socket.

MODEL 80-M
Alignment,Parts

LAFAYETTE RADIO MFG. CO.

INTERMEDIATE CIRCUITS.—Tune the test oscillator to exactly 175 K.C., and connect its output to the grid of the first detector tube after removing the clip on the tip of the tube. Connect the output meter across the secondary of the speaker coupling transformer and then adjust all four condensers which tune the intermediate transformers, for the greatest deflection on the output meter. Check the settings of all four condensers to make certain the maximum output has been obtained.

When the above instructions have been followed remove the test oscillator coupling and replace the grid clip on the tip of the first detector tube.

GANG CONDENSERS.—Turn the gang condenser plates all the way in and see that the dial pointer is on the first dial division point below 550 K.C.

Tune the test oscillator to 1,400 K.C., turn the dial to read 1,400 K.C., and then adjust each gang condenser trimmer for maximum output.

OSCILLATOR.—Tune the test oscillator to 600 K.C., and tune the receiver to the signal. Disconnect the output meter and then rotate the adjusting screw on the oscillator 600 K.C. tracking condenser. Rock the gang condenser back and forth across the signal at the same time, and listen closely until the maximum volume is obtained. The tracking condenser is then properly adjusted and remains fixed thereafter.

The gang condenser trimmers only must then be adjusted again at 1,400 K.C. for maximum output.

The receiver should be accurately aligned if the above instructions have been followed and no further adjustments need be made.

REPAIR PARTS LIST

"1st only" precedes the names of the parts used only on the Series 80-M Chassis. "2nd only" precedes the names of the parts used only on the Series 80-M Type 2 Chassis. When ordering repair parts, the number of the parts and the serial number of the chassis MUST be given.

Part No.	Name
1318	'35 Tube Socket
1316	'27 Tube Socket
1315	'24 Tube Socket
1322	'47 Tube Socket
1312	'80 Tube Socket
1387	Speaker Socket
1396	Antenna Transformer Assembly (no shield)
1397	Interstate R.F. Trans. Assembly (no shield)
1391	1st I.F. Transformer Assembly (with shield)
1400	Oscillator Coil Assembly (no shield)
1392	1st ONLY, 2nd I.F. Transformer Assembly (with shield)
1446	2nd ONLY, 2nd I.F. Transformer Assembly (with shield)
50539	Power Transformer, 60-cycle
50540	Power Transformer, 25-cycle
50537	Speaker Coupling Transformer
50538	Power Supply Choke
1092	Grid Clip Assembly
1402	"QUIET POWER" (S.P.S.T.) Switch
1054	"ON-OFF" Toggle Switch
20406	Tube Shield
1273	2½-volt Dial Lamp
1336	Control Knob
1388	Escutcheon Plate
40412	Shield for R.F. and Oscillator Coils
1011	"PHONO" Switch, S.P.D.T.
1193	Phono Jacks Assembly
70719	Shielded Volume Control Wire Assembly
10142	½" Rubber Washer (for gang condenser mounting)
10143	¼" Rubber Washer (for gang condenser mounting)
20252	¾" Flat Metal Washer (for gang condenser mounting) 10 for
20388	Gang Condenser Cover
30365	Bushing for Rubber Pinion
10182	Rubber Pinion
20438	Drive Shaft
1384-C	Resonance Meter
1394	Dial Strip and Bracket Assembly
1383	Drive Bracket and Bearing Assembly
1382	Drive Disc, Hub and Fulcrum Assembly
1393	Indicator Assembly
70702	A.C. Cord and Plug
1407	Dial Lamp Clip Assembly (no lamp)

RESISTORS

Part No.	Key No.	Resistance	Type	Identification Base	End	Dot
90954-B	R-1	250,000 ohm	Carbon	Red	Green	Yellow
90940	R-2	1,000 ohm	Carbon	Brown	Black	Red
90916	R-3	40,000 ohm	Carbon	Yellow	Black	Orange
90956	R-4	30,000 ohm	Carbon	Orange	Black	Orange
90963	R-5	150,000 ohm	Carbon	Brown	Green	Yellow
90938-B	R-6	500,000 ohm	Carbon	Green	Black	Yellow
90984	R-7	500,000 ohm	Tone Control			
90916	R-8	40,000 ohm	Carbon	Yellow	Black	Orange
90930	R-9	10,000 ohm	Carbon	Brown	Black	Orange
90938	R-15	500,000 ohm	Carbon	Green	Black	Yellow
90916	R-16	40,000 ohm	Carbon	Yellow	Black	Orange
90916	R-17	40,000 ohm	1st ONLY CARBON	Yellow	Black	Orange
90983	R-18	5,000 ohm	1st Only Vol. Control			
90988	R-18	500,000 ohm	2nd Only Vol. Control			
90985	R-10	75 ohm	1st ONLY CANDOHM			
	R-11	1,420 ohm				
	R-12	450 ohm				
	R-13	1,420 ohm				
	R-14	670 ohm				
	R-19	4,500 ohm				
	R-20	206 ohm				
90989-A	R-10	75 ohm	2nd ONLY CANDOHM			
	R-11	1,420 ohm				
	R-12	450 ohm				
	R-13	1,570 ohm				
	R-14	520 ohm				
	R-19	4,500 ohm				
	R-20	206 ohm				

CONDENSERS

Part No.	Key No.	Capacity	Type	Voltage Rating
80862	C-1	.05 mfd.	Tubular	400 V.
80862	C-2	.05 mfd.	Tubular	400 V.
80855	C-6	.0005 mfd.	Molded	
80872	C-7	.01 mfd.	Tubular	500 V.
80872	C-9	.01 mfd.	Tubular	500 V.
80873-B	C-11	4.0 mfd.	Dry Electrolytic	450 V.
80874	C-12	2.0 mfd.	Dry Electrolytic	450 V.
80875	C-13	6.0 mfd.	Dry Electrolytic	450 V.
80878	C-14	4.0 mfd.	Dry Electrolytic	150 V.
80876-G	C-3	.1 mfd.	Block	160 V. White-Green
	C-4	.5 mfd.		160 V. White
	C-5	.25 mfd.		160 V. White-Brown
	C-8	.1 mfd.		600 V. White-Red
	C-10	.25 mfd.		160 V. Red (2)
	C-15	.25 mfd.		160 V. Brown
	C-16	.25 mfd.		200 V. Green
	C-17	.1 mfd.		160 V. White Green
	C-18	.1 mfd.		160 V. Black-White-Yellow
	Detector plate filter choke			
80871	Gang cond. only, no cover, dial assem. or drive assem.			
1385	Oscillator 600 K.C. adjustable tracking condenser			

LAFAYETTE RADIO MFG. CO.

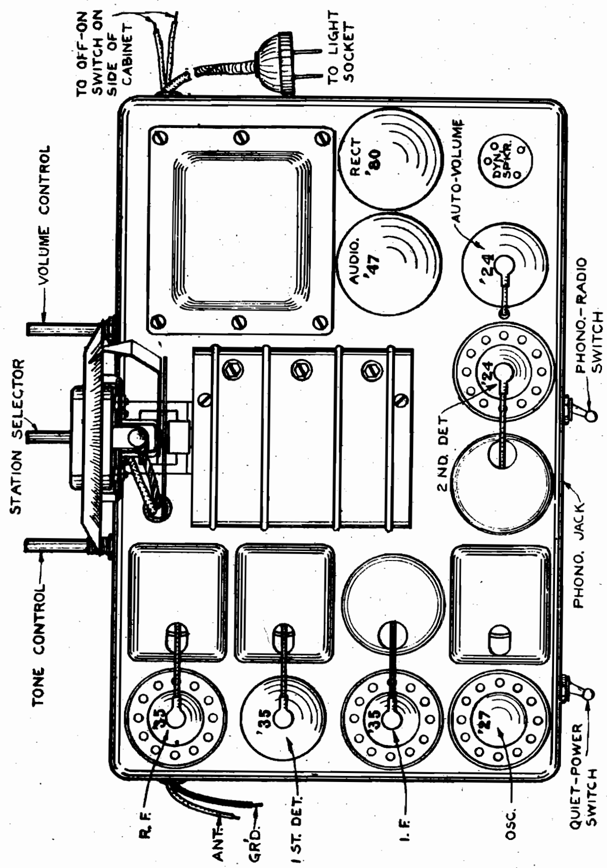
MODEL 80-M
Socket, Voltage
Alignment, Pickup Data

Voltages at Sockets

The voltages shown in the chart were taken with a 1,000 ohm per volt voltmeter; voltage measurements taken with a voltmeter having a different resistance will, of course, differ from those shown.

Turn the volume control all the way on, connect the antenna and ground leads together and turn the gang condenser plates all the way out. Check the line voltage.

Tube	Circuit	LINE VOLTAGE				
		90 V.	100 V.	110 V.	120 V.	130 V.
R. F. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
1st Det. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
I. F. '35	Screen-Grid Plate	70 143	78 159	85 175	92 191	100 207
Oscillator '27	Plate	70	78	85	92	100
2nd Det. '24	Screen-Grid Plate	66 127	73 134	80 141	87 148	94 155
A. V. C. '24	Grid Screen-Grid	14 24	15 5 26	17 28	18.5 30	20 32
Audio '47	Accelerating-Grid Plate	199 171	221 190	244 210	267 230	289 250
Rectifier '80	Current (both plates) Plate to Plate Volt.	67 MA 512	75 MA 569	82 MA 625	89 MA 682	96 MA 739



Condenser Alignment

A thorough check of the receiver should be made before any attempt is made to re-align any circuits. Examine the antenna and ground connections. Test all the tubes and check all voltages to determine if the failure of the receiver to operate properly is not due to some fault other than misalignment. A superheterodyne receiver must be accurately aligned to be selective and sensitive. This receiver has been accurately aligned at the factory, and due to the mechanical design of the gang and adjustable condensers, will not lose its alignment unless damaged by abuse or accident.

A modulated test oscillator and an output meter MUST be used when aligning this receiver to insure accurate alignment. It is important that the oscillator deliver a signal at exactly 175 K.C. in addition to frequencies in the broadcast band.

The adjustable condensers which tune the primaries and secondaries of the I.F. transformers are adjusted by inserting a screw driver through the holes in the chassis base directly below the I.F. transformer assemblies.

A trimmer condenser is mounted over each section in the gang and is adjusted by turning the screw located under the hole in the top of the gang shield.

The oscillator 600 K.C. tracking condenser is on the back of the chassis near the "QUIET-POWER" switch.

Make each adjustment in the order given below or the receiver may be thrown further out of alignment and it will then be a difficult task to align it properly.

The receiver and test oscillator must be well grounded and the output kept within the range of the output meter at all times.

All shields must be in place when making the adjustments.

Phonograph Pickup

A high impedance pickup is recommended for use with this receiver, as that type gives greatest volume when a transformer is not available. A transformer should be used with a low impedance pickup, as that type of pickup generally does not otherwise provide sufficient volume. A transformer having a ratio of 4 to 1 will prove satisfactory in most instances.

A pickup with a self-contained volume control is required as the volume control on the chassis cannot be used to adjust the volume.

To connect the pickup, remove the wire between the two jacks, mounted on bakelite on the rear of the chassis, and plug in the tips of the pickup cord. The word "PHONO" is stamped on the bakelite. Turn the receiver on and then throw the switch, near the center, on the back of the chassis, to the right. The pickup will then be connected and records may be played.

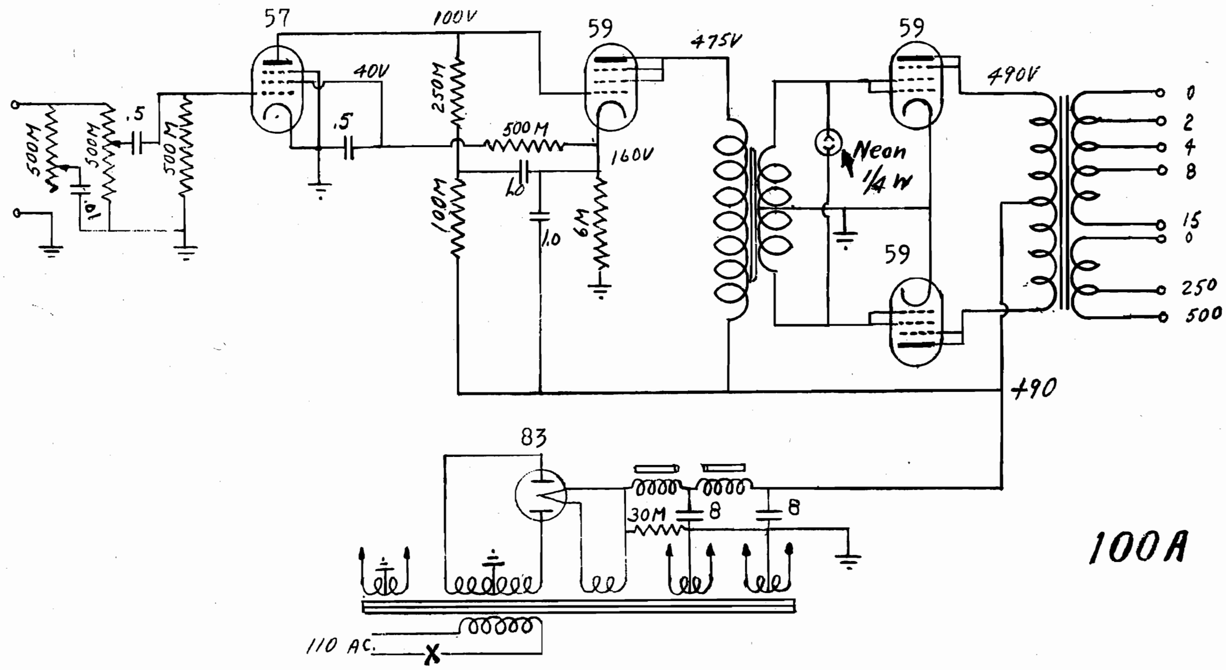
The switch connects the pickup in the grid circuit of the second detector tube and connects the 30,000 ohm cathode bias resistor (R4) so that a proper bias is obtained for record reproduction.

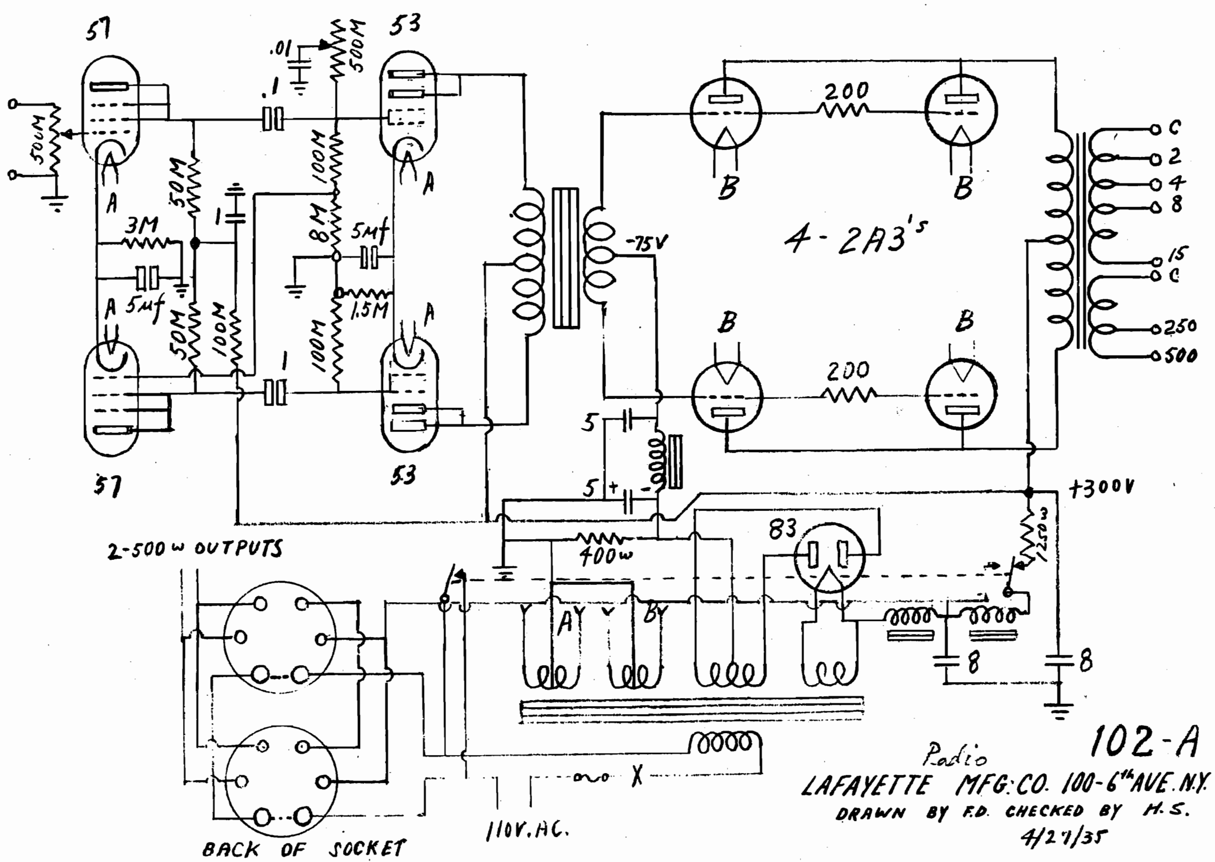
When a transformer is used, connect the pickup cord tips to the primary of the transformer and connect the secondary to the phono jacks on the chassis.

When it is desired to tune in broadcast signals it is only necessary to throw the switch to the left. The pickup cords must not be removed. If, for any reason, they are removed, the wire which originally connected the phone jacks **must** be replaced before the receiver is used for broadcast reception.

MODEL 100A
MODEL 102A
Schematics

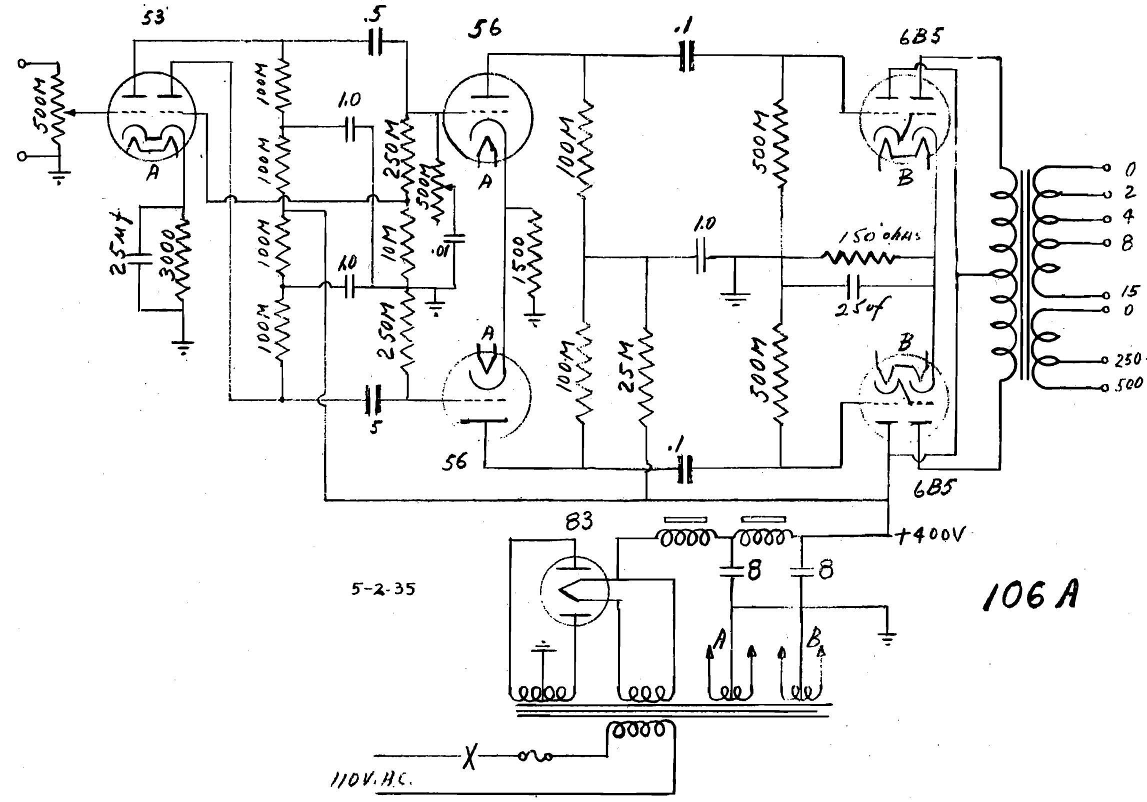
LAFAYETTE RADIO MFG. CO.

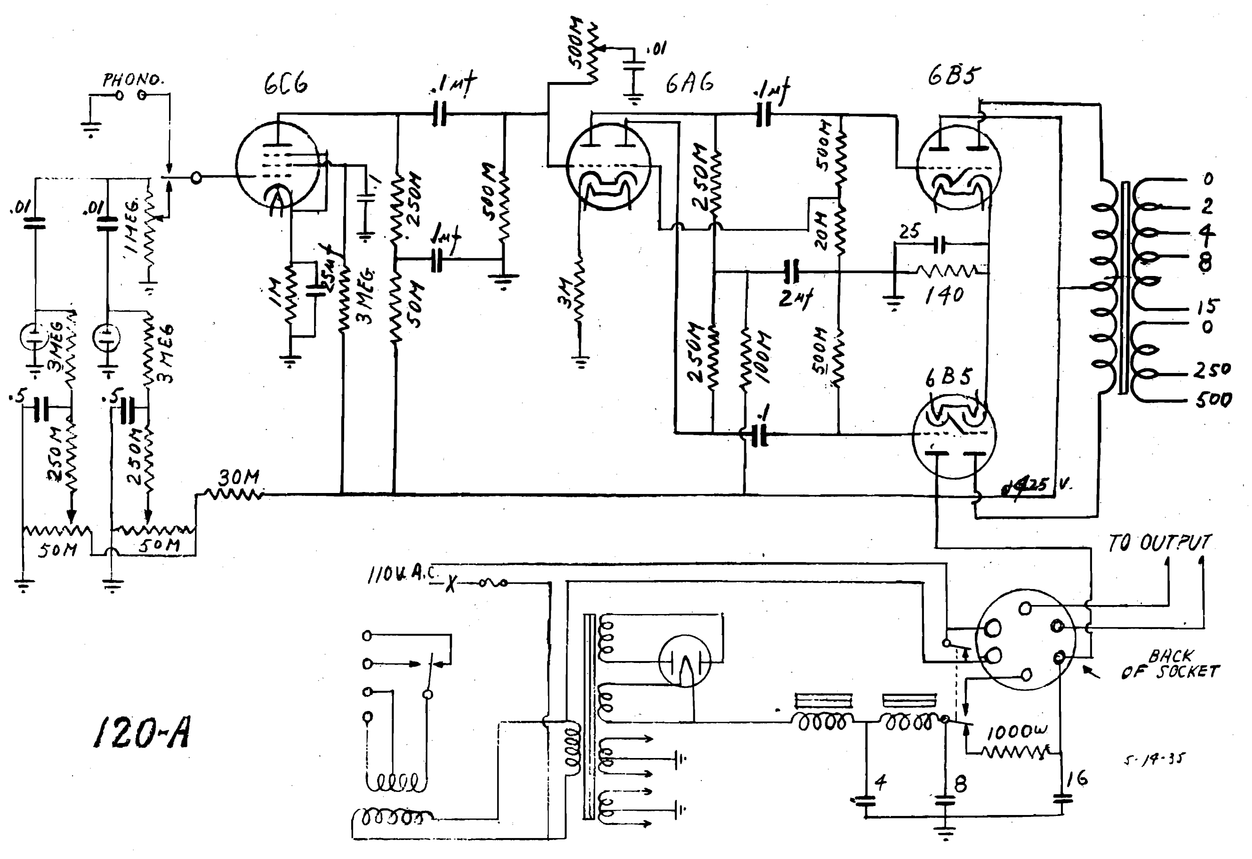




LAFAYETTE RADIO MFG. CO.

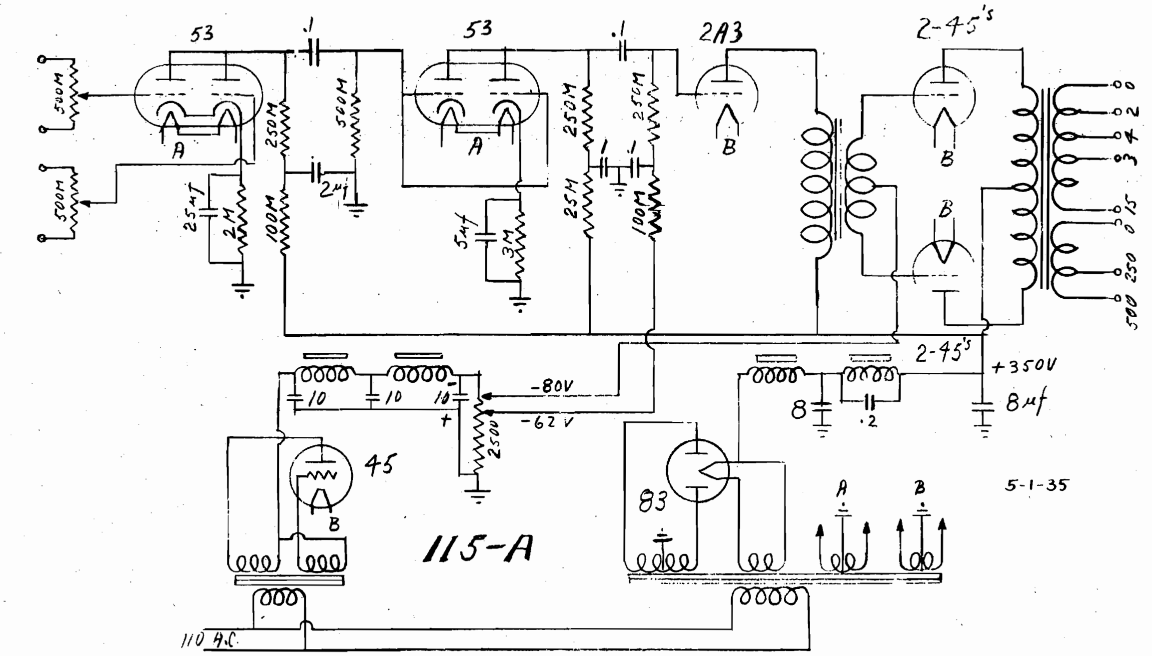
MODEL 106-A
MODEL 120-A
Schematics



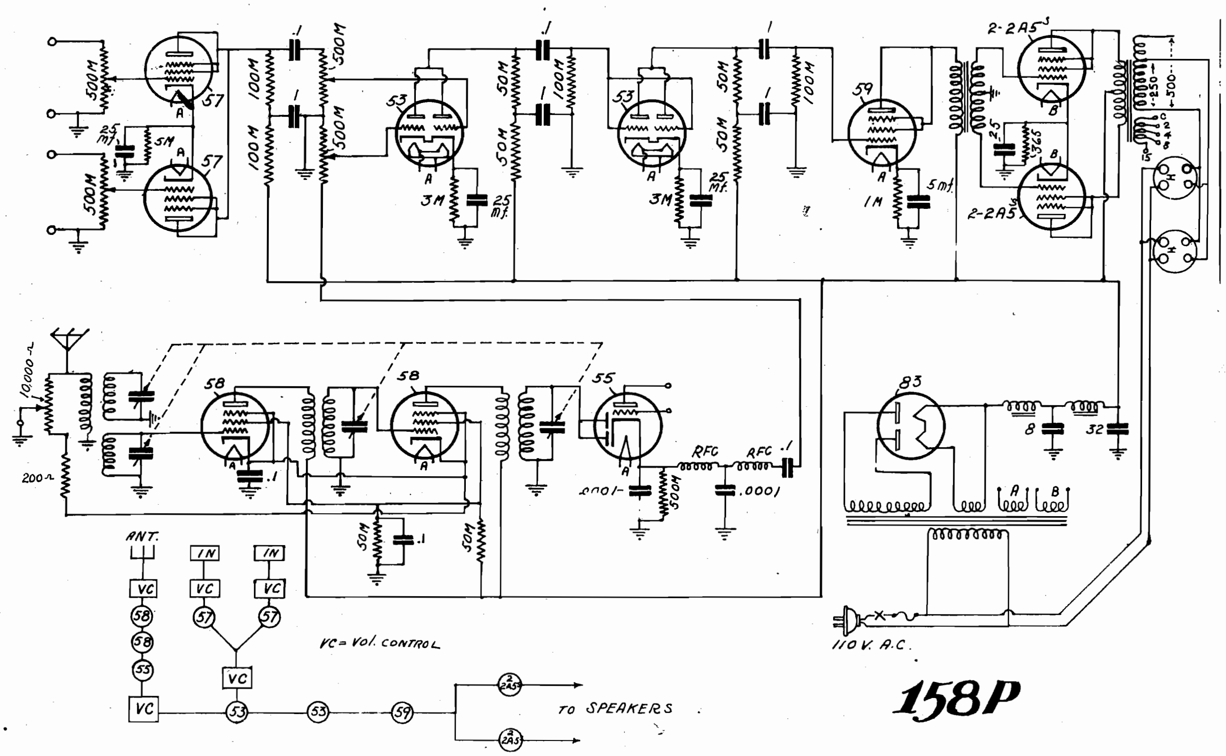


MODEL 115A
MODEL 158P
Schematics
Voltage

LAFAYETTE RADIO MFG. CO.



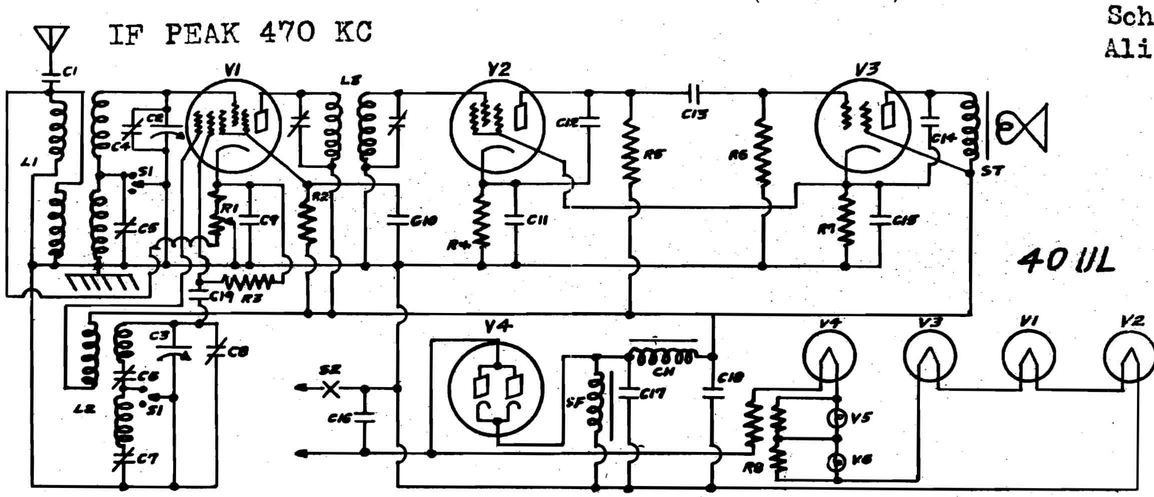
115-A



158P

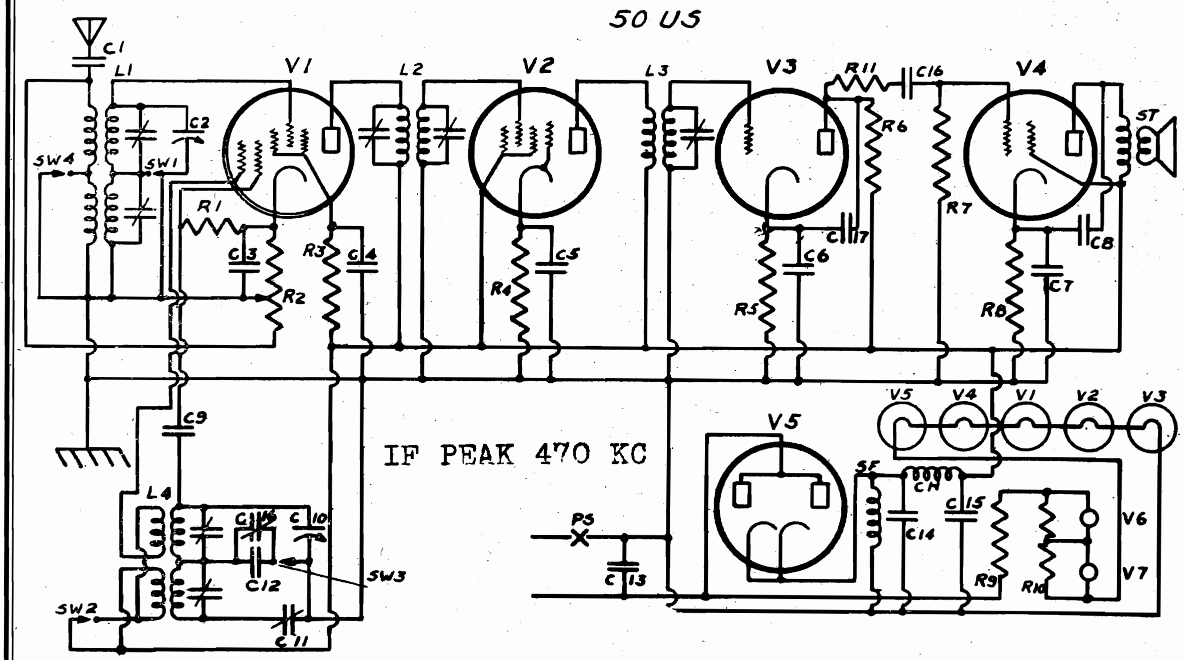
MODEL 40-UL
MODEL 50-US
Schematics
Alignment

LANG RADIO CORP. (New Co.)



V1—6A7 Tube
V2—6C6 Tube
V3—43 Tube
V4—25Z5 Tube
V5-6—6-8V Pilot Bulb
C1—.002 Mf. Cond.
C2-3—365 Mmf. Cond.
C4-5-8—40 Mmf. Cond.
C6—500 Mmf. Cond.
C7—140 Mmf. Cond.
C9-10-16—.05 Mf. Cond.
C11-15—10 Mf. Cond.
C12-19—.00025 Mf. Cond.
C13-14—.01 Mf. Cond.
C17—12 Mf. Cond.
C18—8 Mf. Cond.
R1—10,000w Vol. Cont. 120w Min.
R2—15,000w Resistor
R3-4—20,000 Resistor
R5-6—500,000 Resistor
R7—700w Resistor
R8—150-25-25 Resistor
L1—Antenna Coil
L2—Oscillator Coil
L3—DT IF Trans—470 KC
S1—Band Switch
S2—Power Switch
ST—Speaker Trans.
SF—Speaker Field—3000w
CH—Choke Coil

TO ALIGN RECEIVER: Apply 470 KC to Grid of V1 and adjust L3—Turn Band Switch to Broadcast. Apply 1400 KC to Ant. and Adjust C4 and C8. Apply 600 KC and Adjust C6. Turn to Long Wave—Apply 150 KC and adjust C7—Apply 300 KC and adjust C5.



TO ALIGN RECEIVER:—Turn band switch to Short Wave. Short C10. Apply 470 kilocycles to grid of V1 and adjust L2 trimmers and L3 trimmer. Remove short from C10. Set dial to 15 megacycles calibration. Apply this frequency to antenna and adjust L4 short wave trimmer. Adjust L1 short wave trimmer. Turn band switch to Broadcast. Set dial to 150 calibration. Adjust L4 broadcast trimmer. Adjust L1 broadcast trimmer. Set dial to 60 calibration and adjust C11. Return dial to 150 calibration and re-adjust L4 broadcast trimmer.

V1—6A7
V2—6D6
V3—76
V4—43
V5—25Z5
V6, 7—6-8 V. Pilot Lamps
L1—Antenna Coil
L2—D.T. I.F. Trans.—470 K.C.
L3—S.T. I.F. Trans.—470 K.C.
L4—Oscillator Coil
C1—.002 Mfd.
C2, 10—365 Mmfd.
C3, 4, 5, 13—.05 Mfd.
C8, 16—.01 Mfd.
C9—.0001 Mfd.
C11, 16—300-600 Mmfd.
C12—.0018 Mfd.
C6, 7—10 Mfd.
C14—12 Mfd.
C15—8 Mfd.
C17—.0005 Mfd.
R1, 5, 11—50,000 Ohms
R2—10,000 Ohms Vol. Cont. 120 Ohms Min.
R3—15,000 Ohms
R4—400 Ohms
R6, 7—500,000 Ohms
R8—700 Ohms
R9—130 Ohms (Line Cord)
R10—25-25 Ohms
CH—Filter Choke
PS—Power Switch
SF—Speaker Field 3000 Ohms
ST—Speaker Transformer
SW 1, 2, 3, 4—Band Switch

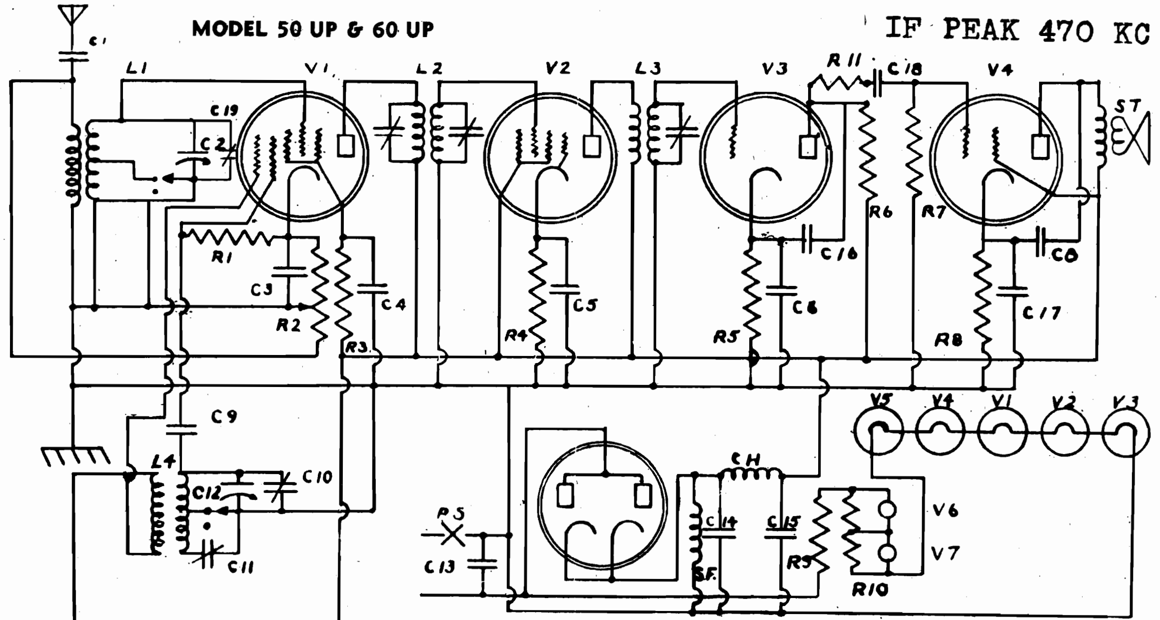
MODELS 50-UP, 60-UP
MODEL 50-AS

LANG RADIO CORP. (New Co.)

Schematics, Alignment

MODEL 50 UP & 60 UP

IF PEAK 470 KC

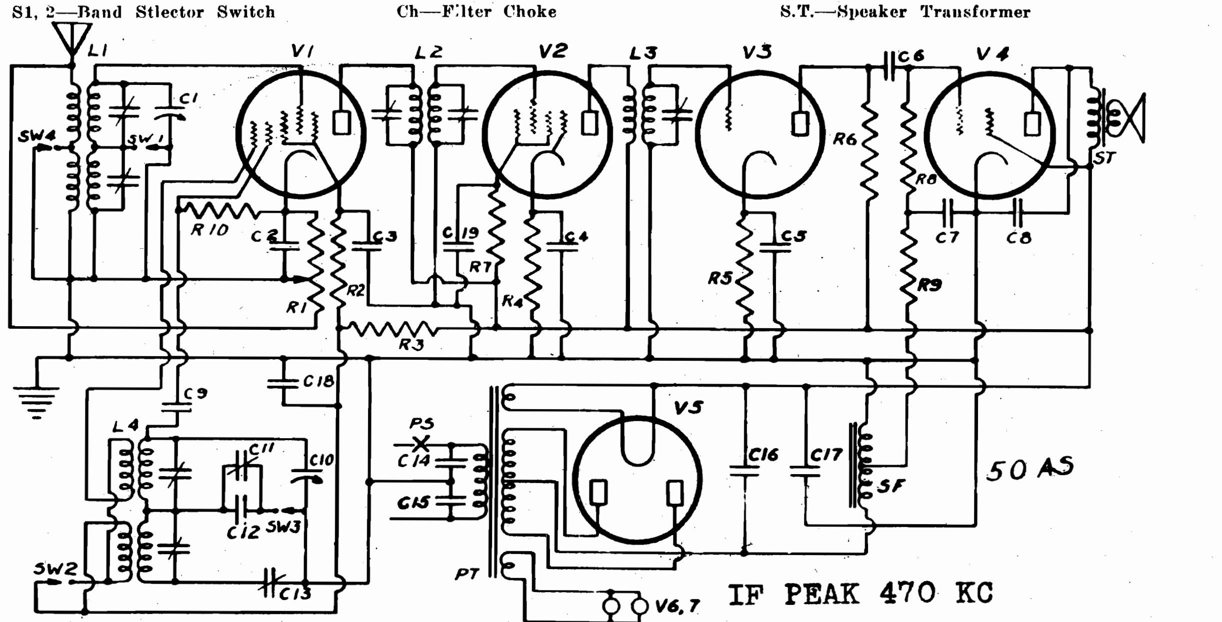


TO ALIGN RECEIVER:—Turn band switch to Short Wave. Short C12. Apply 470 kilocycles to grid of V1 and adjust L2 trimmers and L3 trimmer. Remove short from C12. Turn band switch to Broadcast. Set dial to 150 calibration. Adjust L4 broadcast trimmer. Adjust L1 broadcast trimmer. Set dial to 60 calibration and adjust C11. Return dial to 150 calibration and re-adjust L4 broadcast trimmer.

V1—6A7
V2—6D6
V3—76
V4—43
V5—25Z5
V6, 7—6-8V. Pilot Lamp
L1—Ant. Coil
L2—D.T. I.F. Transformer
L3—S.T. I.F
L4—Oscillator Coil
S1, 2—Band Stlector Switch

C1—.002 Mfd.
C2, 12—365 Mmfd.
C3, 4, 5, 13—.05 Mfd.
C10, 19—20 Mmfd.
C8, 18—.01 Mfd.
C6, 17—10 Mfd.
C14—12 Mfd.
C15—8 Mfd.
C9, 16—.00025 Mfd.
C11—600 Mmfd.
Ch—Filter Choke

R1, 5, 11—50,000 Ohms
R2—10,000 Ohms Vol. ont.
R3—15,000 Ohms
R4—400 Ohms
R6, 7—500,000 Ohms
R8—700 Ohms
R9—130 Ohms Line Cord or Ballast Tube
R10—25-25
P.S.—Power Switch
S.F.—Speaker Field
S.T.—Speaker Transformer



V1—6A7
V2—6D6
V3—76
V4—38
V5—80
V6, 7—6-8 V. Pilot Lamp
L1—Antenna Coil
L2—D.T. I.F. Transformer
L3—S.T. I.F. Transformer

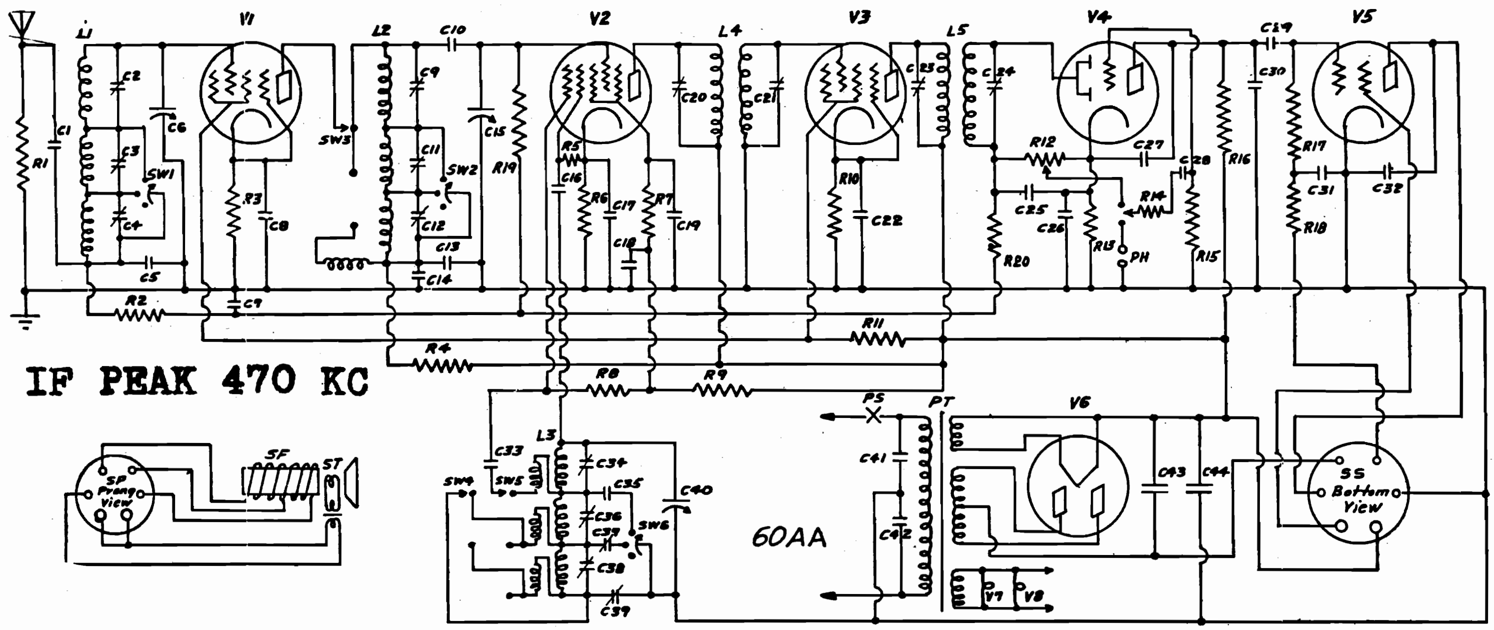
L4—Oscillator Coil
PS—Power Switch
C1, 10—365 Mmfd.
C2, 3, 4, 19—.05 Mfd.
C6, 14, 15, 18—.01 Mfd.
C7—.1 Mfd.
C9—.0001 Mfd.

C11, 13—600 Mmfd.
C12—.0018 Mfd.
C5—.10 Mfd.
C16—8 Mfd.
C18—4 Mfd.
C17—12 Mfd.

R1—10,000 Ohms Vol. Cont.
120 Ohms Minimum
R2—30,000 Ohms
R3—20,000 Ohms
R4—300 Ohms
R5, 9, 10—50,000 Ohms
R6, 8—500,000 Ohms
R7—75,000 Ohms
R9—50,000 Ohms

PT—Power Transformer
SF—Speaker Field
ST—Speaker Transformer
SW1, 2, 3, 4—Band Switch

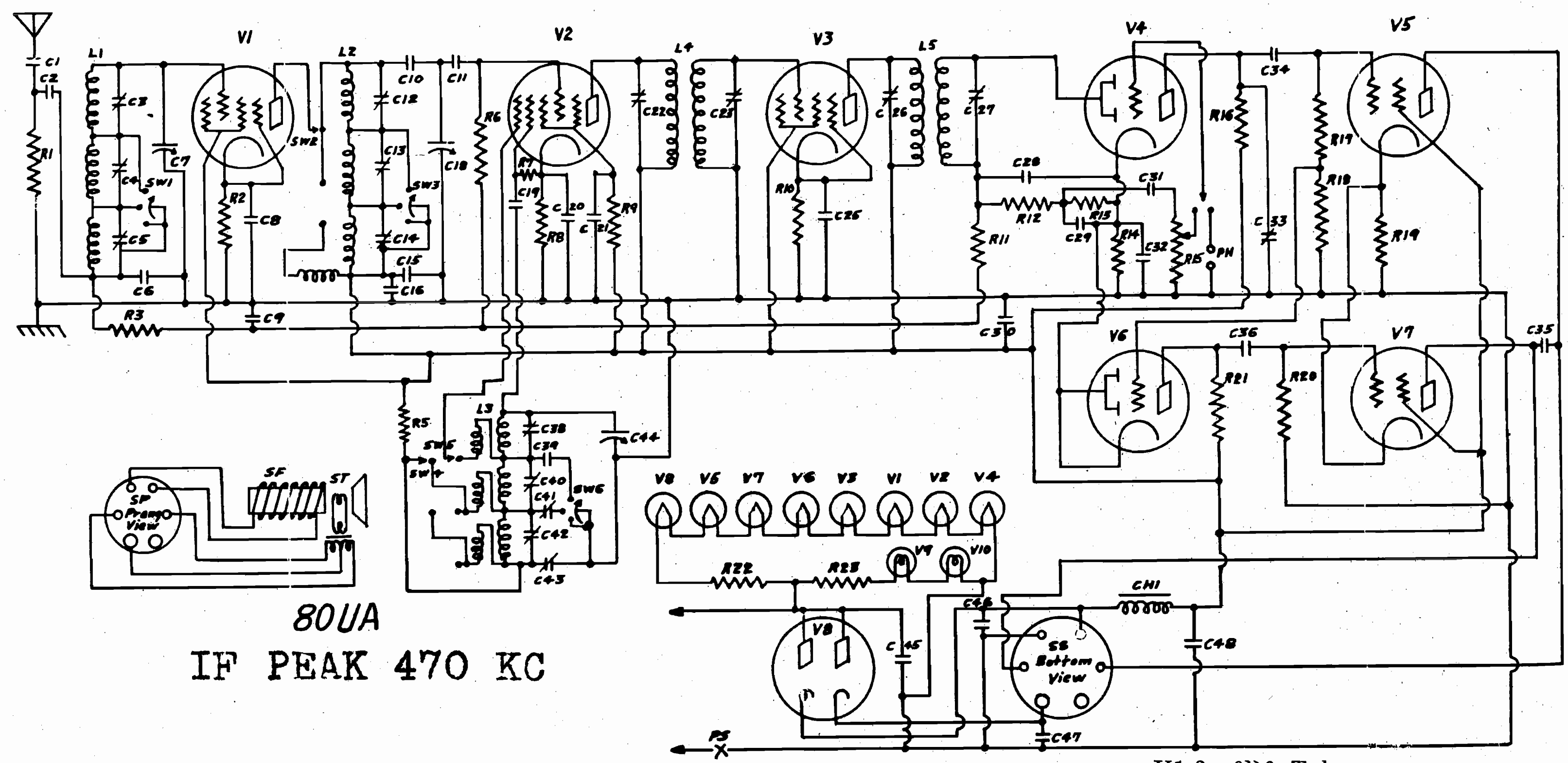
LANG RADIO CORP. (New Co.)



V1-3—6D6 Tube
V2—6A7 Tube
V4—75 Tube
V5—41 Tube
V6—80 Tube
V7-8—6-8V Pilot Bulb
C1—.0001 Mf.
C2-3-4-9-11-12-34-36-38—40 Mmf.
C5—.001819 Mf.
C6-15-40—440 Mmf.
C7-8-17-19-22—.05 Mf.
C10—.003636 Mf.
C13—.1 Mf.
C14-18—4 Mf.
C16—.00005 Mf.
C20-24—220 Mmf.
C21-23—140 Mmf.
C25—.0005 Mf.
C26—5 Mf.
C27—.00025 Mf.
C28-29-41-42—.01 Mf.
C30—.006 Tone Control
C31—.25 Mf.
C32—.006 Mf.
C33—.002 Mf.
C35—.001282 Mf.
C37—1000-2000 Mf.
C39—300-600 Mf.
C43-44—8 Mf.
R1-8—20,000 Ohm
R2—100,000 Ohm
R3—400 Ohm
R4-9—10,000 Ohm
R5-14—50,000 Ohm
R6—300 Ohm
R7—25,000 Ohm
R10—500 Ohm
R11—40,000 Ohm
R12—500,000 Ohm Vol. Cont.
R13—3,000 Ohm
R15-17—500,000 Ohm
R16-18—250,000 Ohm
R-19-20—1,000,000 Ohm
L1—Antenna Coil
L2—R. F. Coil
L3—Oscillator Coil
L4—DT IF Trans. 470 KC—Step Up
L5—DT IF Trans. 470 KC—Step Down
SW1-2-3-4-5-6—Band Selector Switch
PS—Power Switch
PT—Power Transformer
SS—Speaker Socket
SP—Speaker Plug
ST—Speaker Transformer
SF—Speaker Field—1800 Ohm—Tap 266
PH—Phono Jack

MODEL 80-UA
Schematic

LANG RADIO CORP. (New Co.)



80UA
IF PEAK 470 KC

C30—.25 Mf.
C31-34-36—.01 Mf.
C33—.006 Tone Control
C35—.002 Mf.
C39—.001282 Mf.
C41—1000-2000 Mmf.
C43—300-600 Mmf.
C46-47-48—16 Mf.
C11-19—.00005 Mf.
C15—.1 Mf.
C16-32—4 Mf.
C22-27—220 Mmf.
C23-26—140 Mmf.
C28-29—.00025 Mf.

L1—Antenna Coil
L2—R. F. Coil
L3—Oscillator Coil
L4—DT IF Trans. 470 KC—Step Up
L5—DT IF Trans. 470 KC—Step Down
SW1-2-3-4-5-6—Band Selector Switch
PS—Power Switch
SS—Speaker Socket
SF—Speaker Field—3000 Ohm
ST—Speaker Transformer
SP—Speaker Plug
CH1—Filter Choke
PH—Phono Jack

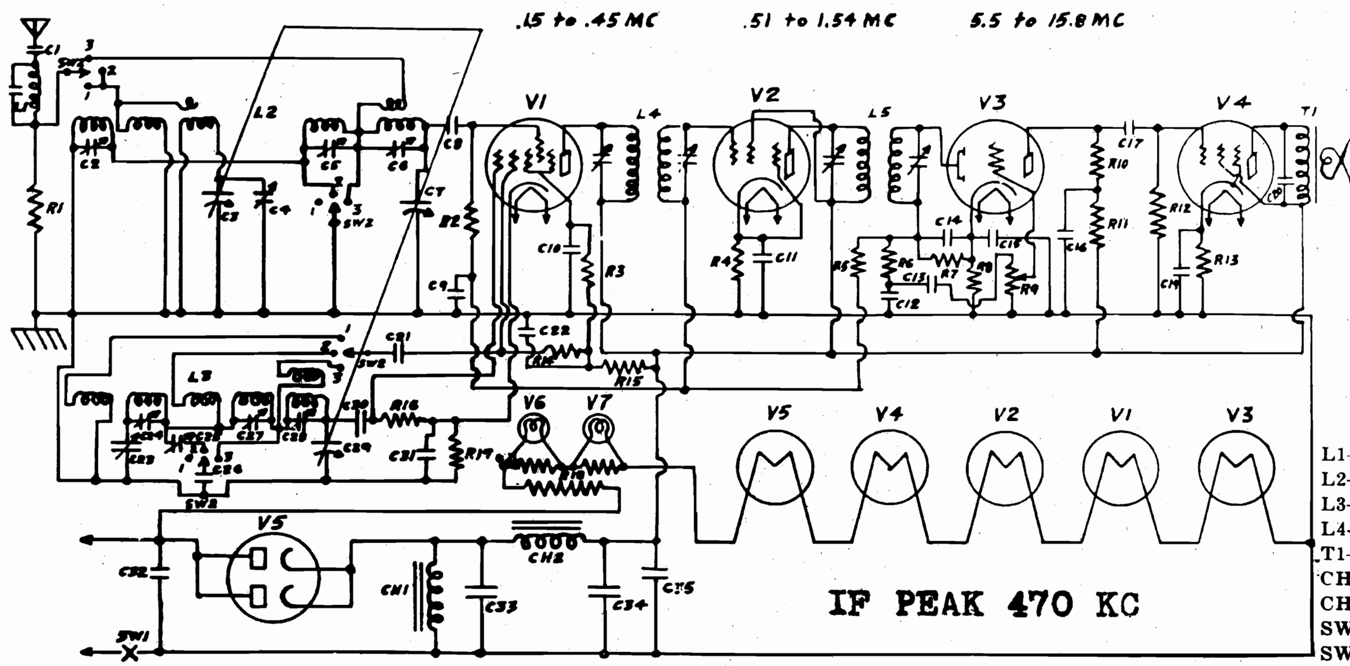
R1—20,000 Ohm
R2—200 Ohm
R3-16-21—100,000 Ohm
R6-11—1,000,000 Ohm
R8-10—400 Ohm
R9—15,000 Ohm
R12-7—50,000 Ohm
R13—500,000 Ohm
R14—2,500 Ohm
R15—500,000 Ohm Volume Cont.
R17-20—250,000 Ohm

V1-3—6D6 Tube
V2—6A7 Tube
V4-6—75 Tube
V5-7—43
V8—25Z5 Tube
V9-10—6-8V Pilot Bulb
C1—.002 Mf.
C2—.0001 Mf.
C3-4-5-12-13-14-38-40-42 40 Mmf.
C6—.001819 Mf.
C7-18-44—440 Mmf.
C8-9-20-21-25-45—.05 Mf.
C10—.003636 Mf.

R18-5—10,000 Ohm
R19—350 Ohm
R22—50 Ohm
R23—700 Ohm

MODELS 503-UT,523-UT
Schematic,Alignment

LANG RADIO CORP. (New Co.)



MODELS
523-UT
503-UT

L1—Wavetrap 470 KC
L2—Antenna Coil
L3—Oscillator Coil
L4-5—D.T.—IF Trans. 470 KC
T1—Speaker Trans.
CH1—Speaker Field 3,000 Ohm
CH2—Filter Choke
SW1—Power Switch
SW2—Band Selector Switch

C1-21—.002 Mf. Cond.
C2-4-5-6-24-27-28—40 Mmf. Cond.
C3-7-29—365 Mmf. Cond.
C8— 0001 Mf. Cond.
C9-10-11-16-31-32—.05 Mf. Cond.
C12-14—.00025 Mf. Cond.
C15-19—10 Mf. Cond.
C13-17-20—.01 Mf. Cond.

C22-34—8 Mf. Cond.
C23—140 Mmf. Cond.
C25—500 Mmf. Cond.
C26—.016 Mf. Cond.
C30—.00005 Mf. Cond.
C33—16 Mf. Cond.

R1-8—5,000 Ohm Resistor
C35—.05 Mf. Cond.
R2-5—1,000,000 Ohm Resistor
R3—15,000 Ohm Resistor
R13—700 Ohm Resistor
R6—50,000 Ohm Resistor
R7—750,000 Ohm Resistor
R10-11—100,000 Ohm Resistor

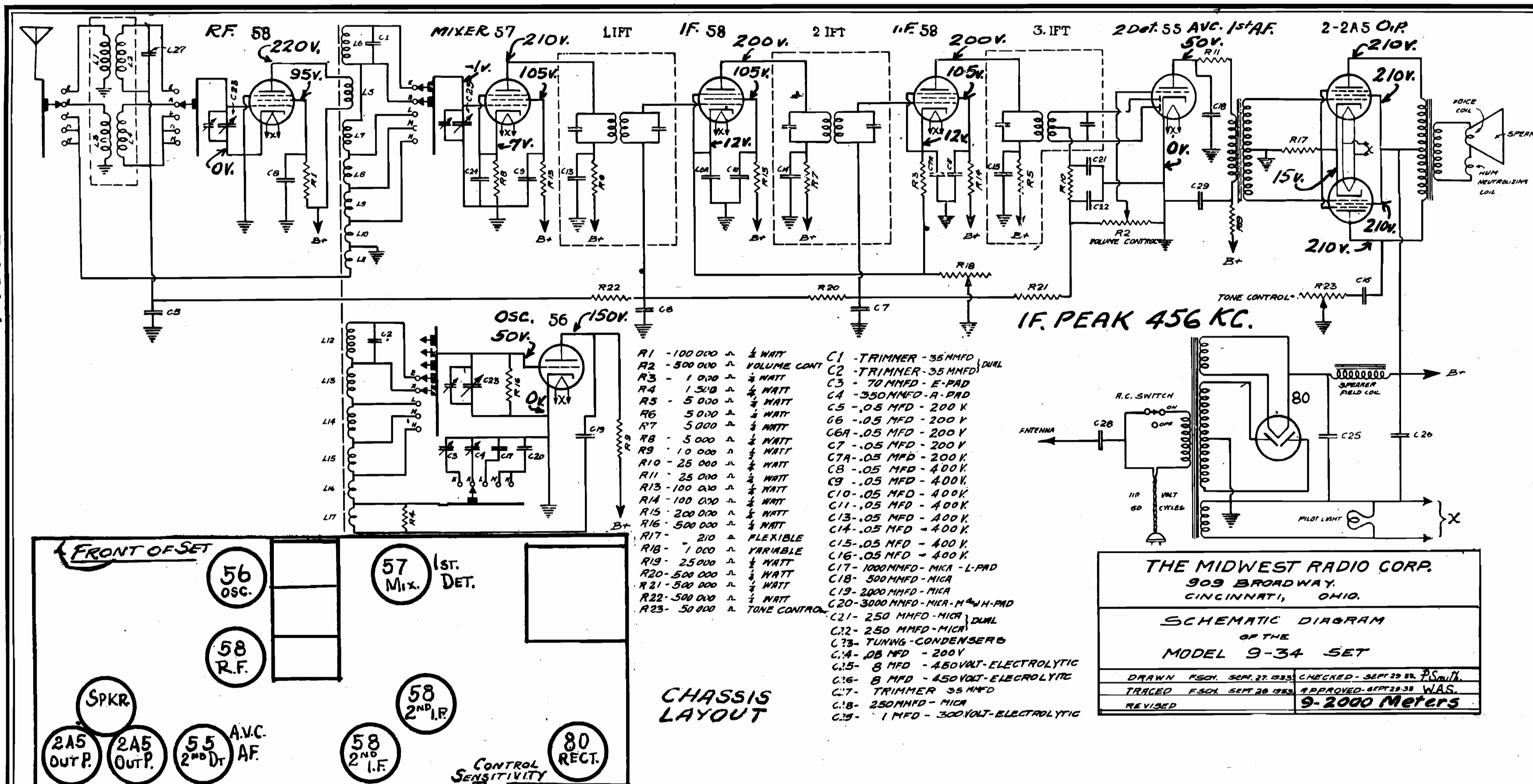
R12—500,000 Ohm Resistor
R14-16—20,000 Ohm Resistor
R15—3,000 Ohm Resistor
R4-17—400 Ohm Resistor
R18—130-29-29 Ohm Resistor
R9—1,000,000 Ohm Volume Control

V1—6A7 Tube
V2—6D6 Tube
V3—75 Tube
V4—43 Tube
V5—25Z5 Tube
V6-7—6-8V. Pilot Bulb

TO ALIGN THE RECEIVER:—Turn band switch to short wave—short C29—apply 470 KC to grid of V2 and adjust L5—apply 470 KC to grid of V1 and adjust L4—remove short from C29—apply 12MC to antenna and adjust C28 and C6 . . . Turn band switch to long wave—apply 150 KC to antenna and adjust C23—apply 300 KC and adjust C24 and C2—keep re-adjusting at these frequencies until done . . . Turn band switch to broadcast—apply 1400 KC to antenna and adjust C27, C4 and C5—apply 600 KC and adjust C25—readjust at 1400 KC if necessary.

MODEL 9-34
Schematic, Voltage
Socket, Alignment

MIDWEST RADIO CORP.



ALIGNMENT: Apply a modulated signal, 456 kc. to the control grid of the 57 Mixer Tube. Trim the i-f. transformers to greatest AVC voltage developed. Keep applied signal low.

ALIGNING BANDS: Turn wave-band switch to the (E) position and adjust the (E) padder at 160 kc. Adjust the (E)trimmers, osc., mixer, and the r-f. at 370 kc

Turn wave-band switch to (A) position and adjust the (A) padder at 530 kc. Adjust the (A) trimmers which will be found on top of the variable condenser to 1500 kc.

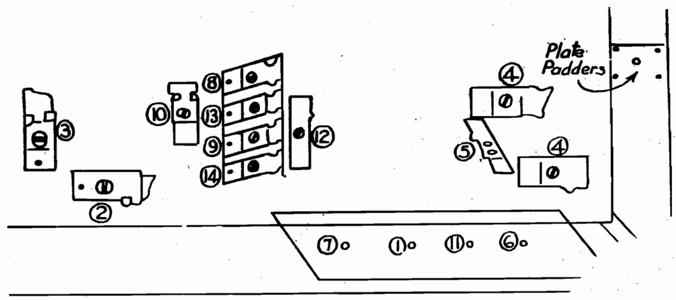
The adjusting of the L,M and H bands is accomplished at the factory by adjusting the spacing of the turns of the coils. We do not advise that you try this, as it is critical work.

MODEL 16-33
Voltage, Socket
Trimmers, Alignment

MIDWEST RADIO CORP.

1. "A" band padder
2. "A" band r-f. trimmer
3. "A" band r-f. trimmer
4. "L" band r-f. trimmer
5. "L" band feeder condenser
6. "L" band padder
7. "M" band padder
8. "M" band r-f. trimmer
9. "M" band r-f. trimmer
10. "M" band feed condenser
11. "H" band padder
12. "H" band feed condenser
13. "H" band r-f. trimmer
14. "H" band r-f. trimmer

On the right will be found the locations of the padding and trimming condensers of the Midwest 16-tube receiver, 1933



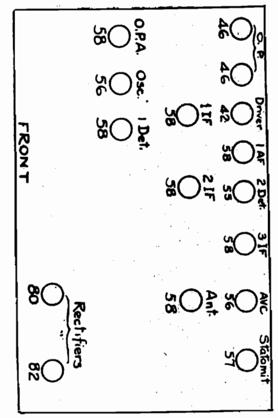
The alignment instructions follow: Before attempting to align the i-f. amplifier, we suggest that you inspect the i-f. transformers for correct spacing, as these transformers often collapse and cause broad tuning. The correct spacing of the windings is ¾ inch between the faces of the coils. Wax the coils tightly in place and then start the procedure of alignment, by adjusting your signal generator to 450 kc., which is the i-f. peak in this receiver. Keep the test signal input at the lowest possible level consistent with proper operation. Measure the AVC voltage developed for peaking purposes. If signal input is too great, it will result in double peaking of stations.

When the i-f. trimmers have been adjusted, the next step is the trimming of the "A" band (white). NOTICE. Do not attempt to adjust the plate padder. It was adjusted at the factory and should not be changed. Proceed as follows: Rotate the tuning dial to 5 and adjust the "A" band r-f. trimmers to highest output. The frequency will be about 1490 kc. Adjust the "A" band padder at 550 kc., with the dial set to 98.

Then set the tuning dial to "L" band (red). Dial should be at division 2. Adjust the "L" band r-f. trimmers. The frequency will be about 4.1 megacycles or 4100 kilocycles. Set dial to 98 and adjust padder for that band. The frequency for adjustment is 1712 kc. Adjust feed condenser until maximum sensitivity is reached all over the band. The condenser, in almost all cases, will be tight.

Then adjust "M" band (green). Proceed as for other bands. Adjust "M" band r-f. trimmers at 9.0 megacycles, 8000 kilocycles at 2 on the dial. Adjust the "M" band padder at 4.5 megacycles, which is 4500 kilocycles. Adjust the feed condenser same as for "L" band.

Adjust "H" band (blue or amber). Adjust the "H" band r-f. trimmers at 5 on the dial. The frequency will be about 20. megacycles. Adjust the "H" band padder at 9.0 megacycles at 98 on the dial.



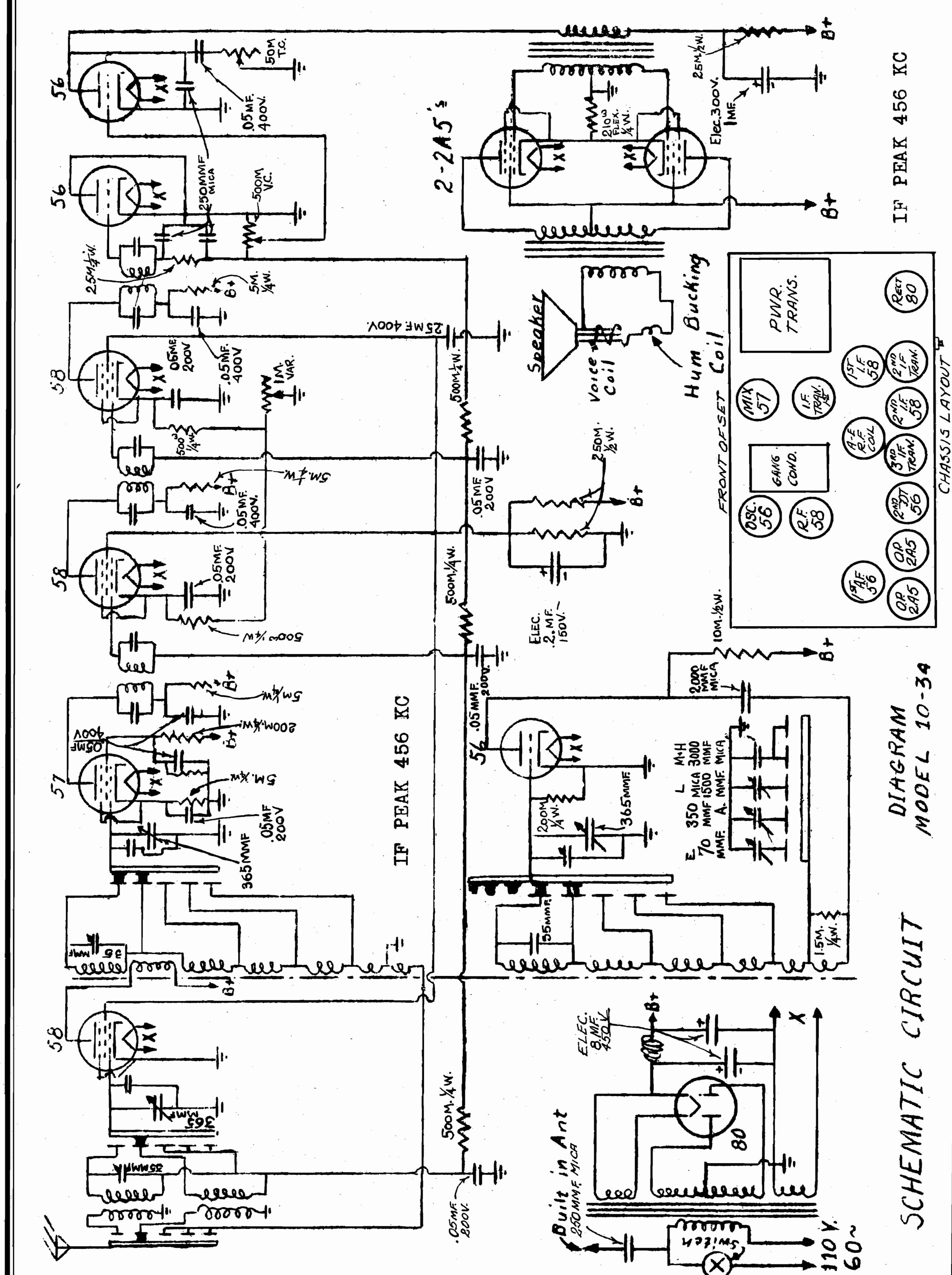
VOLTAGE TABLE

Type	Function	Plate	Screen	Cathode	C. Grid	Fil.
58	Ant.	220	88	0	.25	2.5
58	Mixer	220	128	2	4.25	2.5
56	Osc.	189	...	0	0	2.5
58	O.P.A.	128	92	0	3.5	2.5
58	1st IF.	216	80	7	2.0	2.5
58	2nd IF.	216	80	7	.25	2.5
58	3rd IF.	216	76	8	0	2.5
55	2nd det.	0	...	0	AVC	2.5
56	A.V.C.	0	...	0	0	2.5
57	Statomit	33	76	8	0	2.5
58	1st AF.	98	97	94	36	2.5
42	Driver	184	216	14	0	6.2
46	Output	478	...	..	0	2.5
46	Output	478	...	..	0	2.5
80	Rect.	350 r.m.s. each plate				5.0
82	Rect.	345 r.m.s. each plate				2.6

All readings are taken with no signal input and Statomit full on (clockwise).
All voltages are plus or minus 15 percent, depending on line voltage.

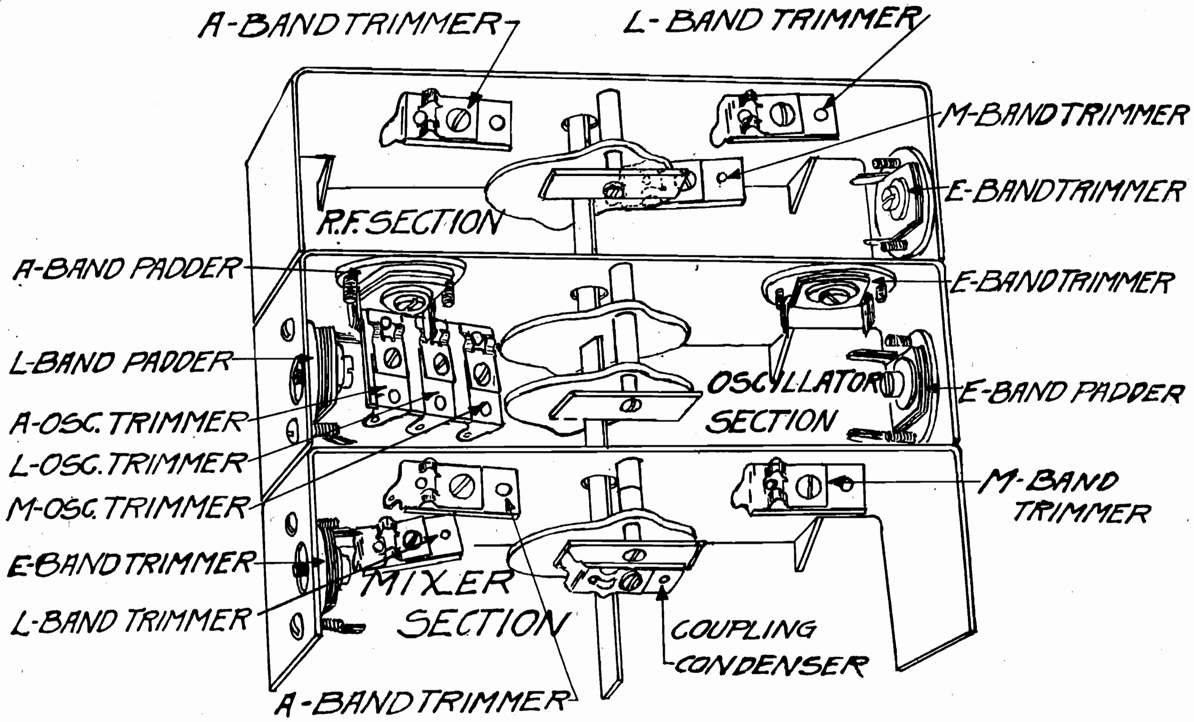
MIDWEST RADIO CORP.

MODEL 10-34
Schematic
Voltage, Socket



MODEL 10-34
Trimmers, Alignment
Voltage

MIDWEST RADIO CORP.



THE MIDWEST RADIO CORP.			CINCINNATI, OHIO.
	DATE	NO REQD.	LOCATION OF TRIMMERS AND PADDERS OF 10-34 MODEL.
DRAWN F.SCH.	OCT. 16.33.	MODEL NO 10-34	
TRACED F.SCH.	OCT. 16.33.	SCALE NONE	
CHECKED		REVISIONS	
APPROVED			

INSTRUCTIONS FOR REBALANCING THE 9 & 10 TUBE ALL-WAVE 1934 MODEL

To rebalance the Midwest 9 and 10 tube all- wave 1934 model receivers proceed as follows:

Apply a signal (modulated) of 456 K. C. to the control grid of the 57 1st. Det. or Mixer tube. Trimm the I. F. Transformers to greatest A. V. C. voltage developed. Remember always to keep the signal applied to the 1st. Det. as low as possible.

To align the bands proceed as follows: Turn wave band switch to the (E) position and adjust the (E) padder at 160 K. C. Adjust the (E) trimmers, osc., mixer and the R. F., at 370 K.C.

Turn wave band switch to (A) position and adjust the (A) padder at 530 K. C. Adjust the (A) trimmers which will be found on top of the variable condenser to 1500 K. C.

The adjusting of the L.M. and H bands is accomplished at the factory by adjusting the spacing of the turns of the coils. We do not advise that you try this as it is very critical work and can be done only by very carefully trained experts.

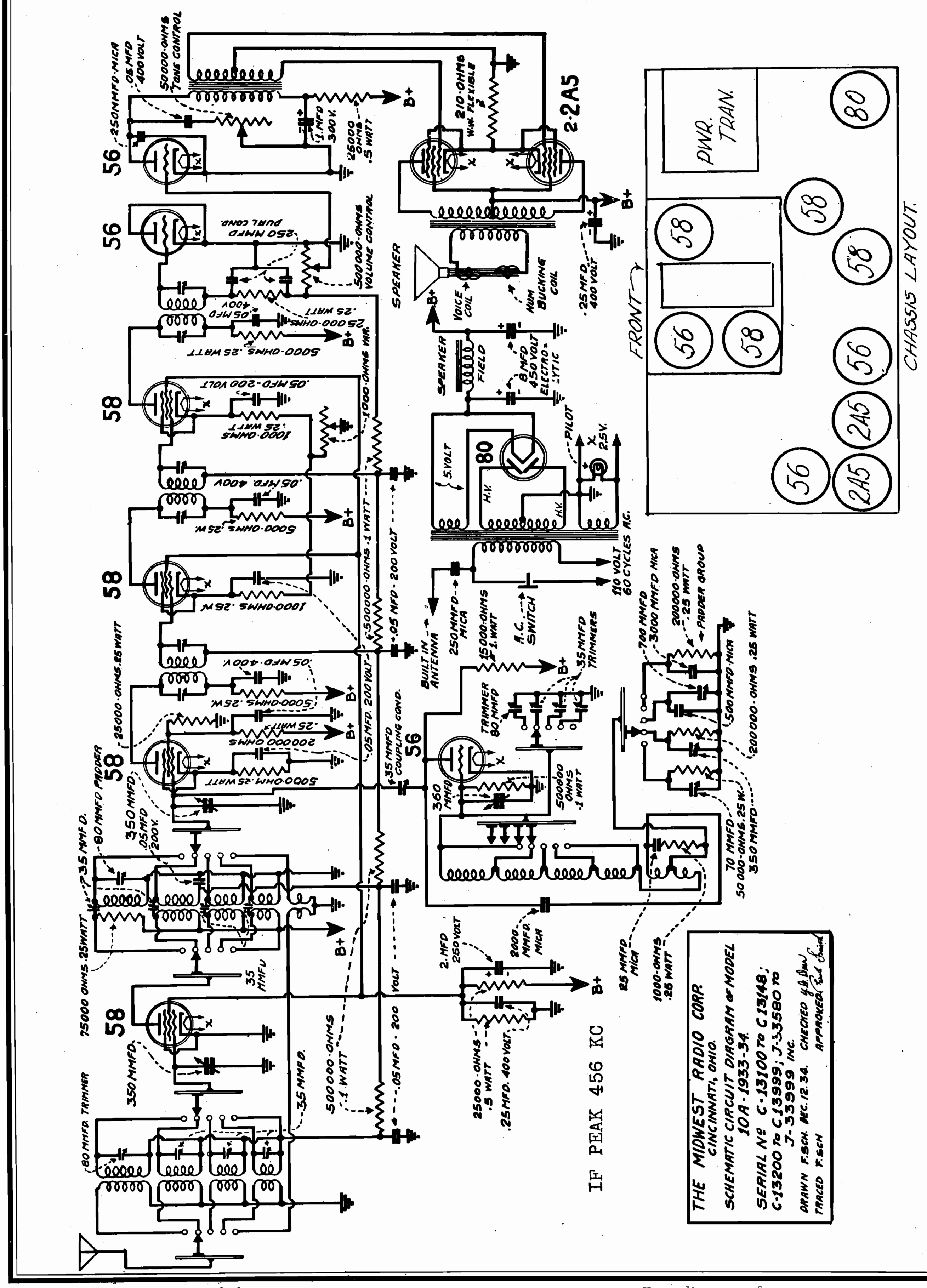
ALL TESTS MADE WITH NO SIGNAL IMPUT AND WITH STATOMIT TURNED FULL ON (CLOCKWISE)

TYPE	POSITION	PLATE VOLTS	SCREEN VOLTS	SUPP. VOLTS	KATHODE VOLTS	GRID VOLTS	FIL. VOLTS
58	R.F.	225	115	0	0	1 AVC	2.5
57	Mixer	225	25	2.5	2.5	0	2.5
56	Osc.	175	___	___	0	-45 on A Band	2.5
58	1 st. I.F.	225	110	.20	.20	-.5 AVC	2.5
58	2 nd. I.F.	225	110	.20	.20	- .5 AVC	2.5
56	2nd. Det.	0	---	---	0	AVC	2.5
56	1 st. A.F.	210	---	---	0	---	2.5
2A5	Output	235	240	---	- 15	---	2.5
2A5	Output	235	240	----	- 15	---	2.5
80	Rect.	240	---	---	---	---	5.0

1000 Ohm per Volt Meter used for tests D.C. Measured from ground. Voltages ± 15% Depending on line voltage.

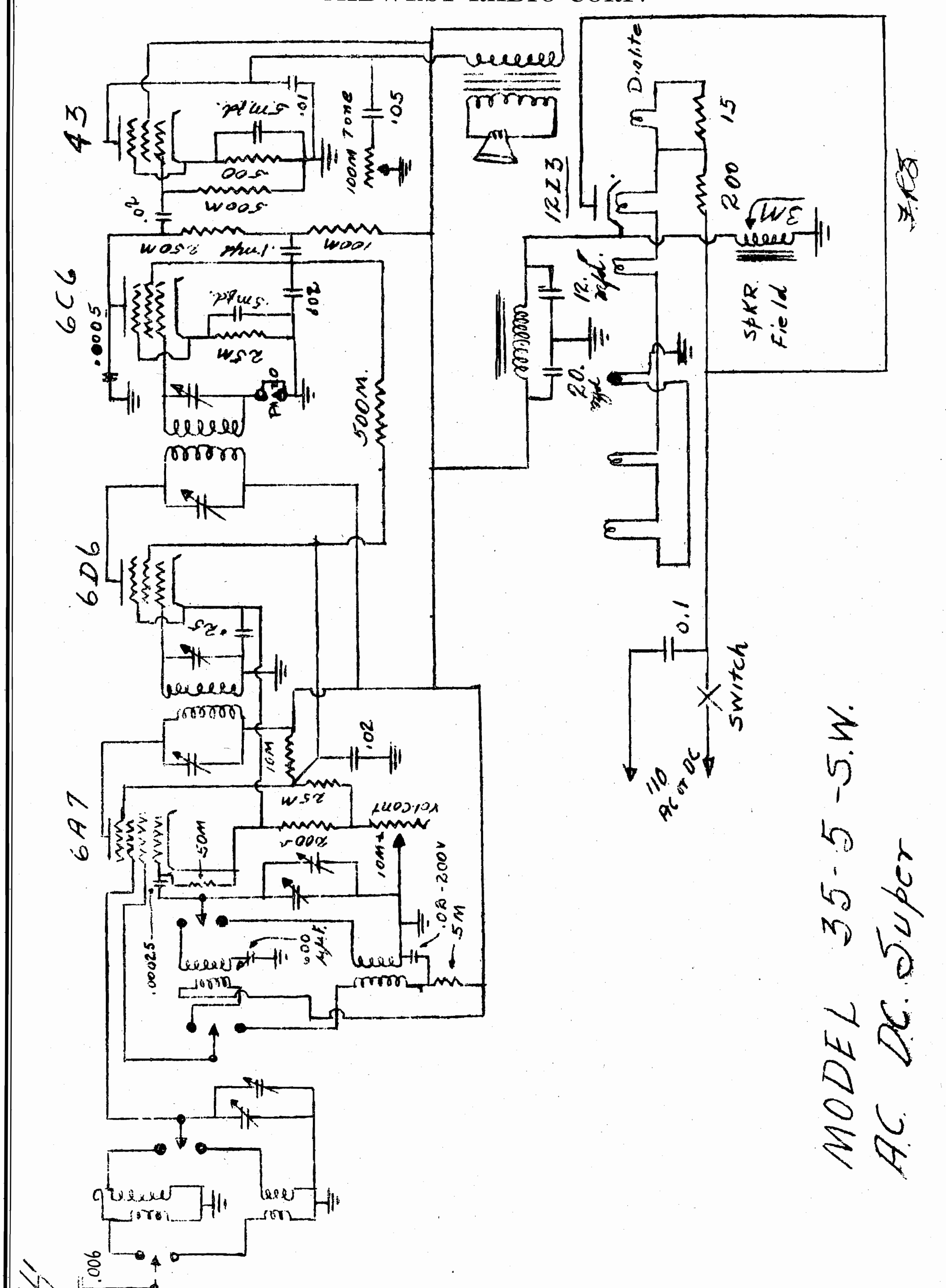
MODEL 10A-33-34
Schematic, Socket

MIDWEST RADIO CORP.



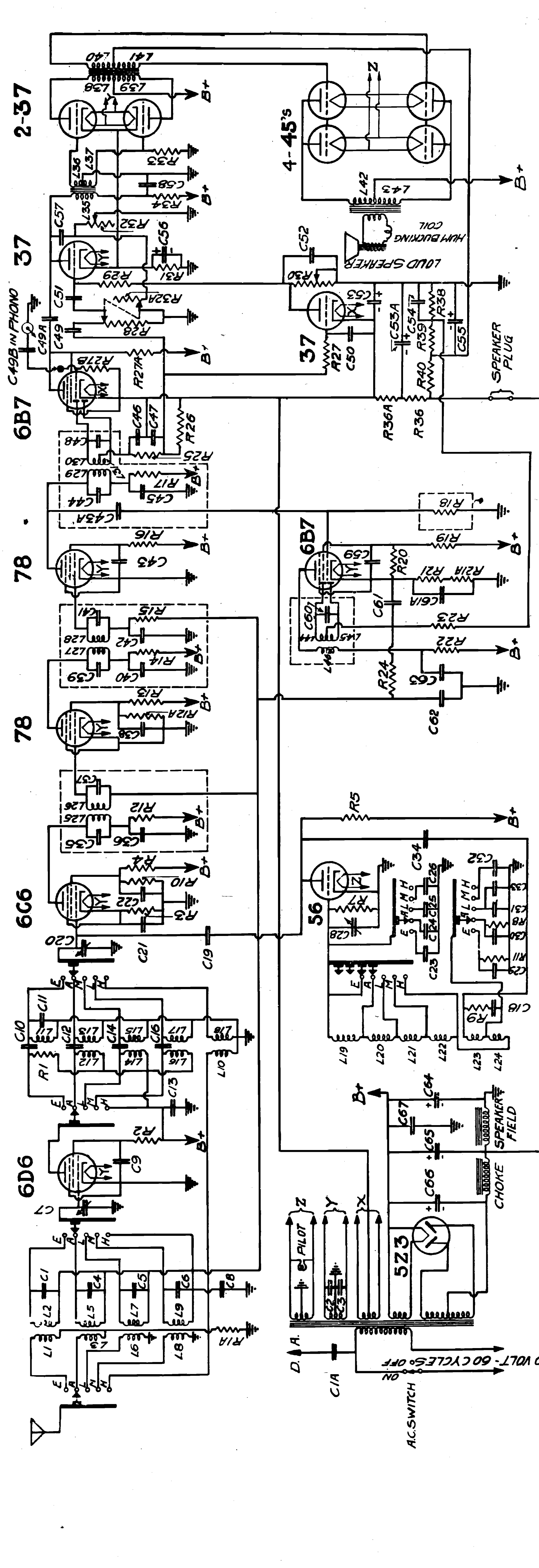
MODEL 35-5-SW
Schematic

MIDWEST RADIO CORP.

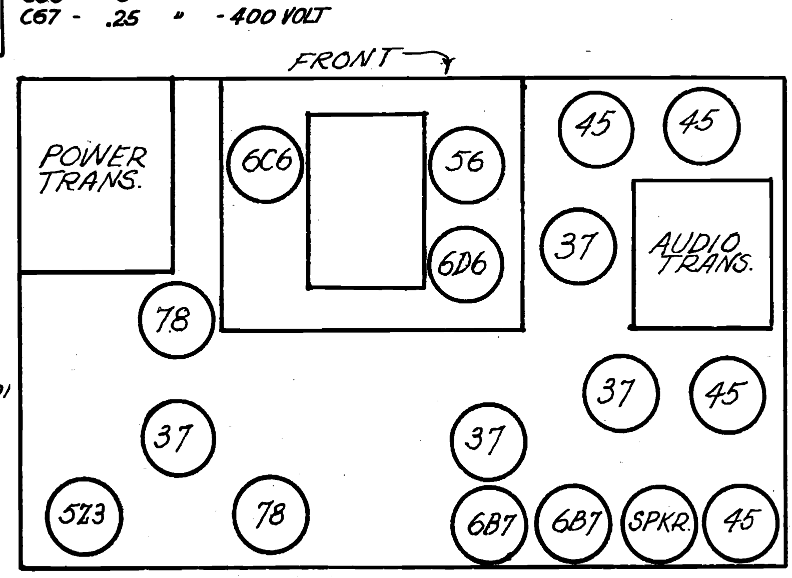


MODEL 16-34
Schematic, Socket

MIDWEST RADIO CORP.



C1A - 250 MMFD - MICA
C1 - 80 " - TRIMMER
C2 - .05 MFD - 200 VOLT
C3 - .05 " - 200 "
C4 - 20 MMFD - TRIMMER
C5 - 20 " - "
C6 - 20 " - "
C7 - 365 " - TUNING CONDENSER
C8 - .05 MFD - 200 VOLT
C9 - .05 " - 400 "
C10 - 25 MMFD - MICA
C11 - 80 " - TRIMMER
C12 - 20 " - "
C13 - .05 MFD - 400 VOLT
C14 - 20 MMFD - TRIMMER
C16 - 20 " - "
C18 - 25 " - MICA
C19 - 20 " - TRIMMER
C20 - 365 " - TUNING CONDENSER
C21 - .05 MFD - 200 VOLT
C22 - .05 " - 200 "
C23 - 80 MMFD - TRIMMER
C24 - 20 " - "
C25 - 20 " - "
C26 - 20 " - "
C28 - 365 " - TUNING CONDENSER
C29 - 160 " - PADDER
C30 - 360 " - "
C31 - 700 " - "
C32 - 3000 " - MICA
C33 - 500 " - "
C34 - 2000 " - "
C35 - I.F.T - TRIMMER
C36 - .05 MFD - 400 VOLT
C37 - I.F.T. - TRIMMER
C38 - .05 MFD - 400 VOLT
C39 - I.F.T. - TRIMMER
C40 - .05 MFD - 400 VOLT
C41 - I.F.T - TRIMMER
C42 - .05 MFD - 200 VOLT
C43 - .05 " - 400 "
C43A - 25 MMFD - MICA
C44 - I.F.T. - TRIMMER
C45 - .05 MFD - 400 VOLT
C46 - 250 MMFD - MICA } DUAL
C47 - 250 " - MICA }
C48 - I.F.T. - TRIMMER
C49 - .05 MFD - 200 VOLT
C49A - .05 " - 400 "
C49B - .05 " - 200 " IN PHONO
C50 - .05 " - 200 "
C51 - .05 " - 200 "
C52 - .01 " - 200 "
C53 - 25 " - 50 "
C53A - 10 " - 75 "
C54 - .05 " - 200 "
C55 - 25 " - 50 "
C56 - 12 " - 25 "
C57 - .05 " - 400 "
C58 - 1 " - 300 "
C59 - .05 " 400 "
C60 - I.F.T. - TRIMMER
C61 - .001 MFD - 600 VOLT
C61A - .05 " - 200 "
C62 - .001 " - 600 "
C63 - .05 " - 400 "
C64 - 8 " - ELECTROLYTIC
C65 - 8 " - "
C66 - 8 " - "
C67 - .25 " - 400 VOLT



CHASSIS LAYOUT

THE MIDWEST RADIO CORP.
909 BROADWAY. CINCINNATI, OHIO.

SCHEMATIC CIRCUIT DIAGRAM OF THE MODEL 16-34 SET

DRAWN F.SCH. SEPT. 14. 1933.
TRACED F.SCH. OKT. 10. 1933
CHECKED P.S. OKT. 10. 1933
APPROVED. W.A.S. OKT. 10. 1933.

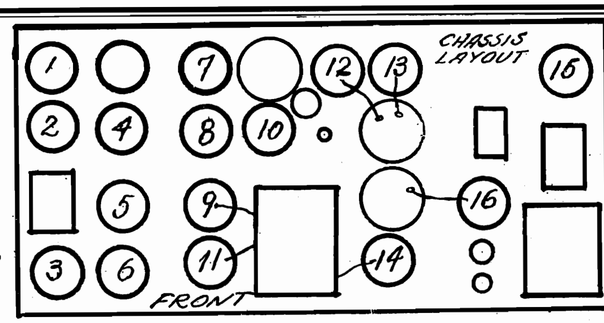
R1A - 5 000 Ω .25 WATT
R1 - 75 000 Ω .25 "
R2 - 200 000 Ω .25 "
R3 - 5 000 Ω 25 "
R4 - 50 000 Ω .50 "
R5 - 15 000 Ω 1 "
R7 - 500 000 Ω .25 "
R8 - 200 000 Ω .25 "
R9 - 1 000 Ω .25 "
R10 - 10 000 Ω .25 "
R11 - 50 000 Ω .25 "
R12 - 5 000 Ω .25 "
R12A - 100 000 Ω .25 "
R13 - 200 000 Ω .25 "
R14 - 5 000 Ω .25 "
R15 - 3 MEG Ω .25 "
R16 - 200 000 Ω .25 "
R17 - 5 000 Ω .25 "
R18 - 3 MEG Ω .25 "
R19 - 25 000 Ω .5 "
R20 - 50 000 Ω .5 "
R21 - 4 000 Ω .25 "
R21A - 4 000 Ω .25 "
R22 - 5 000 Ω .25 "
R23 - 500 000 Ω .25 "
R24 - 100 000 Ω .25 "
R25 - 100 000 Ω .25 "
R26 - 500 000 Ω .25 "
R27 - 500 000 Ω .25 "
R27A - 500 000 Ω .5 "
R27B - 100 000 Ω .25 "
R28 - 500 000 Ω POT. VOLUME CONTROL
R29 - 500 000 Ω .25 WATT
R30 - 50 000 Ω POT. STAT-O-MIT CONTROL
R31 - 700 Ω 1" FLEXIBLE
R32 - 50 000 Ω VARIABLE TONE CONTROL
R32A - 50 000 Ω AUTOMATIC TONE COMPENSATION
R33 - 10 000 Ω .25 WATT
R34 - 15 000 Ω 1 "
R36 - 25 000 Ω .25 "
R36A - 25 000 Ω .25 "
R38 - 10 000 Ω .25 "
R39 - 100 000 Ω .25 "
R40 - 50 000 Ω .25 "

MODEL 16-35
Schematic, Socket

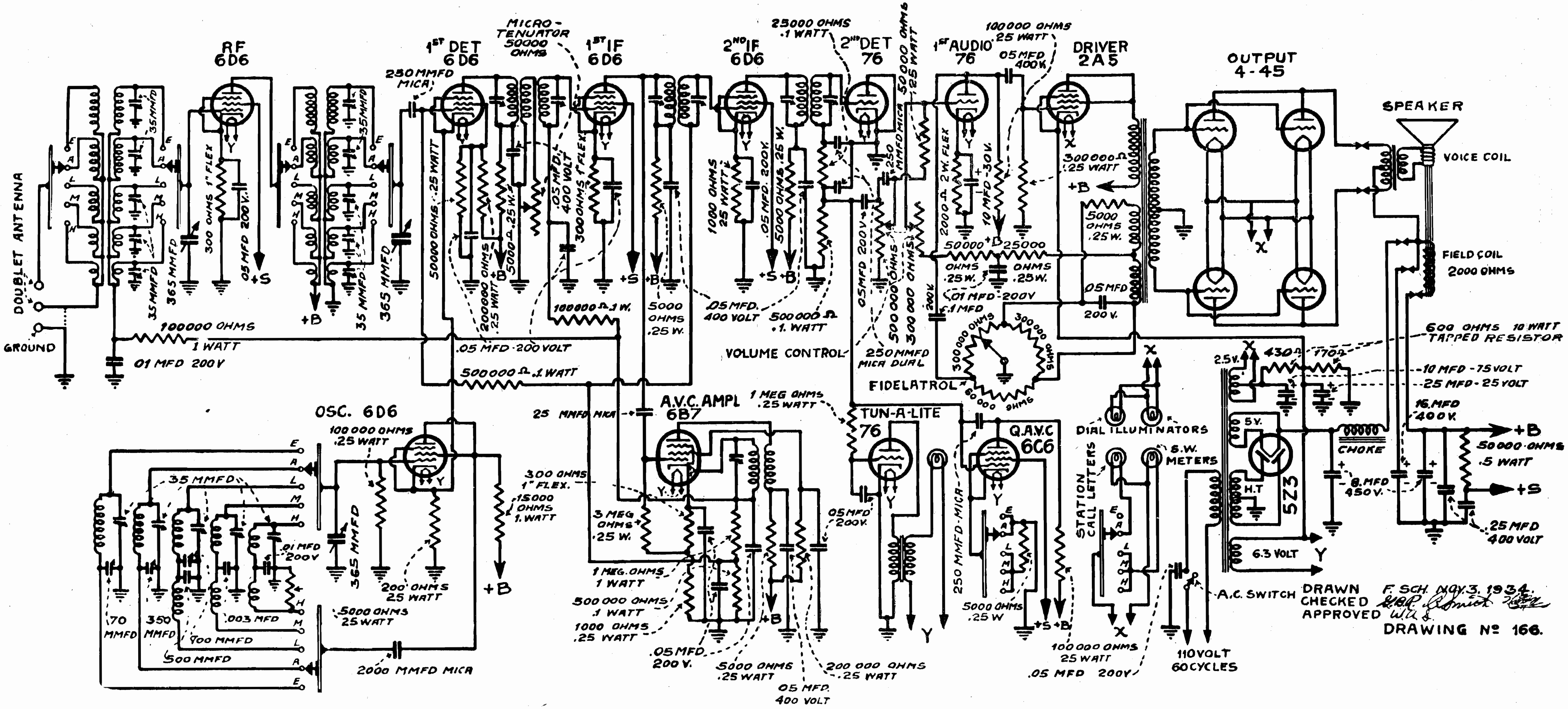
MIDWEST RADIO CORP.

IF PEAK 456 KC

NO.	TUBE
1	45 OUTPUT
2	45 OUTPUT
3	45 OUTPUT
4	2A5 DRIVER
5	76 1ST. A.F.
6	45 OUTPUT
7	76 2ND DECT.
8	6C6 Q.A.V.C.
9	6D6 R.F.AMP.
10	76
11	6D6 OSC.
12	6B7 A.V.C. AMP.
13	6D6 2ND I.F. AMP.
14	6D6 MIXER
15	5Z3 RECT.
16	6D6 1ST I.F. AMP.



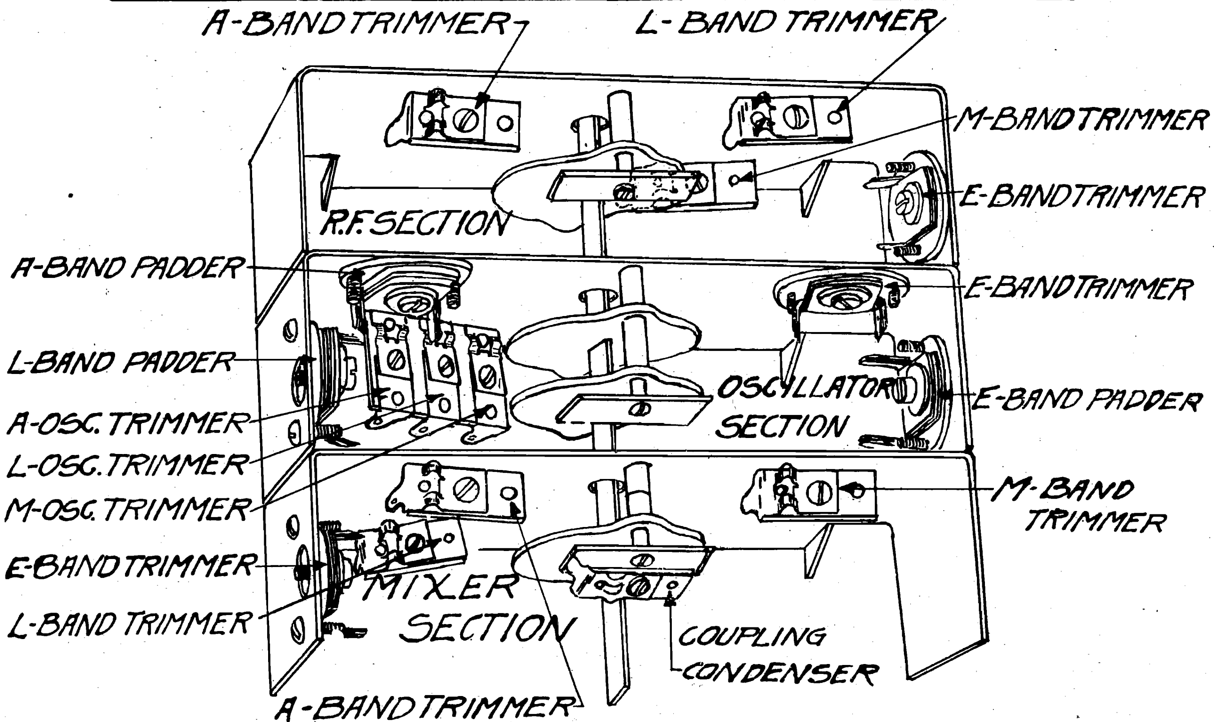
SCHEMATIC CIRCUIT DIAGRAM FOR 16-35 MODEL.



MODEL 16-34
Trimmers, Voltage

MIDWEST RADIO CORP.

THE MIDWEST RADIO CORP.			CINCINNATI, OHIO.
	DATE	NO REQD.	
DRAWN F.SCH.	OCT. 16.33.	MODEL NO 16-34.	LOCATION OF TRIMMERS AND PADDERS ON 16-34 MODEL.
TRACED F.SCH.	OCT. 16.33.	SCALE NONE	
CHECKED		REVISIONS	
APPROVED			



LIST OF TUBE VOLTAGES OF **MODEL 16 - 1934**

Drawn Fitz Sch. 10-1-34
Checked
App.
Drawing No. 73

ALL TESTS MADE WITH NO SIGNAL INPUT AND WITH STATOMIT TURNED FULL ON (CLOCKWISE)

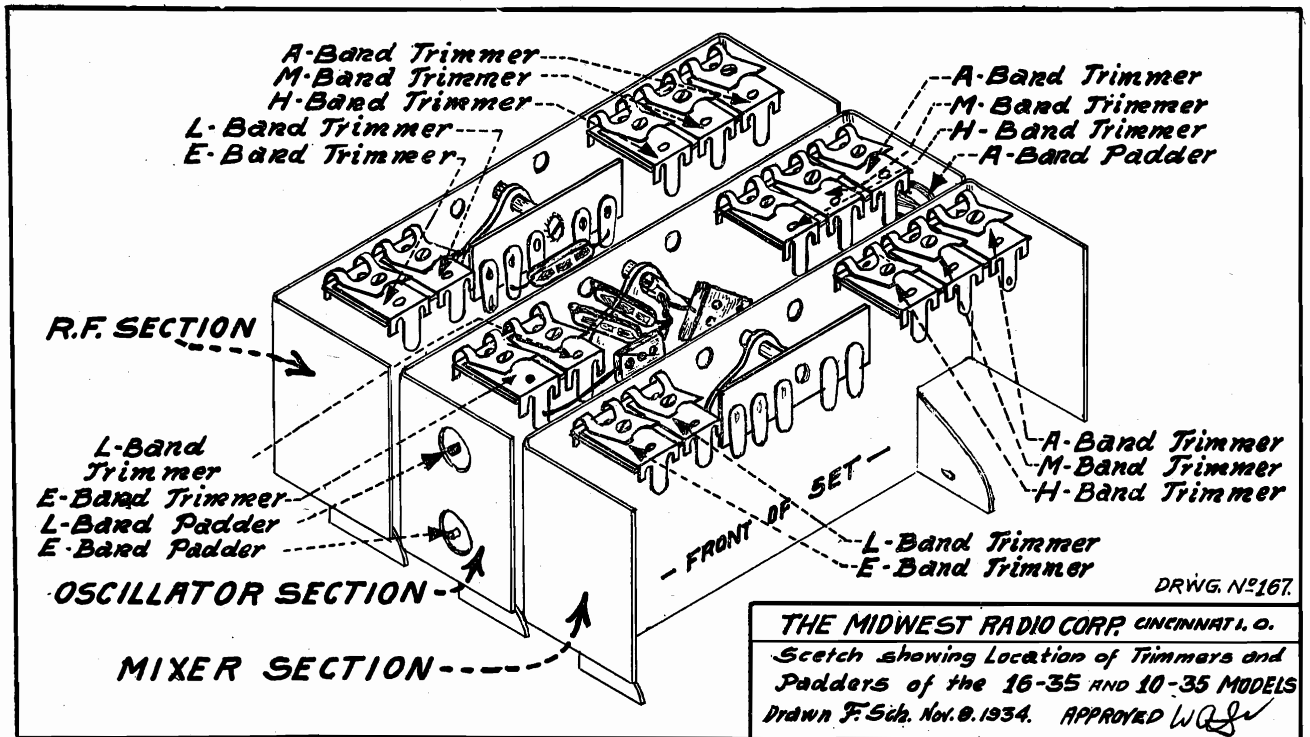
TYPE	POSITION	PLATE VOLTS	SCREEN VOLTS	SUPRESSER VOLTS	KATHODE VOLTS	GRID VOLTS	FIL. VOLTS
6D6	R.F.	240	125	----	----	-5+AVC	6.3
6C6	MIXER	230	50	3	3	----	6.3
56	OSC.	125	---	----	----	----	2.5
78	1st. IF TUBE	230	60	----	----	-5+AVC	6.3
78	2nd IF TUBE	230	125	----	----	-5+AVC	6.3
6B7	A.V.C. AMPL.	230	125	----	35	----	6.3
6B7	2nd DET.	-20	-20	----	40	----	6.3
37	STATOMIT	Full On 0	---	----	40	----	6.3
37	1st A.F.	170	---	----	13	----	6.3
37	2nd A.F.	230	---	----	13	----	6.3
37	2nd A.F.	230	---	----	13	----	6.3
45	OUTPUT	240	---	----	60	----	2.5
45	OUTPUT	240	---	----	60	----	2.5
45	OUTPUT	240	---	----	60	----	2.5
45	OUTPUT	240	---	----	60	----	2.5
5Z3	RECT.	350 R.M.S. PER ANODE					5.0

240 VOLT OUTPUT FROM FILER

1000 ohm per volt meter used for test D.C. measured from ground voltages ± 15% depending on line voltage.

MODEL 10-35
Trimmers, Alignment

MIDWEST RADIO CORP.



Procedure for rebalancing the Midwest 10 - 1935 receiver is as follows:

The I.F. Amplifier is designed to operate at 456 K.C. Peak the 1st, 2nd and 3rd, I.F. transformers tomaximum A.F. output. Trim small A.V.C. transformer to minimum A.F. output. Do not measure A.V.C. as an indication of output. The adjustments screws for the I.F. amplifier will be found in the top of the I.F. Transformers which may be located from the parts location chart.

After the I.F. amplifier has been aligned proceed as follows in the procedure of aligning the R.F. portion of the receiver.

Connect a modern signal generator to the Antenna and Ground posts. Set wave change switch tothe "E" band.

Set signal generator to 325 K.C. Rotate dial of receiver to 325 K.C. Trimm "E" Osc. trimmer until maximum signal is obtained. Trim the "E" band R.F. and "E" band mixer trimmers until maximum signal is obtained. Set signal generator to 125 K.C. Rotate dial to 125 K.C. trim "E" band padder until signal isreceived.

Set wave change switch to the "A" band. Set signal generator to 1400 K.C. Set dial at 1400 K.C. adjust the "A" band Osc. trimmer until the signal is received at maximum. Adjust the A.R.F. and "A" band mixer trimmers to maximum output. Set signal generator at 550 K.C. set dial at 550 band K.C. Adjust the "A" band Osc. padder until signal is received. Set wave change switch to the "L" band. Set signal generator to 4 Meg. Set dial to 4 Meg. Adjust the "L" band Osc. Trimmer until the signal is received at maximum. Adjust the "L" band R.F. and "L" band Mixer trimmers until the signal is received at maximum. Set signal generator to 1600 K.C. and adjust the "L" band padder until signal is received.

Set the wave change to the "M" band. Set signal generator to 11.5 Meg. Set dial to 11.5 Meg. Adjust the "M" band Osc. trimmer until the signal is received at maximum strength. Adjust the "M" band R.F. and "M" band Mixer trimmers until maximum signal isreceived. No padder is provided on this band.

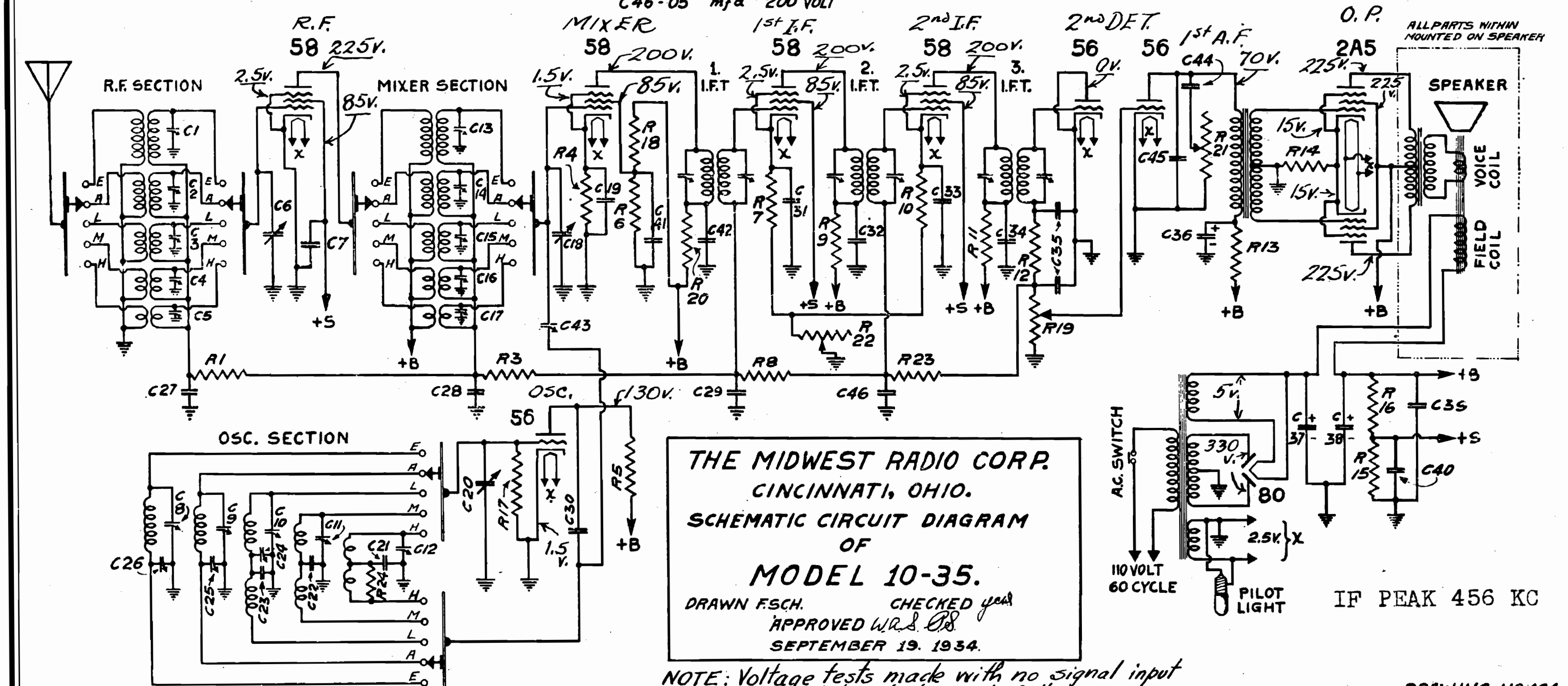
Set wave change switch to the "H" band. Set the signa generator to 28 Meg. Set dial to 28 Meg. Adjust the "H" band Osc trimmer until the signal is received at maximum. Adjust the "H" band R.F. and "H" band Mixer trimmers until the maximum signal is received. No padder is provided for his band.

MODEL 10-35
Schematic, Voltage

MIDWEST RADIO CORP.

C1 - 35	mmfd	TRIMMER
C2 - 35	"	"
C3 - 35	"	"
C4 - 35	"	"
C5 - 35	"	"
C6 - 365	"	TUNING COND.
C7 - 2	mfd	150 VOLT
C8 - 35	mmfd	TRIMMER
C9 - 35	"	"
C10 - 35	"	"
C11 - 35	"	"
C12 - 35	"	"
C13 - 35	"	"
C14 - 35	"	"
C15 - 35	"	"
C16 - 35	mmfd	TRIMMER
C17 - 35	"	"
C18 - 365	"	TUNING COND.
C19 - 05	mfd	200 VOLT
C20 - 365	mmfd	TUNING COND.
C21 - 01	mfd	200V. H. BAND
C22 - 3000	mmfd	MICA M " PADDERS
C23 - 500	"	" L " PADDERS
C24 - 700	"	L " PADDERS
C25 - 400	"	A " PADDERS
C26 - 70	"	E " PADDERS
C27 - 01	mfd	200 VOLT
C28 - 01	"	200 "
C29 - 05	"	200 "
C30 - 2000	mmfd	MICA
C31 - 05	mfd	200 VOLT
C32 - 05	"	400 "
C33 - 05	"	200 "
C34 - 05	"	400 "
C35 - 250	mmfd	MICA - DUAL
C36 - 1	mfd	300 VOLT
C37 - 8	"	450 V. ELECTROLYTIC
C38 - 16	"	450 V. ELECTROLYTIC
C39 - .25	"	400 VOLT
C40 - .25	"	400 "
C41 - 05	"	200 "
C42 - 05	"	400 "
C43 - 35	mmfd	COUPLER
C44 - 05	mfd	400 VOLT
C45 - 250	mmfd	MICA
C46 - 05	mfd	200 VOLT

R1 - 100 000 Ω	.1	WATT	
R2 -			
R3 - 100 000 Ω	.1	"	
R4 - 5 000 Ω	.25	"	
R5 - 15 000 Ω	1	"	
R6 - 25 000 Ω	.25	"	
R7 - 1 000 Ω	.25	"	
R8 - 500 000 Ω	.1	"	
R9 - 5 000 Ω	.25	"	
R10 - 1 000 Ω	.25	"	
R11 - 5 000 Ω	.25	"	
R12 - 25 000 Ω	.1	"	
R13 - 25 000 Ω	.5	"	
R14 - 210 Ω	2	"	FLEXIBLE
R15 - 25 000 Ω	.5	"	
R16 - 25 000 Ω	.5	WATT	
R17 - 100 000 Ω	.25	"	
R18 - 200 000 Ω	.25	"	
R19 - 500 000 Ω	VOLUME CONTROL		
R20 - 5 000 Ω	.25	WATT	
R21 - 50 000 Ω	TONE CONTROL		
R22 - 1 000 Ω	VARIABLE		
R23 - 500 000 Ω	.1	WATT	
R24 - 1 000 Ω	.25	"	



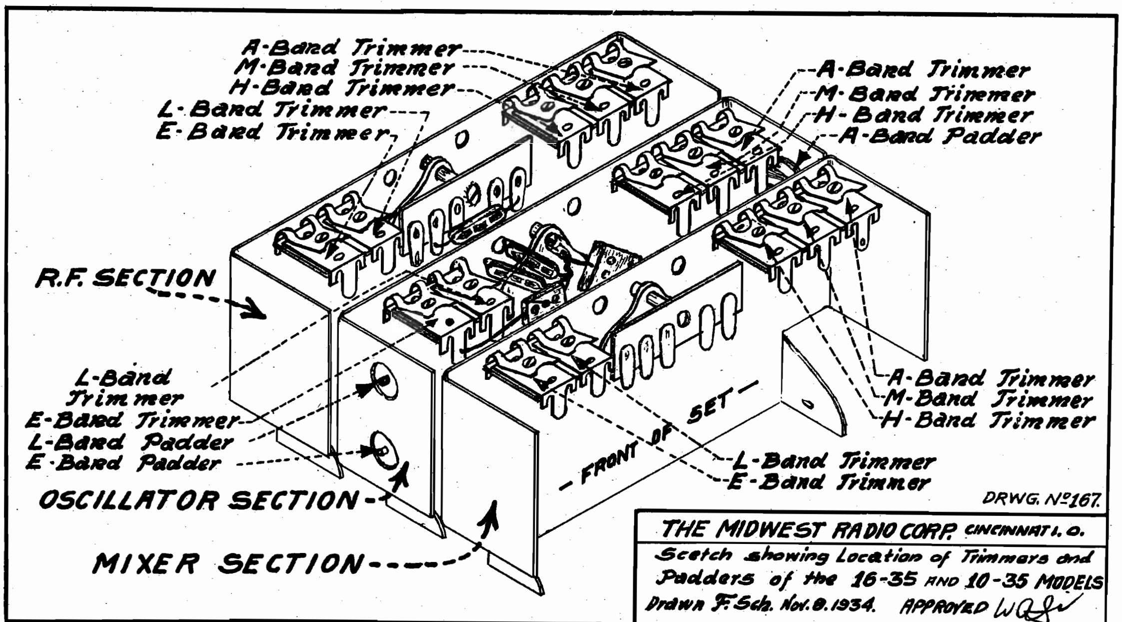
IF PEAK 456 KC

NOTE: Voltage tests made with no signal input and with Statomit turned full on. Line Voltage - 120.

DRAWING NO.164.

MODEL 16-35
Alignment
Trimmers

MIDWEST RADIO CORP.



REBALANCING

Procedure for rebalancing the Midwest 16 - 1935 receiver is as follows:

The I.F. Amplifier is designed to operate at 456 K.C. Peak the 1st, 2nd and 3rd, I.F. transformers tomaximum A.F. output. Trim small A.V.C. transformer to minimum A.F output. Do not measure A.V.C. as an indication of output. The adjustments screws for the I.F. amplifier will be found in the top of the I.F. Transformers which may be located from the parts location chart.

After the I.F. amplifier has been aligned proceed as follows in the procedure of aligning the R.F. portion of the receiver.

Connect a modern signal generator to the Antenna and Ground posts. Set wave change switch tothe "E" band.

Set signal generator to 325 K.C. Rotate dial of receiver to 325 K.C. Trimm "E" Osc. trimmer until maximum signal is obtained. Trim the "E" band R.F. and "E" band mixer trimmers until maximum signal is obtained. Set signal generator to 125 K.C. Rotate dial to 125 K.C. trim "E" band padder until signal isreceived.

Set wave change switch to the "A" band. Set signal generator to 1400 K.C. Set dial at 1400 K.C. adjusst the "A" band Osc. trimmer until the signal is received at maximum. Adjust the A.R.F. and "A" band mixer trimmers to maximum output. Set signal generator at 550 K.C. set dial at 550 band K.C. Adjust the "A" band Osc. padder until signal is received Set wave change switch to the "L" band. Set signal generator to 4 Meg. Set dial to 4 Meg. Adjust the "L" band Osc. Trimmer until the signal is received at maximum. Adjust the "L" band R.F. and "L" band Mixer trimmers until the signal is received at maximum. Set signal generator to 1600 K.C. and adjust the "L" band padder until signal is received.

Set the wave change to the "M" band. Set signal generator to 11.5 Meg. Set dial to 11.5 Meg. Adjust the "M" band Osc. trimmer until the signal is received at maximum strength. Adjust the "M" band R.F. and "M" band Mixer trimmers until maximum signal isreceived. No padder is provided on this band.

Set wave change switch to the "H" band. Set the signal generator to 28 Meg. Set dial to 28 Meg. Adjust the "H" band Osc. trimmer until the signal is received at maximum. Adjust the "H" band R.F. and "H" band Mixer trimmers until the maximum signal is received. No padder is provided for this band.

This completes the alignment process.

TUBE VOLTAGES

TYPE	POSITION	PLATE VOLTS	SCREEN VOLTS	SUPP. VOLTS	KATHODE VOLTS	FIL. VOLTS
6D6	R. F.	215	85	2.7	2.7	6.0
6D6	MIXER	210	20	2.2	2.2	6.0
6D6	OSC.	96	96	2.2	2.2	6.0
6D6	1st. I.F.	190	86	2.6	2.6	6.0
6D6	2nd I.F.	215	86	5.0	5.0	6.0
6B7	AVC. AMP.	190	46	---	6.0	6.0
6C6	Q.A.V.C.	130	86	0- AE 3.0-LMH	0-AE 3.0-LMH	6.0
76	2nd. LET.	0	--	---	0	6.0
76	DIM A LIGHT	115 A.C.	--	---	0	6.0
76	1st. A.F.	60	--	---	2.3	6.0
2A5	DRIVER	210	--	---	18	2.5
45	OUTPUT	330	--	---	GRID 60	2.5
45	OUTPUT	330	--	---	60	2.5
45	OUTPUT	330	--	---	60	2.5
45	OUTPUT	330	--	---	60	2.5

5Z3 Rect. 355 volts from Filter

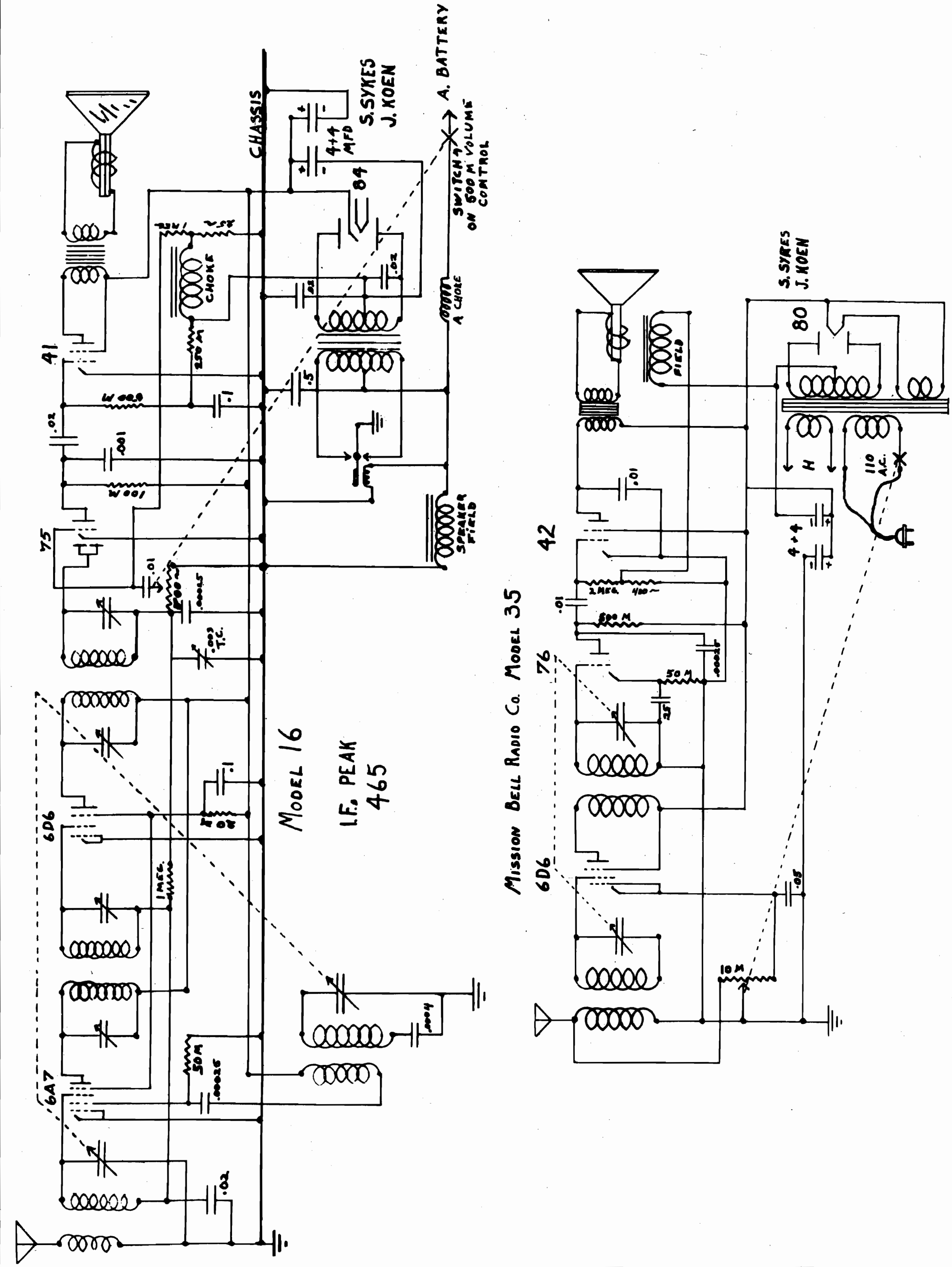
ALL TESTS MADE WITH NOSIGNAL INPUT

Line voltage 120

1000 ohm per volt meter used for all D.C. measurements from ground. Voltage 15% depending on line voltage.

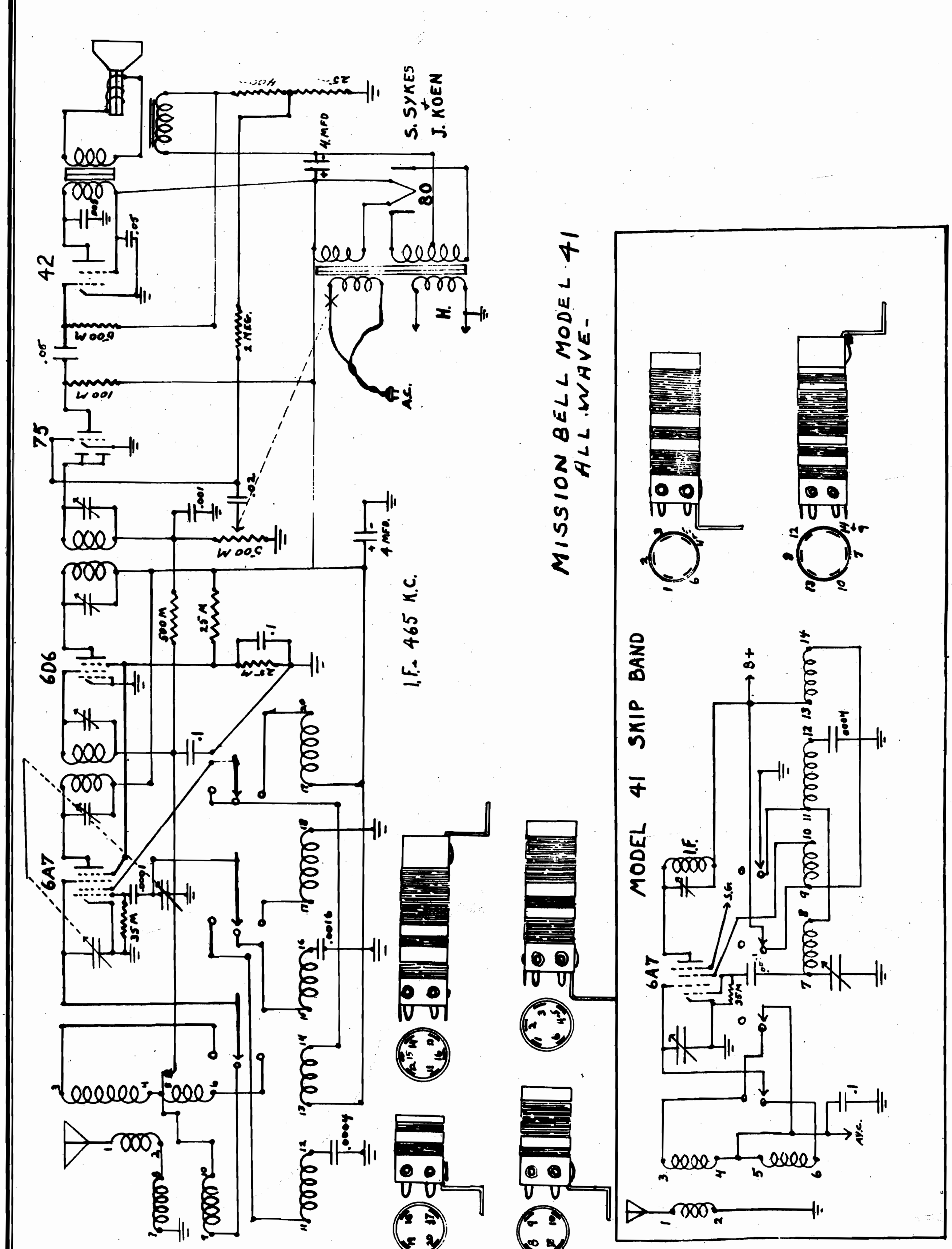
MODEL 16
MODEL 35
Schematics

MISSION-BELL RADIO MFG. CO., INC.



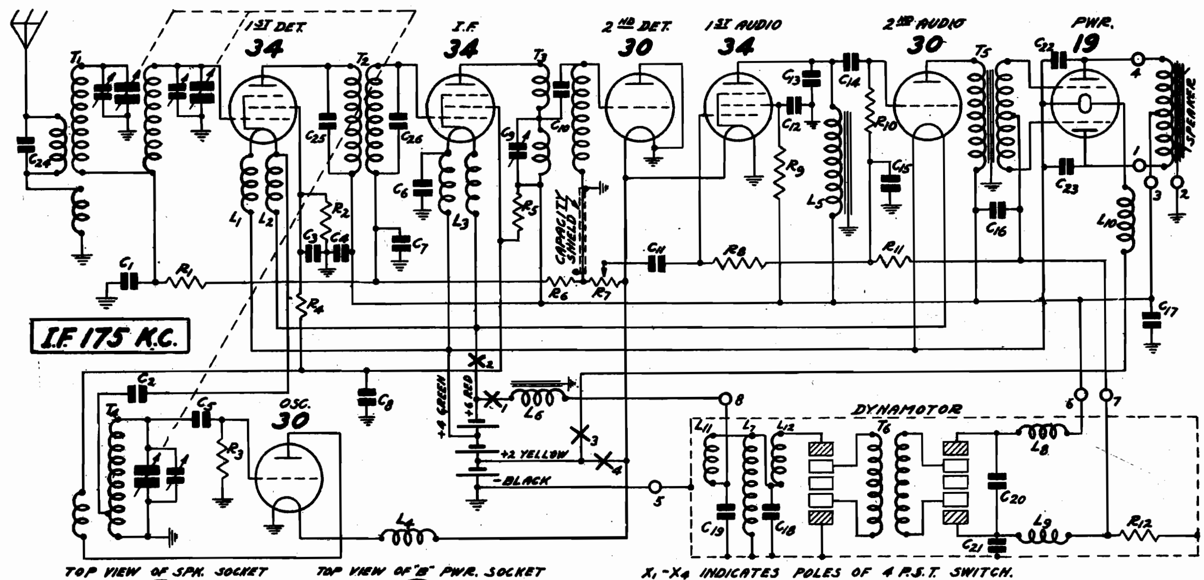
MODEL 41AW
MODEL 41 Skip Band
Schematics

MISSION-BELL RADIO MFG. CO., INC.



MONTGOMERY-WARD & CO.

MODELS 62-114, 62-116
Schematic, Socket, Parts



Sept., 1934

MISCELLANEOUS

Part. No.	ITEM	Selling Price
P-1640	Speaker Socket	$0.06
P-1833	No. 19 Socket	.06
P-1644	No. 30 Socket	.06
P-1645	No. 34 Socket	.06
P-1912	"B" PWR Socket	.06
P-50621	Plate Reactor Assem. L5	.70
P-50622	"A" Filter Reactor Assem. L6	.94
P-50625	Audio Transformer Assem. T5	.82
P-5172	Double Filament Reactor Assem. L1 and L2	.14
P-5173	Dual Filament Reactor Assem. L3 and L4	.22
P-5222	Single Filament Reactor L10	.18
P-5200	Antenna R. F. Transformer Assem. T1	.64
P-40433	Can for the above Assem.	.08
P-5170	1st I. F. Assem. Complete with Can T2	.80
P-5171	2nd I. F. Assem. Complete with Can T3	1.42
P-5169	Oscillator Coil. Complete with Can T4	.46
P-40415	Replacement Can for Osc. Coil	.04
P-10369	8" Black Drive Cord (V. C. or Switch)	.02
P-10370	29" Black Drive Cord (Cond. Drive)	.04

"B" POWER UNIT PARTS

Part No.	ITEM	Selling Price
P-2132	Dynamotor Complete with Case and Cover	$12.00
P-2159	Celotex Box and Cover	.50
P-5151	"B" Reactor Assem. L8 and L9	.12
P-60680	"A" Choke Coil	.20
P-70735B	Cable and Plug	.34
P-1504	Insulated Terminal Strip	.06
P-10191	Rubber Cushion	.04
P-98033	R12 200 Ohm 0.2 Wire Wound	.08
P-81047	C18 0.250 mf 200V; C19 0.250 mf 200V; C20 0.250 mf 200V; C21 0.250 mf 200V — Condenser Block	.58

CONDENSERS

Part No.	Code	Capacity		Voltage	Type	Selling Price
P-80862	C1	0.050	Mf.	200V	Tubular	$0.08
P-80862	C2	0.050	Mf.	200V	Tubular	.08
P-80862	C3	0.050	Mf.	200V	Tubular	.08
P-80864	C4	0.100	Mf.	200V	Tubular	.10
P-81801	C5	35	Mmf.		Cap. Part of Osc. Coil Assem.	.08
P-80888	C6	0.250	Mf.	200V	Tubular	.12
P-80862	C7	0.050	Mf.	200V	Tubular	.08
P-80988	C8	1.500	Mf.	140V	Tubular	.40
P-1965	C9	70-140	Mmf.		Trimmer	.18
P-81800	C10	50	Mmf.		Cap. Part of 2nd I.F. Coil As.	.08
P-80981	C11	0.010	Mf.	400V	Tubular	.10
P-80888	C12	0.250	Mf.	200V	Tubular	.12
P-80945	C13	500	Mmf.		Moulded	.08
P-80862	C14	0.050	Mf.		Tubular	.08
P-80888	C15	0.250	Mf.	200V	Tubular	.12
P-81014	C16 / C17	16.00 / 16.00	Mf. / Mf.		Electrolytic Block	1.22
P-80914	C22	0.002	Mf.	600V	Tubular	.10
P-80914	C23	0.002	Mf.	600V	Tubular	.10
P-81812	C24	200	Mmf.		Cap. Part of Ant. Assem.	.08
P-81807	C25	70	Mmf.		Cap. Part of 1st I.F. Coil As.	.08
P-81805	C26	45	Mmf.		Cap. Part of 1st I.F. Coil As.	.08
P-81015		Three Gang Condenser				1.70

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95104	R1	100,000 Ohm	.2	Carbon	$0.08
P-A93303	R2	30,000 Ohm	.2	Carbon	.10
P-A95104	R3	100,000 Ohm	.2	Carbon	.08
P-A93602	R4	6,000 Ohm	.2	Carbon	.10
P-B93902	R5	9,000 Ohm	.5	Carbon	.10
P-A95505	R6	5 Megohm	.2	Carbon	.08
P- 96012	R7	1 Megohm		Volume Control	.40
P-A95505	R8	5 Megohm	.2	Carbon	.08
P-A94603	R9	60,000 Ohm	.2	Carbon	.08
P-A95104	R10	100,000 Ohm	.2	Carbon	.08
P-A95104	R11	100,000 Ohm	.2	Carbon	.08

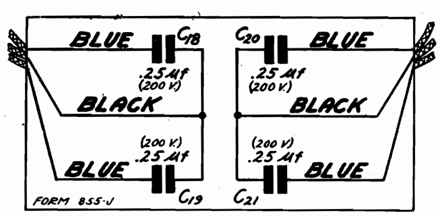


Fig. 3. Four Section Condenser in Power Unit Box

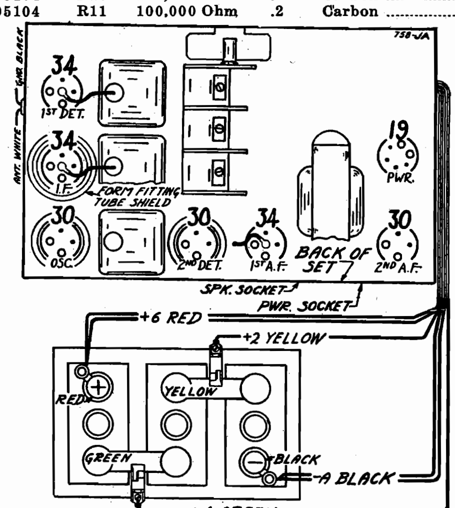


Fig. 2. Location of Tubes and Battery Connections

MODELS 62-114, 62-116
Voltage, Resistance Test
Alignment, Data

MONTGOMERY-WARD & CO.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and Off-On switch collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum
Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tens on spring over the spur on the drive drum.
Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

Voltages at Sockets

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Filament Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 KC. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 KC and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 KC padder and no adjustment at this frequency, therefore, is required.

D. C. Resistance of Windings

Part No.	Item	Code	D. C. Resistance in Ohms
P-5168	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preselector	T1	3.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5169	Oscillator Grid Coil	T4	3.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-50222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1066.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	666.
P-2124	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

MODELS 62-114, 62-116
Wiring Changes, Schematic

MONTGOMERY-WARD & CO.

Models 114 and 116 "B" Batteryless Receivers

Method of changing the filament wiring to 6 volt series operation.

I.F. 175 K.C.

July 1935

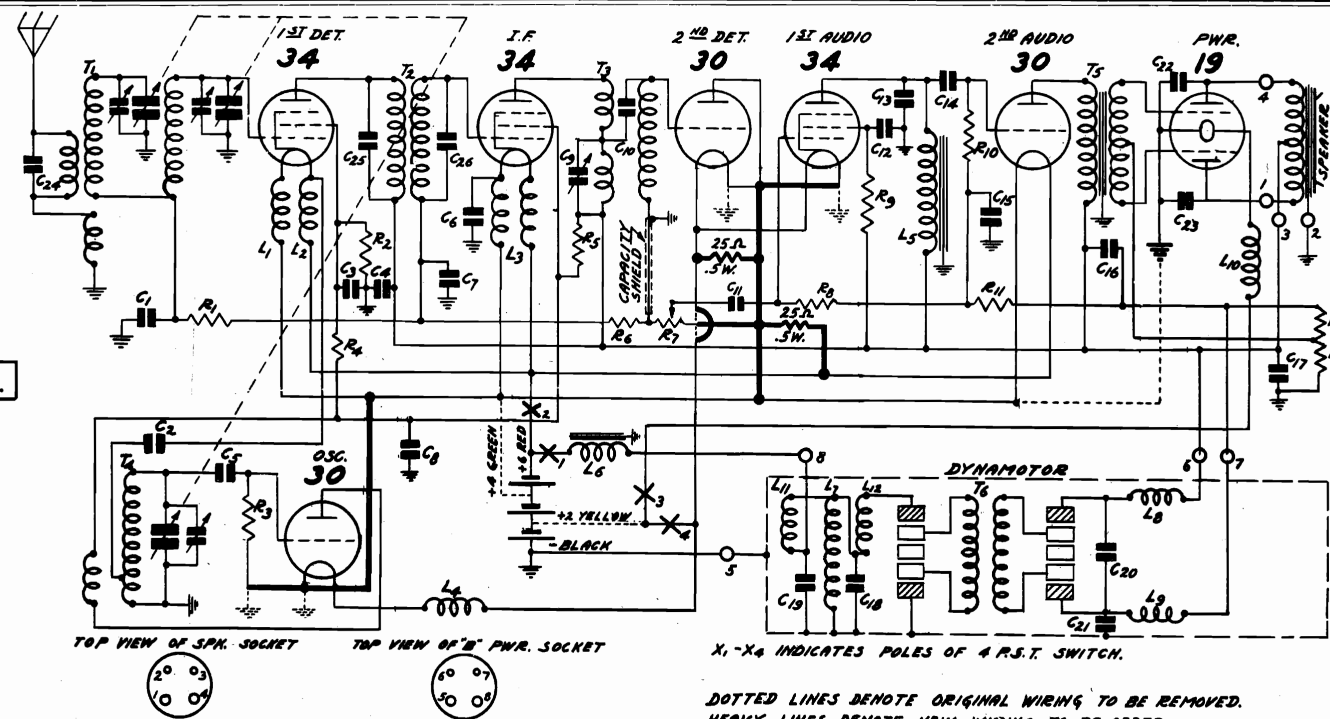


FIG. 1 SCHEMATIC CIRCUIT DIAGRAM SHOWING CHANGES NECESSARY TO REWIRE FOR SERIES FILAMENT.

This receiver uses 2 volt tubes and the power supply is a 6 volt storage battery. Power for the tube filaments is obtained from the individual cells of the battery. A 4 lead cable is used and connections are made at the negative terminal, 2 and 4 volt straps and 6 volt terminal.

If some of the connections are incorrectly made or are open due to corrosion at the battery, it is possible to impress excessive voltages on certain of the tube filaments, burning them out or paralyzing them.

To guard against this condition a cautionary tag was put on the battery cable of each of these sets, and complete information was included in the instruction book. In spite of this fact it was found that users frequently made poor or wrong connections, and changed batteries with the switch on. As a result tubes in many cases were damaged.

For this reason, a system has been worked out for rewiring the tube filaments so that they will be connected in series across the 6 volt battery. The rewiring is simple and can be accomplished in a short time by any experienced radio technician. After rewiring there are only two battery leads, the negative and the 6 volt positive.

It is not recommended that all sets be changed over as obviously most of them are working satisfactorily, and the customers understand how to use them. However, if you have any particularly troublesome cases where tube burn outs continue, it is advisable to rewire the chassis as described.

Complete information for making the change is contained in the following instructions. In the schematic circuit diagram Fig. 1, the old wiring removed is shown dotted while the new wiring is shown in the heavy lines. The actual wiring change is illustrated in Fig. 2.

MODELS 62-114, 62-116
Chassis View of Changes
Data

MONTGOMERY-WARD & CO.

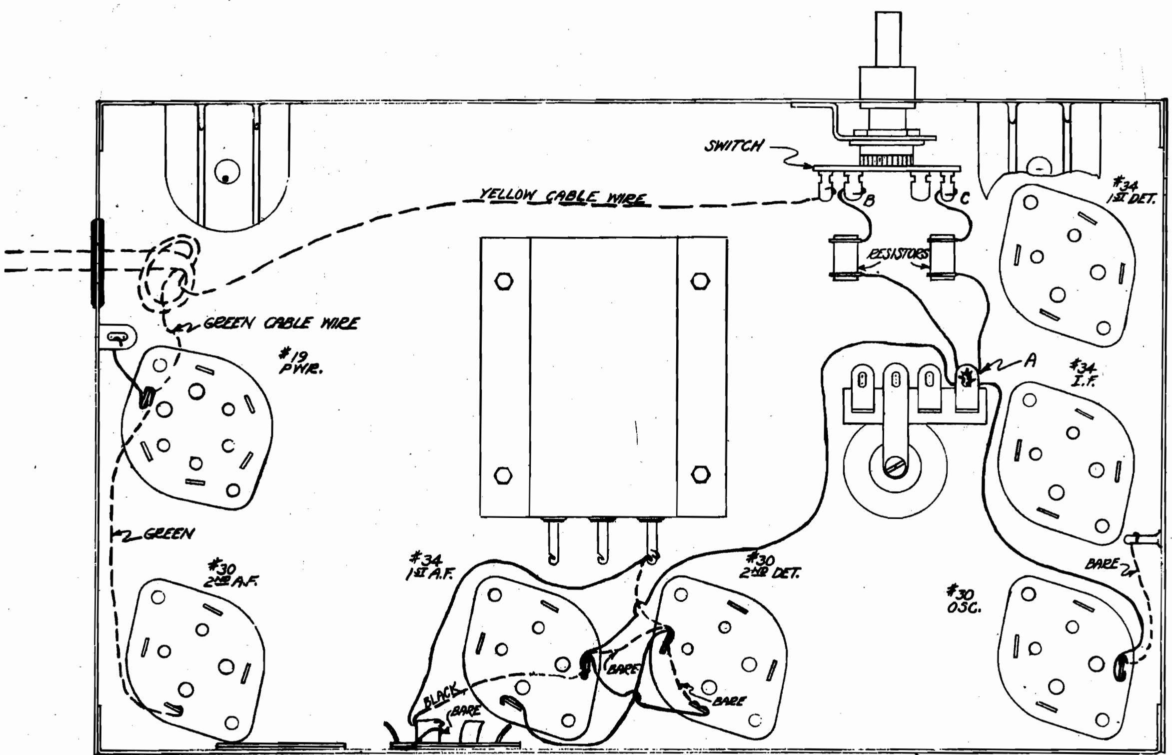


FIG. 2 CHANGES IN WIRING

1. Cut the yellow battery lead at the switch and remove it from the cable. Use this for hook-up wire.

2. Disconnect the wire connecting the 2nd A.F. and 19 tube filaments at the 2nd A.F. terminal and ground it at the lug on the side of the chassis.

3. Remove rear mounting foot.

4. Cut out the bare wire jumpers from the 2nd Det. and 1st A.F. filaments to the plate of the second detector and replace with a bare wire jumper connecting between the two filaments only, leaving just the black wire on the second detector plate.

5. Disconnect that black wire at the condenser block and connect it to the same lug to which the green wire is connected on the 1st A.F. filament.

6. At the 1st A.F. tube socket disconnect the black wire from the filament prong and connect it to the empty lug on the condenser block.

7. Extend the lead from the bare wire junction of the 2nd Detector and 1st A.F. filaments to the lug marked "A." (Do not solder yet).

8. Remove filament ground on oscillator tube and extend the lead so that it can be connected to lug "A." (Do not solder yet).

9. Connect a 25 ohm .5 watt ± 5% resistor between lugs "A" and "B." (Do not solder lug A).

10. Connect a 25 ohm .5 watt ± 5% resistor between lugs "A" and "C." Note: All 4 connections can now be soldered to lug A.

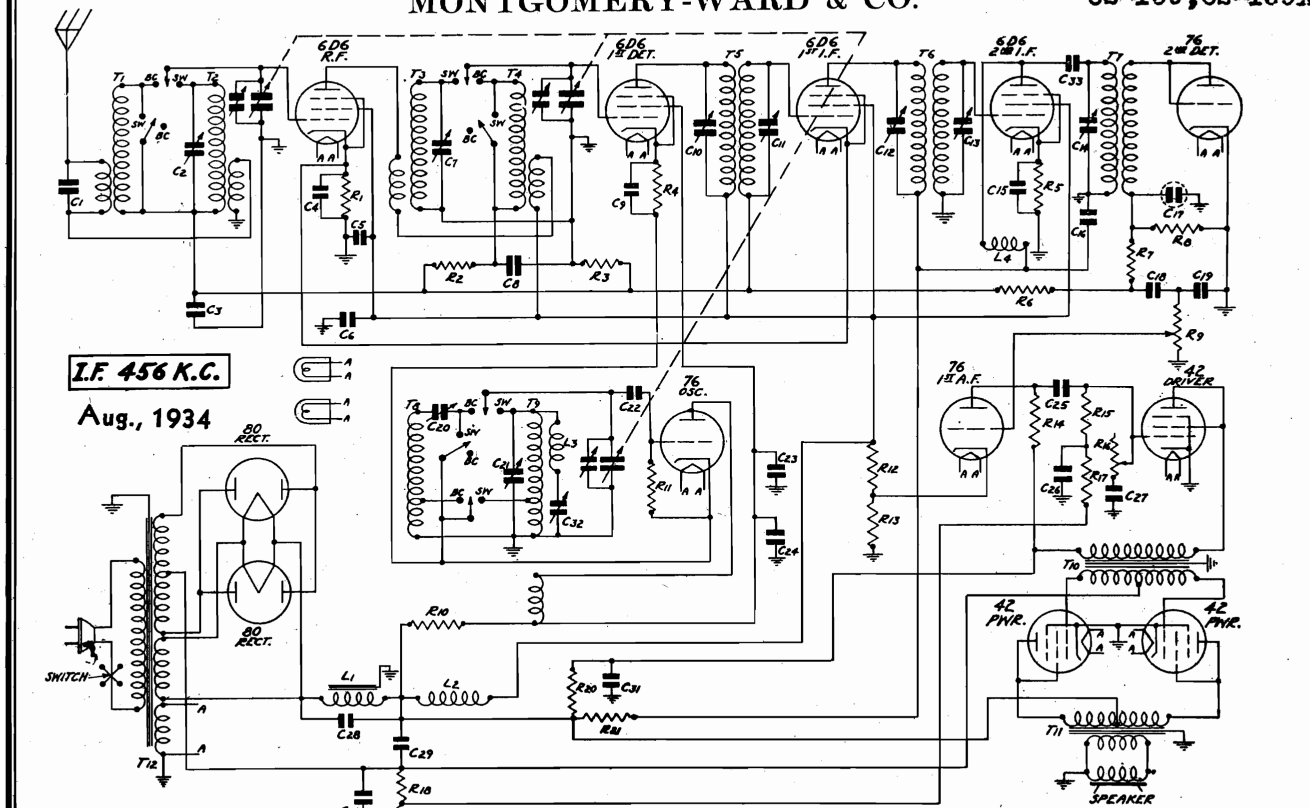
11. Cut the green cable wire at the 19 tube socket and remove it from the cable.

12. Replace the mounting foot and check to see that the 25 ohm resistors are not in a position to short on the bottom plate or other connections.

Schematic, Parts

MODELS 62-134, 62-134X
62-139, 62-139X

MONTGOMERY-WARD & CO.



NOTE: CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

B.C. means Standard Wave
S.W. means Short Wave

REPAIR PARTS LIST FOR 12 TUBE SUPERHETERODYNE RECEIVER

MISCELLANEOUS

Part No.	ITEM	Selling Price
P-5176	Sho. W. and Std. W. Antenna R. F. Transformer less can T1, T2	$0.86
P-5241	Sho. W. and Std. W. Interstage R. F. Transformer less can T3, T4	.94
P-5183	Oscillator Coil Assembly less can T8, T9	.82
P-5245	3rd I. F. Transformer less can T7	.76
P-40433	Cans for the above assemblies	.08
P-5243	1st I. F. Trans. & Can Assem. T5	1.04
P-5244	2nd I. F. Trans. & Can Assem. T6	1.04
P-5190	H. F. Oscillator Tracking Coil L3	.18
P-5246	2nd I. F. Plate Reactor L4	.30
P-50650-2B	Power Choke L1	1.06
P-50653-2B	Input Transformer T10	1.32
P-50642A-2B	Output Transformer T11	.76
P-50620-2B	Power Transformer 115V 60 Cycle T12	3.40
P-50652-2B	Power Transformer 115V 25 Cycle T12	4.52
P-50651-2B	Power Transformer 115-230V 40-60 Cycle T12	3.74
P-2025	No. 80 Tube Socket	.08
P-1884	No. 42 Tube Socket	.08
P-2022	No. 76 Tube Socket	.08
P-1885	No. 6D6 Tube Socket	.08
P-1637	Speaker Socket	.06
P-40445	Tube Shield	.08
P-40443	Tube Shield Base	.04
P-1925	Speaker	5.92
P-10320	Glass Crystal	.08
P-20875	Crystal Retainer Ring	.06
P-2060	Knob, Small	.10
P-2062	Knob, Large	.12
P-10272	Rubber Chassis Cushion	.04
P-20912	Large Double End Pointer	.10
P-2101	Band Change Switch	.90
P-30456	Small Pointer	.04
P-2012	Pilot Light Bulb	.08
P-20905	Condenser Shield	.04
P-10369	8" Black Drive Cord (V. C. or T. C. Ind.)	.02
P-10370	29" Black Drive Cord (Con. Drive)	.04
P-2126	Pilot Light Socket and Clip Assem.	.06
P-70702	Cord and Plug Assem.	.32
P-30342	Grid Cap Only	.04
P-1504	8 Lug Terminal Srip	.06
P-1421	Single Lug Terminal Strip	.04

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A93141ww	R1	140 Ohm		Wire Wound	$0.08
P-A95204	R2	200,000 Ohm	0.2	Carbon	.08
P-A95105	R3	1.0 Megohm	0.2	Carbon	.08
P-A94252	R4	2,500 Ohm	0.2	Carbon	.08
P-A93401ww	R5	400 Ohm	0.2	Wire Wound	.08
P-A95205	R6	2.0 Megohm	0.2	Carbon	.08
P-A95104	R7	100,000 Ohm	0.2	Carbon	.08
P-A94304	R8	300,000 Ohm	0.2	Carbon	.08
P- 96005	R9	2.0 Megohm		& Sw. Vol. Con.	.60
P-E94403	R10	40,000 Ohm	3.0	Carbon	.16
P-A95104	R11	100,000 Ohm	0.2	Carbon	.08
P- 98038	R12	4,000 Ohm	2.5	Armored Wire Wound	.38
	R13	390 Ohm	0.5		
	R18	128 Ohm	2.5		
	R19	145 Ohm	3.0		
P-B95603	R14	60,000 Ohm	0.5	Carbon	.08
P-A95603	R15	60,000 Ohm	0.2	Carbon	.08
P- 97011	R16	150,000 Ohm		Tone Control	.36
P-A95203	R17	20,000 Ohm	0.2	Carbon	.08
P- 98037	R20	4,000 Ohm	4.0	Armored Wire Wound	.34
	R21	6,000 Ohm	2.0		

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80919	C1	250 mmf	600V	Moulded	$0.08
P-2102	C2	3—40 mmf		Short Wave Ant. Trimmer	.08
P-81076	C3	0.05 mf	200V	Tubular	.10
P-81111	C4	0.25 mf	200V	Tubular	.12
P-81117	C5	0.25 mf	200V	Tubular	.12
P-81056	C6	6.0 mf	150V	Dry Electrolytic	.68
	C24	2.0 mf	350V		
P-2102	C7	3—40 mmf		Short Wave Inter. Trimmer	.08
P-81076	C8	0.05 mf	200V	Tubular	.10
P-81076	C9	0.05 mf	200V	Tubular	.10
P-2103	C10	150—250 mmf		Double Trimmer (Part of 1st I. F. Trans.)	.28
	C11	150—250 mmf			
P-2103	C12	150—250 mmf		Double Trimmer (Part of 2nd I. F. Trans.)	.28
	C13	150—250 mmf			
P-1685	C14	40—100 mmf		3rd I. F. Trans. Pri. Trimmer	.18
P-81076	C15	0.05 mf	200V	Tubular	.10
P-81097	C16	0.10 mf	500V	Tubular	.14
	C17			Integral Part of 3rd I. F. Assem.	
P-81076	C18	0.05 mf	200V	Tubular	.10
P-81081	C19	35 mmf		Wire Capacitor	.08
P-2112	C20	300—500 mmf		Osc. Std. W. Padding Cond.	.22
P-2102	C21	3—40 mmf		Osc. Sho. W. Trimmer	.08
P-81081	C22	35 mmf		Wire Capacitor	.08
P-81118	C23	0.10 mf	400V	Tubular	.14
P-81096	C25	0.25 mf	400V	Tubular	.18
P-81117	C26	25 mf	200V	Tubular	.12
P-81076	C27	0.05 mf	200V	Tubular	.10
P-81099	C28	0.15 mf	220V	AC Tubular	.26
P-81058	C29	16 mf	450V	Wet Electrolytic	.84
P-82000	C30	30 mf	50V	Dry Electrolytic	.62
P-81039A	C31	16 mf	400V	Wet Electrolytic	.72
P-1685	C32	40—100 mmf		Osc. Sho. W. Padding Cond.	.18
P-80919	C33	250 mmf	600V	Moulded	.08

MODELS 62-134, 62-134X
62-139, 62-139X
Resistance Test, Socket
Trimmers, Voltage

MONTGOMERY-WARD & CO.

12 Tube A. C. Standard and Short Wave Superheterodyne Receiver

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5176	B. C. Antenna Transformer Primary	T1	28.
	B. C. Antenna Transformer Secondary	T1	4.9
	S. W. Antenna Transformer Primary	T2	.3
	S. W. Antenna Transformer Secondary	T2	Small
P-5241	B. C. & S. W. Interstage R. F. Transformer Primaries in series	T4	2.9
	B. C. Interstage R. F. Trans. Sec.	T4	7.8
	S. W. Interstage R. F. Trans. Sec.	T3	Small
P-5243	1st I. F. Transformer Primary	T5	4.8
	1st I. F. Transformer Secondary	T5	4.8
P-5244	2nd I. F. Transformer Primary	T6	5.
	2nd I. F. Transformer Secondary	T6	5.
P-5245	3rd I. F. Transformer Primary	T7	12.0
	3rd I. F. Transformer Secondary	T7	30.0
P-5183	B. C. Oscillator Grid Coil	T8	3.3
	S. W. Oscillator Grid Coil	T9	Small
	S. W. Oscillator Plate Coil	T9	0.25
P-50653-2B	Audio Input Transformer Primary	T10	400.
	Audio Input Transformer Secondary (Center Top to Inside)	T10	200.
	Audio Input Transformer Secondary (Center Tap to Outside)	T10	280.
P-50642A-2B	Audio Output Transformer primary (Center Tap to Inside)	T11	300.
	Audio Output Transformer Primary (Center Tap to Outside)	T11	340.
	Audio Output Transformer Secondary	T11	.4
P-50620-2B	Power Trans. (115V 60 Cycles) prim.	T12	2.5
	Power Transformer (115V 60 Cycles) H. T. Sec. (Center Tap to Inside)	T12	150.
	H. T. Sec. (Center Tap to Outside)	T12	165.
	Power Transformer (115V 60 Cycles) Secondary (80 Filament)	T12	Small
	Power Transformer (115V 60 Cycles) Secondary A-A (Filament)	T12	Small
P-50650-2B	Power Choke	L1	140.
P-5190	H. F. Oscillator Tracking Coil	L3	1.2
P-5246	2nd I. F. Plate Reactor	L4	57.
P-1925	Speaker Voice Coil		1.6
	Speaker Field Coil	L2	5300.

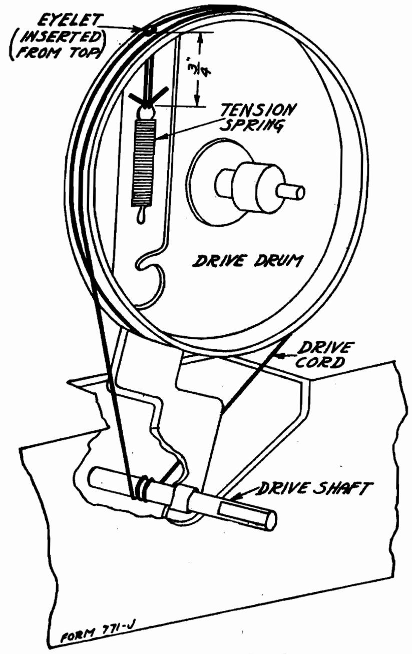


Fig. 3 Drive Cord Replacement.

TUNING RANGE
Standard Wave Band
530 to 1740 Kilocycles
Short Wave Band
5.8 to 18.3 Megacycles

60 Cycle { Model 62-134
" 62-139

25 Cycle { " 62-134x
" 62-139x

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8 (1) 7.7 (2)
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 (3)	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

(1) Switch in Standard Wave position.
(2) Switch in Short Wave position (No Signal).
(3) Measured across resistor R19.

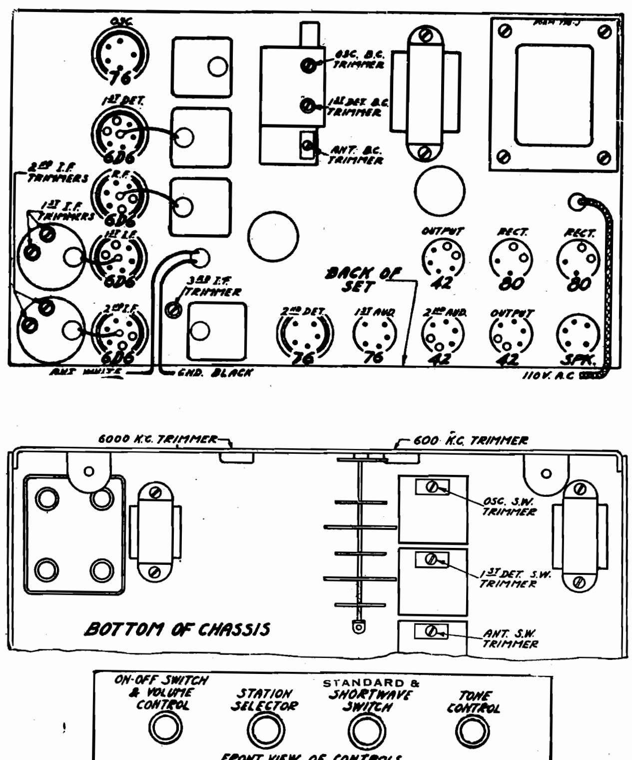


Fig. 2—Location of Tubes, Trimmers and Controls

MONTGOMERY-WARD & CO.

Alignment, Data

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the top panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the top panel.

Standard Wave Band Adjustment

The standard-short wave switch should be in the standard wave position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator standard wave trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the standard wave band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector standard wave trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the standard-short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 3.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 3. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

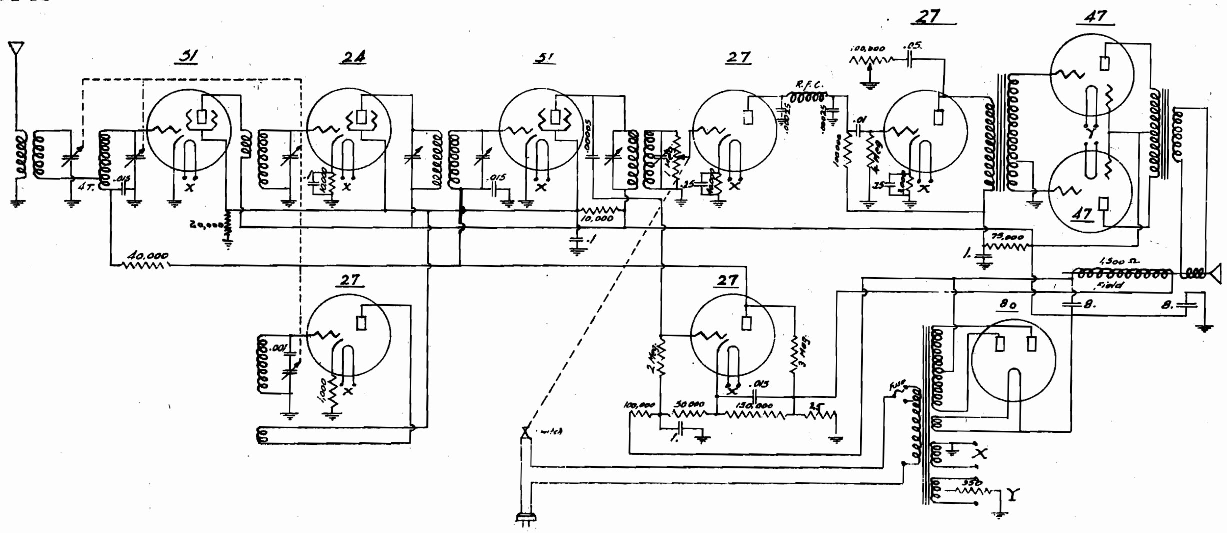
Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

MODEL 62-16
Schematic, Voltage
Parts

MONTGOMERY-WARD & CO.



Ten Tube Super-Heterodyne

This receiver is a super-heterodyne employing the following tubes: Signal frequency amplifier, type No. 235; First detector, type No. 224; Intermediate frequency amplifier, type No. 235; Second detector, type No. 227; First audio, type No. 227; Second audio, two type No. 247's; Rectifier, type No. 280 and AVC tube, type No. 227.

A pre-selector is used between the antenna and the signal frequency RF stage being tuned by the two rear sections of the gang condenser. One coil is mounted directly behind the condenser, in a shield, and the other is located to the right of the condenser, next to the RF tube. The oscillator and detector coils are magnetically coupled and are located underneath the variable condenser.

The I. F. amplifier is designed to give as nearly as possible a flat top response with a band width of ten kilocycles at a signal interference ratio of 1,000 to 1. The coils in the I. F. transformers, therefore are adjusted to approximately critical coupling, and in aligning the I. F. tuned circuits it is unnecessary to stagger the condensers to produce the desirable flat top tuning curve.

INSTALLATION

The sensitivity of this receiver being extremely high, (2 to 5 microvolts) certain precautions are necessary in the installation which are unimportant with receivers of poorer sensitivity. While no definite length can be established for the antenna due to varying local conditions, the average installation should be from 20 to 50 feet, including lead-in. In some locations where field strength is very low, longer antennas may be used, but in all cases, the antenna should be the shortest possible consistent with good station pickup.

The following voltages should be read with no signal being received:

With 300,000 ohm voltmeter (300 volt scale, 1,000 ohms per volt)—	
From ground to R. F. screen	95
From ground to R. F. plate	200
From ground to First detector cathode	10
From ground to Oscillator cathode	5
From ground to Second detector cathode	6
From ground to Second detector plate	50
From ground to Second detector plate resistance	75
From ground to First AF plate	75
From ground to Second AF screen	200
From ground to Second AF plate	190
From ground to Speaker field	140
With 30,000 ohm meter (30 volt scale, 1,000 ohms per volt)—	
Second AF bias	13.5
Second RF bias	2.5
First AF bias	4.8
With 600,000 ohm meter (600 volt scale, 1,000 ohms per volt)—	
80 filament to C. T. of power transformer secondary	345 V.
A. V. C. grid voltage	20
A. V. C. plate voltage	60
A. V. C. filter voltage	40

AC VOLTAGE

Heater filaments	2 V.
Pentode filaments	2.25
80 filaments	4.6

Replacement Parts List
Model 62-16
Supplier: Davison-Haynes Mfg. Co., Los Angeles, California

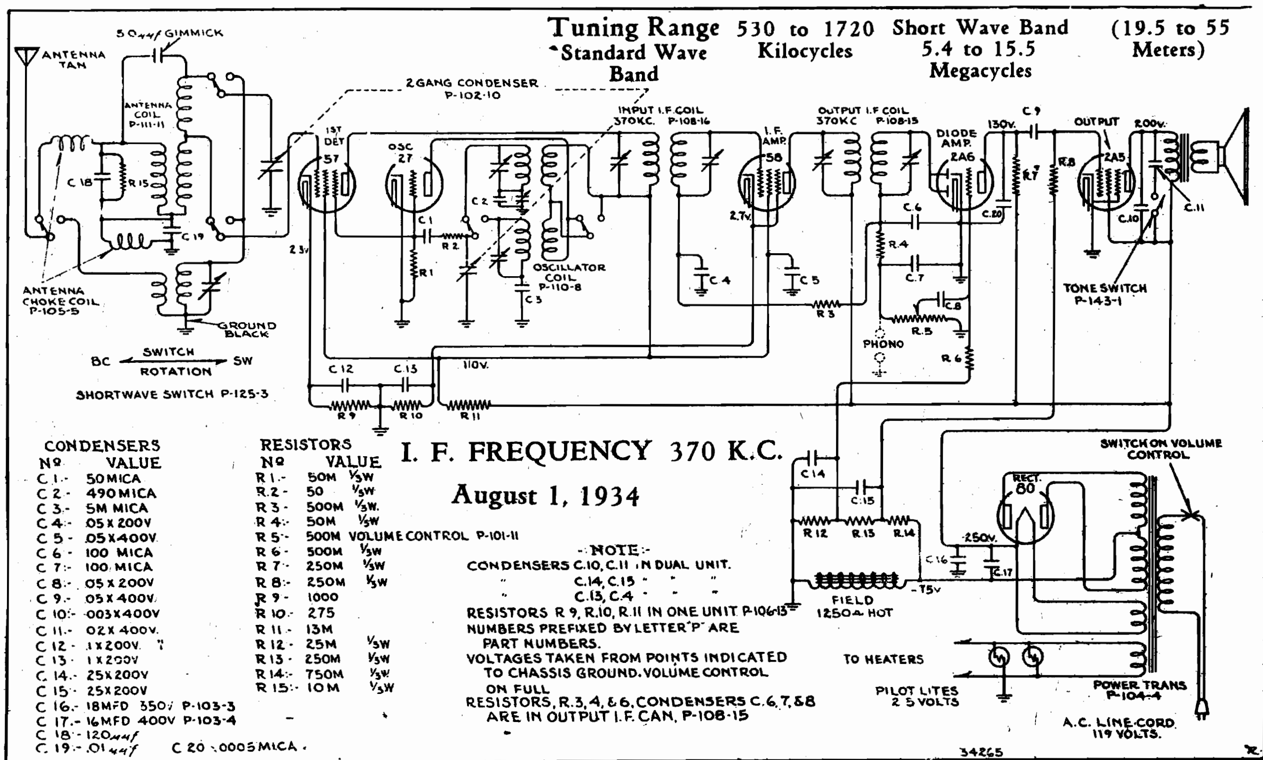
Part No.	PART NAME	Unit Per Chassis	Cost Price	Selling Price
62-A 1	Power Transformer	1	$2.00	$5.00
62-A 2	Audio Transformer	1	.87	2.17
62-A 3	Intermediate Coil—1st stage	1	.40	1.00
62-A 4	Intermediate Coil—2nd stage	1	.40	1.00
62-A 5	Band Pass Coil	1	.40	1.00
62-A 6	Antenna Coil	1	.40	1.00
62-A 7	Coil Shield Can	4	.08	.20
62-A 8	Tube Shield Can	7	.08	.20
62-A 9	Variable Condenser—4 gang	1	2.60	6.50
62-A10	Volume Control with Switch—1 meg ohm	1	.48	1.20
62-A11	Tone Control 100,000 ohm	1	.36	.90
62-A12	Electrolytic Condenser 8 mfd.	2	.60	1.50
62-A13	By Pass Block 2x1. mfd.	1	.50	1.25
62-A14	Dial Assembly with Escutcheon	1	.75	1.87
	RESISTORS			
62-A15	350 ohm—2 watt	1	.12	.30
62-A16	10,000 ohm—2 watt	1	.12	.30
62-A17	75,000 ohm—1 watt	1	.09	.22
62-A18	3,000 ohm—1 watt	1	.09	.22
62-A19	40,000 ohm—1/3 watt	3	.08	.20
62-A20	10,000 ohm—1/3 watt	1	.08	.20
62-A21	1,000 ohm—1/3 watt	1	.08	.20

Part No.	PART NAME	Unit Per Chassis	Cost Price	Selling Price
62-A22	50,000 ohm 1/3 watt	1	.08	.20
62-A23	100,000 ohm 1/3 watt	3	.08	.20
62-A24	150,000 ohm—1/3 watt	1	.08	.20
62-A25	250,000 ohm—1/3 watt	1	.08	.20
62-A26	2 meg ohm 1/3 watt	1	.08	.20
62-A27	3 meg ohm 1/3 watt	1	.08	.20
62-A28	60 ohm wirewound	1	.08	.20
	CONDENSERS			
62-A29	.015—200 Volt	3	.12	.30
62-A30	.01—400 Volt	1	.15	.37
62-A31	.05—400 Volt	1	.12	.30
62-A32	.25—200 Volt	2	.15	.37
62-A33	.1—400 Volt	1	.12	.30
62-A34	.001—3%	1	.13	.32
62-A35	R. F. Choke	1	.21	.52
62-A36	Tuning Meter	1	.75	1.88
62-A37	A. C. Cord and Plug	1	.16	.40
62-A38	Antenna and Ground Post	1	.12	.30
62-A39	Phonograph Jack	1	.12	.30
62-A40	Magnavox Speaker No. 154	2	2.75	6.88
62-A41	Knobs	3	.10	.25
62-A42	Tube Sockets: 4-227, 2-247, 1-280, 1-224, 2-235, 1 speaker socket.	11	.06	.15

MODELS 62-135, 62-150
62-154

MONTGOMERY-WARD & CO.

Schematic, Voltage, Parts



MODEL NUMBERS FOLLOWED BY "X" INDICATES 25-CYCLES

Repair Parts Price List

**Order all parts on stock order from Chicago or Oakland only.
Return defective parts for credit to Chicago or Oakland only.**

Part No.	Description	No. Used in Set	Selling Price
BE 100-9	.05 x 200 Volt Condenser—20%	1	.10
BE 100-13	.05 x 400 Volt Condenser—20%	2	.10
BE 100-14	.1 x 200 Volt Condenser—20%	1	.10
BE 100-18	.01 x 400 Volt Condenser—5%	1	.10
BE 101-11	Volume Control with Switch	1	.60
BE 102-10	Two Gang Variable Condenser	1	1.30
BE 103-3	18 Mfd. x 300 V. Electro. Cond.	1	.70
BE 103-4	16 Mfd. x 350 V. Electro. Cond.	1	.70
BE 104-4	Power Transformer—50-60 Cycle	1	2.00
BE 104-10	Power Transformer—25 Cycle		3.00
BE 104-11	Power Transformer—Universal Primary—40 Cycle		3.50
BE 104-15	Power Transformer—Universal Primary—25 Cycle		4.60
BE 105-5	Antenna Choke Coil	1	.30
BE 106-13	14,275 Ohm Metal Clad Resistor	1	.40
BE 107-5	Line Cord and Plug	1	.30
BE 108-15	Output I.F. Transformer Complete	1	.80
BE 108-16	Input I.F. Transformer Complete	1	.70
BE 110-8	Oscillator Coil Complete in Can	1	1.00
BE 111-11	Antenna Coil Complete in Can	1	1.10
BE 112-10	Drive Bracket—Less Planetary	1	.30
BE 112-21	Dial	1	.20
BE 112-23	Pointer	1	.06
BE 112-24	Dial Glass	1	.10
BE 112-26	Planetary Drive Complete	1	.50
BE 112-31	Compression Spring	1	.02
BE 112-38	Bakelite Escutcheon	1	.30
BE 112-40	Pilot Light Bracket	2	.10
BE 112-65	Glass Retaining Escutcheon with glass		.40
BE 112-68	Dial Scale used on sets with BE 112-65 escutcheons		.25
BE 112-70	Dial Bracket—Less Planetary Replaces BE 112-10 on sets using Glass Retaining Escutcheon BE 112-65	1	.30
BE 114-1	Dynamic Speaker—Six Inch		3.80
BE 114-4	Dynamic Speaker—Eight Inch		4.20
BE 116-1	2.5 Volt Pilot Lamp—41-G3½	2	.10
BE 118-3	.05 x .1—200 Volt Condenser—20%	1	.20
BE 118-4	.003 x .02—400 Volt Dual Cond. 20%	1	.20
BE 118-5	.25 x .25—200 Volt Dual Cond. 20%	1	.20
BE 124-5	J-3-S Series Padder	1	.16
BE 125-3	Short Wave Switch	1	.70
BE 129-2	.0005 Mica Condenser—20%	1	.10
BE 129-5	.0001 Mica Condenser—20%	2	.10
BE 129-9	.005 Mica Condenser—10%	1	.30
BE 129-10	.00049 Mica Condenser — 12%, Min. 8%	1	.10
BE 129-11	.00005 Mica Condenser—30%	1	.10
BE 129-13	120 Mmf. Mica Condenser—10%	1	.10
BE 130-1	25M Ohm—1/3 Watt Carbon Res.	1	.10
BE 130-3	500M Ohm—1/3 Watt Carbon Res.	2	.10
BE 130-11	250M Ohm—1/3 Watt Carbon Res.	2	.10
BE 130-12	50M Ohm—1/3 Watt Carbon Res.	2	.10
BE 130-17	10M Ohm—1/3 Watt Carbon Res.	1	.10
BE 130-27	50M Ohm—1/3 Watt Carbon Res.	1	.10
BE 130-28	750M Ohm—1/3 Watt Carbon Res.	1	.10
BE 130-33	240M Ohm—1/3 Watt Carbon Res.	1	.10
BE 131-2	Bakelite Knobs (Inc. Springs)	3	.10
BE 143-1	Tone Switch	1	.12
	All Sockets	--	.20
	Cabinet—Model 62-135	--	5.60
	Cabinet—Model 62-150	--	5.60
	Cabinet—Model 62-154	--	13.00

All resistors are RMA color coded—specify value and/or resistor (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

MODELS 62-135,62-150,62-154
Socket,Trimmers,Alignment MONTGOMERY-WARD & CO.

60 Cycle Chassis No. 62-135, No. 62-150 and 62-154

25 Cycle Chassis No. 62-135-X, No. 62-150-X and 62-154-X

Service Notes

Voltages taken from different points of circuit to chassis are measured with volume control full on, right turn, with a voltmeter having a resistance of 1000 ohms per volt. These voltage are indicated on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of similar capacity, which is known to be in good condition, until the defective unit is located.

Excessive hum, low volume, stuttering and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser.

Open by-pass condensers frequently cause oscillation and distorted reproduction.

Should the planetary type vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked, broken or weak compression spring. This drive may be dis-assembled by removing the two screws which fasten it to the dial bracket. The part number of the compression spring is BE112-31. All of the other dial parts are hardened and should cause no trouble.

Part BE 106-13, a metal clad resistor combining resistors R9, R10, R11, can be repaired without removing by replacing open sections with carbon resistors.

R 9 = 1/3 watt 1000 ohms ± 10%
R10 = 1/3 watt 275 ohms ± 10%
R11 = 2 watts 13000 ohms ± 10%

Care should be used in replacing broken dial crystals, the small retaining ears sometimes break off unless they are carefully adjusted. Should they break, it is best to solder them in place rather than replace the entire BE112-10 unit.

Some chassis are equipped with glass retaining escutcheons, Part No. BE 112-65, on these chassis dial scale No. BE 112-68 replaces BE 112-21.

25 Cycle Chassis

The 25 cycle chassis, models 62-135X, 62-150X and 62-154X may be used on a power supply from 105 to 115 volts, 60 cycles, but the 60 cycle models must not under any circumstances be operated on 25 cycles.

Chassis equipped with transformers for special voltages or frequencies are so marked.

Aligning I. F. Transformers:

1. With volume control full on, at extreme right of its rotation, and with wave selector switch in the broadcast position, extreme left of its rotation, with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers, parts number BE108-15 and BE108-16 in the following manner:
   (a) Connect an external oscillator adjusted to 370 kilocycles in series with a .1 mfd. condenser to the control grid cap of the type 57 first detector tube.
   (b) Adjust trimming condensers of both I.F. transformers to resonance. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 2A5 output tube. Maximum deflection of the meter indicates resonance. Care should be taken to use only enough signal to give a readily readable output.

Note: The two trimmer condensers which tune the primary and secondary of the I.F. transformers are adjusted by set screws and are accessible from the back of the chassis.

Broadcast Band Alignment:

1. Shift the frequency of the external oscillator to 535 kilocycles and connect it in series with a 200 mmfd condenser to the tan antenna wire and the black ground wire.
   (a) Set the variable condenser in its maximum capacity position, plates entirely in mesh.
   (b) Adjust the broadcast oscillator series trimmer to resonance with oscillator. This adjustment is located between the variable condenser and the power transformer and is accessible from the top of the chassis.

Alignment

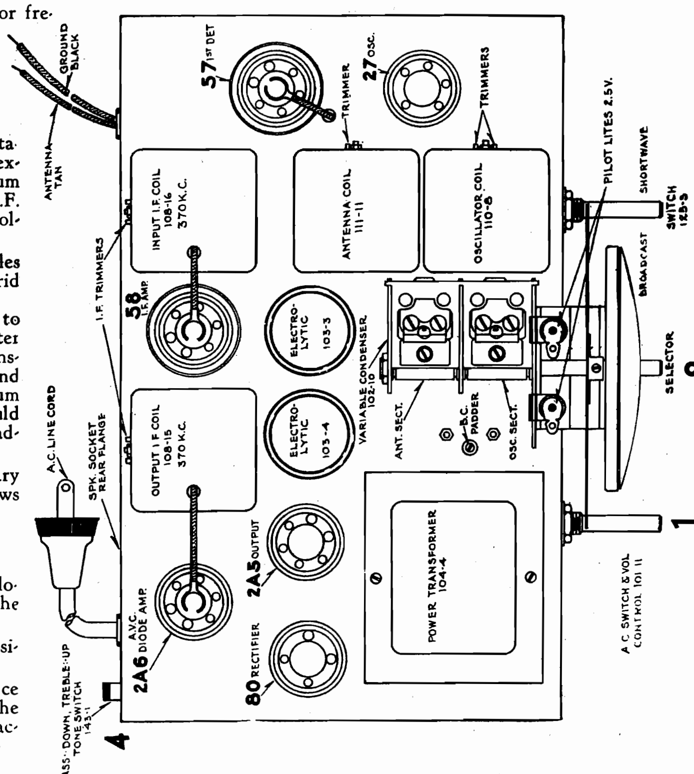
The set should be carefully checked for all other possible causes of trouble, such as defective tubes, condensers, resistors, poor installations and low line voltages before any attempt is made at re-alignment.

Note: When making this adjustment, slowly vary the frequency of the external oscillator as the adjustment is made. Adjust for maximum output.

2. Shift frequency of external oscillator to 1712 kilocycles and set variable condenser in its minimum capacity position, plates entirely out of mesh:
   (a) Adjust the broadcast oscillator shunt trimmer to resonance. This adjustment is the top adjustment in oscillator can assembly, part number BE110-8 (see top view).

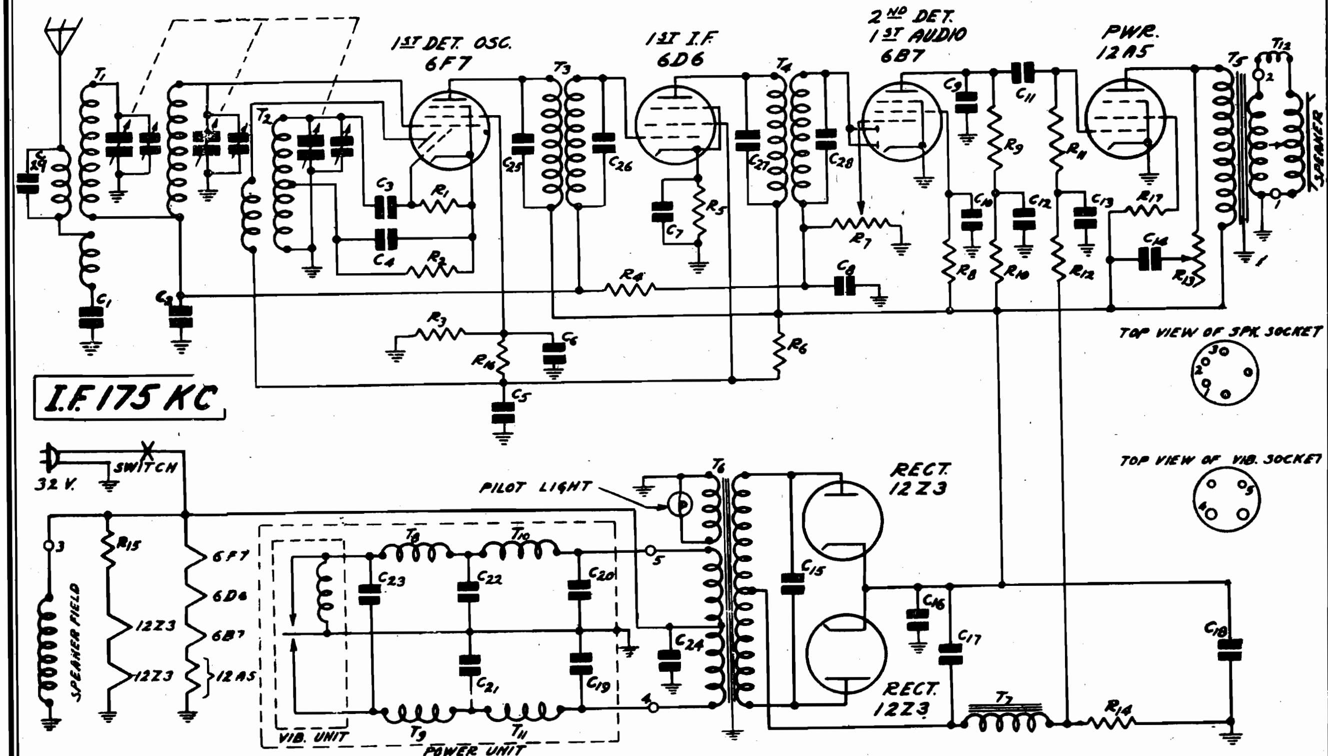
Short Wave Band Alignment:

1. Set the wave changing switch in the short wave position, right turn, and shift external oscillator frequency to 15 megacycles. Connect oscillator to tan antenna lead in series with a 300 ohm resistor to black ground wire.
   (a) With selector knob adjust variable condenser so that dial indicator points to the 15 megacycle calibration on the bottom sector of the dial.
   (b) Adjust the short wave oscillator shunt trimmer to resonance with the 15 megacycle signal (use care and make certain that you do not adjust to resonance with the image instead of the signal). This adjustment is the one closest to the chassis on the side of the oscillator coil can assembly, part number BE110-8, and is accessible from the side of the chassis.
   (c) Adjust the short wave antenna trimmer to resonance. This adjustment is the single adjustment on the side of the antenna coil can assembly, part number BE111-11, and is accessible from the side of the chassis, between the type 57 and 27 tubes.



MODELS 62-136, 62-138
Schematic, Parts

MONTGOMERY-WARD & CO.



The numbers on the 2 sockets shown at the right above, correspond with the numbers as shown, in the circuit.

P-5221	1st I. F. Coil and Can Assembly	.78
P-5203	2nd I. F. Coil and Can Assembly	.72
P-50626	Power Transformer	1.68
P-50624A-6B	Output Transformer	.48
P-50637	"B" Filter Reactor	.42
P-1885	6D6 Tube Socket	.06
P-1944	6B7 Tube Socket	.06
P-1945	6F7 Tube Socket	.06
P-1946	12A5 Tube Socket	.06
P-2020	12Z3 Tube Socket	.08
P-1637	Speaker Socket	.06
P-2060	Knob, Small	.10
P-2062	Knob, Large	.10
P-10272	Rubber Chassis Cushions	.04
P-40445	Tube Shield	.08
P-40443	Tube Shield Base	.04
P-10320	Glass Crystal	.08
P-20875	Crystal Retainer Ring	.06
P-1421	Single Lug Mtg.	.04
P-2130	Double Insulated Mtg. Lug	.04
P-20912	Large Double End Pointer	.10
P-30456	Small Pointer	.04
P-30342	Grid Cap Only	.04
P-70702	115 Volt Line and Plug Assembly	.32
P-70703	Antenna and Ground Wires	.16
P-2012	Pilot Light Bulb (6.8 volts)	.08
P-2147	Speaker 6" Mantel	3.62
P-2173	Speaker 8" Console	4.20
P-10347	Rubber Grommet (Small Gang Cond. Mtg.)	.04
P-10296	Rubber Grommet (Large)	.04

"B" POWER UNIT PARTS

P-70770	Shield Cable and Plug	.24
P-40439	Vibrator Shield Can	.12
P-2153	Vibrator Unit	2.98
P-5172	R. F. Choke Coils	.14
P-2021	Vibrator Socket	.06
P-10349	Rubber Band (For Mtg. Vib.)	.12
P-20926	Screw Hook (For Mtg. Vib.)	.04
P-81101	C19 .01 Mf. 400V Tubular Condenser	.08
P-81101	C20 .01 Mf. 400V Tubular Condenser	.08
P-80888	C21 .25 Mf. 200V Tubular Condenser	.12
P-80888	C22 .25 Mf. 200V Tubular Condenser	.12
P-81054	C23 .5 Mf. 140V Tubular Condenser	.16

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-80862	C1	.05 Mf.	200V	Tubular	$ .08
P-80862	C2	.05 Mf.	200V	"	.08
P-81801	C3	35 Mmf.		Wire Capacitor Part of Osc. Assem.	.08
P-80862	C4	.05 Mf.	200V	Tubular	.08
P-80888	C5	.25 Mf.	200V	"	.12
P-81049	C6	.05 Mf.	200V	"	.20
	C7	.05 Mf.	200V	"	
P-81811	C8	100 Mmf.		Wire Capacitor	.08
P-81051	C9	.002 Mf.	600V	Tubular	.08
P-80888	C10	.25 Mf.	200V	"	.12
P-80872	C11	.01 Mf.	600V	"	.12
P-80888	C12	.25 Mf.	200V	"	.12
P-81062	C13	.01 Mf.	140V	"	.12
P-81055	C14	.05 Mf.	400V	"	.12
P-81052	C15	.015 Mf.	1600V	"	.18
P-80887	C16	.10 Mf.	400V	"	.10
P-81016	C17	8.0 Mf.	300V	Electrolytic Block	1.10
	C18	8.0 Mf.	300V		
P-80993	C24	.5 Mf.	140V	Tubular	.18
P-81806	C25	70 Mmf.		Wire Capac. Part of 1st I. F. Assem.	.08
P-81804	C26	45 Mmf.		Wire Capac. Part of 1st I. F. Assem.	.08
P-81808	C27	90 Mmf.		Wire Capac. Part of 2nd I. F. Assem.	.08
P-81810	C28	100 Mmf.		Wire Capac. Part of 2nd I. F. Assem.	.08
P-81812	C29	200 Mmf.		Wire Capac. Part of Ant. Assem.	.08
P-81015				Three Gang Condenser	1.70

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95104	R1	100,000 Ohm	.2	Carbon	$ .08
P-A95152	R2	1,500 Ohm	.2	Carbon	.08
P-B94303	R3	30,000 Ohm	.5	Carbon	.08
P-A98205	R4	2 Megohm	.2	Carbon	.08
P- 98021	R5	400 Ohm	.2	Wire Wound	.08
P-C93702	R6	7,000 Ohm	1.0	Carbon	.10
P- 96014	R7	500,000 Ohm		Volume Control	.50
P-B94204	R8	200,000 Ohm	.5	Carbon	.68
P-B94603	R9	60,000 Ohm	.5	Carbon	.08
P-A95203	R10	20,000 Ohm	.2	Carbon	.08
P-A95504	R11	500,000 Ohm	.2	Carbon	.10
P-A94104	R12	100,000 Ohm	.2	Carbon	.08
P- 97011	R13	150,000 Ohm		Tone Control	.36
P- 98035	R14	450 Ohm	2.0	Wire Wound	.08
P- 98034	R15	25 Ohm	3.0	Wire Wound	.08
P-B95602	R16	6,000 Ohm	.5	Carbon	.08

INTERFERENCE ELIMINATION PARTS

Part No.		Selling Price
P-80933	Dual .5 Mfd. Generator Condenser	.60
62-5424	Spark Plug Suppressor	.25

MISCELLANEOUS

Part No.	ITEM	Selling Price
P-5200	Antenna Transformer Assembly less Can	$ .64
P-40433	Can for Above Assembly	.08
P-5302	Oscillator Coil and Can Assembly	.50

MODELS 62-136, 62-138
Voltage, Socket, Data
Alignment

MONTGOMERY-WARD & CO.

VOLTAGES AT SOCKETS

Input 32 Volts—Antenna Shorted to Ground

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6F7	1st Det. & Osc.	6.3	167(1)	90	2.6	7.0(1)
			117(2)		0	2.8(2)
6D6	I. F.	6.3	172	120	3.2	8.2
6B7	2nd Det.	6.3	25	25	7.25	2.0
12A5	Output	12.6	180	180	25	32
12Z3	Rectifier	12.6	225			25

(1) Pentode Section of Tube. (2) Triode Section of Tube

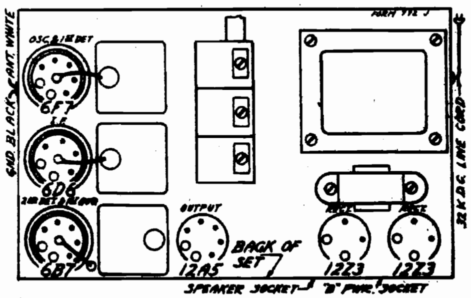


Fig. 2—Arrangement of Tubes

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5200	Primaries of Antenna Trans. in Series	T1	Small
	1st Secondary of Antenna Transformer	T1	3.2
	2nd Secondary of Antenna Transformer	T1	2.4
P-5202	Oscillator Plate Coil	T2	2.0
	Oscillator Grid Coil	T2	3.5
P-5221	1st I. F. Transformer Primary	T3	67
	1st I. F. Transformer Secondary	T3	93
P-5203	2nd I. F. Transformer Primary	T4	63
	2nd I. F. Transformer Secondary	T4	63
P-50624	Output Transformer Primary	T5	243
	Output Transformer Secondary and Bucking Coil in Series	T5 & L12	Small
P-50637	"B" Filter Reactor	T7	300
P-2147	Speaker Field		97
P-2173	Speaker Voice Coil		Small
P-50626	Power Transformer Primary	T6	
	Center Tap to Inside	T6	3.6
	Center Tap to Outside	T6	4.4
	Power Transformer H. V. Secondary	T6	
	Center Tap to Inside	T6	322
	Center Tap to Outside	T6	350
	Power Transformer Pilot Lamp Sec.	T6	.3
P-2153	Vibrator Unit Magnetizing Coil		1025
	Vibrator Unit Filter Chokes		3.0

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

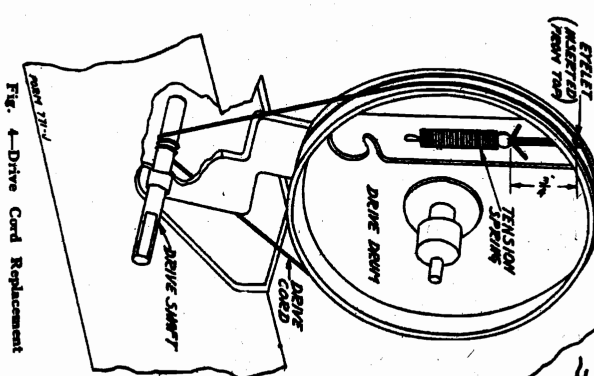


Fig. 4—Drive Cord Replacement

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis. Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one-fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

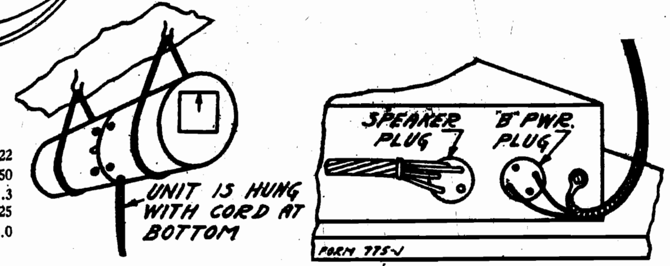
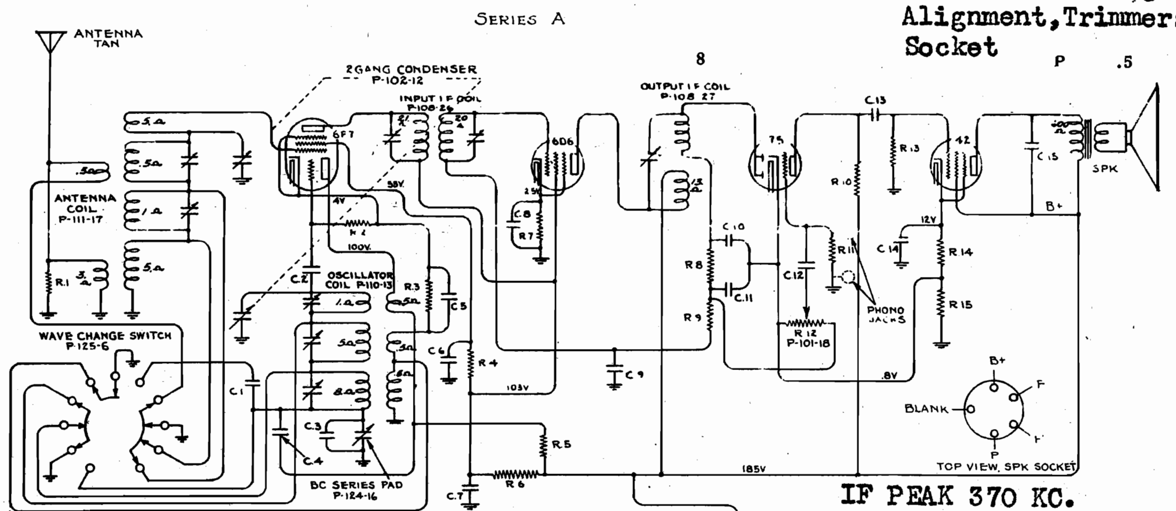


Fig. 3—Method of Installing "B" Power Unit

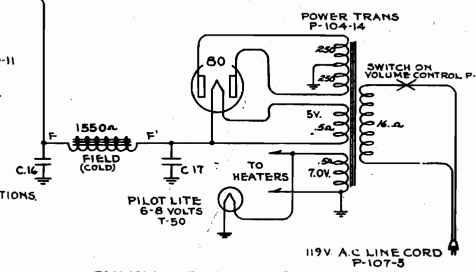
MONTGOMERY-WARD & CO.

MODELS 62-147, 62-156, 62-164. Series A
Schematic, Voltage Alignment, Trimmers Socket

SERIES A



IF PEAK 370 KC.



LEGEND

CONDENSERS

Nº	VALUE
C.1:-	2870 µµf MICA
C.2:-	100 " "
C.3:-	475
C.4:-	.1 X 200V
C.5:-	.1 X 200V.
C.6:-	.1 X 200V
C.7:-	.1 X 200V
C.8:-	.1 X 200V
C.9:-	.1 X 200V.
C.10:-	500 µµf MICA
C.11:-	500 µµf MICA
C.12:-	.05 X 200V
C.13:-	.01 X 400V
C.14:-	4.0 MFD. X 25V.
C.15:-	.015 X 400V.
C.16:-	3.0 MFD. X 250V
C.17:-	4.0 MFD. X 300V

RESISTORS

Nº	VALUE	
R.1:-	800Ω	⅓W.
R.2:-	50MΩ	"
R.3:-	700Ω	
R.4:-	100MΩ	"
R.5:-	20MΩ	½W.
R.6:-	19MΩ	½W.
R.7:-	200Ω	
R.8:-	50MΩ	⅓W
R.9:-	1MEG	"
R.10:-	250MΩ	"
R.11:-	2MEG.	"
R.12:-	500MΩ	VOL. CONTROL
R.13:-	500MΩ	⅓W.
R.14:-	500Ω	"
R.15:-	35Ω	

:NOTE:
C.7, C.9 ARE IN ONE UNIT P-118-1
C.14, C.16, C.17, ONE UNIT LYTIC P-119-11
R.7, R.14, R.15, ONE UNIT P-106-18

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL

WAVE CHANGE SWITCH P-125-6 - 3 POSITIONS, ROTATING CLKWISE -
1ST POSITION - BC. 1720-540KC
2ND " - MW. 7.6 - 2.3 MC
3RD " - SW. 23.0 - 7.5 MC
SWITCH SHOWN AT SW POSITION

TUNING RANGE—SERIES A:

Standard Broadcast Band
540 - 1720 Kilocycles
Intermediate Band
2.3 - 7.6 Megacycles
Short Wave Band
7.5 - 23.0 Megacycles

Series "A" chassis are equipped with dry electrolytic filter condensers and are serially numbered on paper tags which are attached to the line cord and to the inside of the cabinet.

X AFTER MODEL NUMBER INDICATES 25-CYCLE OPERATION

ALIGNING INSTRUCTIONS—SERIES A

Description of various dummy antennas used and referred to in these instructions:

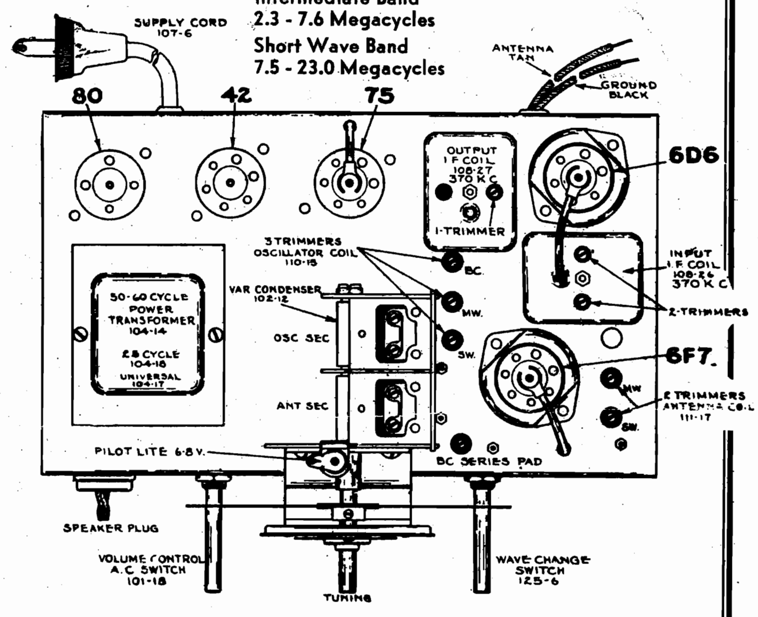
(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

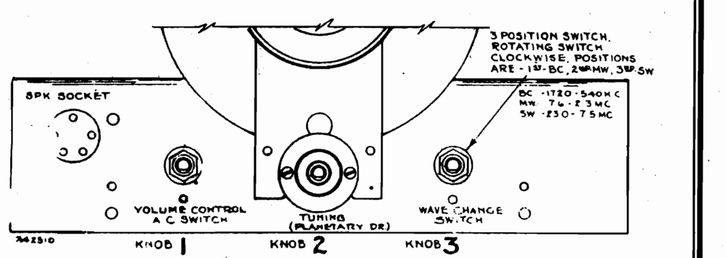
(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.





MODELS 62-147,62-156
62-164,Series A
Alignment

MONTGOMERY-WARD & CO.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates, entirely out of mesh, adjust the I.F. transformers (adjustments at the top of parts number 108-26 and 108-27—see top view).

   (a) Connect external oscillator in series with I.F. dummy antenna. With external oscillator adjusted to 370 kilocycles, in series with I.F. dummy antenna to the control grid cap of the type 6D6 tube and chassis ground, adjust output I.F. transformer, part number 108-27, to resonance.

Note: Output I.F. transformer, part number 108-27, has only one adjustment.

   (b) Move generator output clip from grid of 6D6 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-26, to resonance. NOTE: IT IS EXTREMELY NECESSARY TO ALIGN BOTH I.F. STAGES SEPARATELY.

Broadcast Band Alignment—
(540 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with broadcast dummy antenna to tan antenna lead and black ground lead, make the following adjustments:

   (a) Set external oscillator to 1720 kilocycles and adjust oscillator trimmer to resonance. This adjustment is the rear adjustment of a group of three located next to the variable condenser.

   (b) Readjust external oscillator to 600 kilocycles and adjust broadcast series pad to resonance by rotating condenser to approximately 600 kilocycles, rocking it slowly to and fro until by adjusting pad maximum output is attained. This adjustment is located at the front of the chassis next to the variable condenser and wave changing switch.

   (c) Check for tracking and sensitivity at 1400 and 1000 kilocycles. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Short Wave Band Alignment—
(7.5 - 23.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.

   (a) With external oscillator set at 21 megacycles, and connected to the tan antenna lead in series with the short wave dummy and to the black ground lead, adjust the oscillator short wave trimmer until generator signal is picked up. This trimmer is the one closest to the front of the chassis of the group of three trimmers located next to the gang condenser (see top view of chassis).

   (b) Adjust short wave antenna trimmer to resonance. This adjustment is to the right of the 6F7 tube and is the one closest to the front of the chassis (see top view).

   (c) Re-set external oscillator to 9 megacycles and pick up oscillator signal by rotating variable condenser, moving dial pointer. Check for tracking and sensitivity and do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment—
(2.3 - 7.6 Megacycles)

1. With wave selector switch in the center position and with dial pointer set to 7 megacycles, makes the following adjustments:

   (a) With external oscillator set at 7 magacycles and connected in series with the short wave dummy antenna to the tan antenna lead and black ground lead, same as for short wave adjustments, adjust center trimmer of oscillator coil, part number 110-13, until 7 magacycle signal is picked up. This is the center adjustment of a group of three located next to the gang condenser (see top view).

   (b) Adjust antenna trimmer to resonance, this adjustment is the rear of a group of two located at the right of the chassis next to the 6F7 tube (see top view).

   (c) Re-set external oscillator to 2.5 magacycles (2500 kilocycles), pick up signal by rotating condenser and moving dial pointer. Check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

Notes—(Series "A" Only)

25 Cycle chassis differ from regular 60 cycle and 40 cycle chassis in that a larger electrolytic filter condenser is used. The regular condenser is part number 119-11 and the larger unit for the 25 cycle chassis is part number 119-12.

Part number 106-18, a metal clad resistor, consists of the following sections with resistances and wattages as noted: one, 500 ohms; one, 35 ohms, one, 200 ohms, all 1/3 watt, plus or minus 10%.

X AFTER MODEL NUMBER INDICATES
25-CYCLE OPERATION

SERIES A
Alignment

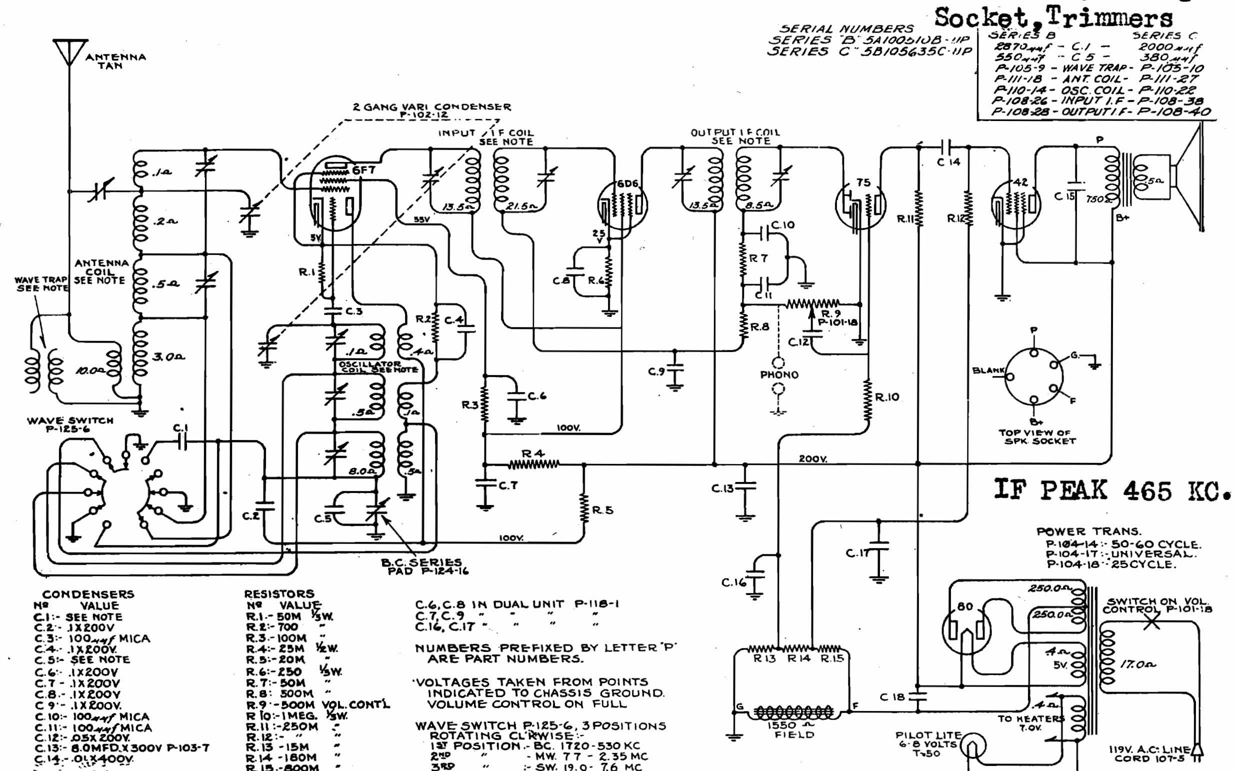
No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis.

MONTGOMERY-WARD & CO.

MODELS 62-147,62-156, 62-164. Series B & C. Schematic,Voltage Socket,Trimmers

SERIAL NUMBERS
SERIES "B" 5A100510B - UP
SERIES "C" 5B105635C - UP

SERIES B		SERIES C
2870 $\mu\mu f$	C.1	2000 $\mu\mu f$
550 $\mu\mu f$	C.5	380 $\mu\mu f$
P-105-9	WAVE TRAP	P-105-10
P-111-18	ANT. COIL	P-111-27
P-110-14	OSC. COIL	P-110-22
P-108-26	INPUT I.F	P-108-38
P-108-28	OUTPUT I.F	P-108-40



IF PEAK 465 KC.

CONDENSERS Nº	VALUE
C.1	SEE NOTE
C.2	.1X200V
C.3	100 $\mu\mu f$ MICA
C.4	.1X200V.
C.5	SEE NOTE
C.6	.1X200V
C.7	.1X200V
C.8	.1X200V
C.9	.1X200V.
C.10	100 $\mu\mu f$ MICA
C.11	100 $\mu\mu f$ MICA
C.12	.05X200V.
C.13	8.0MFD.X300V P-103-7
C.14	.01X400V.
C.16	.1X200V.
C.17	.1 X 200V.
C 18	8.0MFD.X350V. P-103-6
C 15	.015 x 600V

RESISTORS Nº	VALUE	
R.1	50M	1/3W.
R.2	700	"
R.3	100M	"
R.4	25M	1/2W.
R.5	20M	"
R.6	250	1/3W.
R.7	50M	"
R.8	500M	"
R.9	500M	VOL. CONT'L
R 10	1MEG.	1/3W.
R.11	250M	"
R.12	"	"
R.13	15M	"
R.14	180M	"
R 15	800M	"

C.6, C.8 IN DUAL UNIT P-118-1
C.7, C.9 " " "
C.16, C.17 " " "

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL

WAVE SWITCH P-125-6, 3 POSITIONS ROTATING CL'KWISE:-
1ST POSITION - BC. 1720-530 KC
2ND " - MW. 7.7 - 2.35 MC
3RD " :- SW. 19.0 - 7.6 MC
SWITCH SHOWN AT SW. POSITION

Series "B" and "C" chassis are serially numbered on the back flange of the chassis, series "B" beginning with number "5A100510B" and up; series "C" chassis, beginning with number "5B105635C", differs only from series "B" in that the I.F. frequency was changed from 370 to 465 kilocycles.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see illustrations) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

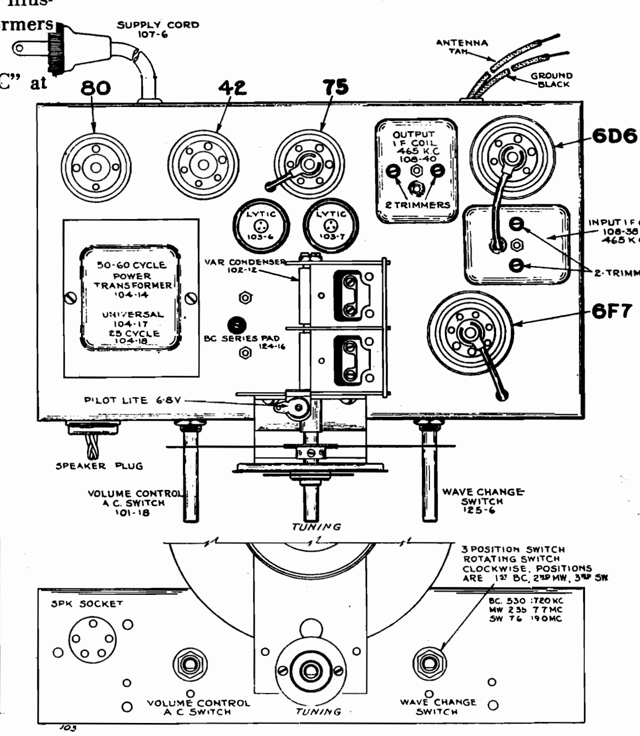
Series "B" and "C" may be identified by the letter "B" and "C" at the end of the serial numbers.

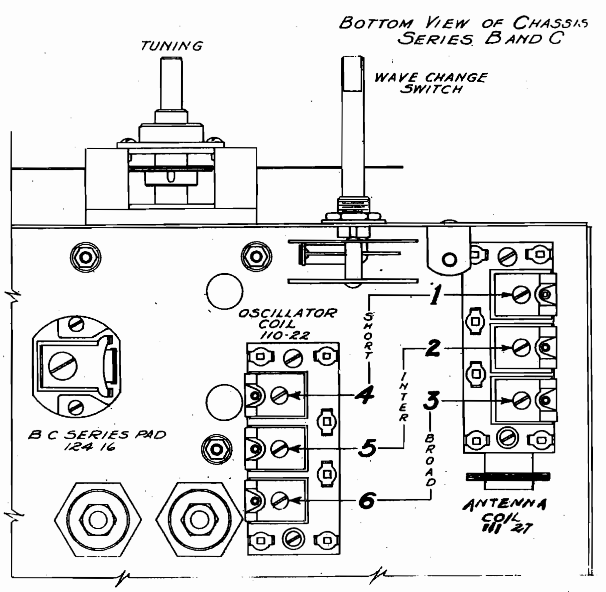
TUNING RANGE—SERIES B & C:

Standard Broadcast Band
530 - 1720 Kilocycles

Intermediate Band
2.35 - 7.7 Megacycles

Short Wave Band
7.6 - 19.0 Megacycles





ALIGNING INSTRUCTIONS—SERIES "B" & "C"

NOTE: These instructions are written for series "C". The instructions are identical for series "B", except that for series "B" the I.F. frequency is 370 kilocycles and for series "C", 465 kilocycles. Also, the I.F. transformers are different:

Series "B"
Part No. 108-26—Input I. F. Trans.
Part No. 108-28—Output I. F. Trans.

Series "C"
Part No. 108-38—Input I. F. Trans.
Part No. 108-40—Output I. F. Trans.

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

SERIES B & C

Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-38 and 108-40—see top view).

(a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-40, to resonance.

(b) Move generator output clip from grid of 6D6 to grid cap of 6F7 tube and align input I.F. transformer, part number 108-38.

(c) With generator connected to grid of type 6F7 tube, readjust output I.F. transformer, part number 108-40, to resonance.

Broadcast Band Alignment— (530 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan. antenna and black ground leads and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance, for location of this adjustment, number 6, see diagram.

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 3, see diagram.

(c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, see top view—part number 124-16.

(d) Check for tracking and sensitivity at 1000 kilocycles.

NOTE (Series "B" and "C" Only)

25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

Short Wave Band Alignment— (7.6 - 19.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been conpleted. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 18 megacycles.

(a) With external oscillator adjusted to 18 megacycles and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.

(b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.

(c) Re-set external oscillator to 9 megacycles, rotate condenser, move dial pointer to 9 megacycles and check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment— (2.35 - 7.7 Megacycles)

1. With wave changing switch in center position, and with dial pointer set to 7 megacycles, make the following adjustments:

(a) With external oscillator set at 7 megacycles and connected in series with short wave dummy antenna, as for short wave adjustments, adjust trimmer of oscillator coil, part number 110-22 until 7 megacycle signal is picked up. For location of this adjustment, number 5, see diagram.

(b) Adjust antenna trimmer to resonance, adjustment number 2, see diagram.

(c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), rotate variable condenser, move pointer, pick up oscillator signal and check for tracking and sensitivity. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Service Notes

To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before re-assembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

MODELS 62-147, 62-147X, 62-156, 62-156X, 62-164, 62-164X. Series A, B & C Parts List

MONTGOMERY-WARD & CO.

LIST OF REPAIR PARTS

RETAIL STORES: ORDER ALL PARTS FROM DIVISION SUPERINTENDENT AT CHICAGO OR OAKLAND, ON STOCK ORDER. RETURN DEFECTIVE PARTS TO DIVISION SUPERINTENDENT ONLY

Parts Used in Ser. A.	Parts Used in Ser. B.	Parts Used in Ser. C.	DESCRIPTION	No. Used in Set
			CONDENSERS	
BE 100-11	BE 100-11	BE 100-11	.01 x 400V—25%	1
BE 100-15	BE 100-15	BE 100-15	.015 x 400V—Plus 10%; Minus 20%	1
BE 100-19	BE 100-19	BE 100-19	.006 x 600V—25%	1
BE 100-20	BE 100-20	BE 100-20	.1 x 120V—25%	4
Not Used.	BE 100-22	BE 100-22	.05 x 200V—25%	1
Not Used.	BE 103-6	BE 103-6	8 Mfd. x 350V Electrolytic	1
Not Used.	BE 103-7	BE 103-7	8 Mfd. x 300V Electrolytic	1
BE 118-1	BE 118-1	BE 118-1	Dual .1 x 200V—Plus 50%; Minus 10% (Series B & C use 3 per set)	1
BE 119-11	Not Used.	Not Used.	4-3-4 Mfd. Electrolytic	1
BE 119-12	Not Used.	Not Used.	8-8-4 Mfd. Electrolytic (For 25 Cy. Only)	1
BE 129-2	BE 129-2	BE 129-2	.0005 Mica—MT—20%	2
BE 129-5	BE 129-5	BE 129-5	.0001 Mica—MT—20%	1
BE 129-15	BE 129-15	Not Used	.00055 Mica—MT—5%	1
BE 129-16	BE 129-16	Not Used.	.00287 Mica—MW—5%	1
Not Used.	Not Used.	BE 129-23	.002 Mica—MW—5%	1
Not Used.	Not Used.	BE 129-24	.000425 Mica—MT—5%	1
			RESISTORS	
BE 130-3	BE 130-3	BE 130-3	500M Ohm—1/5 Watt—20%—100V—Carbon	1
BE 130-11	BE 130-11	BE 130-11	250M Ohm—1/3 Watt—20%— 50V—Carbon	1
BE 130-12	BE 130-12	BE 130-12	50M Ohm—1/3 Watt—20%— 20V—Carbon	1
BE 130-19	BE 130-19	BE 130-19	1 Meg Ohm—1/3 Watt—20%—100V—Carbon	1
BE 130-20	BE 130-20	BE 130-20	100M Ohm—1/5 Watt—20%— 50V—Carbon	1
Not Used.	BE 130-32	BE 130-32	250 Ohm—1/3 Watt—20%—10V—Wire W.	1
BE 130-38	Not Used.	Not Used.	2 Meg Ohm—1/3 Watt—20%— 20V—Carbon	1
BE 130-39	BE 130-39	BE 130-39	700 Ohm—1/3 Watt—20%— 20V—Carbon	1
BE 130-40	Not Used.	Not Used.	19M Ohm—1/2 Watt—20%—150V—Carbon	1
BE 130-41	Not Used.	Not Used.	800 Ohm—1/3 Watt—20%— 20V—Carbon	1
BE 130-42	BE 130-42	BE 130-42	20M Ohm—1/2 Watt—20%—100V—Carbon	1
Not Used.	BE 130-44	BE 130-44	25M Ohm—1/2 Watt—20%—150V—Carbon	1
Not Used.	BE 130-46	BE 130-46	800M Ohm—1/5 Watt—10%—100V—Carbon	1
Not Used.	BE 130-47	BE 130-47	180M Ohm—1/5 Watt—10%—100V—Carbon	1
Not Used.	BE 130-48	BE 130-48	15M Ohm—1/5 Watt—10%— 20V—Carbon	1
			POWER TRANSFORMERS	
BE 104-14	BE 104-14	BE 104-14	50/60 Cycle Power Transformer	1
BE 104-17	BE 104-17	BE 104-17	Universal Power Transformer—40 Cy. Pri.	1
BE 104-18	BE 104-18	BE 104-18	25 Cycle Power Transformer	1
			COILS	
Not Used.	BE 105-9	Not Used.	Antenna Choke Coil	1
Not Used.	Not Used.	BE 105-10	Antenna Choke Coil	1
BE 108-26	BE 108-26	Not Used.	Input I.F. Transformer Complete	1
BE 108-27	Not Used.	Not Used.	Output I.F. Transformer Complete	1
Not Used.	BE 108-28	Not Used.	Output I.F. Transformer Complete	1
Not Used.	Not Used.	BE 108-38	Input I.F. Transformer Complete	1
Not Used.	Not Used.	BE 108-40	Output I.F. Transformer Complete	1
BE 110-13	Not Used.	Not Used.	Oscillator Coil Complete	1
Not Used.	BE 110-14	Not Used.	Oscillator Coil Complete	1
Not Used.	Not Used.	BE 110-22	Oscillator Coil Complete	1
BE 111-17	Not Used.	Not Used.	Antenna Coil Complete	1
Not Used.	BE 111-18	Not Used.	Antenna Coil Complete	1
Not Used.	Not Used.	BE 111-27	Antenna Coil Complete	1
			SOCKETS	
BE 121	BE 121	BE 121	Four Prong Socket—Type 80	1
BE 121	BE 121	BE 121	Five Prong Socket—Speaker	1
BE 121	BE 121	BE 121	Six Prong Socket—Type 42	1
BE 121	BE 121	BE 121	Six Prong Socket—Type 75	1
BE 121	BE 121	BE 121	Six Prong Socket—Type 6D6	1
BE 121	BE 121	BE 121	Seven Prong Socket—Type 6F7	1
			MISCELLANEOUS	
BE 101-18	BE 101-18	BE 101-18	Volume Control	1
BE 102-12	BE 102-12	BE 102-12	Two Gang Variable Condenser	1
BE 106-18	Not Used.	Not Used.	Metal Clad Resistor	1
BE 107-5	BE 107-5	BE 107-5	Line Cord	1
BE 112-15	BE 112-15	BE 112-15	Crystal	1
BE 112-16	BE 112-16	BE 112-16	Pointer	1
BE 112-19	BE 112-19	BE 112-19	Drive Disc Complete	1
BE 112-26	BE 112-26	BE 112-26	Planetary Drive Complete	1
BE 112-31	BE 112-31	BE 112-31	Compression Spring	1
BE 112-40	BE 112-40	BE 112-40	Pilot Light Bracket	1
BE 112-62	BE 112-62	BE 112-62	Drive Bracket Assembly	1
BE 112-66	BE 112-66	BE 112-66	Bakelite Escutcheon with Glass	1
BE 112-64 A	Not Used.	Not Used.	Dial Scale	1
Not Used.	BE 112-64BA	BE 112-64BA	Dial Scale	1
BE 115-22	BE 115-22	BE 115-22	Tube Shield	2
BE 116-5	BE 116-5	BE 116-5	Pilot Light Bulb—6-8V—T50	1
BE 124-16	BE 124-16	BE 124-16	Type J-2-S Padder	1
BE 125-6	BE 125-6	BE 125-6	Wave Change Switch	1
BE 131-2	BE 131-2	BE 131-2	Bakelite Knobs	2
BE 131-10	BE 131-10	BE 131-10	Bakelite Knobs—(3 Dots)	1
BE 114-11	Not Used.	Not Used.	Five Inch Speaker—*	
Not Used.	BE 114-16	BE 114-16	Five Inch Speaker—*	

*NOTE: Speakers cannot be ordered, defective speakers must be repaired.

Mica condensers are RMA color coded and on the reverse side they are coded with an extra dot which indicates the capacity tolerance, tolerances wider than 20% are not coded.

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red

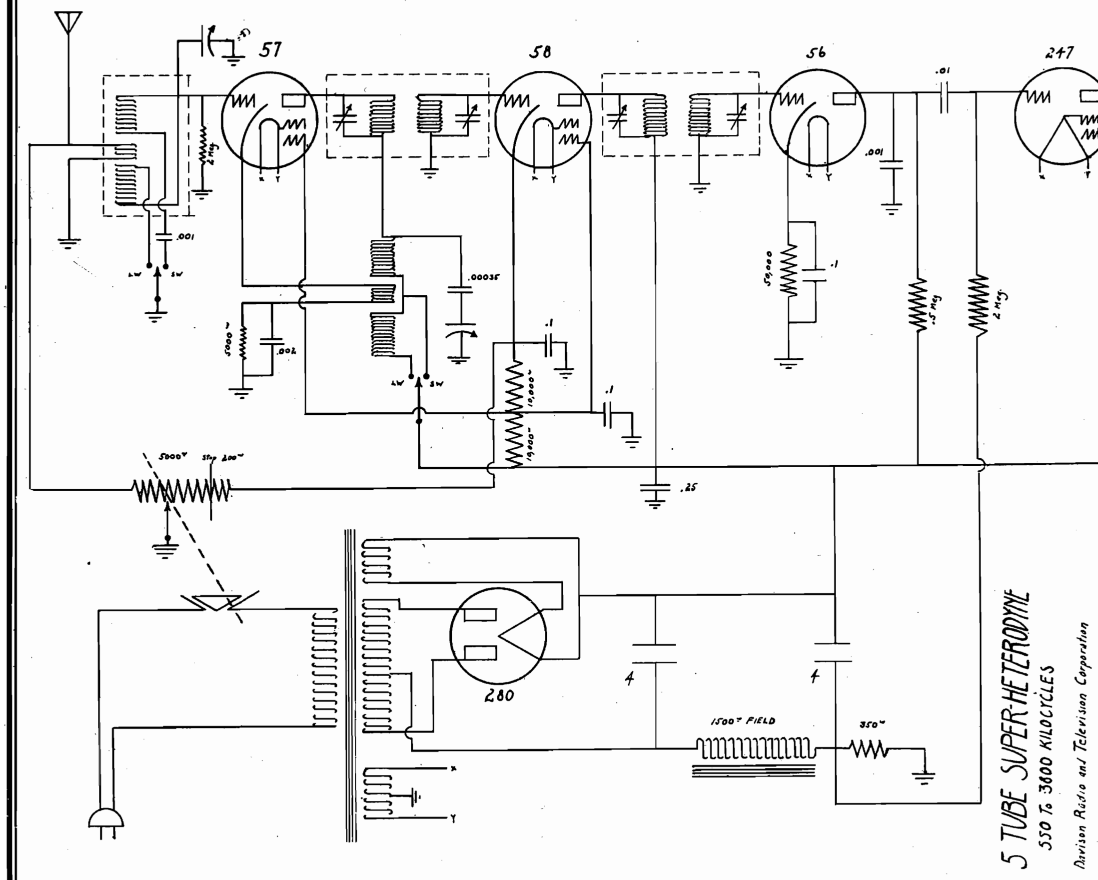
All resistors are RMA color coded—specify value and/or resistor (per schematic diagram) and model number.

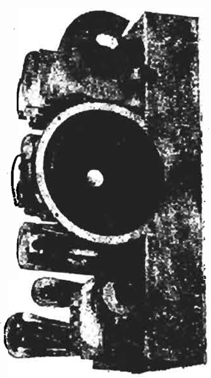
When ordering condensers, specify part number, model and/or capacitor (per schematic diagram) and model number.

When ordering parts, always specify part and model number as well as serial number of chassis.

MODEL 62PC43
Schematic
Voltage, Parts

MONTGOMERY-WARD & CO.





VOLTAGES

With the volume control at maximum and no signal being received, the following values of voltage should be observed at the points indicated:

Ground to R. F. Plate, 240
Ground to First Detector Plate, 240
Ground to Second Detector Plate, 60
Ground to A. F. Plate, 220
Ground to Screens, 115.
Across Field, 95
Across 350w Bias Resistor, 20
Across Second Detector Bias, 10
Across First Detector Bias, 10
Across I. F. Bias, 3½.
Filament, 2.25 A. C.
Rectifier, 4.8 A. C.

Replacement Parts List

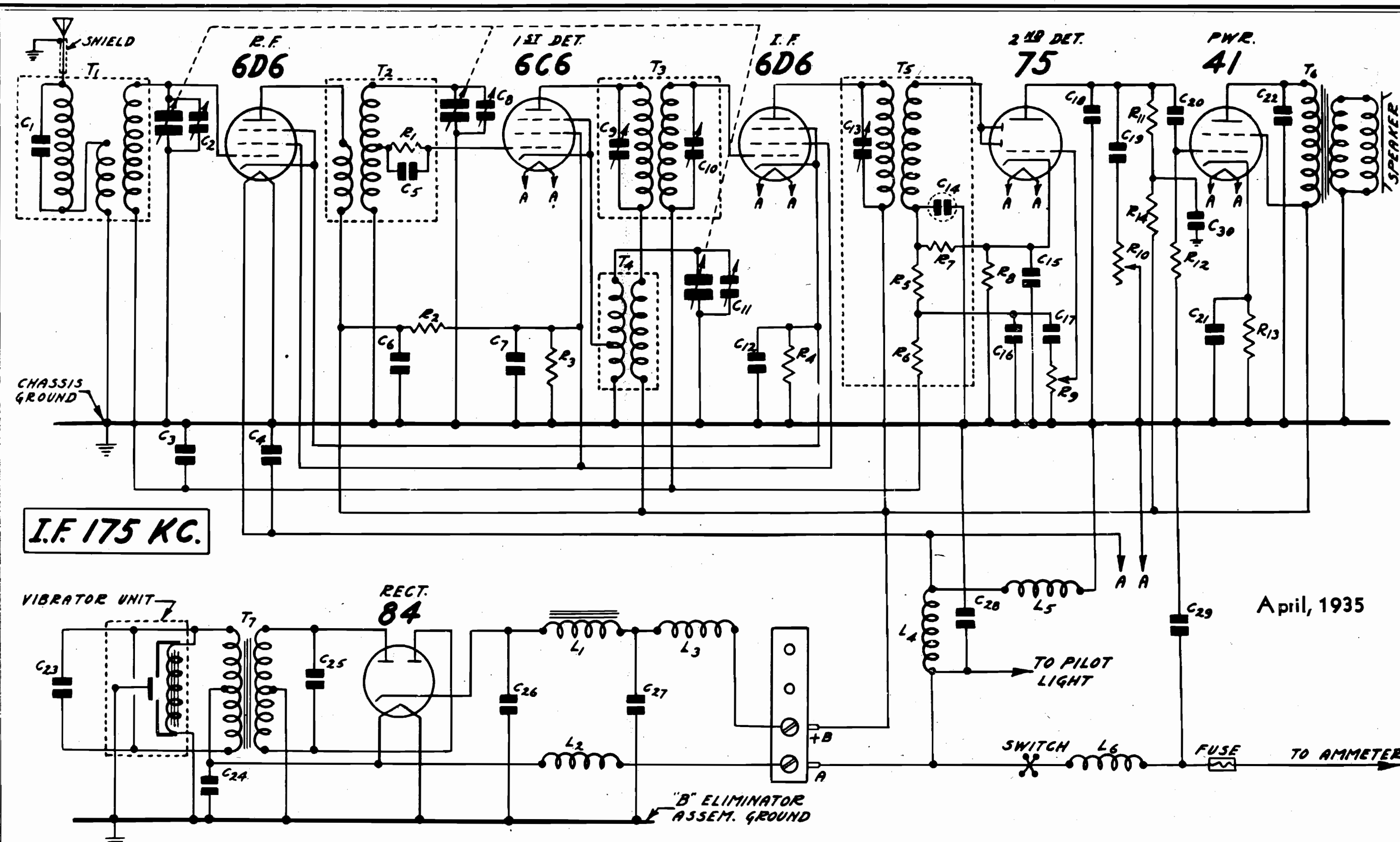
Airline Model 62-PC-43

Supplier: Davison Radio and Television Corporation, Los Angeles, California

Part No.	PART NAME	Unit Per Chassis	Cost Price	Selling Price	Part No.	PART NAME	Unit Per Chassis	Cost Price	Selling Price
SW- 431	Tube Socket No. 56	1	$ .06	$ .15	SW-4317	R. F. Coil	1	.25	.63
SW- 432	Tube Socket No. 57	1	.06	.15	SW-4318	Oscillator Coil	1	.25	.63
SW- 433	Tube Socket No. 58	1	.06	.15	SW-4319	Electrolytic Condenser, Dual, 4 Mfd.	1	.60	1.50
SW- 434	Tube Socket No. 47	1	.06	.15	SW-4320	Wave Switch	1	.75	1.88
SW- 435	Tube Socket No. 80	1	.06	.15	SW-4321	Cub Condenser, .1-200 Volt	3	.12	.30
SW- 436	Variable Condenser, 2 Gang	1	1.00	2.50	SW-4322	Cub Condenser, .1-400 Volt	1	.18	.45
SW- 437	Dial	1	.75	1.88	SW-4323	Cub Condenser, .01	2	.12	.30
SW- 438	Power Transformer	1	1.25	3.13	SW-4324	Cub Condenser, .001-10%	1	.12	.30
SW- 439	Volume Control	1	.48	1.20	SW-4325	Cub Condenser, .001-3%	1	.18	.45
SW-4310	Speaker	1	1.75	4.38	SW-4326	Cub Condenser, .00035-3%	1	.18	.45
SW-4311	Coil Shields	3	.06	.15	SW-4327	Resistor Strip—350 W. W.	1	.10	.25
SW-4312	Tube Shields	2	.06	.15	SW-4328	Resistor Strip—Two 10,000 Ohms	1	.25	.63
SW-4313	I. F. Transformer	2	.40	1.00	SW-4329	Resistor—2 Meg. 1/3 Watt	2	.06	.15
SW-4314	Varitor	2	.20	.50	SW-4330	Resistor—5,000 Ohm 1/3 Watt	1	.06	.15
SW-4315	Ant. and Ground Post	1	.10	.25	SW-4331	Resistor—50,000 Ohm 1/3 Watt	1	.06	.15
SW-4316	Pilot Light	1	.06	.15	SW-4332	Resistor—1 Megohm 1/3 Watt	1	.06	.15

MODEL 62-166
Schematic

MONTGOMERY-WARD & CO.



NOTE:
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

C1	500 MMF. MOULDED
C2	GANG TRIMMER
C3	.05 MF. 180 V.
C4	.003 MF. MOULDED
C5	35. MMF. MOULDED
C6	.10 MF. 400 V.
C7	.10 MF. 180 V.
C8	GANG TRIMMER
C9	130-300 MMF. } ONE
C10	130-300 MMF. } ASSEMBLY
C11	GANG TRIMMER
C12	.10 MF. 180 V.
C13	70-140 MMF.
C14	250. MMF. MOULDED
C15	12.0 MF. 25 V. } ELECTRO-
C21	12.0 MF. 25 V. } LYTIC
C16	.00025 MF. MOULDED
C17	.01 MF. 180 V.
C18	.00025 MF. MOULDED
C19	.006 MF. 600 V.
C20	.01 MF. 400 V.
C22	.002 MF. 600 V.
C23	.50 MF. 180 V.
C24	1.65 MF. 180 V.
C25	.01 MF. 1800 V.
C28	.50 MF. 180 V.
C29	.003 MF. MOULDED
C26	6.0 MF. 350 V. } ELECTRO-
C27	8.0 MF. 350 V. } LYTIC
C30	.25 MF. 300 V.
R1	1.0 MEGOHM .2 W.
R2	15000 OHM .5 W.
R3	20000 OHM .5 W.
R4	450 OHM .2 W. } ONE
R13	800 OHM .5 W. } ASSEMBLY
R5	50000 OHM .2 W.
R6	1.0 MEGOHM .2 W.
R7	500000 OHM .2 W.
R8	7500 OHM .2 W.
R9	2.0 MEGOHM VOL. CONTROL
R10	150000 OHM TONE CONTROL
R11	150000 OHM .2 W.
R12	500000 OHM .2 W.
R14	50000 OHM .2 W.

MODEL 62-166
Alignment, Voltage
Socket, Trimmers
Resistance Test

MONTGOMERY-WARD & CO.

I. F. Adjustment

Remove chassis from case.

Establish ground connection between chassis and power supply.

Reconnect A and B wires from power supply to chassis.

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector (middle) section of the tuning condenser. This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling off action of the A.V.C.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers are shown in Fig. 2.

1650 KC. Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the shielded antenna lead from the chassis through a 250 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 K C. Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC. with the volume control about three-fourths on. Remove the cover of the chassis case. The antenna trimmer is the trimmer condenser closest to the terminal strip—see Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Calibrating the Receiver

After installing the receiver in the car, it will be necessary to calibrate the control unit. Tune in a station of known frequency at about the center of the dial. At the back of the control unit is a calibration screw—See Fig. 4 in the installation manual enclosed with each receiver. Remove the pilot light assembly.

The calibration screw will be seen at the bottom of the receptacle from which the pilot light assembly is withdrawn. Insert a screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

Changes In Early Models

In the early models, resistor R14, and condenser C30, were not used. In these models resistor R11 was rated at 200,000 ohms.

The capacity range of the 1st I.F. Trimmer Condensers, C9 and C10, was from 130 to 300 mmf. in the early models.

Voltages at Sockets
Antenna Disconnected - Voltage at Battery 6.1

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Normal Plate M.A.
6D6	R. F.	5.8	218	100	5.2	5.8
6C6	1st Det. and Osc.	5.8	218	100		2.0
6D6	I. F.	5.8	218	100	5.2	5.8
75	2nd Det. & 1st A. F.	5.8	160 (1)		1.4	2.8
41	Output	5.8	210	220	16.0	16.0
84	Rectifier	5.8				20.0 per plate

Speaker Field ..1.15 Amperes "B" Unit ....3.00 Amperes
Chassis .... 1.50 Amperes Pilot Lamp ....0.1 Amperes

(1) Measured on 1000 V. Scale (1000 Ohms per volt)

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

Part No.	ITEM	Code	D. C. Resistance in Ohms
P-9A368	Antenna Trans. Primaries in Series	T1	6.3
	Antenna Trans. Secondary	T1	2.5
P-9A369	R.F. Interstage Trans. Pri.	T2	4.5
	R.F. Interstage Trans. Sec.	T2	
	(Center Tap to inside)		1.8
	(Center Tap to ground)		1.3
P-9A371	1st I.F. Trans. Primary	T3	58.
	1st I.F. Trans. Secondary	T3	58.
P-9A370	Oscillator Cathode Coil (Total)	T4	3.
	Oscillator Plate Coil	T4	6.
P-9A372	2nd I.F. Trans. Primary	T5	46.
	2nd I.F. Trans. Secondary	T5	46.
P-51X17	Output Trans. Primary	T6	440.
	Output Trans. Sec. and Voice coil in parallel	T6	.4
P-53X72	Power Trans. Primary	T7	.3
	Power Trans. Secondary	T7	500.
P-52X27	Filter Choke	L1	300.
P-9A374	Filament Reactor	L2	Small
P-9A268	R.F. "B" Choke	L3	3.5
P-9A375	Pilot Light Choke Assembly	L4	Small
P-12A62A	Speaker Field	L5	5.
P-9A373	Motor Noise Choke	L6	Small

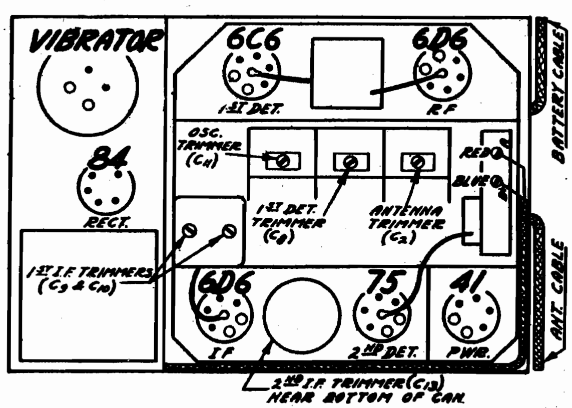


Fig. 2—Tube Arrangement and Trimmers

MODEL 62-166
Parts List

MONTGOMERY-WARD & CO.

Replacement Parts List

INSTALLATION ITEMS

Part No.	Quan. Used	Description	Selling Price
P-18A31	1	25" Volume Control Flexible Drive Shaft (Standard Equipment)	.58
P-18A34	1	25" Tuning Condenser Flexible Drive Shaft (Standard Equipment)	.62
P-18A32	1	20" Volume Control Flexible Drive Shaft..	.54
P-18A36	1	20" Tuning Condenser Flexible Drive Shaft	.54
P-18A37	1	32" Volume Control Flexible Drive Shaft	.74
P-18A38	1	32" Tuning Condenser Flexible Drive Shaft	.78
P-13X52	1	Ammeter Cable and Fuse Receptacle	.16
P-13X204	1	Antenna Cable and Fitting	.36
P-13X211	1	Pilot Light Cable Assembly	.38
P-7A32	1	Pilot Light Bulb—Bayonet Pin Base (6-8 V)	.10
P-20X59	4	Double End Hexagon Bolts for Mounting Chassis to dash	.04
P-20X74	4	5/16" Shakeproof Lockwashers for above Mounting Assembly ...doz.	.04
P-19X18	8	Flat Washers for above mounting assembly ...doz.	.08
P-20X75	8	5/16" Split Lockwashers for above mounting assembly ...doz.	.04
P-20X77	8	5/16"-18 Hexagon Nuts for above assembly, ... doz.	.08
P-28X33	1	Ground Spring (to ground Tuning Condenser Flexible Shaft)	.04
P-20X76	1	No. 6 Shakeproof Lockwasher to assemble Ground Spring ...doz.	.04
P-20X78	1	6-32x¼" Round Head Machine Screw to mount Ground Spring ...doz.	.04
P-16X14	1	20 Ampere Fuse	.04
P-16X3	1	Fuse Shield	.04
P-21A6	1	Distributor Suppressor	.16
P-48X27	1	Generator Condenser	.30
P-20X74	1	Additional 5/16" Shakeproof Lockwasher to Ground Chassis Case to Metal Dash Surface on Engine Side ...doz.	.04
P-21A5	1	Choke Condenser Unit (not shipped with set)	.72
P-21A7		Spark Plug Suppressors (not shipped with set)	.20
P-25A33	**1**	**Set of Steering Column Mounting Brackets complete with necessary mounting screws, nuts and lockwashers**	**.40**
P-25A34	**1**	**Under Instrument Panel Mounting Bracket complete with necessary mounting screws, nuts and lockwashers**	**.30**

MISCELLANEOUS

Part No.	Description	Selling Price
P-3A114	6C6 Tube Socket	$ .06
P-3A113	6D6 Tube Socket	.06
P-3A116	41 Tube Socket	.06
P-3A99	75 Tube Socket	.05
P-8X8	Rubber Bands (for above tubes)	.04
P-12A62	6" Speaker	2.74
P-13X53	"A" Cable	.14
P-3A108	Small Pin Jack (For Pilot Light Connection)	.06
P-3A136	Large Pin Jack (For Antenna Connection) ..	.06
P-4A46	2 Lug Terminal Strip (Ground Lug Extended)	.04
P-4A48	"A" & "B+" Power Terminal Strip	.04
P-4A38	1 Lug Terminal Strip (Insulated—Left Hand Mounting)	.04
P-30X14	Grid Cap Only	.04
P-10A20	Tone Control Knob	.06
P-30X1	Wire Clamp ...doz	.06
P-29X16	Flexible Shaft Anchor Bushing	.12
P-20X27	Anchor Bushing Clamping Nut	.06
P-20X28	Hexagon Nut for above assembly	.05
P-20X80	Shakeproof Lockwasher (for above assembly) ... doz.	.04
P-19X13	Flat Washers (for above assembly) ...... doz.	.04
P-20X61	8-32 Wing Nuts for securing cover to case ... doz.	.08
P-20X79	No. 8 Split Lockwashers (for above nuts) doz.	.04

"B" UNIT PARTS

Part No.	Description	Code	Selling Price
P-9A268	R.F. "B" Choke Coil Assembly	L3	.06
P-9A374	Filament Reactor	L2	.24
P-53X72	Power Transformer	T7	1.52
P-52X27	Filter Choke	L1	.48
P-19A14	Vibrator—Mallory		2.62
P-19A16	Vibrator—Radiart		2.62
P-3A127	Vibrator Socket		.06
P-3A128	84 Tube Socket		.06
P-4A42	2 Lug Terminal Strip (Both Insulated)		.06
P-4A17	1 Lug Terminal Strip (Insulated—Right Hand Mounting)		.04
P-45X204	Dry Electrolytic (See Condensers)	C26, C27	1.00
P-46X89	1.65 mf. 180 Volt Tubular Condenser..	C24	.38
P-46X88	.01 mf. 1800 Volt Tubular Condensers	C25	.14
P-46X93	.50 mf. 180 Volt Tubular Condensers	C28	.18

TRANSFORMERS AND COILS

Part No.	Description	Code	Selling Price
P-51X17	Output Transformer	T6	.78
P-9A368	Antenna Coil Assembly (Less Can) ..	T1	.44
P-9A369	R.F. Interstage Coil Assembly (Less Can)	T2	.60
P-1A23	Dual-Coil Can Assembly Only (for above two coils)		.16
P-9A371	1st I.F. Coil & Can Assembly Complete	T3	.82
P-9A370	Oscillator Coil & Can Assembly Complete	T4	.30
P-9A372	2nd I.F. Coil & Can Assembly Complete	T5	.98
P-9A375	Pilot Light Choke Assembly	L4	.08
P-9A373	Motor Noise Choke	L6	.14
P-9A268	R.F. "B" Choke Coil Assembly	L3	.05
P-9A374	Filament Reactor	L2	.24
P-53X72	Power Transformer	T7	1.52
P-52X27	Filter Choke	L1	.44

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-47X54	C1	.0005 mf.		Moulded	.08
	C2	Antenna Trimmer-Part of Gang Condenser			
P-46X80	C3	.05 mf.	180	Tubular	.08
P-47X50	C4	.003 mf.		Moulded	.12
P-47X53	C5	.000035 mf.		Moulded	.06
P-46X81	C6	.10 mf.	400	Tubular	.12
P-46X83	C7	.10 mf.	180	Tubular	.12
	C8	1st Detector Trimmer-Part of Gang Condenser			
*P-17A32	C9, C10	130-300 mmf.		1st I. F. Trimmer Condensers	.24
†P-17A33	C9, C10	70-150 mmf.		1st I. F. Trimmer Condensers	.18
	C11	Oscillator Trimmer-Part of Gang Condenser			
P-46X82	C12	.10 mf.	180	Tubular	.12
P-17A18	C13	70-140 mmf. 2nd I.F. Trimmer Condenser			.18
	C14	.00025 mf. Part of 2nd I.F. Coil Assembly			
P-45X203	C15, C21	12.00 mf., 12.00 mf.	25, 25	Dry Electrolytic Block	.50
P-47X52	C16	.00025 mf.		Moulded	.08
P-46X84	C17	.01 mf.	180	Tubular	.08
P-47X52	C18	.00025 mf.		Moulded	.08
P-46X92	C19	.006 mf.	600	Tubular	.10
P-46X86	C20	.01 mf.	400	Tubular	.10
P-46X85	C22	.002 mf.	600	Tubular	.10
P-46X93	C23	.50 mf.	180	Tubular	.18
P-46X89	C24	1.65 mf.	180	Tubular	.38
P-46X88	C25	.01 mf.	1800	Tubular	.14
P-45X204	C26, C27	6.00 mf., 8.00 mf.	350, 350	Dry Electrolytic Block	1.00
P-46X93	C28	.50 mf.	180	Tubular	.18
P-47X50	C29	.003 mf.		Moulded	.12
P-46X94	C30	.25 mf.	300	Tubular	.14
P-14A39				3 Section Gang Condenser	2.00

RESISTORS

Part No.	Code	Resistance	Wattage	Type	Selling Price
P-A95504	R1	500,000 Ohm	0.2	Carbon	.06
P-B94153	R2	15,000 Ohm	0.5	Carbon	.08
P-B94203	R3	20,000 Ohm	0.5	Carbon	.08
P-43X41	R4, R13	450 Ohm, 800 Ohm	0.2, 0.5	Armored Wire Wound	.14
P-A95503	R5	50,000 Ohm	0.2	Carbon	.06
P-A95105	R6	1.0 Megohm	0.2	Carbon	.06
P-A94504	R7	500,000 Ohm	0.2	Carbon	.06
P-95752	R8	7,500 Ohm	0.2	Carbon	.06
P-36X200	R9	2.0 Megohm		Volume Control & Switch	.56
P-40X201	R10	300,000 Ohm		Tone Control	.34
*P-A95204	R11	200,000 Ohm	0.2	Carbon	.06
†P-A95154	R11	150,000 Ohm	0.2	Carbon	.06
P-A95504	R12	500,000 Ohm	0.2	Carbon	.06
†P-A95503	R14	50,000 Ohm	0.2	Carbon	.06

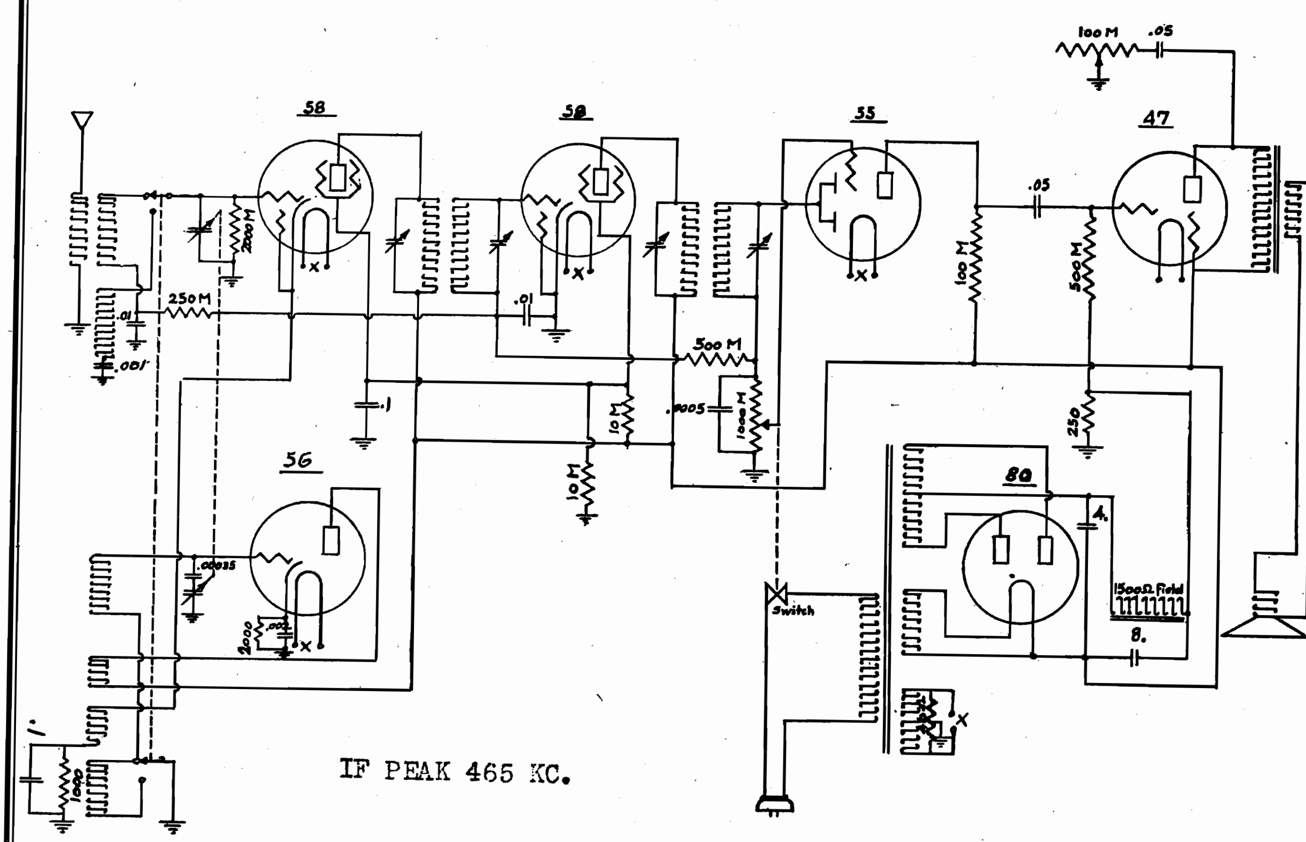
CONTROL UNIT PARTS

Part No.	Quan. Used	Description	Selling Price
P-20A17	1	Complete Remote Control Less Flexible Shafts and Pilot Light Cable Assembly	$2.00
P-35X37	1	Control Unit Case (front) With Screws..	.30
P-35X38	1	Control Unit Case (back) With Screws...	.42
P-35X41	1	Dial Scale Assembly with Pointer and Celluloid Gear (Specify for part P-20A17)	.48
P-35X39	1	Station Selector Shaft Complete with Gear and Horse Shoe Lock	.20
P-24X211	1	Intermediate Gear	.06
P-26X214	1	Volume Control Shaft	.06
P-28X43	1	Volume Control Tension Spring with Nut and Lockwasher	.12
P-17X9	1	Celluloid Crystal	.08
P-10A52	2	Knob with Set Screw	.08

*** Used in early models. (See article on changes in this manual.)**
† Used in later models. (See article on changes in this manual.)

MODEL 62PC55
Schematic, Voltage
Alignment

MONTGOMERY-WARD & CO.



SERVICE NOTES ON MODEL 62-PC-55

6-TUBE AIRLINE RECEIVER

The No. 55 is a combination long and short wave receiver, with a frequency range from 3400 K.C. to 550 K.C., and the change from the short wave to broadcast band is accomplished by a 2-section change-over switch.

The oscillator uses a separate 56 tube. The first detector is also connected to the A.V.C. section of the No. 55 tube, so that better A.V.C. action may be had. The I.F. amplifier is resonated at 465 K.C. The No. 55 tube is used as second detector, and functions as an automatic volume control and triode audio stage also. The 247 power pentode is connected to the output of the 55 through a resistance or capacity circuit. The high voltage rectifier is an 80 tube.

CIRCUIT ADJUSTMENTS

In aligning this receiver, a 465 K.C. modulated oscillator and output meter are required, and the following procedure is recommended:

Use output meter connected in parallel with the plate circuit of the power pentode. Connect the oscillator with the grid of the first detector. Adjust each of the trimming condensers on the I.F. transformers located underneath the chassis, until maximum signal is shown on the output meter. Go over these trimmers several times, as the over-all performance of this receiver depends on I.F. transformer adjustment. If a signal other than 465 K.C. is used, for aligning the amplifier, the oscillator and pre-selector circuit will fail to track. Images will also appear at the low frequency end of the broadcast band. Next, set the dial at 100 degrees when the variable condenser plates are fully meshed. Then set the oscillator to give a 1400 K.C. signal. When the dial is turned to 1400 K.C., a signal should be heard. Adjust the trimming condenser on the variable condenser section nearest the front of the chassis, until the maximum signal is indicated by output meter. Now, adjust the trimmers on the other two sections for maximum signal. The same procedure should be followed with the oscillator set at 900, 700 and 600 K.C.

CAUTION

Do not attempt to bend oscillator plates. All balancing should be done with volume control wide open, and to test oscillator, adjust it to low signal level.

If the intermediate transformers and 2-gang condenser are properly aligned for broadcast, no adjustment is necessary for the tracking of the high frequency bands.

VOLTAGES OF 6-TUBE SET

Ground to Audio Plate	215 Volts
Ground to Audio Screen	240 Volts
Ground to 2nd Detector Plate	70 Volts
Ground to I.F. and 1st Detector Plates	240 Volts
Ground to I.F. and 1st Detector Screens	80 Volts
Ground to Oscillator Plate	80 Volts
Drop through Speaker Fields	105 Volts

Measured with 300,000 Ohm Meter.

Ground to 1st Detector Cathode	2 Volts
Ground to Oscillator Cathode	21 Volts

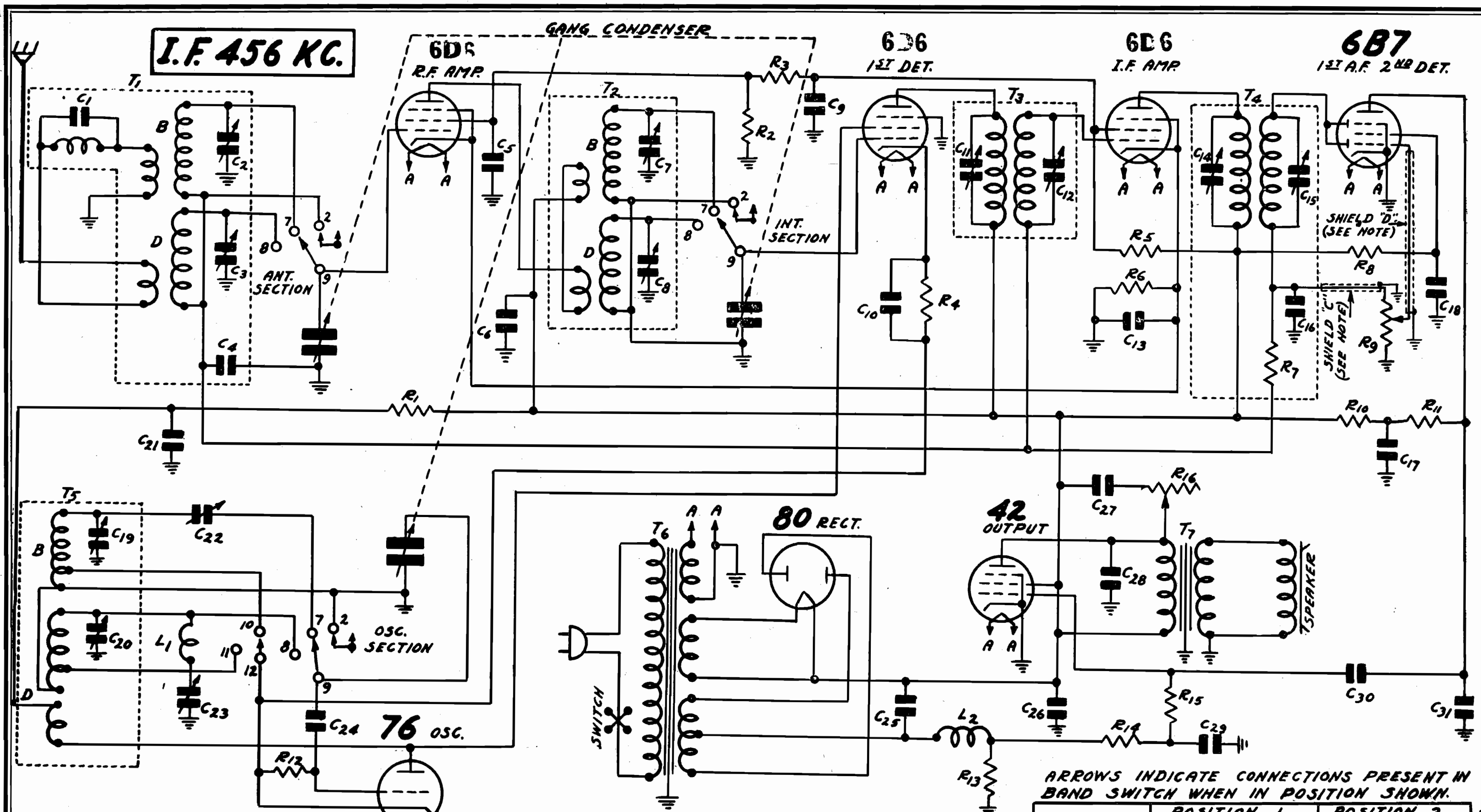
Measured with 30,000 Ohm Meter.

A. C.

All Filaments	2.35 Volts
80 Filaments	4.75 Volts
Input Filaments	111. Volts

MONTGOMERY-WARD & CO.

MODELS 62-173, 62-175, 62-176, 62-177, 62-188
62-193
Schematic



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (D)
OSC. SECTION	2 7 8 9 10 11 12	2 7 8 9 10 11 12
ANT. & INT. SECTION	2 7 8 9	2 7 8 9

CONTACT LOCATIONS NOT NUMBERED ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. THE CAPACITY OF SHIELD "C" AND "D" IS 50 MMF EACH.

Tuning Frequency Range

B Range - - - - 535 to 1730 KC.
D Range - - - - 5.75 to 18.3 MC.

C 1	250 mmf. Moulded		
C 2	2-25 mmf.		
C 3	2-25 mmf.		
C 4	.05 mf. 180 V.		
C 5	.05 mf. 240 V.		
C 6	.10 mf. 360 V.		
C 7	2-25 mmf.		
C 8	2-25 mmf.		
C 9	.25 mf. 240 V.		
C10	.05 mf. 180 V.		
C11	70-150 mmf.	One Assembly	
C12	70-150 mmf.		
C13	.25 mf. 180 V.		
C14	70-150 mmf.	One Assembly	
C15	150-250 mmf.		
C16	50 mmf. Moulded		
C17	.25 mf. 360 V.		
C18	.25 mf. 360 V.		
C19	2-25 mmf.		
C20	2-25 mmf.		
C21	.10 mf. 360 V.		
C22	300-600 mmf.	One Assembly	
C23	40-100 mmf.		
C24	35 mmf. Moulded		
C25	14 mf. 400 V. Electrolytic		
C26	18 mf. 300 V. Electrolytic		
C27	.05 mf. 600 V.		
C28	.002 mf. 600 V.		
C29	.03 mf. 180 V.		
C30	.01 mf. 480 V.		
C31	.002 mf. 600 V.		
L 1	Osc. Tracking Coil		
L 2	Speaker Field (1050 ohms)		

R 1	25000 ohm	1.0 W.	
R 2	30000 ohm	.5 W.	
R 3	6000 ohm	.5 W.	
R 4	2500 ohm	.2 W.	
R 5	16000 ohm	2.0 W.	
R 6	150 ohm	.2 W.	
R 7	2.0 Megohm	.2 W.	
R 8	300000 ohm	.5 W.	
R 9	500000 ohm		Volume Control
R10	20000 ohm	.2 W.	
R11	60000 ohm	.5 W.	
R12	80000 ohm	.2 W.	
R13	235 ohm		Armored Wire Wound
R14	100000 ohm	.2 W.	
R15	500000 ohm	.2 W.	
R16	150000 ohm		Tone Control

T 1	Antenna R. F. Trans.
T 2	Interstage R. F. Trans.
T 3	1st I. F. Trans.
T 4	2nd I. F. Trans.
T 5	Osc. Inductors
T 6	Power Trans.
T 7	Output Trans.

MODELS 62-173, 62-175, 62-176, 62-177, 62-188, 62-193

Voltage
Trimmers
Socket

MONTGOMERY-WARD & CO.

Color Coding, Resistance Data

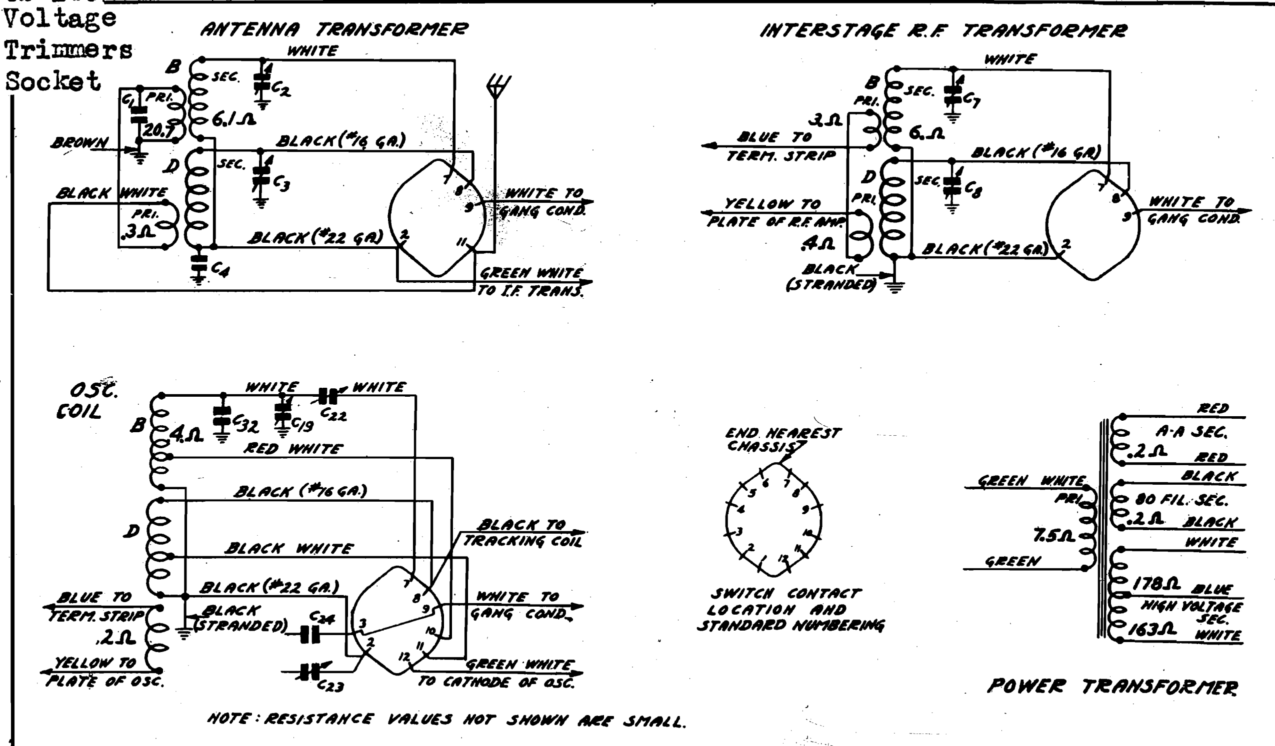


Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

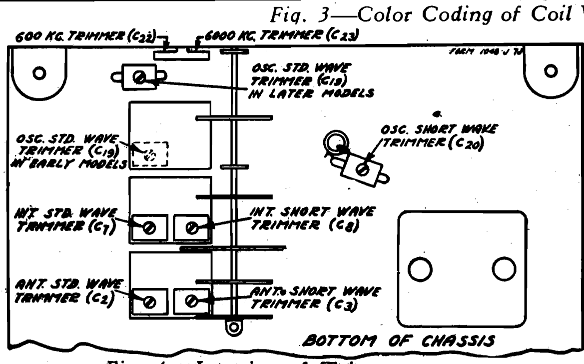


Fig. 4—Location of Trimmers

VOLTAGES AT SOCKETS
Line Voltage - 112
Antenna Shorted to Ground

Type of Tube	Function	Heater Volts	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6D6	R. F.	6.1	240	95	3	7.
6D6	1st Det.	6.1	240	100	9	3.5
76	Osc.	6.1	100			5.
6D6	I. F.	6.1	240	120	3	7.5
6B7	2nd Det.	6.1	55	40	0	2.3
42	Power	6.1	225	240	17 (1)	38.0
80	Rectifier	4.6				32.0 per plate

(1) As read across R13.

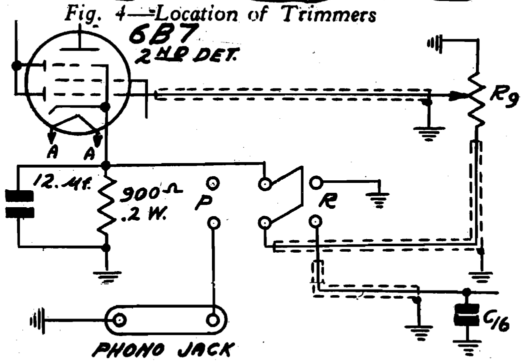


Fig. 7—Phonograph Connections

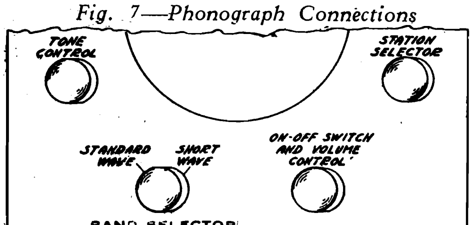


Fig. 1—Arrangement of Controls

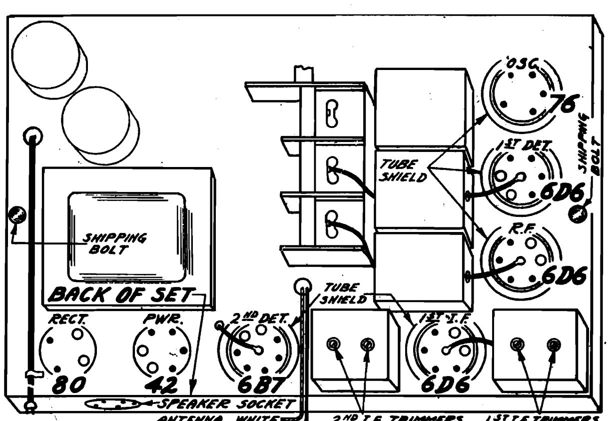


Fig. 6—Location of Tubes

MODELS 62-173,62-175, 62-176,62-177,62-188 62-193
Resistance Test,Parts

General Service Data

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets. Refer to Fig. 3.

New Part No.	Item	Code	D. C. Resistance in Ohms
9A368	Antenna Transformer		
	Range B Primary Winding	T1	20.7
	Range D Primary Winding	T1	0.3
	Range B Secondary Winding	T1	6.1
	Range D Secondary Winding	T1	Small
9A387	R. F. Interstage Transformer		
	Range B Primary Winding	T2	3 0
	Range D Primary Winding	T2	0.4
	Range B Secondary Winding	T2	6.0
	Range D Secondary Winding	T2	Small
9A388	Oscillator Coils		
	Range B Grid Coil	T5	
	Red White to White		4.0
	Red White to ground		Small
	Range D Grid Coil	T5	
	Black White to Black		Small
	Black White to ground		Small
	Oscillator Plate Coil	T5	0.2
9A389	1st I. F. Transformer		
	Primary Winding	T3	12 0
	Secondary Winding	T3	11.1
9A390	2nd I. F. Transformer		
	Primary Winding	T4	12 0
	Secondary Winding	T4	4.5
	Output Transformer (Part of Speaker Assembly)		
	Primary Winding	T7	510.
	Secondary Winding	T7	1.0
	Dynamic Speaker		
	Speaker Field	L2	1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
53X91	115 volt 60 cycle Power Transformer		
	Primary Winding	T6	7.5
	Tube Filament Secondary (A-A)	T6	0.2
	80 Filament Secondary	T6	0.2
	High Voltage Secondary Winding	T6	
	Center tap to inside		153.
	Center tap to outside		178.
9A391	High Frequency Oscillator Tracking Coil	L1	1.1

Replacement Parts

New Part No.	Old Part No.	Description	List Price
12A222		6" Dynamic Speaker Comp. with Output Trans. T7	4.15
12A223		8" Dynamic Speaker Comp. with Output Trans. T7	4.90
12A221		10" Dynamic Speaker Comp. with Output Trans. T7	6.45
2A41		Two Section Band Change Switch	1.65
25X221		Chassis Mounting Feet	.10
30X14	30342	Grid Clip	.10
4A38	2106	Two Lug Terminal Strip (1 Lug Insulated)	.10
4A17	1421	Single Lug Terminal Strip	.10
4A49		Single Lug Terminal Strip (Mtg. hole used)	.10
4A50		Two Lug Terminal Strip (Both Lugs Insulated - Mtg. Foot in Center)	.10
9A386	T1	Antenna Trans. and Can Assembly	$2.35
9A387	T2	R.F. Interstage Trans. and Can Assembly	1.75
9A389	T3	1st I.F. Coil and Can Assembly	1.50
9A390	T4	2nd I.F. Coil and Can Assembly	2.10
9A388	T5	Oscillator Coil and Can Assembly	1.70
53X91	T6	Power Transformer 115 Volt; 60 cycles	3.60
53X92	T6	Power Transformer 115 Volt; 25 cycles	5.95
53X99	T6	Power Transformer 230 Volt; 50 cycles	4.10
9A391	L1	High Frequency Oscillator Tracking Coil Assembly	.25
47X59	C1	250 mmfd. Moulded	$ .15
17A36	C2	2-25 mmfd. Antenna Standard Wave Trimmer	.10
17A36	C3	2-25 mmfd. Antenna Short Wave Trimmer	.10
46X80	C4	.050 mfd. 180 Tubular	.15
46X103	C5	.050 mfd. 240 Tubular	.15
46X105	C6	.100 mfd. 360 Tubular	.20
17A36	C7	2-25 mmfd. R.F. Interstage Standard Wave Trimmer	.10
17A36	C8	2-25 mmfd. R.F. Interstage Short Wave Trimmer	.10
46X104	C9	.250 mfd. 240 Tubular	.25
46X80	C10	.050 mfd. 180 Tubular	.15
17A33	C11 70-150 mmfd. / C12 70-150 mmfd.	1st I.F. Trimmers	.40
46X102	C13	.250 mfd. 180 Tubular	.30
17A34	C14 70-150 mmfd. / C15 150-250 mmfd.	2nd I.F. Trimmers	.40
47X56	C16	50 mmfd. Moulded	.10
46X107	C17	.250 mfd. 360 Tubular	.30
46X116	C18	.250 mfd. 360 Tubular	.35
17A36	C19	2-25 mmfd. Oscillator Standard Wave Trimmer	.10
17A36	C20	2-25 mmfd. Oscillator Short Wave Trimmer	.10
46X105	C21	.100 360 Tubular	.20
17A35	C22 300-600 mmfd. / C23 40-100 mmfd.	Oscillator 600 KC Padding Trimmer / Oscillator 6000 KC Padding Trimmer	.45
47X53	C24	35 mmfd. Moulded	.10
44X10	C25	14.00 mfd. 400 Wet Electrolytic	1.25
44X11	C26	18.00 mfd. 300 Wet Electrolytic	1.10
46X108	C27	.050 mfd. 600 Tubular	.20
46X100	C28	.002 mfd. 600 Tubular	.15
46X110	C29	.030 mfd. 180 Tubular	.15
46X109	C30	.010 mfd. 480 Tubular	.15
46X100	C31	.002 mfd. 600 Tubular	.15
47X63	C32	10 mmfd. Moulded	.10
14A42		3 Section Gang Condenser	3.85
C94253	R1	25,000 ohms 1.0 Carbon	$ .15
B93303	R2	30,000 ohms .5 Carbon	.20
B94602	R3	6,000 ohms .5 Carbon	.15
A94252	R4	2,500 ohms .2 Carbon	.15
D93163	R5	16,000 ohms 2.0 Carbon	.45
A94151	R6	150 ohms .2 Carbon	.15
A95205	R7	2.0 Megohms .2 Carbon	.10
B94304	R8	300,000 ohms .5 Carbon	.15
36X205	R9	500,000 ohms Volume Control & Switch	1.05
A94203	R10	20,000 ohms .2 Carbon	.15
B94603	R11	60 000 ohms .5 Carbon	.15
A94803	R12	80,000 ohms .2 Carbon	.15
43X42	R13	235 ohms 2.0 Armored Wire Wound	.25
A94104	R14	100,000 ohms .2 Carbon	.15
A95504	R15	500,000 ohms .2 Carbon	.10
40X204	R16	150,000 ohms Tone Control	.75
2A31		Phono Switch (Double Pole Double Throw Switch)	$ .60
3A12		Phono Jack	.10
10A36		Switch Knob	.20
45X37		12.0 Mf. - 25 Volt - Dry Electrolytic Condenser	.75
A94901		900 Ohm - 0.2 Watt	.15
		12 Inches of No. 722G Shielded Hookup Wire	.10
		Dial and Drive Assembly (Specify name and Model No.)	2.35
		Dial Strip Only (Specify name and Model No.)	.55

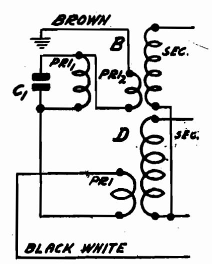


Fig. 5—Antenna Transformer on Early Models

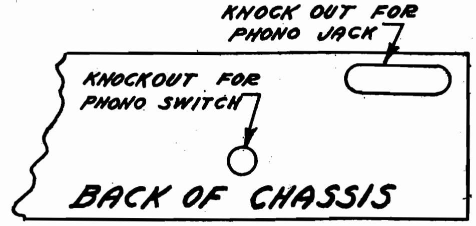


Fig. 8—Location of Phono Knockouts

MODELS 62-173, 62-175
62-176, 62-177, 62-188
62-193
Alignment, Data

MONTGOMERY-WARD & CO.

Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a three section double throw switch. The various circuits made and broken as this switch is thrown are indicated in the schematic circuit diagram Fig. 2.

Referring to the schematic, the standard wave coils are indicated by the letter B, while the short wave coils are indicated by the letter D. The antenna transformer primaries are connected in series. When the switch is in the standard wave position, the B secondary is connected to the grid circuit of the 6D6 R.F. amplifier while the C secondary is open circuited. When the switch is in the short wave position, the C secondary is connected to the grid circuit of this tube while the B secondary is short circuited. The secondary in use is tuned by the antenna section of the three gang condenser.

The output of the R. F. 6D6 tube is fed through another R. F. transformer with tuned secondary into a second 6D6 tube which functions as the first detector. The interstage section of the three gang condenser is used for tuning this circuit. As in the case of the antenna transformer, the R. F. interstage transformer standard wave windings are indicated in the schematic by the letter B, while the short wave windings are indicated by the letter D. The connections to the two coils are made in the same manner as described above for the antenna R. F. transformer.

A separate type 76 tube is employed in the oscillator circuit. Referring to the schematic, B is the standard wave grid coil and D is the short wave grid coil. The winding shown below is the oscillator plate coil. The grid coil in use is tuned by the oscillator section of the three gang condenser. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned. When the switch is in the standard wave position, connections are completed to the B grid coil and the D grid coil is open circuited. When the switch is in the short wave position, connections are completed to the D grid coil and the B grid coil is short circuited. Padding condensers C22 and C23 are used in conjunction with the standard wave and short wave oscillator circuits respectively.

The oscillator potential is fed into the cathode circuit of the 6D6 first detector tube. This results in the intermediate or beat frequency of 456 K.C. being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6D6 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R9 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 42 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the grid of the 1st detector.

Connect the ground lead of the signal generator to the chassis ground.

Turn the band switch to the standard wave position.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 250 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator standard wave trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale Retighten the set screw.

Adjust the interstage standard wave trimmer (C7) and antenna standard wave trimmer (C2) until maximum output is obtained.

Do not change the setting of the oscillator standard wave trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Be sure to use a non-metallic screw driver for this adjustment.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the short wave position.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator short wave trimmer (C20) until maximum output is obtained. See Fig. 4 for location of this trimmer.

If a maximum output peak cannot be reached, it may be due to the fact that the antenna and interstage short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum ouptut.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage short wave trimmer (C8) and antenna short wave trimmer (C3) until maximum output is obtained.

When adjusting the interstage short wave trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator short wave trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Use a non-metallic screw driver for this adjustment.

Servicing R. F. Coil Assemblies

The R. F. coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 3.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —see Fig. 8.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis base directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of the chassis.

The ground lug which extends out from the side of the chassis should be bent back into the chassis wall. The connections are made by opening the diode return circuit at the volume control. Unsolder the shielded lead which runs from the I. F. transformer to the volume control at the lug on the volume control. Cut this lead to length and connect it to the switch as shown in Fig. 7. The extra length of shielded lead which is provided, is connected from the volume control R9 to the phono switch as illustrated.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube by bending the chassis ground lug away from this terminal. Be sure to solder back to this ground lug any leads that were connected to it (not including cathode connection of socket).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of the condenser to the cathode terminal of the 6B7 2nd detector and the phono switch as shown in Fig. 7. To this same terminal on the phono switch connect the 900 ohm .2 watt resistor. The other side of this resistor goes to ground. Complete the other connections as illustrated.

A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

Changes in Early Models

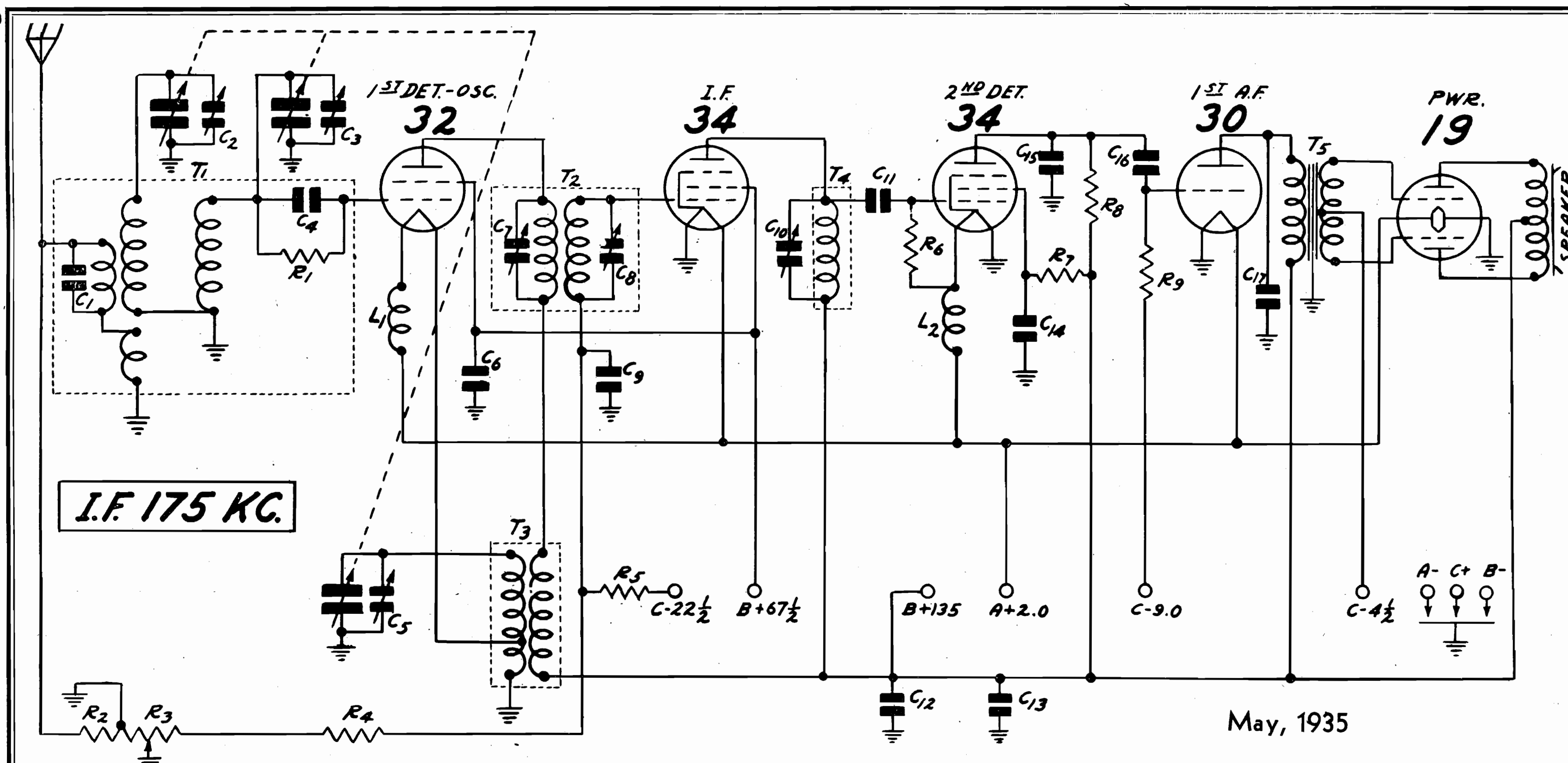
In the early models of this receiver the oscillator standard wave trimmer C19 was in the oscillator coil can—see Fig. 4.

In the early models the antenna transformer had two B primary windings as shown in Fig. 5. In later models only one winding was used as shown in Fig. 3.

MONTGOMERY-WARD & CO.

MODELS 62-178, 62-181
62-189, 62-211

Schematic



May, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C_1 150 MMF MOULDED
C_2 GANG TRIMMER
C_3 GANG TRIMMER
C_4 35 MMF MOULDED
C_5 GANG TRIMMER
C_6 .25 MF 180V.
C_7 40-100 MMF } DUAL
C_8 20-70 MMF } (P-17A37)
C_9 .05 MF 180V.
C_{10} 40-100 MMF (P-17A38)
C_{11} 50 MMF MOULDED
C_{12} .10 MF 180V.
C_{13} 4.0 MF 150V. ELECTROLYTIC (P-45X28)
C_{14} .10 MF 180V.

C_{15} .002 MF 300V.
C_{16} .006 MF 300V.
C_{17} .002 MF 300V.

R_1 1.0 MEGOHM .2 W.
R_2 10 000 OHM } VOLUME CONTROL (P-36X201)
R_3 60 000 OHM }
R_4 900 OHM .2 W.
R_5 6 500 OHM .2 W.
R_6 2.0 MEGOHM .2 W.

R_7 100 000 OHM .5 W.
R_8 40 000 OHM .5 W.
R_9 1.0 MEGOHM .2 W.

L_1 SINGLE FILAMENT REACTOR (P-9A281)
L_2 SINGLE FILAMENT REACTOR (P-9A281)

T_1 DOUBLE TUNED ANTENNA COIL (P-9A381)
T_2 1ST I.F. COIL (P-9A383)
T_3 OSC. COIL (P-9A382)
T_4 2ND I.F. COIL (P-9A384)
T_5 AUDIO INPUT TRANS. (P-50X11)

MONTGOMERY-WARD & CO.

Circuit

A type 32 tube functions as the first detector-oscillator. Referring to Fig. 1, T2 is the 1st I.F. transformer while T3 is the oscillator assembly. The oscillating circuit is tuned by the oscillator section of the gang condenser and is always resonant at a frequency 175 KC above the frequency to which the R.F. circuit is tuned.

One stage of I.F. amplification is employed using a 34 tube. The primary and secondary of the first I.F. transformer are tuned by small trimmer condensers. A second I.F. unit of the impedance coupled type is provided in which the inductance T4 is tuned by a trimmer condenser C10.

The volume control is of the variable antenna input and I.F. bias type. Referring to Fig. 1 it will be noted that one end of the volume control strip is connected to the antenna and the other end is connected to resistor R4. Also note that the volume control strip is tapped. Bias voltage for the 34 I.F. tube is obtained from a potentiometer consisting of resistors R5, R4 and R3, which resistors are connected across the 22½ volt "C" battery.

A 34 tube is used as the 2nd detector or demodulator. Demodulation takes place in the grid circuit of this tube.

Batteries

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A+" line.

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. **Caution the user never to operate the receiver with the adjustment beyond 2 volts.**

Alignment Procedure and Dial Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator.

Keep the volume control at the maximum position.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pointer by removing the screw at the center of the dial.

Remove the dial by taking out the six rivets from the dial assembly.

Remove the on-off indicator dial by pulling it forward.

With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.

Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.

Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now slip the piece of fine tubing (about ¾" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the bend in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. *If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.*

Replace the on-off indicator dial, care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by ¼" long round head machine screws and nuts.

MONTGOMERY-WARD & CO.

MODELS 62-178, 62-181, 62-189, 62-211
Voltage, Socket, Trimmers, Resistance Test, Parts

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery

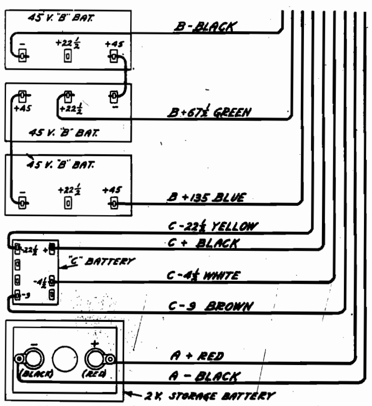


Fig. 2—Complete Battery Wiring Connections

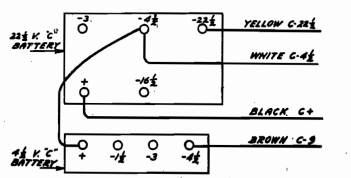


Fig. 3—"C" Battery Connections Using Standard "C" Batteries

Type of Tube	Function	Across Fila-ment	Plate to Gnd.	Screen to Gnd.	Grid to Gnd.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5 (1) (2)	2.5
34	I. F.	2.0	135	67.5	2.5 (3)	2.8
34	2nd Det.	2.0	50	40 (1)	0	1.8
30	1st Audio	2.0	135		9 (4)	3.0
19	Output	2.0	135		4.5	3.2 Total

VOLTAGES AT SOCKETS
Volume Control at Maximum—Antenna Shorted to Ground. B+135 Volts Voltages to Chassis

(1) With 250,000 ohm meter.
(2) Subject to variation.
(3) With 25,000 ohm meter.
(4) Read at "C" battery.

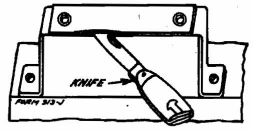


Fig. 6—Prying off Fiber Cover

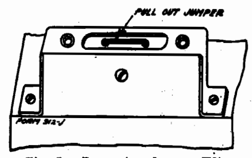


Fig. 7—Removing Jumper Wire

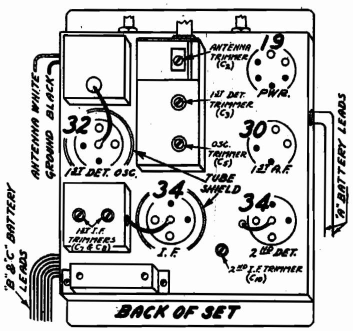


Fig. 8—Tube Arrangement

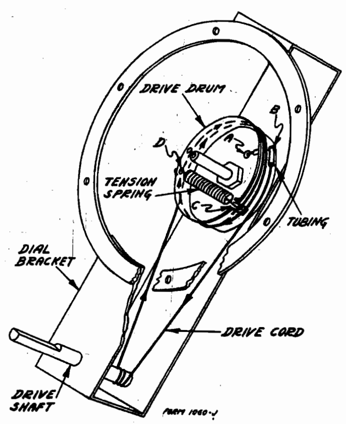


Fig. 9—Replacing Drive Cord

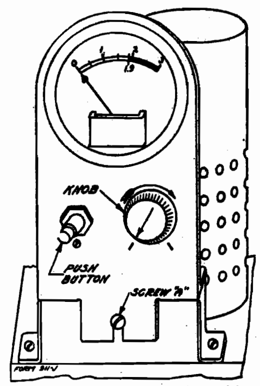


Fig. 4—Voltage Regulator in Position

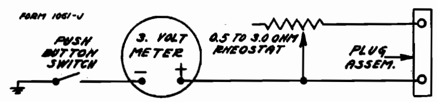


Fig. 5—Schematic Diagram of Voltage Regulator

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

Part No.		Code	D. C. Resistance in Ohms
9A381	Double Tuned Ant. Trans. Pri. (in series)	T1	17.
	Double Tuned Ant. Trans. Sec. (Antenna)	T1	3.5
	Double Tuned Ant. Trans. Sec. (1st Det.)	T1	3.5
9A383	1st I.F. Trans. Primary	T2	80.
	1st I.F. Trans. Secondary	T2	105.
9A382	Oscillator Coil Cathode Winding	T3	2.
	Oscillator Coil Plate Winding	T3	7.
9A384	2nd I.F. Reactor Coil	T4	50.
9A281	Filament Reactor (In 1st Det. Ckt.)	L1	Small
9A281	Filament Reactor (In 2nd Det. Ckt.)	L2	Small
50X11	Audio Transformer Primary	T5	950.
	Audio Transformer Secondary (Center Tap to outside)	T5	600.
	Audio Transformer Secondary (Center Tap to inside)	T5	550.
12A217	Magnetic Speaker (Center Tap to outside)		290.
	Magnetic Speaker (Center Tap to inside)		250.

Replacement Parts

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Code	DESCRIPTION	List Price
9A381		T1	Double Tuned Antenna Transformer Less Can	1.65
42X23	40433		Transformer Can for above Assembly	.15
9A383		T2	1st I.F. Transformer and Can Assembly	2.00
9A382		T3	Oscillator Coil and Can Assembly	1.00
9A384		T4	2nd I.F. Reactor Coil and Can Assembly	1.75
50X11 5G	50586-5G	T5	Push Pull Audio Input Transformer	2.10
9A281	5189	L1	Filament Reactor in 1st Det. Circuit	.25
9A281	5189	L2	Filament Reactor in 2nd Det. Circuit	.25

MISCELLANEOUS

New Part No.	Old Part No.	DESCRIPTION	List Price
3A64	1644	Type 30 Tube Socket (4 Prong)	$ .10
3A65	1645	Type 34 Tube Socket (4 Prong)	.10
3A133	2131	Type 32 Tube Socket (4 Prong)	.10
3A110	1833	Type 19 Tube Socket (6 Prong)	.10
13X212		Speaker Cable and Socket Assembly	.60
13X215		"B" and "C" Battery Cable	.85
13X66		"A" Battery Cable	.40
13X214		Antenna and Ground Lead Assembly	.30
12A217		6" Magnetic Speaker	4.35
12A218		8" Magnetic Speaker	4.90
17X7		Glass Crystal	.10
28X38		Crystal Retainer Ring	.10
10A32	2061	Knobs	.20
2X38	10387	Felt Washers (for use behind knobs)	.10
32X18	20786	Tube Shield Base	.10
32X1	20406A	Tube Shields	.10
8X23	10272	Rubber Chassis Mounting Cushions	.10
4A18	1441	Two Lug Terminal Strip (Both Insulated—Mtg. Foot in Center)	.10
30X14	30342	Grid Clip Only	.10

DIAL ASSEMBLY

New Part No.	Old Part No.	DESCRIPTION	List Price
15A36		Dial and Drive Assembly Complete	2.70
5A28		Drive and Dial Bracket Assembly Only	.65
15X37		Indicator Disc and Hub Assembly Only	.25
26X203		Drive Shaft Only	.10
19X21	20953	Horse Shoe Lockwasher for use on above shaft	.10
26X213		Pointer Shaft	.10
24X20	20941	Drive Drum	.10
23X19	20701	Tension Spring (used in drive drum)	.10
10X10		16" Black Drive Cord ... doz.	.25
10X11		10" Black Indicator Cord ... doz.	.15
29X20	30398	Brass Collar and 6-32 x 3/16" Set Screw for securing above Indicator Cord to Shaft of Volume Control and On-Off Switch	.10
		Dial Strip (Specify Series, Model No. and Name of Receiver)	.35
15X25		Double End Pointer	.10
28X34		Indicator Spring	.10

RESISTORS

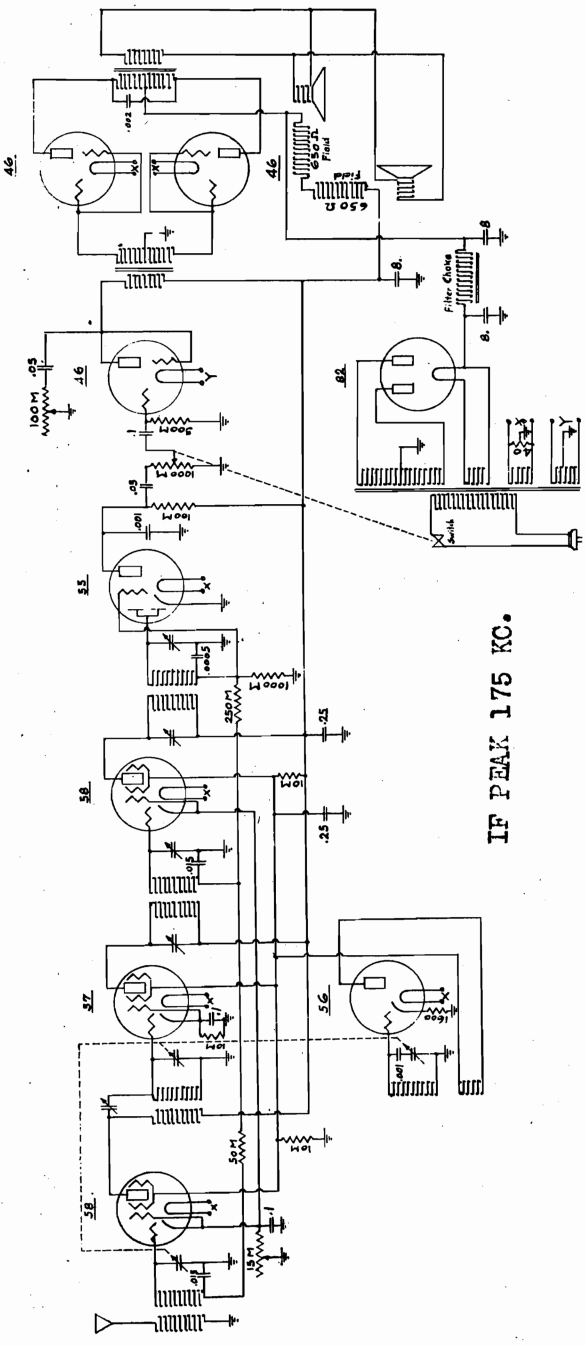
New Part No.	Old Part No.	Code	Resistance	Watts	Type	List Price
A95105		R1	1.0 Megohm	0.2	Carbon	.10
36X201		R2 R3	10,000 Ohms 60,000 Ohms		Dual Volume Control	1.20
A94901		R4	900 Ohms	0.2	Carbon	.15
A94652		R5	6,500 Ohms	0.2	Carbon	.15
A95205		R6	2.0 Megohm	0.2	Carbon	.10
B94104		R7	100,000 Ohms	0.5	Carbon	.15
B94403		R8	40,000 Ohms	0.5	Carbon	.15
A95105		R9	1.0 Megohm	0.2	Carbon	.10

CONDENSERS

New Part No.	Old Part No.	Code	Capacity	Voltage	Type	List Price
47X55		C1	150 mmf.		Moulded	.15
		C2	Antenna Trimmer—Part of Gang Condenser			
		C3	1st Det. Trimmer—Part of Gang Condenser			
47X53		C4	35 mmf.		Moulded	.10
		C5	Oscillator Trimmer—Part of Gang Cond.			
46X97		C6	.25 mf.	180	Tubular	.30
17A37		C7 C8	40-100 mmf. 20-70 mmf.		1st I.F. Trimmer Cond.	.35
46X80		C9	.05 mf.	180	Tubular	.15
17A38		C10	40-100 mmf.		2nd I.F. Trimmer Cond.	.25
47X56		C11	50 mmf.		Moulded	.10
46X98		C12	0.1 mf.	180	Tubular	.20
45X28		C13	4.0 mf.	150	Electrolytic	.85
46X96		C14	0.1 mf.	180	Tubular	.20
46X111		C15	.002 mf.	300	Tubular	.30
46X112		C16	.006 mf.	300	Tubular	.15
46X111		C17	.002 mf.	300	Tubular	.30
14A38			3 Section Gang Condenser			[illegible]

MODEL 62PC68
Schematic, Voltage
Alignment

MONTGOMERY-WARD & CO.



SERVICE NOTES ON MODEL 62-PC-68
9-TUBE AIRLINE RECEIVER

The 68 receiver uses the following tubes:—
- 1 No. 56 Oscillator.
- 1 No. 58 R. F.
- 1 No. 57 First Detector.
- 1 No. 58 Intermediate.
- 1 No. 55 Second Detector.
- 1 No. 46 First Audio.
- 2 No. 46 Push Pull in Second Audio.
- 1 No. 82 Rectifier.

The oscillatory and intermediate circuits of this receiver are of the conventional type. The Second Detector, incorporating No. 55 tube, will be found very interesting as it performs as a diode detector and automatic control and one stage of audio, which is equivalent to three tubes in the usual receiver. The audio channel uses the 46 to drive a pair of 46's in Class B. It will be found in voltage checks that the plate is near 400 volts, while the current drain will be in the order of 7 M.A., with no signal on the grids of the 46's in push pull, but when sufficient power is furnished by the driver, the power output may reach 15 watts with an instantaneous current drain of 200 M.A.

The noise control, or noise suppressor, is a 10,000 ohm variable resistor in the cathode circuit of the I.F. and R.F. tubes, working much the same as the volume control in the older types of sets.

CIRCUIT ALIGNMENT

The intermediate frequency is tuned at 175 K.C. and 2 I.F. transformers are used. The usual care must be used in adjusting these if good results are to be had. All adjustments of this receiver should be made with the volume control at maximum. The following procedure is recommended:—

Use output meter connected in parallel with the plate circuit of the power pentode. Connect the oscillator with the grid of the first detector. Adjust each of the trimming condensers on the I.F. transformers located underneath the chassis, until maximum signal is shown on the output meter. Go over these trimmers several times, as the overall performance of this receiver depends on I.F. transformer adjustment. If a signal other than 175 K.C. is used for aligning the amplifier, the oscillator and pre-selector circuit will fail to track. Images will also appear at the low frequency end of the broadcast band. Next, set the dial at 100 degrees when the variable condenser plates are fully meshed. Then set the oscillator to give a 1400 K.C. signal. When the dial is turned to 1400 K.C., a signal should be heard. Adjust the trimming condenser on the variable condenser section nearest the front of the chassis, until the maximum signal is indicated by output meter. Now, adjust the trimmers on the other two sections for maximum signal. The same procedure should be followed with the oscillator set at 900, 700 and 600 K.C.

CAUTION

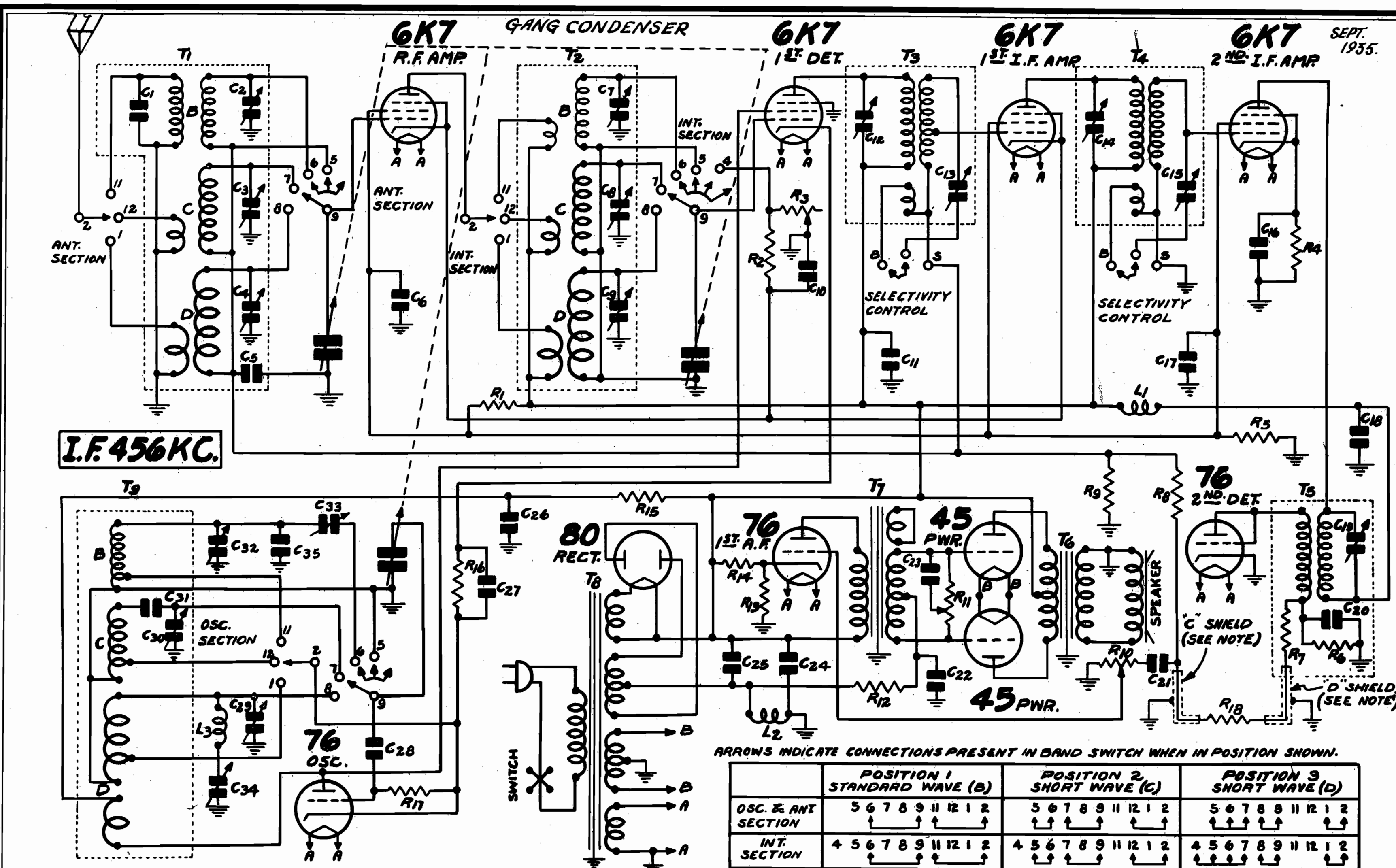
Do not attempt to bend oscillator plates. All balancing should be done with volume control wide open, and to test oscillator, adjust it to low signal level.

VOLTAGES OF 9-TUBE SET

Ground to 2nd Audio Plates	340 Volts
Ground to High side of speaker Fields	340 Volts
Measured with Meter 1000 ohms per volt.	
Ground to Other side of speaker Fields	260 Volts
Drop Across Fields	80 Volts
Ground to 2nd Detector Plate	35 Volts
Ground to I.F. and 1st Detector Plates	260 Volts
Ground to Oscillator Plate	90 Volts
Ground to I.F. and 1st Detector Screens	90 Volts
Ground to 46 Driver	260 Volts
Measured with Meter 1000 ohms per volt.	
Drop through Filter Choke	17 Volts
Ground to I.F. Cathodes	3-5 Volts
Measured with Meter 1000 ohms per volt.	
A. C.	
246 Audio Filament	2.15 Volts
Heater Filament	2.10 Volts
82 Filament	2.20 Volts
Input	106. Volts

MODELS 62-179, 62-194
62-206, 62-216, 62-218
Schematic

MONTGOMERY-WARD & CO.



	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. & ANT. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2
INT. SECTION	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.
THE CAPACITY OF THE "C" SHIELD IS 55 $\mu\mu f$. THE CAPACITY OF THE "D" SHIELD IS 20 $\mu\mu f$.

CONTACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT. SECTIONS, AND 3 AND 10 IN INT. SECTION ARE BLANK.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 240 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 .25 mf. 180 V.
C11 .25 mf. 360 V.
C12 150-250 mmf. } ONE
C13 150-250 mmf. } UNIT
C14 150-250 mmf. } ONE
C15 150-250 mmf. } UNIT
C16 .05 mf. 180 V.
C17 4.0 mf. 150 V.
C18 .10 mf. 360 V.
C19 70-150 mmf.
C20 50 mmf.
C21 .01 mf. 360 V.
C22 .50 mf. 180 V.
C23 .004 mf. 600 V.
C24 18.0 mf. 290 V.
C25 14.0 mf. 400 V.
C26 .05 mf. 360 V.
C27 .05 mf. 180 V.
C28 35 mmf.
C29 2-25 mmf.
C30 2-25 mmf.
C31 1400 mmf.
C32 2-25 mmf.
C33 300-600 mmf. } ONE
C34 40-100 mmf. } UNIT

R 1 16,000 ohm 2.0 W.
R 2 150 ohm .2 W.
R 3 2,500 ohm } Dual Volume
R10 2.0 megohm } Control
R 4 400 ohm .2 W.
R 5 30,000 ohm 1.0 W.
R 6 300,000 ohm .2 W.
R 7 100,000 ohm .2 W.
R 8 2.0 megohm .2 W.
R 9 1.0 megohm .2 W.
R11 3.0 megohm Tone Cont.
R12 100,000 ohm .2 W.
R13 1,000 ohm .5 W.
R14 25,000 ohm 3.0 W.
R15 25,000 ohm 1.0 W.
R16 2,500 ohm .2 W.
R17 80,000 ohm .2 W.

T 1 Ant. R.F. Trans.
T 2 Interstage R.F. Trans.
T 3 1st I.F. Trans.
T 4 2nd I. F. Trans.
T 5 Diode Input Trans.
T 6 Audio Output Trans.
T 7 Audio Input Trans.
T 8 Power Trans.
T 9 Osc. Inductors

L 1 Isolating Reactor
L 2 Speaker Field (570 Ohm)
L 3 Osc. Tracking Coil

MODELS 62-179, 62-194
62-206, 62-216, 62-218
Alignment, Changes
Data

MONTGOMERY-WARD & CO.

Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T9 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T9, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using 6K7 tubes. The primaries and secondaries of the first and second I. F. transformers and the primary of the 3rd I. F. transformer are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st and 2nd I. F. transformers T3 and T4 in Fig. 2, it will be noted that there are coupling windings shown in the illustration below the primaries.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 76 1st audio tube is varied (R10). In the other section the R. F. and 1st I. F. bias is varied (R3). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R3 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 76 tube functions as a diode second detector. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and 1st I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the Type 76 1st audio tube. Transformer coupling is used between the first audio stage and the output stage which employs two type 45 tubes. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes of a size and in the position shown in Fig. 8 at the left hand side (from back) of the rear panel of the chassis.

The connections are made by opening the circuit at the volume control. Unsolder the condenser C21 from the lug on the volume control and reconnect it to the new terminal strip provided (see parts list). This terminal strip should be secured to the inside of the front panel of the chassis base at a point near the volume control and should be soldered in position. From the terminal lug on the above strip, and from the volume control lug from which the condenser C21 was removed, connect leads to the phono switch on the rear panel of the chassis as shown in Fig. 7. Before connecting these two leads permanently to the switch, twist them together and enclose them in the shielded sleeving provided, being sure to ground the shielding to the chassis base at the extreme ends. At the point where the shielding passes the electrolytic condensers cover the cable with insulating tape. Complete the connections as shown in Fig. 7.

Before reassembling the chassis into the cabinet observe the position of the rectifier tube socket. If the socket of the type 80 rectifier tube has the filament prongs nearest the electrolytic condensers, remove the rivets which secure this socket to the chassis base and then rotate the socket 180 degrees, so that the filament prongs are nearest the corner of the chassis. Replace the rivets.

A high impedance phonograph pickup of good quality should be used. If a low impedance pickup is used, a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the condenser C23 between the grids of the 45 tubes in the audio output stage. In the later models it is employed as a potentiometer in the manner shown in Fig. 2.

The 100,000 ohm resistor (R18) was not used in the early models. Condenser C21 was connected directly to resistor R7.

The type 6K7 metal tubes replace the type 6D6 glass tubes which were used in the early models.

Condenser C35 was added to the oscillator coil standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 4. In contact locations not used, the number applying to that particular location is not employed.

Metal Tubes

One type of the new metal tubes is used in this receiver, namely the 6K7. This replaces the type 6D6 glass tube. This metal tube operates at the same voltages and is nearly identical in characteristics to the corresponding glass tube which it replaces. In Fig. 6 are shown the metal tube pin positions from a bottom socket view.

The shells of metal tubes get quite hot and users should be cautioned against touching them.

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 4.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

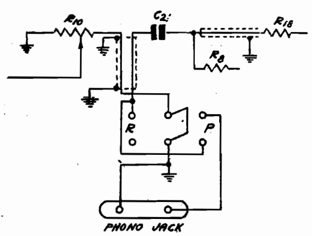


Fig. 7—Phonograph Connections

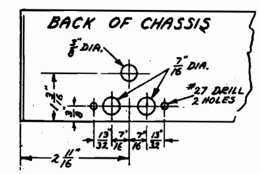


Fig. 8—Details of Panel Drilling for Phono Assembly

Tuning Frequency Range

B Range	535 to 1730 KC.
C Range	1715 to 5800 KC.
D Range	5750 to 18300 KC.

Sensitivity

B Range Average	0.7 Microvolts Absolute
C Range Average	1.0 Microvolts Absolute
D Range Average	2.0 Microvolts Absolute

Power Consumption - 90 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 5 Watts Undistorted

Selectivity - 22 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - 456 KC.

Speaker - - - - - - - - - 10" Dynamic

MONTGOMERY-WARD & CO.

MODELS 62-179, 62-194
62-206, 62-216, 62-218
Voltage, Trimmers
Socket, Data

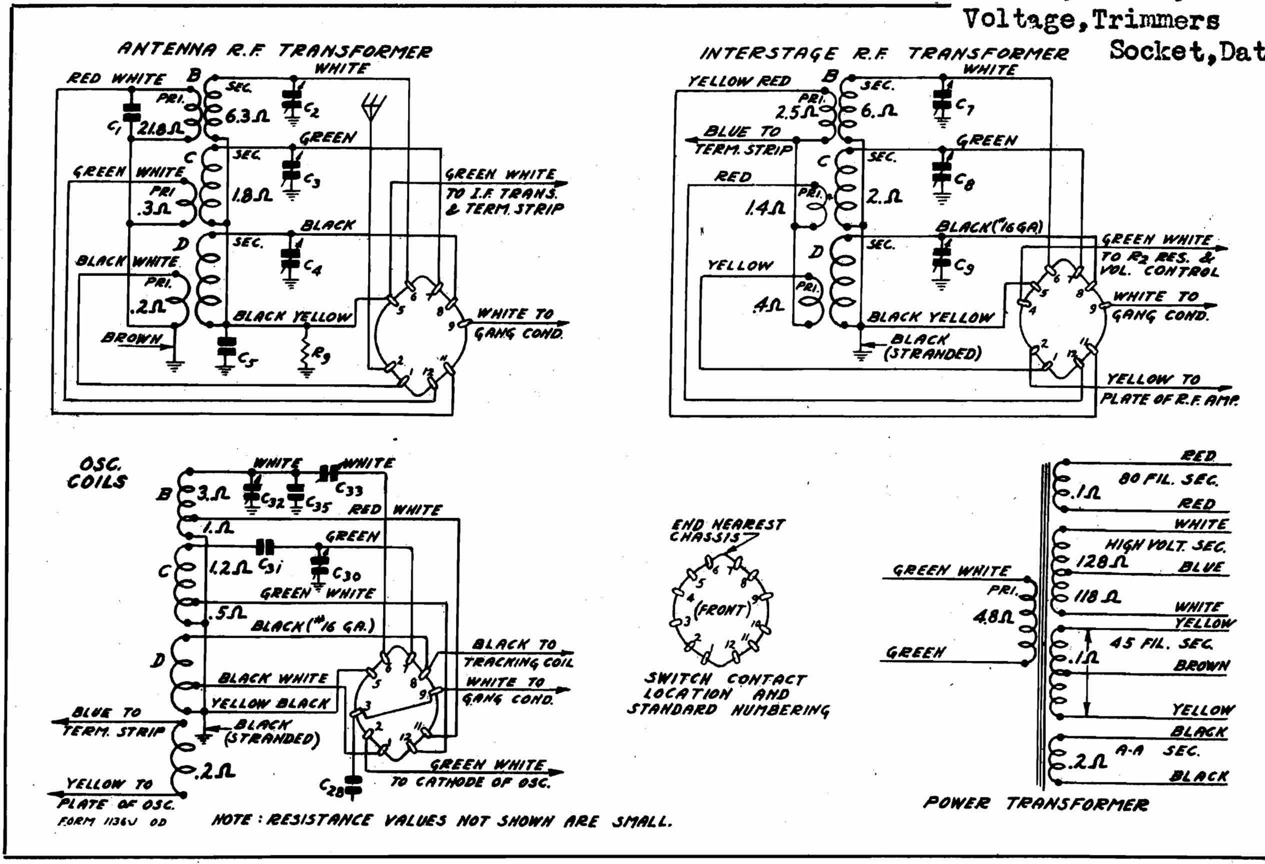


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

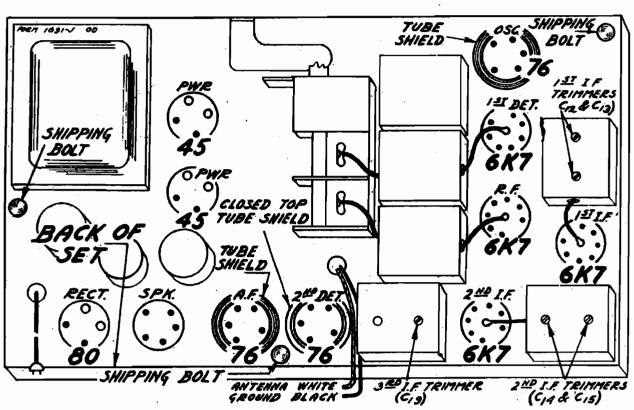


Fig. 5—Location of Tubes

VOLTAGES AT SOCKETS

Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode M. A.
6K7 (6D6)	R. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	1st Det.	6.1	265	110	9.5	3.8
76	Osc.	6.1	110			5.8
6K7 (6D6)	1st. I. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	2nd I. F.	6.1	265	120	3.7	9.0
76	2nd Det.	6.1				
76	1st A. F.	6.1	265		14.	5.0
45	Power	2.5	265		50.(1)	22.
80	Rectifier	4.9				90. (total)

(1) As read with 500 Volt Scale. Grid to Ground.

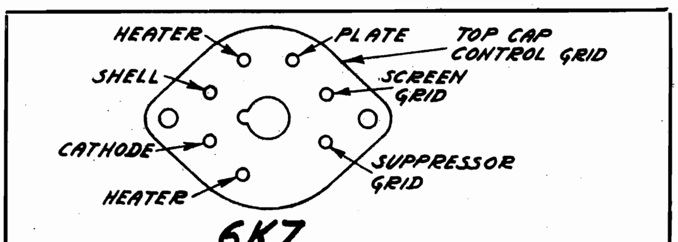


Fig. 6—Metal Tube—Bottom View of Socket

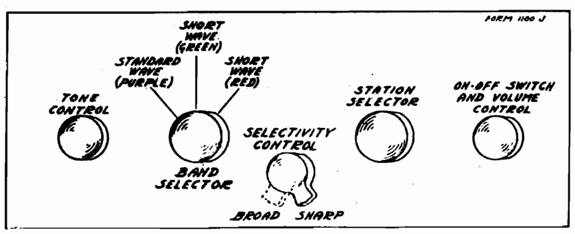


Fig. 1—Arrangement of Controls

MODELS 62-179, 62-194
62-206, 62-216, 62-218
Resistance Test, Parts

MONTGOMERY-WARD & CO.

NOTICE—A change has been made in our parts numbering system. Old parts which are used in new receivers will have a new number assigned to them. For your convenience we are listing below the new part number and the corresponding old part number, should there be one. **Order by new part number only.**

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the series number and this large letter.

MISCELLANEOUS

New Part No.	Old Part No.	Description	List Price
P-3A126	2022	Type 76 Glass Tube Socket	$0.10
P-3A113	1855	Type 6D6 Glass Tube Socket	.10
P-3A211		Type 6K7 Metal Tube Socket	.15
P-3A63	1643	Type 45 Glass Tube Socket	.10
P-3A129	2025	Type 80 Glass Tube Socket	.10
P-32X30	40424	Tube Shield Base to Fit All Shields Below	.10
P-32X32	40434	Bottle-neck Type Shield (Used on 6D6 Tubes)	.15
P-32X50		Closed Top Type Shield (Used on 2nd Det. Tube)	.10
P-3A58	1637	Speaker Socket	.10
P-12A208		10" Dynamic Speaker Complete with Output Transformer	6.70
Specify Name of Knob & Model of Receiver		Small Push-on Type Knob	.15
		Large Set Screw Type Knob	.20
		Special Selectivity Control Knob (Set Screw Type)	.45
P-2X38	10387	Felt Washers for use with above knobs	.10
P-17X1	10320	Glass Crystal	.15
P-28X25	20875	Crystal Retainer Ring	.10
P-8X23	10272	Rubber Chassis Mounting Cushions	.10
P-2A44		Band Change Switch	2.05
P-2A45		Selectivity Control Switch	.45

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Code	Description	List Price
P-9A405		T1	Antenna R. F. Transformer & Can Assembly	$2.80
P-9A425		T2	Interstage R. F. Transformer & Can Assembly	2.30
P-9A426		T9	Oscillator Coil & Can Assembly	2.30
P-9A397		T3	1st I. F. Transformer & Can Assembly	2.15
P-9A398		T4	2nd I. F. Transformer & Can Assembly	1.85
P-9A399		T5	3rd I. F. Transformer & Can Assembly	2.20
P-50X16	50643	T7	Audio Input Transformer	2.40
P-51X32		T6	Audio Output Transformer (Part of Speaker—May be Secured Separately)	2.40
P-53X94		T8	Power Transformer—115 Volt; 60 Cycle	4.70
P-53X95		T8	Power Transformer—115 Volt; 25 Cycle	8.20
P-53X96			**Power Transformer—115-230 Volt; 40-60 Cycle**	**6.70**
P-9A391		L3	High Frequency Oscillator Tracking Coil	.25
P-9A400		L1	2nd I. F. Plate Isolating Reactor	.60

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
P-5A27		Gang Condenser Bracket and Bearing	$ .45
P-26X220		Drive Shaft	.15
P-24X207		Drive Pulley with set screw	.10
P-20X70		Main Shaft Pointer Stud	.10
P-24X205		Gear (Rotary)	.10
P-24X210		Gear (Stationary)	.10
P-28X35		Gear Spreader Spring	.10
P-26X205		Main Pointer Shaft Assembly	.45
P-26X209		Micrometer Pointer Shaft Assembly	.55
P-24X209		Compound Gear Assembly	.25
P-37X33		Tension Pulley Arm Assembly	.15
P-28X42		Tension Pulley Spring	.10
P-8X35		Drive Belt	.20
P-30X36		Dial Clamp to secure Dial Strip to frame (with 6-32x3/16" mounting screw)	.10
		Dial Strip Only (Specify Series No. and Name of Receiver)	.50
P-15X22		Double End Pointer	.10
P-15X26		Micrometer Pointer	.10
P-7A26	2012	Pilot Lamp Bulb (6-8V)	.15
P-7A27	2126	Pilot Lamp Sockets & Spring Clips	.10

DIAL AND DRIVE ASSEMBLY—Continued

New Part No.	Old Part No.	Description	List Price
P-15A38		Dial Bracket Assembly Complete	3.90
P-28X34		Pointer Slide, Take-up Spring Only	.10
P-10X9		4" Black Drive Cord Only ... Dozen	.10
P-29X42		Brass Collars and Set Screws Only for Securing above Drive Cord to Shaft	.10

NOTE: The Gang Condenser and Drive Assembly, less Dial Assembly, can be purchased complete—see Condenser List.

RESISTORS

Part No.	Code	Resistance	Watts	Type	List Price
P-D93163	R1	16,000 ohms	2.0	Carbon	$0.45
P-A94151	R2	150 ohms	0.2	Carbon	.15
P-36X206	R3	2,500 ohms		Dual Volume Control	1.75
	R10	2.0 Megohms			
P-A94401	R4	400 ohms	0.2	Carbon	.15
P-C94303	R5	30,000 ohms	1.0	Carbon	.15
P-A94304	R6	300,000 ohms	0.2	Carbon	.15
P-A95104	R7	100,000 ohms	0.2	Carbon	.10
P-A95205	R8	2.0 Megohms	0.2	Carbon	.10
P-A94105	R9	1.0 Megohm	0.2	Carbon	.15
P-40X205	R11	3.0 Megohms		Tone Control	.75
P-A95104	R12	100,000 ohms	0.2	Carbon	.10
P-B94102	R13	1,000 ohms	0.5	Carbon	.15
P-E94253	R14	25,000 ohms	3.0	Carbon	.30
P-C94253	R15	25,000 ohms	1.0	Carbon	.15
P-A95252	R16	2,500 ohms	0.2	Carbon	.10
P-A94803	R17	80,000 ohms	0.2	Carbon	.15
P-A95104	R18	100,000 ohms	0.2	Carbon	.10

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	List Price
P-47X59	C1	250 mmf.		Moulded	$0.15
P-17A36	C2	2-25 mmf.		Range B Antenna Trimmer	.10
P-17A36	C3	2-25 mmf.		Range C Antenna Trimmer	.10
P-17A36	C4	2-25 mmf.		Range D Antenna Trimmer	.10
P-46X80	C5	0.05 mf.	180	Tubular	.15
P-46X104	C6	0.25 mf.	240	Tubular	.25
P-17A36	C7	2-25 mmf.		Range B Interstage Trimmer	.10
P-17A36	C8	2-25 mmf.		Range C Interstage Trimmer	.10
P-17A36	C9	2-25 mmf.		Range D Interstage Trimmer	.10
P-46X117	C10	0.25 mf.	180	Tubular	.25
P-46X121	C11	0.25 mf.	360	Tubular	.30
P-17A30	C12	150-250 mmf.		1st I. F. Trimmer Condensers	.45
	C13	150-250 mmf.			
P-17A30	C14	150-250 mmf.		2nd I. F. Trimmer Condensers	.45
	C15	150-250 mmf.			
P-46X80	C16	0.05 mf.	180	Tubular	.15
P-44X18	C17	4.0 mf.	150	Wet Electrolytic	.85
P-46X105	C18	0.10 mf.	360	Tubular	.20
P-17A40	C19	70-150 mmf.		3rd I. F. Primary Trimmer	.30
P-47X56	C20	50 mmf.		Moulded	.10
P-46X120	C21	0.01 mf.	360	Tubular	.15
P-46X123	C22	0.50 mf.	180	Tubular	.30
P-46X114	C23	0.004 mf.	600	Tubular	.15
P-44X11	C24	18.0 mf.	290	Wet Electrolytic	1.10
P-44X10	C25	14.0 mf.	400	Wet Electrolytic	1.25
P-46X119	C26	0.05 mf.	360	Tubular	.20
P-46X80	C27	0.05 mf.	180	Tubular	.15
P-47X53	C28	35 mmf.		Moulded	.10
P-17A41	C29	2-25 mmf.		Oscillator Range D Trimmer	.10
P-17A36	C30	2-25 mmf.		Oscillator Range C Trimmer	.10
P-47X60	C31	1400 mmf.		Moulded	.30
P-17A41	C32	2-25 mmf.		Oscillator Range B Trimmer	.10
P-17A35	C33	300-600 mmf.		600 KC Padding Condenser	.45
	C34	40-100 mmf.		6000 KC Padding Condenser	
P-47X63	C35	10 mmf.		Moulded	.15
P-25A38				3 Section Gang Condenser Complete with Drive Assembly—Less Dial Assembly	5.40

PHONO ATTACHMENT PARTS

New Part No.	Old Part No.	Description	List Price
P-2A31	2172	Phono Switch (Double Pole Double Throw Switch)	$0.60
P-3A12	1193	Phono Jack	.10
P-10A36	2122	Switch Knob	.20
P-4A17	1421	Terminal Strip	.10
		7 Inches of No. 866G Shielded Sleeving (5/16 Dia.)	.15

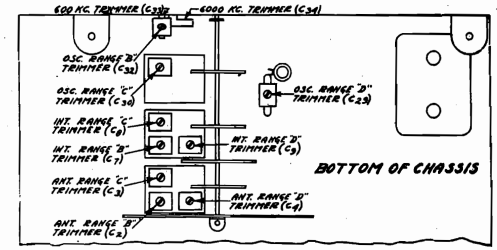


Fig. 3—Location of Trimmers

D. C. Resistance of Windings
Refer to Fig. 4.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A405	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.8
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.3
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A425	Interstage R. F. Transformer	T2	
	Range B Primary Winding		2.5
	Range C Primary Winding		1.4
	Range D Primary Winding		0.4
	Range B Secondary Winding		6.0
	Range C Secondary Winding		2.0
	Range D Secondary Winding		Small
P-9A426	Oscillator Coils	T9	
	Range B Grid Coil		
	Red White Tap to White		3.0
	Red White Tap to Ground		1.0
	Range C Grid Coil		
	Green White Tap to Green		1.2
	Green White Tap to Ground		0.5
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
P-9A397	1st I. F. Transformer	T3	
	Primary Winding		4.6
	Secondary Winding		
	Long Portion		3.4
	Short Portion		1.7
	Coupling Winding		0.2
P-9A398	2nd I. F. Transformer	T4	
	Primary Winding		9.4
	Secondary Winding		9.0
	Coupling Winding		0.5
P-9A399	3rd I. F. Transformer	T5	
	Primary Winding		10.2
	Secondary Winding		28.4
P-50X16	Audio Input Transformer	T7	
	Primary Winding		2350.
	Secondary Winding		
	Center Tap to Inside		2000.
	Center Tap to Outside		2690.
P-51X32	Audio Output Transformer	T6	
	Primary Winding		
	Center Tap to Inside		198.
	Center Tap to Outside		222.
	Secondary Winding		0.4
P-12A208	Dynamic Speaker (10")		
	Speaker Voice Coil		1.6
	Speaker Field	L2	570.
P-53X94	115 Volt 60 Cycle Power Trans.	T8	
	Primary Winding		4.8
	Tube Filament Secondary (A-A)		0.2
	Tube Filament Secondary (B-B) (45)		0.1
	Rectifier Filament Secondary		0.1
	High Voltage Secondary Winding		
	Center Tap to Inside		118.
	Center Tap to Outside		128.
P-9A400	2nd I. F. Plate Isolating Reactor	L1	36.
P-9A391	High Frequency Oscillator Tracking Coil	L3	1.2

MODELS 62-185, 62-187
62-190, 62-196

MONTGOMERY-WARD & CO.

Three Types
Schematic, Trimmers

Tuning Frequency Range

B Range - 535 to 1730 KC.
C Range - 1715 to 5800 KC.
D Range - 5750 to 18300 KC.

THE CAPACITY OF SHIELD "C" "D" AND "E" IS 50 MMF EACH.

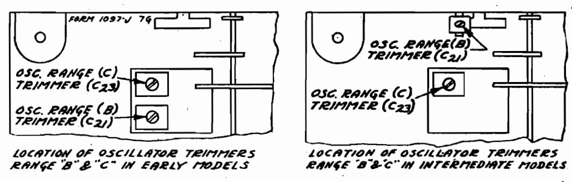


Fig. 4—Oscillator Trimmer Location in Early and Intermediate Models

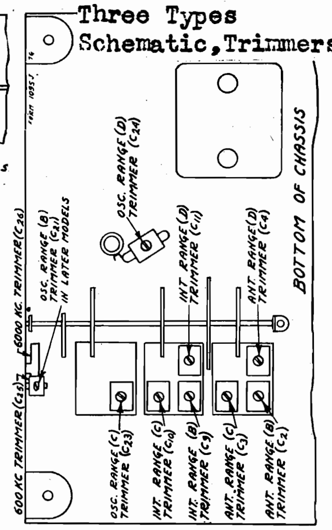
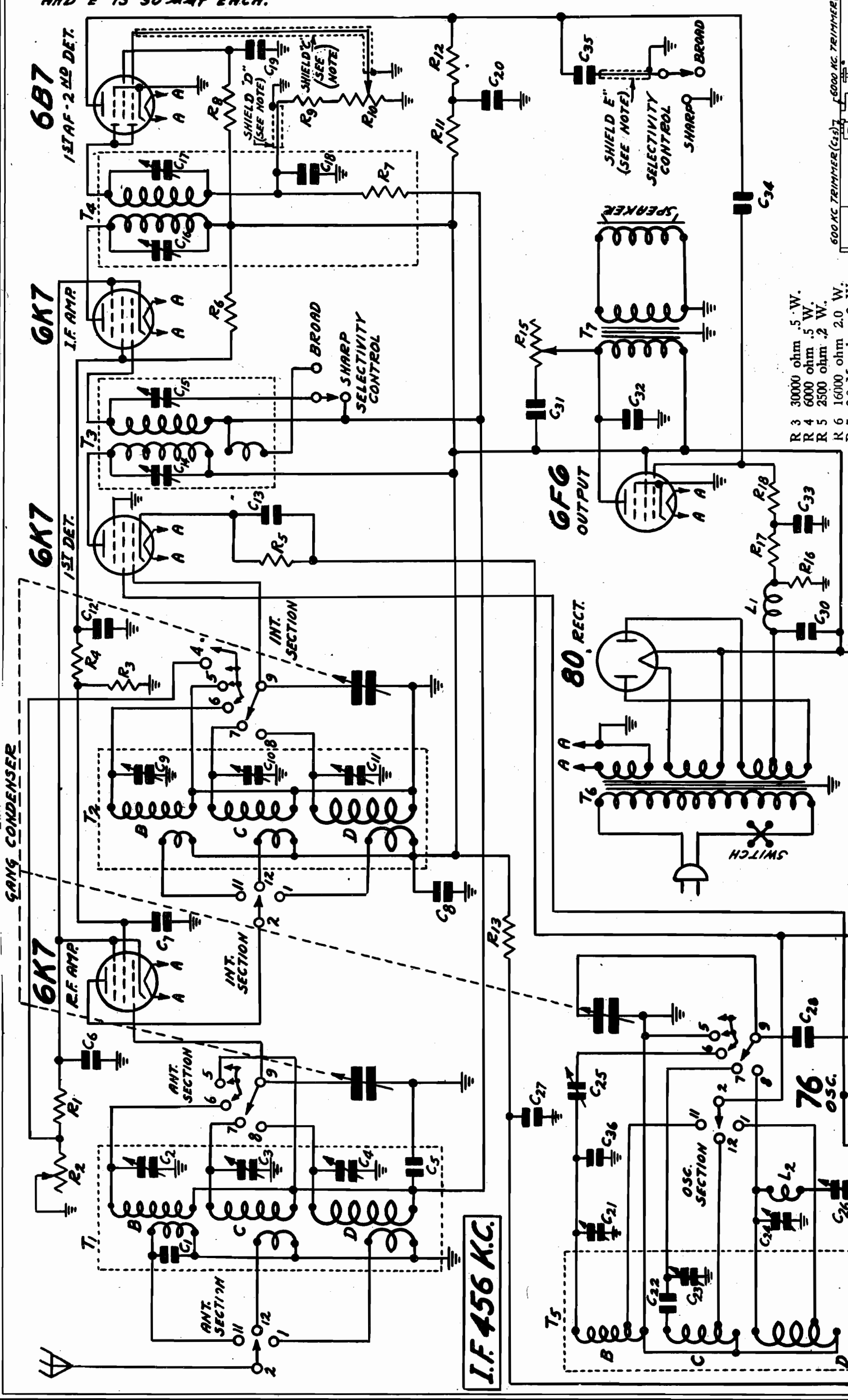


Fig. 3—Location of Trimmers (Latest Models)



August 1935

C 1	250 mmf.
C 2	2-25 mmf.
C 3	2-25 mmf.
C 4	2-25 mmf.
C 5	.05 mf. 180 V.
C 6	.25 mf. 180 V.
C 7	.05 mf. 240 V.
C 8	.10 mf. 360 V.
C 9	2-25 mmf.
C10	2-25 mmf.
C11	2-25 mmf.
C12	.25 mf. 240 V.
C13	.05 mf. 180 V.
C14	70-150 mmf. } ONE UNIT
C15	70 150 mmf. } ONE UNIT
C16	70-150 mmf. } ONE UNIT
C17	150-250 mmf. } ONE UNIT
C18	50 mmf.
C19	.25 mf. 360 V.
C20	.25 mf. 360 V.
C21	2-25 mmf.
C22	1400 mmf.
C23	2-25 mmf.
C24	2-25 mmf.
C25	300-600 mmf. } ONE UNIT
C26	40-100 mmf. } ONE UNIT
C27	.10 mf. 360 V.
C28	35 mmf.
C29	18 mf. 300 V.
C30	14 mf. 400 V.
C31	.05 mf. 600 V.
C32	.002 mf. 600 V.
C33	.03 mf. 180 V.
C34	.01 mf. 480 V.
C35	.004 mf. 600 V.
R 1	150 ohm .2 W.
R 2	2500 ohm } Dual Vol. Control
R10	500000 ohm } Dual Vol. Control

R 3	30000 ohm .5 W.
R 4	6000 ohm .5 W.
R 5	2500 ohm .2 W.
R 6	16000 ohm 2.0 W.
R 7	2.0 Megohm .2 W.
R 8	300000 ohm .5 W.
R 9	50000 ohm .2 W.
R11	20000 ohm .2 W.
R12	60000 ohm .5 W.
R13	25000 ohm 1.0 W.
R14	80000 ohm .2 W.
R15	150000 Tone Cont.
R16	235 ohm 2.0 W.
R17	100000 ohm .2 W.
R18	500000 ohm .2 W.
T 1	Antenna R.F. Trans.
T 2	Interstage R.F. Trans.
T 3	Ist. I.F. Trans.
T 4	2nd I.F. Trans.
T 5	Osc. Inductors
T 6	Power Trans.
T 7	Output Trans.
L 1	Speaker Field
L 2	Osc. Tracking Coil

MODELS 62-185, 62-187
62-190, 62-196

MONTGOMERY-WARD & CO.

Voltage, Socket, Color Code

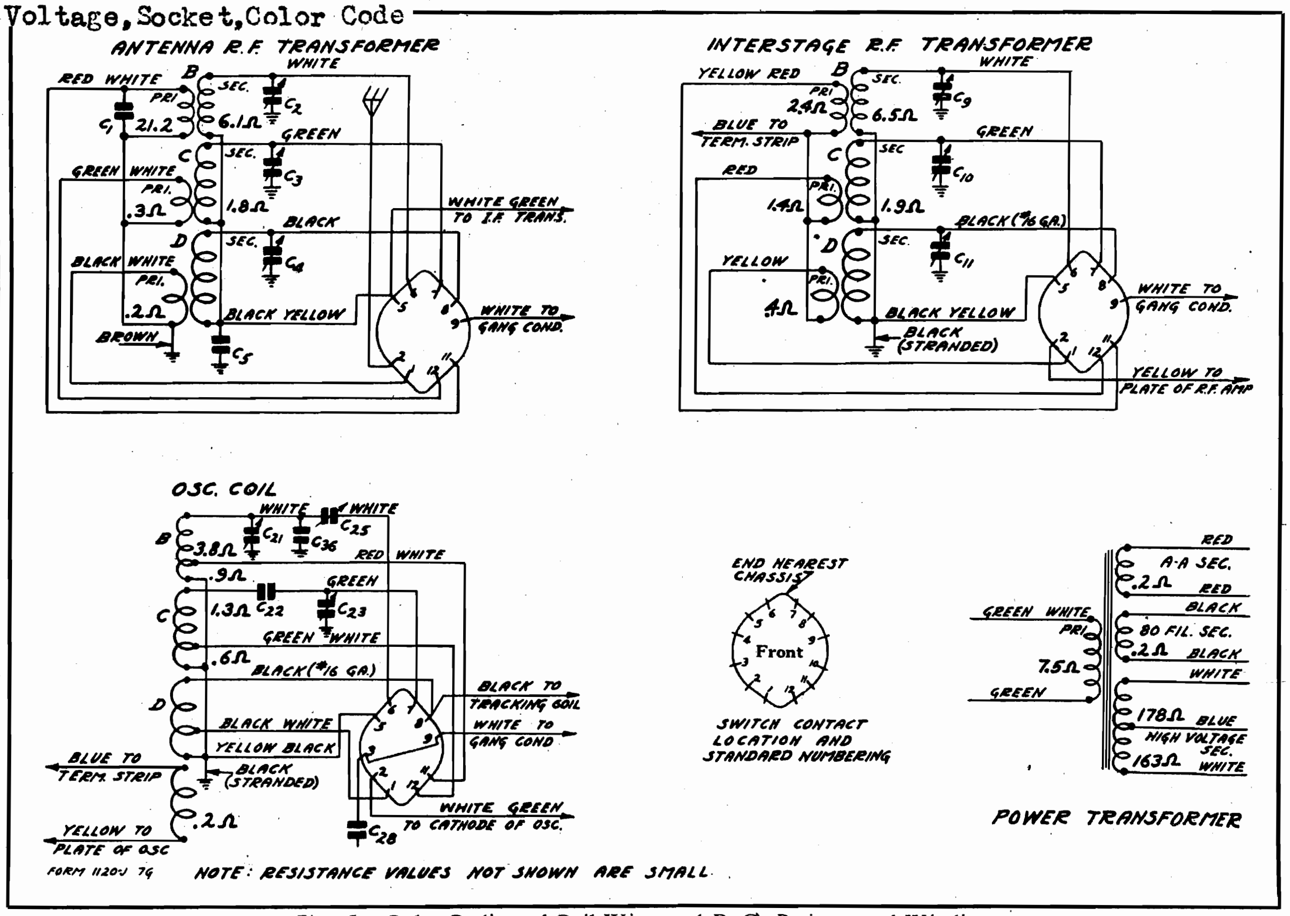


Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)

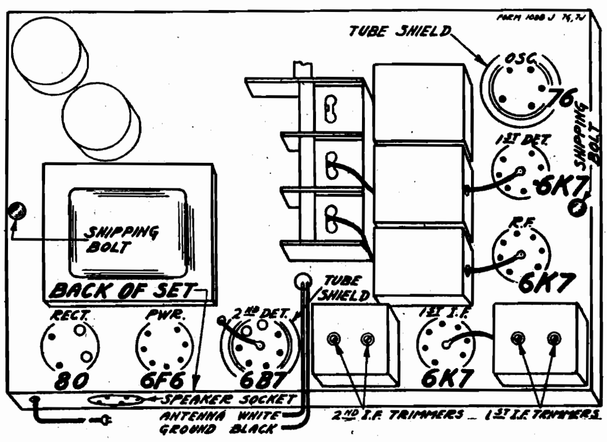


Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6D6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter
(2) As read across R16

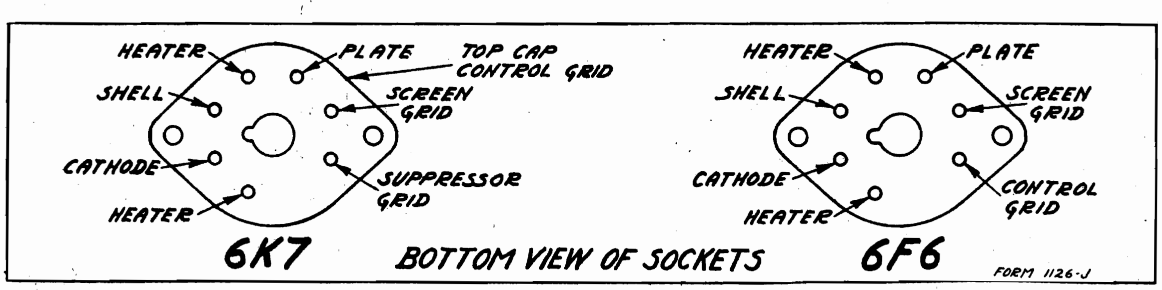


Fig. 7—Metal Tubes—Bottom View of Sockets

MODELS 62-185, 62-187
62-190, 62-196

Three Types
Alignment, Changes, Data

MONTGOMERY-WARD & CO.

Circuit

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T5 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T5, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Metal Tubes

Two types of the new metal tubes are used in this receiver, namely, 6K7 and 6F6. These replace the type 6D6 and 42 glass tubes respectively. The metal tubes operate at the same voltages and are nearly identical in characteristics to the corresponding glass tubes which they replace. In Fig. 7 are shown the metal tube pin positions from a bottom socket view.

The shells of the metal tubes get quite hot and users should be cautioned against touching them.

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¼" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

Connect this shielded lead from the volume control to the phono switch as shown in Fig. 9. Be sure that the saturated sleeving covers the shielded lead where it passes over the volume control.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube socket by bending the chassis ground lug away from this terminal. Be sure to solder back to this lug any leads that were connected to it (not including the cathode connection).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of this condenser to the cathode of the 6B7 2nd detector tube socket and to the phono switch as shown in Fig. 9. To this same terminal on the phono switch connect the 900 ohm resistor. The other side of the resistor is connected to ground. Complete the other connections as illustrated in Fig. 9.

A high impedance pickup should be used. If a low impedance pickup is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

MODEL 62PC64
Schematic, Voltage
Parts List

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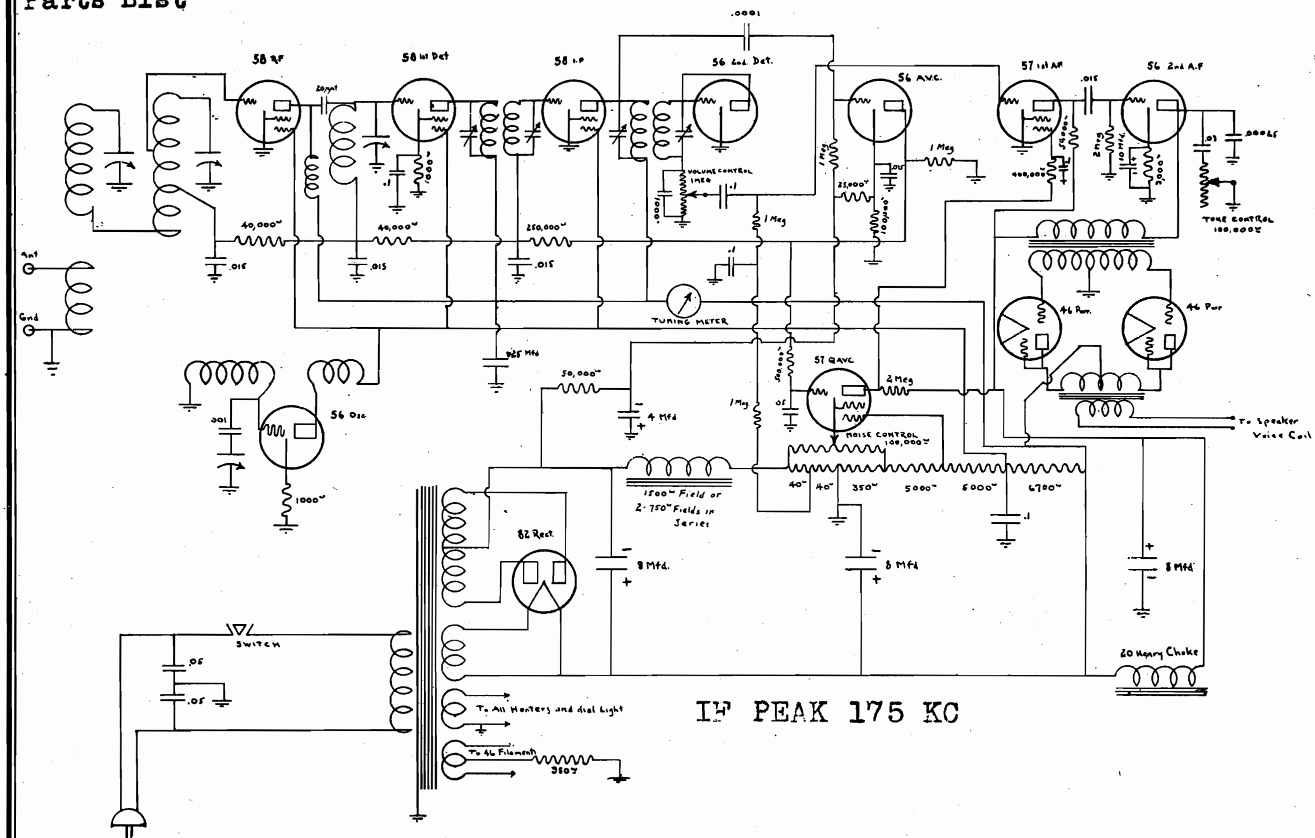


VOLTAGE READINGS

The following voltages should be observed at the points indicated:—

NOTE: In making these readings, a high resistance volt meter should be used, having resistance of at least 1000 ohms per volt.

Across each field, 75 volts.
Across entire voltage divider, 215.
Across first 40 ohm section, 4.
Across second 40 ohm section, 4.
Across 350 ohm section, 3.
Across first 5000 ohm section, 42.
Across second 5000 ohm section, 42.
Across 6700 ohm section, 120.
Across 46 bias resistance, 17½.
Across filter choke, 1.
Across second audio bias resistor, 10.
Across 50,000 ohm A.V.C. filter resistor, 45.
Across 25,000 ohm A.V.C. Grid resistor, 25.
Across 100,000 ohm A.V.C. plate resistor, 80.
From ground to second AF plate, 200.
From ground to first AF plate, 150.
From ground to RF and I.F. plates, 200.
From ground to RF screens, 85.
From ground to oscillator cathode, 5.
From ground to first detector cathode, 5.

Replacement Parts List

12 Tube Super-Heterodyne Model 62-PC-64

Supplier: Davison Radio and Television Corporation, Los Angeles, California

Part No.	DESCRIPTION	Unit Per Chassis	Unit Price	Selling Price
PC- 641	Power Transformer	1	$1.75	$4.38
PC- 642	Dual 8 Elec. Condenser	1	.75	1.88
PC- 643	Dual 8-4 Elec. Condenser	1	1.00	2.50
PC- 644	Filter Choke No. 370	1	.21	.52
PC- 645	Toggle Switch	1	.25	.63
PC- 646	Volume Control 1 meg ohm	1	.48	1.20
PC- 647	Tone Control 100,000 ohm	1	.36	.90
PC- 648	Noise Control 100,000 ohm	1	.36	.90
PC- 649	Variable Condenser 4 Gang	1	2.00	5.00
PC-6410	Intermediate Base No. 140	2	.30	.75
PC-6411	Dial Assembly	1	2.00	5.00
PC-6412	Escutcheon Plate	1	.75	1.88
PC-6413	Noise Control Escutcheon	1	.25	.63
PC-6414	Audio Transformer No. 0984	1	.87	2.18
PC-6415	Antenna Coil	1	.40	1.00
PC-6416	Band Pass Coil	1	.40	1.00
PC-6417	Translator Coil	1	.60	1.50
PC-6418	Litz Intermediate Coils	2	.40	1.00
PC-6419	Resistor—1000 ohm 1/3 W.	2	.06	.15
PC-6420	Resistor—3000 ohm 1/3 W.	1	.06	.15
PC-6421	Resistor—40,000 ohm 1/3 W.	1	.06	.15
PC-6422	Resistor—50,000 ohm 1/3 W.	1	$ .06	$ .15
PC-6423	Resistor—¼ meg ohm 1/3 W.	1	.06	.15
PC-6424	Resistor—½ meg ohm 1/3 W.	1	.06	.15
PC-6425	Resistor—1 meg ohm 1/3 W.	4	.06	.15
PC-6426	Resistor—2 meg ohm 1/3 W.	2	.06	.15
PC-6427	Resistor—400,000 ohm 1/3 W.	1	.06	.15
PC-6428	Resistor—25,000 ohm 1/3 W.-5%	1	.10	.25
PC-6429	Resistor—50,000 ohm 1/3 W.-5%	1	.10	.25
PC-6430	Resistor—100,000 ohm 1/3 W.-5%	1	.10	.25
PC-6431	Resistor—350 Candohm Strip	1	.08	.20
PC-6432	Resistor—6 Section Candohm Strip	1	.36	.90
PC-6433	Condenser .0001-10%	2	.08	.20
PC-6434	Condenser .00025-10%	1	.08	.20
PC-6435	Condenser .001-3%	1	.15	.37
PC-6436	Condenser .015	5	.10	.75
PC-6437	Condenser .03	1	.08	.20
PC-6438	Condenser .05-200 V.	1	.08	.20
PC-6439	Condenser .05-400 V.	2	.08	.20
PC-6440	Condenser .1-200 V.	5	.08	.20
PC-6441	Condenser .25-400 V.	1	.10	.25
PC-6442	Condenser 10 Mfd.-25 V.	1	.25	.63

MONTGOMERY-WARD & CO.

MODEL 62-199
Schematic, Voltage Socket, Trimmers Parts List

VOLTAGES AT SOCKETS
Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

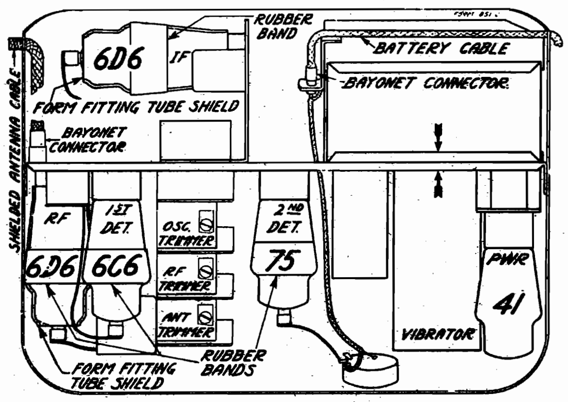


Fig. 2—*Location of Tubes and Vibrator*

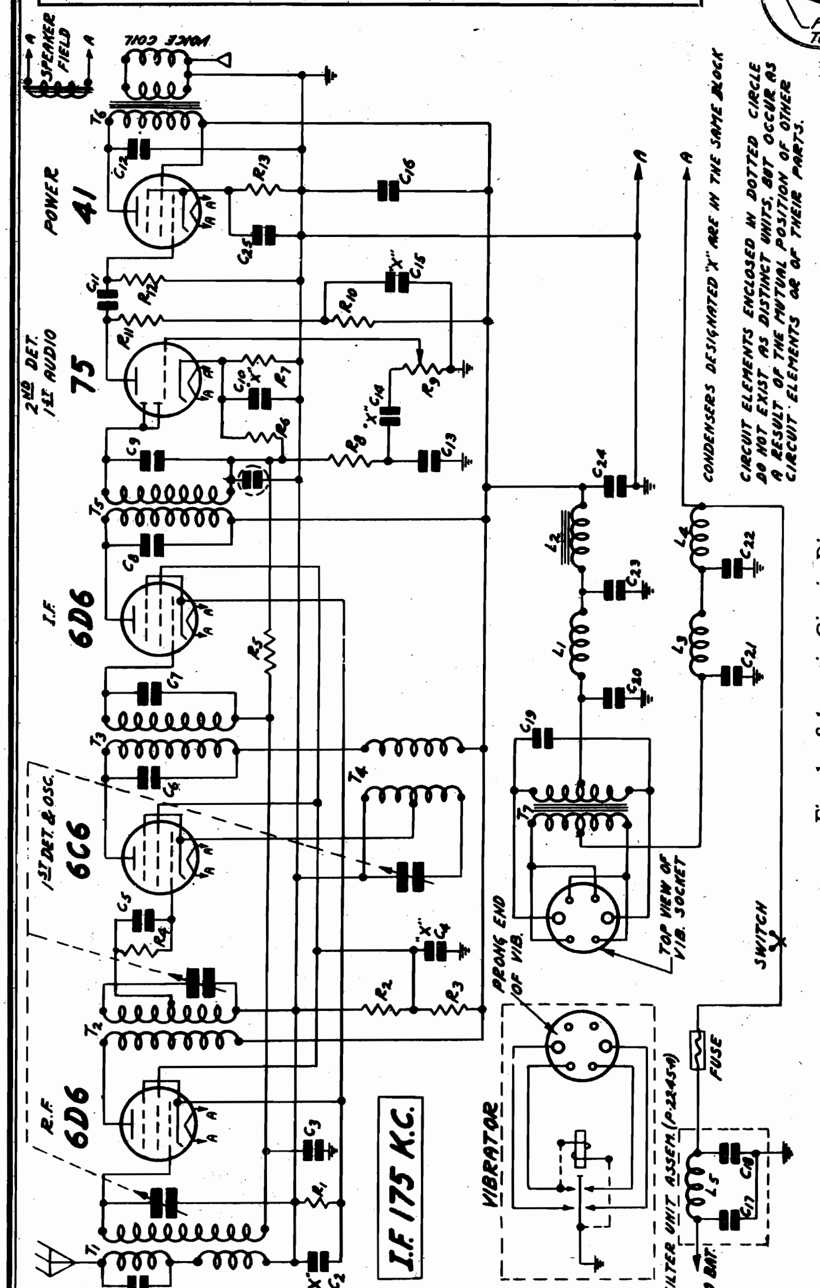


Fig. 1—*Schematic Circuit Diagram*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.		(Part of Antenna Coil Assembly)
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.		Tubular
P-81815	C5	35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.		Part of 2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	[In Choke Condenser Unit]
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500		Gang Condenser		

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

MODEL 62-199
Alignment
Service Notes

MONTGOMERY-WARD & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION—Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec.	T2	
	(Center Tap to Inside)		3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00

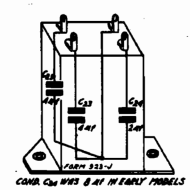


Fig. 7—*Electrolytic Block Internal Wiring*

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

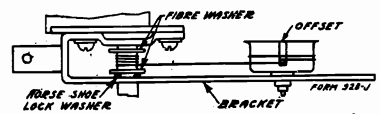


Fig. 3—*Cord Drive—Top View*

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse-shoe lock washer which holds the drive shaft in position. This may be done with a fine jawed, long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse-shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from

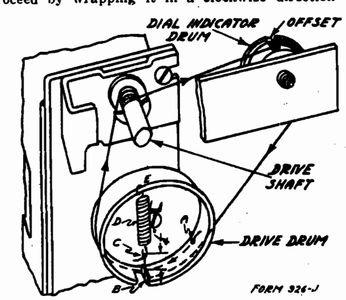


Fig. 4—*Cord Drive Replacement*

front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

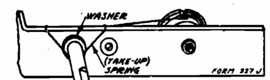


Fig. 5—*Drive "Take-up" Spring*

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between ⅛" and ⅜" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about ¼".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and clip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

Changes In Later Models

In the first models of this receiver a bypass condenser block (P-82600) containing condensers: C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

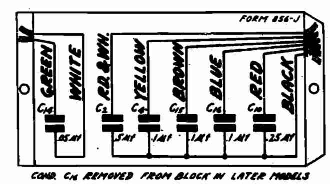


Fig. 6—*Condenser Block Internal Wiring*

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219
Schematic, Trimmers

MONTGOMERY-WARD & CO.

Tuning Frequency Range
- B Range - - - - - - - - - - 535 to 1730 KC.
- C Range - - - - - - - - - - 1680 to 4800 KC.
- D Range - - - - - - - - - - 5650 to 16000 KC.

C 1 250 mmf.	C11 .05 mf. 180 V.	C22 70-150 mmf. } ONE	C33 20.0 mf. 150 V. Electrolytic
C 2 2-25 mmf.	C12 .25 mf. 180 V.	C23 70-150 mmf. } ASSEMBLY	C34 .05 mf. 240 V.
C 3 2-25 mmf.	C13 35 mmf.	C24 40-100 mmf.	
C 4 2-25 mmf.	C14 2-25 mmf.	C25 50 mmf.	
C 5 .05 mf. 180 V.	C15 1400 mmf.	C26 100 mmf.	R 1 1,000 Ohm .2 W.
C 6 .25 mf. 180 V.	C16 2-25 mmf.	C27 50 mmf.	R 2 1.0 Megohm .2 W.
C 7 2-25 mmf.	C17 300-600 mmf. } ONE	C28 .002 mf. 600 V.	R 3 100,000 Ohm .2 W.
C 8 2-25 mmf.	C18 40-100 mmf. } ASSEMBLY	C29 .05 mf. 180 V.	R 4 5,000 Ohm .2 W.
C 9 2-25 mmf.	C19 2-25 mmf.	C30 250 mmf.	R 5 10,000 Ohm .5 W.
C10 35 mmf.	C20 70-150 mmf. } ONE	C31 .50 mf. 180 V.	R 6 60,000 Ohm .2 W.
	C21 70-150 mmf. } ASSEMBLY	C32 .25 mf. 180 V.	R 7 1.0 Megohm Vol. Cont.

R 8 3.0 Megohm .2 W.
R 9 1.0 Megohm .2 W.
R10 2,000 Ohm .2 W.
R11 7,000 Ohm .2 W.
R12 3.0 Megohm .2 W.
R13 30,000 Ohm .2 W.
R14 150,000 Ohm Tone Control

T 1 Antenna R.F. Trans.
T 2 Interstage R.F. Trans.
T 3 Osc. Inductors
T 4 1st. I.F. Trans.
T 5 2nd. I.F. Trans.
T 6 3rd. I.F. Trans.
T 7 Push-Pull Input Trans.

L 1 Single Filament Reactor
L 2 Osc. Tracking Coil
L 3 Single Filament Reactor

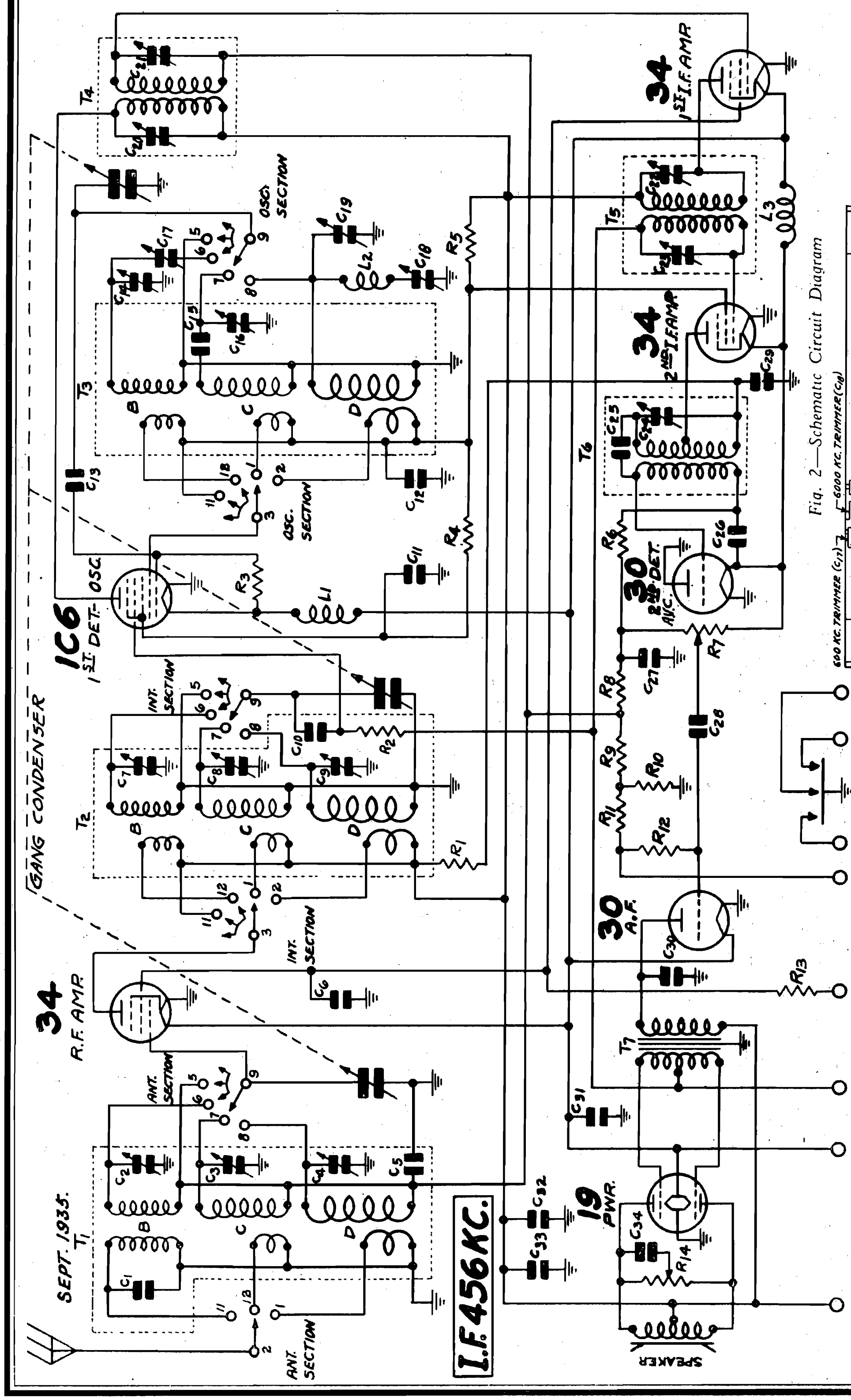


Fig. 2—Schematic Circuit Diagram

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. & INT. SECTION	5 6 7 8 9 11 12 1 2 3	5 6 7 8 9 11 12 1 2 3	5 6 7 8 9 11 12 1 2 3
ANT. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2

Contact Locations 4 and 10 in Osc. & Int. Sections and 3, 4 and 10 in Ant. Section are Blank.

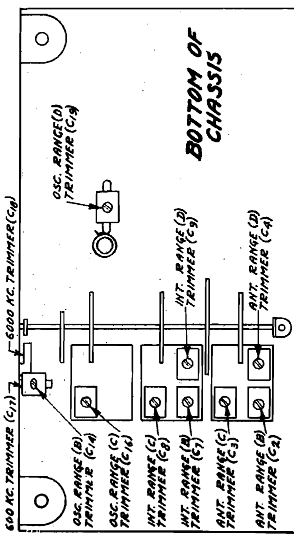


Fig. 9—Arrangement of Trimmers

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219

MONTGOMERY-WARD & CO.

Voltage, Socket, Data

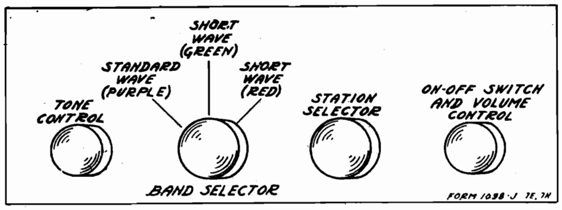


Fig. 1—Arrangement of Controls

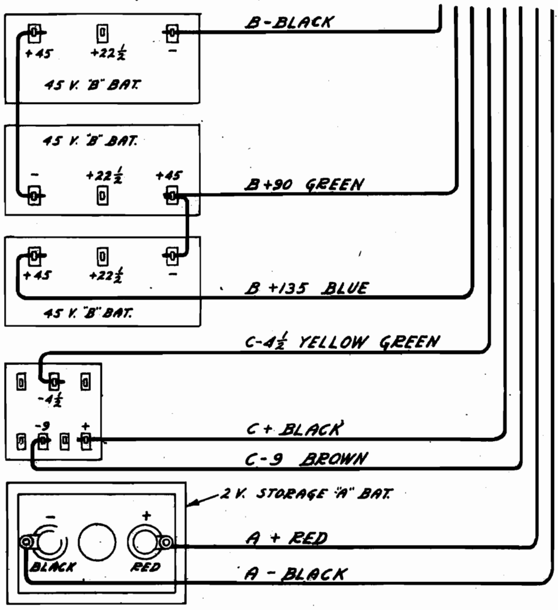


Fig. 3—Complete Battery Wiring Connections

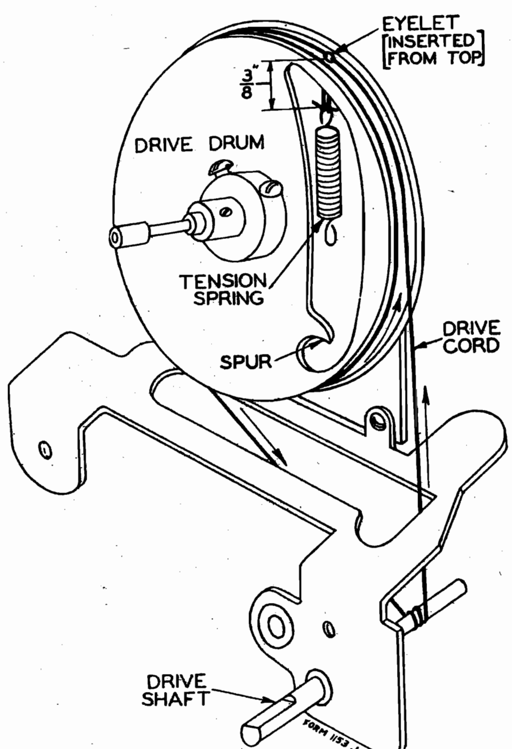


Fig. 12—Drive Cord Replacement

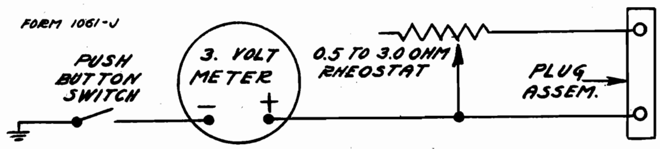


Fig. 6—Schematic Diagram of Voltage Regulator

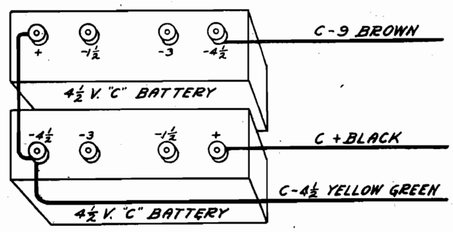


Fig. 4—"C" Battery Connections Using Standard "C" Batteries

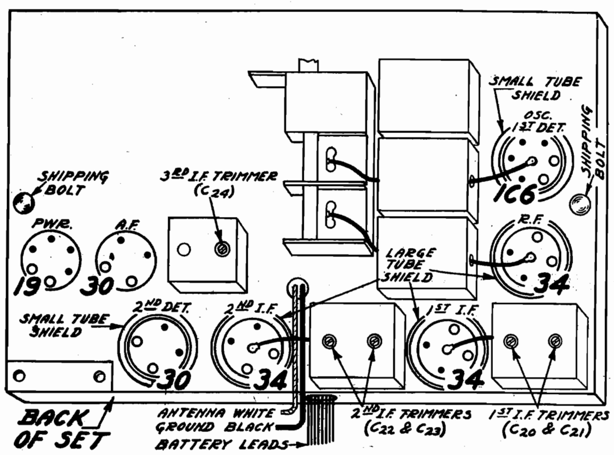


Fig. 10—Tube Arrangement

VOLTAGES AT SOCKETS

Batteries up to Rated Voltages Ant. Shorted to Ground
Voltages Read from Negative Fil. Terminal
Volume Control at Maximum

Type of Tube	Function	Across Filam't	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M. A.
34	R. F. Amp.	2.0	135	45		1.8
1C6	1st Detector Oscillator	2.0	135 75(1)	65		2.6 1.8(1)
34	1st I. F. Amp.	2.0	135	45		1.8
34	2nd I. F. Amp.	2.0	133	75	4.5	2.25
30	2nd Detector	2.0				
30	A. F. Amp.	2.0	135			3.0
19	Power Amp.	2.0	135		4.5	1.0 (Per Plate)

(1) Anode Grid

MONTGOMERY-WARD & CO.

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219
Alignment, Drive Cord
Changes, Data

Circuit

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the antenna R. F. transformer secondaries, the interstage R. F. transformer primaries and secondaries and the oscillator grid and plate windings of lower frequency, not in use.

The antenna transformer with tuned secondary feeds into a type 34 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into the control grid circuit of a 1C6 pentagrid converter tube which functions as the oscillator and 1st detector.

A type 30 tube functions as a diode second detector and as the automatic volume control tube. AVC voltage is applied to the R. F. and 1st I. F. tubes.

The audio voltage developed across the volume control resistor R7 is applied to the control grid of the type 30 1st AF tube.

The output stage employs a type 19 tube. This tube is a Class "B" power amplifier and combines 2 triodes in one envelope. A magnetic reproducer is used.

Batteries

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 5 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 6.

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 7 and 8 before the regulator can be inserted as shown in Fig. 5. The jumper is in the "A+" line.

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. **Caution the user never to operate the receiver with the adjustment beyond 2 volts.**

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery.

Alignment and Calibration

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C-10—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 10. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 10.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C14) until maximum output is obtained. The location of this trimmer is shown in Fig. 9.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C16) until maximum output is obtained. See Fig. 9 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C19) until maximum output is obtained. See Fig. 9 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer (C18) until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Tubes

The tubes used in this receiver are of the 2 volt series. The 1C6 is a pentagrid converter tube while the 34's are R. F. Pentodes with the suppressor grid tied internally to the cathode. The 30 tubes are general purpose triodes. The 19 tube consists of two class "B" output tubes in one envelope. All of these tubes are of the filament or directly heated types. All of them have a 2 volt filament and should not be connected to a power supply not intended for this type of tube. **Maximum filament voltage range is 1.8 to 2.0 volts. Operation of the tubes at over or under these values will be injurious to the tubes or may affect operation of the receiver.**

Changes in Early Models

Condenser C35 7 mmf. (not shown in Fig. 2) was added to the oscillator coil assembly in parallel with oscillator Range B trimmer condenser C14. It is not, however, used in all cases but only when this capacity is required in this circuit.

Replacing Drive Cord

Remove the chassis from the cabinet.

Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector shaft.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket.

Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 12. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one half turns, progressing toward the front.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free should be approximately 3/8" from the flange of the drum as shown in Fig. 12. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Turn the drive shaft back and forth several times.

Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

MODELS 62-203, 62-205
62-208, 62-212, 62-217
62-219
Resistance Test, Parts
Color Coding, Data

MONTGOMERY-WARD & CO.

Series 7H—Replacement Parts

MISCELLANEOUS

New Part No.	Old Part No.	Description	List Price
4A39	2130	Two Lug Terminal Strip (Both lugs insulated—Grd. Lug in center extended as Mtg. foot)	.10
4A18	1441	Two Lug Terminal Strip (Both lugs insulated—Mounting Foot in Center)	.10
4A50		Two Lug Terminal Strip (Both lugs insulated—Mounting hole in Center)	.10
4A49		Single Lug Terminal Strip (Insulated—Mounting hole used)	.10
12A217		6" Magnetic Speaker	4.35
12A218		8" Magnetic Speaker	4.90
13X212		Speaker Cable and Socket Assembly	.60
13X214		Antenna and Ground Wire Assembly	.30
13X217		A-B-C Battery Cable	1.10

VOLTAGE REGULATOR

New Part No.	Old Part No.	Description	List Price
2X42	10399	Special Fibre Washer with Offset Insulation	$0.10
2A36	2281	Switch Push Button	.25
43X38	98042	Rheostat	.65
10A7	1508	Rheostat Knob	.10
16A10	2284	0-3 Volt—D. C. Voltmeter	2.00
5A12	2283	Double Pin Plug Assembly	.10

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
5A27		Gang Support and Bearing Assembly	$0.45
26X208		Drive Shaft	.15
19X21	20953	Horse Shoe Washer	.10
26X212		Pointer Shaft	.10
24X204		Drive Drum and Hub with Set Screw	.35
28X27		Drive Tension Spring	.10
		26 inch Black Drive Cord	.10
28X34		Pointer Slide Take-Up Spring	.10
		4½ Inch Black Indicator Drive Cord	.05
29X42		Brass Collar and Set Screw for securing above cords to shaft	.10
		Dial Strip (Specify Name and Series No. of Receiver—also Std. Wave Band Dial Color)	.55
30X36		Dial Clamp and Mtg. Screw	.10
15X22		Large Double End Pointer	.10

TRANSFORMERS AND COILS

New Part No.	Old Part No.	Code	Description	List Price
9A416		T1	Antenna R. F. Transformer	$2.80
9A392		T2	Interstage R. F. Transformer	2.65
9A393		T3	Oscillator Inductors	2.45
9A394		T4	1st I. F. Transformer	1.50
9A395		T5	2nd I. F. Transformer	1.50
9A396		T6	3rd I. F. Transformer	1.50
50X11		T7	Push Pull Audio Input Transformer	2.10
9A281	5189	L1	Single Filament Reactor	.25
9A391		L2	High Frequency Oscillator Tracking Coil	.25
9A281	5189	L3	Single Filament Reactor	.25

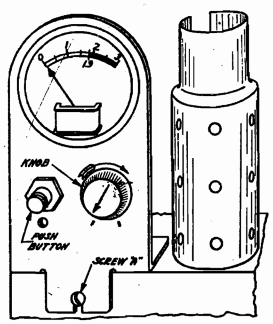


Fig. 5—Voltage Regulator in Position

CONDENSERS

New Part No.	Code	Capacity	Voltage	Type	List Price
47X59	C1	250 mmf.		Moulded	$0.15
17A36	C2	2-25 mmf.		Antenna Range B Trimmer	.10
17A36	C3	2-25 mmf.		Antenna Range C Trimmer	.10
17A36	C4	2-25 mmf.		Antenna Range D Trimmer	.10
46X80	C5	.050 mf.	180	Tubular	.15
46X117	C6	.250 mf.	180	Tubular	.25
17A36	C7	2-25 mmf.		Interstage Range B Trimmer	.10
17A36	C8	2-25 mmf.		Interstage Range C Trimmer	.10
17A36	C9	2-25 mmf.		Interstage Range D Trimmer	.10
47X53	C10	35 mmf.		Moulded	.10
46X80	C11	.050 mf.	180	Tubular	.15
46X117	C12	.250 mf.	180	Tubular	.25
47X53	C13	35 mmf.		Moulded	.10
17A41	C14	2-25 mmf.		Oscillator Range B Trimmer	.10
47X60	C15	1400 mmf.		Moulded	.30
17A36	C16	2-25 mmf.		Oscillator Range C Trimmer	.10
17A35	C17 / C18	300-600 mmf. / 40-100 mmf.		600 KC Trimmer / 6000 KC Trimmer	.45
17A41	C19	2-25 mmf.		Oscillator Range D Trimmer	.10
17A33	C20 / C21	70-150 mmf. / 70-150 mmf.		1st I. F. Trimmers	.40
17A33	C22 / C23	70-150 mmf. / 70-150 mmf.		2nd I. F. Trimmers	.40
17A38	C24	40-100 mmf.		3rd I. F. Primary Trimmer	.25
47X56	C25	50 mmf.		Moulded	.10
47X57	C26	100 mmf.		Moulded	.10
47X56	C27	50 mmf.		Moulded	.10
46X100	C28	.002 mf.	600	Tubular	.15
46X80	C29	.050 mf.	180	Tubular	.15
47X52	C30	250 mmf.		Moulded	.15
46X118	C31	.500 mf.	180	Tubular	.30
46X117	C32	.250 mf.	180	Tubular	.25
44X17	C33	20.0 mf.	150	Wet Electrolytic	.95
46X103	C34	.050 mf.	240	Tubular	.15
47X64	C35	7 mmf.		Moulded	.15
14A41				3 Section Gang Condenser Only	3.80

RESISTORS

New Part No.	Code	Resistance	Watts	Type	List Price
A95102	R1	1,000 Ohm	0.2	Carbon	$0.10
A94105	R2	1.0 Megohm	0.2	Carbon	.15
A94104	R3	100,000 Ohm	0.2	Carbon	.15
A95502	R4	5,000 Ohm	0.2	Carbon	.10
B94103	R5	10,000 Ohm	0.5	Carbon	.15
A95603	R6	60,000 Ohm	0.2	Carbon	.10
36X207	R7	1.0 Megohm		Volume Control & Switch	1.20
A94305	R8	3.0 Megohm	0.2	Carbon	.15
A95105	R9	1.0 Megohm	0.2	Carbon	.10
A94202	R10	2,000 Ohm	0.2	Carbon	.15
A94702	R11	7,000 Ohm	0.2	Carbon	.15
A95305	R12	3.0 Megohm	0.2	Carbon	.10
A94303	R13	30,000 Ohm	0.2	Carbon	.15
40X203	R14	150,000 Ohm		Tone Control	.75

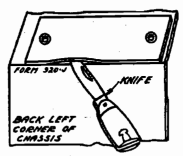


Fig. 7—Prying off Fiber Cover

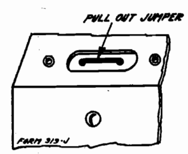


Fig. 8—Removing Jumper Wire

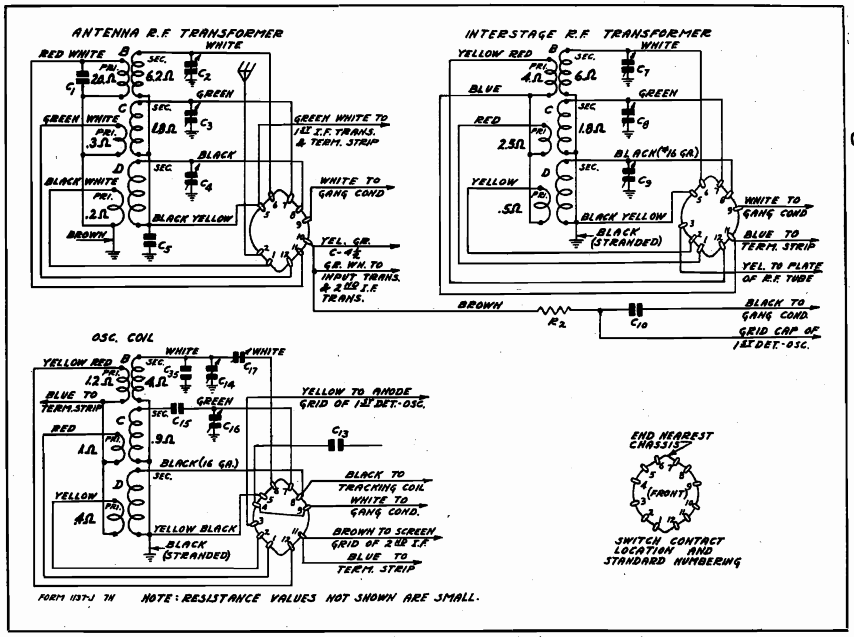


Fig. 11—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also See Complete D. C. Resistance List Below)

D. C. Resistance of Windings
Refer to Fig. 11.

Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

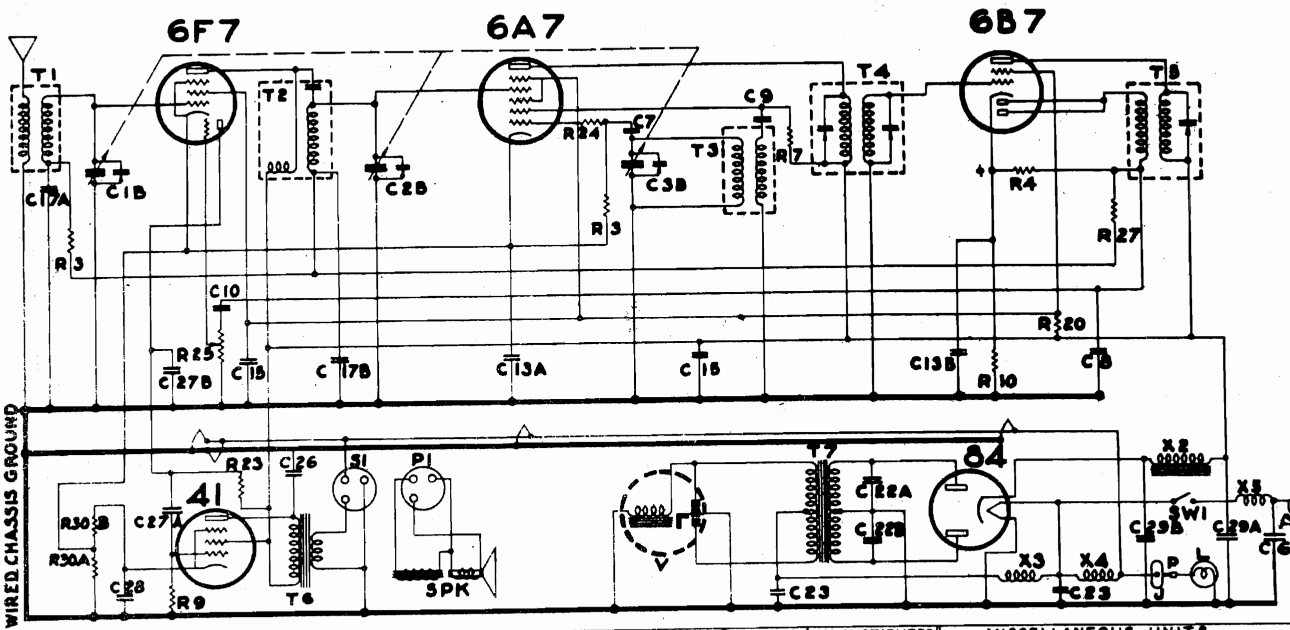
Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A416	Antenna R. F. Transformer	T1	
	Range B Primary Winding		20.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.2
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A392	Interstage R. F. Transformer	T2	
	Range B Primary Winding		4.0
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A393	Oscillator Coils	T3	
	Range B Plate Coil		1.2
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		4.0
	Range C Grid Coil		0.9
	Range D Grid Coil		Small
P-9A394	1st I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A395	2nd I. F. Transformer	T5	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A396	3rd I. F. Transformer	T6	
	Primary Winding		
	Tap to B+		8.0
	Tap to Variable Trimmer		8.2
	Secondary Winding		126.0
P-50X11	Audio Input Transformer	T7	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.6
	Center Tap to Outside		300.0
P-9A281	Single Filament Reactor	L1	1.2
P-9A391	High Frequency Oscillator Tracking Coil	L2	0.7
P-9A281	Single Filament Reactor	L3	1.2

*Speakers with other part numbers may have slightly different values of D. C. Resistance.

NOBLITT SPARKS INDUSTRIES

MODEL 7
Schematic, Voltage
Resistances, Parts

ARVIN CAR RADIO ~ MODEL 7



RESISTORS									
R	OHMS	W	PART Nº	PRICE	R	OHMS	W	PART Nº	PRICE
1					21				
2					22				
3	100 M	1/4	17-2068	.20	23	250 M	1/4	17-3011	.20
4	200 M	1/4	17-2063	.20	24	1 M	1/4	17-2065	
5					25	VOL. CTRL		17-4182-3	1.00
6					26				
7	20 M	1/4	17-2072	.20	27	2 MEG	1/4	17-4788	.20
8					29				
9	1 MEG	1/4	17-2080	.20	30A	52 CANDO		17-3031	.35
10	# 500	1/2	17-2088	.20	30B	640 OHM			
11									
12									
13									
14									
15									
16									
17									
18									
19									
20	25 M	1/2	17-4728	.25					

MAY BE VARIED FROM 200 Ω TO 500 Ω TO CONTROL SENSITIVITY.

* MAY BE VARIED FROM 20,000 Ω TO 50,000 Ω TO CONTROL SENSITIVITY.

CONDENSERS									
C	CAPACITY	VOLT	PART Nº	PRICE	C	CAPACITY	VOLT	PART Nº	PRICE
1B, 2B, 3B	3 GANG — TUNING		17-4788	4.00	18A				
4					18B				
5					19A				
6	.002 MICA	600	17-2063	.20	19B				
7	.0001 MICA	600	17-2064	.20	20A				
8	.0005 MICA	600	17-2211	.20	20B				
9	.001 MICA	600	17-4292	.20	21A				
10	.05	160	17-4702	.30	21B				
11					22A, 22B	.02, .02 TWIN	1000	17-4193	.60
12					23	.5	15	17-4708	.45
13A, 13B	.1, .1 TWIN	15	17-4712	.75	24				
14A					25				
14B					26	.006 MICA	600	17-4759	.25
15	.15	400	17-4714	.35	27A, 27B	.01, .0005 DUAL	600	17-4785	.50
16					28	12 ELECT.	25	17-4786	1.00
17A, 17B	.05, .05 TWIN	160	17-4731	.35	29A, 29B	8, 8 DUAL — ELECT.	300	17-4787	1.25

CHOKES & TRANSFORMERS			
T-X	TYPE	PART Nº	PRICE
T	TRANSFORMERS		
1	ANTENNA	00-4791	.90
2	RADIO FREQUENCY	00-4792	1.00
3	OSCILLATOR	00-4793	.85
4	FIRST I.F.	00-4794	1.75
5	SECOND I.F.	00-4795	1.75
6	OUTPUT	00-4757	1.50
7	POWER	00-4796	3.00
X	CHOKES		
1			
2	"B" FILTER	00-4754	1.30
3	"A" FILTER	00-4816	.40
4	FILAMENT	00-4818	.40
5	SUPPRESSION	00-4782	.25

MISCELLANEOUS UNITS			
SYMBOL	DESCRIPTION	PART Nº	PRICE
SPK	DYNAMIC SPEAKER	29-4231	4.00
V	VIBRATOR	17-4732	4.00
SW1	VOLUME CONTROL SWITCH- SEE R25		
J	DIAL LIGHT JACK	17-4797	
P	DIAL LIGHT CONNECTING PIN	26-4018	
S1	SPEAKER SOCKET	17-4761	.15
P1	SPEAKER PLUG	17-4760	.15
L	DIAL LIGHT 6-8 VOLT	17-2145	.15
A	AMMETER CONNECTION		

I.F. PEAK=170 K.C.

ϕ NOTE: FOR SILENT TUNING DISCONNECT R4 HERE AND RECONNECT TO GROUND.

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Triode Plate	Anode Grid 1500 KC	Osc. Grid 1500 KC
6F7	6	220	100	2.3	50	—	—
6A7	6	220	100	2.3	—	175	5 to 10
6B7	6	220	100	3.5	—	—	—
41	6	205	220	18	—	—	—
84	6	230 (A. C.)	—	230	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

6F7
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen to B+ 25,000
Cathode 52
Control Grid 2,300,500
Triode Grid 500,000
Triode Plate to B+ 250,000

6A7
+ Heater .... Inf.
— Heater 0
Plate to B+ 82
Screen to B+ 25,000
Anode Grid to B+ 20,000
Oscillator Grid 101,052
Cathode 52
Control Grid 2,200,500

6B7
+ Heater .... Inf.
— Heater 0
Plate to B+ 120
Screen to B+ 25,000
Cathode 500
Control Grid 82
Diodes 200,620

41
+ Heater .... Inf.
— Heater 0
Plate to B+ 625
Screen to B+ 0
Cathode 692
Control Grid 1,000,000

84
+ Heater .... Inf.
— Heater 0
Plate 196
Plate 165
Plate to Plate 361
Cathode to B+ 165

COIL RESISTANCES

Ant. Primary 13
Ant. Secondary 5
R. F. Primary 100
R. F. Secondary 5

Oscillator Primary 2
Oscillator Secondary 4
First I. F. Primary 82
First I. F. Secondary 82
Second I. F. Primary 120

Second I. F. Secondary 120
Output Trans. Primary 625
Output Trans. Secondary 0.5
Power Trans. Secondary CT 165 & 196, Total 361

Speaker Field Coil 5.5
Speaker Voice Coil 3
"B" Filter Choke 165

MODEL 7
Parts, Changes

NOBLITT SPARKS INDUSTRIES

MODEL 7

MISCELLANEOUS

PART NO.	DESCRIPTION	PRICE
17-4294	Spark Plug Suppressor	$ .09
17-4295	Distributor Suppressor	.50
17-4701	Generator Condenser	.50
00-4743	Dome Light Filter	.50
00-4529	Ground Clamps	.10
17-4772	Dial Light 6-8 Volts (Screw Base)	.15
17-4732	Vibrator (4 prong)	4.00
17-4235	6" Speaker Cone Assembly (in carton)	1.20
17-4231	6" Speaker Assembly	4.00
23-4490 / 12-565	Stud and Nut (Set Mounting)	.10
29-4664	Carton	.60
17-2048	6A7 Socket	.15
17-2049	6B7 Socket	.15
17-2045	41 Socket	.15
17-2047	84 Socket	.15
17-4790	6F7 Socket	.15
17-4736	Vibrator Socket	.15
10-4804	Speaker Front Screw, per dozen	.10
10-4810	Flex Shaft Set Screw, per dozen	.10
10-4811	No. 8x¼ Self Tapping Screw, Hex Head, per dozen	.10
10-4844	No. 8x5/16 Self Tapping Screw, Binding Head, dozen	.10
29-4850	Worm Gear Drive Assembly	1.00
17-4152-3	Volume Control, 500M ohms	1.00
17-4760	Speaker Plug (3 Prong)	.15
17-4797	Dial Light Pin Jack	.10
17-4857	Dial Light (Bayonet Base)	.15

RESISTORS

17-2060	50,000 ohm Resistor, ¼ watt	.20
17-2065	1000 ohm Resistor, ¼ watt	.20
17-2088	500 ohm Resistor, ¼ watt	.20
17-2072	20,000 ohm Resistor, ¼ watt	.20
17-2080	1 Megohm Resistor, ¼ watt	.20
17-3011	250,000 ohm Resistor, ¼ watt	.20
17-4722	25,000 ohm Resistor, ½ watt	.25
17-2068	100,000 ohm Resistor, ¼ watt	.20
17-2069	200,000 ohm Resistor, ¼ watt	.20
17-4788	2 Megohm Resistor, ¼ watt	.20
17-3031	Muter 3 Tap Candohm Resistor	.35

CONDENSERS

17-2063	.002-600 Volt Mica Condenser	.20
17-4702	.05-160 Volt Condenser	.30
17-4731	.05-.05-160 Volt Condenser	.35
17-4193	.02-.02-1000 Volt Condenser	.60
17-4708	.5-15 Volt Condenser	.45
17-4712	.10-.10-15 Volt Condenser	.75
17-4714	.15-400 Volt Condenser	.55
17-4759	.006-600 Volt Mica Condenser	.25
17-4292	.001-600 Volt Mica Condenser	.20
17-2211	.0005-600 Volt Mica Condenser	.20
17-2064	.0001-600 Volt Mica Condenser	.20
17-4798	3 Gang Variable Condenser	4.00
17-4785	.0005-.01-600 Volt Dual Condenser	.50
17-4786	12. mfd 25 Volt Condenser	1.00
17-4787	2 & 6 mfd 450 V. Filter Condenser	1.25

TRANSFORMERS & COILS

PART NO.	DESCRIPTION	PRICE
00-4792	Radio Frequency Coil	$1.00
00-4791	Antenna Coil	.90
00-4793	Oscillator Coil	.85
00-4794	1st Intermediate Frequency Transformer	1.75
00-4795	2nd Intermediate Frequency Transformer	1.75
00-4757	Output Transformer	1.50
00-4796	Power Transformer	3.00
00-4754	"B" Filter Choke	1.30
00-4516	"A" Filament Choke	.40

REMOTE CONTROL PARTS

29-4673	Remote Control Without Bracket or Housing	$2.75
29-4532	Metal Housing	.25
29-4533	Eye Bolt and Nut	.10
29-4534	Strap	.05
29-4538	Dial Glass	.15
29-4539	Steering Column Bracket	.20
29-4527	Tuning Knob—Black Bakelite	.10
29-4528	Switch Key Shank (less knob) (7-17-17A-27-37)	.05
34-4540	Key Retaining Spring (7-17-17A-27-37)	.05

FLEXIBLE SHAFTS

00-4641	Condenser Drive 6" length	.45
00-4642	Condenser Drive 9" length	.50
00-4643	Condenser Drive 12" length	.60
00-4644	Condenser Drive 15" length	.70
00-4645	Condenser Drive 18" length	.85
00-4649	Condenser Drive 21" length	.95
00-4646	Condenser Drive 24" length	1.00
00-4647	Condenser Drive 30" length	1.20
00-4648	Condenser Drive 36" length	1.40
00-4651	Volume Control Drive 6" length	.45
00-4652	Volume Control Drive 9" length	.50
00-4653	Volume Control Drive 12" length	.60
00-4654	Volume Control Drive 15" length	.70
00-4655	Volume Control Drive 18" length	.85
00-4659	Volmue Control Drive 21" length	.95
00-4656	Volume Control Drive 24" length	1.00
00-4657	Volume Control Drive 30" length	1.20
00-4658	Volume Control Drive 36" length	1.40

DATE: May 23, 1935

MODEL NO. 7 **SUBJECT: Circuit Changes, Model 7**

1. R14—200 ohm ¼ watt resistor has been added in power pack across vibrator points.

2. R3—100,000 ohm ¼ watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm ¼ watt (17-2060).

3. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).

4. Speaker plug socket, part No. 17-4761 (3 prong), has been changed to speaker plug socket, part No. 17-4447 (4 prong).

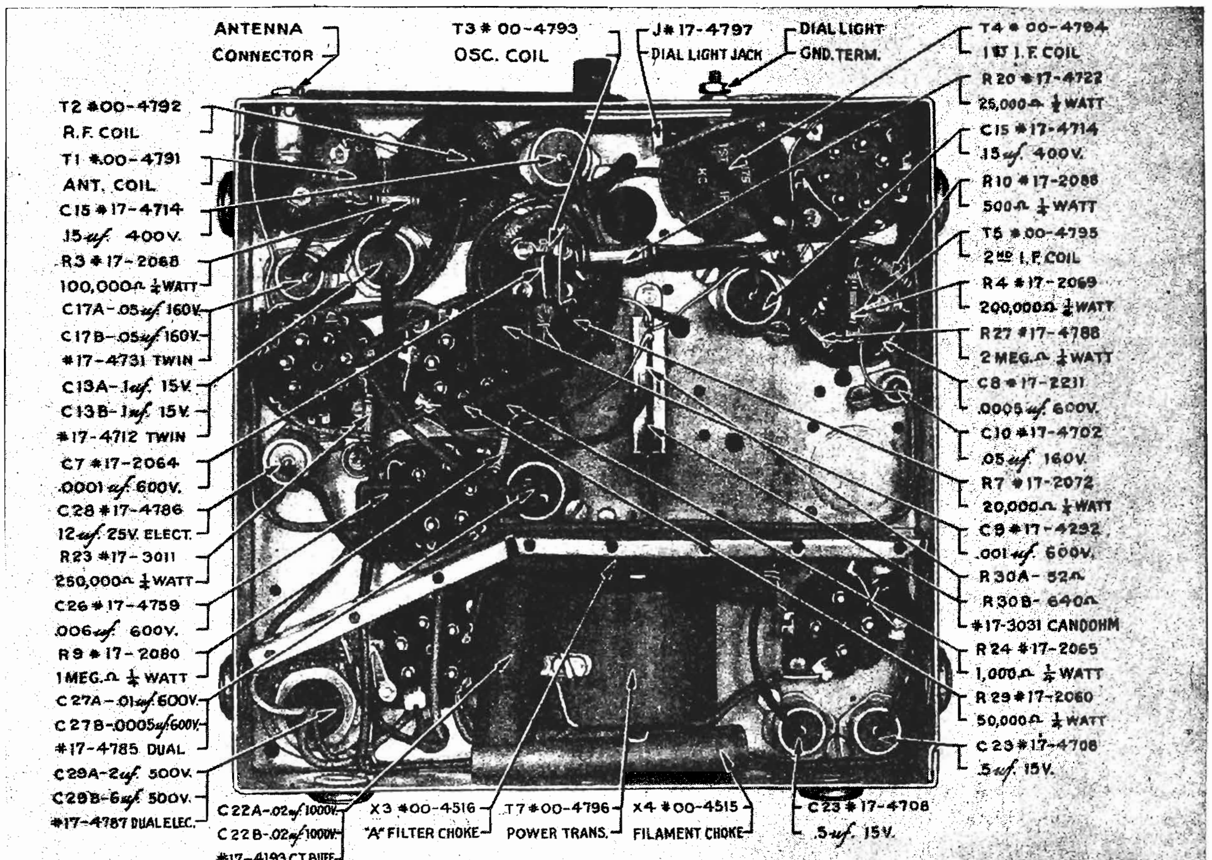
5. Ammeter cable, part No. 00-4778-1, has been added. List Price, $ .70.

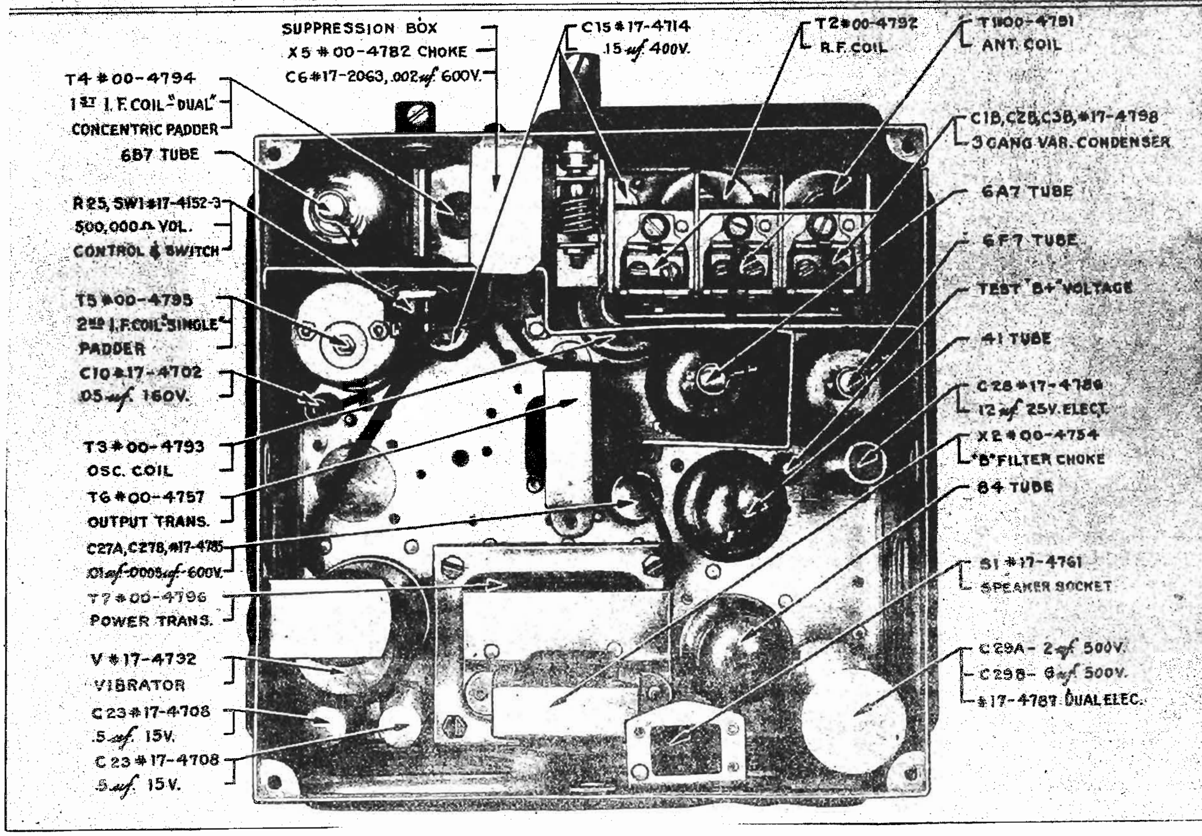
6. Fuse, part No. 17-2228, has been added. List Price, $ .05.

7. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this diffictulty was made beginning with those sets from which the louvers were ommitted.

MODEL 7
Chassis Layouts

NOBLITT SPARKS INDUSTRIES





1935 Receivers
Installation Data

NOBLITT SPARKS INDUSTRIES

INSTALLATION PROCEDURE FOR 1935 ARVIN CAR RADIOS

There are several things which should be done CAREFULLY as a car radio is being installed. Care in making the original installation will pay for itself, particularly if you find it necessary to do additional work because of motor noise.

Some of the major points often overlooked are:

1. The set must be well grounded at the place where it is mounted. Scrape the paint off around the mounting holes drilled in the car so the nut and washer will make contact with a clean, bright surface.

   In some cases where the bulkhead is padded on both sides, it will be necessary to run a piece of shielding from one of the mounting bolts to some NEARBY point where a good ground can be made.

2. In the case of a roof antenna, the antenna lead should be shielded continuously from the set to a point as far up the corner post as possible. Unless the set is mounted on the opposite side of the car from which the antenna lead comes down, the shielded lead supplied will be sufficient. Solder the antenna lead to the shielded lead supplied, tape neatly, and take up any slack by pulling the shielded lead out through the shielding on the connector end. Cut off the excess wire and solder the bakelite button back in place. Push the shielding as far up the corner post as possible and ground the shielding at the point where it enters the corner post.

3. In the case of under-car or running-board antenna, the antenna should preferably be installed so it will clear the car by a few inches. This distance will be governed by a sensible allowance for road clearance, depending on the type of antenna used. It is good practice to shield the antenna lead continuously from the set to a point close to the antenna, grounding the shielding wherever convenient.

4. When installing the remote control, and excess length of tone control cable, and in installing the No. 37, the local-long distance cable as well, should be neatly coiled and taped in place up under the dash out of sight. It is desirable to ground the shielding on these cables at this point also.

5. In some cars a metal tube—supplying the windshield wiper—goes up a corner post. This should be grounded as near the corner post as possible.

6. When installing the dome light filter and generator condenser, be sure that each unit has a good, clean ground connection.

7. When the receiver has been completely installed, turn the set on and tune in a station whose frequency is known. If necessary, remove the small screw in the center of the dial face and with a toothpick or other small implement turn the pointer to the correct frequency. Replace the small screw.

Start the motor (remember that exhaust gasses are dangerous in closed garages) to determine whether the installation is picking up motor noise.

The 1935 Arvin Car Radio is so constructed that on the majority of new cars spark-plug suppressors are not necessary. However, on some of the older cars as well as a couple of the more popular new ones, suppressors will be necessary to eliminate motor noise. These suppressors can be obtained from your jobber.

Some general instructions are given here any one or combination of which has been found very useful in the elimination of motor noise which can be classified as of two kinds:

1. The so-called "feed-back" and radiation, which is audible when the aerial of the set is disconnected.
2. Antenna Pick-up, or motor noise that is heard when the aerial is connected.

I. If motor noise is heard with the antenna disconnected, try the following, leaving the antenna disconnected until the noise is remedied:

First: Run a bonding wire from the dial light and tone control cable shielding of the remote control to the set itself, thus insuring a good ground for the shielding on that cable. It can be determined whether or not this cable is bringing in motor noise by pulling out the plug where it plugs into the set. If the motor noise decreases, it will be necessary to ground this cable as it is bringing in motor noise.

Second: Place an ammeter condenser on the ammeter of the car.

Third: Place a condenser on the ignition switch.

Fourth: Peen out the rotor of the distributor or build up the rotor with solder until the gap between the rotor and the distributor cap is .003 of an inch.

Fifth: If the primary lead to the coil and the distributor run through the same conduit as the spark-plug wires themselves, remove these primary wires from the conduit and keep them as far away as possible from the spark-plugs or high tension wires.

Sixth: Inspect the distributor points, and if they are badly pitted, replace and reset.

Seventh: On Ford V-8 installation, the generator condenser, furnished with each set should be placed on the distributor.

II. For the second kind of motor noise, namely Antenna Pick-up, that is, when the antenna is connected to the set, the following methods may be tried for its elimination:

First: Change location of the dome light filter to the dome light itself.

Second: Place condenser on ammeter.

Third: If the coil is on the passenger side of the dash, shield the high tension lead running from the coil to the distributor and ground this shielding at the point where it passes through the bulkhead.

Fourth: Ground the motor to the frame on each side of the motor.

Fifth: Bond the choke and throttle control rods to the chassis of the car with flexible wire or bonding material.

Sixth: Ground the steering column post to the instrument panel.

Seventh: Ground brake and clutch pedals on motor side of bulkhead to some metal part of the dash.

Eighth: On some cars you will find that the battery lead from the battery to the starting motor radiates through the foot board and any person directly over the battery lead will carry that radiation directly to the antenna. This difficulty may be overcome by placing a copper screen under the floor mat, and grounding this screen to the frame of the car.

NOBLITT SPARKS INDUSTRIES

MODEL 16 SOCKET VOLTAGES

Make voltage tests with 1666 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltages. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	6.0	230	100	4.5	0	—	—
6A7	6.0	240	100	4.5	—	180	5-10
78	6.0	240	100	7.0	0	—	—
75	6.0	85	—	1.5	—	—	—
41	6.0	235	240	18.5	—	—	—
84	6.0	235 (AC)	—	235	—	—	—

MODEL 16 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes removed from set and R. F. chassis and speaker disconnected from power pack unit and R. F. chassis.

1st 6D6 78

+ Heater	Inf.
— Heater	0
Plate to B—	100
Screen Grid to B—	30,000
Suppressor Grid	0
Cathode	260
Control Grid	1,250,000

6A7

+ Heater	Inf.
— Heater	0
Plate to B—	82
Screen Grid to B—	30,000
Anode Grid to B—	20,000
Oscillator Grid	100,260
Cathode	260
Control Grid	1,150,000

2nd 6D6

+ Heater	Inf.
— Heater	0
Plate to B—	90
Screen Grid to B—	30,000
Suppressor Grid	0
Cathode	2,000
Control Grid	82

75

+ Heater	Inf.
— Heater	0
Plate to B—	250,000
Diodes	150,000
Cathode	5,000
Control Grid	0 to 250,000

41

+ Heater	Inf.
— Heater	0
Plate to B—	650
Screen Grid to B—	0
Control Grid	500,000
Cathode	800

84

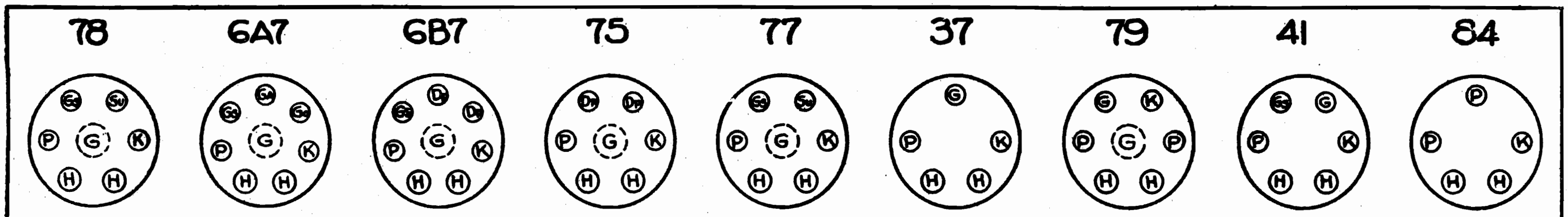
+ Heater	0
— Heater	0
Plate	190
Plate	220
Plate to Plate	410
Cathode	Inf.*

*Reads leakage of electrolytic condenser.

Coil Resistances Model 16

Ant. Primary	13 ohms
Ant. Secondary	5 ohms
R. F. Primary	100 ohms
R. F. Secondary	5 ohms
Oscillator Primary	2 ohms
Oscillator Secondary	3 ohms
First I. F. Primary	82 ohms
First I. F. Secondary	82 ohms
Second I. F. Primary	90 ohms
Second I. F. Secondary	90 ohms
Primary Output Transformer	650 ohms

LOOKING AT BOTTOM OF TUBE SOCKETS



SYMBOLS — H-HEATER; P- PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO- OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP- DIODE PLATE

MODEL 16
Installation Data
Parts List

NOBLITT SPARKS INDUSTRIES

GENERAL MECHANICAL PARTS

00-4213-1	Antenna Cable Assembly
00-4215	Battery Cable Assembly
00-4216	Pilot Light Wire Assembly
29-4525	Remote Control Assembly
29-4525-A	Remote Control Body Assembly
29-4525-B	Steering Column Bracket
29-4525-D	Steering Column Bracket Strap
29-4525-K	Pilot Light Bulb
29-4525-L	Control Knob and Set Screw
29-4525-M	Key
00-4333	24″ Flexible Shaft Assembly
00-4330	12″ Flexible Shaft Assembly (Special Order)
00-4331	15″ Flexible Shaft Assembly (Special Order)
00-4332	18″ Flexible Shaft Assembly (Special Order)
00-4334	30″ Flexible Shaft Assembly (Special Order)
00-4335	36″ Flexible Shaft Assembly (Special Order)
17-2228	Fuse
17-2262	4-Prong Mounting Plug (with cover)
17-2263	5-Prong Mounting Plug (with cover)
	Antenna & Battery Cable Connectors (complete set)
00-4371	Shielded Loom (yard)
17-4226	Speaker (6″ Dynamic)
17-4294	Spark Plug Suppressor
17-4295	Distributor Suppressor
17-4152-1	Volume Control Switch
29-3026	Tube Shield Assembly
29-2169-C	Vibrator and (Rubber Casing .10)
17-2050	Tube Type 6D6
17-2052	Tube Type 78
17-2053	Tube Type 75
17-2054	Tube Type 41
17-2056	Tube Type 84
17-2057	Tube Type 6A7
	Case (complete)
	Accessories
	Set and Tubes
	Power Pack
17-2225	Generator Condenser
17-4296	Ammeter Condenser

CHOKES

00-2178E	See diagram for description
00-2178-F	See diagram for description
00-4141	See diagram for description

INSTALLATION OF AIRPLANE CONTROL IN ASH TRAY COMPARTMENT IN 1934 DODGES AND PLYMOUTHS

This control is designed to fit either on the steering column or in the ash tray compartment. A chromium-plated panel is furnished for this ash tray mounting.

On the 1934 Dodges and Plymouths there is a wide bracket directly behind this ash tray that interferes with the shafts of the remote control. It is impossible to run the shafts around the control, for that causes too sharp a bend in the cables and so they bind.

This condition can be easily remedied by locating the control with the chromium plate attached in the hole left by the ash tray on the panel. Remove the key from the control and mark through the key hole on to the bracket. With this center located, measure one-half inch above and three-sixteenths of an inch to the right of this first mark, and locate the center of the second hole.

Drill a three-eighths inch hole at both places. Run the two flexible shafts through these holes from the rear and fasten them onto the remote control. Then fasten the control on the dash with the bracket furnished and hook the other end of the shafts into the radio set as described in the instructions.

* * * * * * *

INSTALLATION OF TONE CONTROL ON ARVIN MODEL 16 RECEIVERS

When a customer desires a lower pitch in this set, connect together the two external speaker leads. Obtain two phone tips similar to the one on the dial light lead, and put one of these on each end of a 2.5 inch piece of wire. Slip a small piece of rubber tubing over each phone tip, or use tape. Then plug the two tips -- one into each of the external speaker connections.

This will give the set's tone a greater depth, which is desirable in some cases.

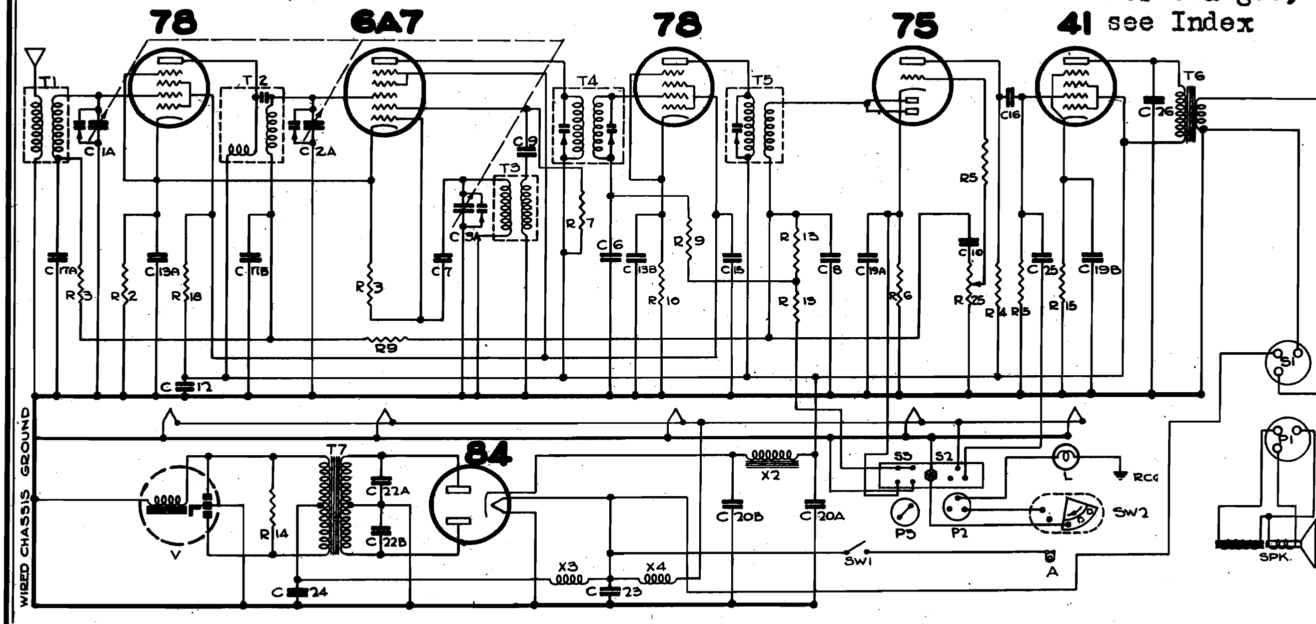
MODEL 17
Schematic, Voltage
Resistances, Parts

NOBLITT SPARKS INDUSTRIES

I.F. PEAK = 175 K.C

ARVIN CAR RADIO—MODEL 17

For Changes, see Index



RESISTORS									
R	OHMS	W	PART NO.	PRICE	R	OHMS	W	PART NO.	PRICE
1					18	.5 OM	1/2	17-4720	.25
2	‡400	1/4	17-4762	.20	19				
3	100M	1/4	17-2068	.20	20				
4	200M	1/4	17-2069	.20	21				
5	500M	1/4	17-2070	.20	22				
6	5000	1/4	17-2071	.20	23				
7	20M	1/4	17-2072	.20	24				
8					25	500M	V.C.	17-4152-B	1.00
9	1MEG	1/4	17-2080	.20	26				
10	500	1/4	17-2088	.20	27				
11									
12									
13	75M	1/4	17-2067	.20		‡ MAY BE	VARIED	FROM	
14	200	1/4	17-4287	.20		200Ω TO	600Ω	TO	
15	500	1/2	17-4717	.25		CONTROL	SENSITIVITY		
16									
17									

CONDENSERS									
C	CAPACITY	VOLT	PART NO.	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1A	3 GANG TUNING		17-4745	4.50	16	.10	600	17-4715	.40
2A					17A	.05 TWIN	160	17-4731	.35
3A					17B	.05			
4					18A				
5					18B				
6	.002	600	17-2065	.20	19A	12.0 TWIN	25	17-4707	1.50
7	.0001	600	17-2064	.20	19B	12.0			
8	.0005	600	17-2211	.20	20A	4.0 DUAL	300	17-4703	2.40
9	.001	600	17-4292	.20	20B	12.0			
10	.05	160	17-4702	.30	21A				
11					21B				
12	.25	400	17-4711	.55	22A	.02 TWIN	1000	17-4193	.60
13A	.10 TWIN	15	17-4712	.75	22B	.02			
13B	.10				23	.50	15	17-4708	.45
14A					24	1.0	15	17-4709	.55
14B					25	.003	600	17-4741	.25
15	.15	400	17-4714	.55	26	.006	600	17-4759	.25

CHOKES & TRANSFORMERS			
T-X	TYPE	PART NO.	PRICE
1	ANTENNA	00-4510	.90
2	RADIO FREQUENCY	00-4511	1.00
3	OSCILLATOR	00-4518	.85
4	FIRST I.F.	00-4517	1.75
5	SECOND I.F.	00-4514	1.75
6	OUTPUT	00-4757	1.50
7	POWER	00-4746	3.00
X-1			
X-2	'B' FILTER CHOKE	00-4754	1.30
X-3	'A' FILTER CHOKE	00-4516	.40
X-4	FILAMENT CHOKE	00-4515	.40

MISCELLANEOUS UNITS		
SYMBOL	DESCRIPTION	PART NO.
SPK	SPEAKER	17-4232
V	VIBRATOR	17-4732
RCG	REMOTE CONTROL GROUND	
SW1	VOLUME CONTROL SWITCH	SEE R25
SW2	TONE CONTROL SWITCH	
S1	SPEAKER SOCKET	17-4761
S2	DIAL LITE-TONE SOCKET	17-4375
S3	LOC.-DIST. CONTROL SOCKET	17-4375
P1	SPEAKER PLUG	17-4760
P2	DIAL-LITE-TONE PLUG	17-4377
P3	LOC.-DIST. CONTROL PLUG	17-4740
L	DIAL LITE 6-8 VOLT	17-2145
A	AMMETER CONNECTION	

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	5.8	220	70	3.3	3.3	—	—
6A7	5.8	220	70	3.3	—	175	5-10
78	5.8	220	70	2.5	2.5	—	—
75	5.8	115	—	1.5	—	—	—
41	5.8	208	220	14.0	—	—	—
84	5.8	230 (AC)	—	225	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

78 (R. F.)
+ Heater ....Inf.
— Heater 0
Plate to B+................113
Screen to B+............50,000
Suppressor Grid.............400
Cathode 400
‡Control Grid..........1,250,000

6A7
+ Heater ....Inf.
— Heater 0
Plate to B+.......................115
Screen to B+..................50,000
Anode Grid to B+..............20,000
Oscillator Grid...............100,400
Cathode 400
‡Control Grid...............1,150,000

78 (I. F.)
+ Heater ....Inf.
— Heater 0
Plate to B+.......................85
Screen to B+..................50,000
Suppressor Grid..................500
Cathode 500
‡Control Grid................1,075,000

41
+ Heater ....Inf.
— Heater 0
Plate to B+.....................625
Screen to B+.......................0
Cathode 500
Control Grid..................500,000

75
+ Heater ....Inf.
— Heater 0
Plate to B+..................200,000
Cathode 5,000
‡Diodes 150,000
Control Grid V. C. on.........1,000,000
Control Grid V. C. off..........500,000

84
+ Heater ....Inf.
— Heater 0
Plate 196
Plate 165
Plate to Plate...................361
Cathode to B+....................165

COIL RESISTANCES

Ant. Primary.............. 12.0
Ant. Secondary............ 4.0
R. F. Primary............113.0
R. F. Secondary............4.0

Oscillator Primary.............. 3.0
Oscillator Secondary............ 1.5
First I. F. Primary..............115.0
First I. F. Secondary............115.0

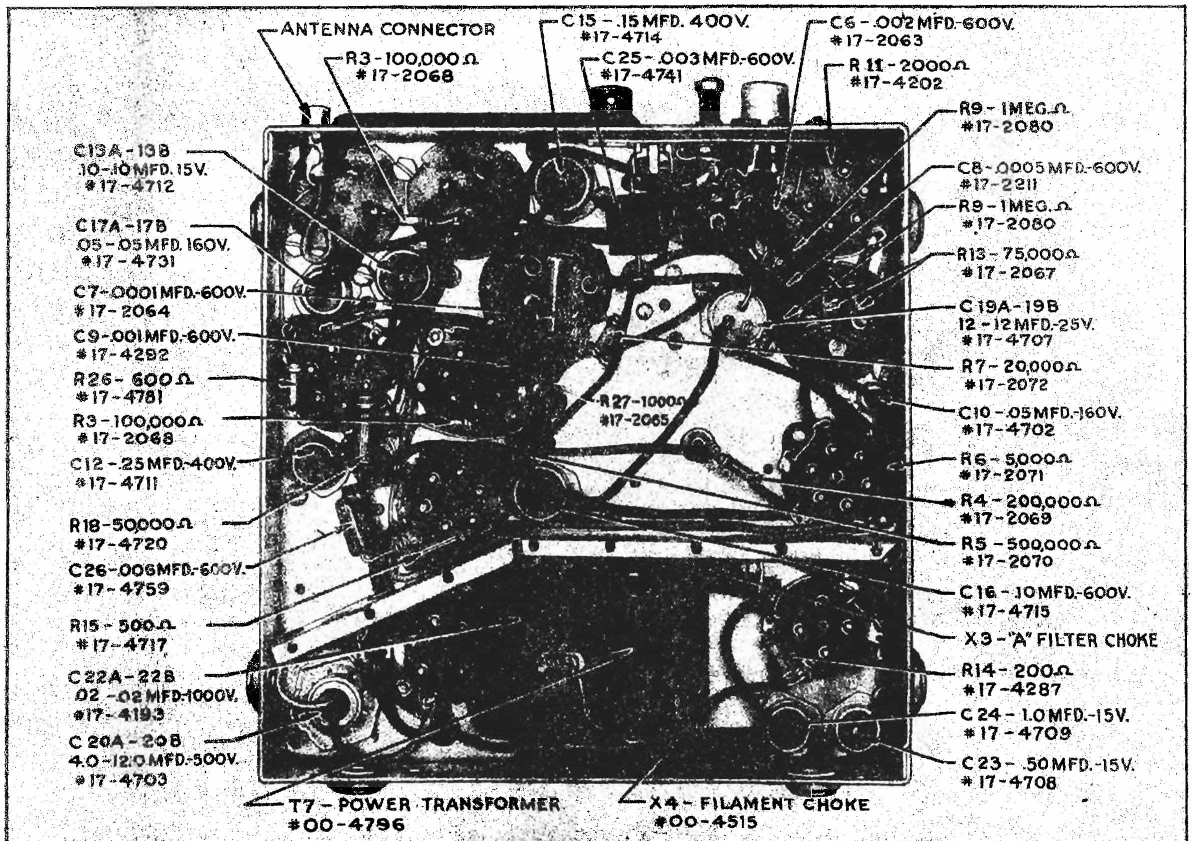
Second I. F. Primary............ 85.0
Second I. F. Secondary.......... 85.0
Output Transformer Primary...... 625
Output Transformer Secondary.... 0.5

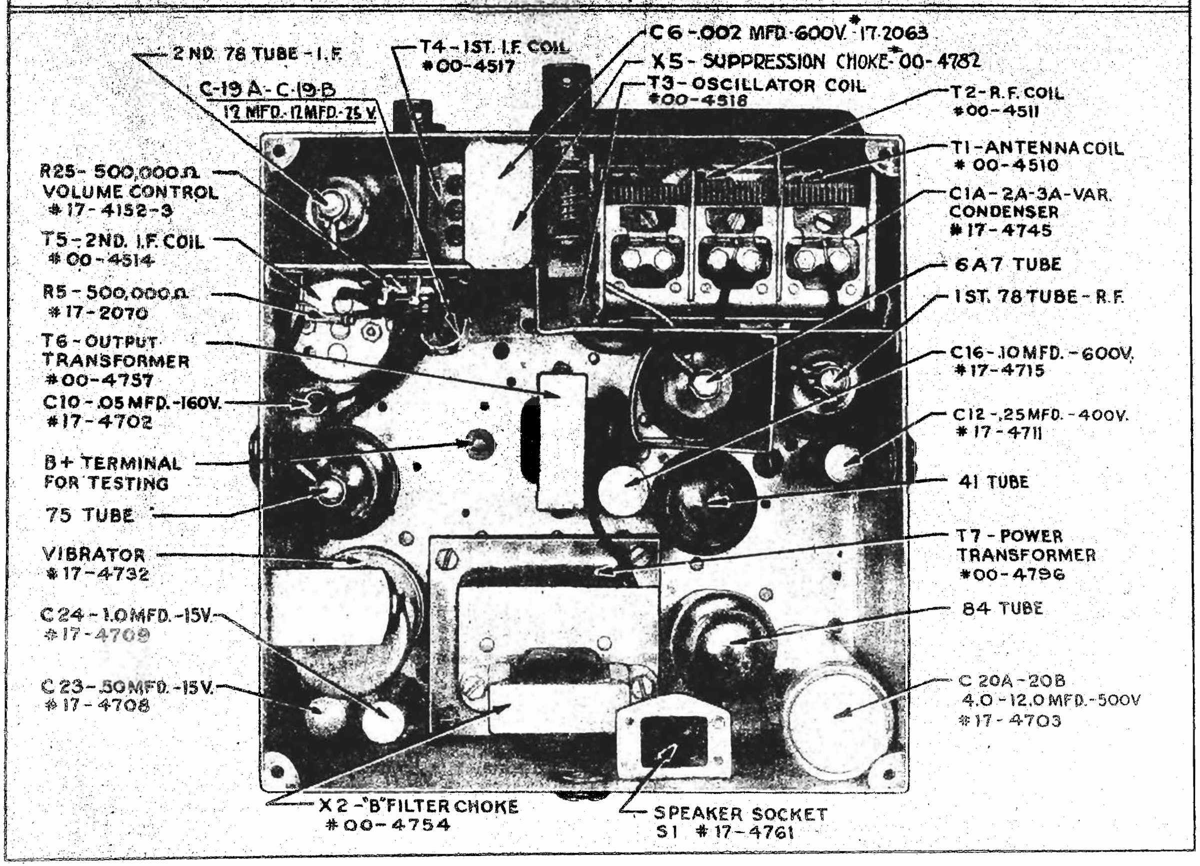
Power Transformer Secondary {165 / 196} 361
Speaker Field Coil.............. 5.0
Speaker Voice Coil.............. 3.0
"B" Filter Choke................ 165

‡ Readings given for sensitivity switch in "Local" position, for "Distance" add 5000 ohms.

MODEL 17
Chassis Layouts

NOBLITT SPARKS INDUSTRIES





NOBLITT SPARKS INDUSTRIES

MODELS 17,27 Changes

MODEL NO. 17

1. R3—100,000 ohm ¼ watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm ¼ watt (17-2060).

2. R24—1,000 ohm ¼ watt resistor has been inserted in 6A7 No. 1 grid circuit.

3. R2—400 ohm ¼ watt resistor has been changed to R10—500 ohm ¼ watt. Allowable variations on R2 was from 200 to 600 ohms. Allowable variation on R10 is from 400 to 600 ohms.

4. R10—500 ohm ¼ watt resistor on cathode of 78 tube has been changed to R28—1,500 ohm ¼ watt.

5. C12 and C26 capacitors have been combined into one dual condenser, part No. 17-4742, .006 mfd 800 volt (lead with red dot is .006 mfd unit) and .25 mfd 400 volt.

6. X5 suppression choke, 00-4782, has been added in "A" line.

7. C6—.002 mfd mica condenser has been inserted ahead of X5 suppression choke and connected from battery side of X5 to ground.

8. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).

9. Speaker plug socket, 17-4761 (3 prong), has been changed to speaker plug socket, 17-4447 (4 prong).

10. Ammeter cable, 00-4778-1, has been added. List Price, $ .70.
Note: On Model 17A this cable is shorter and carries part No. 00-4778-2. List Price, $ .65.

11. Fuse, 17-2228, has been added. List Price, $ .05.

12. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this diffictulty was made beginning with those sets from which the louvers were ommitted.

MODEL NO. 27

1. R3—100,000 ohm ¼ watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm ¼ watt (17-2060).

2. R24—1,000 ohm ¼ watt resistor has been inserted in 6A7 No. 1 grid circuit.

3. R2—400 ohm ¼ watt resistor has been changed to R10—500 ohm ¼ watt. Allowable variation on R2 was from 200 to 600 ohms. Allowable variation on R10 is from 400 to 600 ohms.

4. R10—500 ohm ¼ watt resistor on cathode of 78 tube has been changed to R28—1,500 ohm ¼ watt.

5. C12 and C26 capacitors have been combined into one dual condenser, part No. 17-4742, .006 mfd 800 volt (lead with red dot is .006 mfd unit) and .25 mfd 400 volt.

6. X5 suppression choke, 004782, has been added in "A" line.

7. C6—.002 mfd mica condenser has been inserted ahead of X5 suppression choke and connected from battery side of X5 to ground.

8. Power transformer, 00-4747. Part number has been changed to 00-4746.

9. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base) .

10. Speaker plug socket, 17-4761 (3 prong), has been changed to speaker plug socket, 17-4447 (4 prong).

11. Ammeter cable, 00-4778-1, has been added. List Price, $ .70.

12. Fuse, 17-2228, has been added. List Price, $ .05.

13. Beginning with serial No. D44011H the type 75 tube was replaced with a 6B7, triode connected.

14. C25—.003 mfd 600 volt condenser was changed to C26—.006 mfd 600 volt.

15. Beginning with serial No. E45219H, the triode connection on the 6B7 was changed to a pentode connection, and changes as per paragraphs 16, 17, and 18 were made.

16. C12—.25 mfd 400 volt condenser was added as a screen by-pass from screen of 6B7 tube to ground.

17. R9—1 megohm ¼ watt resistor was added as a screen dropping resistor from +B to screen of 6B7 tube.

18. C26—.006 mfd 600 volt condenser was changed to C25—.003 mfd 600 volt.

19. Under conditions outlined in paragraph 15, voltages on the 6B7 are as follows (using a 1333 ohm per volt meter): Plate 60, Screen 30, cathode 1.7.

20. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this difficulty was made beginning with those sets from which the louvers were omitted.

MODEL 35
Above Serial E31577H
Voltage, Resistances

NOBLITT SPARKS INDUSTRIES

NOTE: The following values are correct for all Model 35 Arvin Car Radios, beginning with and including Serial No. E31577H.

MODEL 35 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	1.6	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
6B7	6.3	250	60	1.6	—	*1.4
79	6.3	135	—	1.6	—	*1.6
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
37	6.3	60	—	0	—	*6—1500 KC
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 35 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes, vibrator and speakcr removed from set and R. F. chassis disconnected from power pack unit.

78
+ Heater .... Inf.
— Heater 0
Plate to B+ 50
Screen Grid to B+ 25,000
Suppressor Grid 500
Cathode 500
Control Grid 1,530,000

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 500,000
Cathode 400

2nd 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 25,000
Suppressor Grid 3,000
Cathode 3,000
Control Grid 6

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 515,000
Cathode 400

6B7
+ Heater .... Inf.
— Heater 0
Plate to B+ 90
Screen Grid to B+ 25,000
Diode 530,000
Diode 530,000
Cathode 500
Control Grid 600,000

79
+ Heater .... Inf.
— Heater 0
Plate to B+ 100,000
Control Grid 15,000
Cathode 1000
Plate to B+ 100,000
Control Grid (Cap):
V. C. on 500,000
V. C. off 250,000

37
+ Heater .... Inf.
— Heater 0
Plate to B+ 25,000
Control Grid 55,000
Cathode 0

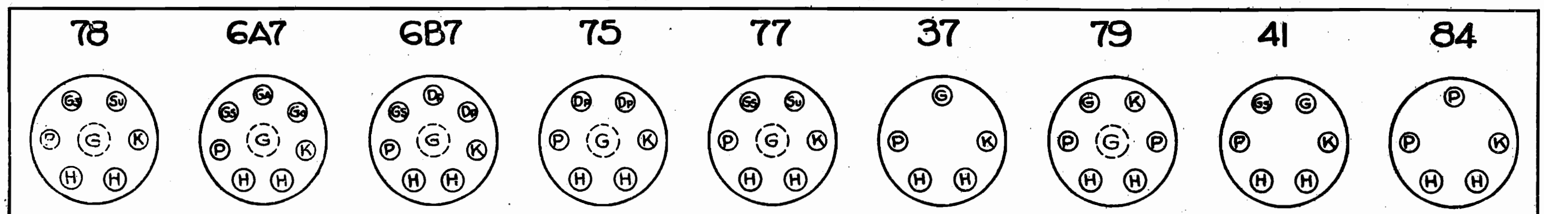
84
+ Heater .... Inf.
— Heater 0
Plate 190
Plate 160
Plate to Plate 350
Cathode .... Inf.†

†Reads leakage of electrolytic condenser.

COIL RESISTANCES

Ant. Primary 2
Ant. Secondary 6
R. F. Primary 50
R. F. Secondary 6
Osc. Primary 2
Osc. Secondary 7
1st I. F. Primary 100
1st I. F. Secondary 100
2nd I. F. Primary 82
2nd I. F. Secondary 82
Primary Output Transformer 600
Voice Coil .... .35

LOOKING AT BOTTOM OF TUBE SOCKETS

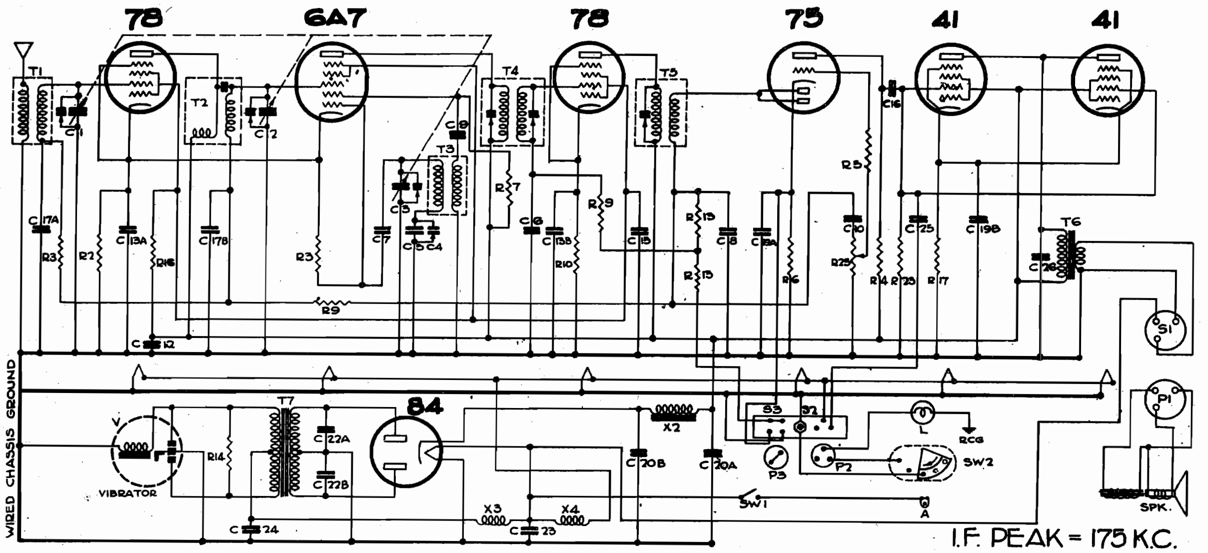


SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

MODEL 27
Schematic, Voltage
Resistances, Parts

NOBLITT SPARKS INDUSTRIES

ARVIN CAR RADIO — MODEL 27



I.F. PEAK = 175 K.C.

RESISTORS

R	OHMS	W	PART NO.	PRICE
1				
2	‡400	1/4	17-4762	.20
3	100M	1/4	17-2068	.20
4	200M	1/4	17-2069	.20
5	800M	1/4	17-2070	.20
6	5000	1/4	17-2071	.20
7	20M	1/4	17-2072	.20
8				
9	1MEG.	1/4	17-2080	.20
10	500	1/4	17-2088	.20
11				
12				
13	75M	1/4	17-2067	.20
14	200	1/4	17-4287	.20
15				
16	80M	1	17-4763	.30
17	250	2	17-4719	.35
18				
19				
20				
21				
22				
23	250M	1/4	17-3011	.20
24				
25	800M	V.C.	17-4152-3	1.00
26				
27				
28				
29				

‡ - MAY BE VARIED FROM 200 Ω TO 600 Ω TO CONTROL SENSITIVITY

CONDENSERS

C	CAPACITY	VOLT	PART NO.	PRICE
1	3 GANG TUNING		17-4725	4.50
2				
3				
4	.00022	PAD.	17-4726	.40
5	.0011	600	17-4700	.30
6	.002	600	17-2063	.20
7	.0001	600	17-2064	.20
8	.0005	600	17-2211	.20
9	.001	600	17-4292	.20
10	.05	160	17-4707	.30
11				
12	.25	400	17-4711	.55
13A	.10 TWIN	15	17-4712	.75
13B	.10			
14A				
14B				
15	.15	400	17-4714	.55
16	.10	600	17-4715	.40
17A	.05 TWIN	160	17-4731	.35
17B	.05			
18A				
18B				
19A	12.0 TWIN	25	17-4707	1.80
19B	12.0			
20A	4.0 DUAL	500	17-4705	2.40
20B	12.0			
21A				
21B				
22A	.02 TWIN	1000	17-4193	.60
22B	.02			
23	.50	15	17-4708	.45
24	1.0	15	17-4709	.55
25	.003	600	17-4741	.25
26	.008	600	17-4759	.25

CHOKES AND TRANSFORMERS

T-X	TYPE	PART NO.	PRICE
1	ANTENNA	00-4510	.90
2	RADIO FREQUENCY	00-4511	1.00
3	OSCILLATOR	00-4512	.85
4	FIRST I.F.	00-4517	1.75
5	SECOND I.F.	00-4514	1.75
6	OUTPUT	00-4756	1.50
7	POWER	00-4747	5.00
X-1			
X-2	'B' FILTER CHOKE	00-4754	1.80
X-3	'A' INPUT CHOKE	00-4516	.40
X-4	FILAMENT CHOKE	00-4515	.40

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.	PRICE
SPK	SPEAKER	17-4233	5.50
V	VIBRATOR	17-4752	4.00
RCG	REMOTE CONTROL GROUND		
SW1	VOLUME CONTROL SWITCH	SEE R25	
SW2	TONE CONTROL SWITCH		
S1	SPEAKER SOCKET	17-4761	.15
S2	DIAL LITE - TONE SOCKET	17-4575	.30
S3	LOC-DIST. CONTROL SOCKET	17-4578	
P1	SPEAKER PLUG	17-4760	.15
P2	DIAL LITE - TONE PLUG	17-4577	.15
P3	LOC-DIST. CONTROL PLUG	17-4740	.15
L	DIAL LITE 6-8 VOLT	17-2145	.15
A	AMMETER CONNECTION		

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	5.8	235	75	4.2	4.2	—	—
6A7	5.8	235	75	4.2	—	170	5-10
78	5.8	235	75	3.3	3.3	—	—
75	5.8	120	—	1.7	—	—	—
41	5.8	220	235	13.0	—	—	—
41	5.8	220	235	13.0	—	—	—
84	5.8	260 (AC)	—	245	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

78 (R. F.)
+ Heater .... Inf.
— Heater 0
Plate to B+ 113
Screen to B+ 50,000
Suppressor Grid 400
Cathode 400
‡Control Grid 1,250,000

6A7
+ Heater .... Inf.
— Heater 0
Plate to B+ 115
Screen to B+ 50,000
Anode to B+ 20,000
Oscillator Grid 100,400
Cathode 400
‡Control Grid 1,150,000

78 (I. F.)
+ Heater .... Inf.
— Heater 0
Plate to B+ 85
Screen to B+ 50,000
Suppressor Grid 500
Cathode 500
‡Control Grid 1,075,000

75
+ Heater .... Inf.
— Heater 0
Plate to B+ 200,000
‡Diodes 150,000
Cathode 5000
Control Grid V. C. on 1,000,000
Control Grid V. C. off 500,000

41
+ Heater .... Inf.
— Heater 0
Plate to B+ 330
Screen to B+ 0
Cathode 250
Control Grid 250,000

41
+ Heater .... Inf.
— Heater 0
Plate to B+ 330
Screen to B+ 0
Cathode 250
Control Grid 250,000

84
+ Heater .... Inf.
— Heater 0
Plate 240
Plate 210
Plate to Plate 450
Cathode to B+ 165

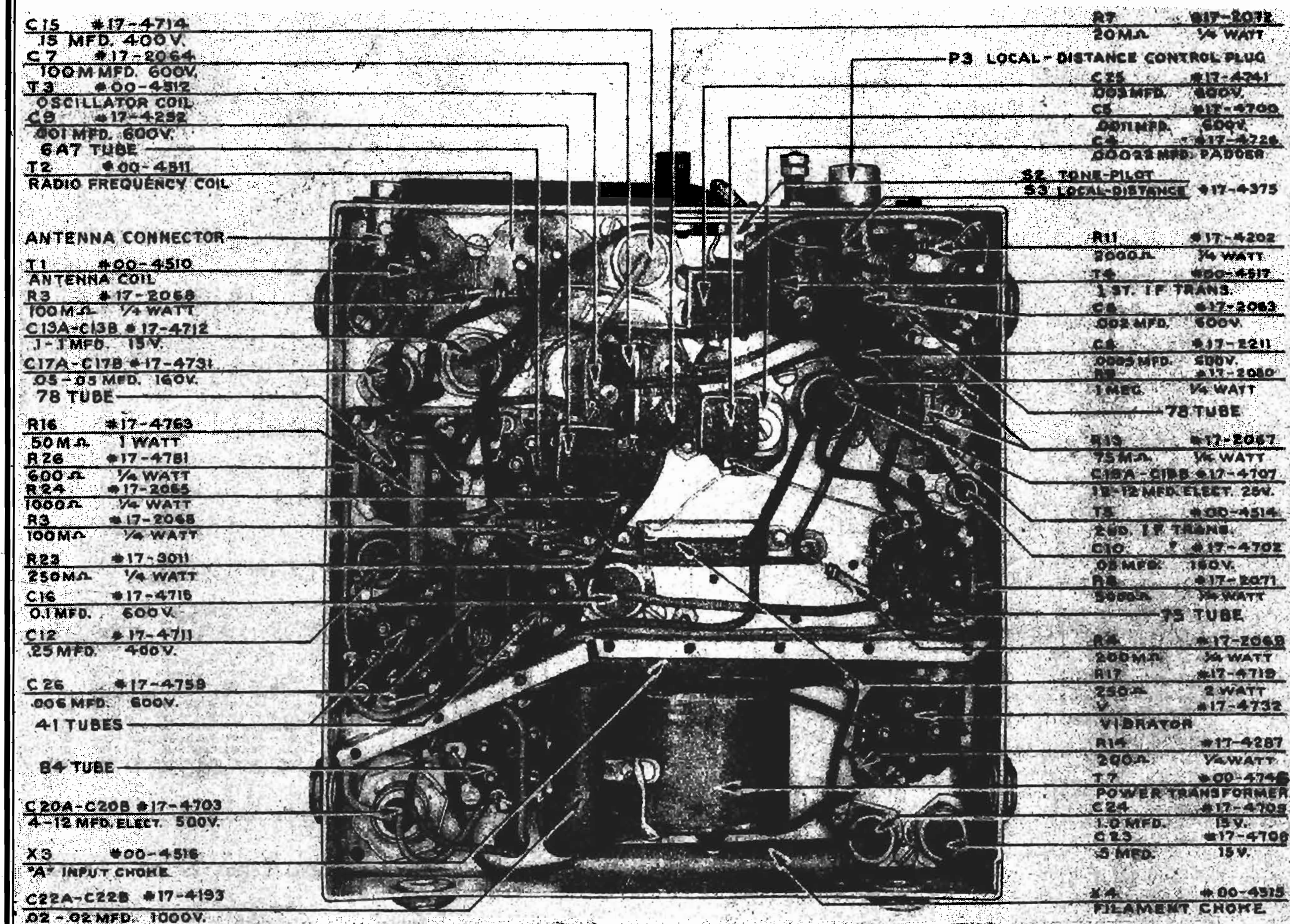
‡ Add 5000 Ω to these readings when sensitivity switch is on "Distance" position.

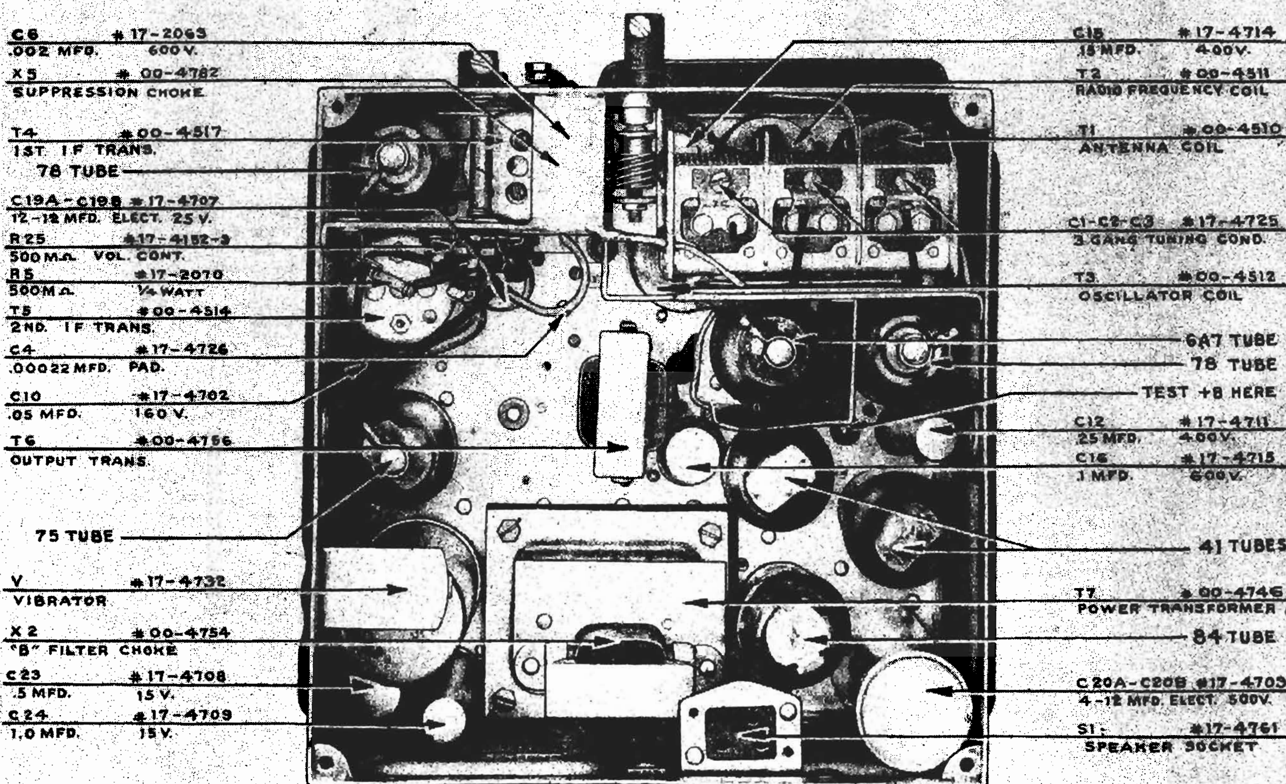
COIL RESISTANCES

Ant. Primary 12.0
Ant. Secondary 4.0
R. F. Primary 113.0
R. F. Secondary 4.0
Oscillator Primary 3.0
Oscillator Secondary 1.5
First I. F. Primary 115.0
First I. F. Secondary 115.0
Second I. F. Primary 85.0
Second I. F. Secondary 85.0
Output Transformer Primary 330
Output Transformer Secondary .... .05
Power Transformer Secondary .... 240-CT-210=450
"B" Filter Choke 165
Speaker Field Coil 4.0
Speaker Voice Coil 3.0

MODEL 27
Chassis Layouts

NOBLITT SPARKS INDUSTRIES



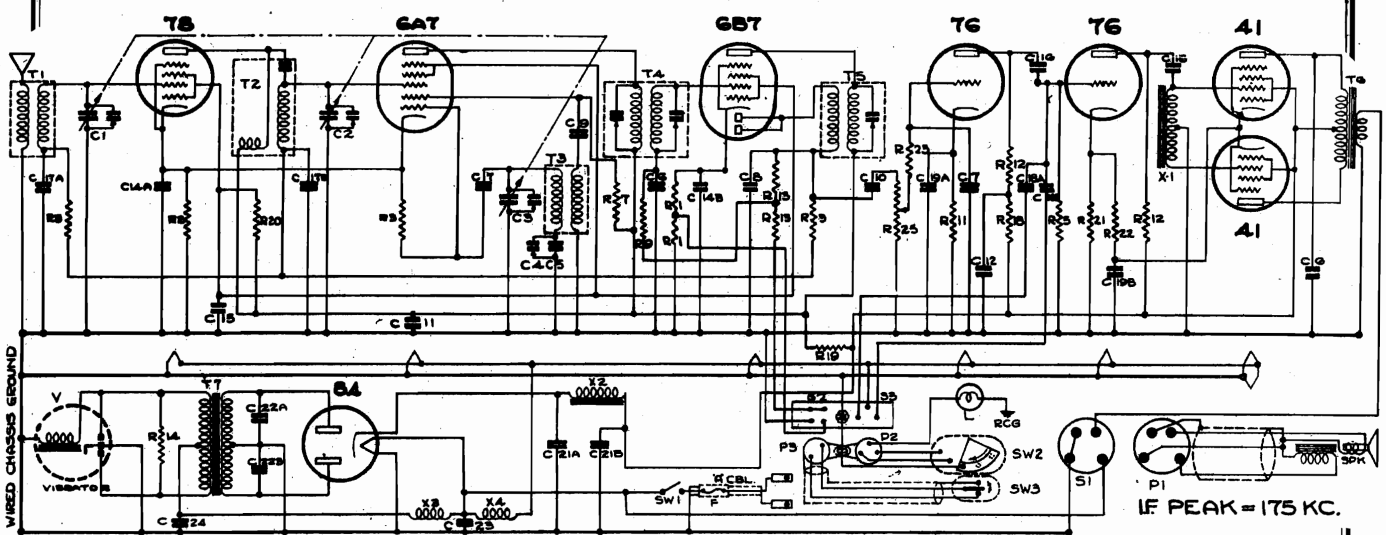


MODEL 37
Schematic, Voltage
Resistances, Parts

NOBLITT SPARKS INDUSTRIES

For Changes, see Index

SCHEMATIC CIRCUIT DIAGRAM
ARVIN CAR RADIO MODEL-37



RESISTORS

R	OHMS	W	PART NO	PRICE	R	OHMS	W	PART NO	PRICE
1	250	¼	17-4767	.20	18	50M	½	17-4720	.25
2	2400	¼	17-4762	.20	19	5M	2	17-4721	.35
3	100M	¼	17-2068	.20	20	25M	½	17-4722	.25
4					21	100	½	17-4723	.25
5	500M	¼	17-2070	.20	22	300	1	17-4724	.30
6					23	250M	¼	17-3011	.20
7	20M	¼	17-2072	.20	24				
8					25	500M	V.C.	17-4826	1.00
9	1MEG	¼	17-2080	.20	26				
10	500	¼	17-2066	.20	27				
11	2M	¼	17-4202	.20	28				
12	10M	¼	17-4275	.20	29				
13	75M	¼	17-2067	.20	30	† MAY BE VARIED FROM			
14	200	¼	17-4287	.20	31	200Ω TO 600Ω TO			
15					32	CONTROL SENSITIVITY			
16					33				
17					34				

CONDENSERS

C	CAPACITY	VOLT.	PART NO	PRICE	C	CAPACITY	VOLT.	PART NO	PRICE
1	3 GANG TUNING		17-4728	4.50	16	.10	600	17-4715	.40
2					17A	.05 TWIN	160	17-4751	.35
3					17B	.05			
4	.00022	PAD.	17-4726	.40	18A	.03 TWIN	200	17-4755	.45
5	.0011	600	17-4700	.30	18B	.03			
6	.002	600	17-2063	.20	19A	12.0 TWIN	25	17-4707	1.50
7	.0001	600	17-2064	.20	19B	12.0			
8	.0005	600	17-2211	.20	20A				
9	.001	600	17-4292	.20	20B				
10	.05	160	17-4702	.30	21A	12.0 TWIN	500	17-4716	2.75
11	40	400	17-4710	1.25	21B	12.0			
12	.25	400	17-4711	.55	22A	.02 TWIN	1000	17-4193	.60
13A					22B	.02			
13B					23	.50	15	17-4708	.45
14A	.10 DUAL	15	17-4713	.95	24	1.0	15	17-4709	.55
14B	.25				25				
15	.15	400	17-4714	.55	26				

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO	PRICE
1	ANTENNA	00-4510	.90
2	RADIO FREQUENCY	00-4511	1.00
3	OSCILLATOR	00-4512	.85
4	FIRST IF	00-4513	1.75
5	SECOND IF	00-4514	1.75
6	OUTPUT	00-4755	1.85
7	POWER	00-4747	3.00
X-1	AUDIO INPUT	00-4758	1.60
X-2	'B' FILTER CHOKE	00-4754	1.30
X-3	'A' INPUT CHOKE	00-4516	.40
X-4	FILAMENT CHOKE	00-4515	.40

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO
SPK	SPEAKER	17-4284
V	VIBRATOR	17-4752
RCG	REMOTE CONTROL GROUND	
SW 1	VOLUME CONTROL SWITCH	SEE R25
SW 2	TONE CONTROL SWITCH	
SW 3	LOCAL-DISTANCE SWITCH	
S-1	SPEAKER SOCKET	17-4447
S-2	DIAL LITE - TONE SOCKET	17-4375
S-3	LOC-DIST. CONTROL SOCKET	17-4375
P-1	SPEAKER PLUG	17-4446
P-2	DIAL LITE - TONE PLUG	17-4377
P-3	LOC.-DIST. CONTROL PLUG	17-4740
L	DIAL LITE 6-8 VOLT	17-2145
F	FUSE - 20 AMPERE	17-2228
"A" CBL.	"A" CABLE	00-4200-2

SOCKET VOLTAGES

Make voltage tests with at least 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Anode Grid 1500 KC	Osc. Grid 1500 KC
78	5.8	170	75	4.0	4.2	—	—
6A7	5.8	170	75	4.0	—	135	5-10
6B7	5.8	170	75	2.0	—	—	—
1st 76	5.8	100	—	4.7	—	—	—
2nd 76	5.8	165	—	5.3	—	—	—
41	5.8	230	235	18.0	—	—	—
41	5.8	230	235	18.0	—	—	—
84	5.8	260 (AC)	—	245	—	—	—

POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set.

78
+ Heater .... Inf.
— Heater 0
Plate to B+ 5,113
Screen to B+ 30,000
Suppressor Grid 400
Cathode 400
‡Control Grid 1,250,250

2nd 76
+ Heater .... Inf.
— Heater 0
Plate to B+ 10,000
Cathode 100
Control Grid 500,000

6A7
+ Heater .... Inf.
— Heater 0
Plate to B+ 5,093
Screen to B+ 30,000
Anode Grid to B+ 25,000
Oscillator Grid 100,400
Cathode 400
‡Control Grid 1,150,250

41
+ Heater .... Inf.
— Heater 0
Plate to B+ 250
Screen to B+ 0
Cathode 400
Control Grid 750

6B7
+ Heater .... Inf.
— Heater 0
Plate to B+ 5,085
Screen to B+ 30,000
‡Diodes 150,250
Cathode 500
‡Control Grid 1,075,250

41
+ Heater .... Inf.
— Heater 0
Plate to B+ 220
Screen to B+ 0
Cathode 400
Control Grid 680

1st 76
+ Heater .... Inf.
— Heater 0
Plate to B+ 60,000
Cathode 2,000
Control Grid V. C. on 750,000
Control Grid V. C. off 500,000

84
+ Heater .... Inf.
— Heater 0
Plate 240
Plate 210
Plate to Plate 450
Cathode to B+ 165

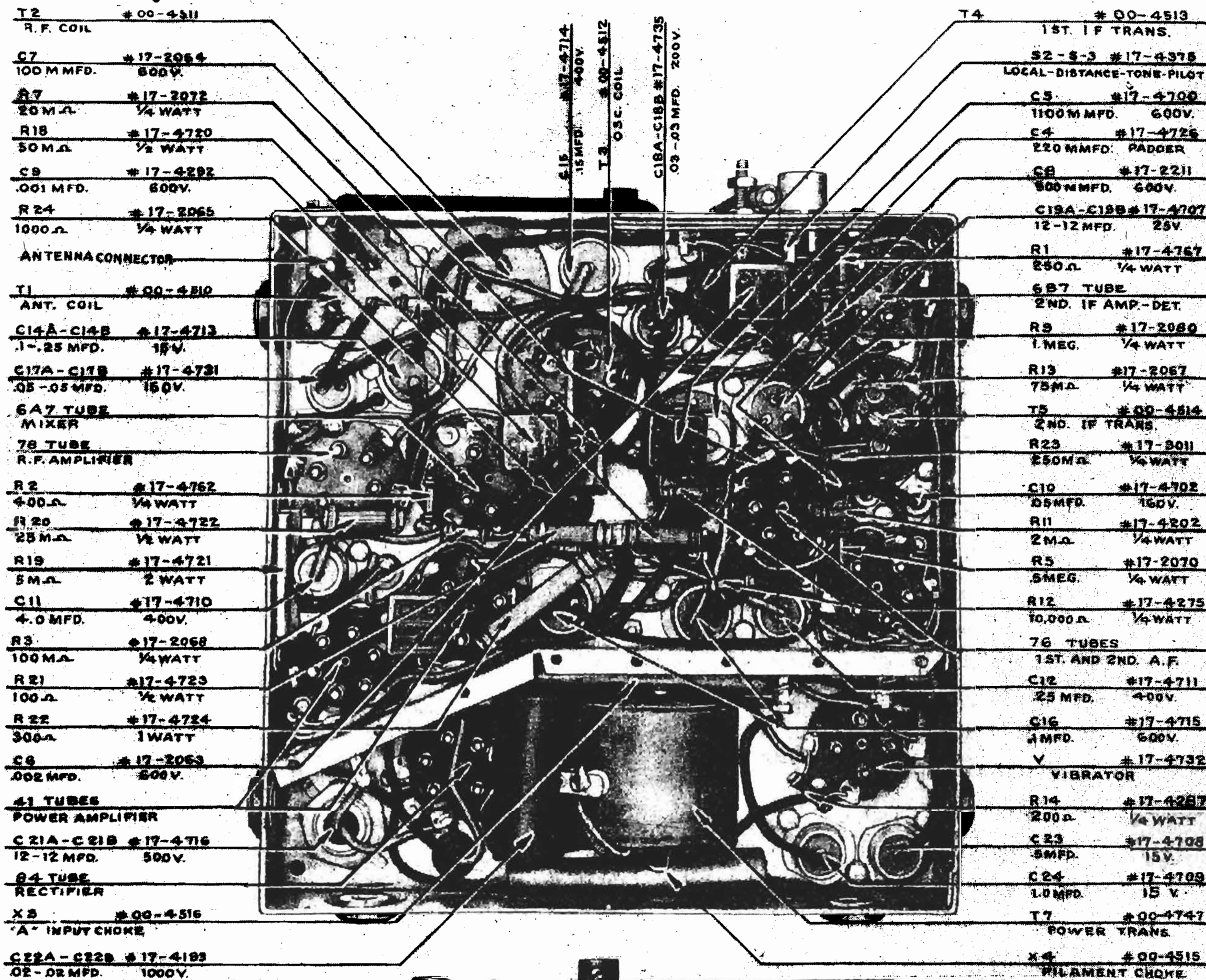
‡ Add 250 Ω to these readings when sensitivity switch is on "Distance" position.

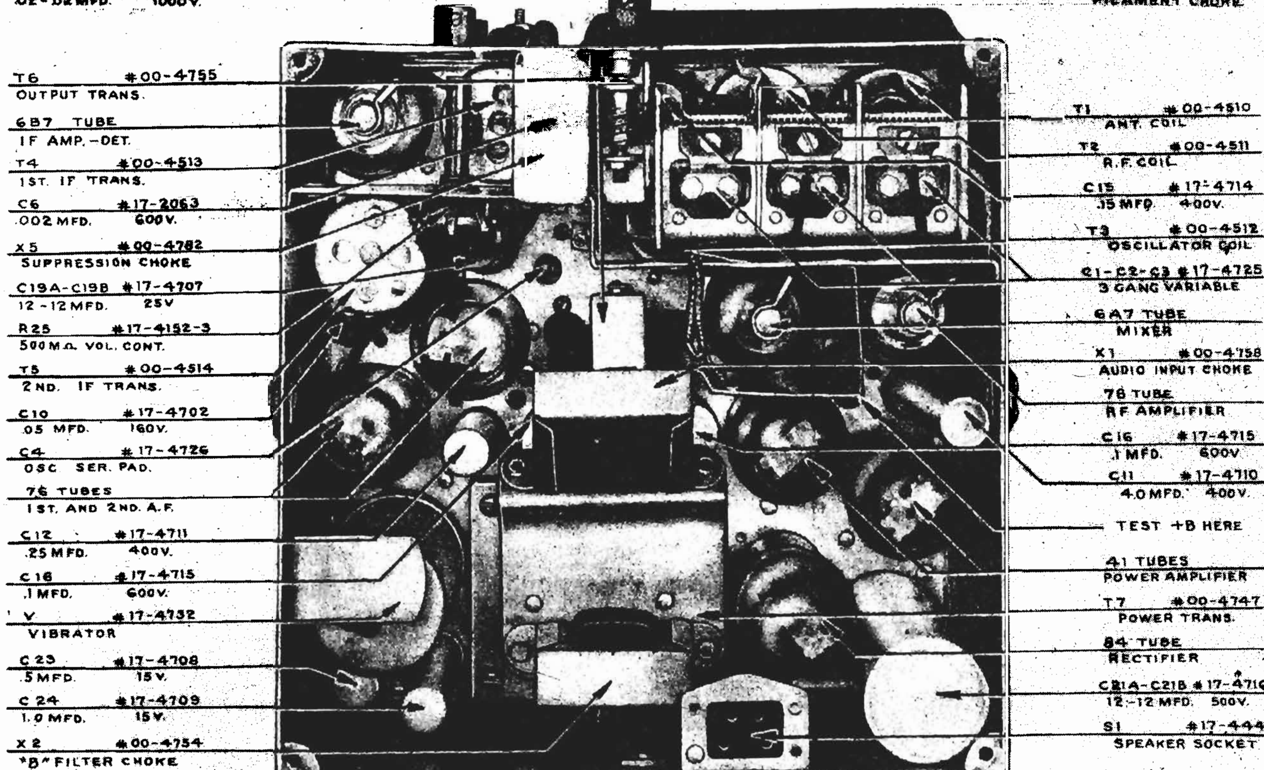
COIL RESISTANCES

Ant. Primary 12.0
Ant. Secondary 4.0
R. F. Primary 113.0
R. F. Secondary 4.0
Oscillator Primary 3.0
Oscillator Secondary 1.5
First I. F. Primary 93.0
First I. F. Secondary 93.0
Second I. F. Primary 85.0
Second I. F. Secondary 85.0
Output Transformer Primary .... 250-CT-220=470
Output Transformer Secondary 0.4
Power Transformer Secondary .... 240-CT-210=450
"B" Filter Choke 165
Audio Input Choke .... 750-CT-680=1430
Speaker Field Coil 4.0
Speaker Voice Coil 2.5

MODEL 37
Chassis Layouts

NOBLITT SPARKS INDUSTRIES





MODELS 17,17A,27,37
Alignment,Parts
MODEL 37
Changes

NOBLITT SPARKS INDUSTRIES

MODELS 17-17A-27-37

MISCELLANEOUS

PART NO.	DESCRIPTION	PRICE
17-4294	Spark Plug Suppressor	$ .40
17-4295	Distributor Suppressor	.50
17-4701	Generator Condenser	.50
00-4743	Dome Light Filter	.50
00-4529	Ground Clamps	.10
17-4772	Dial Light 6-8 Volts	.15
17-4782	Vibrator (4 prong)	4.00
17-4236	8" Speaker Cone Assembly (in carton)	1.60
17-4235	6" Speaker Cone Assembly (in carton)	1.20
17-4232	Speaker Assembly (17)	4.50
17-4233	Speaker Assembly (27)	5.50
17-4234	Speaker Assembly (37)	8.50
17-4237	Speaker Assembly (17A)	4.50
23-4490 12-565	Stud and Nut (Set Mounting)	.10
23-4037 23-4265	Stud and Nut (Speaker Mounting) Model 37	.15
29-4664	Carton—17 or 27	.60
29-4665	Carton—37	.95
17-2043	78 Socket	.15
17-2048	6A7 Socket	.15
17-2049	6B7 Socket	.15
17-2044	75 Socket	.15
17-2045	41 Socket	.15
17-2047	84 Socket	.15
17-4784	76 Socket	.15
17-4736	Vibrator Socket	.15
10-4804	Speaker Front Screw, per dozen	.10
10-4810	Flex Shaft Set Screw, per dozen	.10
10-4811	No. 8x¼ Self Tapping Screw, Hex Head, per dozen	.10
10-4844	No. 8x5/16 Self Tapping Screw, Binding Head, dozen	.10
29-4850	Worm Gear Drive Assembly	1.00

REMOTE CONTROL PARTS

PART NO.	DESCRIPTION	PRICE
29-4679	Remote Control (17A) Without Bracket or Housing	2.75
29-4678	Remote Control (17) Without Bracket or Housing	2.75
29-4549	Remote Control (37) Without Bracket or Housing	2.75
29-4548	Remote Control (27) Without Bracket or Housing	2.75
29-4531	Streamline Housing (27—37)	.60
29-4532	Metal Housing (Model 17 only)	.25
29-4533	Eye Bolt and Nut	.10
29-4534	Strap	.05
29-4535	Tuning Knob—Walnut Bakelite	.10
29-4536	Tuning Knob—Ivory	.10
29-4537	Local Distance or Tone Control Knob	.10
29-4538	Dial Glass	.15
29-4539	Steering Column Bracket	.20
29-4526	Porcelain Taupe Tenite Tuning Knob (17A)	.10

FLEXIBLE SHAFTS

PART NO.	DESCRIPTION	PRICE
00-4641	Condenser Drive 6" length	.45
00-4642	Condenser Drive 9" length	.50
00-4643	Condenser Drive 12" length	.60
00-4644	Condenser Drive 15" length	.70
00-4645	Condenser Drive 18" length	.85
00-4649	Condenser Drive 21" length	.95
00-4646	Condenser Drive 24" length	1.00
00-4647	Condenser Drive 30" length	1.20
00-4648	Condenser Drive 36" length	1.40
00-4651	Volume Control Drive 6" length	.45
00-4652	Volume Control Drive 9" length	.50
00-4653	Volume Control Drive 12" length	.60
00-4654	Volume Control Drive 15" length	.70
00-4655	Volume Control Drive 18" length	.85
00-4659	Volmue Control Drive 21" length	.95
00-4656	Volume Control Drive 24" length	1.00
00-4657	Volume Control Drive 30" length	1.20
00-4658	Volume Control Drive 36" length	1.40

MODEL NO. 37

1. R3—100,000 ohm ¼ watt (17-2068) resistor in 6A7 No. 1 grid circuit has been changed to R29—50,000 ohm ¼ watt (17-2060).

2. R24—1,000 ohm ¼ watt resistor has been inserted in 6A7 No. 1 grid circuit.

3. R2—400 ohm ¼ watt resistor has been changed to R26—600 ohm ¼ watt. Allowable variation on R2 was from 200 to 600 ohms. Allowable variation on R26 is from 500 to 700 ohms.

4. X5 suppression choke, 00-4782, has been added in "A" line.

5. C6—.002 mfd mica condenser has been inserted ahead of X5 suppression choke and connected from battery side of X5 to ground.

6. Dial light, part No. 17-2145 (with screw base), has been changed to dial light, part No. 17-4857 (with bayonet base).

7. Battery cable assembly, 00-4200-2. Part number changed to 00-4776.

8. It was found in the field that in some instances motor noise entered the receiver where the local-distance plug and tone control plug were attached. A change in the mechanical design which eliminated this difficutly was made beginning with those sets from which the louvers were ommitted.

1. Remove front cover, connect oscillator to grid cap of 6A7 tube. Set to 175 K. C. (Set volume control full on for all adjustments.) Adjust output of oscillator until output meter begins to read.

2. With a screwdriver adjust the 2nd. I. F. trimmer for maximum output.

3. Adjust 1st. I. F. trimmers (inside screw and outer box nut also) for maximum output.

4. Connect oscillator to antenna lead; set to 1400 K. C.

5. Turn variable condenser fully out of mesh; set dial pointer to 1620 K. C. Then turn control knob until pointer is at 140.

6. Adjust oscillator trimmer until signal is received. Then adjust R. F. and antenna trimmers for maximum output.

7. Set sensitivity control in "full sensitivity position." Set dial to 600 K. C. Adjust series padder for maximum hiss. (Circuit noise.)

8. Connect set to car aerial and tune in a very weak station 120 to 150 on dial. Adjust antenna trimmer only.

SPECIAL NOTE:

All 1935 Arvin Car Radios may be balanced for a maximum of 1720 kilocycles to cover some of the police bands in that region. The following procedure is necessary:

1. Rotate condenser fully out of mesh. Connect oscillator to antenna lead and set to 1720 K. C.

2. Adjust oscillator trimmer until maximum signal is obtained.

3. Set oscillator input to 1400 K. C. and turn dial until signal is tuned in.

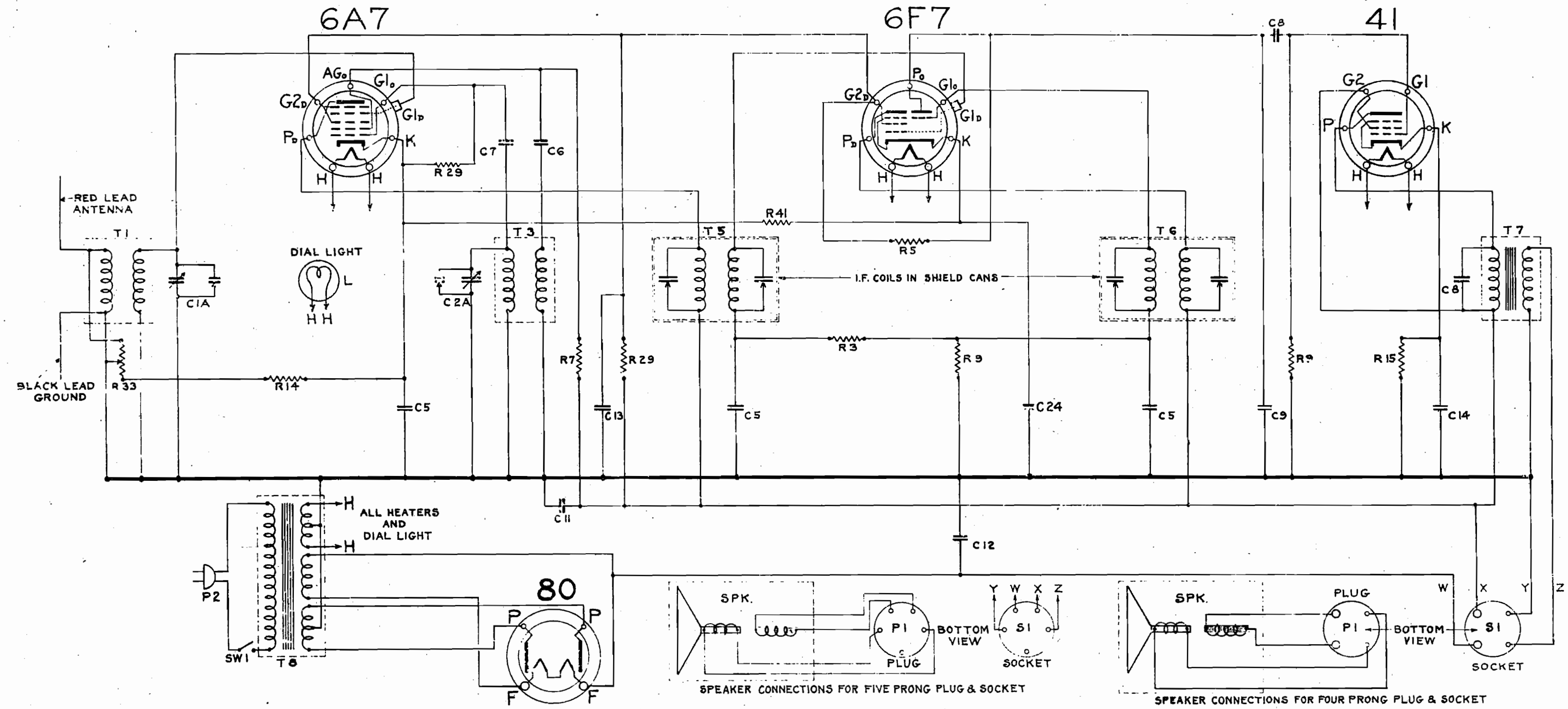
4. Adjust R. F. and antenna trimmer for maximum output.

For remainder of balancing procedure follow instructions exactly as directed for standard adjustment in 7 and 8. With adjustment for 1720 K. C. maximum, the dial will not read accurately for all frequencies above 1000 kilocycles.

MODEL 41
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 41



RESISTORS

R	OHMS	W	PART NO	PRICE	R	OHMS	W	PART NO	PRICE
1					21				
2					22				
3	100 M	1/4	17-2068		23				
4					24				
5	500 M	1/4	17-2070		25				
6					26				
7	20 M	1/4	17-2072		27				
8					28				
9	1 MEG.	1/4	17-2080		29	50 M	1/4	17-2060	
10					30A				
11					30B				
12					31				
13					32				
14	200	1/4	17-4287		33	10 M	V.C.	17-13906	
15	500	1/2	17-4717						
16									
17									
18									
19									
20									
					41	100	40	17-14040	

CONDENSERS

C	CAPACITY	VOLT	PART NO.	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1 A	2 GANG TUNING		17-13600		18 A				
2 A					18 B				
3 A					19 A				
4					19 B				
5	.05 TINY	160	17-14015		20 A				
6	.002 MICA	600	17-2063		20 B				
7	.0001 MICA	600	17-2064		21 A				
8	.01	600	17-14016		21 B				
9	.001 MICA	600	17-4292		22 A				
10									
11	16. ELECT.	475	17-14002		23				
12	8. ELECT.	475	17-14001		24	.5 PAPER	160	17-14040	
13	.1	400	17-14046		25				
14	12. DRY ELECT.	25	17-14005		26				
					27 A				
					27 B				
					28				
					29 A				
					29 B				

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO	PRICE
T	TRANSFORMERS		
1	ANTENNA COIL	29-13617	
2			
3	OSCILLATOR	29-13618	
4			
5	FIRST I.F. COIL	00-13900	
6	SECOND I.F. COIL	00-13901	
7	OUTPUT TRANSF.	00-13626	
8	POWER TRANSF.	00-13608	
9			
X	CHOKES		
1			
2			
3			
4			
5			

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO	PRICE
SPK	DYNAMIC SPEAKER	17-13609	
SW 1	VOLUME CONTROL SWITCH (SEE R 33)	17-13906	
S1	SPEAKER SOCKET	— —	
P1	SPEAKER PLUG (FURNISHED WITH SPK.)	— —	
L	DIAL LIGHT	17-13904	
P2	POWER CORD PLUG	17-13613	

I.F. PEAK 456 K.C.
BALANCE 1500 K.C.

DILGES

MODEL 45
Above Serial E403561
Voltage, Resistances

NOBLITT SPARKS INDUSTRIES

NOTE: The following values are correct for all Arvin Car Radios, Model 35, beginning with and including Serial No. E40356L.

MODEL 45 SOCKET VOLTAGES

Make voltage tests with 1000 ohm per volt meter. Voltages given in table are only comparative due to variance in battery voltage. Plus or minus 20% on all voltages is acceptable.

Tube	Heaters	Plate	Screen	Cathode	Suppressor	Control
78	6.3	250	60	1.6	2.2	*2.0
77	6.3	250	60	2.2	2.2	*2.2
78	6.3	250	60	1.6	1.6	*1.4
37	6.3	60	—	0	—	*6—1500 KC
75	6.3	135	—	1.3	—	*1.3
75	6.3	135	—	1.3	—	*1.3
41	6.3	245	250	18	—	*18
41	6.3	245	250	18	—	*18
84	6.3	275 (AC)	—	255	—	—

* Measured with vacuum tube voltmeter only.

MODEL 45 POINT TO POINT RESISTANCE CHECK

All readings to ground unless otherwise specified. Readings taken with all tubes, vibrator and speaker removed from set and R. F. chassis disconnected from power pack unit.

1st 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 50
Screen Grid to B+ 25,000
Suppressor Grid 500
Cathode 500
Control Grid 1,600,000

75
+ Heater .... Inf.
— Heater 0
Plate to B+ 250,000
Diode 500,000
Diode 500,000
Cathode 2500
Control Grid 8000

84
+ Heater .... Inf.
— Heater 0
Plate 190
Plate 160
Plate to Plate 350
Cathode .... Inf.†

†Reads leakage of electrolytic condenser.

2nd 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 60,000
Suppressor Grid 3,000
Cathode 3,000
Control Grid 6

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 508,000
Cathode 400

3rd 78
+ Heater .... Inf.
— Heater 0
Plate to B+ 100
Screen Grid to B+ 25,000
Suppressor Grid 500
Cathode 500
Control Grid 1,500,000

75
+ Heater .... Inf.
— Heater 0
Plate to B+ 250,000
Diode 530,000
Diode 530,000
Cathode 2500
Control Grid:
V. C. on 500,000
V. C. off 250,000

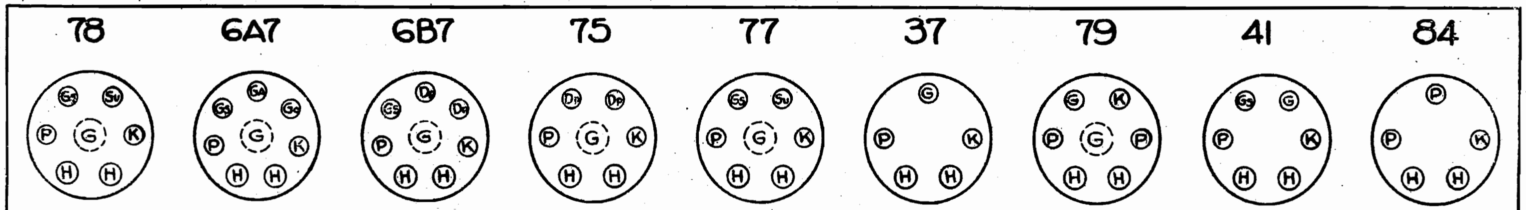
37
+ Heater .... Inf.
— Heater 0
Plate to B+ 60,000
Control Grid 50,000
Cathode 0

41
+ Heater .... Inf.
— Heater 0
Plate to B+ .... Inf.
Screen Grid to B+ 2
Control Grid 508,000
Cathode 400

COIL RESISTANCES

Ant. Primary 2
Ant. Secondary 6
R. F. Primary 50
R. F. Secondary 6
Osc. Primary 2
Osc. Secondary 7
1st I. F. Primary 100
1st I. F. Secondary 100
2nd I. F. Primary 82
2nd I. F. Secondary 82
Primary Output Transformer 600
Voice Coil 35

LOOKING AT BOTTOM OF TUBE SOCKETS

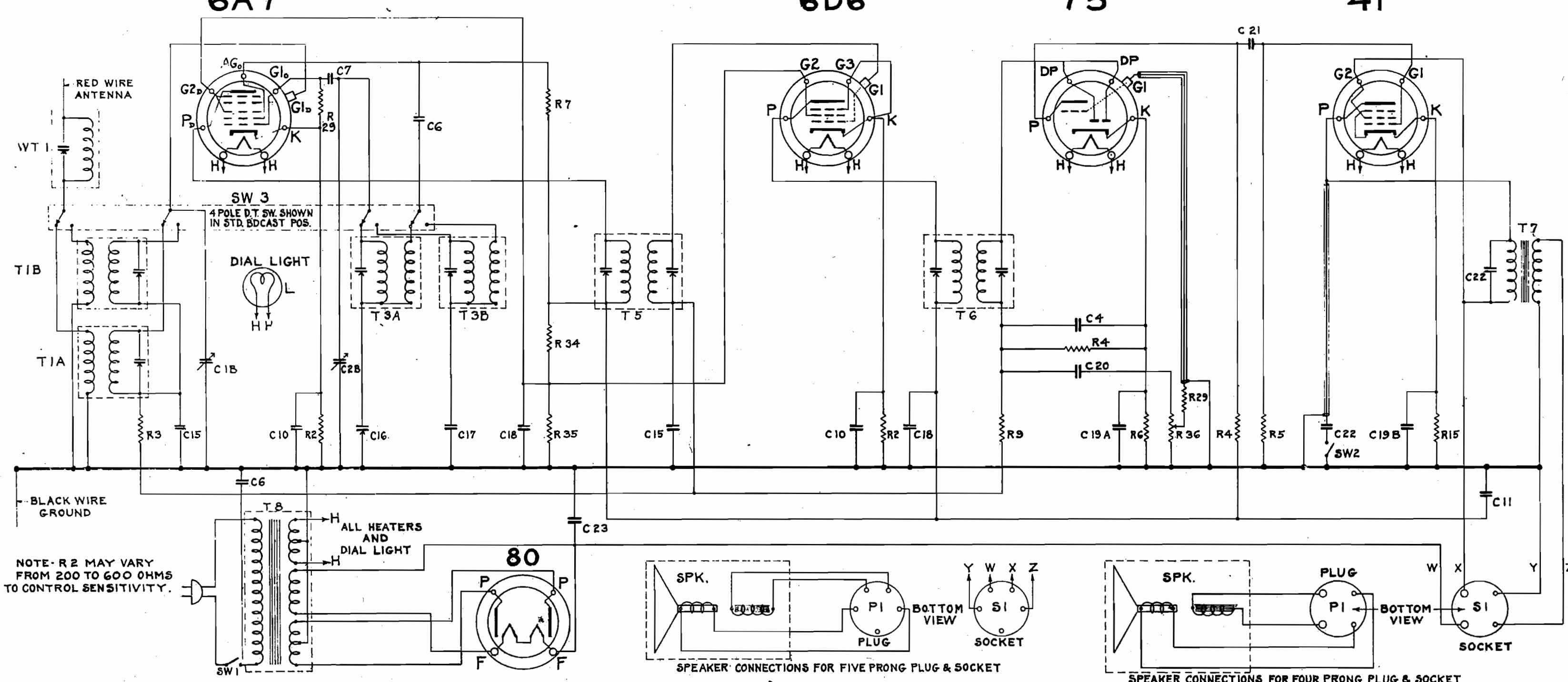


SYMBOLS — H-HEATER; P-PLATE; K-CATHODE; G-CONTROL GRID; GS-SCREEN GRID; GA-ANODE GRID
GO-OSCILLATOR GRID; SU-SUPPRESSOR GRID; DP-DIODE PLATE

MODEL 51
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 51



RESISTORS

R	OHMS	W	PART NO	PRICE
1				
2	400	1/4	17-4762	
3	100 M	1/4	17-2068	
4	200 M	1/4	17-2069	
5	500 M	1/4	17-2070	
6	5 M	1/4	17-2071	
7	20 M	1/4	17-2072	
8				
9	1 MEG.	1/4	17-2080	
10				
11				
12				
13				
14				
15	500	1/2	17-4717	
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29	50 M	1/4	17-2060	
30A				
30B				
31				
32				
33				
34	15 M	1	17-14032	
35	20 M	1/2	17-14049	
36	500 M	V.C.	17-13308	

CONDENSERS

C	CAPACITY	VOLT	PART NO.	PRICE
1-B	2 GANG TUNING			
2-B				
3-B				
4	.0005 MICA	1000	17-2211	
5				
6	.002 MICA	600	17-2063	
7	.0001	600	17-2064	
8				
9				
10	.1 CAN	400	17-14034	
11	16. ELECT.	475	17-14002	
12				
13				
14				
15	.05 MICA MOLD.	200	17-14036	
16	PADDER		17-14024	
17	.005 MICA	600	17-14029	
18	.15 PAPER-CAN TP.	400	17-14009	
19A	TWIN ELECT.	25	17-4707	
19-B		25		
20	.05 PAPER-STRAP	200	17-14027	
21	.02 PAPER CAN TP.	600	17-14008	
22	.01	600	17-14043	
23	12. WET ELECT.	475	17-14000	

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO.	PRICE
T	TRANSFORMERS		
1			
1-A	STD. BDCAST. ANT. COIL	00-13919	
1-B	S.W. " ANT. COIL	00-13921	
2			
3			
3-A	STD. BDCAST. OSCILLATOR	00-13920	
3-B	S.W. " "	00-13922	
4			
5	FIRST I.F. COIL	00-13900	
6	SECOND I.F. COIL	00-13901	
7	OUTPUT. TRANSF.	00-13315	
8	POWER TRANSF.	00-13608	
X	CHOKES		
1			
2			
3			
4			
5			

MISCELLANEOUS UNITS

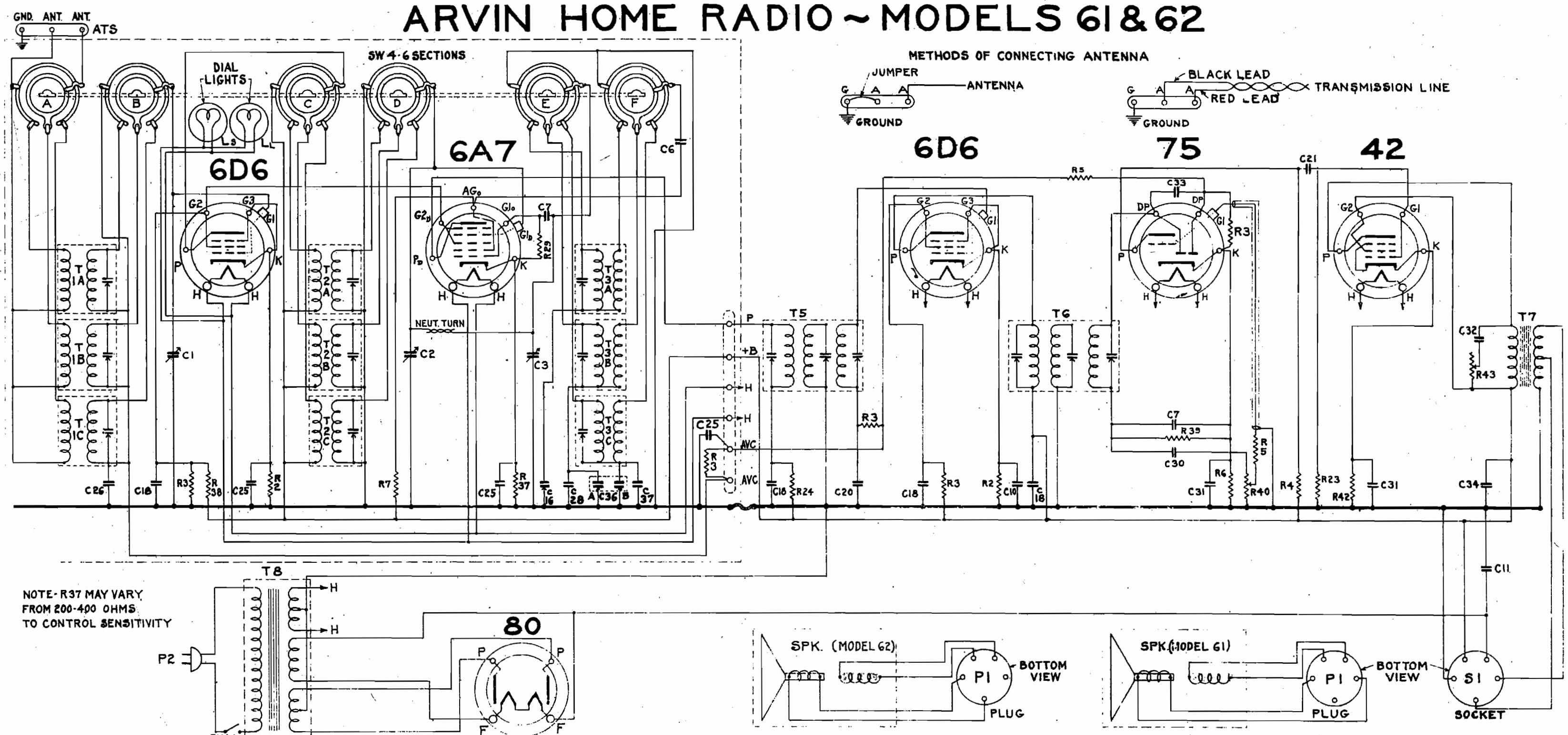
SYMBOL	DESCRIPTION	PART NO.	PRICE
W.T. 1	WAVE TRAP	00-13903	
SPK	DYNAMIC SPEAKER	17-13609	
SW. 1	VOLUME CONTROL SWITCH (SEE R 36)	17-13308	
S 1	SPEAKER SOCKET	— —	
P 1	SPEAKER PLUG (FURNISHED WITH SPK.)	— —	
L	DIAL LIGHT	17-13904	
P 2	POWER CORD PLUG	17-13613	
SW 2	TONE CONTROL SWITCH	17-13313	
SW 3	BAND SWITCH	17-13311	

I.F. PEAK 456 K.C.
BALANCE 1500 K.C.

DILGES

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODELS 61 & 62



RESISTORS

R	OHMS	W	PART NO.	PRICE	R	OHMS	W	PART NO	PRICE
1					24	1000	1/4	17-2065	
2	400	1/4	17-4762		25				
3	100 M	1/4	17-2068		26				
4	200 M	1/4	17-2069		27				
5	500 M	1/4	17-2070		28				
6	5 M	1/4	17-2071		29	50 M	1/4	17-2060	
7	20 M	1/4	17-2072		30A				
8					30B				
9					31				
10					32				
11					33				
12					34				
13					35				
14					36				
15					37	300	1/4	17-14033	
16					38	30 M	1/2	17-14028	
17					39	300 M	1/4	17-14051	
18					40	500 M	V.C.	17-13030	
19					41				
20					42	400	1/2	17-4189	
21					43	100 M	T.C.	17-13101	
22									
23	250 M	1/4	17-3011						

CONDENSERS

C	CAPACITY	VOLT	PART NO.	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1	3 GANG TUNING		17-13000		24				
2					25	.05 CAN	160	17-14006	
3					26	.02 CAN	150	17-14012	
4					27				
5					28	.0011 ±10%	600	17-14023	
6	.002 MICA	600	17-2063		29				
7	.0001 MICA	600	17-2064		30	.02 LARGE CAN	160	17-14010	
8					31	12. LARGE CAN	25	17-14004	
9					32	.03 STRAP	600	17-14044	
10	.1 CAN	400	17-14034		33	.00005 MICA	600	17-14047	
11	16. ELECT.	475	17-14002		34	30. ELECT	475	17-14003	
12					35				
13					36	A 200-400 / B 500-1500 DBL. PAD.	—	17-14054	
14					37	.004 MICA	600	17-14053	
15									
16									
17									
18	.15 CAN	400	17-14009						
19									
20	.05 STRAP CAN	200	17-14027						
21	.02 LARGE CAN	600	17-14008						
22									
23									

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO	PRICE
T	TRANSFORMERS		
1A	.55-1.8 M.C. ANT. COIL	29-13910	
1B	1.8-5.5 M.C. ANT. COIL	29-13913	
1C	5.5-18. M.C. ANT. COIL	29-13916	
2A	.55-1.8 M.C. R.F. COIL	29-13911	
2B	1.8-5.5 M.C. R.F. COIL	29-13914	
2C	5.5-18. M.C. R.F. COIL	29-13917	
3A	.55-1.8 M.C. OSCIL.	29-13912	
3B	1.8-5.5 M.C. OSCIL.	29-13915	
3C	5.5-18. M.C. OSCIL.	29-13918	
4			
5	FIRST I.F. COIL	00-13079	
6	SECOND I.F. COIL	00-13080	
7	OUTPUT TRANSF.	00-13103	
8	POWER TRANSF.	00-13083	

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO	PRICE
SPK.	DYNAMIC SPEAKER - MODEL 61	17-13031	
SPK.	DYNAMIC SPEAKER - MODEL 62	17-13074	
SW. 1	TONE CONTROL & POWER SWITCH (SEE R43)	17-13101	
S1	SPEAKER SOCKET	17-4153	
P1	SPEAKER PLUG-FURNISHED WITH SPK	— —	
L_S	DIAL LIGHT	17-13[illegible]4	
P2	POWER CORD PLUG	17-13613	
SW4A-F	6 SECTION WAVE BAND SWITCH WAFER	17-13044	
L_L	DIAL LIGHT	17-13905	
ATS	ANTENNA TERMINAL STRIP	17-13027	

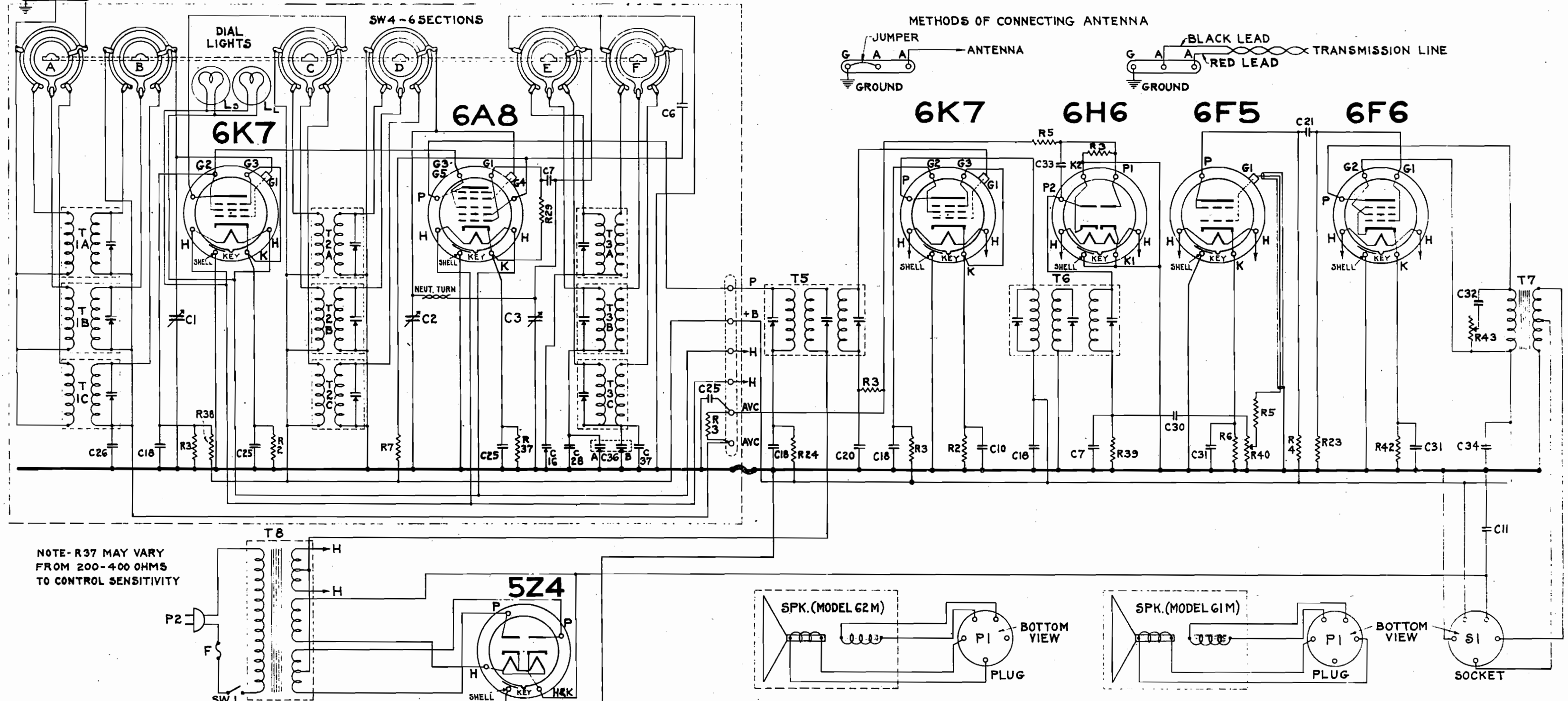
I.F. PEAK 456 K.C.

3 BANDS
BALANCE 1.5 M.C. PAD .60 M.C.
BALANCE 4.7 M.C. PAD 1.9 M.C.
BALANCE 15. M.C. CHECK 6.0 M.C.

DILGES

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODELS 61M & 62M



RESISTORS									
R	OHMS	W	PART NO.	PRICE	R	OHMS	W	PART NO.	PRICE
1					24	1000	1/4	17-2065	
2	400	1/4	17-4762		25				
3	100M	1/4	17-2068		26				
4	200M	1/4	17-2069		27				
5	500M	1/4	17-2070		28				
6	5M	1/4	17-2071		29	50 M	1/4	17-2060	
7	20M	1/4	17-2072		30A				
8					30B				
9					31				
10					32				
11					33				
12					34				
13					35				
14					36				
15					37	300	1/4	17-14033	
16					38	30 M	1/2	17-14028	
17					39	300 M	1/4	17-14051	
18					40	500 M	V.C.	17-13030	
19					41				
20					42	400	1/2	17-4189	
21					43	100 M	T.C.	17-13101	
22									
23	250M	1/4	17-3011						

CONDENSERS									
C	CAPACITY	VOLT	PART NO.	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1	3 GANG TUNING				24				
2			17-13000		25	.05 CAN	160	17-14006	
3					26	.02 CAN	150	17-14012	
4					27				
5					28	.0011 ±10%	600	17-14023	
6	.002 MICA	600	17-2063		29				
7	.0001 MICA	600	17-2064		30	.02 LARGE CAN	160	17-14010	
8					31	12. LARGE CAN	25	17-14004	
9					32	.03 STRAP	600	17-14044	
10	.1 CAN	400	17-14034		33	.00005 MICA	600	17-14047	
11	16. ELECT.	475	17-14002		34	30. ELECT.	475	17-14003	
12					35				
13					36	A 200-400 / B 500-1500 DBL. PADDER	-	17-14054	
14					37	.004 MICA	600	17-14053	
15									
16	T.Q. PADDER	400	17-14024						
17									
18	.15 CAN	400	17-14009						
19									
20	.05 STRAP CAN	200	17-14027						
21	.02 LARGE CAN	600	17-14008						
22									
23									

CHOKES & TRANSFORMERS			
T-X	TYPE	PART NO.	PRICE
T	TRANSFORMERS		
1A	.55-1.8 M.C. ANT. COIL	29-13910	
1B	1.8-5.5 M.C. ANT. COIL	29-13913	
1C	5.5-18. M.C. ANT COIL	29-13916	
2A	.55-1.8 M.C. R.F. COIL	29-13911	
2B	1.8-5.5 M.C. R.F. COIL	29-13914	
2C	5.5-18. M.C. R.F. COIL	29-13917	
3A	.55-1.8 M.C. OSCIL.	29-13912	
3B	1.8-5.5 M.C. OSCIL.	29-13915	
3C	5.5-18. M.C. OSCIL.	29-13918	
4			
5	FIRST I.F. COIL	00-13079	
6	SECOND I.F. COIL	00-13080	
7	OUTPUT TRANSF.	00-13103	
8	POWER TRANSF.	00-13084	

MISCELLANEOUS UNITS			
SYMBOL	DESCRIPTION	PART NO.	PRICE
SPK.	DYNAMIC SPEAKER - MODEL 61M	17-13031	
SPK.	DYNAMIC SPEAKER - MODEL 62M	17-13074	
SW.1	TONE CONTROL & POWER SWITCH (SEE R43)	17-13101	
S1	SPEAKER SOCKET	17-4153	
P1	SPEAKER PLUG - FURNISHED WITH SPEAKER	- -	
L_S	DIAL LIGHT	17-13904	
P2	POWER CORD PLUG	17-13613	
SW4 A-F.	6 SECTION WAVE BAND SWITCH WAFER	17-13044	
F	FUSE	17-13076	
A.T.S.	ANTENNA TERMINAL STRIP	17-13027	
L_L	DIAL LIGHT	17-13905	

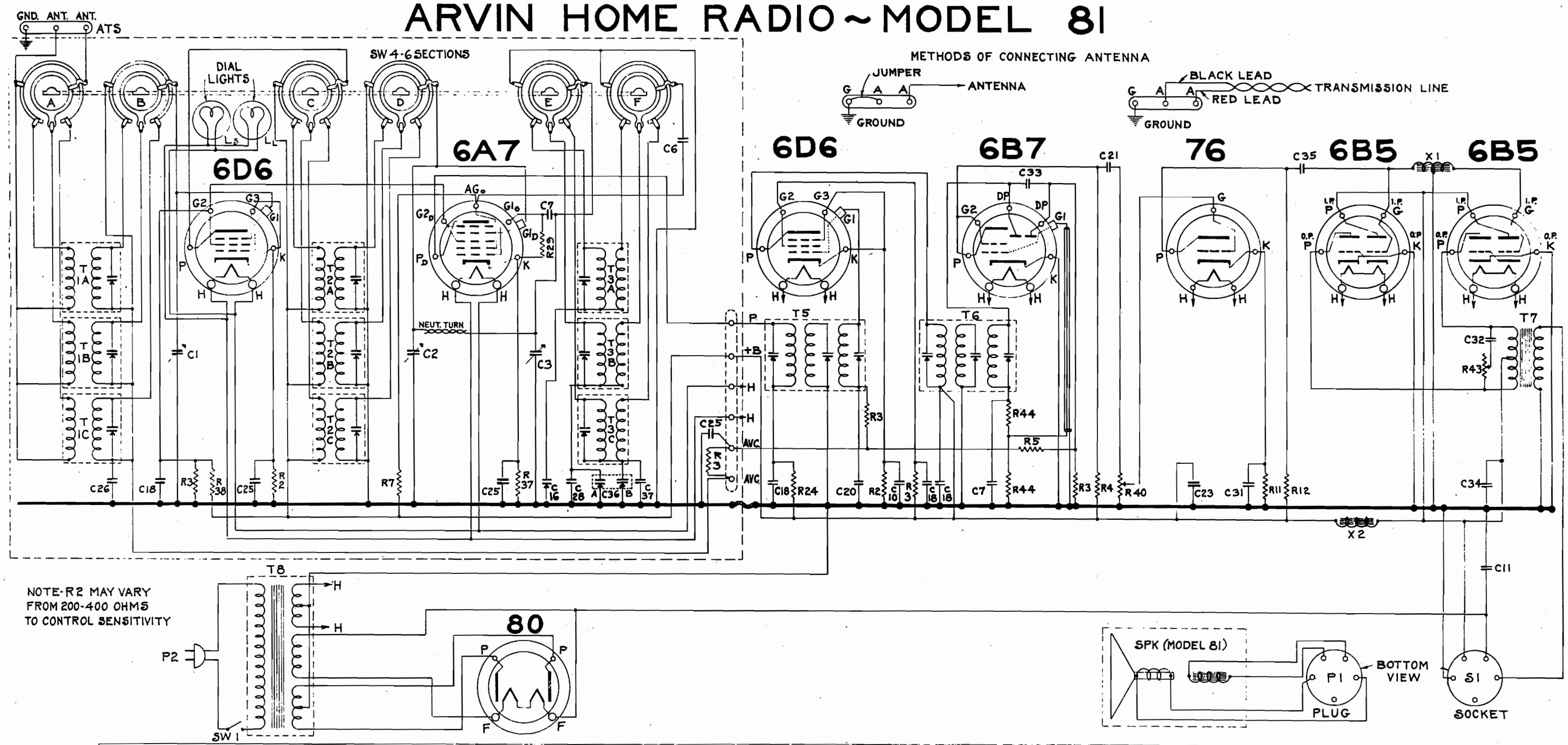
I.F. PEAK 456 K.C.

3 BANDS
BALANCE 1.5 M.C. PAD .60 M.C.
BALANCE 4.7 M.C. PAD 1.9 M.C.
BALANCE 15. M.C. CHECK 6.0 M.C.

DILGES

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 81



RESISTORS

R	OHMS	W	PART NO.	PRICE	R	OHMS	W	PART NO.	PRICE
1					24	1000	1/4	17-2065	
2	400	1/4	17-4762		25				
3	100 M	1/4	17-2068		26				
4	200 M	1/4	17-2069		27				
5	500 M	1/4	17-2070		28				
6					29	50 M	1/4	17-2060	
7	20 M	1/4	17-2072		30A				
8					30B				
9					31				
10					32				
11	2000	1/4	17-4202		33				
12	10 M	1/4	17-4275		34				
13					35				
14					36				
15					37	300	1/4	17-14033	
16					38	30 M	1/2	17-14028	
17					39				
18					40	500 M	V.C.	17-13030	
19					41				
20					42				
21					43	100 M	T.C.	17-13101	
22					44	150 M	1/4	17-4283	
23									

CONDENSERS

C	CAPACITY	VOLT	PART NO	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1	3 GANG TUNING				24				
2			17-13000		25	.05 CAN	160	17-14006	
3					26	.02 CAN	150	17-14012	
4					27				
5					28	.0011 ±10%	600	17-14023	
6	.002 MICA	600	17-2063		29				
7	.0001 MICA	600	17-2064		30				
8					31	12. LARGE CAN	25	17-14004	
9					32	.03 STRAP	600	17-14044	
10	.1 CAN	400	17-14034		33	.00005 MICA	600	17-14047	
11	16. ELECT.	475	17-14002		34	30. ELECT	475	17-14003	
12					35	.03 CAN	600	17-14011	
13					36	A 200-400 / B 500-1500 DBL. PADDER	-	17-14054	
14					37	.004 MICA	600	17-14053	
15									
16	TQ PADDER	-	17-14024						
17									
18	.15 CAN	400	17-14009						
19									
20	.05 STRAP CAN	200	17-14027						
21	.02 LARGE CAN	600	17-14008						
22									
23	12. ELECT.	475	17-14000						

CHOKES & TRANSFORMERS

T-X	TYPE	PART NO	PRICE
T	TRANSFORMERS		
1A	.55-1.8 M.C. ANT. COIL	29-13910	
1B	1.8-5.5 M.C. ANT. COIL	29-13913	
1C	5.5-18. M.C. ANT. COIL	29-13916	
2-A	.55-1.8 M.C. R.F. COIL	29-13911	
2B	1.8-5.5 M.C. R.F. COIL	29-13914	
2C	5.5-18. M.C. R.F. COIL	29-13917	
3A	.55-1.8 M.C. OSCIL.	29-13912	
3B	1.8-5.5 M.C. OSCIL.	29-13915	
3C	5.5-18. M.C. OSCIL.	29-13918	
4			
5	FIRST I.F. COIL	00-13079	
6	SECOND I.F. COIL	00-13080	
7	OUTPUT TRANSF.	00-13087	
8	POWER TRANSF.	00-13086	
X	CHOKES		
1	AUDIO INPUT CHOKE	00-13088	
2	FILTER CHOKE	00-13089	

MISCELLANEOUS UNITS

SYMBOL	DESCRIPTION	PART NO.	PRICE
SPK.	DYNAMIC SPEAKER - MODEL 81	17-13064	
SW. 1	TONE CONTROL & POWER SWITCH (SEE R43)	17-13101	
SW4 A-F	6 SECTION WAVE BAND SWITCH WAFER	17-13044	
S1	SPEAKER SOCKET	17-4153	
P1	SPEAKER PLUG - FURNISHED WITH SPK.	— —	
Ls	DIAL LIGHT	17-13904	
P2	POWER CORD PLUG	17-13613	
ATS	ANTENNA TERMINAL STRIP	17-13027	
LL	DIAL LIGHT	17-13905	

I.F. PEAK 456 K.C.

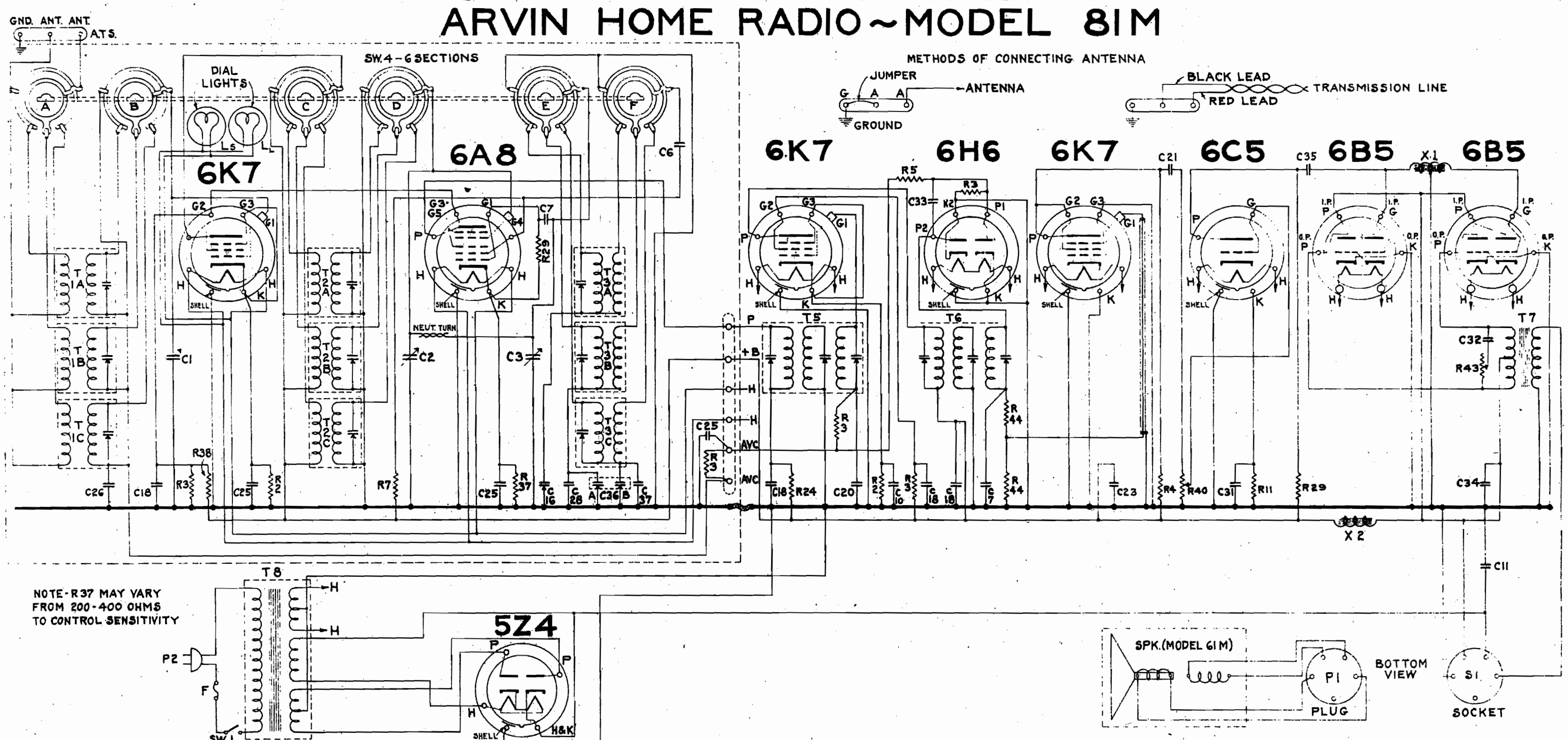
BALANCE 1.5 M.C. PAD .60 M.C.
3 BANDS BALANCE 4.7 M.C. PAD 1.9 M.C.
BALANCE 15. M.C. CHECK 6.0 M.C.

DILGES

MODEL 81M
Schematic, Parts

NOBLITT SPARKS INDUSTRIES

SCHEMATIC CIRCUIT DIAGRAM
ARVIN HOME RADIO ~ MODEL 81M



RESISTORS									
R	OHMS	W	PART NO.	PRICE	R	OHMS	W	PART NO	PRICE
1					24	1000	1/4	17-2065	
2	400	1/4	17-4762		25				
3	100 M	1/4	17-2068		26				
4	200 M	1/4	17-2069		27				
5	500 M	1/4	17-2070		28				
6					29	50 M	1/4	17-2060	
7	20 M	1/4	17-2072		30A				
8					30B				
9					31				
10					32				
11	2000	1/4	17-4202		33				
12					34				
13					35				
14					36				
15					37	300	1/4	17-14033	
16					38	30 M	1/2	17-14028	
17					39				
18					40	500 M	V.C.	17-13030	
19					41				
20					42				
21					43	100 M	T.C.	17-13101	
22					44	150 M	1/4	17-4283	
23									

CONDENSERS									
C	CAPACITY	VOLT	PART NO.	PRICE	C	CAPACITY	VOLT	PART NO.	PRICE
1	3 GANG TUNING				24				
2			17-13000		25	.05 CAN	160	17-14006	
3					26	.02 CAN	150	17-14012	
4					27				
5					28	.0011 ±10%	600	17-14023	
6	.002 MICA	600	17-2063		29				
7	.0001 MICA	600	17-2064		30				
8					31	12. LARGE CAN	25	17-14004	
9					32	.03 STRAP	600	17-14044	
10	.1 CAN	400	17-14034		33	.00005 MICA	600	17-14047	
11	16. ELECT.	475	17-14002		34	30. ELECT.	475	17-14003	
12					35	.03 CAN	600	17-14011	
13					36	A 200-400 DBL. / B 500-1500 PAD.		17-14054	
14					37	.004 MICA	600	17-14053	
15									
16	T.Q. PADDER	400	17-14024						
17									
18	.15 CAN	400	17-14009						
19									
20	.05 STRAP CAN	200	17-14027						
21	.02 LARGE CAN	600	17-14008						
22									
23	12. ELECT.	475	17-14000						

CHOKES & TRANSFORMERS			
T-X	TYPE	PART NO.	PRICE
T	TRANSFORMERS		
1A	.55-1.8 M.C. ANT. COIL	29-13910	
1B	1.8-5.5 M.C. ANT. COIL	29-13913	
1C	5.5-18. M.C. ANT. COIL	29-13916	
2A	.55-1.8 M.C. R.F. COIL	29-13911	
2B	1.8-5.5 M.C. R.F. COIL	29-13914	
2C	5.5-18. M.C. R.F. COIL	29-13917	
3A	.55-1.8 M.C. OSCIL.	29-13912	
3B	1.8-5.5 M.C. OSCIL.	29-13915	
3C	5.5-18. M.C. OSCIL.	29-13918	
4			
5	FIRST I.F. COIL	00-13079	
6	SECOND I.F. COIL	00-13080	
7	OUTPUT TRANSF.	00-13087	
8	POWER TRANSF.	00-13086	
X	CHOKES		
1	AUDIO INPUT CHOKE	00-13068	
2	FILTER CHOKE	00-13069	

MISCELLANEOUS UNITS			
SYMBOL	DESCRIPTION	PART NO.	PRICE
SPK.	DYNAMIC SPEAKER - MODEL 81M	17-13064	
SW. 1	TONE CONTROL & POWER SWITCH (SEE R43)	17-13101	
SW.4 A-F	6 SECTION WAVE BAND SWITCH WAFER	17-13044	
S1	SPEAKER SOCKET	17-4153	
P1	SPEAKER PLUG - FURNISHED WITH SPK.	— —	
L_S	DIAL LIGHT	17-13904	
P2	POWER CORD PLUG	17-13613	
ATS	ANTENNA TERMINAL STRIP	17-13027	
L_L	DIAL LIGHT	17-13905	
F	FUSE	17-13076	

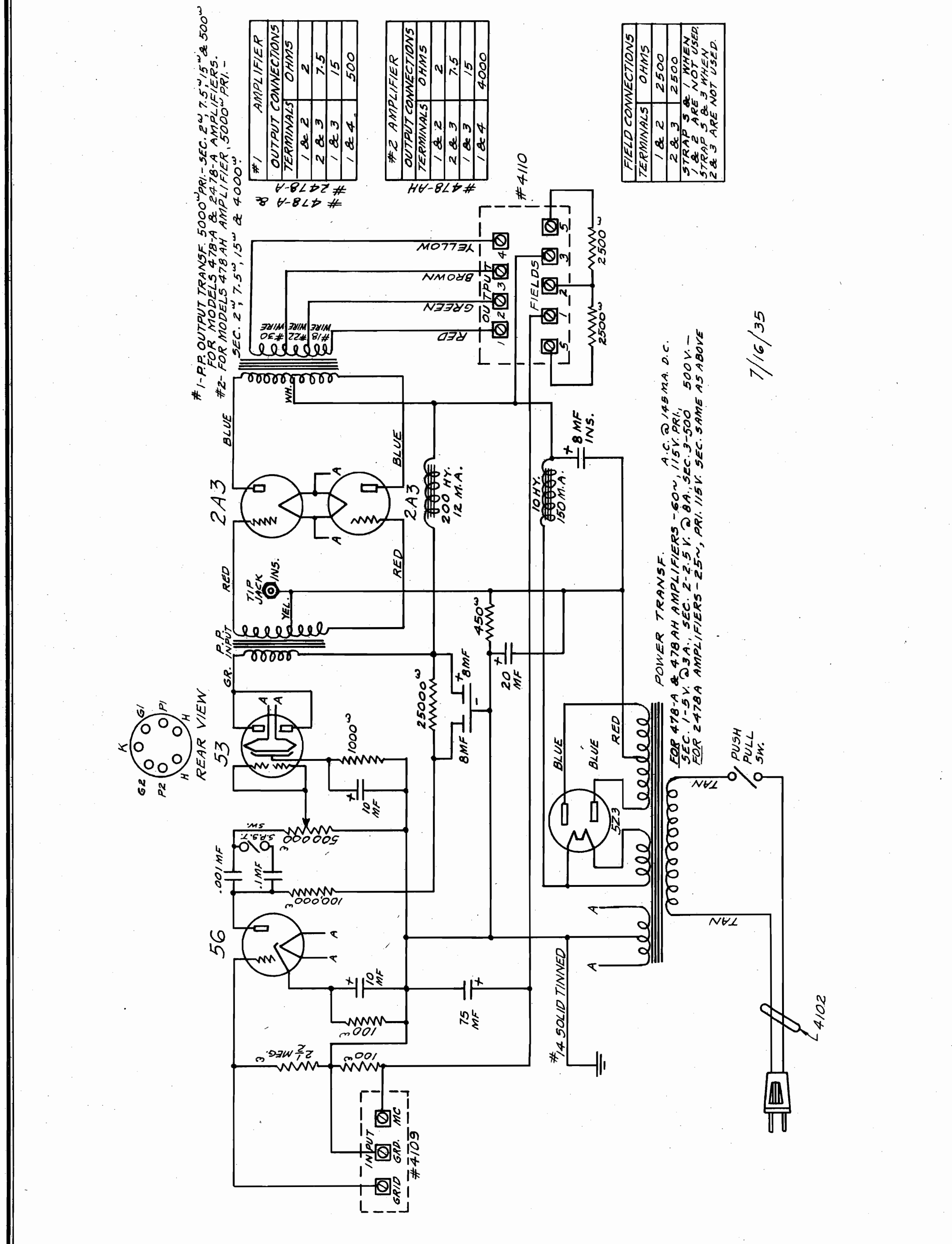
I.F. PEAK 456 K.C.

BALANCE 1.5 M.C. PAD .60 M.C.
3 BANDS BALANCE 4.7 M.C. PAD 1.9 M.C.
BALANCE 15. M.C. CHECK 6.0 M.C.

DILGES

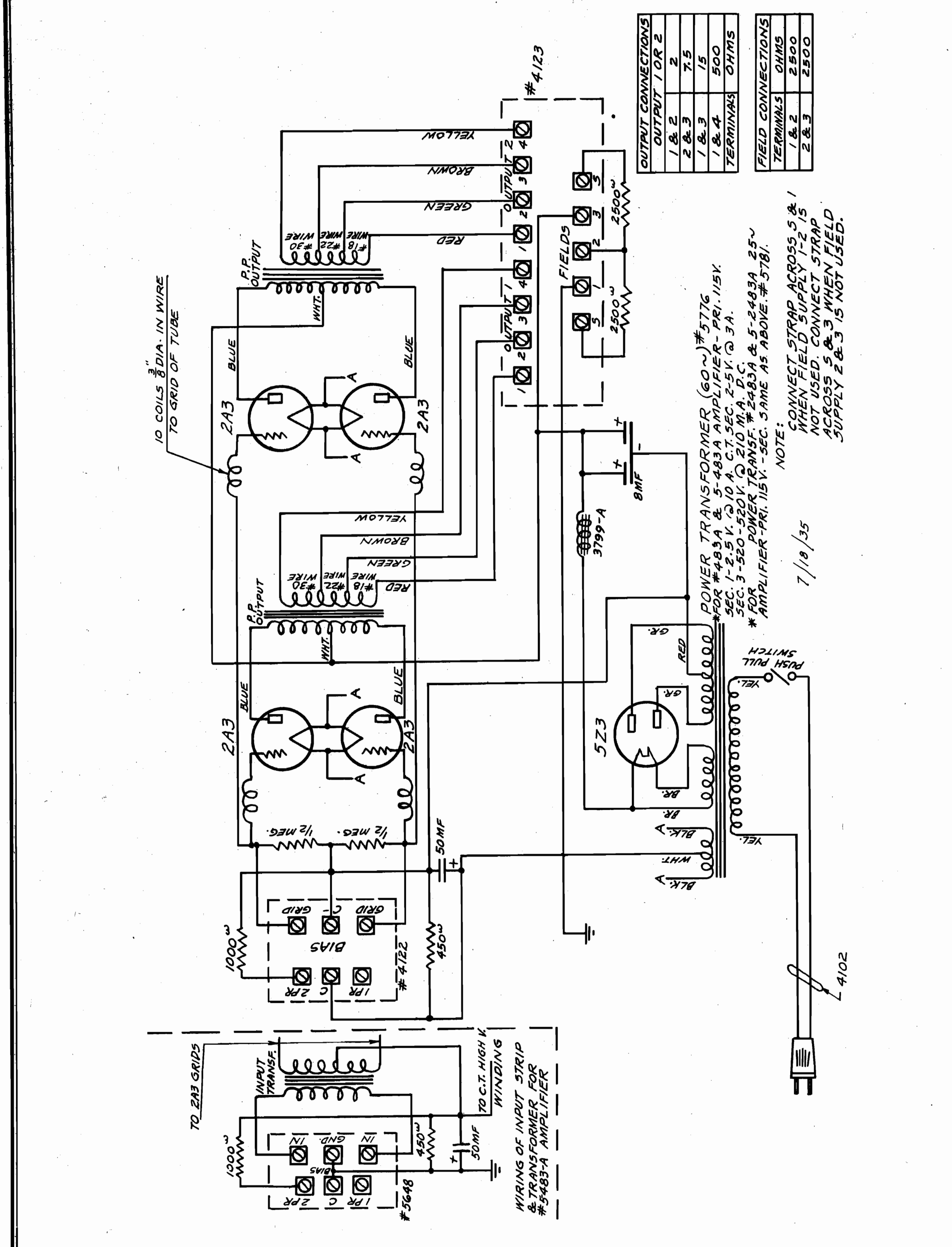
MODELS 478-A, 478-AH 2478-A
Schematic

OPERADIO MFG. CO.



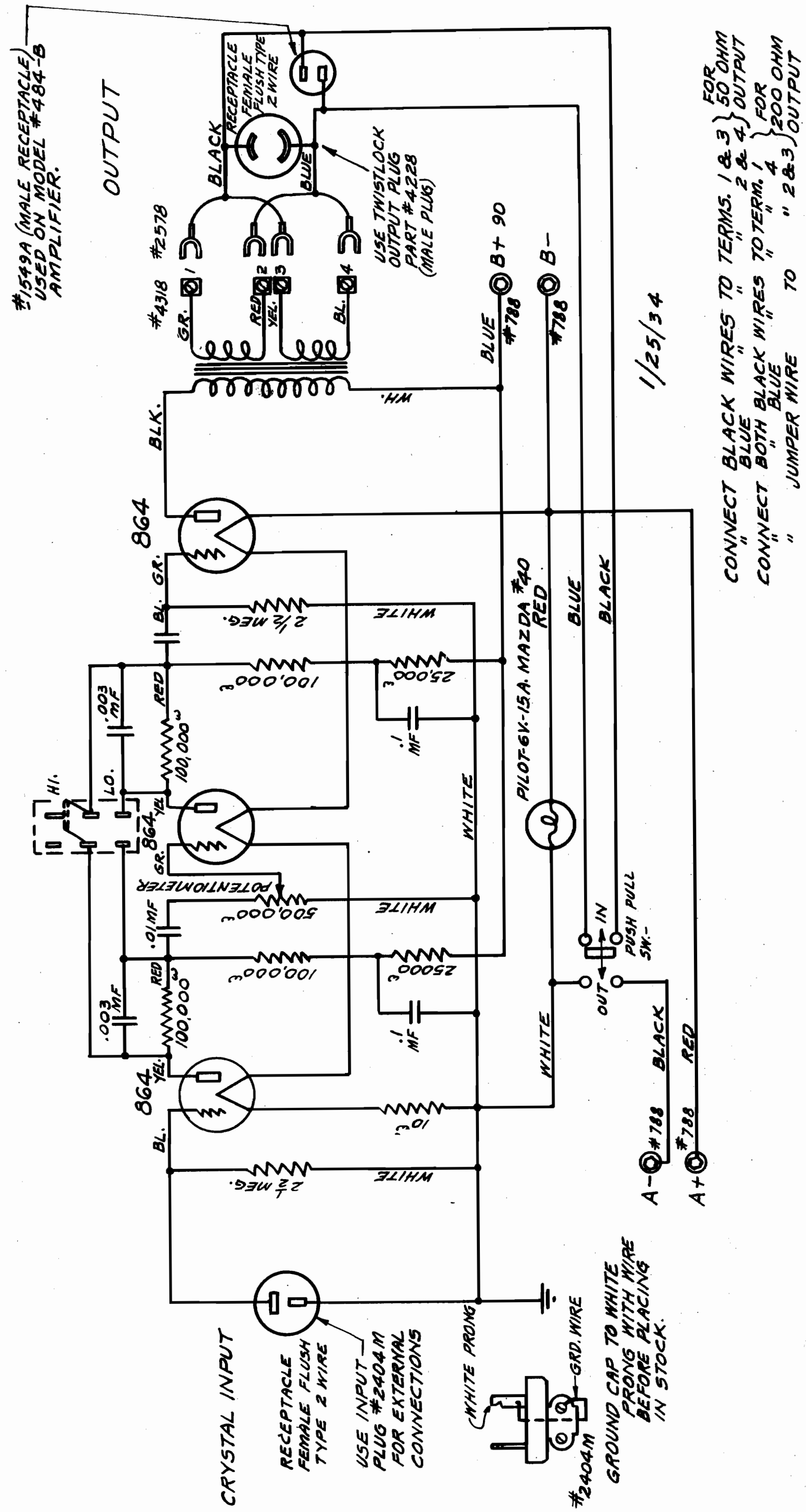
MODEL 483-A, 2483-A,
5-483-A, 5-2483-A
Schematic

OPERADIO MFG. CO.



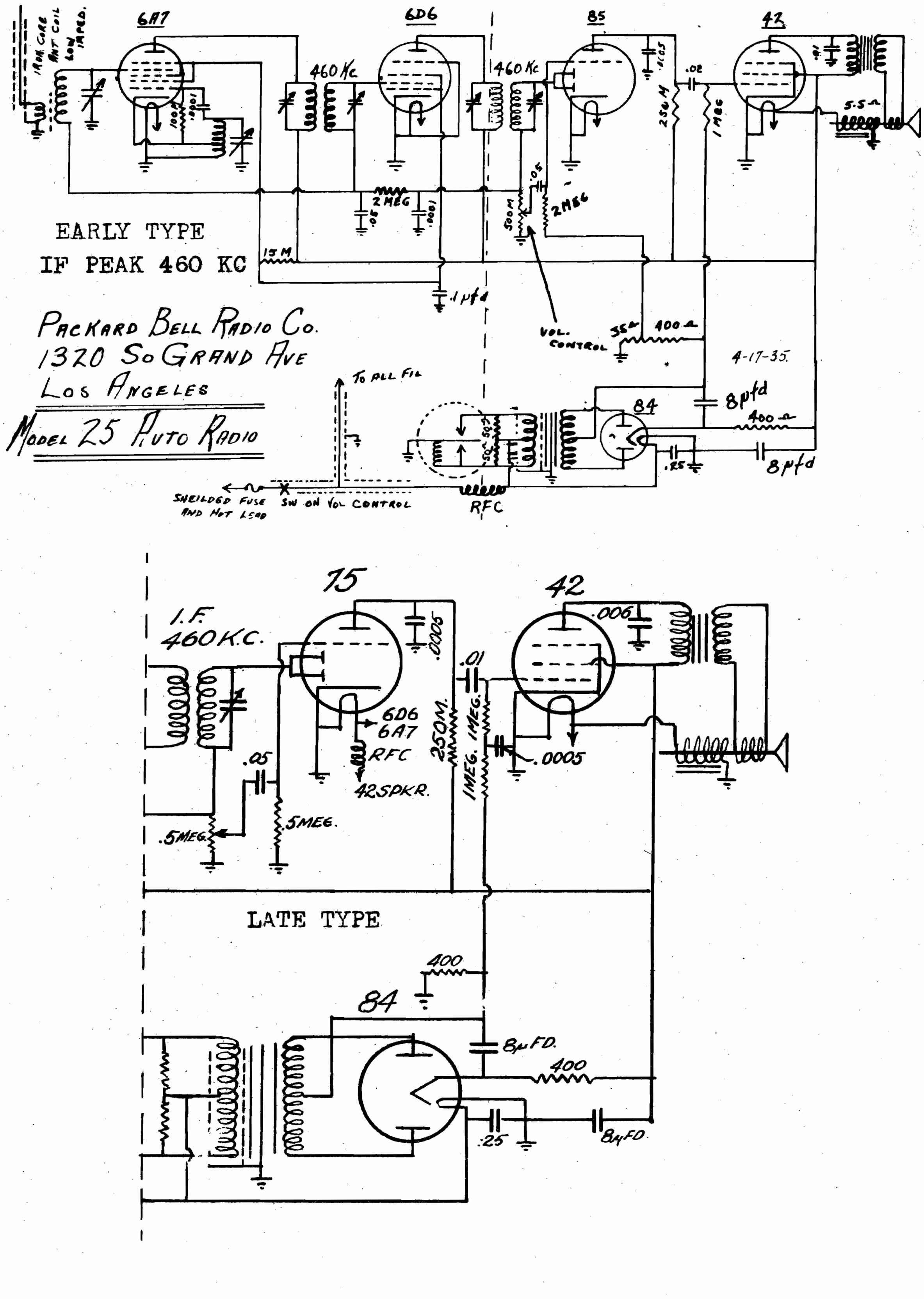
MODELS 484, 484-A
484-B
Schematic

OPERADIO MFG. CO.



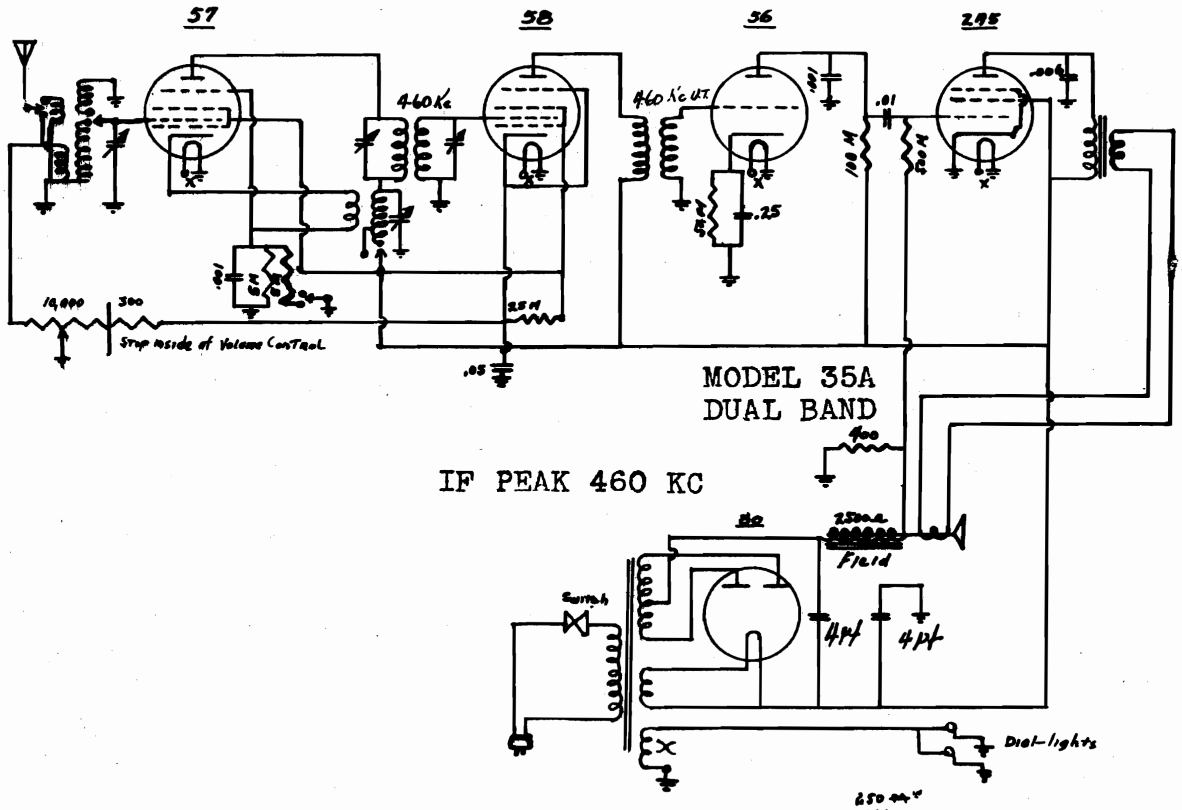
MODEL 25
Early,Late
Schematics

PACKARD-BELL CO.



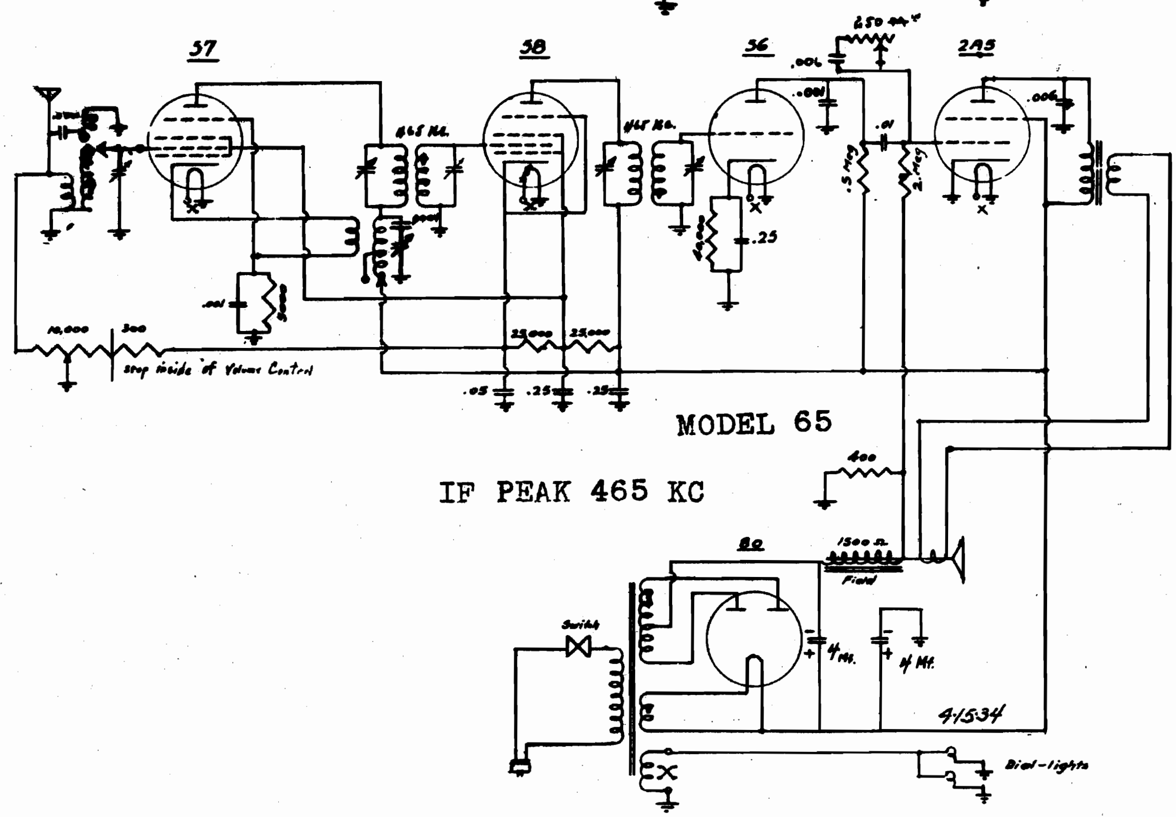
MODEL 35A
MODEL 65
Schematics

PACKARD-BELL CO.



MODEL 35A
DUAL BAND

IF PEAK 460 KC

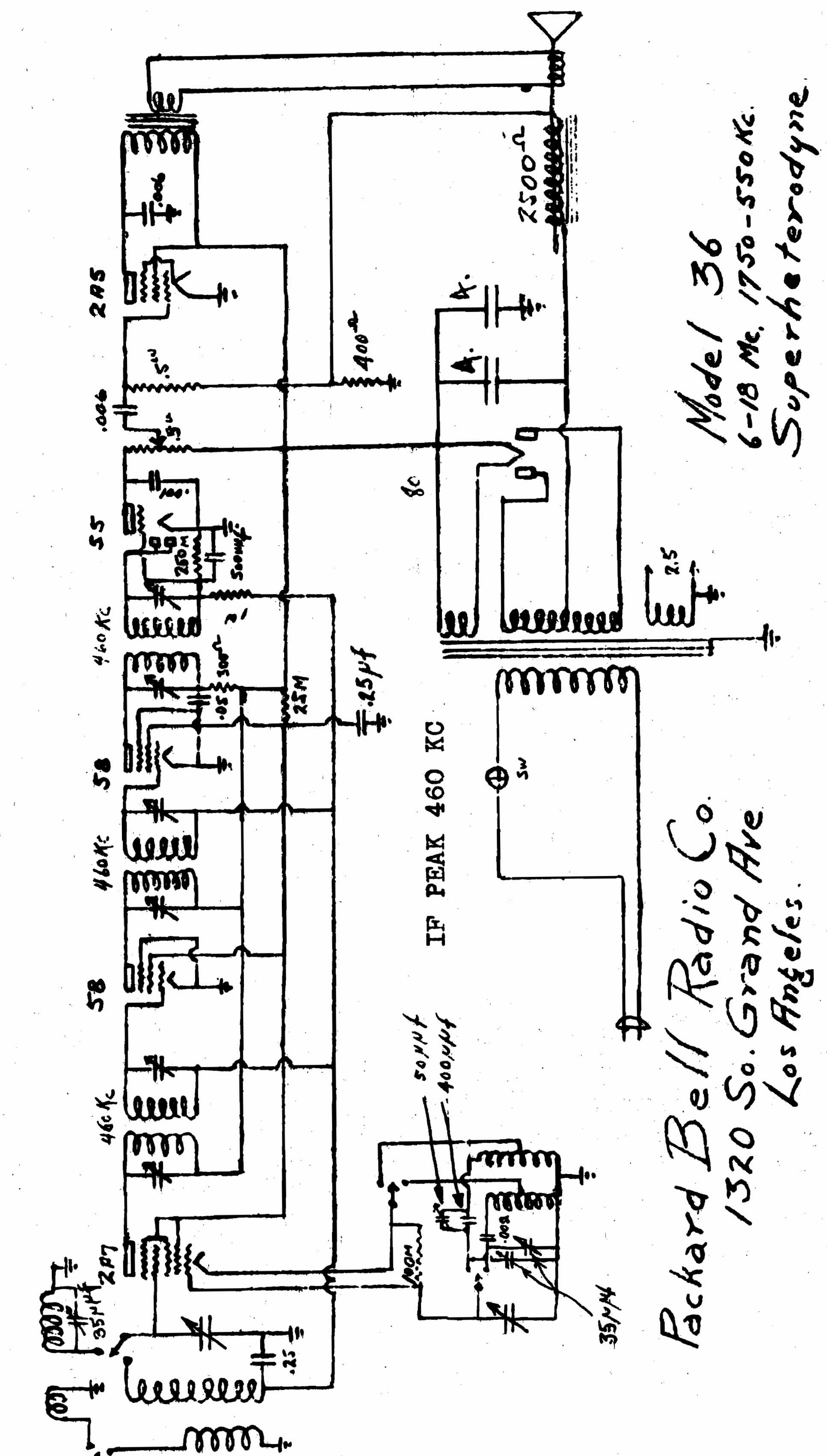


MODEL 65

IF PEAK 465 KC

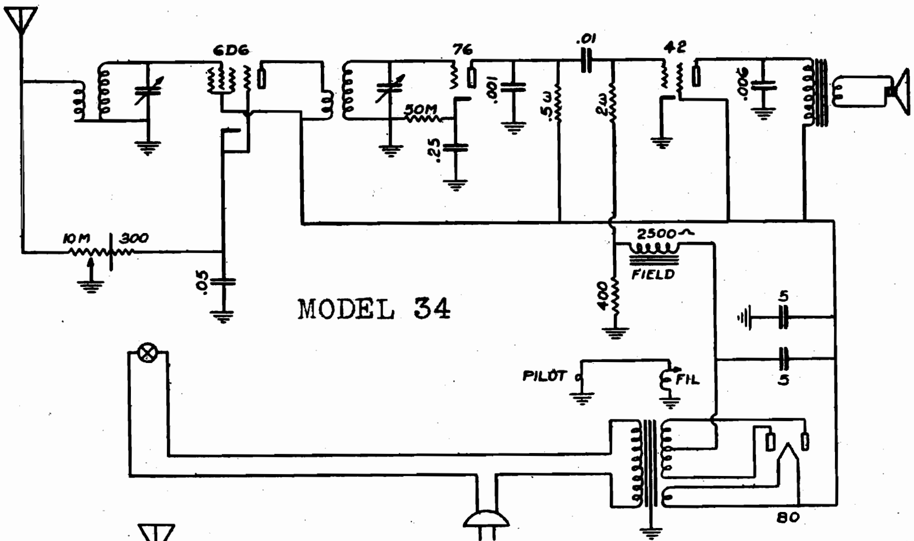
MODEL 36
Schematic

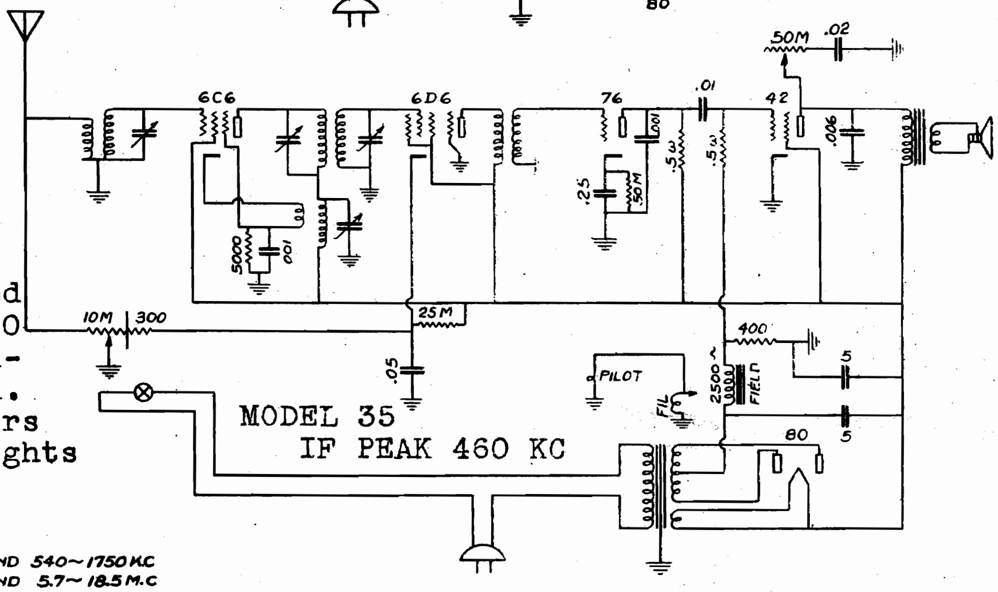
PACKARD-BELL CO.



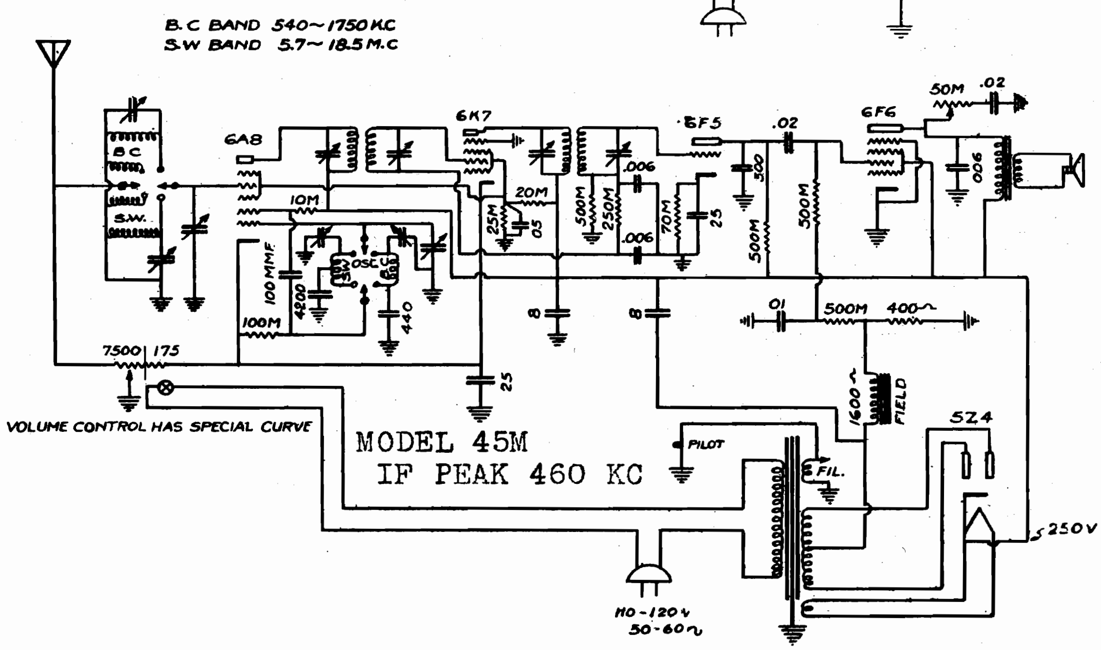
MODEL 34
MODEL 35
MODEL 45M
Schematics

PACKARD-BELL CO.



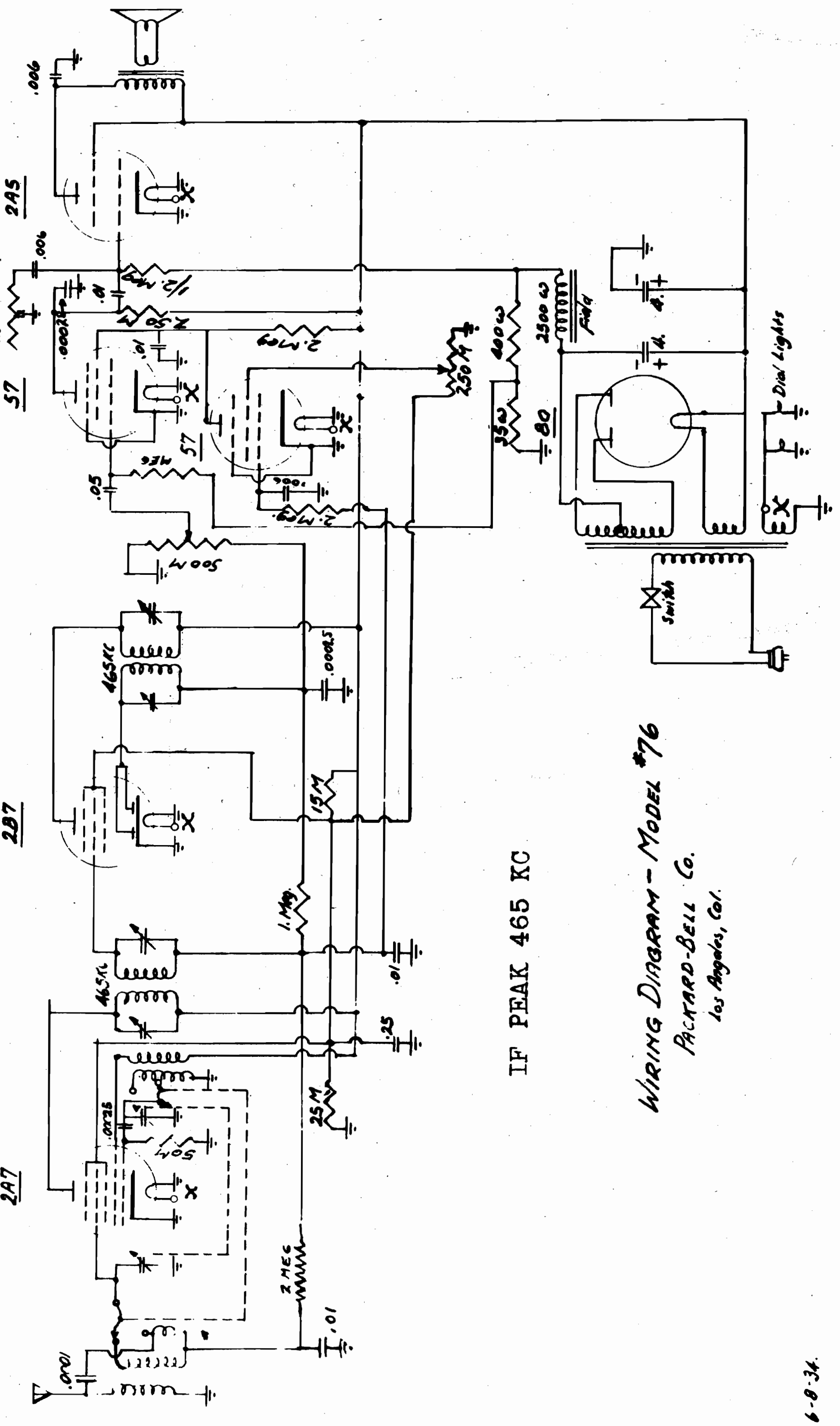


Early model used 57,58,56,2A5, 80
Had no tone control. Used 4mfd. filter condensers and two dial lights



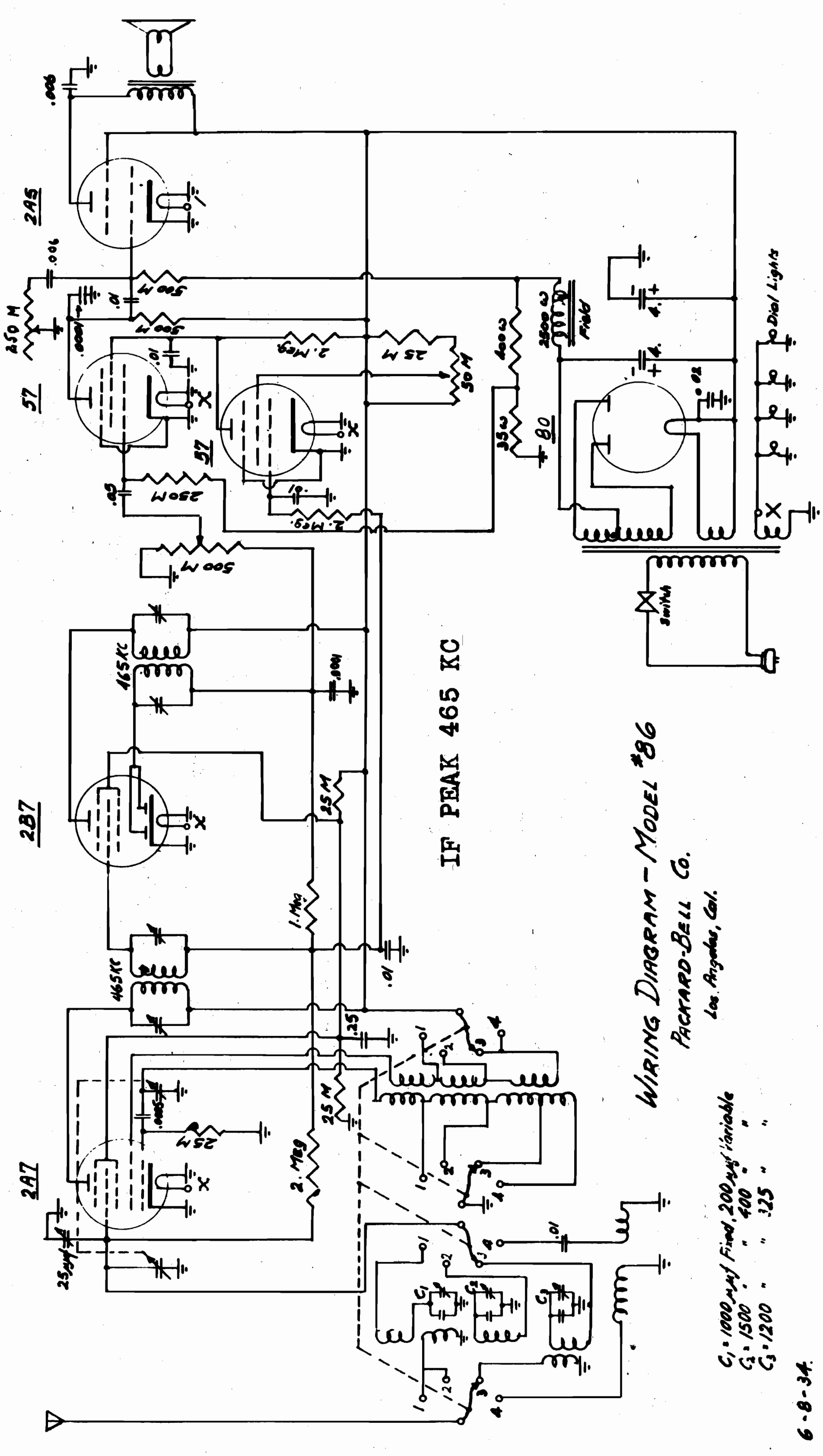
MODEL 76
Schematic

PACKARD-BELL CO.



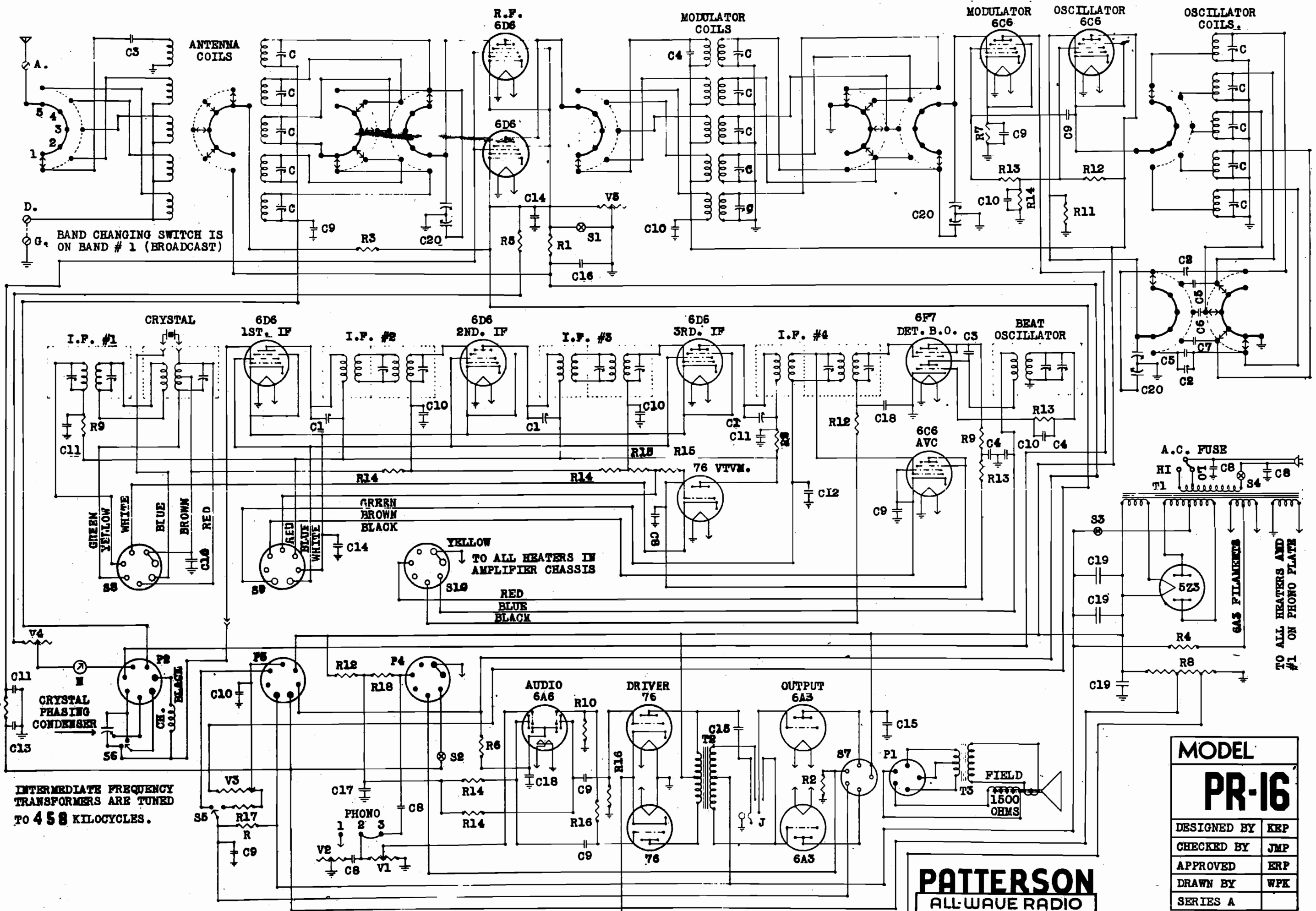
MODEL 86
Schematic

PACKARD-BELL CO.



MODEL PR-16
Schematic

PATTERSON RADIO CO.



C —3.30 —— MMFD.
C 1—300 —— MMFD.
C 2—500 —— MMFD.
C 3—.0001 —— MICA 10%
C 4—.00025 —— MICA 10%
C 5—.001 —— MICA 3%
C 6—.0022 —— MICA 3%
C 7—.004 —— MICA 3%
C 8—.006 —— 600 VOLT
C 9—.02 —— 600 VOLT
C10—.05 —— 600 VOLT
C11—.1 —— 600 VOLT
C12—.25 —— 400 VOLT
C13—.25 —— 600 VOLT
C14—.5 —— 200 VOLT
C15—.5 —— 600 VOLT
C16—1 MFD. —— 200 VOLT
R — 50 OHMS —— 1 WATT

R 1— 150 OHMS—1/2 WATT
R 2— 150 OHMS—1 WATT
R 3— 200 OHMS—1/2 WATT
R 4— 750 OHMS—10 WATT
R 5— 1500 OHMS—1/3 WATT
R 6— 2000 OHMS—1/2 WATT
R 7— 5000 OHMS—1/2 WATT
R 8— 8000 OHMS—20 WATT
R 9— 10000 OHMS—1/2 WATT
R10— 15000 OHMS—1/3 WATT
R11— 20000 OHMS—1/2 WATT
R12— 50000 OHMS—1/2 WATT
R13—100000 OHMS—1/3 WATT
R14—100000 OHMS—1/2 WATT
R15—250000 OHMS—1/2 WATT
R16—300000 OHMS—1/3 WATT
R17—500000 OHMS—1/2 WATT
C17— 8 MFD. —— 450 VOLT
C18—10 MFD. —— 25 VOLT

C19—16 MFD. —— 475 VOLT
C20—6 —— SECTION TUNING
CH —— R. F. CHOKE
J —— PHONE JACK
M —— R METER
P 1 —— SPEAKER PLUG
P 2—CONNECTOR PLUG NO. 1
P 3—CONNECTOR PLUG NO. 2
P 4—CONNECTOR PLUG NO. 3
V 1—VOLUME CONTROL 500000 OHMS
V 2—TONE CONT. 50000 OHMS
V 3—MANUAL VOLUME 500000 OHMS
V 4—R METER ADJUSTMENT 1000 OHMS
V 5—SILENT TUNING ADJUSTMENT 1000 OHMS

R18—1 MEG. OHMS—1/3 WATT
T 1—POWER TRANSFORMER
T 2—AUDIO TRANSFORMER
T 3—OUTPUT TRANSFORMER
S 1—SILENT TUNING SWITCH
S 2—BEAT OSCILLATOR SWITCH
S 3—COMMUNICATION SWITCH
S 4—A.C. LINE SWITCH LOCATED ON VOLUME CONTROL
S 5—A. V. C. ON-OFF SWITCH LOCATED ON MANUAL VOL.
S 6—CRYSTAL, SERIES—PARALLEL SWITCH
S 7 —— SPEAKER SOCKET
S 8—CONNECTOR SOCKET NO. 1
S 9—CONNECTOR SOCKET NO. 2
S10—CONNECTOR SOCKET NO. 3

MODELS 186AW,286AW,386AW
MODELS 1106AW,2106AW,3106AW
MODELS 1126AW,2126AW,3126AW
Trimmers,Alignment,Part 1

PATTERSON RADIO CO.

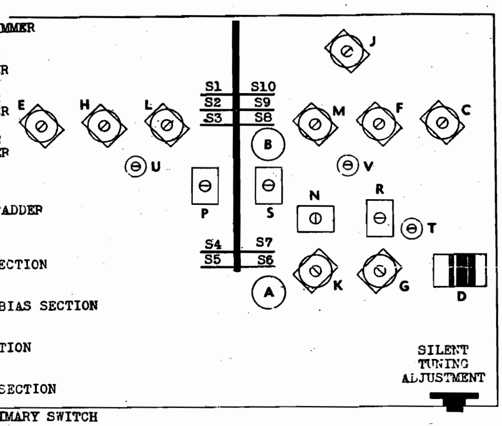
Service Notes 8-10-12 Tube Models—Series B—1936

The following instructions are intended for the use of experienced dealers and radio service men in locating and correcting difficulties which may occasionally arise in receiver operation. They are not intended for use of the average set owner. *Do not* attempt any adjustments unless thoroughly qualified and equipped with the special instruments required.

SET LAYOUT—The coil and switch assembly is identical in all three models. The frequency bands covered are also identical.

Figure 2 shows the layout of coils and trimmer condensers for the various frequency bands.

A - BROADCAST ANTENNA COIL
B - BROADCAST MODULATOR COIL
C - BROADCAST OSCILLATOR AND TRIMMER
D - 2 BAND ANTENNA COIL
E - 2 BAND MODULATOR AND TRIMMER
F - 2 BAND OSCILLATOR AND TRIMMER
G - 3 BAND ANTENNA AND TRIMMER
H - 3 BAND MODULATOR AND TRIMMER
J - 3 BAND OSCILLATOR AND TRIMMER
K - 4 BAND ANTENNA AND TRIMMER
L - 4 BAND MODULATOR AND TRIMMER
M - 4 BAND OSCILLATOR AND TRIMMER
N - ANTENNA BROADCAST TRIMMER
P - MODULATOR BROADCAST TRIMMER
R - 2 BAND ANTENNA TRIMMER
S - 4 BAND OSCILLATOR VARIABLE PADDER
T - 4 BAND ANTENNA PADDER
U - 4 BAND MODULATOR PADDER
V - BROADCAST OSCILLATOR PADDER
S1 - MODULATOR GRID SHORT OUT SECTION
S2 - MODULATOR GRID SECTION
S3 - MODULATOR PLATE SECTION
S4 - ANTENNA SILENT TUNING AND BIAS SECTION
S5 - ANTENNA SECTION
S6 - ANTENNA GRID SECTION
S7 - ANTENNA GRID SHORT OUT SECTION
S8 - OSCILLATOR PLATE SECTION
S9 - OSCILLATOR GRID SECTION
S10 - OSCILLATOR GRID SHORT OUT SECTION



UNIVERSAL A.C. PRIMARY SWITCH

FIG. 2—ADJUSTMENTS FOR REALIGNMENT

Looking down into bottom of chassis, as shown in Figure 2, it will be noted that, with the exception of broadcast antenna and modulator coils, and No. 2 band antenna coil, trimmers are located directly on the coil terminals, and the low frequency pads, where required, are adjacent to the coil involved. The switch sections, as shown in the figure, perform the following functions:

S6—Switches RF grid coils.
S7—Shorts out RF grid coils not in use.
S8—Switches oscillator plate coils.
S9—Switches oscillator grid coils.
S10—Shorts out oscillator grid coils not in use.
S5—Switches antenna coils.
S4—"Kills" silent tuning in all models. Lowers bias on IF and RF in 10 and 12 tube models on all bands except BC.
S3—Switches modulator plate coils.
S2—Switches modulator grid coils.
S1—Shorts out modulator grid coils not in use.

ALIGNMENT OF I. F. AMPLIFIER

NOTE: *Frequency bands referred to in the following instructions are:*

1st Band—Broadcast 1500-550 K.C. *3rd Band—12- 4.5 megacycles*
2nd Band—4.5-1.6 megacycles *4th Band—20-11.5 megacycles*

In these and the following instructions for alignment the term "voltmeter" shall be understood to mean "vacuum tube voltmeter" and the term "voltmeter indicates resonance" shall be understood to mean that the vacuum tube voltmeter shows greatest swing toward zero.

MODELS 86AW-186AW-286AW-386AW (8 TUBES)

Turn band selector switch to 2nd band position. Place service oscillator in operation on 458 K.C. Connect grid of voltmeter to A.V.C. Bus and ground of voltmeter to chassis ground. A convenient place to connect the A.V.C. Bus is at the junction of the ¼ megohm resistor and the by-pass condenser located at the bottom of the chassis directly below 4th band antenna coil. Remove grid clips from 6B7, 6D6 1st I.F. and 6A7. Apply output oscillator to grid of 6B7 and adjust trimmers on rear I.F. transformer until voltmeter indicates resonance. Replace grid clip and shield cap on 6B7 and apply oscillator output to grid of 6D6 and adjust trimmers on center I.F. transformer until voltmeter indicates resonance decreasing the oscillator output, if necessary, in order to obtain a good readable indication on voltmeter. Replace grid clip and shield cap on 6D6 and apply oscillator output to grid of 6A7. Adjust trimmers on front I.F. transformer until voltmeter indicates resonance. Now reduce oscillator output and with oscillator input still applied to grid of 6A7 carefully recheck all adjustments in the same order in which they were initially made. This completes the alignment of the I.F. amplifier.

MODELS 106AW-1106AW-2106AW-3106AW (10 TUBES) AND 126AW-1126AW-2106AW-3126AW (12 TUBES)

As these models use a separate automatic volume control tube 6C6 and a linear power detector (76) it is advisable to make an inspection of the system used in order to understand its operation and to intelligently analyze and correct such troubles as may arise.

Referring to the circuit diagram (it may be advisable to draw out a skeleton diagram showing the A.V.C. system only) it will be noted that the third I.F. transformer has two secondary windings, one tuned which feeds the grid of the power detector (76) and one untuned which feeds the grid of the 6C6, A.V.C. tune. The grid return of the latter coil returns to the negative side of the power supply. The grid of the 6C6 is then at all times approximately 120-170 volts negative with respect to the chassis. The cathode of the 6C6 returns to the 50 ohm resistance (R) in the negative side of power supply. The voltage drop across this resistor furnishes the necessary grid bias for the tube. The plate of the 6C6 is connected to ground through a 500,000 ohm resistor (R 15) and V 1. The screen of the 6C6 is connected to the cathode and the suppressor is connected to the plate. It is evident, then, that we have a 6C6 connected as a triode and operating as a very sensitive D.C. amplifier. Its grid return is connected to the most negative point of the power supply, its cathode connected to a point slightly less negative (difference due to voltage drop across resistance R) and its plate connected to ground through resistance R 15 and V 1. When no signal is applied to the grid the tube is biased to cut off and no current flows through R 15. A voltmeter connected from plate to ground will show no reading. When a signal is applied to the grid of the tube, current does flow through the plate resistor R 15 and a voltmeter connected from plate to ground will show various readings, the amount of voltage shown depending upon the drop across R 15 due to the current flowing through it. The current flowing through R 15 depends entirely upon the strength of the signal applied to the grid of the 6C6. It is this voltage drop across R 15 which is utilized for the A.V.C. voltage. The A.V.C. bus, therefore, is connected to the plate of the 6C6 tube. It is also well to remember that the grid clip of the 6C6 is "*hot*" with respect to the chassis.

To align intermediate frequency amplifier, remove grid clips from 6A7 and 6D6's, 1st and 2nd I.F. tubes. Place service oscillator in operation on 458 kilocycles. Connect voltmeter grid lead to plate prong on socket of 6C6 and ground lead to chassis ground. Turn band selector switch to 2nd band position. Apply oscillator signal to 6D6 2nd I.F. tube (the one farthest toward back of chassis), adjust trimmer on side next to 6C6 of rear I.F. transformer until voltmeter indicates resonance. Do not attempt to adjust the other trimmer at this time. Replace grid clip and shield cap on 6D6 and apply oscillator signal to grid of 6D6 1st I.F. tube and adjust trimmers of center I.F. transformer until voltmeter indicates resonance, reducing oscillator output, as necessary, to obtain a good readable indication. Replace grid clip and shield cap and apply oscillator output to grid of 6A7 and adjust trimmers of front I.F. transformer until voltmeter indicates resonance. Now further reduce oscillator output and with oscillator output still applied to grid of 6A7 check each adjustment in the order in which they were made. Now adjust the trimmer on the rear I.F. transformer, farthest away from 6C6 until the noise level is maximum and the voltmeter makes a slight dip *away from resonance*. This completes the alignment of the I.F. amplifier.

CALIBRATION OF VARIOUS BANDS—ALL MODELS

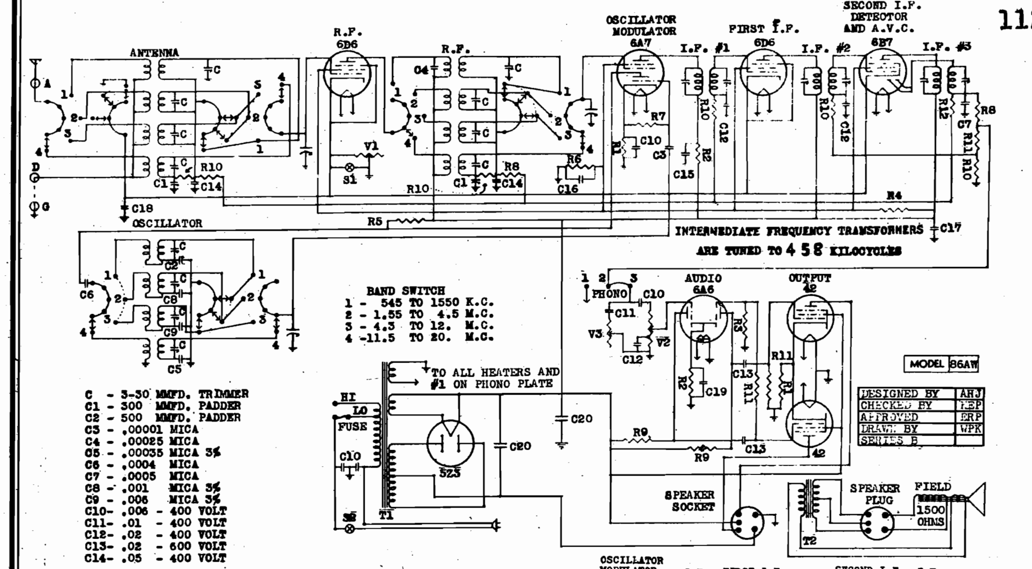
Broadcast Band—1500 - 550 K.C. Connect voltmeter to A.V.C. bus and chassis ground as described under Intermediate Amplifier Alignment. Turn band selector switch to broadcast position. Throw switch for silent tuning to the downward position. Place service oscillator in operation at 1400 K.C. Turn set dial to 1400 K.C. and adjust oscillator trimmer until voltmeter indicates resonance. Now adjust modulator and antenna trimmers, in turn, until voltmeter indicates resonance in each case. Turn set dial to 600 K.C. and set service oscillator at 600 K.C. Adjust oscillator low frequency pad for resonance. Now turn set dial back to 1400 K.C. and set service oscillator at 1400 K.C. Carefully correct oscillator trimmer setting and without moving the dial setting verify and correct the setting of the modulator and R.F. trimmers.

Second Band—4.5 - 1.6 megacycles. Turn band selector switch to second band position. Place high frequency oscillator in operation

Schematics

PATTERSON RADIO CO.

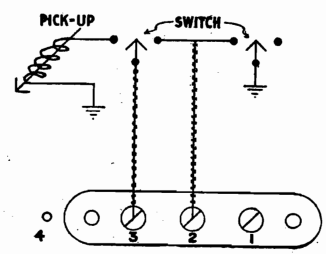
MODELS 186AW,286AW,386AW
1106AW,2106AW,3106AW
1126AW,2126AW,3126AW

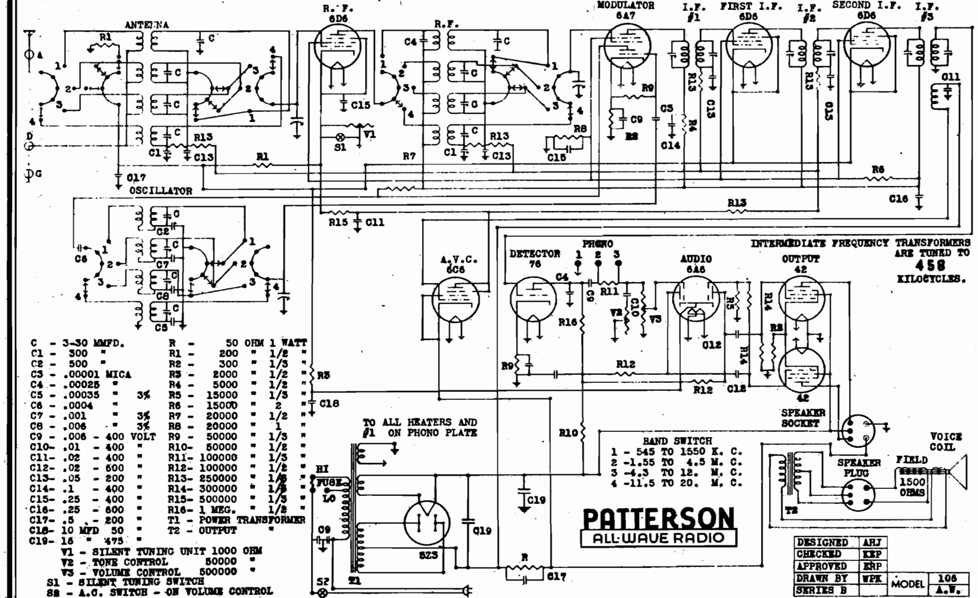


MODELS
186AW
286AW
386AW

PHONO-PICKUP

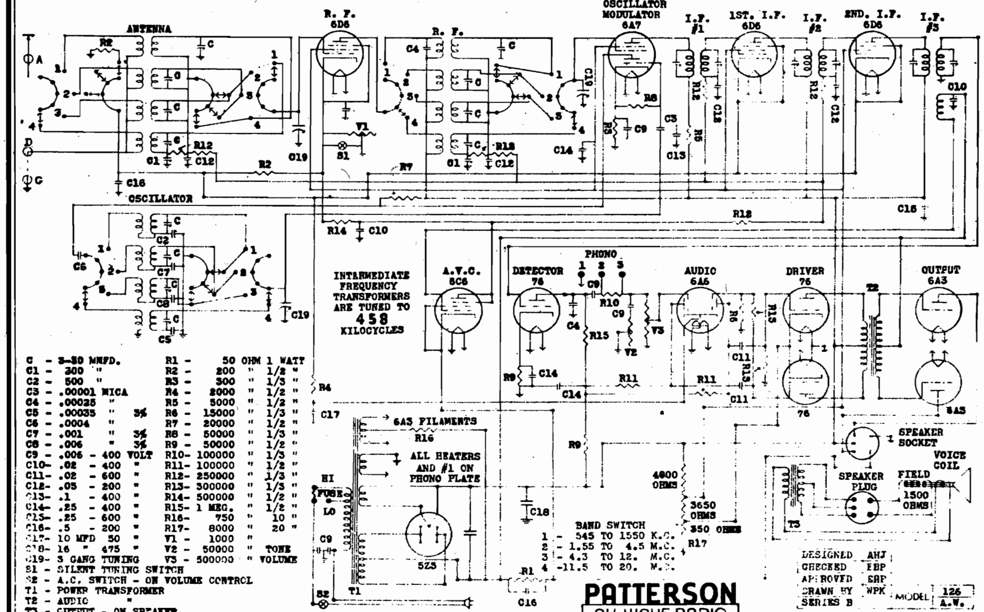
Connect all sets, 8-10-12 in same manner. Remove jumper which connects terminals No. 2 and No. 3. Standard High Impedance pickup must be used. It is essential that leads from terminals No. 2 and No. 3 be shielded and grounded to chassis at No. 4 which hole is provided in all chassis for this purpose. One side of pickup unit must also be grounded.





MODELS
1106AW
2106AW
3106AW

This is accomplished by soldering one lead of the unit to the shielded cable mentioned above. If slight hum occurs try reversing pickup leads. Terminal No. 1 is used when it is desired to install a light in the phono section of the cabinet. Use only a 6 volt lamp running a lead from terminal No. 1 to one side of the lamp socket and grounding the other side by connecting to shielded cable in same method as grounding the pickup. Switch used must be two pole, double throw and connected as shown, grounding one pole to shielded cable, same as in above method.



MODELS
1126AW
2126AW
3126AW

MODELS 186AW,286AW,386AW
MODELS 1106AW,2106AW,3106AW
MODELS 1126AW,2126AW,3126AW
Voltages,Alignment,Part 2
Parts Lists

PATTERSON RADIO CO.

at 4 megacycles. Turn set dial to 4 megacycles. Turn modulator trimmer full in. Adjust oscillator trimmer until resonance with H.F. oscillator signal is indicated. Without moving dial, open the modulator trimmer until voltmeter indicates resonance and then in the same manner adjust antenna trimmer for resonance. Verify dial setting and carefully readjust modulator and R.F. trimmers.

Third Band—12 - 4.5 megacycles. Turn band selector switch to 3rd band position. Place H.F. oscillator in operation at 12 megacycles. Turn dial to 12 megacycles. Adjust trimmers in exactly the same manner as described for 2nd band.

Fourth Band—20 - 11.5 megacycles. Turn band selector switch to 4th band position. Place H.F. oscillator in operation at 20 megacycles. Turn set dial to 20 megacycles. Turn modulator trimmer full in and tighten screw on modulator L.F. pad. Adjust oscillator trimmer until voltmeter indicates resonance with H.F. oscillator signal. Without moving dial setting adjust modulator and R.F. trimmers for resonance. Now place H.F. oscillator in operation at 12 megacycles. Turn set dial to 12 megacycles and adjust oscillator L.F. pad until voltmeter indicates resonance with H.F. oscillator signal. Without moving dial setting adjust modulator and antenna low frequency pads for resonance. Reset dial and H.F. oscillator to 20 megacycles and verify setting of modulator and antenna trimmers.

VOLTAGES

The following tables show representative voltages at various points in normal sets:

All Voltages Measured Under The Following Conditions:

No signal-fuse on 110-115 V. side. Line volts 115, 60 cycles. Band Change Switch in B.C. Band Position — Silent Tuning Control Inoperative. All voltages from various points to chassis ground measured with voltmeter 1000 ohms per volt.

8 TUBE SET

		Plate	Screen	Cathode	Suppressor	
RF	6D6	+250	+80	0	Tied to Cathode	Osc. Plate
Mod. Osc.	6A7	+215	+80	+2.4		+140
1 IF	6D6	+230	+80	0	Tied to Cathode	
2 IF	6B7	+230	+80	0		
1 Audio	6A6	+150*		+4.0		
2 Audio	42	+230	+235	+16.5		
	42	+230	+235	+16.5		

**Each plate measured through 100,000 ohm plate resistor.*

ELECTROLYTIC CONDENSERS

	Center to Ground	Can to Ground
Grounded	+240	0
Insulated	+240	—165 or 120
Speaker Field	Hot Side to Ground	—165 or 120

10 TUBE SET

		Plate	Screen	Cathode	Suppressor	
RF	6D6	+240	+78	0	Tied to Cathode	Osc. Plate
Mod. Osc.	6A7	+220	+78	+2.4		+160
1 IF	6D6	+240	+78	+2.6	Tied to Cathode	
2 IF	6D6	+240	+78	+2.6	Tied to Cathode	
2 Det.	76	+30*		+1.5*		
Inverter	6A6	+120†		+3.6		
Output	42	+240	+245	+16		
Output	42	+240	+245	+16		
AVC	6C6	0	—170 or —120	Tied to Screen	Tied to Plate	Control Grid —175 or —125

**Voltages not accurately measurable due to 1 Meg. plate resistor.*
†Each plate measured through 100,000 ohm plate resistor.

ELECTROLYTIC CONDENSERS

	Center to Ground	Can to Ground
Grounded	+245	0
Insulated	+245	—175 or 125
Speaker Field	Hot Side to Ground	—175 or 125

12 TUBE SET

		Plate	Screen	Cathode	Suppressor	
RF	6D6	+250	+100	0	Tied to Cathode	Osc. Plate
Mod. Osc.	6A7	+230	+100	+3.3		+170
1 IF	6D6	+250	+100	+3.25	Tied to Cathode	
2 IF	6D6	+250	+100	+3.25	Tied to Cathode	
2 Det	76	+40*		+1.75*		
Inverter	6A6	+135†		+4.2		
Driver	76	+245		+11.5		
Driver	76	+245		+11.5		
						Control Grids
Output	2A3	+245		—75 C.T.Fil.		—150
Output	2A3	+245		—75 C.T.Fil.		—150
AVC	6C6	0	—150	Tied to Screen	Tied to Plate	—155

**Voltages not accurately measurable due to 1 Meg. plate resistor.*
†Each plate measured through 100,000 ohm plate resistor.

ELECTROLYTIC CONDENSERS

	Center to Ground	Can to Ground
Grounded	+250	0
Insulated	+250	—155
Speaker Field	Hot Side to Ground	—155

PARTS PRICE LIST NO. 502—SERIES B REPLACEMENT PARTS

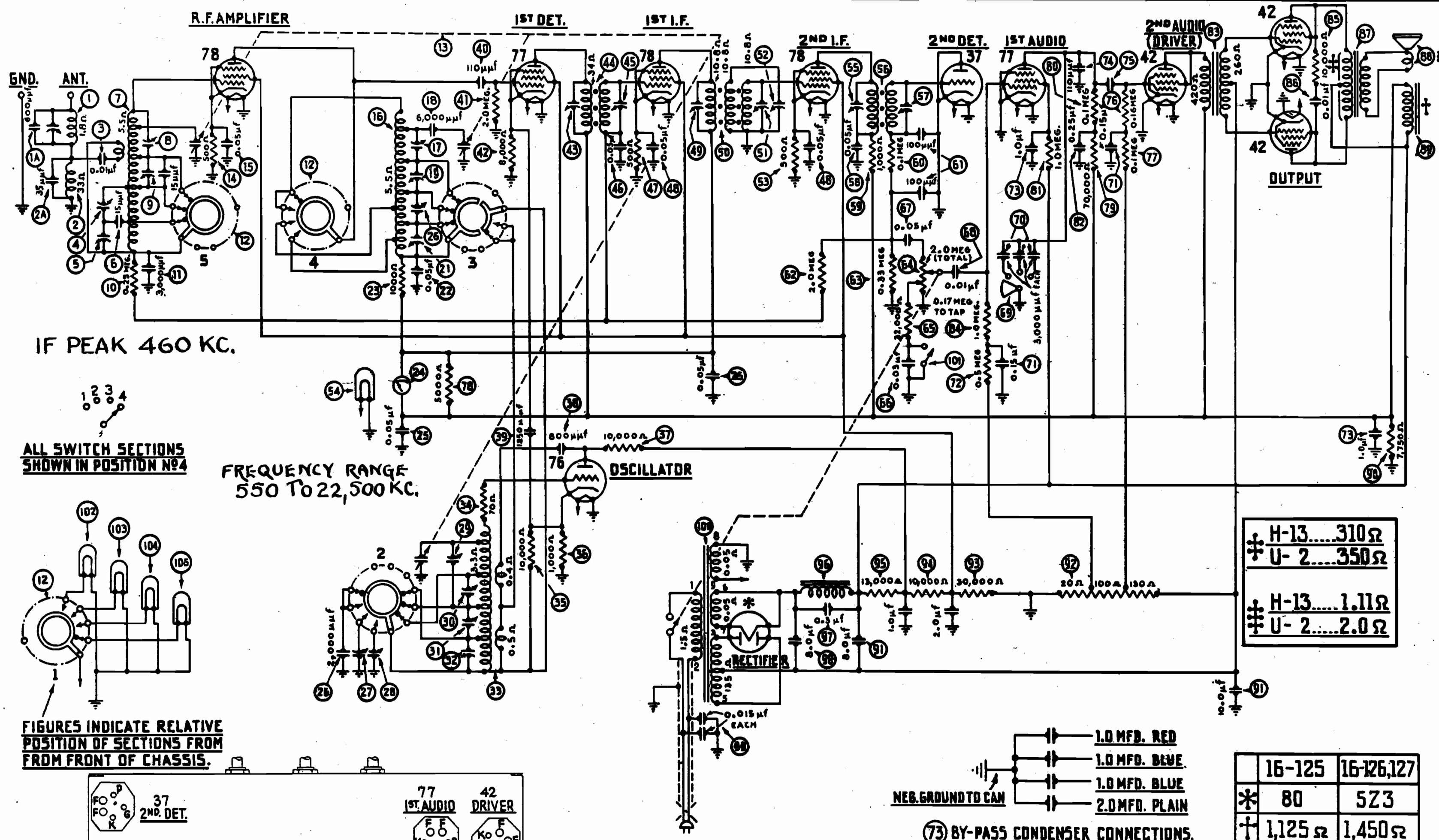
AUGUST 1. 1935 — PRICES SUBJECT TO CHANGE WITHOUT NOTICE — F.O.B. LOS ANGELES

Part No.	DESCRIPTION	List Price
720	Antenna-Doublet Plate A. D. G.	$ .18
721	A. C. Cord and Plug	.35
722	Audio Transformer	2.65
723	Band Changer Disc with Rod—Complete	1.00
724	Band Changer Screw (Flat Head)	.07
725	Band Changer Bakelite Washer	.05
726	Cap —Screen Grid (Per C)	1.00
727	Condenser 8 Mfd.—450 Volt (In Can)	1.00
728	Condenser 16 Mfd.—475 Volt (In Can)	1.25
729	Condenser 10 Mfd.— 25 Volt (Tubular)	.60
730	Condenser .006 —400 Volt	.15
731	Condenser .02 —400 Volt	.15
732	Condenser .05 —400 Volt	.15
733	Condenser .1 —400 Volt	.20
734	Condenser .25 —400 Volt	.25
735	Condenser .5 —200 Volt	.55
736	Condenser 3-30 MMFD.—Trimmer	.15
737	Condenser 300 MMFD.—Padder	.45
738	Condenser 500 MMFD.—Padder	.50
739	Condenser—Mica .0001 —10%	.15
740	Condenser—Mica .00025—10%	.15
741	Condenser—Mica .0004 —10%	.15
742	Condenser—Mica .0004 — 3%	.20
743	Condenser—Mica .001 — 3%	.20
744	Condenser—3 Gang Variable	3.40
745	Coil —B. C. Antenna	1.50
746	Coil —2—3—4 Band Antenna	.75
747	Coil —Broadcast R. F.	1.50
748	Coil —2—3—4 Band R. F.	.75
749	Coil —All Oscillator	1.00
750	Control—Volume	1.10
751	Control—Tone	.80
752	Control—Silent Tuning	.30
753	Dial Disc and Scale	.80
754	Dial Scale Only	.35
755	Dial Drive Vernier Complete	1.25
756	Dial Light—Red Marker	.05
757	Dial Light Socket	.10
758	Dial Lamp—6 Volt	.14
759	Escutcheon Plate	.40
760	Fuse Block	.20
761	Fuse only—2 Amp.	.05
762	Intermediates—Coil only	.40
763	I. F. Trimmer	.35
764	I. F. Shield Can	$ .15
765	Knob —Large Wood	.15
766	Knob —Small Wood	.12
767	Phono Plate	.18
768	Phono Motor	24.00
769	Phono Pickup—Complete	16.80
770	Resistor—Vitreous Enamel— 750 Ohm—10 Watt	.50
771	Resistor—Vitreous Enamel—8000 Ohm—20 Watt	1.30
772	Resistor—Carbon—1/3 Watt—Any Value	.15
773	Resistor—Carbon—1/2 Watt—Any Value	.20
774	Resistor—Carbon— 1 Watt—Any Value	.20
775	Resistor—Carbon— 2 Watt—Any Value	.35
776	Socket —Tube—4—5—6—7 Prong	.12
777	Switch—Band Change	2.50
778	Switch—Silent Tuning	.24
779	Speaker— 8" Complete—1500 Ohm Field	10.00
780	Speaker—12" Complete—1500 Ohm Field	17.50
781	Speaker Field Coil— 8"—1500 Ohm	1.90
782	Speaker Field Coil—12"—1500 Ohm	4.00
783	Speaker Bucking Coil	.30
784	Speaker Output Transformer— 8 & 10	1.90
785	Speaker Output Transformer—12	1.90
786	Speaker Cone and Voice Coil— 8"	2.60
787	Speaker Cone and Voice Coil—12"	4.00
788	Speaker Cord and Plug	.35
789	Tube —76	.90
790	Tube —5Z3	1.20
791	Tube —6A3	1.35
792	Tube —6A6	1.35
793	Tube —6A7	1.30
794	Tube —6C6	1.10
795	Tube —6D6	1.00
796	Transformer—Power 110-130 Volt 50-100 Cycle—8 & 10	7.35
797	Transformer—Power 110-130 Volt 50-100 Cycle—12	9.75
798	Transformer—Power 110-130 Volt 25 Cycle—8 & 10	11.00
799	Transformer—Power 110-130 Volt 25 Cycle—12	14.65
800	Transformer—Power-Universal-110-125 220-250 Volt 50-100 Cycle—8 & 10	9.90
801	Transformer—Power-Universal-110-125 220-250 Volt 50-100 Cycle—12	14.60
802	Transformer Switch for Universal	1.20
803	Transformer—Audio Input	3.25
804	Transformer—Filter Choke	1.25

In Ordering Be Sure to Mention Part Number

MODEL 16
Codes 125,126
Schematic, Socket Voltage

PHILCO RADIO & TELEV. CORP.



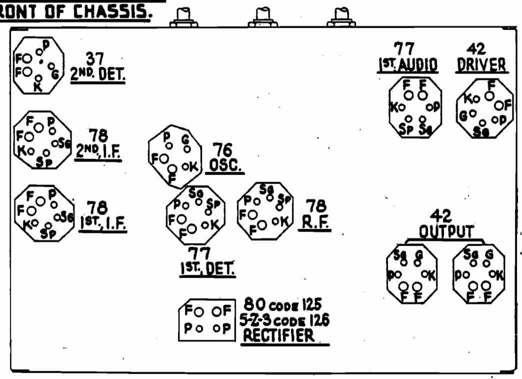


Fig. 1—Tube Sockets (Underside of Chassis)

Volume Control "ON FULL" Wave band switch in standard broadcast position, dial at 55.

Socket Voltages (Code 125)
Line Voltage 115

Tube Function	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st Aud.	42 Driver	42 Output	80 Rect.
Circuit										
F to F........	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K........	175	185	70	180	180	0	60	190	275 ea.	...
SG to K........	65	62	...	65	65	...	48	190	275 ea.	...
K to Gnd......	2.4	4.8	5.4	2.3	2.5	0	0	0	0	...

Socket Voltages (Code 126)
Line Voltage 115

Tube Function	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st Aud.	42 Driver	42 Output	80 Rect.
Circuit										
F to F........	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	5.0
P to K........	210	220	75	215	215	0	70	215	330	...
SG to K........	75	70	...	75	80	...	56	215	330	...
K to Gnd......	2.8	5.8	6.1	2.8	3.3	0	0	0	0	...

MODEL 16
Codes 125,126,127
Alignment,Trimmers

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

Model 16 (Codes 125, 126, 127)

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 77 tube), and connect the "ANT" output terminal of the Model 048 or 024 signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND' terminal of the receiver.

2. Connect the 0 to 20 volt range of the output meter in the Model 048 or 025 tester to the plate prongs of the two output tubes or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the broadcast band, wave band switch to extreme left, and with the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. Using the Philco fibre adjusting screw driver, part No. 27-7059, adjust the I. F. compensating condensers in the following order to give maximum reading in the output meter: (57), (55), (52), (49), (51), (45), (43). (Fig. 4).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the first detector grid cap.

2. Set the wave-band switch of the receiver to the extreme left (broadcast position) (Range No. 1, 550–1500 K.C.), and turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap (1) condenser until a minimum reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment.

Adjustment of High Frequency Padders

1. Leaving the output meter connected to the receiver connect the Philco Model 091 signal generator to the antenna and ground terminals of the chassis and place the signal generator in operation.

2. Turn the wave-band switch to Range 4 (extreme right) and adjust the station selector to 18.0 megacycles, at which point the fifth harmonic of the 3600 K.C. signal will be heard. By means of the Philco padder wrench, part No. 3164, adjust the oscillator, R.F. and antenna padders for maximum reading in the output meter and in the order mentioned. These padders are numbered (29), (17) and (8), respectively in figure No. 4. To make certain that the adjustment has been correctly made check the sixth harmonic at 21.6 M.C. on the dial.

3. Turn the wave-band switch to Range 3 (4.1–10.0 M.C.) and adjust the tuning dial to 7.2 M.C. (the second harmonic of the 3600 K.C. signal). Adjust the oscillator, R.F. and antenna padders ((30), (19) and (9), respectively) for maximum output. Check the calibration of the dial at the upper portion of the third band by tuning in the image of the 10.8 M.C. signal at approximately 9.9 on the dial. (If there is an appreciable error in calibration at this point, readjust padder (30) for maximum output. Return the dial to the 7.2 M.C. position, tuning for maximum output. Readjust padders (19) and (9).)

4. Turn the wave-band switch to scale No. 2 (1.5–4.0 M.C.) and tune in the fundamental frequency from the signal generator at 3.6 M.C. Adjust padders (31), (20) and (4) for maximum output.

5. At this point it will again be necessary to make use of the broadcast type signal generator Models 024, 048 or equivalent. Connect the output of this signal generator to the antenna and ground terminals of the chassis. Turn the station selector dial to 1.5 M.C. (Range 2) and adjust the signal generator to the same frequency (1500 K.C.). Adjust padder (27) (nut).

6. Turn the wave-band switch to Range No. 1 (broadcast band) and set the dial at 1500 K.C. Adjust the signal generator to this frequency and adjust padders (32), (21) and (5) for maximum output.

7. Tune the receiver and the signal generator to 600 K.C. and adjust padder (28) (screw) for maximum output.

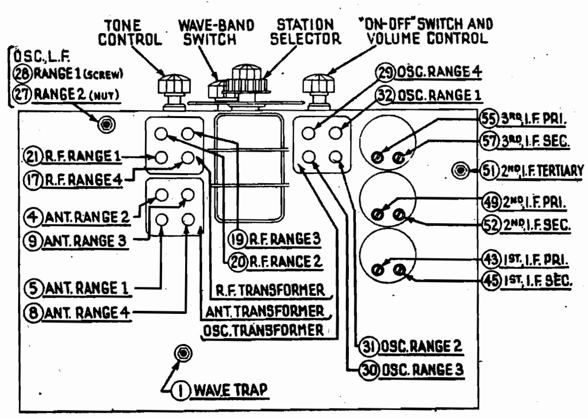


Fig. 4—Locations of Compensating Condensers

Power Transformer Data

Line Voltage 120

Terminals	A.C. Volts	Circuit	Color of Leads
1–2	120	Primary	White
3–5	*720	Plates of Rectifier	Yellow
6–7	5.0	Filament of Rectifier	Blue
8–9	6.3	Filaments	Black
4	...	Center Tap of 3–5	Yellow—Green Tracer

*780 in code 126

MODEL 16
Codes 125,126
Chassis,Parts

PHILCO RADIO & TELEV. CORP.

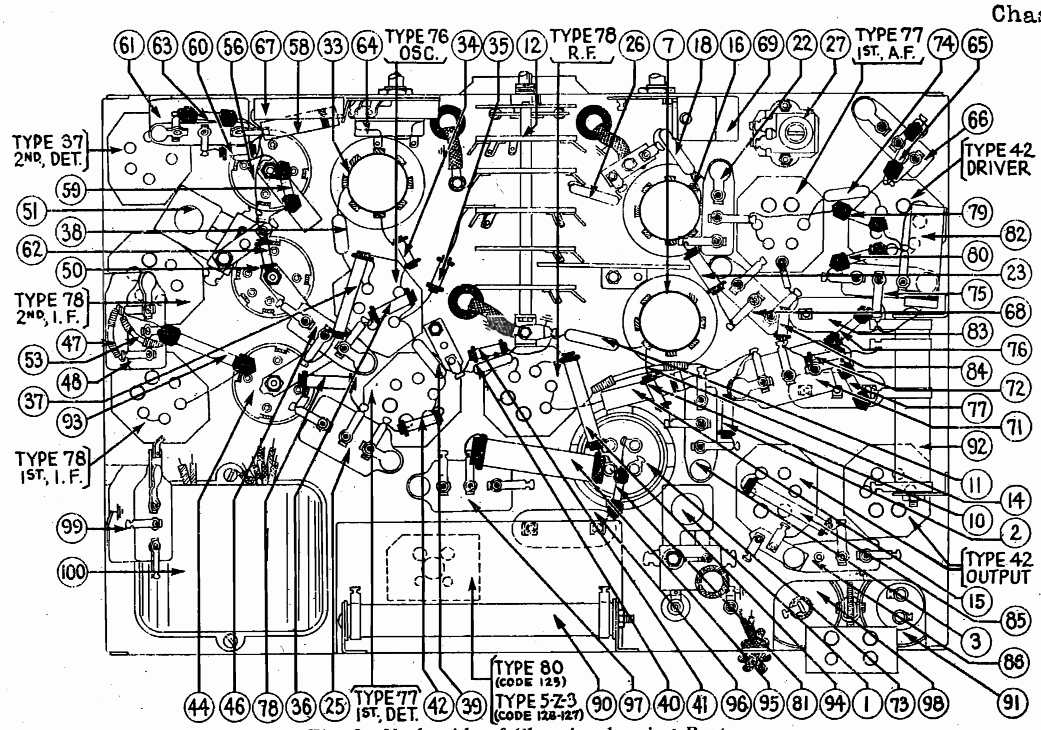


Fig. 3—Underside of Chassis, showing Parts

REPLACEMENT PARTS—MODEL 16—CODES 125 AND 126

Nos. on Diagram	Description	Part No	List Price
1	Wave Trap	38-6049	$0.30
1a	Condenser (.0006 Mfd. Mica	30-1049	.35
2	Antenna Choke Assembly	32-1514	.30
2a	Condenser (.000035 Mfd. Mica)	30-1044	.35
3	Condenser (.01 Mfd. Bakelite Block)	3903 N	.25
4	Compensating Condenser (Ant. Band 2)	†Part of 31-6026	....
5	Compensating Condenser (Ant. Band 1)	†Part of 31-6026	....
6	Condenser (.000015 Mfd. Mica)	30-1030	.35
7	Ant. Transformer	32-1467	....
8	Compensating Condenser (Ant. Band 4)	†Part of 31-6026	....
9	Compensating Condenser (Ant. Band 3)	†Part of 31-6026	....
9a	Condenser (.000015 Mfd. Mica)	30-1030	.35
10	Resistor (.25 Meg.) (Red-Yellow-Yellow)	4410	.20
11	Condenser (.003 Mfd. Mica)	7301	.45
12	Wave Band Switch	42-1079	3.50
13	Tuning Condenser Assembly	31-1350	6.50
14	Resistor (500 ohms Flexible Wirewound)	6977	.20
15	Condenser (.05 Mfd. Tubular)	30-4020	.35
16	R.F. Transformer	32-1468	2.30
17	Compensating Condenser (R.F.; Band 4)	†Part of 31-6026	....
18	Condenser (.006 Mfd. Mica)	30-1043	.60
19	Compensating Condenser (R.F.; Band 3)	†Part of 31-6026	....
20	Compensating Condenser (R.F.; Band 2)	†Part of 31-6026	....
21	Compensating Condenser (R.F.; Band 1)	†Part of 31-6026	....
22	Condenser (.05 Mfd. Bakelite Block)	3615 BL	.35
23	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
24	Shadowmeter	45-2028	2.50
25	Condenser (.05 Mfd. Twin Bakelite Block)	3615 BS	.40
26	Condenser (.002 Mfd. Mica)	30-1042	.40
27	Compensating Condenser (Osc. L.F.; Range 2)	31-6028	.85
28	Compensating Condenser (Osc. L.F.; Range 1)		
29	Compensating Condenser (Osc. H.F.; Range 4)	31-6026	.85
30	Compensating Condenser (Osc. H.F.; Range 3)		
31	Compensating Condenser (Osc. H.F.; Range 2)		
32	Compensating Condenser (Osc. H.F.; Range 1)		
33	Oscillator Transformer	32-1469	2.40
34	Resistor (70 ohms) (Violet-Black-Black)	33-1129	.20
35	Resistor (10000 ohms) (Brown-Black-Orange)	33-1000	.20
36	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
37	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
38	Condenser (.0008 Mfd. Mica)	5878	.35
39	Condenser (.00125 Mfd. Mica)	5886	.35
40	Condenser (.00011 Mfd. Mica)	4519	.35
41	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.20
42	Resistor (8000 ohms) (Gray-Black-Red)	33-1157	.20
43	Compensating Condenser (1st I.F. Pri.)	Part of 44	....
44	1st I.F. Transformer	32-1188	.65
45	Compensating Condenser (1st I.F. Sec.)	Part of 44	....
46	Condenser (.05 Mfd. Bakelite Block)	3615 AA	.35
47	Resistor (500 ohms Flexible Wirewound)	6977	.20
48	Condenser (.05 Mfd. Twin Bakelite Block)	3615 AJ	.40
49	Compensating Condenser (2nd I.F. Pri.)	Part of 50	....
50	2nd I.F. Transformer	32-1470	....
51	Compensating Condenser (2nd I.F. Tertiary)	04000R	.45
52	Compensating Condenser (2nd I.F. Sec.)	Part of 50	....
53	Resistor (500 ohms Flexible Wirewound)	6977	.20
54	Pilot Lamp for Shadowmeter	Part of 24	....
55	Compensating Condenser (3rd I.F. Pri.)	Part of 56	....
56	3rd I.F. Transformer	32-1188	.65
57	Compensating Condenser (3rd I.F. Sec.)	Part of 56	....
58	Condenser (.05 Mfd. Tubular)	30-4123	.35
59	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
60	Resistor (.1 Meg.) (White-White-Orange)	6099	.20
61	Condenser (.0001 Mfd. Twin Bakelite Block)	8035 B	.25
62	Resistor (2 Meg.) (Red-Black-Green)	33-1025	.20
63	Resistor (330000 ohms) (Orange-Orange-Yellow)	6046	.20
64	Volume Control (350000 ohms total) & On-Off Switch	33-5022	1.45
65	Resistor (32000 ohms) (Orange-Red-Orange)	5279	.20
66	Condenser (.03 Mfd. Bakelite Block)	8318 F	....
67	Condenser (.05 Mfd. Tubular)	30-4020	$0.35
68	Condenser (.01 Mfd. Bakelite Block)	3903 G	.25
69	Tone Control	30-4204	.75
70	Condensers (Inside 69)	Part of 69	....
71	Condenser (.15 Mfd. Bakelite Block)	6287 J	.40
72	Resistor (.5 Meg.) (Yellow-White-Yellow)	4517	.20
73	Condenser (Electrolytic—1,1, 1,2 Mfd.)	30-2078	2.45
74	Condenser (.00011 Mfd. Mica)	30-1031	.35
75	Condenser (.05 Mfd. Bakelite Block)	3615 AD	.35
76	Resistor (160,000 ohms) (Brown-Blue-Yellow)	5331	.20
77	Resistor (.1 Meg.) (White-White-Orange)	4411	.20
78	Resistor (5000 ohms) (Green-Black-Red)	5310	.20
79	Resistor (70000 ohms) (Violet-Black-Orange)	5385	.20
80	Resistor (.1 Meg.) (White-White-Orange)	4411	.20
81	Resistor (1 Meg.) (Brown-Black-Green)	4409	.20
82	Condenser (.25 Mfd. Tubular)	30-4146	.40
83	Audio Transformer	32-7057	2.75
84	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
85	Resistor (10000 ohms)	3524	.20
86	Condenser (.01 Mfd. Bakelite Block)	3903 F	.25
87	Output Transformer (U-2)	32-7052	2.00
	(H-13)	32-7078	1.40
88	Voice Coil and Cone Assembly (U-2)	36-3061	1.40
	(H-13)	02625	1.20
89	Field Coil and Pot Assembly (U-2)	36-3088	8.00
	(H-13)	36-3104	2.70
90	Resistor (B.C. Wirewound 7750 ohms)	33-3020	.35
91	Condenser (Electrolytic—8 & 10 Mfd.)	30-2045 (code 125)	1.80
		30-2046 (code 126)	1.85
92	Resistor (Voltage Divider—20 ohms, 100 ohms, 130 ohms)	33-3021	.20
93	Resistor (30000 ohms) (Orange-Black-Orange)	7836	.20
94	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
95	Resistor (13000 ohms) (Brown-Orange-Orange) (3-watt)	6450	.40
96	Filter Choke	32-7056	2.20
97	Condenser (.3 Mfd. Bakelite Block)	6287 F	.40
98	Condenser (Electrolytic—8 Mfd.)	30-2023* (code 125)	1.10
		30-2011 (code 126)	1.40
99	Condenser (.015 Mfd. Twin)	3793 E	.40
100	Power Transformer 60 Cycle 115 Volts (code 125)	32-7291	7.00
	Power Transformer 25 Cycle 115 Volts (code 125)	32-7292	9.25
	Power Transformer 60 Cycle 115 Volts (code 126)	32-7283	7.00
	Power Transformer 25 Cycle 115 Volts (code 126)	32-7284	....
101	Bass Compensation Switch (Toggle Type)	3253	.45
102	Pilot Lamp (Dial Section)	34-2031	.45
103	Pilot Lamp (Dial Section)	34-2031	.12
104	Pilot Lamp (Dial Section)	34-2031	.12
105	Pilot Lamp (Dial Section)	34-2031	.12
	Tube Socket (4 Prong)	7544	.12
	Tube Socket (5 Prong)	27-6013	.11
	Tube Socket (6 Prong)	7547	.11
	Speaker Socket	7828	.10
	Tube Shield (Short Type)	28-1107	.10
	Tube Shield (Tall Type)	28-1820	.06
	Dial Assembly	31-1287	....
	Dial Scale	27-5064	.60
	Chassis Mounting Screw (code 125)	W 1358A	2.60 C
	Chassis Mounting Screw (code 126)	W 1346	.60 C
	Chassis Mounting Foot	27-4116	.05
	Chassis Mounting Foot Plate	27-7497	.35 C
	Chassis Mounting Washer	29-2089	.35 C
	Knob (Waveband Switch, code 126)	27-4051	.10
	Knob (Volume Control and Tone Control)	27-4052	.10
	Knob (Station Selector)	27-4139	.10
	Knob (Fine Tuning Control)	27-4140	.10
	Bass Compensation Switch Plate	28-2415	.05

†31-6026: list price $0.85.

*After Run No. 5: 30-2025, list price $1.35.

MODELS 39,39-A
Voltage,Socket
Trimmers,Alignment

PHILCO RADIO & TELEV. CORP.

Models 39 and 39-A

(Battery Operated—Standard and Short Wave)

PHILCO Models 39 and 39-A are battery-operated radio receivers covering two ranges of frequencies: (1) 550 to 1720 kilocycles, which includes standard broadcasts and some police stations; and (2) 5.5 to 16.0 megacycles (5500 to 16000 kilocycles) which includes the majority of American and foreign Short-wave broadcasting stations.

Model 39 is operated from a two-volt storage battery (Philco 172-R) and a special combination dry B and C battery unit (Philco P-968). The latter is to be connected to the receiver by inserting the plug at the end of the battery cable (attached to chassis) into the socket on the dry battery unit.

Model 39-A is to be operated from a dry A battery (Philco type P-896). The 39-A is also supplied with an additional tube, type 6, used as a "Ballast" tube to keep the voltage on the other tube filaments at a constantly correct voltage. The B and C battery unit, type P-968, is the same for Model 39-A as for Model 39.

The socket for the ballast tube exists in both Model 39 and 39-A chasses but in Model 39, the two filament prong holes are shorted by a metal jumper. This jumper must be left in place at all times on Model 39; on Model 39-A it is removed and replaced by the type 6 ballast tube.

Tubes Used—Type 1C6 detector oscillator, type 34 intermediate frequency, type 30 2d detector and A. V. C., type 32 1st audio, type 30 driver and type 19 output (class B).

Current Consumption—A battery: 670 M.A.; B battery: 19 M.A. **Intermediate Frequency**—460 K.C.

Tube Socket Voltages obtained with PHILCO 025 Tester

(All Voltages Measured to Ground)

	1C6	34	30	32	30	19
Plate..........	130	130	....	45	130	130
Screen Grid.....	66	66	....	30	....	130
Osc. Plate......	112	....	....	....	....	....

Above voltages obtained by use of Philco type 025 Circuit Tester or 048 All-purpose Tester. Both of these units incorporate a high-resistance voltmeter. Tests made by applying test prods to socket terminals underneath chassis (see Fig. 1).

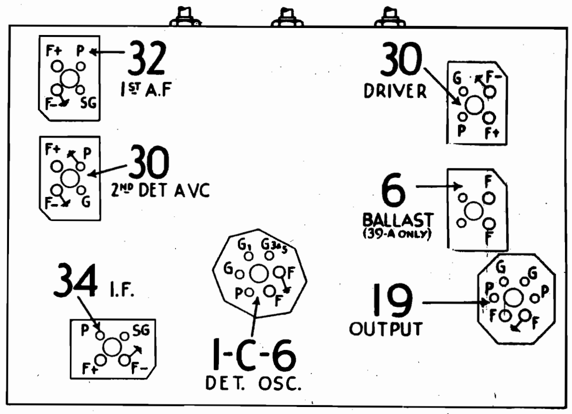


FIG. 1—Bottom View of Tube Sockets for making Voltage Tests

Adjusting Compensating Condensers

The adjustment of compensating condensers in Model 39 requires the use of a signal generator capable of producing a signal on standard broadcast frequencies, and another for the short-waves or high frequencies. For the former we suggest

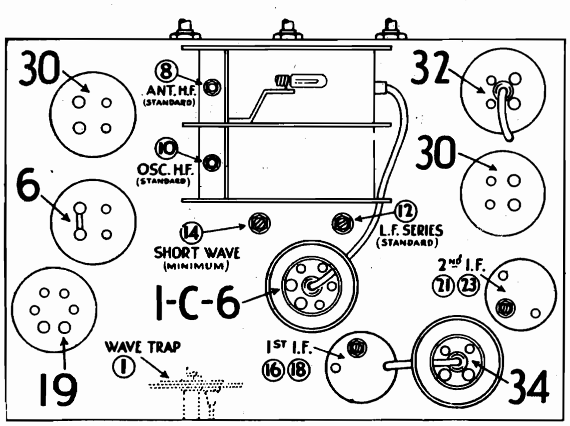


FIG. 2—Locations of Compensating Condensers

Philco Model 024 Signal Generator, and for the Short-wave, Model 091 Crystal Controlled Oscillator. The Model 024 covers frequencies from 105 to 2000 K. C. and the 091 has a fundamental frequency of 3600 K. C. (3.6 M. C.) any harmonic (multiple) of which may be used.

Other equipment needed includes some form of output meter, and a suitable insulated handle wrench and screwdriver for adjusting the condensers. Philco equipment available includes Model 025 or 012 output meter and Part 3164 wrench and 27-7059 screwdriver.

First connect the output meter to the plate contacts of the type 19 output tube.

Adjustments are then made in the following order; positions of all compensators (except number 9 visible in Fig. 4) are shown in Fig. 2.

Adjustment of the Intermediate Frequency

Remove the grid clip from the type 1C6 tube and connect the "ANT." output terminal of the 024 signal generator to the grid cap of the tube. Connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver chassis.

Set the signal generator at 460 K. C. (the intermediate frequency of Model 39) and with the receiver and signal generator turned on, the wave band switch at left and dial at 600

MODELS 39,39-A
Schematic

PHILCO RADIO & TELEV. CORP.

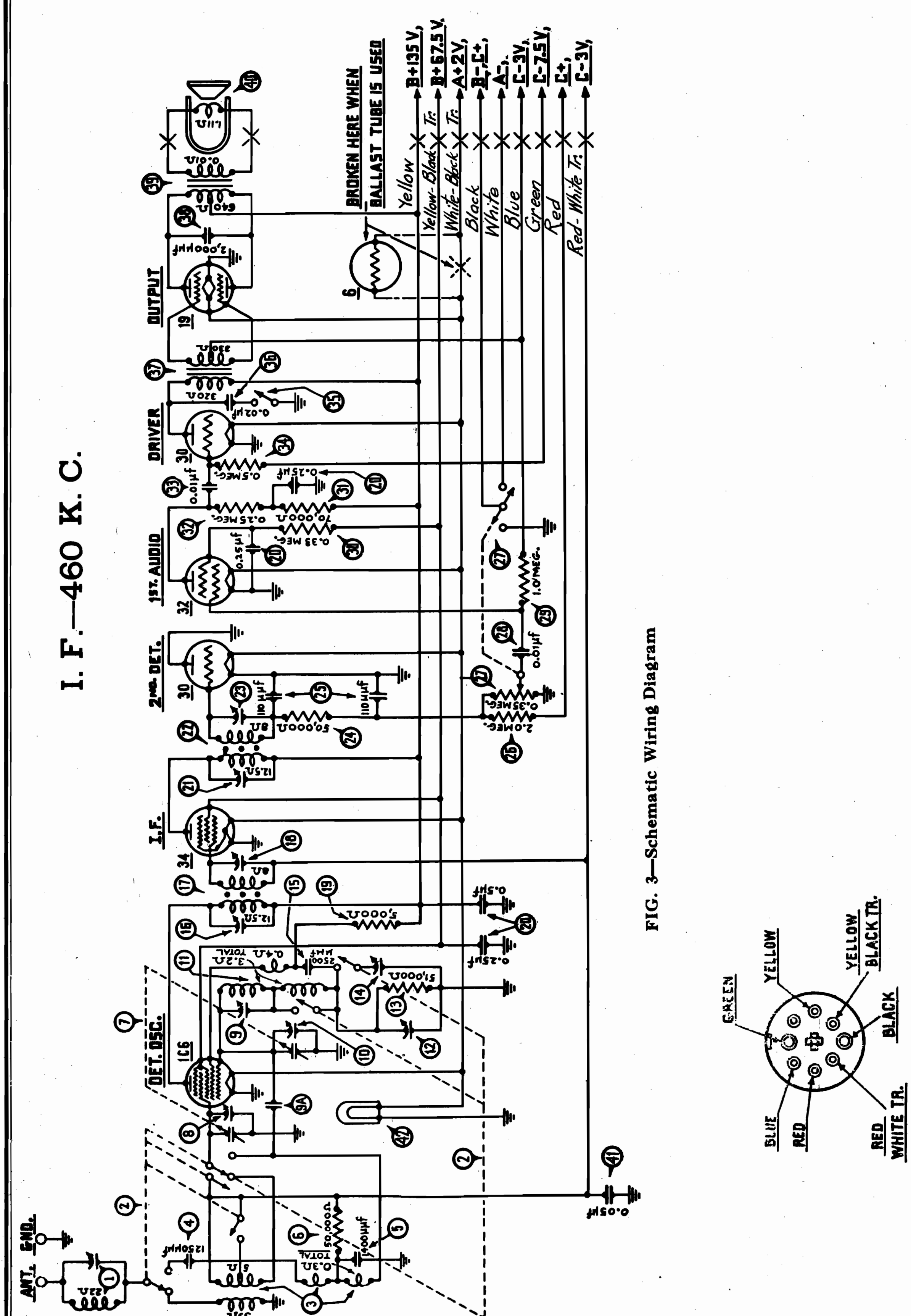


FIG. 3—Schematic Wiring Diagram

Color code of connections from battery cable to plug. "A" battery leads do not come to plug but are brought out of cable just above plug, and polarity marked on metal tag on each lead.

MODELS 39,39-A
Alignment,Part 2
Chassis,Parts

PHILCO RADIO & TELEV. CORP.

K. C., adjust each of the I. F. compensating condensers in turn, to give maximum response in the output meter. If the needle on the meter goes off scale, turn back the attenuator on the signal generator. The two pairs of I. F. compensating condensers are located one pair at the top of each of the two I. F. transformer shields. These are the two metal "cans" near the rear corner of the chassis. Each of the I. F. transformers has a dual compensating condenser mounted at its top, and accessible through a hole in the top of the coil shield. In the dual compensators, the Primary circuit is adjusted by turning the screw; the Secondary circuit is adjusted by turning the hex-head nut. The condenser numbers, referring to Figs. 2 and 3 are (16), (18), (21) and (23).

Adjustment of the Wave Trap

Replace the grid clip upon the Detector-Oscillator tube (Type 1C6). Connect the output leads from the 024 signal generator directly to the antenna and ground terminals of the receiver. Set the Wave-Band Switch of the receiver to the standard broadcast band (left position) and the Station Selector at the low frequency (600 K. C.) end. Adjust the Wave Trap condenser to give MINIMUM response to a 460 K. C. signal from the signal generator. The Wave Trap (1) is located at rear and underneath the chassis, and is shown in Figs. 2 and 4. It is reached from the rear of the chassis, by inserting the fibre wrench through the hole near rear center of sub-base.

Adjustments for Standard Waves

H. F. end: Set signal generator at 1500 K. C. and dial at 150 (lower scale). Now adjust condensers (8) (Antenna) and (10) (Oscillator H. F.) to get maximum response. These condensers are located on the tuning condenser assembly and visible in Fig. 2.

L. F. (series): Turn dial to 60 and set signal generator at 600. Adjust condenser (12) for maximum output. This is reached from the top, through hole in chassis at rear of tuning condenser (see Fig. 2).

Adjustment of Short-Wave Compensators

The crystal controlled signal generator is used for these adjustments. Connect its leads to antenna and ground posts of set. Turn the wave band switch to the right, and the 091 signal generator "on." H. F. or maximum: Turn the dial of the set to about half way between 14 and 15 megacycles (top scale) and you should there pick up the 4th harmonic (14.4) of the 3.6 M. C. signal. Adjust the S. W. (maximum) compensator (9) (see Fig. 4) to give maximum response in the output meter. This compensator is reached from underneath the chassis.

S. W. (minimum): Turn dial of set to a little more than 7 megacycles at which point the second harmonic of the signal generator (7.2 M. C.) should be heard. Adjust condenser (14) (S. W. series) for maximum response. This condenser is reached from above, through hole in top of chassis (see Fig. 2).

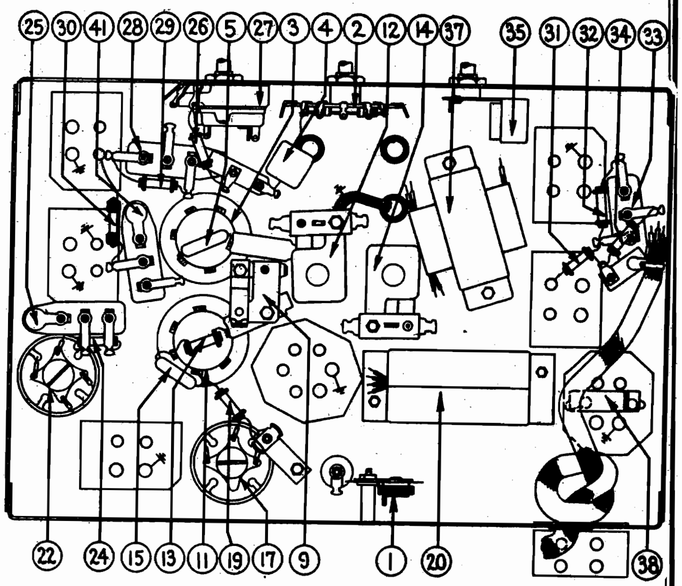


FIG. 4—Bottom View of Chassis

Replacement Parts—Model 39

Nos. on Fig. 3 & 4	Description	Part No.	List Price
(1)	Wave Trap	38-5994	$0.50
(2)	Wave Band Switch	42-1092	.90
(3)	Antenna Transformer	32-1548	1.50
(4)	Condenser (.00125 mfd. mica)	5886	.35
(5)	Condenser (.0014 mfd. mica)	7007	.35
*(6)	Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
*(7)	Tuning Condenser Assembly	31-1440	.....
*(8)	Compensating Condenser (Ant.)	Part of (7)	.....
*(9)	Compensating Condenser (S. W. Maximum)	04000-V	.20
(9)a	Condenser (capacity from twisted wires)	......	.....
(10)	Compensating Condenser (Osc. H. F. Bdcst)	Part of (7)	.....
(11)	Oscillator Transformer	32-1549	1.00
(12)	Compensating Condenser (Osc. L. F. Bdcst)	04000-S	.35
(13)	Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
(14)	Compensating Condenser (Short-wave Minimum)	04000-R	.45
(15)	Condenser (.0025 mfd. mica)	7006	.40
*(16)	Compensating Condenser (1st I. F. pri.)	Part of (17)	.....
(17)	1st I. F. Transformer	32-1550	1.75
*(18)	Compensating Condenser (1st I. F. sec.)	Part of (17)	.....
(19)	Resistor (5000 ohms) (Green-Black-Red)	6096	.20
(20)	Condenser (Metal Case, 4 sec.: .5, .25, .25, .25 mfd.)	30-4253	1.20
*(21)	Compensating Condenser (2nd I. F. pri.)	Part of (22)	.....
(22)	2nd I. F. Transformer	32-1551	1.65
*(23)	Compensating Condenser (2nd I. F. sec.)	Part of (22)	.....
(24)	Resistor (50,000 ohms) (Green-Brown-Orange)	6098	.20
(25)	Condenser (.0001 mfd. twin bakelite block)	8035-C	.25
(26)	Resistor (2 meg.) (Red-Black-Green)	33-1025	.20
(27)	Volume Control & On-Off Switch	33-5020	1.45
(28)	Condenser (.01 mfd. bakelite block)	3903-AD	$0.25
(29)	Resistor (1 meg.) (Brown-Black-Green)	33-1096	.20
(30)	Resistor (330000 ohms) (Orange-Orange-Yellow)	6046	.20
(31)	Resistor (70000 ohms) (Violet-Black-Orange)	33-1115	.20
(32)	Resistor (.25 meg.) (Red-Yellow-Yellow)	33-1097	.20
(33)	Condenser (.01 mfd. bakelite block)	3903-AD	.25
(34)	Resistor (5 meg.) (Yellow-White-Yellow)	6097	.20
(35)	Tone Control (2 pt.)	30-4251	.50
*(36)	Condenser (in tone control)	Part of (35)	.....
(37)	Audio Transformer	7233	1.80
(38)	Condenser (.002 mfd. tubular)	30-4177	.25
*(39)	Output Transformer	32-7286	1.60
*(40)	Cone & Voice Coil Assembly (KR-7 Speaker)	36-3159	.80
(41)	Condenser (.05 mfd. bakelite block)	3615-BC	.35
*(42)	Pilot Lamp (dial)	5316	.23
	Dial Assembly	31-1471	.40
	Tube Shield (fits over base)	8005	.10
	Tube Shield (fits inside base)	28-1107	.10
	Tube Socket (4-prong)	7545	.11
	Tube Socket (6-prong)	7547	.11
	Chassis Mounting Screw	W-567	per C 3.00
	Chassis Mounting Washer (39-B)	5058	per C .85
	Chassis Mounting Washer (39-F)	W-315A	per C .50
	Chassis Mounting Washer (rubber)	5189	.04
	Knob	27-4052	.10
	Battery Cable Assembly (with plug)	41-3118	2.25
	Ballast Tube Jumper Wire	28-8061	.014

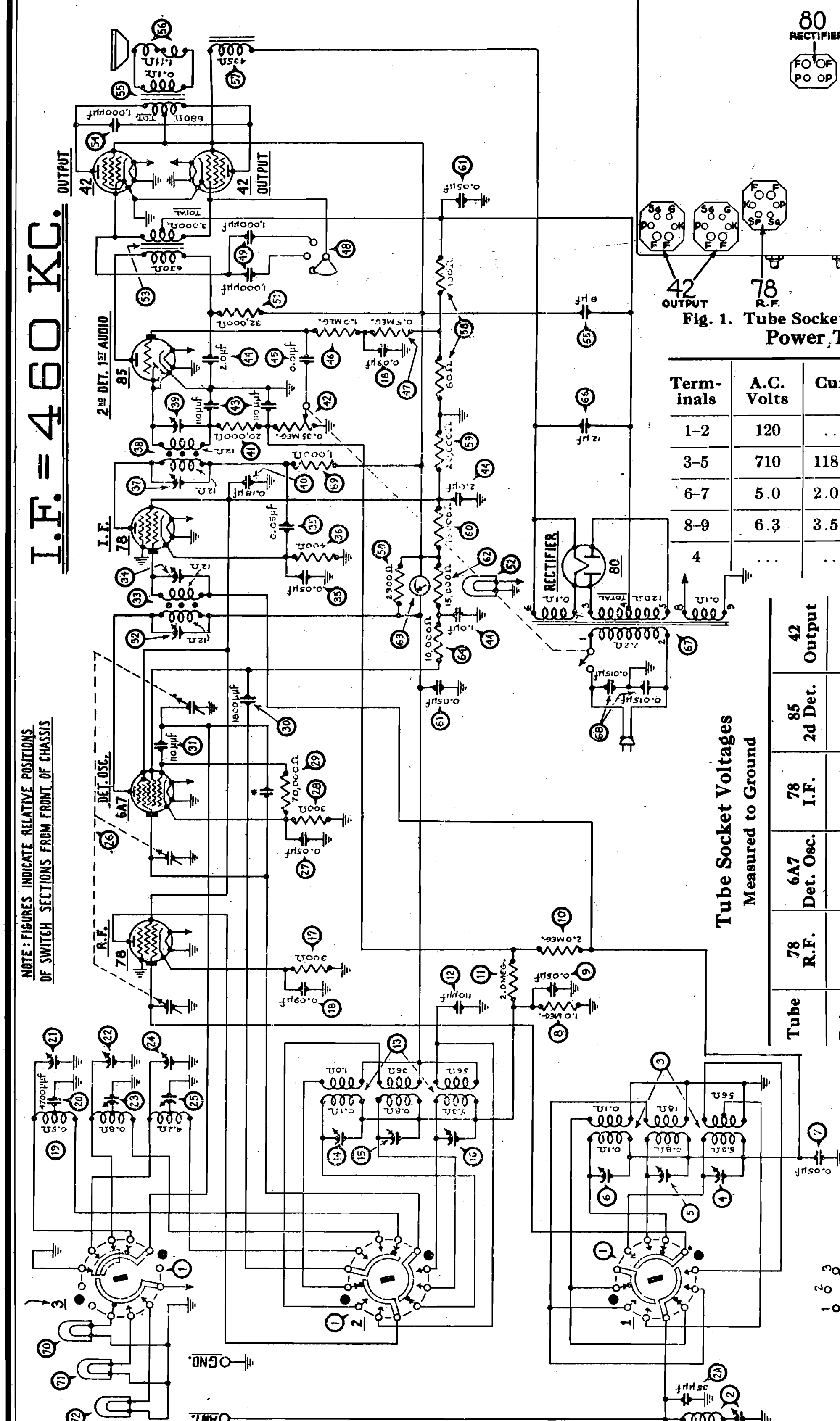
*Do not show in Fig. 4.

MODEL 97
Schematic, Voltage
Socket, Data

PHILCO RADIO & TELEV. CORP.

Fig. 2. Schematic Diagram of Model 97

NOTE: Condenser marked with an asterisk (*) is not a separate part, but simply a capacity obtained by two wires twisted together.



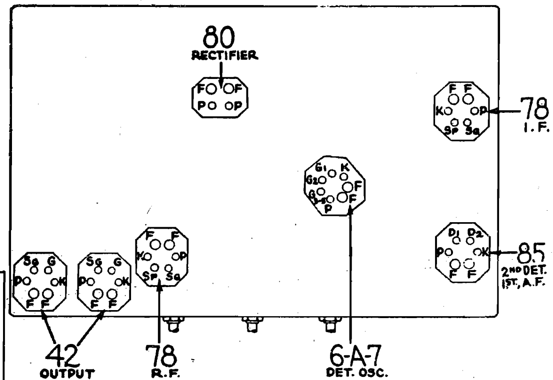


Fig. 1. Tube Sockets as viewed from bottom.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	......	Primary	White
3-5	710	118 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	3.5 A.	Filaments	Black
4	...	......	Center Tap of 3-5	Yellow, Green Tracer

Tube Socket Voltages
Measured to Ground

Tube / Point	78 R.F.	6A7 Det. Osc.	78 I.F.	85 2d Det.	42 Output
P	257	257	265	105	260
SG	97	97	97	...	270
K	2.3	2.6	3	...	...

6A7: G_2 = —14; $G_{3\,\&\,5}$ = 179.

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points.

MODEL 97
Alignment, Trimmers
Data

PHILCO RADIO & TELEV. CORP.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 85, 2d Detector and 1st A.F.; 2 type 42 Output; 1 type 80 Rectifier.

Frequency Range: 540-18000 Kilocycles continuous. Divided into three bands, selectable by 3-point waveband switch.

Coverage of Each Band: Band 1, 550-1750 K.C.; Band 2, 1750-5750 K.C.; Band 3, 5750-18000 K.C. (5.75 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing, non-slip cord from tuning shaft to dial shaft. 80 to 1 ratio for slow-speed tuning.

Tuning Meter: Shadow Tuning Meter. Pilot lamp for each waveband. Waveband switch automatically connects for use the lamp illuminating the scale in use only.

Tone Control: 3-position, with fixed bass compensation.

Intermediate Frequency: 460 K.C.

Power Consumption: 90 watts.

The adjustment of the compensating condensers in Model 97 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. We recommend the Philco model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short wave" frequencies. The location of all compensating condensers is shown in Fig. 4.

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the Model 048A or 024 signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 20 volt range of the output meter in the Model 048A or 025 tester to the plate prongs of the two output tubes or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields (smaller square-top cans) and adjusted thru hole in top. The primary is adjusted by the screw, and the secondary by the nut. Adjust condensers 37 and 39 (2d I.F.) for maximum reading in the output meter, and then condensers 32 and 34 (1st I.F.).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. Set the wave-band switch of the receiver to the extreme left (broadcast position) (Range No. 1, 540-1750 K.C.), and turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap 2 condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment.

Adjustment of High and Low Frequency Compensators

1. Leaving the output meter connected to the receiver connect the Philco Model 091 signal generator to the antenna and ground terminals of the chassis and place the signal generator in operation.

2. Turn the wave-band switch to Range 3 (extreme right) and adjust the station selector to 18.0 megacycles, at which point the fifth harmonic of the 3600 K.C. signal will be heard. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., R.F.-S.W. and antenna S.W. compensators for maximum reading in the output meter. These are numbered 21, 14 and 6, respectively in figure No. 2.

3. Turn the wave-band switch to Range 2 (police bands, 1.75 to 5.8 M.C.) and adjust the tuning dial to 3.6 M.C. (the fundamental signal of the signal generator). Adjust the oscillator, R.F. and antenna compensators (22, 15 and 5, respectively) for maximum output.

5. At this point it will again be necessary to make use of the broadcast type signal generator Models 024, 048A or equivalent. Connect the output of this signal generator to the antenna and ground terminals of the chassis. Turn the station selector dial to 1.8 M.C. (Range 2) and adjust the signal generator to the same frequency (1800 K.C.). Adjust compensator 23 (nut) for maximum output.

6. Turn the wave-band switch to Range No. 1 (broadcast band) and set the dial at 1600 K.C. Set the signal generator at this frequency and adjust compensators 24, 16 and 4 for maximum output.

7. Tune the receiver and the signal generator to 600 K.C. and adjust compensator 25 (screw) for maximum output.

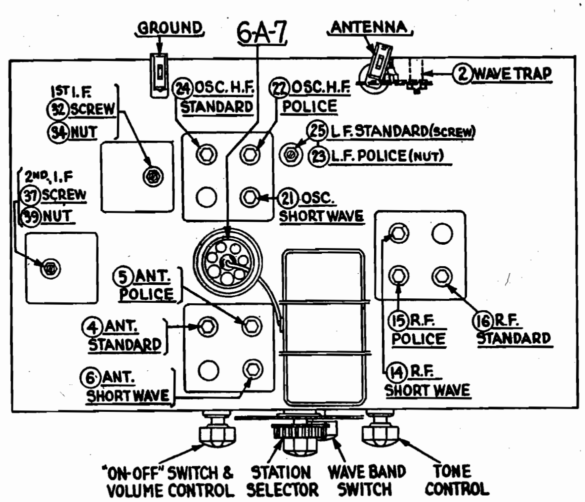


Fig. 4. Locations of Compensating Condensers

PHILCO RADIO & TELEV. CORP.

Replacement Parts—Model 97

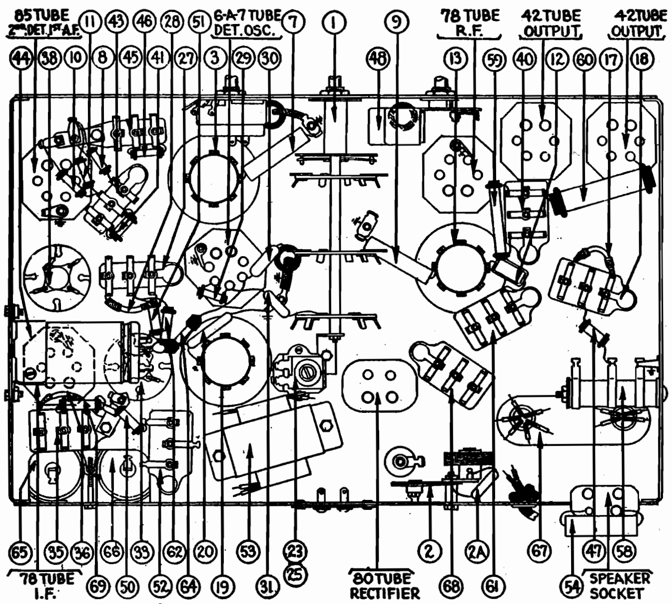


Fig. 3. Bottom View of Chassis

	Description	Part No.	List Price
(1)	Waveband Switch	42-1104	$2.50
(2)	Wavetrap	38-6718	1.00
(2)a	Condenser (.000035 Mfd. Mica)	30-1044	.35
(3)	Antenna Transformer	32-1635	3.00
(4)	Compensating Condenser (Antenna, Standard)	Part of (3)	....
(5)	Compensating Condenser (Antenna, Police Band)	Part of (3)	....
(6)	Compensating Condenser (Antenna, Short Wave)	Part of (3)	....
(7)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(8)	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
(9)	Condenser (.05 Mfd. Tubular)	30-4020	.35
(10)	Resistor (2 Meg.) (Red, Black, Green)	33-1172	.20
(11)	Resistor (2 Meg.) (Red, Black, Green)	33-1172	.20
(12)	Condenser (.00011 Mfd. Mica)	30-1031	.35
(13)	R.F. Transformer	32-1636	3.25
(14)	Compensating Condenser (R.F., Short Wave)	Part of (13)	....
(15)	Compensating Condenser (R.F., Police Band)	Part of (13)	....
(16)	Compensating Condenser (R.F., Standard)	Part of (13)	....
(17)	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010	.20
(18)	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
(19)	Oscillator Transformer	32-1637	2.50
(20)	Condenser (.0047 Mfd. Mica)	30-1052	.60
(21)	Compensating Condenser (OSC., Short Wave)	Part of (19)	....
(22)	Compensating Condenser (OSC., H.F. Police)	Part of (19)	....
(23)	Compensating Condenser (OSC., L.F. Police) Part of	31-6027	.70
(24)	Compensating Condenser (OSC., H.F. Standard)	Part of (19)	....
(25)	Compensating Condenser (OSC., L.F. Standard) Part of	31-6027	.70
(26)	Tuning Condenser Assembly	31-1518	6.75
(27)	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
(28)	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010	.20
(29)	Resistor (70000 ohms) (Violet, Black, Orange)	33-1164	.20
(30)	Condenser (.0018 Mfd. Mica)	6018	.40

‡Omitted after Run 3. Not shown in Fig. 2.
†In Model 97-A (25 cycles) this is Part No. 30-2026.

	Description	Part No.	List Price
(31)	Condenser (.00011 Mfd. Mica)	30-1031	$0.35
(32)	Compensating Condenser (1st I.F. Pri.)	Part of (33)	....
(33)	First I.F. Transformer	32-1631	1.60
(34)	Compensating Condenser (1st I.F. Sec.)	Part of (33)	....
(35)	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DU	.40
(36)	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
(37)	Compensating Condenser (2nd I.F. Pri.)	Part of (38)	....
(38)	2nd I.F. Transformer	32-1632	1.60
(39)	Compensating Condenser (2nd I.F. Sec.)	Part of (38)	....
(40)	Condenser (.18 Mfd. Bakelite Block)	4989-DG	.40
(41)	Resistor (20000 ohms) (Red, Black, Orange)	33-1130	.20
(42)	Volume Control (350000 ohms) & On-Off Switch	33-5102	1.45
(43)	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG	.25
(44)	Condenser (Electrolytic: 2 Mfd., 2 Mfd., 1 Mfd.)	30-2114	2.25
(45)	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
(46)	Resistor (1 Meg.) (Brown, Black, Green)	33-1171	.20
(47)	Resistor (.5 Meg.) (Yellow, White, Yellow)	33-1169	.20
(48)	Tone Control	30-4311	.65
(49)	Condensers in Tone Control	Part of (48)	....
(50)	Resistor (2900 ohms) (Red, White, Red)	5309	.20
(51)	Resistor (32000 ohms) (Orange, Red, Orange)	3525	.20
(52)	Pilot Lamp	Part of (63)	....
‡(52)a	Condenser (.25 Mfd. Bakelite Block)	6287-P	.40
(53)	Audio Transformer	32-7372	2.50
(54)	Condenser (.001 Mfd. Tubular)	30-4201	.25
(55)	Output Transformer (on Speaker)	2585	1.55
(56)	Speaker Cone & Voice Coil Assembly K-31	36-3174	.80
	Speaker Cone & Voice Coil Assembly H-21	02625	1.20
(57)	Speaker Field Coil K-31	36-3463	3.75
	Speaker Field Coil H-21	36-3461	3.75
(58)	B-C Resistor (Wire-Wound 100 ohm, 60 ohms)	33-3208	.20
(59)	Resistor (20000 ohms) (Red, Black, Orange)	33-1130	.20
(60)	Resistor (16000 ohms) (Brown, Blue, Orange)	33-1201	.35
(61)	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG	.40
(62)	Resistor (15000 ohms) (Brown, Green, Orange)	6208	.20
(63)	Shadow Tuning Meter	45-2028	2.50
(64)	Resistor (10000 ohms) (Brown, Black, Orange)	4412	.20
†(65)	Condenser (Electrolytic—8 Mfd.)	30-2025	1.35
†(66)	Condenser (Electrolytic—12 Mfd.)	30-2117	1.50
(67)	Power Transformer, 115 Volts, 60 Cycles	32-7369	8.00
	115 Volts, 25 Cycles	32-7370	8.25
	230 Volts, 60 Cycles	32-7371	7.75
(68)	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
(69)	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
(70)	Dial Lamp (Standard Band)	34-2031	.12
(71)	Dial Lamp (Police Band)	34-2031	.12
(72)	Dial Lamp (Short-wave Band)	34-2031	.12
(73)	Dial Assembly	31-1513	.75
	Knob (Tone Control, Volume Control)	27-4052	.10
	Knob (Waveband)	27-4051	.10
	Knob (Station Selecto	27-4139	.10
	Knob (Fine Tuning)	27-4140	.10
	Tube Shield Body	28-1107	.10
	Tube Shield Base	28-1110	.04
	Pilot Lamp Assembly	38-6075	.15
	4 Prong Tube Socket	27-6006	.10
	6 Prong Tube Socket	27-6020	.11
	7 Prong Tube Socket	27-6012	.10
	Electric Cord and Plug	L-943A	.60
	Speaker Socket	27-6018	.10
	Chassis Mtg. Screw (97-X)	W-1345-A	2.75C
	Chassis Mtg. Screw (97-B)	W-1346-A	.60C
	Chassis Mtg. Foot (Rubber)	27-4116	.05
	Chassis Mtg. Foot Plate	27-7497	.35C
	Chassis Mtg. Washer	29-2089	.35C
	Bezel	27-4120	.15

MODEL 116-B (Code 121)
Chassis, Socket, Voltage
Trimmers, Data

PHILCO RADIO & TELEV. CORP.

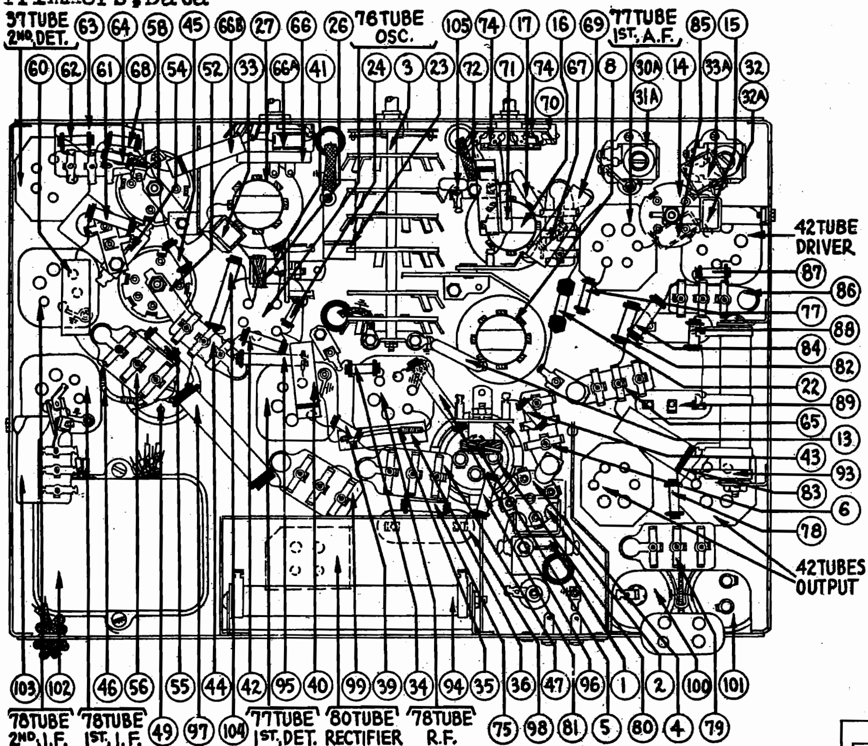


Fig. 4 Bottom View of Chassis

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	......	Primary	White
3–5	720	123 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	5.0 A.	Filaments	Black
4	...	......	Center Tap of 3–5	Yellow, Green Tracer

Tube Socket Voltages

Measured to Ground—Line Voltage 115

Tube Point	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st A.F.	42 Driver	42 Output
P	187	202	75	193	199	0	67	192	279
SG	74	74	...	74	74	..	52	192	279
K	1.8	5.4	5.0	1.8	5.1	..	..	...	...
	80 Rect. Cathode—290V.								

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch standard broadcast (band 4). Use Fig. 1 for test points. H-13 Speaker used.

Type Circuit: Superheterodyne, with push-pull pentodes connected as triodes in output; output 10 watts; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Eleven (11) Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 oscillator, 2 type 78 I.F., 1 type 37 2nd detector, 1 type 77 1st audio, 1 type 42 driver, 2 type 42 output, 1 type 80 rectifier.

Wave Bands: Five—(1) Shortwave, daytime; (2) Shortwave, night-time; (3) Police and amateur; (4) Standard Broadcast; (5) Longwave (weather forecasts).

Frequency Ranges: Band (1)—9.7-22.5 Megacycles; Band (2)—4.1-10.0 Megacycles; Band (3)—1.5-4.1 Megacycles; Band (4)—540 to 1500 K.C.; Band (5)—150-390 K.C.

Program Control: 5 positions: (1) Mellow, (2) Brilliant, (3) Speech, (4) Normal, (5) noise reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Bass Compensation: Automatic: Effective when needed.

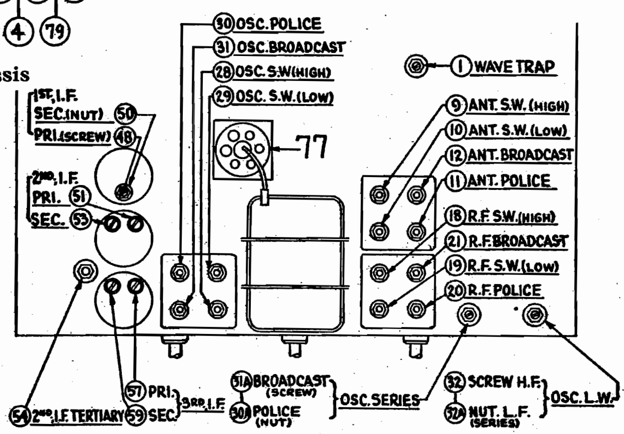


Fig. 2. Locations of Compensating Condensers

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 for main drive.

Intermediate Frequency: 460 K.C.

Power Consumption: 100 watts.

Speaker: Type H-13.

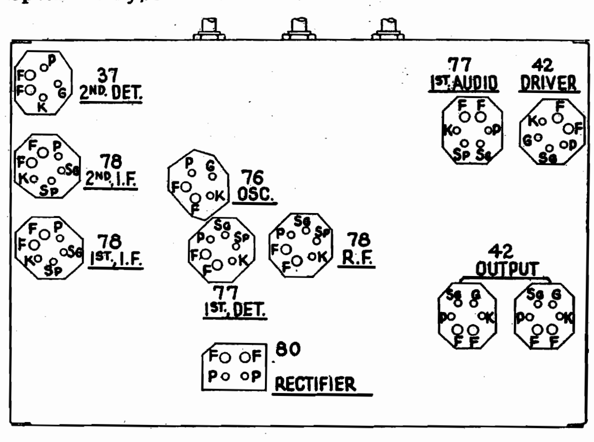
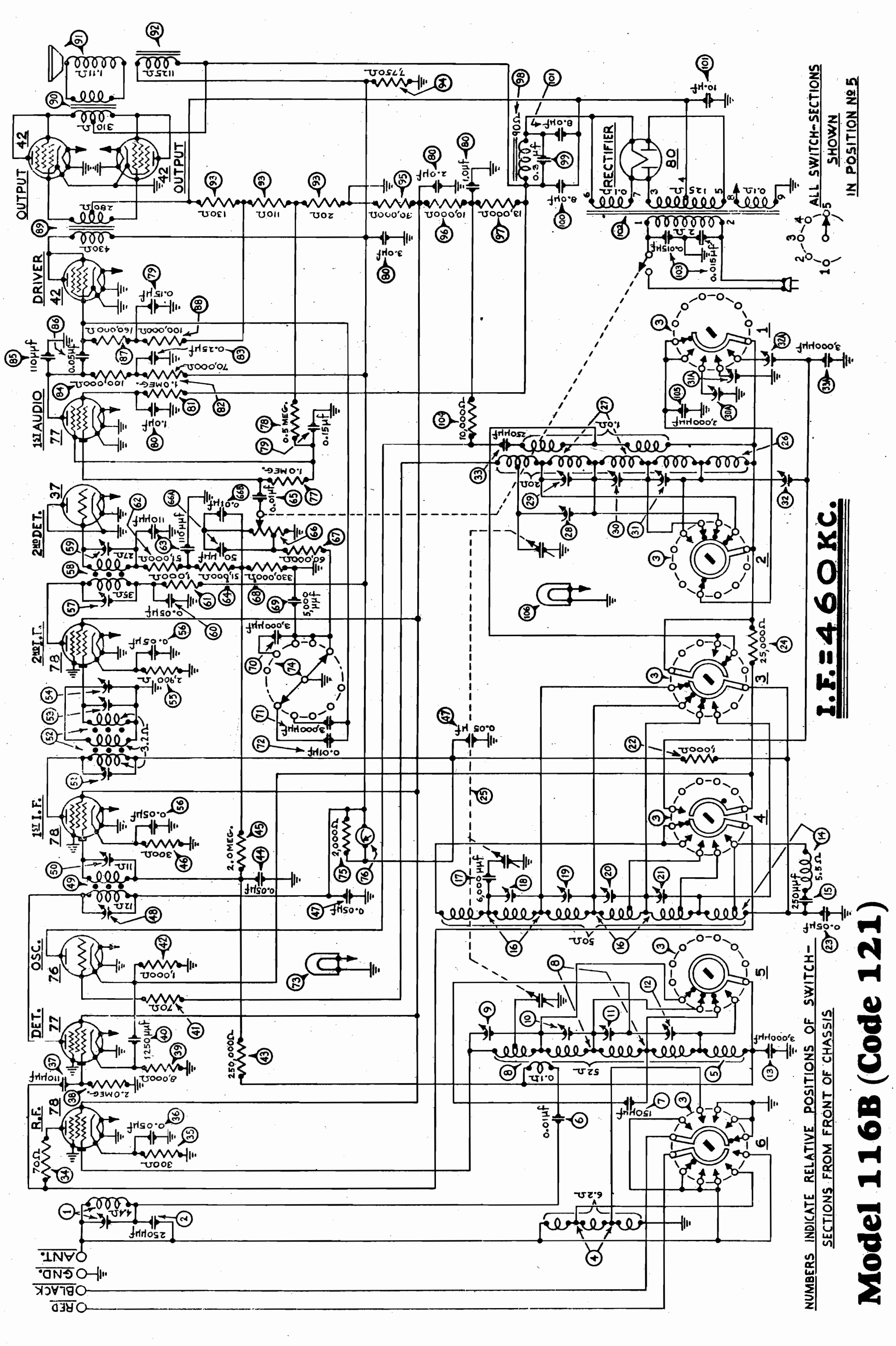


Fig. 1. Tube Sockets as viewed from bottom

MODEL 116-B (Code 121)
Schematic

PHILCO RADIO & TELEV. CORP.



PHILCO RADIO & TELEV. CORP.

Adjustment of compensating condensers in Model 116 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20000 K.C. will be ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high-grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers is shown in Fig. 2. Connect the output meter to the plate contacts of the output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 77 1st detector tube (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to standard broadcast (second position from left) and set dial at 55. Turn condenser 54 (2nd I.F. tertiary) all the way down before adjusting the other I.F. Compensators. Now with the fibre screwdriver, adjust condensers 59 and 57 (3rd I.F.), 53 and 51 (2nd I.F.), and then 50 and 48 (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale. Now adjust condenser 54 (2nd I.F. tertiary for maximum reading).

WAVE TRAP—Connect the Signal Generator antenna and ground leads to the antenna and ground posts of the set. Replace the grid clip on the 77 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap 1 until the minimum reading is obtained in the output meter.

SHORTWAVE (DAYTIME BAND)—Turn wave band switch to the shortwave (daytime) position (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, Antenna, and R.F. shortwave compensators in turn, for maximum reading. These are 28, 9 and 18 respectively.

SHORTWAVE (NIGHT-TIME BAND)—Turn the waveband switch to position 4 (counting from the left). Set the signal generator and receiver at 9.5 megacycles and adjust the oscillator, antenna and R.F. compensators respectively, in this band for maximum reading. These are 29, 10 and 19.

POLICE AND AMATEUR BAND—Turn the waveband switch to position 3. Set the dial and signal generator at 4.0 megacycles and adjust condensers 30, 11 and 20 respectively for maximum reading.

Set the signal generator at 1600 K.C. and turn the dial to 1.6. Adjust condenser 30a (nut), oscillator police series, to maximum reading.

STANDARD BROADCAST BAND—Turn the waveband switch to position 2 (from left). Set the dial and signal generator at 1500 K.C. and adjust condensers 31, 12 and 21 for maximum reading.

Set the dial and signal generator at 600 K.C. and adjust condenser 31a (screw), broadcast series, for maximum reading.

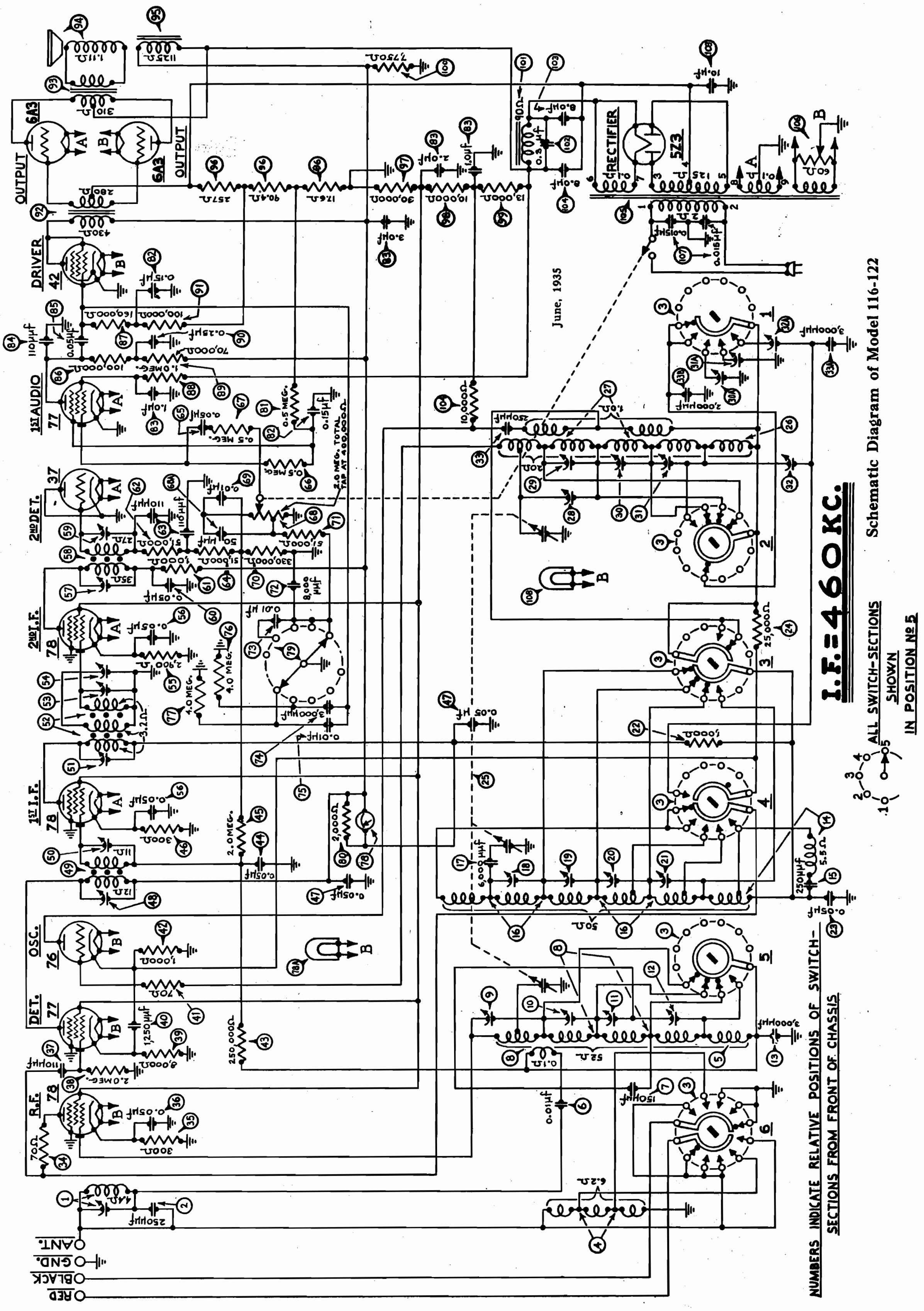
LONGWAVE BAND—Turn waveband switch to position 1 (left). Set the dial and signal generator at 340 K.C. and adjust condenser 32 (screw) to maximum. This is the upper end of the longwave (low frequency) band. Finally, set the dial and signal generator at 175 K.C. and adjust condenser 32a (nut) for maximum reading. This is the lower end of the longwave band.

	Description	Part No.	List Price
1	Wave Trap	38-6889	$1.00
2	Condenser (.00025 Mfd. Mica)	30-1032	.35
3	Waveband Switch	42-1118	2.60
4	Transmission Line Transformer	32-1608	1.00
5	Antenna Transformer (Long Wave)	32-1729	.55
6	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
7	Condenser (.000015 Mfd. Mica)	‡30-1030	.35
8	Antenna Transformer (Standard, Police, Short-wave)	32-1735	3.60
9	Compensating Condenser (Ant. S.W. High Band)	Part of 8	....
10	Compensating Condenser (Ant. S.W. Low Band)	Part of 8	....
11	Compensating Condenser (Ant. Police)	Part of 8	....
12	Compensating Condenser (Ant. Standard)	Part of 8	....
13	Condenser (.003 Mfd. Mica)	7301	.45
14	R. F. Transformer (Long Wave)	32-1730	1.25
15	Condenser (.00025 Mfd. Mica)	30-1038	.35
16	R. F. Transformer (Standard, Police, S.W.)	32-1468	2.30
17	Condenser (.002 Mfd. Mica)	30-1042	.40
18	Compensating Condenser (R.F. Shortwave (High Band)	Part of 16	....
19	Compensating Condenser (R.F. Shortwave (Low Band)	Part of 16	....
20	Compensating Condenser (R.F. Police)	Part of 16	....
21	Compensating Condenser (R.F. Standard)	Part of 16	....
22	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
23	Condenser (.05 Mfd. Tubular)	30-4123	.35
24	Resistor (25000 ohms) (Red-Green-Orange)	33-1013	.20
25	Tuning Condenser Assembly	31-1606	5.50
26	Oscillator Transformer (Long Wave)	32-1731	55
27	Oscillator Transformer (Standard, Police, Shortwave)	32-1736	3.50
28	Compensating Condenser (Osc. S.W., High Band)	Part of 27	....
29	Compensating Condenser (Osc. S.W., Low Band)	Part of 27	....
30	Compensating Condenser (Osc. Police)	Part of 27	....
30a	Compensating Condenser (Osc. Police. Series)	Part of 31-6027	.70
31	Compensating Condenser (Osc. Standard)	Part of 27	....
31a	Compensating Condenser (Osc. Standard Series)	Part of 31-6027	.70
32	Compensating Condenser (Osc. Longwave)	31-6050	.40
32a	Compensating Condenser (Osc. Longwave Series)		
33	Condenser (.00025 Mfd. Mica)	5858	.35
33a	Condenser (.003 Mfd. Mica)	30-1028	.60
34	Resistor (70 ohms) (Violet-Black-Black)	33-1129	.20
35	Resistor (300 ohms Flexible) (Orange-Black-Brown)	33-3010	.20
36	Condenser (.05 Mfd. Tubular)	30-4020	.35
37	Condenser (.00011 Mfd. Tubular)	*30-4340	.25
38	Resistor (2 Megs.) (Red-Black-Green)	*33-1025	.20
39	Resistor (8000 ohms) (Gray-Black-Red)	33-1114	.20
40	Condenser (.00125 Mfd. Tubular)	30-4336	.25
41	Resistor (70 ohms) (Violet-Black-Black)	33-1129	.20
42	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
43	Resistor (240000 ohms)(Red-Yellow-Yellow)	33-1097	.20
44	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
45	Resistor (2 Megs.) (Red-Black-Green)	33-1025	$0.20
46	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20
47	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG	.40
48	Compensating Condenser (1st I.F. Primary)	Part of 49	....
49	First I.F. Transformer	32-1642	2.00
50	Compensating Condenser (1st I.F. Secondary)	Part of 49	....
51	Compensating Condenser (2nd I.F. Primary)	Part of 31-6028	.85
52	Second I.F. Transformer	32-1734	1.85
53	Compensating Condenser (2nd I.F. Secondary)	Part of 31-6028	.85
54	Compensating Condenser (2nd I.F. Tertiary)	04000R	.45
55	Resistor (2900 ohms) (Red-White-Red)	5309	.20
56	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG	.40
57	Compensating Condenser (3rd I.F. Primary)	Part of 31-6003	.45
58	3rd I.F. Transformer	32-1188	.65
59	Compensating Condenser (3rd I.F. Secondary)	Part of 31-6003	.45
60	Condenser (.05 Mfd. Tubular)	30-4123	.35
61	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
62	Resistor (51000 ohms) (Green-Brown-Orange)	33-1163	.20
63	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG	.25
64	Resistor (51000 ohms) (Green-Brown-Orange)	33-1163	.20
65	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
66	Volume Control and On-Off Switch (See Note Below)	33-5022	1.45
66a	Condenser (.00005 Mfd. Mica)	30-1029	.35
66b	Condenser (.05 Mfd. Tubular)	30-4020	.35
67	Resistor (60000 ohms) (Blue-Black-Orange)	33-1181	.20
68	Resistor (330000 ohms) (Orange-Orange-Yellow)	33-1200	.20
69	Condenser (.004 Mfd. Tubular)	30-4185	.40
70	Condenser (.004 Mfd. Tubular)	30-4185	.40
71	Condenser (.003 Mfd. Mica)	30-1028	.60
72	Condenser (.01 Mfd. Tubular)	30-4169	.30
73	Pilot Lamp (Shadow Tuning Meter)	Part of 76	....
74	Tone Control Switch	42-1119	.55
75	Resistor (2000 ohms) (Red-Black-Red)	6984	.20
76	Shadow Tuning Meter	45-2083	2.50
77	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
78	Resistor (500000 ohms) (Yellow-White-Yellow)	6097	.20
79	Condenser (.15 Mfd. Twin Bakelite Block)	6287-DG	.40
80	Condenser (Electrolytic—1 Mfd., 3 Mfd., 2 Mfd., 1 Mfd.)	30-2121	2.50
81	Resistor (1 Meg.) (Brown-Black-Green)	4409	.20
82	Resistor (70000 ohms) (Violet-Black-Orange)	5385	.20
83	Condenser (.25 Mfd. Tubular)	30-4134	.45
84	Resistor (100000 ohms) (White-White-Yellow)	4411	.20
85	Condenser (.00011 Mfd. Mica)	30-1031	.35
86	Condenser (.05 Mfd. Bakelite Block)	3615-SU	.35
87	Resistor (160000 ohms) (Brown-Blue-Orange)	33-1191	.20
88	Resistor (100000 ohms) (White-White-Yellow)	33-1165	.20
89	Audio Transformer	32-7057	2.75
90	Output Transformer	32-7078	1.40
91	Cone and Voice Coil Assembly (H-13)	02625	1.20
92	Field Coil & Pot Assembly (H-13)	36-3104	2.70
93	B.C. Resistor (Wirewound) (20 ohms, 110 ohms, 130 ohms)	33-3021	.20
94	Resistor (Wirewound) (7750 ohms)	33-3020	.35
95	Resistor (30000 ohms) (Orange-Black-Orange)	7836	.20
96	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
97	Resistor (13000 ohms) (Brown-Orange-Orange)	6450	.40
98	Filter Choke	32-7056	2.20
99	Condenser (.3 Mfd. Bakelite Block)	**6287-DU	.40
100	Condenser (Electrolytic, 8 Mfd.)	‡‡30-2025	1.35
101	Condenser (Electrolytic, 8 Mfd., 10 Mfd.)	30-2045	1.80
102	Power Transformer 115 V. 60 Cycles	32-7291	7.00
	Power Transformer 115 V. 25 Cycles	32-7292	9.25
	Power Transformer 230 V. 50 Cycles	32-7293	6.75
103	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
104	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
105	Condenser (.002 Mfd. Mica)	30-1042	.40
106	Pilot Lamp (Dial)	34-2039	.15
107	Condenser (.006 Mfd. Tubular) (Not shown in Fig. 4)	30-4125	.25
108	Condenser (.006 Mfd. Tubular) (Not shown in Fig. 4)	30-4125	.25

*Mounted on top of chassis.
‡Mounted inside 6.
**In 25-cycle model, this is part No. 04357.
‡‡In 25-cycle model, this is part No. 30-2026
Note: Volume Control is 2 meg., tapped at 400.000 ohm

MODEL 116-X (Code 122)
Schematic

PHILCO RADIO & TELEV. CORP.



MODEL 116-X (Code 122)
Voltage, Chassis, Socket, Parts, Data

PHILCO RADIO & TELEV. CORP.

Model 116X (Code 122)

Type Circuit: Superheterodyne. Push-pull, 6A3 tubes, in output, 15 watts. Built in connections for Philco All-wave Aerial. Aerial Selector operated by waveband switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Eleven Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 Oscillator, 2 type 78 I.F., 1 type 37 2nd Detector, 1 type 77 1st Audio, 1 type 42 Driver, 2 type 6A3 Output, [redacted] 1 type 5-Z-3.

Wave Bands: Five—(1) Shortwave, daytime; (2) Shortwave, night-time; (3) Police and amateur; (4) Standard broadcast; (5) Longwave (weather forecasts).

Frequency Ranges: Band (1)—9.7-22.5 Megacycles; Band (2)—4.1-10.0 Megacycles; Band (3)—1.5-4.1 Megacycles; Band (4)—540 to 1500 K.C.; Band (5)—150-390 K.C.

Program Control: 5 positions: (1) Mellow, (2) Brilliant, (3) Speech, (4) Normal, (5) Noise-reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Potentiometer: To compensate for differences in characteristics of 6A3 tubes. Adjust for minimum low-pitched hum when set is in operation, volume at minimum.

Acoustic Clarifiers: Three: mounted on inclined sounding board with speaker.

Bass Compensation: Automatic, effective when needed.

Speaker: Type U-9 (High-fidelity).

Tuning Drive: Dual Planetary, ball-bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 for main drive.

Intermediate Frequency: 460 K.C.

Power Consumption: 135 watts.

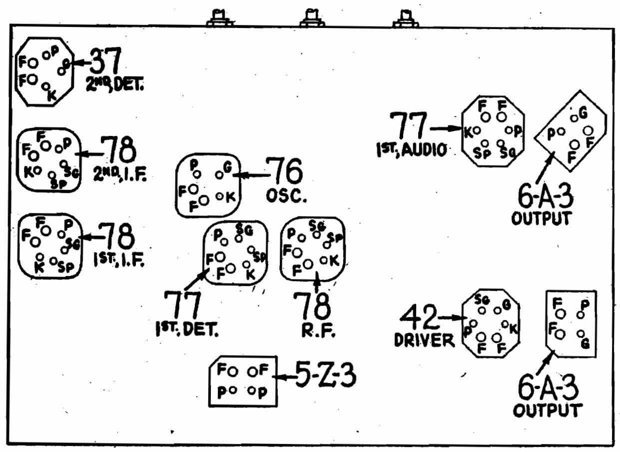


Fig. 1. Tube Sockets as viewed from bottom

Tube Socket Voltages

(Line Voltage 115) All Voltages Measured to Ground

Tube Point	78 R.F.	77 1st Det.	76 Osc.	78 1st I.F.	78 2d I.F.	37 2d Det.	77 1st A.F.	42 Driver	6A3 Output	5Z3
P	207	215	98	208	212	0	95	220	320	...
SG	89	89	...	89	89	..	72	220	320	...
K	2.2	5.2	5.2	2.1	6.4	0	..	....	...	340

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch at standard broadcast. Use Fig. 1 for test points. U-9 Speaker used.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color of Leads
1–2	120	.....	Primary	White
3–5	830	170 M. A.	Secondary	Yellow
6–7	5.0	3.0 A.	Rectifier Filament	Blue
8–9	6.3	2.7 A.	Filaments	Black
4	...	.....	Center Tap of 3–5	Yellow, Green Tracer

Compensating Condensers

Adjustment same as Model 116 Code 121
(Refer to Bulletin No. 222)

Replacement Parts Model 116 (122)

Note: All parts on schematic and base view numbered from ① to 64 inclusive are the same as used on model 116B (121). Refer to Bulletin No. 222. Parts subsequent to 64 are listed herewith.

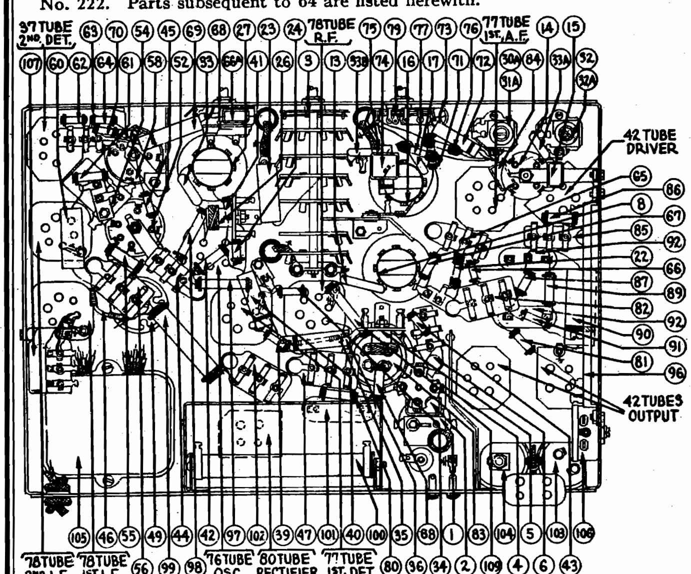


Fig. 2. Base View

	Description	Part No.	List Price
65	Condenser (.05 Mfd. Bakelite Block)	3615-SU	$0.35
66	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20
67	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20
68	Volume Control and On-Off Switch	33-5110	$1.45
68a	Condenser (.00005 Mfd. Mica)	30-1029	.35
69	Condenser (.01 Mfd. Tubular)	30-4169	.30
70	Resistor (330000 ohms) (Orange-Orange-Yellow)	33-1200	.20
71	Resistor (51000 ohms) (Green-Brown-Orange)	6098	.20
72	Condenser (.008 Mfd. Tubular)	30-4112	.25
73	Condenser (.01 Mfd. Tubular)	30-4169	.30
74	Condenser (.003 Mfd. Mica)	30-1028	.60
75	Condenser (.01 Mfd. Tubular)	30-4169	.30
76	Resistor (4 Meg.) (Yellow-Black-Green)	6010	.20
77	Resistor (4 Meg.) (Yellow-Black-Green)	6010	.20
78	Shadow Tuning Meter	45-2083	2.50
78a	Pilot Lamp for Shadow Tuning Meter	Part of 78	....
79	Tone Control Switch	42-1119	.50
80	Resistor (2000 ohms) (Red-White-Red)	6984	.20
81	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097	.20
82	Condenser (.15 Mfd. Twin Bakelite Block)	6287-DU	.40
83	Condenser (Electrolytic) (1 Mfd., 3 Mfd., 2 Mfd., 1 Mfd.)	30-2121	2.50
84	Condenser (.00011 Mfd. Mica)	30-1031	.35
85	Condenser (.05 Mfd. Bakelite Block)	3615-SU	.35
86	Resistor (100000 ohms) (White-White-Yellow)	4411	.20
87	Resistor (160000 ohms) (Brown-Blue-Yellow)	33-1191	.20
88	Resistor (1 Meg.) (Brown-Black-Green)	4409	.20
89	Resistor (70000 ohms) (Violet-Black-Orange)	5385	.20
90	Condenser (.25 Mfd. Tubular)	30-4134	.45
91	Resistor (100000 ohms) (White-White-Orange)	6099	.20
92	Audio Transformer	32-7447	3.00
93	Output Transformer (On Speaker)	32-7446	1.75
94	Cone & Voice Coil Assembly (U-9)	36-3381	1.75
95	Field Coil & Pot Assembly (U-9)	36-3088	8.00
96	Resistor (Wirewound, Flat Type—17.6, 90.4, 257 ohms)	33-3212	.65
97	Resistor (30000 ohms) (Orange-Black-Orange)	7836	.20
98	Resistor (10000 ohms) (Brown-Black-Orange)	3524	.20
99	Resistor (13000 ohms) (Brown-Orange-Orange)	6450	.40
100	Resistor (7750 ohms, Wirewound Porcelain Tube)	33-3020	.35
101	Filter Choke	32-7056	2.20
102	Condenser (.3 Mfd. Bakelite Block)	6287-DU	.40
103	Condenser (Electrolytic) (8 Mfd., 10 Mfd.)	30-2123	1.80
104	Condenser (Electrolytic) (8 Mfd.)	30-2011	1.40
105	Power Transformer: 115 Volts, 60 Cycles	32-7431	7.50
	Power Transformer: 115 Volts, 25 Cycles	32-7432	12.00
	Power Transformer: 230 Volts, 50 Cycles	32-7433	8.75
106	Potentiometer	33-5111	.70
107	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
108	Pilot Lamp (Dial Scales)	34-2064	.09
	4-Prong Socket (6A3 Tubes)	27-6044	.10

PHILCO RADIO & TELEV. CORP.

MODEL 201 (Code 121) Schematic, Parts

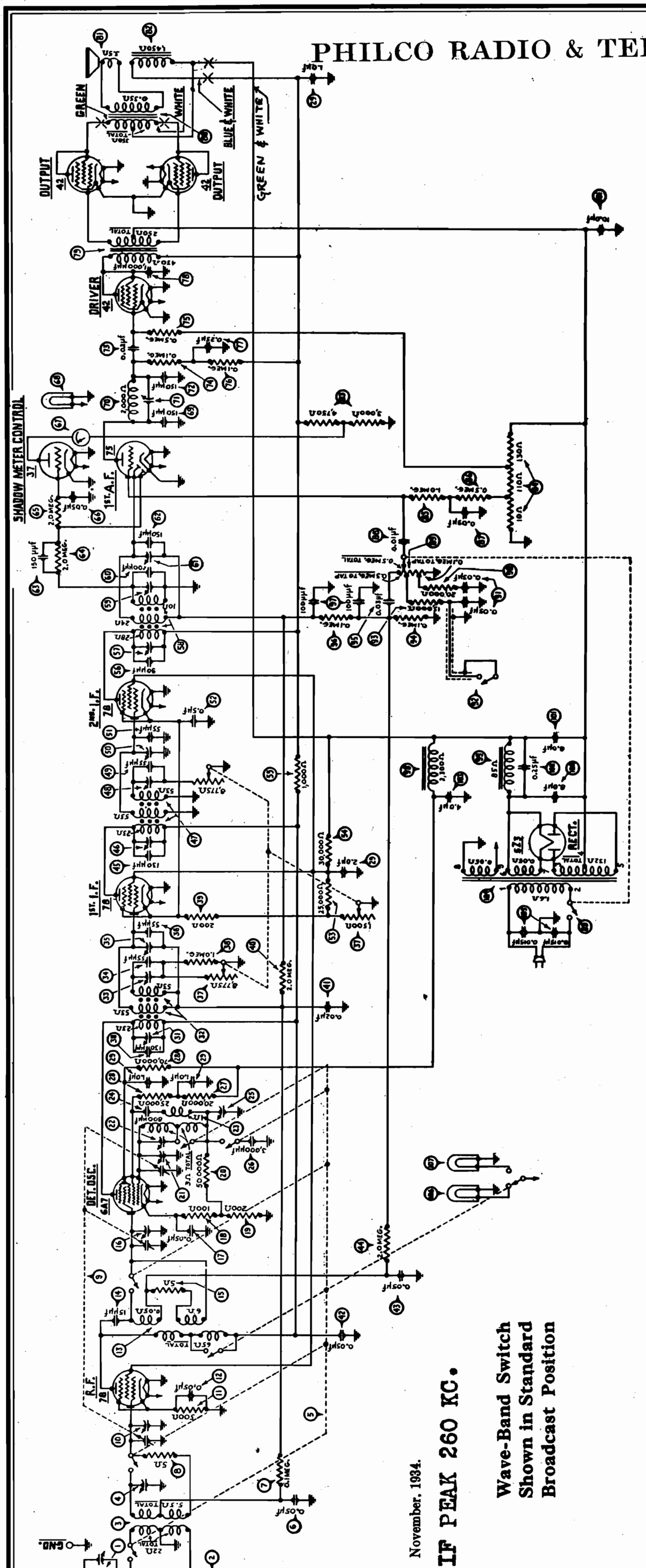


Fig. 2—Model 201 (Code 121) Wiring Diagram

1	Wave Trap	38-6248
2	Resistor (10000 ohms) (Brown-Black-Orange)	33-1000
3	Antenna Transformer	32-1481
4	Compensating Condenser (ANT. S. W.)	04000D
5	Waveband Switch	42-1083
6	Condenser (.05 Mfd. Tubular)	30-4020
7	Resistor (.1 Meg.) (White-White-Yellow)	6099
8	Resistor (5 ohms Flexible Wire-wound)	33-3186
9	Tuning Condenser Assembly	31-1379
10	Compensating Condenser (ANT.)	Part of 9
11	Resistor (500 ohms Flexible Wire-wound)	6977
12	Condenser (.05 Mfd. Tubular)	30-4020
13	Detector Transformer	32-1482
14	Condenser (.000015 Mica)	30-1030
15	Resistor (5 Ohms Flexible Wire-wound)	33-3186
16	Compensating Condenser (DET.)	Part of 9
17	Condenser (.05 Mfd. Tubular)	30-4020
18	Resistor (100 ohms Flexible Wire-wound)	33-3187
19	Resistor (200 ohms Flexible Wire-wound)	7217
20	Resistor (50000 ohms) (Green-Black-Orange)	6098
21	Compensating Condenser (OSC. H. F. Bdcst.)	Part of 9
22	Compensating Condenser (OSC. S. W.)	31-6016
23	Oscillator Transformer	32-1504
24	Condenser (.0008 Mfd. Mica)	5878
25	Compensating Condenser (OSC. L. F.)	04000R
26	Condenser (.003 Mfd. Mica)	30-1028
27	Resistor (20000 ohms) (Red-Black-Orange)	6649
28	Resistor (25000 ohms) (Red-Green-Orange)	4516
29a	Resistor (70000 ohms) (Violet-Black-Orange)	3542
29	Condenser (Electrolytic—1, 1, 1 and 2 Mfd.)	30-2080
30	Condenser (.00013 Mfd. Mica)	30-1036
31	Compensating Condenser (1st I. F. Pri.)	Part of 32
32	1st I. F. Transformer	32-1483
33	Compensating Condenser (1st I. F. Tertiary)	04000A
34	Condenser (.000055 Mfd. Mica)	30-1045
35	Compensating Condenser (1st I. F. Sec.)	Part of 32
36	Condenser (.000055 Mfd. Mica)	30-1045
37	Fidelity-Selectivity Control (Wire-wound—8775, 8775, 1500 ohms)	33-5083
38	Resistor (1 Meg.) (Brown-Black-Green)	33-1096
39	Resistor (200 ohms Flexible Wire-wound)	7217
40	Resistor (2 Megs.) (Red-Black-Green)	33-1025
41	Condenser (.02 Mfd. Tubular)	30-4113
42	Condenser (.05 Mfd. Tubular)	30-4020
43	Condenser (.05 Mfd. Tubular)	30-4020
44	Resistor (2 Megs.) (Red-Black-Green)	33-1025
45	Condenser (.00013 Mfd. Mica)	30-1036
46	Compensating Condenser (2nd I. F. Pri.)	Part of 47
47	2nd I. F. Transformer	32-1483
48	Compensating Condenser (2nd I. F. Tertiary)	04000A
49	Condenser (.000055 Mfd. Mica)	30-1045
50	Compensating Condenser (2nd I. F. Sec.)	Part of 47
51	Condenser (.000055 Mfd. Mica)	30-1045
52	Condenser (.5 & .25 Mfd. Metal Case) (Includes 77)	30-4229
53	Resistor (25000 ohms) (Red-Green-Orange)	4516
54	Resistor (30000 ohms) (3 watt) (Orange-Black-Orange)	33-1018
55	Resistor (1000 ohms) (Brown-Black-Red)	5837
56	Condenser (.00009 Mfd. Mica)	30-1046
57	Compensating Condenser (3rd I.F. pri.)	Part of 58
58	3rd I. F. Transformer	32-1484
59	Compensating Condenser (3rd I. F. Tertiary)	04000X
60	Condenser (.0002 Mfd. Mica)	30-1047
61	Compensating Condenser (3rd I. F. Sec.)	Part of 58
62	Condenser (.00015 Mfd. Mica)	30-1041
63	Condenser (.00015 Mfd. Mica)	30-1083
64	Resistor (2 Meg.) (Red-Black-Green)	33-1025
65	Resistor (2 Meg.) (Red-Black-Green)	33-1025
66	Condenser (.03 Mfd. Tubular)	30-4025
67	Shadowmeter	45-2028
68	Pilot Lamp (Shadowmeter)	Part of 67
69	Condenser (.00015 Mfd. Mica)	30-1046
70	Filter Trap Coil (10 K.C. Trap)	32-7261
71	Compensating Condenser (10 K.C. Trap)	04000B
72	Condenser (.00015 Mfd. Mica)	30-1041
73	Condenser (.02 Mfd. Tubular)	30-4113
74	Resistor (.1 Meg.) (White-White-Yellow)	6099
75	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
76	Resistor (.1 Meg.) (White-White-Yellow)	6099
77	Condenser (.25 Mfd. Metal Case)	Part of 52
78	Condenser (.001 Mfd. Tubular)	30-4201
79	Audio Transformer	32-7057
80	Output Transformer (On Speaker)	32-7247
81	Voice Coil & Cone Assembly (U-7)	36-3381
82	Field Coil & Pot. Assembly (U-7)	36-3088
83	B. C. Wire-wound Resistor (3000, 4750 ohms)	33-3182
84	Resistor (Wire-wound) (10, 110, 130 ohms)	33-3137
85	Resistor (1 Meg) (Brown-Black-Green)	33-1096
86	Resistor (.5 Meg.) (Yellow-White-Yellow)	6097
87	Condenser (.09 Mfd. Bakelite Block)	4989D
88	Condenser (.01 Mfd. Bakelite Block)	3903G
89	Volume Control & On-Off Switch	33-5071
90	Resistor (20000 ohms) (Red-Black-Orange)	33-1130
91	Condenser (Bass Compensator)	8323B
92	Bass Compensation Switch	3253
93	Resistor (15000 ohms) (Brown-Green-Orange)	6208
94	Resistor (.1 Meg.) (White-White-Orange)	6099
95	Condenser (.03 Mfd. Tubular)	30-4025
96	Resistor (.1 Meg.) (White-White-Orange)	6099
97	Condenser (.0001 Mfd. Twin Bakelite Block)	8035P
98	Filter Choke	32-7018
99	Filter Choke	32-7056
100	Condenser (.25 Mfd. Bakelite Block)	6287S
101	Condenser (Electrolytic 8 & 10 Mfd.)	30-2046
102	Condenser (Electrolytic 8 Mfd.)	30-2011
103	Condenser (Electrolytic 4 Mfd.)	30-2104
104	Power Transformer (60 Cycle 115 Volts)	32-7258
	Power Transformer (25 Cycle 115 Volts)	32-7259
105	Condenser (.015 Mfd. Twin Bakelite Block)	3793K
106	Dial Lamp (Standard Band)	34-2040
107	Dial Lamp (Short-wave Band)	34-2040

*Inside I.F. Transformer, so do not show in Fig. 3.

MODEL 201 (Code 121)
Voltage, Socket, Data

PHILCO RADIO & TELEV. CORP.

Tube Socket Voltages

(Line Voltage 115)

	R.F. 78	Det.-Osc. 6A7	1st I.F. 78	2d I.F. 78	Shadow-meter 37	2d Det. 1st A.F. 75	Driver 42	Out-put 42 42
P-K.	210	205	205	210	65	115	215	345
SG-K....	120	100 (G1-K= 17) (G2-K=145)	115	115	..	...	215	345
K-Gnd....	4.2	3.8	7.8	7.8	0	0	0	0

5Z3, F to Center Tap of Power Trans. Sec.—400 volts

5Z3, F to F—5.0 volts (A.C.)

All other filaments, 6.3 volts (A.C.)

Voltages in table above were obtained by using a high resistance voltmeter and test prods applied to underside of chassis (use Fig. 1). Fidelity control at middle position.

Power Transformer Voltages

Terminals	A.C. Volts	Circuit	Color of Leads
1-2	120	Primary	White
3-5	780	Plates of 5Z3	Yellow
6-7	5.0	Fil. of 5Z3	Blue
8-9	6.3	Filaments	Black
4		Center Tap of 3-5	Yellow—Green Tracer

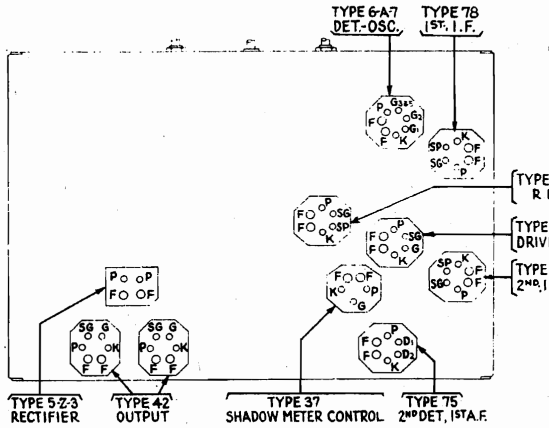


Fig. 1 Tube Sockets as seen from Bottom of Chassis (for Testing Voltages).

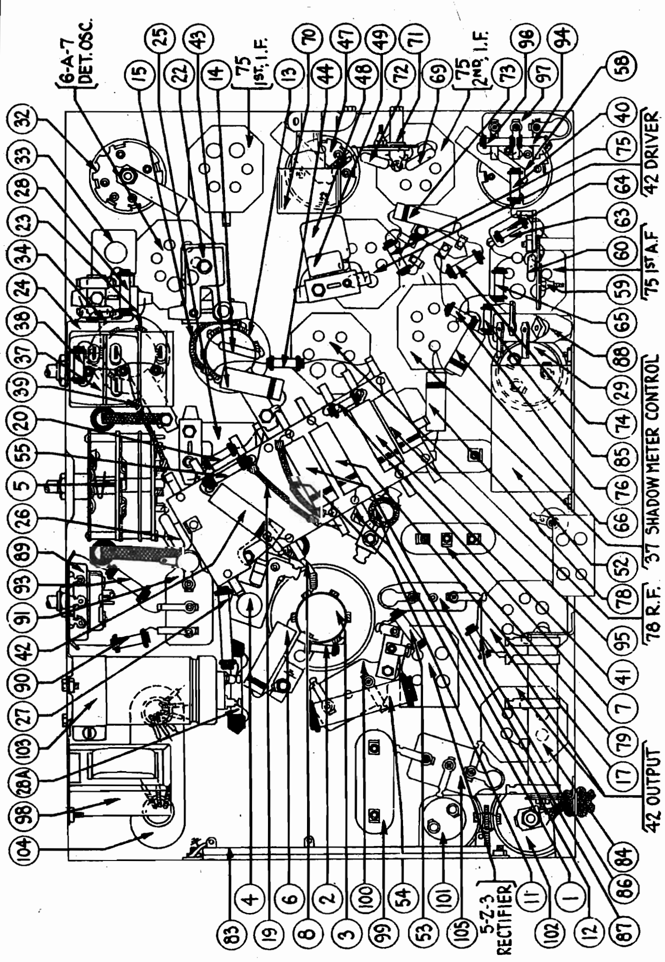


Fig. 3 Bottom View of Chassis, Showing Parts

Model 201

PHILCO Model 201 is a radio receiver incorporating high-fidelity reproduction, the same as in Model 200 (see Service Bulletin No. 201) and also having two frequency ranges, viz.: (1) 540 to 1720 kilocycles, which includes standard broadcasts and some police stations, and (2) 4.2 to 12.0 megacycles which includes the majority of popular short-wave stations. A two-position wave band switch changes reception from one range to the other, and one of the two individual pilot lamps controlled by the wave band switch illuminates whichever scale is in use.

For a description of how high-fidelity reception is accomplished thru the special circuit, speaker, and cabinet used, refer to page 1 of Service Bulletin No. 201. This also describes the "Fidelity-Selectivity" Control which is used in both models, 200 and 201.

Model 201 employs shadow-tuning, bass compensation (turned on or off by a switch on side of cabinet) and automatic volume control. The power consumption is 130 watts. Model 201 is designed for use on alternating current (A.C.) only, of the voltage and frequency specified on the chassis name-plate.

Dial Assembly	31-1205	Tube Socket (7 Prong)	27-6005
Dial Scale	27-5046	Speaker Socket	7828
Knob (Large)	27-4051	Chassis Mtg. Screw	W1386A
Knob (Small)	27-4052	Chassis Mtg. Foot	27-4116
Tube Shield	28-1107	Chassis Mtg. Foot Plate	27-7497
Tube Socket (4 Prong)	7514	AC Cord & Plug Assembly	L943A
Tube Socket (5 Prong)	27-6013	Bass Compensation Switch Plate	28-2415
Tube Socket (6 Prong)	6417		

Adjusting Compensating Condensers in Model 201

The quality performance of this receiver depends to a great extent upon providing a wide channel through the R.F. and I.F. stages to permit the passage of a broadcast signal without cutting of the side bands.

In order to produce this wide tuning band, the set must be carefully and accurately adjusted. These adjustments will be more critical than in the conventional radio, and the procedure will be somewhat more complicated.

In making the adjustments, it is necessary to use an unmodulated signal generator. The PHILCO Model 048 Set Tester or the Model 024 Signal Generator can be readily adapted for this purpose by the installation of a single-pole double-throw switch, and an additional grid leak resistor, as shown in Figure 4. This switch will adapt the signal generator for either a modulated or an unmodulated signal.

With an unmodulated signal, it is not possible to obtain an indication of output by means of the usual form of output meter. An indirect indication can be obtained, however, through the automatic volume control system by connecting a high resistance voltmeter having a scale reading of 0-5 or 0-10 volts across the R.F. cathode resistor ⑪, shown in the wiring diagram Fig. 2. This connection can be made conveniently through the use of leads equipped with test clips. With this arrangement, maximum output at the second detector will be indicated by a minimum reading of the meter, and vice versa. In other words, the action will be just the opposite of an output meter used to measure audio frequency voltage at the power output stage. With no signal applied to the receiver, the bias voltage indicated by the voltmeter, will be approximately 3.5 volts. This voltage will be reduced by the application of a signal to the R.F. or I.F. input circuits.

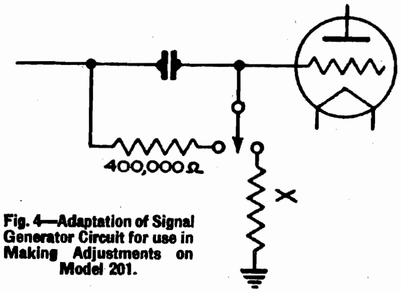


Fig. 4—Adaptation of Signal Generator Circuit for use in Making Adjustments on Model 201.

I. F. ADJUSTMENTS

After preparing the unmodulated signal generator and connecting the voltmeter as directed, proceed as follows:

1. Set the receiver tuning dial at its extreme low frequency position, with the wave-band switch turned to the left (standard broadcast position). Remove the grid clip from the cap of the 6A7 detector-oscillator tube, and connect the signal generator antenna lead in its place. Connect the ground lead from the signal generator to the ground terminal of the chassis. Adjust the signal generator frequency to exactly 260 K. C. Turn the fidelity-selectivity control of the receiver all the way to the left.

2. Adjust the 1st and 2nd I.F. padding condensers ㉛, ㉟, ㊻ and ㊿ for maximum output (minimum meter reading) in the order mentioned. During these adjustments, the output of the signal generator should be regulated to maintain a voltmeter reading of approximately 2 volts.

3. Connect a 500 Mmf. condenser from the plate of the 2nd I.F tube to ground, and adjust padder (81) for maximum output.

4. Connect the 500 Mmf. condenser across the secondary of the 3rd I.F transformer and adjust (57) for maximum output.

5. Turn the attenuator on the signal generator to maximum and adjust padder (59) for minimum width of shadow in the tuning meter.

6. Reduce the output of the signal generator until the voltmeter again reads 2 volts. Turn the fidelity-selectivity control all the way to the right and adjust padders ㉝ and ㊽ for MINIMUM output (maximum meter reading).

7. Leaving the fidelity-selectivity control in the extreme right hand position and tuning the signal generator through 253 K.C. and 267 K.C., two definite peaks at these points should be noted. The meter readings at these two peaks should be equal, but if not, they can be made equal by readjusting padder ㉝.

WAVE TRAP ADJUSTMENTS

8. Adjust the signal generator to exactly 260 K.C. and connect the output leads to the antenna and ground terminals on the chassis. Replace the grid clip on the type 6A7 tube. Turn the fidelity-selectivity control all the way to the left. Leaving the receiver dial at the extreme low frequency position, adjust padder ① for minimum output.

R. F. ADJUSTMENTS—(BROADCAST RANGE)

9. Insert a 250 Mmf. condenser in series with the antenna lead of the signal generator and the antenna terminal on the receiver chassis. Adjust the signal generator and the receiver to 1500 K.C. Turn the fidelity-selectivity control all the way to the left. Adjust padders ⑩, ⑯ and ㉑ for maximum output.

10. Adjust the signal generator and the receiver tuning dial to 600 K.C. Adjust padder ㉕ for maximum output, at the same time rocking the tuning condenser in the chassis back and forth to obtain the setting for the highest possible output.

R. F. ADJUSTMENTS—(SHORT WAVE RANGE)

The PHILCO Model 091 Crystal Controlled Oscillator is required for adjusting the compensating condensers for the short wave tuning range.

11. Connect the antenna and ground leads from the signal generator to the corresponding terminals on the chassis, placing a 400 ohm resistor between the antenna lead of the signal generator and the antenna terminal of the set. (Philco No. 33-3016 flexible resistor will be satisfactory.)

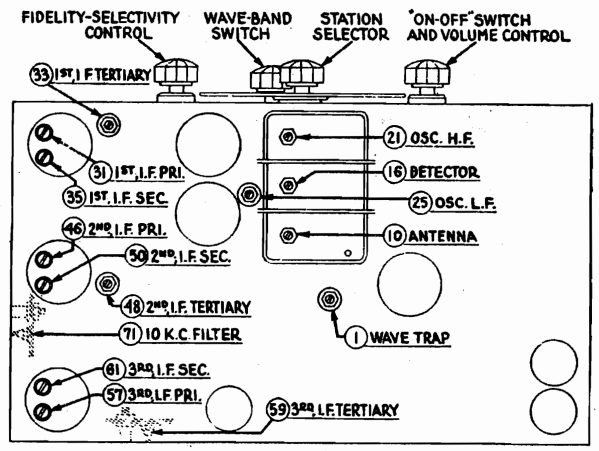


Fig. 5 Locations of Adjusting Condensers

12. Turn the wave-band switch to the right and set the receiver dial at 10.8 M.C. Remove the D.C. voltmeter connections from resistor ⑪ and connect the output meter to the plates of the power output tubes as in adjusting other types of receivers. Adjust the oscillator padder ㉒ and the antenna padder ④ for maximum output. These padders are located and adjusted from underneath the chassis and are visible in Fig. 3. When adjusting padder ㉒ two very definite peaks will be found. It is extremely important that the lower capacity setting be used. To make certain that the adjustment has not been made to the image frequency (which would be the case if padder ㉒ were adjusted to the higher capacity setting) turn the receiver dial to approximately 10.3 M.C. at which point the image frequency should be heard, but much more weakly than the signal at 10.8 M.C.

ADJUSTMENT OF 10 K.C. FILTER

The 10 K.C. filter in the audio circuit will rarely require readjustment. As the proper adjustment of this padder ((71) on diagram) requires an accurately calibrated audio oscillator, it should be reset only in the event that it has been tampered with or in cases where it has become necessary to replace one of the elements of this filter. An emergency adjustment of this filter can be made in the following manner:

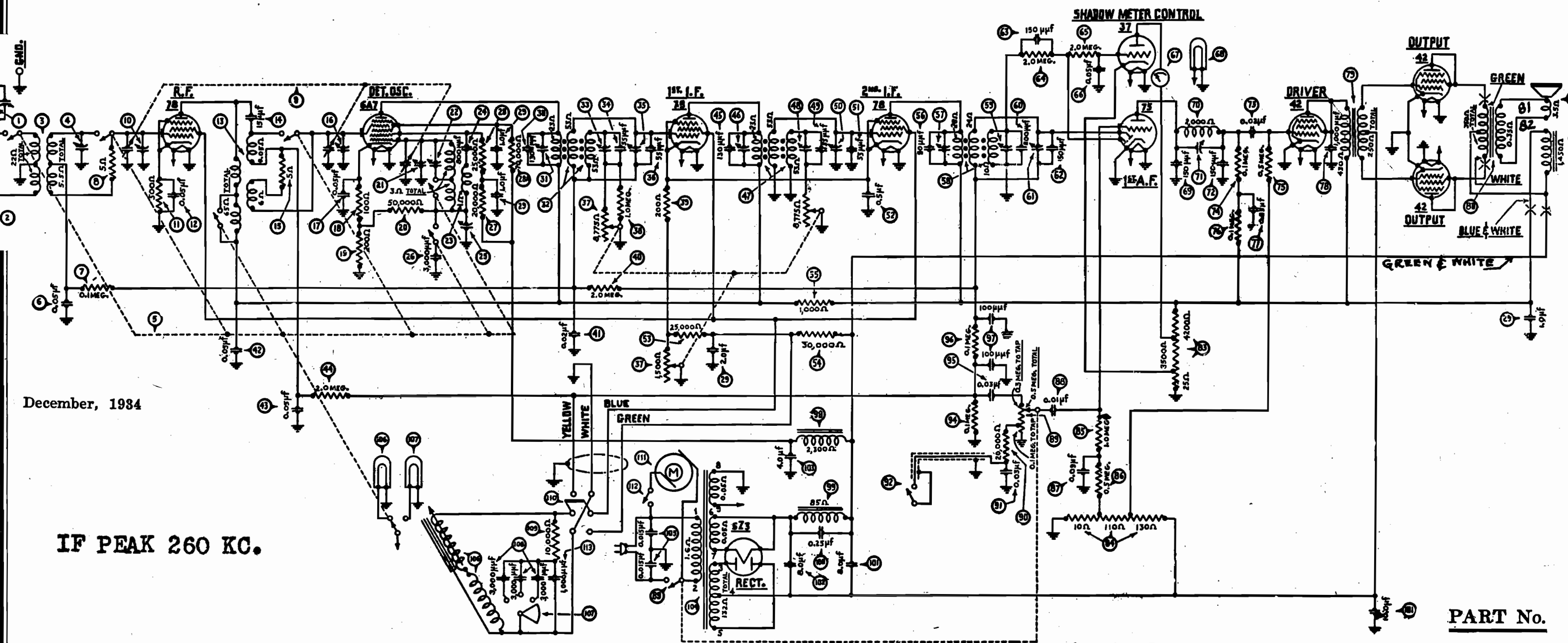
13. Connect the signal generator to the control grid of the type 6A7 tube, leaving the grid clip in place.

14. Leave the output meter connected to the power output circuit as in Paragraph 12.

15. Set the receiver dial at 550 K.C. and wave-band switch at left. At this point, the oscillator in the receiver will be tuned to 810 K.C. The adjustment of the signal generator (switch in unmodulated position) to approximately this same frequency will cause an audible beat note to be heard in the speaker. By means of the signal generator tuning control, reduce the frequency of this beat note until zero beat is reached, at which point the output meter reading will decrease to 0. Turning the receiver dial in either direction will gradually increase the frequency of the audible note so that at 540 or 560 K.C. a 10,000 K.C. note will be heard. At either of these points, the padder (71) should be adjusted for minimum reading of the output meter.

MODEL 509-X
Schematic, Data

PHILCO RADIO & TELEV. CORP.



December, 1934

IF PEAK 260 KC.

Model 509 — Wiring Diagram

		PART No.
(106)	Pick-up and Tone Arm Assem	35-2009
(107)	Tone control (4-position)	30-4239
(108)	Condensers in tone control	Part of (107)
(109)	Resistor (10,000 ohms)	33-1000
(110)	Radio phonograph switch	42-1053
(111)	Phonograph Motor —	
	115 volts, 60 cycles	35-1092
	115 volts, 25 cycles	35-1095
(112)	Phonograph on-off switch	35-1044
(113)	Condenser (.001 mfd. mica)	30-1007
	Field coil and pot assembly	36-3088
	Voice coil and cone assembly	36-3381
	Output transformer	32-7247

PHILCO Model 509-X is a DeLuxe Radio-Phonograph mounted in a cabinet especially designed to promote high-fidelity reproduction. The Radio chassis is practically identical with Model 201 (see Service Bulletin No. 209), which incorporates high-fidelity reproduction and covers both the standard broadcast band (540-1720 K. C.) of frequencies and a major portion (4.2-12 megacycles) of the short-wave band.

For Service Data on the Phonograph and part numbers of the replaceable parts, refer to Service Bulletin No. 165-E on Model 501 Radio Phonograph, which uses the same type pick-up and automatic Record Changer mechanism.

Note that Part (93), Resistor, 15000 ohms (Part 6208) is omitted in Model 509-X; also the value of the condenser (91) in the bass compensator becomes .03 mfd. instead of .07, and a four-point tone control is added for the phonograph. The control knob for this is on the radio control panel.

Also note that the B. C. resistor (83) has an additional tap in Model 509 and the circuit to it has been slightly changed from that shown in wiring diagram of Model 201 (Bulletin 209).

Other parts in Model 509-X, which differ from those in Models 201 and 501 are as follows: Diagram No.102, Electrolytic condenser, part No.30-2014; Diagram No.104, Power Transformer, Part No.32-7259; Diagram No.91, .03 mf. condenser (bass comp.), Part No.8318-F.

MODEL 610
Schematic, Voltage Data

PHILCO RADIO & TELEV. CORP.

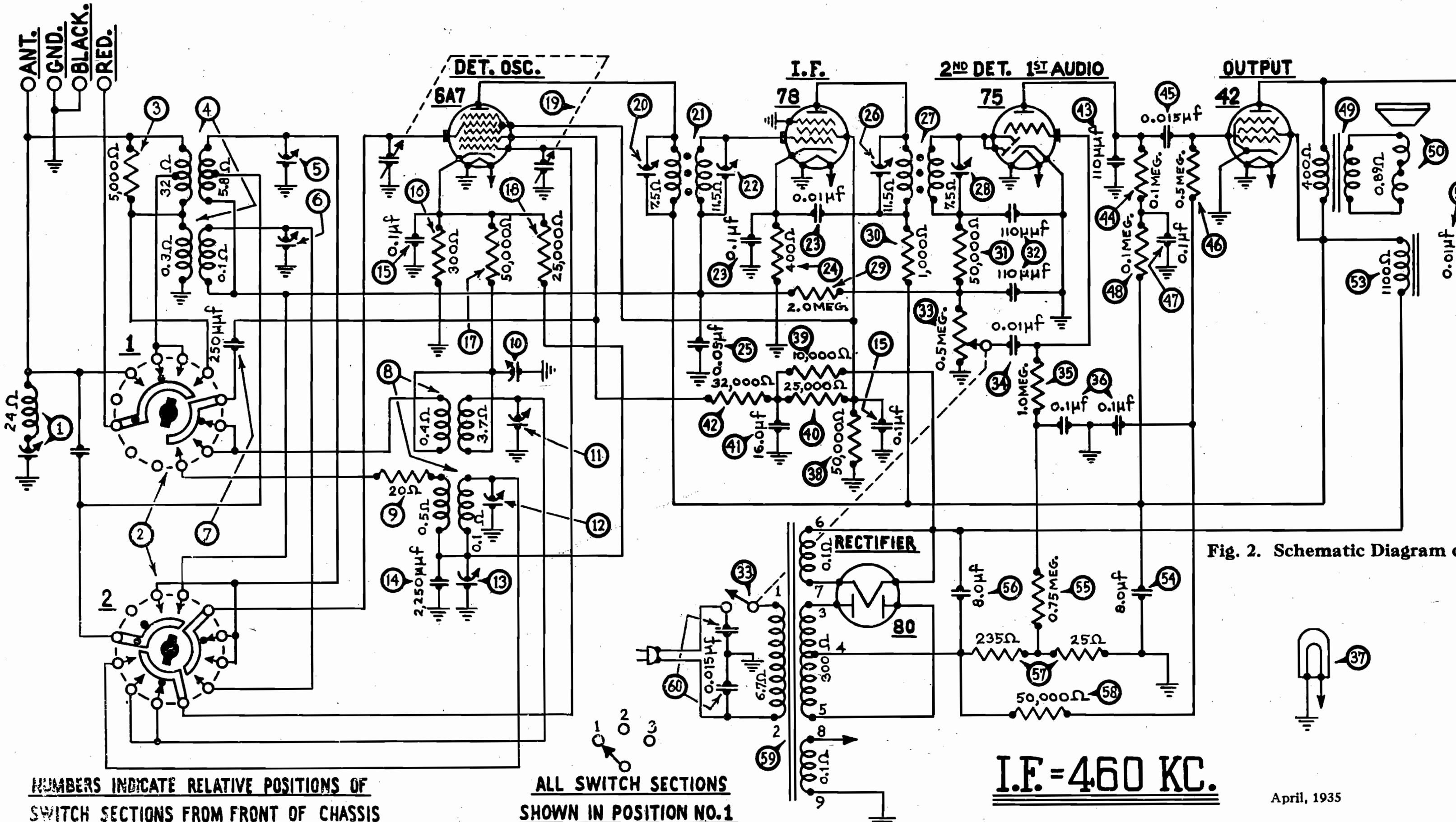


Fig. 2. Schematic Diagram of Model 610

April, 1935

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	......	Primary	White
3–5	680	65 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	2.2 A.	Filaments	Black
4	...	......	Center Tap of 3-5	Yellow, Green Tracer

Tube Socket Voltages
Measured to Ground

Tube	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	255	250	145	238
SG	85	85	...	255
K	2.3	2.5	...	...
	6A7: $G_{3\ \&\ 5}$ = 147			

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points.

MODEL 610
Socket, Trimmers
Alignment, Data

PHILCO RADIO & TELEV. CORP.

Model 610

Type Circuit: Superheterodyne, with pentode output (3 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police; (3) Short-wave.

Coverage of Each Band: Band 1, 530-1720 K.C.; Band 2, 2300 to 2500 K.C. (2.3-2.5 M.C.); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing. 50 to 1 ratio for slow-speed tuning.

Tone Control: 2-position.

Intermediate Frequency: 460 K.C.

Power Consumption: 54 watts.

The adjustment of the compensating condensers in Model 610 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. The Philco Model 088 All-Wave Signal Generator covers these requirements perfectly. An output meter is also required. Philco Model 025 or 012 unit is recommended. The location of all compensating condensers is shown in Fig. 4.

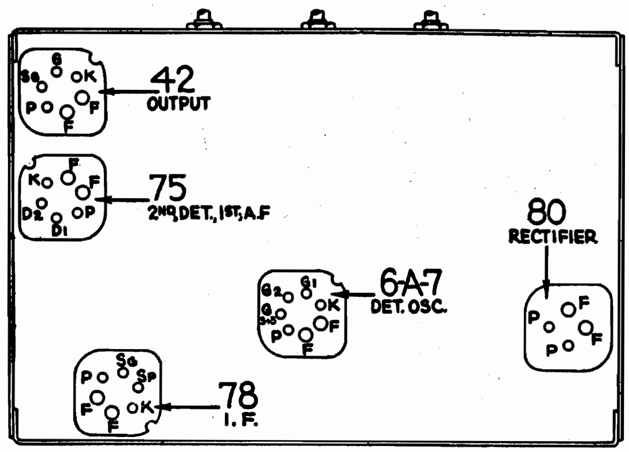


Fig. 1. Tube Sockets as viewed from bottom.

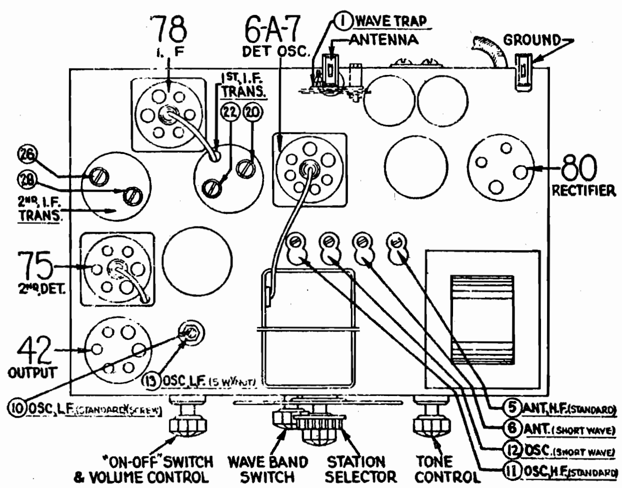


Fig. 2. Locations of Compensating Condensers

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 30 volt range of the output meter to the plate and cathode of the output tube or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields and adjusted by turning the two screws in top. Adjust condensers 26 and 28 (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers 20 and 22 (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (broadcast position), turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap 1 condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Position No. 1 (broadcast band), set the dial at 1600 K.C. Set the signal generator at this frequency and adjust compensators 11 and 5 for maximum output. These are the oscillator and antenna "H.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator 10 (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the wave-band switch to the extreme right (short-wave band) and adjust the station selector to 18.0 megacycles. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., and antenna S.W. compensators for maximum reading in the output meter. These are numbered 12 and 6 respectively in figure No. 4.

4. Turn the tuning dial to 7.2 M.C., and adjust condenser 13 osc. L.F., (S.W.) (nut) to maximum signal.

MODEL 610
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

Replacement Parts—Model 610

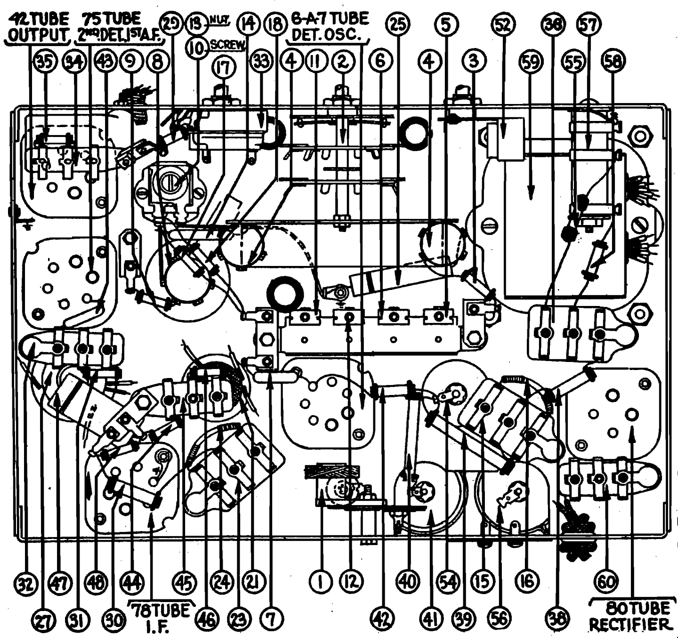


Fig. 3. Bottom View of Chassis

No.	Description	Part No.	List Price
1	Wavetrap	36-6777	$1.00
2	Waveband Switch	42-1112	1.10
3	Resistor (5000 ohms) (Green, Black, Red)	6096	.20
4	Antenna Transformer	32-1669	1.15
5	Compensating Condenser (Antenna, Standard) Part of	31-6047	.50
6	Compensating Condenser (Antenna, S.W.) Part of	31-6047	.50
7	Condenser (.00025 Mfd. Mica)	5858	.35
8	Oscillator Transformer	32-1670	1.40
9	Resistor (20 ohms) (Red, Black, Black)	33-1206	.20
10	Compensating Condenser (Osc. L.F. Standard) (Screw) Part of	31-6027	.70
11	Compensating Condenser (Osc. H.F., Standard) Part of	31-6047	.50
12	Compensating Condenser (Osc. S.W., H.F. End) Part of	31-6047	.50
13	Compensating Condenser (Osc. S.W., L.F. End) (Nut) Part of	31-6027	.70
14	Condenser (.00225 Mfd. Mica)	30-1055	.40
15	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
16	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010	.20
17	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
18	Resistor (25000 ohms) (Red, Green, Orange)	33-1013	.20
19	Tuning Condenser Assembly	31-1528	3.75
20	Compensating Condenser (1st I.F. Primary)	Part of 21	....
21	1st I.F. Transformer	32-1671	1.35
22	Compensating Condenser (1st I.F. Secondary)	Part of 21	....
23	Condenser (.09 Mfd., and .01 Mfd. Bakelite Block)	4989-FU	.40
24	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20

No.	Description	Part No.	List Price
25	Condenser (.05 Mfd. Tubular)	30-4020	$0.35
26	Compensating Condenser (2nd I.F. Primary)	Part of 27	....
27	2nd I.F. Transformer	32-1672	1.35
28	Compensating Condenser (2nd I.F. Secondary)	Part of 27	....
29	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
30	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
31	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
32	Condenser (.00011 Twin Bakelite Block)	8035-DG	.25
33	Volume Control & On-Off Switch	33-5106	.85
34	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
35	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
36	Condenser (.1 Mfd. Twin Bakelite Block)	4989-DG	.40
37	Pilot Lamp	34-2064	.09
38	Resistor (50000 ohms) (Green, Brown, Orange)	4237	.20
39	Resistor (10000 ohms) (Brown, Black, Orange)	3524	.20
40	Resistor (25000 ohms) (Red, Green, Orange)	3656	.20
41	Condenser (Electrolytic—16 Mfd.)	30-2118	1.65
42	Resistor (32000 ohms) (Orange, Red, Orange)	5279	.20
43	Condenser (.00011 Mfd. Mica)	30-1031	.35
44	Resistor (.1 Meg.) (Brown, Black, Green)	6099	.20
45	Condenser (.015 Mfd. Bakelite Block)	3793-SU	.35
46	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
47	Condenser (.1 Mfd. Tubular)	30-4170	.35
48	Resistor (.1 Meg.) (White, White, Yellow)	6099	.20
49	Output Transformer	32-7019	1.25
50	Cone & Voice Coil Assembly (P-27 Speaker)	02861	.65
51	Condensers (in Tone Control)	Part of 52	....
52	Tone Control	30-4318	.50
53	Field Coil & Pot Assembly (P-27 Speaker)	36-3341	2.75
54	Condenser (Electrolytic—8 Mfd.)	30-2025	1.35
55	Resistor (750000 ohms) (Violet, Green, Yellow) (½ Watt)	33-1203	.20
56	Condenser (Electrolytic) (8 Mfd.)	30-2025	1.35
57	Resistor (B.C. Wire-wound, 235 ohms, 25 ohms)	33-3037	.20
58	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
59	Power Transformer (110 volts 60 cycles)	32-7381	4.00
	(110 volts 25 cycles)	32-7382	6.25
	(230 volts 50 cycles)	32-7383	4.50
60	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
	Dial Assembly	31-1539	.30
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03
	Four Prong Socket	27-6034	.10
	Six Prong Socket	27-6036	.11
	Seven Prong Socket	27-6037	.11
	Knob (Station Selector)	27-4206	.12
	Knob (Fine Tuning)	27-4207	.10
	Knob (Volume, Waveband and Tone Control)	27-4208	.10
	Bezel	27-2928	.35
	Bezel Glass	27-7887	.60

MODEL 611
Parts, Alignment

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—MODEL 611

Nos. in Figs. 3 & 4	Description	Part No.	List Price
1	Wave Trap	38-6850	$1.10
2	Condenser (.0014 Mfd. Mica)	7007	.30
3	Waveband Switch	42-1112	1.10
4	Condenser—Capacity Obtained by Twisted Wires)	......	....
5	Resistor (5000 ohms) (Green, Black, Red)	33-1001	.20
6	Antenna Transformer	32-1781	1.15
7	Compensating Condenser (Antenna, Standard)	Part of 31-6047	.50
8	Compensating Condenser (Antenna S.W.)	Part of 31-6047	
9	Condenser (.00025 Mfd. Mica)	5858	.25
10	Resistor (20 ohms) (Red, Black, Black)	33-1206	.20
11	Oscillator Transformer	32-1831	1.50
12	Compensating Condenser (Osc. L.F. Standard)	Part of 31-6027	.70
13	Compensating Condenser (Osc. H.F. Standard)	Part of 31-6047	.50
14	Compensating Condenser (Osc. S.W. H.F. End)	Part of 31-6047	
15	Compensating Condenser (Osc. S.W. L.F. End)	Part of 31-6027	.70
16	Condenser (.00225 Mfd. Mica)	30-1055	.40
17	Tuning Condenser Assembly	31-1528	3.75
18	Resistor (120000 ohms) (Brown, Red, Yellow)	33-1128	.20
19	Resistor (120000 ohms) (Brown, Red, Yellow)	33-1128	.20
20	Resistor (200 ohms Flexible) (Red, Black, Black)	7217	.20
21	Condenser (.1 Mfd. Twin Bakelite Block)	4989-DG	.40
22	Condenser (.05 Mfd. Tubular)	30-4020	.20
23	Compensating Condenser (1st I.F. Primary)	Part of 24	....
24	1st I.F. Transformer	32-1671	1.35
25	Compensating Condenser (1st I.F. Secondary)	Part of 24	....
26	Resistor (300 ohms Flexible) (Orange, Black, Black)	33-3010	.20
27	Condenser (.1 Mfd. & .01 Mfd. Bakelite Block)	4989-FU	.40
28	Pilot Lamp	34-2068	.16
29	Compensating Condenser (2d I.F. Primary)	Part of 30	....
30	2d I.F. Transformer	32-1672	1.35
31	Compensating Condenser (2d I.F. Secondary)	Part of 30	....
32	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
33	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
34	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
35	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DU	.25
36	Condenser (.00011 Mfd. Mica)	30-1031	.20
37	Condenser (.15 Mfd. Twin Bakelite Block)	6287-DU	.40
38	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
39	Volume Control & On-Off Switch	33-5114	1.45
40	Resistor (50000 ohms) (Green, Brown, Orange)	4237	$0.20
41	Resistor (13000 ohms) (Brown, Orange, Orange)	3766	.20
42	Resistor (15000 ohms) (Brown, Green, Orange)	5278	.20
43	Resistor (70000 ohms) (Violet, Black, Orange)	33-1115	.20
44	Resistor (240000 ohms) (Red, Yellow, Yellow)	33-1097	.20
45	Condenser (.015 Mfd. Bakelite Block)	3793-SU	.35
46	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
47	Tone Control	30-4345	.50
48	Resistor (400 ohms Flexible) (Yellow, Black, Black)	33-3016	.20
49	Condenser (Electrolytic—10 Mfd., 10 Mfd.)	30-2125	1.20
50	Condenser (.02 Mfd. Tubular)	30-4215	.20
51	Output Transformer	32-7395	1.10
52	Cone & Voice Coil Assembly (S-15 Speaker)	36-3157	.80
53	Field Coil & Pot Assembly (S-15 Speaker)	36-3519	2.80
54	Resistor (20 ohms Flexible) (Red, Black, Black)	33-1206	.20
55	Condenser (.25 Mfd. Tubular)	30-4146	.25
56	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
57	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
58	Condenser (Electrolytic, 16 Mfd.)	30-2124	.75
59	Condenser (Electrolytic, 16 Mfd.)	30-2124	.75
60	Filter Choke	32-7018	1.50
61	Filter Choke	32-7452	.90
62	Resistor (15 ohms, 130 ohms—Wirewound)	33-3213	.50
63	Condenser (.05 Mfd. Bakelite Block)	3615-SU	.35
	Dial Scale	27-5097	.25
	Dial Hub and Set Screw Assembly	31-1550	.15
	Dial Spring Clamp	28-2837	.10
	Knob (Tone, Volume)	27-4208	.10
	Knob (Waveband)	27-4219	.10
	Knob (Station Selector)	27-4206	.12
	Knob (Fine Tuning)	27-4207	.10
	Socket (6 Prong)	27-6036	.11
	Socket (7 Prong)	27-6037	.11
	Bezel	28-2928	.35
	Bezel Glass	27-2887	.60
	Chassis Mtg. Screw	W-1496A	1.60 per C
	Chassis Mtg. Washer	27-4198	.01
	Tube Shield Body	28-2726	.10
	Tube Shield Base	28-2725	.03

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Position No. 1 (broadcast band), set the dial at 1500 K.C. Set the signal generator at 1.5 M. C. and adjust compensators 13 and 7 for maximum output. These are the oscillator and antenna "H.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator 12 (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the wave-band switch to the extreme right (short-wave band) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18.0 megacycles. Now adjust the oscillator S.W., and antenna S.W. compensators for maximum reading in the output meter. These are numbered 14 and 8 respectively in figure No. 2.

4. Turn the tuning dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser 15 osc. L.F., (S.W.) (nut) to maximum signal.

Specifications

Type Circuit: Superheterodyne, with pentode output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: 115 volts, Alternating or Direct Current.

Tubes Used: 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 43 Output; 1 type 25Z5 Rectifier.

Wave Bands: Three—(1) Standard (with some Police); (2) Police; (3) Short-wave.

Coverage of Each Band: Band 1, 530-1720 K.C.; Band 2, 2300 to 2500 K.C. (2.3-2.5 M.C.); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Dual gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning. 6 to 1 on main drive.

Tone Control: 2-position.

Intermediate Frequency: 460 K.C.

Power Consumption: 50 watts.

Speaker: 611-B (Baby Grand): P-28; 611-F (Console): S-15.

PHILCO RADIO & TELEV. CORP.

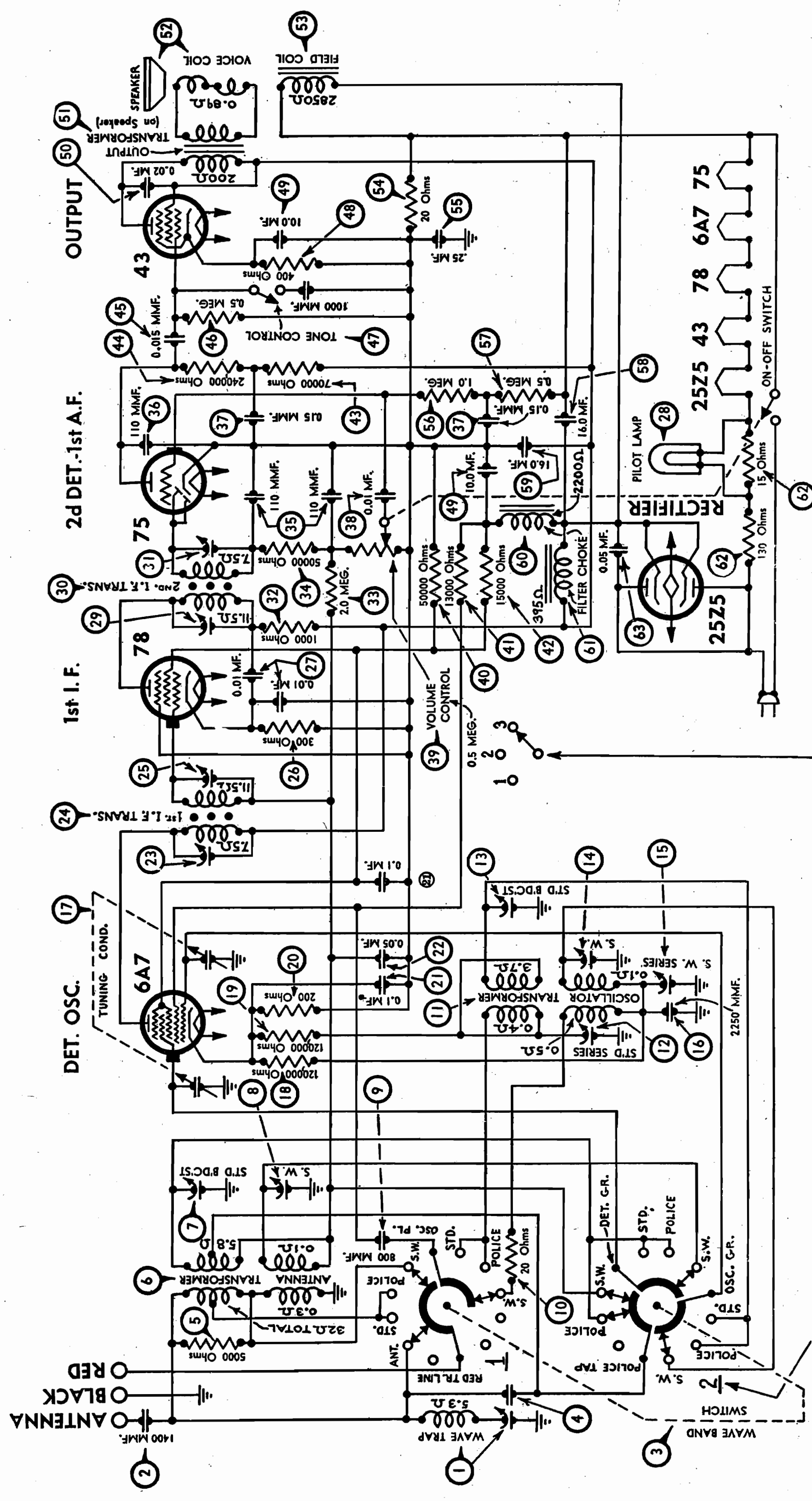


Fig. 3 — Schematic Diagram of Model 611

All Switch Sections Shown in Position No. 3

Numbers Indicate Relative Positions of Switch Sections as Seen from Front of Chassis

August 1935

Note 1: Cathode condenser of 78 tube (lower portion of (27)) is .1 mfd. instead of .01 mfd. shown above.
Note 2: Condenser (9) is .00025 mfd. instead of .0008 mfd. as shown above.

MODEL 611
Alignment,Part 2
Chassis,Socket,Trimmers

PHILCO RADIO & TELEV. CORP.

ADJUSTING COMPENSATING CONDENSERS

The adjustment of the compensating condensers in Model 611 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. The Philco Model 088 All-Wave Signal Generator covers these requirements perfectly. An output meter is also required. Philco Model 025 or 012 unit is recommended. The location of all compensating condensers is shown in Fig. 2.

Adjustment of I. F.

1. Remove the antenna connection from the receiver. Remove the grid clip from the first detector (type 6A7 tube), and attach the "ANT" output lead from the signal generator to the grid cap of this tube.

2. Connect the output meter to the plate and cathode of the output tube by means of the adapters provided with the "025" or to the two bottom prongs of the speaker plug. Set it at the 0-30 volt range.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields and adjusted by turning the two screws in top. Adjust condensers ㉙ and ㉛ (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers ㉓ and ㉕ (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (broadcast position), turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap ① condenser until a MINIMUM reading is obtained on the output meter. The wave-trap compensator is reached from rear of chassis.

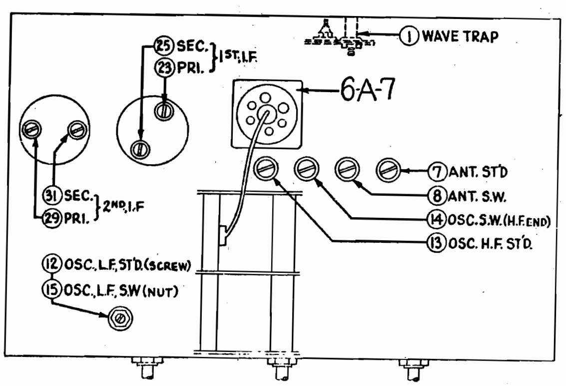


Fig. 2. Locations of Compensating Condensers

Tube Socket Voltages
(Measured at 115 volts A.C.)

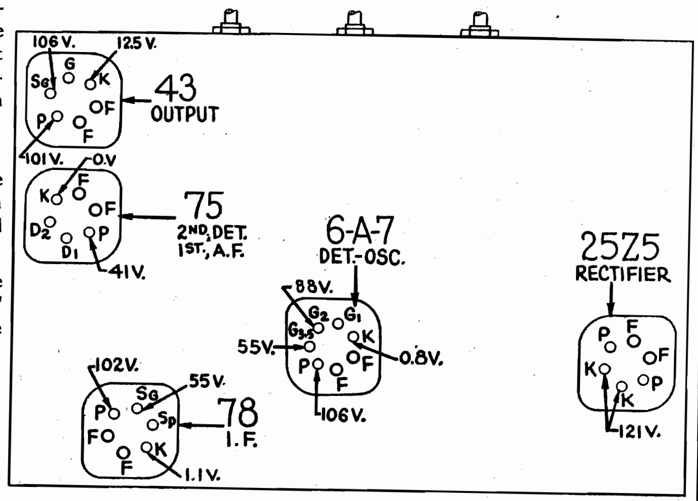
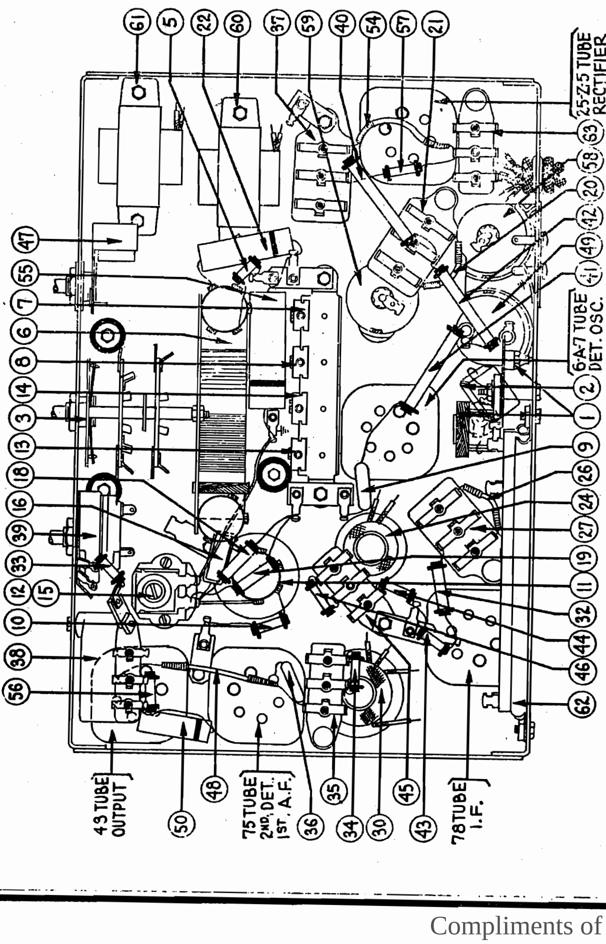


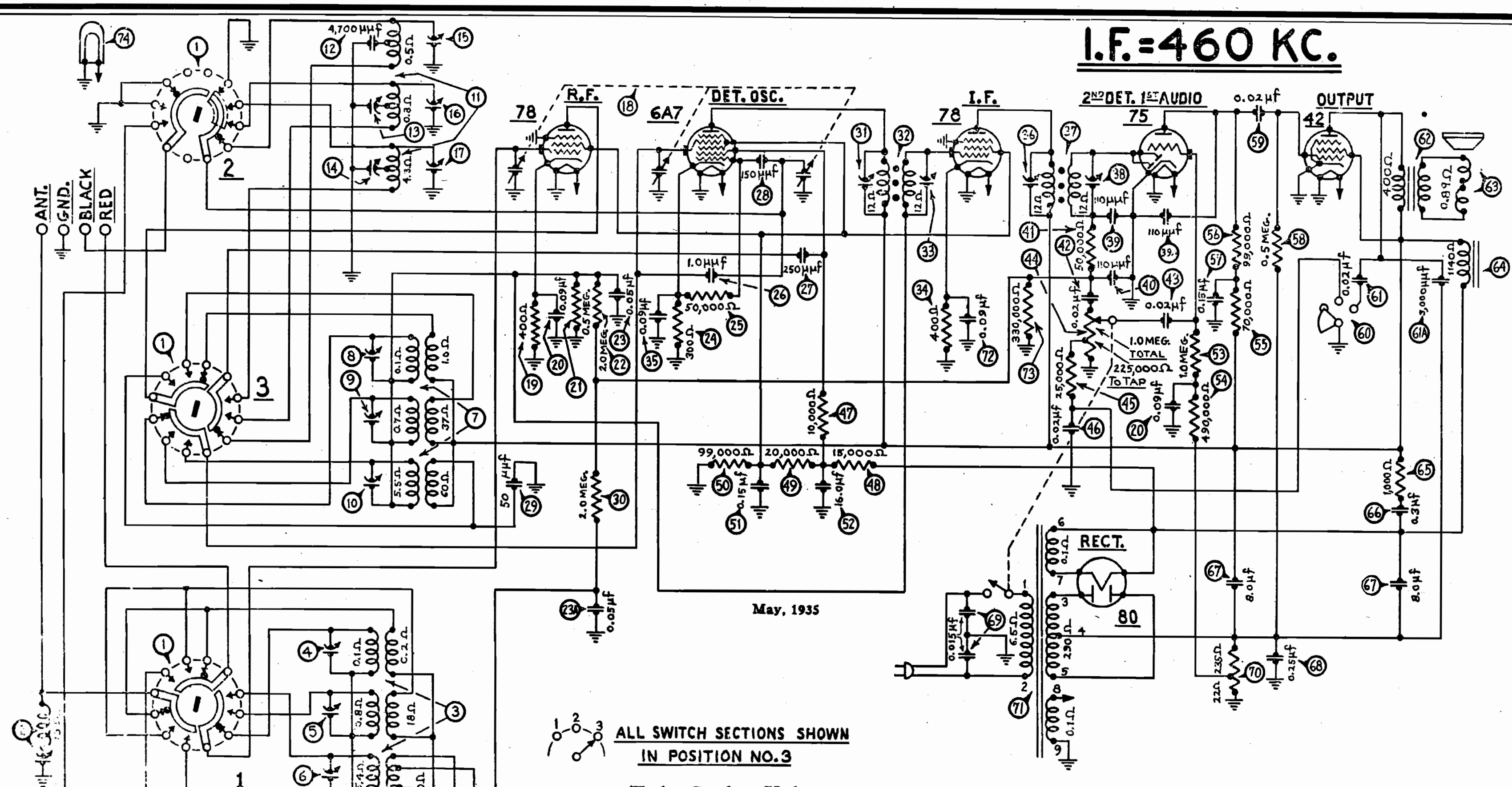
Fig. 1. Tube Sockets as viewed from bottom.

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch counter-clockwise (band 1). S-15 Speaker used.



MODEL 620
Schematic
Voltage, Data

PHILCO RADIO & TELEV. CORP.



NUMBERS INDICATE RELATIVE POSITIONS OF SWITCH SECTIONS FROM FRONT OF CHASSIS

Fig. 3. Schematic Diagram of Model 620

Model 620

Tube Socket Voltages
Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	258	258	258	153	243
SG	95	95	95	...	258
K	2.65	2.5	2.85	...	...
	6A7: $G_{3\,\&\,5} = 173$				

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 115 volts.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	......	Primary	White
3–5	680	65 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	2.0 A.	Filaments	Black
4	...	......	Center Tap of 3-5	Yellow, Green Tracer

MODEL 620
Chassis,Parts

PHILCO RADIO & TELEV. CORP.

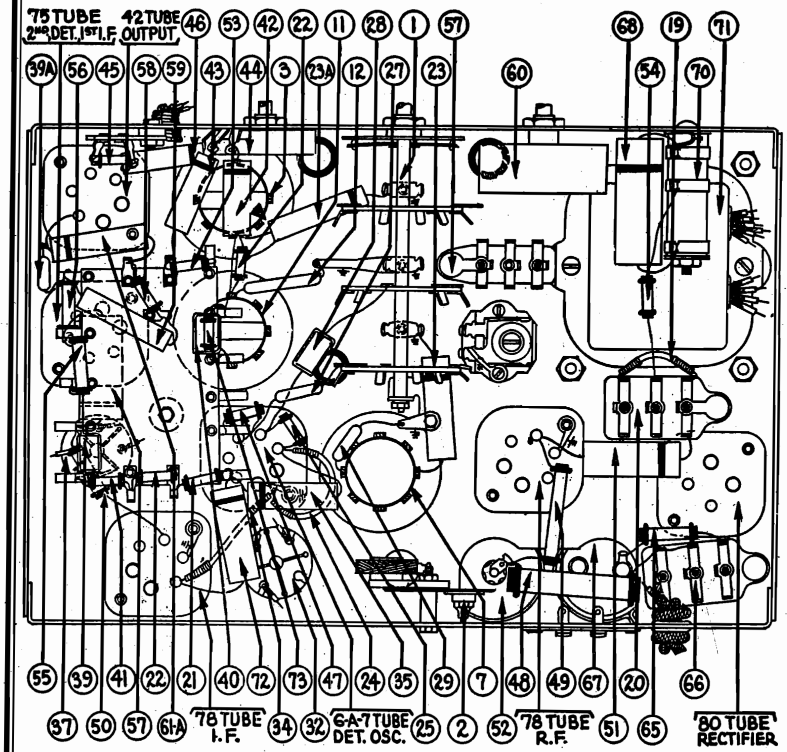


Fig. 4. Bottom View of Chassis

Replacement Parts Model 620

Description	Part No.	List Price
Dial Scale	27-5098	.25
Dial Hub and Set Screw	31-1550	.15
Dial Front Spring	28-2837	.10
Knob (Station Selector)	27-4206	.12
Knob (Fine Tuning)	27-4207	.10
Knob (Waveband)	27-4219	.10
Knob (Tone, Volume)	27-4208	.10
Tube Shield	28-2726	.10
Tube Shield Base	28-2725	.03
Tube Socket (4 Prong)	27-6034	.10
Tube Socket (6 Prong)	27-6036	.11
Tube Socket (7 Prong)	27-6037	.11
Speaker Plug Socket	27-6033	.08
Chassis Mtg. Screw	W-1495	1.50 per C.
Chassis Mtg. Washer (Rubber)	27-4198	.01
Electric Cord and Plug	L-943-A	.60
Bezel	28-2928	.35
Bezel Glass	27-7887	.60

	Description	Part No.	List Price
1	Waveband Switch	42-1107	$1.75
2	Wavetrap	38-6850	1.10
3	Antenna Transformer	32-1699	3.00
4	Compensating Condenser (Ant. S.W.)	Part of 3	....
5	Compensating Condenser (Ant. Police)	Part of 3	....
6	Compensating Condenser (Ant. Standard)	Part of 3	....
7	R. F. Transformer	32-1636	3.25
8	Compensating Condenser (R.F. Short-Wave)	Part of 7	....
9	Compensating Condenser (R.F. Police)	Part of 7	....
10	Compensating Condenser (R.F. Standard)	Part of 7	....
11	Oscillator Transformer	32-1637	2.50
12	Condenser (.0047 Mfd. Mica)	30-1052	.60
13	Compensating Condenser (Osc. Police)	Part of 11	....
14	Compensating Condenser (Osc. H.F. Standard)	Part of 11	....
15	Compensating Condenser (Osc. S.W.)	Part of 11	....
16	Compensating Condenser (Osc. L.F. Police)	Part of 31-6027	.70
17	Compensating Condenser (Osc. L.F. Standard)	Part of 31-6027	
18	Tuning Condenser Assembly	31-1526	2.75
19	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
20	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
21	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
22	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
23	Condenser (.05 Mfd. Tubular)	30-4020	.35
23A	Condenser (.05 Mfd. Tubular)	30-4020	.35
24	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010	.20
25	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
26	Condenser (1 Mmfd.)	Part of 18	....
27	Condenser (.00025 Mfd. Mica)	30-1032	.35
28	Condenser (.00015 Mfd. Mica)	30-1033	.35
29	Condenser (.00005 Mfd. Mica)	30-1029	.35
30	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
31	Compensating Condenser (1st I.F. Primary)	Part of 32	....
32	1st I.F. Transformer	32-1646	$2.25
33	Compensating Condenser (1st I.F. Secondary)	Part of 32	....
34	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
35	Condenser (.1 Mfd. Tubular)	30-4122	.35
36	Compensating Condenser (2nd I.F. Pri.)	Part of 37	....
37	2nd I.F. Transformer	32-1647	2.25
38	Compensating Condenser (2nd I.F. Sec.)	Part of 37	....
39	Condenser (.00011 Mfd. Mica)	30-1031	.35
39A	Condenser (.00011 Mfd. Mica)	30-1031	.35
40	Condenser (.00011 Mfd. Mica)	30-1031	.35
41	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
42	Condenser (.02 Mfd. Tubular)	30-4215	.30
43	Condenser (.02 Mfd. Tubular)	30-4215	.30
44	Volume Control and On-Off Switch	33-5105	1.45
45	Resistor (25000 ohms) (Red, Green, Orange)	33-1013	.20
46	Condenser (.02 Mfd. Tubular)	30-4215	.30
47	Resistor (10000 ohms) (Brown, Black, Orange)	4412	.20
48	Resistor (15000 ohms) (Brown, Green, Orange)	5718	.35
49	Resistor (20000 ohms) (Red, Black, Orange)	6649	.20
50	Resistor (99000 ohms) (White, White, Yellow)	4411	.20
51	Condenser (.15 Mfd. Tubular)	30-4191	.35
52	Condenser (16 Mfd. Electrolytic)	30-2118	1.65
53	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
54	Resistor (.5 meg.) (Yellow, White, Yellow)	6097	.20
55	Resistor (70000 ohms) (Violet, Black, Orange)	5385	.20
56	Resistor (99000 ohms) (White, White, Yellow)	6099	.20
57	Condenser (.1 Mfd. Tubular)	30-4122	.35
58	Resistor (.5 meg.) (Yellow, White, Yellow)	6097	.20
59	Condenser (.02 Mfd. Tubular)	30-4113	.30
60	Tone Control	30-4316	.75
61	Condenser in Tone Control	Part of 60	....
61A	Condenser (.003 Mfd. Tubular)	30-4042	.25
62	Output Transformer	32-7019	1.25
63	Voice Coil & Cone Assembly (S-14 Speaker)	36-3157	.80
64	Field Coil & Pot Assembly (S-14 Speaker)	36-3495	2.75
65	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
66	Condenser (.3 Mfd. Bakelite Block)	6287-DU	.40
67	Condenser (8 Mfd. & 8 Mfd. Electrolytic)	30-2079	2.40
68	Condenser (.25 Mfd. Tubular)	30-4146	.40
69	Condenser (.015 Mfd. Bakelite Block)	3793-DG	.40
70	Resistor (BC Wirewound, 22 ohms, 235 ohms)	33-3037	.20
71	Power Transformer (115 Volts 60 Cycles)	32-7381	4.00
	(115 Volts 25 Cycles)	32-7382	6.25
	(230 Volts 50 Cycles)	33-7383	4.50
72	Condenser (.1 Mfd. Tubular)	30-4122	.35
73	Resistor (330,000 ohms) (Orange, Orange, Yellow)	33-1200	.20
74	Pilot Lamp	34-2064	.09

PHILCO RADIO & TELEV. CORP.

Model 620

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and pentode output (3 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

Coverage of Each Band: Band 1, 540-1720 K.C.; Band 2, 1750 to 5800 K.C. (1.75-5.8 megacycles); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Two-speed gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning.

Tone Control: 3-position, with bass compensation effective in first position.

Intermediate Frequency: 460 K.C.

Power Consumption: 65 watts.

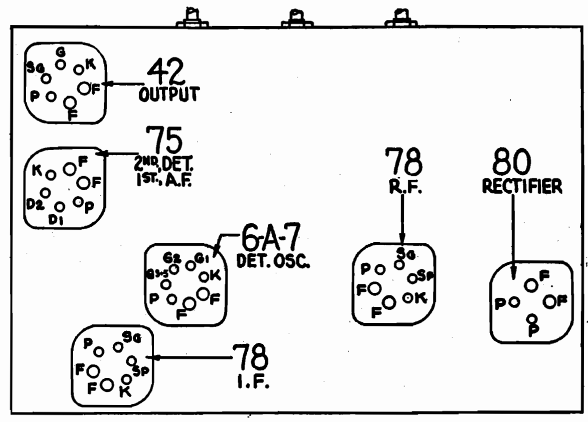


Fig. 1. Tube Sockets as viewed from bottom.

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 620 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. Philco Model 088 All-wave signal generator is ideal for these requirements. Or you can use the Philco Model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short-wave" frequencies. The location of all compensating condensers is shown in Fig. 2. An output meter is also needed, such as in Philco Model 025.

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the broadcast signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 30 volt range of the output meter in the Philco 048A or 025 unit to the plate and cathode of the output tube or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields. The primary is adjusted by turning the screw in top and the secondary by the nut. Adjust condensers 36 and 38 (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers 31 and 33 (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1720 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap 2 condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

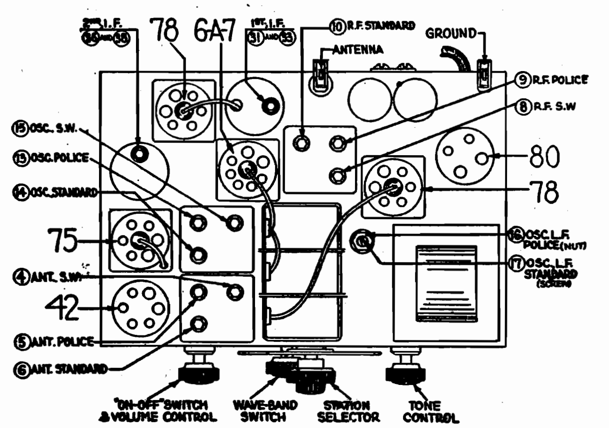


Fig. 2. Locations of Compensating Condensers

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Range No. 1 (broadcast band), set the dial at 1700 K.C. Set the signal generator at this frequency and adjust compensators 14, 6 and 10 for maximum output. These are the oscillator, antenna, and R.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator 17 (screw) for maximum output. This is the oscillator L.F. standard compensator.

3. Turn the waveband switch to the second (middle) position. Set the dial at 3.6 M.C., at which point the fundamental of the 091 signal will be heard. If the Model 088 signal generator is being used, set it at 3.6 M.C. Adjust condensers 13, 5 and 9 in succession. These are the oscillator, antenna and R.F. police band adjustments.

4. Turn the tuning dial to 1.8 M.C., and set the signal generator (Model 024 or Model 088) at 1800 K.C. Adjust condenser 16 (Osc. L.F., police) (nut), to maximum signal.

5. Turn the wave-band switch to Band 3 (extreme right) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., antenna S.W. and R.F. S.W. compensators for maximum reading in the output meter. These are numbered 15, 4 and 8 respectively in figure No. 2.

MODEL 623
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

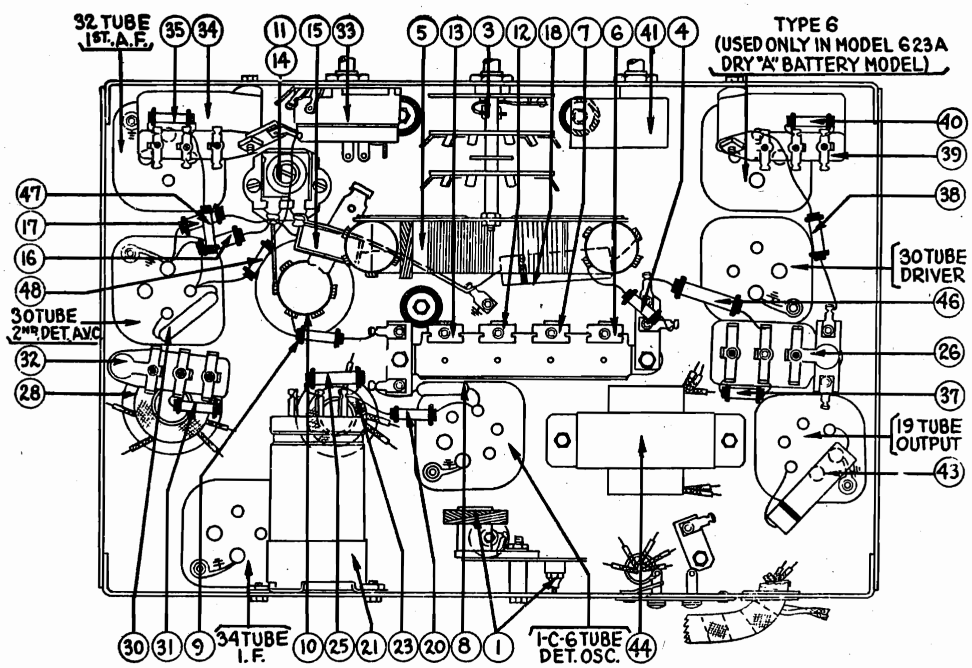


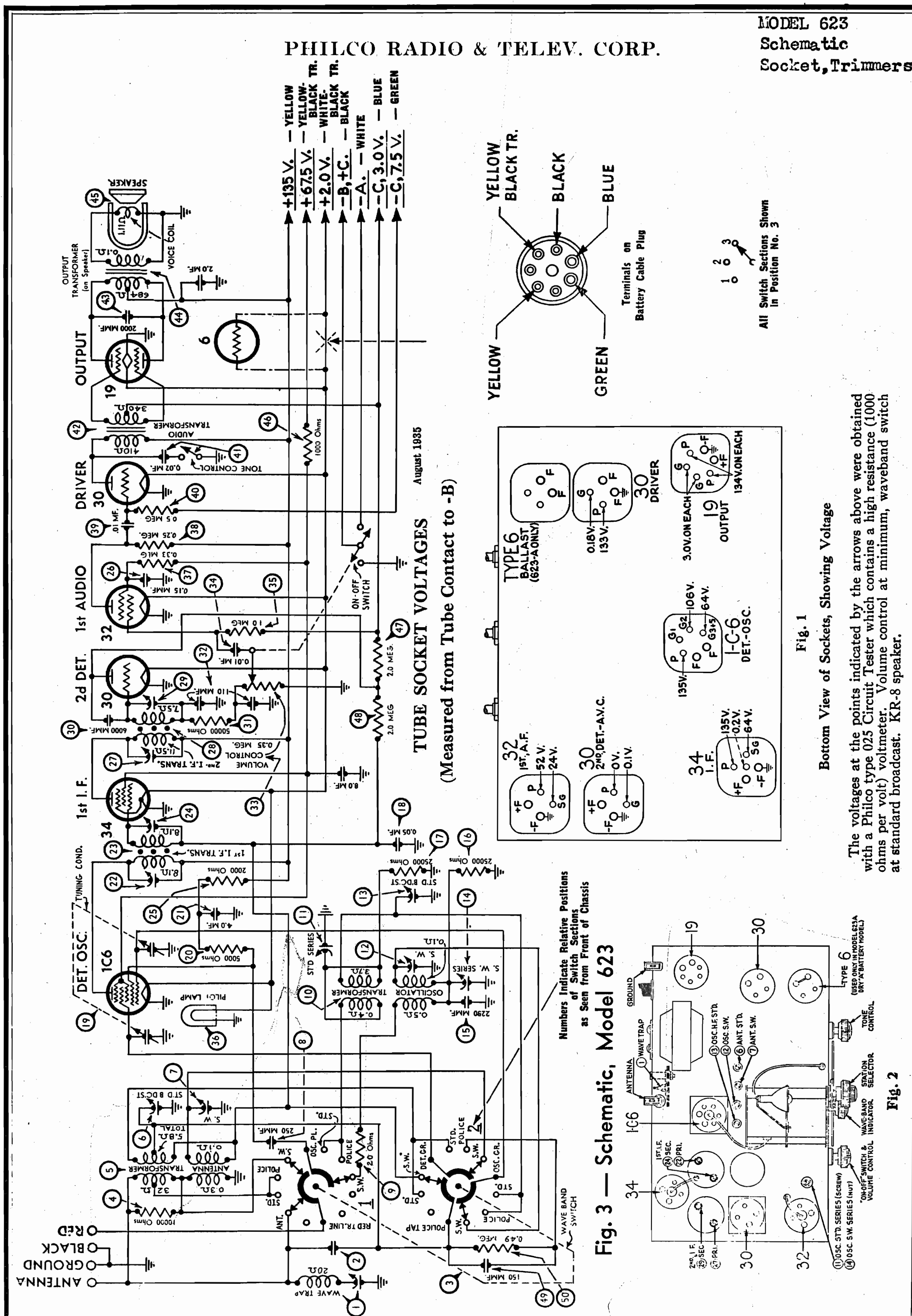
Fig. 4

Replacement Parts—Model 623

Nos. in Figs. 3 & 4	Description	Part No.	List Price
1	Wave Trap	38-6850	$1.10
2	Condenser (Capacity obtained by Twisted Wires)	......	....
3	Waveband Switch	42-1112	1.10
4	Resistor (10000 ohms) (Brown, Black, Orange)	33-1000	.20
5	Antenna Transformer	32-1669	1.15
6	Compensating Condenser (Ant. Standard)	Part of 31-6047	.50
7	Compensating Condenser (Ant. S.W.)	Part of 31-6047	
8	Condenser (.00025 Mfd. Mica)	30-1032	.35
9	Resistor (20 ohms) (Red, Black, Black)	33-1206	.20
10	Oscillator Transformer	32-1831	1.50
11	Compensating Condenser (Osc. L.F. Standard)	Part of 31-6027	.70
12	Compensating Condenser (Osc. S.W., H.F. End)	Part of 31-6047	.50
13	Compensating Condenser (Osc. H.F. Standard)	Part of 31-6047	
14	Compensating Condenser (Osc. S.W. Series)	Part of 31-6027	.70
15	Condenser (.00225 Mfd. Mica)	30-1055	.40
16	Resistor (25000 ohms) (Red, Green, Orange)	33-1013	.20
17	Resistor (25000 ohms) (Red, Green, Orange)	33-1013	.20
18	Condenser (.05 Mfd. Tubular)	30-4020	.35
19	Tuning Condenser Assembly	31-1526	2.75
20	Resistor (5000 ohms) (Green, Black, Red)	6096	.20
21	Condenser (Electrolytic) (4 Mfd., 8 Mfd., 2 Mfd.)	30-2127	1.50
22	Compensating Condenser (1st I.F. Primary)	Part of 23	....
23	1st I.F. Transformer	32-1793	1.35
24	Compensating Condenser (1st I.F. Secondary)	Part of 23	....
25	Resistor (2000 ohms) (Red, Black, Red)	33-1028	.20
26	Condenser (.15 Mfd. Bakelite Block)	6287-SG	.35
27	Compensating Condenser (2nd I.F. Primary)	Part of 28	....
28	2nd I.F. Transformer	32-1672	1.35
29	Compensating Condenser (2nd I.F. Secondary)	Part of 28	....
30	Condenser (.006 Mfd. Mica)	6359	.60
31	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
32	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG	.25
33	Volume Control and On-Off Switch	33-5115	1.45
34	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
35	Resistor (1 Meg.) (Brown, Black, Orange)	33-1096	20
36	Pilot Lamp	34-2065	.35
37	Resistor (330000 ohms) (Orange, Orange, Yellow)	33-1200	$0.20
38	Resistor (250000 ohms) (Red, Yellow, Yellow)	33-1097	.20
39	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
40	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
41	Tone Control	30-4344	.50
42	Audio Transformer (On Top of Chassis)	32-7454	1.60
43	Condenser (.002 Mfd. Tubular)	30-4177	.25
44	Output Transformer (On Chassis)	32-7453	1.50
45	Cone & Voice Coil Assembly (KR-8 Speaker)	36-3159	.80
46	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
47	Resistor (2 Meg.) (Red, Black, Green)	33-1025	.20
48	Resistor (2 Meg.) (Red, Black, Green)	33-1025	.20
*49	Condenser (.00015 Mfd. Mica)	30-1033	.35
*50	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
	Dial Scale	27-5097	.25
	Dial Hub Assembly	31-1550	.15
	Dial Spring Clamp	28-2837	.10
	‡Bezel (623-B)	‡28-3163	.50
	‡‡Bezel Glass (623-B)	‡‡27-8006	.55
	Tube Socket (4-Prong)	27-6044	.10
	Tube Socket (6-Prong)	27-6036	.11
	Tube Shield (Round)	8005	.10
	Tube Shield Base (Round)	8004	.01
	Tube Shield (Square)	28-2726	.10
	Tube Shield Base (Square)	28-2725	.03
	Knob (Waveband)	27-4219	.10
	Knob (Tone, Volume)	27-4208	.10
	Knob (Station Selector)	27-4206	.12
	Knob (Slow Speed)	27-4207	.10
	Chassis Mtg. Screw	W-1496A	1.60 C
	Chassis Mtg. Washer (Rubber)	27-4198	.01
	Chassis Mtg. Bumper (Rubber)	27-4197	2.50 per C
	Battery Cable	41-3143	1.25
	Ballast Tube Socket Jumper Wire	28-8061	.014
	‡623-F Bezel	28-3164	.50
	‡‡623-F Bezel Glass	27-8007	.55

*Not shown in Fig. 4.

MODEL 623
Schematic
Socket, Trimmers



MODEL 623
Alignment,Data

PHILCO RADIO & TELEV. CORP.

Model 623

Adjusting Compensating Condensers

General Specifications

Type Circuit: Superheterodyne, with Class B output; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Battery operated; Model 623 uses a 2-volt storage battery (Philco 172-R). Model 623-A uses dry A battery (Philco P-896). Both sets use a dry combination "B" & "C" battery unit (Philco P-9068). This has a socket into which the plug on the battery cable attached to chassis is to be inserted.

Tubes Used: 1 type 1C6, Detector-Oscillator; 1 type 34, I.F.; 1 type 30, 2d Detector and A.V.C.; 1 type 32 1st A.F.; 1 type 30, driver; 1 type 19 output. Model 623-A has also a ballast tube, type 6, to maintain constant filament voltage on all tubes. The socket for this tube exists in both 623 and 623-A chassis, but in the former, the type 6 tube is not used, and the filament contacts of the socket are shorted by a metal jumper.

Wave Bands: Three—(1) Standard (with some Police); (2) Police; (3) Short-wave.

Coverage of Each Band: Band 1, 530–1720 K.C.; Band 2, 2300 to 2500 K.C. (2.3–2.5 M.C.); Band 3, 5700–18,000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Dual gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning, 6 to 1 on main shaft.

Tone Control: 2-Position.

Intermediate Frequency: 460 K.C.

Current Consumption: A battery, .67A; B battery, 19 M.A.

The adjustment of the compensating condensers in Model 623 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. The Philco Model 088 All-Wave Signal Generator covers these requirements perfectly. An output meter is also required. Philco Model 025 or 012 unit is recommended. The location of all compensating condensers is shown in Fig. 2.

Adjustment of I.F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 1C6 tube), and connect the "ANT" output terminal of the signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the "025" output meter adapter leads to the plate and one filament contact of the type 30 driver tube. Set it at the 0–30 volt range.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields and adjusted by turning the two screws in top. Adjust condensers 27 and 29 (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers 22 and 24 (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 1C6 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (broadcast position), turn the station selector to 550 K.C.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap 1 condenser until a MINIMUM reading is obtained on the output meter. The wave-trap compensator is reached from rear of chassis.

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Position No. 1 (broadcast band), set the dial at 150 K.C. Set the signal generator at 1.5 M. C. and adjust compensators 13 and 6 for maximum output. These are the oscillator and antenna "H.F. standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C. and adjust compensator 11 (screw) for maximum output. This is the oscillator standard series (L.F.) compensator.

3. Turn the wave-band switch to the extreme right (short-wave band) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. Adjust the oscillator S.W., and antenna S.W. compensators for maximum reading in the output meter. These are numbered 12 and 7 respectively in figure No. 2.

4. Turn the tuning dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser 14 osc. series (S.W.) (nut) to maximum signal.

PHILCO RADIO & TELEV. CORP.

MODEL 630
Schematic

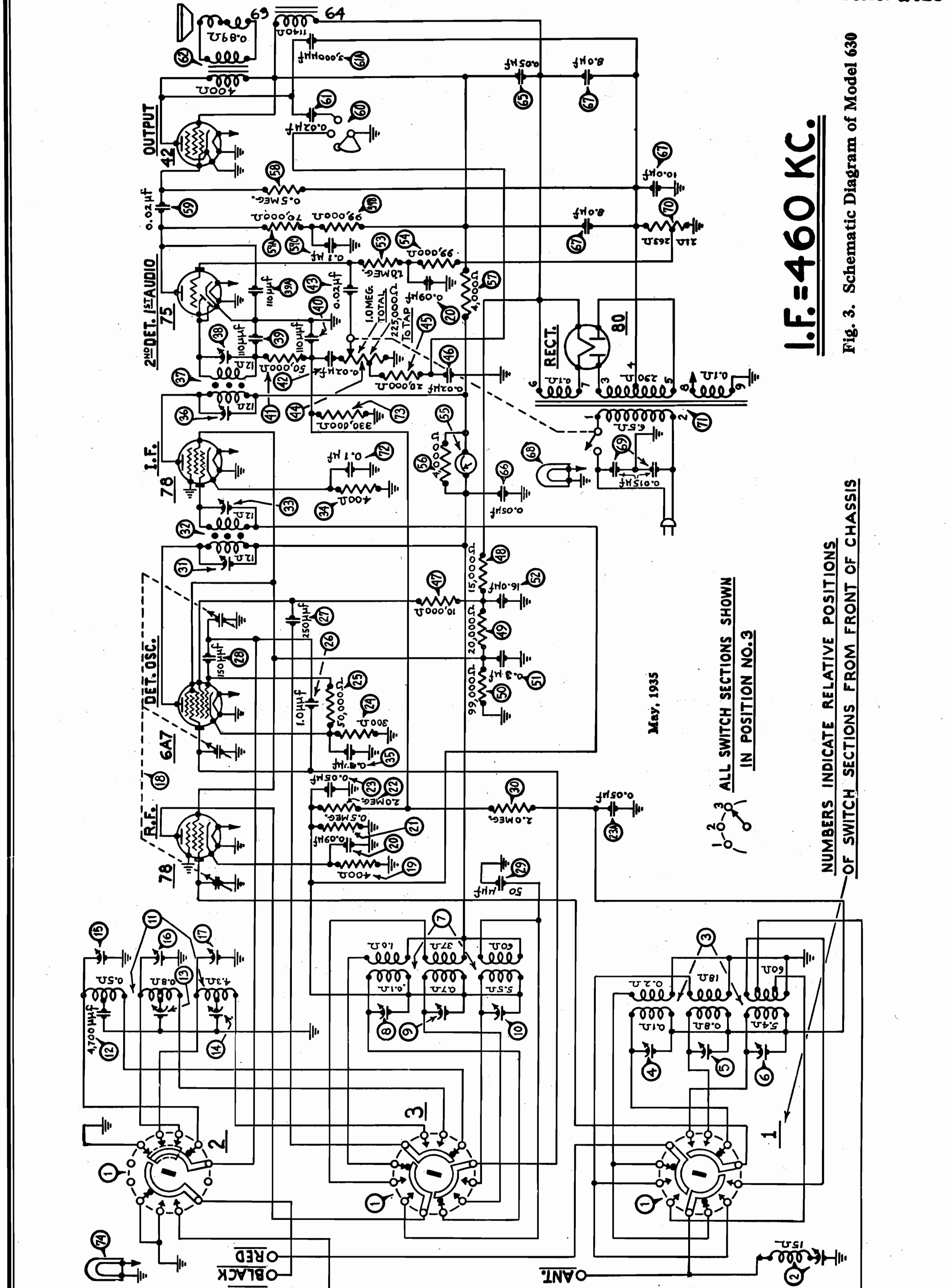


Fig. 3. Schematic Diagram of Model 630

MODEL 630
Voltage, Trimmers
Chassis, Alignment
Data

PHILCO RADIO & TELEV. CORP.

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and pentode output (5 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Output; 1 type 80 Rectifier.

Wave Bands: Three—(1) standard (with some Police); (2) Police, Aircraft and Amateur; (3) Short-wave.

Coverage of Each Band: Band 1, 540-1720 K.C.; Band 2, 1750 to 5800 K.C. (1.75-5.8 megacycles); Band 3, 5700-18000 K.C. (5.7 to 18.0 megacycles).

Tuning Drive: Two-speed gear drive, ball bearing. 50 to 1 ratio for slow-speed tuning.

Tone Control: 3-position, with bass compensation effective in first position.

Intermediate Frequency: 460 K.C.

Power Consumption: 70 watts.

Tube Socket Voltages
Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Output
Point P	245	245	245	188	298
SG	102	102	102	...	311
K	2.7	2.6	2.6	...	...
	6A7: $G_{3\,\&\,5}$ = 175				

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at maximum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Line voltage 115 volts.

Adjustment of High and Low Frequency Compensators

1. With the wave-band switch still at Range No. 1 (broadcast band), set the dial at 1700 K.C. Set the signal generator at this frequency and adjust compensators (14), (6) and (10) for maximum output. These are the oscillator, antenna, and R.F. "standard" compensators respectively.

2. Tune the receiver and the signal generator to 600 K.C and adjust compensator (17) (screw) for maximum output This is the oscillator L.F. standard compensator.

3. Turn the waveband switch to the second (middle) position. Set the dial at 3.6 M.C. at which point the fundamental of the 091 signal will be heard. If the Model 088 Signal Generator is being used, set it at 3.6 M.C. Adjust condensers (13), (5) and (9) in succession. These are the oscillator, antenna and R.F. police band adjustments.

4. Turn the tuning dial to 1.8 M.C., and set the signal generator (Model 026 or Model 088) at 1800 K.C. Adjust condenser (16) (Osc. L.F., police) (nut), to maximum signal.

5. Turn the wave-band switch to Band 3 (extreme right) and adjust the station selector to 18.0 megacycles. Set the signal generator at 18 M.C. By means of the Philco wrench, part No. 3164, adjust the oscillator S.W., antenna S.W. and R.F. S.W. compensators for maximum reading in the output meter. These are numbered (15), (4) and (8) respectively in figure No. 2.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	......	Primary	White
3–5	746	78 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	2.25 A.	Filaments	Black
4	...	......	Center Tap of 3-5	Yellow, Green Tracer

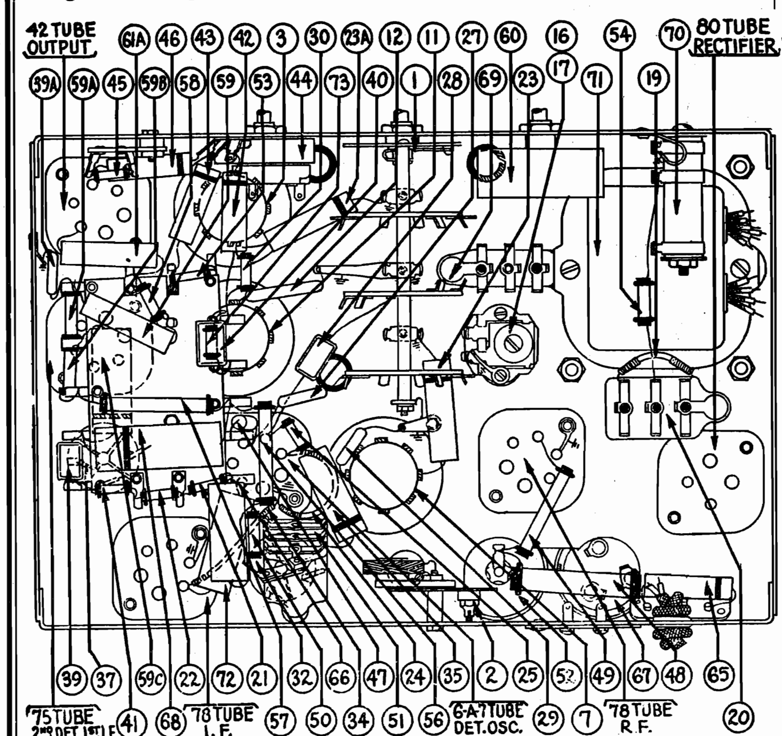


Fig. 4 Bottom View of Chassis

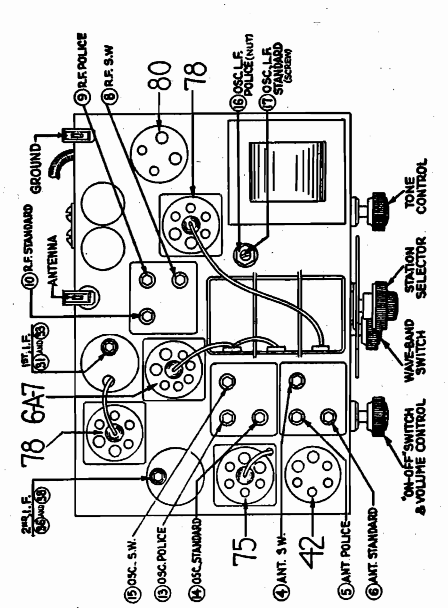


Fig. 2. Location of Compensating Condensers

PHILCO RADIO & TELEV. CORP.

MODEL 630
Alignment,Part 2
Socket,Parts

Replacement Parts—Model 630

	Description	Part No.	List Price
1	Wave Band Switch	42-1107	$1.75
2	Wavetrap	38-6850	1.10
3	Antenna Transformer	32-1699	3.00
4	Compensating Condenser (Ant. S.W.)	Part of 3	....
5	Compensating Condenser (Ant. Police)	Part of 3	....
6	Compensating Condenser (Ant. Standard)	Part of 3	....
7	R. F. Transformer	32-1636	3.25
8	Compensating Condenser (R.F. Short-Wave)	Part of 7	....
9	Compensating Condenser (R.F. Police)	Part of 7	....
10	Compensating Condenser (R.F. Standard)	Part of 7	....
11	Oscillator Transformer	32-1637	2.50
12	Condenser (.0047 Mfd. Mica)	30-1052	.60
13	Compensating Condenser (Osc. Police)	Part of 11	....
14	Compensating Condenser (Osc. H. F. Standard)	Part of 11	....
15	Compensating Condenser (Osc. S. W.)	Part of 11	....
16	Compensating Condenser (Osc. L.F. Police) Part of	31-6027	.70
17	Compensating Condenser (Osc. L.F. Standard) Part of	31-6027	
18	Tuning Condenser Assembly	31-1526	2.75
19	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
20	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
21	Resistor (.5 Meg.) (Yellow, White, Yellow)	6097	.20
22	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
23	Condenser (.05 Mfd. Tubular)	30-4020	.35
23a	Condenser (.05 Mfd. Tubular)	30-4020	.35
24	Resistor (300 ohms Flexible) (Orange, Black, Brown)	33-3010	.20
25	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
26	Condenser (1 Mmfd.)	Part of 18	....
27	Condenser (.00025 Mfd. Mica)	30-1032	.35
28	Condenser (.00015 Mfd. Mica)	30-1033	.35
29	Condenser (.00005 Mfd. Mica)	30-1029	.35
30	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
31	Compensating Condenser (1st I.F. Primary)	Part of 32	....
32	1st I.F. Transformer	32-1646	$2.25
33	Compensating Condenser (1st I.F. Secondary)	Part of 32	....
34	Resistor (400 ohms Flexible) (Yellow, Black, Brown)	33-3016	.20
35	Condenser (.1 Mfd. Tubular)	30-4122	.35
36	Compensating Condenser (2nd I.F. Pri.)	Part of 37	....
37	2nd I.F. Transformer	32-1647	2.25
38	Compensating Condenser (2nd I.F. Sec.)	Part of 37	....
39	Condenser (.00011 Mfd. Mica)	30-1031	.35
39a	Condenser (.00011 Mfd. Mica)	30-1031	.35
40	Condenser (.00011 Mfd. Mica)	30-1031	.35
41	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
42	Condenser (.02 Mfd. Tubular)	30-4215	.30
43	Condenser (.02 Mfd. Tubular)	30-4215	.30
44	Volume Control and On-Off Switch	33-5105	1.45
45	Resistor (20000 ohms) (Red, Black, Orange)	33-1178	.20
46	Condenser (.02 Mfd. Tubular)	30-4215	.30
47	Resistor (10000 ohms) (Brown, Black, Orange)	4412	.20
48	Resistor (15000 ohms) (Brown, Black, Orange)	5718	.35
49	Resistor (20000 ohms) (Red, Black, Orange)	6649*	.20
50	Resistor (99000 ohms) (White, White, Orange)	6099‡	.20
51	Condenser (.3 Mfd. Bakelite Block)	6287-DG	.40
52	Condenser (16 Mfd. Electrolytic)	30-2118	1.65
53	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
54	Resistor (99000 ohms) (White, White, Orange)	6099	.20
55	Shadow Tuning Meter	45-2086	2.00
56	Resistor (4000 ohms) (Yellow, Black, Red)	33-1040	.20
57	Resistor (4000 ohms) (Yellow, Black, Red)	7832	.20
58	Resistor (.5 meg.) (Yellow, White, Yellow)	6097	.20
59	Condenser (.02 Mfd. Tubular)	30-4113	.30
59a	Resistor (70000 ohms) (Violet, Black, Orange)	5385	.20
59b	Resistor (99000 ohms) (White, White, Orange)	6099	.20
59c	Condenser (.1 Mfd. Tubular)	30-4122	.35
60	Tone Control (3 position)	30-4332	.75
61	Condenser in Tone Control	Part of 60	....
61a	Condenser (.003 Mfd. Tubular)	30-4042	.25
62	Output Transformer	32-7178	1.60
63	Voice Coil & Cone Assembly (K-32)	36-3159	.80
64	Field Coil & Pot Assembly (K-32)	36-3498	3.25
65	Condenser (.05 Mfd. Tubular)	30-4020	.35
66	Condenser (.05 Mfd. Tubular)	30-4020	.35
67	Condenser (8 Mfd., 8 Mfd., 10 Mfd. Electrolytic)	30-2073	2.15
68	Pilot Lamp (Shadow Tuning Meter)	Part of 55	....
69	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
70	Resistor (BC Wirewound—21 ohms, 263 ohms)	33-3069	.25
71	Power Transformer (115 Volts 60 Cycles)	32-7384	5.50
	(115 Volts 25 Cycles)	32-7385	7.75
	(230 Volts 50 Cycles)	33-7386	5.75
72	Condenser (.1 Mfd. Tubular)	30-4122	.35
73	Resistor (330,000 ohms) (Orange, Orange, Yellow)	33-1200	.20
74	Pilot Lamp	34-2064	.09

*After Run 2, this is 10000 ohms ,Part 3524.
‡After Run 2, this is 20000 ohms ,Part 6650

Adjusting Compensating Condensers

The adjustment of the compensating condensers in Model 630 requires a signal generator covering the broadcast and police band, and also one capable of producing a signal at certain frequencies in the short wave band. Philco Model 088 All-wave signal generator is ideal for these requirements. Or you can use the Philco Model 024 or 048A instrument for the broadcast frequencies, and the Model 091 crystal controlled short wave signal generator for the "short wave" frequencies. The location of all compensating condensers is shown in Fig. 2. An output meter is also needed, such as in Philco Model 025

Adjustment of I. F.

1. Remove the antenna connection from the receiver, disconnect the grid clip from the first detector (type 6A7 tube), and connect the "ANT" output terminal of the broadcast signal generator to the grid cap of this tube; connect the "GND" terminal of the signal generator to the "GND" terminal of the receiver.

2. Connect the 0 to 30 volt range of the output meter in the Philco 048A or 025 unit to the plate and cathode of the output tube or to the two bottom prongs of the speaker plug.

3. Adjust the signal generator to a frequency of 460 K.C. Place the receiver in operation with the dial turned to the low frequency end of the standard broadcast band, wave band switch to extreme left (clockwise), and have the volume control adjusted near its maximum setting. Adjust the signal generator attenuator for approximately half-scale reading of the output meter.

4. The I.F. compensating condensers are located at the tops of the I.F. coil shields. The primary is adjusted by turning the screw in top and the secondary by the nut. Adjust condensers 36 and 38 (2d I.F. primary and secondary) for maximum reading in the output meter, and then condensers 31 and 33 (1st I.F. primary and secondary).

Adjustment of Wave-Trap

1. Connect the signal generator leads to the antenna and ground terminals of the receiver. Replace the grid clip on the 6A7 grid cap.

2. With the wave-band switch of the receiver still in the extreme left (standard band), (540-1720 K.C.), turn the station selector to 55.

3. With the signal generator in operation at 460 K.C., adjust the wave-trap 2 condenser until a MINIMUM reading is obtained on the output meter. The Philco fibre wrench, part No. 3164, is used for this adjustment. The wave-trap compensator is reached from rear of chassis.

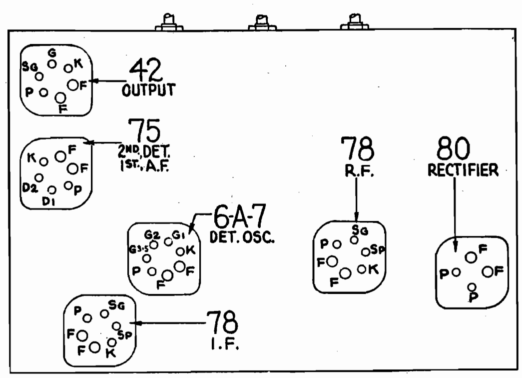


Fig. 1. Tube Sockets as viewed from bottom

MODEL 640
Chassis
Parts

PHILCO RADIO & TELEV. CORP.

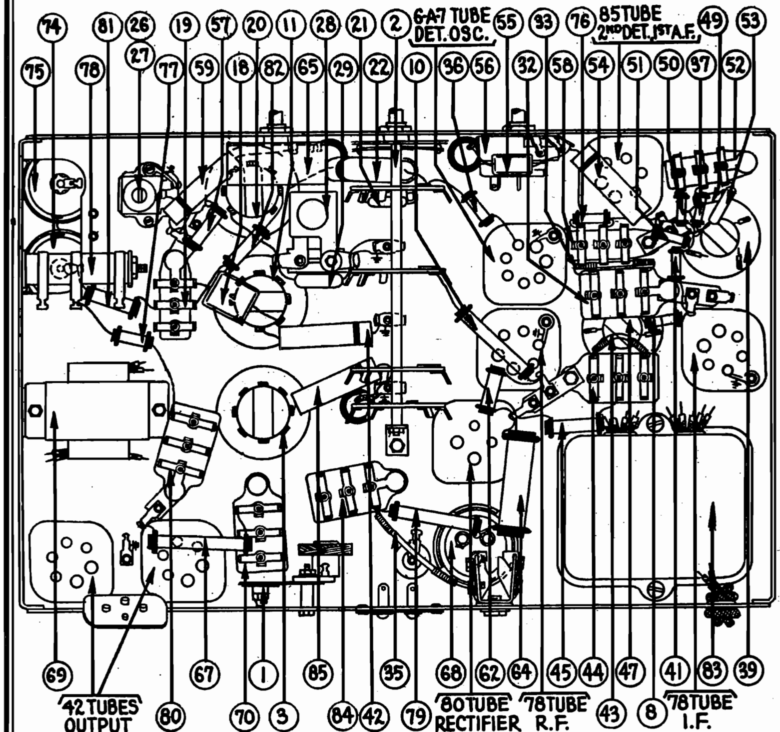


Fig. 3. Bottom View of Chassis

Replacement Parts Model 640

*After Run 2, this is 30-1032 Mica, List .35.

Description	Part No.	List Price
Dial Scale	27-5103	.30
Dial Hub and Set Screw Assembly	31-1550	.15
Dial Spring Clamp	28-2837	.10
Tube Shield	28-2726	.10
Tube Shield Base	28-2725	.03
Socket (4-Prong)	27-6034	.10
Socket (6-Prong)	27-6036	.11
Socket (7-Prong)	27-6037	.11
Socket (Speaker Plug)	27-6033	.08
Knob (Station Selector)	27-4206	.12
Knob (Fine Tuning)	27-4207	.10
Knob (Waveband)	27-4219	.10
Knob (Volume Control or Tone Control)	27-4208	.10
Bezel	28-2933	.35
Glass	27-7931	.60
Chassis Mtg. Screw	W-1495	1.50 per C
Chassis Mtg. Washer	27-4198	.01
Chassis Mtg. Rubber Bumper	27-4197	....

	Description	Part No.	List Price
1	Wave Trap	38-6850	$1.10
2	Waveband Switch	42-1114	2.50
3	Antenna Transformer	32-1708	4.00
4	Compensating Condenser (Ant.) (Police)	Part of 3	....
5	Compensating Condenser (Ant.) (Standard)	Part of 3	....
6	Compensating Condenser (Ant.) (Longwave)	Part of 3	....
7	Compensating Condenser (Ant.) (Shortwave)	Part of 3	....
8	Resistor (.5 meg.) (Yellow-White-Yellow)	6097	.20
10	Resistor (25000 ohms) (Red-Green-Yellow)	3656	.20
11	R.F. Transformer	32-1709	3.75
12	Compensating Condenser (R.F. Longwave)	Part of 11	....
13	Compensating Condenser (R.F. Broadcast)	Part of 11	....
14	Compensating Condenser (R.F. Police)	Part of 11	....
15	Compensating Condenser (R.F. Shortwave)	Part of 11	....
16	Condenser	Part of 11	....
17	Condenser	Part of 11	....
18	Condenser (.0018 Mfd. Mica)	6018	.40
19	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
20	Oscillator Transformer	32-1710	3.00
21	Condenser (.000015 Mfd. Mica)	30-1030	.35
22	Condenser (.01 Mfd. Tubular)	*30-4145	.25
23	Compensating Condenser (Osc. S.W.)	Part of 22	....
24	Compensating Condenser (Osc. Longwave)	Part of 22	....
25	Compensating Condenser (Osc. B.C. & Police)	Part of 22	....
26	Compensating Condenser (Osc. L.W. Series)	Part of 31-6044	.50
27	Compensating Condenser (Osc. B.C. Series)	Part of 31-6044	
28	Compensating Condenser (Osc. S.W. Series)	04000-R	.45
29	Condenser (.0022 Mfd. Mica)	30-1057	.40
31	Tuning Condenser Assembly	31-1555	4.50
32	Condenser (.09 Mfd. Twin Bakelite)	4989-DG	.40
33	Resistor (300 ohms) (Orange-Black-Black)	33-3010	.20
34	Condenser (.05 Mfd. Tubular) (On top of chassis)	30-4327	.20
35	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20
36	Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
37	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
38	Compensating Condenser (1st I.F. Primary)	Part of 39	....
39	1st I.F. Transformer	32-1711	$2.00
40	Compensating Condenser (1st I.F. Secondary)	Part of 39	....
41	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
42	Condenser (.05 Mfd. Tubular)	30-4020	.35
43	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20
44	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DU	.40
45	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
46	Compensating Condenser (2d I.F. Primary)	Part of 47	....
47	2d I.F. Transformer	32-1712	2.00
48	Compensating Condenser (2d I.F. Secondary)	Part of 47	....
49	Resistor (330000 ohms) (Orange-Orange-Yellow)	33-1200	.20
50	Resistor (25000 ohms) (Red-Green-Orange)	33-1013	.20
51	Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
52	Condenser (.00025 Mfd. Bakelite Block)	8317-SG	.25
53	Condenser (.00011 Mfd. Mica)	30-1031	.35
54	Condenser (.05 Mfd. Tubular)	30-4020	.35
55	Condenser (.00011 Mfd. Mica)	30-1031	.35
56	Volume Control and On-Off Switch	33-5113	1.45
57	Resistor (20000 ohms) (Red-Black-Orange)	6650	.20
58	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.35
59	Condenser (.03 Mfd. Mica)	30-4025	.30
60	Condenser (in Tone Control)	Part of 66	....
61	Shadow Tuning Meter	45-2080	2.50
62	Resistor (4000 ohms) (Yellow-Black-Red)	33-1040	.20
63	Pilot Lamp (Shadow Tuning Meter)	Part of 61	....
64	Resistor (16000 ohms) (Brown-Blue-Orange)	33-1201	.35
65	Tone Control	30-4333	.75
66	Condensers in Tone Control	Part of 65	....
67	Resistor (32000 ohms) (Orange-Red-Orange)	3525	.20
68	Condenser (Electrolytic) (2 Mfd., 2 Mfd., 1 Mfd.)	30-2114	2.25
69	Audio Transformer	32-7471	2.10
70	Condenser (.002 Mfd. Twin Bakelite Block)	7296-DU	.30
72	Voice Coil & Cone Assembly K-31	36-3159	.80
	Voice Coil & Cone Assembly H-21	02625	1.20
73	Field Coil & Pot Assembly K-31	36-3463	3.75
	Field Coil & Pot Assembly H-21	36-3461	3.75
74	Condenser (8 Mfd. Electrolytic)	30-2025	1.35
75	Condenser (12 Mfd. Electrolytic)	30-2117	1.50
76	Resistor (1 Meg.) (Brown-Black-Green)	33-1171	.20
77	Resistor (.5 Meg.) (Yellow-White-Yellow)	33-1169	.20
78	Resistor (B.C. Wirewound, 60 Ohms, 100 Ohms)	33-3208	.20
79	Resistor (20000 ohms) (Red-Black-Orange)	6649	.20
80	Condenser (.09 Mfd. Twin Bakelite Block)	4989-DG	.40
81	Resistor (15000 ohms) (Brown-Green-Orange)	6208	.20
82	Resistor (15000 ohms) (Brown-Green-Orange)	6208	.20
83	Power Transformer (115 Volts 60 Cycles)	32-7462	6.00
84	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
85	Condenser (.05 Mfd. Tubular)	30-4020	.35

PHILCO RADIO & TELEV. CORP.

MODEL 640
Schematic

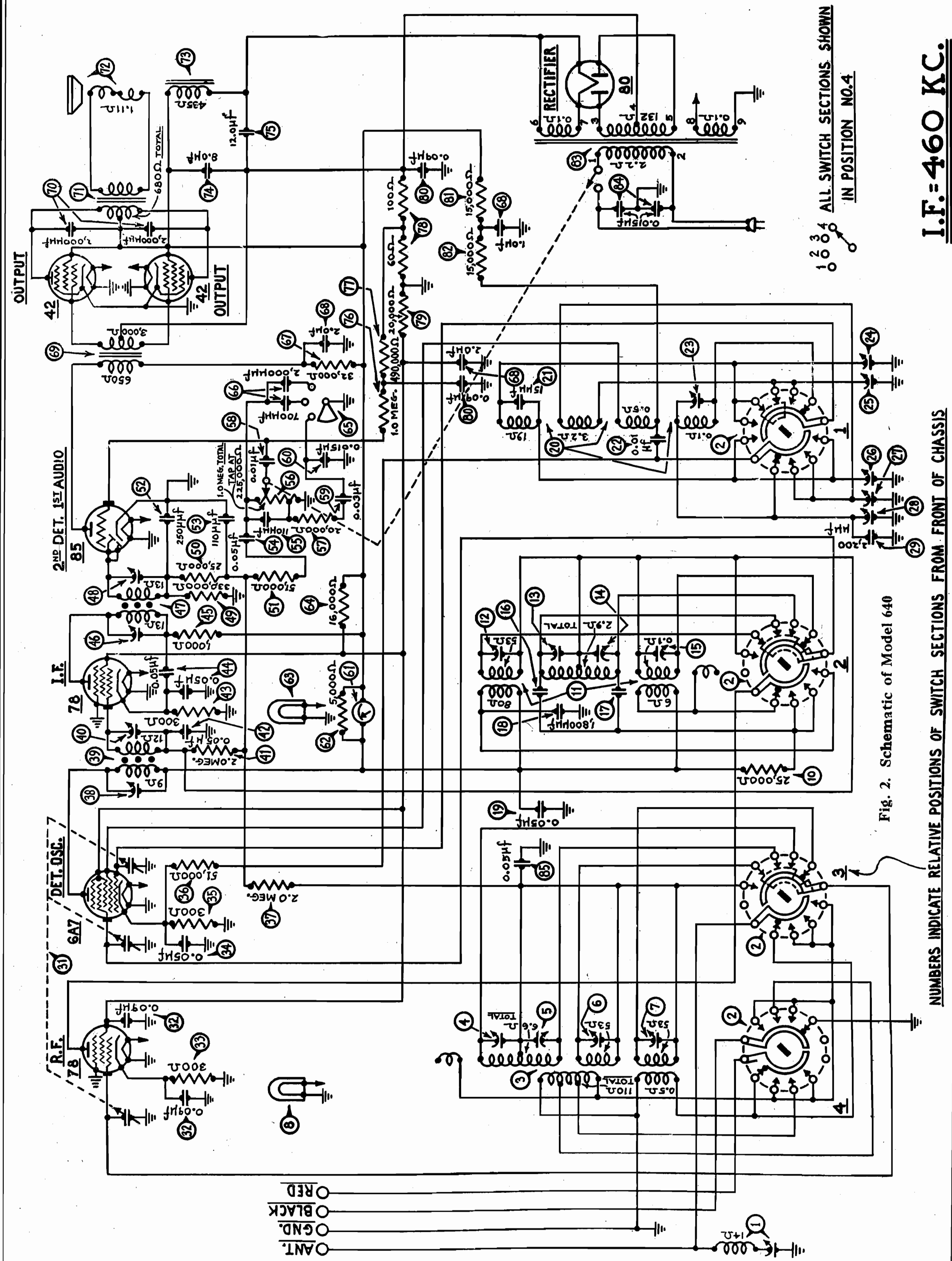


Fig. 2. Schematic of Model 640

PHILCO RADIO & TELEV. CORP.

Model 640

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and push-pull output (7 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 85, 2d Detector and 1st A.F.; 2 type 42 Push-Pull Output; 1 type 80 Rectifier.

Wave Bands: Four: (1) Long-wave (U. S. Weather Forecasts); (2) Standard (with some Police); (3) Police; (4) Short-wave.

Coverage of Each Band: Band 1, 145 to 390 K.C.; Band 2, 540-1720 K.C.; Band 3, 2.2 to 2.6 M.C.; Band 4, 5800-18000 K.C. (5.8 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 on main shaft.

Tone Control: 4-position, with bass compensation effective in first position (counter-clockwise).

Intermediate Frequency: 460 K.C.

Power Consumption: 85 watts.

Speaker: 640B (Code 121); K-31, 640X (Code 122); H-21.

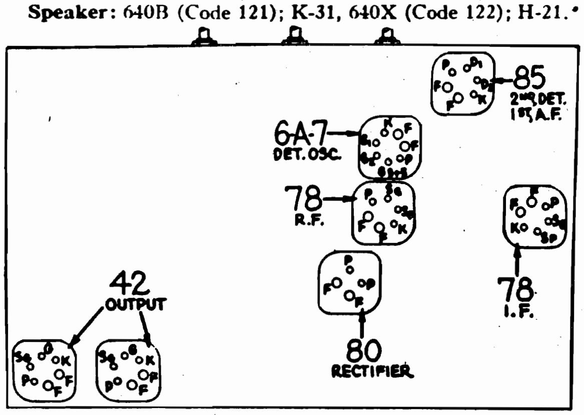


Fig. 1. Tube Sockets as viewed from bottom.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1-2	120	......	Primary	White
3-5	710	118 M.A.	Secondary	Yellow
6-7	5.0	2.0 A.	Fil. Rect.	Blue
8-9	6.3	3.5 A.	Filaments	Black
4	..	.....	Center Tap of 3-5	Yellow, Green Tracer

Tube Socket Voltages (Line Voltage 115)

Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	85 2d Det.	42 Output
Point P	71	240	242	102	240
SG	91	91	91	..	250
K	2.1	2.2	2.3	...	...
	6A7: G 3 & 5 = 102V. 80 Fil.—Gnd.: 300V.				

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch at standard broadcast. Use Fig. 1 for test points. Type K-31 speaker employed.

Adjustment of compensating condensers in Model 640 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20000 K.C., is ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers is shown in Fig. 2. Connect the output meter to the plate contacts of the 42 output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 6A7 tube on the Model 640 (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to second position (standard) and set dial at 55. Now with the fibre screwdriver, adjust condensers 48 and 46 (2d I.F.) and then 38 and 40 (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale.

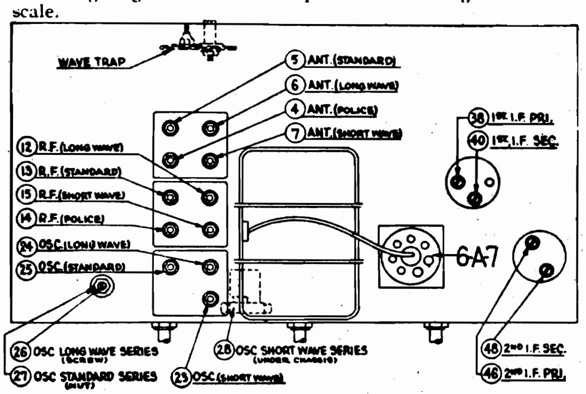


Fig. 2. Locations of Compensating Condensers

WAVE TRAP—Connect the Signal Generator antenna and ground leads to the antenna and ground posts of the set. Replace the grid clip on the 6A7 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap 1 until the minimum reading is obtained in the out-put meter.

SHORTWAVE—Turn waveband switch to position 4 (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, R.F., and Antenna compensators in turn, for maximum reading. These are 23, 15 and 7 respectively.

Turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser 28 for maximum reading. This compensator is located underneath the chassis and reached from underneath. (See Fig. 3).

STANDARD WAVE—Turn waveband switch to position 2 (standard broadcast), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, R.F., and antenna "Standard" condensers. These are 25, 13 and 5 respectively.

Now turn the dial to 60, set signal generator at 600 and adjust condenser 27 (oscillator standard-series) (nut) for maximum reading.

POLICE BAND—Turn waveband switch to position 3 from left (police band); set dial at 2.4 and signal generator at 2400 K.C. Adjust condensers 14 and 4 for maximum reading. (Antenna and R.F. Police.)

LONG WAVE (Weather) BAND—Turn waveband switch to position 1 (left) (Longwave). Set dial at 35 and signal generator at 350 K.C. Adjust condensers 24, 12 and 6 (oscillator, R.F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser 26 (longwave series) (screw) for maximum reading

MODEL 650
Schematic

PHILCO RADIO & TELEV. CORP.

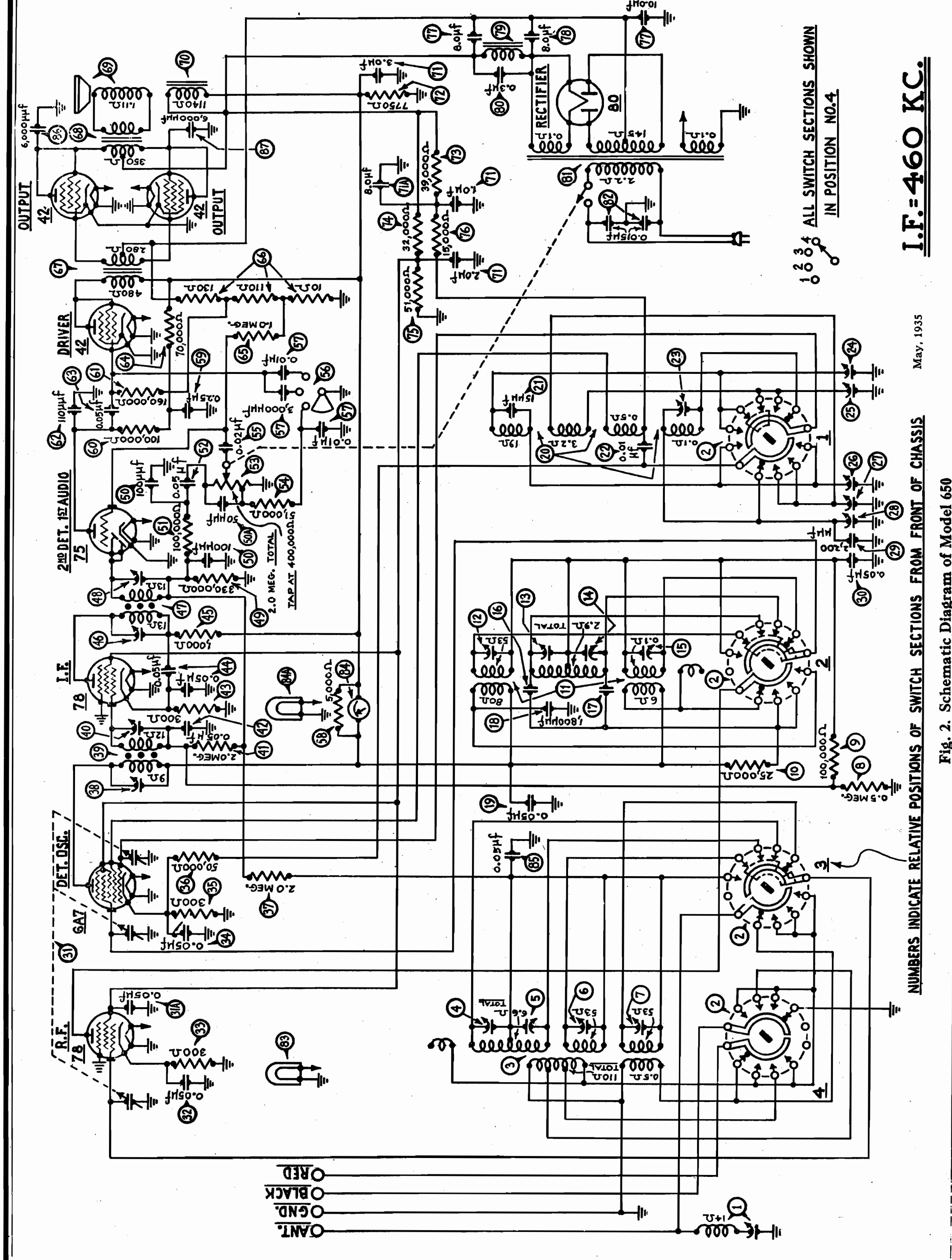


Fig. 2. Schematic Diagram of Model 650

MODEL 650
Alignment, Trimmers
Voltage, Data

PHILCO RADIO & TELEV. CORP.

Adjusting Compensating Condensers

Adjustment of compensating condensers in Model 650 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20000 K.C., is ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre-handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers is shown in Fig. 2. Connect the output meter to the plate contacts of the 42 output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 6A7 tube on the Model 650 (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to second position (standard) and set dial at 55. Now with the fibre screwdriver, adjust condensers (46) and (48) (2d I.F.) and then (38) and (40) (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale.

Tube Socket Voltages (Line Voltage 115)
Measured to Ground

Tube	78 R.F.	6A7 Det. Osc.	78 I.F.	75 2d Det.	42 Driver	42 Output
Point P	55	200	200	115	200	300
SG	90	90	90	...	200	300
K	2.2	2.3	2.6	...	...	...
	6A7: $G_{3\,\&\,5}=155$					

Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to underside of chassis. Volume control at minimum; dial at 55; waveband switch counter-clockwise (band 1). Use Fig. 1 for test points. Type K-17 speaker employed.

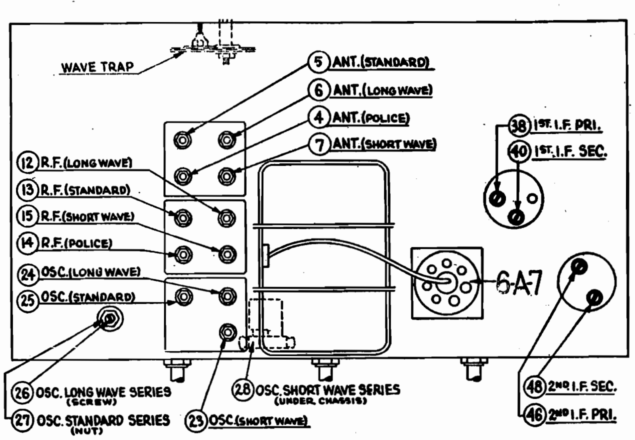


Fig. 2. Locations of Compensating Condensers

WAVE TRAP—Connect the Signal Generator antenna and ground leads to the antenna and ground posts of the set. Replace the grid clip on the 6A7 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap (1) until the minimum reading is obtained in the out-put meter.

SHORTWAVE—Turn waveband switch to position 4 (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, R.F., and Antenna compensators in turn, for maximum reading. These are (23), (15) and (7) respectively.

Turn the dial to 6.0 M.C., set the signal generator at 6.0 M.C., and adjust condenser (28) for maximum reading. This compensator is located underneath the chassis and reached from underneath. (See Fig. 3).

STANDARD WAVE—Turn waveband switch to position 2 (standard broadcast), set signal generator at 1500 and dial of set at 150. Now adjust the oscillator, R.F., and antenna "Standard" condensers. These are (25), (13) and (5) respectively.

Now turn the dial to 60, set signal generator at 600 and adjust condenser (27) (oscillator standard-series) (nut) for maximum reading.

POLICE BAND—Turn waveband switch to position 3 from left (police band); set dial at 2.4 and signal generator at 2400 K.C. Adjust condensers (4) and (14) for maxmium reading. (Antenna and R.F. Police.)

LONG WAVE (Weather) BAND—Turn waveband switch to position 1 (left) (Longwave). Set dial at 35 and signal generator at 350 K.C. Adjust condensers (24), (12) and (6) (oscillator, R.F., and Antenna Longwave) for maximum reading.

Turn dial to 17, signal generator to 170 and adjust condenser (26) (longwave series) (screw) for maximum reading.

Type Circuit: Superheterodyne, with preselector R.F. amplifier, and push-pull pentode output (10 watts); built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: 1 type 78, R.F.; 1 type 6A7, Detector-Oscillator; 1 type 78, I.F.; 1 type 75, 2d Detector and 1st A.F.; 1 type 42 Driver; 2 type 42 Push-Pull Output; 1 type 80 Rectifier.

Wave Bands: Four: (1) Long-wave (U.S. Weather Forecasts); (2) Standard (with some Police); (3) Police; (4) Short-wave.

Coverage of Each Band: Band 1, 145 to 390 K.C.; Band 2, 540-1720 K.C.; Band 3, 2.2 to 2.6 M.C.; Band 4, 5800-18000 K.C. (5.8 to 18.0 megacycles).

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning.

Tone Control: 4-position, with bass compensation effective in first position (counter-clockwise).

Intermediate Frequency: 460 K.C.

Power Consumption: 98 watts.

Speaker: 650B (Code 121); K-17, 650X, 650MX, 650-H, (Code 122); H-13.

MODEL 650
Chassis, Socket
Parts, Data

PHILCO RADIO & TELEV. CORP.

Replacement Parts—Model 650

	Description	Part No.	List Price
1	Wave Trap	38-6850	$1.10
2	Waveband Switch	42-1114	2.50
3	Antenna Transformer	32-1708	4.00
4	Compensating Condenser (Ant.) (Police)	Part of (3)	....
5	Compensating Condenser (Ant.) (Standard)	Part of (3)	....
6	Compensating Condenser (Ant.) (Longwave)	Part of (3)	....
7	Compensating Condenser (Ant.) (Shortwave)	Part of (3)	....
8	Resistor (.5 meg.) (Yellow-White-Yellow)	▲6097	.20
9	Resistor (100000 ohms) (White-White-Yellow)	6099	.20
10	Resistor (25000 ohms) (Red-Green-Yellow)	3656	.20
11	R.F. Transformer	32-1709	3.75
12	Compensating Condenser (R.F. Longwave)	Part of (11)	....
13	Compensating Condenser (R.F. Broadcast)	Part of (11)	....
14	Compensating Condenser (R.F. Police)	Part of (11)	....
15	Compensating Condenser (R.F. Shortwave)	Part of (11)	....
16	Condenser	Part of (11)	....
17	Condenser	Part of (11)	....
18	Condenser (.0018 Mfd. Mica)	6018	.40
19	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
20	Oscillator Transformer	32-1710	3.00
21	Condenser (.000015 Mfd. Mica)	30-1030	.35
22	Condenser (.01 Mfd. Tubular)	#30-4145	.25
23	Compensating Condenser (Osc. S.W.)	Part of (22)	....
24	Compensating Condenser (Osc. Longwave)	Part of (22)	....
25	Compensating Condenser (Osc. B.C. & Police)	Part of (22)	....
26	Compensating Condenser (Osc. L.W. Series) Part of	31-6044	.50
27	Compensating Condenser (Osc. B.C. Series) Part of	31-6044	
28	Compensating Condenser (Osc. S.W. Series)	04000-R	.45
29	Condenser (.0022 Mfd. Mica)	30-1057	.40
30	Condenser (.05 Mfd. Tubular)	30-4020	.35
31	Tuning Condenser Assembly	31-1555	4.50
31a	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
32	Condenser (.05 Mfd. Tubular)	30-4020	.35
33	Resistor (300 ohms) (Orange-Black-Black)	33-3010	.20
34	Condenser (.05 Mfd. Tubular) (On top of chassis)	30-4327	.20
35	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20
36	Resistor (50000 ohms) (Green-Brown-Orange)	6098	.20
37	Resistor (2 Megs.) (Red-Black-Green)	33-1025	.20
38	Compensating Condenser (1st I.F. Primary)	Part of (39)	....
39	1st I.F. Transformer	32-1711	2.00
40	Compensating Condenser (1st I.F. Secondary)	Part of (39)	....
41	Resistor (2 Megs.) (Red-Black-Green)	33-1025	$0.20
42	Condenser (.05 Mfd. Tubular)	30-4020	.35
43	Resistor (300 ohms Flexible) (Orange-Black-Black)	33-3010	.20
44	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DU	.40
45	Resistor (1000 ohms) (Brown-Black-Red)	5837	.20
46	Compensating Condenser (2d I.F. Primary)	Part of (47)	....
47	2d I.F. Transformer	32-1712	2.00
48	Compensating Condenser (2d I.F. Secondary)	Part of (47)	....
49	Resistor (330000 ohms) (Orange-Orange-Yellow)	33-1200	.20
50	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG	.25
50a	Condenser (.00005 Mfd. Mica) (Not shown Fig. 3)	30-1029	.35
51	Resistor (100000 ohms) (White-White-Orange)	6099	.20
52	Condenser (.05 Mfd. Tubular)	30-4020	.35
53	Volume Control and On-Off Switch	33-5108	1.45
54	Resistor (51000 ohms) (Green-Brown-Orange)	6098	.20
55	Condenser (.02 Mfd. Tubular)	30-4113	.30
56	Tone Control	30-4343	.75
57	Condensers in Tone Control	Part of (56)	....
58	Resistor (5000 ohms) (Green-Black-Red)	5310	.20
59	Condenser (.25 Mfd. Tubular)	30-4134	.40
60	Resistor (100000 ohms) (White-White-Orange)	6099	.20
61	Resistor (160000 ohms) (Brown-Blue-Yellow)	33-1191	.20
62	Condenser (.00011 Mfd. Mica)	30-1031	.35
63	Condenser (.05 Mfd. Bakelite Block)	3615-SU	.35
64	Resistor (70000 ohms) (Violet-Black-Orange)	5385	.20
65	Resistor (1 Meg.) (Brown-Black-Green)	33-1096	.20
66	B.C. Resistor (Wirewound) (10 ohms, 110 ohms, 130 ohms)	33-3137	.30
67	Input Transformer	32-7114	2.00
68	Output Transformer	32-7078	1.40
69	Cone and Voice Coil Assembly (H-13)	02625	1.20
	Cone and Voice Coil Assembly (K-17)	02996	.90
70	Field Coil and Pot Assembly (H-13 or K-17)	36-3104	2.70
71	Condenser (Electrolytic—3 Mfd., 1 Mfd., 2 Mfd.)	30-2122	1.85
72	Resistor (Wirewound) (7750 ohms)	33-3211	1.60
73	Resistor (39000 ohms) (Orange-White-Orange)	33-1027	.20
74	Resistor (32000 ohms) (Orange-Red-Orange)	33-1026	.35
75	Resistor (51000 ohms) (Green-Brown-Orange)	4237	.20
76	Resistor (15000 ohms) (Brown-Green-Orange)	6208	.20
77	Condenser (Electrolytic—8 Mfd., 10 Mfd.)	30-2045	1.80
78	Condenser (Electrolytic—8 Mfd.)	†30-2025	1.10
79	Filter Choke	32-7115	1.80
80	Condenser (.3 Mfd. Bakelite Block)	*6287-DU	.40
81	Power Transformer 110 Volts 60 Cycles	32-7402	4.50
	Power Transformer 110 Volts 25 Cycles	32-7403	9.00
	Power Transformer 230 Volts 50 Cycles	32-7404	7.50
82	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
83	Pilot Lamp (Dial)	34-2064	.09
84	Shadow Tuning Meter	**45-2086	2.00
84a	Pilot Lamp (Shadowmeter)	Part of (84)	....
85	Condenser (.05 Mfd. Tubular)	30-4020	.35
86	Condenser (.006 Mfd. Tubular)	30-4125	.25
87	Condenser (.006 Mfd. Tubular)	30-4125	.25

▲ Omitted after Run 5.
*In Model 650A (115 Volts 25 Cycles) this is part No. 04357, List .75.
†In Code 122 (650X, 650MX, 650H) this is part No. 30-2014, List 1.50.
**In Code 122 (650X, 650MX, 650H) this is part No. 45-2082.
After Run 2, this is 30-1032 mica, List .35.

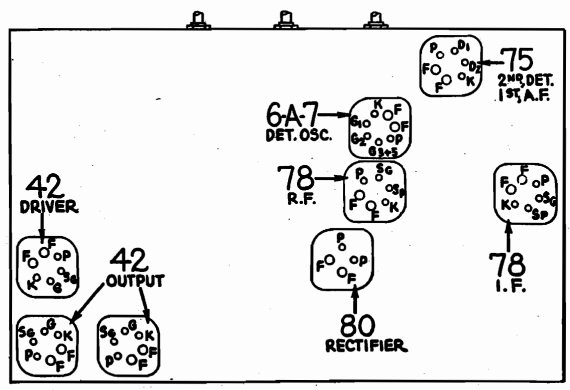


Fig. 1. Tube Sockets as viewed from bottom.

Power Transformer Data

Terminals	A.C. Volts	Current	Circuit	Color
1–2	120	......	Primary	White
3–5	760	140 M.A.	Secondary	Yellow
6–7	5.0	2.0 A.	Fil. Rect.	Blue
8–9	6.3	3.75 A.	Filaments	Black
4	...	......	Center Tap of 3–5	Yellow, Green Tracer

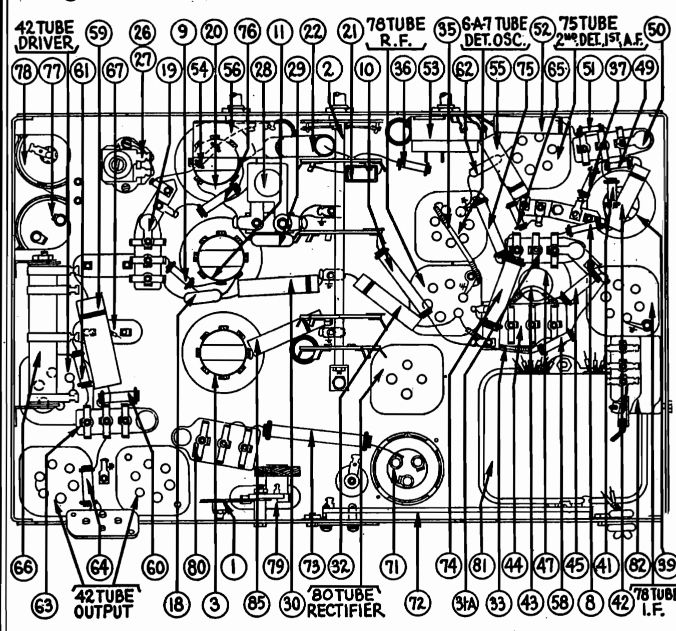


Fig. 3. Bottom View of Chassis

MODEL 660
Alignment
Trimmers

PHILCO RADIO & TELEV. CORP.

ADJUSTING COMPENSATING CONDENSERS

Adjustment of compensating condensers in Model 660 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20,000 K.C. (all fundamental frequencies) will be ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high-grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers are shown in Fig. 2. Connect the output meter to the plate contacts of the output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 77 1st detector tube (having removed the grid clip from the tube). Connect the ground terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to standard broadcast (second position from left) and set dial at 60. Turn condenser 61 (2nd I.F. tertiary) all the way down before adjusting the other I.F. Compensators. Now with the fibre screwdriver, adjust condensers 67 and 65 (3rd I.F.), 52 and 49 (2nd I.F.), and then 42 and 40 (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale. Now adjust condenser 61 (2nd I.F. tertiary) for maximum reading.

WAVE TRAP—Connect the Signal Generator antenna lead to the grid cap of the 78 R.F. tube. Replace the grid clip on the 77 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap 24 until the **minimum** reading is obtained in the output meter.

SHORTWAVE—Turn wave band switch to the shortwave position (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, Antenna, and R.F. shortwave compensators in turn, for maximum reading. These are 21, 13 and 7 respectively.

POLICE AND AMATEUR BAND—Turn the waveband switch to position 3 (from left). Set the dial and signal generator at 4.5 megacycles and adjust condensers 27, 12 and 6 respectively for maximum reading.

Set the signal generator at 1800 K.C. and turn the dial to 1.8. Adjust condenser 18 (nut), oscillator police series, to maximum reading.

STANDARD BROADCAST BAND—Turn the waveband switch to position 2 (from left). Set the dial and signal generator at 1500 K.C. and adjust condensers 29, 10 and 4 for maximum reading.

Set the dial and signal generator at 600 K.C. and adjust condenser 16 (screw), broadcast series, for maximum reading.

LONGWAVE BAND—Turn waveband switch to position 1 (left). Set the dial and signal generator at 340 K.C. and adjust condenser 28 (screw) to maximum. Then adjust 11 and 5 for maximum reading. Finally, set the dial and signal generator at 175 K.C. and adjust condenser 17 (nut) for maximum reading. This is the longwave series compensator.

General Specifications

Type Circuit: Superheterodyne, with push-pull pentodes connected as triodes in output; output 10 watts; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Ten (10) Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 oscillator, 2 type 78 I.F., 1 type 75 2nd detector 1st audio, 1 type 42 driver, 2 type 42 output, 1 type 80 rectifier.

Wave Bands: Four—(1) Shortwave; (2) Police and amateur; (3) Standard Broadcast; (4) Longwave (weather forecasts).

Frequency Ranges: Band (1)—5.7-18.0 Megacycles; Band (2)—1.75-5.8 Megacycles; Band (3)—540 to 1750 K.C.; Band (4)—150-390 K.C.

Program Control: 4 positions: (1) Mellow, (2) Brilliant, (3) Normal, (4) Noise reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Bass Compensation: Automatic: Effective on first two positions of program control, with volume control turned down.

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 on main knob.

Intermediate Frequency: 460 K.C.

Power Consumption: 90 watts.

Speaker: Type H-13.

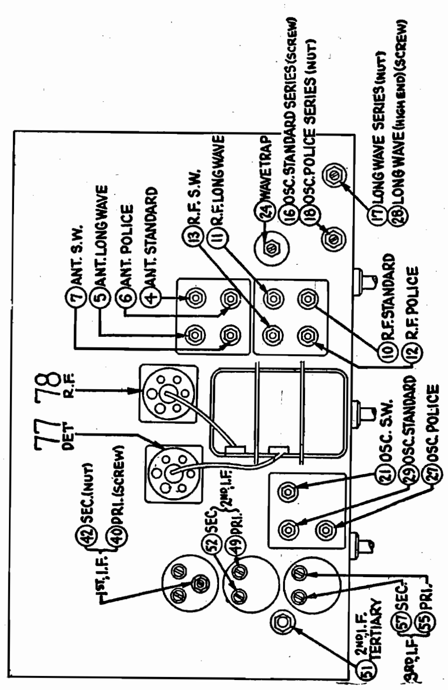
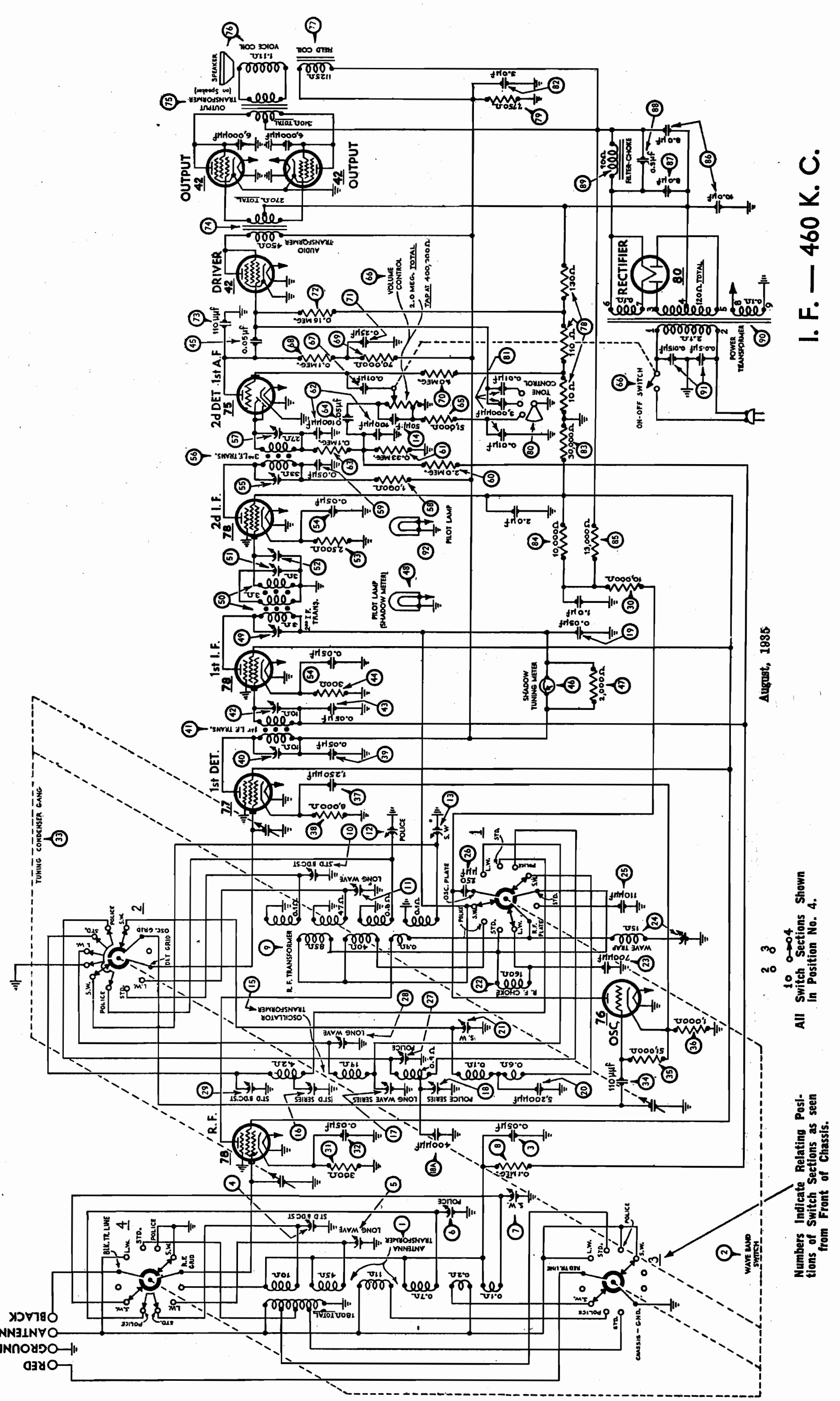


Fig. 2. Location of Compensating Condensers

MODEL 660
Schematic

PHILCO RADIO & TELEV. CORP.



I. F. — 460 K. C.

Figure 3 — Schematic Diagram — Model 660

All Switch Sections Shown in Position No. 4.

Numbers Indicate Relating Positions of Switch Sections as seen from Front of Chassis.

MODEL 660
Socket, Chassis
Parts List

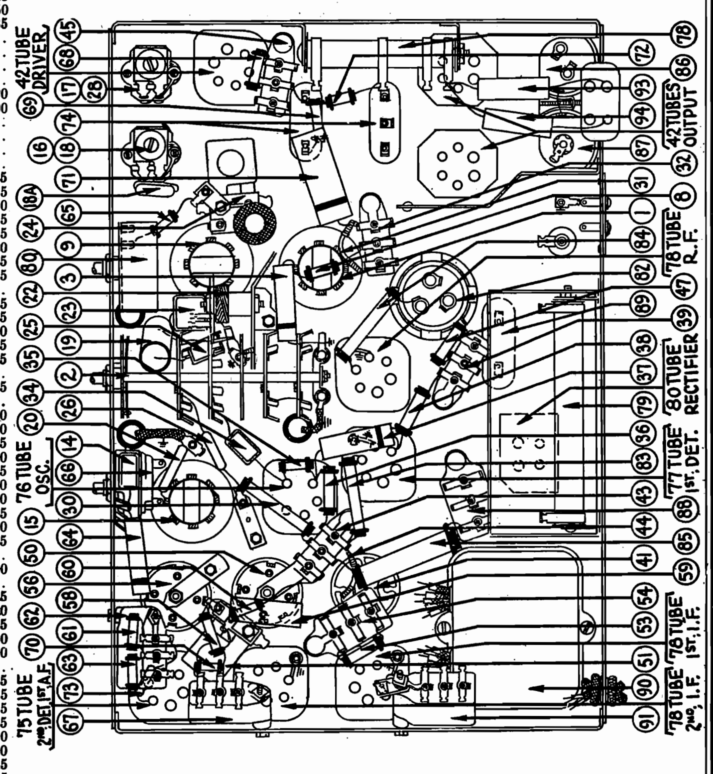
PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—MODEL 660

1	Antenna Transformer	32-1750	$3.25
2	Waveband Switch	42-1120	2.50
3	Condenser (.05 Mfd. Tubular)	30-4020	.35
4	Compensating Condenser (Ant. Standard)	Part of 1	....
5	Compensating Condenser (Ant. Longwave)	Part of 1	....
6	Compensating Condenser (Ant. Police)	Part of 1	....
7	Compensating Condenser (Ant. Shortwave)	Part of 1	....
8	Resistor (.1 Meg.) (White, White, Orange)	4411	.20
9	R. F. Transformer	32-1751	3.00
10	Compensating Condenser (R. F. Standard)	Part of 9	....
11	Compensating Condenser (R. F. Longwave)	Part of 9	....
12	Compensating Condenser (R. F. Police)	Part of 9	....
13	Compensating Condenser (R. F. Shortwave)	Part of 9	....
14	Condenser (.00005 Mfd. Mica)	30-1029	.35
15	Oscillator Transformer	32-1752	2.25
16	Compensating Condenser (Standard Series)	Part of 31-6027	.70
17	Compensating Condenser (Longwave Series)	Part of 31-6054	.45
18a	Condenser (.00041 Mfd. Mica)	30-1000	.35
18	Compensating Condenser (Osc. Police Series)	Part of 31-6027	.70
19	Condenser (.05 Mfd. Tubular)	30-4123	.35
20	Condenser (.0052 Mfd. Mica)	30-1058	.55
21	Compensating Condenser (Osc. Shortwave)	Part of 15	....
22	R. F. Choke	32-1745	.65
23	Condenser (.007 Mfd. Mica)	5863	.35
24	Wave Trap	38-6850	1.10
25	Condenser (.00011 Mfd. Mica)	30-1031	.35
26	Condenser (.00025 Mfd. Mica)	30-1032	.35
27	Compensating Condenser (Osc. Police)	Part of 15	....
28	Compensating Condenser (Longwave H. F. End)	Part of 31-6054	.45
29	Compensating Condenser (Osc. Standard)	Part of 15	....
30	Resistor (10000 ohms) (Brown, Black, Orange)	3524	.20
31	Resistor (300 ohms Flexible) (Orange, Black, Black)	33-3010	.20
32	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
33	Tuning Condenser Assembly	31-1609	5.50
34	Condenser (.00011 Mfd. Mica)	30-1031	.35
35	Resistor (51000 ohms) (Green, Brown, Orange)	6098	.20
36	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
37	Condenser (.00125 Mfd. Tubular)	30-4336	.25
38	Resistor (8000 ohms) (Gray, Black, Red)	5838	.20
39	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
40	Compensating Condenser (1st I. F. Primary)	Part of 40	....
41	1st I. F. Transformer	*32-1642	2.00
42	Compensating Condenser (1st I. F. Secondary)	Part of 40	....
43	Condenser (.05 Mfd. Bakelite Block)	3615-SG	.35
44	Resistor (300 ohms Flexible) (Orange, Black, Black)	33-3010	.20
45	Condenser (.05 Mfd. Bakelite Block)	3615-SU	.35
46	Shadow Tuning Meter	°45-2083	2.50
47	Resistor (2000 ohms) (Red, Black, Red)	6984	.20
48	Pilot Lamp (Shadow Tuning Meter)	Part of 46	....
49	Compensating Condenser (2nd I. F. Primary)	Part of 31-6028	.85
50	2nd I. F. Transformer	‡32-1734	1.85
51	Compensating Condenser (2nd I. F. Tertiary)	04000-R	.45
52	Compensating Condenser (2nd I. F. Secondary)	Part of 31-6028	.85
53	Resistor (2500 ohms) (Red, Green, Red)	7775	.20
54	Condenser (.05 Mfd. Twin Bakelite Block)	3615-DG	.40
55	Compensating Condenser (3rd I. F. Primary)	Part of 31-6003	.45
56	Third I. F. Transformer	^32-1188	.65
57	Compensating Condenser (3rd I. F. Secondary)	Part of 31-6003	.45
58	Resistor (1000 ohms) (Brown, Black, Red)	5837	.20
59	Condenser (.05 Mfd. Tubular)	30-4123	$0.35
60	Resistor (2 Megs.) (Red, Black, Green)	33-1025	.20
61	Resistor (330000 ohms) (Orange, Orange, Yellow)	33-1200	.20
62	Condenser (.00011 Mfd. Twin Bakelite Block)	8035-DG	.25
63	Resistor (.1 Meg.) (White, White, Yellow)	6099	.20
64	Condenser (.05 Mfd. Tubular)	30-4020	.35
65	Resistor (50000 ohms) (Green, Brown, Orange)	6098	.20
66	Volume Control & On-Off Switch	33-5110	1.45
67	Condenser (.01 Mfd. Bakelite Block)	3903-SU	.25
68	Resistor (.1 Meg.) (White, White, Yellow)	6099	.20
69	Resistor (70000 ohms) (Violet, Black, Orange)	5385	.20
70	Resistor (1 Meg.) (Brown, Black, Green)	33-1096	.20
71	Condenser (.25 Mfd. Tubular)	30-4134	.45
72	Resistor (160000 ohms) (Brown, Blue, Orange)	33-1191	.20
73	Condenser (.00011 Mfd. Mica)	30-1031	.35
74	Audio Transformer	32-7057	2.75
75	Output Transformer	32-7078	1.40
76	Cone & Voice Coil Assembly (H-13)	02625	1.20
77	Field Coil & Pot Assembly (H-13)	36-3104	2.70
78	Resistor (B. C., Wirewound) (10 ohms, 110 ohms, 130 ohms)	33-3137	.30
79	Resistor (Wirewound, 7750 ohms)	33-2020	.35
80	Tone Control	30-4343	.75
81	Condensers in Tone Control	Part of 80	....
82	Condenser (Electrolytic) (3 Mfd., 2 Mfd., 1 Mfd.)	30-2122	1.85
83	Resistor (30000 ohms) (Orange, Black, Orange)	7836	.20
84	Resistor (10000 ohms) (Brown, Black, Orange)	3524	.20
85	Resistor (13000 ohms) (Brown, Orange, Orange)	6450	.40
86	Condenser (Electrolytic: 8 Mfd., 10 Mfd.)	30-2045	1.80
87	Condenser (Electrolytic: 8 Mfd.)	30-2025	1.35
88	Condenser (.3 Mfd. Bakelite Block)	6287-DG	.40
89	Filter Choke	32-7056	2.20
90	Power Transformer 115 Volts 60 Cycles	32-7440	6.00
	115 Volts 25 Cycles	32-7441	8.75
	230 Volts 50 Cycles	32-7442	6.75
91	Condenser (.015 Mfd. Twin Bakelite Block)	3793-DG	.40
92	Pilot Lamp (Dial)	34-2039	.15
93	Condenser (.006 Mfd. Tubular)	30-4125	.25
94	Condenser (.006 Mfd. Tubular)	30-4125	.25

* Code 122: 32-1864 ° Code 122: 45-2086

‡ Code 122: 32-1865 ^ Code 122: 32-1866



Tube Socket and Power Transformer Voltages
Line Voltage 115

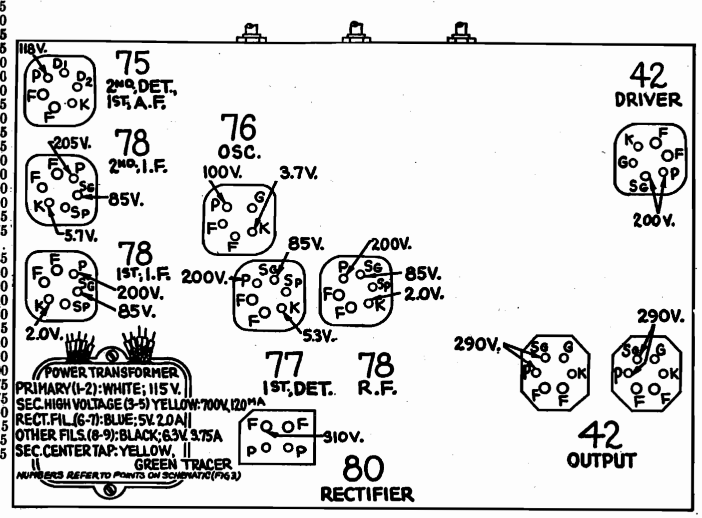
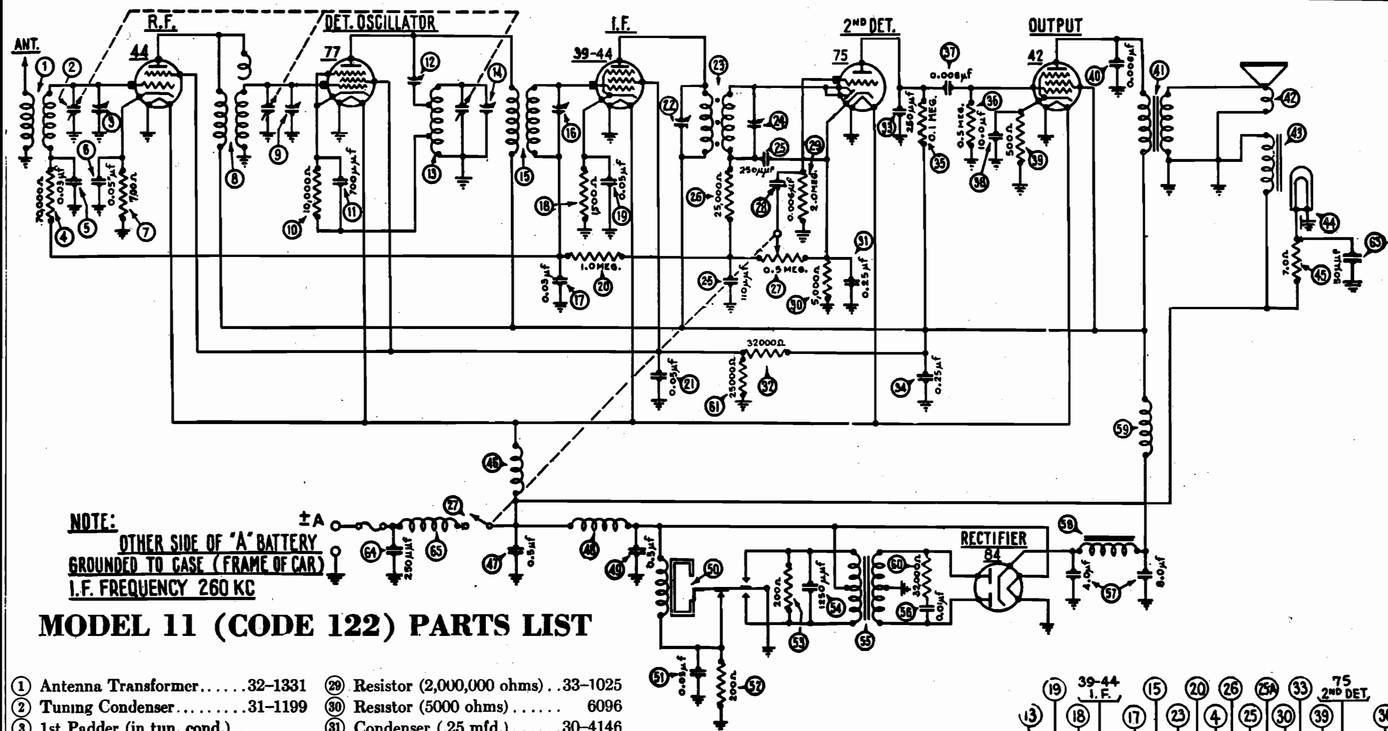


Fig. 1. Sockets as Viewed from Bottom

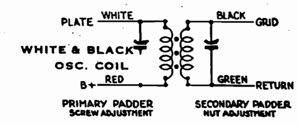
Socket voltages (measured to ground) obtained at points indicated by arrows. Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to sockets on underside of chassis. Volume control at minimum; dial at 60; waveband switch at standard broadcast (2d position from left). H-13 Speaker used.

PHILCO RADIO & TELEV. CORP.

MODEL 11 (Code 122)
Schematic, Chassis
Parts List
Transformer Data

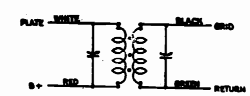


NOTE: OTHER SIDE OF "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)
I.F. FREQUENCY 260 KC



1st I. F. Transformer
32-1329

FIG. 1



2nd I. F. Transformer
32-1237

MODEL 11 (CODE 122) PARTS LIST

(1) Antenna Transformer......32-1331
(2) Tuning Condenser.........31-1199
(3) 1st Padder (in tun. cond.).......
(4) Resistor (70,000 ohms).....33-1115
(5) Condenser (.03 mfd.)......30-4025
(6) Condenser (.05 mfd.)......30-4020
(7) Resistor (700 ohms)....... 6443
(8) R. F. Transformer.........32-1332
(9) 2nd Padder (in tun. cond.)........
(10) Resistor (10,000 ohms).....33-1000
(11) Condenser (.0007 mfd.).... 5863
(12) Padder (Pri. 1st I. F. Tran.).......
(13) Oscillator Transformer.....32-1333
(14) 3rd Padder (in tun. cond.).........
(15) 1st I. F. Transformer......32-1329
(16) Padder (Sec. 1st I. F. Tran.).......
(17) Condenser (.03 mfd.)......30-4025
(18) Resistor (1500 ohms)......33-3047
(19) Condenser (.05 mfd.)......30-4020
(20) Resistor (1,000,000 ohms)..33-1096
(21) Condenser (.05 mfd.)..... 30-4020
(22) Padder (Pri. 2nd I. F. Tran.)......
(23) 2nd I. F. Transformer.....32-1237
(24) Padder (Sec. 2nd I. F. Tran.).......
(25) Condenser (.00025 mfd.)...30-1032
(26) Condenser (.00011 mfd.)...30-1031
(26) Resistor (25,000 ohms).....33-1013
(27) Vol. Con. & Switch Assm...38-5534
(28) Condenser (.006 mfd.).....30-4125
(29) Resistor (2,000,000 ohms)..33-1025
(30) Resistor (5000 ohms)....... 6096
(31) Condenser (.25 mfd.)......30-4146
(32) Resistor (32,000 ohms)..... 3535
(33) Condenser (.00025 mfd.)...30-1032
(34) Condenser (.25 mfd.)...... 04360
(35) Resistor (100,000 ohms) ... 6099
(36) Resistor (500,000 ohms).... 6097
(37) Condenser (.006 mfd.).....30-4125
(38) Condenser (10 mfd.).......30-2072
(39) Resistor (500 ohms).......33-3031
(40) Condenser (.006 mfd.).....30-4024
(41) Output Transformer........32-7245
(42) Cone & Voice Coil.........36-3157
(43) Field Coil Assembly.......36-3046
(44) Pilot Lamp................34-2031
(45) Resistor (7 ohms).........33-3035
(46) "A" Choke.................32-1402
(47) Condenser (.5 mfd.).......30-4147
(48) Vibrator Choke............32-1282
(49) Condenser (.5 mfd.).......30-4015
(50) Vibrator..................38-5036
(51) Condenser (.05 mfd.)......30-4039
(52) Resistor (200 ohms)....... 7217
(53) Resistor (200 ohms)....... 7217
(54) Condenser (.00125 mfd.)... 5886
(55) Power Transformer.........32-7216
(56) Condenser (.01 mfd.)......30-4051
(57) Condenser (4-8-10 mfd.)...30-2072
(58) "B" Choke.................32-7215
(59) R. F. Choke...............32-1281
(60) Resistor (32,000 ohms)..... 3525
(61) Resistor (25,000 ohms).....33-1013
(63) Condenser (.00005 mfd.)...30-1029
(64) Condenser (.00025 mfd.)...30-1032
(65) "A" Choke.................32-1374
Spark Plug Resistor.......33-1015
Distributor Resistor......33-1113E
Interference Condenser....30-4007
Nuts (mounting).......... W55A
Battery Cable.............38-5296
Acorn Nut................ W821
Fuse..................... 7227
Fuse Insulator............27-7131
Studs.....................28-6036
Bracket.................. 6035
Strap.................... 04344
Strap Pad................ 6206
Knob......................27-4058
Glass.....................27-7325
Gasket (for glass)........27-7509
Pointer...................28-1957
Face Assembly.............42-5175
Control Housing Cover.....29-7064
Control Unit Assembly.....42-5107

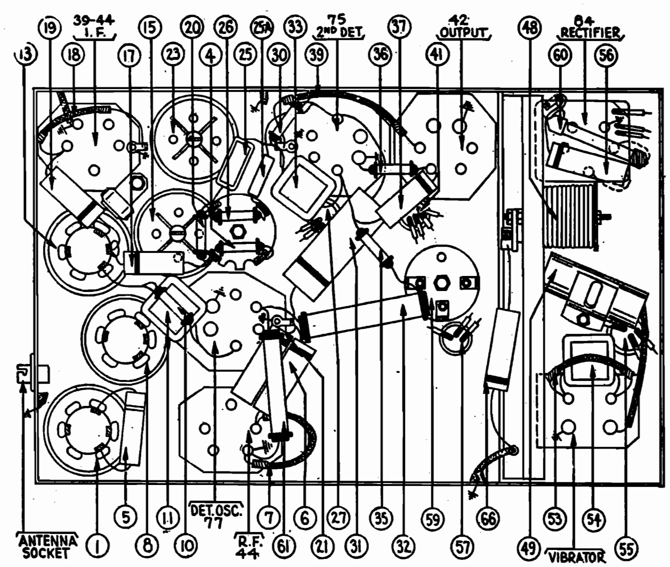


FIG. 4

MODEL 11 (CODE 122) RECEIVER

THE PHILCO auto radio Model 11 (Code 122) is a new Philco development in single-unit automobile radio. It is compact, easy to install and will give exceptional performance.

A superheterodyne, using six of the latest tubes designed for automobile radio, it has a genuine Philco electro-dynamic speaker, the same type that is used in many of the larger home radio receivers. A three-section tuning condenser giving improved selectivity, remarkable sensitivity and tone, inherently quiet circuits and other improvements make this model one of the outstanding and most popular automobile radios.

Added to this, the ease of installation characteristic of this model (only one unit to install, one lead to the antenna and one lead to the ammeter) and the handy, attractive steering-column control which makes this model universal in its use are additional features which make the Model 11 a very desirable one for the dealer and for the owner.

I. F. TRANSFORMER AND PADDERS

The new style I. F. transformer complete with padders is used in the Model 11 (Code 122).

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

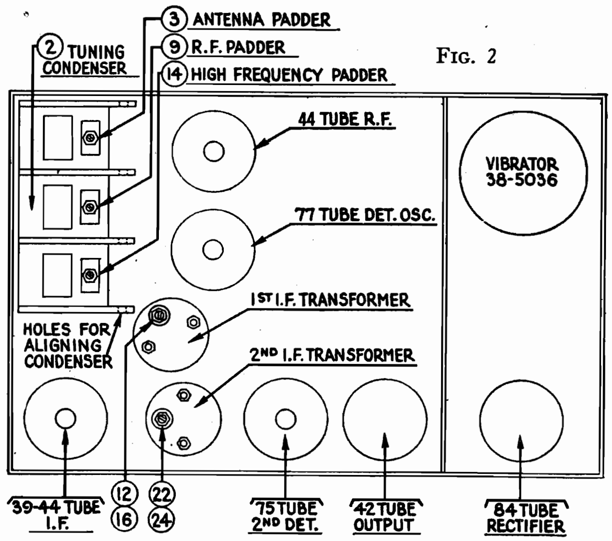


FIG. 2

MODEL 11 (CODE 122) ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The Philco Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and turned on for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the speaker lid from the Receiver. Remove the grid cap terminal from the 77 tube (for location see Fig. 2).

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 77 tube. (See Fig. 2.) The output meter must be connected.

The Receiver volume control must be turned on to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The padders 22 and 24 are adjusted first (Figs. 2 and 3). Turn the adjusting screw 22 all the way in. A metal screwdriver can be used for this. Then, with generator attenuator set so there is approximately half-scale reading, adjust the nut 24 with a fibre wrench for the maximum reading on the output meter.

Then adjust the screw 22 for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

Repeat the above procedure with the condensers 12 and 16.

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid lead to the 77 tube. Set the generator to 1600 K. C. and then connect the generator lead to the antenna lead.

There are four holes in line, one in each of the sections of the tuning condenser housing. (See Fig. 2.) Place a nail of the size that fits snugly through the holes and then turn the condenser plates out of mesh until they strike against the nail.

With the tuning condenser in this position adjust the high-frequency padder 14 until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

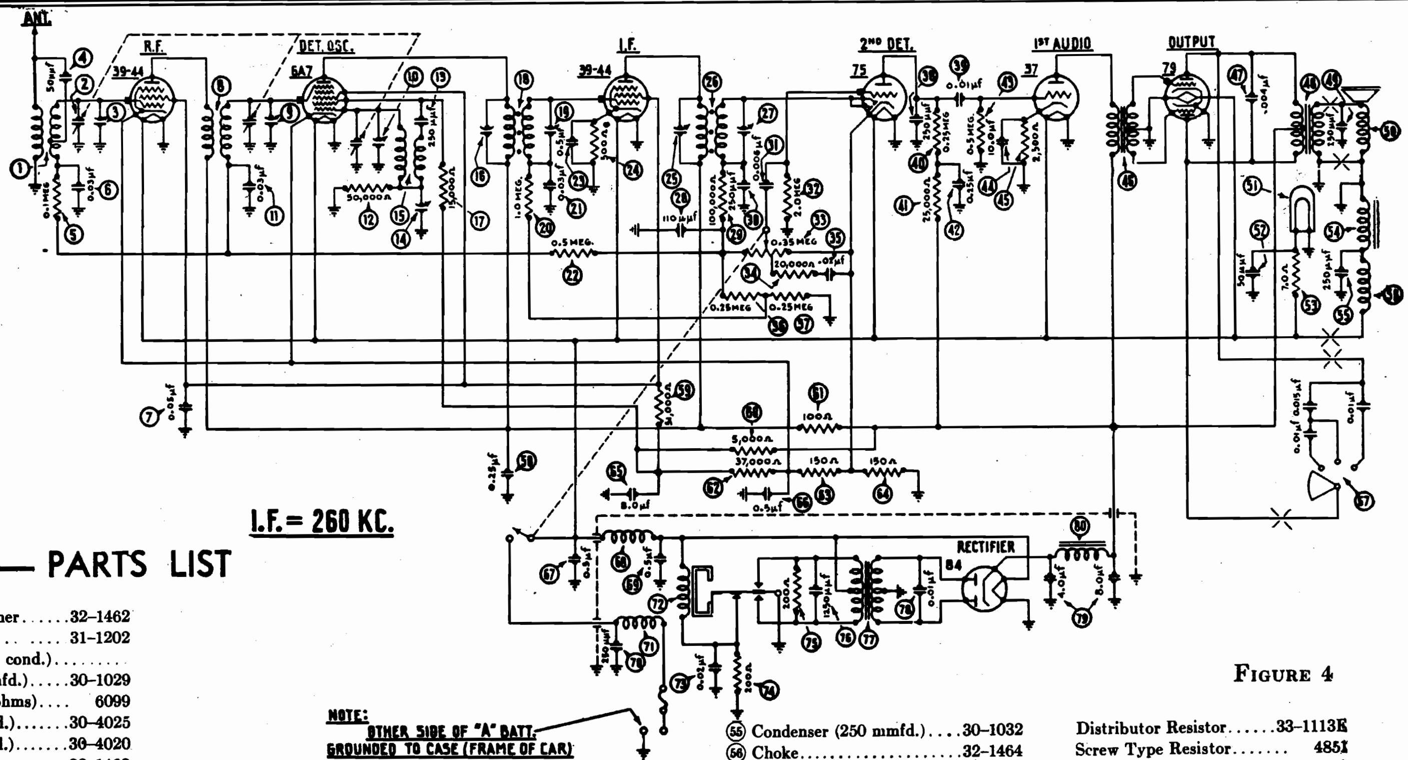
Next turn the condenser plates in mesh to 140 on the scale, 1400 K. C., and set the signal generator for 1400 K. C. The R. F. padder 9 and the antenna padder 3 are next adjusted for the maximum reading on the output meter.

Recheck the adjustments and then remove all test leads. If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver is adjusted properly.

NOVEMBER, 1934

MODEL 802
Schematic
Parts List

PHILCO RADIO & TELEV. CORP.



I.F. = 260 KC.

FIGURE 4

MODEL 802 — PARTS LIST

1. Antenna Transformer 32-1462
2. Tuning Condenser 31-1202
3. 1st Padder (in tun. cond.) ....
4. Condenser (50 mmfd.) 30-1029
5. Resistor (100,000 ohms) 6099
6. Condenser (.03 mfd.) 30-4025
7. Condenser (.05 mfd.) 30-4020
8. R. F. Transformer 32-1463
9. 2nd Padder (in tun. cond.) ....
10. 3rd Padder (in tun. cond.) ....
11. Condenser (.03 mfd.) 30-4025
12. Resistor (50,000 ohms) 6098
13. Condenser (250 mmfd.) 3082
14. Padder 30-6012
15. Oscillator Transformer 32-1222
16. Padder (Pri. 1st I. F. Trans.) ......
17. Resistor (15,000 ohms) 6208
18. First I. F. Transformer 32-1471
19. Padder (Sec. 1st I. F. Trans.) ......
20. Resistor (1,000,000 ohms) ... 33-1096
21. Condenser (.03 mfd.) 30-4025
22. Resistor (500,000 ohms) 6097
23. Condenser (.5 mfd.) 30-4058
24. Resistor (500 ohms) 6977
25. Padder (Pri. 2nd I. F. Trans) ......
26. Second I. F. Transformer ... 32-1449
27. Padder (Sec. 2nd I. F. Trans.) ......
28. Condenser (110 mmfd.) 30-1031
29. Resistor (100,000 ohms) 6099
30. Condenser (250 mmfd.) 30-1032
31. Condenser (.006 mfd.) 30-4125
32. Resistor (2,000,000 ohms) ... 33-1025
33. Vol. Cont. & Sw. Assembly . 38-5851
34. Resistor (20,000 ohms) 33-1130
35. Condenser (.02 mfd.) 30-4215
36. Resistor (250,000 ohms) 33-1097
37. Resistor (250,000 ohms) 33-1097
38. Condenser (250 mmfd.) 30-1032
39. Condenser (.01 mfd.) 30-4145
40. Resistor (250,000 ohms) 33-1097
41. Resistor (25,000 ohms) 33-1013
42. Condenser (.25 mfd.) 30-4135
43. Resistor (500,000 ohms) 6097
44. Condenser (10 mfd.) 30-4135
45. Resistor (2500 ohms) 33-1100
46. Input Transformer 32-7206
47. Condenser (.004 mfd.) 30-4185
48. Output Transformer 32-7205
49. Condenser (250 mmfd.) 30-1032
50. Cone & Voice Coil 36-3159
51. Pilot Lamp 34-2040
52. Condenser (50 mmfd.) 30-1029
53. Resistor (7 ohms) 33-3130
54. Field Coil Assembly 02795
55. Condenser (250 mmfd.) 30-1032
56. Choke 32-1464
57. Tone Control 30-4208
58. Condenser (.25 mfd.) 30-4134
59. Resistor (51,000 ohms) 4237
60. Resistor (5000 ohms) 33-1070
61. Resistor (100 ohms) 33-3023
62. Resistor (37,000 ohms) 33-1098
63. Resistor (150 ohms) 33-3045
64. Resistor (150 ohms) 33-3045
65. Condenser (8 mfd.) 30-4135
66. Condenser (.5 mfd.) 30-4018
67. Condenser (.5 mfd.) 30-4015
68. Vibrator Choke 32-1474
69. Condenser (.5 mfd.) 30-4047
70. Condenser (250 mmfd.) 32-1466
71. "A" Choke 32-1466
72. Vibrator 38-5036
73. Condenser (.02 mfd.) 30-4039
74. Resistor (200 ohms) 7217
75. Resistor (200 ohms) 7217
76. Condenser (1250 mmfd.) 5886
77. Power Transformer 32-7098
78. Condenser (.01 mfd.) 30-4051
79. Filter Condenser (4-8 mfd.) . 30-2015
80. "B" Choke 32-7104

Spark Plug Resistors 33-1015E
Distributor Resistor 33-1113E
Screw Type Resistor 4851
Interference Condenser 30-4007S
Studs 28-6036
Nuts (Mounting) W55A
Ammeter Cable 38-5296
Speaker Cable 41-3112
Antenna Lead 38-5131
Acorn Nut W841
Fuse 7227
Fuse Insulator 27-7131
Control Assembly 42-5256
Bracket (Control) 6035
Strap (Control) 04344
Knob 27-4058
Knob Spring 28-1738
Glass 27-7325
Glass Gasket 27-7509
Pointer 28-1957
Flexible Shaft 28-8206
Face Assembly 42-5255
Control Cover 28-7037
4-prong Socket 27-6006
5-prong Socket 27-6014
6-prong Socket 27-6020
7-prong Socket 27-6005
Auto Radio Lock Switch ... 42-1076

MODEL 805
Alignment
Socket, Trimmers

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1650 for the first I. F. stage and 32-1651 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

MODEL 805 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 2)

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 41 tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

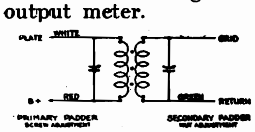


FIGURE 1

The secondary nut padder (25) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (23) for maximum reading.

Remove the generator lead from the 78 tube and reconnect the grid clip.

Disconnect the grid clip from the 6A7 tube, and connect the generator lead to the grid cap of this tube. The secondary nut padder (20) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (18) for maximum reading.

Readjust padders (25) and (23) for maximum reading on the output meter.

After padding the second I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1600 K. C., and then connect the generator lead to the antenna lead, using a 150 mmfd. condenser in series between the two leads. Ground the shield to the Receiver housing.

Turn the Tuning Condenser Plates fully out of mesh.

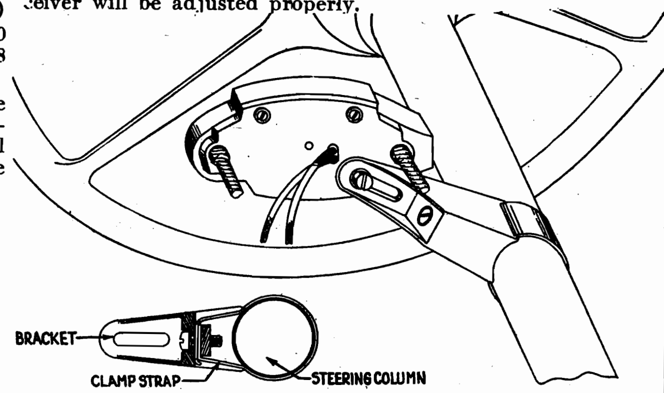
With the tuning condenser in this position, adjust the high-frequency padder (12) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C., 160 on the dial scale. Adjust the padders (11) and (5) in the same manner.

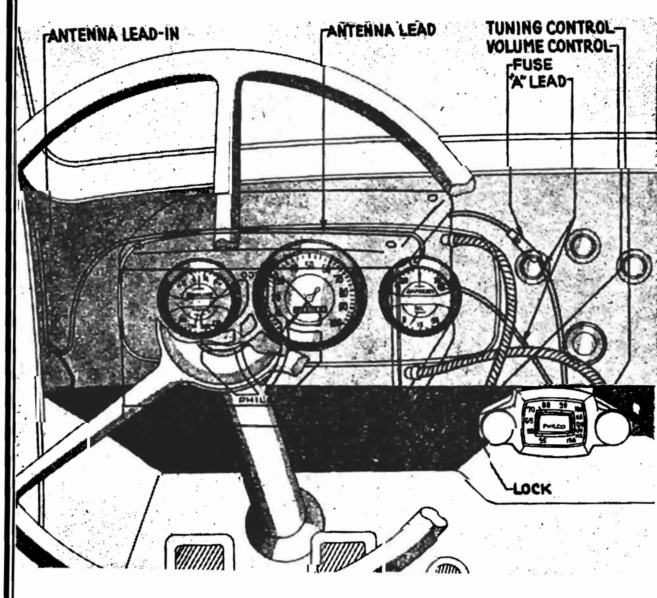
Turn the tuning condenser plates in mesh to approximately 580 on the dial scale, and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the series padder (16) for the maximum meter reading.

Readjust the padder (12) at 1600 K. C.

Tune the condenser to 1400 K. C. and adjust the padders (11) and (5) for the maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver will be adjusted properly.





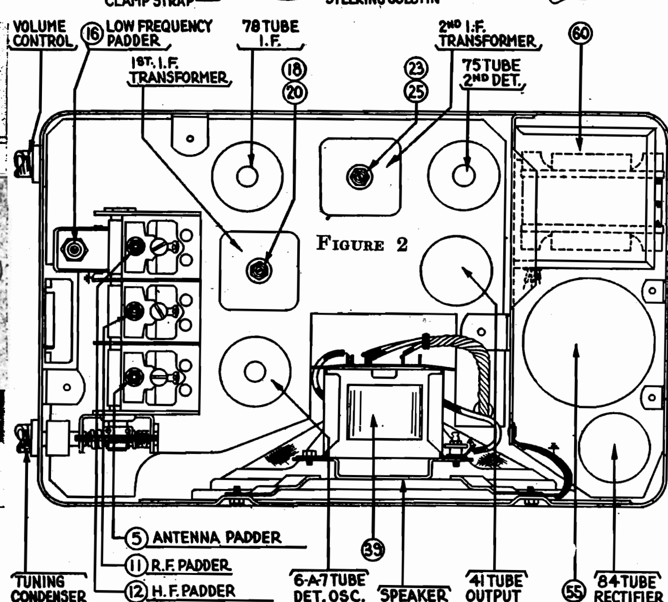


FIGURE 2

PHILCO RADIO & TELEVISION CORP.

MODEL 805
Schematic, Chassis
Parts List

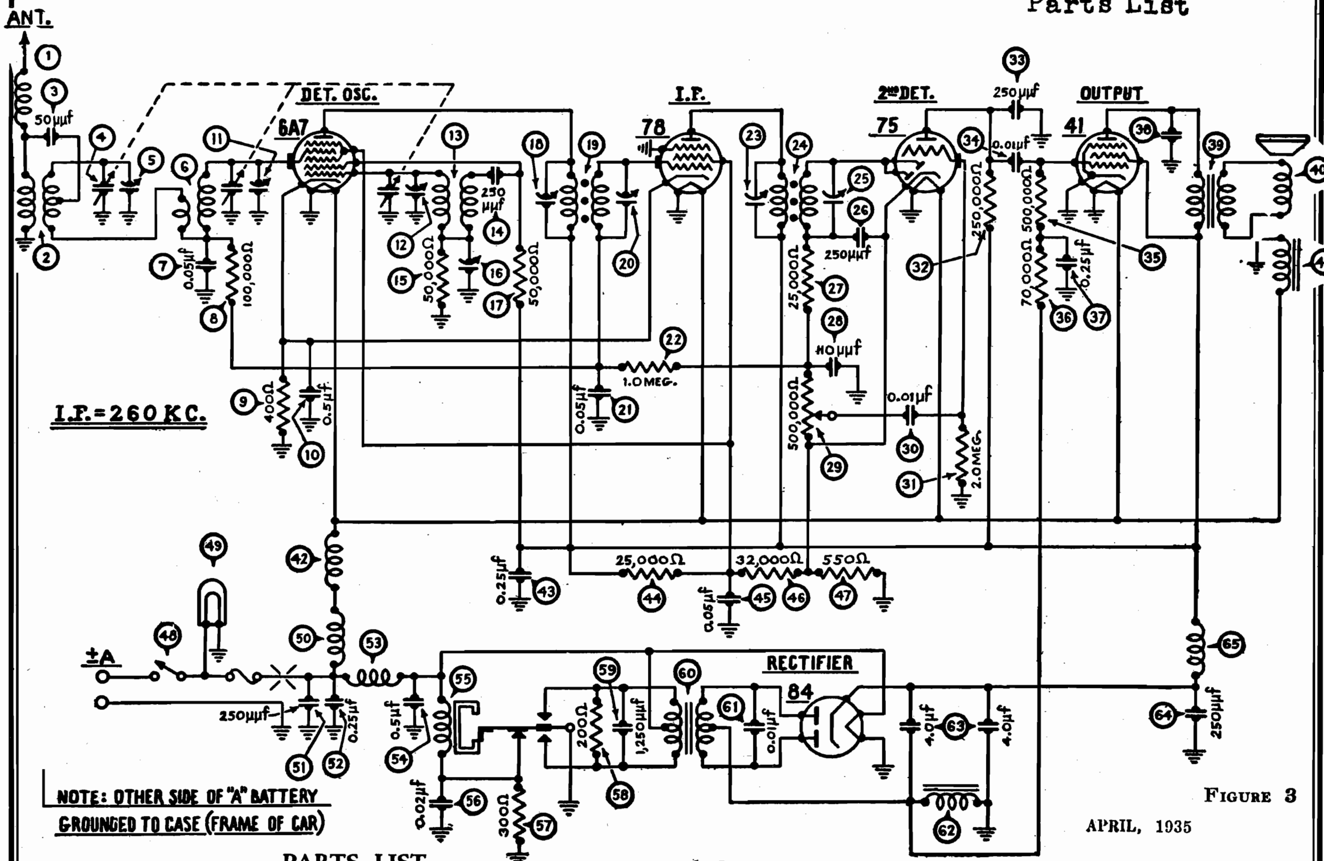


FIGURE 3

APRIL, 1935

PARTS LIST

No.	Description	Part No.
1	Antenna Choke	32-1372
2	Antenna Transformer	32-1655
3	Condenser (50 mmfd.)	4587
4	Tuning Condenser	31-1483
5	First Padder (on tun. cond.)	
6	R. F. Transformer	32-1656
7	Condenser (.05 mfd.)	30-4020
8	Resistor (100,000 ohms)	6099
9	Resistor (400 ohms)	33-3016
10	Condenser (.5 mfd.)	30-4227
11	Second Padder (on tun. cond.)	
12	Third Padder (on tun. cond.)	
13	Oscillator Transformer	32-1657
14	Condenser (250 mmfd.)	30-1032
15	Resistor (50,000 ohms)	33-1163
16	Fourth Padder (on tun. cond.)	
17	Resistor (50,000 ohms)	6098
18	Padder (Pri. 1st I. F. Transf.)	
19	First I. F. Transformer	32-1650
20	Padder (Sec. 1st I. F. Transf.)	
21	Condenser (.05 mfd.)	30-4020
22	Resistor (1,000,000 ohms)	33-1096
23	Padder (Pri. 2nd I. F. Transf.)	
24	Second I. F. Transformer	32-1651
25	Padder (Sec. 2nd I. F. Transf.)	
26	Condenser (250 mmfd.)	30-1032
27	Resistor (25,000 ohms)	33-1013
28	Condenser (110 mmfd.)	30-1031
29	Volume Control — (500,000 ohms)	38-6635
30	Condenser (.01 mfd.)	30-4124
31	Resistor (2,000,000 ohms)	33-1025
32	Resistor (250,000 ohms)	33-1097
33	Condenser (250 mmfd.)	30-1032
34	Condenser (.01 mfd.)	30-4169
35	Resistor (500,000 ohms)	6097
36	Resistor (70,000 ohms)	33-1115
37	Condenser (.25 mfd.)	30-4146
38	Condenser (8000 mmfd.)	30-4317
39	Output Transformer	32-7019
40	Cone and Voice Coil	36-3406
41	Field Coil Assembly	36-3405
42	"A" Choke	32-1377
43	Condenser (.25 mfd.)	30-4134
44	Resistor (25,000 ohms)	3656
45	Condenser (.05 mfd.)	30-4020
46	Resistor (32,000 ohms)	3525
47	Resistor (550 ohms)	33-3031
48	On-Off Switch Assembly	42-5336
49	Pilot Lamp	34-2039
50	"A" Choke	32-1644
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Lead	38-5131
	Flexible Shaft (21")	28-8354
	Flexible Shaft (28")	28-8355
	Lock Cylinder Assembly	42-5337
51	Condenser (250 mmfd.)	30-1032
52	Condenser (.25 mfd.)	30-4146
53	Vibrator Choke	32-1625
54	Condenser (.5 mfd.)	30-4227
55	Vibrator	38-5036
56	Condenser (.02 mfd.)	30-4039
57	Resistor (300 ohms)	33-3010
58	Resistor (200 ohms)	7217
59	Condenser (1250 mmfd.)	5886
60	Power Transformer	32-7352
61	Condenser (.01 mfd.)	30-4051
62	Filter Choke	32-7351
63	Filter Condenser (4-4 mfd.)	30-2115
64	Condenser (250 mmfd.)	30-1032
65	"B" Choke	32-1281
	Control Assembly	42-5331
	Glass and Dial Assembly	27-7835
	Pointer Assembly	42-5335
	Bezel Plate	28-7108
	Knobs	27-4187
	Keys	28-2782
	Control Mtg. Bracket (dash)	29-2773
	Control Mtg. Bracket (steering)	6035
	Steering Mtg. Kit (28")	45-1133
	Studs (Set Mtg.)	28-6272
	Nuts (Set Mtg.)	W98A
	Spark Plug Resistor	33-1195
	Distributor Resistor	33-1196
	Interference Condenser	30-4007

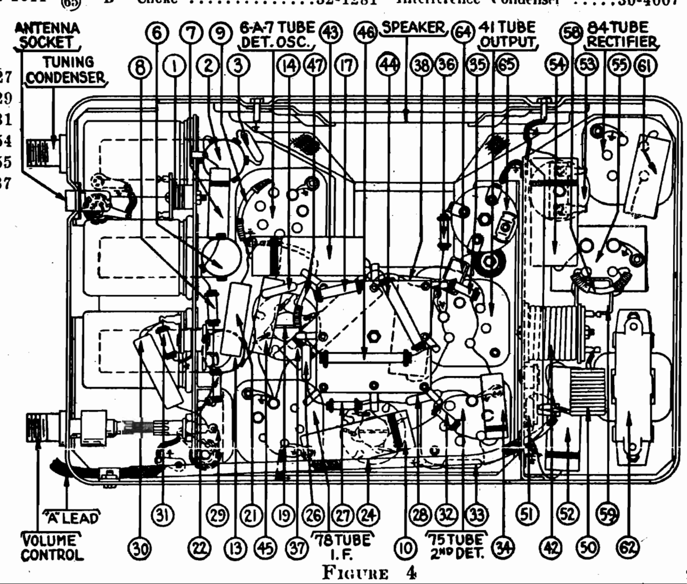


FIGURE 4

MODEL 806
Alignment, Socket
Trimmers

PHILCO RADIO & TELEV. CORP.

I. F. TRANSFORMER AND PADDERS

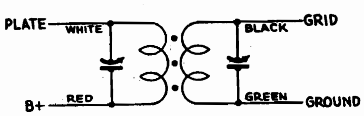
The first I. F. transformer is assembled complete with padding condensers. The second I. F. transformer is assembled complete with a padding condenser, two resistors and two mica condensers.

The padders are placed in the top of the shield can, one above the other.

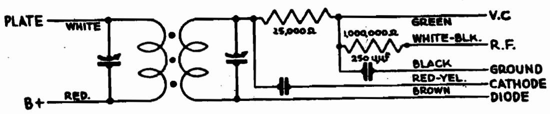
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1622 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer 32-1621



2nd I. F. Transformer 32-1622

FIG. 1

MODEL 806 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 41 tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

The secondary nut padder (25) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (23) for maximum reading.

Remove the generator lead from the 78 tube and reconnect the grid clip.

Disconnect the grid clip from the 6A7 tube, and connect the generator lead to the grid cap of this tube. The secondary nut padder (21) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (19) for maximum reading.

After padding the first I. F. stage, remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1580 K.C., and then connect the generator lead to the antenna lead, using a 200 mmfd. condenser in series between the two leads. Ground the shield to the Receiver housing.

Turn the tuning condenser plates fully out of mesh. Place a slip of paper, .006 inch thick between stator plates and the heel of the rotor plates. Turn the rotor plates back until they just strike the paper.

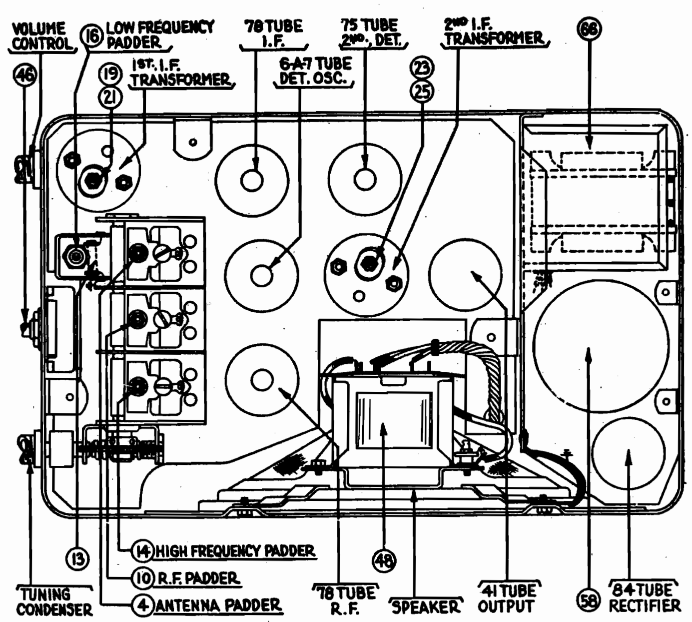


FIG. 2

PHILCO RADIO & TELEV. CORP.

MODEL 806
Schematic, Chassis
Parts List

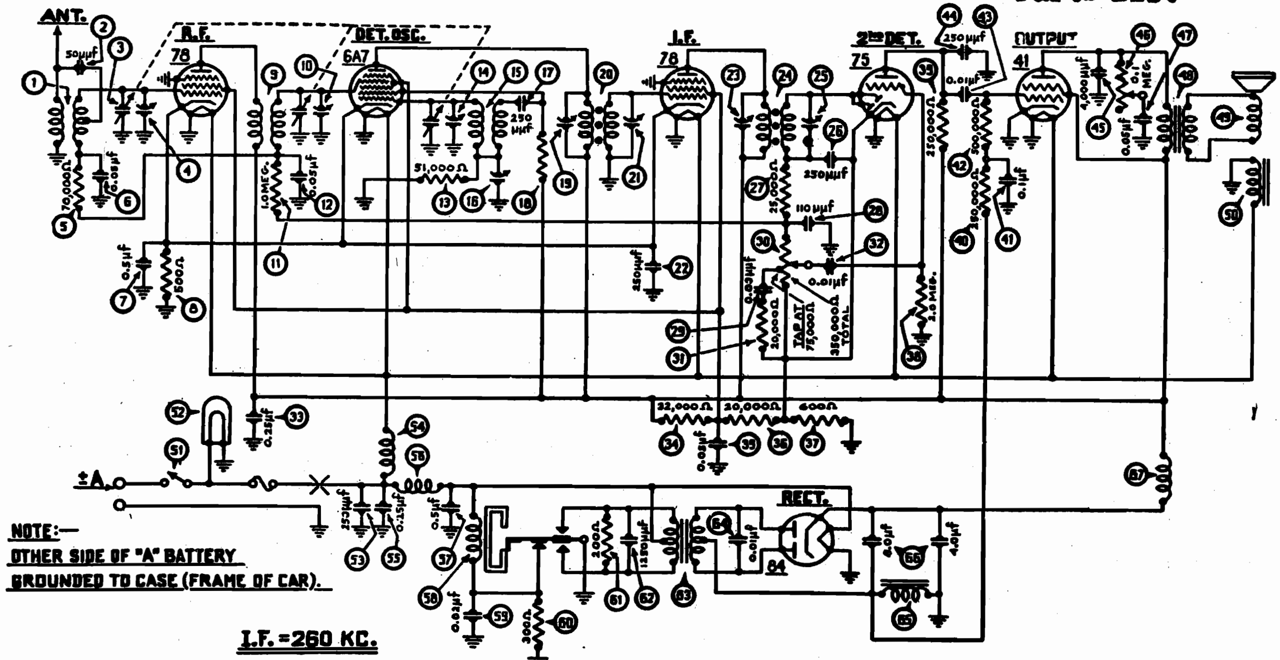


FIG. 3

MARCH, 1935

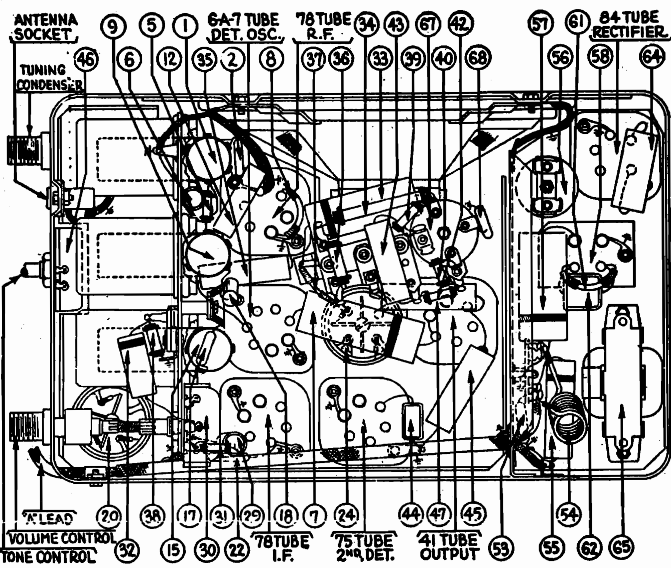


FIG. 4

With the tuning condenser in this position, adjust the high-frequency padder ⑭ until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust the padders ⑩ and ④ in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the dial scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder ⑯ for the maximum meter reading.

Readjust the padder ⑭ at 1580 K.C.

Tune the condenser to 1400 K.C. and adjust the padders ⑩ and ④ for the maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the Receiver will be adjusted properly.

NOTE—A condenser, ⑱, Part No. 30-1032 (250 mmfd.), has been added to the Receiver. One side is connected between the choke ⑰ and the 4 mfd. section of ⑯, and the other side to ground.

MODEL 806 PARTS LIST

No. Shown on Schematic	Description	Part No.	No. Shown on Schematic	Description	Part No.
1	Antenna Transformer	32-1618	45	Condenser (4000 mmfd.)	30-4185
2	Condenser (50 mmfd.)	4587	46	Tone Control	33-5101
3	Tuning Condenser	31-1483	47	Condenser (.05 mfd.)	30-4012
4	First Padder (on tun. cond.)		48	Output Transformer	32-7019
5	Resistor (70,000 ohms)	33-1115	49	Cone & Voice Coil	36-3406
6	Condenser (.05 mfd.)	30-4020	50	Field coil Assembly	36-3405
7	Condenser (.5 mfd.)	30-4227	51	"On" & "Off" Switch Assm.	42-5336
8	Resistor (600 ohms)	33-3209	52	Pilot Lamp	34-2039
9	R. F. Transformer	32-1619	53	Condenser (250 mmfd.)	30-1032
10	Second Padder (on tun. cond.)		54	"A" Choke	32-1644
11	Resistor (1,000,000 ohms)	33-1096	55	Condenser (.25 mfd.)	30-4146
12	Condenser (.05 mfd.)	30-4020	56	Vibrator Choke	32-1625
13	Resistor (51,000 ohms)	6098	57	Condenser (.5 mfd.)	30-4227
14	Third Padder (on tun. cond.)		58	Vibrator	38-5036
15	Oscillator Transformer	32-1620	59	Condenser (.02 mfd.)	30-4039
16	Fourth Padder (on tun. cond.)		60	Resistor (300 ohms)	33-3010
17	Condenser (250 mmfd.)	30-1032	61	Resistor (200 ohms)	7217
18	Resistor (51,000 ohms)	33-1163	62	Condenser (1250 mmfd.)	5886
19	Padder (Pri. 1st I. F. Tran.)		63	Power Transformers	32-7352
20	First I. F. Transformer	32-1621	64	Condenser (.01 mfd.)	30-4051
21	Padder (Sec. 1st I. F. Tran.)		65	Filter Choke	32-7351
22	Condenser (250 mmfd.)	30-1032	66	Filter Condenser	30-2109
23	Padder (Pri. 2nd I. F. Tran.)		67	R. F. Choke	32-1348
24	Second I. F. Transformer	32-1622	68	Condenser (250 mmfd.)	30-1032
25	Padder (Sec. 2nd I. F. Tran.)			Control Assembly	42-5331
26	Condenser (250 mmfd.)	30-1032		Glass and Dial	27-7835
27	Resistor (25,000 ohms)	33-1013		Pointer Assembly	42-5335
28	Condenser (110 mmfd.)	30-1031		Bezel Plate	28-7108
29	Condenser (.03 mfd.)	30-4025		Knobs	27-4187
30	Vol. Con. & Coupling Assm.	38-6605		Control Mounting Bracket	29-2773
31	Resistor (20,000 ohms)	33-1178		Keys	28-2782
32	Condenser (.01 mfd.)	30-4169		Studs (Set Mtg.)	28-6272
33	Condenser (.25 mfd.)	30-4134		Nuts (Set Mtg.)	W98A
34	Resistor (32,000 ohms)	3525		Spark Plug Resistors	33-1195
35	Condenser (.05 mfd.)	30-4020		Distributor Resistor	33-1196
36	Resistor (20,000 ohms)	6650		Interference Condensers	30-4007
37	Resistor (600 ohms)	33-3207		Fuse	7227
38	Resistor (2,000,000 ohms)	33-1025		Fuse Insulator	27-7729
39	Resistor (250,000 ohms)	33-1097		Antenna Lead	38-5131
40	Resistor (250,000 ohms)	33-1097		Flexible Shaft (21")	28-8354
41	Condenser (.1 mfd.)	30-4122		Flexible Shaft (28")	28-8355
42	Resistor (500,000 ohms)	6097		Lock Cylinder Assembly	42-5337
43	Condenser (.01 mfd.)	30-4145		28" Shaft Kit	45-1133
44	Condenser (250 mmfd.)	30-1032			

MODEL 808
Installation Data

PHILCO RADIO & TELEV. CORP.

GENERAL INSTALLATION

ANTENNA—In cars equipped with a top antenna, the antenna lead-in is usually brought down one of the windshield pillars and coiled behind the cowl trim panel. In such cases, the antenna lead (Receiver) must be spliced to the antenna lead-in as close as possible to the corner post and the shield pigtail on the lead grounded.

In cars having an all metal top, the Philco special under-car antenna should be installed (Part No. 45-1128 Kit). The shielded lead-in must be spliced to the shielded antenna lead and the shielding grounded. In all cases, cut off all excess lead-in, tape the splice and keep the lead-in out of the motor compartment.

RECEIVER AND SPEAKER INSTALLATION—The Receiver and Speaker must be installed under the cowl on the dash. Be sure that in the location selected, there is ample foot room and that they do not in any way interfere with the operation of the control pedals and ventilators. The Receiver can be installed on the right side of the dash, in the center or on the left side, above the steering column, while the Speaker can be installed on one side of the Receiver. Fig. 3 shows a typical installation with the Receiver on the left side.

The standard mounting for the Receiver is with three studs. Figure 1 shows a detailed view of the Receiver installed on the right side of the dash, using three studs for mounting the Receiver. When installed on the right side or the left side, the control coupling end of the Receiver must be towards the center of the dash. When installed in the center of the dash, the control coupling end must be towards the control unit. Cardboard templates are furnished so that the mounting bolt hole locations can be easily and accurately marked on the dash.

The dash on some 1935 cars is drilled for two Receiver mounting bolts. An extra set of bolt holes is provided in the Receiver housing for installation in these cars.

Before installing the Receiver, turn the volume control coupling counter-clockwise as far as it will go.

CONTROL UNIT—The control unit can be fastened to the bottom edge of the instrument board or on the steering column. Figure 2 shows how the control and the mounting bracket must be assembled on the steering column. Figure 3 shows a typical installation of the control on the instrument board. When used in this manner, bolt the "L" bracket to the rear of the control. Drill two holes in the instrument board flange in the desired location and fasten the bracket securely to the instrument board.

Unlock the control unit and turn the volume control knob clockwise half a turn. Seat the volume control shaft end in the proper coupling on the Receiver housing and fasten the shaft casing nut securely. The volume control must be turned counter-clockwise as far as it will go. Then remove the knob and loosen the set screw in the shaft end. Turn the shaft counter-clockwise until the switch in the control head snaps "off." Tighten the set screw and replace the knob.

The tuning control and tone control flexible shafts must be coupled in their respective bushings on the Receiver housing. The knurled casing nuts must be securely tightened. Fig. 1 and Fig. 3 show the locations of the shaft bushings on the Receiver housing.

In case the control unit is mounted on the steering column and the Receiver is installed at the extreme right of the dash, it will be necessary to replace the standard 21" flexible shafts with 28" shafts and extend the "A" lead. A special kit, Part No. 45-1138 can be obtained in exchange for the standard shafts.

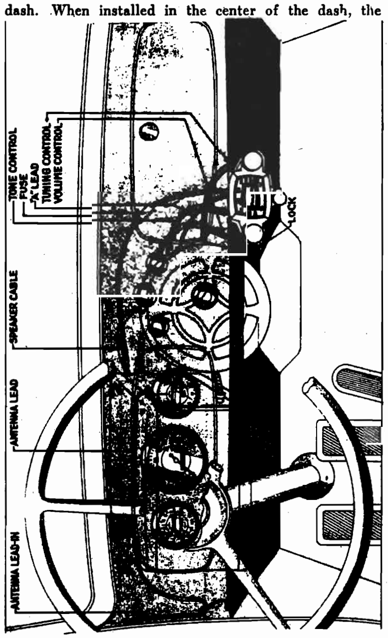


FIGURE 3

CABLE CONNECTIONS—Place the fuse and fuse insulator in the metal fuse housing in the control "A" lead. Couple this to the short Receiver lead and then connect the other "A" lead to the ammeter stud on the rear of the instrument board.

The speaker cable must be connected into the socket on the speaker housing. The antenna lead must be connected in its socket on the end of the Receiver housing. (See Figures 1 and 3).

FLEXIBLE SHAFT ADJUSTMENTS—With the Receiver turned on for operation, tune in a broadcast station of known frequency. Remove the knob and loosen the set screws on the shaft end. Turn the shaft until the control pointer indicates the proper channel (add 0 to the channel number for frequency in kilocycles). Tighten the set screws and replace the knob.

STANDARD SUPPRESSION—The standard spark plug resistors (33-1195) can be installed on the spark plugs of practically all cars. Likewise the distributor resistor (33-1196) can be connected in the high tension center lead to the distributor.

Disconnect the high tension leads to the spark plugs. Cut off the terminal end of the lead and screw the small elbow-type resistor on the lead. The resistor can then be snapped on the terminal of the spark plug. To avoid confusion when the leads cannot be identified easily, install the resistor and make all connections on one lead at a time.

Remove the coil to distributor high tension lead from the distributor head and cut the lead two inches from the end. Screw the resistor to the short end and then screw the resistor into the main lead. Reconnect the terminal end of the lead to the distributor.

In case the spark plugs are not equipped with a suitable terminal, the standard ferrules can be obtained and placed on the plugs. Cars equipped with twin ignition require a spark plug resistor on each plug. Cars equipped with two ignition coils require two distributor resistors.

Two interference condensers are furnished — one must be connected to the generator side of the cut-out, the other to the battery side of the primary of the ignition coil or to the ignition switch. The condenser bracket must be fastened securely to a grounded metal part of the car. The condenser on the generator usually can be fastened to the generator housing under the same screw that holds the cut-out, while the coil condenser can usually be fastened under the coil mounting bolts.

In some cases, it may be necessary to connect an additional condenser to the ammeter or to the dome light lead at the corner post.

There may be some interference caused by an excessive gap between the distributor rotor and the high-tension contacts. This can be overcome by lengthening the contact end of the rotor. Place the metal end of the rotor on a steel block and peen or hammer it with a small machinist's hammer. Dress the end with a file so that it retains its original shape. The rotor should not brush or wipe the contacts, but should just clear them.

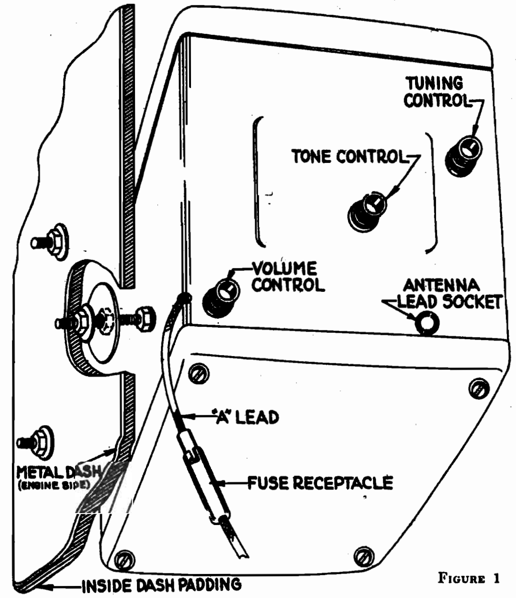


FIGURE 1

OPERATION

To operate the Receiver, the control must first be unlocked. The left-hand knob on the control is a combination switch and volume control. Turn the volume control knob clockwise. The first range of motion operates the Receiver switch; from there on it is the manual volume control.

With the volume control turned on half-way, allow the tubes to heat up. Then turn the right-hand knob (the station selector) to tune in the various programs. The numbers on the dial are channel numbers which, with the addition of "0" to the number correspond to the frequency in kilocycles. Adjust the volume to a suitable level and recheck the tuning. The Receiver must be tuned so that the maximum signal is obtained. Since the Receiver is extremely selective, it is of the utmost importance that the Receiver be tuned right on the station. Careless tuning off to one side even though the signal is still heard, results in very poor tone quality and very mushy reception.

The full range tone control knob is on the control unit. Adjust this control to the tone most pleasing. Speech is clearest when the control is set for "brilliant" — while orchestras will usually sound best when the control is set for a deeper tone.

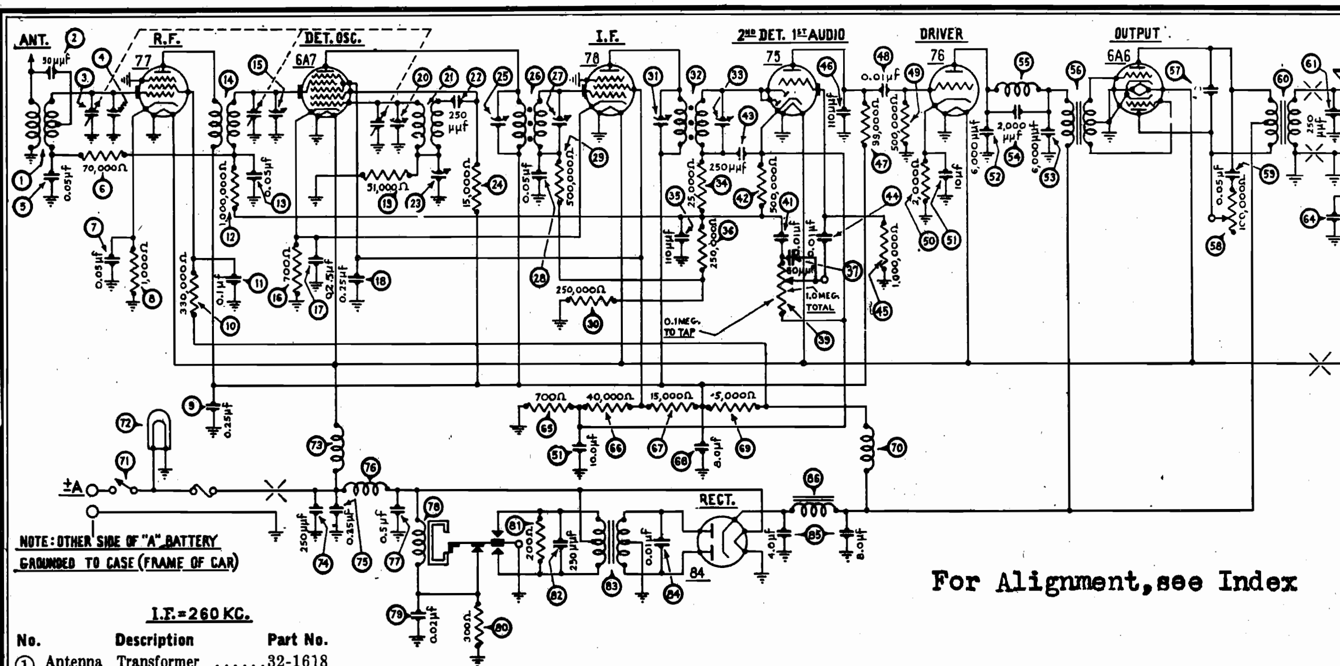
Another use of the tone control is as a static modifier. When driving through an extremely noisy location, the tone control should be set for mellow or deep. This will subdue the harsh, rasping static.

Except on very weak signals, the automatic volume control maintains the same volume level while driving along without continually manipulating the manual volume control, cuts out external interference, counteracts fading and prevents blasting of local stations while tuning. It is virtually impossible, however, to maintain satisfactory reception while driving under bridges or in places which are totally shielded, known as dead spots.

The Receiver should be turned off by turning the volume control knob counter-clockwise until the switch clicks "off". The control can then be locked with the key.

MODEL 808
Schematic
Parts, Notes

PHILCO RADIO & TELEV. CORP.



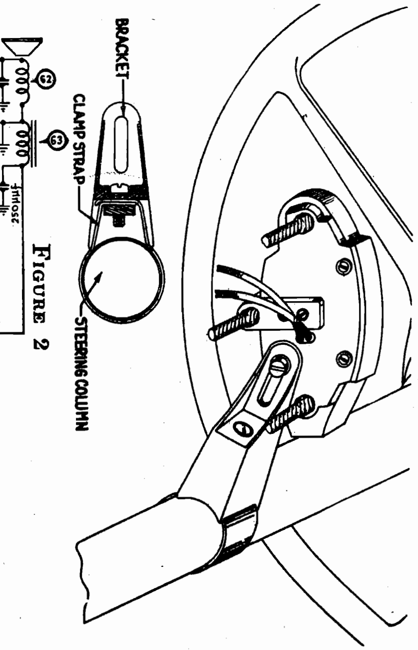


FIGURE 2

For Alignment, see Index

MODEL 808 — PARTS LIST

No.	Description	Part No.
1	Antenna Transformer	32-1618
2	Condenser (50 mfd.)	30-1029
3	Tuning Condenser	31-1490
4	First Padder (on tun. cond.)	
5	Condenser (.05 mfd.)	30-4020
6	Resistor (70,000 ohms)	33-1115
7	Condenser (.05 mfd.)	30-4020
8	Resistor (1000 ohms)	33-3017
9	Condenser (.25 mfd.)	30-4134
10	Resistor (330,000 ohms)	33-1200
11	Condenser (.1 mfd.)	30-4170
12	Resistor (1,000,000 ohms)	33-1096
13	Condenser (.05 mfd.)	30-4020
14	R. F. Transformer	32-1619
15	Second Padder (on tun. cond.)	
16	Resistor (700 ohms)	6443
17	Condenser (.25 mfd.)	30-4146
18	Condenser (.25 mfd.)	30-4146
19	Resistor (51,000 ohms)	4518
20	Third Padder (on tun. cond.)	
21	Oscillator Transformer	32-1620
22	Condenser (250 mmfd.)	30-1032
23	Fourth Padder (on tun. cond.)	
24	Resistor (15,000 ohms)	33-1177
25	Padder (Pri. 1st I. F. Transf.)	
26	First I. F. Transformer	32-1621
27	Padder (Sec. 1st I. F. Trans.)	
28	Condenser (.05 mfd.)	30-4020
29	Resistor (500,000 ohms)	6097
30	Resistor (250,000 ohms)	33-1097
31	Padder (Pri. 2nd I. F. Trans.)	
32	Second I. F. Transformer	32-1630
33	Padder (Sec. 2nd I. F. Trans.)	
34	Resistor (25,000 ohms)	33-1013
35	Condenser (110 mmfd.)	30-1031
36	Resistor (250,000 ohms)	33-1097
37	Condenser (50 mmfd.)	30-1029
39	Volume Control (1,000,000 ohms)	38-6636
41	Condenser (.01 mfd.)	30-4124
42	Resistor (500,000 ohms)	6097
43	Condenser (250 mmfd.)	30-1032
44	Condenser (.01 mfd.)	30-4169
45	Resistor (1,000,000 ohms)	33-1096
46	Condenser (110 mmfd.)	30-1031
47	Resistor (99,000 ohms)	6099
48	Condenser (.01 mfd.)	30-4124
49	Resistor (500,000 ohms)	6097
50	Resistor (2000 ohms)	33-1029
51	Condenser (10 — 10 mfd.)	30-2111
52	Condenser (6000 mmfd.)	30-4125
53	Condenser (6000 mmfd.)	30-4125
54	Condenser (2000 mmfd.)	30-4177
55	Choke	32-1281
56	Input Transformer	32-7356
57	Condenser (4000 mmfd.)	30-4185
58	Tone Control (100,000 ohms)	33-5096
59	Condenser (.05 mfd.)	30-4025
60	Output Transformer	32-7355
61	Condenser (250 mmfd.)	30-1032
62	Cone and Voice Coil	36-3441
63	Field Coil Assembly	36-3454
64	Condenser (250 mmfd.)	30-1032
65	Resistor (700 ohms)	6443
66	Resistor (40,000 ohms)	33-1044
67	Resistor (15,000 ohms)	5278
68	Condenser (8 mfd.)	30-2110
69	Resistor (5000 ohms)	3526
70	R. F. Choke	32-7368
71	On and Off Switch	42-5336
72	Pilot Lamp	34-2039
73	"A" Choke	32-1644
74	Condenser (250 mmfd.)	30-1032
75	Condenser (.25 mfd.)	30-4146
76	Vibrator Choke	32-1607
77	Condenser (.5 mfd.)	30-4227
78	Vibrator	38-5036
79	Condenser (.02 mfd.)	30-4039
80	Resistor (300 ohms)	30-3010
81	Resistor (200 ohms)	7217
82	Condenser (1250 mmfd.)	5886
83	Power Transformer	32-7352
84	Condenser (.01 mfd.)	30-4051
85	Filter Condenser (4-8 mfd.)	30-2112
86	Filter Choke	32-7104
87	Antenna Choke	32-1372
88	"A" Choke	32-1438
89	Condenser (250 mmfd.)	30-1032
	Control Assembly	42-5332
	Glass and Dial	27-7835
	Pointer Assembly	42-5335
	Bezel Plate	28-7108
	Knobs	27-4187
	Control mtg. Bracket (Dash)	29-2773
	Control mtg. Bracket (Steering)	6035
	Strap	04344
	Strap Pad	6206
	Keys	28-2782
	Studs (set mtg.)	28-6272
	Nuts (set mtg.)	W98A
	Stud (speaker mtg.)	6122
	Nut (speaker mtg.)	W55A
	Spark Plug Resistors	33-1195
	Distributor Resistor	33-1196
	Interference Condenser	30-4007
	Fuse	7227
	Fuse Insulator	27-7729
	Antenna Lead	38-5131
	Lock Cylinder Assembly	42-5337
	Control Shaft 21"	28-8354
	Control Shaft 28"	28-8355
	Tone Control Shaft (21")	28-8356
	Tone Control Shaft (28")	28-8358

NOTE: An antenna choke 87 Part No. 32-1372 has been added to the Receiver. This is connected in series with the antenna lead, and the antenna transformer 1 and condenser 2.

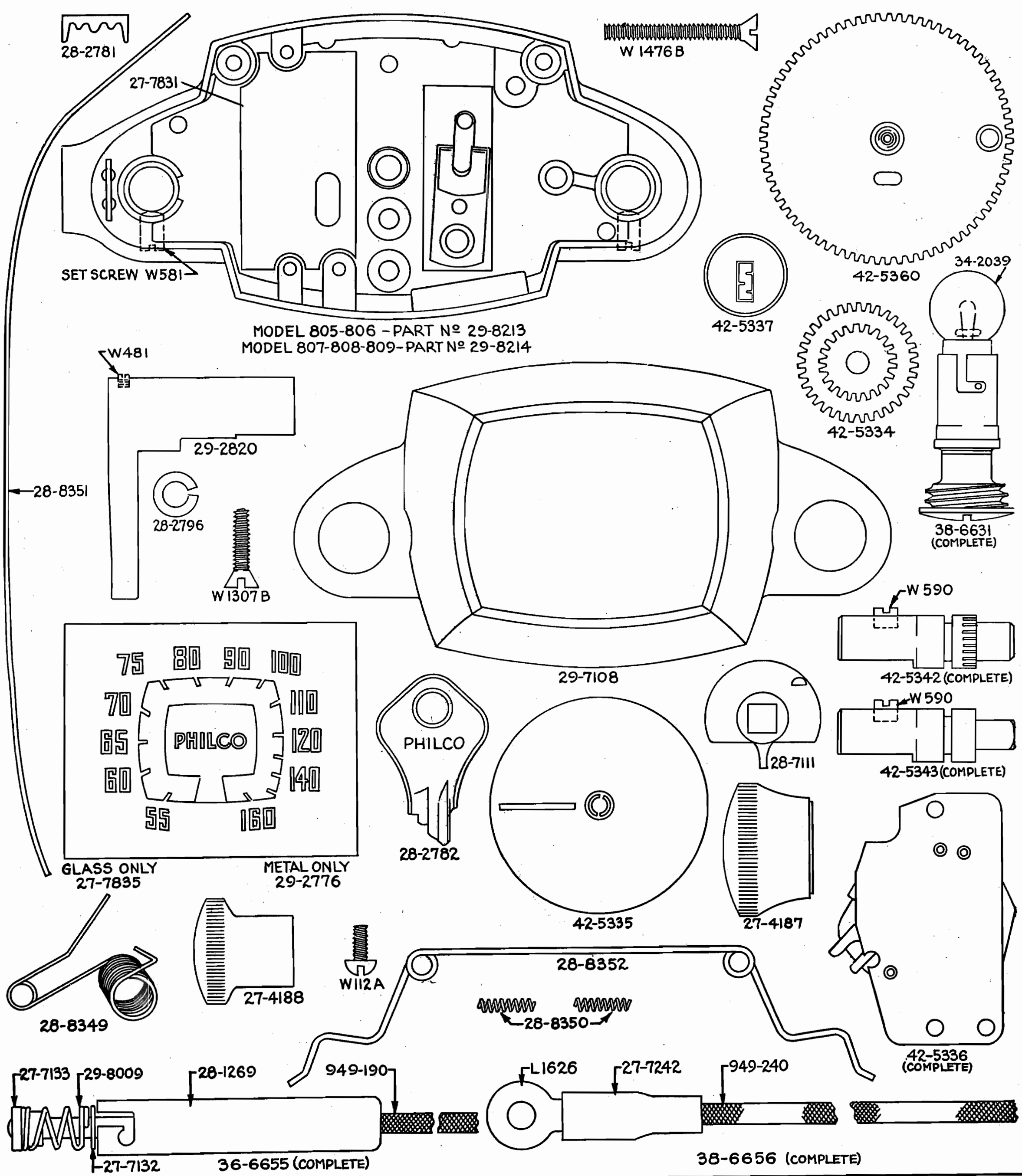
A Filter Choke 88 Part No. 32-1438 has been added to the Receiver. This is connected in series with one side of Choke 73 and the tube filaments.

A Condenser 89 Part No. 30-1032 has been added to the Receiver. One side is connected between this new Choke and Choke 73, and the other side to ground.

MODELS 805,806,808,809
Parts Details,Parts

PHILCO RADIO & TELEV. CORP.

Control Unit Assembly — Models 805, 806, 807, 808 and 809



Part No.	Description	Part No.	Description	Part No.	Description
L-1626	Sleeve	28-2782	Key	29-8214	Control Housing and Set Screw (807-808-809)
W-112A	Screw (bracket mtg.)	28-7111	Switch Operating Disc	34-2039	Pilot Lamp
W-481	Set Screw	28-8349	Spring (anti back lash)	38-6631	Pilot Lamp Assembly
W-581	Set Screw	28-8350	Springs (Lock)	38-6655	Fuse Terminal Assembly
W-590	Set Screw	28-8351	Spring (glass holder)	38-6656	Ammeter Lead Assembly
W-1307B	Screw (tone control mtg.)	28-8352	Spring (shaft retaining)	42-5331	Complete Control (805-806)
W-1476B	Screw (control cover mtg.)	28-8354	Flexible Shaft (21")	42-5332	Complete Control (808-809))
27-4187	Tuning and Volume Control Knob	28-8355	Flexible Shaft (28")	42-5334	Intermediate Gear and Shaft
27-4188	Tone Control Knob	28-8356	Tone Control Shaft (21")	42-5335	Pointer disc assembly
27-7132	Washer	28-8358	Tone Control Shaft (28")	42-5336	Switch and bracket assembly
27-7133	Contact	29-2776	Glass Holder	42-5337	Lock cylinder assembly
27-7831	Insulator	29-2820	Tone Control Shaft Mtg. Bracket	42-5342	Tuning Shaft and Set Screw
27-7835	Glass and Dial	29-7108	Control Cover	42-5343	Volume Shaft and Set Screw
28-1269	Fuse Housing	29-8009	Spring (fuse housing assembly)	42-5360	Pointer gear and stop assembly
28-2781	Lock Indexing Plate	29-8213	Control Housing and Set Screw (805-806)	949-240	Wire

MODEL 809
Schematic
Chassis, Parts

PHILCO RADIO & TELEV. CORP.

MODEL 809

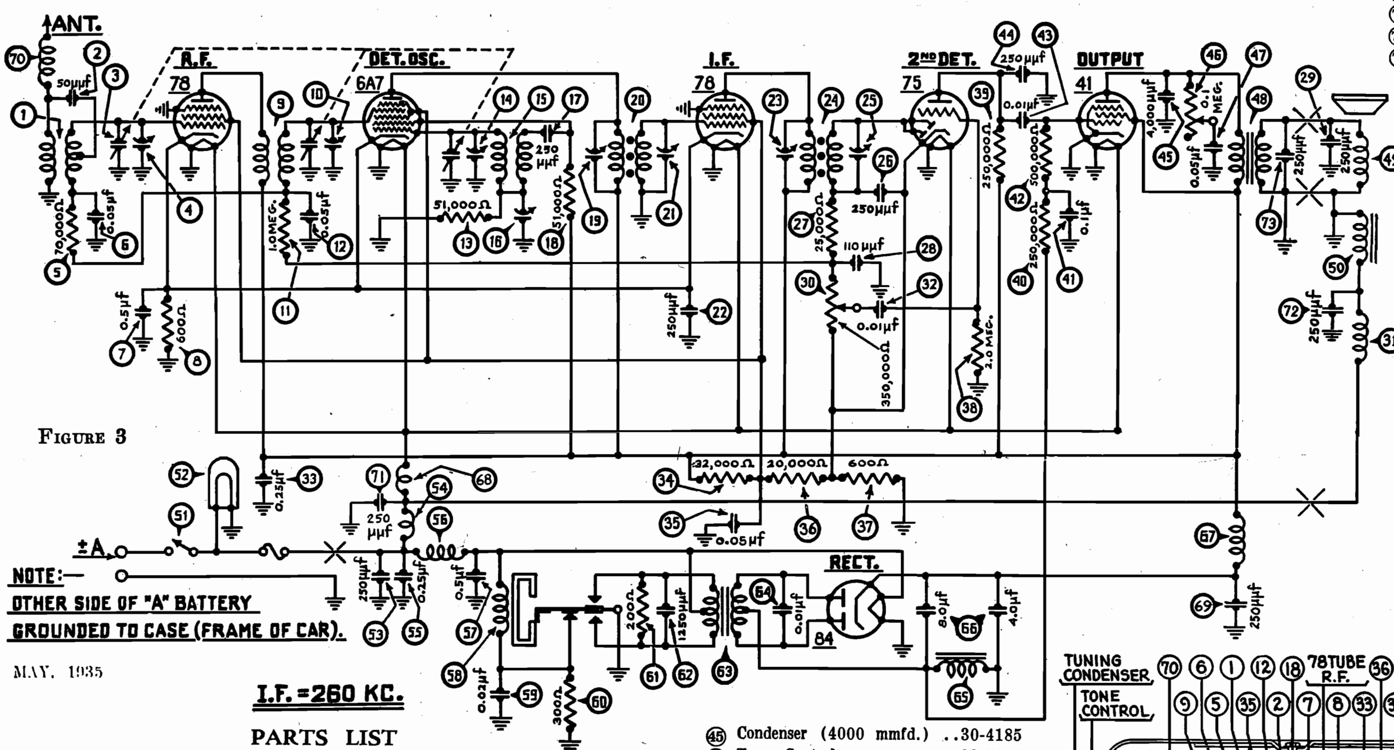


FIGURE 3

MAY, 1935

I.F. = 260 KC.

PARTS LIST

① Antenna Transformer	32-1618
② Condenser (50 mmfd.)	4587
③ Tuning Condenser	31-1483
④ First Padder (on tun. cond.)	
⑤ Resistor (70,000 ohms)	33-1115
⑥ Condenser (.05 mfd.)	30-4020
⑦ Condenser (.5 mfd.)	30-4227
⑧ Resistor (600 ohms)	33-3209
⑨ R. F. Transformer	32-1619
⑩ Second Padder (on tun. cond.)	
⑪ Resistor (1,000,000 ohms)	33-1096
⑫ Condenser (.05 mfd.)	30-4020
⑬ Resistor (51,000 ohms)	6098
⑭ Third Padder (on tun. cond.)	
⑮ Oscillator Transformer	32-1620
⑯ Fourth Padder (on tun. cond.)	
⑰ Condenser (250 mmfd.)	30-1032
⑱ Resistor (51,000 ohms)	33-1163
⑲ Padder (Pri. 1st I. F. Tran.)	
⑳ First I. F. Transformer	32-1621
(21) Padder (Sec. 1st I. F. Tran.)	
(22) Condenser (250 mmfd.)	30-1032
(23) Padder (Pri. 2nd I. F. Tran.)	
(24) Second I. F. Transformer	32-1622
(25) Padder (Sec. 2nd I. F. Tran.)	
(26) Condenser (250 mmfd.)	30-1032
(27) Resistor (25,000 ohms)	33-1013
(28) Condenser (110 mmfd.)	30-1031
(29) Condenser (250 mmfd.)	30-1032
(30) Vol. Con. & Coupling Assm.	38-6605
(31) Choke	32-1464
(32) Condenser (.01 mfd.)	30-4169
(33) Condenser (.25 mfd.)	30-4134
(34) Resistor (32,000 ohms)	3525
(35) Condenser (.05 mfd.)	30-4020
(36) Resistor (20,000 ohms)	6650
(37) Resistor (600 ohms)	33-3207
(38) Resistor (2,000,000 ohms)	33-1025
(39) Resistor (250,000 ohms)	33-1097
(40) Resistor (250,000 ohms)	33-1097
(41) Condenser (.1 mfd.)	30-4122
(42) Resistor (500,000 ohms)	6097
(43) Condenser (.01 mfd.)	30-4145
(44) Condenser (250 mmfd.)	30-1032
(45) Condenser (4000 mmfd.)	30-4185
(46) Tone Control	33-5101
(47) Condenser (.05 mfd.)	30-4012
(48) Output Transformer	2598
(49) Cone & Voice Coil	36-3159
(50) Field-coil Assembly	02795
(51) "On" & "Off" Switch Assm.	42-5336
(52) Pilot Lamp	34-2039
(53) Condenser (250 mmfd.)	30-1032
(54) "A" Choke	32-1644
(55) Condenser (.25 mfd.)	30-4146
(56) Vibrator Choke	32-1377
(57) Condenser (.5 mfd.)	30-4227
(58) Vibrator	38-5036
(59) Condenser (.02 mfd.)	30-4039
(60) Resistor (300 ohms)	33-3010
(61) Resistor (200 ohms)	7217
(62) Condenser (1250 mmfd.)	5886
(63) Power Transformer	32-7352
(64) Condenser (.01 mfd.)	30-4051
(65) Filter Choke	32-7351
(66) Filter Condenser	30-2109
(67) R. F. Choke	32-1348
(68) "A" Choke	32-1438
(69) Condenser (250 mmfd.)	30-1032
(70) Antenna Choke	32-1637
(71) Condenser (250 mmfd.)	30-1032
(72) Condenser (250 mmfd.)	30-1032
(73) Condenser (250 mmfd.)	30-1032
Control Assembly	42-5332
Glass and Dial	27-7835
Pointer Assembly	42-5335
Bezel Plate	28-7108
Knobs (Tuning-Volume)	27-4187
Knob (Tone Control)	27-4052
Stud (Spker Mtg.)	6122
Control Mounting Bracket	29-2773
Keys	28-2782
Studs (Set Mtg.)	28-6298
Nuts (Set Mtg.)	W98A
Spark Plug Resistors	33-1195
Distributor Resistor	33-1196
Interference Condensers	30-4007
Fuse	7217
Fuse Insulator	27-7729
Antenna Lead	38-5131
Flexible Shaft (21")	28-8354
Flexible Shaft (28")	28-8355
Tone Control Shaft (21")	28-8356
Tone Control Shaft (28")	28-8358
Lock Cylinder Assembly	42-5337
28" Shaft Kit	45-1133

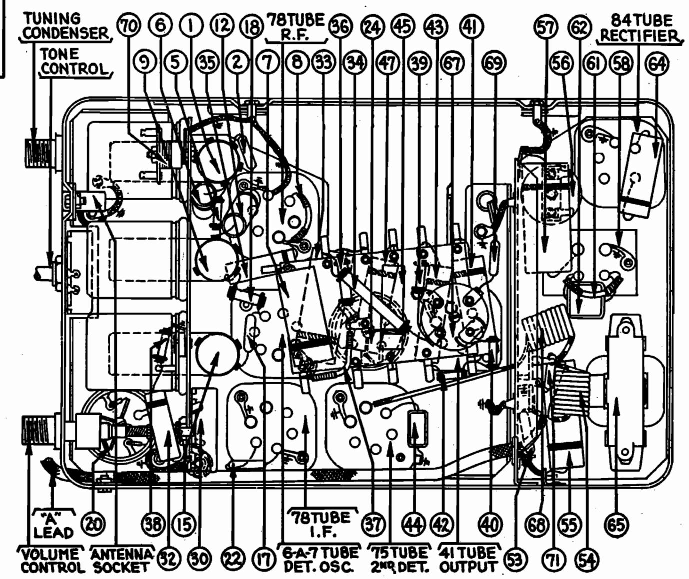


FIGURE 4

MODELS 808,809
Trimmers,Alignment

PHILCO RADIO & TELEV. CORP.

I. F. Transformer and Padders (Models 808-809)

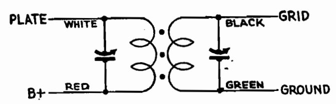
The first I. F. transformer is assembled complete with padding condensers. The second I. F. transformer is assembled complete with padding condensers and a network of resistors and mica condensers.

The padders are placed in the top of the shield can, one above the other.

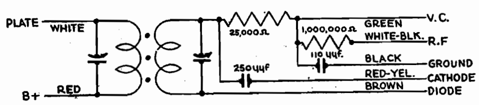
The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figures 5-6-7).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 5.

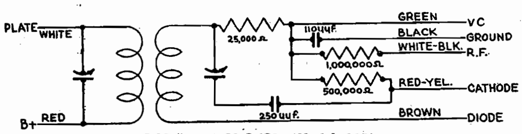
If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1630 (Model 808) and 32-1622 (Model 809) for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



PART No. 32-1621 (Model 808 - 809)



PART No. 32-1622 (Model 809)



PART No. 32-1630 (Model 808)

FIGURE 5

Model 808 *Adjustments*

All adjustments have been carefully checked at the factory. If, however, it is found necessary to readjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO SET TESTER 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 78 tube, I. F. stage. (For location see Fig. 6).

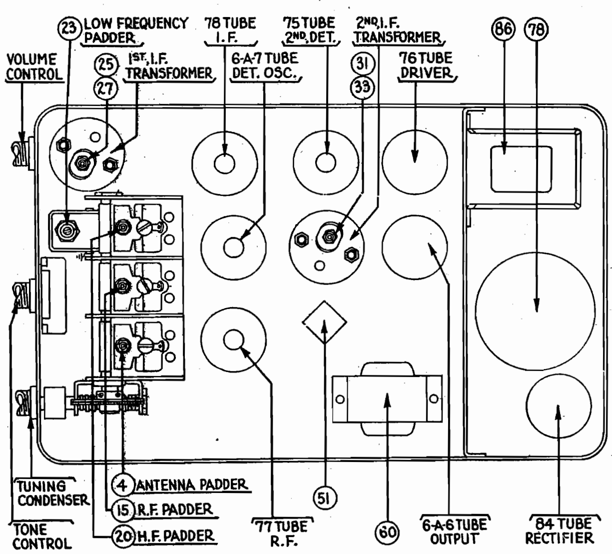


FIGURE 6

Set up the signal generator and adjust it to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the output tube and the other lead to the Receiver housing. The Receiver volume control must be turned to approximately full volume, and the attenuator in the generator set for a half-scale reading of the output meter.

1. The secondary nut padder (33) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (31) for maximum reading.

2. Remove the generator lead from the 78 tube and reconnect the grid clip.

3. Disconnect the grid clip from the 6A7 tube and connect the generator lead to the grid cap of this tube. The secondary nut padder (27) must be adjusted for maximum reading in the output meter. Then adjust the primary screw padder (25) for maximum reading.

4. After padding the first I. F. stage remove the generator lead from the 6A7 tube and reconnect the grid clip. Adjust the generator to 1600 K. C. and then connect the generator lead to the antenna lead, using a 150 mmfd. condenser in series between the two leads, ground the shield to the Receiver housing.

5. Turn the tuning condenser out of mesh as far as it will go. With the tuning condenser in this position adjust the high frequency padder (20) until the maximum reading is obtained in the output meter. This is the true setting for 1600 K. C. 160 on the dial scale. Adjust the padders (15) and (4) in the same manner.

6. Turn the tuning condenser plates in mesh to approximately 580 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the series padder (23) for maximum reading.

7. Readjust padder (20) at 1600 K. C.

8. Turn the condenser to 1400 K. C. and adjust the padders (15) and (4) for maximum reading.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

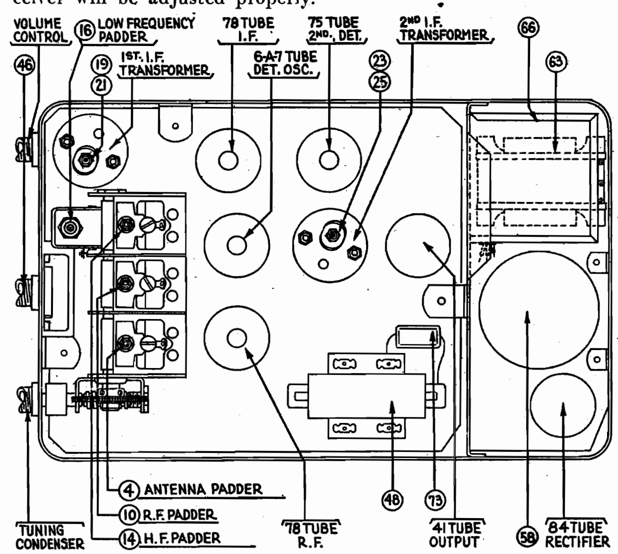


FIGURE 7

Model 809 *Adjustments*

Adjustments for the Model 809 are practically the same as for the Model 808. (For location of padders, See Fig. 7).

In step 1—adjust the secondary nut padder (25) and the primary screw padder (23)

In step 3—adjust the secondary nut padders (21) and the primary screw padder (19)

In step 5—adjust padders (14), (10) and (4)

In step 6—adjust padder (16)

In step 7—adjust padder (14)

In step 8—adjust padders (10) and (4)

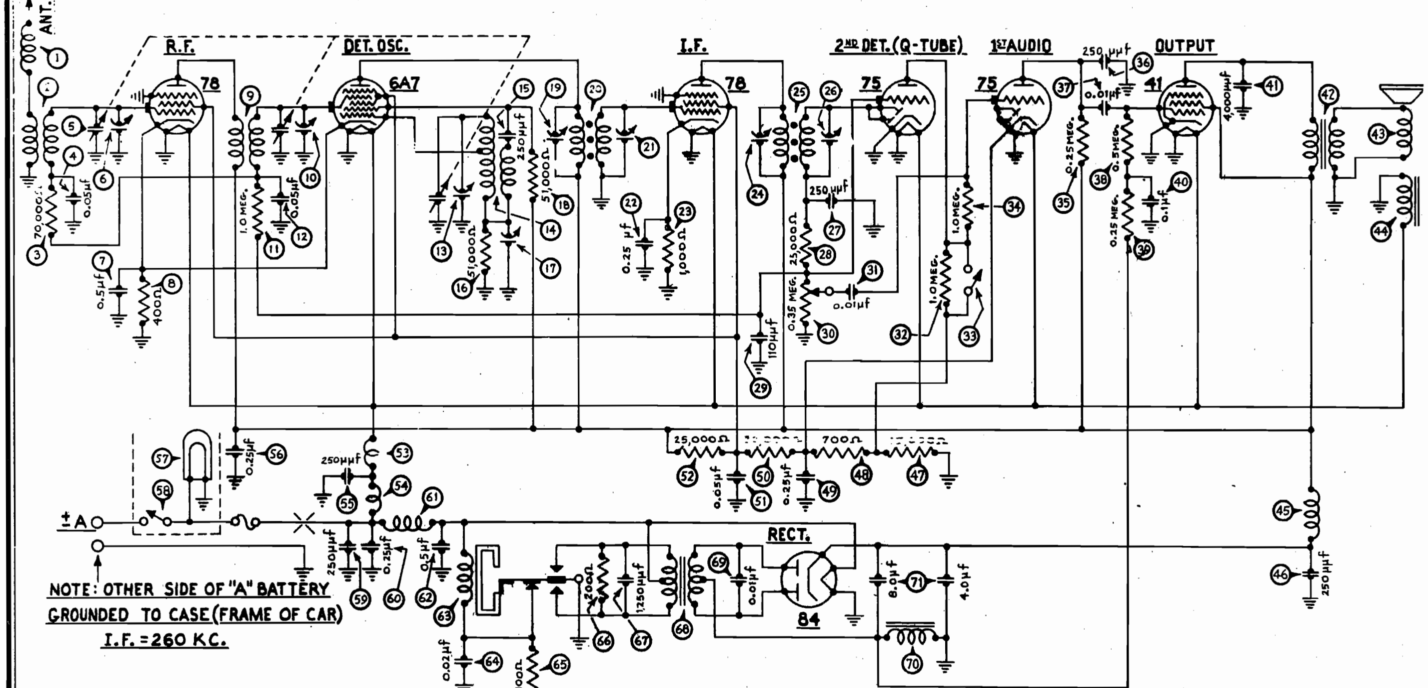
MODEL 810-PV

Schematic, Chassis

PHILCO RADIO & TELEV. CORP.

MODELS 810PA, 810PB, 810PV

Parts List



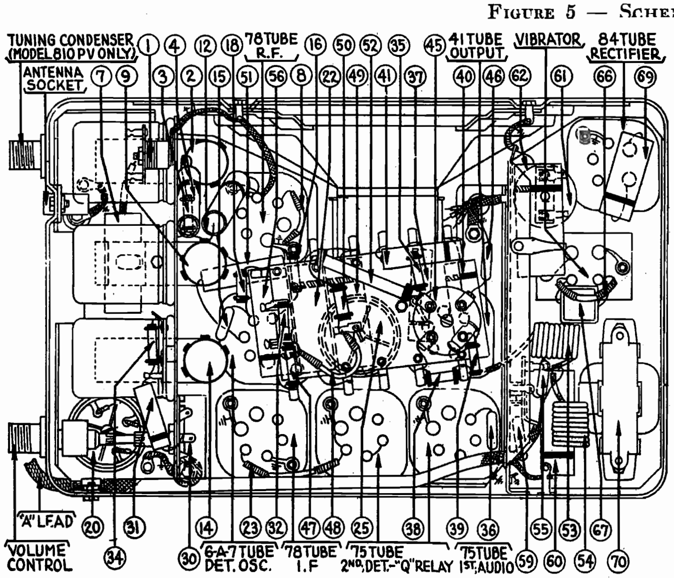


FIGURE 5 — SCHEMATIC — MODEL 810PV

No.	Description	Part No.
1	Antenna Choke	32-1673
2	Antenna Transformer	32-1778
3	Resistor (70,000 ohms)	33-1115
4	Condenser (.05 mfd.)	30-4020
5	Tuning Condenser	31-1595
6	First Padder (on tun. cond.)	....
7	Condenser (.5 mfd.)	30-4227
8	Resistor (400 ohms)	33-3016
9	R. F. Transformer	32-1779
10	Second Padder (on tun. cond.)	....
11	Resistor (1,000,000 ohms)	33-1096
12	Condenser (.05 mfd.)	30-4020
13	Third Padder (on tun. cond.)	....
14	(810PA & PB) Oscillator Transformer	32-1804
14	(810PV) Oscillator Transformer	32-1780
15	(810PA & PB) Condenser (50 mmfd.)	30-1029
15	(810 PV) Condenser (250 Mmfd.)	30-1032
16	Resistor (51,000 ohms)	6098
17	Fourth Padder (on tun. cond.)	...
18	Resistor (51,000 ohms)	6098
19	Padder (Pri. 1st I. F. Transf.)	...
20	First I. F. Transformer	32-1621
21	Padder (Sec. 1st I. F. Transf.)	..
22	Condenser (.25 mfd.)	30-4146
23	Resistor (1,000 ohms)	33-3017
24	Padder (Pri. 2nd. I. F. Transf.)	..
25	Second I. F. Transformer	32-1622
26	Padder (Sec. 2nd I. F. Transf.)	..
27	Condenser (250 mmfd.)	30-1032
28	Resistor (25,000 ohms)	33-1013
29	Condenser (110 mmfd.)	30-1031
30	Volume Control (350,000 ohms)	38-6605
31	Condenser (.01 mfd.)	30-4169
32	Resistor (1,000,000 ohms)	33-1096
33	Switch	3253
34	Resistor (1,000,000 ohms)	33-1096
35	Resistor (250,000 ohms)	33-1097
36	Condenser (250 mmfd.)	30-1032
37	Condenser (.01 mfd.)	30-4145
38	Resistor (500,000 ohms)	6097
39	Resistor (250,000 ohms)	33-1097
40	Condenser (.1 mfd.)	30-4122
41	Condenser (4000 mmfd.)	30-4185
42	Output Transformer	32-7019
43	Cone and Voice Coil	36-3406
44	Field Coil Assembly	36-3405
45	"B" Choke	32-1281
46	Condenser (250 mmfd.)	30-1032
47	Resistor (10,000 ohms)	4412
48	Resistor (700 ohms)	33-3019
49	Condenser (.25 mfd.)	30-4146
50	Resistor (25,000 ohms)	4516
51	Condenser (.05 mfd.)	30-4020
52	Resistor (25,000 ohms)	3656
53	"A" Choke	32-1348
54	"A" Choke	32-1644
55	Condenser (250 mmfd.)	30-1032
56	Condenser (.25 mfd.)	30-4134
57	Pilot Lamp	34-2040
58	On and Off Switch Assembly Model 810P only	42-5362
59	Condenser (250 mmfd.)	30-1032
60	Condenser (.25 mfd.)	30-4146
61	Vibrator Choke	32-1377
62	Condenser (.5 mfd.)	30-4227
63	Vibrator	38-503[illegible]
64	Condenser (.02 mfd.)	30-40[illegible]
65	Resistor (300 ohms)	33-3010
66	Resistor (200 ohms)	7217
67	Condenser (1250 mmfd.)	5886
68	Power Transformer	32-7352
69	Condenser (.01 mfd.)	30-4051
70	Filter Choke	32-7351
71	Filter Condenser (4—8 mfd.)	30-2109
72	Cystal (Model 810PA) 1875 K. C. Receiver Range 1565 K.C. to 1665 K.C.	45-2101
	1970 K.C. Receiver Range 1660 K.C. to 1760 K.C.	45-2102
72	Crystal (Model 810PB) 2410 K. C. Receiver Range 2100 K.C. to 2200 K.C.	45-2103
	2510 K.C. Receiver Range 2200 K.C. to 2300 K.C.	45-2104
	2610 K.C. Receiver Range 2300 K.C. to 2400 K.C.	45-2105
	2710 K. C. Receiver Range 2400 K.C. to 2500 K.C.	45-2106
	Receiver Mtg. Bracket	29-1791
	Receiver Mtg. Plate	29-1792
	Mtg. Bolt	W1316A
	Nut	W55A
	Control Mtg. Strap	04344
	Control Mtg. Bracket	6035
	Key	6091
	Dial (Model 810PV only)	27-5126
	Knobs	27-4058
	Screens (Cover Mtg.)	W274B
	Fuse	7227
	Fuse Insulators	27-7729

MODELS 810PA,810PB,810PV
Data,Alignment

PHILCO RADIO & TELEV. CORP.

HOUSING, PLATING, FINISH All are single unit Receivers, housed in containers 11 inches long by 7⅜ inches wide by 7 inches deep. All corners are rounded, the chassis, housing and covers are all steel and are plated to prevent rusting. They are given an exterior black wrinkle finish.

MOUNTING BRACKETS The Receivers are furnished with metal mounting brackets. One bracket is bolted to the inside of the dash, the other bracket is fastened to back of the Receiver. The Receiver bracket engages on the dash bracket and is fastened by a single small screw. This makes the installation and removal of the Receiver a simple, rapid operation. The Receiver may be installed with the tubes upright or inverted, depending on the location of the Receiver in the car.

CONTROL SHAFTS, CONNECTIONS The volume control and (in case of 810 PV) the tuning control shaft, the "A" battery and the antenna connectors are located on one end of the housing. The shafts are the rapid coupling type with the locking gland nut at the Receiver end. The "A" battery and antenna connections are the quick, detachable bayonet locking type, with the "A" fuse placed in the "A" lead.

FLOATING CHASSIS AND CONDENSER The Receiver chassis is shock mounted within the housing, actually floating on live rubber bushings. The tuning condenser is likewise rubber mounted.

CONDENSER DRIVE The condenser drive gear ratio (Model 810PV) is 16:1. This eliminates practically all back lash and due to the mechanism used, prevents the tuning condenser from detuning from vibration. This high gear ratio also makes accurate tuning much easier.

CONTROL UNIT A steering column control unit, with illuminated dial (calibrated for the Model 810PV) is used.

SUPERHETERODYNE RANGE 810PV DRIFT A superheterodyne circuit is used for the 810PV, also the 810PA and PB. The frequency coverage of the Model 810PV is from 1575 K.C. to 2600 K.C. continuously in one band. The oscillator and I.F. circuits are especially designed to reduce frequency drift to a minimum. The Models

RANGE 810PA AND 810PB 810PA and 810PB, the fixed frequency Receiver, can be furnished adjusted for any one particular frequency within the limits of the regular police band, i.e. the Model PA covers from 1575 K.C. to 1750 K.C. and the Model 810PB covers from 2100 K.C. to 2500 K.C.

CRYSTAL CONTROL A crystal controlled oscillator circuit is employed in the Model 810PA and 810PB. The crystal control naturally holds the oscillator on the required frequency, and is responsible, in a large measure, for the greatly improved performance of this Receiver.

TUBE EQUIPMENT The tubes used in the 810PV and 810PA and 810PB are:

78 Tube— Tuned R. F. Amplifier with A. V. C.
6A7 Tube—First Detector—Oscillator Modulator with A.V.C
78 Tube—I. F. Amplifier.
75 Tube—Second Detector and "Q" Relay Stage.
75 Tube—First A. F. Amplifier with "Q" Control.
41 Tube—Power Output Stage.
84 Tube—Full Wave Rectifier.

A. V. C. Both the R. F. stage and the first detector oscillator modulator stage have full automatic volume control supplied by the diode detector. In addition to this, the Receiver also has a "Q" or carrier relay circuit. The function of this circuit is to

"Q" CIRCUIT completely silence the Receiver when tuned off carrier, or when the carrier goes off the air. The correct values of the resistor network have been determined and used for satisfactory city operation where it is desirable to exclude street car noises, etc. A switch is provided on the face of the Receiver to open or close this circuit, since, when in remote sections of the territory, where the police transmitter signal might be very weak, slight additional sensitivity can be obtained with the "Q" circuit cut out. This "Q" circuit should not be confused with the conventional squelch circuit. The "Q" relay circuit operates on a carrier field strength equivalent to approximately 3 microvolts in the antenna. A carrier below this strength is almost always of insufficient strength to give satisfactory reception, especially in noisy locations.

DYNAMIC SPEAKER SPECIAL AUDIO A full powered electro-dynamic speaker is used to give clarity of reproduction and better articulation. The audio and the speaker circuits are especially designed to give the best reproduction of the voice frequencies. The Receiver and speaker are capable of delivering considerably greater undistorted output than is normally required.

POWER SUPPLY The power supply is self contained and is not polarized. The Receiver can be installed in any car without reversing battery connections. Philco's full-wave Vibrator (more than three-quarters of a million in successful operation during the past three years) is used.

These models are without peer and are the most modern police Receivers obtainable. They represent the best designing, engineering and production skill in the industry.

ADJUSTMENTS MODELS 810PA AND 810PB

The fixed frequency Auto Radio Receivers are identical, except for the crystals used to obtain the various oscillator frequencies.

The Receivers, when used with the proper crystals, can be adjusted for any specified frequency between the limits of 1575 K.C. and 1750 K.C. (Model 810PA) and 2100 K.C. and 2500 K.C. (Model 810PB). Six crystals are used to obtain these frequencies. The crystal frequency, however, is no indication of the Receiver frequency adjustment.

The frequency of the crystal required for any Receiver frequency within the range of frequencies quoted above, is between 210 K.C. and 310 K.C. higher than the desired frequency. The crystal frequencies, together with the frequency coverage of the Receiver with each crystal, are:

FREQ. OF CRYSTAL	RANGE OF RECEIVER	PART No. CRYSTAL
1875 K. C.	1565-1665 K. C.	45-2101
1970 K. C.	1660-1760 K. C.	45-2102
2410 K. C.	2100-2200 K. C.	45-2103
2510 K. C.	2200-2300 K. C.	45-2104
2610 K. C.	2300-2400 K. C.	45-2105
2710 K. C.	2400-2500 K. C.	45-2106

The I. F. frequency used in each Receiver is the difference between the frequency of the crystal in the Receiver and the frequency of the transmitter, i.e.: the transmitter frequency is 2422 K. C., the crystal used is 2710 K. C., the difference is 288 K. C., which is the frequency to which the I. F. amplifier must be tuned.

The Receivers are carefully adjusted to the required frequency at the factory and ordinarily need no readjustments except when the transmitter frequency is changed. Then the Receiver must be padded while warm and repadded after the Receiver has operated for several hours.

The Receiver must be set up for operation and the volume control set at maximum. The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit. Use a quality modulated oscillator or signal generator for the test signal, with an output meter connected across the output stage. The signal from the signal generator should be attenuated so that the output signal is just sufficient to actuate the output meter. The signal should not be strong enough to operate the automatic volume control.

I. F. STAGES— The padding condensers are placed in the top of the I. F. coil shield can. The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

Remove the grid lead from the 78 I. F. amplifier tube. The signal generator must be set exactly on the predetermined frequency and the output connected to the grid of the amplifier tube. Adjust the padders ㉔, ㉖ on the second I. F. transformer for maximum output. Reconnect the grid lead.

In like manner, connect the signal generator output to the grid of the 6A7 detector oscillator tube and adjust the padders ⑲ and ㉑ on the first I. F, transformer.

Check the adjustments of the second I. F. transformer and the first I. F. transformer.

R. F. — Tune the signal generator to the frequency of the transmitter and connect the output of the generator to the Receiver antenna lead, through a 200 mmfd. dummy antenna.

The variable condenser is locked in place with two set screws. Adjust these and tune the variable condenser to the input frequency. If the crystal oscillator circuit does not function at first, loosen the padder ⑬ on the oscillator section of the tuning condenser and also the series padder ⑰. If the oscillator output is low, it can be increased by adjusting the padder ⑬ for the higher frequencies and the padder ⑰ for the lower frequencies.

Adjust the R. F. and detector padders ⑥ and ⑩ for maximum output. If after adjusting, they are loose, back out the tuning condenser slightly — or if they are too tight, turn the condenser in slightly. Then readjust the padders.

On the Model 810PA (lower frequency band) adjust the series padder ⑰ for maximum output reading and on the Model 810PB (higher frequency band) adjust the high frequency padder ⑬. The adjustment will not give a sharp peak, but it is possible to adjust for the maximum output. After this is obtained, back off the adjusting nut a half turn.

After completing these adjustments, recheck all the padders. This time, using a carefully calibrated signal generator, or better still, test tone from the police transmitter, connected to the Receiver antenna lead through a 200 mmfd. dummy antenna, Recheck the padders ⑥, ⑩, ⑬ and ⑰ on the gang condenser. Using the same signal, adjust the second I. F. and first I. F. padders for maximum output.

DO NOT OPEN THE CRYSTAL HOLDER. If, for any reason whatever it has been opened, the crystal and plates should be very carefully cleaned with carbon tetrachloride. After cleaning, the crystal must not be touched by the fingers. Use a clean cloth for handling.

ADJUSTMENTS — MODEL 810PV

Remove the grid lead from the 78 I.F. amplifier tube. Connect a 260 K. C. signal to the grid of the amplifier tube and adjust the padders ㉔ and ㉖ on the second I. F. transformer for maximum output. Reconnect the grid lead.

In a like manner, connect the 260 K. C. signal to the grid of the 6A7 detector oscillator tube and adjust the padders on the first I. F. transformer.

R. F. — Connect a 2600 K. C. signal to the grid of the 78 R. F. amplifier tube. Set the tuning condenser at minimum capacity, using a strip of bond paper as a guage under the heel of the rotor plates.

Adjust the first detector and oscillator padders ⑩ and ⑬ for maximum output.

Reset the signal generator for a 1600 K. C. signal. Tune in the signal and roll the variable condenser while adjusting the oscillator series padders ⑰.

Recheck the oscillator padder adjustment at 2600 K. C Connect the signal generator to the Receiver antenna lead using a 200 mmfd. condenser dummy antenna and adjust the antenna padder ⑥ at 2600 K. C.

The Model 810PV is a variable Auto Radio Receiver with a frequency range of 1560 K. C. to 2600 K. C. The scale is calibrated only between 1575 K. C. and 1750 K. C., and between 2100 K.C. and 2500 K. C., since these are the conventional emergency police bands. The Model 810PV has an intermediate frequency of 260 K. C. and does not employ crystal control.

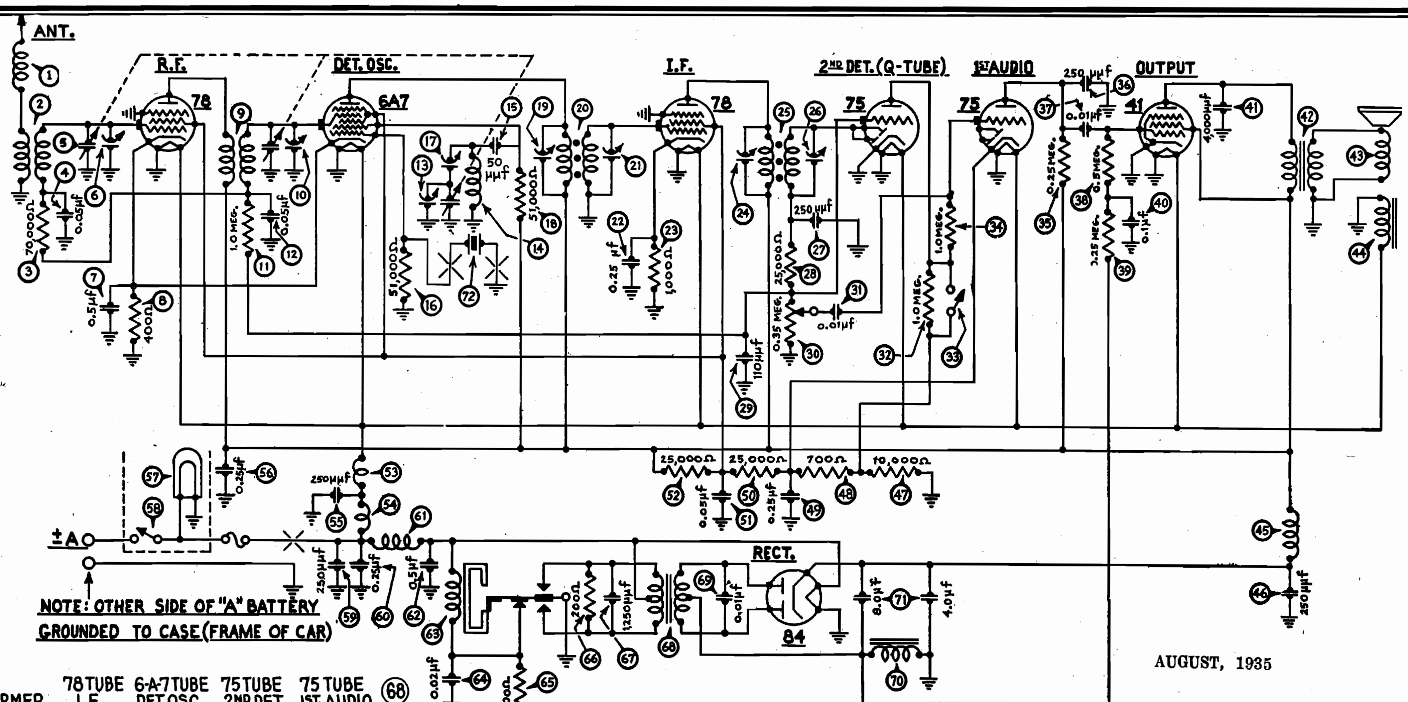
The Receiver must be set up for operation and the volume control set at maximum. The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit. Use a quality modulated oscillator or signal generator for the test signal, with an output meter connected across the output stage. The signal from the signal generator should be attenuated so that the output signal is just sufficient to actuate the output meter. The signal should not be strong enough to operate the automatic volume control.

I. F. — The padding condensers are placed in the top of the I. F. coil shield can. The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield.

MODELS 810PA, 810PB
Schematic, Trimmers Data

PHILCO RADIO & TELEV. CORP.

FOR PARTS LIST SEE INDEX



AUGUST, 1935

FIGURE 3 — SCHEMATIC — MODEL 810PA - 810PB

I. F. TRANSFORMERS

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figures 1 and 2.

If replacements are ever necessary, replace the entire coil assembly 32-1621 for the first I. F. stage and 32-1622 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

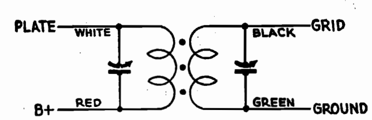


FIGURE 1—PART No. 32-1621 (1st I. F. Transformer)

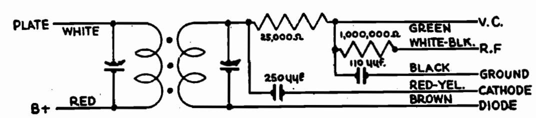


FIGURE 2—PART No. 32-1622 (2nd I. F. Transformer)

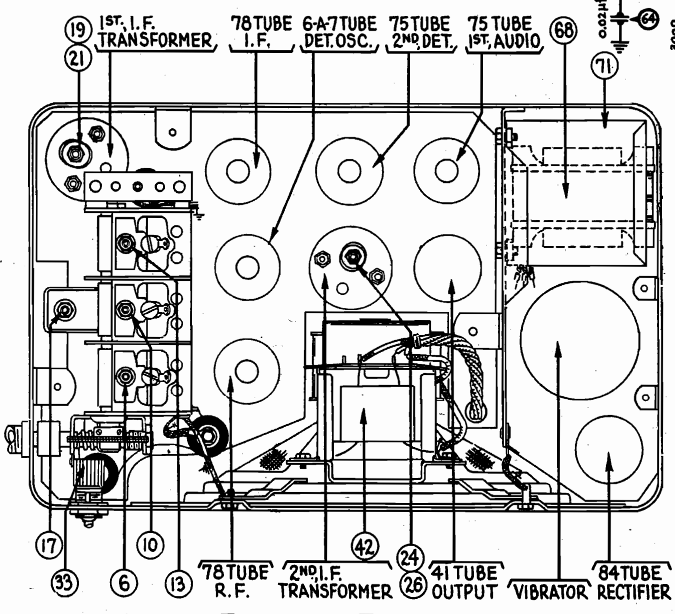


FIGURE 4 — TOP VIEW

AUGUST, 1935

MODEL FT-6
Alignment
Socket, Trimmers

PHILCO RADIO & TELEV. CORP.

MODEL FT-6 RECEIVER

THE new Ford auto radio incorporates new advanced principles of circuit and tube design. A totally new idea in sound distribution and musical fidelity is built into a dynamic speaker located above the occupants' heads in the header-bar of the car. Other features of the set are two-unit construction with separate speaker, highly developed Automatic Volume Control, illuminated custom-built instrument panel control, mounting in the ash receptacle opening.

The Receiver is mounted directly above the steering column out of sight and out of the way.

I. F. TRANSFORMER AND PADDERS

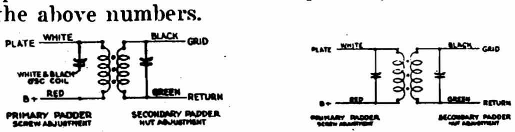
The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figs. 1 and 2.)

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

If replacements are ever necessary, replace the entire coil assembly 32-1329 for the first I. F. stage and 32-1237 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.



1st I. F. Transformer 32-1329

2nd I. F. Transformer 32-1237

FIG. 1

MODEL FT-6 ADJUSTMENTS

All adjustments have been carefully checked at the factory. If, however, it is found necessary to re-adjust the padding condensers, this procedure must be followed carefully. Do not attempt to make any adjustments until the procedure is clearly understood or without the use of a good oscillator or signal generator and output meter. The PHILCO Set Tester 048 is highly recommended for this procedure and for all service work.

The Receiver must be connected to a six-volt storage battery and set up for operation. It is assumed that tubes have been checked and that the Receiver is in good condition except for the padding adjustments.

Remove the cover from the Receiver and disconnect the grid clip from the 77 tube. (For location see Fig. 2.)

Set up the signal generator and adjust it to exactly 260 K.C. Connect the generator lead to the grid cap of the 77 tube, and ground the shield to the Receiver housing.

Connect one lead from the output meter to the plate of the 42 tube and the other lead to the receiver housing. The Receiver volume control must be turned to approximately full volume and the attenuator in the generator set for a half-scale reading of the output meter.

The primary screw padders (24) and (14) must be screwed all the way in. (Figs. 2 and 3.) The secondary nut padders (26) and (19) must then be adjusted. These padders should be adjusted for maximum reading on the output meter.

The screw padders (24) and (14) must be adjusted next.

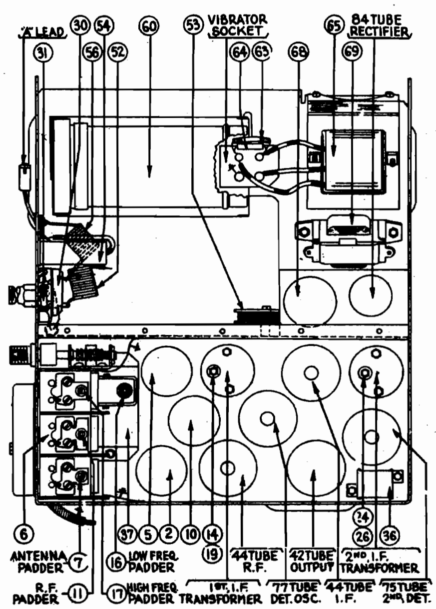


FIG. 2

Adjust the screw on each padder for maximum reading on the meter. This adjustment is critical. Note the maximum reading obtainable. Turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off.

After padding the I. F. stages, remove the generator lead from the 77 tube and reconnect the grid clip to the 77 tube. Adjust the generator to 1580 K.C. and then connect the generator lead to the antenna lead. Ground the shield to the receiver housing.

Using a piece of paper approximately .006 inch in thickness, place it under the heel of the tuning condenser between the stator and rotor plates and turn the tuning condenser until the rotor plates strike this paper.

With the tuning condenser in this position, adjust the high-frequency padder (17) until the maximum reading is obtained in the output meter. This is the true setting for 1580 K.C., 158 on the dial scale. Adjust condensers (11) and (7) in the same manner.

Remove the paper and turn the tuning condenser plates in mesh to approximately 60 on the scale, and adjust the signal generator to 600 K.C. Roll the tuning condenser and adjust the series padder (19) for the maximum meter reading.

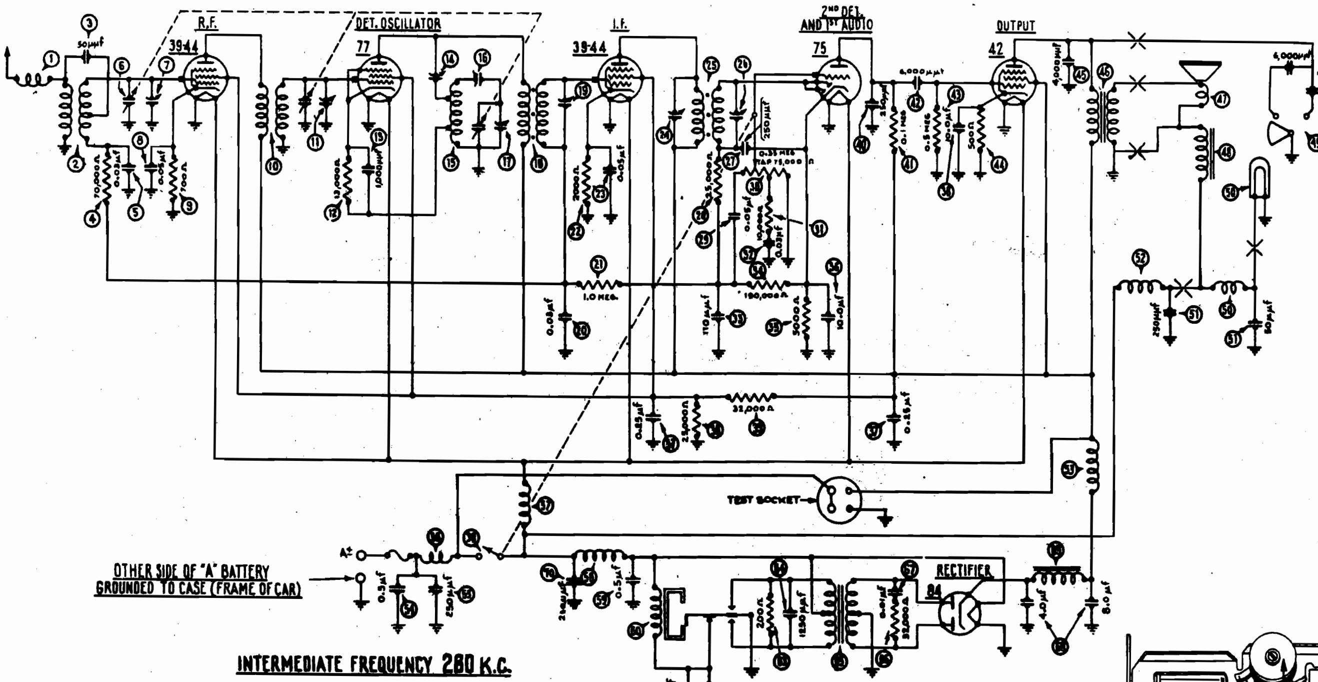
Readjust the padder (17) at 1580 K.C.

Tune the gang to 1400 K.C. and adjust padders (11) and (7) to maximum.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator used, the receiver will be adjusted properly.

PHILCO RADIO & TELEV. CORP.

MODEL FT-6
Schematic
Chassis View
Parts List



INTERMEDIATE FREQUENCY 280 K.C.

Fig. 3

4-prong Socket	27-6006
5-prong Socket	27-6014
6-prong Socket	27-6020
Spark Plug Resistor	33-1015
Spark Plug Terminal	28-6179
Interference Cond. (Gen.)	30-4181
Interference Cond. (Dist.)	30-4176
Face Assembly	42-5302
Glass for Control	27-7757
Knobs	27-4171
Pointer	28-2605
Flexible Shaft (Tuning)	28-8331
Flexible Shaft (Volume)	28-8332
Ammeter Cable	38-5749
Fuse	7227
Fuse Insulator	27-7131
Antenna Lead	L1741
"T" Bolt (set mounting)	28-8161
Nut (set mounting)	W518A
Speaker Cable	41-3125
Tow Strap	36-3432
"U" Clamp Control Mtg.	29-2699

MODEL FT-6 PARTS LIST

No. Shown on Schematic	Description	Part No.
1	Antenna Choke	32-1372
2	Antenna Transformer	32-1535
3	Condenser (50 mmfd.)	30-1029
4	Resistor (70,000 ohms)	33-1115
5	Condenser (.03 mfd.)	30-4025
6	Tuning Condenser	31-1459
7	1st Padder (on tun. cond.)	
8	Condenser (.05 mfd.)	30-4020
9	Resistor (700 ohms)	6443
10	R. F. Transformer	32-1536
11	2nd Padder (on tun. cond.)	
12	Resistor (11,000 ohms)	33-1194
13	Condenser (1000 mmfd.)	30-1007
14	Padder (Pri. 1st I. F. Trans.)	
15	Oscillator Transformer	32-1537
16	3rd Padder (on tun. cond.)	
17	4th Padder (on tun. cond.)	
18	First I. F. Transformer	32-1329
19	Padder (Sec. 1st I. F. Trans.)	
20	Condenser (.03 mfd.)	30-4025
21	Resistor (1.0 meg.)	33-1096
22	Resistor (2000 ohms)	33-3048
23	Condenser (.05 mfd.)	30-4020
24	Padder (Pri. 2nd I. F. Trans.)	
25	Second I. F. Transformer	32-1237
26	Padder (Sec. 2nd I. F. Trans.)	
27	Condenser (250 mmfd.)	30-1032
28	Resistor (25,000 ohms)	33-1013
29	Condenser (.05 mfd.)	30-4020
30	Vol. Con. & Switch Assm.	33-5067
31	Resistor (10,000 ohms)	33-1000
32	Condenser (.03 mfd.)	30-4025
33	Condenser (110 mmfd.)	30-1031
34	Resistor (190,000 ohms)	33-1116
35	Resistor (5000 ohms)	6096
36	Condenser (10-10 mfd.)	30-2076
37	Condenser (.25-.25 mfd.)	30-4126
38	Resistor (25,000 ohms)	3656
39	Resistor (32,000 ohms)	3525
40	Condenser (250 mmfd.)	30-1032
41	Resistor (.1 meg.)	6099
42	Condenser (6000 mmfd.)	30-4125
43	Resistor (.5 meg.)	6097
44	Resistor (500 ohms)	33-3031
45	Condenser (4000 mmfd.)	30-4185
46	Output Transformer	32-7347
47	Cone and Voice Coil	02861
48	Field Coil Assembly	36-3097
49	Tone Control	30-4243
50	Pilot Lamp	34-2039
51	Condenser (250 mmfd.)	30-1032
52	Choke	32-1374
53	R. F. Choke	32-1078
54	Condenser (.5 mfd.)	30-4018
55	Condenser (250 mmfd.)	30-1032
56	"A" Choke	32-1374
57	"A" Choke	32-1368
58	Vibrator Choke	32-1367
59	Condenser (.5 mfd.)	30-4227
60	Vibrator	38-5036
61	Condenser (.02 mfd.)	30-4039
62	Resistor (200 ohms)	7217
63	Resistor (200 ohms)	7217
64	Condenser (1250 mmfd.)	5886
65	Power Transformer	32-7232
66	Resistor (32,000 ohms)	3525
67	Condenser (.01 mfd.)	30-4051
68	Filter Condenser (4-8 mfd.)	30-2030
69	"B" Choke	32-7233
70	Condenser (110 mmfd.)	30-1031

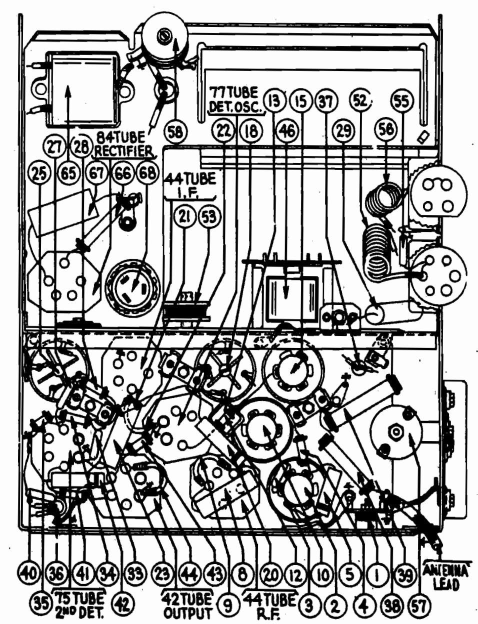


Fig. 4

JANUARY, 1935

MODEL FT-9 Ford
Alignment, Data
Chassis, Trimmers

PHILCO RADIO & TELEV. CORP.

FORD PHILCO RADIO MODEL FT9

I. F. Transformers and Padders
Model FT9

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Fig. 2).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 1.

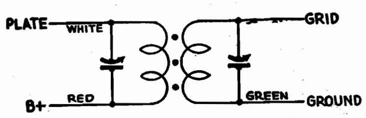


FIGURE 1

If replacements are ever necessary, replace the entire coil assembly, 32-1928 for the first I. F. stage and 32-1929 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model FT9 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model FT9 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The tone control should be turned to the brilliant position.

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder (25) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (23) for maximum reading. (See Fig. 2 for location of padders).

Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder (22) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (20) for maximum reading. (See Figure 2 for location of padders).

NOVEMBER, 1935

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (13) until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder screw (15) for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

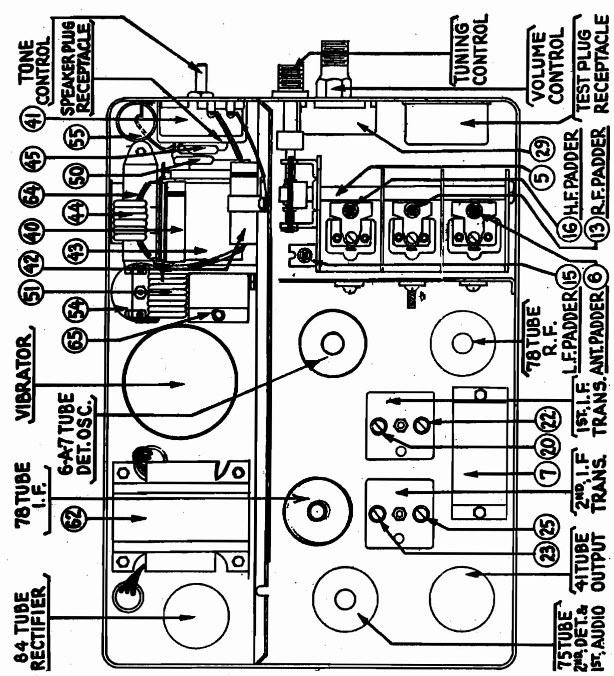


FIGURE 2 — *FT9 Top View*

ANTENNA — Connect the generator lead to the antenna lead using a 125 mmfd. condenser in series between the two leads. Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the paddders (15) and (6) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

NOTE: When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

MODEL FT-9 Ford
Schematic, Chassis
Parts List

PHILCO RADIO & TELEV. CORP.

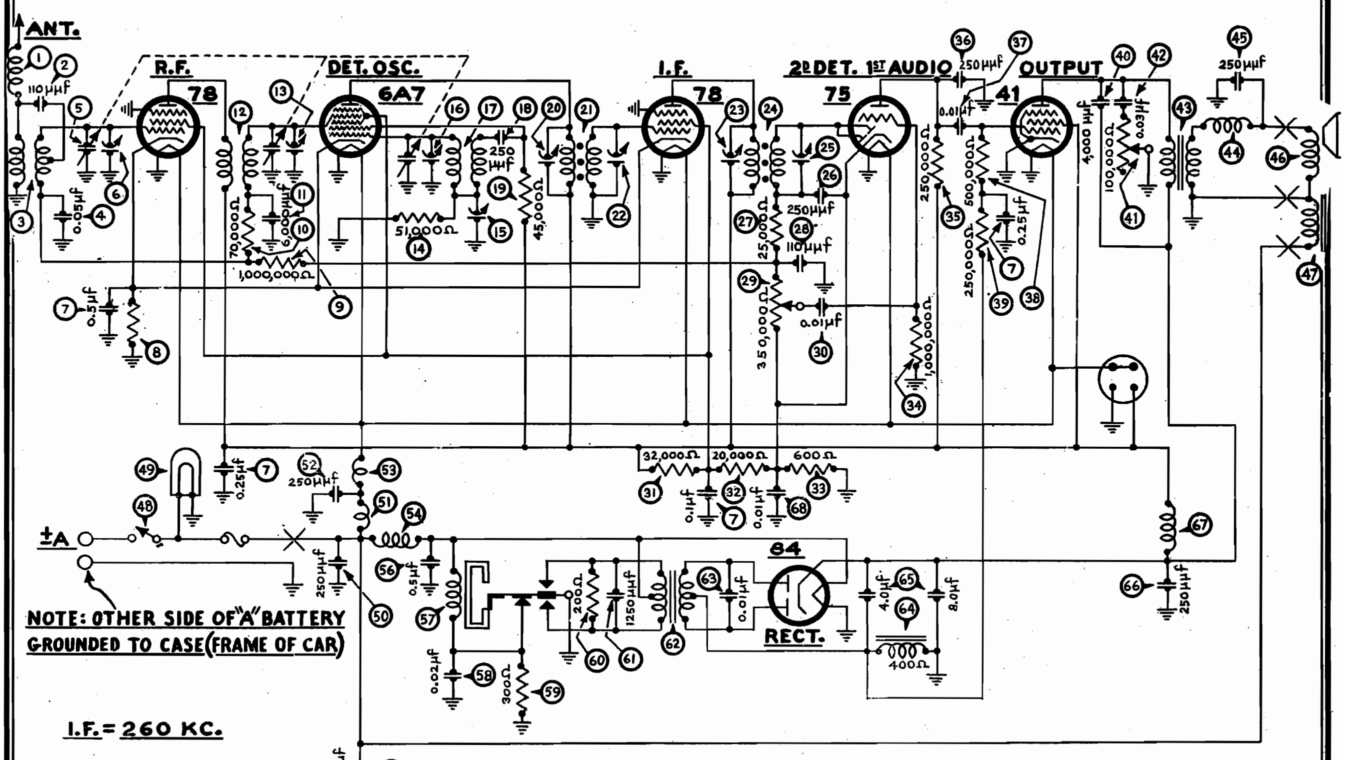


Figure 3 — *Model FT9 Schematic*

MODEL FT-9 — PARTS LIST

No.	Description	Part No.
41	Tone Control (100,000 ohms)	33-5101
42	Condenser (.03 mfd.)	30-4380
43	Output Transformer	32-7495
44	Choke	32-1644
45	Condenser (250 mmfd.)	30-1032
46	Cone and Voice Coil	36-3526
47	Field Coil Assembly	32-9236
48	On and Off Switch	42-5422
49	Pilot Lamp	34-2039
50	Condenser (250 mmfd.)	30-1032
51	"A" Choke	32-1644
52	Condenser (250 mmfd.)	30-1032
53	Choke	32-1930
54	Vibrator Choke	32-1968
55	Condenser (.25 mfd.)	30-4146
56	Condenser (.5 mfd.)	30-4047
57	Vibrator	38-5036
58	Condenser (.02 mfd.)	30-4039
59	Resistor (300 ohms)	33-3130
60	Resistor (200 ohms)	33-1210
61	Condenser (1250 mmfd.)	5886
62	Power Transformer	32-7488
63	Condenser (.01 mfd.)	30-4381
64	Filter Choke	32-7491
65	Filter Condenser	30-2134
66	Condenser (250 mmfd.)	30-1032
67	R. F. Choke	32-1932
68	Condenser (.01 mfd.)	30-4124
	Four-hole Socket	27-6044
	Five-hole socket	27-6035
	Six-hole Socket	27-6036
	Seven-hole Socket	27-6037
	Tuning and Volume Shaft	28-8435
	Pilot Lamp Assembly	38-7217
	Glass	27-7757
	Face Assembly	28-3444
	Pointer	28-2605
	Knob	27-4249
	"U" Clamp (control mtg.)	29-2699
	Wing Nut (control mtg.)	W1321
	Tee Bolt (set mtg.)	28-6161
	Nut (set mtg.)	W518A

No.	Description	Part No.
1	Antenna Choke	38-7219
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-1939
4	Condenser (.05 mfd.)	30-4020
5	Tuning Condenser	31-1674
6	First Padder (on tun. cond.)	.....
7	Condenser .1-.25-.25-.5 mfd.)	30-4374
8	Resistor (400 ohms)	33-1211
9	Resistor (1,000,000 ohms)	33-1096
10	Resistor (70,000 ohms)	33-1115
11	Condenser (6000 mmfd.)	30-4125
12	R. F. Transformer	32-1926
13	Second Padder (on tun. cond.)	.....
14	Resistor (51,000 ohms)	6098
15	Low Frequency Padder	31-6066
16	Third Padder (on tun. cond.)	.....
17	Oscillator Transformer	32-1927
18	Condenser (250 mmfd.)	30-1032
19	Resistor (45,000 ohms)	5256
20	Padder (Pri 1st I.F. transf.)	.....
21	First I. F. Transformer	32-1928
22	Padder (Sec. 1st I. F. transf.)	...
23	Padder (Prt. 2nd I.F. transf.)	....
24	Second I. F. transformer	32-1929
25	Padder (Sec. 2nd I.F. transf.)	....
26	Condenser (250 mmfd.)	30-1032
27	Resistor (25,000 ohms)	33-1013
28	Condenser (110 mmfd.)	30-1031
29	Volume Control (350,000 ohms)	33-5139
30	Condenser (.01 mfd.)	30-4124
31	Resistor (32,000 ohms)	3525
32	Resistor (20,000 ohms)	6650
33	Resistor (600 ohms)	33-1212
34	Resistor (1,000,000 ohms)	33-1096
35	Resistor (250,000 ohms)	33-1097
36	Condenser (250 mmfd.)	30-1032
37	Condenser (.01 mfd.)	30-4145
38	Resistor (500,000 ohms)	6097
39	Resistor (250,000 ohms)	33-1097
40	Condenser (4000 mmfd.)	30-4185

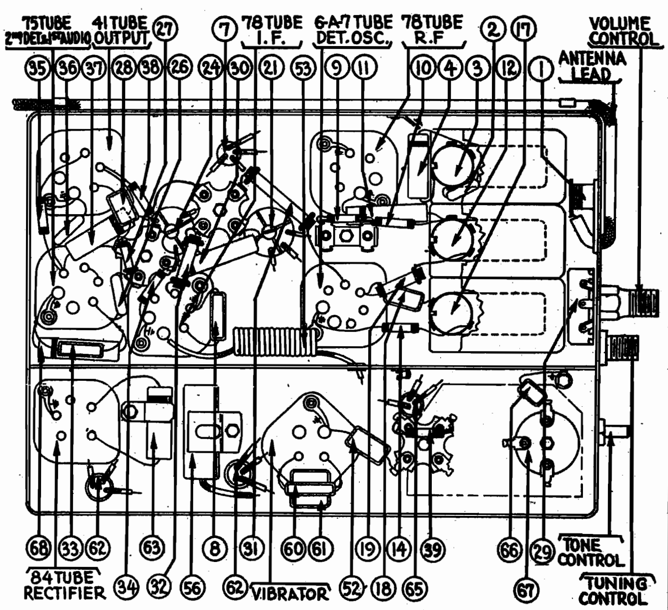


Figure 4 — *Model FT9 Base View*

No.	Description	Part No.
	Fuse	7227
	Fuse Insulator	27-7729
	Distributor Condenser	30-4176
	Generator Condenser	30-4181
	Gas gauge Condenser	30-4387

No.	Description	Part No.
	Dome Light Condenser	30-4388
	Oil Gauge Condenser	30-4307
	Speaker Cable	41-3167
	Tow Strap	36-3432
	Antenna Lead	L-1921
	Receiver Housing	38-1567

MODEL G (Code 122) Dodge, Chrysler

PHILCO RADIO & TELEV. CORP.

Plymouth Schematic, Chassis, Parts

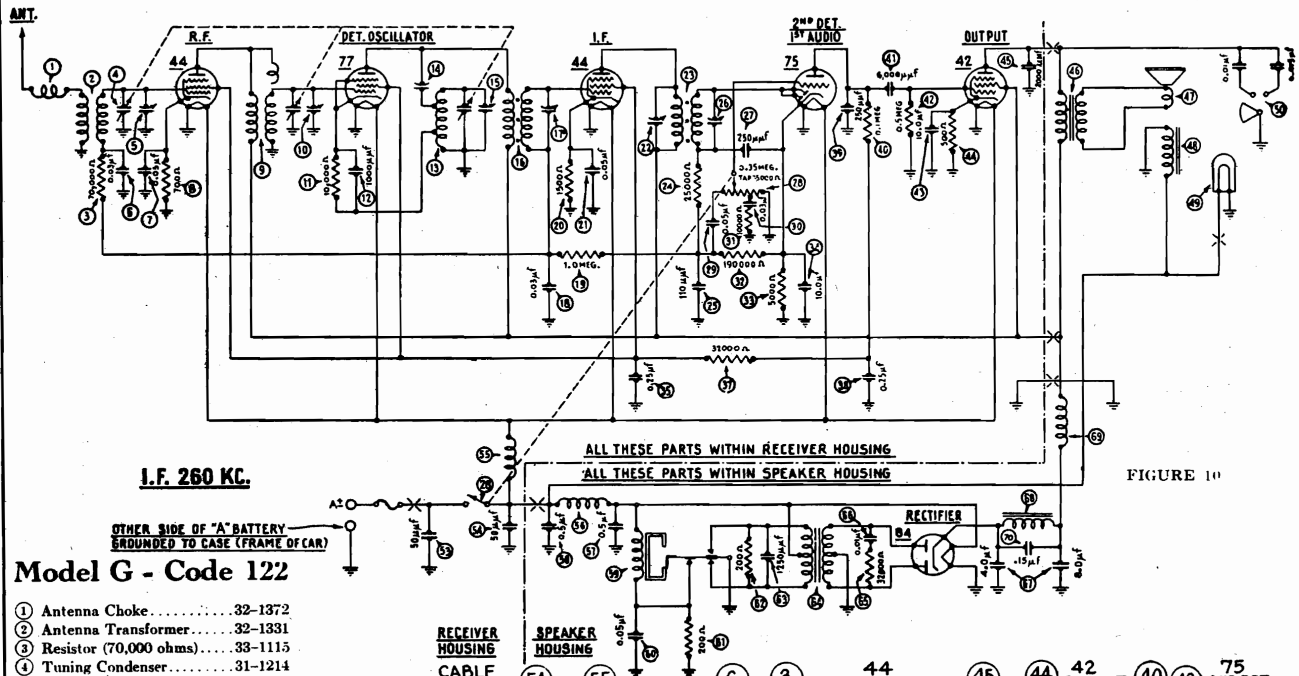


FIGURE 10

Model G - Code 122

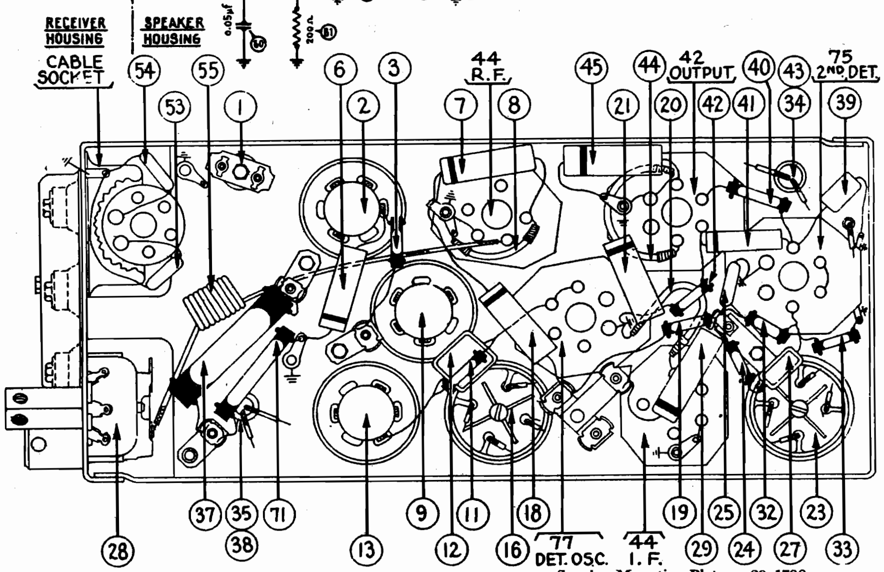


Figure 11

(1) Antenna Choke.........32-1372
(2) Antenna Transformer......32-1331
(3) Resistor (70,000 ohms).....33-1115
(4) Tuning Condenser.........31-1214
(5) First Padder (on Tun. Cond.)......
(6) Condenser (.03 mfd.)......30-4025
(7) Condenser (.05 mfd.)......30-4020
(8) Resistor (700 ohms)... ... 6443
(9) R. F. Transformer.........32-1332
(10) Second Padder (on Tun. Cond.).....
(11) Resistor (10,000 ohms).....33-1000
(12) Condenser (1000 mmfd.)...33-1007
(13) Oscillator Transformer.....32-1333
(14) Padder (Pri. 1st I. F. Trans.).......
(15) Third Padder (on Tun. Cond.)......
(16) First I. F. Transformer 32-1329
(17) Padder (Sec. 2nd I. F. Trans.).......
(18) Condenser (.03 mfd.)......30-4025
(19) Resistor (1,000,000 ohms)...33-1096
(20) Resistor (1500 ohms)......33-3047
(21) Condenser (.05 mfd.)......30-4020
(22) Padder (Pri. 2nd I. F. Trans.).......
(23) Second I. F. Transformer...32-1237
(24) Resistor (25,000 ohms).....33-1013
(25) Condenser (.00011 mfd.)...30-1031
(26) Padder (Sec. 2nd I. F. Trans.)......
(27) Condenser (.00025 mfd.)...30-1032
(28) Volume Control and Switch Assembly..............33-5067
(29) Condenser (.05 mfd.)......30-4020
(30) Condenser (.03 mfd.)......30-4025
(31) Resistor (10,000 ohms).....33-1000
(32) Resistor (190,000 ohms).....33-1116
(33) Resistor (5000 ohms)...... 6096
(34) Condenser (10 mfd.).......30-2076
(35) Condenser (.25 mfd.)......30-4126
(37) Resistor (32,000 ohms)..... 3525
(38) Condenser (.25 mfd.)......30-4126
(39) Condenser (.00025 mfd.)...30-1032
(40) Resistor (100,000 ohms).... 6099
(41) Condenser (.006 mfd.).....30-4125
(42) Resistor (500,000 ohms).... 6097
(43) Condenser (10 mfd.).......30-2076
(44) Resistor (500 ohms).......33-3031
(45) Condenser (.004 mfd.).....30-4185
(46) Output Transformer.......32-7042
(47) Cone and Voice Coil.......36-3157
(48) Field Coil Assembly.......36-3097
(49) Pilot Lamp.............34-2031
(50) Tone Control.............30-4189
(53) Condenser (.00005 mfd.)...30-1029
(54) Condenser (.00005 mfd.)...30-1029
(55) "A" Choke..............32-1432
(56) Vibrator Choke...........32-1260
(57) Condenser (.5 mfd.).......30-4047
(58) Condenser (.5 mfd.)......30-4015
(59) Vibrator.................38-5036
(60) Condenser (.05 mfd.).....30-4039
(61) Resistor (200 ohms)....... 7217
(62) Resistor (200 ohms)....... 7217
(63) Condenser (.00125 mfd.)... 5886
(64) Power Transformer........32-7253
(65) Resistor (3 2,000 ohms)... 3525
(66) Condenser (.01 mfd.)......30-4051
(67) Filter Condenser (4-8 mfd.).30-2030
(68) Filter Choke.............32-7254
(69) R. F. Choke.............32-1260
(70) Condenser (.15 mfd.).......30-4191
(71) Resistor (25,000 ohms.)..... 3656
Spark Plug Resistor.......33-1015
Distributor Resistor......33-1113E
1 mfd. Condenser......... 4522S
½ mfd. Condenser.........30-4007
Glass for Control.........27-7325

DODGE MODEL G-Code 122
Above items are identical for Dodge Model G-Code 122. See following items for additional accessories:
Dial Assembly...........42-5204
Pointer 28-1764
Control Assembly.........42-5196
Knobs—Volume..........27-4080
Knobs—Tuning...........27-4079
Knob Springs 28-1738
Bezel Assembly 42-5115
Interconnecting Cable.....41-3065
Ammeter Cable...........38-5704
Terminal.. .... L-1626
Flexible Shaft—Tuning....28-8188
Flexible Shaft—Volume....28-8198
Speaker Mounting Plate...29-1790
Speaker Mounting Bracket.29-1791
Receiver Mounting Plate...29-1792
Receiver Mounting Bracket.29-1848
Carriage Bolt............W-1316A
Fuse..................... 7227
Fuse Insulator............27-7131

CHRYSLER MODEL G-Code 122
Items 1 to 71 and next five are identical for Chrysler Model G, Code 122. See following items for additional accessories:
Dial Assembly............42-5204
Pointer........... 28-1825
Control Assembly.........12-5194
Knobs—Volume..........27-4072
Knobs—Tuning...........27-4071
Knob Springs............28-1738
Bezel Assembly...........42-5115
Interconnecting Cable.....41-3065
Ammeter Cable 38-5704
Terminal................ L-1626
Flexible Shaft—Tuning....28-8188
Flexible Shaft—Volume....28-8198
Speaker Mounting Bracket 29-1791
Speaker Mounting Plate...29-1790
Receiver Mounting Plate...29-1792
Receiver Mounting Bracket.29-1848
Carriage Bolt...........W-1316A
Fuse..................... 7227
Fuse Insulator............27-7131

PLYMOUTH MODEL G-Code 122
Items 1 to 71 and next five are identical for Plymouth Model G-Code 122. See following items for additional accessories:
Dial Assembly...........42-5205
Pointer.................28-1763
Control Assembly.........42-5197
Knobs—Volume..........27-4084
Knobs—Tuning...........27-4083
Knob Springs............28-1738
Bezel Assembly...........42-5115
Interconnecting Cable.....41-3065
Ammeter Cable...........38-5704
Terminal........... ..... L-1626
Flexible Shaft—Tuning....28-8188
Flexible Shaft—Volume....28-8198
Speaker Mounting Plate...29-1790
Speaker Mounting Bracket.29 1791
Receiver Mounting Plate. .29-1792
Receiver Mounting Bracket.29-1848
Carriage Bolt...........W-1316A
Fuse... 7227
Fuse Insulator 27-7131

Note 1. Adjust the High Frequency padders (15) at 1600 K. C.

Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

PHILCO RADIO & TELEV. CORP. MODEL G (Code 122) Chrysler Code CU & CV Airflow Custom-Built Installation Data

Installation Instructions - Chrysler Model - Codes CU and CV

THESE instructions have been carefully prepared for your use in installing the Chrysler Airflow Custom Built Radio by Philco in the 1934 Chrysler Airflow Model — Code CU-CV cars. Read thoroughly, then follow the instructions carefully in every detail.

Speaker Installation

Refer to Figure 1. This gives detailed dimensions for the location and drilling of the holes in the instrument board reinforcing brace on which the speaker will be mounted. Dimensions shown are along the surface of the brace. The speaker mounting brackets must be bolted to the sides of the speaker. To do this, place the speaker on the bench face down with the tone control knob on the right-hand side, attaching the brackets as follows: The smallest angle bracket must be bolted to the side towards you, the longest angle bracket to the left side with the part having the elongated hole directed

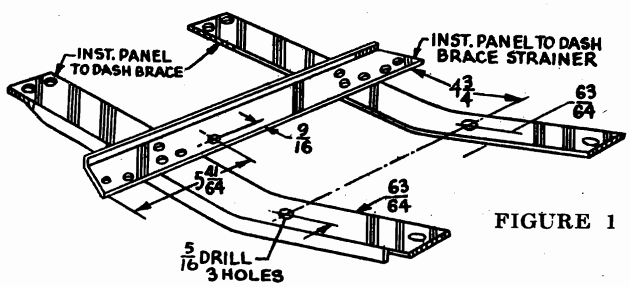


FIGURE 1

away from the speaker. The other bracket must be bolted to the right-hand side of the speaker with the part having the elongated hole turned under the speaker. Refer to Figure 2. The speaker should now be mounted in the car, placing it between the right-hand instrument board brace and the emergency brake control, locating the elongated holes in the speaker mounting brackets over the holes previously drilled in the braces. Bolt it securely in place with the three cadmium plated $\frac{1}{4}$—20 bolts and nuts supplied for this purpose. Be sure to use lockwashers under the nuts. The left, lower corner of the right cowl ventilator fly screen will interfere with the speaker. This may be remedied by bending this corner out of the way with a pair of pliers.

Instrument Panel Control

Remove the right hand ash receiver assembly. Remove the knobs from the control assembly by pulling them off the control head shafts. Then loosen the set screws in front that secure the flexible control shafts in place and the set screws in the rear of the housing that secure the control shaft housings in place. Remove the shaft assemblies from the control head. Install the control head in the instrument panel and fasten securely, using the U-shaped clamp supplied for this purpose, together with the nut and lockwasher. See Figure 3.

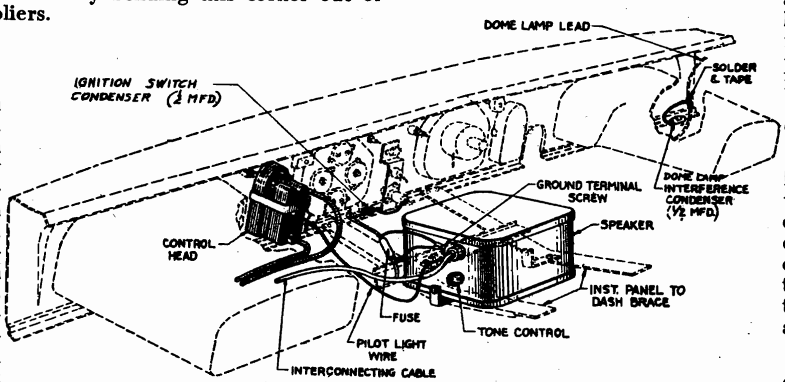


FIGURE 2

Receiver and Cable Installation

Before placing the Receiver in the under-carriage mounting box, the flexible cable housing set screws in the collars must be placed in position so they will be accessible from the top. Wrap the cardboard liner around the Receiver, bending it on the scored lines. Then place the Receiver in the undercarriage box with the shaft coupling collars and plug receptacle in line with their respective holes in the end of the box. The rectangular cardboard liner must be placed between the Receiver and the blank end of the box.

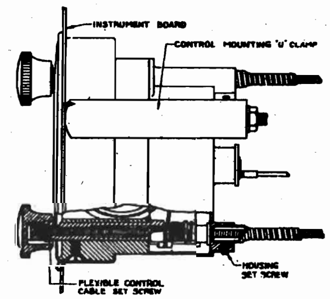


FIGURE 3

Connecting Remote Control Cables to the Receiver

1. Place the grommet caps and rubber grommets on the control shaft housings in the same manner in which they are assembled on the speaker cable. Insert the shafts in their respective couplings on the Receiver and tighten the housing retaining set screws. Secure the grommet caps to the mounting box with the 8-32 screws provided for this purpose. Be sure to use a fibre washer and a lockwasher under the head of each screw.

2. Install the six-hole plug in its receptacle in the Receiver, grounding the eye terminal on the end of the shield pigtail box with 8-32 screws, using a fibre washer and a lockwasher under the head of each screw. (The fibre washers are for the purpose of water-proofing). Then secure the grommet cap to the cable cover plate.

3. Place the rubber gasket around the edge of the box and then put the cover on, forcing it well down on the box, being certain that the ends of the gasket butt together to insure a water-tight assembly.

4. Remove the right cowl quarter-kick-pad. Then run the cables along the body side rail under the floor board and up through the opening in the floor board riser provided for the speedometer cable. See Fig. 4. In bodies where the hole in the toeboard riser is not large enough or obstructed and will not permit the passage of the plug on the speaker end of the cable it will be necessary to remove the floorboard and make a $\frac{1}{2}''$ slot in the toeboard riser into the speedometer cable channel to allow the cables to be assembled in place. Do not attempt to remove the plug from the end of the cable. Fasten them in the clips provided in the frame channel adjacent to the speedometer cable. Plug the four hole plug into its receptacle in the speaker. Place the volume control cable (with the red mark)

MODEL G (Code 122)
Chrysler Code CU & CV PHILCO RADIO & TELEV. CORP. Installation Data, Part 2
Airflow Custom-Built Parts List

INSTALLATION INSTRUCTIONS - CHRYSLER MODEL -

in the top of the control head and the tuning control cable (unpainted) in the bottom. Securely tighten the cable housing retaining set screws in the rear of the control head and then tighten the shaft retaining set screws in the control head shafts. Then replace the cowl quarter kick-pad.

5. Figure 5 shows the method of mounting the radio receiver under the right-hand front seat stool mounting bolt with the 1-¾" x 5/16" bolt provided in the radio package. The front bracket is secured to the floorboard using the bolt removed from where the rear bracket is mounted.

Before tightening the receiver in place, be sure that the cover is flush with the floorboard. If the wood shim that is between the floorboard and the frame mounting bracket interferes, the interfering part may be removed by the use of a wood chisel.

6. See Figure 6. Secure the control and speaker cables by means of the clip provided for this purpose.

7. The antenna lead wire from the roof will be found in the under body side rail and should be connected to the antenna lead branch of the speaker cable, as shown in Figure 5. Make a twisted splice, using plenty of tape to insure a water tight joint, grounding the eye terminal on the end of the antenna lead pigtail to the body side rail.

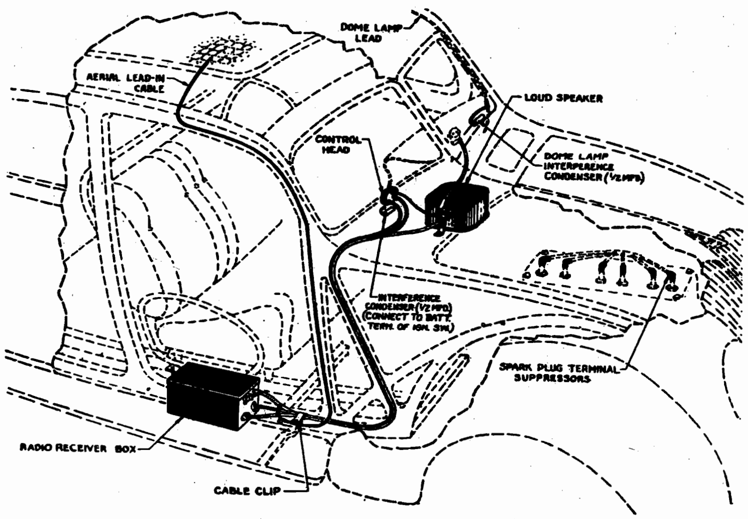


FIGURE 4

Battery Connections

Connect the battery lead to the fuse terminal of the ammeter. Place the fuse and fuse insulator in the metal fuse housing of the battery cable and connect it to the small bayonet fuse connector which branches out of the speaker cable close to the speaker. The three shield terminals must be connected under the grounding screw provided for this purpose near the speaker receptacle.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which with the addition of a cipher become the frequency numbers). Loosen the set screw on the front of the tuning control shaft without detuning the Receiver. Turn the shaft until the indicator points to the correct number on the dial. Tighten the set screw securely and then replace the knobs on the shafts.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the moulded bakelite elbow suppressors. Connect the suppressors to the spark plugs. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay. (See Figures 7 and 8).

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinist's hammer. Replace the rotor and the cap, then turn the motor over a few times, using the starter only. After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

Occasionally you may find a distributor cap which is out of round or with a short electrode. This condition does not affect the operation of the car, but sometimes makes satisfactory elimination impossible. If such a condition is found, take the defective cap to the nearest United Motors Service Station and exchange it for a new one.

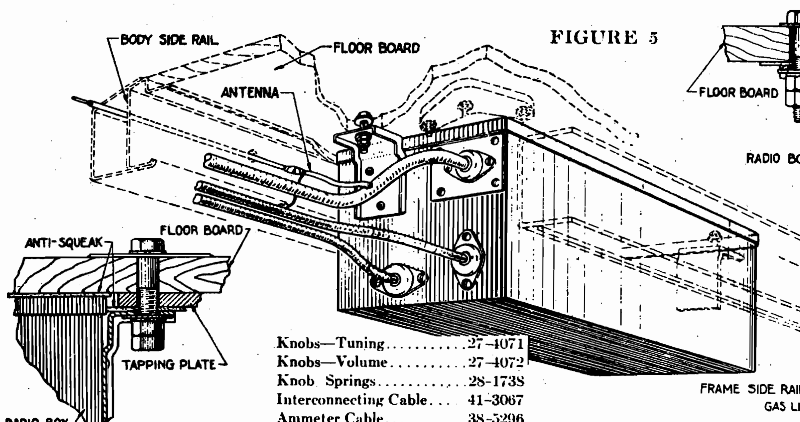


FIGURE 5

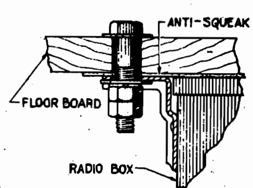


FIGURE 7

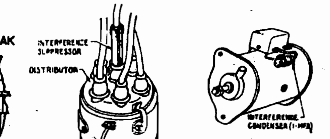


FIGURE 8

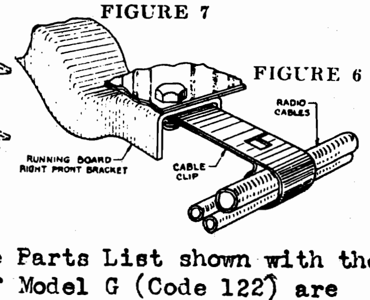


FIGURE 6

Spark Plug Resistor	33-1015
Distributor Resistor	33-1113E
½ mfd. Condenser	30-4007
Front Cover	28-1767
Dial and Drum Assembly	42-5202
Control Assembly	42-5193
Cable Spring	28-8203
Knobs—Tuning	27-4071
Knobs—Volume	27-4072
Knob Springs	28-1738
Interconnecting Cable	41-3067
Ammeter Cable	38-5296
Flexible Shaft—Tuning	28-8218
Flexible Shaft—Volume	28-8219
Fuse	7227
Fuse Insulator	27-7131
Speaker Mounting Bracket	29-1847
Speaker Mounting Bracket	29-1846
Speaker Mounting Bracket	29-1851
"U" Clamp	29-1808

Items 1 to 71 of the Parts List shown with the schematic diagram of Model G (Code 122) are identical for Model G (Code 122) Chrysler Code CU and CV. See items at left for additional accessories.

MODEL G (Code 122)
DeSoto Code SE
Airflow Custom-Built

PHILCO RADIO & TELEV. CORP.

Installation Instructions - DeSoto Model - Code SE

These Instructions have been carefully prepared for your use in installing the De Soto Airflow Custom-Built Radio by Philco in the 1934 De Soto Airflow Model — Code SE cars. Read thoroughly then follow the instructions carefully in every detail.

Carefully unpack the carton and check the contents with the material packing list. Examine the parts and compare with the illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

Speaker Installation

Refer to Figure 1. This gives detailed dimensions for the location and drilling of the holes in the instrument board reinforcing brace on which the speaker will be mounted. Dimensions shown are along the surface of the brace. The speaker mounting brackets must be bolted to the sides of the speaker. To do this, place the speaker on the bench face down with the tone control knob on the right-hand side, attaching the brackets as follows: The smallest angle bracket must be bolted to the side towards you, the longest angle bracket to the left side with the part having the elongated hole directed

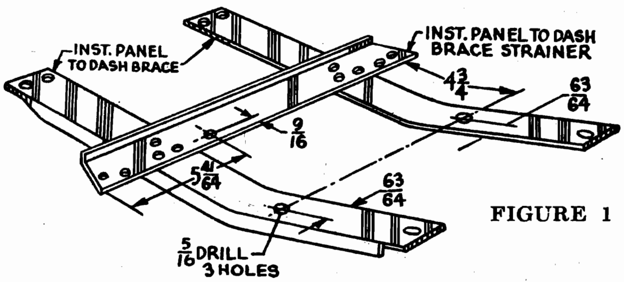


FIGURE 1

away from the speaker. The other bracket must be bolted to the right-hand side of the speaker with the part having the elongated hole turned under the speaker. Refer to Figure 2. The speaker should now be mounted in the car, placing it between the right-hand instrument board brace and the emergency brake control, locating the elongated holes in the speaker mounting brackets over the holes previously drilled in the braces. Bolt it securely in place with the three cadmium plated 1/4—20 bolts and nuts supplied for this purpose. Be sure to use lockwashers under the nuts. The left, lower corner of the right cowl ventilator fly screen will interfere with the speaker. This may be remedied by bending this corner out of the way with a pair of pliers.

Instrument Panel Control

Remove the De Soto medallion plate from the center of the instrument panel. To do this, it is necessary to remove the two retaining nuts from the back of the instrument panel.

Remove the knobs from the control assembly by pulling them off the control head shafts. Then loosen the set screws in front that secure the flexible control shafts in place and the set screws in the rear of the housing that secure the control shaft housings in place. Remove the shaft assemblies from the control head. Install the control head in the instrument panel and fasten securely, using the U-shaped clamp supplied for this purpose, together with the nuts and lockwashers. See Figure 3.

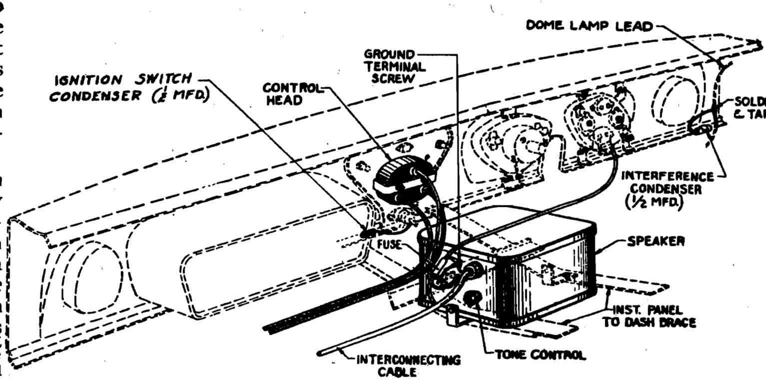


FIGURE 2

Receiver and Cable Installation

Before placing the Receiver in the under-carriage mounting box, the flexible cable housing set screws in the collars must be placed in position so they will be accessible from the top. Wrap the cardboard liner around the Receiver, bending it on the scored lines. Then place the Receiver in the undercarriage box with the shaft coupling collars and plug receptacle in line with their respective holes in the end of the box. The rectangular cardboard liner must be placed between the Receiver and the blank end of the box.

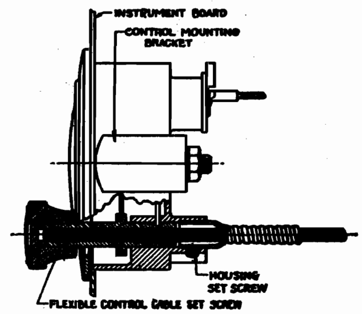


FIGURE 3

Connecting Remote Control Cables to the Receiver

1. Place the grommet caps and rubber grommets on the control shaft housings in the same manner in which they are assembled on the speaker cable. Insert the shafts in their respective couplings on the Receiver and tighten the housing retaining set screws. Secure the grommet caps to the mounting box with the 8-32 screws provided for this purpose. Be sure to use a fibre washer and a lockwasher under the head of each screw.

2. Install the six-hole plug in its receptacle in the Receiver, grounding the eye terminal on the end of the shield pigtail under one of the Receiver cover screws. Secure the cable cover plate to the box with 8-32 screws, using a fibre washer and a lockwasher under the head of each screw. (The fibre washers are for the purpose of water-proofing). Then secure the grommet cap to the cable cover plate.

3. Place the rubber gasket around the edge of the box and then put the cover on, forcing it well down on the box, being certain that the ends of the gasket butt together to insure a water-tight assembly.

4. Remove the right cowl quarter kick-pad. Then run the cables along the body side rail under the floor board and up through the opening in the floor board riser provided for the speedometer cable. See Fig. 4. In bodies where the hole in the toeboard riser is not large enough or obstructed and will not permit the passage of the plug on the speaker end of the cable it will be necessary to remove the floorboard and make a 1/2" slot in the toeboard riser into the speedometer cable channel to allow the cables to be assembled in place. Do not attempt to remove the plug from the end of the cable. Fasten them in the clips provided

MODEL G (Code 122)
DeSoto Code SE
Airflow Custom-Built

Installation Data, Part 2

PHILCO RADIO & TELEV. CORP.

in the frame channel adjacent to the speedometer cable. Plug the four-hole plug into its receptacle in the speaker. Place the volume control cable (with the red mark) in the left-hand side of the control head and the tuning control cable (unpainted in the right-hand side. Securely tighten the cable housing, retaining set screws in the rear of the control head and then tighten the shaft retaining set screws in the control head shafts. Then replace the cowl quarter kick pad.

5. Figure 5 shows the method of mounting the radio receiver under the right-hand front seat stool mounting bolt with the 1-3/4" x 5/16" bolt provided in the radio package. The front bracket is secured to the floorboard using the bolt removed from where the rear bracket is mounted.

Before tightening the receiver in place, be sure that the cover is flush with the floorboard. If the wood shim that is between the floorboard and the frame mounting bracket interferes, the interfering part may be removed by the use of

6. See Figure 6. Secure the control and speaker cables by means of the clip provided for this purpose.

7. The antenna lead wire from the roof will be found in the under body side rail and should be connected to the antenna lead branch of the speaker cable, as shown in Figure 5. Make a twisted splice, using plenty of tape to insure a water tight joint, grounding the eye terminal on the end of the antenna lead pigtail to the body side rail.

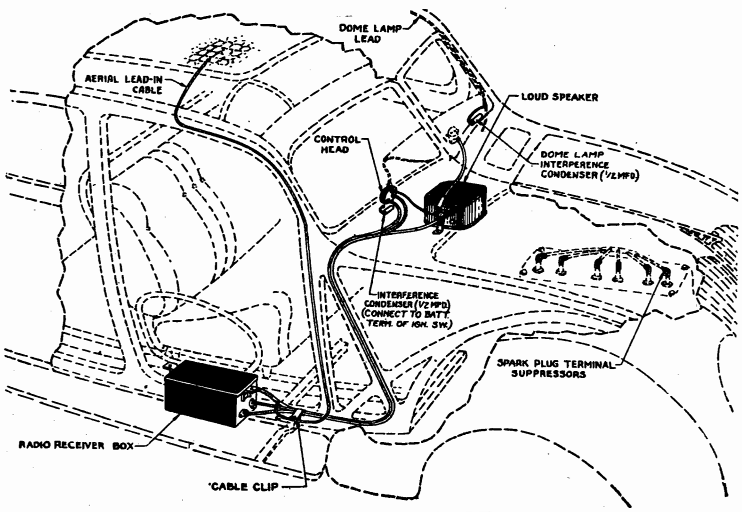


FIGURE 4

Battery Connections

Connect the battery lead to the fuse terminal of the ammeter. Place the fuse and the fuse insulator in the metal fuse housing of the battery cable and connect it to the small bayonet fuse connector which branches out of the speaker cable close to the speaker. The three shield terminals must be connected under the grounding screw provided for this purpose near the speaker receptacle.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which with the addition of a cipher become the frequency numbers). Loosen the set screw on the front of the tuning control shaft without detuning the Receiver. Turn the shaft until the indicator points to the correct number on the dial. Tighten the set screw securely and then replace the knobs on the shafts.

Motor Interference Suppression

Cut the elbow terminals from the spark plug cables and screw on the moulded bakelite elbow suppressors. Connect the suppressors to the spark plugs. Cut off the end of the distributor center lead cable and screw the straight molded resistor into the lead. Then plug this into the distributor cap. Install a one microfarad by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the generator battery lead to the relay. (See Figures 7 and 8).

There may be some interference caused by an excessive gap between the distributor rotor and the high tension contacts. This can be overcome by lengthening the contact end of the rotor.

The following procedure should be carefully followed: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinist's hammer. Replace the rotor and the cap, then turn the motor over a few times, using the starter only. After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file. Repeat the above operation until the rotor just clears the contacts.

Occasionally you may find a distributor cap which is out of round or with a short electrode. This condition does not affect the operation of the car, but sometimes makes satisfactory elimination impossible. If such a condition is found, take the defective cap to the nearest United Motors Service Station and exchange it for a new one.

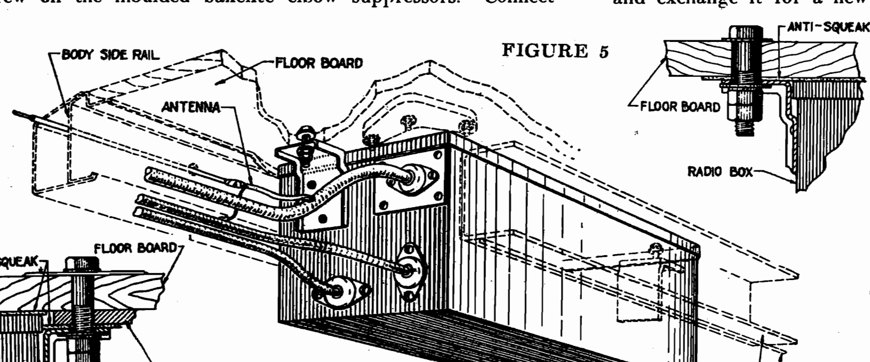
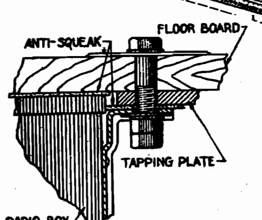


FIGURE 5



FRAME SIDE RAIL
GAS LINE

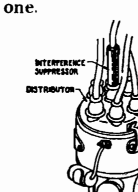


FIGURE 7

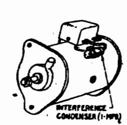


FIGURE 8

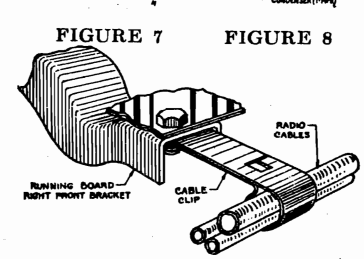


FIGURE 6

		Control Assembly	42-5195
		Knobs—Tuning	27-4075
		Knobs—Volume	27-4076
		Knobs Springs	28-1838
		Interconnecting Cable	41-3067
		Ammeter Cable	38-5296
		Flexible Shaft—Tuning	28-8201
Spark Plug Resistor	33-1015	Flexible Shaft—Volume	28-8202
Distributor Resistor	33-1113E	Fuse	7227
1/2 mfd. Condenser	30-4007	Fuse Insulator	27-7131
Glass for Control	27-7325	Speaker Mounting Bracket	29-1847
Bezel Assembly	42-5115	Speaker Mounting Bracket	29-1846
Dial Assembly	42-5200	Speaker Mounting Bracket	29-1851
Pointer	28-2094	"U" Clamp	29-1705

Items 1 to 71 of the Parts List shown with the schematic diagram of Model G (Code 122) are identical for Model G (Code 122) DeSoto Code SE. See items at left for additional accessories.

MODEL CT-2 Chrysler

PHILCO RADIO & TELEV. CORP.

INSTALLATION INSTRUCTIONS

Plymouth Model Code PJ **De Soto Model Code SF**
Dodge Model Code DU
Chrysler Model Code CZ **Chrysler Model Code C-6**

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxe Custom-Built Rad Read thru thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and coı pare them with illustrations given in these instructions so that you may become familiar with them and thus mal the installation easily and quickly.

This new DeLuxe Custom Built radio mounts on the dash above the steering column.

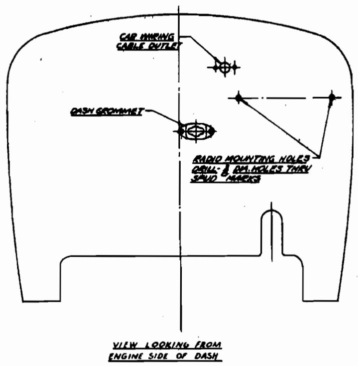


FIGURE 1

Receiver Installation

1. Remove the car lighting fuse from the back of the ammeter.

2. Drill two $\frac{7}{16}$" holes in the dash. Refer to Figure 1 for the location of the center punch marks on the dash. After drilling, remove the paint from the dash for a distance of ¾" around the holes to insure good ground contact.

3. The two ⅜" "T" bolts supplied in the radio package must be placed in these holes in the dash from the inside of the car. Put the washers and nuts on the ends of the bolts, but do not tighten.

4. Pull forward on the knob of the ash receiver to remove it. It is also necessary to take out the ash receiver wind deflector. This can be done after removing the three retaining nuts.

5. The shielded antenna lead supplied in the radio package must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post.

The shield pig-tail of the antenna lead must be grounded to the cowl. To do this, drill a ⅛" hole in the cowl in front of the hood line. Use an 8-32 bolt and connect the pig-tail eyelet under the nut. (See Figure 4).

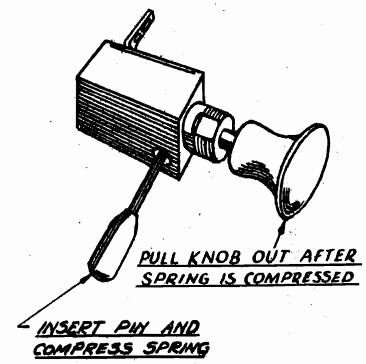


FIGURE 2

For Plymouth Model, Code PJ Only

1. Remove the short auxiliary brace from between the lower part of the instrument board and the brace that supports the cowl ventilator regulator mechanism.

2. Remove the head lamp switch. Pull the control knob out all the way. There is a small hole in the top of the switch, close to the instrument panel. Insert a nail or small screw driver in the hole and press down, at the same time pulling on the knob and thereby freeing the shaft. Remove the switch retaining nut on the front of the instrument panel. The switch can now be moved out of the way. DO NOT disconnect the wires attached to the switch.

6. Before installing the Receiver, place the gear shift lever in "LOW" and pull back the emergency hand brake lever as far as possible. Slide the Receiver into place above the steering column, hook the "T" bolts in the lugs on the side of the Receiver housing and then tighten the "T" bolt nuts on the engine side.

7. Connect the antenna lead in its receptacle on the end of the Receiver housing (See Figure 3)

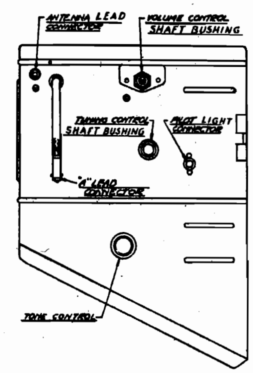


FIGURE 3

Control Installation

1. Install the control unit on the instrument panel, fitting it in the opening left by the removal of the ash receiver.

2. Fasten the control in place by means of the "U" clamp and nuts.

3. The volume control flexible shaft is on the left and must be coupled in the upper shaft bushing on the end of the Receiver housing (See Figure 3). The knurled shaft nut must be tightened securely.

4. Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.

5. Turn the right-hand (tuning control) knob so that the pointer indicates "54" on the dial.

6. The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 3). The knurled shaft nut must be tightened securely.

7. Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 3).

Power Connections

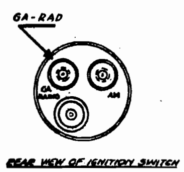


FIGURE 5

1. Connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 5, showing the back of the ignition switch.

2. Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead (see Figure 3).

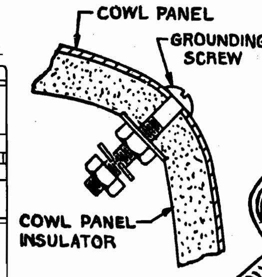


FIGURE 4

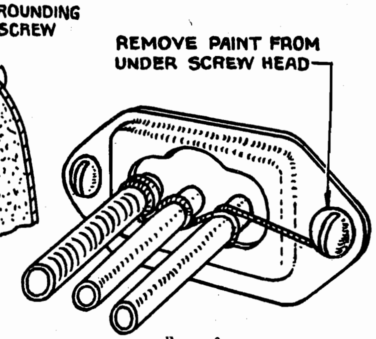


FIGURE 6

For Plymouth Model, Code PJ Only

Replace the auxiliary brace and the headlight switch referred to in the special Plymouth instructions under "Receiver Installation."

Motor Interference Suppression

1. Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals.

2. Screw the straight molded resistor on the end of the distributor center lead cable.

3. Plug this into the distributor cap.

4. Install a one mfd. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay.

5. Connect a ½ mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped.

6. Drill a ⅛" hole in the cowl in front of the hood line close to the corner post. Fasten the dome light condenser to the under side of the cowl using the 8-32 bolt and nut furnished for this purpose.

7. Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8 — ¼" self-tapping screw. Scrape the paint off around this hole. Using the bare stranded wire with the two eye terminals, place one terminal under one of the screws that holds the steering column dash seal in place. The other end must be fastened to the steering column with a No. 8 -- ¼" self-tapping screw.

8. If there is no hole in the steering column near the dash opening seal for a No. 8 — ¼" self-tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire supplied and ground this wire under one of the screws that holds the steering column dash seal in place.

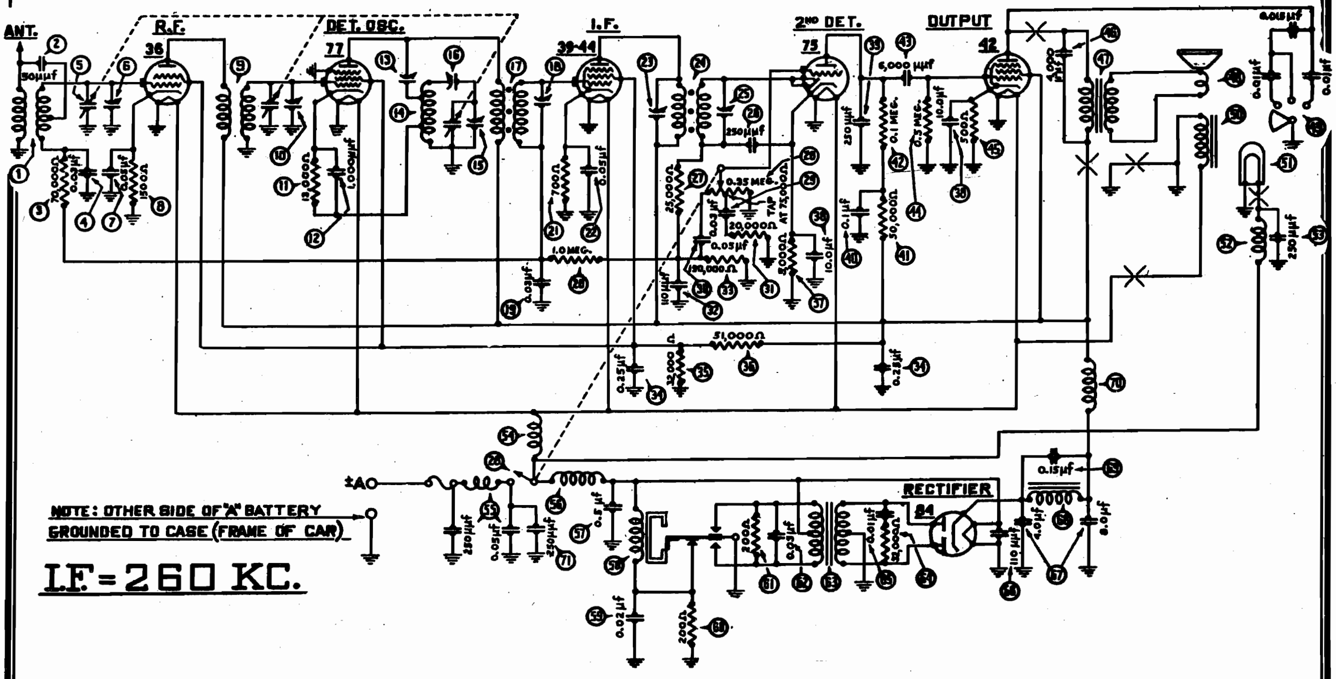
9. Ground the speedometer cable, oil line and temperature indicator tube where they enter the dash under one of the gromet cap screws with the No. 14 stranded wire provided. (See Figure 6).

10. Replace the car lighting fuse — test the lights and horn.

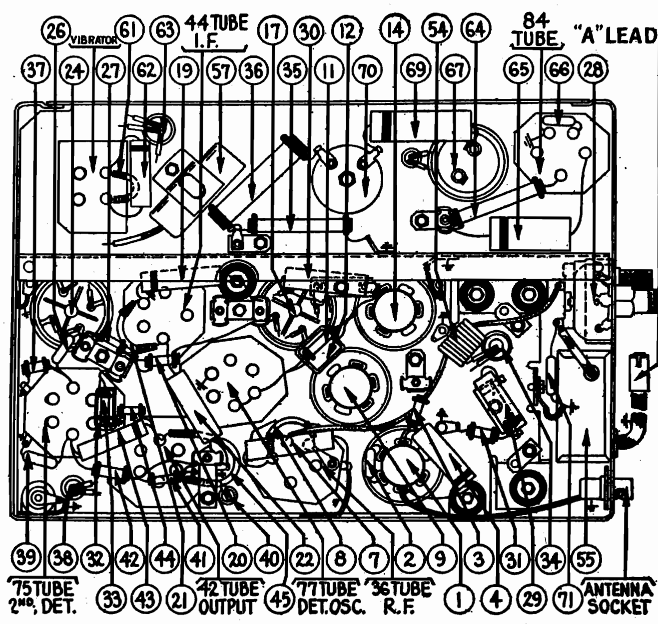
11. An additional ½ mfd. condenser may at times be used to advantage. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch directly behind the instrument panel.

Note: See auto index vol.II for various indexing of several cars for this page
2-13

MODEL CT-2 Chrysler
MODEL CT-5 DeSoto SG, **PHILCO RADIO & TELEV. CORP.**
Plymouth Code PJ SF
Dodge Code DU
Chrysler Code CZ,C-6
Schematic,Chassis,Parts



Parts List - CT-2 Chrysler De Luxe Custom Built Radio



1. Antenna Transformer.....32-1535
2. Condenser (50 mmfd.).....30-1029
3. Resistor (70,000 ohms)....33-1115
4. Condenser (.03 mfd.)......30-4025
5. Tuning Condenser........31-1425
6. 1st Padder (on tun. cond.)........
7. Condenser (.05 mfd.)......30-4020
8. Resistor (1500 ohms)......33-3047
9. R. F. Transformer........32-1536
10. 2nd Padder (on tun. cond.).......
11. Resistor (11,000 ohms)....33-1194
12. Condenser (1000 mmfd.)..30-1007
13. Padder (Pri. 1st I. F. Tran.).......
14. Oscillator Transformer....32-1537
15. 3rd Padder (on tun. cond.)........
16. 4th Padder (on tun. cond.)........
17. First I. F. Transformer....32-1538
18. Padder (Sec. 1st I. F. Tran.).......
19. Condenser (.03 mfd.).....30-4025
20. Resistor (1 meg.).........33-1096
21. Resistor (700 ohms)...... 6443
22. Condenser (.05 mfd.).....30-4020
23. Padder (Pri. 2nd I. F. Tran.)......
24. Second I. F. Transformer..32-1449
25. Padder (Sec. 2nd I. F. Tran.)......
26. Condenser (250 mmfd.)...30-1032
27. Resistor (25,000 ohms)....33-1161
28. Vol. Con. & Switch Assm...33-5088
29. Condenser (.03 mfd.).....30-4025
30. Condenser (.05 mfd.).....30-4020
31. Resistor (20,000 ohms)....33-1130
32. Condenser (110 mmfd.)...30-1031
33. Resistor (190,000 ohms)...33-1116
34. Condenser (.25-.25 mfd.)..30-4231
35. Resistor (32,000 ohms).... 3525
36. Resistor (51,000 ohms).... 5868
37. Resistor (5,000 ohms)..... 6096
38. Condenser (10-10 mfd.)...30-2076
39. Condenser (250 mmfd.)...30-1032
40. Condenser (.1 mfd.)......30-4170
41. Resistor (50,000 ohms).... 6098
42. Resistor (.1 meg.)........ 6099
43. Condenser (6000 mmfd.)..30-4125
44. Resistor (.5 meg.)........ 6097
45. Resistor (500 ohms)......33-3031
46. Condenser (4000 mmfd.)..30-4185
47. Output Transformer...... 2598
48. Cone & Voice Coil........36-3159
49. *Tone Control............30-4138
50. Field Coil Assembly...... 02795
51. Pilot Lamp..............34-2036
52. Choke...................32-1374
53. Condenser (250 mmfd.)...30-1032
54. "A" Choke...............32-1374
55. Interference Filter........32-1534
56. Vibrator Choke..........32-1563
57. Condenser (.5 mfd.)......30-4015
58. Vibrator................38-5036
59. Condenser (.02 mfd.).....30-4039
60. Resistor (200 ohms)...... 7217
61. Resistor (200 ohms)...... 7217
62. Condenser (.03 mfd.)......30-4025
63. Power Transformer.......32-7315
64. Resistor (32,000 ohms).... 3525
65. Condenser (.01 mfd.)......30-4051
66. Condenser (110 mmfd.)...30-1031
67. Filter Cond. (4-8 mfd.)...30-2107
68. "B" Choke...............32-7254
69. Condenser (.15 mfd.)......30-4191
70. R. F. Choke..............32-1530
71. Condenser (250 mmfd.)...30-1032

*Ground Clip.............28-2488
Spark Plug Resistor......33-1015
Distributor Resistor......33-1113
Interference Cond. (1 mfd.) 4522
Interference Cond. (½ mfd.)30-4007
*"T" Bolt (Set Mtg.)......28-6161
*Nut (Set Mtg.).......... W518
Fuse.................... 7227
Fuse Insulator...........27-7729
*Antenna Lead...........38-6355
*"A" Lead...............38-6551
*"U" Clamp (Control Mtg.)29-1705
*Nut (Control Mtg.)...... W317A
Glass....................27-7325
*Face Assembly (Chrysler).28-2500
*Face Assembly (Plymouth)28-2498
*Face Assembly (Dodge)...28-2496
*Face Assembly (DeSoto)..28-2497
*Pointer (Chrysler)........28-2503
*Pointer (Plymouth).......28-2505
*Pointer (Dodge).........28-2506
*Pointer (DeSoto).........28-2504
*Knob (Chrysler).........27-4163
*Knob (Plymouth Economy)27-4156
*Knob (Plymouth DeLuxe).27-4159
*Knob (Dodge)...........27-4155
*Knob (DeSoto)..........27-4153
*Flex. Shaft (Tun.) (Dodge).28-8319
*Flex. Shaft (Vol.) (Dodge).28-8320
*Flex. Shaft (Tun.) (Plym., DeSoto, Chrysler)......28-8317
*Flex. Shaft (Vol.) (Plym., DeSoto, Chrysler)......28-8318

Installation Instructions - Chrysler Airflow Models - Codes C-1, C-2 and C-3

THESE INSTRUCTIONS have been prepared for your use in installing the DeLuxe Custom-Built Radio. Read through thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists so that you may become familiar with all the parts and thereby make the installation easily and quickly.

This new DeLuxe Custom-Built Radio is mounted on a special bracket under the cowl on the left-hand side. The speaker is mounted on the "H" shaped instrument board to dash brace.

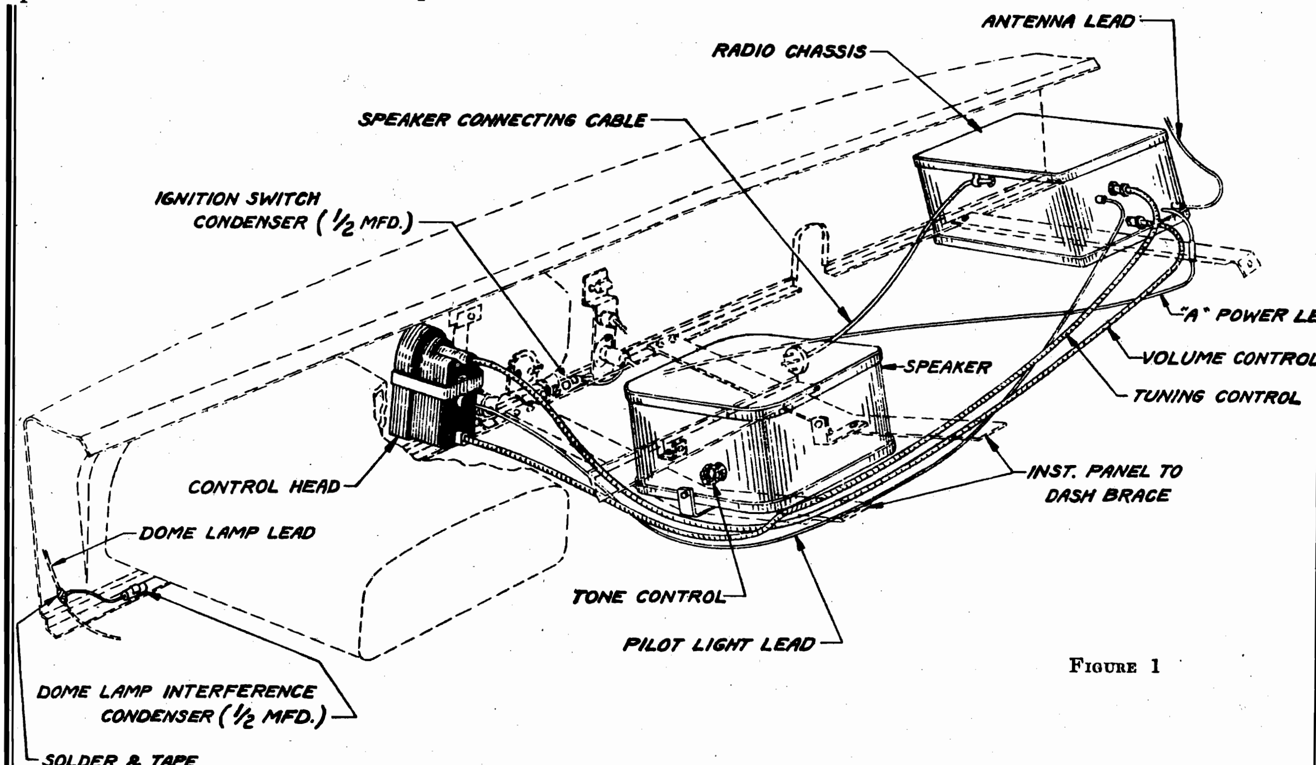


FIGURE 1

Antenna Lead

The shielded antenna lead must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post. The shield pig-tail of the antenna lead must be grounded.

ReceiverInstallation

(See Figure 1)

1. Remove the car lighting fuse from the back of the ammeter.

2. Bolt the Receiver fast to the special set-mounting bracket so that when installed in the car, the control coupling end of the Receiver faces the dash of the car. The bracket, together with the nuts and lockwashers are provided in the accessory kits.

3. Drill a 1/4" hole in the flange of the instrument board 6⅝" to the left of the steering column opening in the instrument board.

4. Rest the flat part of the Receiver mounting bracket on the flange of the instrument board over the hole just drilled and place the 3/4" 10-32 bolt through the hole in the flange of the instrument panel and the Receiver mounting bracket. Put on the nut but do not tighten at this time.

FOR CHRYSLER AIRFLOW MODELS
CODE C-2 and C-3 ONLY

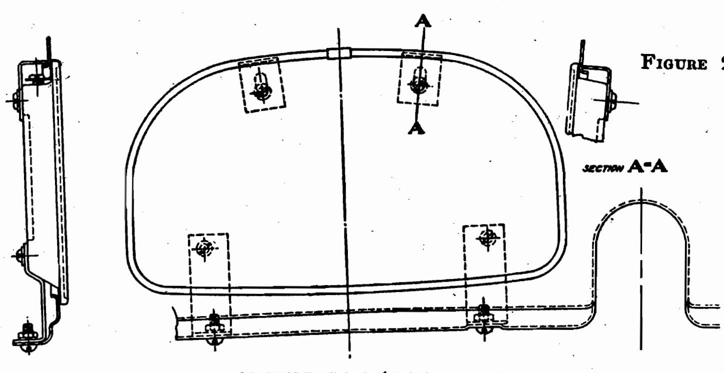


FIGURE 2

Remove the left hand glove compartment, door, hinge and fastener. Replace the glove compartment door and fasten with the four special adapter brackets. See Figure 2.

MODEL CT-5 DeLuxe Chrysler Airflow, Installation Data

PHILCO RADIO & TELEV. CORP.

Installation Instructions — Chrysler Airflow Models — Codes C-1, C-2 and C-3

5. Raise the Receiver as high as the switch lock-to-coil cable permits and mark the location for the bolt hole on the dash.

6. Drill a $\frac{3}{8}$" hole through the dash.

7. Using the $1\frac{3}{4}$" bolt and nut, fasten the mounting bracket securely to the dash. The nut must be on the engine side.

8. Tighten the bolt that fastens the mounting bracket to the instrument board.

Speaker Installation

(See Figures 1, 3 and 5)

1. Refer to Figure 3 which shows the location of the holes in the reinforcing brace on which the speaker is to be mounted.

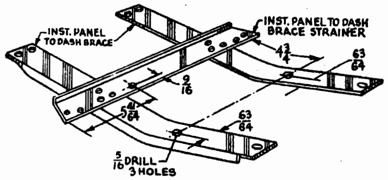
2. The speaker mounting brackets must be bolted to the sides of the speaker before it is installed in the car.

3. Place the speaker on the work bench, face down with the tone control knob to the right. The small angle bracket with the cage nut must be bolted to the side nearest you. The longest angle bracket must be bolted to the left side of the speaker with the part having the elongated hole directed away from the speaker. The third bracket must be bolted to the right-hand side of the speaker with the caged nut turned under the speaker.

4. Loosen the bolt on the right hand bracket at the dash to which is attached the instrument board reinforcing brace. Slip the "U" shim (furnished in the accessory kit) between the bracket and the brace and then tighten the bolt. (See Figure 5).

5. Place the speaker on the instrument board brace face down with the tone control to the right and securely fasten with the three $\frac{1}{4}$" No. 20 bolts, nuts and lockwashers.

6. The Receiver connecting cable must be plugged into its receptacle in the speaker.



Control Installation

1. Install the control unit on the instrument board, fitting it in the opening left by the removal of the ash receptacle.

2. Fasten the control head in place by means of the "U" clamp and nuts. (See Figure 6).

3. The volume control flexible shaft is at the top and must be coupled in the lower shaft bushing on the end of the Receiver housing (see Figure 1). The knurled shaft nut must be tightened securely.

4. Before connecting the tuning condenser flexible shaft, use a small screw-driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.

5. Turn the bottom (tuning control) knob so that the indicator points to "54" on the dial.

6. The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure 1). The knurled shaft nut must be tightened securely.

7. Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 1).

8. Connect the antenna lead to its receptacle on the end of the Receiver housing (see Figure 1).

Power Connections

For installations in Code C-1 cars, connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 4 showing the back of the ignition switch.

CODE C-2 and C-3 ONLY

In Code C-2 and C-3 cars, connect the terminal end of the "A" lead to the fuse terminal of the ammeter.

Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead.

Code C-1 — Ignition Switch

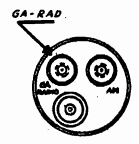


Figure 4

REAR VIEW OF IGNITION SWITCH

Motor Interference Suppression

1. Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Snap the resistors on the plug terminals.

2. Screw the straight molded resistor on the distributor end of the distributor center lead cable.

3. Plug this into the distributor cap.

4. Install a one mfd. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay.

5. Connect a $\frac{1}{2}$ mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped. Drill a $\frac{1}{4}$" hole in the flange of the instrument board 2" from where it joins the cowl on the right side. Remove the paint from around the hole and fasten the condenser to the flange with an 8-32 bolt and nut.

6. Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8—$\frac{1}{4}$" self-tapping screw. Scrape the paint off around this hole. Using the bare stranded wire with the two eye terminals, place one terminal under one of the screws that holds the steering column dash seal in place. The other end must be fastened to the steering column with a No. 8—$\frac{1}{4}$" self-tapping screw.

7. If there is no hole in the steering column near the dash opening seal for a No. 8—$\frac{1}{4}$" self-tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire and ground this wire under one of the screws that holds the steering column dash seal in place.

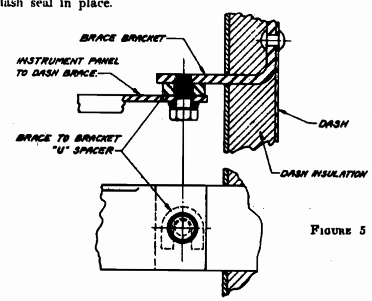


Figure 5

8. Ground the oil line and temperature indicator tube where they enter the dash under one of the gromet cap screws with the No. 14 stranded wire (see Figure 7).

9. Replace the car lighting fuse — test the lights and horn.

10. An additional $\frac{1}{2}$ mfd. condenser may be used to advantage at times. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch behind the instrument board.

CODE C-2 and C-3 ONLY

11. In case there is any motor interference in Code C-2 or C-3 cars, caused by an excessive gap between the distributor rotor and the high tension contacts in the distributor head, this can be overcome by extending the metal end of the rotor.

Follow this procedure carefully: Remove the distributor cap and chalk the inside faces of the stationary contacts. Remove the rotor and place the contact end on a small anvil or steel block. Peen or hammer the end carefully with a small machinists' hammer. Replace the rotor and the cap and then turn the motor over with the ignition turned off.

After a few revolutions, examine the distributor cap to see if the rotor has scraped or touched any of the stationary contacts in the cap. If so, dress lightly with a fine file.

Ignition Switch

CODE C-1 ONLY

When the ignition switch key is in its center position all circuits are disconnected and locked.

When the switch key is turned to the left, the gas gauge registers and the battery supply is connected to the radio.

When the key is turned to the right, the gas gauge registers and the battery supply is connected to the ignition circuit and to the radio.

Operating Instructions

To operate the Receiver, the ignition switch key must first be turned either to the right or to the left, as described above. The upper knob on the radio control is a combination switch and volume control. Turn the volume control knob clockwise. The first range of motion operates the Receiver switch. From there on, it is the manual volume control.

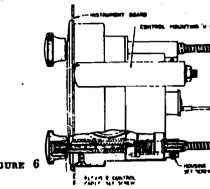


Figure 6

With the volume control turned on half way, allow the tubes to heat up. Then turn the lower knob (the station selector) to tune in the various programs. The numbers on the dial represent channel numbers which, with the addition of "0" to the number, correspond to the frequencies in kilocycles. Adjust the volume to a suitable level and recheck the tuning. The Receiver must be tuned so that the maximum signal is obtained. Since the Receiver is extremely selective, it is of the utmost importance that the Receiver be tuned right on the station. Careless tuning off to one side, even though the signal is still heard, results in very poor tone quality and very mushy reception.

The tone control knob is on the right hand side of the speaker housing (see Figure 1). It should be adjusted to the tone most pleasing. There are four (4) positions: brilliant, bright, mellow and deep. Speech is clearest when in bright or brilliant, while usually orchestras will sound best on bright or mellow.

Another use of the tone control is as a static modifier. When driving through extremely noisy locations, the tone control should be set on mellow or deep. This will subdue the harsh, rasping static.

Except on very weak signals, the automatic volume control maintains the same volume level while driving along without continually manipulating the manual volume control, cuts out external interferences, counteracts fading and prevents blasting of local stations while tuning. It is virtually impossible, however, to maintain satisfactory reception while driving under bridges or in places which are totally shielded, known as dead spots.

IMPORTANT—When turning off the Receiver, be sure the volume control is turned counter-clockwise until a click is heard and the dial light goes out, otherwise the Receiver will continue to operate and discharge the battery.

REMOVE PAINT FROM UNDER SCREW HEAD

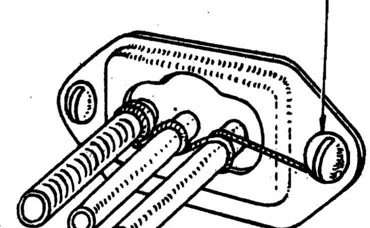


Figure 7

Items 1 to 72 of the Parts List for PT-5 Packard DeLuxe Custom Built Model 120 are identical for the CT-5 DeLuxe Custom Built Radio for Chrysler Airflow, Codes C-1, C-2 and C-3.

See the items listed below, for additional accessories.

*Ground Clip	28-2488	*Glove Box Door Brkt. (Upper)	29-2821	*Knob	27-4161
Spark Plug Resistor	33-1015	*Glove Box Door Brkt. (Lower R. H.)	29-2822	*Flex. Shaft (Tun.)	28-8324
Distributor Resistor	33-1113	*Glove Box Door Brkt. (Lower L. H.)	29-2823	*Flex. Shaft (Vol.)	28-8325
Interference Cond (1 mfd.)	4522	*Bolt (Set Mtg. Front)	W1441B	*Speaker Cable	41-3126
Interference Cond. ($\frac{1}{2}$ mfd.)	30-4007	*Bolt (Set Mtg. Rear)	W1853B	*Speaker Mtg. Brkt. (R.H.)	30-3428
Fuse	7227	*Nut (Set Mtg. Front)	W98B	*Speaker Mtg. Brkt. (L.H.)	29-2567
Fuse Insulator	27-7131	*Nut (Set Mtg. Rear)	W317B	*Speaker Mtg. Brkt. (Rear)	30-3429
*Antenna Lead	38-6355	*Scale Assembly	42-5203	*Screw (Speaker Mtg.)	W99B
*"A" Lead	38-6352			*Screw (Speaker Mtg.)	W285B
*"U" Clamp (Control Mtg.)	20-1808			*Nut (Speaker Mtg.)	W98B
*Nut (Control Mtg.)	W98A				

Installation Instructions - DeSoto Airflow Model - Code SG

These instructions have been prepared for your use in installing the DeLuxe Custom-Built Radio. Read through thoroughly, then follow the instructions carefully in every detail when making the installation.

Carefully unpack the cartons and check the contents with the material packing lists so that you may become familiar with all the parts and thereby make the installation easily and quickly.

This new DeLuxe Custom-Built Radio is mounted on a special bracket under the cowl on the left-hand side. The speaker is mounted on the "H" shaped instrument board to dash brace.

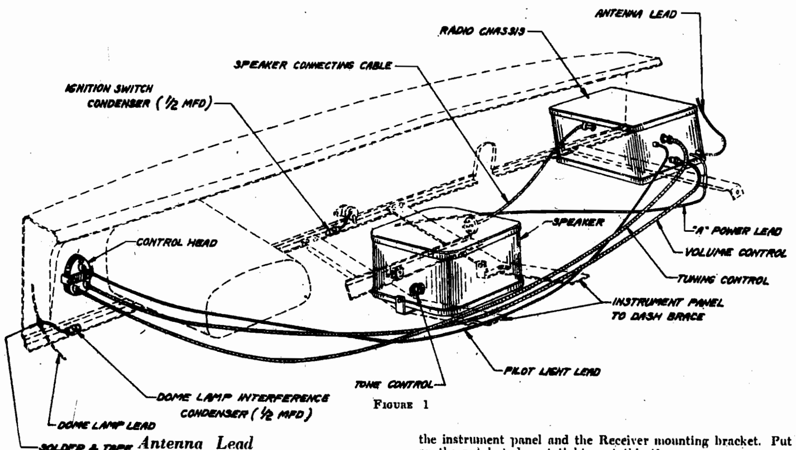


Figure 1

Antenna Lead

The shielded antenna lead must be connected to the car antenna lead-in that comes down the front left-hand corner post. The bare ends of the two leads must be twisted together and taped. Make the splice as close as possible to the corner post. The shield pig-tail of the antenna lead must be grounded.

Receiver Installation

(See Figure 1)

1. Remove the car lighting fuse from the back of the ammeter.

2. Bolt the Receiver fast to the special set-mounting bracket so that when installed in the car, the control coupling end of the Receiver faces the dash of the car. The bracket, together with the nuts and lockwashers are provided in the accessory kits.

3. Drill a ¼" hole in the flange of the instrument board 6⅝" to the left of the steering column opening in the instrument board.

4. Rest the flat part of the Receiver mounting bracket on the flange of the instrument board over the hole just drilled and place the ¾" 10-32 bolt through the hole in the flange of the instrument panel and the Receiver mounting bracket. Put on the nut but do not tighten at this time.

5. Raise the Receiver as high as the switch lock-to-coil cable permits and mark the location for the bolt hole on the dash.

6. Drill a ⁵⁄₁₆" hole through the dash.

7. Using the 1¾" bolt and nut, fasten the mounting bracket securely to the dash. The nut must be on the engine side.

8. Tighten the bolt that fastens the mounting bracket to the instrument board.

Speaker Installation

(See Figures 1, 2 and 3)

1. Refer to Figure 2 which shows the location of the holes in the reinforcing brace on which the speaker is to be mounted.

2. The speaker mounting brackets must be bolted to the sides of the speaker before it is installed in the car.

3. Place the speaker on the work bench, face down with the tone control knob to the right. The small angle bracket with the cage nut must be bolted to the side nearest you. The longest angle bracket must be bolted to the left side of the speaker with the part having the elongated hole directed away from the speaker. The third bracket must be bolted to the right-hand side of the speaker with the caged nut turned under the speaker.

4. Loosen the bolt on the right-hand bracket at the dash to which is attached the instrument board reinforcing brace. Slip the "U" shim (furnished in the accessory kit) between the bracket and the brace and then tighten the bolt. (See Figure 3).

5. Place the speaker on the instrument board brace face down with the tone control to the right and securely fasten with the three (3) ¼" No. 20 bolts, nuts and lockwashers.

6. The Receiver connecting cable must be plugged into its receptacle in the speaker.

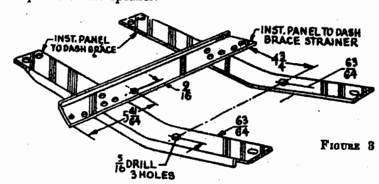


Figure 2

Figure 3

Control Installation

(See Figure 4)

1. Install the control unit on the instrument board, fitting it in the opening left by the removal of the ash receptacle.

2. Fasten the control head in place by means of the "U" clamp and nuts. (See Figure 4).

3. The volume control flexible shaft is on the left and must be coupled in the lower shaft bushing on the end of the Receiver housing (see Figure 1). The knurled shaft nut must be tightened securely.

4. Before connecting the tuning condenser flexible shaft, use a small screw driver and turn the variable condenser coupling in the Receiver in a counter-clockwise direction as far as it will go.

5. Turn the right-hand (tuning control) knob so that the pointer indicates "54" on the dial.

6. The tuning control flexible shaft must be coupled in the proper shaft bushing on the end of the Receiver housing (see Figure1). The knurled shaft nut must be tightened securely.

7. Connect the terminal on the pilot light wire to its receptacle on the end of the Receiver housing (see Figure 1).

8. Connect the antenna lead to its receptacle on the end of the Receiver housing (see Figure 1).

Power Connections

(See Figure 5)

1. Connect the terminal end of the "A" lead to the switch terminal GA-RAD. Refer to Figure 5 showing the back of the ignition switch.

2. Place the fuse and fuse insulator in the small metal fuse housing on the end of the "A" lead and connect it to the short Receiver "A" lead.

Motor Interference Suppression

1. Cut the elbow terminals from the spark plug cables and screw on the molded bakelite elbow suppressor terminals. Snap the resistors on the plug terminals.

2. Screw the straight molded resistor on the distributor end of the distributor center lead cable.

3. Plug this into the distributor cap.

4. Install a one mfd. by-pass condenser on the generator. Mount it on the generator frame under the screw that holds the generator relay in place. Connect the condenser lead under the screw that connects the battery lead to the relay.

5. Connect a ½ mfd. condenser to the dome light lead as close as possible to the point where it enters the right front corner post. This connection must be soldered and taped. Drill a ⅛" hole in the flange of the instrument board 2" from where it joins the cowl on the right side. Remove the paint from around the hole and fasten the condenser to the flange with an 8-32 bolt and nut.

6. Ground the steering column to the dash. There is a hole in the steering column near the dash opening seal for a No. 8—¼" self-tapping screw. Scrape the paint off around this hole. Using the bare stranded wire with the two-eye terminals, place one terminal under one of the screws that holds the steering column dash seal in place. The other end must be fastened to the steering column with a No. 8—¼" self-tapping screw.

7. If there is no hole in the steering column near the dash opening seal for a No. 8—¼" self-tapping screw, scrape the paint from the column near the dash opening seal, solder on a piece of the No. 14 bare stranded wire and ground this wire under one of the screws that holds the steering column dash seal in place.

8. Ground the oil line and temperature indicator tube where they enter the dash under one of the gromet cap screws with the No. 14 stranded wire (see Figure 6).

9. Replace the car lighting fuse — test the lights and horn.

10. An additional ½ mfd. condenser may be used to advantage at times. Mount this condenser on the bottom ledge of the instrument board and connect it to one of the terminals of the ammeter or ignition switch behind the instrument board.

Ignition Switch

When the ignition switch key is in its center position all circuits are disconnected and locked.

When the switch key is turned to the left, the gas gauge registers and the battery supply is connected to the radio.

When the key is turned to the right, the gas gauge registers and the battery supply is connected to the ignition circuit and to the radio.

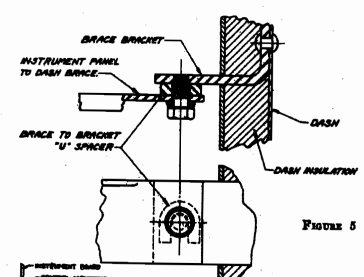


Figure 5

Figure 8

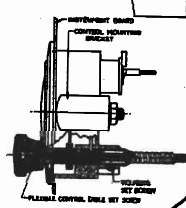


Figure 4

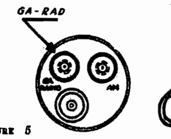


Figure 5

REAR VIEW OF IGNITION SWITCH

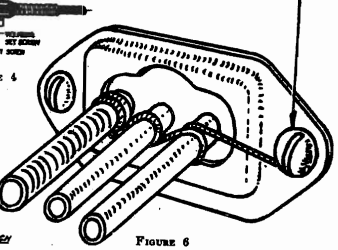


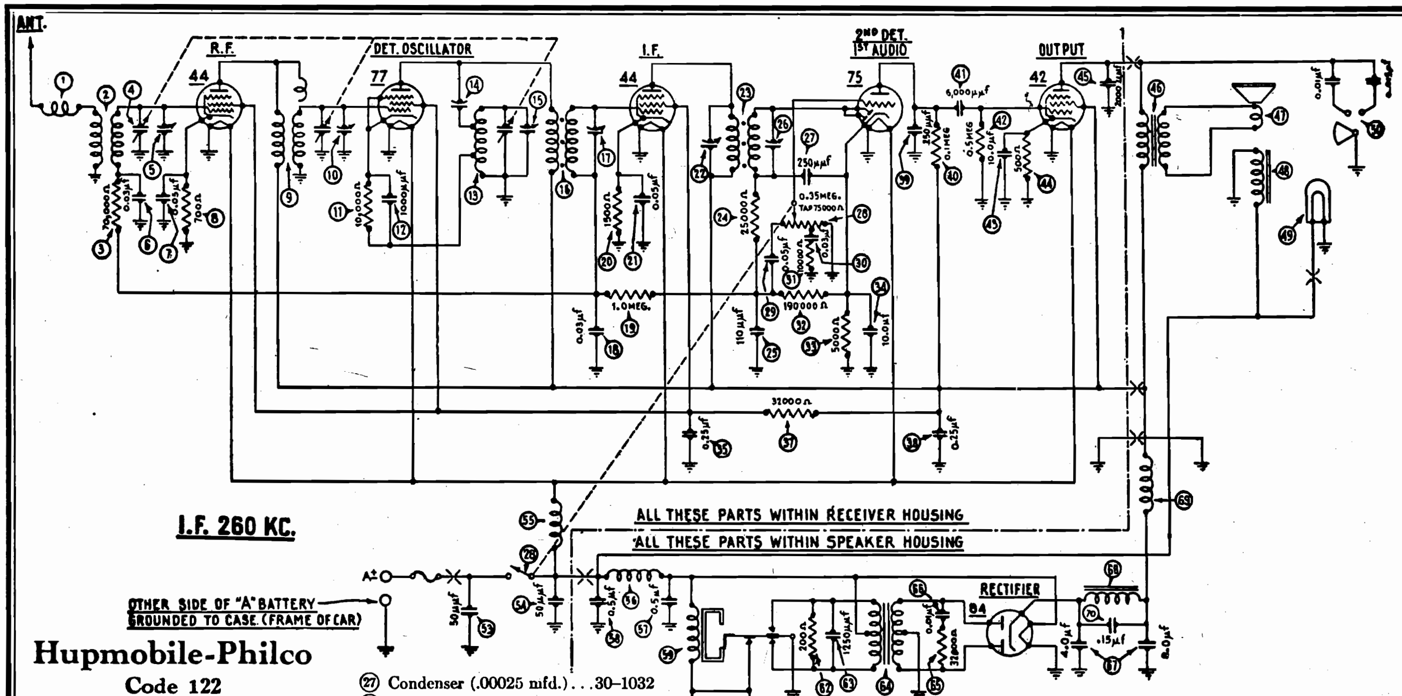
Figure 6

Items 1 to 71 of the Parts List for CT-2 Chrysler DeLuxe Custom Built Set are identical for DeSoto Airflow Code SG, Model CT-5. See the items on the right for additional accessories.

*Ground Clip	28-2488	*"U" Clamp (Control Mtg.)	29-1712	*Knob (DeSoto)	27-4167
Spark Plug Resistor	33-1015	*Nut (Control Mtg.)	W895A	*Flex. Shaft (Tun.) (DeSoto)	28-8322
Distributor Resistor	33-1113	*Bolt (Set Mtg. Front)	W1441B	*Flex. Shaft (Vol.) (DeSoto)	28-8323
Interference Cond. (1 mfd.)	4522	*Bolt (Set Mtg. Rear)	W1353B	*Speaker Cable	41-3126
Interference Cond. (½ mfd.)	30-4007	*Nut (Set Mtg. Front)	W98B	*Speaker Mtg. Brkt. (R. H.)	36-3428
Fuse	7227	*Nut (Set Mtg. Rear)	W317B	*Speaker Mtg. Brkt. (L. H.)	29-2587
Fuse Insulator	27-7131	Glass	27-7325	*Speaker Mtg. Brkt. (Rear)	36-3429
*Antenna Lead	38-6355	*Face Assembly (DeSoto)	28-2549	*Screw (Speaker Mtg.)	W99B
*"A" Lead	38-6552	*Pointer (DeSoto)	28-2504	*Screw (Speaker Mtg.)	W285B

MODEL G (Code 122) Hup
For J,T & W Cars
Schematic,Chassis,Parts

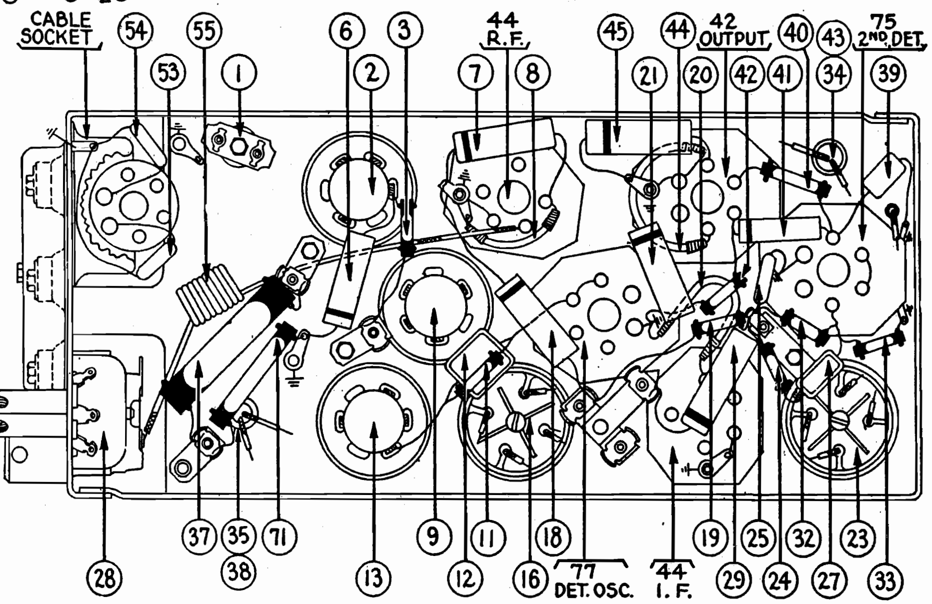
PHILCO RADIO & TELEV. CORP.



Hupmobile-Philco
Code 122
Model G Parts List

1. Antenna Choke............32-1372
2. Antenna Transformer......32-1331
3. Resistor (70,000 ohms).....33-1115
4. Tuning Condenser.........31-1214
5. First Padder (on Tun. Cond.)......
6. Condenser (.03 mfd.)......30-4025
7. Condenser (.05 mfd.)......30-4020
8. Resistor (700 ohms)........ 6443
9. R. F. Transformer..........32-1332
10. Second Padder (on Tun. Cond.).....
11. Resistor (10,000 ohms).....33-1000
12. Condenser (1000 mmfd.)...33-1007
13. Oscillator Transformer.....32-1333
14. Padder (Pri. 1st I. F. Trans.).......
15. Third Padder (on Tun. Cond.).......
16. First I. F. Transformer....32-1329
17. Padder (Sec. 2nd I. F. Trans.)......
18. Condenser (.03 mfd.)......30-4025
19. Resistor (1,000,000 ohms)..33-1096
20. Resistor (2000 ohms)......33-3048
21. Condenser (.05 mfd.)......30-4020
22. Padder (Pri. 2nd I. F. Trans.)......
23. Second I. F. Transformer...32-1237
24. Resistor (25,000 ohms).....33-1013
25. Condenser (.00011 mfd.)...30-1031
26. Padder (Sec. 2nd I. F. Trans.)....
27. Condenser (.00025 mfd.)...30-1032
28. Volume Control and Switch Assembly..............33-5067
29. Condenser (.05 mfd.)......30-4020
30. Condenser (.03 mfd.)......30-4025
31. Resistor (10,000 ohms).....33-1000
32. Resistor (190,000 ohms)....33-1116
33. Resistor (5000 ohms)...... 6096
34. Condenser (10 mfd.).......30-2076
35. Condenser (.25 mfd.)......30-4126
37. Resistor (32,000 ohms)..... 3525
38. Condenser (.25 mfd.)......30-4126
39. Condenser (.00025 mfd.)...30-1032
40. Resistor (100,000 ohms).... 6099
41. Condenser (.006 mfd.).....30-4125
42. Resistor (500,000 ohms)..... 6097
43. Condenser (10 mfd.).......30-2076
44. Resistor (500 ohms).......33-3031
45. Condenser (.004 mfd.).....30-4185
46. Output Transformer.......32-7042
47. Cone and Voice Coil.......36-3157
48. Field Coil Assembly.......36-3097
49. Pilot Lamp...............34-2031
50. Tone Control.............30-4189
53. Condenser (.00005 mfd.)...30-1029
54. Condenser (.00005 mfd.)...30-1029
55. "A" Choke..............32-1432
56. Vibrator Choke..........32-1260
57. Condenser (.5 mfd.).......30-4047
58. Condenser (.5 mfd.).......30-4015
59. Vibrator.................38-5036
60. Condenser (.02 mfd.)......30-4039
61. Resistor (200 ohms)....... 7217
62. Resistor (200 ohms)....... 7217
63. Condenser (.00125 mfd.)... 5886
64. Power Transformer........32-7253
65. Resistor (32,000 ohms)..... 3525
66. Condenser (.01 mfd.)......30-4051
67. Filter Condenser (4-8 mfd.).30-2030
68. Filter Choke.............32-7254
69. R. F. Choke..............32-1260
70. Condenser (.15 mfd.)......30-4191
71. Resistor (25,000 ohms)..... 3656

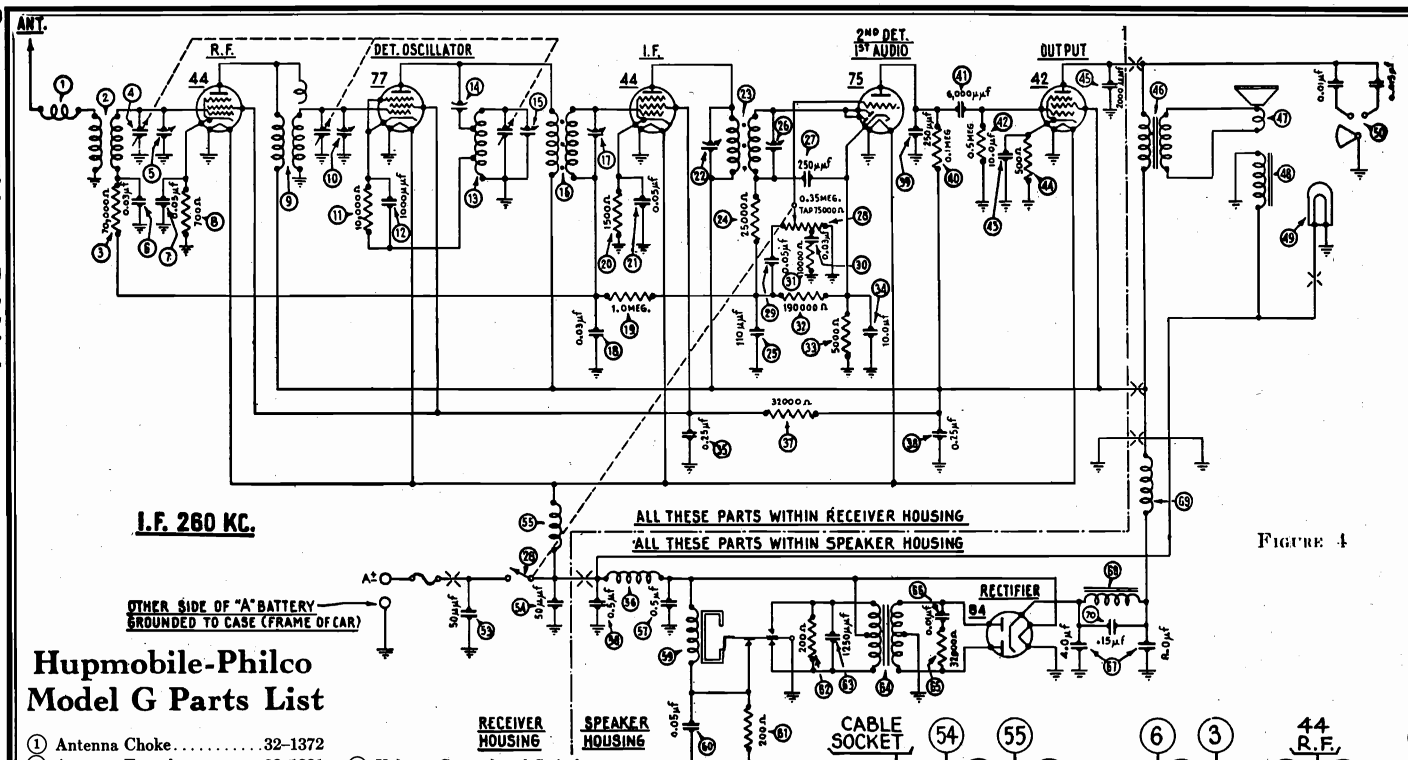
Glass for Control..........27-7325
Face Assembly............42-5208
Pointer..................28-1793
Knobs...................27-4091
Interconnecting Cable.....41-3087
Ammeter Cable...........38-5833
Flexible Shaft—Tuning....28-8226
Flexible Shaft—Volume....28-8227
Receiver Mounting Plate...29-1792
Receiver Mounting Bracket.29-1848
Carriage Bolt...........W-1316A
Fuse.................... 7227
Fuse Insulator............27-7131
Stud (Speaker Mtg.)....... 6122
Screw (Speaker Mtg.)....W-1312A
Spark Plug Resistor.......33-1015
Distributor Resistor..........4851
Interference Condenser....30-4007



Note 1. Adjust the High Frequency padders (15) at 1600 K. C.
Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

MODEL G, Hupmobile For J, T, & W Cars Schematic, Chassis Parts List

PHILCO RADIO & TELEV. CORP.



I.F. 260 KC.

OTHER SIDE OF "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)

ALL THESE PARTS WITHIN RECEIVER HOUSING

ALL THESE PARTS WITHIN SPEAKER HOUSING

FIGURE 4

Hupmobile-Philco Model G Parts List

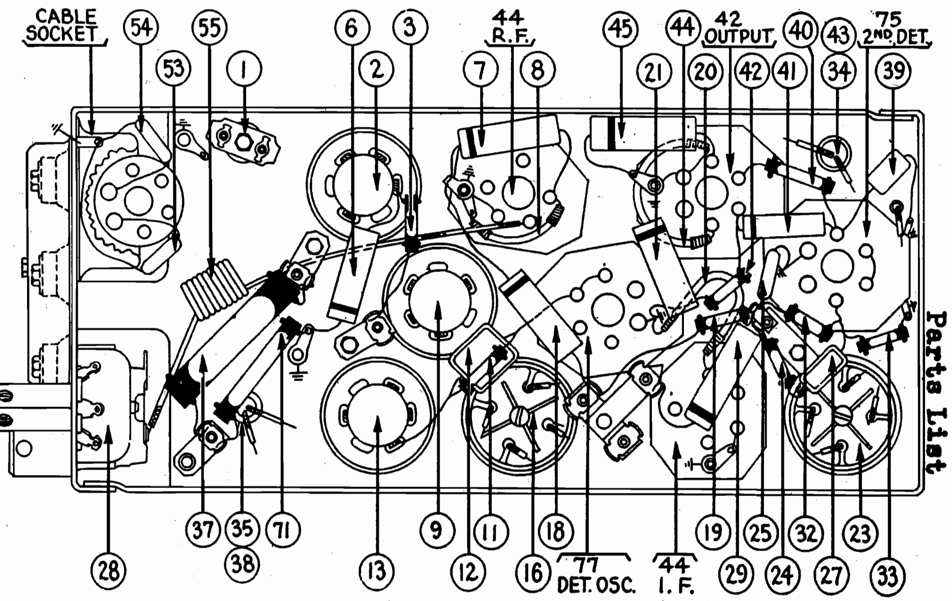
RECEIVER HOUSING

1. Antenna Choke...........32-1372
2. Antenna Transformer......32-1331
3. Resistor (70,000 ohms).....33-1115
4. Tuning Condenser.........31-1214
5. First Padder (on Tun. Cond.)......
6. Condenser (.03 mfd.)......30-4025
7. Condenser (.05 mfd.)......30-4020
8. Resistor (700 ohms)....... 6443
9. R. F. Transformer.........32-1332
10. Second Padder (on Tun. Cond.).....
11. Resistor (10,000 ohms).....33-1000
12. Condenser (1000 mmfd.)...33-1007
13. Oscillator Transformer.....32-1333
14. Padder (Pri. 1st I. F. Trans.).......
15. Third Padder (on Tun. Cond.)......
16. First I. F. Transformer.....32-1329
17. Padder (Sec. 2nd I. F. Trans.)......
18. Condenser (.03 mfd.)......30-4025
19. Resistor (1,000,000 ohms)..33-1096
20. Resistor (1500 ohms)......33-3047
21. Condenser (.05 mfd.)......30-4020
22. Padder (Pri. 2nd I. F. Trans.)......
23. Second I. F. Transformer...32-1237
24. Resistor (25,000 ohms).....33-1013
25. Condenser (.00011 mfd.)...30-1031
26. Padder (Sec. 2nd I. F. Trans.)......
27. Condenser (.00025 mfd.)...30-1032
28. Volume Control and Switch Assembly.............33-5067
29. Condenser (.05 mfd.)......30-4020
30. Condenser (.03 mfd.)......30-4025
31. Resistor (10,000 ohms).....33-1000
32. Resistor (190,000 ohms)....33-1116
33. Resistor (5000 ohms)...... 6096
34. Condenser (10 mfd.).......30-2076
35. Condenser (.25 mfd.)......30-4126
37. Resistor (32,000 ohms)..... 3525
38. Condenser (.25 mfd.)......30-4126
39. Condenser (.00025 mfd.)...30-1032
40. Resistor (100,000 ohms).... 6099
41. Condenser (.006 mfd.).....30-4125
42. Resistor (500,000 ohms)..... 6097
43. Condenser (10 mfd.).......30-2076
44. Resistor (500 ohms)........33-3031
45. Condenser (.004 mfd.).....30-4185

SPEAKER HOUSING

46. Output Transformer.......32-7042
47. Cone and Voice Coil.......36-3157
48. Field Coil Assembly........36-3097
49. Pilot Lamp................34-2031
50. Tone Control.............30-4189
53. Condenser (.00005 mfd.)...30-1029
54. Condenser (.00005 mfd.)...30-1029
55. "A" Choke..............32-1432
56. Vibrator Choke...........32-1260
57. Condenser (.5 mfd.).......30-4047
58. Condenser (.5 mfd.).......30-4015
59. Vibrator.................38-5036
60. Condenser (.05 mfd.)......30-4039
61. Resistor (200 ohms)....... 7217
62. Resistor (200 ohms)....... 7217
63. Condenser (.00125 mfd.)... 5886
64. Power Transformer........32-7253
65. Resistor (32,000 ohms)..... 3525
66. Condenser (.01 mfd.)......30-4051
67. Filter Condenser (4-8 mfd.).30-2030
68. Filter Choke.............32-7254
69. R. F. Choke..............32-1260
70. Condenser (.15 mfd.)......30-4191
71. Resistor (25,000 ohms)..... 3656

Glass for Control..........27-7325
Face Assembly............42-5125
Pointer..................28-1793
Knobs...................27-4091
Interconnecting Cable......41-3087
Ammeter Cable...........38-5833
Flexible Shaft—Tuning....28-8226
Flexible Shaft—Volume....28-8227
Receiver Mounting Plate...29-1792
Receiver Mounting Bracket.29-1848
Carriage Bolt...........W-1316A
Fuse.................... 7227
Fuse Insulator...........27-7131
Stud (Speaker Mtg.)....... 6122
Screw (Speaker Mtg.)....W-1312A

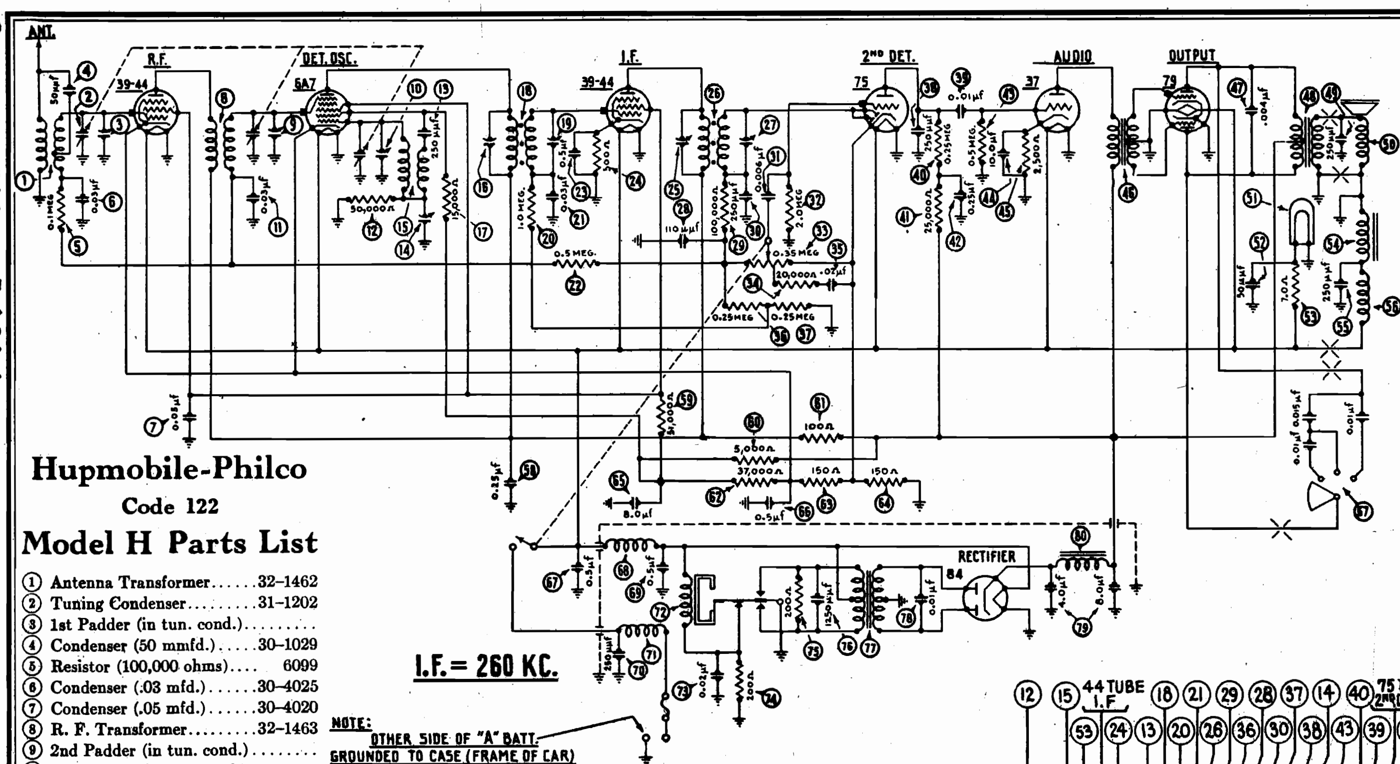


Note 1. Adjust the High Frequency padders (15) at 1600 K. C.

Note 2. A 25,000 ohm resistor, part number 3656, (71) on the parts list and base view has been added to the Receiver. One end is connected to the screen grid lead for the R. F. Osc. and I. F. tubes and the other end is grounded.

MODEL H (Code 122)Hup
For J,T & W Cars
Schematic,Chassis, Parts

PHILCO RADIO & TELEV. CORP.



Acorn Nut	W821
Fuse	7227
Fuse Insulator	27-7131
Knob	27-4091
Glass	27-7325
Glass Gasket	27-7509
Pointer	28-1793
Shaft	28-8214
Face Assembly	42-5125
Speaker Cable	41-3113
Pilot Lamp Assembly	38-5889

Hupmobile-Philco

Code 122

Model H Parts List

1	Antenna Transformer	32-1462
2	Tuning Condenser	31-1202
3	1st Padder (in tun. cond.)	
4	Condenser (50 mmfd.)	30-1029
5	Resistor (100,000 ohms)	6099
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	R. F. Transformer	32-1463
9	2nd Padder (in tun. cond.)	
10	3rd Padder (in tun. cond.)	
11	Condenser (.03 mfd.)	30-4025
12	Resistor (50,000 ohms)	6098
13	Condenser (250 mmfd.)	3082
14	Padder	30-6012
15	Oscillator Transformer	32-1222
16	Padder (Pri. 1st I. F. Trans.)	
17	Resistor (15,000 ohms)	6208
18	First I. F. Transformer	32-1471
19	Padder (Sec. 1st I. F. Trans.)	
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.03 mfd.)	30-4025
22	Resistor (500,000 ohms)	6097
23	Condenser (.5 mfd.)	30-4058
24	Resistor (500 ohms)	6977
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-1449
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (110 mmfd.)	30-1031
29	Resistor (100,000 ohms)	6099
30	Condenser (250 mmfd.)	30-1032
31	Condenser (.006 mfd.)	30-4125
32	Resistor (2,000,000 ohms)	33-1025
33	Vol. Cont. & Sw. Assembly	38-5851
34	Resistor (20,000 ohms)	33-1130
35	Condenser (.02 mfd.)	30-4215
36	Resistor (250,000 ohms)	33-1097
37	Resistor (250,000 ohms)	33-1097
38	Condenser (250 mmfd.)	30-1032
39	Condenser (.01 mfd.)	30-4145
40	Resistor (250,000 ohms)	33-1097
41	Resistor (25,000 ohms)	33-1013
42	Condenser (.25 mfd.)	30-4135
43	Resistor (500,000 ohms)	6097
	ondenser (10 mfd.)	30-4135
45	Resistor (2500 ohms)	33-1100
46	Input Transformer	32-7206
47	Condenser (.004 mfd.)	30-4185
48	Output Transformer	32-7205
49	Condenser (250 mmfd.)	30-1032
50	Cone & Voice Coil	36-3159
51	Pilot Lamp	34-2040
52	Condenser (50 mmfd.)	30-1029
53	Resistor (7 ohms)	33-3130
54	Field Coil Assembly	02795
55	Condenser (250 mmfd.)	30-1032
56	Choke	32-1464
57	Tone Control	30-4208
58	Condenser (.25 mfd.)	30-4134
59	Resistor (51,000 ohms)	4237
60	Resistor (5000 ohms)	33-1070
61	Resistor (100 ohms)	33-3023
62	Resistor (37,000 ohms)	33-1098
63	Resistor (150 ohms)	33-3045
64	Resistor (150 ohms)	33-3045
65	Condenser (8 mfd.)	30-4135
66	Condenser (.5 mfd.)	30-4018
67	Condenser (.5 mfd.)	30-4015
68	Vibrator Choke	32-1474
69	Condenser (.5 mfd.)	30-4047
70	Condenser (250 mmfd.)	32-1466
71	"A" Choke	32-1466
72	Vibrator	38-5036
73	Condenser (.02 mfd.)	30-4039
74	Resistor (200 ohms)	7217
75	Resistor (200 ohms)	7217
76	Condenser (1250 mmfd.)	5886
77	Power Transformer	32-7098
78	Condenser (.01 mfd.)	30-4051
79	Filter Condenser (4-8 mfd.)	30-2015
80	"B" Choke	32-7104
	Interference Condenser	4522S
	Studs (Rec. Mtg.)	28-6036
	Nuts (mounting)	W55
	Battery Cable	38-5296
	Antenna Lead	38-5674

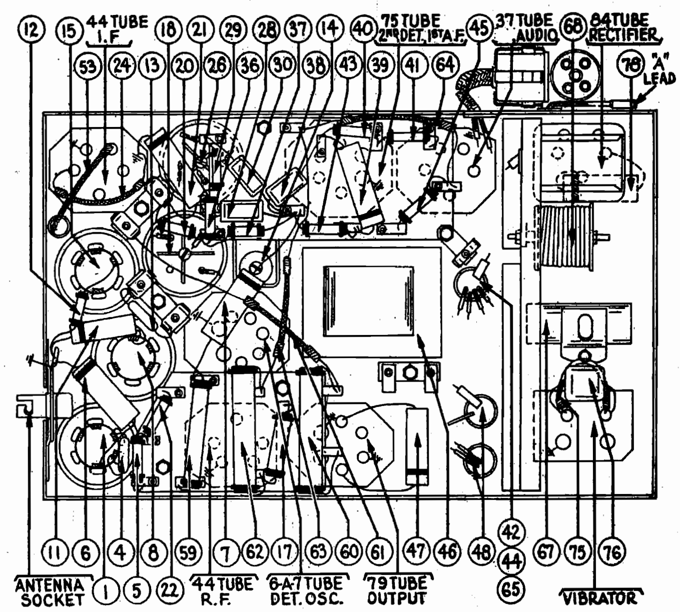
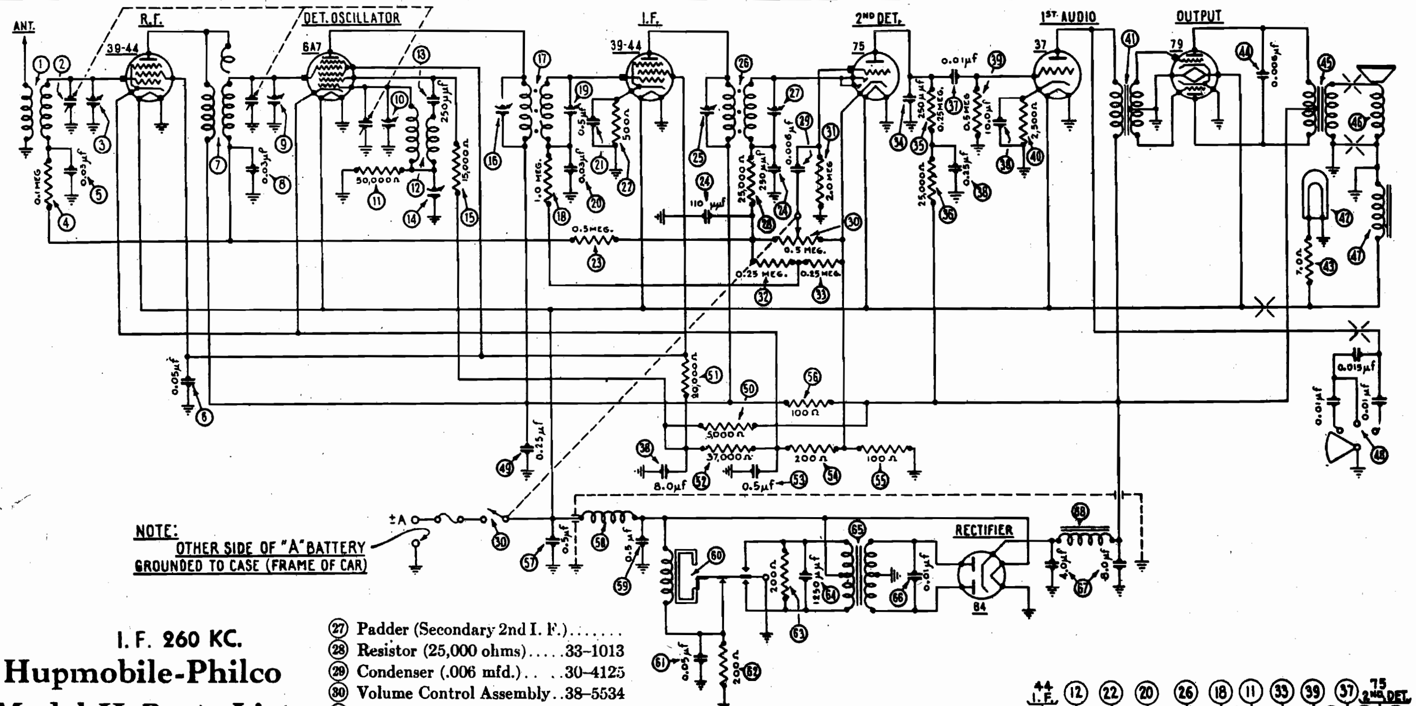
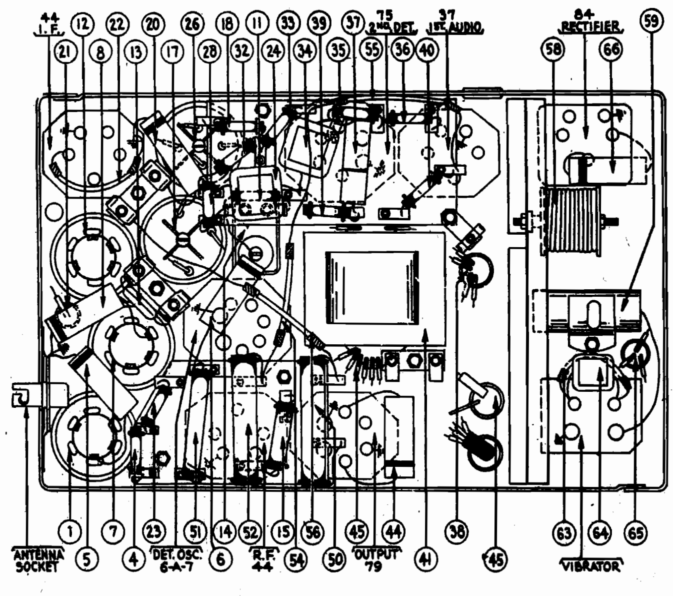


FIGURE 7

PHILCO RADIO & TELEV. CORP.

MODEL H, Hupmobile For J,T, & W Cars Schematic, Chassis Parts List





I. F. 260 KC.

Hupmobile-Philco Model H Parts List

1. Antenna Transformer......32-1220
2. Tuning Condenser.........31-1202
3. 1st Padder (in tun. cond.).........
4. Resistor (100,000 ohms).... 6099
5. Condenser (.03 mfd.)......30-4025
6. Condenser (.05 mfd.)......30-4020
7. R. F. Transformer.........32-1221
8. Condenser (.03 mfd.)......30-4025
9. 2nd Padder (in tun. cond.)........
10. 3rd Padder (in tun. cond.).........
11. Resistor (50,000 ohms)..... 6098
12. Oscillator Transformer.....32-1222
13. Condenser (.00025 mfd.)... 3082
14. Padder.................31-6012
15. Resistor (15,000 ohms)..... 6208
16. Padder (Primary 1st I. F.)........
17. First I. F. Transformer....32-1236
18. Resistor (1,000,000 ohms)..33-1096
19. Padder (Secondary 1st I. F.)......
20. Condenser (.03 mfd.)......30-4025
21. Condenser (.5 mfd.).......30-4058
22. Resistor (500 ohms)........ 6977
23. Resistor (500,000 ohms).... 6097
24. Condenser (.00011-.00025)..30-1020
25. Padder (Primary 2nd I. F.).......
26. Second I. F. Transformer...32-1237
27. Padder (Secondary 2nd I. F.).......
28. Resistor (25,000 ohms).....33-1013
29. Condenser (.006 mfd.).....30-4125
30. Volume Control Assembly..38-5534
31. Resistor (2,000,000 ohms)..33-1025
32. Resistor (250,000 ohms)....33-1097
33. Resistor (250,000 ohms)....33-1097
34. Condenser (.00025 mfd.)... 5858
35. Resistor (250,000 ohms)....33-1097
36. Resistor (25,000 ohms).....33-1013
37. Condenser (.01 mfd.)......30-4145
38. Condenser (.25-8-10 mfd.)..30-4135
39. Resistor (500,000 ohms).... 6097
40. Resistor (2500 ohms)......33-1100
41. Input Transformer........32-7206
42. Pilot Lamp.............. 6608
43. Resistor (7 ohms).........33-3130
44. Condenser (.006 mfd.).....30-4024
45. Output Transformer.......32-7205
46. Cone and Voice Coil.......36-3159
47. Field Coil Assembly.......36-3130
48. Tone Control.............30-4142
49. Condenser (.25 mfd.)......30-4134
50. Resistor (5,000 ohms).....33-1070
51. Resistor (20,000 ohms)..... 6649
52. Resistor (37,000 ohms).....33-1098
53. Condenser (.5 mfd.).......30-4018
54. Resistor (200 ohms)....... 7217
55. Resistor (100 ohms).......33-3023
56. Resistor (100 ohms).......33-3023
57. Condenser (.5 mfd.).......30-4015
58. Vibrator Choke...........32-1335
59. Condenser (.5 mfd.).......30-4115
60. Vibrator Unit............38-5036
61. Condenser (.05 mfd.)......30-4039
62. Resistor (200 ohms)....... 7217
63. Resistor (200 ohms)....... 7217
64. Condenser (.00125 mfd.)... 5886
65. Power Transformer........32-7098
66. Condenser (.01 mfd.)......30-4051
67. Filter Condenser (4-8 mfd.).30-2015
68. "B" Choke...............32-7104

Interference Condenser.... 4522S
Studs...................28-6036
Nuts (mounting).......... W55
Battery Cable............38-5296
Antenna Lead............38-5674
Acorn Nut............... W821
Fuse.................... 7227
Fuse Insulator............27-7131
Knob...................27-4091
Glass...................27-7325
Glass Gasket.............27-7509
Pointer..................28-1793
Shaft....................28-8214
Face Assembly............42-5125

MODELS G, G (Code 122), H, H (Code 122), R PHILCO RADIO & TELEV. CORP.
Hupmobile For J, T & W

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Models G, H, and R radio Receivers in Series W, J and T Hupmobile cars. Read these instructions carefully before beginning the installation.

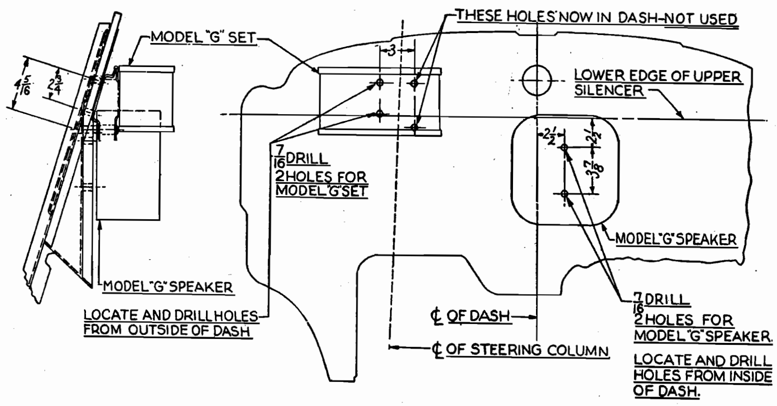


FIGURE 1

THESE DIMENSIONS ARE FOR "J" & "T" DASHES ONLY. "G" RADIO SET.

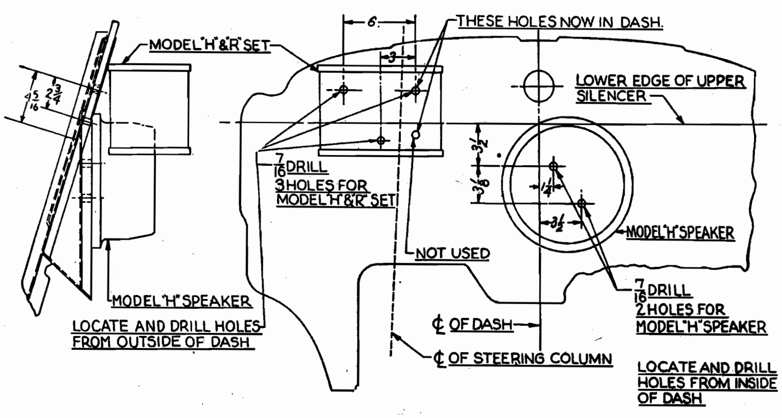


FIGURE 2

THESE DIMENSIONS ARE FOR "J" & "T" DASHES ONLY. "H" & "R" RADIO SET.

Antenna Lead

The antenna lead in all closed cars of Series W will be found at the base of the left-hand windshield pillar. In all closed cars of the J and T Series, the antenna lead will be found at the base of the right pillar.

Speaker Location (Models G and H)

In Series J and T Cars

The Model G speaker vibrator unit, and the Model H speaker must be mounted near the center of the car by means of two 5/16" studs which are screwed into two holes provided on the back of the speaker. Mount the Model G speaker with the tone control to the left (from driver's seat).

Refer to Figure 1 for the Model G and Figure 2 for the Model H speaker mounting hole locations. Cut the mounting studs to 2⅜" overall before installing. Place the card board and felt baffle between the back of the H speaker and the dash.

In Series W Cars

Mount the Model G speaker vibrator unit over the steering column with the cable plug socket toward the right and the Model H speaker, with the plug socket on top. Cut the speaker mounting studs to 2⅜" overall before installing. Place the cardboard and felt baffle between the back of the Model H speaker and the dash. Refer to Figure 8 for the location of the holes in the dash.

Receiver Location (Models G, H and R)

In Series J and T Cars

Figures 1 and 2 also show detailed dimensions for locating the mounting bolt holes for the Models G, H and R Receivers in the Series J and T cars. The Receiver must be mounted on the dash so that the control shafts enter from the right side.

In Series W Cars

Figure 8 also shows detailed dimensions for locating the mounting bolt holes for the Models G, H and R Receivers in the Series W cars. The Receiver must be mounted on the dash so that the control shafts enter from the left side.

When installing the Model G, bend out the bottom lip of the dash mounting bracket before fastening the bracket to the dash. The top face of the Receiver, when installed, will then be parallel to the silencer pad and the long hold-down screw and spacer at the bottom of the bracket will be centered.

Fasten the Receiver mounting plate to the back of the Receiver with four hex-head sheet metal screws (one side of the bracket and part of the side of the Receiver housing have been left unpainted to insure good contact). After locating the holes for the dash mounting bracket, fasten it in place and then hook on the Receiver. Place the spacer between the dash and the Receiver brackets and tighten the long hold-down screw.

In order to obtain the maximum foot clearance in the series W cars, when installing the Models H and R, the Receiver must be mounted so that the top face is against the silencer pad. The Receiver must be tilted upwards and the full length of the bottom stud utilized as shown in Figure 8.

Connections

Model G

The connecting cable must be plugged into the outlets on both the Receiver and Speaker housings. The shield terminals on the cable ends must be grounded to the housings under hex-head screws close to the plug connectors.

The antenna lead which branches from the connecting cable close to the Receiver must be spliced, soldered and taped to the car lead-in wire at the base of the front pillar (left-hand in series W, right-hand in series J and T). Cut off all excess lead-in wire and ground the antenna lead shield terminal on the flange of the instrument board.

Models H and R

The speaker cable from the Model H Receiver must be plugged into the outlet on the speaker housing and the shield pigtail grounded to the rim of the speaker housing. The antenna lead (Models H and R) must be spliced, soldered and taped to the car lead-in at the base of the front pillar (left-hand in series W, right-hand in series J and T). Cut off all excess lead-in wire and ground the antenna lead shield terminal on the flange of the instrument board.

Models G, H and R Ammeter Lead

Place the fuse and fuse insulator in the metal fuse receptacle and connect to the Receiver battery lead. Connect the eyelet terminal of the lead to the ammeter.

Instrument Board Control

Remove the ash receiver. Loosen the two nuts behind the instrument board and take out the ash receiver bezel. Install the radio control from the front of the panel. Put the U clamp on the back of the control and tighten the wing nuts to hold the control in place. The cowl ventilator handle must pass between the flexible shafts on all Series W cars.

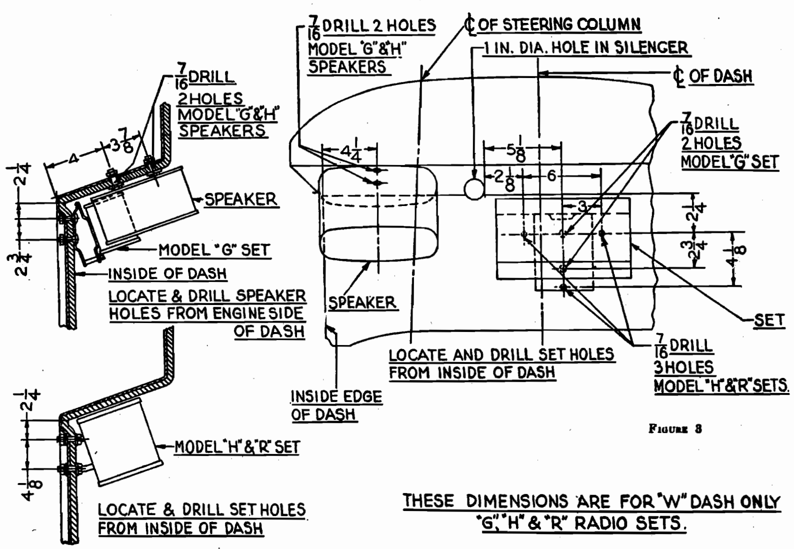


FIGURE 8

THESE DIMENSIONS ARE FOR "W" DASH ONLY "G", "H" & "R" RADIO SETS.

Connect the flexible shafts to the Receiver. The Model G shafts are equipped with male and female fittings. In series W cars, the male end must be coupled to the lower bushing and the female end to the upper bushing. In series J and T cars, the Model G Receiver is completely turned around so that the male shaft end connects to the upper bushing and the female end connects to the lower bushing.

Models H and R control shafts are both equipped with male fittings. The tuning or right-hand shaft must be coupled to the bushing nearest the small triangular shield on the end of the Receiver housing. The volume control or left-hand shaft must be coupled to the other bushing. The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housing to be seated. After the flexible shafts have been properly coupled, tighten the set screws again. The dial light lead pin terminal must be connected in its socket which is on the side of the speaker on the Model G and on the control end on the Models H and R Receivers.

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers). Pull the knob from the right-hand control shaft and loosen the set screw. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob, and re-check with other stations for correct setting of the dial.

PHILCO RADIO & TELEV. CORP.

MODEL R Hupmobile For J,T & W Cars Schematic,Chassis Parts List

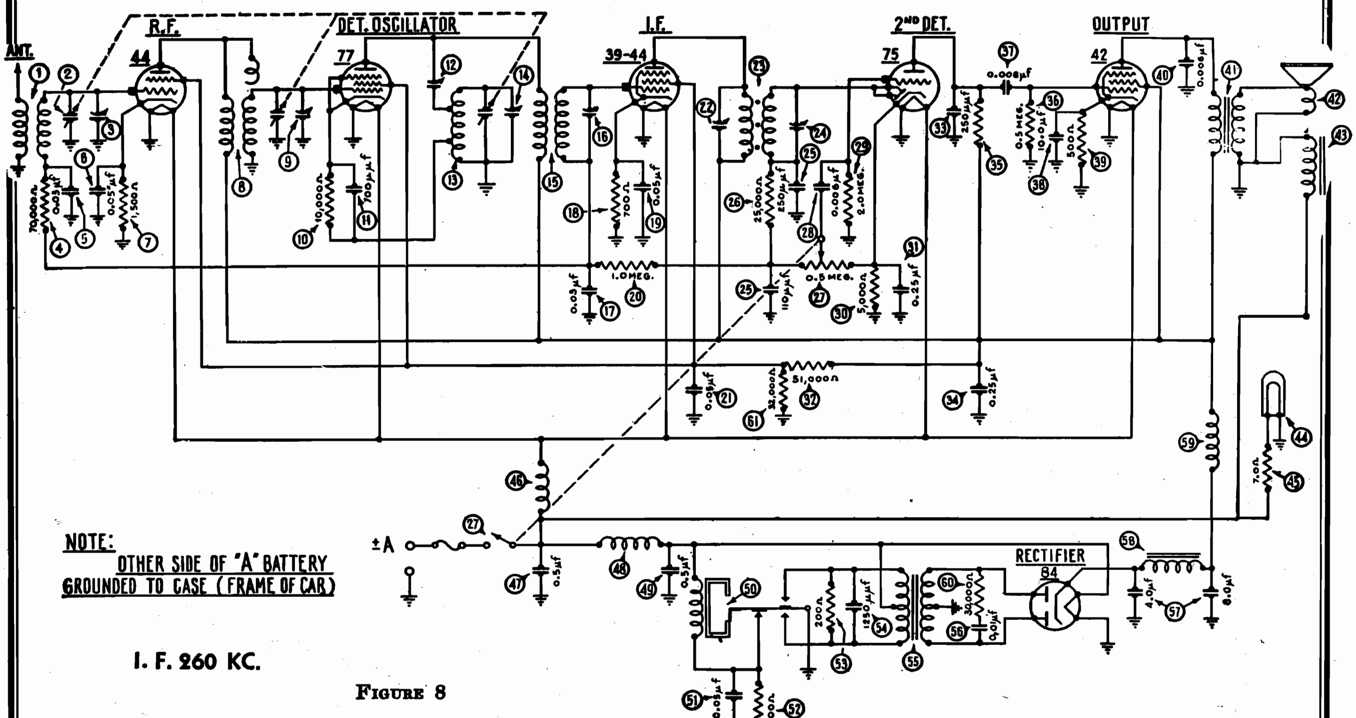


FIGURE 8

Hupmobile-Philco Model R Parts List

1. Antenna Transformer......32-1331
2. Tuning Condenser.........31-1164
3. 1st Padder (on tun. cond.)........
4. Resistor (70,000 ohms).....33-1115
5. Condenser (.03 mfd.)......30-4025
6. Condenser (.05 mfd.)......30-4020
7. Resistor (1500 ohms)......33-3047
8. R. F. Transformer.........32-1332
9. 2nd Padder (on tun. cond.)........
10. Resistor (10,000 ohms).....33-1000
11. Condenser (.0007 mfd.).... 5863
12. Padder (Pri. 1st I. F. Tran.).......
13. Oscillator Transformer.....32-1333
14. 3rd Padder (on tun. cond.)........
15. 1st I. F. Transformer......32-1329
16. Padder (Sec. 1st I. F. Tran.)......
17. Condenser (.03 mfd.)......30-4025
18. Resistor (700 ohms)....... 6443
19. Condenser (.05 mfd.)......30-4020
20. Resistor (1,000,000 ohms)..33-1096
21. Condenser (.05 mfd.)......30-4020
22. Padders (Prim. 2nd I. F.).........
23. 2nd I. F. Transformer.....32-1237
24. Padder (Sec. I. F. Tran.)..........
25. Cond. (.00011-.00025 mfd.).30-1020
26. Resistor (25,000 ohms).....33-1013
27. Vol. Con. & Switch Assm...38-5534
28. Condenser (.006 mfd.).....30-4125
29. Resistor (2,000,000 ohms)..33-1025
30. Resistor (5000 ohms)...... 6096
31. Condenser (.25 mfd.)......30-4146
32. Resistor (51,000 ohms)..... 5868
33. Condenser (.00025 mfd.)... 3082
34. Condenser (.25 mfd.)...... 04360
35. Resistor (100,000 ohms).... 6099
36. Resistor (500,000 ohms).... 6097
37. Condenser (.006 mfd.).....30-4125
38. Condenser (10 mfd.).......30-2072
39. Resistor (500 ohms).......33-3031
40. Condenser (.006 mfd.).....30-4024
41. Output Transformer.......32-7214
42. Cone & Voice Coil......... 02861
43. Field Coil Assembly.......36-3097
44. Pilot Light.............. 6608
45. Resistor (7 ohms).........33-3035
46. "A" Choke...............32-1286
47. Condenser (.5 mfd.).......30-4047
48. Vibrator Choke...........32-1235
49. Condenser (.5 mfd.).......30-4147
50. Vibrator Unit............38-5036
51. Condenser (.05 mfd.)......30-4039
52. Resistor (200 ohms)....... 7217
53. Resistor (200 ohms)....... 7217
54. Condenser (.00125 mfd)..... 5886
55. Power Transformer........32-7216
56. Condenser (.01 mfd.).......30-4051
57. Condenser (4.-8. mfd.).....30-2072
58. "B" Choke...............32-7215
59. R F Choke...............32-1281
60. Resistor (30,000 ohms)..... 7836
61. Resistor (32,000 ohms)..... 3525

Spark Plug Resistor.......33-1015
Distributor Resistor....... 4851
Interference Cond. (½ mfd.).30-4007
Face Assembly............42-5208
Glass for Control..........27-7325
Pointer..................28-1957
Knobs...................27-4091

Stud....................28-6036
Battery Cable............38-5833
Nut.................... W55A
Antenna Lead............38-5682

Fuse.................... 7227
Fuse Insulator...........27-7131
Shafts..................28-8214

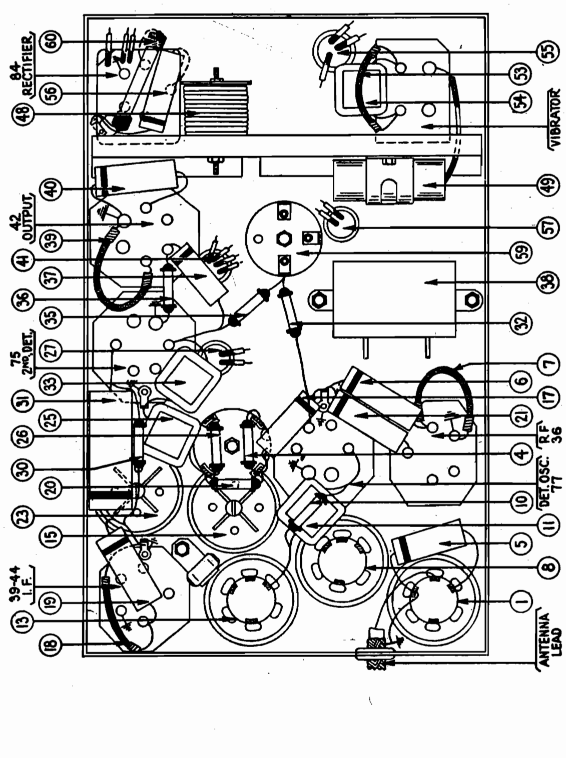
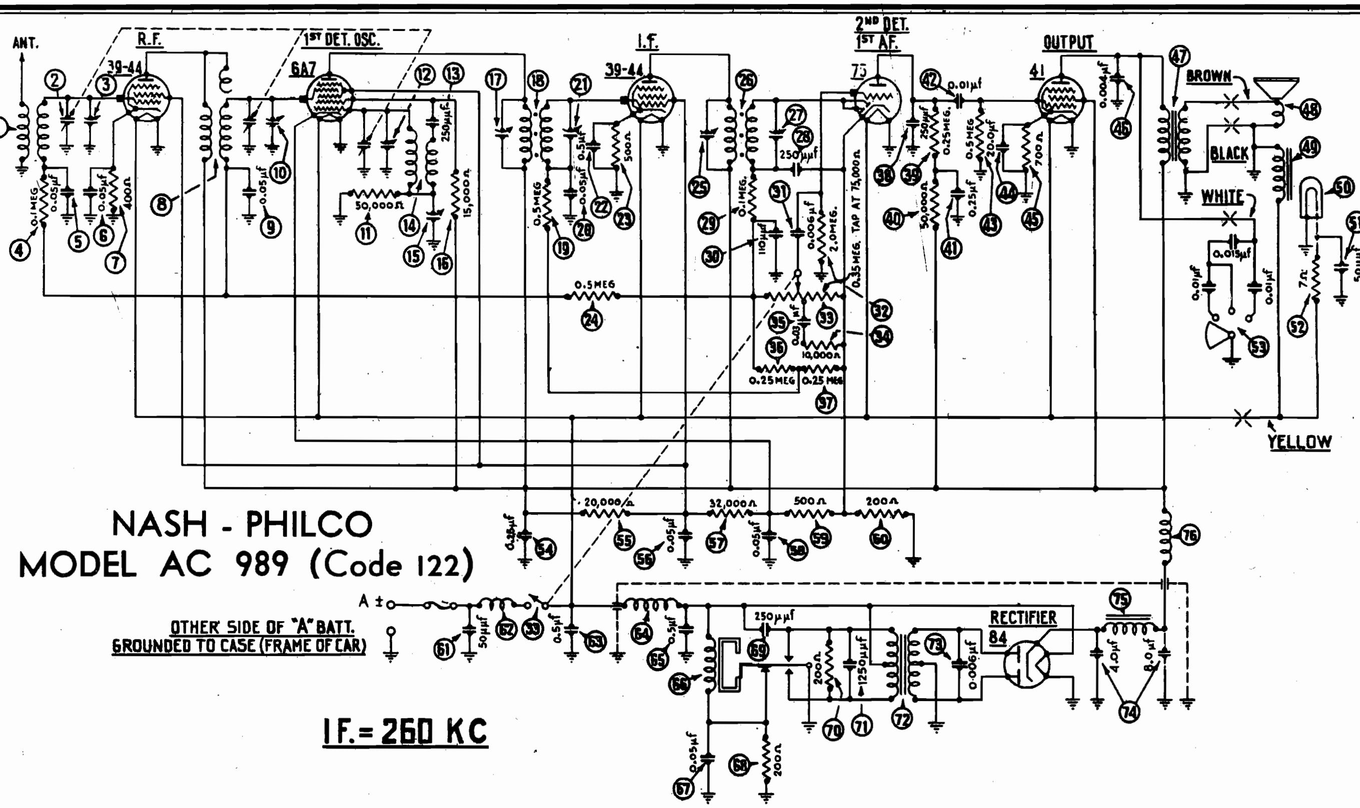


FIGURE 9

MODEL D
Nash AC-989 (Code 122
Schematic,Parts List

PHILCO RADIO & TELEV. CORP.

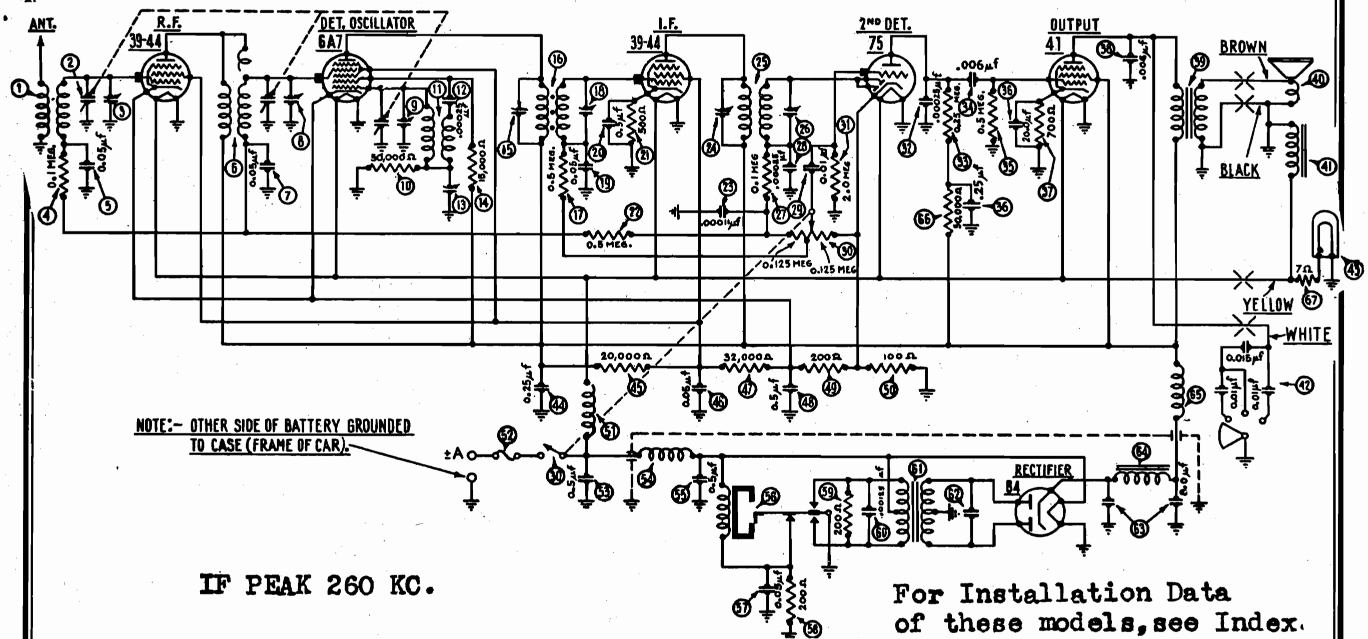


① Antenna Transformer	32-1220
② Tuning Condenser	31-1083
③ First Padder (in tun. cond.)	
④ Resistor (100,000 ohms)	6099
⑤ Condenser (.05 mfd.)	30-4020
⑥ Condenser (.05 mfd.)	30-4020
⑦ Resistor (400 ohms)	33-3016
⑧ R. F. Transformer	32-1221
⑨ Condenser (.05 mfd.)	30-4020
⑩ Second Padder (in tun. cond.)	
⑪ Resistor (50,000 ohms)	6098
⑫ Third Padder (in tun. cond.)	
⑬ Condenser (.00025 mfd.)	30-1032
⑭ Oscillator Transformer	32-1222
⑮ Padder	04000S
⑯ Resistor (15,000 ohms)	6208
⑰ Padder (Pri. 1st I. F. Trans.)	
⑱ First I. F. Transformer	32-1236
⑲ Resistor (500,000 ohms)	6097
⑳ Condenser (.05 mfd.)	30-4020
㉑ Padder (Sec. 1st I. F. Trans.)	
㉒ Condenser (.5 mfd.)	30-4058
㉓ Resistor (500 ohms)	6977
㉔ Resistor (500,000 ohms)	6097
㉕ Padder (Pri. 2nd I. F. Trans.)	
㉖ Second I. F. Transformer	32-1237
㉗ Padder (Sec. 2nd I. F. Trans.)	
㉘ Condenser (.00025 mfd.)	30-1032
㉙ Resistor (100,000 ohms)	6099
㉚ Condenser (.00011 mfd.)	30-1031
㉛ Condenser (.006 mfd.)	30-4125
㉜ Resistor (2,000,000 ohms)	33-1025
㉝ Vol. Control & Sw. Assembly	38-5935
㉞ Resistor (10,000 ohms)	33-1000
㉟ Condenser (.03 mfd.)	30-4025
㊱ Resistor (250,000 ohms)	33-1097
㊲ Resistor (250,000 ohms)	33-1097
㊳ Condenser (.00025 mfd.)	30-1032
㊴ Resistor (250,000 ohms)	3768
㊵ Resistor (50,000 ohms)	4237
㊶ Condenser (.25 mfd.)	30-4065
㊷ Condenser (.01 mfd.)	30-4169
㊸ Resistor (500,000 ohms)	6097
㊹ Condenser (20 mfd.)	30-4065
㊺ Resistor (700 ohms)	33-3019
㊻ Condenser (.004 mfd.)	30-4185
㊼ Output Transformer	32-7102
㊽ Cone and Voice Coil	36-3159
㊾ Field Coil Assembly	36-3130
㊿ Pilot Lamp	34-2039
(51) Condenser (.00005 mfd.)	30-1029
(52) Resistor (7 ohms)	33-3035
(53) Tone Control	30-4056
(54) Condenser (.25 mfd.)	04360
(55) Resistor (20,000 ohms)	6649
(56) Condenser (.05 mfd.)	30-4020
(57) Resistor (32,000 ohms)	3525
(58) Condenser (.05 mfd.)	30-4020
(59) Resistor (500 ohms)	6977
(60) Resistor (200 ohms)	7217
(61) Condenser (.00005 mfd.)	30-1029
(62) Choke	32-1374
(63) Condenser (.5 mfd.)	30-4061
(64) Vibrator Choke	32-1259
(65) Condenser (.5 mfd.)	30-4061
(66) Vibrator	38-5036
(67) Condenser (.05 mfd.)	30-4039
(68) Resistor (200 ohms)	7217
(69) Condenser (.00025 mfd.)	5858
(70) Resistor (200 ohms)	7217
(71) Condenser (.00125 mfd.)	5886
(72) Power Transformer	32-7131
(73) Condenser (.006 mfd.)	30-4024
(74) Filter Condenser (4-8 mfd.)	30-2015
(75) Filter Choke	32-7104
(76) R. F. Choke	32-1281
Spark Plug Resistors	33-1101
Spark Plug Resistors	33-1102
Distributor Resistor	33-1103
Interference Condenser	30-4007
Studs	28-6102
Nuts (mounting)	W55A
Battery Cable	38-5296
Antenna Lead	38-5131
Acorn Nut	W821
Dial	27-5034
Knob (volume)	27-4045
Knob (tuning)	03064
Flexible Shaft (volume)	28-8182
Flexible Shaft (tuning)	28-8181

MODELS C & D Nash (AC-989)
Schematic,Parts

PHILCO RADIO & TELEV. CORP

MODEL AC-206 Studebaker
MODEL ME Pierce-Arrow



IF PEAK 260 KC.

For Installation Data of these models,see Index.

(1) Antenna Transformer......32-1220
(2) Tuning Condenser.........31-1083
(3) 1st Padder (in tuning cond.).......
(4) Resistor (100,000 ohms).... 6099
(5) Condenser (.05 mfd.)......30-4020
(6) R.F. Transformer.........32-1221
(7) Condenser (.05 mfd.)......30-4020
(8) 2nd Padder (in tuning cond.)......
(9) 3rd Padder (in tuning cond.).......
(10) Resistor (50,000 ohms)..... 6098
(11) Oscillator Transformer.....32-1222
(12) Condenser (.00025 mfd.)... 3082
(13) Padder.................. 04000S
(14) Resistor (15,000 ohms)..... 6208
(15) Padder (prim. 1st I.F.)....31-6007
(16) I.F. Transformer (1st).....32-1236
(17) Resistor (500,000 ohms).... 6097
(18) Padder (secondary 1st I.F.).31-6007
(19) Condenser (.05 mfd.)......30-4020
(20) Condenser (.5 mfd.).......30-4058
(21) Resistor (500 ohms)....... 6977
(22) Resistor (500,000 ohms).... 6097
(23) Condenser (.00011 mfd.)... 4519
(24) Padder (prim. 2nd I.F.)....31-6008
(25) I.F. Transformer (2nd)....32-1237
(26) Padder (secondary 2nd I.F.).31-6008
(27) Resistor (100,000 ohms).... 6099
(28) Condenser (.00025 mfd.)... 3082
(29) Condenser (.01 mfd.)......30-4051
(30) Vol. Control Assembly.....38-5280
(31) Resistor (2,000,000 ohms)..33-1025
(32) Condenser (.00025 mfd.)... 5858
(33) Resistor (250,000 ohms).... 3768
(34) Condenser (.006 mfd.).....30-4024
(35) Resistor (500,000 ohms).... 6097
(36) Condenser (20 mfd.; 25 mfd.)30-4065
(37) Resistor (700 ohms).......33-3019
(38) Condenser (.006 mfd.).....30-4024
(39) Output Transformer.......32-7102
(40) Cone and Coil...........36-3020
(41) Field Coil Assembly.......36-3130
(42) Tone Control............30-4056
(43) Pilot Lamp.............. 6608
(44) Condenser (.25 mfd.)...... 04360
(45) Resistor (20,000 ohms)..... 6649
(46) Condenser (.05 mfd.)......30-4020
(47) Resistor (32,000 ohms)..... 3525
(48) Condenser (.5 mfd.).......30-4048
(49) Resistor (200 ohms)....... 7217
(50) Resistor (100 ohms)....... 7838
(51) A Choke................32-1268
(52) 15 Amp. Fuse............ 7227
(53) Condenser (.5 mfd.).......30-4061
(54) Vibrator Choke..........32-1259
(55) Condenser (.5 mfd.).......30-4061
(56) Vibrator.................38-5036
(57) Condenser (.05 mfd.)......30-4039
(58) Resistor (200 ohms)....... 7217
(59) Resistor (200 ohms)....... 7217
(60) Condenser (.00125 mfd.)... 5886
(61) Power Transformer.......32-7131
(62) Condenser (.006 mfd.).....30-4024
(63) Filter Condenser.........30-2015
(64) B Chokes...............32-7038
(65) R. F. Chokes............32-1078
(66) Resistor (50,000 ohms)..... 4237
(67) Resistor (7 ohms)......... 5110
Spark Plug Resistors....... 4531
Distributor Resistor....... 4546
Screw Type Resistor....... 4851
Interference Condenser....30-4007
Dial.....................27-5022
Studs—4½" Special.......28-6102
Nuts (mounting).......... W55
Knob.................... 03064
Battery Cable............38-5296
Antenna Lead............38-5131
Instrument Panel Control..42-5088
Acorn Nut............... W821
De Luxe Control Assembly.42-5097
Standard Control Assembly.42-5101
Steering Col. Control Assem.42-5096
Gasket...................27-7290
Nash Control Plate........28-7025

Above is Model D Nash-Philco (AC-989). Model C Nash-Philco (AC-989) is similar except that a 42 output tube is used and resistor #37 is 550 ohms,part number 6977.

Studebaker Model AC-206.

This is same as above and is available with 42 output tube and resistor #37 changed to 550 ohms,part number 6977. Items 1 to 67 in above list are identical for Model AC-206. See following items for additional accessories

Spark Plug Resistors....... 4531
Distributor Resistor....... 4546
Screw Type Resistor....... 4851
Interference Condenser.....30-4007
Dial....................27-5027
Studs...................28-6036
Nuts (mounting).......... W55
Knobs................... 03064
Battery Cable............38-5296
Antenna Lead............38-5161
Instrument PanelControl.... 42-5088
Acorn Nut............... W821
Steering Column Control.... 42-5087

Pierce-Arrow Model ME

This is same as above except a 42 tube is used in the output and resistor #37 is changed to 550 ohms,part number 6977. Also volume control assembly's part number is changed to 38-5511. Other numbered items in above list are identical for the Model ME. See items below for additional accessories.

Spark Plug Resistors......33-1015
Distributor Resistor.......33-1019
Screw Type Resistor....... 4851
Interference Condenser.... 4522
Studs (Set Mtg.)..........28-6036
Nuts (Mounting).......... W55A
Battery Cable............38-5296
Antenna Lead............38-5131
Fuse Insulator............27-7131
Speaker (Model A15)......36-1048
Stud (Model A15).........28-6132
Wood Block (Spker. Mtg.).27-7359
Speaker Back Plate........27-7360
Cardboard & Felt Assem... 2697A
Control Unit Assembly....
Right Hand Mtg. (Walnut).42-5126
Left Hand Mtg. (Walnut)..42-5127
Right Hand Mtg. (Black)..42-5128
Left Hand Mtg. (Black)...42-5129
Knobs (Black)............27-4058
Knobs (Walnut)...........27-4098
Tuning and Volume Shaft Assembly, 28" Long.....28-8206
Face Assembly...........42-5130
Pointer.................28-1805
Face Gasket..............27-7331
Glass....................27-7325
Glass Gasket.............27-7327
Gasket (Panel to Casting)..27-7346
Speaker Cable Assembly...41-3069

MODELS C & D
Nash AC-989
Nash AC-989 (Code 122)
Installation Data

PHILCO RADIO & TELEV. CORP.

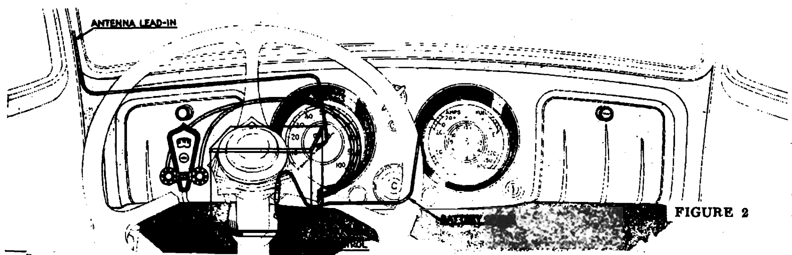


FIGURE 2

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Model D Nash-Philco automobile radio Receiver in the 1934 model Nash cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Nash closed cars is brought down the left front pillar post and is coiled behind the left cowl trim panels.

Receiver Location and Installation

Refer to Figure 1 which gives detailed dimensions for the location of the holes to be drilled in all models. These dimensions are shown from the engine side of the dash. On all current model cars, the carburetor air cleaner and silencer should be removed until the Receiver is bolted in place. This will facilitate drilling the holes in the dash.

On all 1290 models the Receiver must be spaced away from the dash approximately two inches to clear all pulleys and cables. On the 1220 and 1280 models the Receiver should be spaced far enough away from the dash to give ample clearance for the speaker cover flange and keep the Receiver in a vertical position.

In fastening the studs to the Receiver the lock washer is placed between the Receiver and the shoulder on the bolt. The large flat washer is used against the padding on the inside of the dash. Extra nuts are furnished to be used as spacers. Mount the Receiver with the control shaft couplings towards the center of the car and with the speaker facing down. See Figure 2. On the 1220 and 1280 models the throttle control wire should be disconnected to facilitate installation.

Instrument Board Control

A dummy door is provided with cutouts in which the control unit is mounted. Remove the standard door from the instrument board by taking out the two stove bolts at the bottom and loosening the nut on the rear of the cigar lighter. Disconnect the lighter wire at the fuse block. On cars not equipped with a cigar lighter the door is fastened in place with a knob and stove bolts. Install the control door on the instrument board. The greatest care must be used so as not to mar or scratch the finish.

When no provision is made in a car for instrument board mounting, a steering column control assembly may be secured from your distributor or the Nash Factory. This assembly is furnished with an adjustable strap and bracket and may be mounted to the right side or above the steering column. In assembling the strap and bracket be sure that the round nut clinched on the strap is against the steering column. This will prevent the round nut from being torn from the strap.

The black lead coming from the back of the control unit is the pilot light lead which must be connected under the pilot light terminal screw head on the speaker panel.

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control — the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the steering column dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections (SEE FIG. 2)

Connect the battery cable to the Receiver. The small end at the Receiver must be plugged into the fuse housing receptacle on the battery lead. The other end of the battery lead must be connected to the ammeter and the cable dressed up out of the way. Be sure the fuse and fuse insulator are placed in the fuse housing before connecting the cable to the Receiver.

Antenna Lead (SEE FIG. 2)

A shielded antenna lead is provided for connecting the Receiver to the roof antenna. This lead must be plugged into the bayonet type receptacle on the side of the Receiver. Splice to the antenna lead-in as close as possible to the left front pillar, cutting off all the excess car lead-in. The shield pig-tail must be grounded to the flange of the instrument board.

Lining Up The Receiver

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, i.e. 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screws again. Then recheck the dial setting.

Ignition and Generator Interference Suppression

Install spark plug resistors on all spark plugs. On the right side of the motor the spark plug porcelains are covered with a rubber sleeve. When the sleeves are replaced, make sure that they are pushed down far enough to completely cover the porcelain on the plugs. Dipping the rubber sleeves in gasoline will make this operation very easy.

Cut the coil to distributor high tension lead about one inch from the distributor head and install the screw type suppressor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cutout relay. The condenser must be fastened in place under the relay mounting screw.

The other by-pass condenser must be mounted behind the instrument board and the lead connected to the ammeter. Fasten the condenser mounting bracket under one of the instrument mounting screws. On some cars, this condenser may be more effective when connected to the dome light wire. In such cases, the condenser lead must be spliced to the dome light wire at the right pillar post and the condenser mounted on the instrument board flange.

Ordinarily these operations will eliminate all ignition interference. Should there still be some objectionable interference, the distributor rotor arms must be peened out in order to minimize the sparking in the distributor head. Both ends of the rotor must be peened.

Peening the Rotor Arm

Place one end of the rotor on a steel block and peen with a small machinist's hammer, extending it for the first trial about .005 inch. Great care must be taken in performing the operation to make sure the rotor arm itself does not strike the stationary electrodes. Repeat this operation until there is just sufficient clearance (.002 inch to .005 inch) between the end of the rotor arm and the stationary electrodes in the distributor cap.

Dress the end of the rotor with a file to its original shape. Without turning on the ignition, press the starter and then examine the rotor arm and the stationary electrodes to be sure that the steel arm is not striking the stationary electrodes.

To judge whether or not the rotor has been lengthened sufficiently, place a thick layer of chalk on each of the stationary electrodes. If there is evidence of the rotor touching the stationary electrodes, file off about .001 inch and recheck.

After the one end of the rotor arm has been peened, repeat the procedure with the other end. When both ends of the motor have been properly peened, replace the rotor and distributor cap.

If there is a tendency for the motor to lope or roll at idling speed, remove the spark plugs and set the gaps to .080 inch. It may be necessary to change slightly the carburetor idle adjustment.

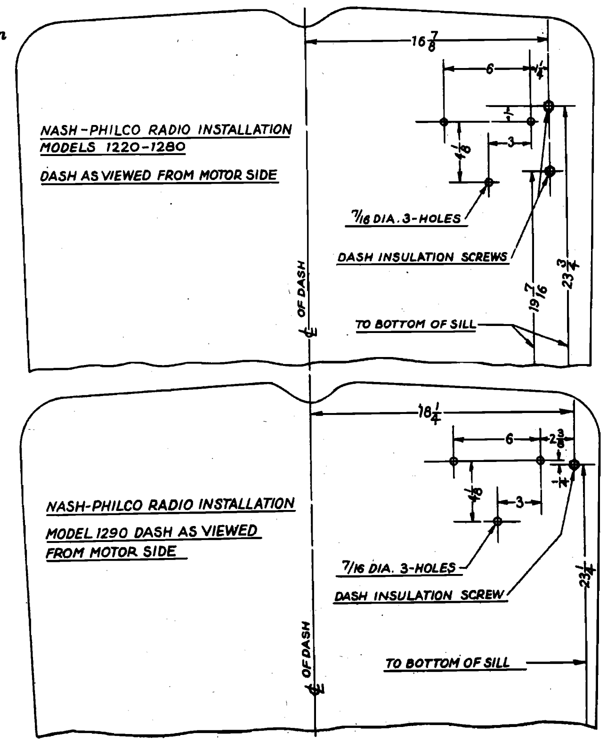


FIGURE 1

MODEL AC-206 Studebaker
PHILCO RADIO & TELEV. CORP. MODEL AC-236 Studebaker
Installation Data

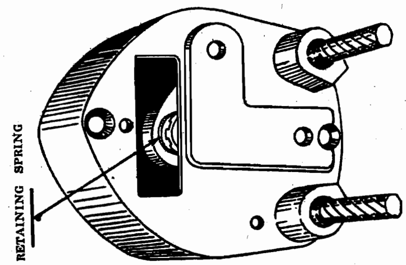


FIGURE 2

Receiver Location and Installation

Refer to Fig. 1 showing the location of the holes in the dash. Locate one of the holes and mark with a sharp punch; then use the template furnished with the Receiver to locate the remaining two holes. These holes should be drilled with a 7/16" drill.

Install the Receiver with the control connections to the left side of the car with the speaker facing down. (see Fig. 3)

Control Unit

The control unit is mounted on a panel which replaces the dummy door on the left side of the instrument board. These panels are held in place by means of four small metal tabs which pass through corresponding slots in the instrument board proper and are bent to one side. Care should be taken to fasten this panel securely so it does not rattle or mar the finish.

The control is furnished with a blank lock cylinder which must be crushed to match the car keys. This operation must be completed before the control is installed on the instrument board.

Instructions for Fitting Car Key to Control Lock

1. Remove the knobs and take off the control unit from the door.
2. Remove the hex-head screw in the rear and take out the pilot lamp bracket.
3. Reach in through the oblong opening in the back of the control unit with a medium size screw driver and press down on the brass retaining lock spring, at the same time working the lock cylinder forward. (See Fig. 2).
4. Insert the car key in the lock cylinder and crush in the same manner that you crush the standard lock, with pliers or vise.
5. Assemble the dial and spring on the cylinder. Push down the retaining spring and replace the lock in the same relative position that it had when removed. With the key in the lock push the lock back, working the lock pin in place in the slot in the lock bar in back of the lock. Push the lock in until the retaining spring snaps in place.
6. Ressemble the control on the panel.

Steering Column Control Unit

For installation in Studebaker cars prior to the 1934 models a special steering column control kit is available, Studebaker Stock No. AC-207. This kit includes a steering column control unit with the proper length flexible shafts and all the necessary hardware for installation on the steering column.

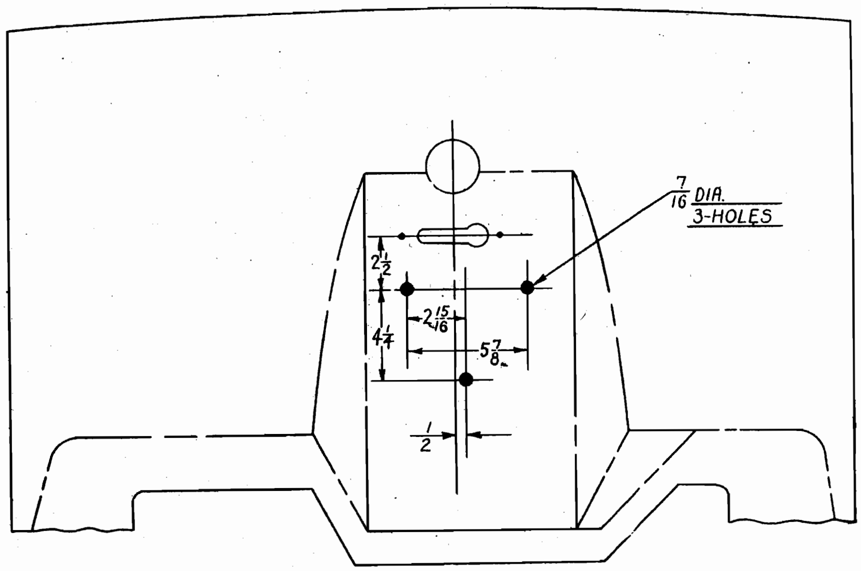


FIGURE 1

Control Shaft Installation

Turn the volume control (lower knob in panel mounting, left hand knob in steering column mounting) to a position where the key will lock it. Loosen the set screws in both shaft couplings and connect the volume control shaft to the rear coupling (nearest the dash). Then connect the tuning control shaft in the front coupling (nearest the front seat) and tighten all the set screws.

Battery Cable Connection (See Fig. 3)

Connect the battery cable to the Receiver by means of the fuse housing connector which fastens by inserting and making a slight turn clockwise, the other end must be connected to the right side of the ammeter and the cable dressed up behind the Receiver. Be sure the fuse and fuse insulator are placed in the fuse housing before the battery cable is connected to the Receiver.

The antenna cable must be plugged into the receptacle on the left side of the Receiver near the top and run along the instrument board to the left hand windshield post where it must be connected to the car antenna lead and the shielding grounded. Connect the black wire from the dial light on the control unit under the screw on the lower left side of the speaker face.

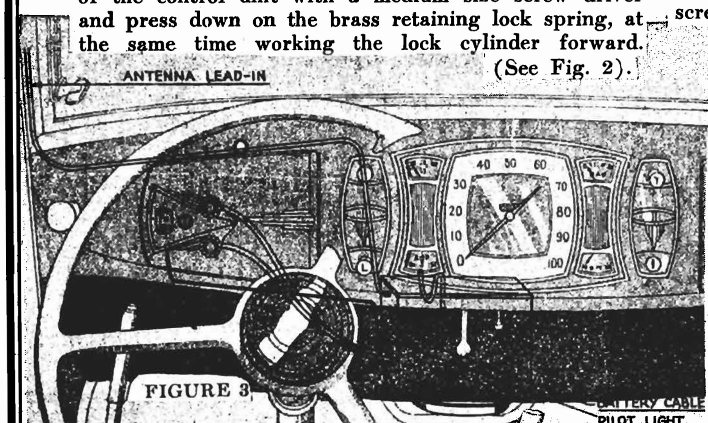


FIGURE 3

MODEL ME Pierce-Arrow
Installation Data

PHILCO RADIO & TELEV. CORP.

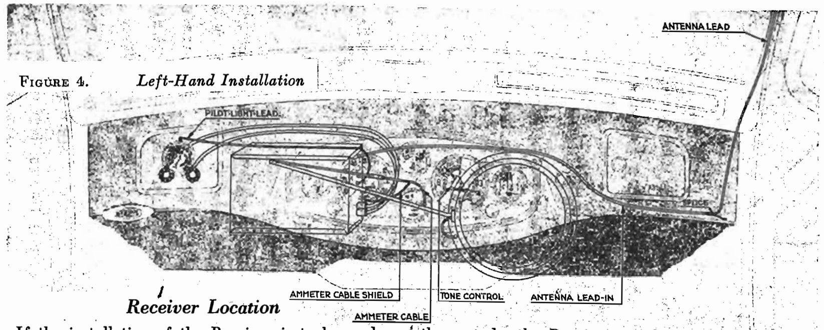


FIGURE 4. *Left-Hand Installation*

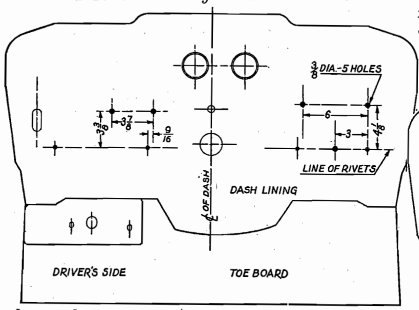
Receiver Location

If the installation of the Receiver is to be made on the right side of the car use the dimensions given in Figure 1. Refer to Figure 2 for the dimensions when the Receiver is to be mounted on the left side of the car.

Before locating and drilling the holes for the left-hand installation, remove the left glove box. The box is fastened at the instrument board by four short bolts and nuts, two at the top and two at the bottom. Those at the bottom are very easily removed, while those at the top can be removed by extending the hand up between the cowl and the box and holding the nuts while the bolts are removed. Two more bolts at the rear right side should also be removed and the bracket bent over to one side. Remove the left glove box door by loosening the two screws that fasten the door hinge to the instrument board. A similar procedure is used for removing the right glove box and door when making right-hand installations.

Locate and drill the three 7/16" holes from the inside of the dash, in accordance with Figure 1 or Figure 2 as required. The holes must be located accurately, otherwise there is danger of drilling through the windshield wiper tube which is located between the inner

FIGURE 1. *Right-Hand Installation*



and outer dash. Fasten the three studs into the threaded holes on the Receiver and mount the Receiver as shown in Figure 3 for right-hand installation and Figure 4 for left-hand installation. By cutting 3/8" from all three studs, the Receiver can be mounted without removing the bottom stud.

Use the large lockwashers between the stud shoulders and the Receiver. The large flat washers should be used against the padding behind the Receiver. The high-tension conduit should be bent slightly forward to prevent interference with the Receiver mounting studs.

Speaker Location

The speaker is mounted with the tone control towards the center of the car. Extra long bolts and a block of wood are provided so that the speaker can be mounted squarely on the dash. The hole locations are given in Figure 1 and Figure 2.

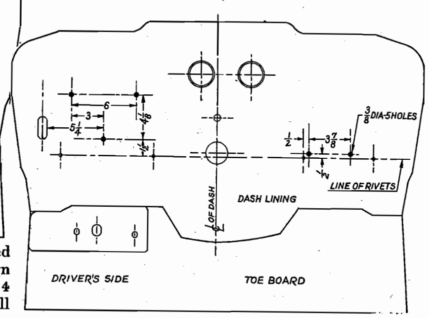
The felt edge on the round cardboard should be placed next to the rim of the speaker housing and the circular piece of fibre placed in back of cardboard with the cut-out toward the center of the car. The felt and fibre improve the tone of the speaker and keep out dust and must be used.

Wiring Connections

Refer to Figure 3 or 4 as Required

The antenna shielded lead-in should be soldered and taped to the car antenna lead. This lead-in is provided with a plug-in connection which fits into a female connector on the side of the Receiver. The shield pigtail on the end of this lead-in must be grounded to the

FIGURE 2. *Left-Hand Installation*



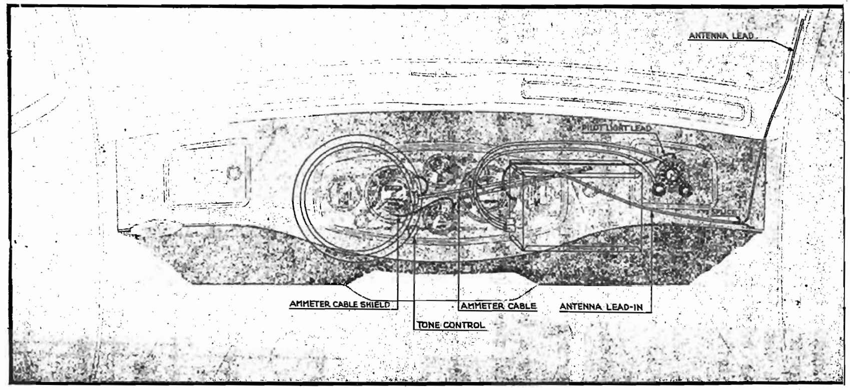


FIGURE 3. *Right-Hand Installation*

flange of the instrument board with a small bolt and nut close to the point where the antenna lead leaves the front pillar.

All excess antenna lead must be cut off or it will be difficult to eliminate ignition noise.

Connect the ammeter lead to the ammeter and the shielding on this lead (black wire) under a metal screw behind the speedometer. Insert the fuse insulator and fuse in the metal fuse housing and connect to the Receiver lead. The shield connection (black wire) on the Receiver end must be grounded under a sheet metal screw on the Receiver.

The speaker cable must be plugged into the socket in the speaker and the shield pigtail grounded under a nut on the rim of the speaker housing.

Glove Box Door Control

Since the glove box door has already been removed, attach the radio control and dress the flexible control shafts and dial light wire over the top of the Receiver. Refer to Fig. 3 or Fig. 4 as required.

Control Shaft Installation

The flexible shafts each have a split end which engages a pin in the bushing in the Receiver. The right-hand control knob is the station selector. The end of the station selector shaft must be coupled (plugged-in) to the bushing nearest the rubber mounting washers on the end of the Receiver housing. Line up the split end of the shaft with the pin and push it in as far as it will go. Tighten the set screws on the shaft housing bushings. The same procedure must be followed for the left-hand (Switch and Volume Control) shaft.

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers). Pull the knob from the right-hand control shaft and loosen the set screw found there. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob. A finer adjustment can be made if this is done on a station between 1000 and 1500 kilocycles.

Wind the dial light wire around the flexible shafts and insert the pilot light connector in the hole in the Receiver housing just above the flexible shaft bushings.

Ignition and Generator Interference Supression

Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the *ammeter side* of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place. Cut each distributor-to-coil high-tension wire about 1" from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again. Peen the distributor rotor to reduce sparking at this point. Place the end of the rotor on a flat steel block and peen with a machinists hammer. Both ends must be treated with a double coil system. The more care taken on this operation the better the interference elimination will be. Chalk the end of the rotor each time it is peened to gauge the clearance. See that all high-tension wires entering the distributor cap are seated properly.

These operations should give good elimination; however, in severe cases, all rods and tubes entering the dash should be bound together and grounded to the metal dash. Speaker, antenna and ammeter cables should be dressed and fastened in the position which gives the least motor interference.

PHILCO RADIO & TELEV. CORP.

MODEL J Nash (AC-1189) Lafayette 110 Installation Data

THE INSTRUCTIONS have been carefully prepared for your use in installing the Model "J" Nash-Philco automobile radio Receiver in the 1934 Model LAFAYETTE cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Lafayette closed cars is brought down the left front pillor post and is coiled behind the left cowl trim panel.

Instrument Board Control

The instrument board control can be installed more conveniently if this is done as the first operation.

Remove the left dummy ash receptacle door by removing the three nuts behind the instrument panel. Refer to Fig. 1 for dimensions. Paste a piece of paper 1½" wide, 2½" long, over the two lower holes. Pierce holes through the paper with a pencil and draw a center line between them. Drop a vertical line down 13/32" from the center of these holes and mark with a center punch. Drill a ⅜" hole. Remove the paper and elongate the hole horizontally with a round file, as shown on Fig. 1. The control shaft holes should now be enlarged with a ⅜" drill. With a round file, notch the top of the large hole, as shown on Fig. 1. Remove the burrs. Assemble the felt washer between the control head casting and the back of the instrument board. Mount the cover plate and assemble with the two flat-head machine screws. Dress the flexible control shafts over the top of the instrument board-to-dash bracket.

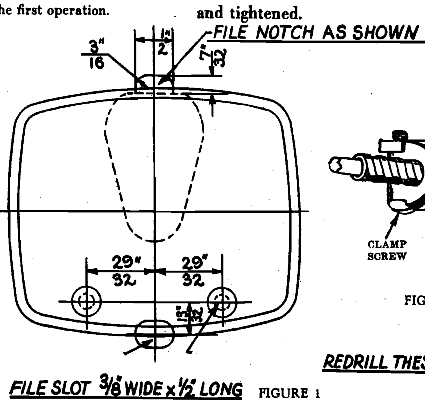


FIGURE 1

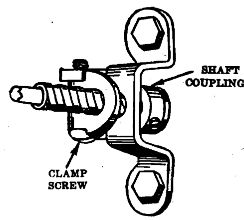


FIGURE 4

Receiver Location and Installation

Holes for the two top mounting studs are provided in the metal dash. The single hole on the bottom is occupied by a padding fastening bolt. The locations of these holes are shown in Fig. 2. On certain bodies these holes must be slotted downward a half inch.

Install the mounting studs in the dash holes. Drop the steering column to its lowest position by loosening the two bolts on the steering column bracket. This will facilitate the installation of the radio behind the steering column.

In fastening the studs to the Receiver, the lock washer must be placed between the Receiver and the shoulder on the bolt. The large flat washer must be placed against the padding on the inside of the dash. Mount the Receiver with the control shaft couplings toward the center of the car and with the speaker facing down. See Fig. 3.

Slip the radio in place, and screw the studs into the holes in the Receiver housing from the outside of the dash. This operation can be made easier if the end of the studs entering the set are slightly tapered.

After the radio is installed, the steering column must be returned to its original position and tightened.

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control—the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the instrument board-to-dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. See Fig. 4. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections

Insert the fuse and fuse insulator in the fuse receptacle and connect to the Receiver battery lead as shown in Fig. 3. Connect the black-white lead of the battery cable to the battery side of the ammeter.

The black lead at each end of the battery cable is the shield lead which must be grounded to the back of the instrument panel and under one of the nuts on the Receiver housing. Exercise care when making these connections. The cable must be dressed and secured in place.

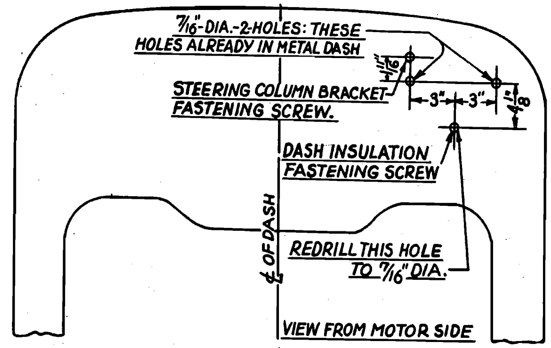


FIGURE 2

The black lead coming from the rear of the control unit must be plugged into the pilot lamp terminal on the speaker panel.

Antenna Lead

Splice the antenna lead to the antenna lead-in as close as possible to the corner post, dressing it in place above or in back of the Receiver. The shield on the lead must be grounded close to the corner post.

The dial in the control is calibrated in channel numbers, which with the addition of a cipher indicate the frequencies in kilocycles, *i.e.*, 70 on the dial represents 700 kilocycles.

Tune in a broadcast station of known frequency and then loosen the coupling screws on the tuning shaft. Turn the dial to the proper number and tighten set screws again. Then re-check the dial setting.

Ignition and Generator Interference Suppression

A spark plug resistor must be installed on each spark plug. Cut off the angle snap-on terminal from the high-tension lead and screw the spark plug resistor into the lead as far as it will go. Snap the resistor on the spark plug. Cut the distributor-to-coil lead 2" from the distributor and screw distributor resistor into the lead. Then screw the end of the lead into the resistor and reconnect to the distributor.

Install a by-pass condenser on the generator and connect the condenser lead to the generator side of the cut-out relay. The condenser must be fastened in place under the relay mounting screw.

The second condenser must be fastened under the left coil mounting screw and the lead connected to the ammeter side of the coil primary.

In some cars it may be necessary to connect a condenser to the dome light wire. The condenser lead must be spliced to the dome light wire at the right pillar post and the condenser mounted on the instrument board flange.

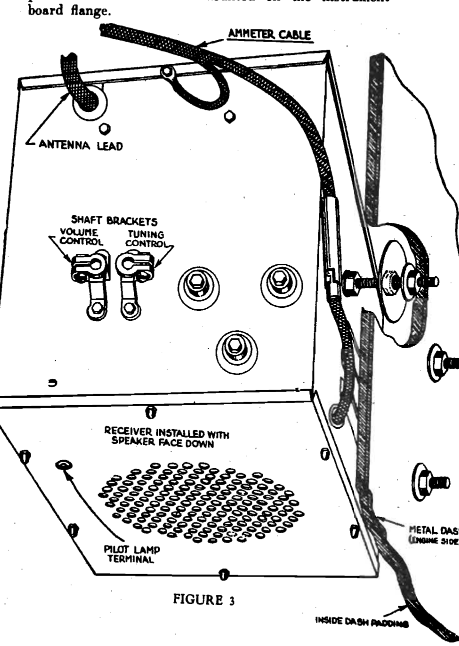
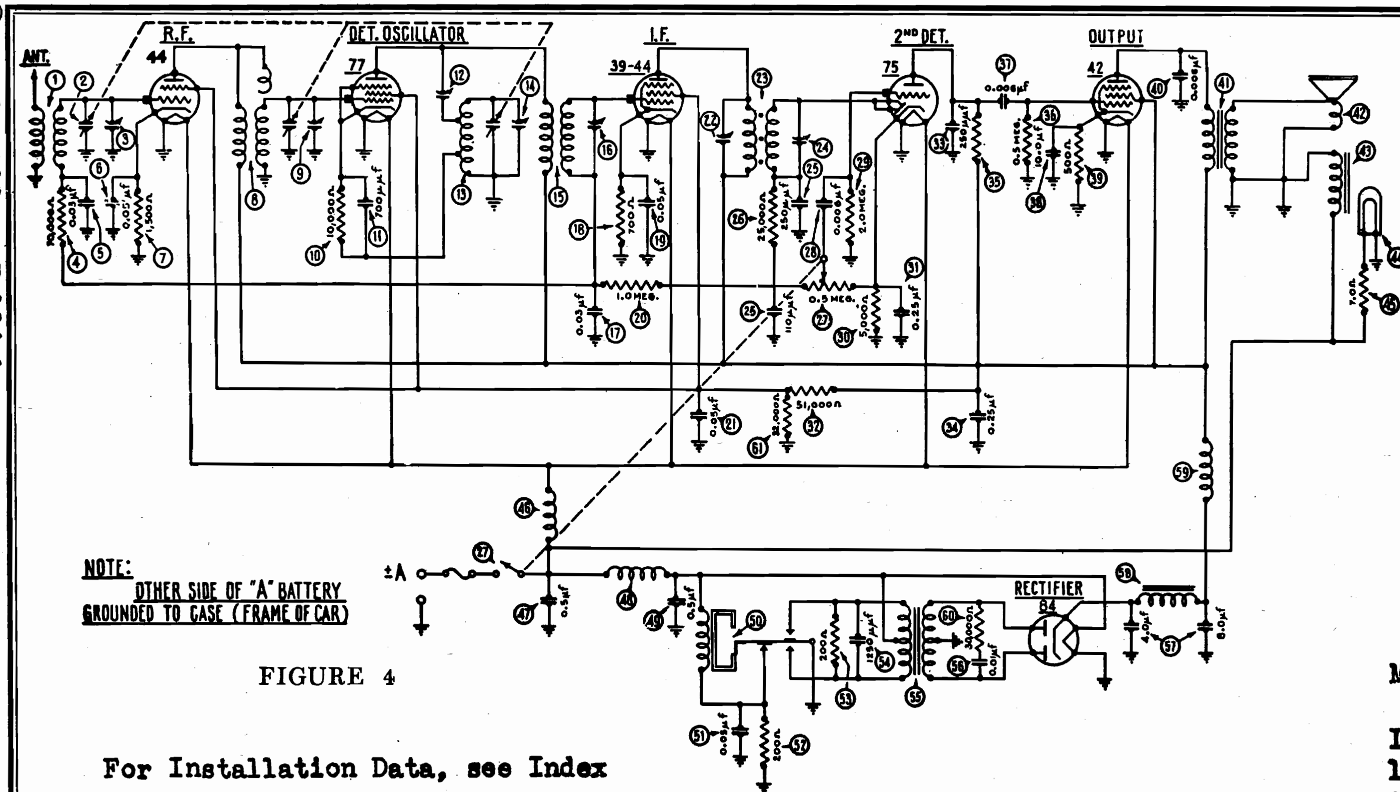


FIGURE 3

MODEL Junior AC-236 Stud
MODEL J Nash (AC-1189 PHILCO RADIO & TELEV. CORP. **MODEL J Nash (AC-1289)**
Lafayette 110 Series **Schematic, Parts List**



NOTE: OTHER SIDE OF "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)

FIGURE 4

For Installation Data, see Index

STUDEBAKER JUNIOR MODEL AC-236 PARTS LIST

(1) Antenna Transformer	32-1331
(2) Tuning Condenser	31-1149
(3) 1st Padder (on tun. cond.)	
(4) Resistor (70,000 ohms)	33-1115
(5) Condenser (.03 mfd.)	30-4025
(6) Condenser (.05 mfd.)	30-4020
(7) Resistor (1500 ohms)	33-3047
(8) R. F. Transformer	32-1332
(9) 2nd Padder (on tun. cond.)	
(10) Resistor (10,000 ohms)	33-1000
(11) Condenser (.0007 mfd.)	5863
(12) Padder (Pri. 1st I. F. Tran.)	
(13) Oscillator Transformer	32-1333
(14) 3rd Padder (on tun. cond.)	
(15) 1st I. F. Transformer	32-1329
(16) Padder (Sec. 1st I. F. Tran.)	
(17) Condenser (.03 mfd.)	30-4025
(18) Resistor (700 ohms)	6443
(19) Condenser (.05 mfd.)	30-4020
(20) Resistor (1,000,000 ohms)	33-1096
(21) Condenser (.05 mfd.)	30-4020
(22) Padders (Prim. 2nd I. F.)	
(23) 2nd I. F. Transformer	32-1237
(24) Padder (Sec. 2nd I.F. Tran.)	
(25) Cond. (.00011-.00025 mfd.)	30-1020
(26) Resistor (25,000 ohms)	33-1013
(27) Vol. Con. & Switch Assm.	33-5058
(28) Condenser (.006 mfd.)	30-4125
(29) Resistor (2,000,000 ohms)	33-1025
(30) Resistor (5000 ohms)	33-1001
(31) Condenser (.25 mfd.)	30-4146
(32) Resistor (51,000 ohms)	5868
(33) Condenser (.00025 mfd.)	3082
(34) Condenser (.25 mfd.)	04360
(35) Resistor (100,000 ohms)	6099
(36) Resistor (500,000 ohms)	6097
(37) Condenser (.006 mfd.)	30-4125
(38) Condenser (10 mfd.)	7440
(39) Resistor (500 ohms)	33-3031
(40) Condenser (.006 mfd.)	30-4024
(41) Output Transformer	32-7214
(42) Cone & Voice Coil	02861
(43) Field Coil Assembly	36-3097
(44) Pilot Light	6608
(45) Resistor (7 ohms)	33-3035
(46) "A" Choke	32-1268
(47) Condenser (.5 mfd.)	30-4047
(48) Vibrator Choke	32-1235
(49) Condenser (.5 mfd.)	30-4147
(50) Vibrator Unit	38-5036
(51) Condenser (.05 mfd.)	30-4039
(52) Resistor (200 ohms)	7217
(53) Resistor (200 ohms)	7217
(54) Condenser (.00125 mfd.)	5886
(55) Power Transformer	32-7216
(56) Condenser (.01 mfd.)	30-4051
(57) Condenser (4.—8. mfd.)	30-2072
(58) "B" Choke	32-7215
(59) R. F. Choke	32-1281
(60) Resistor (30,000 ohms)	7836
(61) Resistor (32,000 ohms)	3525
Spark Plug Resistor	4531
Distributor Resistor	4546
Screw Type Resistor	4851
Interference Condenser	30-4007
Dial	27-5040
Studs	28-6036
Nuts (mounting)	W55A
Knobs (tuning)	03334
Knobs (volume)	06886
Battery Cable	38-5296
Acorn Nut	W821
Fuse	7227
Fuse Insulator	27-7131
4-Prong Socket	27-6006
5-Prong Socket	27-6014
6-Prong Socket	6417
Instrument Panel Control	42-5164
Steering Column Control	42-5165

Model J Nash-Philco Lafayette 110 Series Model AC-1189

Items 1 to 61 in the list at the left are identical for Model AC-1189. See following items for additional accessories.

Spark Plug Resistors	33-1101
Distributor Resistor	33-1103
Screw-Type Resistor	4851
Interference Condenser	30-4007
Dial	27-5041
4-Prong Socket	27-6006
5-Prong Socket	27-6014
6-Prong Socket	6417
Studs	28-6036
Nuts (Mounting)	W55
Knob	03064
Battery Cable	38-5296
Instrument Panel Control	42-5169
Fuse	7227
Fuse Insulator	27-7131
Keys	6091

Model J Nash-Philco Model AC-1289

Items 1 to 61 in the list at the left are identical for Model AC-1289. See following items for additional accessories.

Ins. Panel Control DeLuxe	42-5183
Ins. Panel Con. Standard	42-5182
Fuse	7227
Fuse Insulator	27-7131
Keys	6091
4-Prong Socket	27-6006
5-Prong Socket	27-6014
6-Prong Socket	6417
Spark Plug Resistors	33-1101
Distributor Resistor	33-1103
Screw-Type Resistor	4851
Interference Condenser	30-4007
Dial	27-5041
Studs	28-6102
Nuts (Mounting)	W55
Knob	03064
Battery Cable	38-5296

MODEL Q Nash (AC-1089)
For Lafayette 110 Series
Schematic, Parts List

PHILCO RADIO & TELEV. CORP

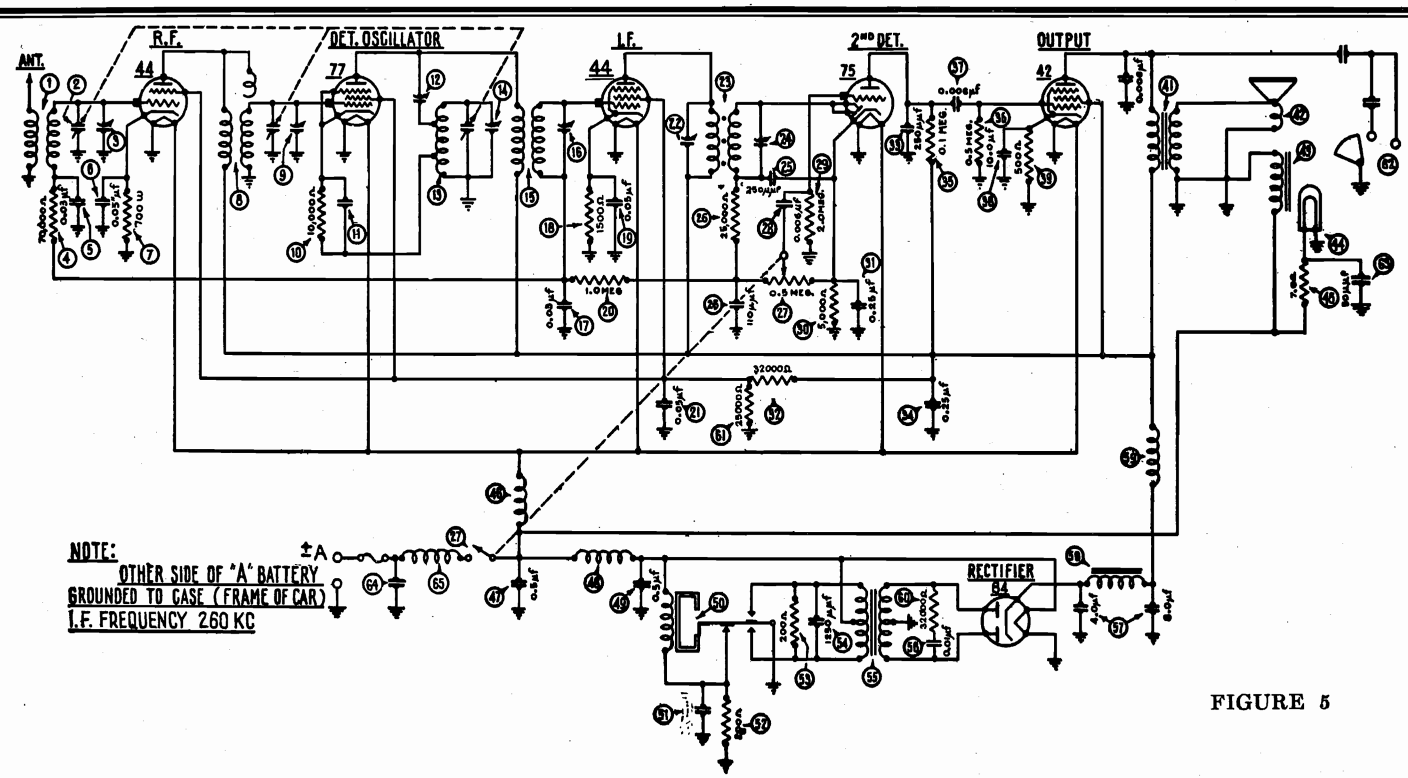


FIGURE 5

NASH - PHILCO MODEL AC 1089 PARTS LIST

(1) Antenna Transformer	32-1331
(2) Tuning Condenser	31-1340
(3) 1st Padder (in tun. cond.)	
(4) Resistor (70,000 ohms)	33-1115
(5) Condenser (.03 mfd.)	30-4025
(6) Condenser (.05 mfd.)	30-4020
(7) Resistor (700 ohms)	6443
(8) R. F. Transformer	32-1332
(9) 2nd Padder (in tun. cond.)	
(10) Resistor (10,000 ohms)	33-1000
(11) Condenser (.00025 mfd.)	30-1032
(12) Padder (Pri. 1st I. F. Tran.)	
(13) Oscillator Transformer	32-1333
(14) 3rd Padder (in tun. cond.)	
(15) 1st I. F. Transformer	32-1329
(16) Padder (Sec. 1st I. F. Tran.)	
(17) Condenser (.03 mfd.)	30-4025
(18) Resistor (2000 ohms)	33-3048
(19) Condenser (.05 mfd.)	30-4020
(20) Resistor (1,000,000 ohms)	33-1096
(21) Condenser (.05 mfd.)	30-4020
(22) Padder (Pri. 2nd I. F. Tran.)	
(23) 2nd I. F. Transformer	32-1237
(24) Padder (Sec. 2nd I. F. Tran.)	
(25) Condenser (.00025 mfd.)	30-1032
(25)A Condenser (.00011 mfd.)	30-1031
(26) Resistor (25,000 ohms)	33-1013
(27) Vol. Con. & Switch Assm.	38-5606
(28) Condenser (.006 mfd.)	30-4125
(29) Resistor (2,000,000 ohms)	33-1025
(30) Resistor (5000 ohms)	6096
(31) Condenser (.25 mfd.)	30-4146
(32) Resistor (32,000 ohms)	3525
(33) Condenser (.00025 mfd.)	3082
(34) Condenser (.25 mfd.)	04360
(35) Resistor (100,000 ohms)	6099
(36) Resistor (500,000 ohms)	6097
(37) Condenser (.006 mfd.)	30-4125
(38) Condenser (10 mfd.)	30-2072
(39) Resistor (500 ohms)	33-3031
(41) Output Transformer	32-7245
(42) Cone & Voice Coil	36-3157
(43) Field Coil Assembly	36-3046
(44) Pilot Lamp	34-2031
(45) Resistor (7 ohms)	33-3035
(46) "A" Choke	32-1402
(47) Condenser (.5 mfd.)	30-4184
(48) Vibrator Choke	32-1235
(49) Condenser (.5 mfd.)	30-4015
(50) Vibrator	38-5036
(51) Condenser (.02 mfd.)	30-4039
(52) Resistor (200 ohms)	7217
(53) Resistor (200 ohms)	7217
(54) Condenser (.00125 mfd.)	5886
(55) Power Transformer	32-7216
(56) Condenser (.01 mfd.)	30-4051
(57) Condenser (4-8-10 mfd.)	30-2072
(58) "B" Choke	32-7215
(59) R. F. Choke	32-1281
(60) Resistor (32,000 ohms)	3525
(61) Resistor (25,000 ohms)	33-1013
(62) Tone Control	30-4180
(63) Condenser (.00005 mfd.)	30-1029
(64) Condenser (.00025 mfd.)	30-1032
(65) "A" Choke	32-1374
Spark Plug Resistors	33-1101
	33-1102
Distributor Resistor	33-1103
Interference Condenser	30-4007
Nuts (mounting)	W55A
Battery Cable	38-5296
Acorn Nut	W821
Fuse	7227
Fuse Insulator	27-7131
Studs	28-6036
Knob	03064
Dial	27-5041
Antenna Lead	38-5131
4-prong Socket	27-6015
5-prong Socket	27-6014
6-prong Socket	27-6020
Shaft (volume)	28-8182
Shaft (tuning)	28-8181

MODEL Q Nash (AC-1089)
For Lafayette 110
Installation Data

PHILCO RADIO & TELEV. CORP.

General Installation Instructions

FOR 110 SERIES LAFAYETTE CARS

Custom Built by Philco — Sold Exclusively by Nash Dealers

THE INSTRUCTIONS have been carefully prepared for your use in installing the Model Q Nash-Philco automobile radio Receiver in the 1934 Model LAFAYETTE cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

The antenna lead in the 1934 Lafayette closed cars is brought down the left front pillor post and is coiled behind the left cowl trim panel.

Instrument Board Control

The instrument board control can be installed more conveniently if this is done as the first operation.

Remove the left dummy ash receptacle door by removing the three nuts behind the instrument panel. Refer to Fig. 1 for dimensions. Paste a piece of paper 1½" wide, 2½" long, over the two lower holes. Pierce holes through the paper with a pencil and draw a center line between them. Drop a vertical line down 13/32" from the center of these holes and mark with a center punch. Drill a ⅜" hole. Remove the paper and elongate the hole horizontally with a round file, as shown on Fig. 1. The control shaft holes should now be enlarged with a ⅜" drill. With a round file, notch the top of the large hole, as shown on Fig. 1. Remove the burrs. Assemble the felt washer between the control head casting and the back of the instrument board. Mount the cover plate and assemble with the two flat-head machine screws. Dress the flexible control shafts over the top of the instrument board-to-dash bracket.

Receiver Location and Installation

Holes for the two top mounting studs are provided in the metal dash. The single hole on the bottom is occupied by a padding fastening bolt. The locations of these holes are shown in Fig. 2. On certain bodies these holes must be slotted downward a half inch.

Install the mounting studs in the dash holes. Drop the steering column to its lowest position by loosening the two bolts on the steering column bracket. This will facilitate the installation of the radio behind the steering column.

In fastening the studs to the Receiver, the lock washer must be placed between the Receiver and the shoulder on the bolt. The large flat washer must be placed against the padding on the inside of the dash. Mount the Receiver with the control shaft couplings toward the center of the car and with the speaker facing down. See Fig. 3.

Slip the radio in place, and screw the studs into the holes in the Receiver housing from the outside of the dash. This operation can be made easier if the end of the studs entering the set are slightly tapered.

After the radio is installed, the steering column must be returned to its original position and tightened.

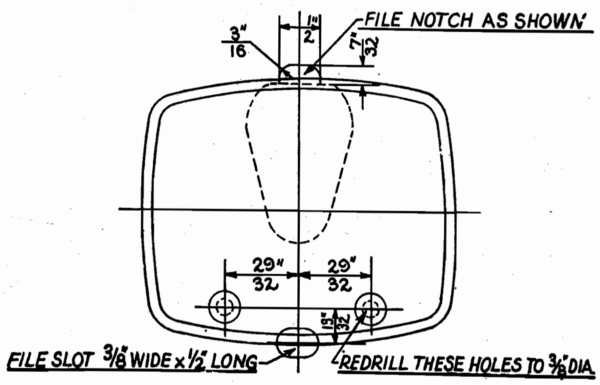


FIGURE 1

Connecting Control Shafts

The flexible shafts are coupled to the control unit when shipped from the factory. The right-hand knob on the control is the tuning control—the left-hand knob is the volume control and switch. The volume control must be locked with the key at the control. The flexible shafts should be dressed above the instrument board-to-dash bracket towards the center of the car and then curved down and around to the couplings on the Receiver. Loosen the small set screws and the clamp screws on the shaft couplings and clamp brackets. See Fig. 4. The volume control and switch in the Receiver must be turned all the way off (counter clockwise). The volume control coupling is the one nearest the front edge of the Receiver. The tuning control coupling is nearest the dash.

Seat the casings and shafts in the brackets and shaft couplings. Loosen the bracket mounting screws sufficiently so that the shafts and couplings are correctly aligned. Then tighten the casing clamp screws and the coupling set screws, and finally tighten the bracket mounting screws.

Battery Connections

Insert the fuse and fuse insulator in the fuse receptacle and connect to the Receiver battery lead as shown in Fig. 3. Connect the black-white lead of the battery cable to the battery side of the ammeter.

The black lead at each end of the battery cable is the shield lead which must be grounded to the back of the instrument panel and under one of the nuts on the Receiver housing. Exercise care when making these connections. The cable must be dressed and secured in place.

The black lead coming from the rear of the control unit must be plugged into the pilot lamp terminal on the speaker panel.

Antenna Lead

Splice the antenna lead to the antenna lead-in as close as possible to the corner post, dressing it in place above or in back of the Receiver. The shield on the lead must be grounded close to the corner post.

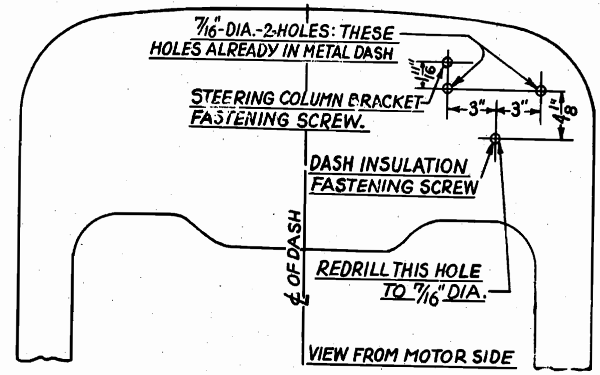


FIGURE 2

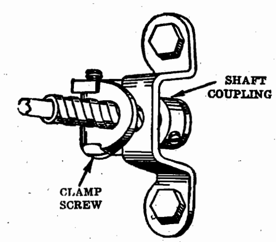


FIGURE 4

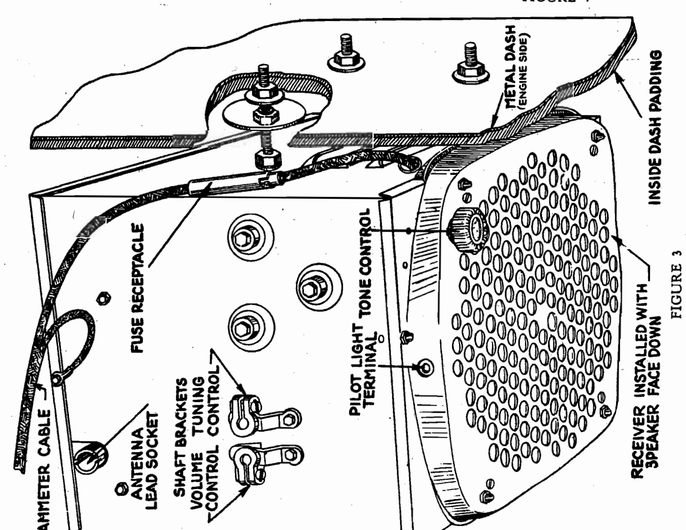


FIGURE 3

PHILCO RADIO & TELEV. CORP.

MODEL PA Packard Schematic, Chassis Wiring, Parts List

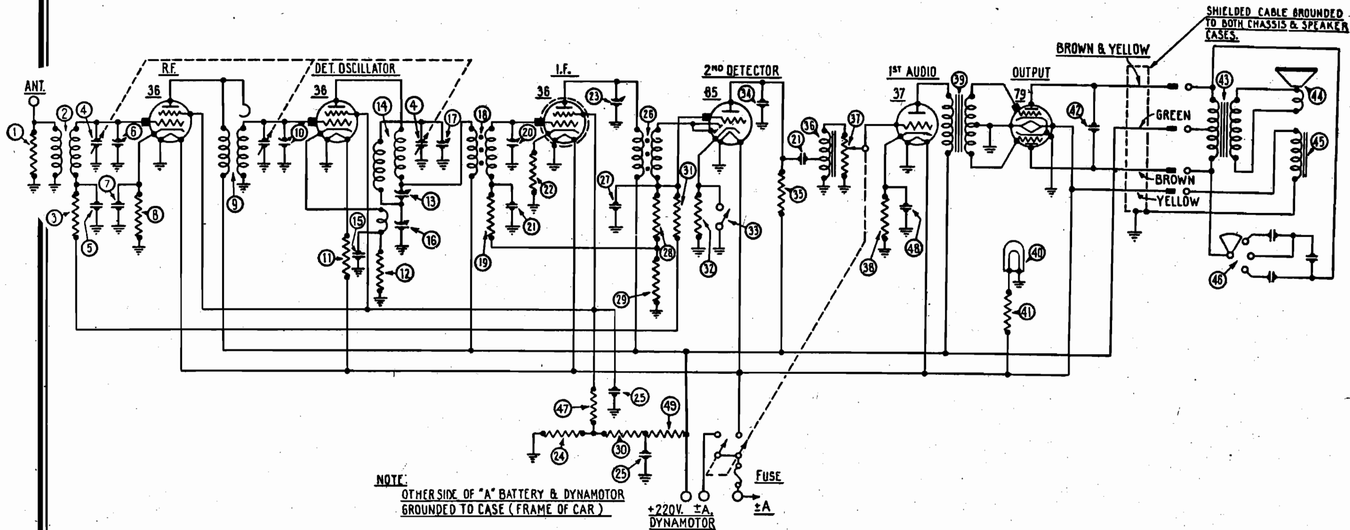


DIAGRAM C

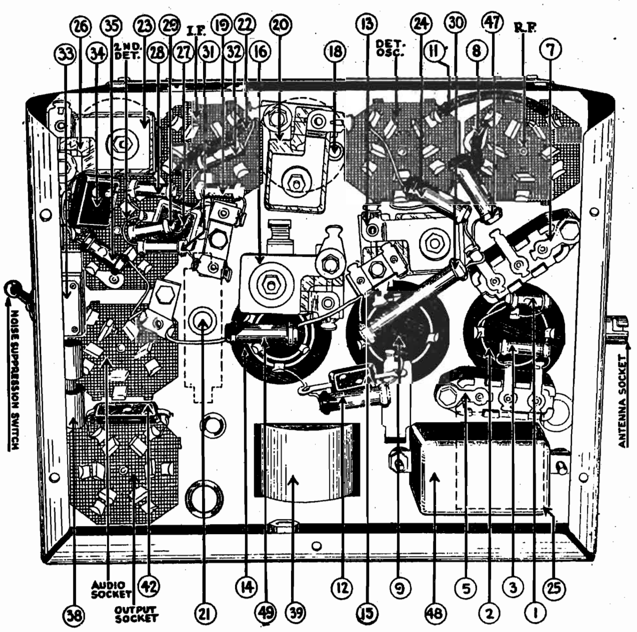


DIAGRAM D

MODEL PA PARTS LIST

No. in Figs. 1 and 2	Description	Part No.
1	Resistor (5,000 ohm)	60f6
2	Antenna Coil	.06914
3	Resistor (100,000 ohm)	6099
4	Tuning Condenser	.04308
5	By-pass Condenser (.05 mfd.)	3615-AN
6	Compensator section on tuning condenser	
7	By-pass Condenser	3615-AY
8	Resistor (500 ohm)	6977
9	R. F. Transformer	.06915
10	Compensator section on tuning condenser	
11	Resistor (2.7 ohm)	6511
12	Resistor (13,000 ohm)	8267
13	Compensator	.04000-J
14	Oscillator Coil	.06916
15	Condenser (.0007 mfd.)	4520
16	Compensating Condenser	.04000-S
17	Compensator section on tuning condenser	
18	First I. F. Transformer	.06932
19	Resistor (500,000 ohm)	6097
20	Compensating Cond.	.04000-X
21	Condenser (.05 mfd., .15 mfd.)	.06091
22	Resistor (500 ohm)	6977
23	Compensating Cond.	.04000-X
24	Resistor (20,000 ohm)	6650
25	Cond. (.5 mfd., .25 mfd.)	.06088
26	Second I. F. Transformer	.05970
27	Condenser (.00025 mfd.)	3082
28	Resistor (100,000 ohm)	6099
29	Resistor (100,000 ohm)	6099
30	Resistor (20,000 ohm)	6649
31	Resistor (500,000 ohm)	6097
32	Resistor (5,000 ohm)	6096
33	Switch	5462
34	Condenser (.00125 mfd.)	5886
35	Resistor (50,000 ohm)	4518
36	Audio Transformer	7552
37	Volume Control	7525
38	Resistor (2,500 ohm)	7775
39	Input Transformer	7652
40	Pilot Lamp	6608
41	Resistor (7 ohm)	5110
42	Condenser (.06 mfd.)	6359
43	Output Transformer	2515
44	Speaker Coil and Cone	.02823
45	Speaker Field Pot	.02795
46	Tone Control	.05366
47	Resistor (25,000 ohm)	4516
48	Condenser	7774
49	Resistor (8,000 ohm)	7835
	Dial	8255
	Battery Cable	41-3035
	Antenna Lead	38-5161
	Packard Dynamotor	41-1005
	Key	6091
	Studs	28-6088
	Nuts (Studs)	W-55
	Spark Plug Resistor	33-1016
	Distributor Resistor	33-1017
	Spark Plug Terminals	28-6053
	Intereference Condenser	4522

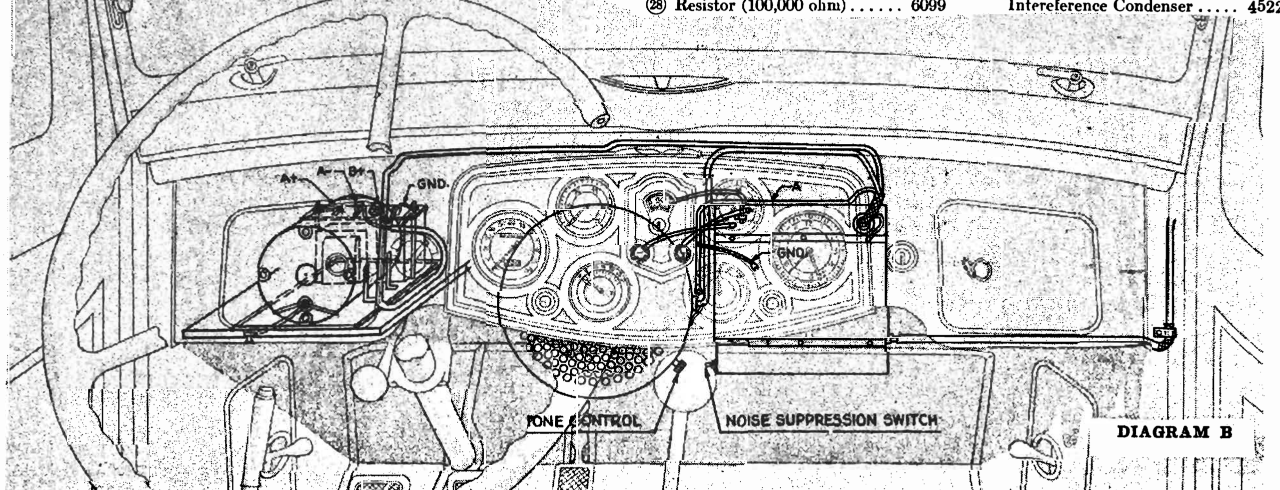


DIAGRAM B

MODEL PA Packard Installation Data

PHILCO RADIO & TELEV. CORP.

These instructions are intended to assist you when installing the Packard De Luxe Car Radio and should be carefully read before starting work. The installation is not complicated and no special troubles should be encountered if instructions are followed.

Antenna

All enclosed cars manufactured after January 1, 1933, are equipped with a roof type antenna, the lead-in from which is brought down inside the right front pillar post and coiled behind the cowl trim panel. Antennas suitable for open and convertible jobs can be secured from the Factory on special orders and are easily installed by snapping in place. Detailed information on these units can be secured by writing the Accessory Division of the Packard Motor Car Company.

On earlier cars that are not equipped with a roof antenna, the under-car type can be used with a reduction in efficiency of approximately 35 per cent.

Receiver and Speaker Location

Refer to the diagram "A", showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use this same procedure for the speaker, drilling with 7/16-inch drill. On Packard Twelve models you may find it difficult to locate and drill the speaker holes from the motor side of the dash, and if so, this work can be done from the body side, providing care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models the receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the larger washer furnished, next to the insulating material.

Mount the speaker with the tone control to the right side of the car, which permits easy operation. The felt baffle should be mounted on studs between speaker and dash.

Control Unit

On cars where provision has been made to mount the control unit in the instrument panel a finish plate is used to fill the opening. Remove this plate by loosening the three hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket formerly provided for the plate) and secured by the three hold-down clamps.

Note.—As the finish on instrument panels varies with different models of Packard cars, it may be desirable to match the finish plate of the radio control unit to the panel. The Packard Motor Car Company can supply control unit finish plates to match the various instrument panels.

When no provision has been made to mount the control unit in the instrument panel, it should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right, approximately six inches below the steering wheel hub. Cut off the metal strap to proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

Lining Up Receiver

As the tuning dial is calibrated in kilocycles, it may be necessary to line it up with the receiver, so stations may be tuned in at the proper point, this being accomplished as follows:

Set the tuning dial to line up with the extra division below 150 and insert a blunt-pointed wire or match through the small hole located at the back of the control unit close to the tuning knob. Next carefully press the tuning dial out of mesh with the gear and while holding it so, turn the knob to the extreme counter-clockwise limit and release the tuning dial. It should now line up and can be checked by tuning in stations whose operating frequency is known.

Control Shaft Installation

Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it firmly in position. Insert this shaft and conduit into the left-hand receptacle on the front of receiver and tighten set screw. Next turn the dial to line up with the extra division below 150 and turn the condenser unit so the plates are completely out of mesh, at which point the screw in the brass coupler should be accessible. Next insert the tuning shaft and conduit in the right-hand receptacle on front of receiver, locking them in position with their respective set screws.

When the control unit is mounted on the steering column, fasten the two flexible shafts to the bottom edge of the instrument panel with a small clamp, this being so located as to make the best appearance and provide the smoothest operation. Cover these flexible shafts and the dial light wire with the small piece of loom (supplied with set) to prevent the shafts coming in contact with the ammeter terminals in the instrument board.

Battery Cable Location and Connections

(See diagram "B")

Plug the cable into the receptacle at the front of the receiver and run the battery portion sharply upwards to the recess above the instrument board and follow this recess to the left-side glove compartment, where the dynamotor cable passes into the glove compartment through a hole located near the forward edge of the box. The "A" or two-wire cable should be run to the ammeter, keeping it as close to the instrument board as possible. Connect the feed wire (small closed terminal) to the discharge side of the ammeter and the shield (equipped with spade terminal—wire marked "GND") should be grounded under the lower clock clamp screw. Connect the black wire from the dial light on the control unit to the fahnstock terminal on the face of the receiver. The speaker cable is plugged into the receptacle on the speaker and the ground tabs on the cables are fastened under a screw head on the receiver and speaker. The antenna lead-in should then be plugged into the receiver, the cable being carried along the dash in the rear of the right glove compartment, using the glove compartment rear bracket as a means of support. This lead-in should be spliced to the antenna lead-in, which will be found coiled and taped back of the cowl trim panel. Any excess cable should be cut off, using enough lead-in to make a neat installation. The lead-in provided with the receiver is equipped with pigtail ground, which should be wrapped around the antenna lead-in shield and carefully taped.

Operating Instructions

The receiver is placed in operation by turning the left-hand knob on the control head in a clockwise position. After tubes have been warmed up a minute or so, resonance will be indicated by a rushing sound, and any station within range can be tuned in by manipulating the right-hand knob, after which the volume is set to the desired level with the left. The small snap switch on the left end of the receiver cabinet should be pulled to the rear (towards the front seat) for maximum sensitivity when operating in the country or quiet part of the city. When driving close to the broadcast station being received or in a noisy location, smoother operation and quieter tuning can often be obtained by throwing this switch forward.

Ordinarily the tone control (on the loud speaker) should be fully opened by tuning in a clockwise direction and then turned back (counter-clockwise) one or two notches, which will give the best compromise between tonal brilliancy and minimum noise. When operating extremely noisy parts of the city, however (as when following a street car), it will sometimes be advisable to turn this control in a clockwise direction as far as it will go. When operating in the immediate vicinity of a power line or car tracks, crackling or snapping noises are quite likely to be in evidence, due to leakage of high voltage to ground. This man-made static cannot be eliminated by any receiver, but its effects will be minimised if the dial is set to bring in the most powerful local station. Man-made as well as natural static is amplified along with the radio signal, and naturally the powerful local needs less amplification, thus enabling it to ride over unwanted noises.

When turning off the receiver be sure the left-hand knob is turned counter-clockwise until a definite click is heard, otherwise the receiver may continue to operate and run down the battery.

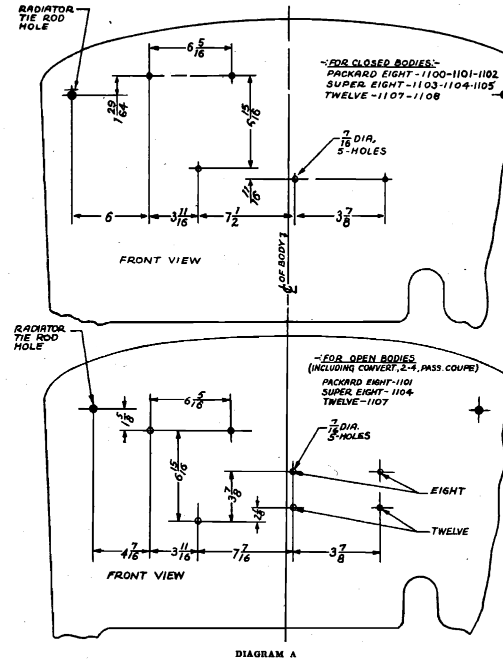


DIAGRAM A

PACKARD DE LUXE RADIO—Installation Dash Layout for Packard Models 1100, 1101, 1102, 1103, 1105, 1107, 1108

Dynamotor

The dynamotor is so designed that it can be installed in the left-hand glove compartment. Pull the dynamotor cable through the hole in the upper corner of the box and connect the white lead of this cable to the "A" terminal of the dynamotor. The blue lead must then be connected to the "B plus" terminal and the shield on the cable grounded under the left-hand terminal strip nut. Slide the complete unit into the glove compartment, making sure that the rubber mat is not doubled up and that the cables are dressed neatly in place. The dynamotor grounding strip must be securely attached to the instrument board and a convenient mount is easily provided by replacing the left-hand screw that holds the glove compartment to the panel with a longer one.

On open models the rubber mat must be removed to permit the dynamotor to slide through the glove compartment door. Following the installation of the dynamotor as previously described, the rubber mat can be attached to the dynamotor in the glove compartment, replacing the rivets with small screws.

Ignition and Generator Interference Suppression

On the twelve-cylinder cars provision has been made to mount a condenser in the coil bracket, using the right front coil mounting screw as a means of attachment. The condenser can be installed by passing the condenser lead through the hole provided in the coil bracket and attaching to one of the terminals on the lower side of the coil to which a brass strip is fastened. Replace the unit and tighten nuts, making certain that the condenser case is grounded through the enamel. Locate the second condenser under outside generator relay mounting screw and connect wire to the battery terminal of relay.

On eight-cylinder cars it will generally be best to locate the first condenser under the clock clamp screw with the wire fastened to the ammeter side of ignition switch. The generator condenser is then mounted as previously described.

Cut off the spark plug terminals from the high tension wires and screw on the resistor units, after which the small round nuts (furnished with set) can be screwed on to the spark plugs and the resistors snapped in place. Cut distributor to coil high tension wires about one inch from distributor head and insert "screw-in" type distributor resistors. When the rest of the installation is carefully made, the resistor between coil and distributor will sometimes be unnecessary, thus tending to improve throttling and idling. In all cases, however, spark plug gap should be increased from the standard .025" to .030". Spark plugs with built-in resistors can be used in place of the detachable type if desired, in which case the terminals on the spark plug wires are not cut off.

To check for ignition interference, disconnect the antenna lead-in from set. Turn on receiver and start engine. If there is any noise coming through the speaker from the electrical system of the car when the volume control is about three-fourths open and the local-long distance switch pointing to rear of car, carefully relocate speaker cable and battery cable to a point where the noise is reduced to a minimum. If relocation of these two cables does not practically eliminate ignition interference, it will then be advisable to peen the distributor rotor arm.

Peening the Rotor Arm

Place the ends of the rotor on a steel block and peen with a small machinist hammer, extending them about .005". Both ends must be so treated with a double coil system.

The greatest care must be taken in performing the operation to make sure the rotor arm itself does not strike the stationary contacts after the rotor and cap are replaced. Without turning on the ignition key, press the starter and then examine the rotor arm and the contact points to be sure that the steel part of the arm is not striking the stationary contacts.

Start the motor again and the volume of noise should now be down to a minimum. If not, relocate the speaker and battery cables slightly. If generator interference is encountered, it can usually be eliminated by cleaning the commutator and reseating the brushes. This noise can easily be isolated by speeding up the engine and cutting off ignition to make sure it is not responsible.

Connect the antenna lead to the receiver, recheck for noise and relocate speaker and battery cables if necessary.

PHILCO RADIO & TELEV. CORP.

MODEL PB Packard
Schematic, Chassis
Parts List, Socket

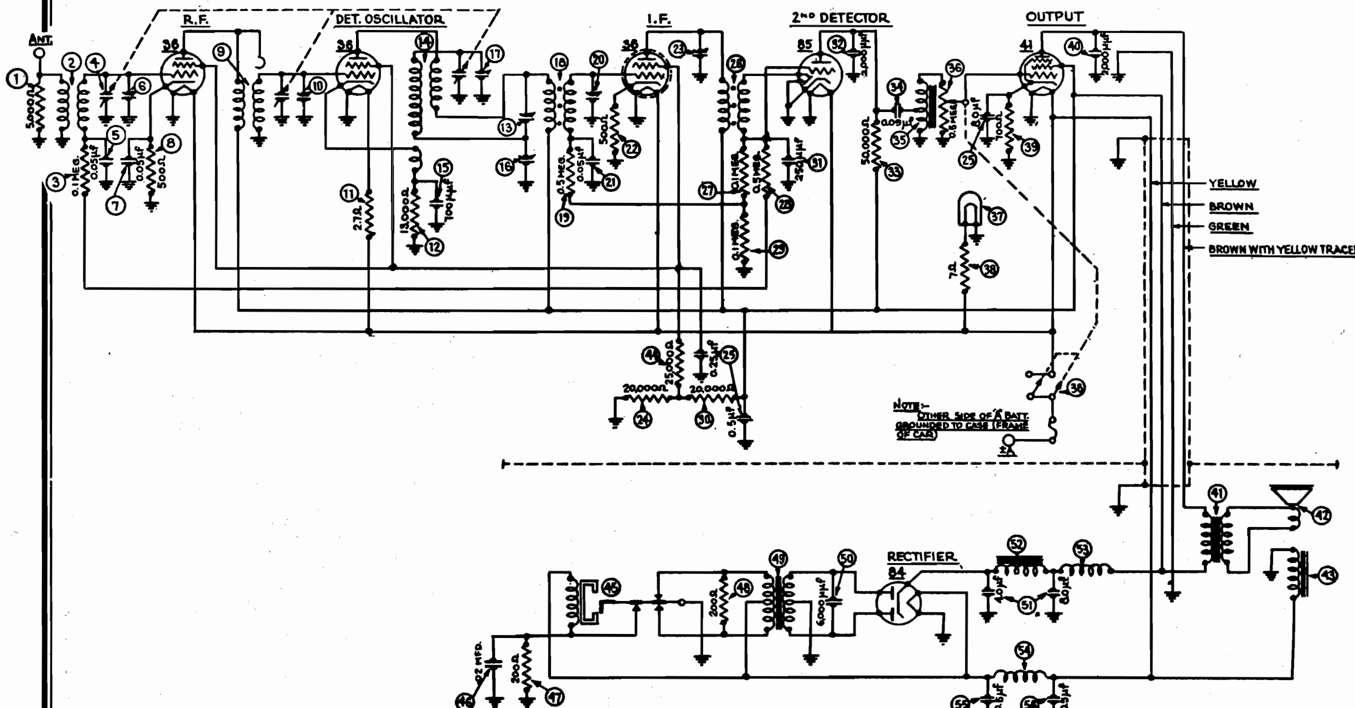


DIAGRAM C

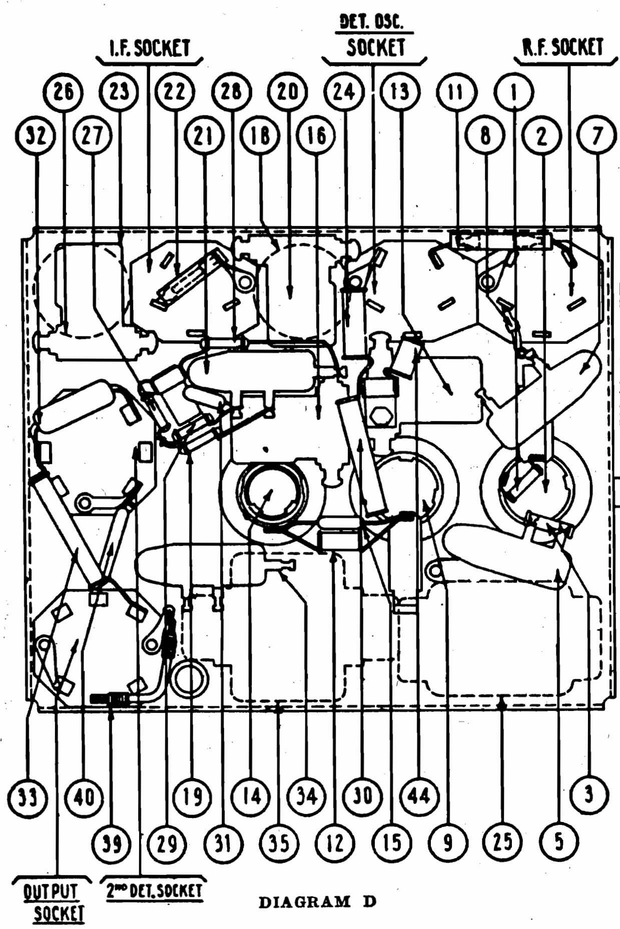


DIAGRAM D

MODEL PB PARTS LIST

No. in Diagrams C & D	Description	Part No.
1	Resistor (5,000 ohm)	6096
2	Antenna Transformer	32-1197
3	Resistor (100,000 ohm)	6099
4	Tuning Condenser	04308
5	By-pass Condenser (.05 mfd.)	3615-AN
6	R. F. Transformer	32-1198
7	By-pass Condenser (.05 mfd.)	3615-AT
8	Resistor (500 ohm)	6977
9	Detector Coil	03915
10	Compensator section on tuning condenser	
11	Resistor (2.7 ohm)	6511
12	Resistor (13,000 ohm)	8267
13	Compensating Cond.	04000-J
14	Oscillator Coil	06916
15	Condenser (.0007 mfd.)	4520
16	Compensating Cond.	04000-S
17	Compensator section on tuning condenser	
18	First I. F. Transformer	06932
19	Resistor (500,000 ohm)	6097
20	Compensating Cond.	04000-X
21	Condenser (.05 mfd.)	3615-AK
22	Resistor (500 ohm)	6977
23	Compensating Cond.	04000-X
24	Resistor (20,000 ohm)	6650
25	Condenser (.25 mfd., .5 mfd., 8 mfd.)	04354
26	Second I. F. Transformer	05970
27	Resistor (100,000 ohm)	6099
28	Resistor (500,000 ohm)	6097
29	Resistor (100,000 ohm)	6099
30	Resistor (20,000 ohm)	6649
31	Condenser (.00025 mfd.)	3082
32	Condenser (.0002 mfd.)	4059
33	Resistor (50,000 ohm)	4237
34	Condenser (.09 mfd.)	4989-Y
35	Audio Transformer	7535
36	Volume Control (500,000 ohm) and switch	7525
37	Pilot Lamp	6608
38	Resistor (7 ohm)	5110
39	Resistor (700 ohm)	6443
40	Condenser (.002 mfd.)	6853
41	Output Transformer	2598
42	Cone and Coil	36-3020
43	Field Coil	33-3140
44	Resistor (25,000 ohm)	4516
45	Vibrator	38-5036
46	Condenser (.05 mfd.)	30-4039
47	Resistor (200 ohm)	7217
48	Resistor (200 ohm)	7217
49	Power Transformer	32-7110
50	Condenser (.006 mfd.)	6359
51	Filter Condenser (4 mfd., 8 mfd.)	30-2030
52	Filter Choke	32-7118
53	R. F. Choke	32-1068
54	"A" Choke	32-1259
55	Condenser (.5 mfd.)	30-4015
56	Condenser (.5 mfd.)	30-4015
	Fuse (15A.)	7227
	Dial	8255
	"A" Battery Lead	41-3042
	Speaker Power Cable	41-3044
	Antenna Lead	38-5161
	Key	6091
	Studs	28-6088
	Nuts (Studs)	W-55
	Spark Plug Resistor	33-1016
	Distributor Resistor	33-1017
	Spark Plug Terminal	28-6053
	Interference Condenser	4522

MODEL PB Packard
Installation Data

PHILCO RADIO & TELEV. CORP.

PACKARD STANDARD CAR RADIO GENERAL INSTALLATION INSTRUCTIONS

Antenna

All closed cars manufactured after January 1, 1933, are equipped with a roof-type antenna, the lead-in from which is brought down inside the right front pillar post and coiled behind the cowl trim panel.

Antennas suitable for open and convertible jobs can be secured from the Factory on special orders and are easily installed by snapping in place. Detailed information on these units can be secured by writing the Accessory Division of the Packard Motor Car Company.

On earlier cars that are not equipped with a roof antenna, the undercar type can be used with a reduction in efficiency of approximately 85 per cent.

Installation Preparation

Although it is not really necessary to remove the right-hand glove compartment, some will find it an advantage to take it out until the installation is completed.

Receiver and Speaker Location

Refer to the cuts showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use this same procedure for the speaker, drilling with 7/16-inch drill. On Packard Twelve models, you may find it difficult to locate and drill the speaker holes from the motor side of the dash, and if so, this work can be done from the body side, provided care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models, the receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the large washer furnished, next to the insulating material.

Instrument Board Control Unit

On cars where provision has been made to mount the control unit in the instrument panel, a finish plate is used to fill the opening. Remove this plate by loosening the three hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket formerly provided for the plate) and secured by the three hold-down clamps.

NOTE.—As the finish on instrument panels varies with different models of Packard cars, it may be desirable to match the finish plate of the radio control unit to the panel. The Packard Motor Car Company can supply control unit finish plates to match the various instrument panels.

Steering Column Control Unit

When no provision has been made to mount the control head in the instrument panel, a special unit should be obtained from the Accessory Division. This should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right approximately six inches below the steering wheel hub Cut off the metal strap to proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

Fasten the two flexible shafts to the bottom edge of the instrument panel with a small clamp, this being so located as to make the best appearance and provide the smoothest operation. Cover these flexible shafts and the dial light wire with the small piece of loom (supplied with set) to prevent the shafts coming in contact with the ammeter terminals in the instrument board.

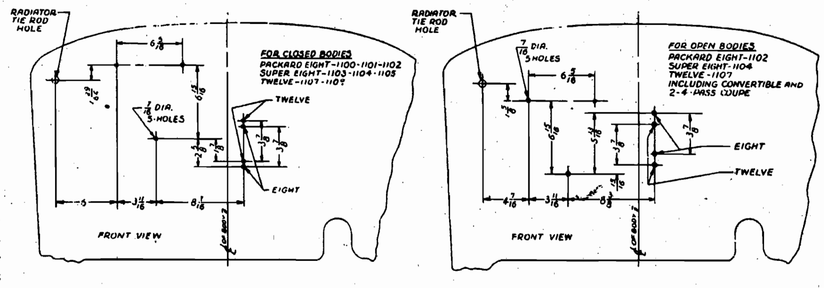
Control Shaft Installation

Remove the front cover plate from the receiver. Turn the left-hand knob (volume control) to a point where the key will lock it firmly in position. Insert this shaft and conduit into the left-hand receptacle on the front of receiver and tighten set screw. Next turn the dial to line up with the extra division below 150 and turn the condenser unit so the plates are completely out of mesh, at which point the screw in the brass coupler should be accessible. Next insert the tuning shaft and conduit in the right-hand receptacle on front of receiver, locking them in position with their respective set screws.

Battery Cable Location and Connections

Plug the cable into the receptacle at the front of the receiver and run the speaker cable over to that unit, plugging it in top. The "A" or two-wire cable should be run to the ammeter, keeping it as close to the instrument board as possible. Connect the hot wire (small closed terminal) to the discharge side of the ammeter and the shield (equipped with spade terminal) should be grounded under the lower clock clamp screw. Connect the black wire from the dial light on the control unit to the fahnestock terminal on the face of the receiver. The ground tab on the cable is fastened under a screw head on the receiver. The detachable part of the antenna lead-in should then be attached to the shielded wire that comes down through the right-hand pillar post after the latter has been cut to the proper dimension. Ordinarily the splice should be made fairly close to the pillar post, with one shield telescoping over the other and snugly conneted after the splice has been properly taped to prevent any likelihood of short circuits. The lead is then carried up over the glove box and down on the left-hand side, where it is attached to the receiver lead by means of the bayonet lock.

NOTE.—On bodies where the antenna lead-in has not been provided with a grounded shield, it will be necessary to remove the cowl trim panel, so the shield of the detachable antenna lead-in can be grounded as close to the pillar post as possible.



RADIO INSTALLATION DASH LAYOUT FOR PACKARD MODELS 1100-1101-1102-1103-1104-1105-1107-1108

DIAGRAM A

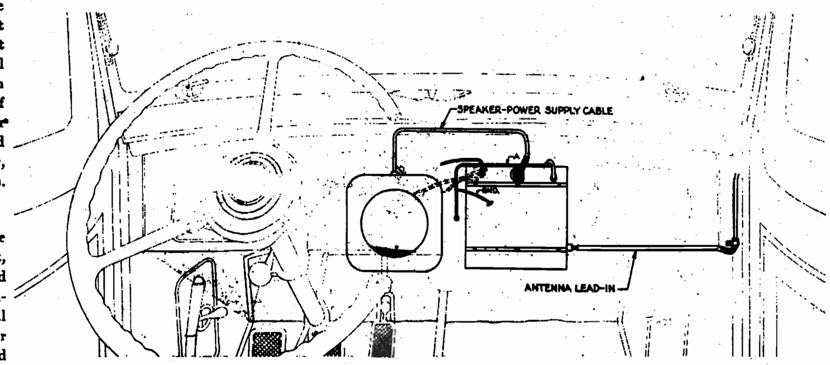


DIAGRAM B

Lining Up Receiver

As the tuning dial is calibrated in kilocycles, it may be necessary to line it up with the receiver, so stations may be tuned in at the proper point, this being accomplished as follows:

Set the tuning dial to line up with the extra division below 150 and insert a blunt-pointed wire or match through the small hole located at the back of the control unit. Next carefully press the tuning dial out of mesh with the gear, and while holding it so, turn the knob to the extreme counter-clockwise limit and release the tuning dial. It should now line up and can be checked by tuning in stations whose operating frequency is known.

Operating Instructions

The receiver is placed in operation by turning the left-hand knob on the control head in a clockwise position. After tubes have been warmed up, a minute or so, resonance will be indicated by a rushing sound, and any station within range can be tuned in by manipulating the right-hand knob, after which the volume is set to the desired level with the left.

When operating in the immediate vicinity of a power line or car tracks, crackling or snapping noises are quite likely to be in evidence, due to leakage of high voltage to ground. This man-made static cannot be eliminated by any receiver, but its effects will be minimized if the dial is set to bring in the most powerful local station. Man-made as well as natural static is amplified along with the radio signal, and naturally the powerful local needs less amplification, thus enabling it to ride over unwanted noises.

When turning off the receiver be sure the left-hand knob is turned counter-clockwise until a definite click is heard, otherwise the receiver may continue to operate and run down the battery.

PHILCO RADIO & TELEV. CORP.

MODEL PHD Packard
Schematic, Chassis
Socket, Parts

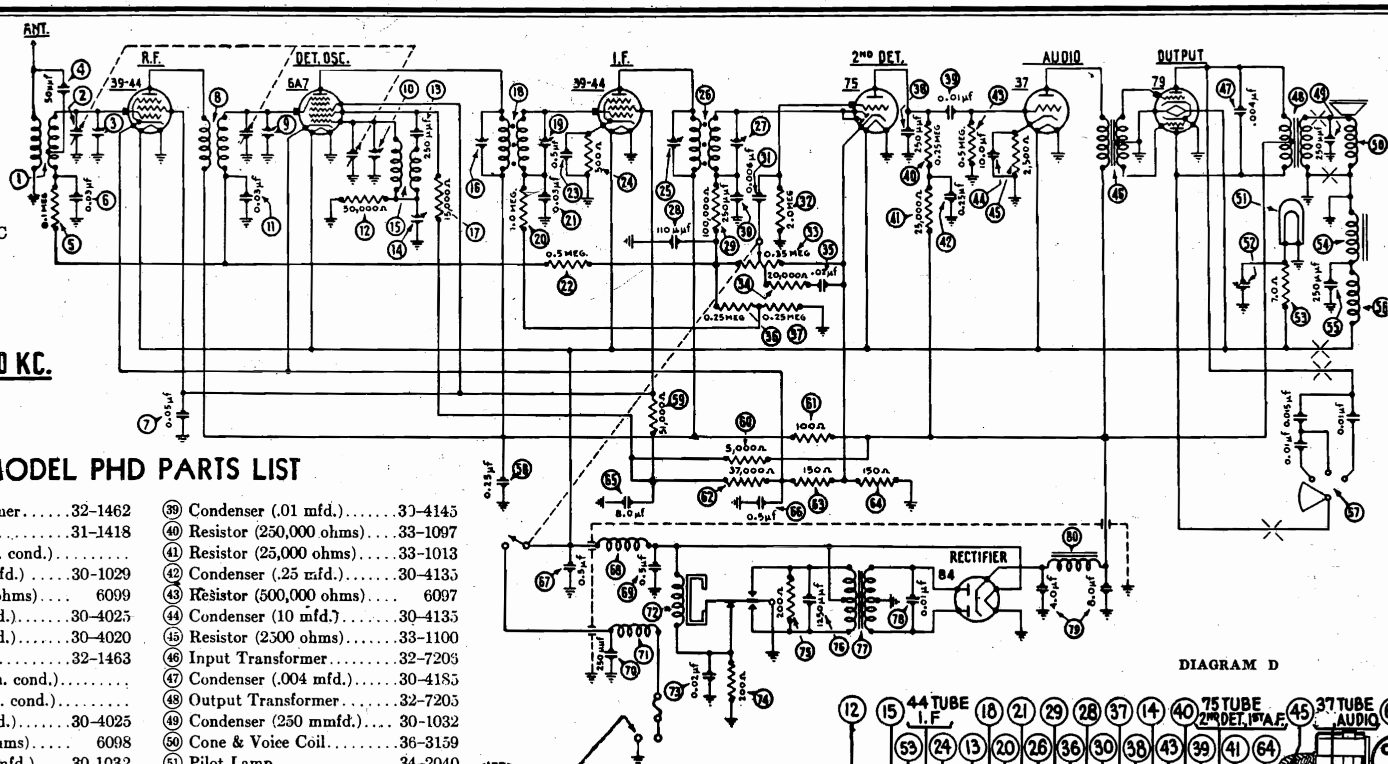


DIAGRAM C

I.F. = 260 KC.

NOTE. OTHER SIDE OF "A" BATT. GROUNDED TO CASE (FRAME OF CAR)

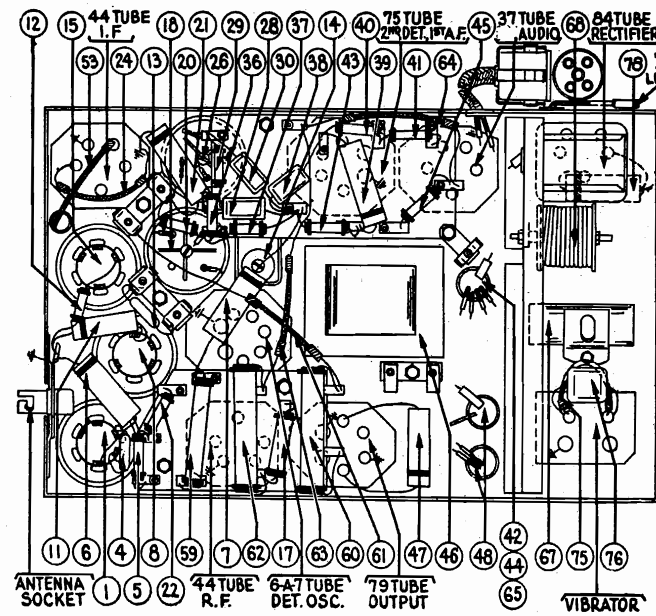


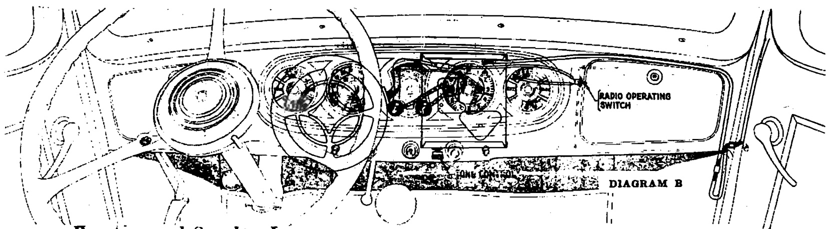
DIAGRAM D

MODEL PHD PARTS LIST

1	Antenna Transformer	32-1462
2	Tuning Condenser	31-1418
3	1st Padder (in tun. cond.)	
4	Condenser (50 mmfd.)	30-1029
5	Resistor (100,000 ohms)	6099
6	Condenser (.03 mfd.)	30-4025
7	Condenser (.05 mfd.)	30-4020
8	R. F. Transformer	32-1463
9	2nd Padder (in tun. cond.)	
10	3rd Padder (in tun. cond.)	
11	Condenser (.03 mfd.)	30-4025
12	Resistor (50,000 ohms)	6098
13	Condenser (250 mmfd.)	30-1032
14	Padder	30-6012
15	Oscillator Transformer	32-1222
16	Padder (Pri. 1st I. F. Trans.)	
17	Resistor (15,000 ohms)	6208
18	First I. F. Transformer	32-1471
19	Padder (Sec. 1st I. F. Trans.)	
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.03 mfd.)	30-4025
22	Resistor (500,000 ohms)	6097
23	Condenser (.5 mfd.)	30-4038
24	Resistor (500 ohms)	6977
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-1449
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (110 mmfd.)	30-1031
29	Resistor (100,000 ohms)	6099
30	Condenser (250 mmfd.)	30-1032
31	Condenser (.006 mfd.)	30-4125
32	Resistor (2,000,000 ohms)	33-1025
33	Vol. Cont. & Sw. Assembly	38-6022
34	Resistor (20,000 ohms)	33-1130
35	Condenser (.02 mfd.)	30-4215
36	Resistor (250,000 ohms)	33-1097
37	Resistor (250,000 ohms)	33-1097
38	Condenser (250 mmfd.)	30-1032
39	Condenser (.01 mfd.)	30-4145
40	Resistor (250,000 ohms)	33-1097
41	Resistor (25,000 ohms)	33-1013
42	Condenser (.25 mfd.)	30-4135
43	Resistor (500,000 ohms)	6097
44	Condenser (10 mfd.)	30-4135
45	Resistor (2500 ohms)	33-1100
46	Input Transformer	32-7203
47	Condenser (.004 mfd.)	30-4185
48	Output Transformer	32-7205
49	Condenser (250 mmfd.)	30-1032
50	Cone & Voice Coil	36-3159
51	Pilot Lamp	34-2040
52	Condenser (250 mmfd.)	30-1032
53	Resistor (7 ohms)	33-3130
54	Field Coil Assembly	02795
55	Condenser (250 mmfd.)	30-1032
56	Choke	32-1464
57	Tone Control	30-4208
58	Condenser (.25 mfd.)	30-4134
59	Resistor (51,000 ohms)	4237
60	Resistor (5000 ohms)	33-1070
61	Resistor (100 ohms)	33-3023
62	Resistor (37,000 ohms)	33-1098
63	Resistor (150 ohms)	33-3045
64	Resistor (150 ohms)	33-3045
65	Condenser (8 mfd.)	30-4135
66	Condenser (.5 mfd.)	30-4048
67	Condenser (.5 mfd.)	30-4015
68	Vibrator Choke	32-1474
69	Condenser (.5 mfd.)	30-4047
70	Condenser (250 mmfd.)	32-1466
71	"A" Choke	32-1466
72	Vibrator	38-5036
73	Condenser (.02 mfd.)	30-4039
74	Resistor (200 ohms)	7217
75	Resistor (200 ohms)	7217
76	Condenser (1250 mmfd.)	5886
77	Power Transformer	32-7098
78	Condenser (.01 mfd.)	30-4051
79	Filter Condenser (4-8 mfd.)	30-2015
80	"B" Choke	32-7104
	Dial	27-5022
	Antenna Lead	38-5131
	Mounting Studs	28-6231
	Mounting Nuts	W55A
	Spark Plug Resistor	33-1015E
	Distributor Resistor	4851E
	Interference Condenser	4522S
	Interference Condenser	30-4007
	Spark Plug Terminals	28-6053
	4 Hole Socket	27-6006
	5 Hole Socket	27-6014
	6 Hole Socket	27-6020
	7 Hole Socket	27-6005
	Knobs	27-4146
	Knob Springs	28-1738
	"A" Switch Assembly	38-6023
	"A" Switch	42-1080

MODEL PHD Packard Installation Data

PHILCO RADIO & TELEV. CORP.



Receiver and Speaker Location

Holes are provided in the dash for radio installation on all Twelfth Series Packard cars. These holes are plugged with snap buttons which can easily be removed with a screw driver. The inside dash liner is not punched and before making the installation corresponding holes should be cut through the cardboard dash liner with a knife.

For dash drilling information on cars previous to Twelfth Series, refer to the diagram "A", showing location of the holes to be drilled. Locate one of the receiver stud holes and mark with a sharp punch; then use the template furnished to locate the remaining two holes. Use this same procedure for the speaker, drilling with 7/16 drill. On Packard Twelve models you may find it difficult to locate and drill the speaker holes from the motor side of the dash and, if so, this work can be done from the body side, providing care is taken to avoid cutting the vacuum and oil lines.

On Packard Eight models the Receiver must be spaced out enough to allow the speedometer cable to pass behind it. This can be accomplished by placing two or three flat washers on the lower mounting stud before bolting in place, using the larger washer furnished, next to the insulating material. The felt baffle should be mounted on the studs between the speaker and dash. On twelve cylinder cars previous to Twelfth Series it is necessary to cut away a portion of the speaker rim to provide clearance for the vacuum connection on the dash.

Control Unit

On Eleventh and Twelfth Series cars, where provision has been made to mount the control unit in the instrument panel, a finish plate is used to fill the opening. Remove this plate by loosening the hold-down clamps at the rear of the instrument panel. The radio control unit can then be put in place (using the gasket provided for the plate) and secured by the same fastening clamps.

When no provision has been made to mount the control unit in the instrument panel, it should be located on the steering column, either at the right side of the post or in a vertical position directly above it. A generally satisfactory location is to the right, approximately six inches below the steering wheel hub. Cut off the metal strap to the proper length and mount bracket, using the long machine screw with one turn of friction tape between column and strap. Mount control unit on bracket in a vertical position.

The radio control locking switch on the Twelfth Series Receiver should be located in the right glove compartment, a hole for which is located in the wall of the compartment near the door. This provides a means of locking the radio when the occasion demands.

NOTE: As the shape of the instrument panel control units vary between Eleventh and Twelfth Series models, it is desirable to supply the proper control head for the car on which the installation is made. The Packard Motor Car Company can supply control units with the proper length control cables for Eleventh Series panel installations as well as previous models where the steering column control unit is required.

Control Shaft Installation

The tuning control knob is on the right of the control panel — the combination switch and volume control knob is on the left. The flexible control shafts are coupled to the short shafts in the control panel on which the knobs are placed.

Insert the flexible control cables into the proper shaft housing bracket on the Receiver. Turn the knobs until the slotted male coupling on the shaft is seated in the female coupling in the Receiver so that the pin in the female end is fully engaged in the slotted male end.

Tighten the shaft housing fastening nuts which hold the control cables in place on the Receiver.

IMPORTANT: Be sure the controls are attached to the proper couplings on the Receiver. The volume control shaft operated by left knob engages with the coupling nearest the Receiver and to the left.

On installing the control shafts on non-current models, where a special control head is used provided with a lock, insert the cables in their proper position in the Receiver as outlined above.

Remove the left-hand knob and loosen the set screw in the knob shaft. Turn this shaft to a point where the key will lock it firmly in position and retighten the set screw.

Battery Cable Location and Connections
(SEE DIAGRAM "B")

The "A" or two-wire cable should be run over the top of the set to the ammeter. NOTE: On Twelfth Series installations this lead is provided with a switch to be mounted in the wall of the right glove compartment with the control accessible from the inside.

Connect the feed wire (small eyelet terminal) to the discharge side of the ammeter. Connect the black wire from the dial light on the control unit to the small jack terminal on the end of the Receiver.

The speaker cable must then be plugged into the receptacle on the speaker. The antenna lead-in should be plugged into the Receiver, the cable being carried over the set and right glove compartment. This lead-in should be spliced to the antenna lead-in which will be found coiled and taped back of the cowl trim panel. Any excess lead should be cut off, using just enough lead-in to make a neat installation. The lead-in provided with the Receiver is equipped with a shield which should be wrapped around the antenna lead-in shield and carefully taped.

The radio fuse is located in the "A" cable in a small tubular housing and is very plainly marked.

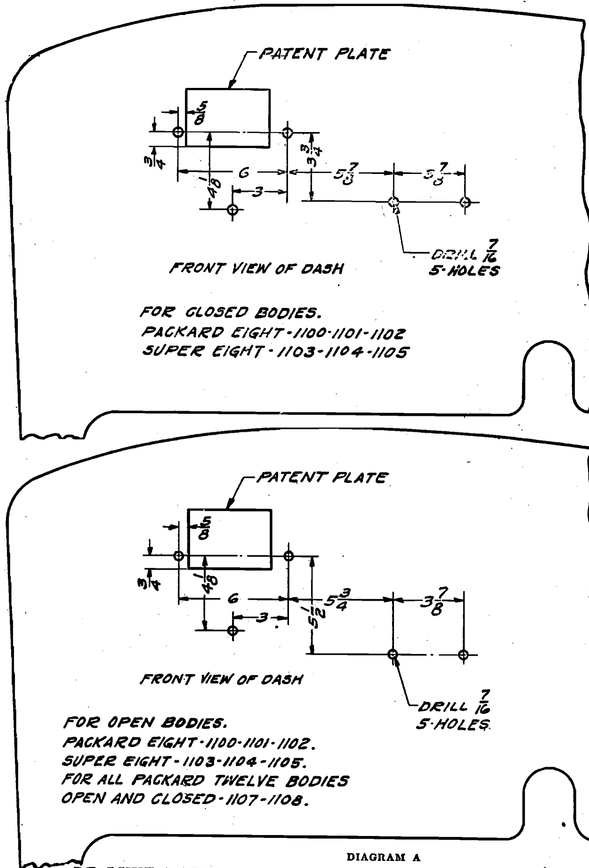


DIAGRAM A

DE LUXE RADIO—Installation Dash Layout for Packard Models 1100, 1101, 1102, 1103, 1105, 1107, 1108

On the twelve-cylinder cars, provision has been made to mount a condenser on the coil bracket, using the right front coil mounting screw as a means of attachment. The condenser can be installed by passing the condenser lead through the hole provided in the coil bracket and attaching to the terminal on the lower side of the coil to which a brass strip is fastened. Replace the unit and tighten nuts, making certain that the condenser case is grounded through the enamel. Locate the second condenser under outside generator relay mounting screw and connect the lead to the battery terminal of relay.

On eight-cylinder cars it will generally be best to locate the first condenser under the lower instrument light housing screw with the wire fastened to the ammeter side of the ignition switch.

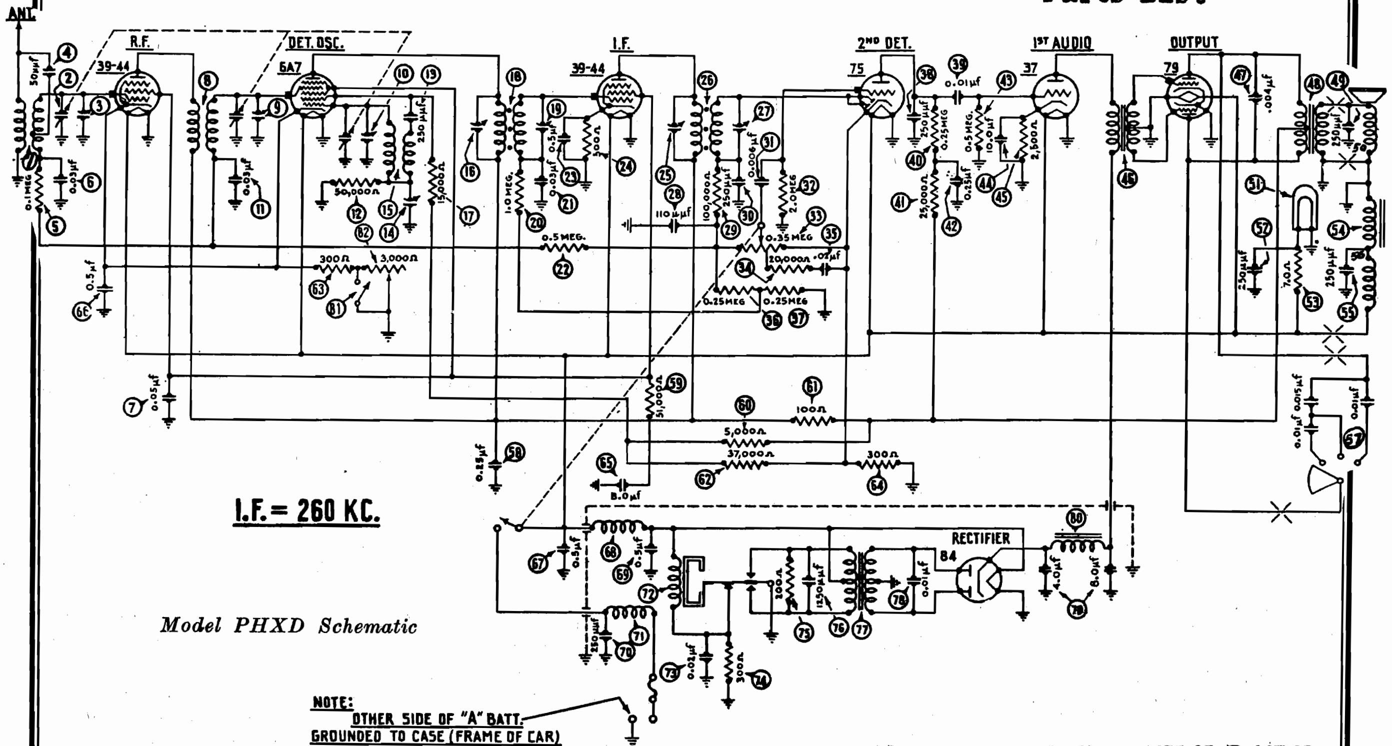
The generator condenser is then mounted as previously described.

All Twelfth Series, twelve-cylinder cars are equipped with resistors as standard equipment, it being only necessary to install the two coil wire resistors provided with the set. On eight-cylinder models and non-current models, cut off the spark plug terminals from the high tension wires and screw on the resistor units, after which the small round nuts (furnished with the set) can be screwed onto the spark plugs and the resistors snapped in place. Cut distributor to coil high tension wires about one inch from distributor head and insert "screw in" type distributor resistors. When the rest of the installation is carefully made, the resistors will sometimes be unnecessary between the coil and distributor. In all cases, however, the spark plug gap should be increased from the standard .025" to .030".

To check for ignition interference, disconnect the antenna lead-in from the set. Turn on Receiver and start the engine. If there is any noise coming through the speaker from the electrical system of the car when the volume control is about three-fourths open and the dial set between stations, carefully relocate speaker and battery cables to a point where the noise is reduced to a minimum. If relocation of these cables does not practically eliminate the ignition disturbances, it will then be advisable to peen the distributor arm.

PHILCO RADIO & TELEV. CORP.

MODEL PHXD Packard
Schematic, Chassis
Parts List



Model PHXD Schematic

MODEL PHXD PARTS LIST

No.	Description	Part No.	No.	Description	Part No.
1	Antenna Transformer	32-1462	40	Resistor (250,000 ohms)	33-1097
2	Tuning Condenser	31-1418	41	Resistor (25,000 ohms)	33-1013
3	First Padder (on tun. cond.)		42	Condenser (.25 mfd.)	30-4135
4	Condenser (50 mmfd.)	30-1029	43	Resistor (500,000 ohms)	6097
5	Resistor (100,000 ohms)	6099	44	Condenser (10 mfd.)	30-4135
6	Condenser (.03 mfd.)	30-4025	45	Resistor (2500 ohms)	33-1100
7	Condenser (.05 mfd.)	30-4020	46	Input Transformers	32-7206
8	R. F. Transformer	32-1463	47	Condenser (.004 mfd.)	30-4185
9	Second Padder (on tun. cond.)		48	Output Transformer	32-7205
10	Third Padder (on tun. cond.)		49	Condenser (250 mmfd.)	30-1032
11	Condenser (.03 mfd.)	30-4025	50	Cone & Voice Coil	36-3159
12	Resistor (50,000 ohms)	6098	51	Pilot Lamp	34-2040
13	Condenser (250 mmfd.)	30-1032	52	Condenser (250 mmfd.)	30-1032
14	Padder	31-6012	53	Resistor (ohms)	33-3130
15	Oscillator Transformer	32-1222	54	Field Coil Assembly	02795
16	Padder (Pri. 1st I. F. Trans.)		55	Condenser (250 mmfd.)	30-1032
17	Resistor (15,000 ohms)	6208	56	Choke	32-1464
18	First I. F. Transformer	32-1471	57	Tone Control	30-4208
19	Padder (Sec. 1st I. F. Trans.)		58	Condenser (.25 mfd.)	30-4134
20	Resistor (1,000,000 ohms)	33-1096	59	Resistor (51,000 ohms)	4237
21	Condenser (.03 mfd.)	30-4025	60	Resistor (5000 ohms)	33-1070
22	Resistor (500,000 ohms)	6097	61	Resistor (100 ohms)	33-3023
23	Condenser (.5 mfd.)	30-4058	62	Resistor (37,000 ohms)	33-1098
24	Resistor (500 ohms)	6977	63	Resistor (300 ohms)	33-3121
25	Padder (Pri. 2nd I. F. Trans.)		64	Resistor (300 ohms)	33-3121
26	Second I. F. Transformer	32-1499	65	Condenser (8 mfd.)	30-4135
27	Padder (Sec. 2nd I. F. Trans.)		66	Condenser (.5 mfd.)	30-4048
28	Condenser (110 mmfd.)	30-1031	67	Condenser (.5 mfd.)	30-4015
29	Resistor (100,000 ohms)	6099	68	Vibrator Choke	32-1474
30	Condenser (250 mmfd.)	30-1032	69	Condenser (.5 mfd.)	30-4210
31	Condenser (.006 mfd.)	30-4125	70	Interference Filter	32-1466
32	Resistor (2,000,000 ohms)	33-1025	71	Interference Filter	32-1466
33	Vol. Cont. & Sw. Assembly	38-6022	72	Vibrator	38-5036
34	Resistor (20,000 ohms)	33-1130	73	Condenser (.02 mfd.)	30-4039
35	Condenser (.02 mfd.)	30-4215	74	Resistor (300 ohms)	33-3010
36	Resistor (250,000 ohms)	33-1097	75	Resistor (200 ohms)	7217
37	Resistor (250,000 ohms)	33-1097	76	Condenser (1250 mmfd.)	5886
38	Condenser (250 mmfd.)	30-1032	77	Power Transformer	32-7098
39	Condenser (.01 mfd.)	30-4145	78	Condenser (.01 mfd.)	30-4051

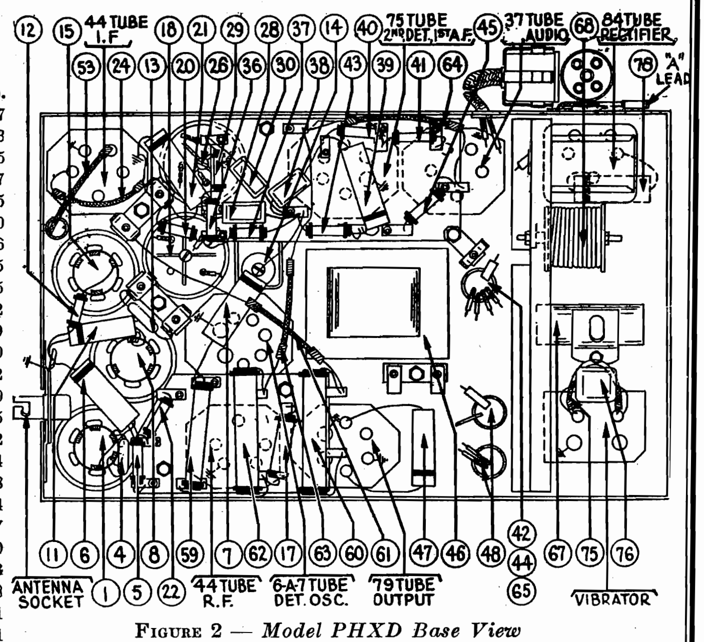


FIGURE 2 — *Model PHXD Base View*

No.	Description	Part No.	Description	Part No.
79	Filter Condenser (4-8 mfd.)	30-2015	Spark Plug Terminals	28-6053
80	"B" Choke	32-7104	4 Hole Socket	27-6006
81	Sensitivity Control Switch	42-1140	5 Hole Socket	27-6016
82	Sensitivity Control	33-5130	6 Hole Socket	27-6020
	Dial	27-5070	7 Hole Socket	27-6005
	Antenna Lead	38-5131	Knobs	27-4146
	Mounting Studs	28-6231	Knob Springs	28-1738
	Mounting Nuts	W55A	"A" Cable and Switch Assembly	38-6023
	Spark Plug Resistor	33-1015E	"A" Switch	42-1080
	Distributor Resistor	4851E	Flexible Shaft (Tun.)	28-8268
	Interference Condenser	4522S	Flexible Shaft (Vol.)	28-8269
	Interference Condenser	30-4007	Receiver Housing	29-2285

Note: A choke, Part Number 32-1374 has been added. This is connected in series between Pilot Lamp (51) and Condenser (52) and Resistor (53).

MODEL PHXD Packard
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

I. F. Transformers and Padders
Model PHXD

The I. F. transformers are assembled complete with padding condensers.

The padders are placed in the top of the shield can, one above the other.

The primary padder is adjusted by means of the screw slot, accessible through the hole in the top of the shield can. The secondary padder is adjusted by means of the small hex nut, also accessible through the hole in the top of the shield. (See Figure 8).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Figure 7.

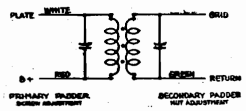


FIGURE 7

If replacements are ever necessary, replace the entire coil assembly, 32-1471 for the first I. F. stage and 32-1449 for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model PHXD Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model PHXD are required, the procedure given below must be followed in detail.

Equipment

Full charged heavy duty storage battery or 6-volt power pack, 048 Philco Set Tester, 3164 Padding Wrench, 27-7159 Padding Screw Driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to one of the plates of the type 79 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

Remove the cover from the Receiver. The antenna lead must be disconnected.

I. F.—Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 39-44 I. F. tube, in series with a .1 mfd. condenser.

Adjust the secondary nut padder (27) on the second I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading. (See Figure 8 for location of padders). Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off. This adjustment is critical.

Remove the generator lead from the 39-44 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary nut padder (19) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (16) for maximum reading. (See Figure 8 for location of padders). Note the maximum reading obtained and then turn the screw in again and readjust, just bringing the adjustment up to the maximum reading. Do not pass it and then back off. This adjustment is critical.

HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1500 K. C., and then connect the generator lead to the grid cap of the 39-44 R. F. tube in series with a .1 mfd. condenser.

Using a piece of paper approximately .006″ thick as a gauge between the heel of the rotor plates and the stator plates, turn the rotor plates until they strike against the paper. With the tuning condenser in this position, adjust the high frequency padder (10) and the R. F. padder (9) until the maximum reading is obtained on the output meter. This is the true setting for the 1500 K. C., 150 on the dial scale.

LOW FREQUENCY—Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder (14) for maximum reading on the output meter.

HIGH FREQUENCY READJUSTMENT—Next turn the tuning condenser plates out of mesh to 1500 K. C., 150 on the dial scale, and adjust the signal generator to 1500 K. C. Then adjust the high frequency padder (10) for maximum reading on the output meter.

ANTENNA AND R. F.—Connect the generator lead to the antenna lead using a 200 mmfd. condenser in series between the two leads and the .1 mfd. condenser. Turn the tuning condenser to 1400 K. C., and set the generator for 1400 K. C. Adjust the padders (9) and (3) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

NOTE: When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.

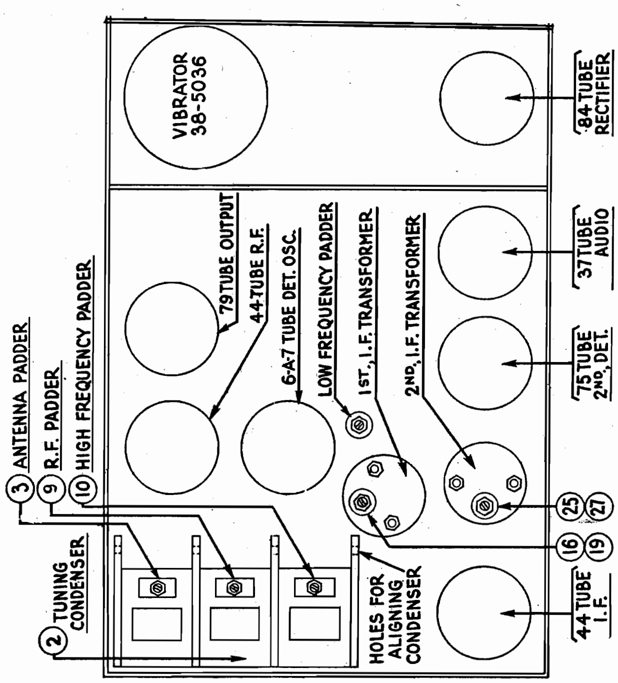


FIGURE 8 —Model PHXD—Top View

MODEL PT-5 Packard
Model 120 Cars
Schematic, Socket, Chassis
Parts List

PHILCO RADIO & TELEV. CORP.

MODEL CT-5 Chrysler
Codes C1, C2 & C3

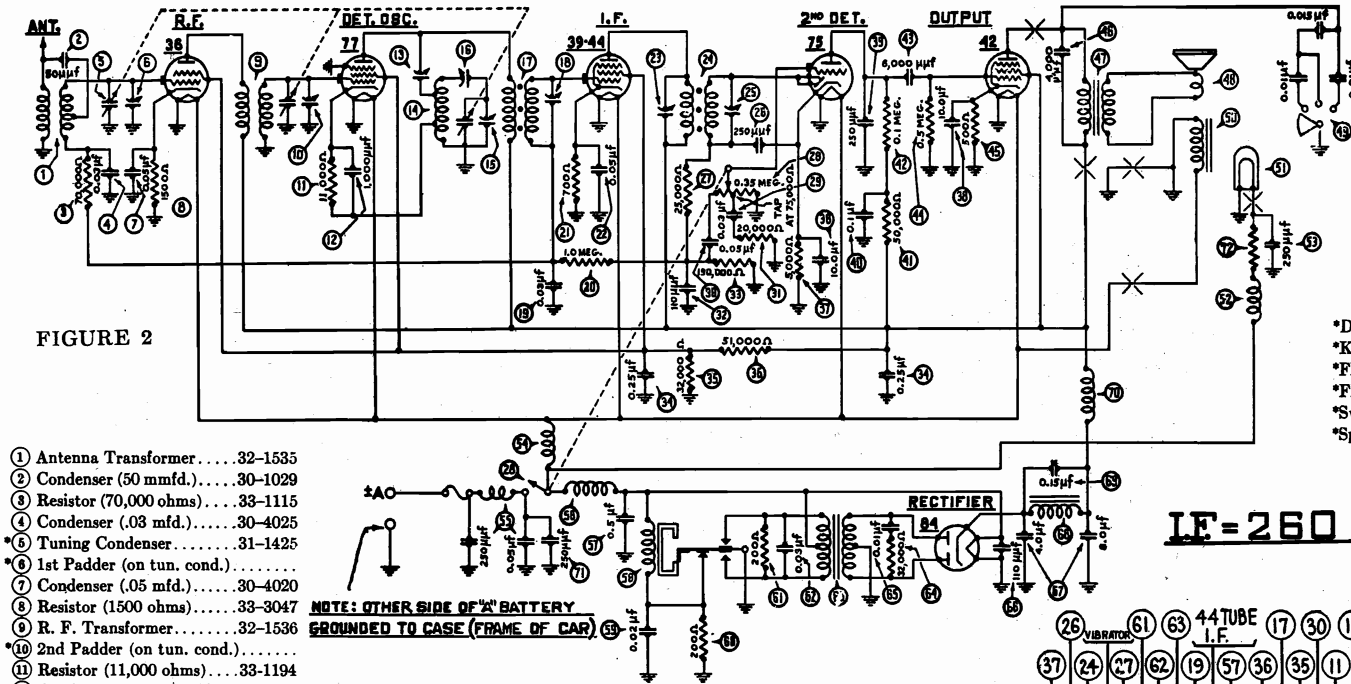


FIGURE 2

- ① Antenna Transformer.....32-1535
- ② Condenser (50 mmfd.).....30-1029
- ③ Resistor (70,000 ohms)....33-1115
- ④ Condenser (.03 mfd.)......30-4025
- *⑤ Tuning Condenser.........31-1425
- *⑥ 1st Padder (on tun. cond.)........
- ⑦ Condenser (.05 mfd.)......30-4020
- ⑧ Resistor (1500 ohms)......33-3047
- ⑨ R. F. Transformer........32-1536
- *⑩ 2nd Padder (on tun. cond.)........
- ⑪ Resistor (11,000 ohms)....33-1194
- ⑫ Condenser (1000 mmfd.)..30-1007
- ⑬ Padder (Pri. 1st I. F. Tran.).......
- ⑭ Oscillator Transformer....32-1537
- *⑮ 3rd Padder (on tun. cond.)........
- *⑯ 4th Padder (on tun. cond.)........
- ⑰ First I. F. Transformer....32-1538
- ⑱ Padder (Sec. 1st I. F. Tran.).......
- ⑲ Condenser (.03 mfd.)......30-4025
- ⑳ Resistor (1 meg.).........33-1096
- ㉑ Resistor (700 ohms)....... 6443
- ㉒ Condenser (.05 mfd.)......30-4020
- ㉓ Padder (Pri. 2nd I. F. Tran.)......
- ㉔ Second I. F. Transformer..32-1449
- ㉕ Padder (Sec. 2nd I. F. Tran.)......
- ㉖ Condenser (250 mmfd.)...30-1032
- ㉗ Resistor (25,000 ohms)....33-1161
- ㉘ Vol. Con. & Switch Assm...33-5088
- ㉙ Condenser (.03 mfd.)......30-4025
- ㉚ Condenser (.05 mfd.)......30-4020
- ㉛ Resistor (20,000 ohms)....33-1130
- ㉜ Condenser (110 mmfd.)...30-1031
- ㉝ Resistor (190,000 ohms)...33-1116
- ㉞ Condenser (.25-.25 mfd.)..30-4231
- ㉟ Resistor (32,000 ohms).... 3525
- ㊱ Resistor (51,000 ohms).... 5868
- ㊲ Resistor (5,000 ohms)..... 6096
- ㊳ Condenser (10-10 mfd.)...30-2076
- ㊴ Condenser (250 mmfd.)...30-1032
- ㊵ Condenser (.1 mfd.).......30-4170
- ㊶ Resistor (50,000 ohms).... 6098
- ㊷ Resistor (.1 meg.)........ 6099
- ㊸ Condenser (6000 mmfd.)..30-4125
- ㊹ Resistor (.5 meg.)........ 6097
- ㊺ Resistor (500 ohms)......33-3031
- ㊻ Condenser (4000 mmfd.)..30-4185
- ㊼ Output Transformer...... 2598
- ㊽ Cone & Voice Coil........36-3159
- *㊾ Tone Control............30-4127
- ㊿ Field Coil Assembly...... 02795
- (51) Pilot Lamp.............34-2040
- (52) Choke..................32-1374
- (53) Condenser (250 mmfd.)....30-1032
- (54) "A" Choke.............32-1374
- (55) Interference Filter........32-1534
- (56) Vibrator Choke..........32-1563
- (57) Condenser (.5 mfd.).......30-4015
- (58) Vibrator...............38-5036
- (59) Condenser (.02 mfd.)......30-4039
- (60) Resistor (200 ohms)....... 7217
- (61) Resistor (200 ohms)....... 7217
- (62) Condenser (.03 mfd.)......30-4025
- (63) Power Transformer.......32-7315
- (64) Resistor (32,000 ohms).... 3525
- (65) Condenser (.01 mfd.)......30-4051
- (66) Condenser (110 mmfd.)...30-1031
- (67) Filter Cond. (4-8 mfd.)...30-2107
- (68) "B" Choke..............32-7254
- (69) Condenser (.15 mfd.)......30-4191
- (70) R. F. Choke............32-1530
- (71) Condenser (250 mmfd.)...30-1032
- (72) Resister (7 ohms).........33-3130
- *Ground Clip.............28-2488
- Spark Plug Resistor.......33-1015
- Distributor Resistor...... 4851
- Interference Cond. (1 mfd.) 4522
- InterferenceCond. (½mfd.)30-4007
- *"T" Bolt (Set Mtg.)......28-6268
- *Nut (Set Mtg.)........... W518A
- Fuse.................... 7227
- Fuse Insulator...........27-7729
- *Antenna Lead...........38-5131
- *"A" Lead...............38-6468

- *Dial....................27-5078
- *Knob...................27-4174
- *Flex. Shaft (Tun.)........28-8338
- *Flex. Shaft (Vol.)........28-8339
- *Switch..................42-1080
- *Speaker Cable..........41-3127

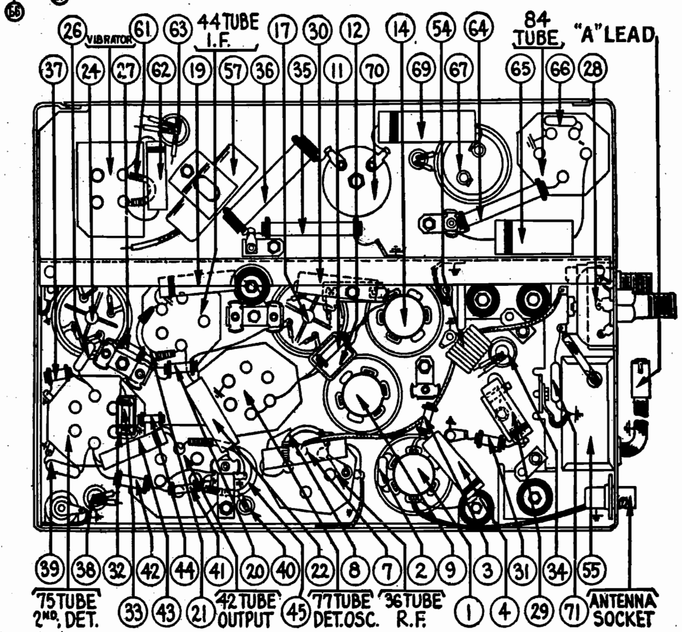


FIGURE 3

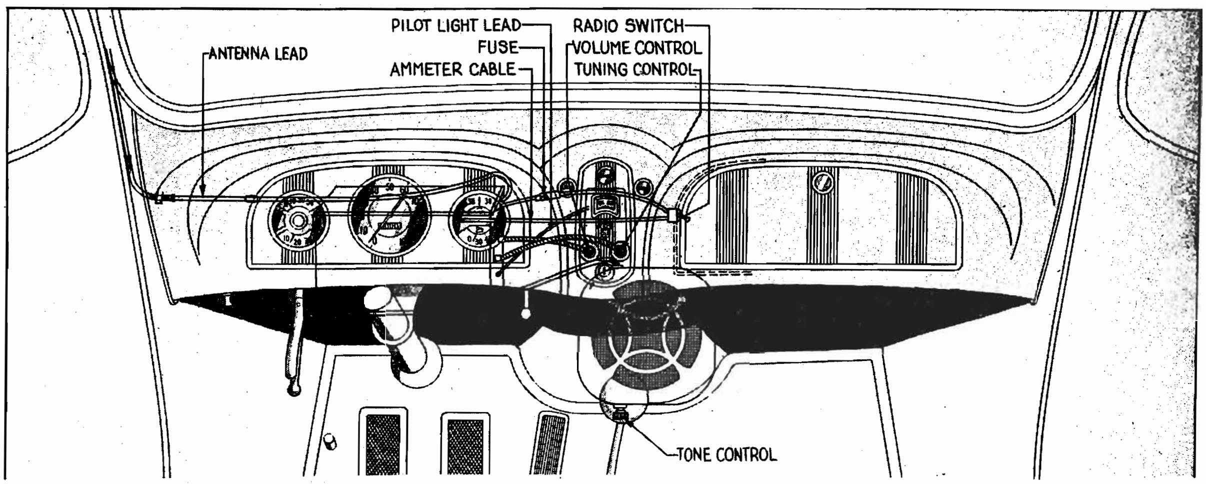
Parts List - PT-5 Packard De Luxe Custom Built Radio Model 120

For Installation Data, see Index

MODEL PT-5 Packard
Model 120 Cars
Installation Data

PHILCO RADIO & TELEV. CORP.

PACKARD CUSTOM CAR RADIO - - MODEL 120 GENERAL INSTALLATION INSTRUCTIONS



Receiver and Speaker Location

(SEE FIGURE 1)

Holes are provided in the dash for radio installation in all model 120 Packard cars. These holes are plugged with snap buttons which can be removed easily with a screw driver. The inside dash liner is not punched, so before making the installation, corresponding holes should be cut or drilled through the cardboard dash liner. Two T bolts are used to fasten the Receiver in place.

Install the Receiver above the steering column. Screw the two studs into the back of the speaker and locate it near the center of the dash, a few inches above the top of the toe boards, with the tone control down. NOTE: After the Receiver has been securely fastened in place be sure to dress the speedometer cable, avoiding all sharp bends.

Control Unit

On Model 120 cars, provision has been made to install the control unit in the ash receptacle opening. Remove the ash receptacle and cut the upper and lower wire hinges. This permits the removal of the wire hinge as well as the upper ash receptacle cover. Fasten the radio control unit in place, using the starter button and ignition switch fastening studs.

The black dial light lead coming from the rear of the control must be connected to the small jack terminal in the end of the Receiver housing.

Control Shafts

The flexible shaft on the left of the control is the volume control shaft and must be coupled in the shaft bushing nearest the dash, on the end of the Receiver housing. After the shaft has been properly seated, the knurled casing nut must be securely tightened.

Next couple the tuning control flexible shaft in the proper coupling on the Receiver and tighten the casing nut.

Cable Connections

There is a hole in the wall of the right glove compartment for installing the radio control locking switch. After installing the switch, place the "A" fuse and insulator in the fuse housing and connect it to the Receiver "A" lead. Connect the eyelet terminal of the lead to the discharge side of the ammeter. Locking the compartment provides a means of locking the radio when the occasion demands.

Connect the speaker cable plug in the receptacle on the side of the speaker housing.

The antenna lead must be spliced to the car antenna lead-in as close to the corner post as possible. All excess lead-in must be cut off and the splice taped. The shield pigtail must be wrapped around the lead-in shielding and carefully taped. Connect the antenna lead in its receptacle on the end of the Receiver housing.

Generator and Motor Interference Suppression

Cut the distributor-to-coil high tension lead about two inches from the distributor cap and insert the screw-in type resistor in the lead.

Using a piece of emery cloth, clean the speedometer and ignition coil cable at the dash where it enters the motor compartment. Solder the end of the braided strap to the oil pressure gauge line tubing and wind the braided strap tightly around each of the tubes and cables coming through the dash at this point. The braid must then be soldered to pressure gauge tubing again and the eyelet in the braided strap grounded to the dash. The toe board-to-dash fastening screw, directly above the point where these cables come through the dash, furnishes a convenient place to ground the braid.

PHILCO RADIO & TELEV. CORP.

MODEL PT-14 Packard
Schematic, Chassis
Parts List

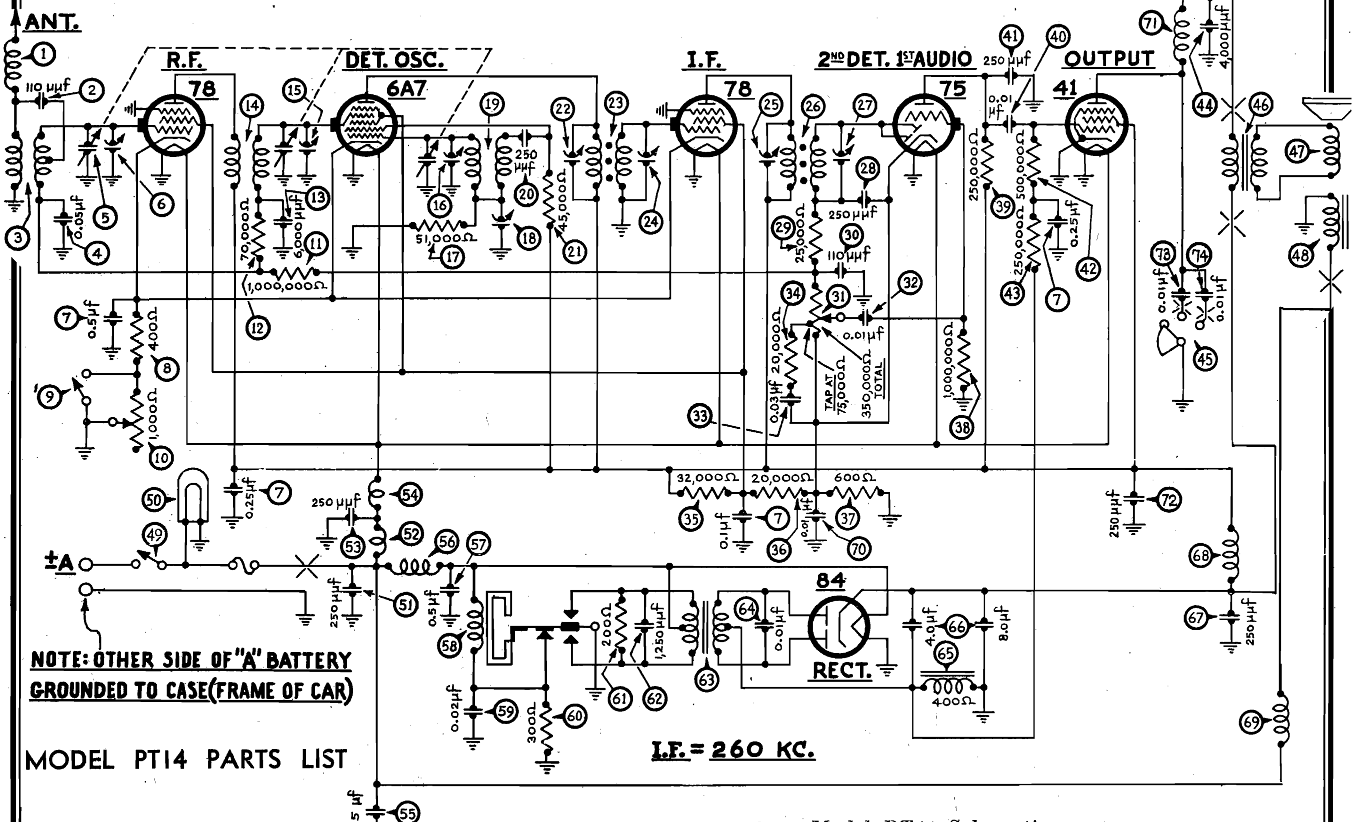


Figure 3 — *Model PT14 Schematic*

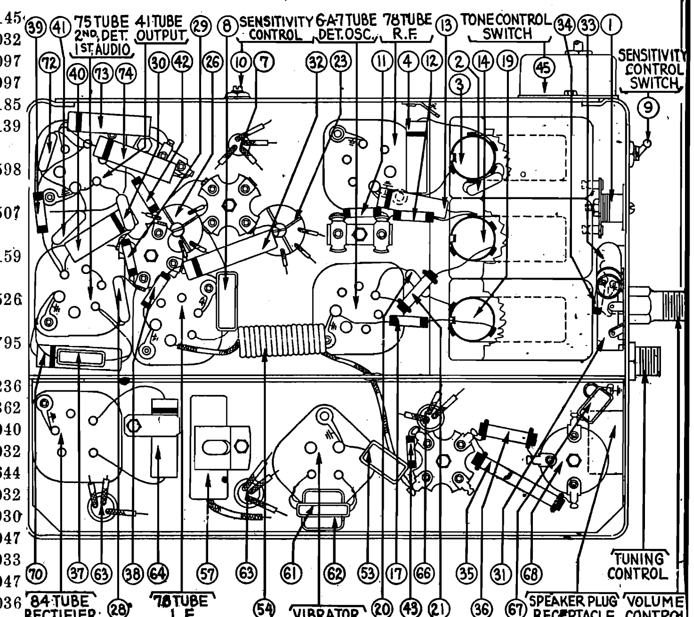


Figure 4 — *Model PT14 Base View*

MODEL PT14 PARTS LIST

No.	Description	Part No.
1	Antenna Choke	38-7210
2	Condenser (110 mmfd.)	30-1031
3	Antenna Transformer	32-1934
4	Condenser (.05 mfd.)	30-4020
5	Tuning Condenser	31-1674
6	First padder (on tun. cond.)	
7	Condenser (.1-.25-.25-.5 mfd.)	30-4375
8	Resistor (400 ohms)	33-1211
9	Sensitivity Control Switch	42-1140
10	Sensitivity Control	33-5129
11	Resistor (1,000,000 ohms)	33-1096
12	Resistor (70,000 ohms)	33-1115
13	Condenser (6000 mmfd.)	30-4125
14	R. F. Transformer	32-1926
15	Second Padder (on tun. cond.)	
16	Third Padder (on tun. cond.)	
17	Resistor (51,000 ohms)	6098
18	Low Frequency Padder	31-6066
19	Oscillator Transformer	32-1927
20	Condenser (250 mmfd.)	30-1032
21	Resistor (45,000 ohms)	5256
22	Padder (Pri. 1st I. F. Trans.)	
23	First I. F. Transformer	32-1928
24	Padder (Sec. 1st. I. F. Trans.)	
25	Padder (Pri. 2nd I. F. Trans.)	
26	Second I. F. Transformer	32-1929
27	Padder (Sec. 2nd I. F. Trans.)	
28	Condenser (250 mmfd.)	30-1032
29	Resistor (25,000 ohms)	33-1013
30	Condenser (110 mmfd.)	30-1031
31	Volume Control (350,000 ohms)	33-5121
32	Condenser (.01 mfd.)	30-4124
33	Condenser (.03 mfd.)	30-4025
34	Resistor (20,000 ohms)	33-1178
35	Resistor (32,000 ohms)	3525
36	Resistor (20,000 ohms)	5649
37	Resistor (600 ohms)	33-1212
38	Resistor (1,000,000 ohms)	33-1096
39	Resistor (250,000 ohms)	33-1097
40	Condenser (.01 mfd.)	30-4145
41	Condenser (250 mfd.)	30-1032
42	Resistor (500,000 ohms)	6097
43	Resistor (250,000 ohms)	33-1097
44	Condenser (4000 mmfd.)	30-4185
45	Tone Control Switch	42-1139
46	Output Transformer (Dash Speaker)	2598
46	Output Transformer (Header Bar Speaker)	32-7507
47	Cone and Voice Coil (Dash Speaker)	36-3159
47	Cone & Voice Coil (Header Bar Speaker)	36-3526
48	Field Coil Assembly (Dash Speaker)	02795
48	Field Coil Assembly (Header Bar Speaker)	32-9236
49	On and Off Switch	42-5362
50	Pilot Lamp	34-2040
51	Condenser (250 mmfd.)	30-1032
52	"A" Choke	32-1644
53	Condenser (250 mmfd.)	30-1032
54	Choke	32-1930
55	Condenser (.5 mfd.)	30-4047
56	Vibrator Choke	32-1933
57	Condenser (.5 mfd.)	30-4047
58	Vibrator	38-5036
59	Condenser (.02 mfd.)	30-4039
60	Resistor (300 ohms)	33-3130
61	Resistor (200 ohms)	33-1210
62	Condenser (1250 mfd.)	5886
63	Power Transformer	32-7488
64	Condenser (.01 mfd.)	30-4381
65	Filter Choke	32-7491
66	Filter Condenser 4-8 mfd.)	30-2134
67	Condenser (250 mmfd.)	30-1032
68	R. F. Choke	32-1932
69	"A" Choke	32-1464
70	Condenser (.01 mfd.)	30-4124
71	Choke	32-1382
72	Condenser (250 mmfd.)	30-1032
73	Condenser (.01 mfd.)	30-4051
74	Condenser (.01 mfd.)	30-4051

MODEL PT-14 Packard
Alignment, Socket
Trimmers

PHILCO RADIO & TELEV. CORP.

I. F. Transformers and Padders

Model PT14

The I. F. transformers are assembled complete with padding condensers.

Both the primary and the secondary padders are placed side by side in the top of the transformer shield can. The adjusting screws are accessible thru the holes in the top of the shield. (See Fig. 6).

The coil windings terminate in leads instead of terminals or lugs. The color scheme of the leads is given in Fig. 5.

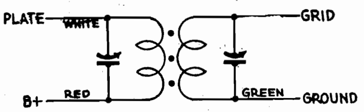


FIGURE 5

If replacements are ever necessary, replace the entire coil assembly, **32-1928** for the first I. F. stage and **32-1929** for the second I. F. stage. Neither the coil nor the padders will be furnished separately. Order only by the above numbers.

Model PT14 Adjustments

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments to the Model PT14 are required, the procedure given below must be followed in detail.

Equipment

Fully charged heavy duty storage battery or 6-volt power pack, 048A Philco Set Tester, 3164 Padding wrench, 27-7159 Padding screw driver.

General

OUTPUT METER — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Receiver chassis.

SIGNAL GENERATOR — With the Receiver and signal generator set up for operation at the prescribed frequency, turn the Receiver volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the signal generator output lead must be connected to the Receiver housing.

The sensitivity switch must be in the "distance" position. The tone control should be turned to the brilliant position.

Remove the cover from the Receiver. The antenna lead must be disconnected.

I. F. — Adjust the signal generator to exactly 260 K. C. Connect the generator lead to the grid cap of the 78 I. F. tube in series with a .1 mfd. condenser.

Adjust the secondary screw padder (27) on the second I. F transformer for maximum reading on the output meter. Then adjust the primary screw padder (25) for maximum reading (See Fig. 6 for location of padders).

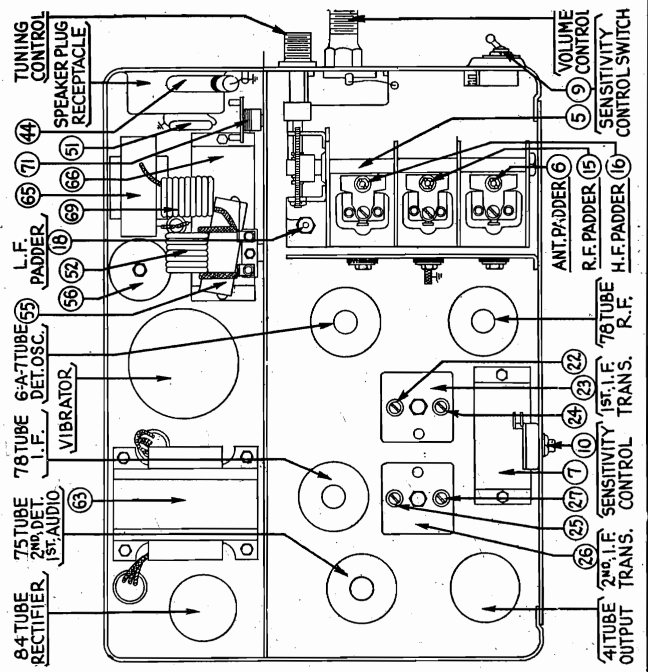
Remove the generator lead from the 78 tube.

Connect the generator lead to the grid cap of the 6A7 tube in series with a .1 mfd. condenser. Adjust the secondary screw padder (24) on the first I. F. transformer for maximum reading on the output meter. Then adjust the primary screw padder (22) for maximum reading. (See Figure 6 for location of padders).

ANTENNA — Connect the generator lead to the antenna lead using a 230 mmfd. condenser in series between the two leads and the .1 mfd. condenser. Turn the tuning condenser to 1400 K. C. and set the generator for 1400 K. C. Adjust the padders (15) and (6) for maximum reading on the output meter.

If this procedure has been carefully followed and an accurately calibrated oscillator or signal generator has been used, the Receiver will be adjusted properly.

NOTE: When the antenna stage adjustment is made with the Receiver installed in the car, the Receiver antenna lead must be connected to the car antenna in the usual manner. The signal generator output lead should be connected to a wire placed near the car antenna but not connected to it.



HIGH FREQUENCY AND R. F. — After padding the first I. F. stage remove the generator lead from the 6A7 tube. Adjust the signal generator to 1600 K. C. and then connect the generator lead to the grid cap of the 78 R. F. tube in series with a .1 mfd. condenser.

Turn the tuning condenser plates out of mesh as far as they will go. With the tuning condenser in this position, adjust the high frequency padder (16) and the R. F. padder (15) until the maximum reading is obtained on the output meter. This is the true setting for 1600 K. C., 160 on the dial scale.

LOW FREQUENCY — Turn the tuning condenser plates in mesh to approximately 580 K. C., 58 on the dial scale and adjust the signal generator to 580 K. C. Roll the tuning condenser and adjust the low frequency padder (18) for maximum reading on the output meter.

HIGH FREQUENCY RE-ADJUSTMENT — Turn the tuning condenser plates out of mesh as far as they will go and adjust the signal generator to 1600 K. C. Then adjust the high frequency padder (16) again for maximum reading on the output meter.

MODEL AC-266 Studebaker
MODEL MT-3 Pierce
MODEL RT-3 Reo DeLuxe
Schematic, Socket, Parts

PHILCO RADIO & TELEV. CORP

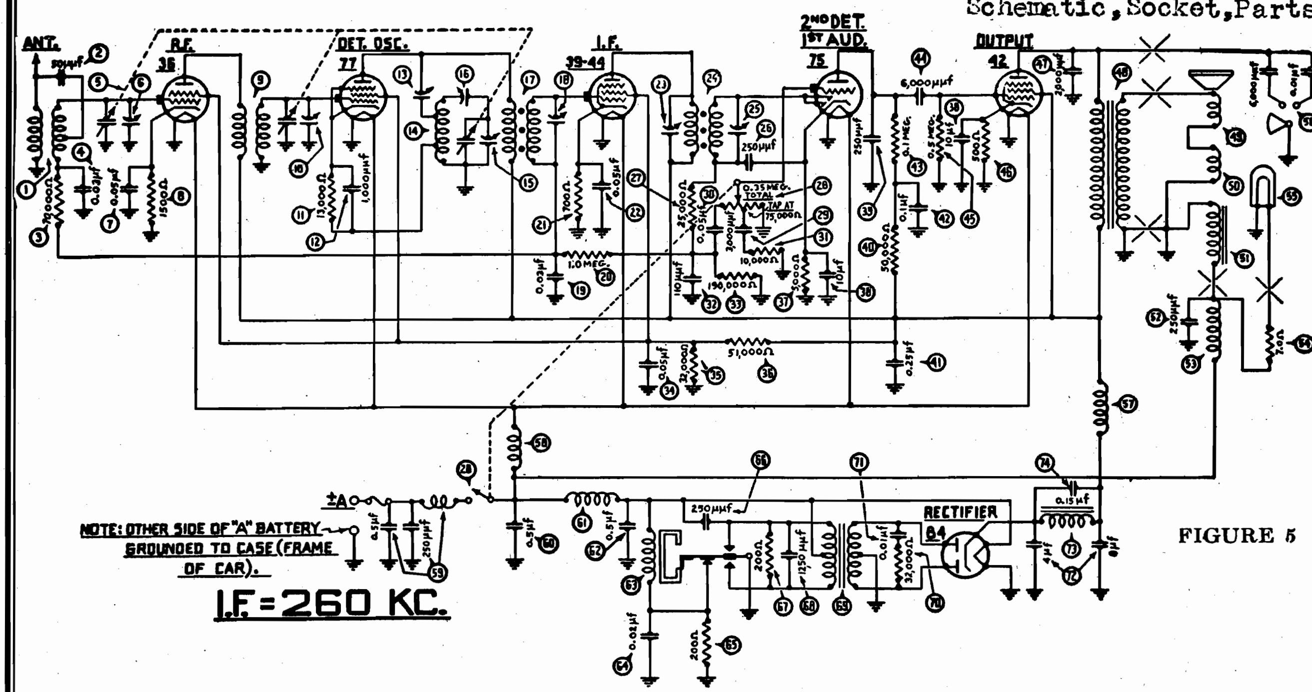


FIGURE 5

PARTS LIST ST3 - STUDEBAKER DE LUXE MODEL AC-266

(1) Antenna Transformer.....32-1535
(2) Condenser (50 mmfd.)....30-1029
(3) Resistor (70,000 ohms)....33-1115
(4) Condenser (.03 mfd.)......30-4025
*(5) Tuning Condenser........31-1419
(6) 1st Padder (on tun. cond.).........
(7) Condenser (.05 mfd.)......30-4020
(8) Resistor (1500 ohms)......33-3047
(9) R. F. Transformer........32-1536
(10) 2nd Padder (on tun. cond.)........
(11) Resistor (11,000 ohms)....33-1194
(12) Condenser (1000 mmfd.)... 5215
(13) Padder (Pri. 1st I. F. Tran.).......
(14) Oscillator Transformer....32-1537
(15) 3rd Padder (on tun. cond.)........
(16) 4th Padder (on tun. cond.)........
(17) 1st I. F. Transformer.....32-1538
(18) Padder (Sec. 1st I. F. Tran.).......
(19) Condenser (.03 mfd.)......30-4025
(20) Resistor (1 meg.).........33-1171
(21) Resistor (700 ohms)....... 6443
(22) Condenser (.05 mfd.)......30-4020
(23) Padder (Pri. 2nd I. F. Tran.)......
(24) 2nd I. F. Transformer.....32-1449
(25) Padder (Sec. 2nd I. F. Tran.)......
(26) Condenser (250 mmfd.)....30-1032
(27) Resistor (25,000 ohms)....33-1161
(28) Vol. Con. & Switch Assm...38-6297
(29) Condenser (3000 mmfd.)...30-4042
(30) Condenser (.05 mfd.)......30-4020
(31) Resistor (10,000 ohms)....33-1000
(32) Condenser (110 mmfd.)....30-1031
(33) Resistor (190,000 ohms)...33-1116
(34) Condenser (.05 mfd.)......30-4020
(35) Resistor (32,000 ohms).... 3525
(36) Resistor (51,000 ohms).... 5868
(37) Resistor (5000 ohms)......33-1155
(38) Condenser (10-10 mfd.)...30-2106
(39) Condenser (250 mmfd.)....30-1032
(40) Resistor (50,000 ohms)....33-1163
(41) Condenser (.25 mfd.)...... 04360
(42) Condenser (.1 mfd.).......30-4170
(43) Resistor (.1 meg.)........ 6099
(44) Condenser (6000 mmfd.)...30-4125
(45) Resistor (.5 meg.)........ 6097
(46) Resistor (500 ohms).......33-3031
(47) Condenser (2000 mmfd.)...30-4177
(48) Output Transformer......32-7318
*(49) Cone & Voice Coil........45-2062
*(50) Bucking Coil............45-2066
*(51) Field Coil..............45-2065
(52) Condenser (250 mmfd.)....30-1032
(53) Choke..................32-1374
(54) Resistor (7 ohms).........33-3035
(55) Pilot Lamp.............34-2040
(56) Tone Control...........30-4243
(57) Choke..................32-1539
(58) "A" Choke..............32-1282
(59) Interference Filter........32-1544
(60) Condenser (.5 mfd.).......30-4210
(61) Vibrator Choke..........32-1281
(62) Condenser (.5 mfd.).......30-4047
(63) Vibrator...............38-5036
(64) Condenser (.02 mfd.)......30-4039
(65) Resistor (200 ohms)....... 7217
(66) Condenser (250 mmfd.)....30-1032
(67) Resistor (200 ohms)....... 7217
(68) Condenser (1250 mmfd.)... 5886
(69) Power Transformer.......32-7216
(70) Resistor (32,000 ohms).... 3525
(71) Condenser (.01 mfd.)......30-4051
(72) Filter Cond. (4-8 mfd.)....30-2105
(73) Filter Choke............32-7215
(74) Condenser (.15 mfd.)......30-4191
(75) Antenna Choke..........32-1372
*Spark Plug Resistor.......33-1192
Distributor Resistor...... 4851
Interference Condenser....30-4007
4-prong Socket...........27-6006
5-prong Socket...........27-6014

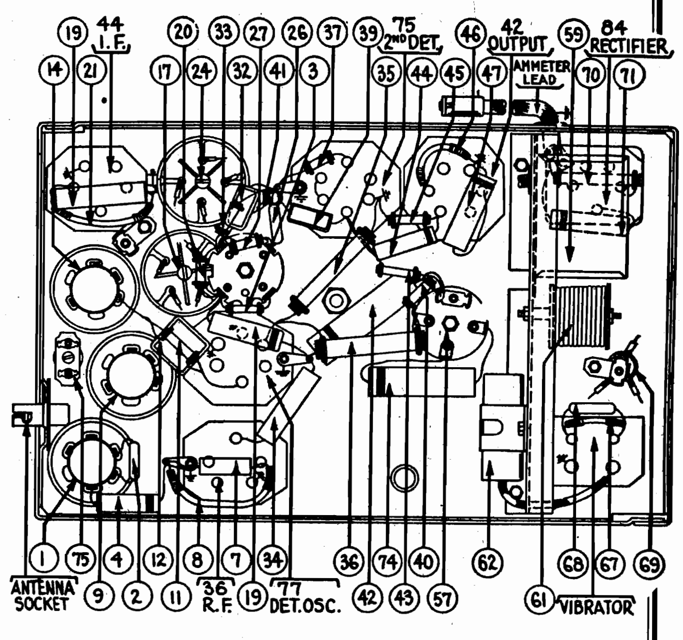


FIGURE 6

6-prong Socket...........27-6020
Antenna Lead............38-5131
*Ammeter Lead...........38-6339
*Stud...................28-6231
Nuts (set mtg.).......... W55A
*Flexible Shaft............28-8336
*Dial...................27-5073
*Knob...................27-4098
Knob (tone control)...... 03064
*Lock (Less Keys).........28-8166
*Speaker Cable (speaker end) 36-3350
*Knob (President).........27-4058
*Flexible Shaft (President)..28-8284

An Antenna Choke, Part No. 32-1372 (75) on the Parts List and Base View has been added. This is connected in series with the Antenna Lead and the Antenna Transformer (1) and Condenser (2).

NOTE: The items marked with an asterisk are rarely required for service and in many cases will not be carried in stock by the local service station. In such cases it will be necessary to order these parts from Philco Transitone, Phila., Chicago, or San Francisco.

MODEL AC-266 Studebaker
Installation Data

PHILCO RADIO & TELEV. CORP.

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Studebaker DeLuxe Radio (Stock No. AC-266) in the 1935 model Studebaker cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

All closed cars manufactured after July 1, 1931, are equipped with the roof-type antenna. The lead-in is brought down the left windshield post and is coiled up behind the left cowl trim panel. An antenna designed especially for convertible models can be secured from the Studebaker factory through the Accessory Division.

Receiver Location and Installation

Refer to Fig. 1 showing the location of the holes in the dash. Locate one of the holes and mark with a sharp punch; then use the template furnished with the Receiver to locate the remaining two holes. These holes should be drilled with a 7/16" drill.

Install the Receiver with the control connections to the left side of the car. (See Fig. 3).

Control Unit

The control unit is mounted on a panel which replaces the dummy door on the left side of the instrument board. This door is held in place by means of three bolts (one at each end and one at the bottom). Care should be taken to fasten the control panel securely so it does not rattle.

The control is furnished with a blank lock cylinder which must be crushed to match the car keys. This operation must be completed before the control is installed on the instrument board.

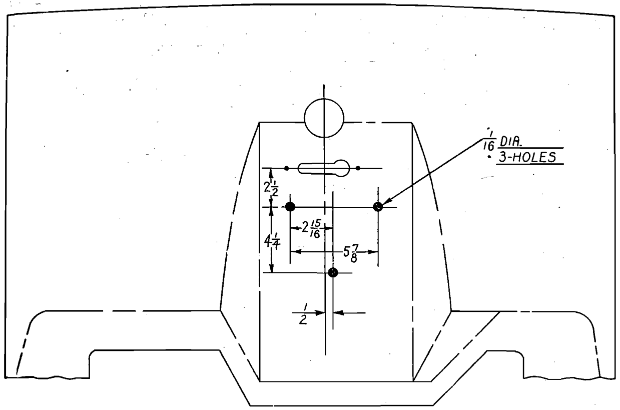


FIGURE 1

Instructions for Fitting Car Key to Control Lock

1. Remove the knobs and take off the control unit from the panel.
2. Remove the pilot lamp socket assembly in the rear of the control.
3. Reach in through the opening in the back of the control unit with a medium size screw driver and press down on the brass retaining lock spring, at the same time working the lock cylinder forward. (See Fig. 2).
4. Insert the car key in the lock cylinder and crush in the same manner that you crush the standard lock, with pliers or vise.
5. Assemble the dial and spring on the cylinder. Push down the retaining spring and replace the lock in the same relative position that it had when removed. With the key in the lock push the lock back, working the lock pin in place in the slot in the lock bar in back of the lock. Push the lock in until the retaining spring snaps in place.
6. Reassemble the control on the panel.

Control Shaft Installation

The control must be unlocked so that the volume control shaft is free. Then connect the volume control flexible shaft (left hand) to the rear coupling on the end of the Receiver. Be sure the coupling is properly seated and then tighten the knurled casing retaining nut. Next connect the tuning control shaft in a like manner to the front coupling.

The black lead coming from the back of control must be coupled to the short connector that branches from the speaker cable at the plug.

"A" Or Battery Cable (See FIGURE 4)

Connect the "A" or battery cable to the Receiver lead. The fuse housing connector couples by inserting the small end and making a slight turn clockwise. The other end of the cable must be connected to the right side of the ammeter. The shield pigtail at each end of the cable must be grounded under a convenient screw and the cable dressed up behind the Receiver. Be sure the fuse and fuse insulator are in place in the fuse housing before the cable is connected.

Antenna Lead

The antenna lead must be connected in the receptacle on the left end of the Receiver near the top and run along the instrument board to the left-hand windshield post. The lead must be spliced to the car antenna lead-in. Solder and tape the splice. The shield pigtail must be grounded. Cut off the excess lead-in before making the splice.

Speaker Cable and Speaker Installation (Fig. 3 and 4)

Determine the location of the metal frame for mounting the speaker in the center above the windshield. (See Fig. 4). This can be felt thru the headlining. Then slit the headlining vertically and horizontally inside the frame. Carefully cut away the headlining to within one inch of the frame. This will make a circular hole two inches smaller in diameter than the frame.

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the right windshield post. To do this, first feed a piece of iron or fish wire across the header and down the right windshield post. A piece of

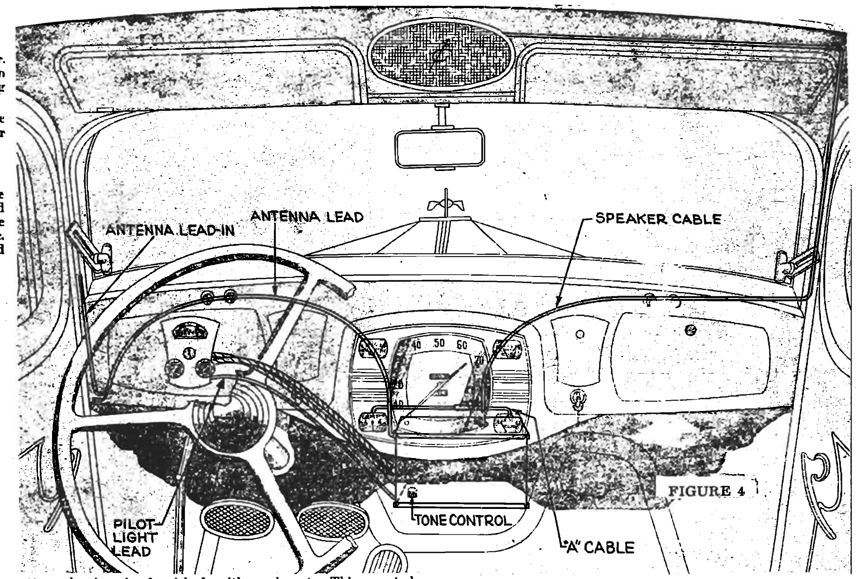


FIGURE 4

cotton sleeving is furnished with each set. This must be slipped over the end of the cable and then drawn tight with the fingers. Fasten to the wire and then carefully pull the wire and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors.

The speaker must be fastened in the opening provided with four self tapping screws (see fig. 3 and 4). The connections on the speaker must be down so that they cannot be pulled out by any strain on the cable.

The grille and bezel must next be fastened in place. The location of the four screw holes is shown in Fig. 3. The cardboard spacer must be placed between the grille and the headlining.

Control Adjustments

Turn the left-hand (volume control) knob counter-clockwise to the "off" position. Pull off the knob and loosen the set screw on the shaft. Then turn the shaft until it can be locked in place with the control lock. Tighten the set screw securely and replace the knob.

This adjustment must be made so that the radio can be turned "off" and the control locked.

The right hand knob is the tuning control knob. With the Receiver turned on, tune in a station whose frequency in kilocycles is known. The numbers on the dial represent the frequency in kilocycles with the last "0" omitted. With the known station accurately tuned in, pull off the knob and loosen the set screw. Then turn the shaft until the proper frequency is indicated on the dial. Tighten the set screw securely and replace the knob.

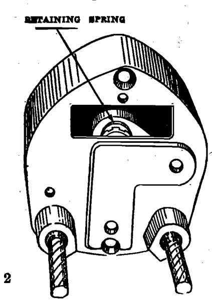


FIGURE 2

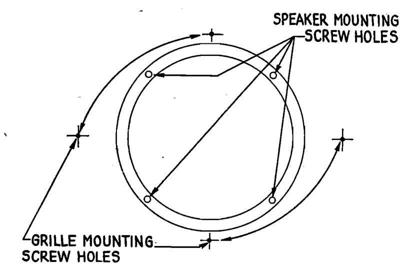


FIGURE 3

PHILCO RADIO & TELEV. CORP.

MODEL RT-3 Reo DeLuxe (Part No.5485) Installation Data,Parts

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Reo DeLuxe Radio **(Part No. 5485)** in the 1935 Reo cars. Read thoroughly, then follow the instructions carefully in every detail.

Antenna

All Reo closed cars manufactured after January 1, 1933, are equipped with a roof type antenna. The lead-in is brought down the right-hand windshield post and is coiled behind the right cowl trim panel.

Receiver Location and Installation

Install the Receiver above the steering column on the left hand side of the car, allowing adequate foot clearance at the

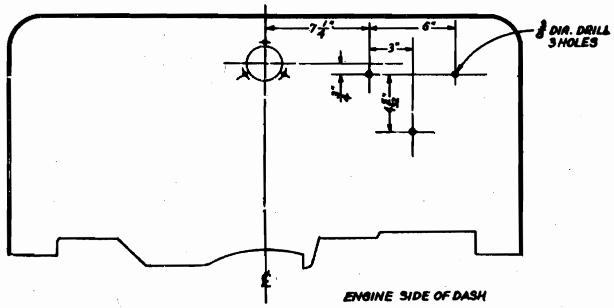


FIGURE 1

pedals. Refer to Figure 1 for the location of the bolt holes in the dash and drill three 3/8" holes. Assemble the bolts and fasten the Receiver securely to the dash. The control end of the Receiver must face the center of the car.

Control Unit

In 1935 cars, provision has been made to install the control unit in the ash receptacle opening in the instrument board. Unscrew the ash receptacle door knob to release the face plate. This exposes the two bolts which hold the two clamp brackets against the back of the instrument board. Remove these and take out the ash receptacle.

Fasten the radio control unit in place on the instrument board. Place the "U" clamp over the studs on the back of of the control and tighten the wing nuts to draw the control flush with instrument board. (See Figure 2).

Control Shafts

The flexible shaft on the right of the control is the tuning control shaft. This must be coupled in the shaft bushing nearest the dash, on the end of the Receiver housing. After the shaft has been properly seated, the knurled casing nut must be securely tightened.

Next couple the volume control shaft in the proper bushing on the Receiver and tighten the knurled casing nut.

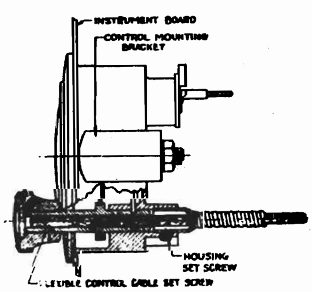


FIGURE 2

The black lead coming from the back of the control unit must be coupled to the short connector on the lead branching from the speaker cable plug.

"A" Lead

Place the "A" fuse and insulator in the fuse housing and connect it to the Receiver "A" lead. Connect the eyelet terminal of the lead to the right side of the ammeter.

Antenna Lead

The antenna lead must be spliced to the car antenna lead-in as close to the right corner post as possible. All excess lead-in must be cut off and the splice soldered and taped. Dress the lead along the instrument board and over the top of the glove compartment. The shield pigtail must be grounded under a

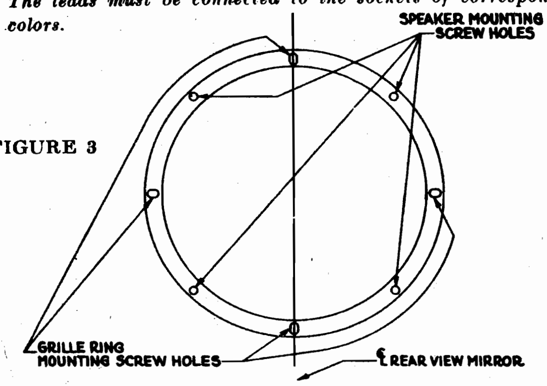
Speaker Cable and Speaker Installation

Determine the location of the opening for mounting the speaker in the center above the windshield. This can be felt through the headlining. Then slit the headlining vertically and horizontally inside the frame. Carefully cut away the headlining to within one inch of the opening. This will make a circular hole two inches smaller in diameter than the opening.

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the left windshield post. A fish wire is tacked to the headlining trim panel and is used to pull the speaker cable up the left pillar. A piece of cotton sleeving or tow strap is furnished with each set. This must be slipped over the end of the three wires on the cable and then drawn tight with the fingers. Fasten to the wire and then carefully pull the wire and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. *The leads must be connected to the sockets of corresponding colors.*

FIGURE 3



The speaker must be fastened in the speaker opening with wood screws. In mounting the speaker, be sure to mount it with the slotted holes in a vertical line with rear view mirror. The connections on the speaker must be down so that they cannot be pulled out by any strain on the cable. (See Figure 3).

The speaker grille and bezel must next be fastened in place, using four chrome plated oval head wood screws as furnished. The cardboard spacer must be placed between the grille and the headlining.

Items 1 to 75 of the Parts List for the Studebaker ST-3,DeLuxe Model AC-266 are identical for Reo DeLuxe Model RT-3. See the items below for additional accessories.

		Spark Plug Resistor	33-1101
		Distributor Resistor	33-1113
		Interference Condenser	30-4007
		4-prong Socket	27-6006
		5-prong Socket	27-6014
6 prong Socket	27-6020	Knob	27-4182
Antenna Lead	38-5131	Knob (tone control)	03064
*Ammeter Lead	38-6595	*Speaker Cable (speakerend)	41-3128
Stud (Set Mtg.)	28-6231	*Tow Strap	36-3403
Nuts (set mtg.)	W55A	Glass	27-7325
•Flexible Shaft (Tuning)	28-8317	*Face Assembly	28-2206
*Flexible Shaft (Volume)	28-8318	"U" Clamp	29-1705
•Pointer	28-2510	Nuts (Control Mtg.)	W317A

MODEL MT-3 DeLuxe
Pierce Arrow 1935
Installation Data

PHILCO RADIO & TELEV. CORP.

THESE INSTRUCTIONS have been carefully prepared for your use in installing the Pierce-Arrow Philco Auto Radio, with EAR LEVEL RECEPTION, Model MT3, in the 1935 Series Pierce-Arrow cars. Read the instructions carefully and be sure you understand each step of the installation before proceeding with the work.

Antenna

All closed cars of the 1935 series are equipped with a roof-type antenna. The antenna lead-in is coiled behind the left cowl trim panel. In the 1935 series open cars, the antenna is in the roof and the lead-in coiled behind the rumble seat left side kick pad.

The shielded antenna lead must be connected to the car lead-in as close as possible to the corner post. Splice the bare ends together and then solder and tape the connection. Cut off all the excess lead-in, and ground the shield pigtail under a convenient screwhead.

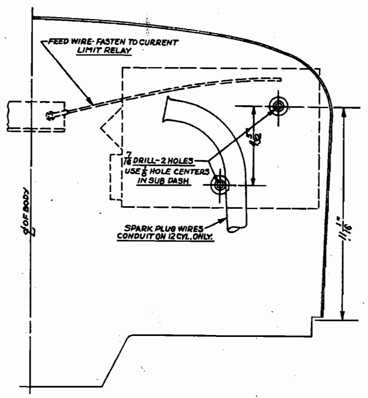


FIGURE 1

Receiver Location

Refer to Figure 1 for the location of the 1/8" hole in the dash. These holes must be enlarged to 7/16". Fasten the studs to the Receiver housing and then mount it on the dash with the control end of the Receiver facing the center of the car.

Control Unit

Take off the two nuts and spacers and remove the medallion plate from the left side of the instrument board. Remove the knobs from the control unit and then install it in the opening. Fasten it in place on the two studs on the back of the instrument board, using the medallion, nuts and washers. Replace the knobs on the control shafts. See Figures 2 and 3.

Items 1 to 75 of the Parts List for the Studebaker ST-3, DeLuxe Model AC-266 are identical Pierce-Arrow DeLuxe Model MT-3. See the items on the right for additional accessories.

Speaker Cable and Speaker Installation
(CLOSED CARS)

Determine the location of the opening for mounting the speaker in the center above the windshield. This can be felt through the headlining. Slit the headlining vertically and horizontally and carefully cut away the headlining to within one inch of the opening. This will make a circular hole two inches smaller in diameter than the opening.

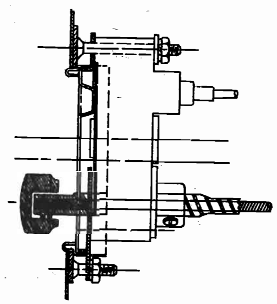


FIGURE 2

Connect the speaker cable plug in the socket on the lid of the Receiver and then fish the cable up the left windshield post. A fish cord is tacked to the headlining trim panel and is used to pull the speaker cable up the left pillar. A piece of cotton sleeving on tow strap is furnished with each set. This must be slipped over the end of the cable and then drawn tight with the fingers. Fasten to the cord and then carefully pull the cord and cable up the post, across the header and out the speaker opening.

The ends of the speaker cable are equipped with small tip connectors which plug into the sockets on the side of the speaker. The sockets are marked with green, yellow and black paint to correspond with the colors of the speaker cable leads. The leads must be connected to the sockets of corresponding colors. The connections on the speaker must be down so that they cannot be pulled out easily.

Fasten the speaker in the opening with wood screws and then install the speaker grille and bezel.

Spark Plug Resistor	33-1015
Distributor Resistor	4851
Interference Condenser	30-4007
4-prong Socket	27-6006
5-prong Socket	27-6014
6-prong Socket	27-6020
Antenna Lead	38-5131
*Ammeter Lead	38-6545
Stud	28-6036
Nuts (set mtg.)	W55A
*Flexible Shaft	28-8341
*Dial	27-5084
Knob	27-4098
Knob (tone control)	03064
*Speaker Cable (speaker end)	33-3350
*Tow-Strap	36-3403

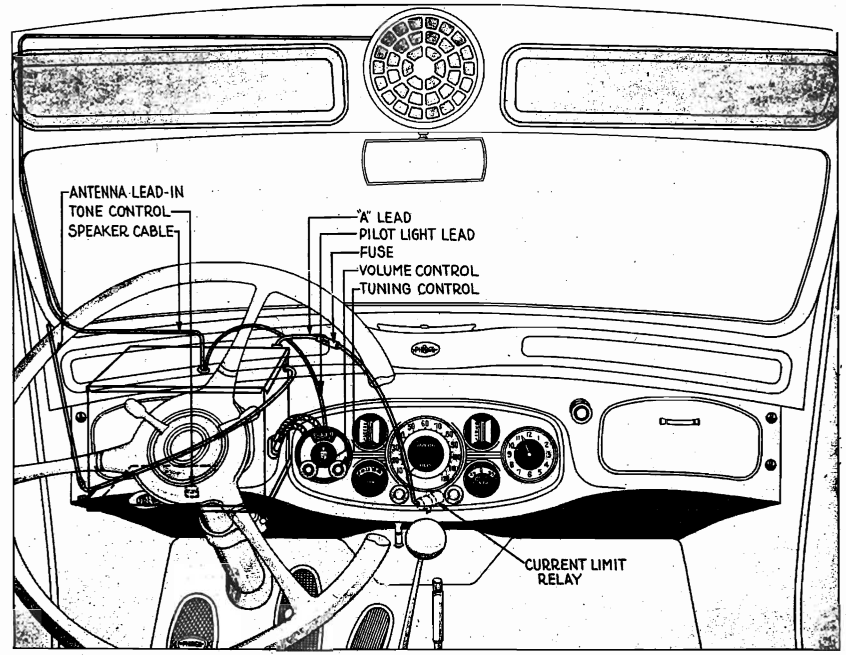


FIGURE 3

Speaker Cable and Speaker Installation
(OPEN CARS)

In open cars, the speaker location is in the right kick pad, under the cowl. The speaker mounting block can be felt thru the carpet of the kick pad. Cut the carpet vertically and horizontally inside the block and carefully trim the carpet to the edge of the cardboard circle under the carpet. Connect the speaker cable to the Receiver and then run the cable over and down inside the right kick pad.

Connect the cable to the speaker as described under Speaker Cable and Speaker Installation for closed cars.

Fasten the speaker to the mounting block with wood screws and then install the grille and bezel.

Connections

Connect the terminal end of the "A" lead to the left side of the current limit relay. Place the fuse and fuse insulator in the fuse housing and connect it to the Receiver lead.

The pilot light lead coming from the back of the control must be coupled to the short connector that branches from the speaker cable at the plug.

The antenna lead must be connected to its receptacle in the end of the Receiver housing and dressed in place.

Flexible Shafts

Connect the tuning control flexible shaft (right hand) to the rear coupling on the end of the Receiver. Be sure the coupling is properly seated and then tighten the knurled casing nut. Next connect the volume control shaft in a like manner to the front coupling.

Control Adjustments

The right-hand knob is the tuning control knob. With the Receiver turned on, tune in a station whose frequency in kilocycles is known. The numbers on the dial represent the frequency in kilocycles with the last "0" omitted. With the known station accurately tuned in, pull off the knob and loosen the set screw (See Fig. 2). Then turn the shaft until the proper frequency is indicated on the dial. Tighten the set screw securely and replace the knob.

Ignition and Generator Interference Suppression

Two interference condensers are supplied — one must be fastened under the inside generator relay leg and the lead connected to the battery side of the relay. The second condenser must be fastened under an ignition coil mounting screw and the lead connected to the *ammeter side* of the coil.

Cut the spark plug terminals from the spark plug wires and screw on the spark plug resistors and snap them in place on the spark plug terminals. Cut each distributor-to-coil high-tension wire about 1" from the distributor and screw into it a distributor resistor. Then screw the distributor end of the lead into the resistor and plug into the distributor cap again.

PHILCO RADIO & TELEV. CORP.

MODEL R
Schematic, Chassis
Parts List

1	Antenna Transformer	32-1331
2	Tuning Condenser	31-1164
3	1st Padder (on tun. cond.)	
4	Resistor (70,000 ohms)	33-1115
5	Condenser (.03 mfd.)	30-4025
6	Condenser (.05 mfd.)	30-4020
7	Resistor (1500 ohms)	33-3047
8	R. F. Transformer	32-1332
9	2nd Padder (on tun. cond.)	
10	Resistor (10,000 ohms)	33-1000
11	Condenser (.0007 mfd.)	5863
12	Padder (Pri. 1st I. F. Tran.)	
13	Oscillator Transformer	32-1333
14	3rd Padder (on tun. cond.)	
15	1st I. F. Transformer	32-1329
16	Padder (Sec. 1st I. F. Tran.	
17	Condenser (.03 mfd.)	30-4025
18	Resistor (700 ohms)	6443
19	Condenser (.05 mfd.)	30-4020
20	Resistor (1,000,000 ohms)	33-1096
21	Condenser (.05 mfd.)	30-4020
22	Padders (Prim. 2nd I. F.)	
23	2nd I. F. Transformer	32-1237
24	Padder (Sec. I. F. Tran.)	
25	Cond. (.00011-.00025 mfd.)	30-1020
26	Resistor (25,000 ohms)	33-1013
27	Vol. Con. & Switch Assm.	33-5058
28	Condenser (.006 mfd.)	30-4125
29	Resistor (2,000,000 ohms)	33-1025
30	Resistor (5000 ohms)	6096
31	Condenser (.25 mfd.)	30-4146
32	Resistor (51,000 ohms)	5868
33	Condenser (.00025 mfd.)	3082
34	Condenser (.25 mfd.)	04360
35	Resistor (100,000 ohms)	6099
36	Resistor (500,000 ohms)	6097
37	Condenser (.006 mfd.)	30-4125
38	Condenser (10 mfd.)	7440
39	Resistor (500 ohms)	33-3031
40	Condenser (.006 mfd.)	30-4024
41	Output Transformer	32-7214
42	Cone & Voice Coil	02861
43	Field Coil Assembly	36-3097
44	Pilot Light	6608
45	Resistor (7 ohms)	33-3035
46	"A" Choke	32-1268
47	Condenser (.5 mfd.)	30-4047
48	Vibrator Choke	32-1235
49	Condenser (.5 mfd.)	30-4147
50	Vibrator Unit	38-5036
51	Condenser (.05 mfd.)	30-4039
52	Resistor (200 ohms)	7217
53	Resistor (200 ohms)	7217
54	Condenser (.00125 mfd.)	5886
55	Power Transformer	32-7216
56	Condenser (.01 mfd.)	30-4051
57	Condenser (4.—8. mfd.)	30-2072
58	"B" Choke	32-7215
59	R F Choke	32-1281
60	Resistor (30,000 ohms)	7836
61	Resistor (32,000 ohms)	3525

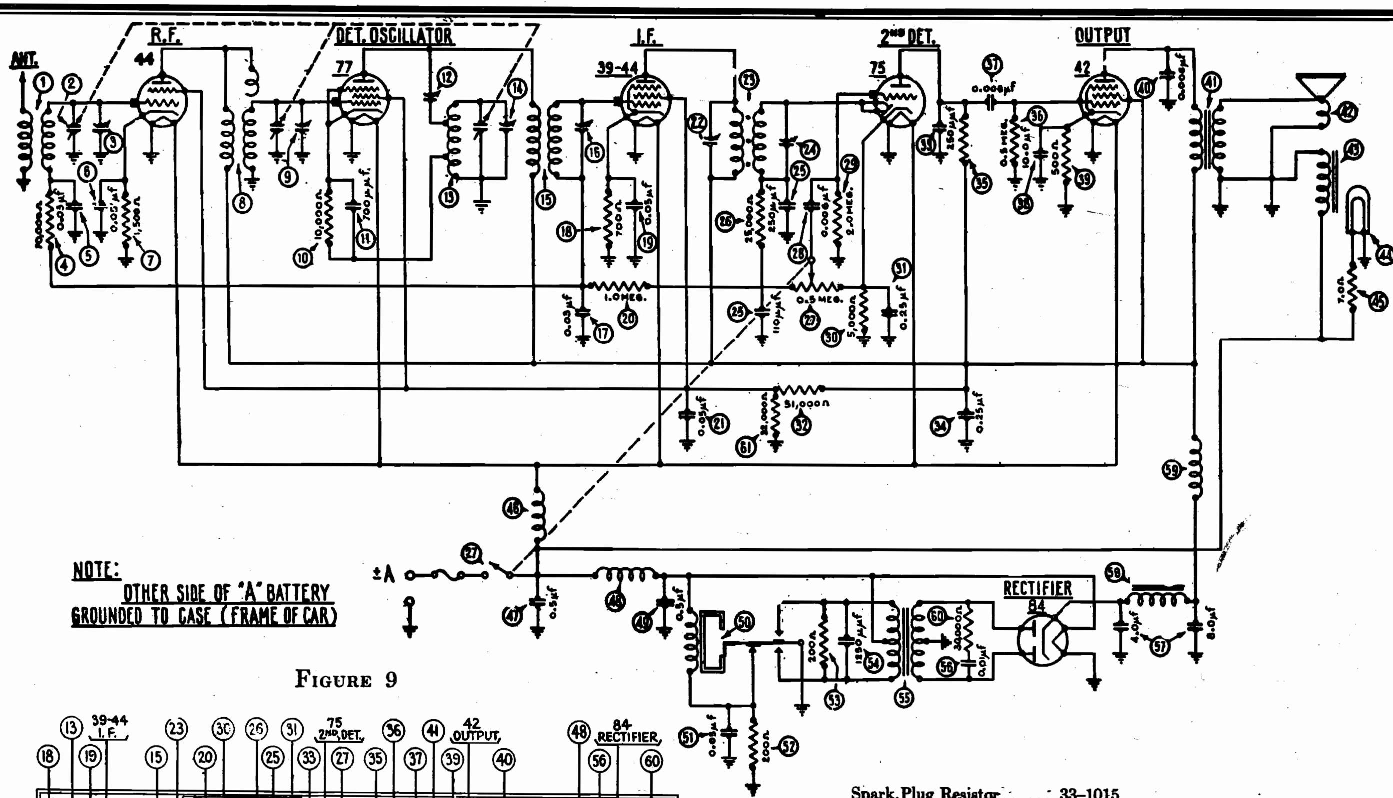


FIGURE 9

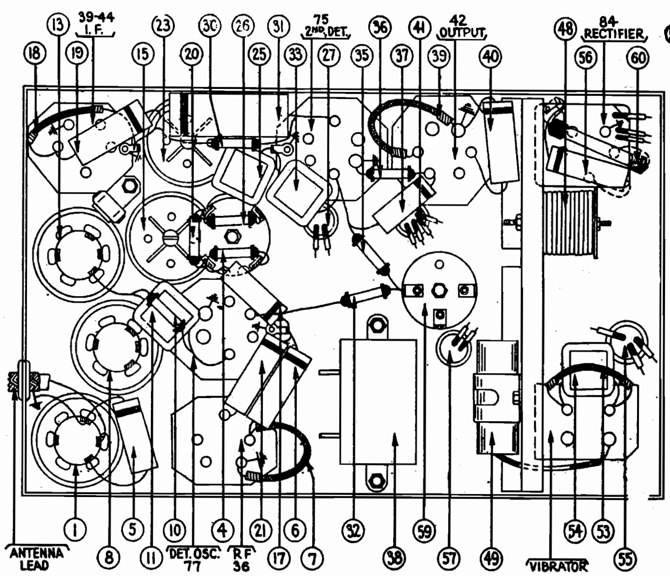


FIGURE 10

Spark Plug Resistor		33-1015
Distributor Resistor		33-1113E
Screw Type Resistor		4851
Interference Cond. (½ mfd.)		30-4007
Interference Cond. (1 mfd.)		4522
Face Assembly		42-5176
Glass for Control		27-7325
Pointer		28-1991
Control Assembly		42-5174
Knobs		27-4058
Knob Spring		28-1738
Bezel Assembly		42-5115
Battery Cable		38-5704
Stud		28-6036
Nut		W55
4-prong Socket		27-6006
5-prong Socket		27-6014
6-prong Socket		6417
Antenna Lead		38-5703
Fuse		7227
Fuse Insulator		27-7131
Shafts		28-8234

MODEL R
Installation Data

PHILCO RADIO & TELEV. CORP.

Installation Instructions - Standard Model - Part No. 628808

These Instructions have been carefully prepared for your use in installing the Standard Custom-Built Model R Radio, by Philco. Read thoroughly, then follow the instructions carefully in every detail.

Carefully unpack the cartons and check the contents with the material packing lists. Examine the parts and compare them with illustrations given in these instructions so that you may become familiar with them and thus make the installation easily and quickly.

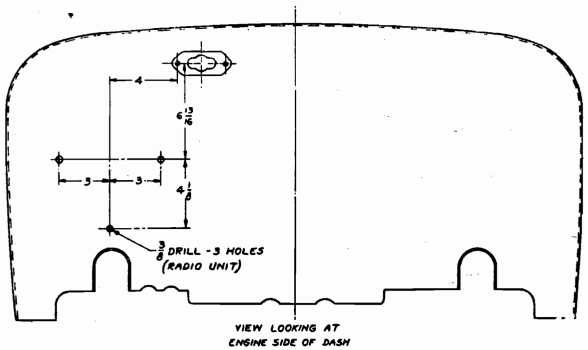


Figure 1

Receiver Location

Refer to Figure 1, which gives detailed dimensions for the location and drilling of the holes in the dash. All dimensions are shown from the engine side of the dash. Remove the paint from the dash for ¾" around the holes to insure good ground contact. After drilling the holes, install the three mounting studs in the back of the Receiver so that when the Receiver is mounted in the car, the control cables will come out toward the center and the speaker will face toward the toe boards. Before installing, the three spacing nuts should be put on the mounting studs, so that there will be ¾" spacing between the Receiver and the dash lining. (See Figure 2 and 3).

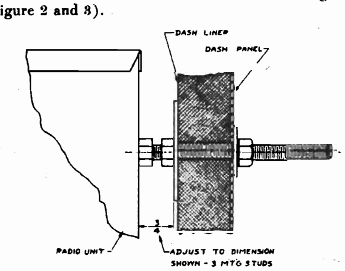


Figure 2

Antenna Lead

Splice the shielded Receiver antenna lead to the car lead-in as close as possible to windshield pillar post, cutting off all excessive lead-in. Tape this connection securely. All unshielded lead must be pushed back up the windshield pillar. The shielding pigtail must be grounded to the body cowl panel as close as possible to the "A" pillar. Drill a ⅛" hole where the hood overlaps and use the 8-32 bolt, washers, and nuts supplied for this purpose. Remove the paint from around the hole, to secure a good ground connection. (See Figure 4)

Ammeter Lead

Place the fuse and fuse insulator in the metal fuse holder and connect it to the black and white wire coming from the back of the Receiver. Determine the correct length for connection to the ammeter output terminal, cut the wire and strip the insulation, then solder on the eye terminal and connect it to the ammeter output terminal.

Instrument Panel Control

Remove the ash receiver from the panel with an upward pull.

Remove the ash receiver bezel from the panel by compressing the retaining tabs at the bottom of the bezel assembly. This can be done best by using a screw-driver and working from in back of the instrument panel. While pushing up on an end tab, pull the bezel forward and it will come out.

Loosen the two (2) screws which secure the instrument board brace to the instrument board flange. The cradle assembly can be slid forward then. Next, loosen the bolts on the brace in back of the instrument panel and remove the toggle spring. Slide the entire assembly forward and remove. Figure 5 gives the details of the ash receiver assembly while Figure 6 gives an enlarged view of the section A in Figure 5. Be sure to tighten all bolts and screws that were loosened for this operation.

Loosen the car lighting switch to permit more working space. While this operation is not absolutely necessary, it makes the following operation easier.

Push the flexible shafts of the control through the opening in the panel and install the control unit in this opening.

The "U" retaining clamp must be placed over the studs on the back of the control and the hex-nuts tightened to draw the control bezel flush with the instrument panel. (See Figure 7). Replace and tighten the car lighting switch.

The knob on the left of the control is the switch and volume control. Its cable should be installed in the flexible cable coupling bushing on the Receiver nearest the dash. The right-hand knob is the tuning control. The flexible cable from this point should be installed in the other control coupling bushing.

The set screws on the coupling bushings must be loosened sufficiently to allow the shaft housings and couplings to be properly seated. After the shafts have been coupled, tighten the set screws again. The dial light connector should now be pushed into its receptacle on the speaker panel.

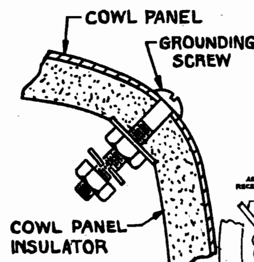


Figure 4

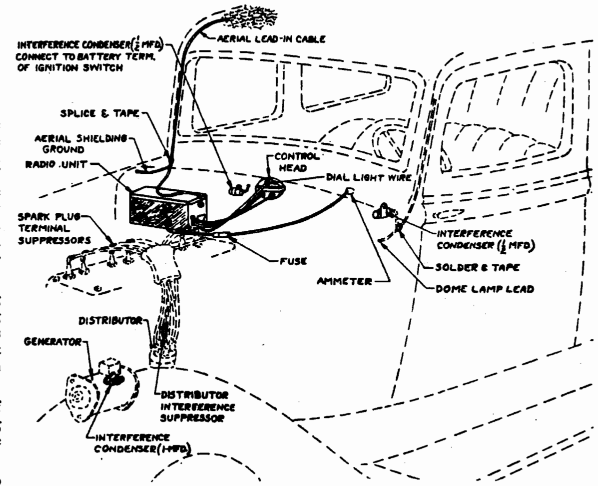


Figure 3

Adjustment

Turn on the Receiver and tune in a station whose frequency in kilocycles is known. (The numbers on the dial represent channel numbers which, with the addition of a cipher, become the frequency numbers.) Pull the knob from the right-hand control shaft and loosen the set screw found there. See Figure 7. Turn the shaft until the indicator points to the correct number on the dial. Then tighten the set screw and replace the knob.

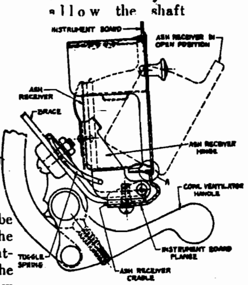


Figure 5

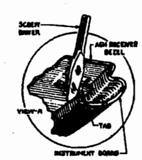


Figure 6

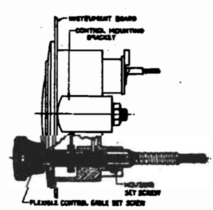
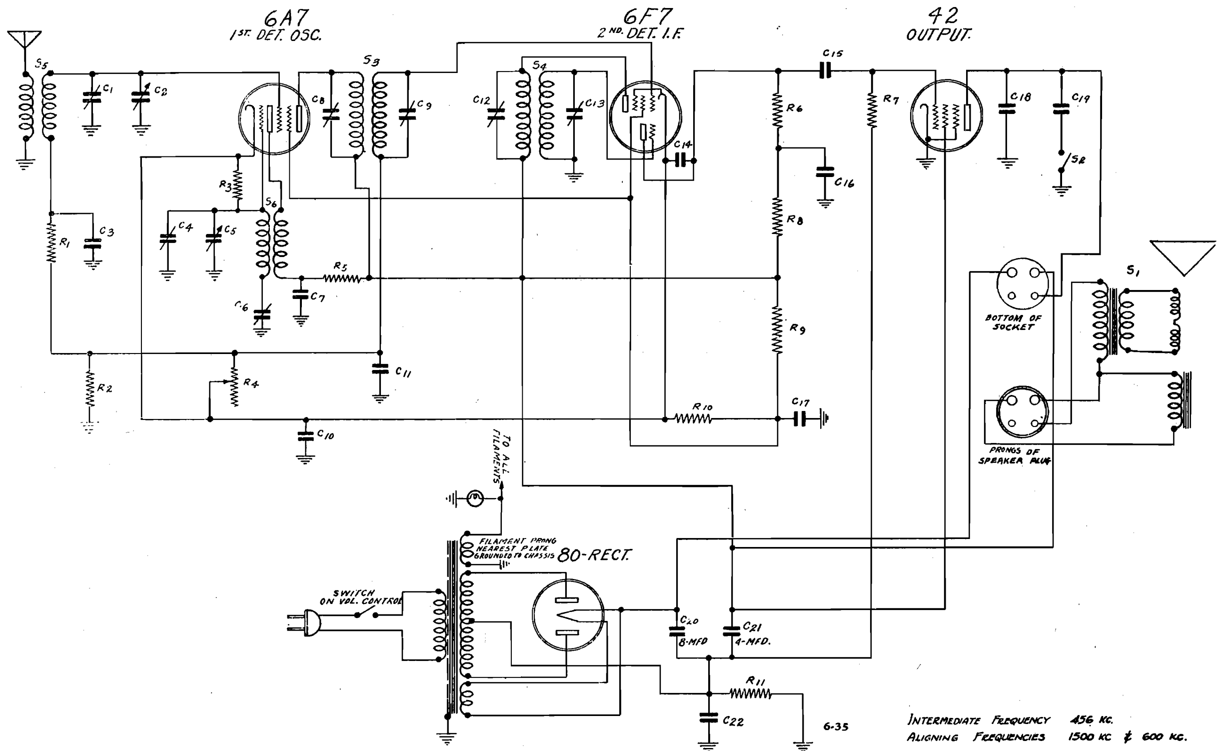


Figure 7

MODEL 41
Schematic, Voltage Alignment, Socket Trimmers

PILOT RADIO CORP.

SCHEMATIC DIAGRAM PILOT MODEL No. 41



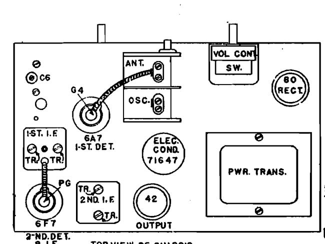
Model 41 Broadcast Receiver

Range: 170 Meters—550 Meters (1,770 kc.—545 kc.)

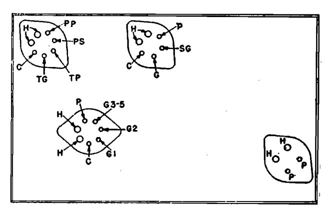
CONDENSERS		
DESIGNATION	PART NO.	DESCRIPTION
C1, C4		TRIMMERS ON GANG COND.
C2, C5	71646	2 GANG COND.
C3 C11 C17	22055-M	.1-200V. PAPER TUBULAR
C6	71503-A	250-500 MMFD. PADDER
C7 C15	22055-C	.05-600V. PAPER TUBULAR
C8 C9		TRIMMERS IN 1ST. I.F. TRANS.
C12 C13		TRIMMERS IN 2ND. I.F. TRANS.
C10	22055-F	.25-200V. PAPER TUBULAR
C14	27726	.0002 MFD. MICA
C16	22055-AB	.1-600V. PAPER TUBULAR
C18	22055-U	.01-1000V. PAPER TUBULAR
C19	22055-V	.03-1000V. PAPER TUBULAR
C20-C21	71647	4-8 MFD. 450V. ELEC. COND.
C22	22055-S	.5-200V. PAPER TUBULAR

RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R1	13031	100,000 .25 WATT
R2	13028	1,000-OHMS .25 WATT
R3 R8	13164	50,000 OHMS .25 WATT
R4	71656	VOL. CONTROL & SW. 5000-WIRE 150W MIN.
R5 R10	13074	20,000-OHMS .25 WATT
R6	13171	250,000-OHMS .25 WATT
R7	13072	750,000-OHMS .25 WATT
R9	13126	25,000-OHMS .5 WATT
R11	13059	250-OHMS 1 WATT

MISC.		
DESIGNATION	PART NO.	DESCRIPTION
S1	40775	SPEAKER 1400 OHM FIELD
S2	71657	TONE CONTROL SWITCH
S3	70936-4	1ST I.F. TRANS.
S4	70937-4	2ND. I.F. TRANS.
S5	71685	ANT. COIL
S6	71701	OSC. COIL



TOP-VIEW-OF-CHASSIS



BOTTOM-VIEW – TUBE-LAYOUT

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6F7 tube in the I. F. Amplifier stage through a .002 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6F7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Adjust the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

VOLTAGES MEASURED AT TUBE SOCKETS

	Det. Osc. 6A7	Amp. Det. 6F7	Audio Output 42	Rectifier 80
PLATE	220	220	210	335 Volts D.C. from Filament to transformer center tap.
SCREEN	66	66	237	
CATHODE	18	18	*16	
FILAMENT	6.3	6.3	6.3	4.9

Speaker field volts—85 volts.
Anode grid of 6A7—150 volts.
Triode plate of 6F7—95 volts.
Plate and screen voltages measured to cathode.
Cathode voltages measured to chassis frame.

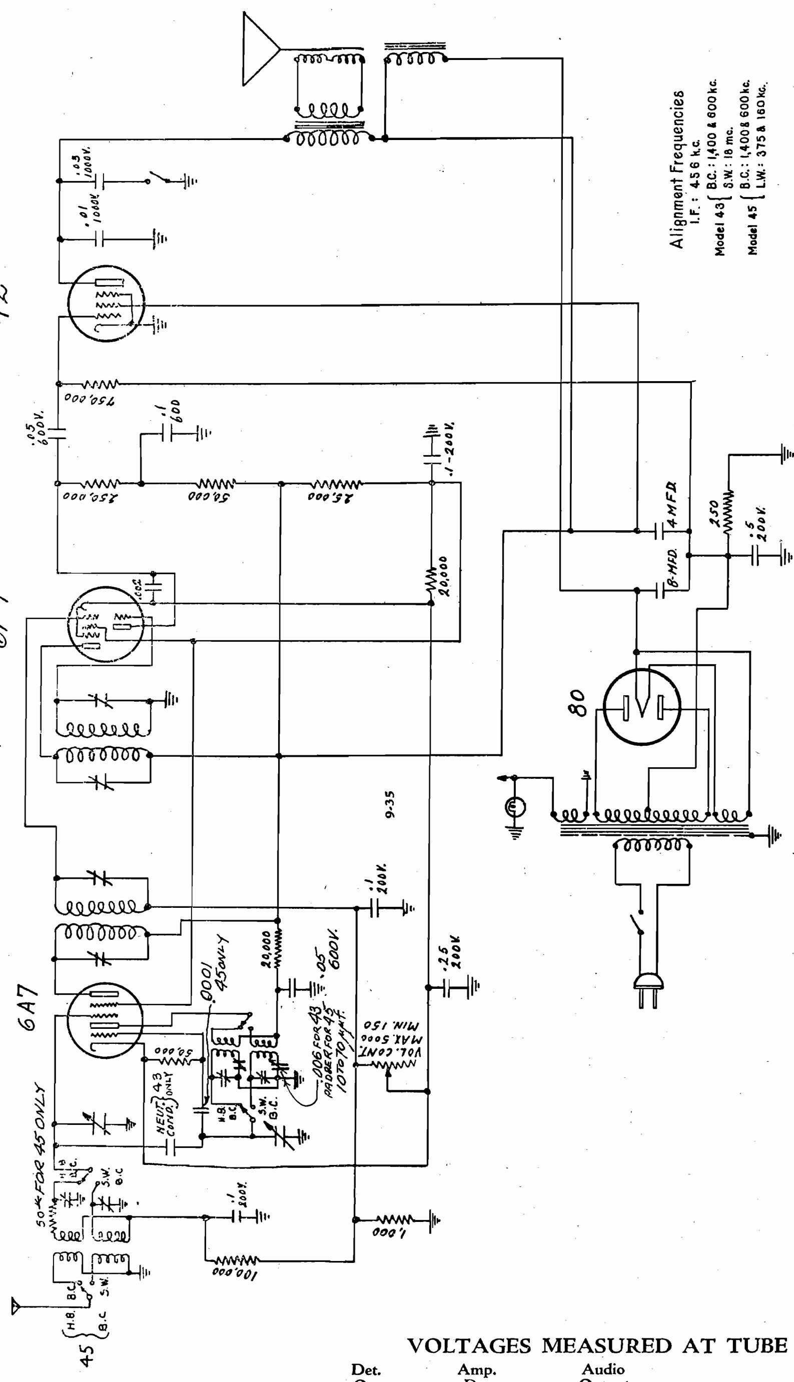
*Measured across 250 ohm resistor, R-11.
Measurements made with voltmeter of 1,000 ohms per volt.

MODELS 43,45
Schematic,Voltage
Alignment

PILOT RADIO CORP.

Model 43 Short-Wave Broadcast Receiver

Range: 16-52.6 M. and 178-550 M. (18,800-5700 kc. and 1680-545 kc.)



REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6F7 tube in the I. F. Amplifier stage through a 0.1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground clip. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6F7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads, this time with a .0002 mfd. condenser in the antenna lead. Adjust the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400 ohm resistor should be inserted in the antenna lead. The alignment frequency is 16.8 Meters—(17,800 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

VOLTAGES MEASURED AT TUBE SOCKETS

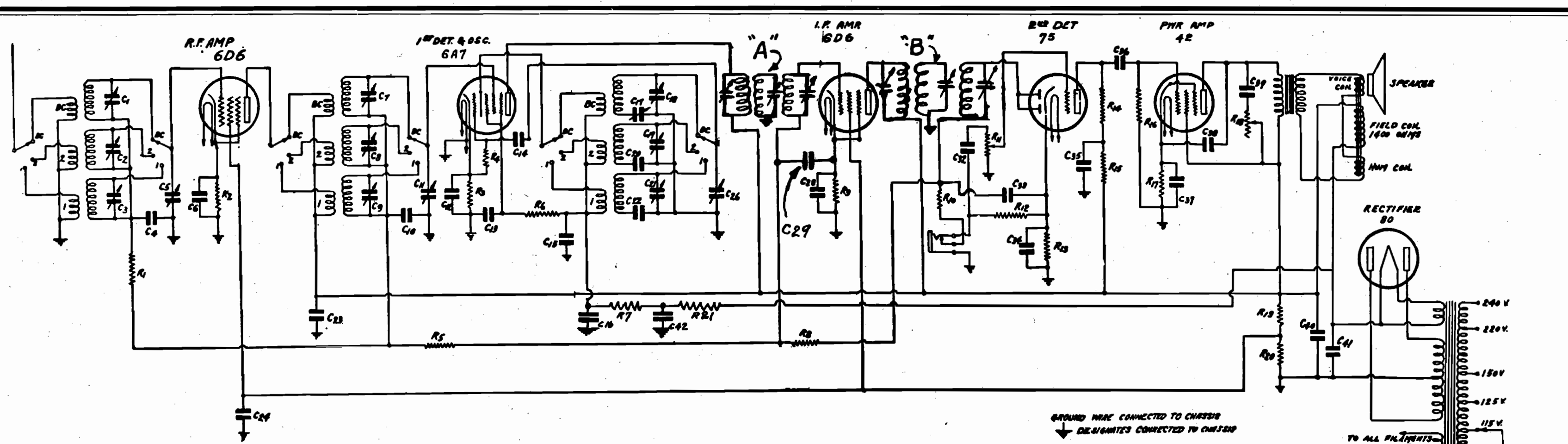
	Det. Osc.	Amp. Det.	Audio Output
	6A7	6F7	42
PLATE	220	220	210
SCREEN	66	66	237
CATHODE	18	18	*16
FILAMENT	6.3	6.3	6.3

Speaker field volts—85 volts.
Anode grid of 6A7—150 volts.
Triode plate of 6F7—95 volts.
Plate and screen voltages measured to cathode.
Cathode voltages measured to chassis frame.

Rectifier
80
335 Volts D.C. from Filament to transformer center tap.
4.9

*Measured across 250 ohm resistor, R-11.
Measurements made with voltmeter of 1,000 ohms per volt.

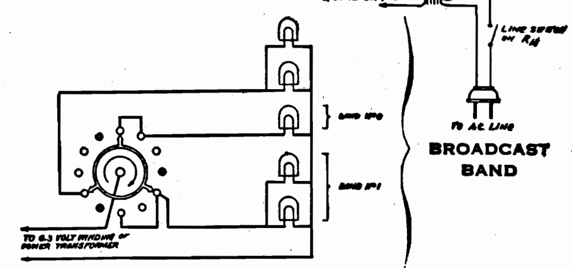
PILOT RADIO CORP.



Note. In Model 63 receivers where the serial number is lower than 20000 the I. F. amplifiiar is designed with double tuned transformers. Coils "A" and "B" do not appear in those chassis.

CONDENSERS		
DESIGNATION	PART No	DESCRIPTION
C1, C2, C3	70969-A	TRIMMER STRIP ON BAND SW. HOUS'G
C4, C10, C29	22055-I	.05 MFDS-200V. TUBULAR PAPER
C5, C11, C26	70957	406 MMFDS 3 GANG VARIABLE
C7, C8, C9	70969-A	TRIMMER STRIP ON BAND SW. HOUS'G
C12, C6, C28	22055-M	.10 MFDS-200V TUBULAR PAPER
C13, C15	22055-P	.05 MFDS-400V. TUBULAR PAPER
C14	27723	.00005 MFD MICA
C16, C42	71106	2 MFDS. 475 V ELECTROLYTIC
C17	16052-A	450 MMFD PADDER
C18, C19, C21	70969-A	TRIMMER STRIP ON BAND SW. HOUS'G
C20	27717	.0028 MFD MICA
C22	27732	.0016 MFD MICA
C23, 24, 35, 45	22055-L	.10 MFDS-400V TUBULAR PAPER
C25, C27, C43	70936	TRIMMERS IN 1st I.F. TRANS. CAN
C30, C31, C44	70937	TRIMMERS IN 2nd I.F. TRANS. CAN
C32, C36	22055-A	.01 MFD - 600V. TUBULAR PAPER
C33	27712	.0005 MFD. MICA
C34, C37	70971	DUAL 5 MFD-25V. TUBULAR ELECTRO.
C38	22055-Q	.005 MFD-600V. TUBULAR PAPER
C39	22055-C	.05 MFD-600V. TUBULAR PAPER
C40, C41	71106	2-8 MFDS-475V. ELECTROLYTIC BLOCK

RESISTORS		
DESIGNATION	PART No	DESCRIPTION
R1, R5, R15	13031	100,000 OHMS .25 WATT CARBON
R2, R3, R9	13115	400-OHMS .25 WATT CARBON
R4, R10, R20	13164	50,000-OHMS .25 WATT CARBON
R6	13068	30,000-OHMS .50 WATT CARBON
R7	13053	10,000-OHM 1. WATT CARBON
R8	13001	1-MEGOHM .25 WATT CARBON
R11	70955	750,000-OHMS. VOLUME CONTROL
R12	13147	300,000-OHMS .25 WATT CARBON
R13	13149	6000-OHMS-.25 WATT CARBON
R14	13171	250,000-OHMS .25 WATT CARBON
R16	13024	500,000-OHMS .25 WATT CARBON
R17	13108	410-OHMS 1. WATT CARBON
R18	70954	100,000-OHMS TONE CONTROL & SWITCH
R19	13092	20,000-OHMS 1. WATT CARBON
R21	13053	10,000-OHMS 1. WATT CARBON.



SWITCHING METHOD OF SELECTIVE DIAL LIGHTING SYSTEM IN MODEL No 63 RECEIVER

IF PEAK 456 KC

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating —50 to 60 cycles.
Power Consumption—70 Watts.
Tubes —1 type 6A7
2 type 6D6
1 type 75
1 type 42
1 type 80

Circuit —One stage of Tuned Radio Frequency amplification for all frequencies, electron-coupled oscillator-modulator, diode detector, class "A" pentode output stage, automatic volume control.

Wavelength Range —From 550 meters to 16 meters (545 kc to 18,800 kc).
Undistorted power output—3 watts.
Intermediate Frequency — 456 kc.
Tube Functions —Type 6D6: R. F. amplifier for all bands.
Type 6A7: Electron emission control oscillator-detector.
Type 6D6: I. F. amplifier.
Type 75: Duo-diode detector-amplifier.
Type 42: Class "A" power pentode.
Type 80: Full-wave rectifier for power supply.

VOLTAGES

The D. C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

RECTIFIER Type 80	R.F. Type 6D6	OSC. DET. Type 6A7	I.F. Type 6D6	DIODE DET. Type 75	POWER PENTODE Type 42
Plate	235	235	235	120*	210
Cathode	4.	4.5	4.	1.5	14.
Screen	90	90	90		230
Filament	6.3	6.3	6.3	6.3	6.3

*Voltages measured through 250,000 ohm plate resistor.

Speaker field voltage 110 volts. All plate voltages measured to cathode. All screen voltages measured to cathode. All cathode voltages measured to chassis frame.

MODEL 63
Socket, Trimmers
Alignment

PILOT RADIO CORP.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .002 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the SIDE of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer (See illustration on Service Information Sheet) to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS:—The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequencies are as follows:

Band 2: 49 Meters (6,100 kc.)
Band 1: 16.8 Meters—(17,800 kc.)

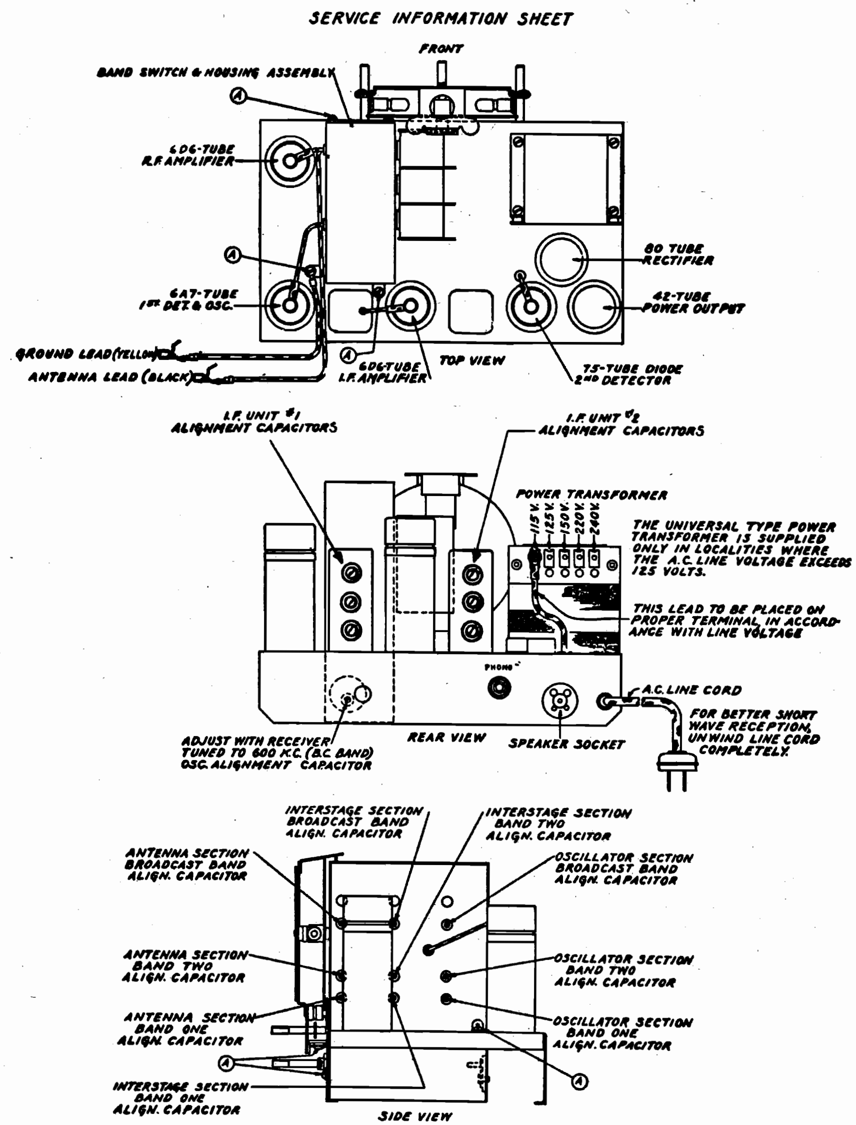
When aligning Band 2, set the Band Selector Switch in the position marked "Band 2." Set the tuning control pointer at the 49 meter mark. Set the external oscillator at 49 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Swith in the position marked "Band 1." Set the tuning control pointer at the 16.8 meter mark. Set the external oscillator at 16.8 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the screws marked "A" on the Service Information Sheet. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis. Also remove the screw beneath the Dial Drive Assembly, which secures the dial assembly to the chassis.

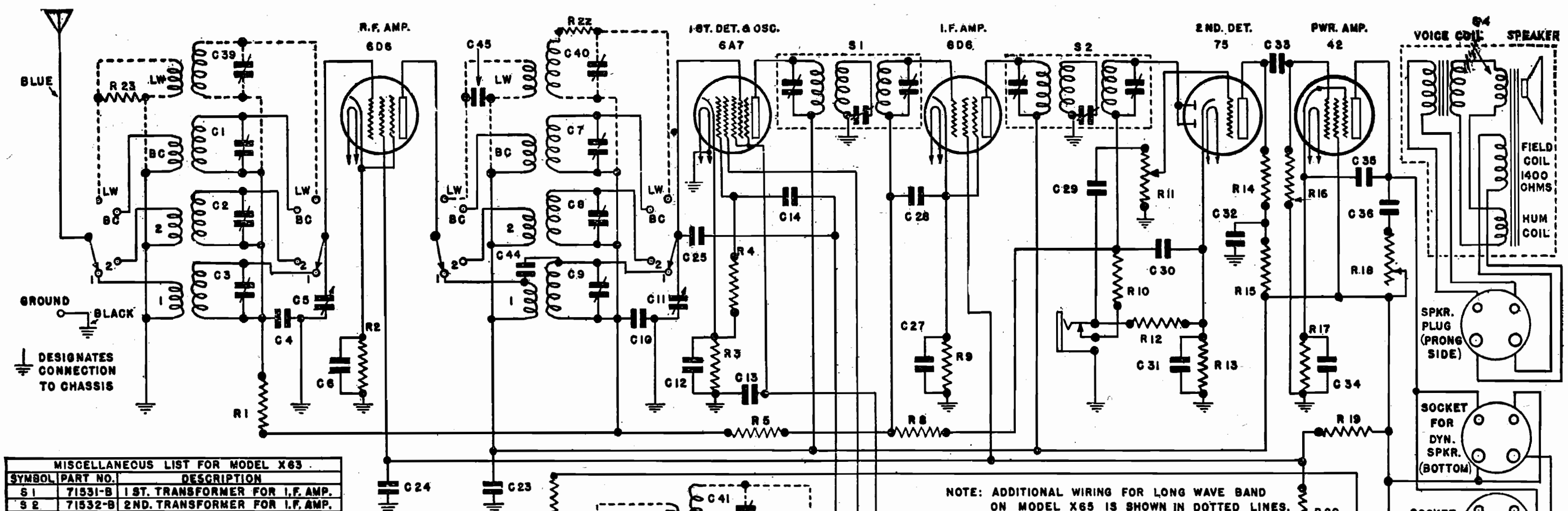
It is advisable to realign the receiver after reinstalling the switch assembly.

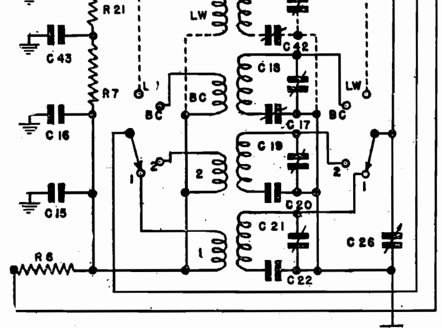


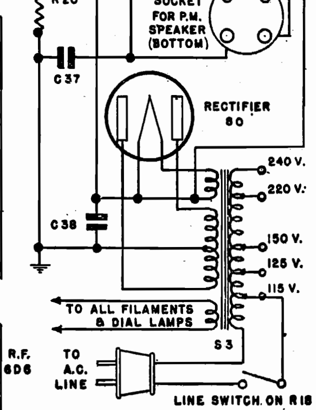
"PILOT" MODEL No 63 SUPERHETERODYNE RECEIVER
FREQUENCY RANGE - 18,800 K.C. TO 545 K.C. (16 METERS TO 550 METERS)

MODELS X-63, X-65
Schematic, Socket, Trimmers

PILOT RADIO CORP.







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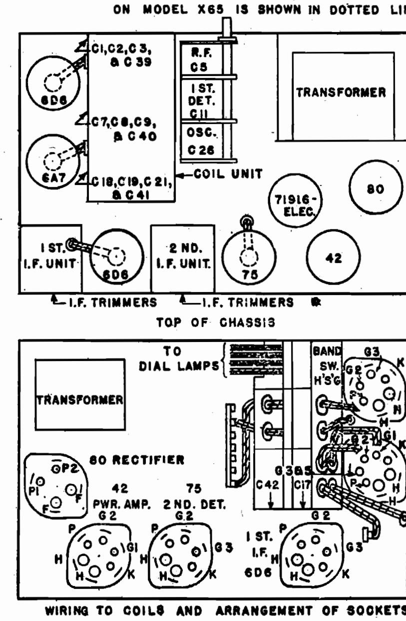


MISCELLANEOUS LIST FOR MODEL X63		
SYMBOL	PART NO.	DESCRIPTION
S1	71531-B	1 ST. TRANSFORMER FOR I.F. AMP.
S2	71532-B	2ND. TRANSFORMER FOR I.F. AMP.
S3	71844	PWR. TRANSFORMER 115 V. 60 CY.
	71381	" " UNIVERSAL V. 60 CY.
	71538	" " UNIVERSAL V. 25 CY.
S4	40771	SPEAKER 8"
	40784	SPEAKER 12"
	71918-A	BAND SWITCH AND COIL ASSEMBLY
MISCELLANEOUS LIST FOR MODEL X65		
SAME AS MODEL X63 EXCEPT FOLLOWING:		
	71918-B	BAND SWITCH AND COIL ASSEMBLY

CONDENSERS FOR MODEL X63		
SYMBOL	PART NO.	DESCRIPTION
C1,C2,C3	70969-C	TRIMMER STRIP ON BAND SW. HOUSING
C4,C10,C28	22055-I	0.05 MFD. 200 V. TUBULAR PAPER
C5,C11,C26	71921	450 MMFDS. 3 GANG VARIABLE
C6,C12,C27	22055-M	0.1 MFD. 200 V. TUBULAR PAPER
C7,C8,C9	70969-C	TRIMMER STRIP ON BAND SW. HOUSING
C13,C15	22055-P	0.05 MFD. 400 V. TUBULAR PAPER
C14	27723-W	0.00005 MFD. MICA
C16,C43	71915	2 MFD. 475 V. ELECTROLYTIC
C31		5 MFD. 25 V. ELECTROLYTIC
C17	71503-A	250-500 MMFDS. PADDER
C18,C19,C21	70969-D	TRIMMER STRIP ON BAND SW. HOUSING
C20	27743-W	1370 MMFDS. MICA
C22	27730-W	2875 MMFDS. MICA
C23	22055-AH	0.25 MFD. 600 V. TUBULAR PAPER
C24,C32	22055-AB	0.1 MFD. 600 V. TUBULAR PAPER
C25	71525	NEUTRALIZING CONDENSER
C29,C33	22055-A	0.01 MFD. 500 V. TUBULAR PAPER
C30	27701-W	0.00025 MFD. MICA
C34	71918	10 MFDS. 25 V. ELECTROLYTIC
C37,C38		8 MFDS. 475 V. ELECTROLYTIC
C35	22055-R	0.005 MFD. 1000 V. TUBULAR PAPER
C36	22055-C	0.05 MFD. 600 V. TUBULAR PAPER
C44	27737-O	10 MMFD. MICA
CONDENSERS FOR MODEL X65		
SAME AS FOR MODEL X63 EXCEPT ONES GIVEN BELOW:		
C1,C2,C3,C39	70969-A	TRIMMER STRIP ON BAND SW. HOUSING
C7,C8,C9,C40	70969-A	TRIMMER STRIP ON BAND SW. HOUSING
C17,C42	71577-C	DUAL PADDER 250-500 & 30-150 MMFDS.
C18,C19,C21, & C41	70969-B	TRIMMER STRIP ON BAND SW. HOUSING
C45	27701-O	250 MMFDS. MICA

RESISTORS FOR MODEL X63		
SYMBOL	PART NO.	DESCRIPTION
R1,R5,R15	13031	100,000 OHMS 1/4 WATT CARBON
R2,R3,R9	13115	400 OHMS 1/4 WATT CARBON
R4,R10,R20	13164	50,000 OHMS 1/4 WATT CARBON
R6	13068	30,000 OHMS 1/2 WATT CARBON
R7,R21	13053	10,000 OHMS 1 WATT CARBON
R8	13001	1 MEGOHM 1/4 WATT CARBON
R11	71913	750,000 OHMS VOLUME CONTROL
R12	13147	300,000 OHMS 1/4 WATT CARBON
R13	13149	6,000 OHMS 1/4 WATT CARBON
R14	13171	250,000 OHMS 1/4 WATT CARBON
R16	13024	500,000 OHMS 1/4 WATT CARBON
R17	13108	410 OHMS 1 WATT CARBON
R18	71914	100,000 OHMS TONE CONTROL & SWITCH
R19	13092	30,000 OHMS 1 WATT CARBON
RESISTORS FOR MODEL X65		
SAME AS FOR MODEL X63 WITH ADDED ONES BELOW:		
R22	13029	250 OHMS 1/4 WATT CARBON
R23	13164	50,000 OHMS 1/4 WATT CARBON

Wavelength Range—From 550 meters to 16 meters (545 kc. to 18,800 kc.).
Undistorted power output—3 watts.
Intermediate Frequency—456 kc.

PILOT RADIO CORP.

TUBE SOCKETS

Part No.	
70927	4-Prong Bakelite Base Tube Socket
70863	6-Prong Bakelite Base Tube Socket
70864	7-Prong Bakelite Base Tube Socket

TUBE SHIELDS

70865	Tube Shield Base
71857	Tube Shield Base, Long 4¼"
71858	Tube Shield Base, Short 3⅞"

SPEAKER AND PARTS

40771	8" Dynamic Speaker
40784	12" Dynamic Speaker
70509	Steel Speaker Mounting Bushing
70002	Rubber Grommet

POWER TRANSFORMER

71381	Replacement Unit

TUNING EQUIPMENT

71531-B	1st I.F. Transformer
71532-B	2nd I.F. Transformer
71921	3-Gang Tuning Condenser
71910-A	Band Switch and Coil Assembly completely mounted in shield, with gang condenser, for Model X-63
71910-B	Band Switch Assembly as above for Model X-65
70918	Dial Escutcheon
70910-2	Dial Crystal
70919	Dial Crystal Retaining Ring
71911	2-Speed Dial Drive Mechanism
70998	Dial Drive Disc
71539-K	Dial Scale and Holder Assembly Model X-63
71539-L	Dial Scale and Holder Assembly Model X-65
70934	Pointer
642	Pointer Holding Screw
71056	Pointer Spacing Washer
70953-B	Band Switch Escutcheon Model X-63
70953-J	Band Switch Escutcheon Model X-65
71282	Dial Light Bulb—Bayonet Base 6.3 Volts

LINE CORD

70885	Cord without Plug
70003	American Type Plug
70889	European Type Plug
71341	British Type Plug

REALIGNMENT: Should the receiver require re-alignment, the outlined procedure below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

SWITCHES AND CONTROLS

Part No.	
71914	Tone Control and Switch
71913	Volume Control
70953-A	Volume Control Escutcheon
71620	Small Knob with Dot
71977	Large Set Screw Knob
70950	Phonograph Jack

PAPER CONDENSERS

22055-A	.01 mfd.	600 Volt
22055-C	.05 mfd.	600 Volt
22055-I	.05 mfd.	200 Volt
22055-M	.1 mfd.	200 Volt
22055-P	.05 mfd.	400 Volt
22055-R	.005 mfd.	1000 Volt
22055-AB	.1 mfd.	600 Volt
22055-AH	.25 mfd.	500 Volt

MICA CONDENSERS

27701	.00025 mfd.
27723-O	.00005 mfd.
27737-O	.00001 mfd.
27743	.00137 mfd. Padding Condensers
27744	.00287 mfd. Padding Condensers

CARBON RESISTANCE

¼ Watt All Resistance Values
½ Watt All Resistance Values

PADDING CONDENSERS

71503-A	.00025—.0005 mfd. Model X-63
71577-C	.00003—.00015 mfd. and .00025—.0005 mfd. Dual Type Model X-65

ELECTROLYTIC CONDENSERS

71915	2-2 mfd. 475 Volt and 5 mfd. 25 Volts
71916	8-8 mfd. 475 Volt and 10 mfd. 25 Volts

Type 75: Duo-Diode detector-amplifier.
Type 42: Class "A" power pentode.
Type 80: Full-wave rectifier for power supply.

VOLTAGES

The D. C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	R. F. Type 6D6	OSC. DET. Type 6A7	I. F. Type 6D6	DIODE DET. Type 75	POWER PENT. Type 42	RECTIFIER Type 80
Plate	250	250**	250	100*	225	
Cathode	3.5	4	3.5	1.5	15	
Screen	90	90	90		250	
Filament	6.3	6.3	6.3	6.3	6.3	

***Voltages measured through 250,000 ohm plate resistor.**
****Anode grid of 6A7 tube 160 volts.**
Speaker field voltage 100 volts. All plate voltages measured to ground. All screen voltages measured to ground. All cathode voltages measured to ground.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast. In the Model X65 there is an additional row of trimmers located immediately above those for the Broadcast.

The padder condenser is located under the rear section of the band switch. In the Model X65 an additional padder for the Highband range is located at the right of the Broadcast padder. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE-BANDS:—
The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequencies are as follows:

Band 2: 50 Meters (6,000 kc.)
Band 1: 16.6 Meters—(18,000 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2." Set the tuning control pointer at the 50 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1." Set the tuning control pointer at the 16.6 meter mark. Set the external oscillator at 16.6 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

NOTE.
The above alignment positions refer to the Model X-63 only, which is calibrated in frequency. The alignment points for the Model X-65, which is calibrated in meters only, is as follows:

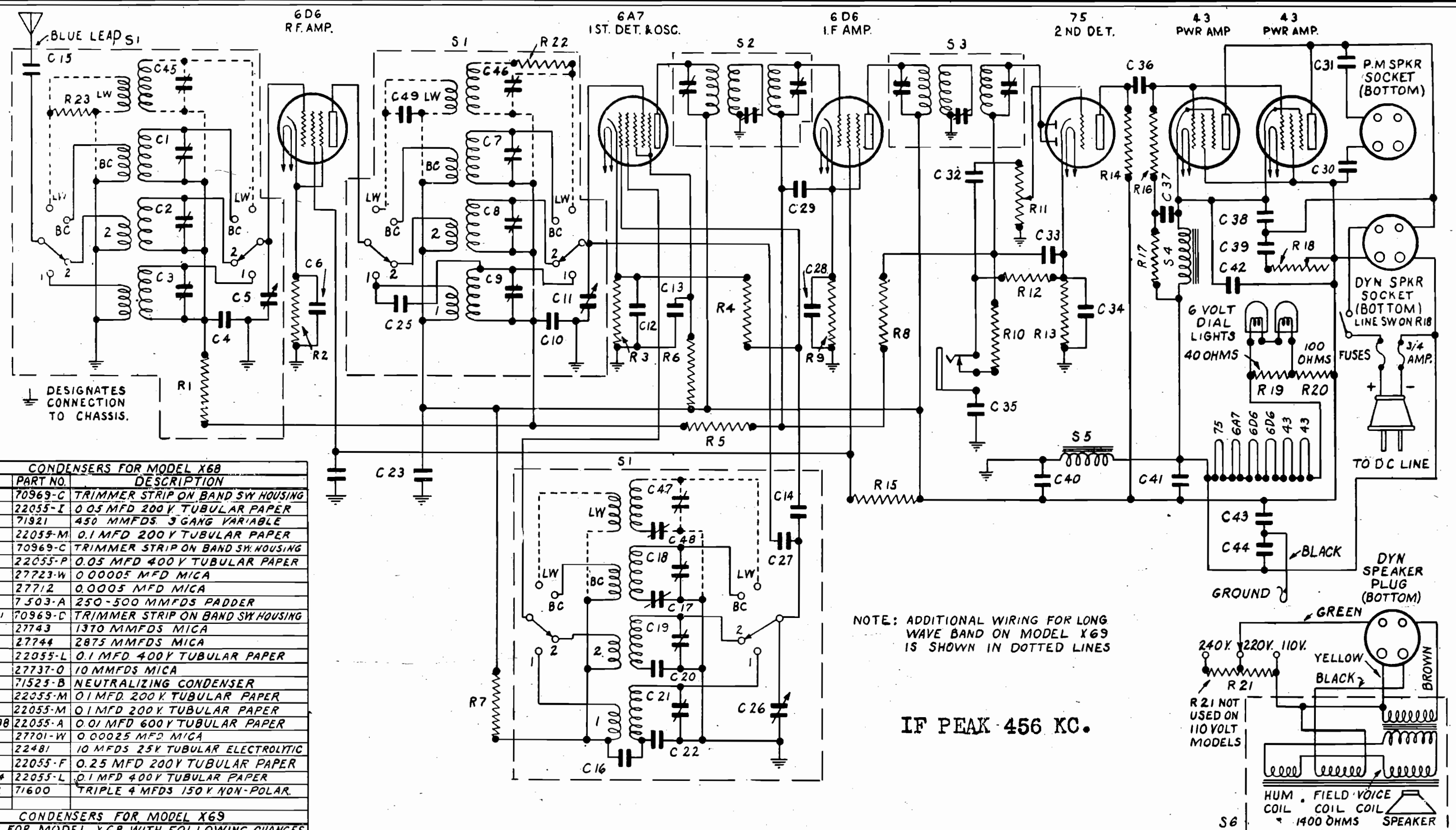
High Band	Align at 750 meters.
	Pad at 2,000 meters.
Broadcast	Align at 200 meters.
	Pad at 500 meters.
Band 2	Align at 49 meters.
Band 1	Align at 17 meters.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the supporting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

MODELS X-68, X-69
Schematic, Socket Trimmers

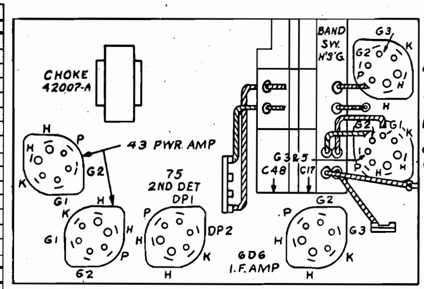
PILOT RADIO CORP.



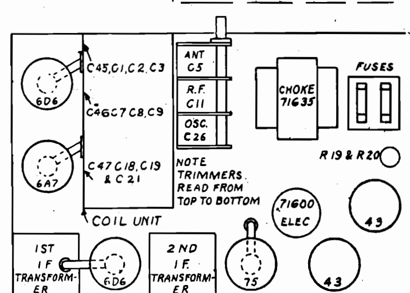
CONDENSERS FOR MODEL X68		
SYMBOL	PART NO.	DESCRIPTION
C1, C2, C3	70969-C	TRIMMER STRIP ON BAND SW HOUSING
C4, C10, C29	22055-I	0.05 MFD 200 V. TUBULAR PAPER
C5, C11, C26	71921	450 MMFDS. 3 GANG VARIABLE
C6, C12, C16	22055-M	0.1 MFD 200 V TUBULAR PAPER
C7, C8, C9	70969-C	TRIMMER STRIP ON BAND SW. HOUSING
C13	22055-P	0.05 MFD 400 V TUBULAR PAPER
C14	27723-W	0.00005 MFD MICA
C15	27712	0.0005 MFD MICA
C17	7503-A	250-500 MMFDS PADDER
C18 C19, C21	70969-C	TRIMMER STRIP ON BAND SW HOUSING
C20	27743	1370 MMFDS MICA
C22	27744	2875 MMFDS MICA
C23, C24	22055-L	0.1 MFD. 400 V TUBULAR PAPER
C25	27737-O	10 MMFDS MICA
C27	71525-B	NEUTRALIZING CONDENSER
C28, C35	22055-M	0.1 MFD. 200 V. TUBULAR PAPER
C30 C31	22055-M	0.1 MFD 200 V. TUBULAR PAPER
C32, C36, C38	22055-A	0.01 MFD 600 V TUBULAR PAPER
C33	27701-W	0.00025 MFD MICA
C34	22481	10 MFDS 25 V. TUBULAR ELECTROLYTIC
C37	22055-F	0.25 MFD 200 V TUBULAR PAPER
C39, C43 C44	22055-L	0.1 MFD 400 V TUBULAR PAPER
C40, C41, C42	71600	TRIPLE 4 MFDS 150 V. NON-POLAR.
CONDENSERS FOR MODEL X69		
SAME AS FOR MODEL X68 WITH FOLLOWING CHANGES		
C1 C2 C3 C45	70969-A	TRIMMER STRIP ON BAND SW HOUSING
C7, C8, C9, C46	70969-A	TRIMMER STRIP ON BAND SW HOUSING
C17, C48	71577-C	DUAL PADDER 250-500 & 30-150 MMFDS
C18, C19, C21 & C47	70969-B	TRIMMER STRIP ON BAND SW HOUSING
C49	27701-W	0.00025 MFD MICA

MISCELLANEOUS LIST FOR MODEL X68		
SYMBOL	PART NO.	DESCRIPTION
S1	71910-C	BAND SWITCH AND COIL ASSEMBLY
S2	71531-B	1 ST. I.F. TRANSFORMER
S3	71532-B	2 ND I.F. TRANSFORMER
S4	71635	POWER CHOKE
S5	42007-A	FILTER CHOKE
S6	40776	SPEAKER 8" DC
	40778	SPEAKER 12" DC
MISCELLANEOUS LIST FOR MODEL X69		
SAME AS FOR MODEL X68 WITH FOLLOWING CHANGE.		
S1	71910-D	BAND SWITCH AND COIL ASSEMBLY

RESISTORS FOR MODEL X68		
SYMBOL	PART NO.	DESCRIPTION
R1, R4, R5, R17	13031	100,000 OHMS 1/4 WATT CARBON
R2, R3, R9	13115	400 OHMS 1/4 WATT CARBON
R6, R13	13116	12,000 OHMS 1/4 WATT CARBON
R7	13019	2,000 OHMS 1/4 WATT CARBON
R8	13001	1 MEGOHM 1/4 WATT CARBON
R10	13164	50,000 OHMS 1/4 WATT CARBON
R11	71913	750,000 OHMS VOLUME CONTROL
R12	13147	300,000 OHMS 1/4 WATT CARBON
R14, R16	13024	500,000 OHMS 1/4 WATT CARBON
R15	13149	6,000 OHMS 1/4 WATT CARBON
R18	72138	10,000 OHMS TONE CONTROL AND SWITCH
R19, R20	71101	140 OHMS TAP AT 40 OHMS. 20 WATTS
R21	71029	284 OHMS TAP AT 238 OHMS 75 WATTS
RESISTORS FOR MODEL X69		
SAME AS FOR MODEL X68 WITH ADDITIONAL ONES BELOW		
R22	13029	250 OHMS 1/4 WATT CARBON
R23	13164	50,000 OHMS 1/4 WATT CARBON



WIRING TO COILS AND ARRANGEMENT OF SOCKETS



TOP OF CHASSIS

MODELS X-68, X-69
Voltage, Parts
Alignment

PILOT RADIO CORP.

Model X68 D. C. All-Wave Receiver

Range: 16 Meters—550 Meters (18,800 kc.—545 kc.)

Model X69 D. C. Long-Wave Receiver

(For Sale in Eureopean Area Only)

Range: 16 Meters—550 Meters (18,800 kc.—545 kc.)
732 Meters—2,140 Meers (410 kc.—140 kc.)

LIST OF REPLACEMENT PARTS FOR PILOT MODELS

TUBE SOCKETS

Part No.	
70927	4-prong bakelite-base tube socket
70863	6-prong bakelite-base tube socket
70864	7-prong bakelite-base tube socket

TUBE SHIELDS

71857	Tube shield 3 in. long
71858	Tube shield 2⅝ in. long

CHOKES

42007-A	Small choke
71635	Large choke

TUNING EQUIPMENT

71531-B	1st I. F. transformer
71532-B	2nd I. F. transformer
71921	3-gang tuning condenser
71910-C	Band switch and coil assembly completely mounted in shield, with 3-gang condenser, for Model X68
71910-D	Band switch assembly, as above, for Model X69

CONTROLS AND SWITCHES

71911	2-speed dial-driving mechanism
70998	Dial drive disc
72163-2	Dial scale X68
72165-2	Dial scale X69
70934	Pointer
642	Pointer holding screw
71056	Pointer spacing washer
70918	Dial escutcheon
70910	Dial crystal
70919	Crystal retaining ring
70953-A	Volume escutcheon
70953-B	Band switch escutcheon for Model 68
70953-C	Band switch escutcheon for Model 69
71618	Large tuning knob
71619	Small knob
71620	Small knob with white dot
72138	Tone control and switch
70950	Phonograph jack
70422	Dial lamp

PAPER CONDENSERS

Part No.	
22055-I	.05 mfd. 200 volts
22055-M	.1 mfd. 200 volts
22055-F	.25 mfd. 200 volts
22055-L	.1 mfd. 400 volts
22055-A	.01 mfd. 600 volts
22055-P	.05 mfd. 400 volts

MICA CONDENSERS

27712	.0005 mfd.
27701	.00025 mfd.

ELECTROLYTIC CONDENSERS

71600	Electrolytic Condenser block
22481	10 mfd., 25 volts

WIRE WOUND RESISTOR

71101	Line resistor

LINE FUSE

70053-D	Line fuse .75 amp.

LOUD SPEAKER AND PARTS

40776	8-in. speaker, 110 v., D.C., table model
40777	8-in. speaker and resistance assembly, 220-240 v., D.C., table model

CARBON RESISTORS

¼ watt, all resistance values
½ watt, all resistance values

CORD AND PLUG

71399	Cord and plug

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Remove the slip-on knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

The location of the R. F. alignment trimmer condensers is on the side of the band switch. The trimmers in the lowest row are those for aligning Band 1. Those in the second row from the bottom are for Band 2. Those in the third row up are for the Broadcast. In the Model X69 there is an additional row of trimmers located immediately above those for the Broadcast.

The padder condenser is located under the rear section of the band switch. In the Model X69 an additional padder for the Highband range is located at the right of the Broadcast padder. Access to the padder condenser is made through a hole provided in the rear of the chassis frame.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in both I. F. Units, with the external oscillator connected to the 6A7 grid.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Selector Switch in the Broadcast position and place the tuning control pointer at the 1500 kc. mark. Insert a .0002 mfd. condenser in series with the antenna lead. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS:— The procedure in aligning the short-wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser and the use of a 400 ohm resistor in the antenna lead. The alignment frequencies are as follows:

Band 2: 49 Meters—(6,100 kc.)
Band 1: 16.8 Meters—(17,800 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2". Set the tuning control pointer at the 49 meter mark. Set the external oscillator at 49 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1". Set the tuning control pointer at the 16.8 meter mark. Set the external oscillator at 16.8 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

LONG WAVE ALIGNMENT: This is similar to the broadcast band. Align at 750 meters. Adjust the padder at 1900 meters.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the assembly mounting screws. Before doing this, however, it is essential to unsolder the leads between the switch and the chassis. Also remove the screw beneath the Dial Drive Assembly, which secures the dial assembly to the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

CHARACTERISTICS

Operating Voltage: 110 Volts—Direct Current.

Power Consumption: 50 Watts.

Tubes: One type 6A7, two type 6D6, one type 75, two type 43.

Circuit: One stage of Tuned Radio Frequency amplification for all frequencies, electron-coupled oscillator-modulator, automatic volume control.

Wavelength Range: From 550 meters to 16 meters (545 kc. to 18,800 kc.). Long Wave covers 732-2,140 meters (410-140 kc.) also.

Undistorted Power Output: 2 watts.

Intermediate Frequency: 456 kc.

Tube Functions: Type 6D6—R. F. amplifier for all bands. Type 6A7—Electron emission control oscillator detector; Type 6D6—I. F. amplifier; Type 75—Duo-diode detector-amplifier; Type 43—Class "A" power pentodes in parallel.

TABLE OF VOLTAGES

VOLTAGES: The D. C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

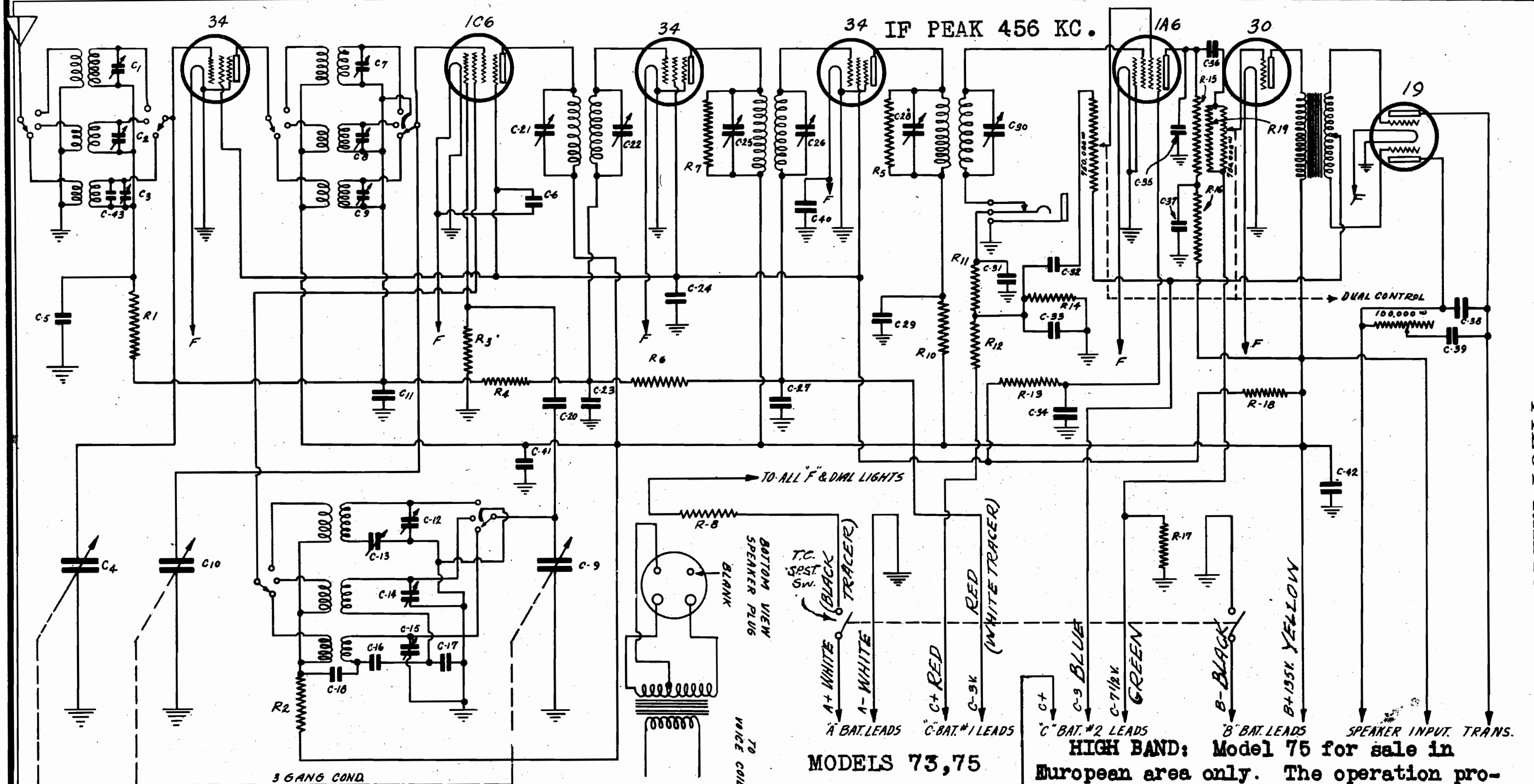
	R.F.	OSC. 1-DET.	I. F.	DIODE 2-DET.	AUDIO OUTPUT	
Tube:	6D6	6A7	6D6	75	43	43
Plate:	100	100*	100	35**	97	97
Screen:	81	60	81		103	103
Cathode:	2.7	3.	2.7	1.2***	15.****	15.****
Filament:	6.3	6.3	6.3	6.3.	25.	25.

*** Anode Grid—92 volts.**
**** Measured through Plate Resistor.**
***** Measured on 30 volt scale.**
****** Measured across 71,635 choke.**
All voltages to chassis ground.

Dial lights 8.6 volts across both lamps in series.
Speaker Field 110 volts.

MODELS 73,75
Schematic

PILOT RADIO CORP.



MODELS 73,75

CONNECT TO "-A" ON BAT.

HIGH BAND: Model 75 for sale in European area only. The operation procedure of the high band section is similar to that of the broadcast and short wave ranges. To operate this receiver on the high-band, rotate the band switch knob to the position marked HIGH BAND on the band switch escutcheon.

NOTE
THIS D'W'G. REVISED FROM D'W'G. NO. 25094-8 DATED 7/31/34 (DRAWN ON PAPER)

CONDENSERS		
	PART No.	DESIGNATION
C43	27737	.00001-MICA
C-1-2-3-7-8-9-12-14-15	70969-A	TRIMMER STRIP ON BAND SW. HOUSING
C 4-C10-C19	71229	150 MMFD. 3 GANG VARIABLE
C5-C11-C23-C27-C29	22055-I	.05-MFD. 200V. TUBULAR PAPER
C13	16052-A	450 MFD. PADDER
C6-C41	22055-F	.25-MFD. 200V. TUBULAR PAPER
C-16	27735	.003-MFD. ± 5% MICA
C-17	27717	.0028 MFD. MICA
C18-C-34-C37	22055-M	.1-MFD. 200V. TUBULAR PAPER
C-20	27723-0	.00005-MFD. MICA
C-21-C22	70936	TRIMMERS 1ST I.F.
C-24-C-40	22055-S	.5-MFD. 200V. TUBULAR PAPER
C-26 C25	70936-A	TRIMMERS 2ND I.F.
C-28-C30	70936-B	TRIMMERS 3RD I.F.
C31-C33	28016	.0001-MFD. MICA
C-32-C39	22055-A	.01-MFD. 600V. TUBULAR PAPER
C35	27726	.0002 MFD MICA
C-36	22055-P	.05 MFD. 400V. TUBULAR PAPER

RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R-1-R4-R6-R19	13031	100,000 Ω .25 WATT CARBON
R2	13149	6,000 Ω .25 WATT CARBON
R3-R5-R7-R11-R16	13164	50,000 Ω .25 WATT CARBON
R8	13178	.3-1 WATT WIRE
R10	13113	4000 Ω .25 WATT CARBON
R12	13001	1-MEG. .25 WATT CARBON
R13	13074	20,000 Ω .25 WATT CARBON
R14	13024	500,000 Ω .25 WATT CARBON
R15	13171	250,000 Ω .25 WATT CARBON
R17	13117	15,000 Ω .25 WATT CARBON
R18	13013	10,000 Ω .5 WATT CARBON
C38	27704	.002 MFD. MICA
C42	71203	8 MFD. 200V. DRY ELEC.

ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED MUST BE HELD TO A TOLERANCE OF ± .005"

GROSS WEIGHT INCLUDING SCRAP — W'GHT PER ___ P'CS ___ LBS
NET WEIGHT — " " ___ " ___ "
RAW MATERIAL — LENGTH — WIDTH — THICK. — DIA.
ALTERATIONS ① - R19 WAS ON OTHER SIDE OF CONTROL - E.F. 1/31/35 — FINISH

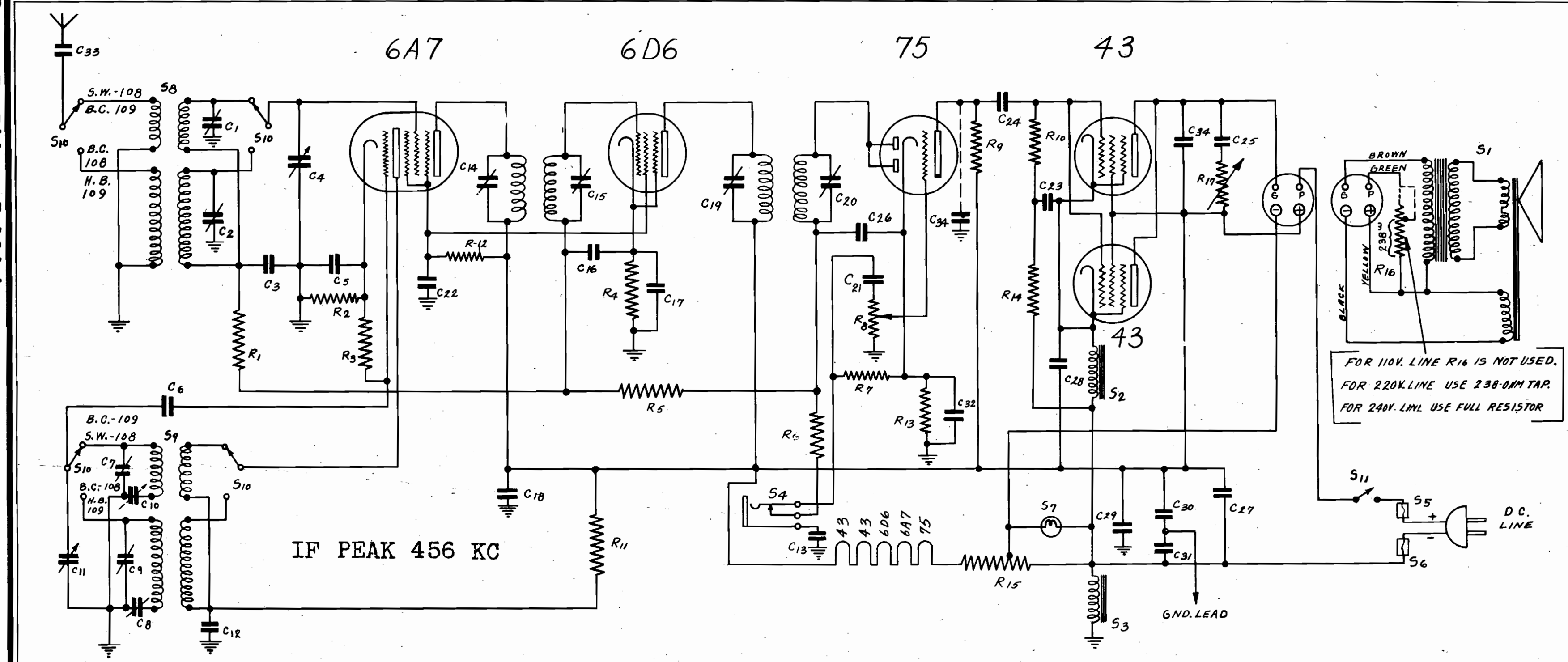
CLASSIFICATION: MODEL 73

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
7 TUBE AIR CELL REC. (CIRCUIT DIAG. RAM.)
MODEL 73
MATERIAL
SCALE NONE DATE 1/31/35
DRAWN BY E.F.
CHECKED BY
APPROVED BY
DRWG. NO. 25094-9

MODELS 108,109
Schematic

PILOT RADIO CORP.



CONDENSERS		
DESIGNATION	PART NO.	DESCRIPTION
$C_1 C_2 C_7 C_9$	71168	TRIMMER ON BAND SW.
$C_3 C_5 C_{16}$	22055-I	.05 MFD. 200V. PAPER
$C_4 C_{11}$	71181	2 GANG COND. 406 MMFD.
C_6	27723	50 MMFD. MICA
C_8	16052-A	SINGLE PAPPER
C_{10}	27734	6000 MMFD. MICA
$C_{12} C_{18} C_{22}$	22055-P	.05 MFD. 400V. PAPER
$C_{14} C_{15}$	71166	TRIMMER 1ST I.F.
$C_{17} C_{13}$	22055-M	.1 MFD. 200V. PAPER
$C_{19} C_{20}$	70937	TRIMMER 2ND I.F.
$C_{21} C_{24} C_{34}$	22055-A	.01 MFD. 600V. PAPER
C_{23}	22055-F	.25 MFD. 200V. PAPER
$C_{25} C_{30} C_{31}$	22055-L	.1 MFD. 400V. PAPER
$C_{26} C_{33}$	27712	500 MMFD. MICA
$C_{27} C_{28} C_{29}$	71600	TRIPLE 4 MFD. 150V. N.P.
C_{32}	22481	5 MFD. 25V. ELEC. COND.

RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R1 R14	13031	100,000 OHMS .25 WATT
R4	13115	400 OHMS .25 WATT
R3 R6	13164	50,000 OHMS .25 WATT
R5	13001	1,000,000 OHMS .25 WATT
R7	13147	300,000 OHMS .25 WATT
R8	71211	750,000 OHM VOLUME CONTROL
R2	13029	250 OHMS .25 WATT
R9 R10	13024	500,000 OHMS .25 WATT
R11	13073	3,000 OHMS .5 WATT
R12	13149	6,000 OHMS .25 WATT
R13	13116	12,000 OHMS .25 WATT
R15	71601	170 OHMS-TAPPED AT 40-20 WATTS
R16	71029	289 OHMS-TAPPED AT 238-55 WATTS
R17	71634	10,000-OHMS TONE CONTROL

MISC		
DESIGNATION	PART NO.	DESCRIPTION
S1	40785	SP'KER 1400" FIELD-PAR. 43'S.
S2	71635	FILTER CHOKE 312Ω 10 HENRIES.
S3	42007	FILTER CHOKE
S4	70950	PHONO JACK
S5, S6	70053-B	FUSES .6 AMPS.
S7	70422-B	DIAL LAMP 6.3V. .3 AMPS.
S8	71169	ANT. COIL
S9	71170	OSC. COIL
S10	71172	BAND SWITCH
S11	ON-71211	LINE SWITCH (ON R8-71211)

REVISIONS FOR MAKING 109 REC.		
R2	13131	600 OHMS .25 WATT
S8	71173	ANT. COIL
S9	71174	OSC. COIL
C8, C10	71577-C	DUAL PADDER C8-250-500 MMFD. C10-30-150 MMFD.
C34	27712	500 MMFD. MICA (FOR 109 ONLY)

ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED MUST BE HELD TO A TOLERANCE OF ± .005"

GROSS WEIGHT INCLUDING SCRAP	W'GHT. PER __ P'CS __ LBS	RAW MATERIAL			
NET WEIGHT	" " __ " __ "	LENGTH	WIDTH	THICK.	DIA.

ALTERATIONS

FINISH

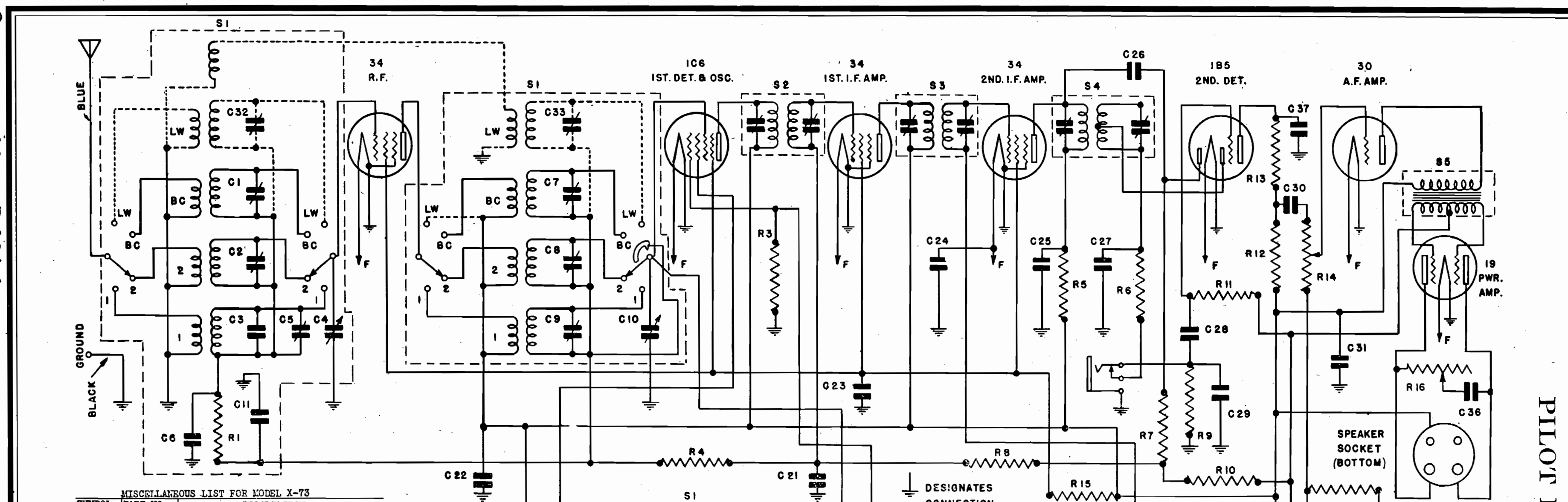
CLASSIFICATION: MODEL 108 / 109

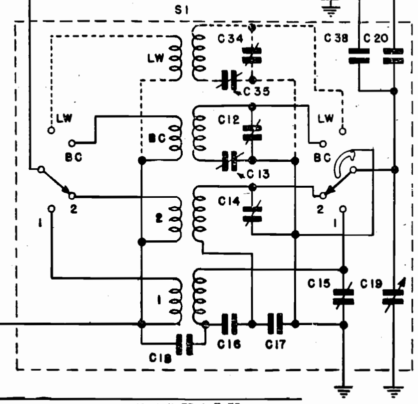
THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]
DO NOT SCALE THIS PRINT

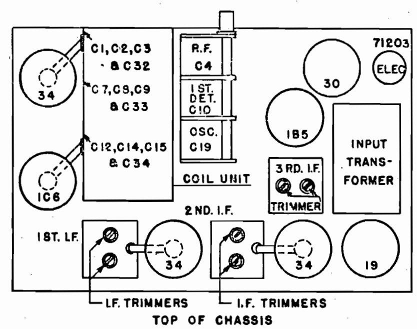
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC DIAGRAM
MODEL 108-109
MATERIAL
SCALE NONE DATE 3/15/35
DRAWN BY E.F.
CHECKED BY
APPROVED BY
DRWG. NO. 25104

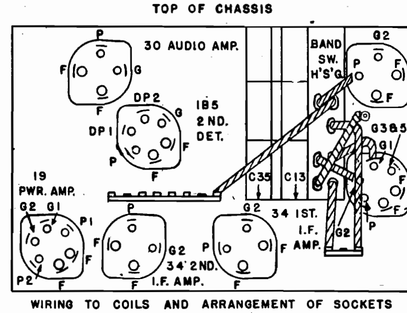
MODELS X-73, X-75
Schematic, Socket
Trimmers

PILOT RADIO CORP.









NOTE: ADDITIONAL WIRING FOR LONG WAVE BAND ON MODEL X75 IS SHOWN IN DOTTED LINES.

9/1935

IF PEAK 456 KC.

MISCELLANEOUS LIST FOR MODEL X-73

SYMBOL	PART NO.	DESCRIPTION
S1	71025-E	Band Switch and Coil Assembly
S2	72042	1st. I. F. Transformer
S3	72043	2nd. I. F. Transformer
S4	72044	3rd. I. F. Transformer
S5	72045	Input Transformer Assembly
	(40780	Permanent Magnet Speaker 8"
S6	(40782	Permanent Magnet Speaker 10"

MISCELLANEOUS LIST FOR MODEL X-75

Same as for Model X-73 except following change:

SYMBOL	PART NO.	DESCRIPTION
S1	71025-F	Band Switch and Coil Assembly

CONDENSERS FOR MODEL X-73

SYMBOL	PART NO.	DESCRIPTION
C1,C2,C5	70969-C	Trimmer Strip on Band Switch Housing
C3	27737-O	10 mmfds. Mica
C4,C10, C19	71229	456 mmfds. 3 Gang Variable
C6,C11	22055-I	.05 mfd. 200 V. Tubular Paper
C7,C8,C9	70969-C	Trimmer Strip on Band Switch Housing
C12,C14, C15	70969-D	Trimmer Strip on Band Switch Housing
C13	71503-A	250-500 mmfds. Padder
C16	27735	.003 mfd. Mica
C17	27717	.0028 mfd. Mica
C18	22055-AG	.1 mfd. 200 V. Tubular Paper
C20	27723-O	50 mmfds. Mica
C21,C25	22055-I	.05 mfd. 200 V. Tubular Paper
C22	22055-F	.25 mfd. 200 V. Tubular Paper
C23	22055-S	.5 mfd. 200 V. Tubular Paper
C24	22055-AK	1 mfd. 200 V. Tubular Paper
C26	27723-W	50 mmfds Mica
C27,C29	28016	100 mmfds. Mica
C28,C30	22055-A	.01 600 V. Tubular Paper
C31	71203	8 mfd. 200 V. Electrolytic
C36	22055-AJ	.03 mfd. 600 V. Tubular Paper
C37	27712	.0005 mfd. Mica
C38	71525-B	Neutralizing Condenser Assy.

CONDENSERS FOR MODEL X-75

Same as for Model X-73 with following changes.

SYMBOL	PART NO.	DESCRIPTION
C1,C2,C5 C32	70969-A	Trimmer Strip on Band Switch Housing
C7,C8,C9 C33	70969-A	Trimmer Strip on Band Switch Housing
C12,C15, C14,C34	70969-B	Trimmer Strip on Band Switch Housing
C13,C35	71577-C	Dual Padder 250-500 and 30-150 mmfds.

RESISTORS FOR MODEL X-73 & X-75

SYMBOL	PART NO.	DESCRIPTION
R1, R4	13031	100,000 Ohms 1/4 Watt Carbon
R2, R5	13149	6,000 Ohms 1/4 Watt Carbon
R3,R6,R12	13164	50,000 Ohms 1/4 Watt Carbon
R7,R10	13024	500,000 Ohms 1/4 Watt Carbon
R8,R11	13001	1 megohm 1/4 Watt Carbon
R9	13147	300,000 Ohms 1/4 Watt Carbon
R13	13074	20,000 Ohms 1/4 Watt Carbon
R14	71913	750,000 Ohms Volume Control
R15	13117	15,000 Ohms 1/4 Watt Carbon
R16	71914	100,000 Ohms Tone Control & Switch
R17	13180	18,000 Ohms 1/4 Watt Carbon
R18	13178	.3 Ohm 1 Watt Flexible

MODEL X-75 A.W. 16-550 M. & 750-2000M.

MODEL X-73 16-550M.

MODELS X-73, X-75
Voltage, Parts
Alignment

PILOT RADIO CORP.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

Before connecting the chassis to the batteries reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control and the tone control should be turned to the maximum clockwise position. Connect the antenna lead of the external oscillator to the control grid of the 34 tube in the 2nd I. F. Amplifier through .002 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground lead. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 3 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the 34 2nd I. F. amplifier tube and connect it in the same manner to the control grid of the 34 1st I. F. amplifier tube. Now rotate each adjustment screw on I. F. Unit No. 2 for maximum output. Following this, connect the external oscillator leads to the control grid of the 1C6 tube. Adjust each trimmer on the I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected across the control grid of the 1C6 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS:— The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequencies are as follows:

Band 2: 49 Meters (6,100 kc.)
Band 1: 16.8 Meters—(17,800 kc.)

When aligning Band 2, set the Band Selector Switch in the position marked "Band 2." Set the tuning control pointer at the 49 meter mark. Set the external oscillator at 49 meters. Adjust the oscillator alignment capacitor on Band 2 for maximum output. Next adjust the interstage and antenna section alignment capacitors for maximum output.

To align Band 1, set the Band Selector Switch in the position marked "Band 1." Set the tuning control pointer at the 16.8 meter mark. Set the external oscillator at 16.8 meters. Adjust the oscillator section alignment capacitor on Band 1 for maximum output.

Proceed next to align the interstage section of Band 1. In doing this, it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonance peak. Next align the antenna section for maximum sensitivity.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, this is easily done by removing the screws which hold it in place, and unsoldering the leads between the switch and the chassis. Also remove the screw beneath the Dial Drive Assembly, which secures the dial assembly to the chassis.

It is advisable to realign the receiver after reinstalling the switch assembly.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

CHARACTERISTICS

Batteries Required: One Eveready Air Cell or 2.2-volt storage battery, three 45-volt B batteries, one 7½-volt C battery, and one 4½-volt C battery.

Tubes: Three 34's, one 1C6, one 1A6, one 19, and one 30.

Wavelength Range: Model 73 — 16 to 550 meters (18,800 to 545 kc.)

Model 75 — 16 to 550 meters and 750 to 2,000 meters. (18,800 to 545 kc. and 400 to 150 kc.) (EXPORT ONLY)

Undistorted Power Output: 1.9 watts.

I. F. Alignment Frequency: 456 kc.

Circuit. All-wave superheterodyne, with one stage of R. F. on all bands.

Output: Class B amplifier.

Air Cell Life: When operating a Pilot 73 or 75, the No. SA-600 Air Cell will have a total operating life of at least 750 hours.

TABLE OF VOLTAGE MEASUREMENTS

	R.F. No. 34	Osc. Det. No. 1C6	1st I. F. No. 34	2nd I. F. No. 34
Plate Volts	145	145	145	130
Screen Volts	65	65	65	65
Fil. Volts	2.2	2.2	2.2	2.2

	Det. No. 1A6	Driver No. 30	"B" Amp. No. 19
Plate Volts	50*	135	145 both plates
Screen Volts	28**		
Fil. Volts	2.2	2.2	2.2

* Measured through .25 meg. plate resistor.
** Measured through 20,000-ohm resistor.

Note 1: All voltages are measured to chassis frame.

Note 2: These measurements should be made with 145 volts B battery.

Note 3: Anode grid of 1C6 should show 115 volts.

List of Replacement Parts for Pilot Models X73 & X75

TUBE SOCKETS

Part No.	
70927	4-prong bakelite-base tube socket.
70863	6-prong bakelite-base tube socket.

TUBE SHIELDS

70865	Tube shield base, 1⅝ ins. diameter.
71125	Tube shield base, 1⅞ ins. diameter.
70801-B	Small tube shield, 3¼ ins. long
71126	Large tube shield, 4$\frac{1}{16}$ ins. long
70802	Tube shield cover for above.

SPEAKER AND PARTS

40780	8-in. permanent magnet speaker.
40782	10-in permanent magnet speaker.
70509	Steel speaker mounting bushing.
70002	Rubber grommet for speaker mounting.

AUDIO TRANSFORMERS

71112	A. F. transformer.

TUNING EQUIPMENT

70936-B	1st I. F. transformer.
70936-B	2nd I. F. transformer.
71129	3rd I. F. transformer.
71229	3-gang tuning condenser.
71025E	Band switch and coil assembly completely mounted in shield, with 3-gang condenser, for Model 73.
71025-F	Band switch assembly, as above, for Model 75.
70918	Dial escutcheon.
70910	Dial Crystal.
70919	Dial crystal retaining ring.
71028	2-speed dial driving mechanism.
70998	Dial drive disc.
71000-A	Dial scale and holder assembly.
70934	Pointer.
642	Pointer holding screw.
71056	Spacing Washer.
70953-B	Band switch escutcheon for Model 73.
70953-C	Band switch escutcheon for Model 75.
70432-B	Dial light bulb, screw base, 2. volts, 60 ma.

*Part No. 71750

SWITCHES AND CONTROLS

71127	Tone control and switch
71111	Dual volume control.
70953-A	Volume control escutcheon.
71619	Small knob.
71620	Small knob with dot.
71618	Large tuning knob.
70950	Phonograph jack.

PAPER CONDENSERS

22055-I	.05 mfd., 200v.
22055-M	.10 mfd., 200v.
22055-F	.25 mfd., 200v.
22055-S	.50 mfd., 200v.
22055-P	.05 mfd., 400v.
22055-A	.01 mfd., 600v.

MICA CONDENSERS

27737-O	.000010 mfd.
27735	.00300 mfd.
27717	.002800 mfd.
27723-O	.000050 mfd.
28016	.000100 mfd.
27726	.000200 mfd.
27704	.002000 mfd.

ELECTROLYTIC CONDENSER

71203	Electrolytic condenser.

PADDING CONDENSER

71503-A	.000450 mfd. max.

WIRE WOUND RESISTOR

13178	.3 ohm, 1 watt.

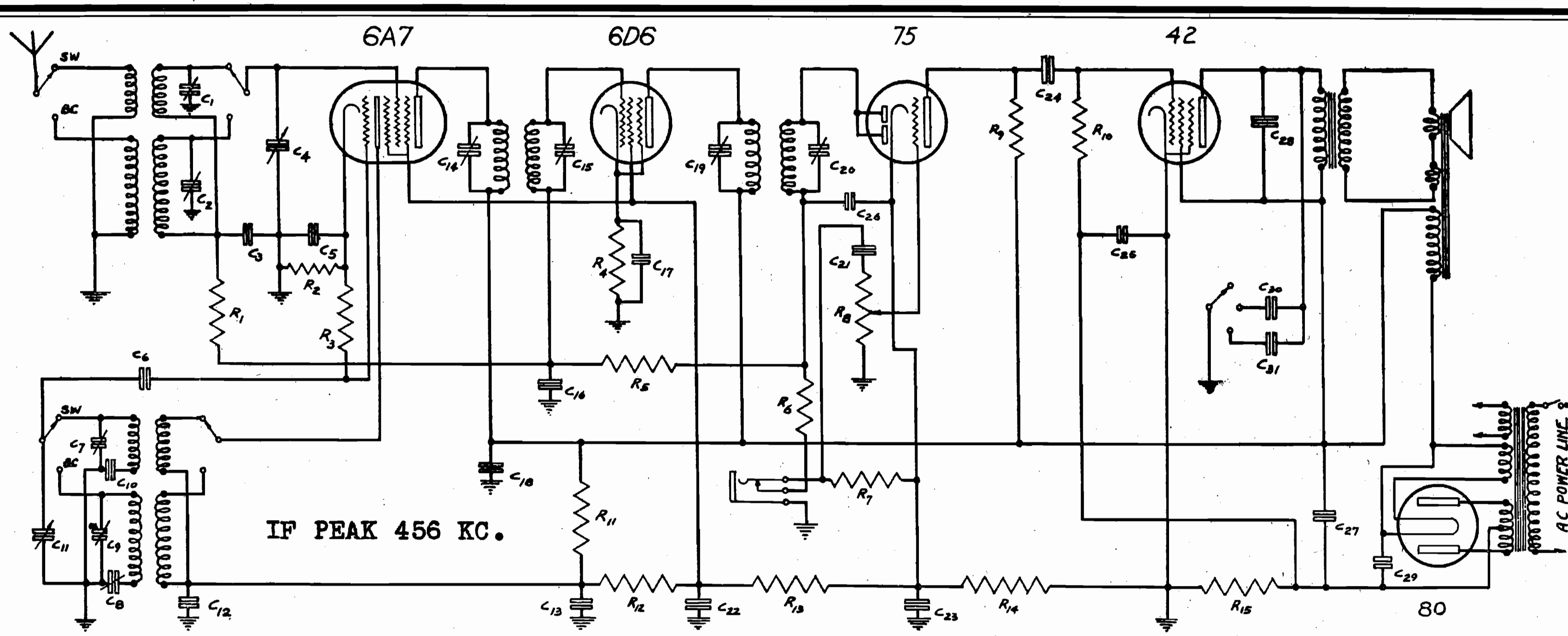
CARBON RESISTORS

¼-watt, all resistance values.
½-watt, all resistance values.

BATTERY CABLE

71110	Battery cable.

PILOT RADIO CORP.



CONDENSERS		
DESIGNATION	PART NO	DESCRIPTION
C_1 C_2 C_7 C_9	71168	TRIMMER ON BAND SW.
C_3 C_5 C_{16}	22055-I	.05 MFD. 200 VOLT PAPER
C_4 C_{11}	71181	2 GANG COND. 406 MMF.
C_6	27723	50 MICRO-MFD. MICA
C_8	16052-A	SINGLE PADDER
C_{10}	27734	6000 MICRO-MFD. MICA
C_{12} C_{22}	22055-P	.05 MFD. 400V. PAPER
C_{13}	71215	4 MFD. 450V. ELEC.
C_{14} C_{15}	71166	TRIMMER 1ST I.F.
C_{17}	22055-M	.1 MFD. 200V. PAPER
C_{19} C_{20}	70937	TRIMMER 2ND I.F.
C_{21} C_{24}	22055-A	.01 600V. PAPER
C_{23}	22055-F	.25 MFD. 200V PAPER
C_{25}	22055-S	.5 MFD. 200V PAPER
C_{26}	27712	500 MICRO-MFD. MICA.
C_{27} C_{29}	71045-B	DUAL 8 MFD. 475V. (CAN)
C_{28}	22055-R	.005 MFD. 1000V. PAPER
C_{30}	22055-U	.01 MF. 1000V. PAPER
C_{31}	22055-V	.03 MF. 1000V PAPER.
C18		.05 MFD. 600V PAPER

RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R_1	13031	100,000 OHMS .25 WATT.
R_2 R_4	13115	400 OHMS .25 WATT.
R_3 R_6	13164	50,000 OHMS .25 WATT.
R_5	13001	1,000,000 OHMS .25 WATT.
R_7	13147	300,000 OHMS .25 WATT.
R_8	71211	750,000 VOLUME CONTROL
R_9	13171	250,000 OHMS .25 WATT
R_{10}	13024	500,000 OHMS .25 WATT.
R_{11}	13073	3000 OHMS .5 WATT
R_{12}	13129	15,000 OHMS 1 WATT
R_{13}	13148	30,000 OHMS .25 WATT.
R_{14}	13130	420 OHMS .25 WATT.
R_{15}	13059	250 OHMS 1 WATT.

All screen voltages measured to cathode. All cathode voltages measured to chassis frame.
** Grid bias voltage for No. 42 tube obtained across R-15 (250 ohms resistor).
***Filament to chassis ground 315 Volts D. C.
Anode grid of 6A7 to cathode—175 Volts.

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating —50 to 60 cycles.
Power Consumption—60 Watts.
Tubes— —1 type 6A7, 1 type 6D6, 1 type 75, 1 type 42, 1 type 80.
Wavelength Range —16 meters to 52.6 meters—178.5 meters to 550 meters.
Undistorted power output—3 watts.
Intermediate Frequency—456 kc.
Tube Functions —Type 6A7: Electron emission control oscillator-detector.
Type 6D6: I. F. Amplifier.
Type 75: Duo-diode detector amplifier.
Type 42: Class "A" power pentode.
Type 80: Full-wave rectifier for power supply.

VOLTAGES

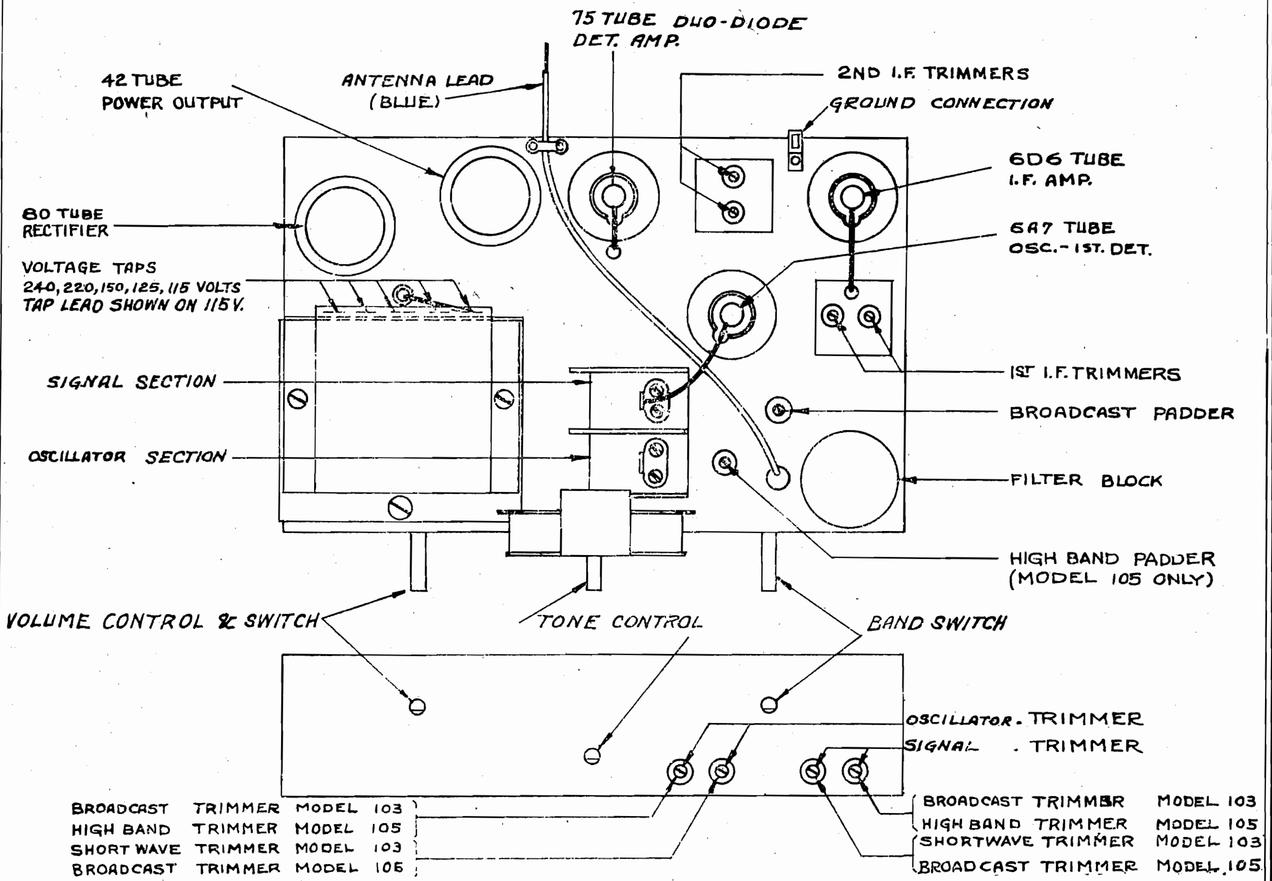
The D. C. Voltages measured at the tube sockets of the set shoud be read with a high resistance voltmeter of at least 1000 ohms per volt.

	OSC. DET. Type 6A7	I. F. Type 6D6	DIODE DET. Type 75	POWER PENTODE Type 42	RECTIFIER Type 80
Plate	230	230	105*	205	***
Cathode	4.	3.8	1.4	**	
Screen	85	85		230	
Filament	6.3	6.3	6.3	6.3	

*Voltages measured through 250,000 ohm plate resistor.
Speaker field voltage 90 volts. All plate voltages measured to cathode.

MODELS 103,105
Socket, Trimmers
Alignment

PILOT RADIO CORP.



REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .002 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver ground lead. The I. F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6D6 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1400 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 kc. padder condenser. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT-WAVE BANDS: The procedure in aligning the short wave-bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. The alignment frequency is;

16.8 Meters—(17,800 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

THE HIGH BAND ALIGNMENT: Procedure in the Model 105 is similar to the Broadcast section of that receiver. Align at 375 k.c. Adjust the padder at 160 k.c.

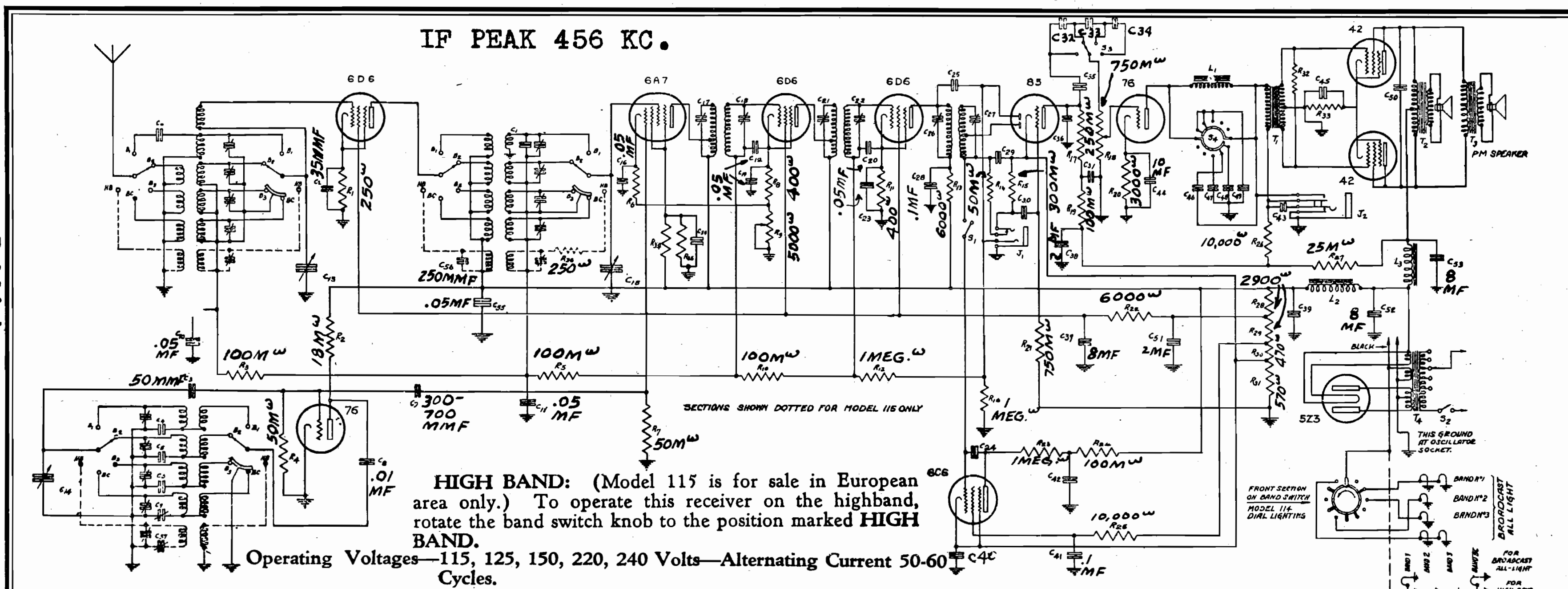
Should it be necssary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

MODEL 103 SHORTWAVE—BROADCAST RECEIVER. The Model 103 is a Shortwave and Broadcast receiver. The Shortwave band embraces all of the internationally assigned Shortwave transmission frequencies from 18800 kc. to 5700 kc., (16 meters to 52.6 meters). The Broadcast band includes all frequencies from 1680 kc. to 545 kc., (178.5 meters to 550 meters).

MODEL 105 HIGHBAND—BROADCAST RECEIVER: (For sale in European area only). The Model 105 is a Highband and Broadcast receiver. The Highband range extends from 380 kc. to 140 kc., (789 meters to 2142 meters). The operation procedure of the Model 105 is similar to the Model 103 except for the Band Switch position. To operate this receiver on the Highband section, rotate the Band Switch knob to the counter-clockwise position. With this knob in the clockwise position, the receiver will function on the standard broadcast band. The Highband calibration may be observed on the lower portion of the dial scale.

PILOT RADIO CORP.

IF PEAK 456 KC.



HIGH BAND: (Model 115 is for sale in European area only.) To operate this receiver on the highband, rotate the band switch knob to the position marked **HIGH BAND.**

Operating Voltages—115, 125, 150, 220, 240 Volts—Alternating Current 50-60 Cycles.

CONDENSERS		
DESIGNATION	PART NO	DESCRIPTION
C_a	27736	25 MICRO-MFD. MICA
C_{1P}	27740-0	35 MICRO-MFD. MICA
C_2 C_6 C_{13} C_{16} C_{19} C_{20}	22055-I	.05 MFD. 200 VOLT PAPER
C_{23} C_{30} C_{37} C_{10}	"	" "
C_3 C_9 C_{25}	27723-0	50 MICRO-MFD MICA
C_4	27738	2870 MICRO-MFD MICA
C_5	28018	1480 " "
C_6	27741	1150 " "
C_7	71503-D	300-700 MMF. (114 ONLY)
C_8	22055-W	.01 MFD. 400 VOLT PAPER
C_{18} C_{14} C_{15}	71585	3 GANG TUNING COND.
C_{17} C_{18}	71261	TRIMMER CONDS 1ST I.F TRANS.
C_{21} C_{22}	71343	TRIMMER CONDS. 2ND I.F TRANS.
C_{26} C_{27}	71262	TRIMMER CONDS. 3RD I.F TRANS.
C_{24} C_{23} C_{33}	27712	500 MICRO-MFD. MICA
C_{28} C_{31} C_{42} C_{55}	22055-AB	.1 MFD 600 VOLT PAPER.
C_{32}	27711	1000 MICRO MFD. MICA
C_{3x} C_{56}	27701-0	250 MICRO-MFD MICA

CONDENSERS		
DESIGNATION	PART NO	DESCRIPTION
C_{35} C_{43}	22055-C	.05 MFD. 600 VOLT PAPER
C_{36}	27726	200 MICRO-MFD. MICA.
C_{38}	71589	2 MFD. 450 VOLT ELECTROLYTIC IN ONE CAN
C_{39}		8 MFD 450 VOLT
C_{40}		10 MFD 25 VOLT
C_{41}	22055-M	.1 MFD 200 VOLT PAPER
C_{44}	71590	10 MFD. 25 VOLT IN ONE CAN
C_{45}		10 MFD 50 VOLT
C_{46} C_{47} C_{49}	22055-R	.005 MFD. 1000 VOLT
C_{48}	22055-AD	.02 MFD. 1000 VOLT
C_{50}	22055-AA	.005 MFD. 1600 VOLT
C_{51}	71588	2 MFD 200 VOLT IN ONE CAN
C_{52} C_{53}		8 MFD 475 VOLT
C_{54}	22055-P	.05 MFD. 400 VOLT PAPER
C_{57}	71577 C	30-... MICRO MFD. PADDER
C_7	71577-C	250-500 MMFD. (115 ONLY)

RESISTORS		
DESIGNATION	PART NO	DESCRIPTION
R_1 R_{36}	13029	250 OHM .25 WATT.
R_2	13179	18.000 OHM 2 WATT
R_3 R_5 R_{10} R_{19} R_{24} R_{25}	13031	100 000 OHM .25 WATT
R_{32}	13031	100 000 OHM 25 WATT
R_4 R_7 R_{14} R_{35}	13164	50.000 OHM .25 WATT
R_6 R_8 R_{11}	13115	400 OHM 25 WATT
R_9	71667	5000 OHM VARIABLE WIRE WOUND
R_{12} R_{16} R_{23}	13001	1 000.000 OHM 25 WATT
R_{13}	13149	6000 OHM. .25 WATT
R_{15}	13147	300.000 OHM 25 WATT
R_{17}	13171	250.000 OHM 25 WATT
R_{18}	71566	750.000 OHM VARIABLE
R_{20}	13133	3000 OHM 25 WATT
R_{21}	13072	750.000 OHM .25 WATT
R_{22}	13052	6000 OHM 5 WATT
R_{26}	13030	10 000 OHM 25 WATT
R_{27}	13126	25.000 OHM 5 WATT

RESISTORS		
DESIGNATION	PART NO	DESCRIPTION
R_{28}	71256	2900 OHM
R_{29}		2090 OHM
R_{30}		470 OHM
R_{31}		570 OHM
R_{33}	13132	730 OHM 3 WATT WIRE WOUND
R_{34}	13092	30.000 OHM 1 WATT

MISC		
DESIGNATION	PART NO	DESCRIPTION
S_1	ON 71567	INTER-STATION CLARIFIER SW. ON R_9
S_2	ON 71566	POWER SUPPLY SWITCH ON R_{18}
S_3	71592	BASE ACCENTUATOR SWITCH
S_4	71258	TONE CONTROL SWITCH
J_1	71272	PHONO JACK
J_2	71273	HEAD PHONE JACK
L_1	71271	TONE CONTROL CHOKE
L_2	71276 10" 71277 12"	SPEAKER FIELD WINDING 1400ω
L_3	71315	POWER FILTER CHOKE
T_1	71271	AUDIO PUSH PULL INPUT TRANS.
T_2	71276-10" 71277-12"	SPEAKER-P.P INPUT TRANSFORMER
T_3	40780-8" 40782-10"	P.M SPEAKER-INPUT TRANSFORMER
T_4	71274	POWER SUPPLY TRANSFORMER

Power Consumption—120 Watts.

Tubes 1—6A7 1—6C6 2— 76 1—5Z3
3—6D6 1— 85 2— 42

Wavelength range—From 12.7 to 550 meters (23,560 kc. to 545 kc.)

Undistorted power output—12 Watts.

I. F. —456 kc.

Type of circuit —All wave Superhetrodyne with TRF stage on all bands, A. V. C., Class "A" Prime push pull power output stage.

Line Volts=115

*Voltages measured through plate resistor.

**Measured on 100V Scale.

***A. C. Voltage plate to chassis.

Speaker field voltage-volts. All plate voltages measure to cathode. All screen voltage measure to cathode. All cathode voltages measure to chassis frame.

The D. C. Voltages measure at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

	R.F. Amp. 6D6	1st. Det. 6A7	Oscillator 76	1st. I. F. Amp. 6D6	2nd. I. F. Amp. 6D6
Plate	253	252	145	252	210
Cathode	2.5	2.65	0	3.2	3.2
Screen	90	74	....	89	89
Filament	6.3	6.3	6.3	6.3	6.3

	Diode Detector 85	Audio Driver 76	Class "A Prime Audio Output" 42 42	Inter Channel Clarifier	6C6 Rectifier 5Z3
Plate	105*	210	330	20	375***
Cathode	22**	10.5	33	21.5	375***
Screen	....	....	....	8.7	....
Filament	6.3	6.3	6.3	6.3	5

MODELS 114,115
Alignment, Socket Trimmers

PILOT RADIO CORP.

SERVICE INFORMATION

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket.

Unfasten the base accentuator switch on the side of the cabinet.

Remove the "slip-on" knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the service information sheet, the location and function of the various alignment capacitors are clearly illustrated. For best results, an external modulated oscillator with adequate frequency range and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Switch should be in the position marked "Broadcast," and the tuning condenser should be set at maximum capacity. When aligning the receiver on all positions, the volume control and the tone control should be turned to the maximum clockwise position. The inter-channel clarifier should be turned off. (Knob in maximum counter-clockwise position.) Connect the antenna lead of the external oscillator to the control grid of the 6D6 tube in the 2nd I. F. Amplifier through .002 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground lead. The I. F. alignment trimmers are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 3 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the 6D6 2nd. I. F. amplifier tube and connect it in the same manner to the control grid of the 6D6 1st I. F. amplifier tube. Now rotate each adjustment screw on I. F. Unit No. 2 for maximum output. Following this, connect the external oscillator leads to the control grid of the 6A7 tube. Adjust each trimmer on the I. F. Unit No. 1 for maximum gain.

During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. amplifier, it is essential to repeat the alignment process in all I. F. Units, with the external oscillator leads connected across the control grid of the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and ground leads. Set the Band Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Tune the external oscillator to 1500 kc. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located in the lower rear section of the band switch, under the chassis. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance position, and at the same time adjust the padder condenser for the highest peak.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

The alignment frequencies are as follows:

Band 3—67.38 meters— 4,450 kc.
Band 2—30.04 meters— 9,980 kc.
Band 1—13. meters—23,000 kc.

When aligning Band 3, set the Band Switch in the position marked Band 3. Rotate the tuning condenser to the extreme high frequency end of the range. Set the external oscillator at 4450 kc. Adjust the Band 3 oscillator trimmer for maximum sensitivity. Next adjust the interstage and antenna trimmer condensers for maximum sensitivity. Check the overall sensitivity of the band at several points along the dial scale.

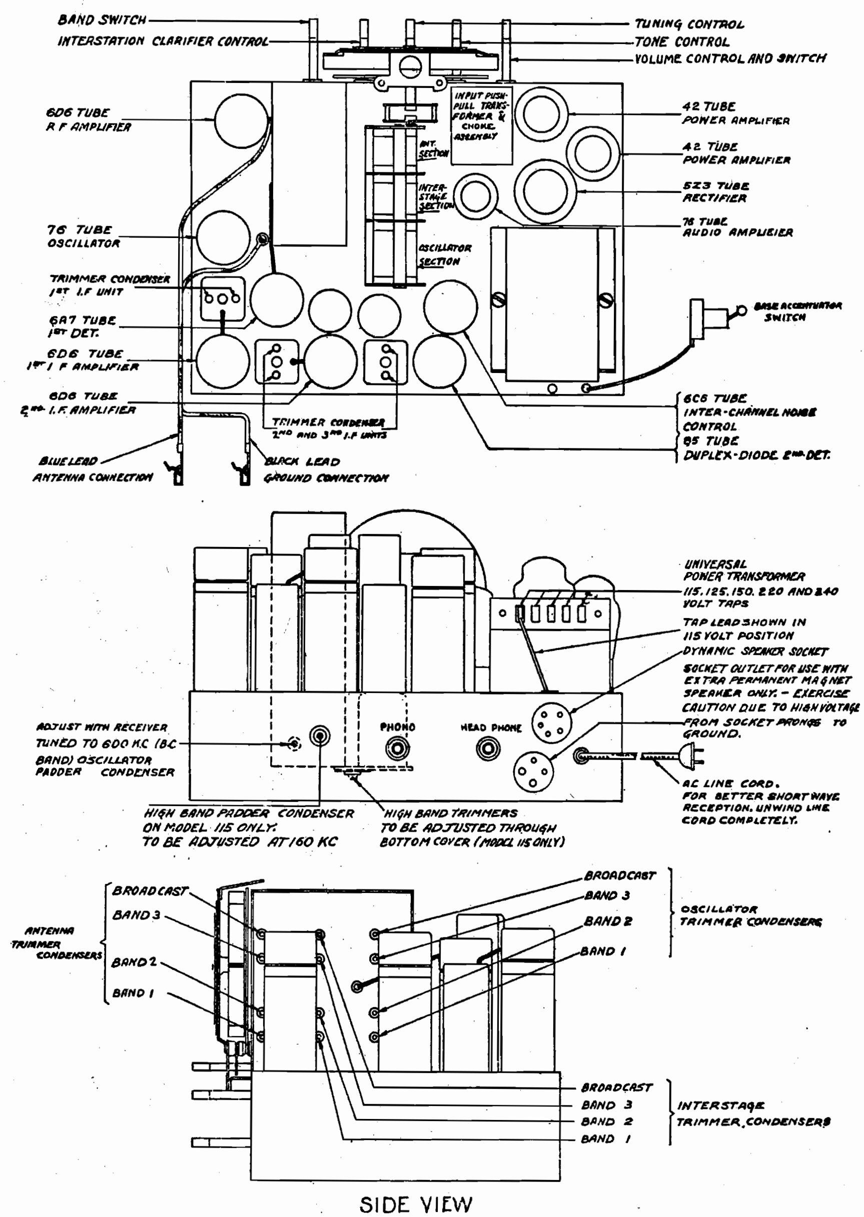
Align Band 2 in a similar manner. The alignment frequency is 9980 kc. (30.04 meters).

The alignment of Band 1 requires greater care due to the higher frequencies covered by this band. The alignment frequency is 23000 kc. or 13 meters. Set the external oscillator at 13 meters. Rotate the tuning condenser of the receiver until the dial pointer is co-incidental with the 13 meter indication on the dial scale. Adjust the oscillator trimmer condenser for maximum sensitivity. Proceed next to align the interstage section. In doing this it is essential to rock the tuning control back and forth about the resonance position and at the same time to adjust the trimmer for the highest resonant peak. Next align the antenna section for maximum sensitivity.

THE HIGHBAND ALIGNMENT procedure in the Model 115 is similar to that of the broadcast. Turn the Band Switch to the High Band position. The alignment frequency is 375 kc. Adjust the padder condenser at 160 kc.

REMOVAL OF BAND SELECTOR SWITCH ASSEMBLY: Should it be necessary to remove the switch assembly, it is advisable to realign the receiver after reinstalling it.

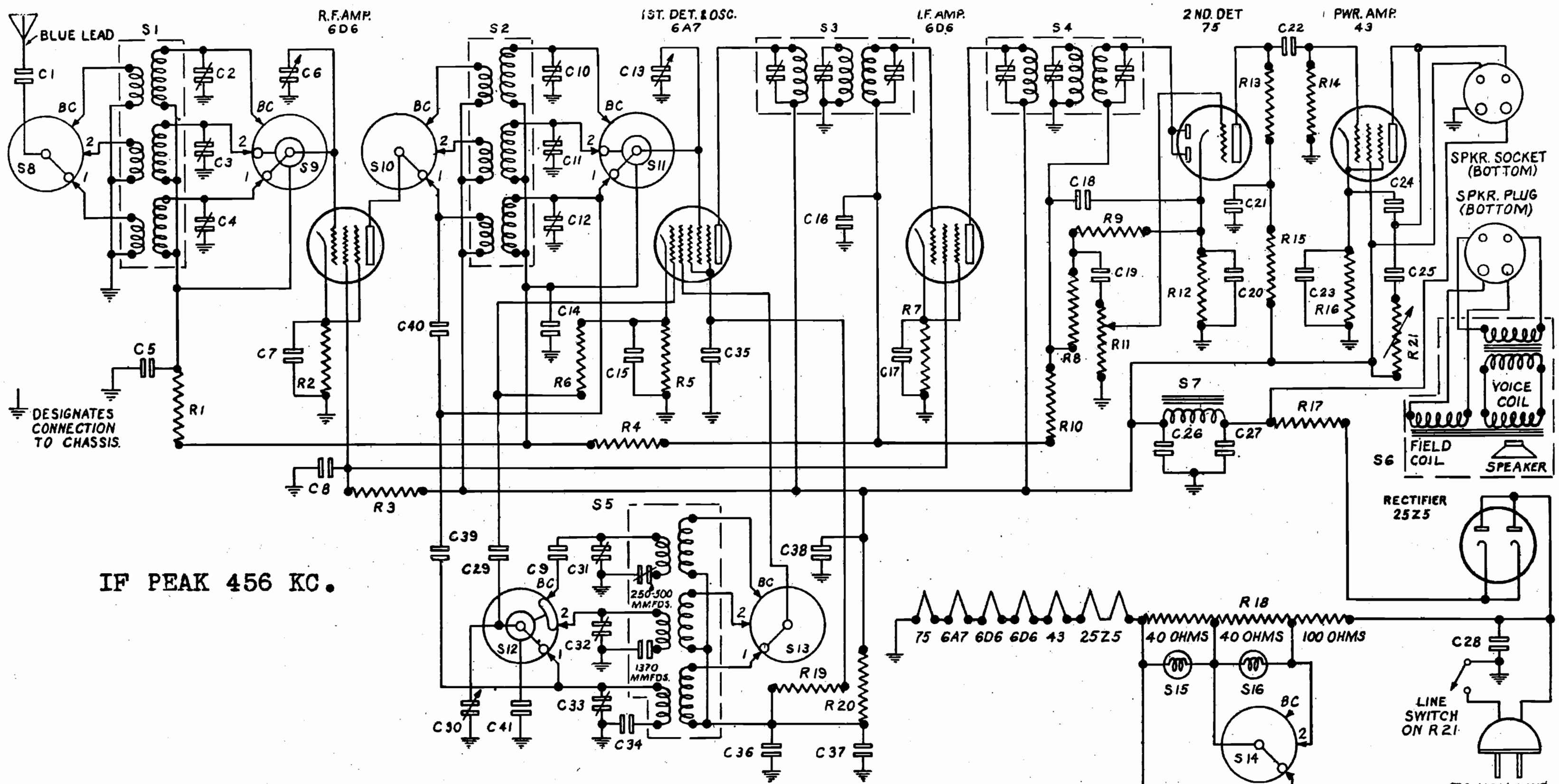
CAUTION: When making repairs on the receiver, use only **ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.**



CHASSIS ILLUSTRATION PILOT MODELS 114-115

MODEL 123
Schematic

PILOT RADIO CORP.



IF PEAK 456 KC.

CONDENSERS		
DESIGNATION	PART NO.	DESCRIPTION
C1	27712	0.0005 MFD. MICA
C2, C3, C4	71674	3 GANG TRIMMER STRIP
C5, C14, C16	22055-I	0.05 MFD. 200 V. PAPER
C6, C13, C30	71650	3 GANG VARIABLE
C7, C15, C17	22055-M	0.1 MFD. 200 V. PAPER
C8, C25	22055-P	0.05 MFD. 400 V. PAPER
C9, C41	22055-W	0.01 MFD. 400 V. PAPER
C10, C11, C12	71674	3 GANG TRIMMER STRIP
C18	27701-W	0.00025 MFD. MICA
C19, C22, C28	22055-A	0.01 MFD. 600 V. PAPER
C20, C23	71675	10-10 MFD. 25 V. ELECTROLYTIC
C21, C38	22055-L	0.1 MFD. 400 V. PAPER
C24	22055-G	0.0005 MFD. 600 V.
C26	71676	20 MFD. 150 V. ELECTROLYTIC
C27		16 MFD. " "
C37		8 MFD. " "
C29	27723-W	50 MMFDS. MICA
C31, C32, C33	71674	3 GANG TRIMMER STRIP
C34	27742	0.0023 MFD. MICA
C35, C36	22055-P	0.05 MFD. 400 V. PAPER
C39	71525-A	NEUTRALIZING
C40	27737-0	10 MMFDS. MICA

RESISTORS		
DESIGNATION	PART NO.	DESCRIPTION
R1, R4	13031	100,000 OHMS 1/4 WATT CARBON
R2, R5, R7	13115	400 OHMS 1/4 WATT CARBON
R3, R19	13149	6,000 OHMS 1/4 WATT CARBON
R6, R8, R15	13164	50,000 OHMS 1/4 WATT CARBON
R9	13147	300,000 OHMS 1/4 WATT CARBON
R10	13001	1 MEGOHM 1/4 WATT CARBON
R11 70955	71637	750,000 OHMS VOLUME CONTROL
R12	13116	12,000 OHMS 1/4 WATT CARBON
R13, R14	13024	500,000 OHMS 1/4 WATT CARBON
R16	13146	600 OHMS 1/2 WATT CARBON
R17	13172	30 OHMS 1/2 WATT CARBON
R18	71683	180 OHMS. TAPPED-100 OHMS, 15 WATTS, 40 OHMS, 6 WATTS, 40 OHMS, 6 WATTS. WIRE WOUND
R20	13073	3,000 OHMS 1/2 WATT CARBON
R21	~~71680~~ 70954	100,000 OHMS TONE CONTROL AND SWITCH

MISCELLANEOUS		
DESIGNATION	PART NO.	DESCRIPTION
S1	72079	ANTENNA COIL
S2	72077	DETECTOR COIL
S3	71679	1ST. I.F. TRANSFORMER
S4	71678	2ND I.F. TRANSFORMER
S5	72078	OSCILLATOR COIL
S6	40789	SPEAKER-2500 OHM FIELD
S7	71685	FILTER CHOKE-450 OHMS
S8, S9, S10, S11, S12, S13, S14	72113	BAND SWITCH
S15, S16	70422-B	PILOT LIGHT-6.3V. 0.3 AMP.

MODEL 123
Voltage, Parts
Alignment

PILOT RADIO CORP.

LIST OF REPLACEMENT PARTS FOR PILOT MODEL 123

Part No.	
	TUBE SOCKETS
70927	4-prong bakelite-base tube socket
70863	6-prong bakelite-base tube socket
70864	7-prong bakelite-base tube socket
	TUBE SHIELDS
71857	Tube shield 3½ in. long
71858	Tube shield 3¼ in. long
70865	Tube shield base
	SPEAKER
40789	6 in. dynamic speaker
	TUNING EQUIPMENT
71679	1st I. F. transformer
71678	2nd I. F. ansformer
71650	3-gang tuning condenser
71703	Condenser drive assembly
71725	Drive disc assembly
71704-A	Dial scale and holder assembly
71178	Dial pointer
642	Dial pointer holding screw
71056	Dial pointer spacing washer
71183	Dial crystal
70422-B	Dial light bulb screw base
19627	Dial light socket assembly
	SWITCHES AND CONTROLS
71632	Band switch assembly for Model 123
70954	Tone control and switch
70955	Volume control
	KNOBS
71619	Knob for volume and tone controls
71620	Knob for band switch control
71691	Knob for tuning control
	COILS
71735	Oscillator coil complete with can Model 123
71736	R. F. coil complete with can Model 123
71737	Antenna coil complete with can Model 123

Part No.	
	ESCUTCHEON PLATES
70953-B	Band switch escutcheon plate
71145	Dial escutcheon plate
70953-H	Tone control ecutcheon plate
	PAPER CONDENSERS
22055-I	.05 mfd., 200 volts
22055-M	.1 mfd., 200 volts
22055-P	.05 mfd., 400 volts
22055-L	.1 mfd., 400 volts
22055-A	.01 mfd., 600 volts
22055-R	.005 mfd., 1000 volts
	NEUTRALIZING CONDENSER
71525	Neutralizing condenser assembly
	MICA ASSEMBLY
27712	.0005 mfd.
27737	.00001 mfd.
27723	.00005 mfd.
27742	.0023 mfd.
27701	.00025 mfd.
	CARBON RESISTORS
	¼-watt all resistance values
	½-watt all resistance values
	WIRE-WOUND RESISTOR
71683	Wire-wound resistor
	TRIMMER CONDENSERS
71674	Triple trimmer
	ELECTROLYTIC CONDENSER
71675	10-10 mfd.
71676	20-16-8 mfd.
	CHOKES
42007-B	Choke coil

REALIGNMENT: Should the receiver require realignment, the outlined procedure below should be followed. In the schematic wiring diagram the location and function of the various alignment capacitors are clearly illustrated. For best results an external modulated oscillator with adequate frequency range, and a visual output meter should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the top of the chassis.

I. F. ALIGNMENT: When aligning the Intermediate Frequency Amplifier, the external oscillator must be set at 456 kc. The Band Selector Switch should be in the position marked "Broadcast", and the tuning condenser should be set at maximum capacity. Connect the "antenna" lead of the external oscillator to the control grid of the type 6D6 tube in the I. F. Amplifier stage through a .1 mfd. fixed condenser. Connect the "ground" lead of the external oscillator to the receiver chassis. The I. F. alignment capacitors are located at the side of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator lead from the type 6D6 I. F. amplifier tube and connect it in the same manner to the control grid at the top of the type 6A7 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. Units, with the external oscillator connected to the 6A7 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna and chassis, this time with a 200 mmf. condenser in the antenna lead. Set the Band Selector Switch in the "Broadcast" position and place the tuning control pointer at the 1500 kc. mark. Adjust the broadcast band oscillator trimmer to maximum response.

Next adjust the interstage alignment trimmer for maximum response. Finally adjust the antenna section trimmer in the same manner.

Next adjust the 600 kc. padder condenser, located on the top of the oscillator coil. Set the external oscillator at 600 kc. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest response.

Now repeat the 1500 kc. trimmer adjustment, following in every detail the procedure previously described.

ALIGNMENT OF THE SHORT WAVE BANDS: The procedure in aligning the short wave bands is identical with that for the broadcast with the exception of the adjustment of the padder condenser. A 400-ohm resistor should be connected in the antenna lead. The alignment frequency of Band 1 is 16.8 Meters—(17,800 kc) and of Band 2, 6 Meters.

Turn the Band Switch to Band 1. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust Band 1 oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain. Then align Band 2 in the same manner at 6 meters.

NOTE: Should it be necessary to remove any part of the band switch assembly, it is advisable to realign the receiver after reinstalling.

	R.F. AMP.	OSC.-1st DET.	I.F. AMP.	2nd DET. DIODE	AUDIO OUTPUT	DUAL RECTIFIER
	6D6	6A7	6D6	75	43	25Z5
PLATE	96	96	96	45*	91	—
SCREEN	80	65	80	—	95	—
CATHODE	2.6	2.25	2.6	.5	12.5	120**
FILAMENT	6.3	6.3	6.3	6.3	25	25

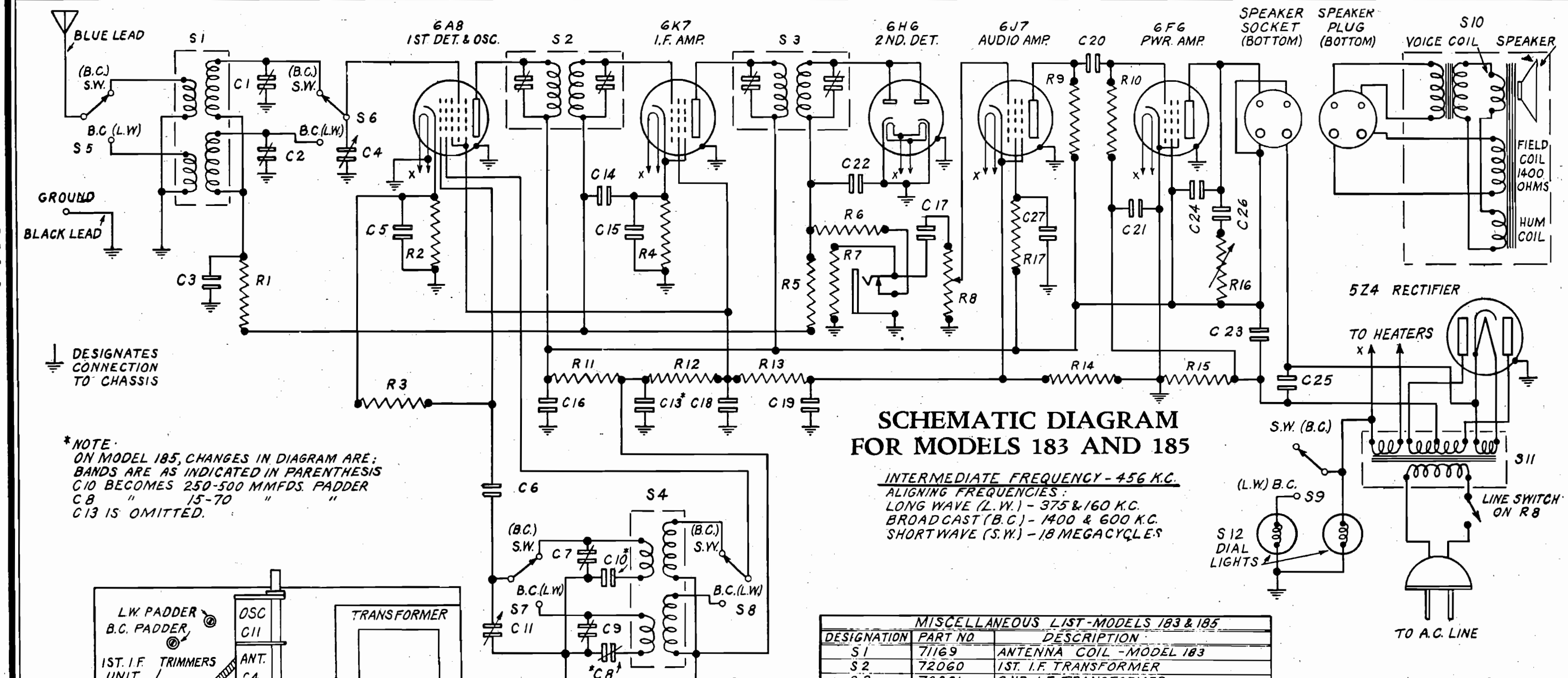
NOTE: The D.C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1,000 ohms per volt.

All voltages measured to chassis.
Speaker field voltage 118 volts.
Anode Grid of 6A7 81 volts.
*** Measured through Plate Resistor.**
**** Cathode to chassis.**
NOTE: These measurements should be made with the volume control turned to the right, and with the tuning adjusted at "No signal" position on dial.

Power Consumption .... 50 Watts
Line Volts ....110-125 volts A.C.-D.C.
I. F. Frequency ....456 Kc.
Power Output .... 1 Watt

MODELS 183,185
Schematic,Socket
Trimmers

PILOT RADIO CORP.

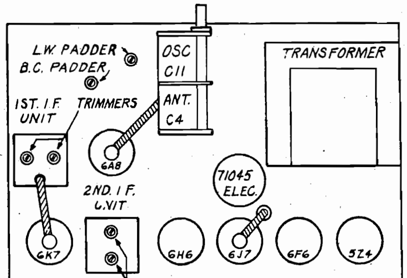


DESIGNATES CONNECTION TO CHASSIS

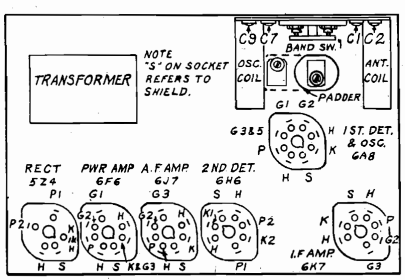
*NOTE.
ON MODEL 185, CHANGES IN DIAGRAM ARE;
BANDS ARE AS INDICATED IN PARENTHESIS
C10 BECOMES 250-500 MMFDS. PADDER
C8 " 15-70 " "
C13 IS OMITTED.

SCHEMATIC DIAGRAM FOR MODELS 183 AND 185

INTERMEDIATE FREQUENCY - 456 K.C.
ALIGNING FREQUENCIES:
LONG WAVE (L.W.) - 375 & 160 K.C.
BROADCAST (B.C.) - 1400 & 600 K.C.
SHORTWAVE (S.W.) - 18 MEGACYCLES



I.F. TRIMMERS
TOP OF CHASSIS



BOTTOM OF CHASSIS AND ARRANGEMENT OF SOCKETS

MISCELLANEOUS LIST-MODELS 183 & 185

DESIGNATION	PART NO.	DESCRIPTION
S1	71169	ANTENNA COIL - MODEL 183
S2	72060	1ST. I.F. TRANSFORMER
S3	72061	2ND I.F. TRANSFORMER
S4	71170	OSCILLATOR COIL - MODEL 183
S5, S6, S7 S8, S9	71948	BAND SWITCH
S10	40775	SPEAKER 6"
S11	71239-U	PWR. TRANSFORMER UNIVERSAL, 60 CYCLE
	71238-S	PWR. " SINGLE TAP " "
S12	71282	DIAL LIGHTS 6.3 VOLTS
S1	71173	ANTENNA COIL - MODEL 185
S4	71174	OSCILLATOR COIL - MODEL 185

CONDENSERS - MODEL 183

DESIGNATION	PART NO.	DESCRIPTION
C1, C2, C7, C9	71168	TRIMMER STRIP
C3, C14	22055-I	0.05 MFD. 200V. PAPER
C4, C11	72070	406 MMFDS. 2 GANG VAR.
C5, C15	22055-M	0.1 MFD. 200 V. PAPER
C6	27723-W	50 MMFDS. MICA
C8	71503-A	250-500 MMFDS. PADDER
C10	27734.	6,000 MMFDS. MICA
C12, C18	22055-P	0.05 MFD. 400 V. PAPER
C13	72168	4 MFD. 450 V. ELECTROLYTIC
C16, C26, C27	22055-C	0.05 MFD. 600 V. PAPER
C17, C20	22055-A	0.01 MFD. 600 V. PAPER
C19	22481	10 MFD. 25 V. ELECTROLYTIC
C21	22055-S	0.5 MFD. 200 V. PAPER
C22	27701-W	250 MMFDS. MICA
C23, C25	71045	DUAL 8 MFD. 475 V. ELECTROLYTIC
C24	22055-R	0.005 MFD. 1000 V. PAPER

*CONDENSERS - MODEL 185
SAME AS FOR MODEL 183 WITH FOLLOWING CHANGES:

DESIGNATION	PART NO.	DESCRIPTION
C8, C10	71577-F.	DUAL PADDER (250/500 & 15/70)

RESISTORS - MODELS 183 & 185

DESIGNATION	PART NO.	DESCRIPTION
R1	13031	100,000 OHMS 1/4 WATT
R2	13003	300 OHMS 1/4 WATT
R3, R6	13164	50,000 OHMS 1/4 WATT
R4	13115	400 OHMS 1/4 WATT
R5, R17	13001	1 MEGOHM 1/4 WATT
R7	13147	300,000 OHMS 1/4 WATT
R8	71211	750,000 OHMS VOLUME CONTROL & SWITCH
R9	13171	250,000 OHMS 1/4 WATT
R10	13024	500,000 OHMS 1/4 WATT
R11	13073	3,000 OHMS 1/2 WATT
R12	13129	15,000 OHMS 1 WATT
R13	13148	30,000 OHMS 1/4 WATT
R14	13028	1,000 OHMS 1/4 WATT
R15	13059	250 OHMS 1 WATT
R16	71615	100,000 OHMS TONE CONTROL

MODELS 183,185
Voltage,Parts
Alignment

PILOT RADIO CORP.

REMOVAL OF CHASSIS FROM CABINET:

To remove the chassis from the cabinet proceed as follows:

Be certain that the line cord is removed from the power outlet socket. Remove the slip-on knobs and felt washers from the controls on the front panel.

Remove the speaker plug from the socket at the rear of the chassis.

Remove the four mounting screws, located underneath the cabinet.

REALIGNMENT: Should the receiver require re-alignment, the procedure outlined below should be followed. For best results an external modulated oscillator with adequate frequency range, and a visual output meter, should be used.

Before connecting the chassis to the power line, reconnect the speaker cable in its socket at the rear of the chassis.

I. F. ALIGNMENT: When aligning the intermediate Frequency Amplifier, the external oscillator must be set at 456 KC. The tuning condenser should be set at maximum capacity. Connect the antenna lead of the external oscillator to the control grid of the type 6K7 tube in the I.F. Amplifier stage through a .1 mfd. fixed condenser. Connect the ground lead of the external oscillator to the receiver ground clip. The I.F. alignment capacitors are located at the top of the shielded I. F. Transformers. Rotate the adjusting screw of each capacitor on I. F. Unit No. 2 slowly until maximum output is noted. On completion of this operation, remove the external oscillator leads from the type 6K7 I. F. Amplifier tube and connect it in the same manner to the control grid at the top of the type 6A8 tube.

Now rotate each adjustment screw on I. F. Unit No. 1 for maximum output. During these operations, use the least possible input to prevent broadening of the resonance peaks.

In order to obtain the most accurate realignment of the I. F. Amplifier, it is essential to repeat the alignment process in both I. F. units with the external oscillator leads connected across the control grid of the 6A8 tube.

BROADCAST ALIGNMENT: After the I. F. Amplifier is completely realigned, connect the external oscillator leads to the receiver antenna through a .002 mfd. condenser. Adjust the tuning control pointer at the 1400 KC mark. Adjust the broadcast band oscillator trimmer to the maximum response. Adjust the signal section trimmer in the same manner.

Next adjust the 600 KC padder condenser. Set the external oscillator at 600 KC. Rotate the receiver tuning control until resonance is indicated. Then rock the tuning control back and forth about this resonance position, and at the same time adjust the padder condenser for the highest resonance peak.

Now repeat the 1400 KC trimmer adjustment, following in every detail the procedure previously described.

SHORT-WAVE ALIGNMENT: The procedure in aligning the short-wave bands is identical with that for the broadcast, except that the padder condenser does not require adjustment. A 400-ohm resistor should be inserted in the antenna lead. The alignment frequency is 16.8 Meters—(17,800 kc.)

Turn the Band Switch to the right. Tune the external oscillator to 16.8 meters. Tune the receiver so that the dial pointer is in a position coincidental with the 16.8 meter indication on the dial scale. Adjust the short-wave oscillator trimmer for maximum response. Next adjust the signal circuit trimmer for maximum resonance. Repeat all adjustments to assure correct alignment, rocking the gang condenser to right or left for maximum gain.

LONG-WAVE ALIGNMENT: Procedure in the Model 185 is similar to the Broadcast section of this receiver. Align at 375 KC. Adjust the padder at 160 KC.

Should it be necessary to remove the band switch assembly, it is advisable to realign the receiver after reinstalling.

CAUTION: When making repairs on the receiver, use only ROSIN CORE SOLDER. NEVER USE SOLDERING PASTE OR ACID FLUXES OF ANY TYPE.

RECEIVER DESCRIPTION

Operating Voltages—115, 125, 150, 220, 240 volts, Alternating Current.
Frequency Rating—50 to 60 cycles.
Power Consumption—60 Watts.
Tubes—1 type 6A8
1 type 6K7
1 type 6H6
1 type 6J7
1 type 6F6
1 type 5Z4
Circuit—Electron-coupled oscillator-modulator, diode dectector, Class "A" pentode output stage, automatic volume control.
Wavelength Range—Model 183—16.2 meters to 52.6 meters.
178 meters to 550 meters.
Model 185—178 meters to 550 meters.
EXPORT ONLY 789 meters to 2142 meters.
Undistorted power output—3 watts.
Intermediate Frequency—456 KC.
Tube Functions—Type 6A8: Electron emission control oscillator-detector.
Type 6K7: I. F. amplifier.
Type 6H6: Duo-diode detector and automatic volume control.
Type 6J7: Audio amplifier.
Type 6F6: Class "A" power pentode.
Type 5Z4: Full-wave rectifier for power supply.

VOLTAGES

The D. C. voltages measured at the tube sockets of the set should be read with a high resistance voltmeter of at least 1000 ohms per volt.

	Osc.-Det. Type 6A8	I. F. Type 6K7	Diode Det. Type 6H6	Audio Amp. Type 6J7	Power Pentode Type 6F6	Rectifier Type 5Z4
Plate	250**	250	....	70*	225	....
Cathode	3.5	3.5	....	4.5	16***	....
Screen	95	95	....	60*	250	....
Filament	6.3	6.3	6.3	6.3	6.3	5.0

*Voltages measused through resistor.
**Anode grid of 6A8 tube, 210 volts.
***Measured across 250 ohm resistor.

Speaker field voltage 100 volts. All plate voltages measured to ground. All screen voltages measured to ground. All cathode voltages measured to ground.

LIST OF REPLACEMENT PARTS FOR PILOT MODELS 183 AND 185

TUBE SOCKETS

Part No.	
72080	Socket for 6A8 Tube
72081	Socket for 6K7 Tube
72082	Socket for 6J7 Tube
72083	Socket for 6H6 Tube
72084	Socket for 6F6 Tube
72085	Socket for 5Z4 Tube

TUNING EQUIPMENT

71169	Antenna Coil, Model 183
71173	Antenna Coil, Model 185
71170	Oscillator Coil, Model 183
71174	Oscillator Coil, Model 185
72060	Ist I.F. Transformer
72061	2nd I.F. Transformer
72070	2-gang Tuning Condenser
72062	Band switch and Coil Assembly, Model 183
72064	Band switch and Coil Assembly, Model 185

PAPER CONDENSERS

22055-R	.005 mfd.	1,000 Volts
22055-A	.01 mfd.	600 Volts
22055-I	.05 mfd.	200 Volts
22055-P	.05 mfd.	400 Volts
22055-C	.05 mfd.	600 Volts
22055-M	.1 mfd.	200 Volts
22055-S	.5 mfd.	200 Volts

MICA CONDENSERS

27701-W	.00025 mfd.
27723-W	.00005 mfd.
27734	.006 mfd.

ELECTROLYTIC CONDENSERS

72168	4. mfd.	450 Volts
22481	10. mfd.	25 Volts
71045	8.-8. mfd.	475 Volts

CONTROLS AND SWITCHES

72072	2-speed Dial Driving Mechanism only
71725	Dial Drive Disc and Hub
72183	Dial Scale, Model 183
72185	Dial Scale, Model 185
71178	Pointer
642	Pointer Holding Screw
71056	Pointer Spacing Washer
71145	Dial Escutcheon
71182	Dial Crystal
72177	Control Knob
72176	Small Knob with White Dot
71211	Volume Control and Switch
71615	Tone Control
70950	Phonograph Jack
71282	Dial Lamp

POWER TRANSFORMER

71336	Power Transformer, Universal Type, 60 cycles
71238-5	Power Transformer, non-adjustable, 60 cycles, 110-125 V.

PADDING CONDENSERS

71503-A	Single Padder, Model 183
71577-F	Dual Padded, Model 185

CARBON RESISTORS

¼ Watt
½ Watt
1 Watt

LOUDSPEAKER

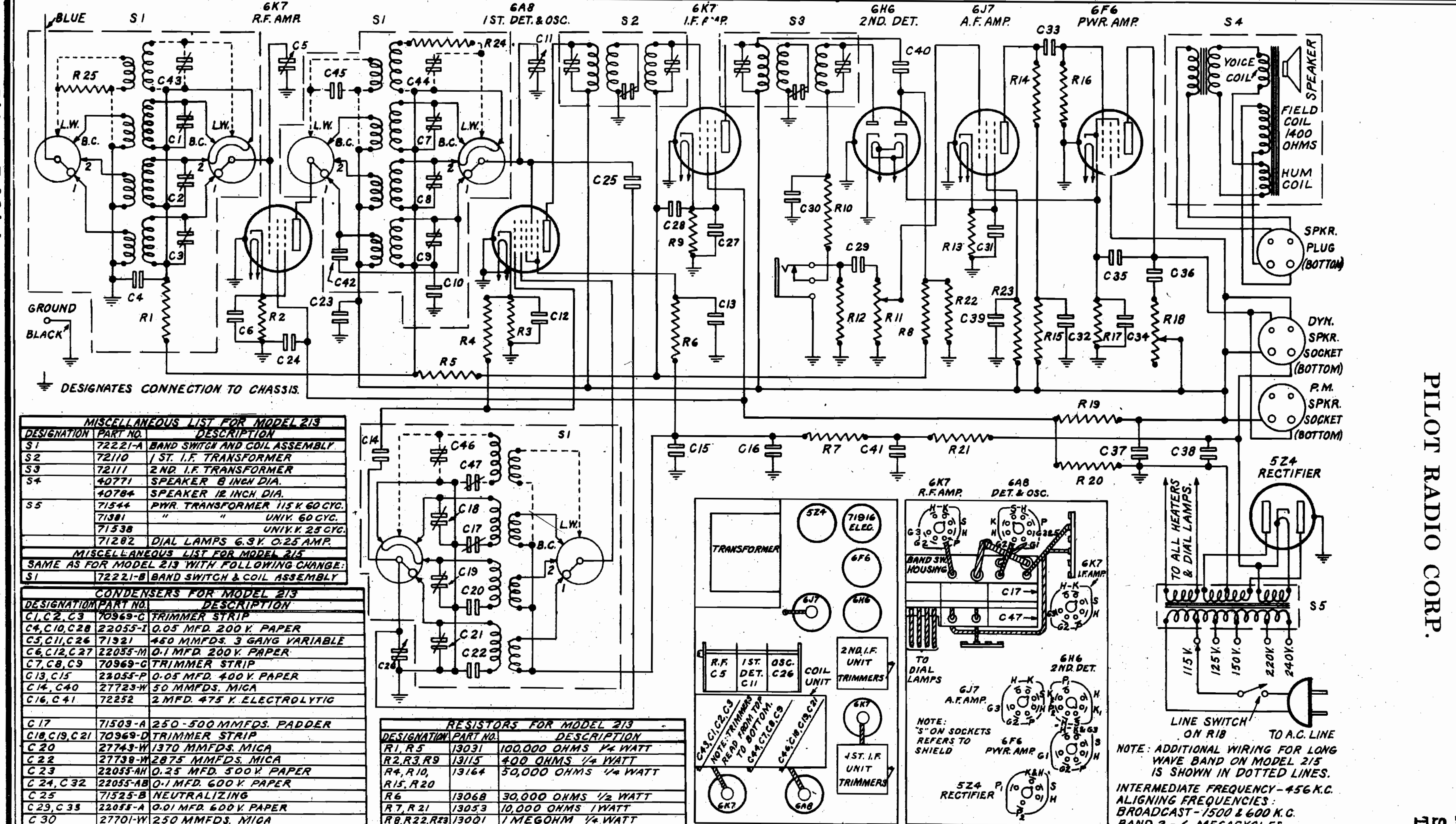
40775	Loudspeaker
70927-B	Loudspeaker Socket
	Loudspeaker Plug

CORD AND PLUG

58032	8 ft. Cord
	Plug

PILOT RADIO CORP.

MODELS 213, 215
Schematic, Socket Trimmers



DESIGNATES CONNECTION TO CHASSIS.

TOP OF CHASSIS

WIRES TO BAND SW. & SOCKET ARRANGEMENT.

NOTE: ADDITIONAL WIRING FOR LONG WAVE BAND ON MODEL 215 IS SHOWN IN DOTTED LINES.

INTERMEDIATE FREQUENCY - 456 K.C.
ALIGNING FREQUENCIES:
BROADCAST - 1500 & 600 K.C.
BAND 2 - 6 MEGACYCLES
BAND 1 - 18 "
LONG WAVE - 400 & 160 K.C.

MISCELLANEOUS LIST FOR MODEL 213		
DESIGNATION	PART NO.	DESCRIPTION
S1	72221-A	BAND SWITCH AND COIL ASSEMBLY
S2	72110	1 ST. I.F. TRANSFORMER
S3	72111	2 ND. I.F. TRANSFORMER
S4	40771	SPEAKER 8 INCH DIA.
	40784	SPEAKER 12 INCH DIA.
S5	71544	PWR. TRANSFORMER 115 V. 60 CYC.
	71381	" " UNIV. 60 CYC.
	71538	UNIV. V. 25 CYC.
	71282	DIAL LAMPS 6.3 V. 0.25 AMP.
MISCELLANEOUS LIST FOR MODEL 215		
SAME AS FOR MODEL 213 WITH FOLLOWING CHANGE:		
S1	72221-B	BAND SWITCH & COIL ASSEMBLY

CONDENSERS FOR MODEL 213		
DESIGNATION	PART NO.	DESCRIPTION
C1, C2, C3	70969-C	TRIMMER STRIP
C4, C10, C28	22055-I	0.05 MFD. 200 V. PAPER
C5, C11, C26	71921	450 MMFDS. 3 GANG VARIABLE
C6, C12, C27	22055-M	0.1 MFD. 200 V. PAPER
C7, C8, C9	70969-C	TRIMMER STRIP
C13, C15	22055-P	0.05 MFD. 400 V. PAPER
C14, C40	27723-W	50 MMFDS. MICA
C16, C41	72252	2 MFD. 475 V. ELECTROLYTIC
C17	71503-A	250-500 MMFDS. PADDER
C18, C19, C21	70969-D	TRIMMER STRIP
C20	27743-W	1370 MMFDS. MICA
C22	27738-W	2875 MMFDS. MICA
C23	22055-AH	0.25 MFD. 500 V. PAPER
C24, C32	22055-AB	0.1 MFD. 600 V. PAPER
C25	71525-B	NEUTRALIZING
C29, C33	22055-A	0.01 MFD. 600 V. PAPER
C30	27701-W	250 MMFDS. MICA
C31, C34	70971	10 MFDS. 25 V. ELECTROLYTIC
C37, C38	71045	8 MFDS. 475 V. ELECTROLYTIC
C35	22055-R	0.0005 MFD. 1000 V. PAPER
C36, C39	22055-C	0.05 MFD. 600 V. PAPER
C42	27737-0	10 MMFDS. MICA
CONDENSERS FOR MODEL 215		
SAME AS FOR MODEL 213 WITH FOLLOWING CHANGES:		
C1, C2, C3, C43	70969-A	TRIMMER STRIP
C7 C8, C9, C44	70969-A	TRIMMER STRIP
C17, C47	71577-C	DUAL PADDER (250-500 & 30-150)
C18, C19, C21 & C46	70969-B	TRIMMER STRIP
C45	27701-0	250 MMFDS. MICA

RESISTORS FOR MODEL 213		
DESIGNATION	PART NO.	DESCRIPTION
R1, R5	13031	100,000 OHMS 1/4 WATT
R2, R3, R9	13115	400 OHMS 1/4 WATT
R4, R10, R15, R20	13164	50,000 OHMS 1/4 WATT
R6	13068	30,000 OHMS 1/2 WATT
R7, R21	13053	10,000 OHMS 1 WATT
R8, R22, R23	13001	1 MEGOHM 1/4 WATT
R11	72119	750,000 OHMS VOLUME CONTROL
R12	13147	300,000 OHMS 1/4 WATT
R13	13113	4000 OHMS 1/4 WATT
R14	13171	250,000 OHMS 1/4 WATT
R16	13024	500,000 OHMS 1/4 WATT
R17	13108	410 OHMS 1 WATT
R18	72120	100,000 OHMS TONE CONTROL & SWITCH
R19	13092	30,000 OHMS 1 WATT
RESISTORS FOR MODEL 215		
SAME AS FOR MODEL 213 WITH ADDITIONS BELOW:		
R24	13029	250 OHMS 1/4 WATT
R25	13164	50,000 OHMS 1/4 WATT

ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED MUST BE HELD TO A TOLERANCE OF ± .005"

GROSS WEIGHT INCLUDING SCRAP	W'GHT PER ___ P'CS ___ LBS	RAW MATERIAL			
NET WEIGHT	" " ___ " ___ "	LENGTH	WIDTH	THICK.	DIA.

ALTERATIONS: C16, C41 / C31 was {71915} 2 MFDS. 475 V. ELEC. / 5 " 25 V. " — C37, C38 / C34 was {71916} 8 MFDS. 475 V. ELEC. / 10 " 25 V. " — J.P.H. 10/2/35

FINISH

CLASSIFICATION: 210 SERIES

THIS PRINT SUPERSEDES ALL OTHERS
PRIOR TO [redacted]

DO NOT SCALE THIS PRINT

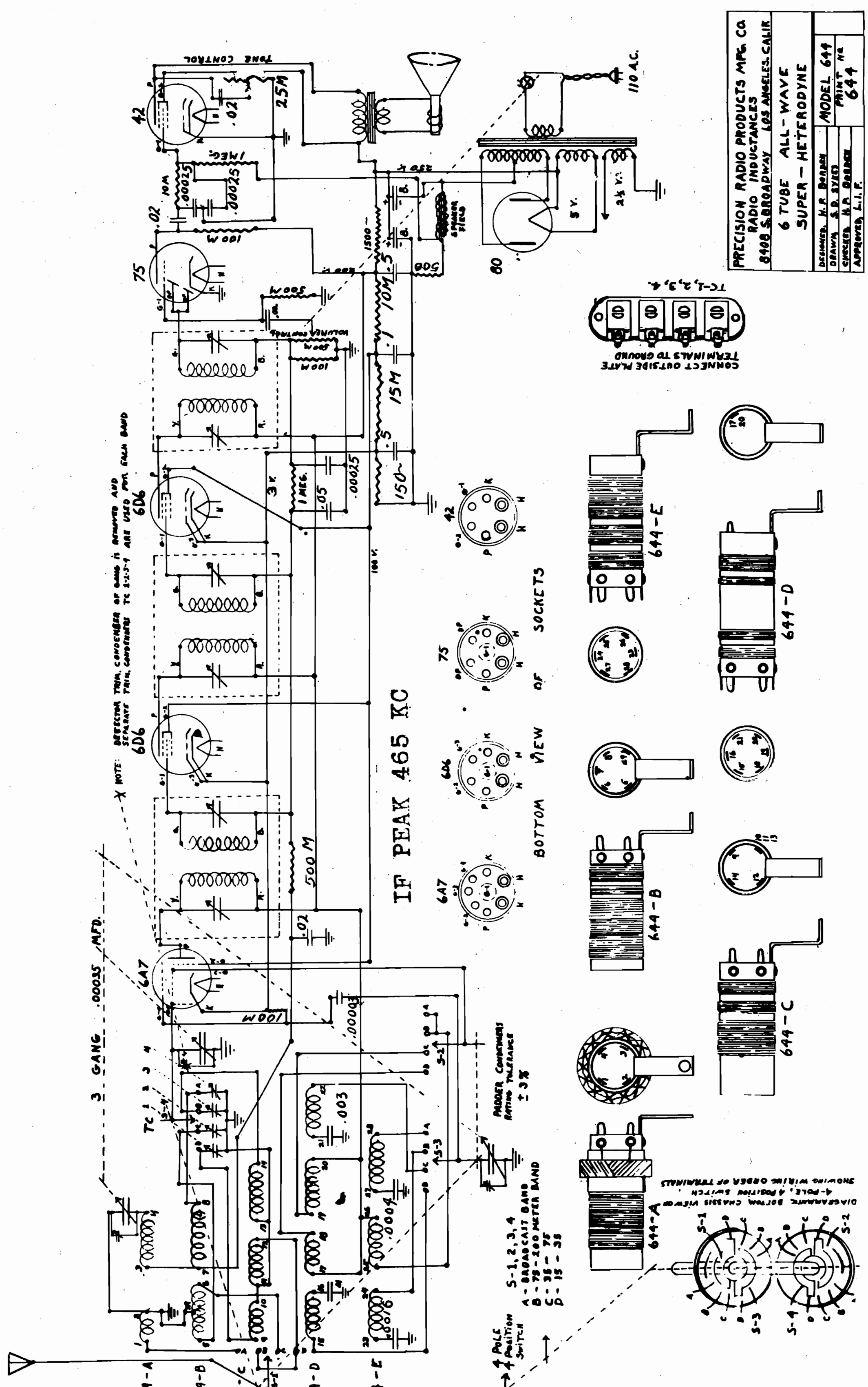
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.

SCHEMATIC CIRCUIT DIAGRAM FOR MODELS 213 AND 215 (INCLUDING CHASSIS LAYOUT)

MATERIAL ___
SCALE ___ DATE SEPT. 24, 1935
DRAWN BY J. P. H.
CHECKED BY
APPROVED BY
DRWG. NO. 25113-2

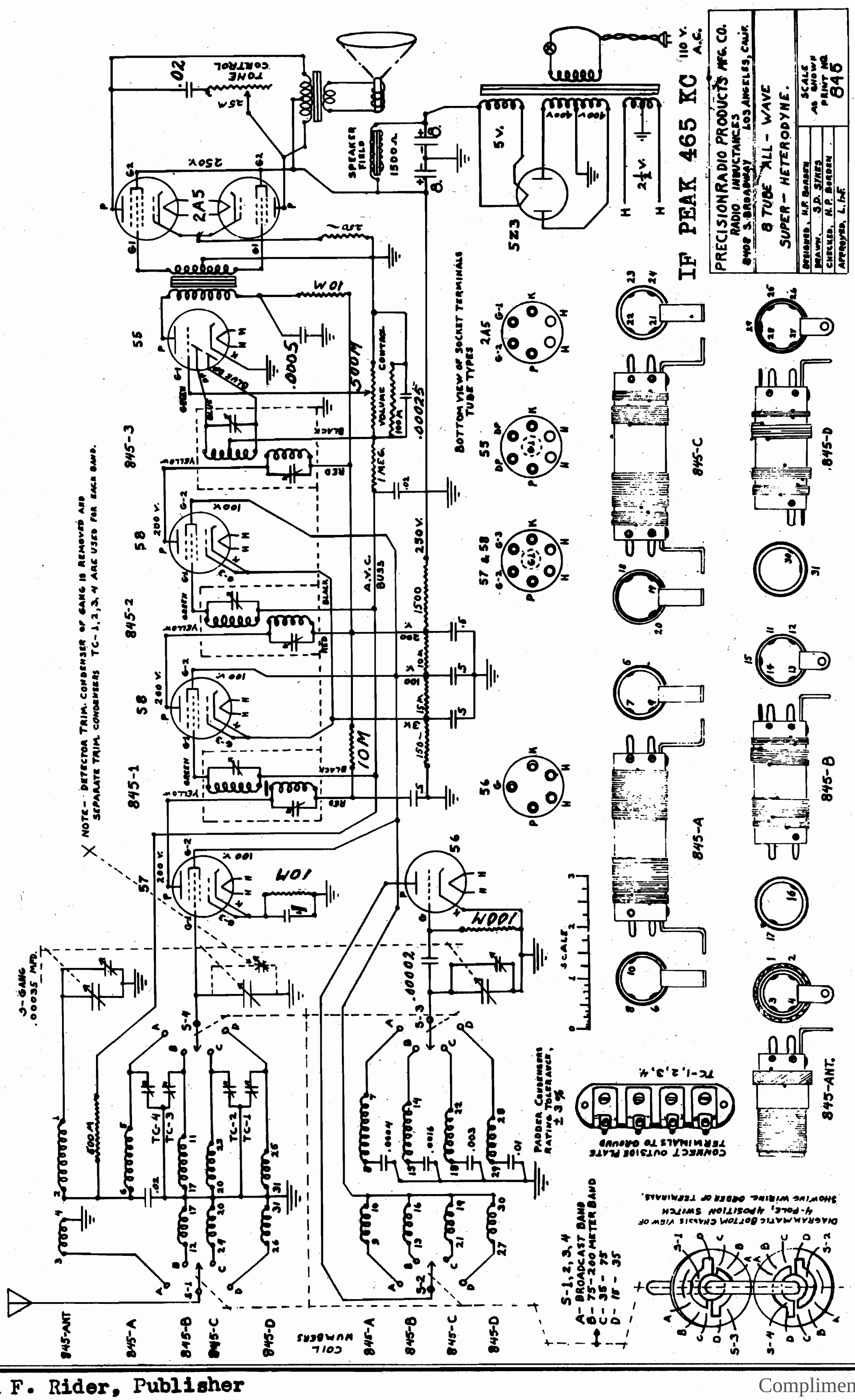
MODEL 6-Tube A-W. Superhet. Schematic

PRECISION RADIO PRODUCTS MFG. CO



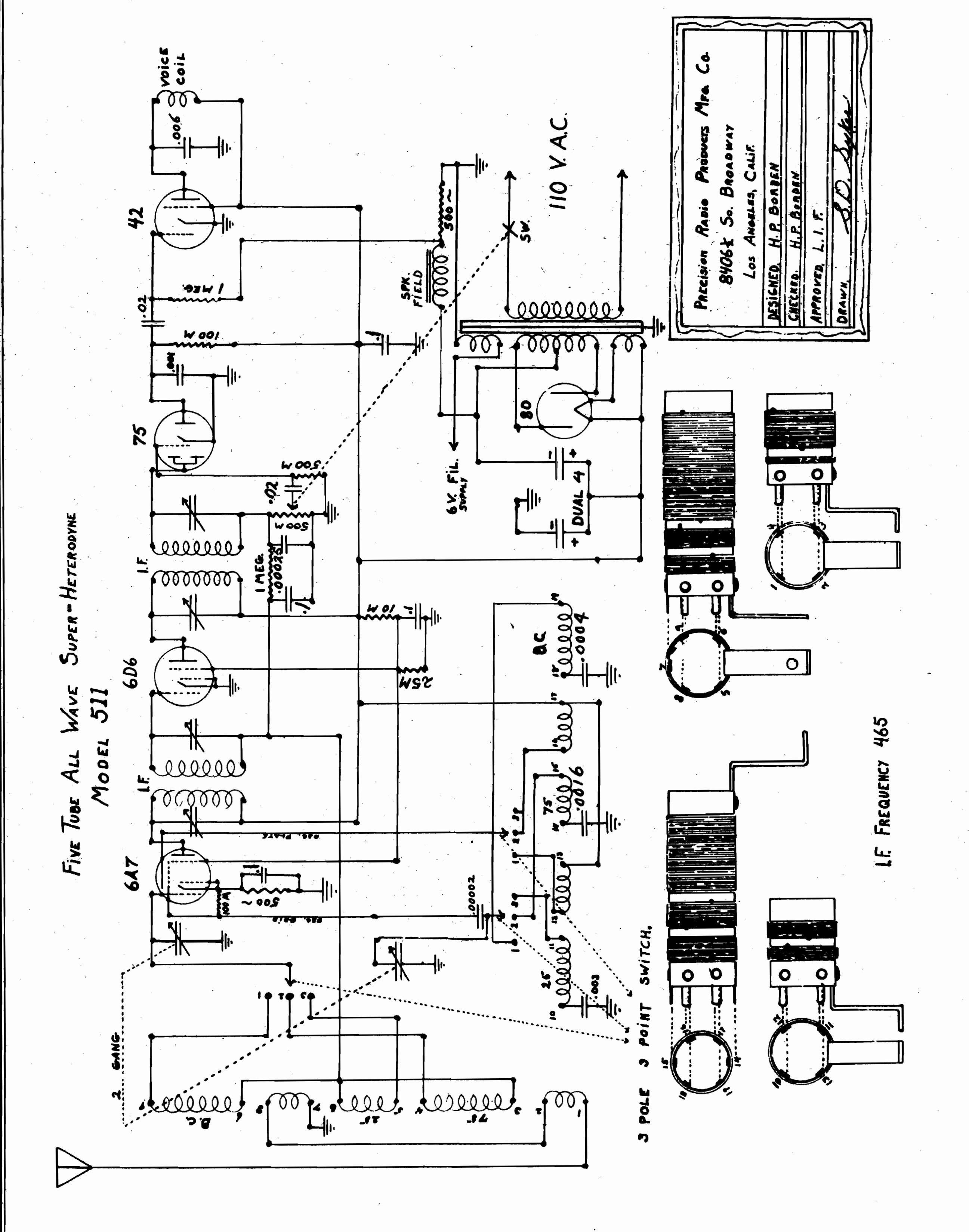
MODEL 8-Tube A-W. Superhet. Schematic

PRECISION RADIO PRODUCTS MFG. CO.



MODEL 511
Schematic

PRECISION RADIO PRODUCTS MFG. CO.



RCA MFG. CO., INC.

MODEL M-101
Schematic
Transformer Data

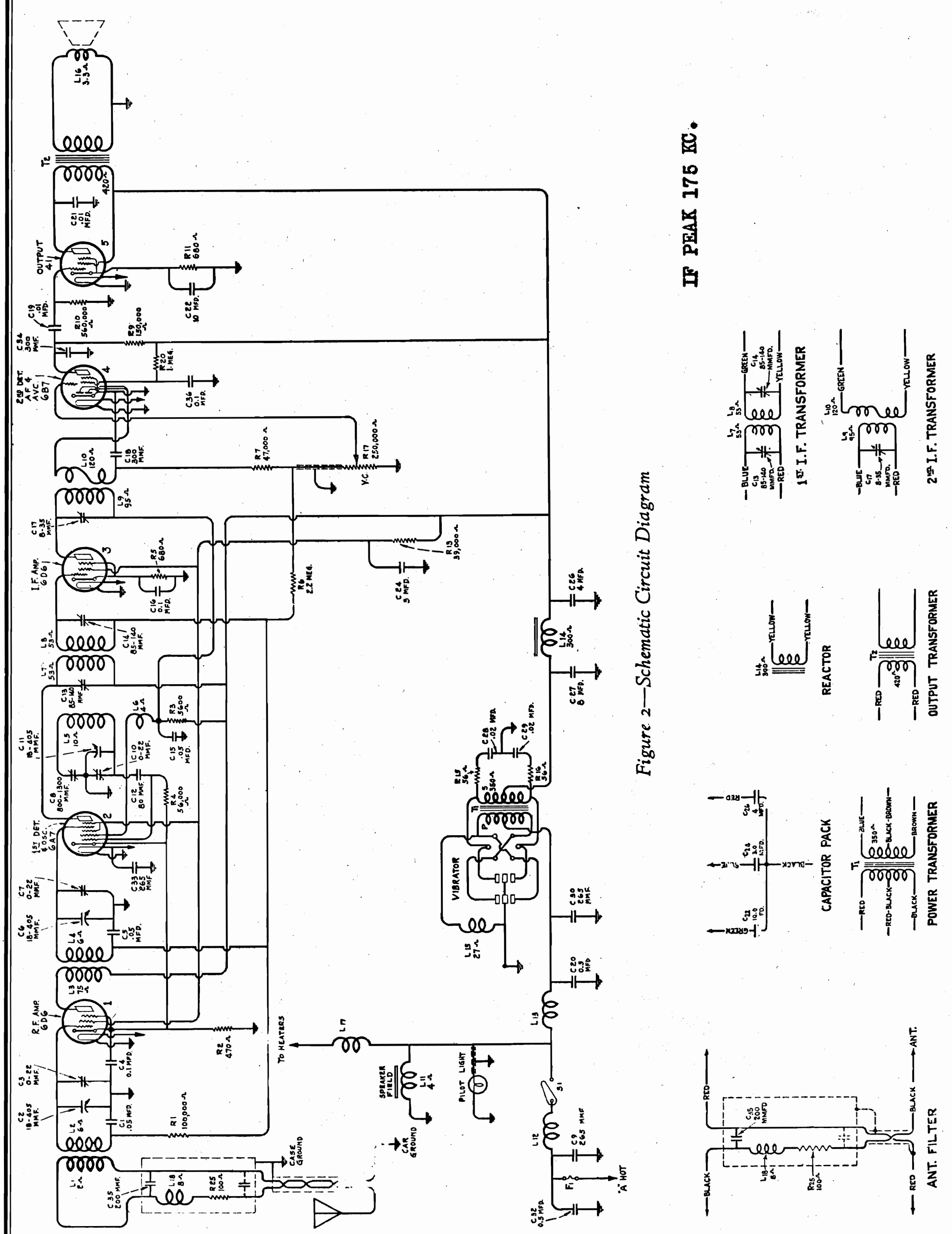


Figure 2—Schematic Circuit Diagram

MODEL M-101
Alignment, Voltage Socket, Trimmers

RCA MFG. CO., INC.

LINE-UP ADJUSTMENTS

As in all standard receivers, this instrument must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be re-aligned after each major servicing or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of low sensitivity, poor tone quality, and irregular double-peaked tuning.

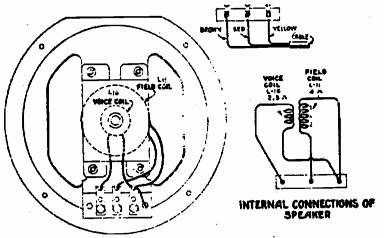


Figure 1—Loudspeaker Wiring

The important requirements in re-adjusting the line-up trimmers are the use of proper oscillator and indication equipment and adherence to a definite procedure.

(1) PREPARATORY DETAILS

(a) Dial Calibration—The tuning-condenser flexible shaft operates the dial pointer through a gear mechanism within the control unit. To adjust their mechanical relations so that accurate scale calibration obtains:—Rotate the station selector knob until the variable tuning capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. mark.)

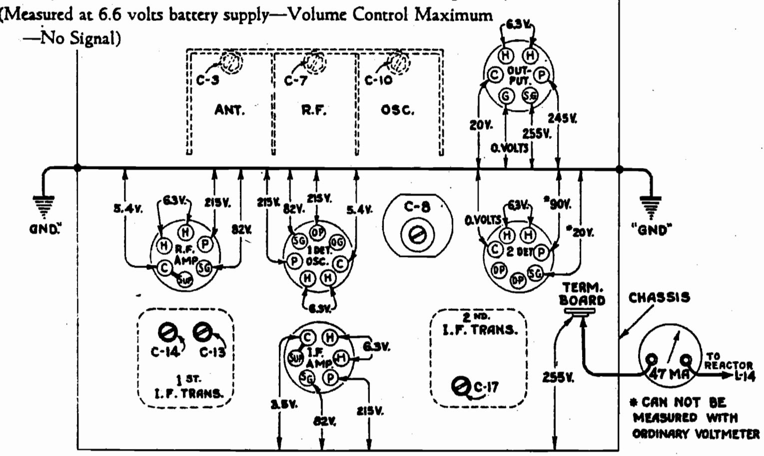
(b) General Procedure—The "Output Indicator" should be attached to the voice coil circuit of the loudspeaker, and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control set at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

(2) I. F. ADJUSTMENTS

Three trimmers are provided in the i-f system, two on the first transformer and one on the second transformer. The locations of the adjustment screws are shown in Figure 4.

(a) Tune the "Full Range Oscillator" to 175 kc. and connect its output to the first detector control grid and chassis ground. Tune the station selector to a point where no signals are received.

Figure 4—Trimmer Locations and Radiotron Socket Voltages to Ground
(Measured at 6.6 volts battery supply—Volume Control Maximum—No Signal)



(b) Tune each of the trimmer capacitors, C17, C14 and C13, in order. C17 should be set for maximum (peak) output. C14 and C13 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of 175 kc. and noting whether or not the receiver output remains substantially constant.

(3) R. F. DETECTOR AND OSCILLATOR ADJUSTMENTS

Three high-frequency adjusting capacitors are provided for alignment at 1400 kc., and one trimmer is used for the low frequency line-up at 600 kc. The "Full Range Oscillator" should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm series resistance in the antenna side.

(a) Tune the external oscillator to a frequency of 1400 kc. and turn the station selector knob until the dial pointer is at the 1400 kc. scale marking.

(b) Adjust the oscillator trimmer, C10; the detector trimmer, C7; and the r-f trimmer, C3, for maximum (peak) receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned on the receiver. Adjust the oscillator trimmer C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer, as in (b), to correct any reflective errors caused by the procedure of (c).

RADIOTRONS

Under ordinary usage within the ratings specified for voltage supply, tube life will be consistent with that obtained in other applications. Their deterioration and approach to failure is usually evidenced by noisy or intermittent operation, loss of sensitivity and distorted tone quality.

It is not feasible to test the Radiotrons in the receiver sockets, due to likelihood of errors being caused by the associated circuits. Their removal and check with standard tube-testing apparatus is therefore advisable.

In this receiver the Radiotrons are compactly placed and snugly fitted into tight-gripping sockets to protect against vibration and to insure positive electrical connections. They should be withdrawn by exerting a direct pull on the tube.

To replace the tubes having the form-fitting shields, attach the shield to the tube and orient the grid lead opening in proper relation to the tube base, and insert the tube into its socket so that the shield clamps slide into their correct position on the outer surface of the shield.

CIRCUIT VOLTAGES

The voltages indicated at the socket contacts on Figure 4 will serve to assist in analyzing defective circuit conditions. The values specified should hold within ±20% when the receiver is normally operative. They are actual operating values and do not take into account inaccuracies due to voltmeter resistance. A meter having a multiplier of at least 1000 ohms per volt should be used, and the amount of circuit resistance shunted by the meter resistance duly considered when the two are comparable.

SYNCHRONOUS RECTIFIER-VIBRATOR

The vibrator power unit used in this receiver is of rugged design and construction. It has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected to be in defective condition, but a renewal installed. A convenient plug-in base is provided for effecting a quick replacement.

SPEAKER CONE ALIGNMENT

In the event the cone coil becomes misaligned, it will be necessary to correct its position by an adjustment provided on the speaker assembly. A small round-head brass screw installed on pole piece adjacent to the terminal strip is used to clamp the cone coil mounting. To center the cone, loosen the screw and insert a small 1/16" rod or nail into the hole next to the screw and pry the coil mounting into the position giving normal speaker operation. The screw should then be retightened.

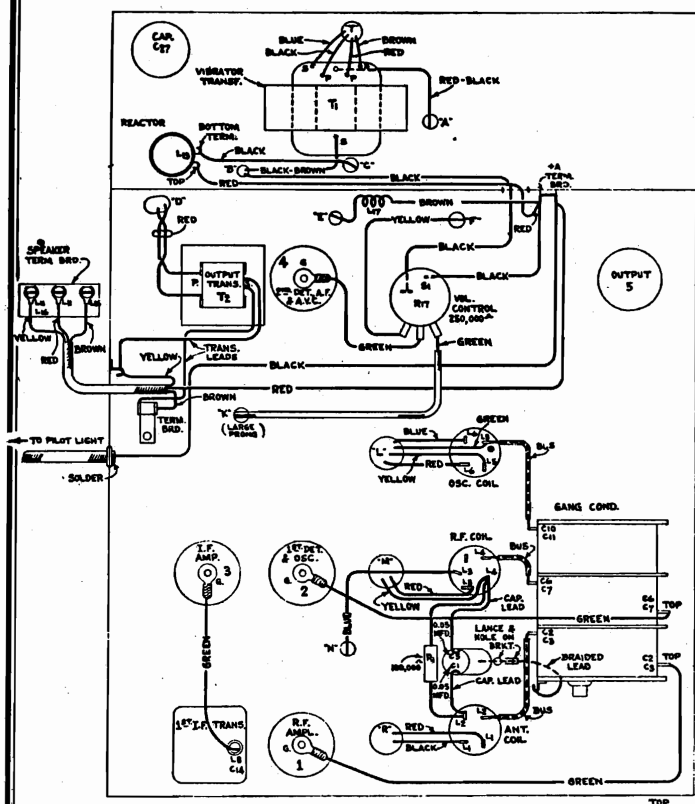
TUNING CONDENSER DRIVE

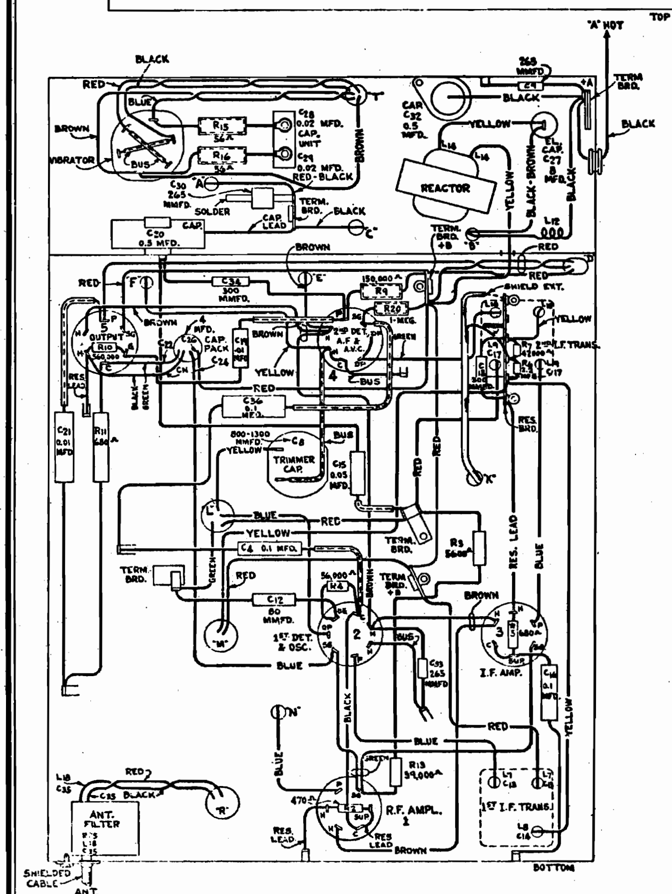
Smooth control should be obtained over the entire tuning range of the variable condenser. If there is any irregularity noticed, the following corrective steps should be taken:

Check the action of the gear mechanism for presence of binding or backlash at every point within the

MODEL M-101
Chassis Wiring
Service Notes

RCA MFG. CO., INC.





tuning range. A bind may be due to improper mesh between the small pinion gear and large gears on the rotor shaft. To correct such a condition, remove the coupling on the pinion of the tuning gear, insert a screw-driver through the hole in the case and loosen the two screws holding gear plate. The mesh of the gears should be adjusted to a position which gives smooth operation.

Gear back-lash is prevented by the compression spring between the large gears on the rotor shaft. To check for this back-lash, rotate the pinion slowly in both directions, observing the free gear (on rotor shaft) carefully to determine if it shifts without turning the rotor.

MISCELLANEOUS SERVICE HINTS

If back-lash is apparent, the large gear assembly should be removed and the free gear moved (against the spring compression) 2 to 3½ teeth in relation to the fixed gear and the assembly slid in place on the shaft and in mesh with the pinion. The set screws should then be securely tightened.

(a) The grounding of the outer end of the antenna lead shield is quite critical, in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

(b) In some cars, ignition interference may be introduced through lack of antenna lead shielding. In such cases, a shield should be placed over the exposed section of antenna lead and carried as near as possible to the actual antenna. It should be solidly grounded.

(c) Interference in the form of a grating scratch may arise from static collecting on the front wheels of some cars due to road surface friction in dry weather. The insulation caused by the grease of the wheel hub enables this action to develop. A number of devices are available through automotive supply dealers which are designed to eliminate this type of trouble. They all serve to form a grounding tie between the hub and the axle, and thus drain the static to the frame of the car (ground).

(d) If the flexible tuning shaft is installed so that it protrudes through the insulating coupling at the receiver end and makes intermittent contact with the metal of the pinion gear, some r-f disturbance will result. The shaft should therefore be inserted into the coupling just far enough to be properly secured by the set screw.

(e) The screws holding the chassis to the case must all be in place and tightly installed, inasmuch as they appreciably affect the ground resistance of the assembly and will consequently have a bearing on the amount of ignition noise received.

MODEL M-101
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4993	Bumper—Rubber bumper—Used under variable condenser bracket assembly—Package of 5	$0.25
4244	Cap—Grid contact cap—Package of 5	.20
4955	Capacitor—Adjustable capacitor (C8)	.48
5021	Capacitor—80 mmfd. (C12)	.22
5078	Capacitor—265 mmfd. (C9, C30, C33)	.24
4248	Capacitor—300 mmfd. (C18, C34)	.22
4882	Capacitor—.01 mfd. (C21)	.20
4858	Capacitor—.01 mfd. (C19)	.25
4791	Capacitor—0.1 mfd. (C4, C16)	.24
4885	Capacitor—0.1 mfd. (C36)	.28
4886	Capacitor—.05 mfd. (C15)	.20
5019	Capacitor—.5 mfd. (C32)	.42
4960	Capacitor—.5 mfd. (C20)	.46
4961	Capacitor—8.0 mfd	1.28
4964	Capacitor pack—Comprising two .02 mfd. capacitors (C28, C29)	1.02
5016	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.26
4958	Capacitor pack—Comprising one 3. mfd., one 10. mfd. and one 4. mfd. capacitors (C22, C24, C26)	1.34
5020	Clamp—Metal clamp with screw—For antenna filter shielded cable—Package of 5	.14
5074	Clamp—Radiotron shield clamp	.14
4950	Coil—Antenna coil (L1, L2)	.74
4968	Coil—Choke coil (L12)	.14
4969	Coil—Choke coil (15 turns—approximately 23 inches—length) (L17)	.14
6967	Coil—Oscillator coil (L5, L6)	.52
6956	Coil—R. F. coil (L3, L4)	.80
4948	Condenser—3 [illegible] variable tuning condenser (C2, C3, C[illegible], C10, C11)	3.81
4954	Filter—Antenna filter (L18, C35, R25)	1.46
4972	Lead—Power lead with male section of connector—Chassis end	.20
7766	Lead—Power lead with clip and female section of fuse connector	.30
4966	Lead—Single connector dial lamp lead—With female section of connector—Chassis end	30
4962	Reactor (L14)	.88
4963	Reactor (L13)	.38
5034	Resistor—56 ohms—Carbon type—½ watt (R15, R16)—Package of 5	1.00
5030	Resistor—470 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
5031	Resistor—680 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
5026	Resistor—680 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
5175	Resistor — 5600 ohms — Carbon type — ½ watt (R3)—Package of 5	1.00
5176	Resistor — 39,000 ohms — Carbon type — 1 watt (R13)	.22

Stock No.	Description	List Price
5132	Resistor — 47,000 ohms — Carbon type — 1/10 watt (R7)—Package of 5	$0.75
5029	Resistor — 56,000 ohms — Carbon type — ¼ watt (R4)—Package of 5	1.00
3118	Resistor — 100,000 ohms — Carbon type — ¼ watt (R1)—Package of 5	1.00
5027	Resistor — 150,000 ohms — Carbon type — ¼ watt (R9)—Package of 5	1.00
5035	Resistor — 560,000 ohms — Carbon type — ¼ watt (R10)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R20)—Package of 5	1.00
5131	Resistor—2,200,000 ohms—Carbon type—1/10 watt (R6)—Package of 5	.75
5129	Ring—Radiotron shield ring—Package of 5	.10
3584	Ring—Retaining ring for antenna, r-f, or oscillator coils—Package of 5	.40
3623	Shield—Antenna, r-f, or oscillator coil shield	.30
4953	Shield—First intermediate frequency transformer shield	.24
4956	Shield—Second intermediate frequency transformer shield	.30
5037	Shield—Radiotron shield	.15
4946	Socket—6-contact Radiotron socket	.18
4959	Socket—6-contact vibrator socket	.18
4947	Socket—7-contact Radiotron socket	.18
4951	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.26
4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.76
4957	Transformer—Output transformer (T2)	1.18
7859	Transformer—Vibrator transformer (T1)	2.02
7857	Vibrator—Complete (L15)	5.64
5018	Volume control (R17, S1)	1.00
	CONTROL BOX ASSEMBLIES	
4987	Bezel—Station selector dial bezel	.42
7855	Box—Control box—Complete	3.86
7864	Bracket—Mounting bracket and rear section of control box housing	.30
4988	Crystal—Station selector dial crystal	.38
4989	Dial—Station selector dial	.20
4981	Gear—18-tooth intermediate drive gear	.15
4978	Gear—Indicator drive gear and shaft	.42
7862	Housing—Front section of control box housing	.28
7863	Housing—Center section of control box housing	.32
4990	Indicator—Station selector (pointer) indicator	.10
4985	Knob—Station selector or volume control knob—Package of 5	.62
4991	Lamp—Dial lamp—Package of 5	.74
7856	Plate—Bearing plate assembly—Comprising plate gear and shaft, volume control shaft, station selector shaft, pinion and spring	1.22
4986	Screw—Oval fillister head machine screw—Fastens bracket and center section of control box housing—Package of 5	.25

REPLACEMENT PARTS (Continued)

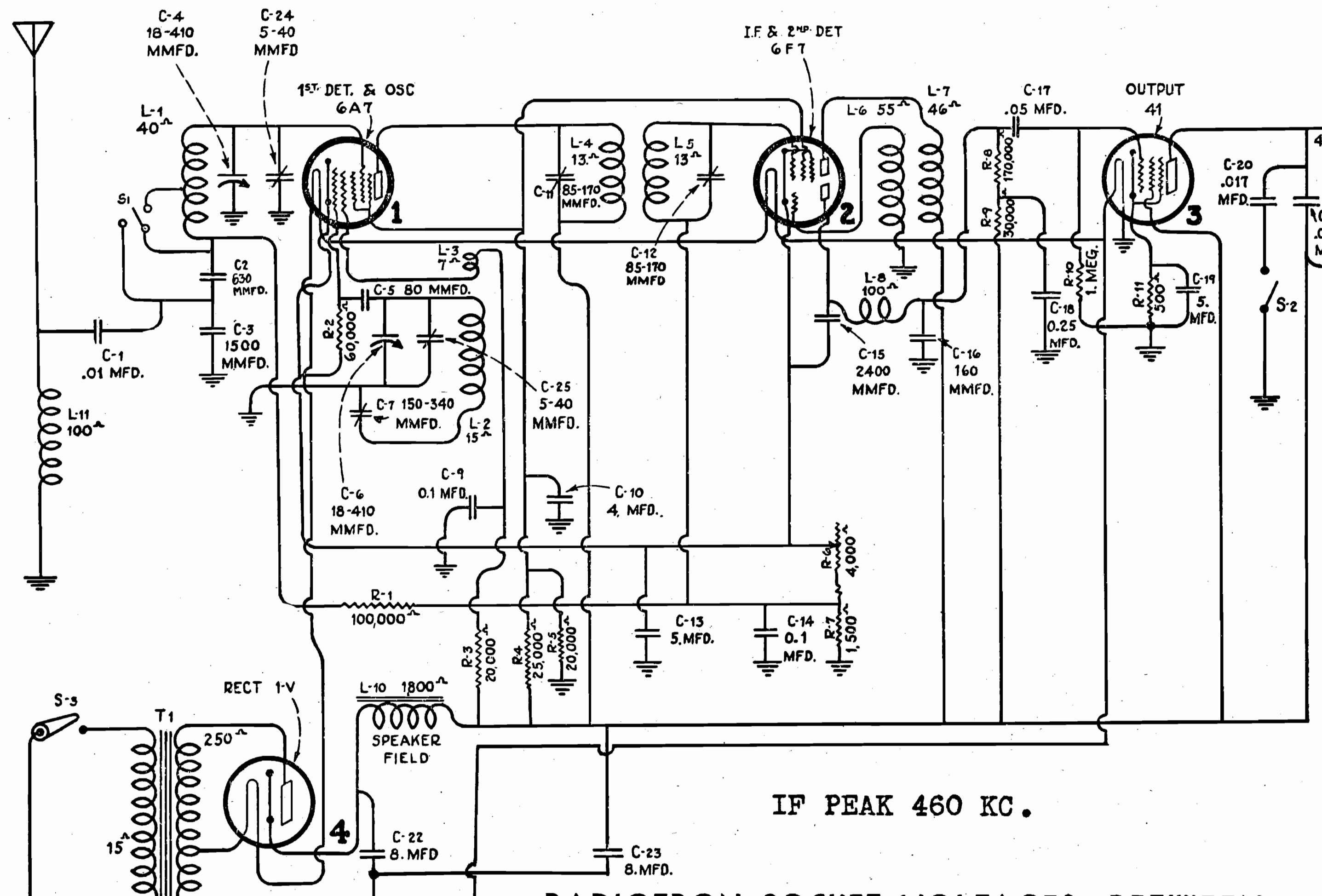
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
5042	Screw—No. 8-32-⅛-inch headless set-screw for station selector or volume control shaft—Package of 10	$0.25
4983	Shaft—Station selector drive shaft	.16
4979	Shaft—Volume control drive shaft	.16
4984	Socket—Dial lamp socket	.16
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26
4980	Spring—Tension spring—Package of 5	.15
	FLEXIBLE SHAFT ASSEMBLIES	
5000	Bracket—Volume or tuning condenser flexible shaft bracket—Bracket mounted on housing	.30
4994	Nut—Knurled locking nut for condenser drive or volume control flexible shafts	.10
7854	Shaft—Tuning condenser—Flexible (steering column) drive shaft—31⅜ inches long	1.08
7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9⁵⁄₁₆ inches long	.58
7855	Shaft—Volume control—Flexible (steering column) shaft—28⅞ inches long	1.00
	REPRODUCER ASSEMBLIES	
4970	Cable—3-conductor reproducer cable	1.02
9602	Cone—Reproducer cone (L16)	.75
9576	Housing—Reproducer housing—Top cover of receiver	1.08
9577	Reproducer—Complete (L11, L16)	4.32
4995	Screw—Reproducer mounting screw—Package of 10	.15
	HOUSING ASSEMBLIES	
7868	Case — Receiver housing assembly — Complete	1.76

Stock No.	Description	List Price
7869	Cover—Bottom cover of receiver housing assembly	$0.32
4999	Screw—No. 8-¼-inch slotted hex head self-tapping screw—Used to assemble housing—Package of 5	.12
	MISCELLANEOUS PARTS	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
5188	Cable—Two conductor antenna cable approximately 40¾ in. long with male section of connector	.40
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
5025	Capacitor—0.5 mfd. generator capacitor	.40
6516	Connector—Fuse connector complete	.16
4973	Coupling—Tuning condenser shaft coupling	.30
4974	Coupling—Volume control shaft coupling	.36
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
5023	Fuse—15-ampere—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4975	Lead—Dial lamp lead—Control box end	.38
3903	Screw—No. 8-32-3/16-inch headless set-screw for couplings—Package of 20	.36
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
4992	Stud—Receiver mounting stud and nuts—Package of 3	.22
5064	Stud—Variable condenser bracket mounting assembly comprising one stud, one bushing, one washer, and one lockwasher	.12
5024	Suppressor—Distributor suppressor	.38

MODEL 103
Schematic
Voltage

RCA MFG. CO., INC.



IF PEAK 460 KC.

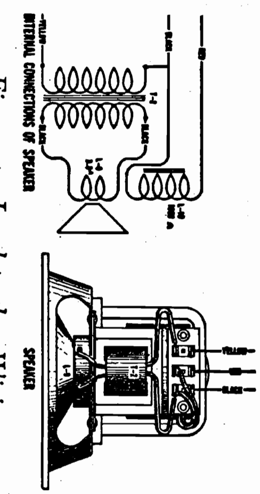


Figure 5—Loudspeaker Wiring

RADIOTRON SOCKET VOLTAGES—BETWEEN ELEMENTS

120-Volt, 60-Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Detector	19.0	—	145*	0.4	
RCA-41 Output		17.0	240	230	26.5	6.3
RCA-1-V Rectifier		—	—	335 R.M.S.	50,0	6.3

*Actual voltage cannot be measured with ordinary voltmeter.

MODEL 103
Chassis Wiring

RCA MFG. CO., INC.

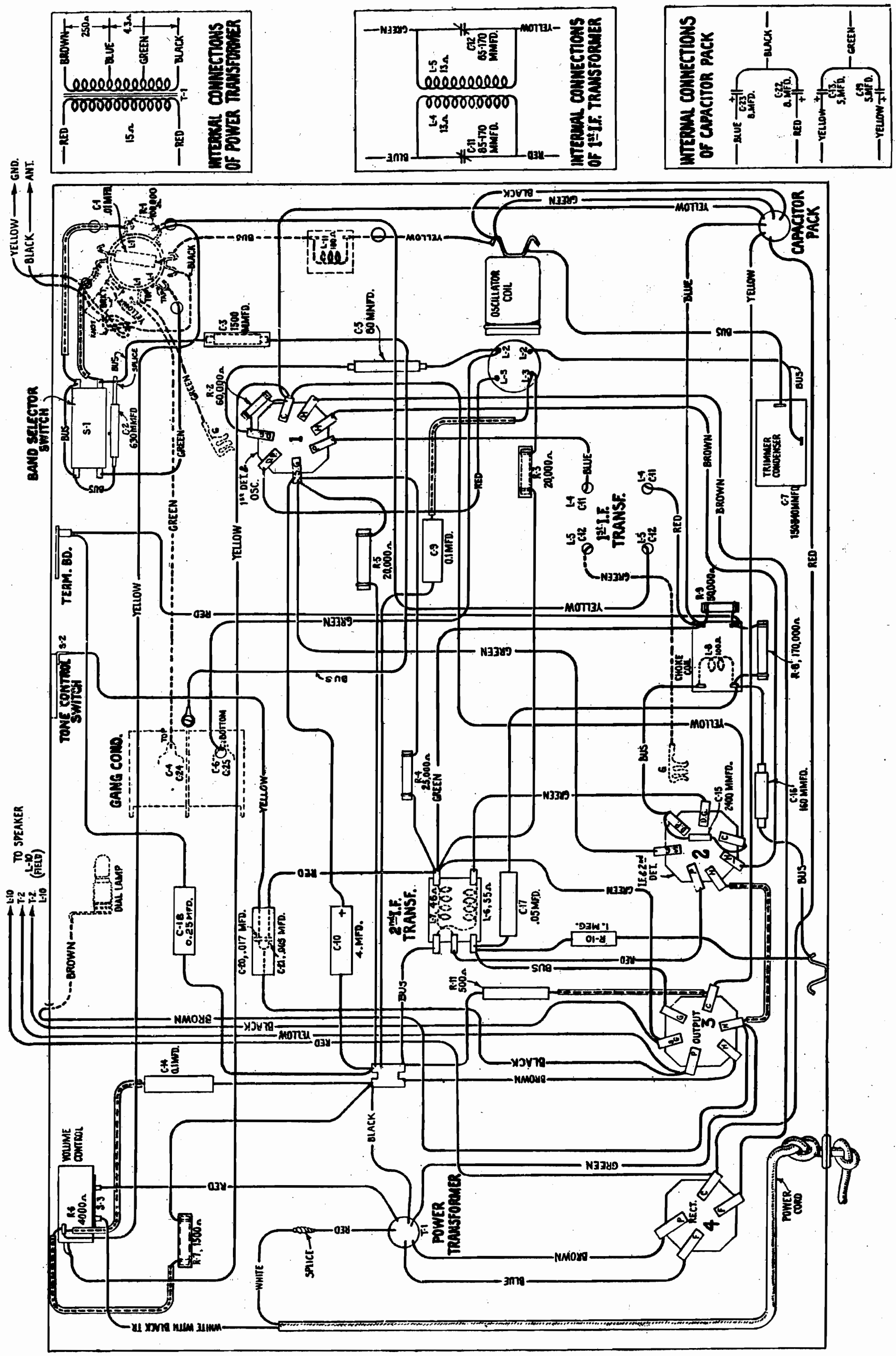


Figure 2—Chassis Wiring Diagram

MODEL 103
Circuit Data, Socket Trimmers, Voltage Alignment, Parts

RCA MFG. CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The first stage is a combined detector and oscillator using an RCA Radiotron 6A7. The two functions are obtained through means of individual tuned circuits. On the detector tuning coil a tap is made, so that a portion of the coil can be short-circuited by switch contacts and thus extend the tuning of the receiver to the higher frequency range. The oscillator second harmonic is used to produce the intermediate frequency for the upper tuning range. The oscillator circuit is arranged to have the low-frequency trimmer capacitor attached in series with the inductance, permitting accuracy in its adjustment to be easily secured, and to give a more uniform sensitivity over the tuning range.

In the following stage, the I. F. amplification and final detection take place in the dual-purpose RCA 6F7. The input section of this tube constitutes a screen-grid I. F. amplifier, with the output elements arranged to perform as a triode detector.

One RCA-41, a Pentode type, is employed in the audio output stage.

The rectifying unit consists of an RCA-1-v, a cathode-type, half-wave tube. Its high voltage is supplied from the power transformer secondary, which is a single winding tapped at various points for furnishing heater current to all Radiotrons of the receiver. The heater of the RCA-41 stage and the pilot lamp are supplied by one section of the secondary winding; and the remaining three heaters are connected series to receive supply from a 19-volt section of the same winding.

Voltage Rating	105–125 Volts
Frequency Ratings	25–60 or 50–60 Cycles
Power Consumption	40 Watts at 115 Volts
Number and Type of Radiotrons	1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1V—Total 4
Tuning Frequency Ranges	540–1500 K. C. and 1600–3500 K. C.
Intermediate Frequency	460 K. C.
Maximum Undistorted Output	1.9 Watts
Maximum Output	3 Watts
Line-up Frequencies	460 K. C., 600 K. C. and 1400 K. C.

SERVICE DATA

(1) ALIGNMENT PROCEDURE

Locations of the alignment condensers are indicated on Figure 3. There are five adjustments necessary. Before attempting to align the receiver, the antenna must be disconnected to obviate any interference that may be caused by pickup on a local station. The adjusting should then be performed in order as follows:

(a) *First I. F. Transformer*—Connect the output of an external oscillator, which is set to produce a 460 KC. signal, from the RCA-6A7 detector grid to chassis-ground. Tune the primary and secondary trimmers C-11 and C-12, respectively, for maximum receiver output.

(b) *Receiver Oscillator and Detector*—Two adjustments are provided. The first is accomplished by feeding a 1400 KC. signal from an external oscillator into the antenna-ground terminals. Set the tuning dial at 1400, and adjust the two trimmers of the tuning condenser for maximum receiver output. For the second oscillator adjustment, a signal of 600 KC. is required from the external source, fed into the antenna-ground connections. The trimmer for this frequency appears on the rear of the chassis. Adjust this trimmer, simultaneously rocking the tuning condenser through the signal, until maximum receiver output is obtained. Reading of the dial should fall within reasonable limits of accuracy at the 600 KC. point.

(2) VOLTAGE READINGS

In Figure 3, voltage values from tube contacts to ground are shown. They are the actual operating values and should be checked with the tubes in place. The table of Figure 4 lists the operating voltages and currents, referred to cathode, and measurable by means of a socket adaptor or set analyzer.

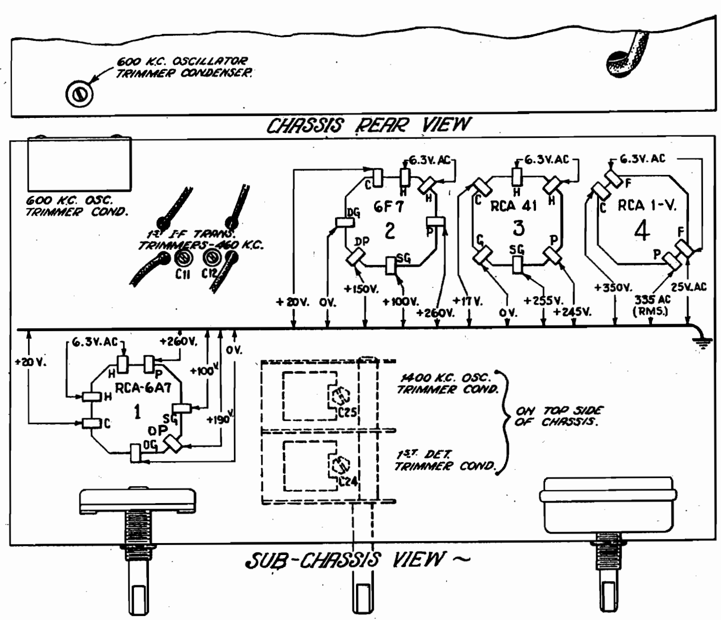


Figure 3—Line-Up Capacitor Locations and Miscellaneous Voltages at Radiotron Sockets, 120-Volt, 60-Cycle Line—Volume Control at Maximum—No Signal

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
4000	Capacitor—Adjustable capacitor (C7)	.78
4887	Capacitor—0.0025 mfd. (C15)	.18
3701	Capacitor—0.01 mfd. (C1)	.30
4886	Capacitor—0.05 mfd. (C17)	.20
4885	Capacitor—0.1 mfd. (C14)	.28
4835	Capacitor—0.1 mfd. (C9)	.28
3597	Capacitor—0.25 mfd. (C18)	.40
3459	Capacitor—80 mmfd. (C5)	.44
3865	Capacitor—160 mmfd. (C16)	.30
3933	Capacitor—630 mmfd. (C2)	.32
3873	Capacitor—1500 mmfd. (C3)	.30
6832	Capacitor—4.0 mfd. (C10)	.85
6787	Capacitor—Comprising one 0.005 mfd. and one 0.017 mfd. capacitors (C20, C21)	.30
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6666	Coil—Antenna coil (L1, C1, R1)	1.08
4018	Coil—Choke coil (L11)	.90
3857	Coil—Detector choke coil (L8)	.90
6664	Coil—Oscillator coil (L2, L3)	.94
6660	Condenser—2-gang variable condenser (C4, C6, C24, C25)	2.78
4890	Dial—Station selector dial	.58
4085	Knob—Station selector knob—Package of 5	.60
4884	Insulator—Radiotron Socket Insulator	.10
4132	Knob—Volume control, tone control or range switch knob—Package of 5	.55
3886	Reflector—Dial light reflector	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3047	Resistor—1,500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	$0.25
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3869	Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R10)—Package of 5	1:00
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
4087	Screw—Chassis mounting screw and washer—Package of 4	.22
6665	Shield—Oscillator coil shield and mounting bracket	.34
4104	Shield—Radiotron shield	.20
3858	Socket—Dial lamp socket and bracket	.26
4784	Socket—4-contact Radiotron socket	.15
4785	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	.50
9464	Transformer—Power transformer—105–125 volts—50–60 cycles (T1)	3.20
9465	Transformer—Power transformer—105–125 volts—25–40 cycles	4.38
9466	Transformer—Power transformer—200–250 volts—50–60 cycles	3.28
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6667	Volume control (R6, S3)	1.58
	REPRODUCER ASSEMBLIES	
9548	Coil assembly—Comprising field coil, magnet and cone support (L10)	3.08
9588	Cone—Reproducer cone (L9)—Package of 5	3.55
9547	Reproducer complete	5.45
4803	Transformer—Output transformer	1.45

RCA MFG. CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The electrical arrangement of the receiver is pictured in the schematic of Figure 2. A corresponding wiring layout is shown in Figure 3, where the actual physical relations of parts and coding of conductors are given.

Five Radiotrons are used, forming the total tube complement around which the superheterodyne circuit is built. In sequence, there is an r-f stage, a dual first detector–oscillator stage, a single i-f stage, a second detector–audio amplifier–a.v.c. stage, and a pentode output stage. Five tuned circuits operate upon the desired signal to strengthen its magnitude and reject the undesired signals and interference.

Current for operation of the receiver is obtained from a standard 6.3 volt storage battery. This current is filtered through several chokes and by-passed to ground by a number of capacitors before being applied to the Radiotron filaments and the high voltage conversion unit. The number and arrangement of the filter elements is such as to gain a very great reduction in the amount of interference conducted into the r-f circuits by the current supply wiring.

The following details elaborate the functions and features of the various stages of the receiver:

Starting at the antenna, an r-f signal is impressed across a special transmission line, which in conjunction with a "noise filter," acts selectively to the entire standard broadcast range and drastically attenuates signals and interference outside the limits of the band (540–1600 kc.). Instead of the ground for the antenna input coil appearing at the usual point on the chassis frame, the low end of the coil is extended as part of the transmission line to the outer termination of the antenna lead-in shield, where it grounds to the frame of the car. With this arrangement, the r-f disturbances circulating in the car frame (ground) do not become mutual to the receiver input. The transmission line section of the antenna lead-in also has characteristics favorable to the operation of the "noise filter." Its length, conductor sizes, insulation, etc., are precisely designed to have a critical capacitance (represented by dotted lines on schematic), which resonates with the inductance of the input system to produce a band-pass filter having an acceptance band between 540 kc. and 1600 kc., and sharply defined cut-off below and above these two limits. By using this antenna filter system and minimizing capacity coupling between primary and secondary of antenna coupling transformer, it is generally possible to dispense with the usual spark plug and distributor suppressors, without encountering serious interference on latest types of cars.

The signal is passed from the input coil by transformer action to the r-f stage control grid. An RCA-6D6 at this point performs the function of an r-f amplifier, its super-control property being adapted as means of preventing cross-modulation and securing a wide range of automatic volume control. The first (front) section of the tuning condenser is connected to sharply tune the secondary of the antenna coupling transformer.

A second r-f coupling transformer transmits the signal to the following receiver stage, which comprises a combination first detector and local oscillator. The secondary inductance of this transformer is tuned by the second (center) section of the variable capacitor and connects to the detector grid of the RCA-6A7 Radiotron. By proper arrangement of the several elements within this tube, a local oscillator system is established, which generates the correct frequency and causes it to mix with the incoming signal. The difference frequency beat (i-f) of these two combined signals is detected by the tube and transferred by a closely coupled transformer to the intermediate frequency amplifier tube, an RCA-6D6. Both windings of this i-f transformer are tuned by trimmers. The second i-f transformer which joins the RCA-6D6 tube to the second detector stage has only one trimmer, that being in shunt with its primary winding.

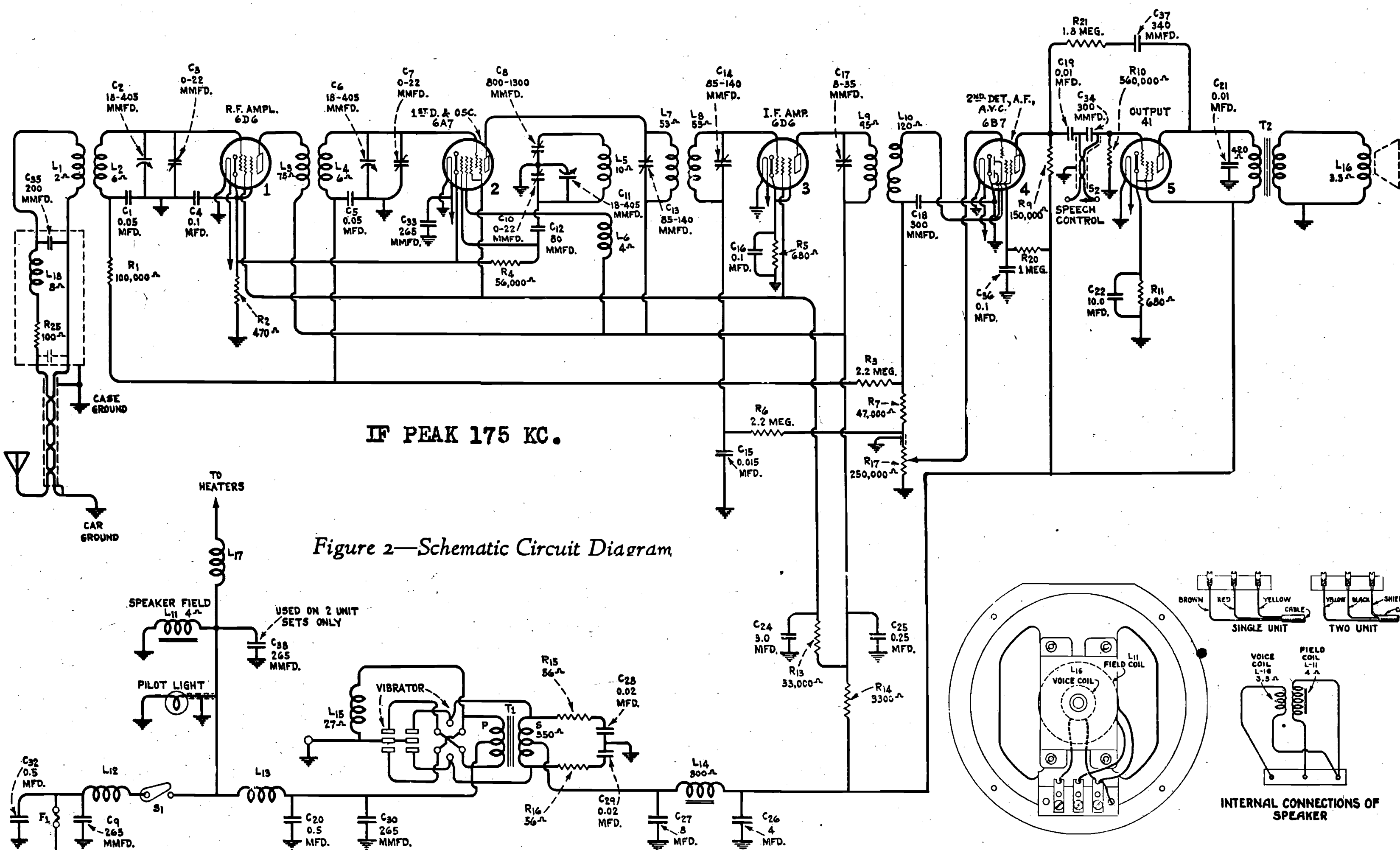
The RCA-6B7 second detector stage receives the i-f signal on its diode plates. Detection takes place as a result of the rectifying action of the diodes and develops a current through resistors R7 and R17. The d-c voltage drop in the resistance R7 plus R17 is used for automatically regulating the control grid bias of the r-f and first detector stage, and thus the amplification becomes dependent upon the signal strength. This process (a.v.c.) compensates for fading signals and reduction of signals due to change of antenna direction and shielding effects of buildings, bridges, etc. A smaller portion of the d-c voltage obtained by detection is tapped from the juncture of R7 and R17 and carried to the control grid of the i-f stage. This likewise furnishes automatic volume control.

The audio and d-c components of the detected signal are selected from the manual volume control resistor (R17) by its movable arm, and applied to the control grid of the RCA-6B7; amplification results and the signal passes on to the power output stage. The variable d-c applied to the grid prevents overload. A resistance-capacitance coupling system conveys the signal from the second detector stage to the RCA-41 output tube. In this coupling arrangement, a "speech" control is used for shorting capacitor C34, the effect in the open position being attenuation of the lower frequencies and consequent improvement of speech intelligibility. The circuit composed of R21 and C37 effects the proper fidelity balance.

The power amplifier stage delivers to the loudspeaker a high level audio signal. Correct matching relations between the speaker and output stage are maintained by the output transformer.

MODELS M-104, M-108
Schematic
Speaker Wiring

RCA MFG. CO., INC.



IF PEAK 175 KC.

Figure 2—Schematic Circuit Diagram

Figure 1—Loudspeaker Wiring

RCA Model M-104 and G.E. Model D-51 are single-unit receivers, containing the radio chassis, power conversion adjunct and loud speaker in one housing. RCA Model M-108 and G.E. Model D-52 are double-unit receivers, utilizing a chassis and its power conversion equipment similar to those above, assembled in one case, but with the loud speaker mounted individually in a separate case.

MODEL M-104, M-108
Chassis Wiring
Notes

RCA MFG. CO., INC.

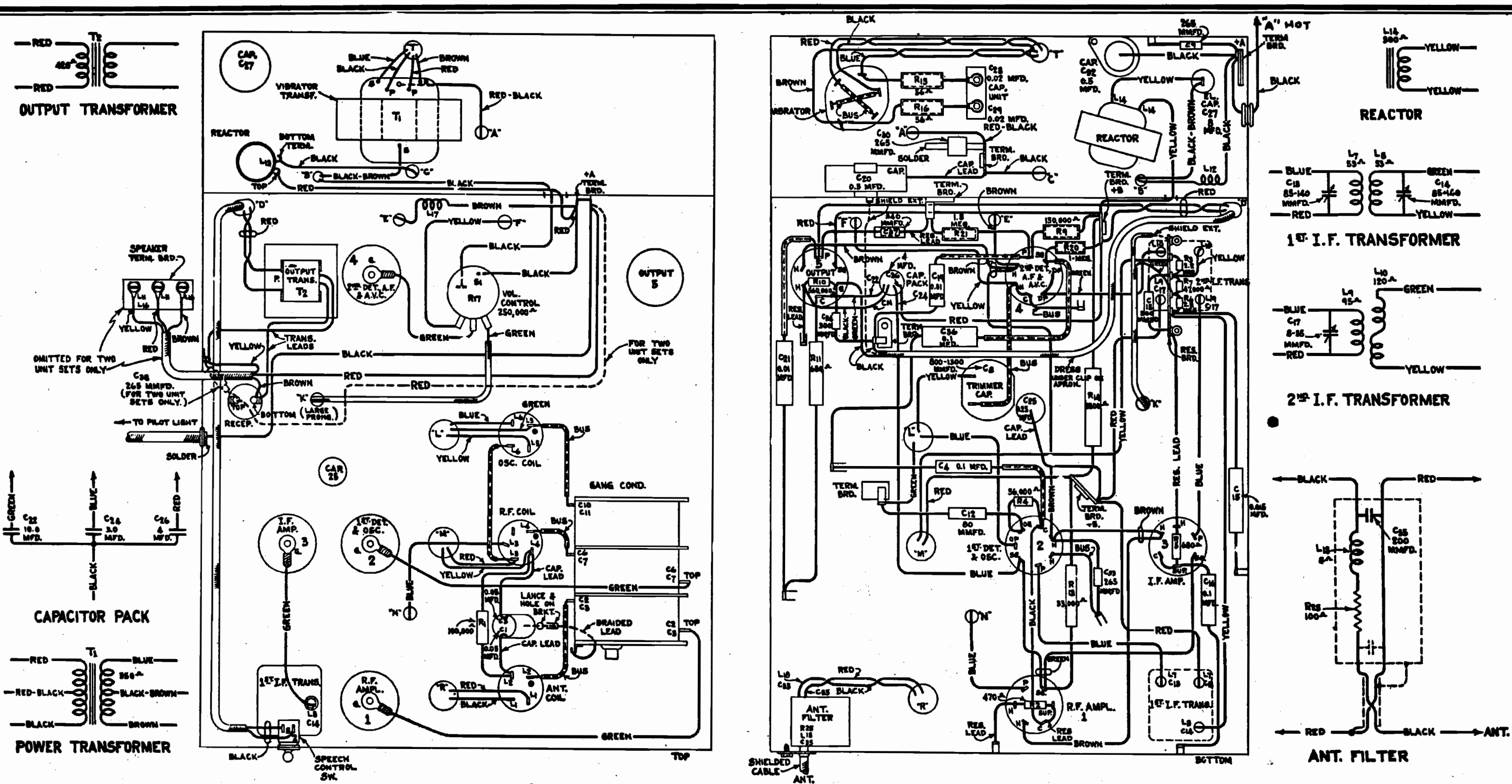


Figure 3—Chassis Wiring Diagram

In this receiver the Radiotrons are compactly placed and snugly fitted into tight-gripping sockets to protect against vibration and to insure positive electrical connections. They should be withdrawn by exerting a direct pull on the tube.

To replace the tubes having the form-fitting shields, attach the shield to the tube and orient the grid lead opening in proper relation to the tube base, and insert the tube into its socket so that the shield clamps slide into their correct position on the outer surface of the shield.

Heater connections of the Radiotrons are wired multiple, and supplied through a carefully filtered system. One heater terminal of each tube is grounded.

High voltage for plate and bias supply is generated by inversion, transformation and mechanical rectification; these three functions occurring in the "synchronous rectifier-vibrator." This vibrator is adapted for convenient removability by having its base constructed for "plug-in" mounting. Simple means are provided for correcting the vibrator input to agree with the ground polarity of the car by having the vibrator reversible. The vibrator may be inserted in two possible positions. As normally shipped, it is plugged in to operate with "positive" car ground. On a car having "negative ground," it will be necessary to withdraw the vibrator, rotate the unit 180 degrees and re-insert into the new position.

RCA MFG. CO., INC.

(1) PREPARATORY DETAILS

(a) Dial Calibration—The tuning-condenser flexible shaft operates the dial pointer through a gear mechanism within the control unit. To adjust their mechanical relations so that accurate scale calibration obtains:—Rotate the station selector knob until the variable tuning capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. mark.)

(b) General Procedure—The "Output Indicator" should be attached to the voice coil circuit of the loudspeaker, and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control set at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

(2) I. F. ADJUSTMENTS

Three trimmers are provided in the i-f system, two on the first transformer and one on the second transformer. The locations of the adjustment screws are shown in Figure 4.

(a) Tune the "Full Range Oscillator" to 175 kc. and connect its output to the first detector control grid and chassis ground. Tune the station selector to a point where no signals are received.

(b) Tune each of the trimmer capacitors, C17, C14 and C13, in order. C17 should be set for maximum (peak) output. C14 and C13 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of 175 kc. and noting whether or not the receiver output remains substantially constant.

(3) R. F. DETECTOR AND OSCILLATOR ADJUSTMENTS

Three high-frequency adjusting capacitors are provided for alignment at 1400 kc., and one trimmer is used for the low frequency line-up at 600 kc. The "Full Range Oscillator" should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm series resistance in the antenna side.

(a) Tune the external oscillator to a frequency of 1400 kc. and turn the station selector knob until the dial pointer is at the 1400 kc. scale marking.

(b) Adjust the oscillator trimmer, C-10; the detector trimmer, C7; and the r-f trimmer, C3, for maximum (peak) receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned on the receiver. Adjust the oscillator trimmer C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer, as in (b), to correct any reflective errors caused by the procedure of (c).

CIRCUIT VOLTAGES

The voltages indicated at the socket contacts on Figure 4 will serve to assist in analizing defective circuit conditions. The values specified should hold within $\pm 20\%$ when the receiver is normally operative. They are actual operating values and do not take into account inaccuracies due to voltmeter resistance. A meter having a multiplier of at least 1000 ohms per volt should be used, and the amount of circuit resistance shunted by the meter resistance duly considered when the two are comparable.

SYNCHRONOUS RECTIFIER-VIBRATOR

The vibrator power unit used in this receiver is of rugged design and construction. It has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected to be in defective condition, but a renewal installed. A convenient plug-in base is provided for effecting a quick replacement.

SPEAKER CONE ALIGNMENT

In the event the cone coil becomes mis-aligned, it will be necessary to correct its position by an adjustment provided on the speaker assembly. A small round-head brass screw installed on pole piece adjacent to the terminal strip is used to clamp the cone coil mounting. To center the cone, loosen the screw and insert a small 1/16" rod or nail into the hole next to the screw and pry the coil mounting into the position giving normal speaker operation. The screw should then be retightened.

TUNING CONDENSER DRIVE

Smooth control should be obtained over the entire tuning range of the variable condenser. If there is any irregularity noticed, the following corrective steps should be taken:

Check the action of the gear mechanism for presence of binding or backlash at every point within the tuning range. A bind may be due to improper mesh between the small pinion gear and large gears on the rotor shaft. To correct such a condition, remove the coupling on the pinion of the tuning gear, insert a screw-driver through the hole in the case and loosen the two screws holding gear plate. The mesh of the gears should be adjusted to a position which gives smooth operation.

Gear back-lash is prevented by the compression spring between the large gears on the rotor shaft. To check for this back-lash, rotate the pinion slowly in both directions, observing the free gear (on rotor shaft) carefully to determine if it shifts without turning the rotor.

If back-lash is apparent, the large gear assembly should be removed and the free gear moved (against the spring compression) 2 to 3½ teeth in relation to the fixed gear and the assembly slid in place on the shaft and in mesh with the pinion. The set screws should then be securely tightened.

MISCELLANEOUS SERVICE HINTS

(a) The grounding of the outer end of the antenna input lead is quite critical, in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

(b) In some cars, ignition interference may be introduced through lack of antenna lead shielding. In such cases, a shield should be placed over the exposed section of antenna lead and carried as near as possible to the actual antenna. It should be solidly grounded.

(c) Interference in the form of a grating scratch may arise from static collecting on the front wheels of some cars due to road surface friction in dry weather. The insulation caused by the grease of the wheel hub enables this action to develop. A number of devices are available through automotive supply dealers which are designed to eliminate this type of trouble. They all serve to form a grounding tie between the hub and the axle, and thus drain the static to the frame of the car (ground).

(d) If the flexible tuning shaft is installed so that it protrudes through the insulating coupling at the receiver end and makes intermittent contact with the metal of the pinion gear, some r-f disturbance will result. The shaft should therefore be inserted into the coupling just far enough to be properly secured by the set screw.

(e) The screws holding the chassis to the case must all be in place and tightly installed, inasmuch as they appreciably affect the ground resistance of the assembly and will consequently have a bearing on the amount of ignition noise received.

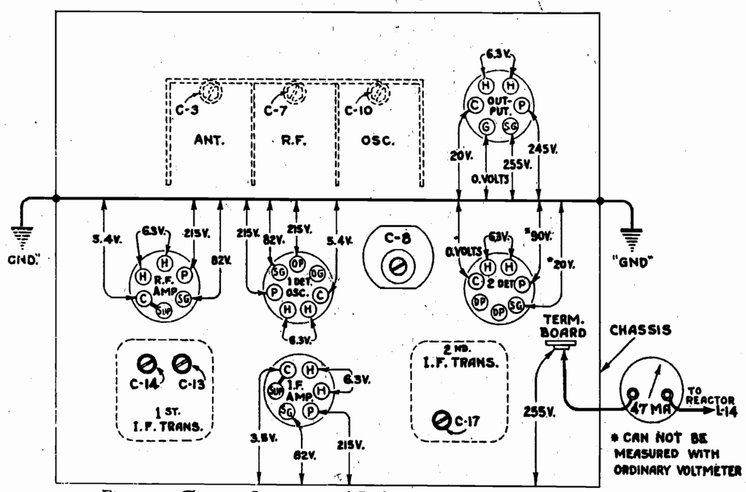


Figure 4—Trimmer Locations and Radiotron Socket Voltages to Ground
(Measured at 6.6 volts battery supply—Volume Control Maximum—No Signal)

MODELS M-104,M-108
Parts List

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4993	Bumper—Rubber bumper—Used under variable condenser bracket assembly—Package of 5	$0.25
4965	Cable—2-conductor shielded—Approximately 17 inches long—To speech control switch	.36
4244	Cap—Grid contact cap—Package of 5	.20
4955	Capacitor—Adjustable capacitor (C8)	.48
5021	Capacitor—80 mmfd. (C12)	.22
5078	Capacitor—265 mmfd. (C9, C30, C33, C38)	.24
3981	Capacitor—300 mmfd. (C34)	.30
4248	Capacitor—300 mmfd. (C18)	.22
5022	Capacitor—340 mmfd. (C37)	.20
4882	Capacitor—.01 mfd. (C21)	.20
4883	Capacitor—.01 mfd. (C19)	.20
4791	Capacitor—0.1 mfd. (C4, C16)	.24
4885	Capacitor—0.1 mfd. (C36)	.28
4792	Capacitor—.015 mfd. (C15)	.22
4967	Capacitor—.25 mfd. (C25)	.46
5019	Capacitor—.5 mfd. (C32)	.42
4960	Capacitor—.5 mfd. (C20)	.46
4961	Capacitor—8.0 mfd. (C27)	1.28
4964	Capacitor pack—Comprising two .02 mfd. capacitors (C28, C29)	1.02
5015	Capacitor pack—Comprising two .05 mfd. capacitors (C1, C5)	.26
4958	Capacitor pack—Comprising one 3. mfd., one 10. mfd. and one 4. mfd. capacitors (C22, C24, C26)	1.34
5020	Clamp—Metal clamp with screw—For antenna filter shielded cable—Package of 5	.14
4950	Coil—Antenna coil (L1, L2)	.74
4968	Coil—Choke coil (L12)	.14
4969	Coil—Choke coil (15 turns—approximately 23 inches—length) (L17)	.14
6967	Coil—Oscillator coil (L5, L6)	.52
6966	Coil—r-f coil (L3, L4)	.80
4948	Condenser—3-gang variable tuning condenser (C2, C3, C6, C7, C10, C11)	3.81
4954	Filter—Antenna filter (L18, C35, R25)	1.46
4972	Lead—Power lead with male section of connector—Chassis end	.20
7766	Lead—Power lead with clip and female section of fuse connector	.30
4966	Lead—Single connector dial lamp lead—With female section of connector—Chassis end	.30
4962	Reactor (L14)	.88
4963	Reactor (L13)	.38
5034	Resistor—56 ohms—Carbon type—½ watt (R15, R16)—Package of 5	1.00
5030	Resistor—470 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
5031	Resistor—680 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
5026	Resistor—680 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
5032	Resistor—3300 ohms—Carbon type—2 watts (R14)	.22
5033	Resistor — 33,000 ohms — Carbon type — 1 watt (R13)—Package of 5	1.10
5132	Resistor — 47,000 ohms — Carbon type — 1/10 watt (R7)—Package of 5	$0.75
5029	Resistor — 56,000 ohms — Carbon type — ¼ watt (R4)—Package of 5	1.00
3118	Resistor — 100,000 ohms — Carbon type — ¼ watt (R1)—Package of 5	1.00
5027	Resistor — 150,000 ohms — Carbon type — ¼ watt (R9)—Package of 5	1.00
5035	Resistor — 560,000 ohms — Carbon type — ¼ watt (R10)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R20)—Package of 5	1.00
5028	Resistor—1.8 megohm—Carbon type—¼ watt (R21)—Package of 5	1.00
5131	Resistor—2,200,000 ohms—Carbon type—1/10 watt (R3, R6)—Package of 5	.75
5129	Ring—Radiotron shield ring—Package of 5	.10
3584	Ring—Retaining ring for antenna, r-f, or oscillator coil—Package of 5	.40
3623	Shield—Antenna, r-f, or oscillator coil shield	.30
4953	Shield—First intermediate frequency transformer shield	.24
4956	Shield—Second intermediate frequency transformer shield	.30
5037	Shield—Radiotron shield	.15
4946	Socket—6-contact Radiotron socket	.18
4959	Socket—6-contact vibrator socket	.18
4947	Socket—7-contact Radiotron socket	.18
5001	Switch—Speech control switch (S2)	.66
4951	Transformer—First intermediate frequency transformer (L7, L8, C13, C14)	1.26
4952	Transformer—Second intermediate frequency transformer (L9, L10, C17)	1.76
4957	Transformer—Output transformer (T2)	1.18
7859	Transformer—Vibrator transformer (T1)	2.02
7857	Vibrator—Complete (L15)	5.64
5018	Volume control (R17, S1)	1.00
	CONTROL BOX ASSEMBLIES	
4987	Bezel—Station selector dial bezel	.42
G7866	Box—Control box—Complete	3.86
7864	Bracket—Mounting bracket and rear section of control box housing	.30
4988	Crystal—Station selector dial crystal	.38
G5083	Dial—Station selector dial	.20
4981	Gear—18-tooth intermediate drive gear	.15
4978	Gear—Indicator drive gear and shaft	.42
7862	Housing—Front section of control box housing	.28
7863	Housing—Center section of control box housing	.32
4990	Indicator—Station selector (pointer) indicator	.10
4985	Knob—Station selector or volume control knob—Package of 5	.62
4991	Lamp—Dial lamp—Package of 5	.74
7866	Plate—Bearing plate assembly—Comprising plate, gear and shaft, volume control shaft, station selector shaft, pinion and spring	1.22
4986	Screw—Oval fillister head machine screw—Fastens bracket and center section of control box housing	.25
5042	Screw—No. 8-32-⅛-inch headless set-screw for station selector or volume control shaft—Package of 10	$0.25
4983	Shaft—Station selector drive shaft	.16
4979	Shaft—Volume control drive shaft	.16
4984	Socket—Dial lamp socket	.16
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26
4980	Spring—Tension spring—Package of 5	.15
	FLEXIBLE SHAFT ASSEMBLIES	
5000	Bracket—Volume or tuning condenser flexible shaft bracket—Bracket mounted on housing	.30
4994	Nut—Knurled locking nut for condenser driv or volume control flexible shafts	.10
7854	Shaft—Tuning condenser—Flexible (steering column) drive shaft—31⅛ inches long	1.08
7856	Shaft—Volume control or tuning condenser—Flexible (dash mounting) drive shaft—9 5/16 inches long	.58
7855	Shaft—Volume control—Flexible (steering column) shaft—28⅛ inches long	1.00
	REPRODUCER ASSEMBLIES	
4970	Cable—3-conductor reproducer cable (M104)	1.02
5079	Cable—2-conductor shielded—With pin tips—for M108	.86
9602	Cone—Reproducer cone (L16)	.75
9576	Housing—Reproducer housing—Top cover of Receiver for M104	1.08
7873	Housing—Reproducer housing complete for M108	2.10
5133	Pin—Large and small contact pins for reproducer cable—Package of 10	.35
9577	Reproducer—Complete (L11, L16)	4.32
4995	Screw—Reproducer mounting screw—Package of 10	$0.15
4977	Socket—Reproducer cable pin socket	.18
	HOUSING ASSEMBLIES	
7868	Case — Receiver housing assembly — Complete (M104)	1.76
7869	Cover—Bottom cover of receiver housing assembly (M104 and M108)	.32
7870	Cover—Top cover of receiver housing assembly (Model M108)	.26
4999	Screw—No. 8-¼-inch slotted hex head self-tapping screw—Used to assemble housing—Package of 5	.12
	MISCELLANEOUS PARTS	
4287	Body—Antenna connector body—Package of 10	.40
4289	Body—Fuse connector body—Package of 10	.35
4288	Cap—Antenna or fuse connector cap—Package of 10	.36
4293	Capacitor—0.5 mfd. ammeter capacitor	.60
5025	Capacitor—0.5 mfd. generator capacitor	.40
6516	Connector—Fuse connector complete	.16
4973	Coupling—Tuning condenser shaft coupling	.30
4974	Coupling—Volume control shaft coupling	.36
4286	Ferrule—Antenna or fuse connector ferrule and bushing—Package of 10	.38
5023	Fuse—15-ampere—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4976	Lead—Antenna lead assembly	.16
4975	Lead—Dial lamp lead—Control box end	.38
3903	Screw—No. 8-32-3/16-inch headless set-screw for couplings—Package of 20	.36
4284	Spring—Antenna or fuse connector spring—Package of 10	.30
4992	Stud—Receiver mounting stud and nuts—Package of 3	.22
5024	Suppressor—Distributor suppressor	.38

MODEL M-109
Schematic

RCA MFG. CO., INC.

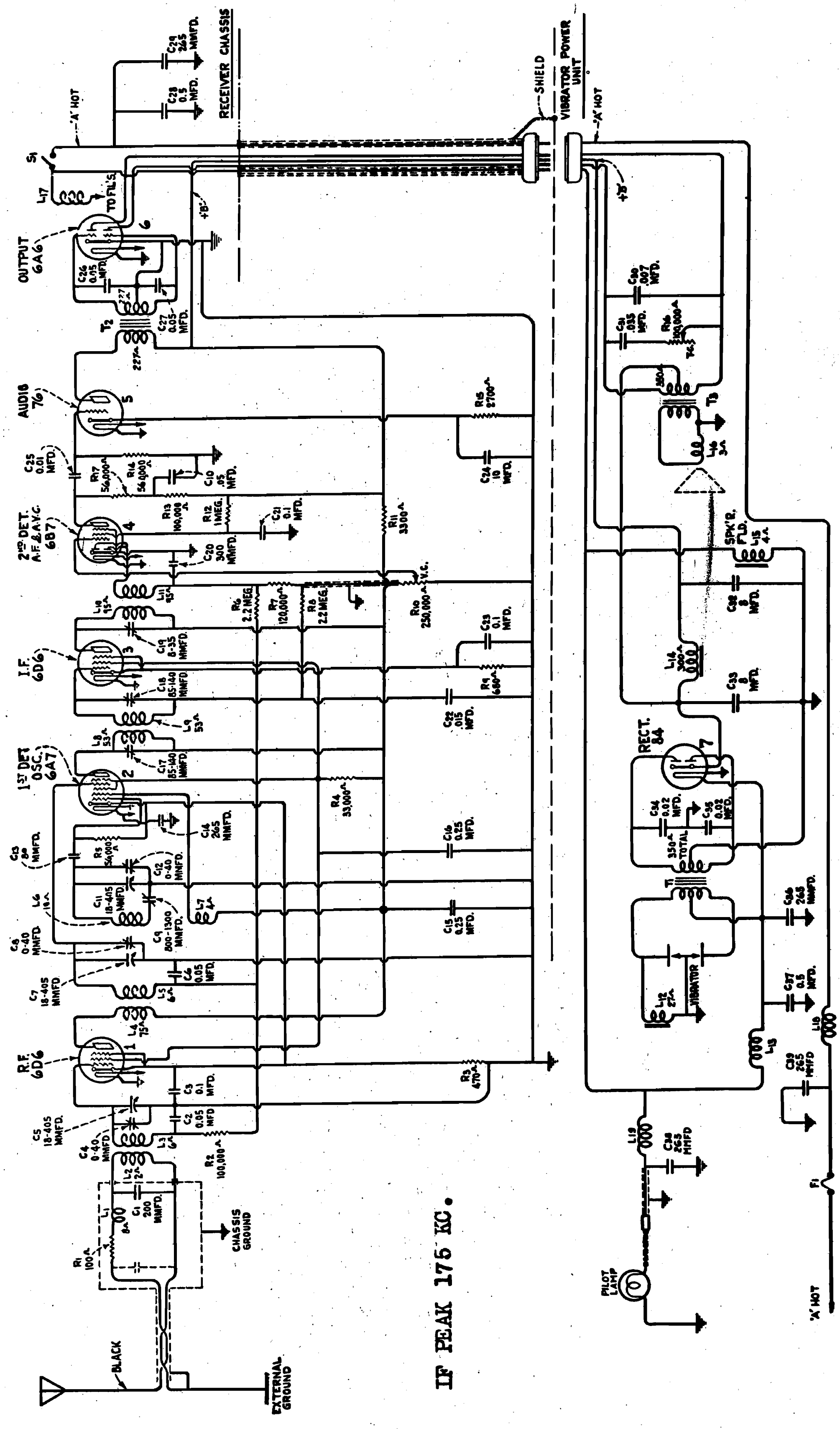


Figure 3—Schematic Circuit Diagram

MODEL M-109
Chassis Wiring

RCA MFG. CO., INC.

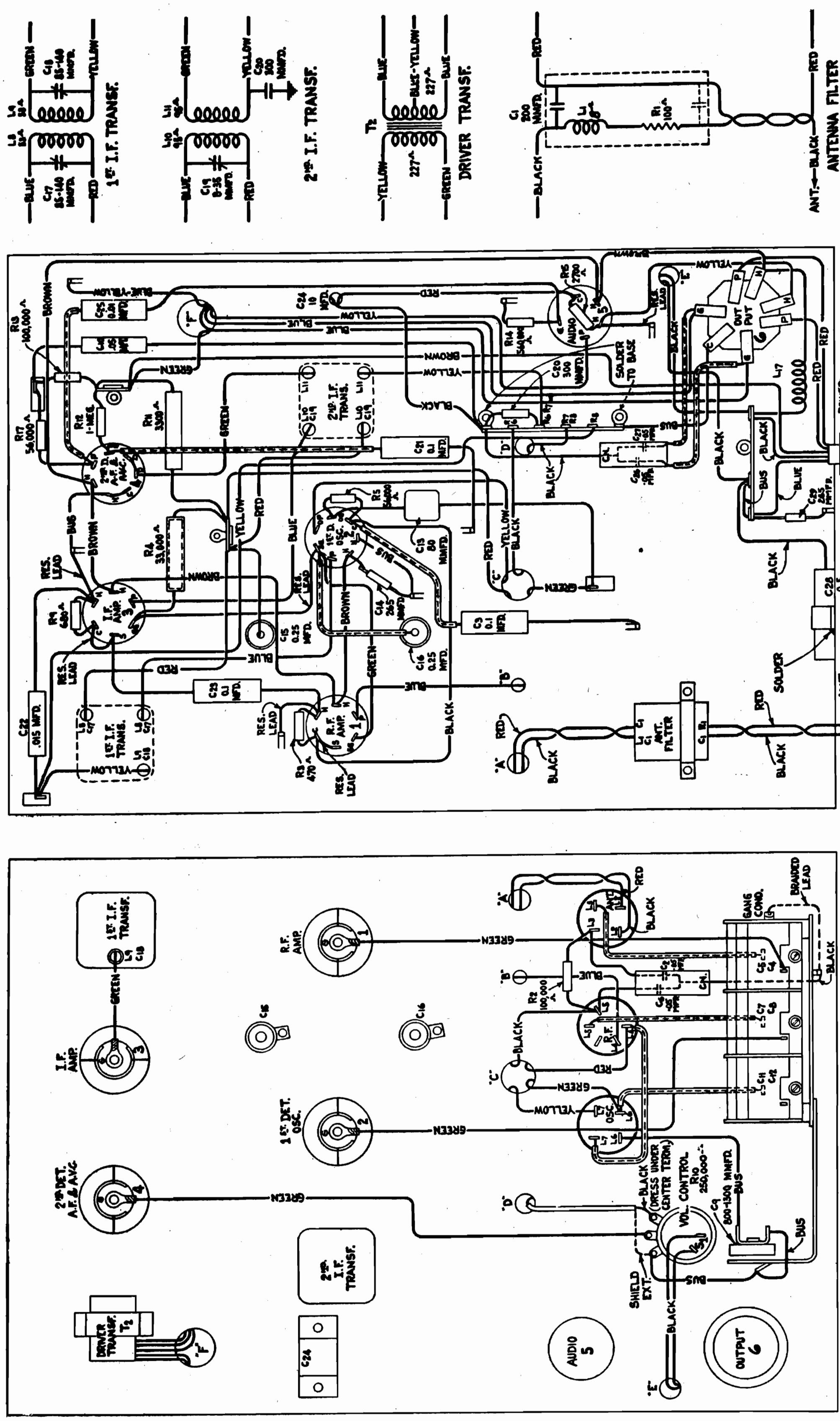


Figure 4—Chassis Wiring Diagram

Preparatory Details

(a) **Dial Calibration**—The tuning condenser flexible shaft engages a gear system within the control unit which actuates the dial pointer. To adjust the mechanical relations of the variable condenser and the dial pointer so that accurate calibration is obtained:—rotate the station selector knob until the variable capacitor is at full mesh, which will carry the dial pointer to its minimum frequency position; then remove the tuning knob, loosen the set screw in the bushing and rotate the bushing until the pointer sets exactly opposite the last radial line at the low-frequency end of the scale. (The line referred to is the second one counter-clockwise of the 550 kc. marking.)

(b) **General Procedure**—The "Output Indicator" should be attached to the voice coil or speaker input circuit; and for each adjustment, the oscillator output increased until a noticeable registration or glow occurs on the indicator. The signal from the oscillator should be held as low as possible consistent with getting a good indication, with the receiver volume control at its maximum position. This method of procedure prevents the automatic volume control from affecting the adjustments.

I-F Adjustments

Three trimmers are provided in the i-f system. Two are located on the first i-f transformer, and one on the second i-f transformer. Their physical positions are shown in Figure 5. To correct their alignment proceed as follows:

(a) Connect the output of the "Full Range Oscillator" to the first detector grid and ground, and adjust its frequency to 175 kc. Tune the station selector to a point where no signals are received.

(b) Tune each of the trimmer capacitors C19, C18 and C17 in order. C19 should be set for maximum (peak) output. C18 and C17 should be roughly adjusted for maximum output and then carefully "trimmed" so that a flat-topped response is obtained. This may be checked by shifting the external oscillator frequency through a range two kilocycles each side of the 175 kc. and noting whether or not the receiver output remains substantially constant.

R. F., Detector and Oscillator Adjustments

Three adjustments are used at the high-frequency end of the tuning range. They are located on the gang condenser as shown by the diagram of Figure 5. One trimmer (C9) is used in the oscillator circuit for alignment at 600 kc., it being located as shown in Figure 5.

The external oscillator should be connected to the antenna-ground input at the outer end of the lead-in shield through a 300-ohm resistor in the antenna side. Tuning should be done as follows:

(a) Adjust the frequency of the external oscillator to 1400 kc. and turn the station selector until the dial pointer is at the 1400 kc. marking.

(b) Tune the oscillator high-frequency trimmer, C12, the detector trimmer C8 and the r-f trimmer C4 for maximum receiver output.

(c) Set the external oscillator to a frequency of 600 kc. and rotate the station selector until this signal is accurately tuned. Then adjust the oscillator trimmer C9, simultaneously rocking the tuning condenser slowly through the signal until maximum obtainable output results from the two combined operations. This adjustment should be made irrespective of dial calibration.

(d) Recheck the adjustment of the 1400 kc. oscillator trimmer (C12) as in (b) to correct any reflective errors caused by the procedure of (c).

Tuning Condenser Drive

The coupling of the flexible drive shaft to the variable tuning condenser is through a worm-gear arrangement. Figure 6 shows the two gears and their positions. Smooth operation should be obtained over the entire tuning range. The presence of binding or backlash may cause irregularity in the tuning. To correct these conditions, it will be necessary to remove the chassis from the case and the following procedure applied:—Loosen the two screws behind the condenser drive gear which clamp the worm-gear support plate, and shift the plate upward or downward to change the degree of gear mesh and tension of the spring as required for smooth operation. The screws should then be carefully re-tightened.

Pilot Lamp

A novel type of mounting is provided for the pilot lamp. It consists of a miniature socket attached to a heavy screw which threads into the case of the control unit. The head of this screw is accessible from the underside of the control unit and may be removed with a large screwdriver whenever it becomes necessary to replace the pilot lamp. The power switch should be turned to "off" in order to prevent blowing the fuse if the lamp socket should come in contact with the grounded control case.

Power Unit Interrupter

The mechanical interrupter used in combination with a tube rectifier in the power unit is constructed so as to be conveniently exchanged. Its base is of the "plug-in" type. The adjustments of this device have been correctly set during manufacture by means of special equipment. They should therefore be left undisturbed. In cases of faulty operation, a renewal should be installed.

Speaker Cone Alignment

In the event the cone coil becomes mis-aligned, it will be necessary to correct its centering by an adjustment provided on the speaker assembly. The coil is supported by an external spider. Two round-head brass screws secure its mounting. To center the cone, loosen these two screws and insert a small rod or nail into the hole adjacent to one of these screws and pry the cone mounting into the position which gives normal operation.

Miscellaneous Service Hints

1. The grounding of the outer end of the antenna lead shield is quite critical in that ignition interference may be minimized by selecting the proper point of attachment to the car frame, determined by experiment for each individual installation.

2. In some cars, ignition interference may be introduced through lack of sufficient shielding on the antenna lead-in. In such cases, a shield should be placed over the exposed section of lead and carried as near to the antenna as possible. It should be solidly grounded.

MODEL M-109
Socket, Trimmers
Circuit Notes
Power Unit Wiring

RCA MFG. CO., INC.

DESCRIPTION OF ELECTRICAL CIRCUIT

The electrical arrangement of the receiver is shown in the schematic of Figure 3. A corresponding wiring layout is shown in Figure 4, where the actual physical relations and coding of conductors are given.

The tube line-up in the superheterodyne circuit consists of seven Radiotrons. In sequence, there is an r-f stage, a dual first detector and oscillator stage, a single i-f stage, a combined second detector-audio amplifier-a.v.c. stage, an audio driver stage, a push-pull power output stage, and a full-wave rectifier. There are five circuits which are tuned to the signal desired, to strengthen its magnitude and reject undesired signals and interference.

The following describes the functions of the various stages of the receiver: Beginning at the antenna circuit, there is a special transmission line and "noise filter" circuit, which, in conjunction with the tuned input system, acts selectively to the entire broadcast range and drastically attenuates signals and interference outside the limits of the band (540–1600 kc.). These properties of the filter circuit and minimizing of primary to secondary capacity coupling in first r-f transformer cause a very great reduction of the ignition noise present when the car is in operation. The ground of the input coil does not appear at the usual point on the chassis frame, but instead is extended as part of the antenna transmission line lead-in to the outer termination of the shield, where it grounds to the frame of the car. This arrangement prevents r-f disturbances which are circulating in the car frame (ground) from becoming mutual to the receiver input. The characteristics of the transmission line section of the antenna lead-in are such as to favor the operation of the noise filter. Its distributed capacitance due to length, conductor sizes, insulation, etc., is of such value as to operate with the inductance and capacitance elements of the input system to obtain a "band-pass" filtering effect. The filter has an acceptance band between 540 kc. and 1600 kc., and sharply defined cut-off below and above these two limits. It is generally possible, because of this input arrangement, to dispense with the usual spark-plug and distributor suppressors without encountering substantial ignition interference on latest types of cars.

After passing through the input filter the signal is applied by transformer action to the control grid of the r-f stage. An RCA-6D6 at this point performs the function of an r-f amplifier, its super-control property being adapted as means of preventing cross-modulation and securing a wide range of volume control. The first (front) section of the tuning condenser is connected to sharply tune the secondary of the antenna coupling transformer.

A second r-f coupling transformer transmits the signal to the following receiver stage, which comprises a combination first detector and local oscillator. The secondary inductance of this transformer is tuned by the second (center) section of the variable capacitor and connects to the detector grid of the RCA-6A7 Radiotron. The local oscillator circuit is established by mutual arrangement of the several elements within this tube. Here the incoming signal is mixed with the local oscillator frequency. The difference frequency beat (i. f.) of these two combined signals is detected by the tube and transferred by a closely coupled transformer to the intermediate-frequency amplifier tube, an RCA-6D6. Both windings of this i-f transformer are tuned by trimmers. The second i-f transformer which joins the RCA-6D6 to the second detector stage has only one trimmer, that being in shunt with its primary winding.

The RCA-6B7 second detector stage receives the i-f signal on its diode plates. Detection takes place as a result of the rectifying action of the diodes and develops a current through the resistors R7 and R10. The d-c voltage drop across the resistance R7 plus R10 is used for automatically regulating the control grid bias of the r-f and first detector stages. The amplification thus becomes dependent upon the signal strength. This process (a.v.c.) compensates for fading signals and tendency toward reduction of signals due to change of antenna direction and shielding effect of buildings, etc. A smaller portion of the d-c voltage obtained by detection is tapped from the juncture of R7 and R10 and is carried to the control grid of the i-f stage. This likewise furnishes automatic volume control, but in a smaller degree.

The audio and d-c components of the detected signal are selected from the resistor R10 by its movable arm and applied to the control grid of the RCA-6B7. The d-c obtained from the signal and applied to the grid prevents overload as the volume control is advanced. Amplification results and the signal passes on to the audio-driver stage. The RCA-76 Radiotron used as an a-f amplifier is resistance-capacitance coupled to the detector stage output. Its plate is matched to the power output stage by a transformer.

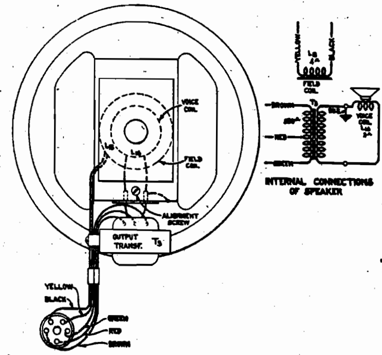


Figure 1—Loudspeaker Wiring

The output stage utilizes an RCA-6A6 tube which performs as a push-pull type. It delivers a high level-high quality signal to the remote loudspeaker unit.

The power supply system consists of a mechanical vibrator for interrupting the d-c from the battery in order to transform the current to high voltage, which in turn is rectified by a full-wave tube, an RCA-84. The vibrator used is adapted for convenient removability by having its base constructed for "plug-in" mounting.

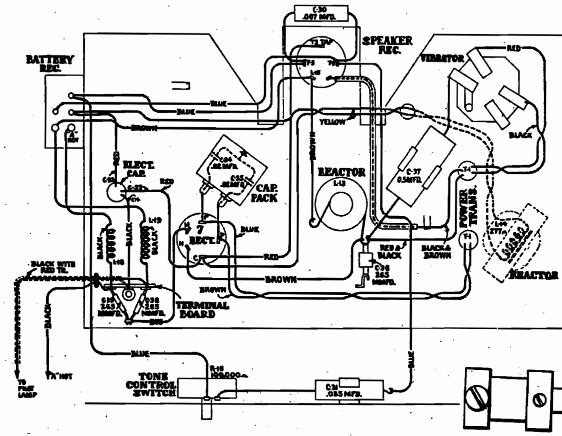
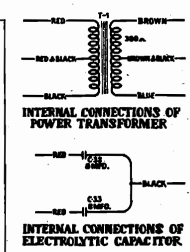


Figure 2—Power Unit Wiring



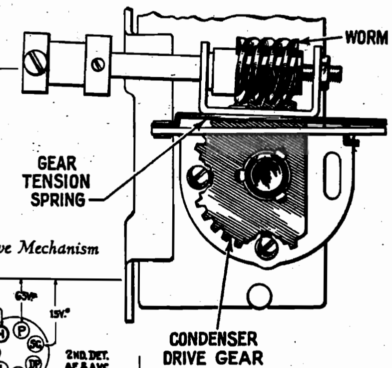


Figure 6—Condenser Drive Mechanism

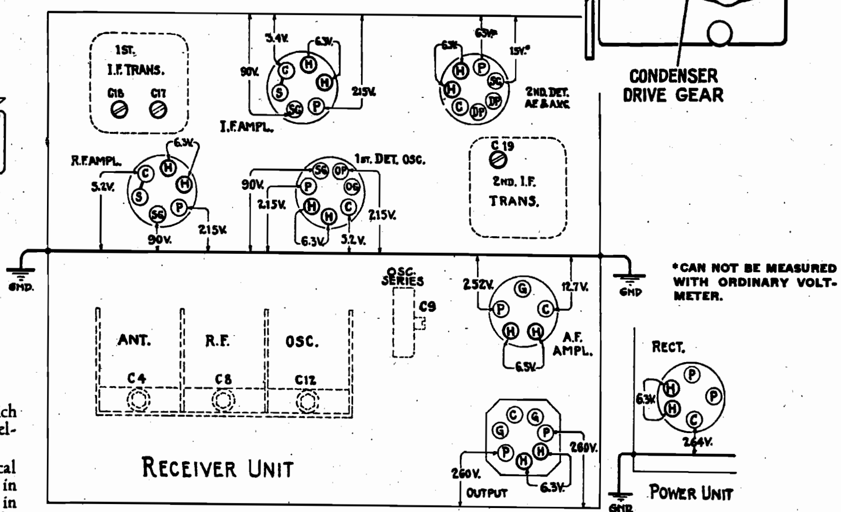


Figure 5—Trimmer Locations and Radiotron Socket Voltages to Ground (Measured at 6.6 volts battery—Volume Control Maximum—No Signal)

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4993	Bumper — Rubber bumper for condenser mounting bracket—Package of 5	$0.25
4955	Capacitor — Adjustable trimmer capacitor (C9)	.48
4246	Capacitor—80 mmfd. (C13)	.24
5078	Capacitor—200 mmfd. (C14, C29)	.24
4248	Capacitor—300 mmfd. (C20)	.22
4792	Capacitor—0.015 mfd. (C22)	.22
4882	Capacitor—0.01 mfd. (C25)	.20
4886	Capacitor—0.05 mfd. (C10)	.20
4885	Capacitor—0.1 mfd. (C21)	.28
4841	Capacitor—0.1 mfd. (C3, C23)	.22
4967	Capacitor—0.25 mfd. (C15, C16)	.46
4011	Capacitor—0.5 mfd. generator capacitor	.60
5054	Capacitor—10 mfd. (C24)	1.80
4243	Capacitor pack—Comprising two 0.05 mfd. capacitors (C2, C6, C26, C27)	.35
5074	Clamp—Radiotron shield clamp	.14
4950	Coil—Antenna coil (L3, L4)	.74
5142	Coil—Choke coil (L17)	.15
6967	Coil—Oscillator coil (L6, L7)	.52
6966	Coil—R.F. coil (L4, L5)	.80
5061	Condenser—3-gang variable tuning condenser (C4, C5, C7, C8, C11, C12)	3.68
5018	Volume control (R10)	1.00
5163	Filter—Antenna filter (R1, C1, L1)	1.45
5062	Gear—Condenser drive gear—Located on condenser drive shaft	.12
5030	Resistor—Carbon type—¼ watt—470 ohms (R3)—Package of 5	1.00
5031	Resistor—680 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
5144	Resistor — 2700 ohms — Carbon type — ¼ watt (R15)—Package of 5	1.00
5147	Resistor — 3300 ohms — Carbon type — 1 watt (R11)	.22
5033	Resistor — 33,000 ohms — Carbon type — 1 watt (R4)—Package of 5	1.10
5029	Resistor—56,000 ohms—Carbon type—¼ watt (R5, R17)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2, R13)—Package of 5	1.00
5035	Resistor—560,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R12)—Package of 5	1.00
3584	Ring—Antenna, r-f, or oscillator coil retaining ring—Package of 5	$0.40
5129	Ring—Radiotron shield ring—Package of 5	.10
4953	Shield—First intermediate frequency transformer shield	.24
4956	Shield—Second intermediate frequency transformer shield	.30
5037	Shield—Radiotron shield	.15
5058	Socket—5-contact Radiotron socket	.18
4946	Socket—6-contact Radiotron socket	.18
4947	Socket—7-contact Radiotron socket	.18
5060	Socket—7-prong Radiotron output socket	.20
5064	Stud—Variable condenser bracket mounting assembly—Comprising one stud, one bushing, one washer and one lockwasher	.12
5057	Transformer—Driver transformer (T2)	1.00
5055	Transformer—First intermediate frequency transformer (L8, L9, C17, C18)	1.32
5056	Transformer—Second intermediate frequency transformer (L10, L11, C19)	1.42
5063	Worm—Condenser drive worm gear	.54
	POWER UNIT ASSEMBLIES	
5078	Capacitor—200 mmfd. (C36, C38, C39)	.24
5148	Capacitor—0.007 mfd. (C30)	.20
5073	Capacitor—0.035 mfd. high-frequency tone control capacitor (C31)	.44
4490	Capacitor—0.5 mfd. (C37)	.62
5070	Capacitor pack—Comprising two 0.02 mfd. capacitors (C34, C35)	.74
5069	Capacitor pack—Comprising two 8 mfd. capacitors (C32, C33)	1.76
5075	Clamp—Mounting clamp for capacitor—Stock No. 4490	.08
5068	Cup—Grounding cup	.10
4693	Clamp—Mounting clamp for capacitor—Stock No. 5069	.15
5143	Coil—Choke coil (L18, L19)	.15
5072	Tone control (R16)	.82
4085	Knob—Tone control knob—Package of 5	.60
7778	Reactor—Filter reactor (L13)	.45
5066	Reactor—Filter reactor (L14)	.88
5071	Receptacle—Power cable plug female receptacle—5-contact—Female section	.20
6980	Socket—4-contact vibrator socket	.20
5058	Socket—5-contact Radiotron socket or reproducer plug receptacle	$0.18
5065	Transformer—Power transformer (T1)	2.48
5067	Vibrator—Complete (L12)	3.66
	CABLE ASSEMBLIES	
4976	Cable—Antenna lead assembly—Single-conductor with male section of antenna connector	.16
7766	Cable—Power lead with clip and female section of fuse connector—To ammeter	.30
5059	Cable—Main power cable—Complete—With male section of connector plug, fuse connector and fuse, ammeter clip and female section of pilot light cable connector	1.50
5150	Cap—Cap for power cable plug	.22
5149	Plug—Power cable plug—Less cap	.20
	FLEXIBLE SHAFT ASSEMBLIES	
5000	Bracket—Flexible drive shaft connection bracket—Mounted on housing	.30
4973	Coupling—Tuning condenser flexible drive shaft coupling	.30
5141	Coupling—Volume control flexible drive shaft coupling	.36
3903	Screw—No. 8-32-⅛" headless set screw for flexible drive shaft coupling—Package of 20	.36
7855	Shaft—Tuning condenser or volume control flexible drive shaft—Approximately 28¾" long	1.00
	CONTROL BOX ASSEMBLIES	
4987	Bezel—Station selector dial bezel	.42
7865	Box—Control box—Complete	3.86
7864	Bracket—Mounting bracket and rear section of control box housing	.30
4988	Crystal—Station selector dial crystal	.38
4989	Dial—Station selector dial	.20
4981	Gear—18-tooth intermediate drive gear	.15
4978	Gear—Indicator drive gear and shaft	.42
7862	Housing—Front section of control box housing	.28
7863	Housing—Center section of control box housing	.32
4990	Indicator—Station selector (pointer) indicator	.10
4985	Knob—Station selector or volume control knob—Package of 5	.62
4991	Lamp—Dial lamp—Package of 5	$0.74
7866	Plate—Bearing plate assembly—Comprising plate, gear and shaft, volume control shaft, station selector shaft, pinion and spring	1.22
4986	Screw—Oval fillister head machine screw—Fastens bracket and center section of control box housing	.25
5042	Screw—No. 8-32-¼" headless set screw for station selector or volume control shaft—Package of 10	.25
4983	Shaft—Station selector drive shaft	.16
4979	Shaft—Volume control drive shaft	.16
4984	Socket—Dial lamp socket	.16
4982	Spring—Holding spring for station selector or volume control knob—Package of 10	.26
4980	Spring—Tension spring—Package of 5	.15
5011	Strap—Control box mounting strap	.25
	REPRODUCER ASSEMBLIES	
9597	Coil—Field coil (L15)	2.62
9598	Cone—Reproducer cone (L16)—Package of 5	3.90
9596	Reproducer—Complete	8.00
4995	Screw—Reproducer mounting screw—Package of 10	.15
5090	Transformer—Output transformer (T3)	2.62
	MISCELLANEOUS ASSEMBLIES	
4244	Cap—Grid contact cap—Package of 5	.20
4293	Capacitor—0.5 mfd. ammeter capacitor	.60
5025	Capacitor—0.5 mfd. generator capacitor	.40
7871	Case—Complete—With top and bottom cover—Less screws	3.28
7952	Cover—Bottom cover of receiver case—Less screws	.35
7953	Cover—Top cover of receiving case—Less screws	.35
5023	Fuse—15-ampere—Package of 5	.40
4985	Knob—Package of 5	.62
4999	Screw—No. 8-¼" slotted hex-head self-tapping screw—Package of 5	.12
5037	Shield—Radiotron shield	.15
4992	Stud—Receiver mounting stud, nut and washer—Package of 3	.22
5024	Suppressor—Distributor suppressor	.38
5067	Vibrator—Complete	3.66

MODELS 117,214
Circuit Notes

RCA MFG. CO., INC.

Loud Speaker Data
Voltage,Trimmers
Socket

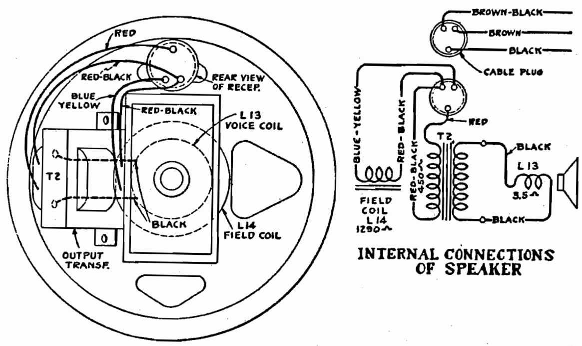


Figure 3—Loudspeaker Wiring (Table Model)

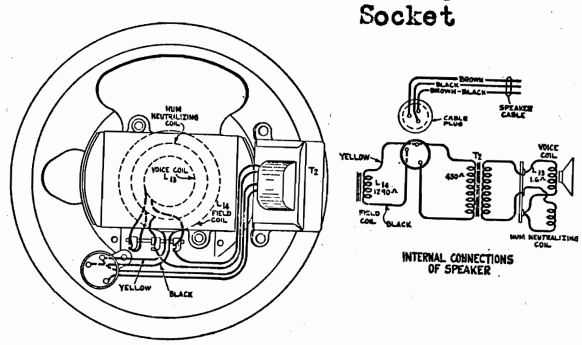


Figure 4—Loudspeaker Wiring (Console Model)

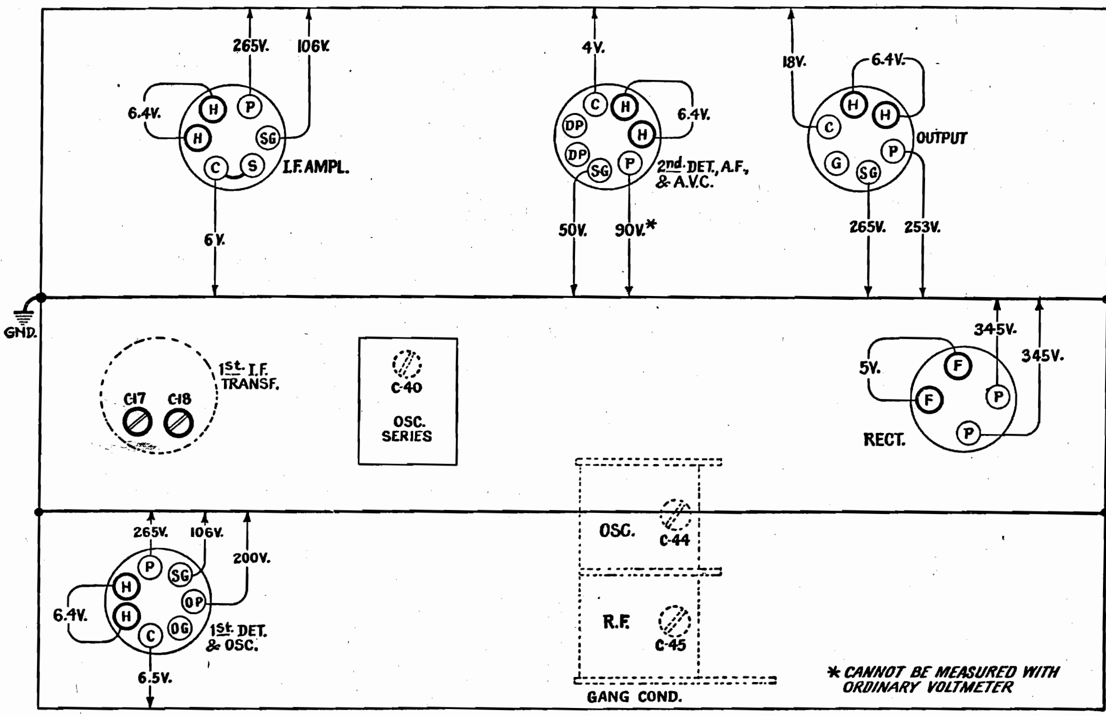


Figure 5—Trimmer Locations and Radiotron Socket Voltages
(Measured at 115 volts line supply—Maximum Volume Control—No Signal)

Five Radiotrons are associated in combination with a Superheterodyne circuit. Two of the Radiotrons are applied so as to obtain plural functions, thereby gaining more than the adequate results normally expected of a five-tube receiver. In the first stage of the circuit an RCA-6A7 pentagrid converter tube is employed as detector and local oscillator, the related external high-frequency circuits consisting of a tuned antenna transformer with a short-wave tap, and a three-winding oscillator coil assembly with changeover switches ganged to the antenna transformer s-w switch. Within the first detector tube, mixing of the signal and oscillator voltages is accomplished through electron coupling, the i-f appearing in the plate circuit.

The i-f system operates at 460 kc. as the basic frequency. The presence of the natural period transformer at the i-f output should be especially noted. Its use minimizes the number of line-up adjustments.

The combined second detector-audio amplifier-a.v.c. stage utilizes an RCA-6B7, a duplex-diode pentode Radiotron. One diode connects directly to ground, the other is used for detection. Part of the detected signal is filtered to remove the audible fluctuations and is applied to the first and second stages as a means of providing automatic volume control. The audio component of the detected signal is amplified by the RCA-6B7 and conveyed to a resistance-capacitance coupling network.

A power amplifier pentode, RCA-41, is used in the output stage and is coupled by a transformer to the low impedance voice coil of the speaker.

Full-wave rectification is employed in the power-supply stage. The speaker field winding serves in the filter circuit as a reactor.

MODELS 117,214
Schematic

RCA MFG. CO., INC.

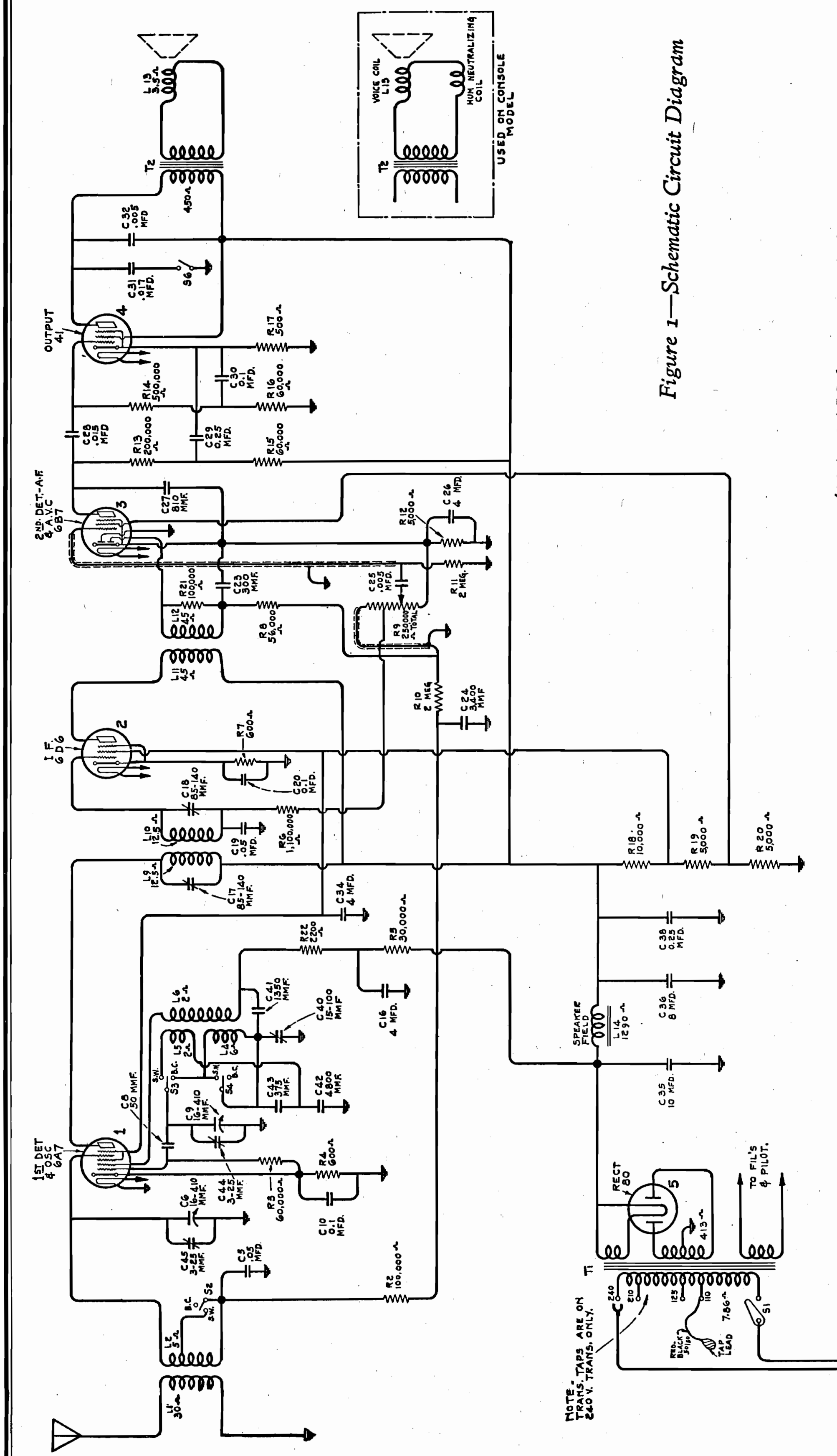


Figure 1—Schematic Circuit Diagram

Voltage and Frequency Ratings.............. 105–125 Volts, 50–60 Cycles
105–125 Volts, 25–60 Cycles
105–125/195–250 Volts, 50–60 Cycles

Power Consumption..............................80 Watts

Tuning Frequency Ranges..............540 to 1720 KC. and 2250 to 6850 KC.

Alignment Frequencies........460 KC. (I.F.), 1720 KC. (R.F. and Oscillator) and 600 KC. (Oscillator)

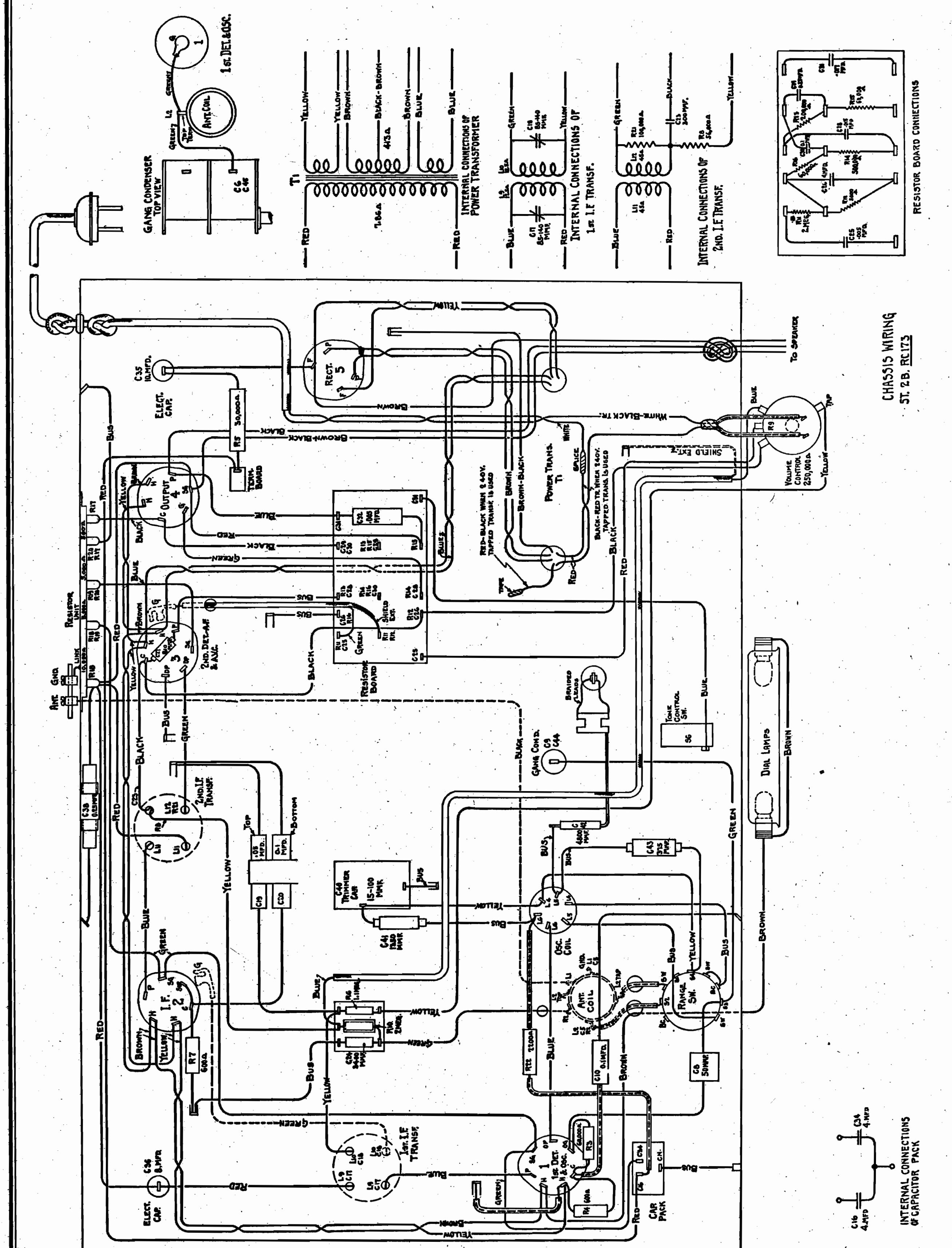
Undistorted Output.............................1.75 Watts

Maximum Output................................3.5 Watts

Loudspeaker...................................Electrodynamic

MODELS 117,214
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

(1) Line-Up Capacitor Adjustments

This receiver must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be realigned after each major service or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of: low sensitivity, poor tone quality and irregular double-peaked tuning.

A definite procedure must be applied in readjusting the line-up trimmers. The proper oscillator and indication equipment must also be used. Certain standard service instruments, which are useful for receiver adjustment, have been designed and made available by the manufacturer of this receiver. These are illustrated and described on page 2.

(2) I-F Tuning Adjustments

There are two i-f transformers associated in the intermediate amplifier system. The first of these transformers is tuned by accessible trimmers. The second transformer has a natural tuning inherent to its design. To obtain the correct alignment, proceed as follows:

(a) Short circuit the antenna and ground terminals and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.

(b) Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated on page 2, to the speaker circuit.

(c) Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment; this requirement is important in that the a.v.c. action is voided by such a method. Adjust the secondary and primary trimmers (C18 and C17) of the first i-f transformer for maximum receiver output.

R-F and Oscillator Adjustments

Three trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the short-wave bands. Locations of the trimmers are shown on Figure 5. They should be adjusted in the following manner:

(a) Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer. It should set exactly on the radial line, adjacent to the dial reading of 540 when the tuning capacitor plates are at full mesh. After correcting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.

(b) Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output indicator. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.

(c) Retune the test oscillator, setting its frequency to 600 kc. Turn the receiver selector control to the point where the incoming oscillator signal is received best. *This point will not always be exactly at 600 on the dial.* Then adjust the low-frequency trimmer C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44 in order to correct for any change caused by the tuning of C40.

Radiotron Socket Voltages

The various normal operating voltages are given on Figure 5. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt, and for each reading use the highest range which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.

Code Interference

In certain localities near to high-powered radio-telegraph stations operating at frequencies in the vicinity of 460 kc., slight code interference may be present. This adverse condition usually occurs over the entire tuning range, the strength of the interference not being affected by changing the station selector. A shielded wave trap, such as Part No. 4539, is adaptable for suppressing interference of this type. It should be connected in series with the antenna lead at the receiver, with its *green* lead to the antenna, and its *yellow* lead to the antenna terminal. The trap must be accurately tuned to the interfering signal. The shield of the trap should be securely grounded to the receiver chassis.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4379	Board—Terminal board—Engraved "ANT-GND"	$0.20
5043	Bracket—First I.F. transformer mounting bracket	.10
4880	Bracket—Tone control switch mounting bracket	.12
4427	Bracket—Volume control mounting bracket	.18
4244	Cap—Grid contact cap—Package of 5	.20
3861	Capacitor—Adjustable capacitor (C40)	.78
4442	Capacitor—50 mmfd. (C8)	.22
4913	Capacitor—375 mmfd. (C43)	.20
5044	Capacitor—810 mmfd. (C27)	.20
4914	Capacitor—1350 mmfd. (C41)	.24
4881	Capacitor—3400 mmfd. (C24)	.20
4912	Capacitor—4800 mmfd. (C42)	.38
4793	Capacitor—0.005 mfd. (C25)	.20
4868	Capacitor—0.005 mfd. (C32)	.20
4792	Capacitor—0.015 mfd. (C28)	.22
4906	Capacitor—0.017 mfd. (C31)	.25
4836	Capacitor—0.05 mfd. (C5, C19)	.30
4791	Capacitor—0.1 mfd. (C10, C20)	.24
4841	Capacitor—0.1 mfd. (C30)	.22
3597	Capacitor—0.25 mfd. (C29, C38)	.40
3796	Capacitor—4.0 mfd. (C26)	.60
4428	Capacitor—8.0 mfd. (C36)	1.05
7790	Capacitor—10.0 mfd. (C35)	1.05
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64
4358	Clamp — Capacitor mounting clamp for capacitors—Stock Nos. 7790 and 4428	.15
4903	Coil—Antenna coil (L1, L2, R2, C5)	1.58
4902	Coil—Oscillator coil (L4, L5, L6)	1.22
4896	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45)	3.48
4790	Volume control (R9, S1)	1.40
5045	Lead—Single conductor—Shielded lead from volume control to resistor (R10)	.20
3218	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5	1.00
5185	Resistor — 2200 ohms — Carbon type — ½ watt (R22)—Package of 5	1.00
4436	Resistor — 5000 ohms — Carbon type — ¼ watt (R12)—Package of 10	2.00
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R5)	.22
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3, R15, R16)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
4783	Resistor — 1,100,000 ohms — Carbon type —¼ watt (R6)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R10, R11)—Package of 5	1.00
4721	Resistor — Tapped resistor — one 10,000 ohms, two 5,000 ohms and one 500 ohms sections (R17, R18, R19, R20)	.88
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
5049	Screw—First I.F. transformer clamp screw—No. 6-32-7/16" set screw—Package of 5	.10
4908	Shield—Second I.F. transformer shield	.45
5186	Shield—First I.F. transformer shield	.28
3623	Shield—Oscillator coil shield	.30
3782	Shield—Second detector Radiotron shield	.26
3942	Shield—First Detector and output Radiotron shield	.18

Stock No.	Description	List Price
7487	Shield—I.F. Radiotron shield	$0.25
3858	Socket—Dial lamp socket assembly	.26
4784	Socket—4-contact Radiotron socket	.15
4785	Socket—6-contact Radiotron socket	.15
4786	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
4904	Switch—Range switch (S2, S3, S4)	.75
5052	Switch—Tone control switch (S6)	.30
4900	Transformer—First intermediate frequency transformer (L9, L10, C17, C18)	2.25
4901	Transformer—Second intermediate frequency transformer (L11, L12, R8, R21, C23)	1.50
4898	Transformer—Power transformer—105-125 volts—25-50 cycles	5.55
4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	3.98
4899	Transformer—Power transformer—105-125 200-240 volts—40-60 cycles	4.05
	CONDENSER DRIVE ASSEMBLIES	
5048	Dial—Station selector dial	.38
5046	Drive—Tuning condenser drive assembly—Complete	1.04
4475	Indicator—Station selector (indicator) pointer	.18
4340	Lamp—Station selector dial lamp—Package of 5	.60
3943	Screen—Translucent screen for dial light—Package of 2	.18
5047	Shaft—Condenser drive shaft	.22
3858	Socket—Station selector dial lamp socket	.26
	REPRODUCER ASSEMBLIES (CONSOLE MODEL)	
9579	Coil—Field coil (L14)	2.10
9533	Cone—Reproducer cone—Mounted and centered on metal housing (L13)	3.50
5118	Connector—3-contact male connector plug for reproducer	.25
5119	Connector—3-contact female connector plug for reproducer cable	.25
9578	Reproducer—Complete	6.58
4818	Transformer—Output transformer (T2)	2.15
	REPRODUCER ASSEMBLIES (TABLE MODEL)	
4915	Cable—3-conductor reproducer cable	.50
9587	Coil—Field coil, magnet and cone support (L14)	2.18
9588	Cone—Reproducer cone (L13)—Package of 5	3.55
5118	Connector—3-contact male connector plug for reproducer	.25
5119	Connector—3-contact female connector plug for reproducer cable	.25
9586	Reproducer—Complete	5.95
4893	Transformer—Output transformer (T2)	1.48
	MISCELLANEOUS ASSEMBLIES	
6755	Bezel—Metal bezel for station selector dial glass	.50
6707	Glass—Station selector dial glass	.20
4449	Knob—Package of 5	.60
6708	Ring—Retaining ring for dial glass—Package of 5	.44
4917	Screw—Chassis mounting screw and washer (for table model)—Package of 4	.15
5178	Screw—Chassis mounting screw assembly (for console model)—Package of 4	.15

MODELS 118,211
1935 Production
Parts List

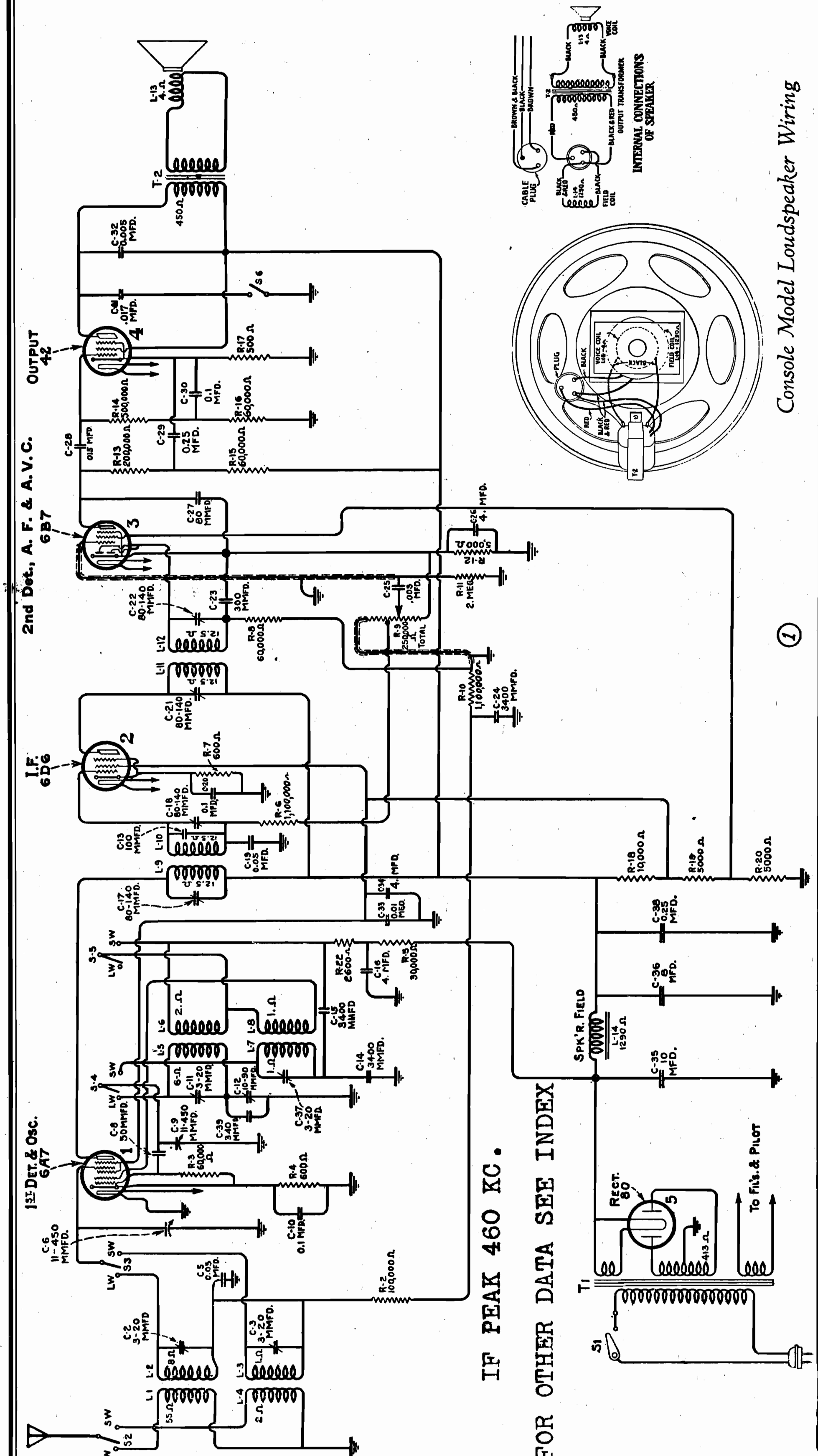
RCA MFG. CO., INC.

REPLACEMENT PARTS—Models 118 and 211 (1935 Production)

Stock No.	Description	List Price	Stock No.	Description	List Price
	RECEIVER ASSEMBLIES		4433	Transformer—Second intermediate frequency transformer (L11, L12, C21, C22, C23, R8)	$2.15
4379	Board—Terminal board—Two terminals and link—Engraved "ANT-GND"	$0.20	9512	Transformer—Power transformer—105-125 volts—25-40 cycles	6.58
4880	Bracket—Tone control mounting bracket	.12	9513	Transformer—Power transformer—105-250 volts—40-60 cycles	4.85
4427	Bracket—Volume control mounting bracket	.18	9511	Transformer—Power transformer—105-125 volts—50-60 cycles	4.78
4244	Cap—Grid contact cap	.20	4429	Volume control (R9, S1)	1.40
3861	Capacitor — Adjustable capacitor — 10-100 mmfd. (C12)	.78		DRIVE ASSEMBLIES	
4793	Capacitor—0.005 mfd. (C25)	.20	10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
4868	Capacitor—0.005 mfd. (C32)	.20	4422	Clutch—Condenser drive clutch assembly complete	1.00
4883	Capacitor—0.01 mfd. (C33)	.20	4474	Dial—Station selector dial (table model)	.76
4792	Capacitor—0.015 mfd. (C28)	.22	4450	Dial—Station selector dial (console model)	.52
4752	Capacitor—0.017 mfd. (C31)	.26	4434	Drive—Tuning condenser drive assembly	2.42
4836	Capacitor—0.05 mfd. (C5, C19)	.30	4340	Lamp—Dial lamp—Package of 5	.60
4442	Capacitor—50 mmfd. (C8)	.22	4363	Pointer—Station selector pointer (console model)	.18
4509	Capacitor—80 mmfd. (C27)	.15	4475	Pointer—Station selector pointer (table model)	.18
4791	Capacitor—0.1 mfd. (C10, C20, C30)	.24	3943	Screen—Translucent screen for dial lamps—Package of 2	.18
3597	Capacitor—0.25 mfd. (C29, C38)	.40	3529	Socket—Dial lamp socket	.32
4811	Capacitor—340 mmfd. (C39)	.25		REPRODUCER ASSEMBLIES (TABLE MODEL)	
4439	Capacitor—3400 mmfd. (C14)	.35	4915	Cable—3-conductor reproducer cable—Complete with 3-contact female connector plug	.50
4881	Capacitor—3400 mmfd. (C15, C24)	.20	9587	Coil—Field coil magnet and cone support (L14)	2.18
3796	Capacitor—4.0 mfd. (C26)	.60	9588	Cone—Reproducer cone (L13)—Package of 5	3.55
4428	Capacitor—8.0 mfd. (C36)	1.05	5118	Connector—3-contact male connector plug for reproducer	.25
7790	Capacitor—10.0 mfd. (C35)	1.05	5119	Connector—3-contact female connector plug for reproducer cable	.25
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64	9586	Reproducer—Complete	5.95
4358	Clamp — Electrolytic capacitor mounting clamp	.15	4893	Transformer—Output transformer (T2)	1.48
5087	Coil—Antenna coil (L1, L2, L3, L4, C2, C3)	1.86		REPRODUCER ASSEMBLIES (CONSOLE MODEL)	
5089	Coil—Oscillator coil (L5, L6, L7, L8, C11, C37)	1.90	9590	Coil—Field coil magnet and cone support (L14)	4.20
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78	8935	Cone—Reproducer cone (L13)—Package of 5	5.25
4788	Insulator—Radiotron socket insulator—Package of 5	.20	9589	Reproducer—Complete	8.20
3708	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5	1.00	4892	Transformer—Output transformer (T2)	1.30
4812	Resistor — 2600 ohms — Carbon type — ¼ watt (R22)—Package of 5	1.00		MISCELLANEOUS ASSEMBLIES	
4436	Resistor — 5000 ohms — Carbon type — ¼ watt (R12)—Package of 10	2.00	6840	Escutcheon—Station selector escutcheon—Console model	.56
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R5)	.22	6706	Escutcheon—Station selector escutcheon—Table model	.42
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3, R8, R15, R16)—Package of 5	1.00	6614	Glass—Station selector dial glass—Console model	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00	6707	Glass—Station selector dial glass—Table model	.20
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00	4449	Knob—Station selector, range switch, tone control switch or volume control knob—Package of 5	.60
6185	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00	6615	Ring—Spring retaining ring for dial glass—Console model—Package of 5	.34
4783	Resistor—1,100,000 ohms—Carbon type—¼ watt (R6, R10)—Package of 5	1.00	6708	Ring—Spring retaining ring for dial glass—Table model—Package of 5	.44
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11)—Package of 5	1.00	4685	Screw—Chassis mounting screw assembly—Comprising four screws, four spacers, four lockwashers, four washers and eight cushions (for console model)	.40
4721	Resistor—Tapped resistor—One 10,000 ohm, two 5,000 ohm and one 500 ohm section (R17, R18, R19, R20)	.88	4446	Screw—Chassis mounting screw assembly—Comprising four screws, four spacers, four lockwashers, four washers and eight cushions (for table model)	.28
4521	Shield—Antenna, r-f or oscillator coil shield	.42			
3942	Shield—First detector-oscillator Radiotron shield	.18			
7487	Shield—I.F. Radiotron shield	.25			
3782	Shield—Second detector Radiotron shield	.26			
4784	Socket—4-contact Radiotron socket	.15			
4785	Socket—6-contact output Radiotron socket	.15			
4786	Socket—6-contact i-f Radiotron socket	.15			
4787	Socket—7-contact Radiotron socket	.15			
5088	Switch—Range switch (S2, S3, S4, S5, SW, LW)	1.35			
5052	Switch—Tone control switch (S6)	.30			
4431	Transformer—First intermediate frequency transformer (L9, L10, C13, C17, C18)	2.28			

MODELS 118,211
1935 Production
Schematic, Voltage
Speaker Wiring

RCA MFG. CO., INC.



IF PEAK 460 KC.

FOR OTHER DATA SEE INDEX

Console Model Loudspeaker Wiring

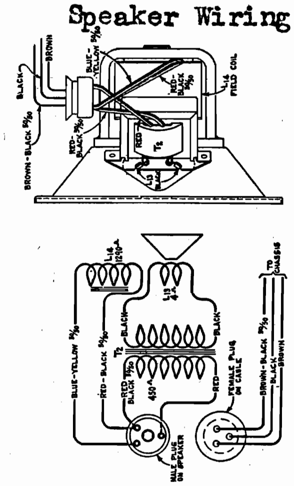
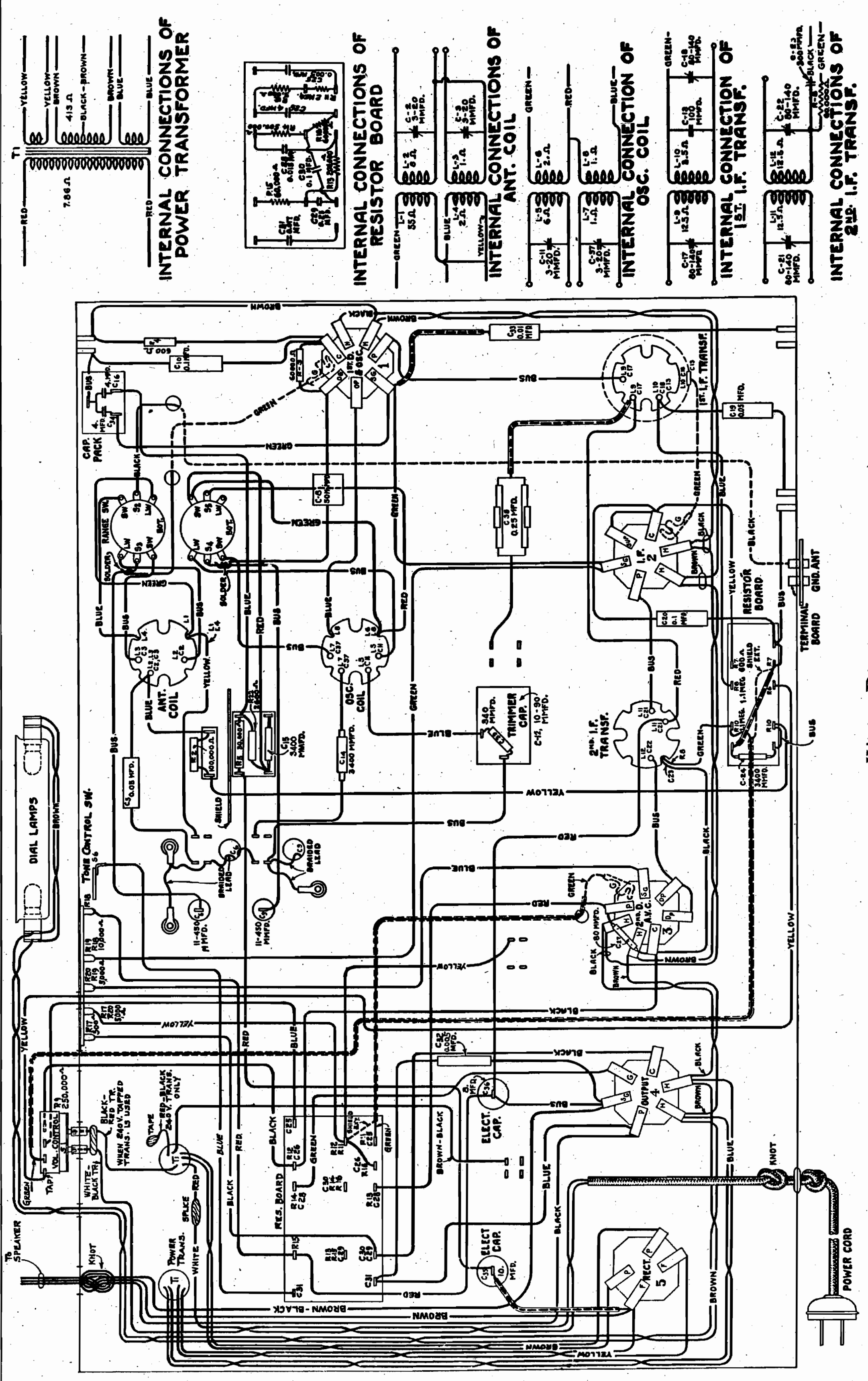


Table Model Loudspeaker Wiring

Radiotron		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6A7	Detector	6.0	105	265	3.5	6.3
	Oscillator		—	220	4.5	
RCA-6D6 I. F.		6.0	105	265	9.0	6.3
RCA-6B7 2nd Det.		3.0	50*	90*	0.7	6.3
RCA-42 Power		16.5	265	245	30.0	6.3
RCA-80 Rectifier		—	—	690 (Plate to Plate)	64.0	5.0

MODELS 118,211
Chassis Wiring

RCA MFG. CO., INC.



Wiring Diagram
Model 118 and Model 211 (1935 Production)

Recently manufactured receivers of Models 118 and 211 contain a number of modifications in circuit and assembly. These changes appear in the following data and on the schematic and wiring diagrams. The major items affected are the speaker cable connection, type of Radiotron in output stage, band switch and voltage divider system.

MODEL 119
Schematic

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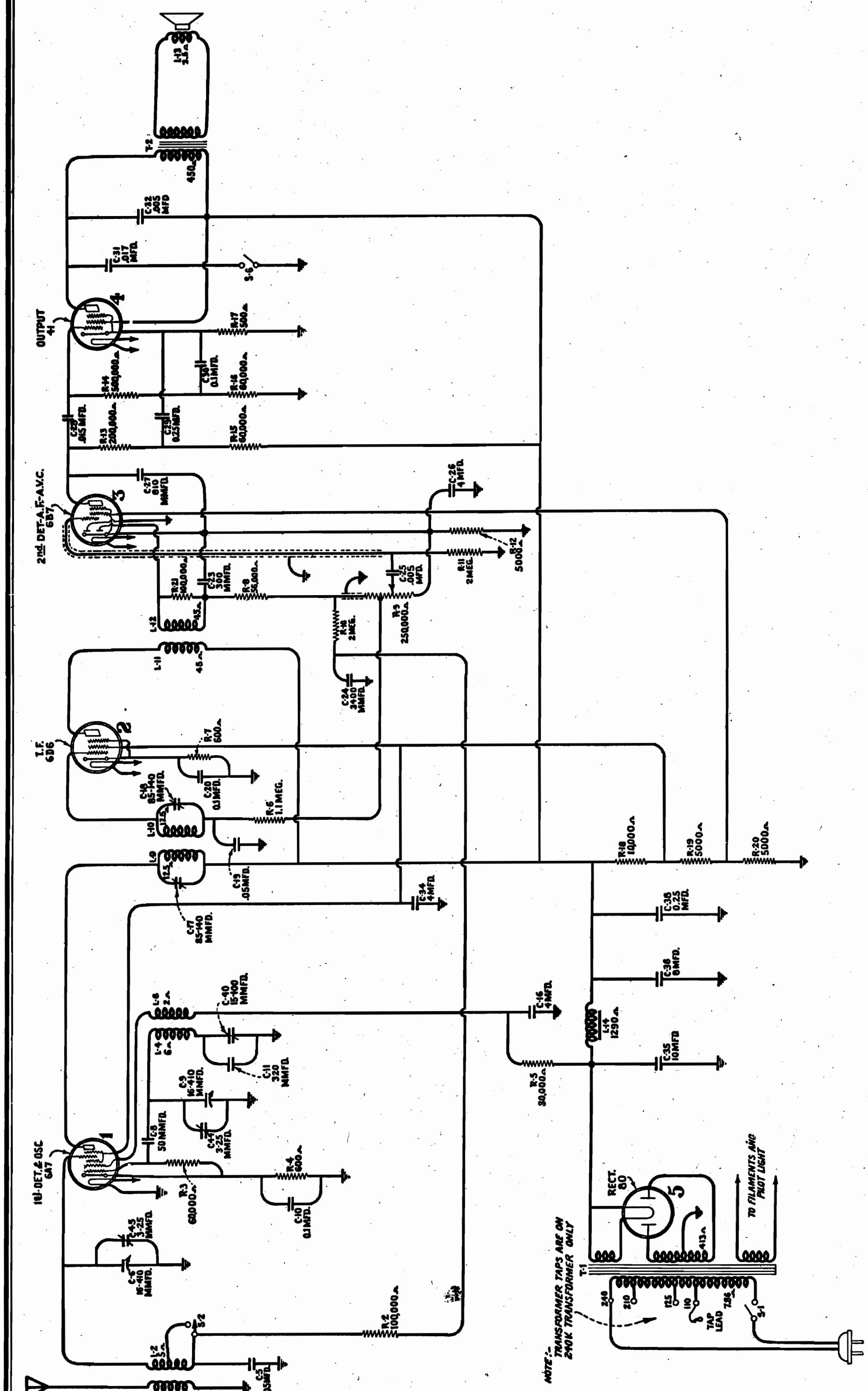
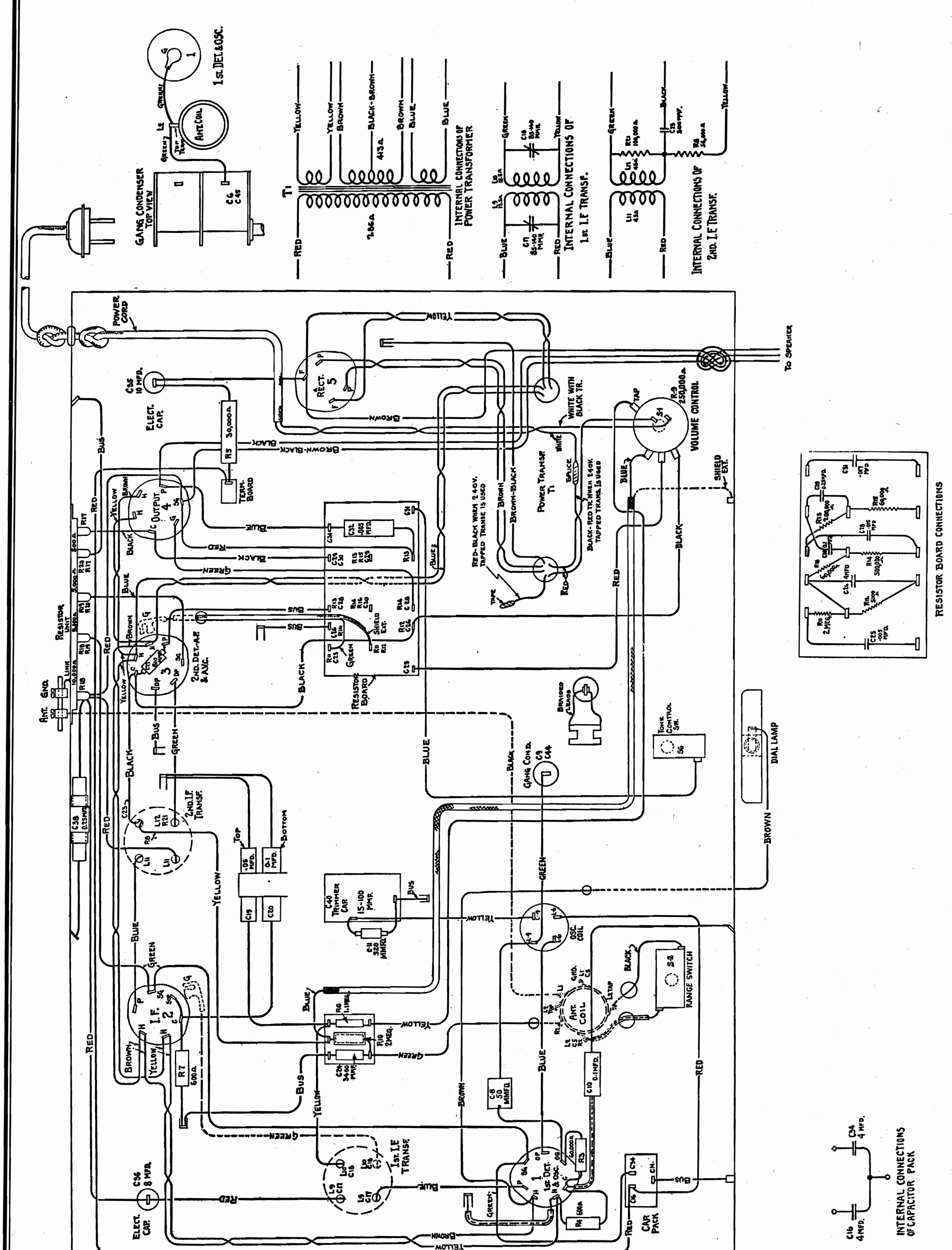


Tuning Frequency Ranges..........540 KC. to 1720 KC. and 1600 KC. to 3500 KC.
Alignment Frequencies..........460 KC. (I.F.), 1720 KC. (R.F. and Oscillator) 600 KC. (Oscillator)
Undistorted Output..........1.75 Watts
Maximum Output..........3.5 Watts
Loudspeaker..........6-Inch, Electro-Dynamic

MODEL 119

Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

In the first stage of the circuit, an RCA-6A7 pentagrid converter tube is employed as an r-f amplifier and local oscillator, the related external high-frequency circuits consisting of a tuned antenna transformer with a short-wave tap. The oscillator second harmonic is used for the short-wave position. Within the first detector tube, mixing of signal and oscillator voltages is accomplished through electron coupling, the i-f appearing in the plate circuit.

The i-f system operates at 460 kc. as the basic frequency. The presence of the natural period transformer at the i-f output should be especially noted. Its use minimizes the number of line-up adjustments.

The combined second detector—audio amplifier—a.v.c. stage, utilizes an RCA-6B7, a duplex-diode pentode Radiotron. One diode connects directly to ground, the other is used for detection. Part of the detected signal is filtered to remove the audible fluctuations and is applied to the first and second stages as a means of providing automatic volume control. The audio component of the detected signal is amplified by the RCA-6B7 and conveyed to a resistance-capacitance coupling network.

A power-amplifier pentode, RCA-41, is used in the output stage and is coupled by a transformer to the low impedance voice-coil of the speaker.

Full-wave rectification is employed in the power-supply stage. The speaker field winding serves in the filter circuit as a reactor.

(2) I-F Tuning Adjustments:

There are two i-f transformers associated in the intermediate amplifier system. The first of these transformers is tuned by accessible trimmers. The second transformer has a natural tuning inherent to its design and does not require adjustment. To obtain the correct alignment proceed as follows:

(a) Short circuit the antenna and ground terminals and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.

(b) Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated on page 2, to the speaker circuit.

(c) Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment; this requirement is important in that the a.v.c. action is voided by such a method. Adjust the secondary and primary trimmers (C18 and C17) of the first i-f transformer for maximum receiver output.

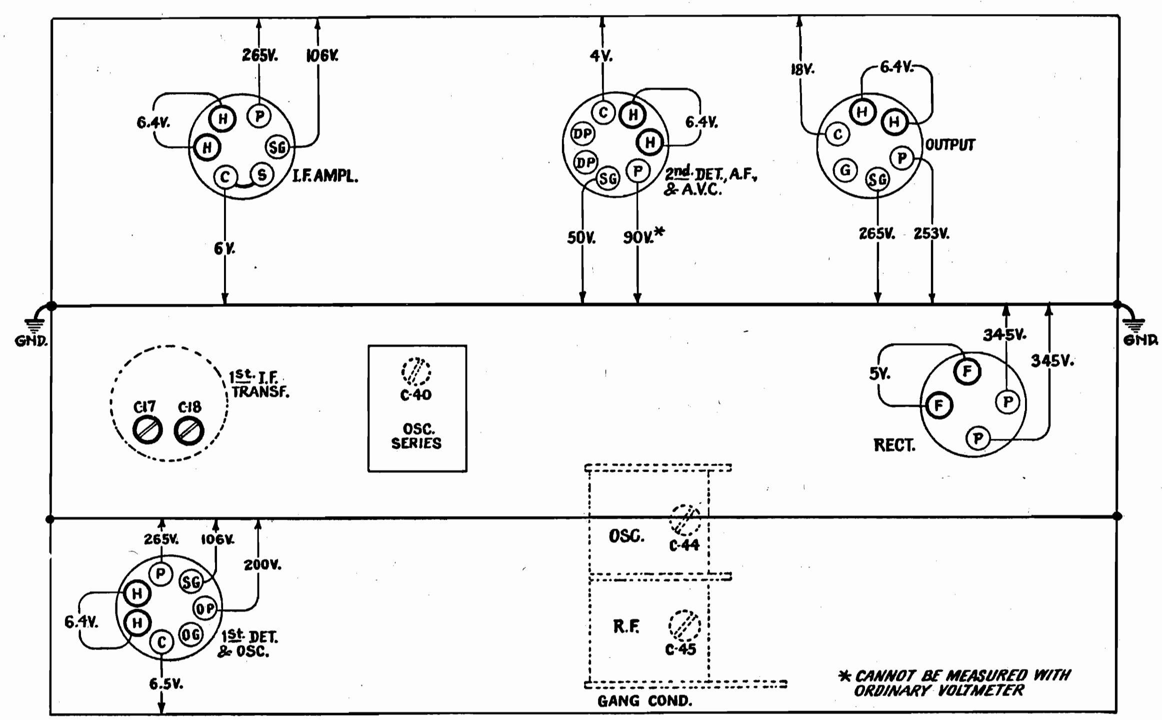


Figure 3—Trimmer Locations and Radiotron Socket Voltages (Measured at 115 volts A. C. Supply—Maximum Volume Control—No Signal)

RCA MFG. CO., INC.

R. F. and Oscillator Adjustments:

Three trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the short-wave bands. Locations of the trimmers are shown on Figure 3. They should be adjusted in the following manner:

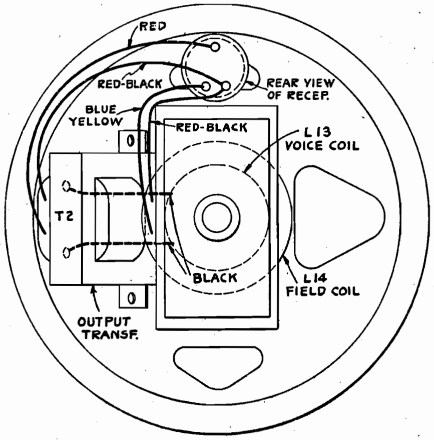
(a) Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer. It should set exactly on the radial line, adjacent to the dial reading of 540 when the tuning capacitor plates are at full mesh. After correcting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.

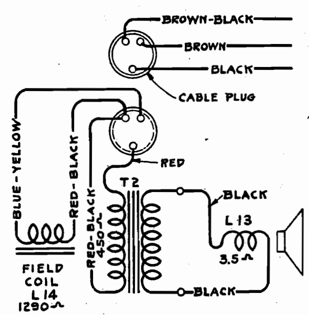
(b) Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output indicator. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.

(c) Re-tune the test oscillator, setting its frequency to 600 kc. Turn the receiver selector control to the point where the incoming oscillator signal is received best. *This point will not always be exactly at 600 on the dial.* Then adjust the low-frequency trimmer, C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44, in order to correct for any change caused by the tuning of C40.

Radiotron Socket Voltages

The various normal operating voltages are given on Figure 3. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt, and for each reading use the highest range which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.





INTERNAL CONNECTIONS OF SPEAKER

Figure 4—Loudspeaker Wiring

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4379	Board—Terminal board—Engraved "ANT-GND"	$0.20
4244	Cap—Contact cap	.20
3861	Capacitor—Adjustable capacitor (C40)	.78
5094	Capacitor—50 mmfd. (C8)	.20
5151	Capacitor—320 mmfd. (C11)	.20
5044	Capacitor—810 mmfd. (C27)	.20
4881	Capacitor—3400 mmfd. (C24)	.20
4793	Capacitor—0.005 mfd. (C25)	.20
4868	Capacitor—0.005 mfd. (C32)	.20
4792	Capacitor—0.015 mfd. (C28)	.22
4906	Capacitor—0.017 mfd. (C31)	.25
4836	Capacitor—0.05 mfd. (C5, C19)	.30
4841	Capacitor—0.1 mfd. (C10, C20, C30)	.22
3597	Capacitor—0.25 mfd. (C29, C38)	.40
3796	Capacitor—4.0 mfd. (C26)	.60
4428	Capacitor—8.0 mfd. (C36)	1.05
7790	Capacitor—10.0 mfd. (C35)	1.05
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C34)	1.64
4358	Clamp—Capacitor mounting clamp for Stock No. 4428 and No. 7790	.15
5051	Coil—Antenna coil (L1, L2, C5, R2)	1.28
5050	Coil—Oscillator coil (L4, L6)	.56
4896	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45)	3.48
3708	Resistor—600 ohms—Carbon type—¼ watt (R4, R7)—Package of 5	1.00
4436	Resistor—5000 ohms—Carbon type—¼ watt (R12)—Package of 10	2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	.22
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3, R15, R16)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
4783	Resistor—1,100,000 ohms—Carbon type—¼ watt (R6)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R10, R11)—Package of 5	1.00
4721	Resistor—Tapped resistor—One 500 ohm, two 5,000 ohm, and one 10,000 ohm sections (R17, R18, R19, R20)	.88
3584	Ring—Oscillator coil retaining ring	.40
3623	Shield—Oscillator coil shield	.30

Stock No.	Description	List Price
3942	Shield—First Detector and output Radiotron shield	$0.18
3782	Shield—Second Detector Radiotron shield	.26
7487	Shield—I.F. Radiotron shield	.25
5186	Shield—First I.F. transformer shield	.28
4908	Shield—Second I.F. transformer shield	.45
3858	Socket—Dial lamp socket	.26
4784	Socket—4-contact Radiotron socket	.15
4785	Socket—6-contact Radiotron socket	.15
4786	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
5053	Switch—Range switch (S2)	.50
4905	Switch—Tone control switch (S6)	.30
4900	Transformer—First intermediate frequency transformer (L9, L10, C17, C18)	2.25
4901	Transformer—Second intermediate frequency transformer (L11, L12, C23, R8, R21)	1.50
4898	Transformer—Power transformer—105-125 volts—25-50 cycles	5.55
4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	3.98
4899	Transformer—Power transformer—105-125/200-240 volts—40-60 cycles	4.05
4429	Volume control (R9, S1)	1.40
	REPRODUCER ASSEMBLIES	
4915	Cable—3 conductor reproducer cable—Complete with 3-contact female connector	.50
9587	Coil—Field coil, magnet and cone support (L14)	2.18
9588	Cone—Reproducer cone (L13)—Package of 5	3.55
5118	Connector—3-contact male connector for reproducer cable	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9586	Reproducer—Complete	5.95
4893	Transformer—Output transformer (T2)	1.48
	MISCELLANEOUS ASSEMBLY	
5111	Dial—Station selector dial scale	.32
4132	Knob—Station selector knob—Package of 5	.55
4449	Knob—Volume control, range switch, or tone control knob—Package of 5	.60
4340	Lamp—Station selector dial lamp—Package of 5	.60
4909	Pointer—Station selector pointer	.15
3886	Reflector—Station selector dial reflector	.30
4917	Screw—Chassis mounting screw—Comprising one screw, and one washer—Package of 4	.15

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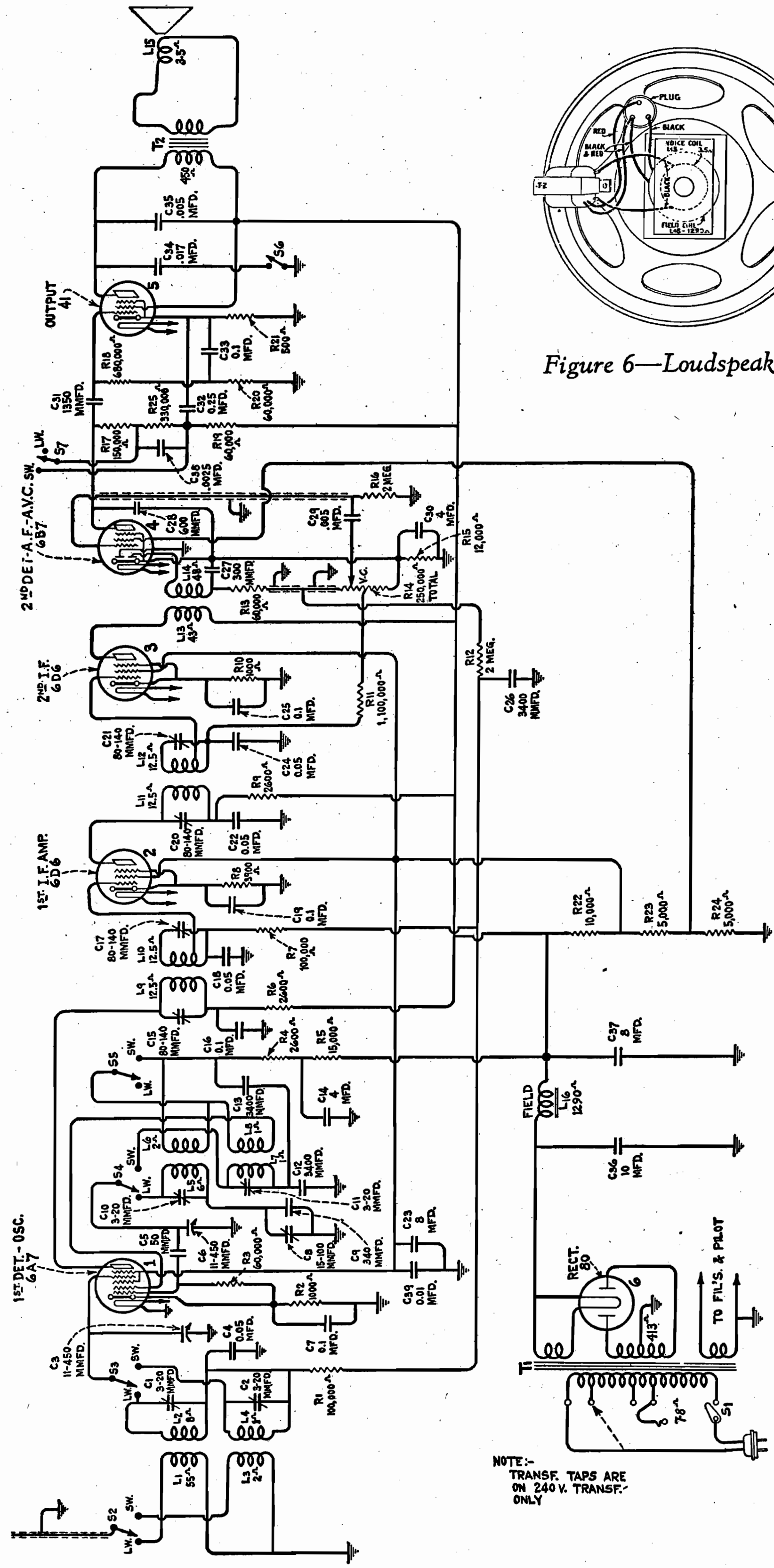


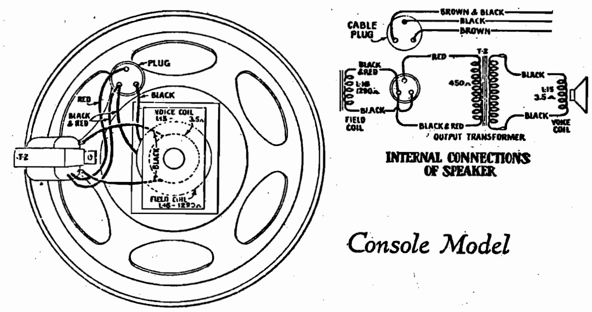
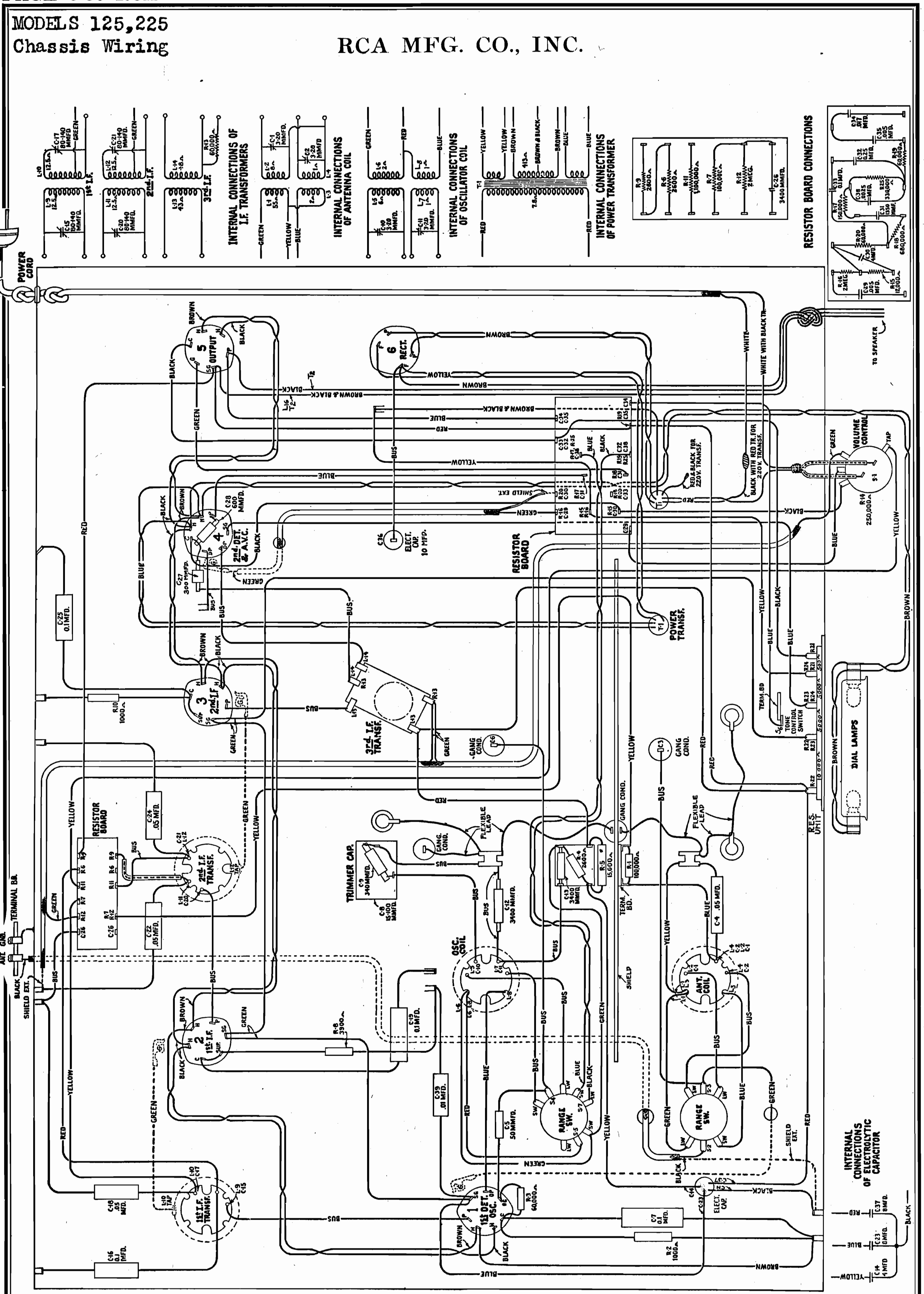


Figure 6—Loudspeaker Wiring

Voltage and Frequency Ratings	105–125 Volts, 50–60 Cycles 105–125 Volts, 25–60 Cycles 105–125/200–250 Volts, 50–60 Cycles
Power Consumption	85 Watts
Tuning Frequency Ranges	540 KC.–1720 KC. and 5400 KC.–18,000 KC.
Alignment Frequencies	460 KC. (I.F.), 600 KC. (Osc.), 1720 KC. (Osc. and Det.) and 18,000 KC. (Osc. and Det.)
Undistorted Output	1.75 Watts
Maximum Output	3.5 Watts

MODELS 125,225
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

(1) Line-Up Adjustments

Maximum efficiency and best quality of performance will only be obtained when the circuits are in proper alignment. "Trimmer" capacitors are provided at accessible locations on the receiver chassis for accurately realigning the circuits when they have deviated from normal. Incorrect alignment is usually evidenced by low sensitivity, poor quality and irregular double-peaked tuning.

It is important in re-adjusting the line-up trimmers to use proper oscillator and indicator apparatus. Certain standard service instruments, which are useful in making these adjustments, have been devised and made available to the service man by the manufacturer of this receiver. They are illustrated and described on page 2.

Preliminary Tests

Before making any adjustments, it is wise to determine the correctness of the existing alignment. This may be done by supplying a signal to the circuit (r-f, oscillator or i-f) from the "Full-Range Oscillator," and inserting the "Tuning Wand" into the coils involved. The "Tuning Wand" consists of a bakelite rod having a brass cylinder attached to one end, and a small core of finely divided iron compacted into the opposite end. By inserting the brass cylinder end into the center of a particular coil, through the opening provided in the top of the shield as shown in Figure 1, the inductance of the coil is lowered, and therefore, the resonant frequency is increased. Placing the other end (iron filing core) into the coil raises the inductance and conversely decreases the resonant frequency. Thus it is apparent, that if the circuits are in exact resonance with the standard signal of the "Full-Range Oscillator," the insertion of either end of the wand will cause a reduction of receiver output; whereas if the circuits are not in tune or resonance with the incoming signal, one end will bring about an increase of the signal, and the other end will cause a decrease. When an increase in signal is obtained with the iron filled end of the wand, an increase of the inductance and decrease in frequency of resonance is indicated. The trimmer condenser associated with the circuit under test will therefore require adjustment so as to increase its capacitance. The reverse occurs when a gain in signal is obtained when using the brass cylinder end of the wand.

Changes Indicated By Wand

Wand	*Signal*	*Trimmer*
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

The following procedure should be applied:

I-F Tuning Adjustments

The four i-f trimmer screws shown on Figure 2 must be tuned to 460 kc., as explained below:

(a) Short circuit the antenna and ground terminals of the receiver to prevent external signal pick-up. Set the volume control to maximum and attach a good ground connection to the receiver.

(b) Feed the test oscillator output to the control grid of the first-detector. Connect an output indicator to the voice coil circuit. Regulate the oscillator output control so that a slight indication occurs on the indicating instrument.

(c) Adjust the secondary and primary trimmers of the second i-f transformer for maximum (peak) output. Then tune the first i-f transformer in a similar manner. The oscillator output should be maintained at as low a level as will give a good output indication. This will keep the signal from being affected by the a.v.c. action of the receiver. A slight improvement in line-up may be obtained by repeating the above procedure, since there is an interlocking effect between the several tuned circuits.

R-F and Oscillator Adjustments

The trimmer capacitor locations for the r-f and oscillator stages are indicated on Figure 2. Their adjustments should be performed as follows:

(a) Attach the oscillator output to the antenna-ground terminals of the receiver.

(b) Check the dial pointer and correct its position if necessary. It should be coincident with the dial marking adjacent to 540 when the gang condenser plates are in full mesh.

(c) With the external oscillator tuned to 1720 kc., and its output adjusted for the critical minimum at full volume control, set the station selector to the 1720 scale marking. Turn the range switch to its right position and adjust the trimmers C10 and C1 on Figure 2 to give maximum (peak) receiver output. Then shift the oscillator frequency to 600 kc., and tune in this signal on the receiver. Adjust the oscillator trimmer, C8, simultaneously rocking the tuning condenser slowly through the signal until the maximum output obtainable results from the two combined operations. The dial calibration should be disregarded for this adjustment. The oscillator trimmer C10 should be retuned at 1720 kc. to correct for any change caused by the 600 kc. adjustment.

(d) Turn the receiver range switch to its left (short-wave) position and set the station selector at the 18 megacycle dial marking. Tune the test oscillator to 18,000 kc. and regulate its output to produce a noticeable indication at the receiver output. Adjust C2 and C11 of the antenna and oscillator coils for maximum receiver output. There will be two positions of the trimmers which give maximum signal. On the oscillator, the position of minimum capacitance is correct; whereas the position of maximum capacitance is proper on the antenna trimmer. The latter should be made while slowly rocking the variable tuning condenser through the signal.

It is important in making the foregoing adjustments to have the receiver operating at maximum sensitivity and using as low an input as will give an accurate output indication. This procedure will obviate the broadness of tuning apparent from the effect of automatic volume control.

(2) Circuit Voltages

Refer to Figure 2. The voltages indicated at the various socket contacts are measured to the chassis.

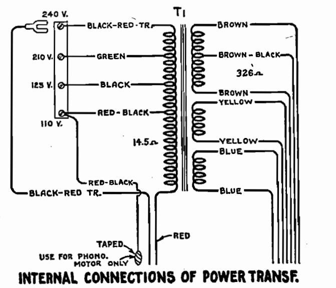


Figure 5—Universal Transformer Connections

They represent the values which apply to a receiver in normal operating condition at the specified supply voltage. At other voltages, a consistent difference will be perceptible for all readings. Such a general deviation, due to line voltage, should not be judged as a sign of defective circuit conditions, but rather the erratic measurement used as a basis for the circuit analysis.

Accuracy of the voltage measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt and for each reading use the highest range which will give an acceptably accurate reading.

(3) Code Interference

In certain localities near to high-powered radio-telegraph stations operating at frequencies in the vicinity of 460 kc., slight code interference may be present on both bands of the receiver. This adverse condition usually occurs over the entire tuning range of each band, and is not affected by change of tuning. To overcome this interference, a shielded wave trap, such as part No. 4539, should be installed. This trap consists of a parallel resonant circuit, tuned by two trimmer capacitors. It should be connected in series with the antenna input lead at the receiver. The connections should be arranged so that a minimum of exposed (unshielded) lead is left between the trap and the band switch or the shielded input lead of the receiver. The trap is mountable by means of two holes provided in the chassis between the first i-f transformer shield and the oscillator coil shield. The can of the trap should be securely grounded. The trimmers must be accurately tuned to suppress the undesired station.

(4) 220-Volt Transformer Connections

The 220–110 volt, 50–60 cycle transformer furnished with some instruments has taps for a variety of voltages. These taps are located on the transformer assembly, and are accessible without removing the chassis from the cabinet. A schematic of the transformer with colors of its leads is shown in Figure 5.

The circuit embodied in this receiver is of the superheterodyne type. Its layout is shown schematically, in Figure 3. Two ranges of tuning are provided by two separate sets of coils. A tuned transformer is employed to couple the antenna system into the first detector tube which is an RCA-6A7. This tube also serves, by the coordinate arrangement of its elements, to generate the local oscillation required for superheterodyne operation. The local oscillation is modulated with the incoming signal by the mutual effect of the tube elements on the electron flow. The difference beat frequency of these two signals is amplified by this same tube and delivered to the i-f amplifier system. There are two Radiotron 6D6 tubes used for i-f amplification. Three transformers intercouple these tubes. The primaries and secondaries of two of these transformers are resonated to the intermediate frequency (460 kc.). The third i-f transformer has no adjustable capacitors; its natural tuning is such as to obtain the desired selectivity and efficiency. Diode detection is performed in an RCA-6B7 tube, a duplex diode pentode. The signal from the i-f system is applied to one of the diodes of the tube, where detection takes place. The remaining diode is tied solidly to ground.

A voltage having the character of an audio wave superimposed upon a constant d-c is developed by the detection process across the manual volume control resistor R14. The d-c portion of this voltage, which is dependent upon the strength of the carrier of the signal being received, is used to automatically regulate the control grid bias voltages of the first-detector and the i-f amplifier stages. Maximum control is used on the detector and first i-f, while a reduced amount of control is applied to the second i-f. A portion of the audio component of the detected voltage appearing across the manual volume control is carried through the variable arm and a blocking condenser to the control grid of the RCA-6B7, which simultaneously functions to provide audio amplification. The audio signal is conducted from the detector —a-f amplifier—a.v.c. stage to the power-output tube through a resistance-capacitance network. At this point there is provision for changing the audio response of the receiver, so that proper results will be obtained in both the long-wave and the short-wave bands. As shown on the schematic, the switch S7 operates so that for long-wave reception the resistor R25 and condenser C32 are in series with the plate resistor R17, while for short-wave reception the resistor-condenser combination is shorted out. The output tube delivers a high-level high-quality signal to the electro-dynamic loudspeaker through an efficiently designed matching transformer. A two-point tone control consisting of a small capacitor and a single pole switch is connected in the plate circuit of the RCA-41 output tube.

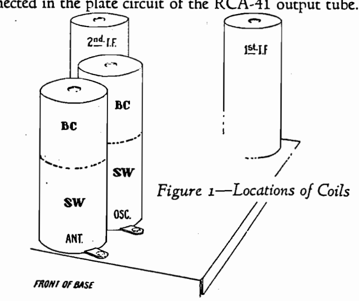


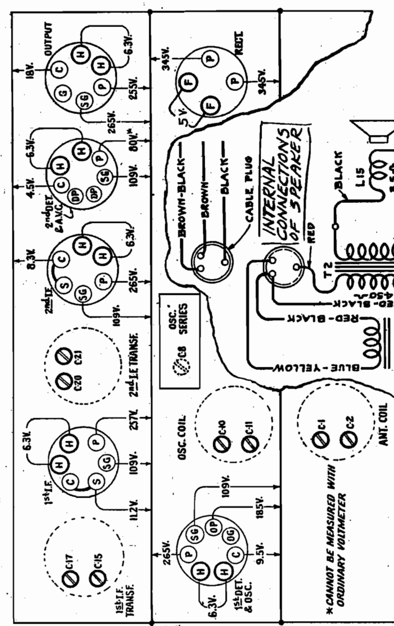
Figure 1—Locations of Coils

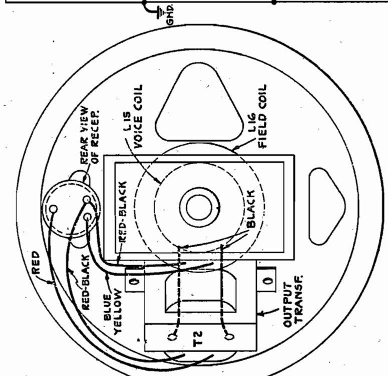
MODELS 125,225
Socket, Trimmers
Voltage, Parts
Speaker Wiring

RCA MFG. CO., INC.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4880	Bracket — Tone control switch mounting bracket	$0.12
4427	Bracket—Volume control mounting bracket	.18
4358	Bracket—Electrolytic capacitor bracket for capacitor No. 7790	.15
4693	Bracket—Electrolytic capacitor bracket for capacitor No. 5101	.15
3861	Capacitor—Adjustable trimmer capacitor (C8)	.78
5094	Capacitor—50 mmfd. (C5)	.20
3981	Capacitor—300 mmfd. (C27)	.30
4811	Capacitor—340 mmfd. (C9)	.25
4210	Capacitor—600 mmfd. (C28)	.25
5115	Capacitor—1350 mmfd. (C31)	.25
4439	Capacitor—3400 mmfd. (C12)	.35
4881	Capacitor—3400 mmfd. (C13, C26)	.20
5107	Capacitor—0.0025 mfd. (C38)	.16
4793	Capacitor—0.005 mfd. (C29)	20
4868	Capacitor—0.005 mfd. (C35)	.20
4906	Capacitor—0.017 mfd. (C34)	.25
4883	Capacitor—0.01 mfd. (C39)	.20
4836	Capacitor—0.05 mfd. (C4, C18, C24)	.30
4886	Capacitor—0.05 mfd. (C22)	.20
4841	Capacitor—0.1 mfd. (C7, C19, C25, C33)	.22
4885	Capacitor—0.1 mfd. (C16)	.28
3597	Capacitor—0.25 mfd. (C32)	.40
3796	Capacitor—4.0 mfd. (C30)	.60
7790	Capacitor—10.0 mfd. (C36)	1.05
5101	Capacitor pack—Comprising two 8. mfd. and one 4. mfd. sections (C14, C23, C37)	2.14
5087	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	1.86
5089	Coil—Oscillator coil (L5, L6, L7, L8, C10, C11)	1.90
4504	Condenser—2-gang tuning condenser (C3, C6)	2.78
5104	Lead—Shielded—Single conductor—From range switch to antenna terminal board	.30
5106	Lead—Shielded—2-conductor—From volume control to third I.F. transformer and resistor board	.40
5112	Resistor—1000 ohms—Carbon type—¼ watt (R2, R10)—Package of 5	1.00
4812	Resistor—2600 ohms—Carbon type—¼ watt (R4, R6, R9)—Package of 5	1.00
5113	Resistor—3900 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
5109	Resistor—12,000 ohms—Carbon type—¼ watt (R15)—Package of 5	$1.00
5114	Resistor — 15,000 ohms — Carbon type — 1 watt (R5)	.72
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R3, R19, R20)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R7)—Package of 5	1.00
5027	Resistor—150,000 ohms—Carbon type—¼ watt (R17)—Package of 5	1.00
5108	Resistor—330,000 ohms—Carbon type—¼ watt (R25)—Package of 5	1.00
5110	Resistor—680,000 ohms—Carbon type—¼ watt (R18)—Package of 5	1.00
4783	Resistor—1,100,000 ohms—Carbon type—¼ watt (R11)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R12, R16)—Package of 5	1.00
4721	Resistor—Tapped—One 500, one 10,000 and two 5000 ohm sections (R21, R22, R23, R24)	.88
4521	Shield—Antenna, I.F. or oscillator coil shield	.42
3942	Shield—First detector and output Radiotron shield	.18
3782	Shield—Second detector Radiotron shield	.26
7487	Shield—I.F. Radiotron shield	.25
4784	Socket—4-contact Radiotron socket	.15
4785	Socket—6-contact Radiotron socket	.15
4786	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
4379	Strip — Terminal strip — Engraved "ANT-GND"	.20
5100	Switch—Range switch (S2, S3, S4, S5, S7)	1.20
5052	Switch—Tone control switch (S6)	.30
9512	Transformer—Power transformer—105-125 volts—25-40 cycles	6.58
9513	Transformer—Power transformer—105-125/210-240 volts—40-60 cycles	4.85
9511	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	4.78
5102	Transformer—First intermediate frequency transformer (L9, L10, C15, C17)	1.98
5103	Transformer—Second intermediate frequency transformer (L11, L12, C20, C21)	1.98
5105	Transformer—Third intermediate frequency transformer (L13, L14, R13)	1.65
4429	Volume control (R14, S1)	1.40

Stock No.	Description	List Price
	CONDENSER DRIVE ASSEMBLIES	
4450	Dial—Station selector dial—Console model	$0.52
4474	Dial—Station selector dial—Table model	.76
4434	Drive—Tuning condenser drive assembly—Complete	2.42
4475	Indicator—Station selector (pointer) indicator—Table model	.18
4363	Indicator—Station selector (pointer) indicator Console model	.18
4340	Lamp—Dial lamp—Package of 5	.60
3943	Screen—Translucent screen for dial light—Package of 2	.18
3529	Socket—Dial lamp socket	.32
	REPRODUCER ASSEMBLIES TABLE MODEL	
4915	Cable—3-conductor reproducer cable	.50
9587	Coil—Field coil, magnet and cone support (L16)	2.18
9588	Cone—Reproducer cone (L15)—Package of 5	3.55
5118	Plug—3-contact plug—Male section for reproducer cable	.25
5119	Plug—3-contact plug—Female section for reproducer cable	.25
9586	Reproducer—Complete	5.95
4893	Transformer—Output transformer (T2)	1.48
	REPRODUCER ASSEMBLIES CONSOLE MODEL	
4915	Cable—3-conductor reproducer cable	.50
9590	Coil—Field coil, magnet and cone support (L16)	4.20
8935	Cone—Reproducer cone (L15)—Package of 5	$5.25
5118	Plug—3-contact plug—Male section for reproducer cable	.25
5119	Plug—3-contact plug—Female section for reproducer cable	.25
9589	Reproducer—Complete	8.20
4892	Transformer—Output transformer (T2)	1.30
	MISCELLANEOUS ASSEMBLIES	
6755	Bezel—Station selector dial escutcheon bezel—Table model	.50
6840	Bezel—Station selector dial escutcheon bezel—Console model	.56
6707	Glass—Station selector dial glass—Table model	.20
6614	Glass—Station selector dial glass—Console model	.30
4449	Knob—Station selector, volume control, band switch or tone control knob—Package of 5.	60
6708	Ring—Spring retaining ring for dial glass—Table model—Package of 5	.44
6615	Ring—Spring retaining ring for dial glass—Console model—Package of 5	.34
4446	Screw—Chassis mounting assembly—Comprising four screws, four spacers, eight cushions, four washers and four lockwashers—For table model	.28
5184	Screw—Chassis mounting assembly—Comprising one screw, one spacer, two cushions, one washer and one lockwasher—Package of 4—For console model	.28



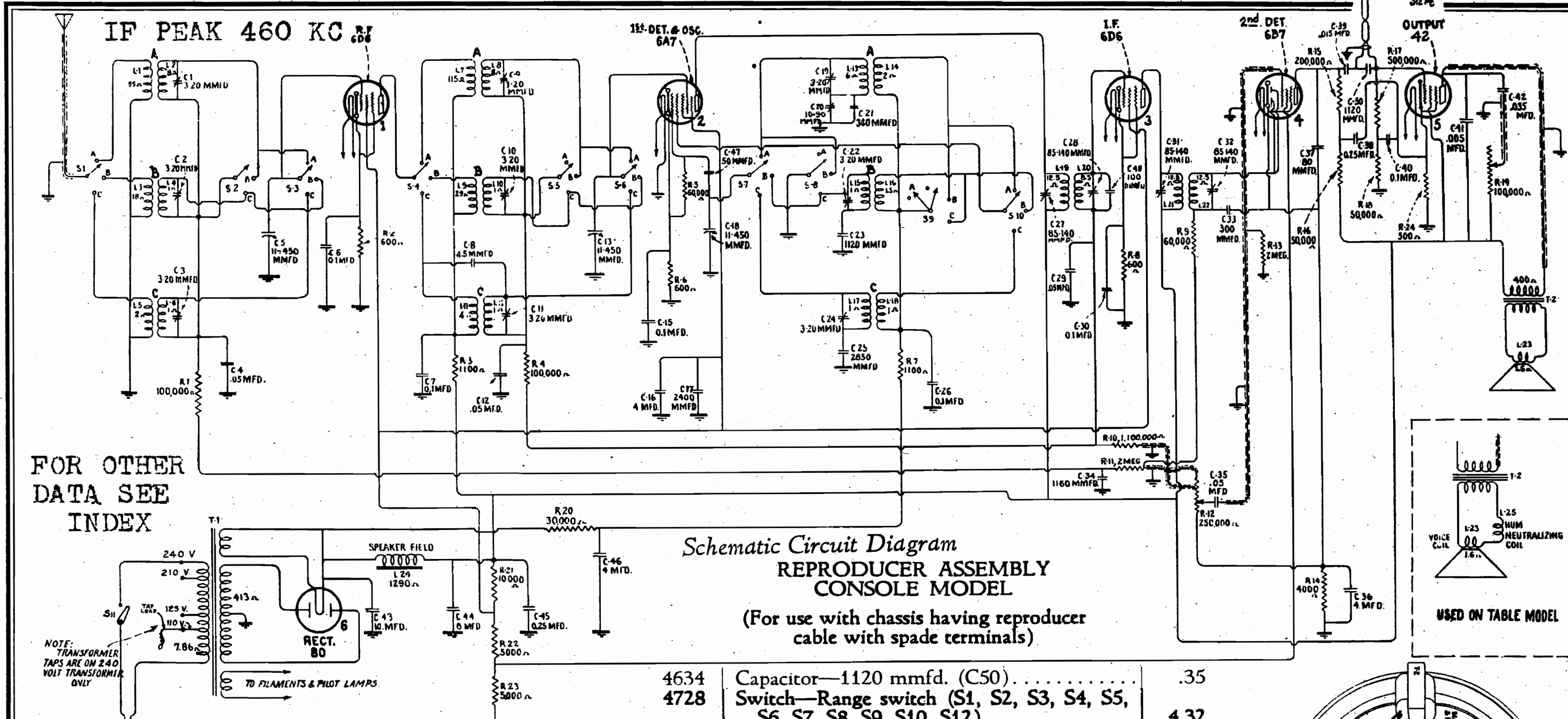


Radiotron		Plate to Ground Volts, D.C.	Screen Grid to Ground Volts, D.C.	Cathode to Ground Volts, D.C.	Plate Current	Heater Volts
RCA-6A7	Oscillator	185	—	—	4.5	—
	Detector	265	109	9.5	1.6	6.3
RCA-6D6 First I.F.		257	109	11.2	2.2	6.3
RCA-6D6 Second I.F.		265	109	8.3	6.6	6.3
RCA-6B7 Second Det.		80*	109	4.5	0.3	6.3
RCA-41 Power		255	265	18.0	30.0	6.3
RCA-80 Rectifier		345/345	—	—	68.0	5.0

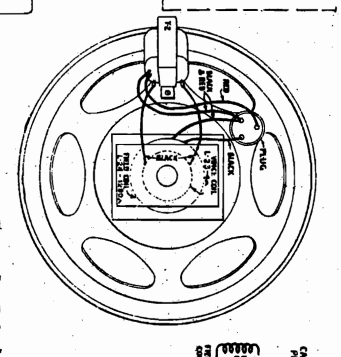
*Calculated from +B.

RCA MFG. CO., INC.

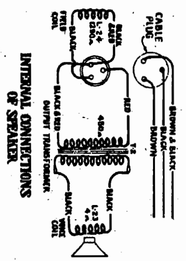
MODELS 128,226
1935 Production
Schematic, Parts
Speaker Wiring



Schematic Circuit Diagram



Console Model Loudspeaker (with cable plug)



INTERNAL CONNECTIONS OF SPEAKER

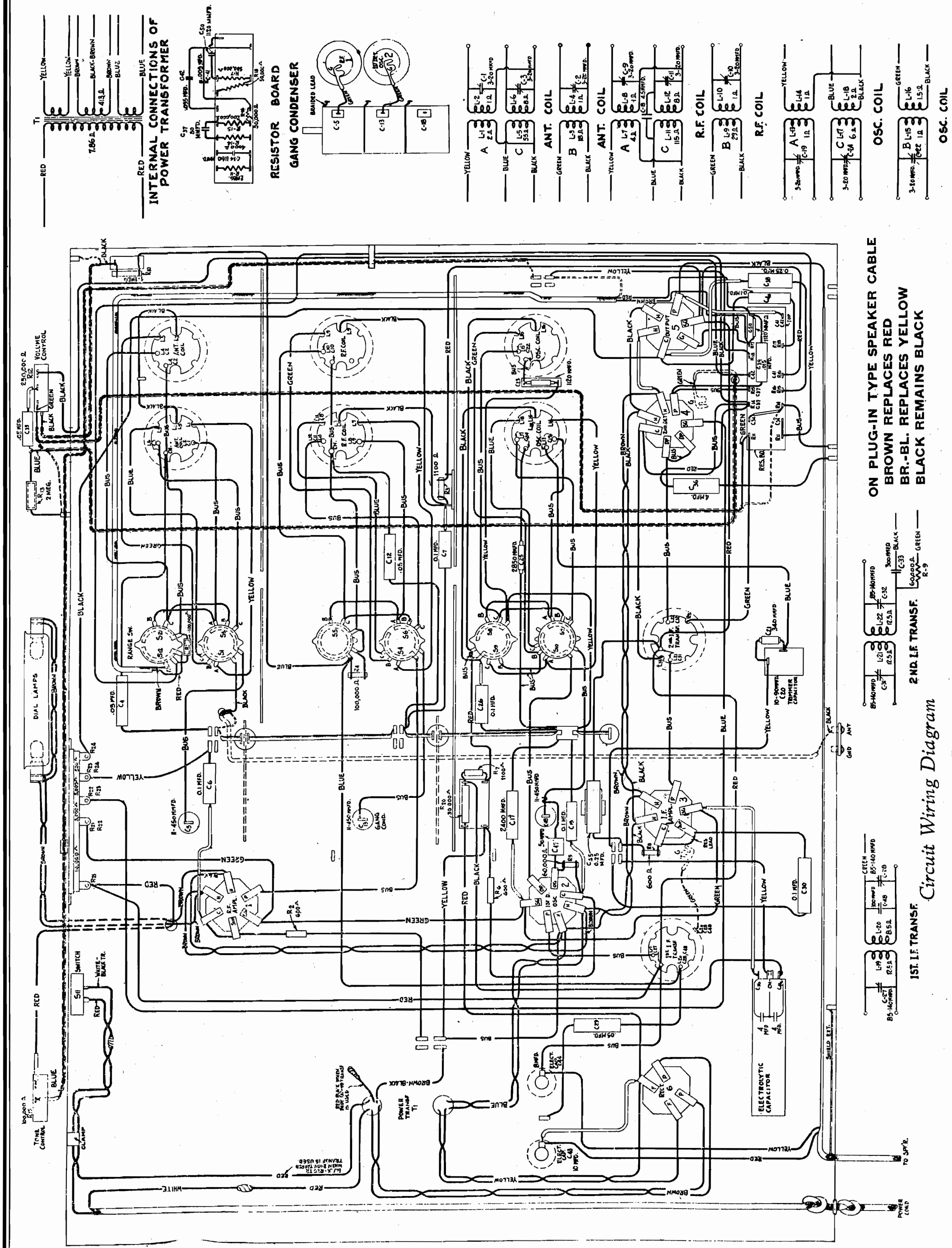
Stock No.	Assembly	Description	List Price
	REPRODUCER ASSEMBLY TABLE MODEL		
4526	REPRODUCER ASSEMBLY TABLE MODEL	Cable—3-conductor—Reproducer cable with spade terminals	$0.32
5085	REPRODUCER ASSEMBLY TABLE MODEL	Cable—3-conductor reproducer cable with female connector	.45
9579	REPRODUCER ASSEMBLY TABLE MODEL	Coil—Field coil only	2.10
9533	REPRODUCER ASSEMBLY TABLE MODEL	Cone—Reproducer cone mounted and centered on housing	3.50
5118	REPRODUCER ASSEMBLY TABLE MODEL	Connector—3-contact male connector for reproducer	.25
5119	REPRODUCER ASSEMBLY TABLE MODEL	Connector—3-contact female connector for reproducer cable	.25
7818	REPRODUCER ASSEMBLY TABLE MODEL	Reproducer complete—For use with chassis having reproducer cable with spade terminals	6.58
9578	REPRODUCER ASSEMBLY TABLE MODEL	Reproducer complete—For use with chassis having cable with connector	6.58
4818	REPRODUCER ASSEMBLY TABLE MODEL	Transformer—Output transformer	2.15
4792	REPRODUCER ASSEMBLY TABLE MODEL	Capacitor—.015 mfd. (C39)	.22

REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)

Stock No.	Assembly	Description	List Price
4634		Capacitor—1120 mmfd. (C50)	.35
4728		Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S12)	4.32
4473	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)	Board—Terminal board assembly	.26
4526	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)	Cable—3-conductor with spade terminals	.32
9460	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)	Coil—Field coil, magnet and cone support (L24)	6.00
8935	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)	Cone—Reproducer cone (L23)—Package of 5	5.25
9527	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)	Reproducer—Complete	8.00
4472	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with spade terminals)	Transformer—Output transformer (T2)	1.40
	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)		
5085	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Cable—3-conductor reproducer cable complete with female connector	.45
5118	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Connector—3-contact male connector for reproducer	.25
5119	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Connector—3-contact female connector for reproducer cable	.25
9590	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Coil—Field coil, magnet and cone support (L24)	4.20
8935	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Cone—Reproducer cone (L23)—Package of 5	5.25
9589	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Reproducer complete	8.20
4892	REPRODUCER ASSEMBLY CONSOLE MODEL (For use with chassis having reproducer cable with connector)	Transformer—Output transformer (T2)	1.30

MODELS 128, 226
1935 Production
Chassis Wiring

RCA MFG. CO., INC.



Circuit Wiring Diagram

MODELS 128E,224E
Schematic
Transformer Data

RCA MFG. CO., INC.

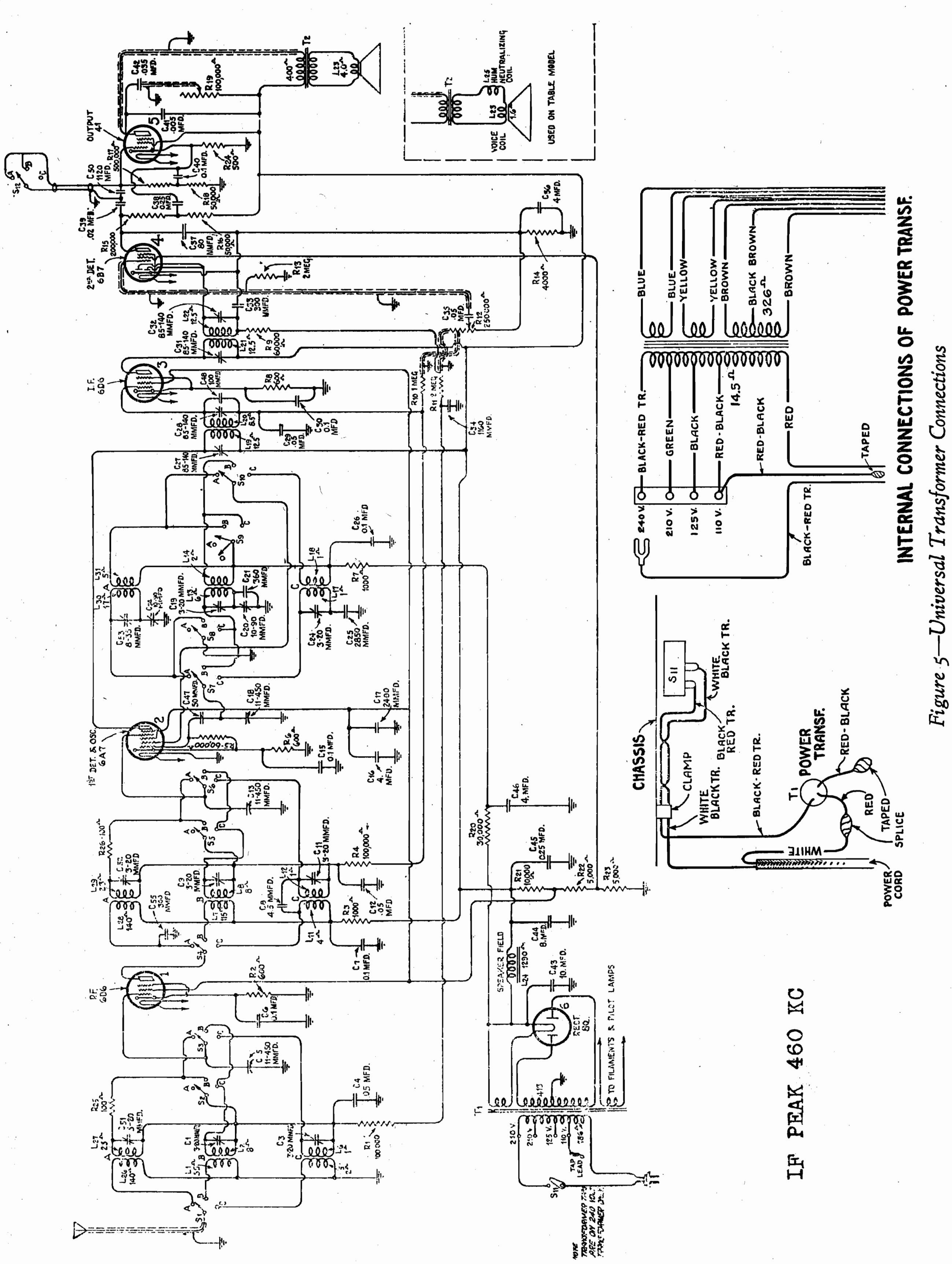


Figure 5—Universal Transformer Connections

MODELS 128E,224E
Chassis Wiring

RCA MFG. CO., INC.

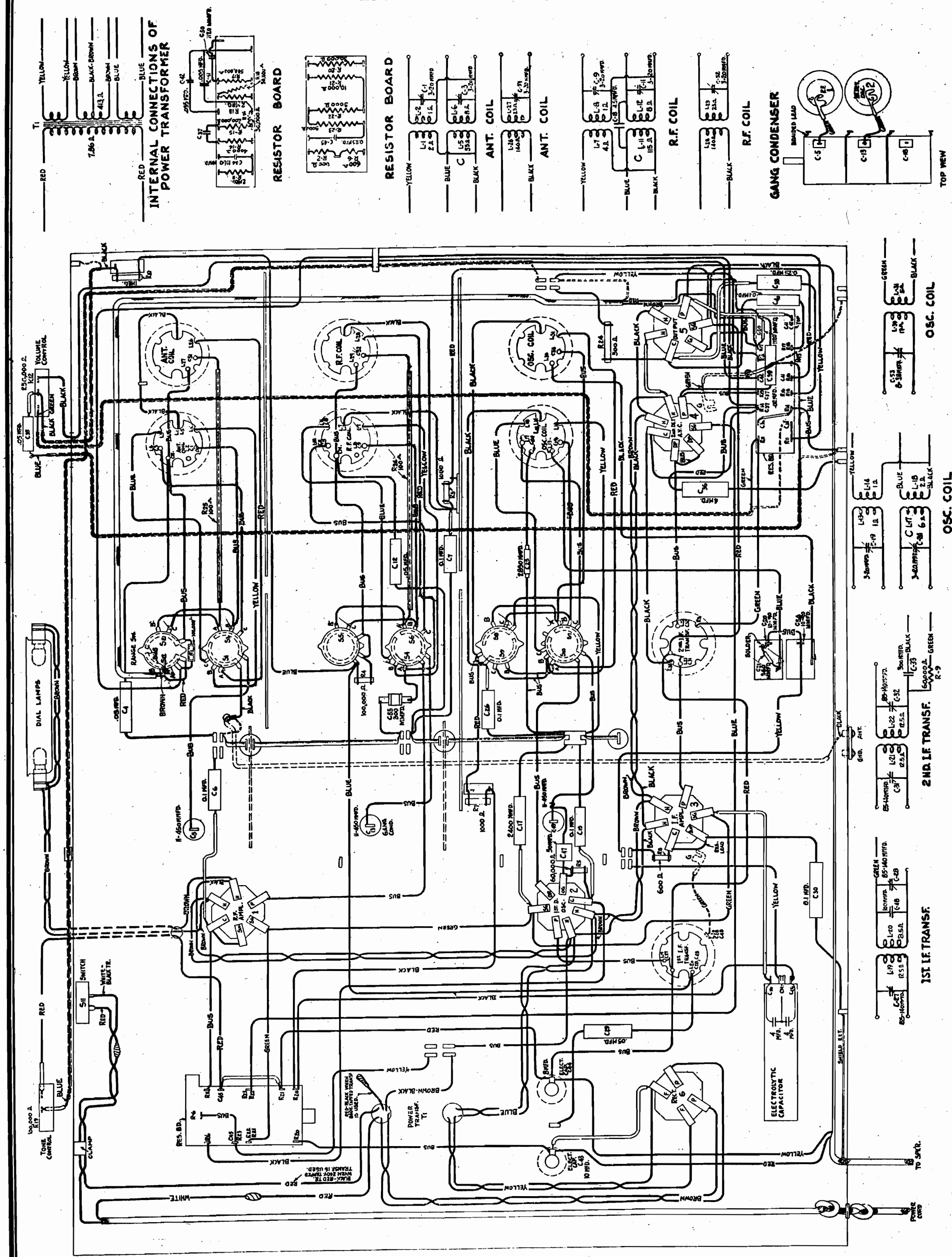


Figure 2—Chassis Wiring Diagram

RCA MFG. CO., INC.

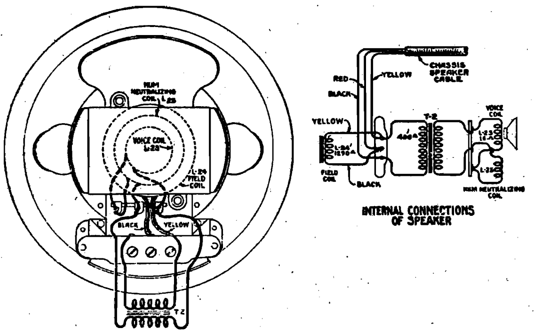


Figure 3—Table Loudspeaker Wiring

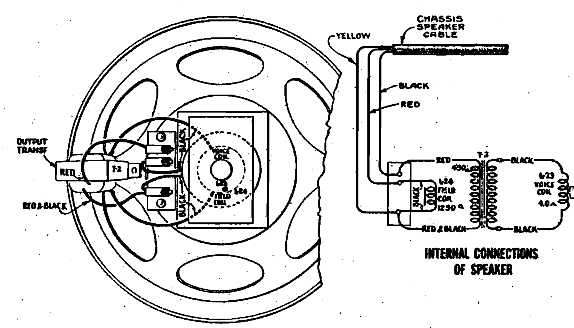


Figure 4—Console Loudspeaker Wiring

600 K.C. TRIMMER
175 K.C. TRIMMER

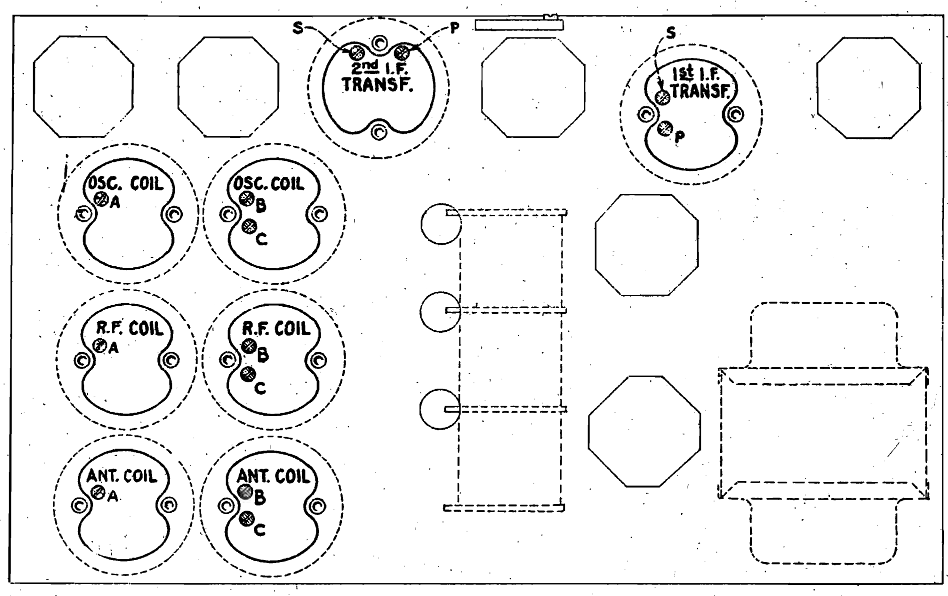
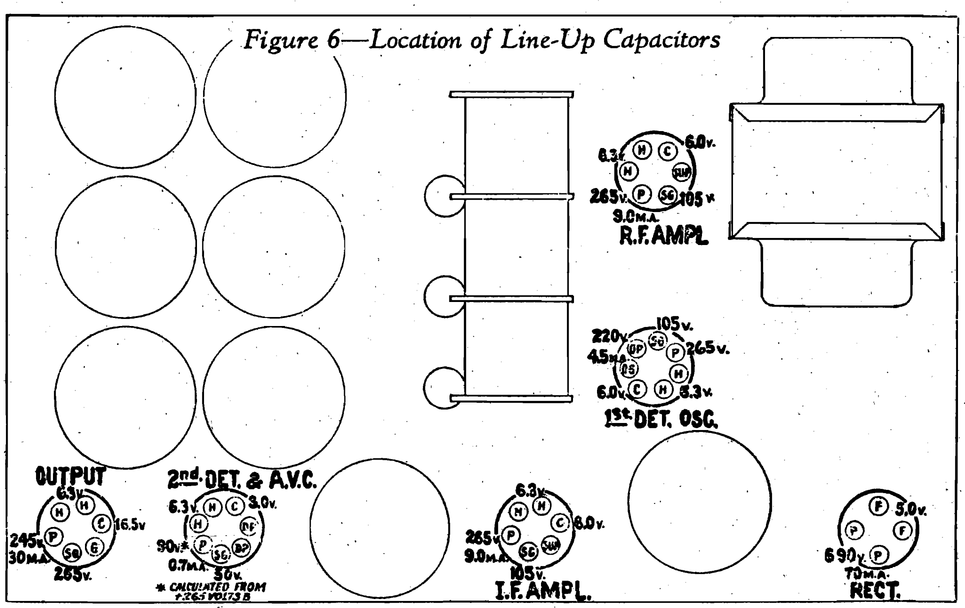


Figure 6—Location of Line-Up Capacitors



ALL VOLTAGES ARE TO GROUND

Figure 7—Tube Socket Voltages

RCA MFG. CO., INC.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is perfect at alignment frequencies, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 8. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage that employs two transformers in conjunction with four adjustable capacitors. These capacitors may require adjustment, being tuned to 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (Band B) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

(3) R. F., OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "B." Three are required in Band "C."

To properly align the various bands, each band must be aligned individually in the order given. This is "A," "B" and "C." The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of Band "A."

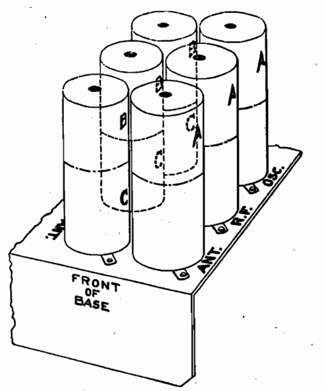


Figure 8—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers of the band under test.

Band "A"

(a) Set the Band Switch at "A."

(b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K. C. on Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

Band "B"

(a) Set the Band Switch at "B."

(b) Tune the external oscillator to 1720 K. C., set the pointer at 1720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 K. C. as described in (b).

Band "C"

(a) Set the Band Switch at "C."

(b) Tune the external oscillator to 18,000 K. C., set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 K. C. on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 5 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made:

RADIOTRON SOCKET VOLTAGES

115-Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		6.0	105	265	9.0	6.3
RCA-6A7	Det.	6.0	105	265	3.5	6.3
	Osc.	—	—	220	4.5	
RCA-6D6—I. F.		6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector		3.0	50	90*	0.7	6.3
RCA-41—Power		16.5	265	245	30.0	6.3
RCA-80—Rectifier		—	—	690 (RMS)	70.0	5.0

* Voltage calculated from 265 V. + B.

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
2747	Cap—Contact cap—Package of 5	.50
3861	Capacitor—Adjustable trimmer capacitor (C20)	.78
4442	Capacitor—50 mmfd. (C47)	.22
4662	Capacitor—80 mmfd. (C37)	.28
4413	Capacitor—360 mmfd. (C21)	.22
4634	Capacitor—1120 mmfd. (C50)	.35
4515	Capacitor—1160 mmfd. (C34)	.22
4670	Capacitor—2250 mmfd. (C14)	.30
4523	Capacitor—2400 mmfd. (C17)	.26
4524	Capacitor—2850 mmfd. (C25)	.35
4435	Capacitor—0.02 mfd. (C39)	.25
4518	Capacitor—0.05 mfd. (C35)	.52
4417	Capacitor—0.05 mfd. (C4, C12, C29)	.25
3877	Capacitor—0.1 mfd. (C40)	.32
4415	Capacitor—0.1 mfd. (C6, C15, C30)	.30
4645	Capacitor—0.1 mfd. (C7, C26)	.25
3597	Capacitor—0.25 mfd. (C38, C45)	.40
4525	Capacitor—4.0 mfd. (C36)	.70
4428	Capacitor—8.0 mfd. (C44)	1.05
7790	Capacitor—10.0 mfd. (C43)	1.05
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42)	.30
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C46)	1.64
4358	Clamp—Electrolytic capacitor mounting clamp	.15
4734	Coil—Antenna coil "A" (L26, L27, C51)	3.05
7803	Coil—Antenna coil "B & C" (L1, L2, L5, L6, C1, C3)	1.82
4751	Coil—Detector coil "A" (L28, L29, C52)	2.38
7805	Coil—Detector coil "B & C" (L7, L8, L11, L12, C8, C9, C11)	2.15
7807	Coil—Oscillator coil "B & C" (L13, L14, L17, L18, C19, C24)	1.62
4733	Coil—Oscillator coil "A" (L30, L31, C53)	3.05
7801	Condenser—3-gang variable tuning condenser (C5, C13, C18)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5	$1.00
4370	Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10	2.00
3997	Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
6318	Resistor—10,000 ohms (R21)	.80
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R11, R13)—Package of 5	1.00
3413	Resistor—5000 ohms—Carbon type—½ watt (R22, R23)—Package of 5	1.00
4513	Resistor—30,000 ohms—Carbon type—3 watts (R20)	.25
4521	Shield—Antenna R. F. or oscillator coil shield	.42
4145	Shield—First detector or output Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
6955	Shield—R. F. amplifier Radiotron shield	.25
3782	Shield—Second detector Radiotron shield	.26
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4379	Strip—Antenna terminal engraved "ANT-GND"	.20
4684	Switch—Operating switch (S11)	.45
4728	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	4.32
4517	Tone control (R19)	.90
4431	Transformer—First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15
9511	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	$4.78
9512	Transformer—Power transformer—105-125 volts—25-40 cycles	6.58
9513	Transformer—Power transformer—105-250 volts—40-60 cycles	4.85
4519	Volume control (R12)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
4422	Clutch—Clutch drive assembly for variable condenser drive	.88
4510	Drive—Tuning condenser drive assembly	2.42
4361	Indicator—Band indicator (celluloid)	.12
4732	Scale—Station selector dial scale	.40
3943	Screen—Dial light screen (celluloid)—Package of 2	.18
3993	Screw—Number 6-32-5/32 square head set screws for band indicator operating arm—Package of 10	.25
4669	Screw—Number 8-32-5/32 set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLY TABLE MODEL	
4526	Cable—3-conductor—Reproducer cable	$0.32
7818	Reproducer complete	6.58
	REPRODUCER ASSEMBLY CONSOLE MODEL	
4473	Board—Terminal board assembly	.26
9460	Coil—Field coil, magnet and cone support (L24)	6.00
8935	Cone—Reproducer cone (L23)—Package of 5	5.25
9527	Reproducer—Complete	8.00
4472	Transformer—Output transformer (T2)	1.40
	MISCELLANEOUS ASSEMBLY	
4677	Bezel—Station selector dial (escutcheon) bezel	.56
6614	Glass—Station selector dial glass	.30
4520	Indicator—Station selector indicator pointer	.18
4449	Knob—Station selector, volume control, tone control, range switch or operating switch knob—Package of 5	.60
4678	Ring—Dial glass retaining ring—Package of 5	.34
4527	Screw—Chassis mounting screw assembly comprising 4 spacers, 4 screws, 4 lock-washers, 4 washers, 8 cushions—For table model	.40
4685	Screw—Chassis mounting screw assembly—Comprising 4 spacers, 4 screws, 4 lock-washers, 4 washers and 8 cushions—For console model	.40
4632	Screw—Number 8-32-7/16 headless set screw for knobs—Package of 10	.25

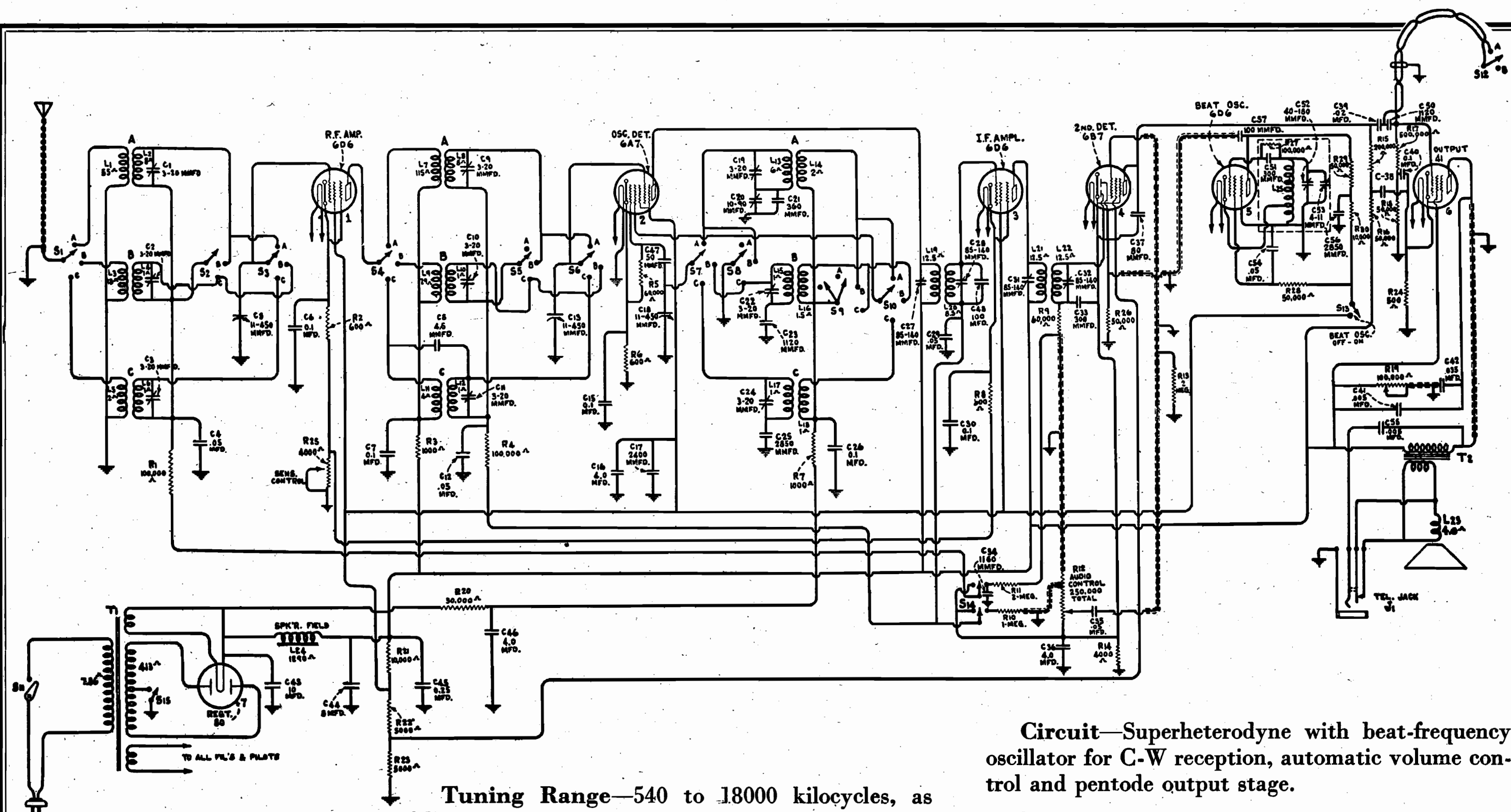
MODEL ACR-136
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
2747	Cap—Contact cap—Package of 5	.50
3361	Capacitor—Adjustable trimmer capacitor (C20)	.78
4442	Capacitor—50 mmfd. (C47)	.22
4662	Capacitor—80 mmfd. (C37)	.24
4413	Capacitor—360 mmfd. (C21)	.22
4412	Capacitor—1120 mmfd. (C23)	.25
4515	Capacitor—1160 mmfd. (C34)	.22
4523	Capacitor—2400 mmfd. (C17)	.26
4524	Capacitor—2850 mmfd. (C25)	.35
4824	Capacitor—.005 mfd. (C55)	.55
4435	Capacitor—.02 mfd. (C39)	.25
4518	Capacitor—.05 mfd. (C35)	.52
4417	Capacitor—.05 mfd. (C4, C12, C29)	.25
3877	Capacitor—.1 mfd. (C40)	.32
4415	Capacitor—.1 mfd. (C6, C15, C30)	.30
4645	Capacitor—.1 mfd. (C7, C26)	.25
3597	Capacitor—.25 mfd. (C45)	.40
4525	Capacitor—4.0 mfd. (C36)	.70
4428	Capacitor—8 mfd. (C44)	1.05
7790	Capacitor—10 mfd. (C43)	1.05
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42)	.30
7589	Capacitor pack—Comprising two 4.0 mfd. capacitors (C16, C46)	1.64
4358	Clamp—Electrolytic capacitor mounting clamp	.15
4516	Coil—Antenna coil "B" (L3, L4, C2)	1.65
7803	Coil—Antenna coil "A-C" (L1, L2, L5, L6, C1, C3)	1.82
4514	Coil—Detector coil "B" (L9, L10, C10)	1.65
7805	Coil—Detector coil "A-C" (L7, L8, L11, L12, C8, C9, C11)	2.15
7807	Coil—Oscillator coil "A-C" (L13, L14, L17, L18, C19, C24)	1.62
4511	Coil—Oscillator coil "B" (L15, L16, C22)	1.52
7801	Condenser—3-gang variable tuning condenser (C5, C13, C18)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5	$1.00
4370	Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10	2.00
3997	Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt (R11, R13)—Package of 5	1.00
4513	Resistor—30,000 ohms—Carbon type—3 watt (R20)	.25
4521	Shield—Antenna R. F. or oscillator coil shield	.42
4145	Shield—First detector or output Radiotron shield	.30
4103	Shield—I. F. amplifier Radiotron shield	.20
6955	Shield—R. F. amplifier Radiotron shield	.25
3782	Shield—Second detector Radiotron shield	.26
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4379	Strip—Antenna terminal engraved "ANT-GND"	.20
4684	Switch—Oscillator switch (S13)	.45
4512	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	3.42
4517	Tone control (R19)	.90
4431	Transformer—First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15
4721	Resistor—Tapped resistor—One 10,000 ohm, two 5000 ohm and one 500 ohm section (R21, R22, R23, R24)	.88
9511	Transformer—Power transformer 105–125 volts, 50–60 cycles (T1)	4.78
9512	Transformer—Power transformer 105–125 volts, 25–40 cycles	$6.58
9513	Transformer—Power transformer—105–250 volts—40–60 cycles	4.85
4519	Volume control (R12)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	.88
4724	Dial—Station selector dial	.40
7799	Drive—Variable tuning condenser drive assembly complete	2.45
4364	Gear—Spring gear assembly complete with hub pinion, gear cover and spring	.96
4361	Indicator—Band indicator—Celluloid	.12
4520	Pointer—Station selector main pointer—Large	.18
4725	Pointer—Station selector vernier pointer—Small	.22
3993	Screw—No. 6-32-5/16" square head set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4360	Stem—Pointer stem assembly	.35
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	OSCILLATOR ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	.50
3640	Capacitor—.05 mfd. (C54)	.25
3794	Capacitor—100 mmfd. (C57)	.30
4524	Capacitor—2850 mmfd. (C56)	$0.35
4755	Coil—Beat coil—Oscillator assembly—Complete (R27, C51, C52, C53, L25)	7.28
3381	Resistor—10,000 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R26, R28, R29)—Package of 5	1.00
6955	Shield—Oscillator Radiotron shield	.25
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLY	
4448	Board—Terminal board assembly	.25
9531	Coil—Field coil, magnet and cone support (L24)	2.75
9492	Cone—Reproducer cone (L23)—Package of 5	3.70
9514	Reproducer—Complete	6.00
4505	Transformer—Output transformer (T2)	1.55
4447	Shield—Terminal board shield	.18
	MISCELLANEOUS ASSEMBLY	
4757	Bezel—Station selector dial (escutcheon) bezel	.82
6614	Glass—Station selector dial glass	.30
4823	Knob—Station selector knob—Package of 5	.75
4132	Knob—Volume control, tone control, sensitivity control, oscillator switch, range switch or AVC switch knob—Package of 5	.55
6615	Ring—Dial glass retaining ring—Package of 5	.34
4613	Screw—Number 8-32-1/16" headless set screw for knobs—Package of 10	.25
4726	Rheostat—Sensitivity control rheostat (R25, S11)	1.42
4756	Jack—Phone jack (J1)	1.44
4758	Switch—Standby switch (S15)	.95
4727	Switch—AVC control switch (S14)	1.44

RCA MFG. CO., INC.



IF PEAK 460 KC.

Tuning Range—540 to 18000 kilocycles, as follows:

Band	Limits (kc.)	Services
A	540–1720	Standard Broadcast–Police Calls
B	1720–5400	Amateur–Police Calls–Aviation
C	5400–18000	Amateur–S-W Broadcast–Aviation

Intermediate Frequency—460 kilocycles.

Power Output—1.9 watts (undistorted); 3.5 watts (maximum).

Loudspeaker—Electrodynamic (voice-coil impedance 4 ohms).

Circuit—Superheterodyne with beat-frequency oscillator for C-W reception, automatic volume control and pentode output stage.

Power-Supply Ratings—See rating symbol on chassis.

Symbol	Voltage	Frequency (cycles)
A	105–125	50–60
B	105–125	25–60
C	100–130/195–250	50–60

As shipped from factory, instruments rated "C" are connected for 225–250 volts unless prominently specified otherwise on chassis. Any of these, however, can be converted for operation at 100–117, 117–130 or 195–225 volts when required. (See A-C Line Voltages in Part II.)

Power Consumption—85 watts.

MODEL ACR-136
Chassis Wiring

RCA MFG. CO., INC.

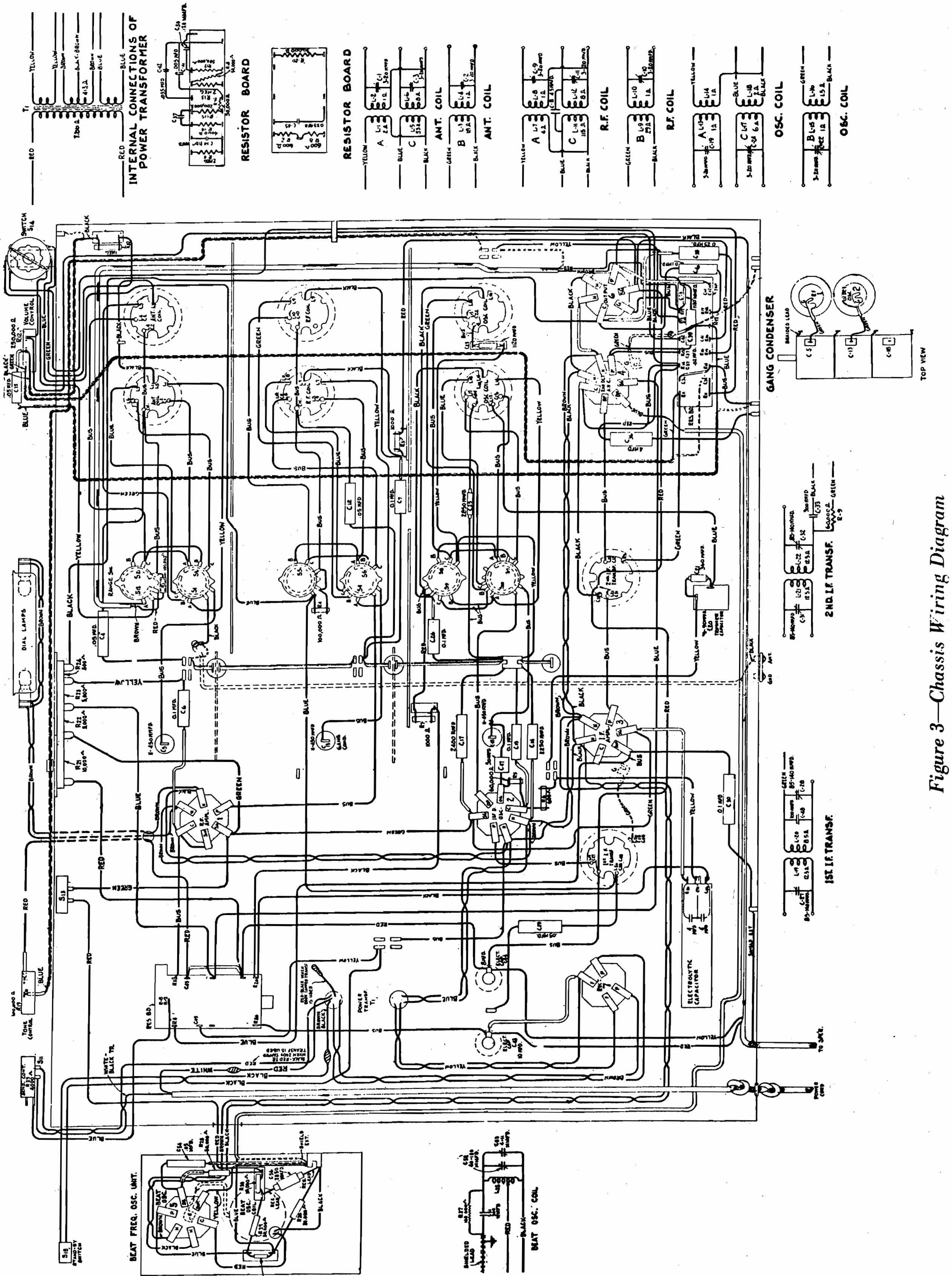


Figure 3—Chassis Wiring Diagram

MODEL ACR-136
Socket, Trimmers
Voltage, Alignment

RCA MFG. CO., INC.

Alignment Procedure

This receiver, of course, was aligned at the factory, but should be checked regularly (preferably once every six months) to insure best possible results. Adjustments when necessary can be performed easily since all trimmer capacitors are accessible through openings in the external case as shown in Figure 6. If desired, however, the chassis can be withdrawn upon removal of the front panel and four mounting screws.

Equipment

Good equipment is prerequisite to satisfactory alignment. A modulated r-f oscillator having an adequate frequency range such as No. 9050, an output meter or simply an output indicator such as No. 4317, and a non-metallic screwdriver such as No. 4160 are three very necessary items. The process can be greatly facilitated through use of tuning wand No. 6679. The parts to which these numbers apply were designed by the manufacturer of this receiver for use by its authorized servicemen. Such parts, however, can be purchased by radio amateurs or engineers through the regular commercial channels. Brief descriptions and net prices of those items are shown on page 15.

I-F Alignment

Both the primary and the secondary circuits of the two coupling transformers for the i-f stage are tuned. Thus, four trimmers may require adjustment to the nominal intermediate frequency—460 kilocycles. To effect these adjustments, refer to Figure 6 and proceed as follows:

1. Connect a modulated oscillator so that its output is impressed between the grid of the first detector and ground.

2. Connect an output indicator across the voice coil of the loudspeaker or an output meter across the secondary of the output transformer with the loudspeaker voice coil open-circuited.

3. Remove the antenna lead-in connection from the rear (ANT-GND) terminal board. Apply power to receiver, turn volume and sensitivity controls fully clockwise (for maximum output) and set tuning control to any point in band A where no signal is received.

4. Place the oscillator in operation at 460 kilocycles and adjust its output control to a position just sufficient to actuate the output meter or indicator.

5. Adjust each of the four trimmer capacitors in turn for maximum output, reducing the input from the oscillator in order to maintain a suitable reading at all times. It will be advisable to go over these adjustments again to make certain that each circuit is exactly peaked rather than merely approximately correct. When an i-f alignment has been made, always follow with the r-f adjustments, as an interlocking effect is usually incurred.

R-F Alignment

The r-f amplifier, oscillator and first detector stages include a total of four trimmers in band A and totals of three trimmers each in bands B and C. These bands should be aligned individually and in alphabetical sequence. Care must be used to avoid disturbing the adjustments of trimmers not involved in the band under test. Nominal line-up frequencies for band A are 600 and 1720 kilocycles, while bands B and C are aligned at 5160 and 18000 kilocycles, respectively. For these adjustments, refer to Figure 6 and proceed as follows:

1. Check setting of dial pointer and adjust if necessary. With tuning capacitor plates fully meshed, one end of the pointer should point exactly toward

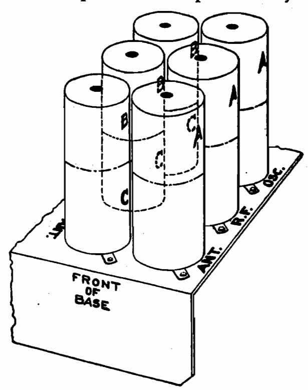


Figure 7—Locations of R-F Coils

the horizontal line at the low-frequency end of band A while the other end should point to within 1/64-inch of the horizontal line at the high-frequency end of that band.

2. Connect a modulated oscillator to the antenna (ANT) and ground (GND) terminals of the receiver.

3. Connect an output indicator across the voice coil of the loudspeaker or an output meter across the secondary of the output transformer with the loudspeaker voice coil open-circuited.

4. Apply power to receiver and turn volume and sensitivity controls fully clockwise (for maximum output).

5. Set range switch at "A":

(a) Adjust oscillator series capacitor (accessible from rear of case) to approximately the center of its range.

(b) Place test oscillator in operation at 1720 kilocycles, set dial pointer at 1720 kilocycles and adjust the three trimmers designated by the letter "A" (Figure 6) for maximum output.

(c) Shift test oscillator frequency to 600 kilocycles and tune receiver to this signal irrespective of the actual dial reading, then adjust the oscillator series trimmer (accessible through opening in rear of case) for maximum output while rocking the tuning capacitor.

(d) Re-adjust at 1720 kilocycles as described in (b).

6. Set range switch at "B":

(a) Tighten the r-f amplifier and first detector trimmers to afford approximately three-quarters of their maximum capacitance—that is, screwed inward three-quarters of the total travel.

(b) Shift test oscillator frequency to 5160 kilocycles, set dial pointer at 5160 kilocycles and adjust oscillator trimmer for maximum output. Set the trimmer at the first peak obtained while increasing the capacitance from "minimum" position.

(c) Check for the image signal at approximately 4240 kilocycles on dial (increasing the test oscillator output if necessary) in order to make certain that the oscillator trimmer is adjusted correctly in accordance with paragraph (b).

(d) Reset dial to 5160 kilocycles and reduce the capacitance of the first detector trimmer until signal disappears. (At this setting, the detector is tuned to the same frequency as the oscillator and the RCA-6A7 tube is blocked.) Now, increase the trimmer capacitance while rocking the tuning capacitor until maximum output is attained.

(e) Adjust the r-f amplifier trimmer for maximum output. It is not necessary to rock the tuning capacitor during this adjustment.

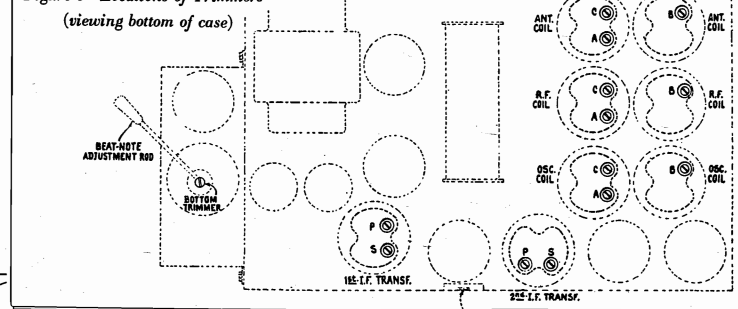
7. Set range switch at "C":

(a) Follow the same procedure as for band B (6) except use a test frequency of 18000 kilocycles and check for the image signal at 17,080 kilocycles.

During these adjustments, always leave the *sensitivity* and *volume* controls of the receiver at "maximum." To maintain a suitable output, reduce the test-oscillator input as necessary. In the high-frequency bands, it may be found necessary to disconnect the test oscillator and place it at an appreciable distance from the receiver.

Tuning Wand—This tool permits checking the accuracy of r-f alignment without disturbing any of the trimmer adjustment screws. It consists of a bakelite rod with a brass cylinder at one end and iron laminations at the other end. An opening is provided in the top surface of each shield in the r-f assembly (see Figure 7) for inserting the wand. Obviously, the inductance of any coil will be lowered when the brass end is inserted and will be raised upon insertion of the iron end. The trimmer setting is correct when the output at alignment frequencies is decreased alike by each end of the wand. If either end causes an increase in output, it is evident that the associated trimmer requires adjustment.

Figure 6—Locations of Trimmers
(viewing bottom of case)



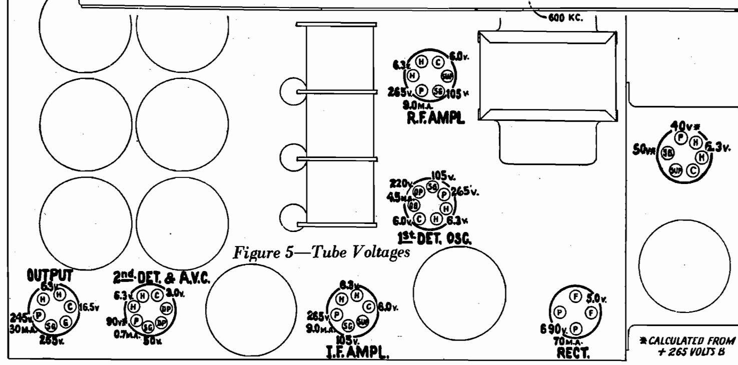


Figure 5—Tube Voltages

MODEL ACR-136
Circuit Data
Voltage, Transformer Data

RCA MFG. CO., INC.

Circuit Description

Before attempting to align or otherwise adjust this receiver, it is advisable to form a general knowledge of the circuit arrangement. A schematic diagram of the complete circuit is shown in Figure 1 (frontispiece). Figure 2 illustrates the arrangement of wiring which interconnects the radio chassis, loudspeaker and front-panel controls while the wiring layout of the radio chassis independently is detailed in Figure 3.

A signal upon entering the receiver passes through a shielded lead to the antenna coupling transformer, the secondary of which is tuned by one section of the three-gang variable capacitor, and is thence impressed upon the grid of the r-f amplifier—a stage of pre-selection used primarily for reducing image-frequency interference to a negligible value. The output of this stage is transformer coupled to the grid circuit of the first detector which also is tuned to the signal frequency by the second unit of the gang capacitor.

As in all superheterodynes, the first detector is actually a mixer stage, combining the incoming r-f carrier with an unmodulated sinusoidal voltage produced by a local oscillator. The oscillator plate circuit, being tuned by the third section of the gang capacitor, maintains a constant frequency difference from the transmitted signal throughout the entire tuning range. Thus, a difference or *beat* frequency is developed when any signal is received which is the same at each position of exact resonance. In this receiver, the functions of the first detector and oscillator are performed by a single tube.

It should be noted at this point that the three tuning ranges are obtained through a coil-selector system in conjunction with the one three-gang variable capacitor. Three sets of coils, each set consisting of three coils, are employed and with each shift of the range switch, a different and complete coil set is substituted. In addition to selecting the desired coil set, other contacts are provided on the range switch to short-circuit the coil set for band A when operating in band B and the coil set for band B together with the oscillator coil for band A when operating in band C. This practice prevents the occurrence of "dead spots" in bands B and C because of absorption effects in coil sets A and B which (when untuned) have natural periods within the range of the next higher-frequency band.

The beat frequency set up in the first detector carries the same modulation as the original r-f signal and is commonly termed the *intermediate* frequency. Since this intermediate frequency is constant for all r-f carriers, the next (i-f amplifier) stage utilizes fixed tuning. Its grid circuit is coupled to the first detector through a transformer, both windings of which are tuned to the intermediate frequency (460 kilocycles) by means of independent adjustable capacitors. A similarly-tuned transformer is used to couple the output of this amplifier to the second detector, making a total of four capacitors for adjustment during alignment.

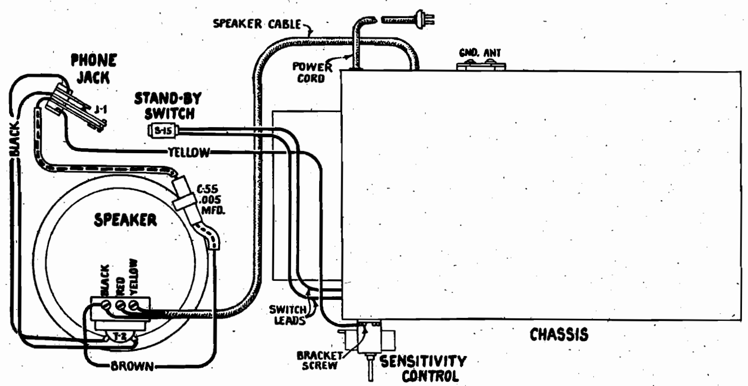


Figure 2—Assembly Wiring Diagram

The i-f signal generated by the beat oscillator for c-w reception also is applied to the input of the second detector. As mentioned in the foregoing section, the variable capacitor operated by the horizontal rod inside the case is actually a *vernier* control which permits adjustment of the oscillator output frequency over a very limited range on either side of the receiver intermediate frequency. The latter is connected in parallel with the main tuning capacitor for the oscillator stage—also a variable air-dielectric unit accessible for adjustment by means of a screw-driver through an opening in bottom of case. Both capacitors together with the oscillator tuning coil are contained inside a single shield.

In addition to detection, the succeeding stage also performs functions of automatic volume control and audio-frequency amplification. Diode detection is employed to avoid distortion and provide automatic volume control. The i-f signal is applied between the cathode and diode plate elements of the tube and the volume control, which is in series with this circuit, assumes a negative d-c potential of an amplitude that varies directly in accordance with the strength of the original r-f carrier. By returning this potential or portions thereof to the grids of the r-f amplifier, first detector and i-f amplifier, these tubes are biased in varying degree to compensate for fluctuations in field strength (fading) and for extreme changes of r-f input when tuning. The switch in this circuit permits elimination of the automatic volume control feature by removing all variable bias from the aforementioned tubes.

The audio-frequency component of the rectified signal is capacitance-coupled from the arm of the volume control to the grid of the pentode section wherein amplification occurs. Resistance coupling is used between this amplifier section and the power output stage which also is connected as a pentode for high-power sensitivity. The plate circuit of the output stage is matched to the cone coil of the electro-dynamic loudspeaker through a step-down (output) transformer.

A tone control circuit consisting of a variable resistor and a fixed capacitor in series is connected across the primary of the output transformer. The sensitivity control is a variable resistor common to the cathode circuits of the r-f and i-f amplifiers for alteration of self-bias produced by the combined plate currents for those tubes.

All power voltages are obtained from a full-wave rectifier and filter system connected to the a-c line. The loudspeaker field coil is excited from this system and serves therein as a filter reactor.

A-C Line Voltages

As noted under Electrical Specifications in Part I, this receiver is manufactured in three a-c line ratings designated as A, B and C, respectively. The first two models (A and B) cover a single-voltage range (105 to 125 volts), whereas the third or "C" model is operable in either of four ranges (100 to 117, 117 to 130, 195 to 225 and 225 to 250), three taps being provided on the primary of the power transformer. Internal connections of the transformer are shown in Figure 4. All taps are brought out to a terminal board on the top of the transformer and may be interchanged without removing the chassis from its case.

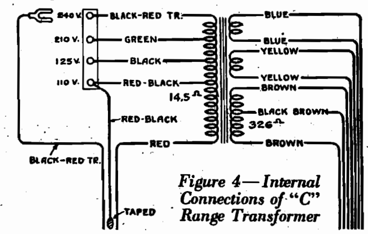


Figure 4—Internal Connections of "C" Range Transformer

Tube Voltages

The following voltages are normal at the tube sockets when the receiver is operating at 115 volts a-c line, with no incoming r-f signal, with the volume and sensitivity controls at "maximum" (both turned fully clockwise), and with the automatic volume control switch turned to the "on" position. Such voltages, of course, were measured with high-resistance meters. If low-resistance meters are used in checking, therefore, allowances must be made for meter-current drain. See Figure 5.

Radiotron Type Number	Cathode to Ground (Volts)	Screen Grid to Ground (Volts)	Plate to Ground (Volts)	Plate Current (M. A.)	Heater Volts
RCA-6D6 (R-F Amplifier)	6.0	105	265	9.0	6.3
RCA-6A7 (1st Detector)	6.0	105	265	3.5	6.3
(Oscillator)	—	—	220	4.5	6.3
RCA-6D6 (I-F Amplifier)	6.0	105	265	9.0	
RCA-6D6 (Beat Oscillator)	—	50*	40*	—	6.3
RCA-6B7 (2nd Detector)	3.0	50	90*	0.7	6.3
RCA-41 (Output)	16.5	265	245	30.0	6.3
RCA-80 (Rectifier)	—	—	690 (r-m-s) Plate to Plate	70.0 Total	5.0

* Difficult to measure—Calculated from 265 Volts (+B).

MODELS 143,242,243
1935 Production
Schematic, Speakers

RCA MFG. CO., INC.

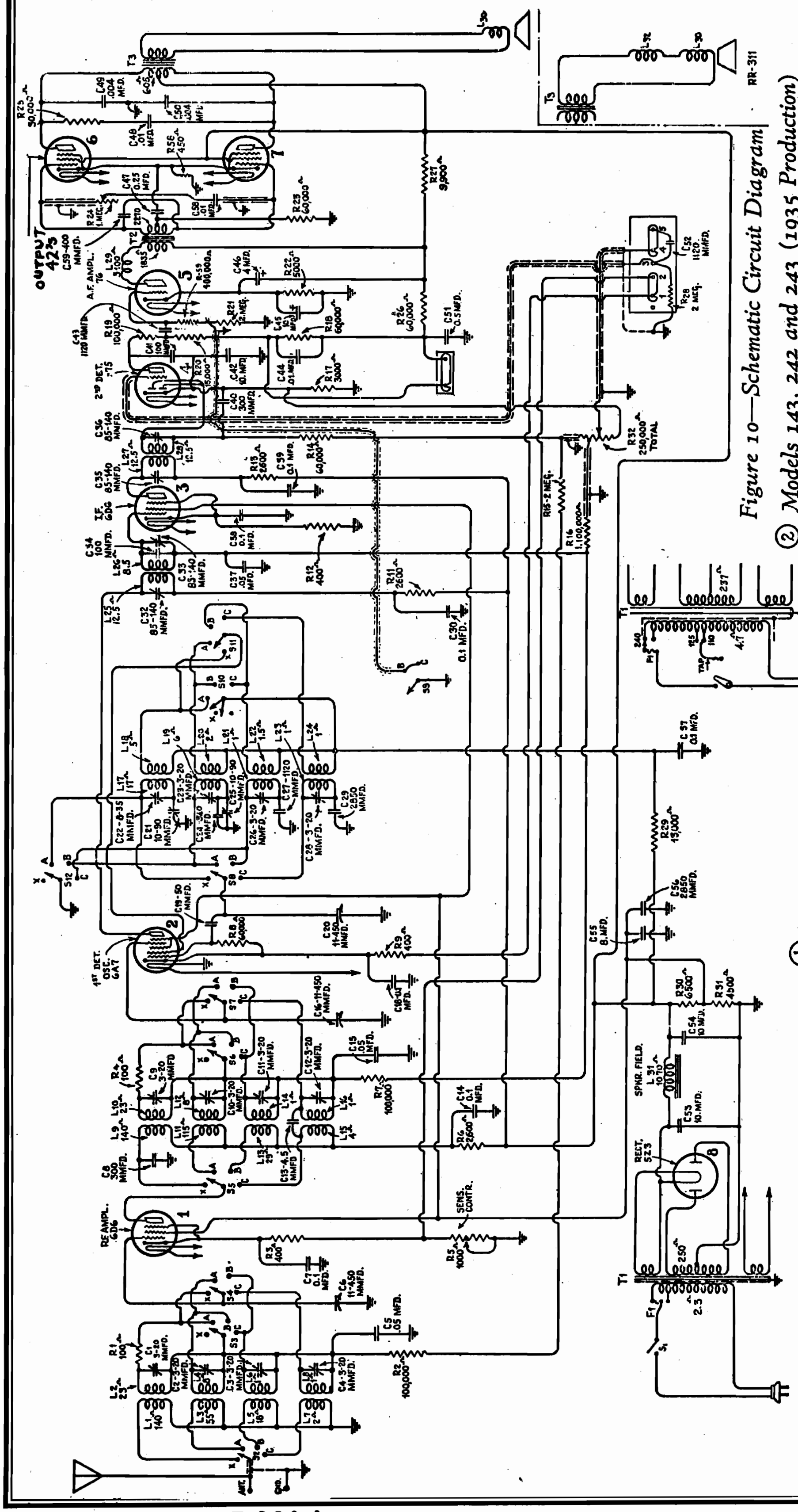


Figure 10—Schematic Circuit Diagram
② Models 143, 242 and 243 (1935 Production)

IF PEAK 460 KC.

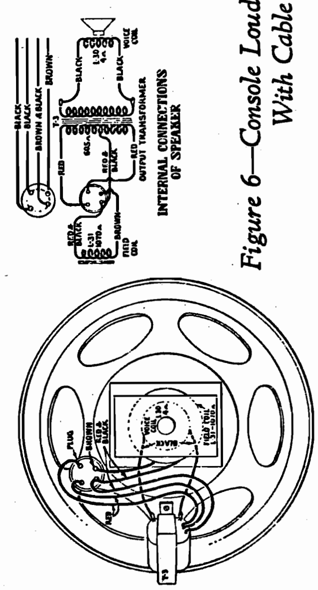


Figure 6—Console Loudspeaker Wiring—With Cable Plug

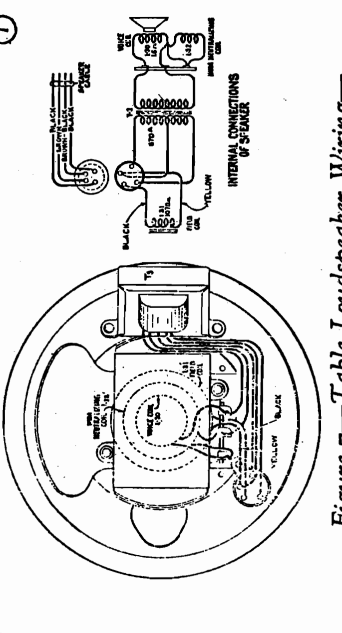
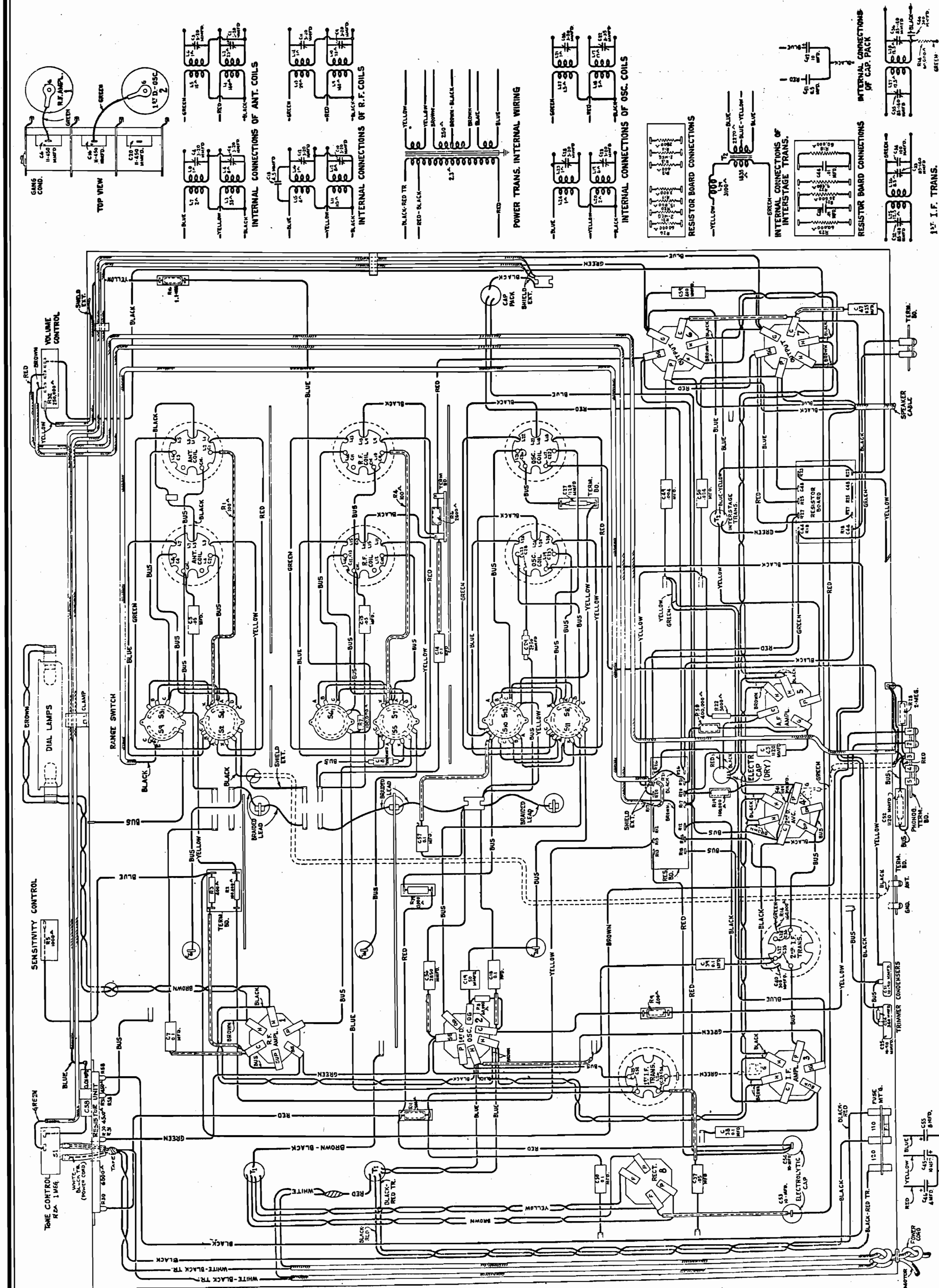


Figure 7—Table Loudspeaker Wiring—With Cable Plug

MODELS 143,242,243
1935 Production
Chassis Wiring

RCA MFG. CO., INC.



FOR PLUG TYPE SPEAKER CABLE
BROWN REPLACES RED
BLACK REPLACES BLUE
BR-BL REPLACES BLACK

Figure 11—Chassis Wiring Diagram
Models 143, 242 and 243 (1935 Production)

RCA MFG. CO., INC.

REPLACEMENT PARTS—Models 143, 242 and 243 (1935 Production)

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4632	Board—Terminal board—Two terminals and link—For changing fidelity	$0.25
4379	Board—Antenna terminal board	.20
4427	Bracket—Volume control, tone control or noise suppressor mounting bracket	.18
4244	Cap—Contact cap—Package of 5	.20
3861	Capacitor — Oscillator trimmer capacitor (C21, C25)	.78
4633	Capacitor—50 mmfd. (C19)	.25
4635	Capacitor—100 mmfd. (C41)	.25
4248	Capacitor—300 mmfd. (C8)	.22
4811	Capacitor—340 mmfd. (C24)	.25
4183	Capacitor—400 mmfd. (C59)	.26
4412	Capacitor—1120 mmfd. (C27)	.25
4409	Capacitor—1120 mmfd. (C43)	.35
4634	Capacitor—1120 mmfd. (C52)	.35
4524	Capacitor—2850 mmfd. (C29)	.35
4615	Capacitor—2850 mmfd. (C56)	.34
4628	Capacitor—0.004 mfd. (C49, C50)	.28
3787	Capacitor—0.01 mfd. (C48)	.30
4212	Capacitor—0.01 mfd. (C44)	.30
4624	Capacitor—0.01 mfd. (C58)	.54
4836	Capacitor—0.05 mfd. (C5, C15, C37)	.30
4791	Capacitor—0.1 mfd. (C7, C18, C38)	.24
4885	Capacitor—0.1 mfd. (C14, C30, C39, C57)	.28
4840	Capacitor—0.25 mfd. (C47)	.30
7790	Capacitor—10 mfd. (C53, C54)	1.05
4619	Capacitor pack—Comprising one 0.5 mfd., one 10 mfd. capacitor (C42, C51)	1.44
4626	Capacitor pack—Comprising one 4 mfd., one 10 mfd. and one 8 mfd. capacitor (C45, C46, C55)	2.82
4358	Clamp—Electrolytic capacitor clamp—For capacitor Stock No. 7790	.15
4693	Clamp—Electrolytic capacitor clamp—For capacitor Stock No. 4626	.15
7810	Coil—Antenna coil "Band B-X" (L1, L2, L5, L6, C1, C3)	2.10
7803	Coil—Antenna coil "Band A-C" (L3, L4, L7, L8, C2, C4)	1.82
7808	Coil—Detector coil "Band X-B" (L9, L10, L13, L14, C9, C11)	2.05
7805	Coil—Detector coil "Band A-C" (L11, L12, L15, L16, C10, C12, C13)	2.15
7807	Coil—Oscillator coil "Band A-C" (L19, L20, L23, L24, C23, C28)	1.62
7809	Coil—Oscillator coil "Band X-B" (L17, L18, L21, L22, C22, C26)	$1.70
4806	Condenser—3-gang variable tuning condenser (C6, C16, C20)	5.64
4371	Cover—Fuse mount cover	.15
4631	Cover—Terminal strip cover	.15
10907	Fuse—3-ampere—Package of 5	.40
3376	Mount — Fuse mount — 105-125-volt instrument	.40
4604	Mount—Fuse mount for 200-250-volt instrument	.35
4625	Resistor—Wire wound resistor—Comprising one 6500-ohm-4500-ohm and 450 section (R30, R31, R58)	.70
3704	Resistor—400 ohms—Carbon type—¼ watt (R3, R9, R12)—Package of 5	1.00
4812	Resistor — 2600 ohms — Carbon type — ¼ watt (R6, R11, R13)—Package of 5	1.00
4242	Resistor — 3000 ohms — Carbon type — ¼ watt (R17)—Package of 5	1.00
2871	Resistor — 5000 ohms — Carbon type — ¼ watt (R22)—Package of 5	1.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R20)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8, R18, R23, R26)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R2, R7, R19)—Package of 5	1.00
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R59)—Package of 5	1.00
4783	Resistor—1,100,000 ohms—Carbon type—¼ watt (R16)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R15, R21, R28)—Package of 5	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt (R27)—Package of 5	1.00
4623	Resistor—13,000 ohms—Carbon type—½ watt (R29)—Package of 10	2.00
2240	Resistor—30,000 ohms—Carbon type—1 watt (R25)	.22
4418	Resistor—100 ohms—Flexible type (R1, R4)—Package of 10	1.50
4618	Rheostat—Sensitivity control (R5)	1.25
4742	Shield—Antenna, detector or oscillator coil shield	.40
4627	Shield—First detector—Oscillator Radiotron shield	.36
6956	Shield—First detector—Oscillator Radiotron shield top	.15
4452	Shield—Second detector—"A.V.C." Radiotron shield	.35
4629	Shield—Second detector—"A.V.C." Radiotron shield top	.15
3950	Shield—I. F. amplifier Radiotron shield	$0.26
4521	Shield—I. F. amplifier shield	.42
4663	Shield—Oscillator coil wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal board, clamp and resistor	.32
4664	Shield—Oscillator wiring shield—Shields oscillator coil wiring from R. F. coil—Complete with terminal strip and resistor	.36
4630	Shield—R. F. amplifier—Radiotron shield	.36
4665	Shield—R. F. coil wiring shield with two resistors and terminal board	.50
3529	Socket—Dial lamp socket	.32
4784	Socket—4-contact Radiotron socket	.15
4814	Socket—5-contact Radiotron socket	.15
4786	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
4617	Switch—Range switch (S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12)	3.32
4813	Tone control (R24, S1)	1.42
4431	Transformer—First intermediate frequency transformer (L25, L26, C32, C33, C34)	2.28
9505	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105-125 volts—25-40 cycles	8.90
9507	Transformer—Power transformer—105-250 volts—40-60 cycles	6.40
4433	Transformer—Second intermediate frequency transformer (L27, L28, C35, C36, C40, R14)	2.15
4620	Transformer and reactor—Interstage transformer and reactor (T2, L29)	2.98
4809	Volume control (R32)	1.45
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	1.00
7799	Drive—Variable tuning condenser drive complete	2.45
4827	Gear—Spring gear assembly complete with hub, pinion, gear, cover and spring	1.25
4704	Indicator—Band indicator—Celluloid	.12
4367	Indicator—Station selector vernier pointer—Small	.15
4520	Indicator—Station selector main pointer—Large	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or condenser drive—Package of 10	.25
4377	Spring — Band indicator and arm tension spring—Package of 5	$0.25
4722	Pinion — Vernier pointer pinion — Station selector pointer stem	.18
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLY (TABLE MODEL)	
5038	Cable—4-conductor—Reproducer cable with female connector plug	.60
9534	Coil—Field coil (L31)	1.90
9533	Cone—Cone mounted and centered on housing (L30)	3.50
5039	Connector—4-prong male connector for reproducer cable	.25
5040	Connector—4-contact female connector for reproducer cable	.25
9593	Reproducer complete	7.50
9535	Transformer—Output transformer (T3)	1.50
	REPRODUCER ASSEMBLY (CONSOLE MODEL)	
5038	Cable—4-conductor—Reproducer cable with female connector plug	.60
9591	Coil—Field coil magnet and cone support (L31)	4.00
8969	Cone—Reproducer cone (L30)—Package of 5	6.35
5039	Connector—4-prong male connector for reproducer cable	.25
5040	Connector—4-contact female connector for reproducer cable	.25
9592	Reproducer complete	8.00
5041	Transformer—Output transformer (T3)	1.40
	MISCELLANEOUS PARTS	
4677	Bezel—Metal bezel (escutcheon) for station selector dial*	.56
4621	Dial—Station selector dial	.65
4895	Escutcheon—Station selector escutcheon and celluloid crystal*	.55
6614	Glass—Station selector dial glass*	.30
4449	Knob—Station selector, volume control, tone control, noise suppressor rheostat on range switch knob—Package of 5	.60
4340	Lamp—Dial lamp—Package of 5	.60
4678	Ring—Retaining ring for dial glass—Package of 5*	.35
4446	Screw assembly—Chassis mounting screw assembly—Comprising four screws, four lockwashers, four washers, four spacers and eight cushions—For table model	.28
4613	Screw—No. 8-32-1/16" headless set screw for knobs—Package of 10	.25

* Used on some models
S. O. 765208 11M

MODEL 236-B
Alignment
Parts List

RCA MFG. CO., INC.

SERVICE DATA

(1) Line-Up Capacitor Adjustments

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9050, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I. F. Tuning Adjustments

The I. F. amplifier comprises two stages which have three transformers. The third transformer is untuned so that only a total of four tuned circuits are used. Refer to Figure 4 and proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight glow is obtained in the output indicator.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight glow is obtained in the output indicator at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. alignment.

R. F. and Oscillator Adjustments

The important points to remember are the need for using the minimum oscillator output to obtain an indication in the output device with the volume control at its maximum position and the manner of obtaining the proper high-frequency oscillator and detector adjustments.

The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.

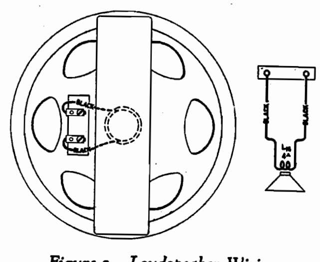


Figure 3—Loudspeaker Wiring

(b) Then set the Test Oscillator at 1720 K. C., the dial pointer at 1720, and adjust the oscillator output so that a slight glow will be obtained in the output indicator when the volume control is at its maximum position. Adjust the two trimmers under the two R. F. coils, see Figure 4, until a maximum output is obtained. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K. C. adjustment.

(2) Voltage and Current Measurements

Voltage and current values listed in the following table and indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the filaments (F-F). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests; the lower the voltmeter resistance, the lower the degree of accuracy. Allowances must therefore be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
4498	Capacitor—8 mfd. (C18)	1.25
4442	Capacitor—50 mmfd. (C10)	.22
3981	Capacitor—300 mmfd. (C25)	.30
4413	Capacitor—360 mmfd. (C16)	.22
2749	Capacitor—2400 mmfd. (C26)	.35
4801	Capacitor—2400 mmfd. (C31, C32)	.50
4529	Capacitor—2650 mmfd. (C33)	.32
4858	Capacitor—0.01 mfd. (C29)	.25
4518	Capacitor—0.05 mfd. (C27)	.52
4836	Capacitor—0.05 mfd. (C5, C19, C23, C24)	.30
4906	Capacitor—0.017 mfd. (C30)	.25
4791	Capacitor—0.1 mfd. (C8, C28)	.24
4840	Capacitor—0.25 mfd. (C7)	.30
3861	Capacitor — Adjustable trimmer capacitor (C17)	.78
4796	Coil—Antenna coil (L4, L5, R1, C4)	2.30
4800	Coil—Oscillator coil (L8, L9, C35)	1.90
4504	Condenser—2-gang variable tuning condenser (C6, C9)	2.78
4370	Resistor—1,000 ohms—Carbon type—¼ watt—Package of 10 (R5)	2.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2, R7)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4, R6)—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R11, R12)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R13)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R8, R10)—Package of 5	1.00
4521	Shield—Antenna, oscillator or I. F. transformer shield	.42
7487	Shield—Second detector Radiotron shield—"AVC"	.25
3942	Shield—First detector and oscillator Radiotron shield	.18
3056	Shield—First I. F., second I. F., first audio Radiotron shield—Package of 2	.40
4794	Socket—4-contact Radiotron socket	.15
4784	Socket—4-contact audio amplifier—Radiotron socket	.15
4786	Socket—6-contact detector-oscillator Radiotron socket	.15
4785	Socket—6-contact output Radiotron socket	.15
4799	Switch—Tone control switch (S3)	.62
4431	Transformer—First intermediate transformer (L10, L11, C13, C14, C15)	2.28
7840	Transformer — Second intermediate transformer (L12, L13, C20, C21, C22)	2.35
4538	Transformer—Third intermediate frequency transformer (L14, L15)	$2.15
4533	Transformer pack—Audio transformer pack—Comprising driver and output transformer (T1, T2)	3.98
4535	Volume control (R9)	1.40
	REPRODUCER ASSEMBLIES	
4541	Cable—2-conductor reproducer cable	.38
9432	Cone—Reproducer cone (L16)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7819	Reproducer complete	12.18
4234	Rivet—Cone mounting rivet—Package of 100	.66
	DRIVE ASSEMBLY	
4996	Dial—Station selector dial	.75
4798	Drive—Variable tuning condenser drive assembly complete	1.50
4363	Pointer—Station selector pointer	.18
4669	Screw—No. 8-32-5/32 square head set screw for condenser drive—Package of 10	.25
4997	Shaft—Condenser drive shaft	.28
	MISCELLANEOUS ASSEMBLIES	
4895	Bezel—Metal bezel (escutcheon) and crystal for station selector drive	.55
4289	Body—Fuse connector body—Package of 10	.35
7867	Cable—8-conductor battery cable complete	.78
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector complete	.16
4286	Ferrule—Fuse connector ferrule and bushing—Package of 10	.38
3748	Fuse—0.5 ampere—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
4449	Knob—Station selector, volume control, tone or battery switch knob—Package of 5	.60
4644	Resistor—0.38 ohms—Flexible type—Filament series (R15)—Package of 5	.80
4638	Screw—Chassis mounting screw assembly—Comprising eight cushions, four screws, four washers, four lockwashers and four spacers	.52
3238	Screw—6-40-1⅛" knurled head—Set screw for operating switch knob No. 3088—Package of 10	.25
4613	Screw—8-32-⅛" headless set screw for station selector volume control, tone control or range switch knob—Package of 10	.25
4284	Spring—Fuse connector spring—Package of 10	.30
4797	Switch—Operating switch	1.50
4285	Washer—Fuse connector insulating washer—Package of 10	.22

MODEL 236-B
Schematic, Voltage
Trimmers, Socket

RCA MFG. CO., INC.

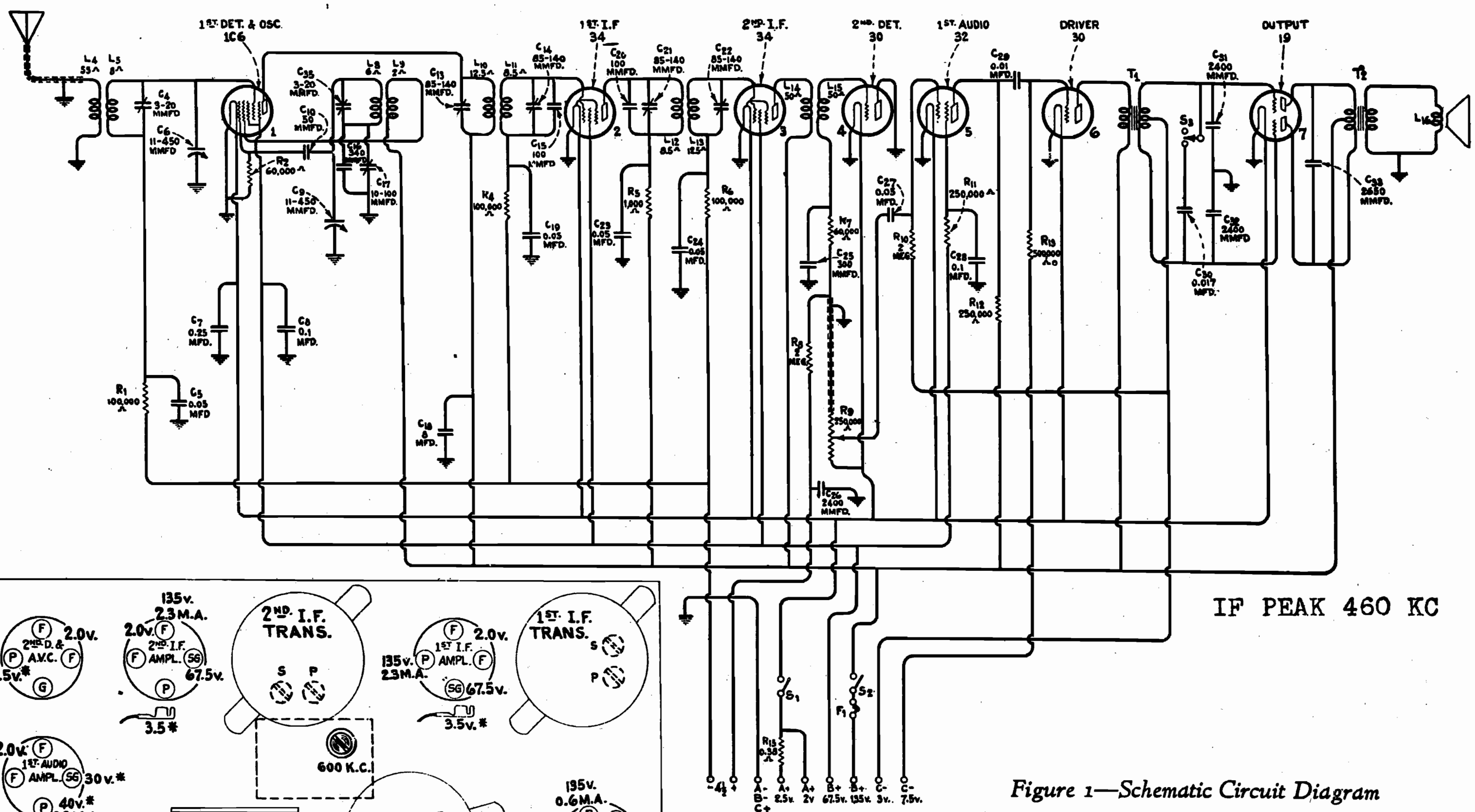


Figure 1—Schematic Circuit Diagram

Total "A" Battery Current	0.68 Ampere
Maximum "B" Battery Current	21 M. A.
Tuning Range	540 K. C.–1720 K. C.
Maximum Undistorted Output	1.2 Watts
Maximum Output	2.2 Watts
Line-up Frequencies	460 K. C., 600 K. C. and 1720 K. C.

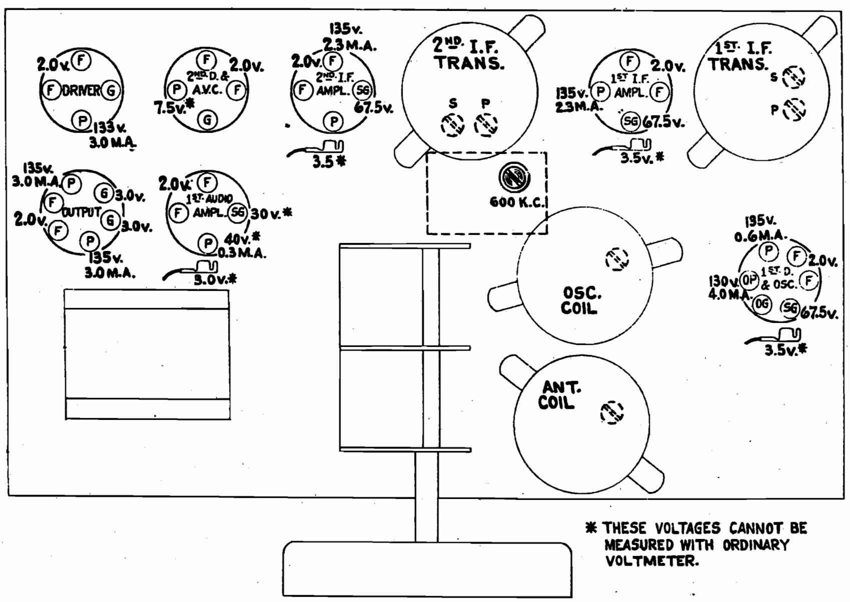


Figure 4—Line-Up Capacitor Locations and Voltage Values at Socket Contacts

MODEL 236-B
Chassis Wiring

RCA MFG. CO., INC.

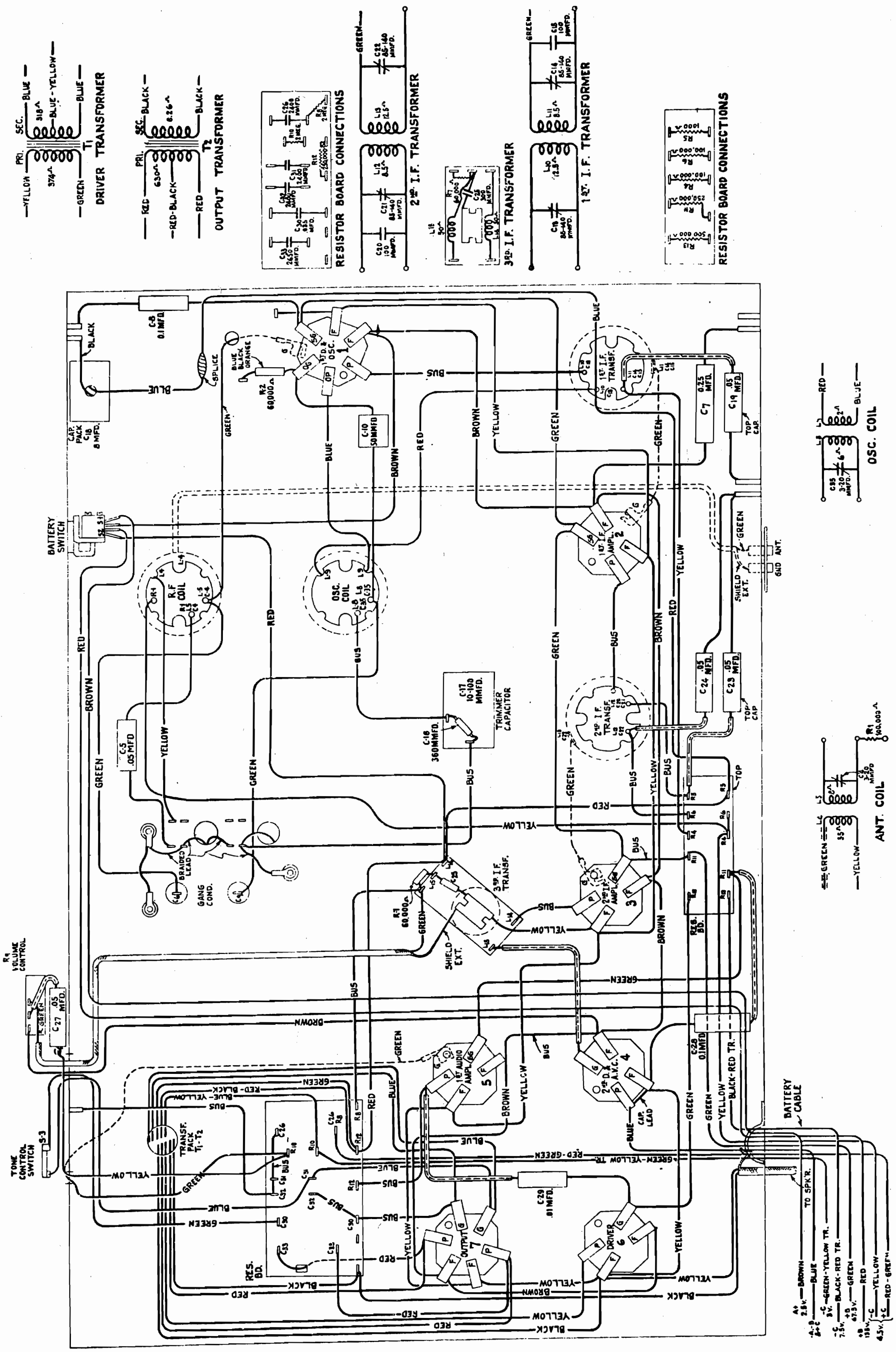


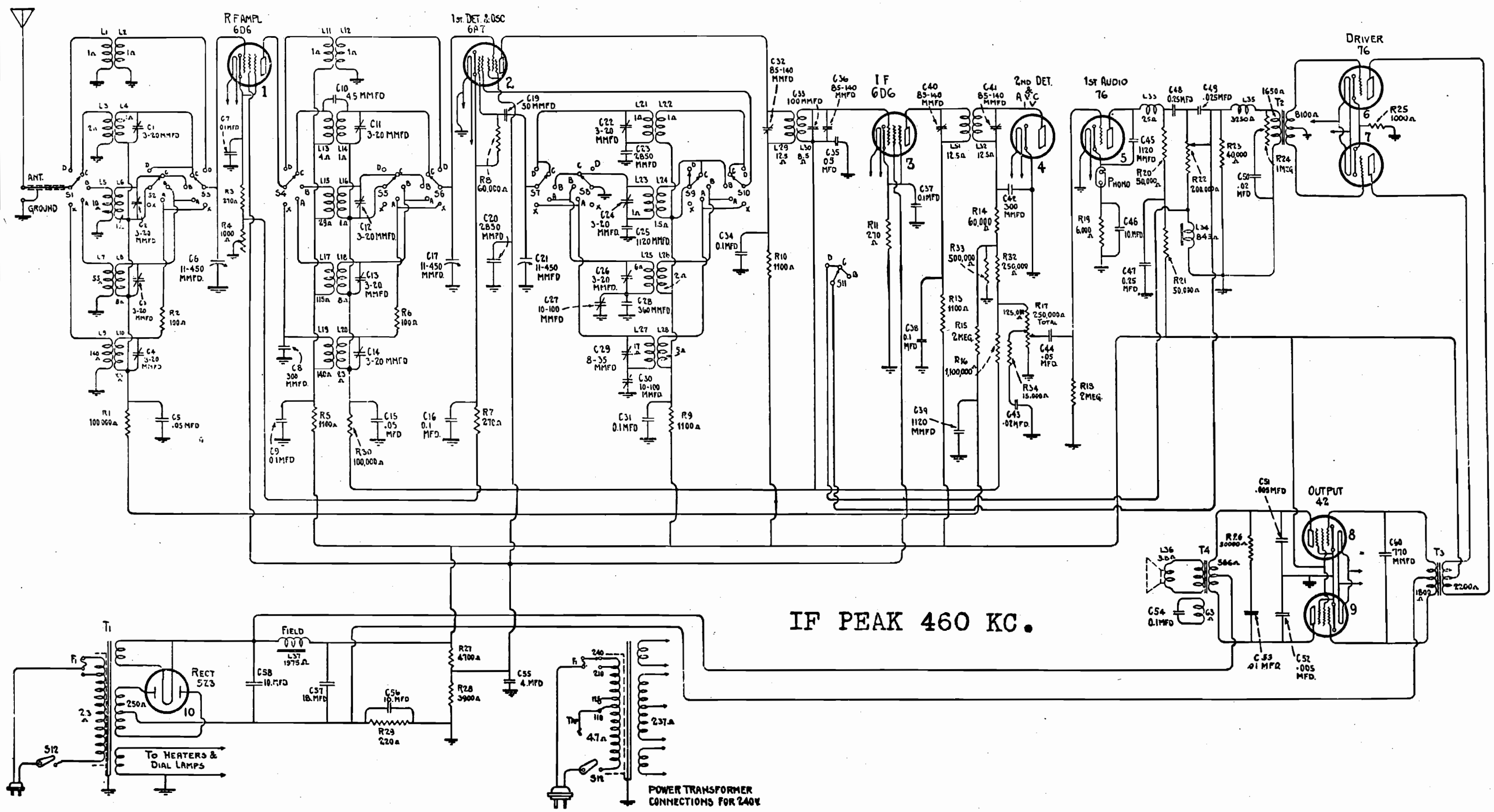
Figure 2—Chassis Wiring Diagram

MODEL 262
Late Production
Schematic

RCA MFG. CO., INC.

SUPPLEMENT
to
RCA VICTOR MODEL 262 SERVICE NOTES

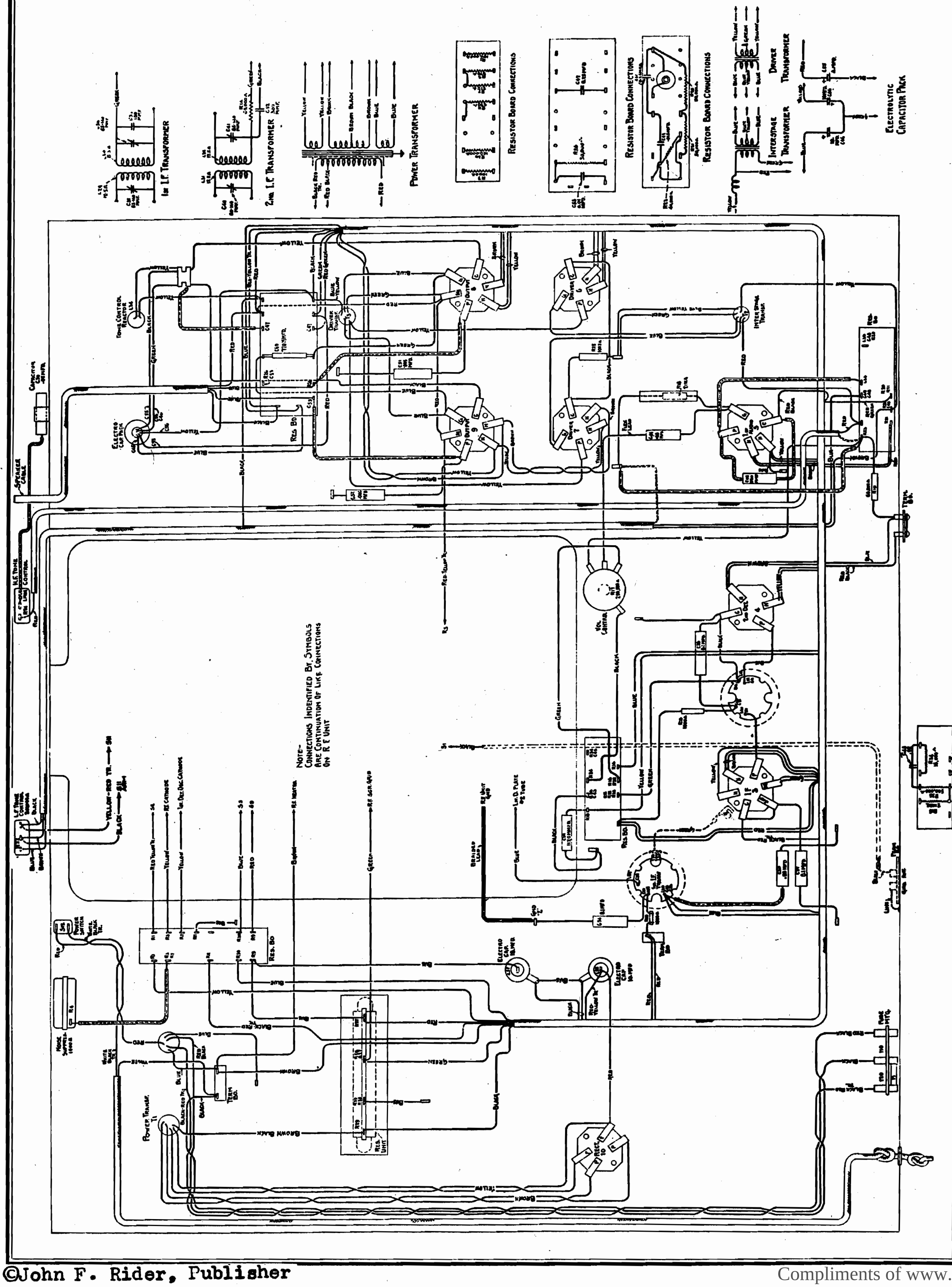
Late production of the RCA Victor Model 262 uses Radiotron RCA-1-V as the second detector instead of Radiotron RCA-76. The changes in the schematic and chassis wiring diagrams are shown on this and the reverse page.



Schematic Circuit Diagram

MODEL 262
Late Production
Chassis Wiring

RCA MFG. CO., INC.



MODELS 262,263
1935 Production
Schematic

RCA MFG. CO., INC.

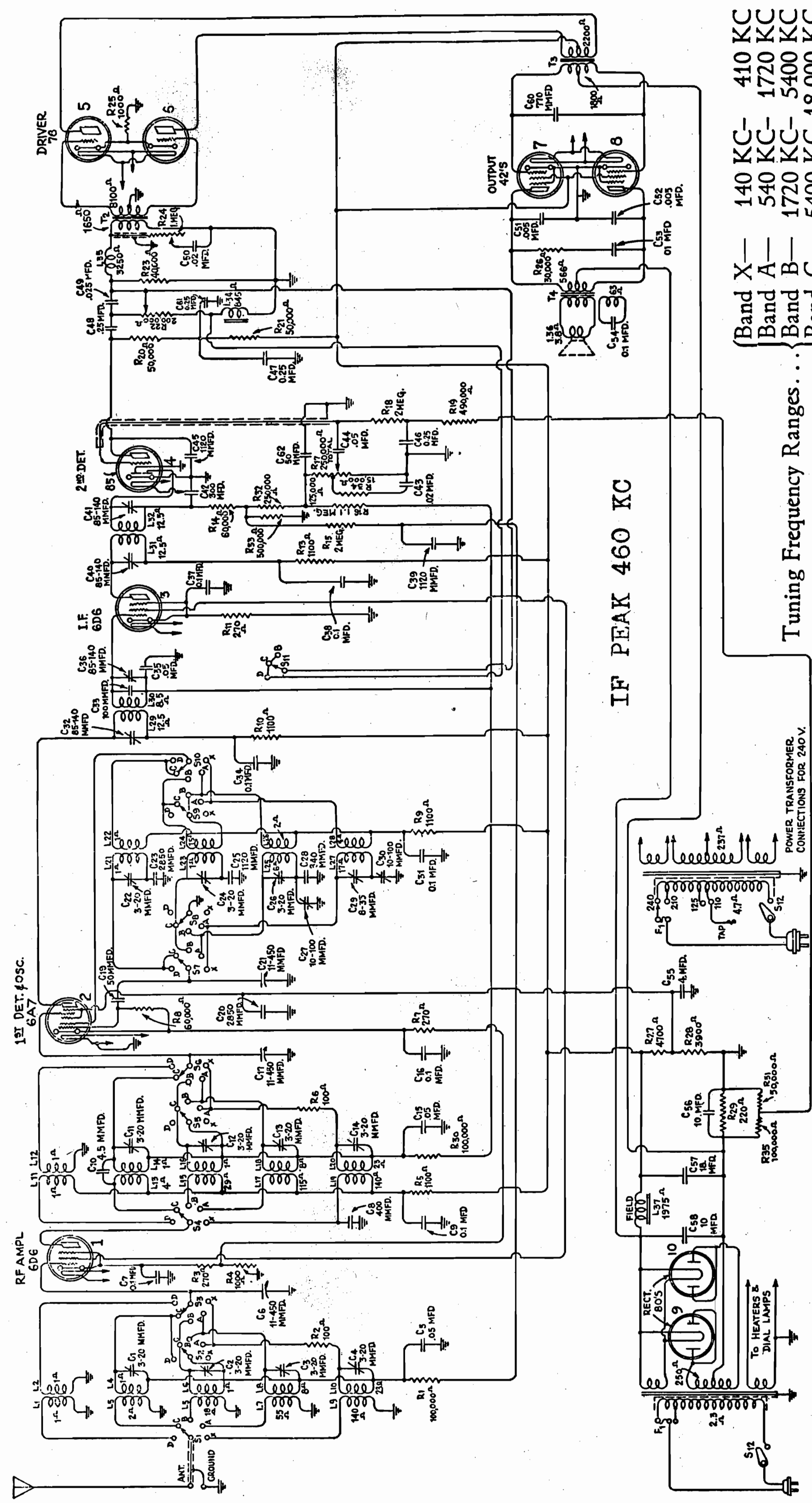


Figure 3—Schematic Circuit Diagram

Tuning Frequency Ranges		
Band X—	140 KC–	410 KC
Band A—	540 KC–	1720 KC
Band B—	1720 KC–	5400 KC
Band C—	5400 KC–18,000 KC	
Band D—18,000 KC–36,000 KC		

Voltage Ratings..........................105–125 Volts
Frequency Ratings..........................25–60 Cycles and 50–60 Cycles
Power Consumption..........130 Watts at 125 Volts, 50 Cycles; 130 Watts at 125 Volts, 25 Cycles
Number and Type of Radiotrons
2 RCA-6D6, 1 RCA-6A7, 2 RCA-76, 1 RCA-85, 2 RCA-42, 2 RCA-80—Total, 10

Line-up Frequencies..........175 KC, 410 KC, 460 KC, 600 KC, 1720 KC, 5160 KC, and 18,000 KC
Maximum Undistorted Output..........................7 Watts
Maximum Output..........................14 Watts

MODELS 262,263
1935 Production
R-F.Unit Wiring Diagram
Speaker Data

RCA MFG. CO., INC.

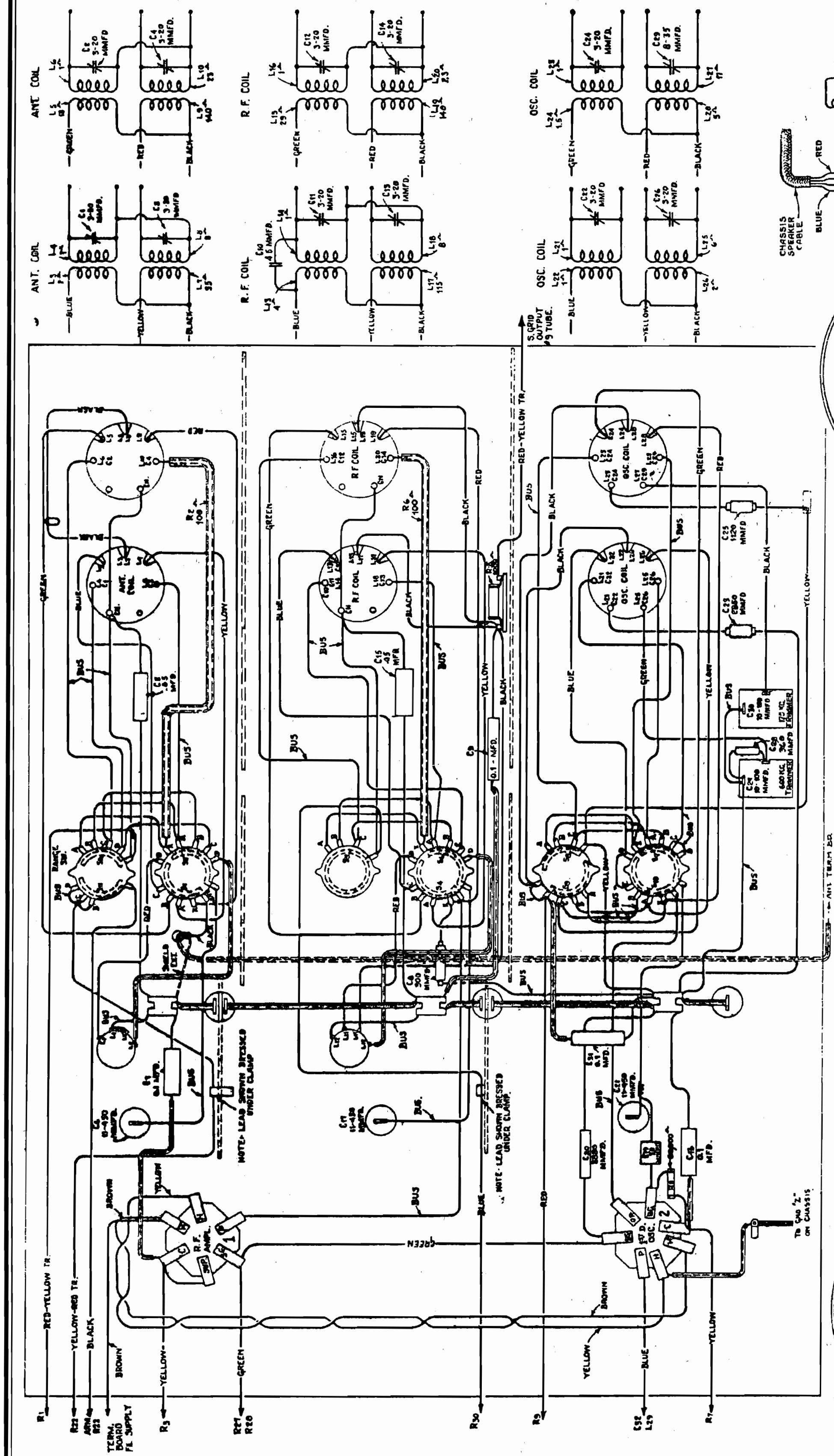


Figure 5—R. F. Unit Wiring Diagram

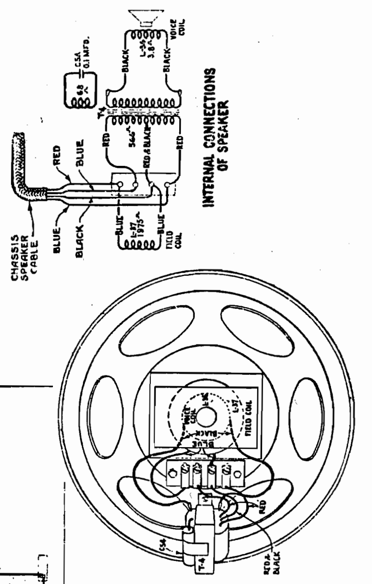


Figure 1—Loudspeaker Wiring—Without Plug

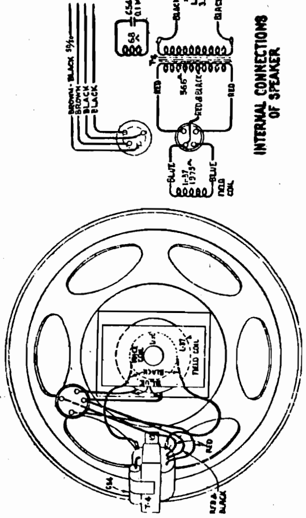
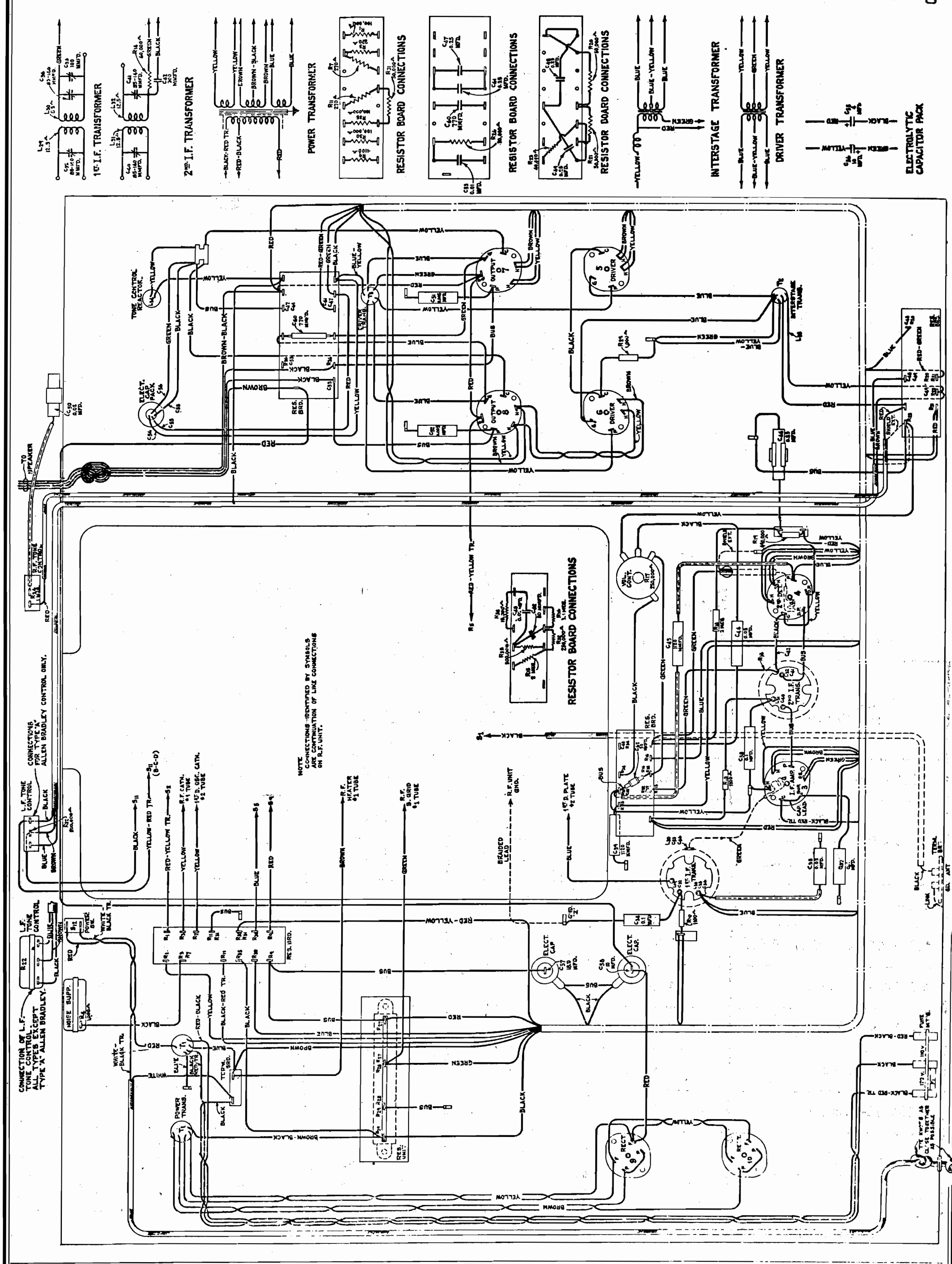


Figure 2—Loudspeaker Wiring for Plug-In Type

MODELS 262,263
1935 Production
Chassis Wiring

RCA MFG. CO., INC.



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MODELS 262,263
1935 Production
Socket,Voltage

RCA MFG. CO., INC.

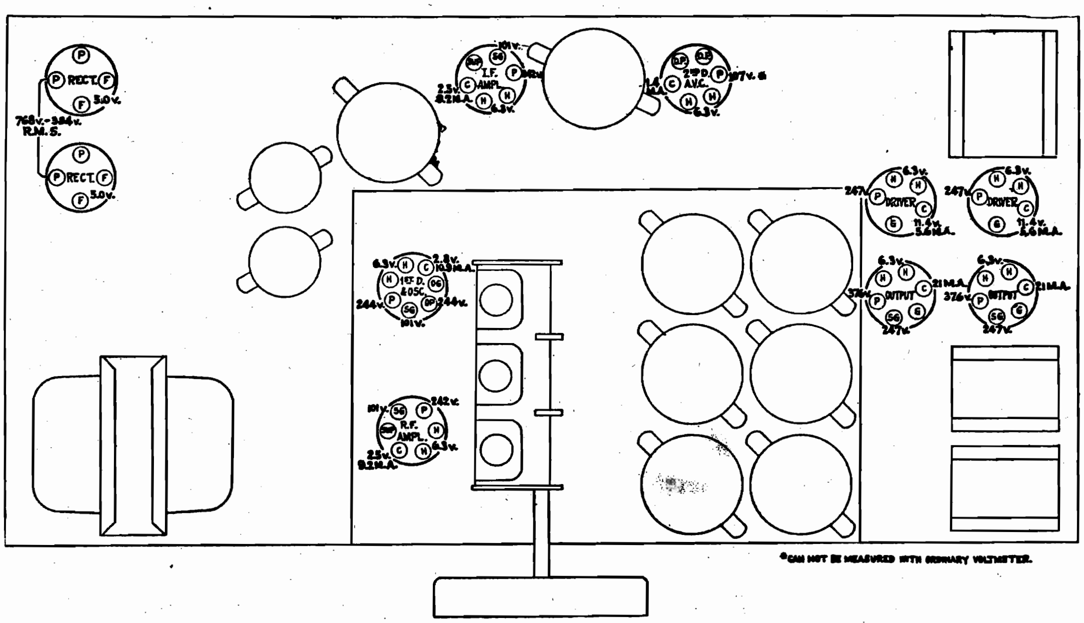


Figure 8—Radiotron Socket Voltages

RADIOTRON SOCKET VOLTAGES

120-Volt A. C. Input—Volume and Sensitivity Controls Maximum—Band Switch at "A"—No Signal

Radiotron Type and Purpose		Cathode to Ground Volts, D. C.	Screen Grid to Ground Volts, D. C.	Plate to Ground Volts, D. C.	Cathode Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		2.5	101	242	9.2	6.3
RCA-6A7	Detector	2.8	101	244	10.9	6.3
	Oscillator	—	—	244		
RCA-6D6—I. F.		2.5	101	242	9.2	6.3
RCA-85—2nd Det. AVC		0	—	107*	1.4	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-76—Driver		11.4	—	247	5.6	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-42—Power		0	247	376	21.0	6.3
RCA-80—Rectifier		—	—	768/384 R. M. S.	56.0	5.0
RCA-80—Rectifier		—	—		56.0	5.0

*Cannot be measured with ordinary voltmeter.

RCA MFG. CO., INC.

SERVICE DATA

(1) LINE-UP PROCEDURE

The line-up procedure for these receivers is somewhat involved and it is important that these instructions be carefully followed when making adjustments. Properly aligned, they have outstanding performance, otherwise, poor reception may be experienced.

Equipment

To align this receiver, proper test equipment must be used. This consists of a modulated R. F. oscillator having proper frequency range, an output indicator, an alignment tool and a tuning wand. These parts have been developed by the manufacturer of this receiver for use by service men to duplicate the original factory adjustments.

Checking with Tuning Wand

Before making any R. F., oscillator or first detector adjustments, the accuracy of the present adjustments may be checked by means of the tuning wand (Stock No. 6679). The tuning wand consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron insert at the other end. Inserting the cylinder into the center of a coil lowers its inductance, while inserting the iron end increases its inductance. From this, it is seen that unless the trimmer adjustment for a particular coil is correctly adjusted, inserting one end of the wand may increase the output of a particular signal. A perfect adjustment is evidenced by a lowering of output when either end of the wand is inserted into a coil.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 6. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 KC and the signal tuned in. The output indicator should be connected across the voice coil of the loudspeaker. Then insert the tuning wand, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when either end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is out of alignment. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

There is one I. F. stage, with two I. F. transformers in the receiver. A total of four adjustable capacitors are used, two on each transformer. The transformers are both peaked at 460 KC.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 KC between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 KC. Place the receiver in operation and adjust the station selector until a point is reached (Band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 7. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in Bands "A" and "X." Three are required in Bands "B" and "C." None are required in Band "D."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should be toward the horizontal line at the lowest frequency end of Band "A," while the other end should point to within 1/64 inch of the horizontal line at the highest frequency end of band "A."

Figure 7 shows the location of the trimmers for each band. Care must be exercised to only adjust the trimmers in the band under test.

Band "X"

(a) Set the band switch at "X."

(b) Tune the external oscillator to 410 KC, set the pointer at 410 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 175 KC. Tune in the 175 KC signal irrespective of scale calibration and adjust the series trimmer marked 175 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 KC as described in (a).

Band "A"

(a) Set the band switch at "A."

(b) Tune the external oscillator to 1720 KC, set the pointer at 1720 KC and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator to 600 KC. Tune in the 600 KC signal irrespective of scale calibration and adjust the series trimmer, marked 600 KC on Figure 7, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1720 KC as described in (a).

Band "B"

(a) Set the band switch at "B."

(b) Tune the external oscillator to 5160 KC, and set the pointer at 5160 KC. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which will be received at approximately 4240 on the dial if the oscillator trimmer has been set correctly in accordance with paragraph (b).
It will probably be necessary to increase the external oscillator output for this check.

(d) Reset the dial to 5160 KC and peak the antenna and detector trimmers for maximum output.

Band "C"

(a) Set the band switch at "C."

(b) Tune the external oscillator to 18,000 KC, and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacity from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "D"

No adjustments are required for Band "D."

(4) MAGNETIC PICKUP CONNECTIONS

A convenient point for attachment of a phonograph turntable exists at the RCA-85 second detector stage, where such an input may be connected between the control grid cap and ground. A switching arrangement should be provided for disconnecting or shorting the antenna input to prevent the reception of radio signals when the record adjunct is being used. It will be necessary to provide an external volume control for the phonograph. The wiring should be well shielded to prevent "hum" pickup.

(5) ADJUSTMENT OF DIAL VERNIER MECHANISM

A small vernier indicator is provided for giving a simple means of band spread. Under normal conditions, adjustment of this mechanism will not be required. However, in event the initial adjustment is not satisfactory or adjustment is required because of replacement, the following procedure should be used:

(a) Remove the chassis from the cabinet to a place convenient for work.

(b) Check the tension on the vernier hand by pushing it in a counter-clockwise direction. There should be tension against such a push. If this tension does not exist, the action of the hand may be erratic and possibly fail to return to the same position for a particular station.

(c) Pull off the long hand with a pair of long-nose pliers.

(d) Straighten the lugs that hold the dial in place. Then remove the dial "vernier" hand and stem gear together.

(e) Then remove the "vernier" hand from the stem gear.

(f) Turn the dial to each extreme and to its center position and check the backlash of the back gear (closest to reflector). There should be definite backlash in each direction at each of these three positions.

(g) If this backlash is not obtained, it will be necessary to re-adjust the position of the gears. Loosen the lock-screw located above the central set of gears and move the adjoining gear assembly in or out of mesh as required.

(h) After making sure there is backlash at the three check points mentioned, turn the outside gear in a clockwise direction 1½ turns.

MODELS 262,263
1935 Production
Trimmers,Data

RCA MFG. CO., INC.

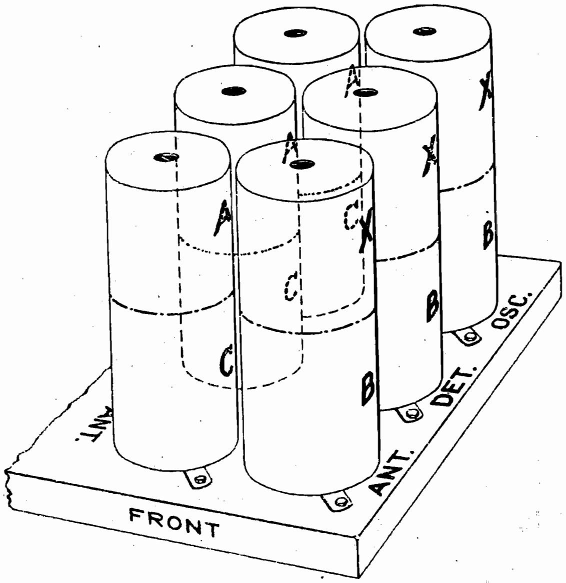


Figure 6—Location of Coils in Shields

Hold it at this position and replace the stem gear.

(i) Turn the dial throughout its range. If the gears become noisy, move the gear further toward the reflector edges described in (g).

(j) Replace the dial scale, making sure the hole clears the spindle.

(k) Replace the vernier hand. It should point at zero when the tuning capacitor is fully meshed.

(l) Replace the large hand. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of Band "A" when the tuning capacitor is fully meshed.

The above covers the proper manner of making adjustments, assuming all parts are in normal condition. Of course, if any part is defective, it must be replaced. The spring gear may be checked by turning it until the spring is tight and unwinding it slowly. It should unwind 4¼ turns.

(6) HUM INDUCTION

In chasses of early manufacture (models with a type-76 or 1-v second detector), a slight "buzz" or "hum" will often be encountered. In order to reduce this interference the following steps should be taken:

(1) Remove the connections of the *red with yellow tracer* lead from the 10 mfd. electrolytic capacitor (C-56) and from the lug on the resistor board where it terminates. In place of this conductor, install a new one that will be outside of the chassis cable, carried along the front side of the chassis, similar to the *red* lead connecting the corresponding points on the wiring diagram of Figure 4.

(2) Connect the grounding lead from the second detector cathode to a ground point nearer the detector socket.

(3) The secondary leads of the interstage transformer connecting to the driver stage, should be kept away from the heater prongs and heater wiring. It is desirable to shorten these leads as much as possible.

(4) It is important that the heater leads of the audio stages of the receiver be carefully twisted.

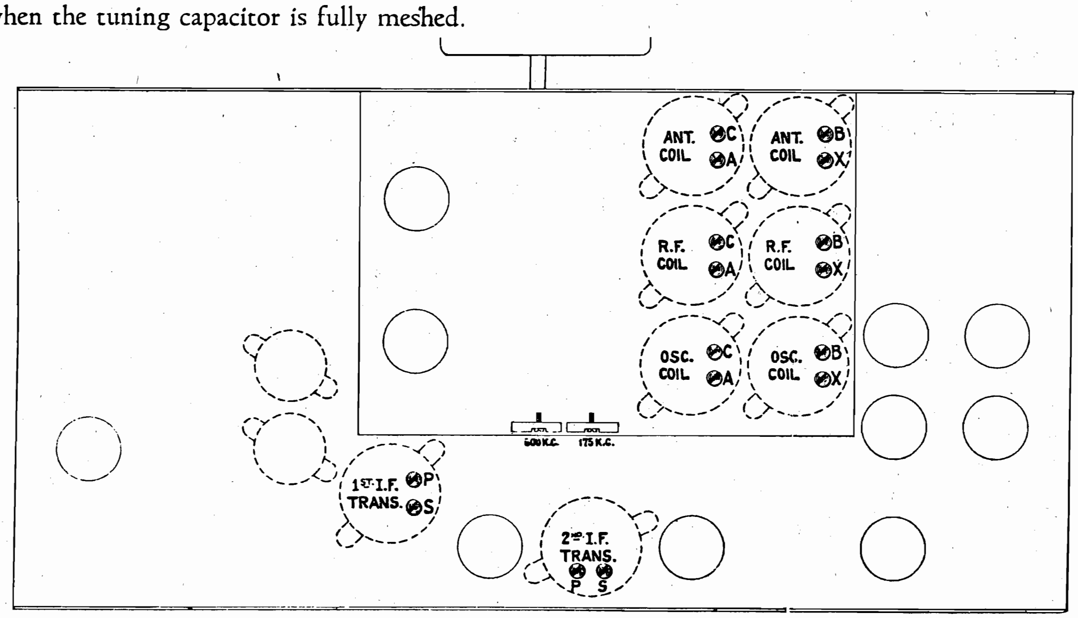


Figure 7—Location of Trimmer Capacitors

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4372	Bracket—Bass tone control mounting bracket	$0.20
4683	Bracket — Treble tone control mounting bracket	.25
4406	Bracket—Volume control mounting bracket	.25
4416	Capacitor—50 mmfd. (C62)—Package of 5	1.25
3794	Capacitor—100 mmfd.—Located on first I.F. transformer (C33)	.30
3981	Capacitor—300 mmfd.—Located on second I. F. transformer (C42)	.30
4668	Capacitor—770 mmfd. (C60)	.30
4409	Capacitor—1120 mmfd. (C39, C45)	.35
4838	Capacitor—0.005 mfd. (C51, C52)	.20
3787	Capacitor—0.01 mfd. (C53)	.30
3639	Capacitor—0.02 mfd. (C43)	.25
4652	Capacitor—0.02 mfd. (C50)	.60
4836	Capacitor—0.05 mfd. (C35)	.30
4694	Capacitor—0.05 mfd. (C44)	.30
3765	Capacitor—0.025 mfd. (C49)	.34
4835	Capacitor—0.1 mfd. (C38)	.28
4841	Capacitor—0.1 mfd. (C34, C37)	.22
3597	Capacitor—0.25 mfd. (C46, C47, C61)	.40
3702	Capacitor—0.25 mfd. (C48)	.42
7790	Capacitor—10. mfd. (C58)	1.05
7788	Capacitor—18 mfd. (C57)	1.10
483[illegible]	Capacitor pack—Comprising one 10. mfd. and one 4. mfd. capacitor (C55, C56)	2.40
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4358	Clamp—Mounting clamp for capacitor—Stock No. 7788 or No. 7790	.15
7806	Coil—First audio plate choke (L33)	.30
4371	Cover—Fuse mount cover	.15
10907	Fuse—3 amperes—Package of 5	.40
3376	Mount—Fuse mount—105-125 volt operation	.40
4604	Mount—Fuse mount for 200-250 volt operation	.35
7784	Reactor—Tone control reactor (L34)	1.30
6135	Resistor—270 ohms—Carbon type—¼ watt (R3, R7, R11)—Package of 5	1.00
4687	Resistor—1000 ohms—Carbon type—½ watt (R25)—Package of 10	2.00
4834	Resistor—1100 ohms—Carbon type—¼ watt (R9, R10, R13)—Package of 5	1.00
4833	Resistor—490,000 ohms—Carbon type—¼ watt (R19)—Package of 5	1.00
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R34)—Package of 5	1.00
6143	Resistor—40,000 ohms—Carbon type—¼ watt (R23)—Package of 5	1.00
3114	Resistor—50 000 ohms—Carbon type—¼ watt (R31)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R30, R35)—Package of 5	1.00

Stock No.	Description	List Price
3744	Resistor—250,000 ohms—Carbon type—¼ watt (R32)—Package of 5	$1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R33)—Package of 5	1.00
4783	Resistor—1,100,000 ohms—Carbon type—¼ watt (R16)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R15, R18)—Package of 5	1.00
3594	Resistor—50,000 ohms—Carbon type—½ watt (R20, R21)—Package of 5	1.00
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R26)	.22
4649	Resistor—Flat type—Total resistance 8820 ohms—Divided as follows: one 220 ohms, one 3,900 ohms and one 4,700 ohms section (R27, R28, R29)	1.05
7804	Rheostat—Sensitivity control rheostat (R4)	1.30
4656	Screw—Volume control mounting assembly—Comprising one bushing, one washer, one shakeproof washer and one nut	.18
4452	Shield—Second detector A.V.C. Radiotron shield	.35
3683	Shield—Second detector—A.V.C. Radiotron shield top	.20
4453	Shield—I. F. Radiotron shield	.32
4742	Shield—Intermediate frequency transformer shield	.40
4784	Socket—4-contact rectifier Radiotron socket	.15
4814	Socket—5-contact driver Radiotron socket	.15
4786	Socket—6-contact I. F. amplifier—Second detector—"A.V.C." or output Radiotron socket	.15
4686	Strip—"ANT-GND" terminal strip—Two terminals and link	.20
7796	Switch—Operating switch (S12)	.62
4829	Tone control—Bass tone control (R22)	1.00
4830	Tone control—Treble tone control (R24)	1.00
7841	Transformer—Audio transformer pack comprising interstage transformer and reactor (T2, L35)	4.05
4431	Transformer—First intermediate frequency transformer (L29, L30, C32, C33, C36)	2.28
4433	Transformer—Second intermediate frequency transformer (L31, L32, C40, C41, C42)	2.15
7832	Transformer—Driver transformer (T3)	2.85
9505	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	6.35
9506	Transformer—Power transformer—105-125 volts—25-40 cycles	8.90
9507	Transformer—Power transformer—105-250 volts—40-60 cycles	6.40
4832	Volume control (R17)	1.25
	R. F. UNIT ASSEMBLIES	
4244	Cap—Contact cap—Package of 5	.20
4646	Capacitor—4.5 mmfd. (C10)	.20
4633	Capacitor—50 mmfd. (C19)	.25
4842	Capacitor—400 mmfd. (C8)	.24
4811	Capacitor—340 mmfd. (C28)	.25

Stock No.	Description	List Price
4412	Capacitor—1,120 mmfd. (C25)	$0.25
4524	Capacitor—2,850 mmfd. (C23)	.35
4615	Capacitor—2,850 mmfd. (C20)	.34
4836	Capacitor—0.05 mfd. (C5, C15)	.30
4841	Capacitor—0.1 mfd. (C7, C16)	.22
4835	Capacitor—0.1 mfd. (C9, C31)	.28
3861	Capacitor—Adjustable capacitor (C27, C30)	.78
4420	Clamp—Antenna lead clamp and screw—Package of 10	.40
4410	Coil—Antenna coil—Band "D" (L1, L2)	.70
7803	Coil—Antenna coil—Band B-C (L3, L4, L7, L8, C1, C3)	1.82
7810	Coil—Antenna coil—Band X-B (L5, L6, L9, L10, C2, C4)	2.10
7805	Coil—Detector coil—Band A-C (L13, L14, L17, L18, C11, C13)	2.15
7808	Coil—Detector coil—Band X-B (L15, L16, L19, L20, C12, C14)	2.05
4421	Coil—Detector coil—Band D (L11, L12)	.70
7807	Coil—Oscillator coil—Band A-C (L21, L22, L25, L26, C22, C26)	1.62
7809	Coil—Oscillator coil—Band X-B (L23, L24, L27, L28, C24, C29)	1.70
4806	Condenser—3-gang variable tuning condenser (C6, C17, C21)	5.64
4340	Lamp—Dial lamp—Package of 5	.60
4834	Resistor — 1100 ohms — Carbon type — ¼ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R8)—Package of 5	1.00
4418	Resistor—100 ohms—Flexible type (R2, R6)—Package of 10	1.50
4656	Screw—Chassis mounting screw assembly—Comprising one bushing, one washer, one shakeproof washer, and one nut (four sets required to mount chassis)	.18
4742	Shield—Antenna, detector or oscillator coil shield	.40
3682	Shield—First detector-oscillator Radiotron shield	.22
3683	Shield—Radiotron shield top	.20
4235	Shield—R. F. amplifier Radiotron shield	.24
3529	Socket—Dial lamp socket	.32
4786	Socket—6-contact R. F. amplifier Radiotron socket	.15
4787	Socket — 7-contact first detector-oscillator Radiotron socket	.15
7836	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11)	3.05
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for variable condenser drive assembly—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shafts, balls, ring, spring and washers—Assembled	.88
4455	Dial—Station selector dial	.60

Stock No.	Description	List Price
7799	Drive—Variable tuning condenser drive assembly complete	$2.45
4827	Gear—Spring gear assembly complete with hub, pinion, gear cover and spring	1.25
4704	Indicator—Band indicator—Celluloid lettered —D. C. B. A. X.	.12
4360	Pinion—Vernier pointer pinion	.35
4363	Pointer—Station selector main (large) pointer	.18
4367	Pointer—Station selector vernier (small) pointer	.15
3943	Screen—Celluloid screen for dial light—Package of 2	.18
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm or variable condenser drive—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	CABLE ASSEMBLIES	
5084	Cable—Main cable	1.35
5083	Cable—4-conductor—Reproducer cable	.60
4655	Cable—Shielded cable—From low-frequency tone control to resistor boards	.58
5039	Plug—4-contact male plug for reproducer cable	.25
5040	Plug—4-contact female plug for reproducer cable	.25
	REPRODUCER ASSEMBLY	
4645	Capacitor—0.1 mfd.—Located on output transformers (C54)	.25
9583	Coil—Field coil, magnet and cone support (L37)	5.20
8969	Cone—Reproducer cone (L36)—Package of 5	6.35
9582	Reproducer—Reproducer complete	9.00
6999	Screen—Dust (cloth) screen—Package of 6	.12
5080	Transformer—Output transformer and capacitor (T4, C54)	1.60
	MISCELLANEOUS PARTS	
4677	Bezel—Metal bezel (escutcheon) for station selector dial glass*	.56
4895	Escutcheon—Station selector escutcheon and crystal*	.55
6614	Glass—Station dial glass*	.30
3829	Knob—Bass or treble tone control, volume or sensitivity control range switch or operating switch knob—Package of 5	1.10
4657	Knob—Knob station selector knob—Package of 5	.65
4678	Ring—Retaining ring for dial glass—Package of 5*	.34
4119	Screw—8-32-¼" headless set screw for knob—Stock No. 4657—Package of 20	.38
4393	Screw—8-32-5/16" headless set screw for knob—Stock No. 3829—Package of 10	.25

*Used in some models.

MODEL 322 Duo
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

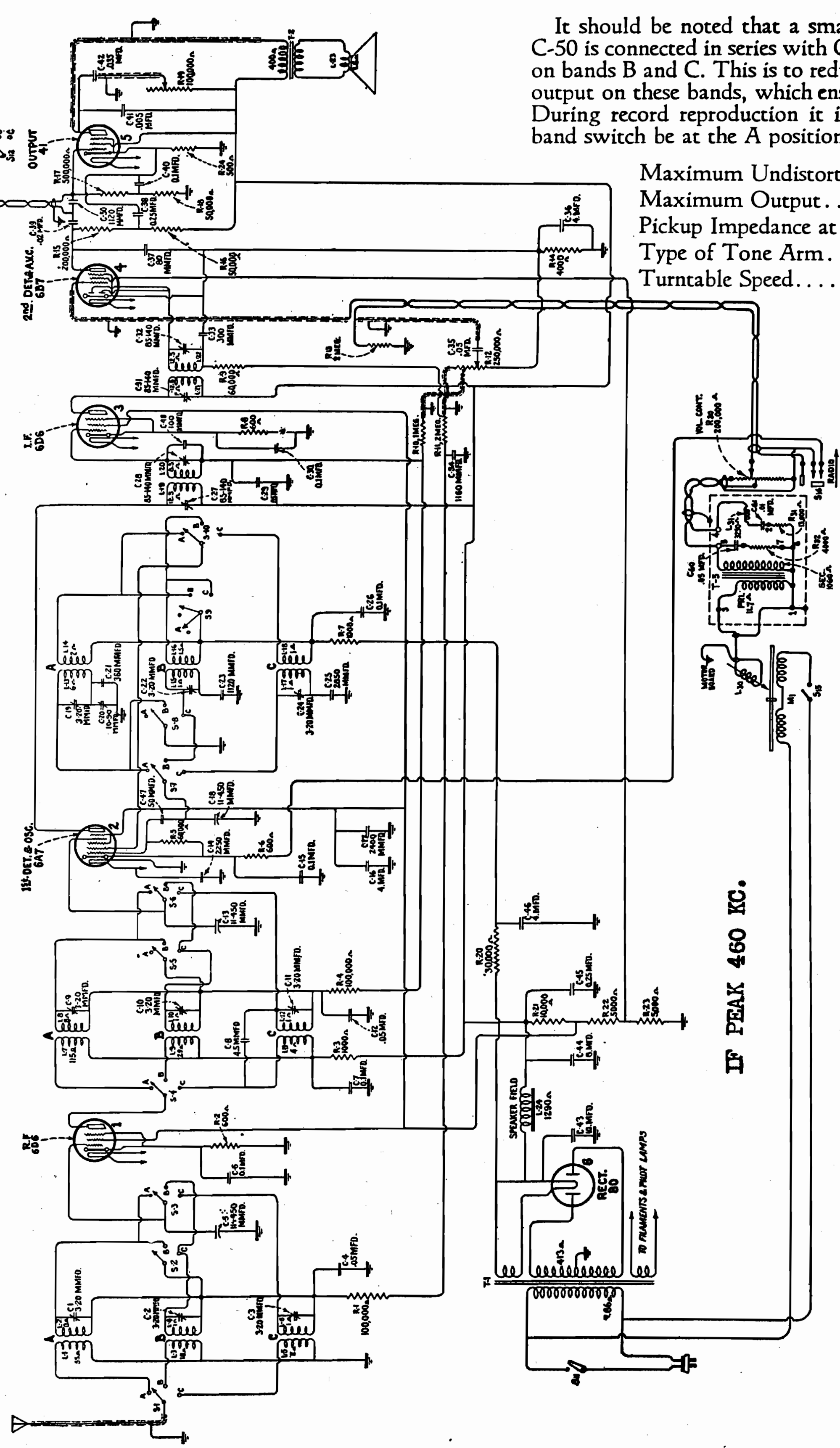
Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
4729	Cable—2-conductor shielded—From range switch to resistor board	.20
2747	Cap—Contact cap—Package of 5	.50
3861	Capacitor — Adjustable trimmer capacitor (C20)	.78
4442	Capacitor—50 mmfd. (C47)	.22
4662	Capacitor—80 mmfd. (C37)	.24
4413	Capacitor—360 mmfd. (C21)	.22
4412	Capacitor—1120 mmfd. (C23)	.25
4634	Capacitor—1120 mmfd. (C50)	.35
4515	Capacitor—1160 mmfd. (C34)	.22
4670	Capacitor—2250 (C14)	.30
4523	Capacitor—2400 mmfd. (C17)	.26
4524	Capacitor—2850 mmfd. (C25)	.35
4435	Capacitor—.02 mfd. (C39)	.25
4518	Capacitor—.05 mfd. (C35)	.52
4417	Capacitor—.05 mfd. (C4, C12, C29)	.25
3877	Capacitor—.1 mfd. (C40)	.32
4415	Capacitor—.1 mfd. (C6, C15, C30)	.30
4645	Capacitor—.1 mfd. (C7, C26)	.25
3597	Capacitor—.25 mfd. (C38, C45)	.40
4525	Capacitor—4.0 mfd. (C36)	.70
4428	Capacitor—8 mfd. (C44)	1.05
7790	Capacitor—10 mfd. (C43)	1.05
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42)	.30
7589	Capacitor Pack—Comprising two 4. mfd. capacitors (C16, C46)	1.64
4358	Clamp—Electrolytic capacitor mounting clamp	.15
4516	Coil—Antenna coil "PB" (L3, L4, C2)	1.65
7803	Coil—Antenna coil "B & SW" (L1, L2, L5, L6, C1, C3)	1.82
4514	Coil—Detector Coil "PB" (L9, L10, C10)	1.65
7805	Coil—Detector coil "B & SW" (L7, L8, L11, L12, C8, C9, C11)	2.15
7807	Coil—Oscillator coil "B & SW" (L13, L14, L17, L18, C19, C24)	1.62
4511	Coil—Oscillator coil "PB" (L15, L16, C22	1.52
7801	Condenser—3-gang variable tuning condenser (C5, C13, C18)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5	1.00
4370	Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10	2.00
3997	Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
6318	Resistor—10,000 ohms (R21)	.80
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5	$1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11, R13)—Package of 5	1.00
3413	Resistor—5000 ohms—Carbon type—½ watt (R22, R23)—Package of 5	1.00
4513	Resistor — 30,000 ohms — Carbon type — 3 watt (R20)	.25
4521	Shield—Antenna R. F. or oscillator coil shield	.42
3942	Shield—First detector or output Radiotron shield	.18
7487	Shield—I. F. amplifier Radiotron shield	.25
4705	Shield—R. F. amplifier Radiotron shield	.30
3782	Shield—Second detector Radiotron shield	.26
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4379	Strip—Antenna terminal engraved "ANT-GND"	.20
4684	Switch—Operating switch (S11)	.45
4728	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	4.32
4517	Tone control (R19)	.90
4431	Transformer — First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15
9511	Transformer—Power transformer 105-125 volts, 50-60 cycles (T1)	4.78
9512	Transformer—Power transformer 105-125 volts, 25-40 cycles	6.58
9513	Transformer—Power transformer—105-250 volts—40-60 cycles	4.85
4519	Volume control (R12)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
4422	Clutch—Clutch drive assembly for variable condenser drive	.88
4661	Dial—Station selector dial	.62
4510	Drive—Tuning condenser drive assembly	2.42
4704	Indicator—Band indicator (celluloid)	.12
4520	Indicator—Station selector indicator pointer	.18
3943	Screen—Dial light screen (celluloid)—Package of 2	.18
3993	Screw—Number 6-32-5/32 square head set screws for band indicator operating arm—Package of 10	.25
4669	Screw—Number 8-32-5/32 set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud—Package of 5	.25
	MOTOR ASSEMBLIES	
4577	Connector—Male section two-prong motor connector plug	$0.30
8989	Motor—105-125 volts—60 cycle motor complete	18.52
8990	Motor—105-125 volts—50 cycle motor complete	18.52
8991	Motor—105-125 volts—40 cycle motor complete	23.36
8992	Motor—105-125 volts—25 cycle motor complete	23.36
8993	Rotor and shaft—For 105-125 volt—60 cycle motor	7.00
8995	Rotor and shaft—For 105-125 volt—50 cycle motor	7.00
8999	Rotor and shaft—For 105-125 volt—25 cycle motor	8.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
3817	Stud—Motor mounting stud—Package of 3	.18
3398	Motor mounting—Spring and washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
	PICKUP AND ARM ASSEMBLIES	
7842	Arm—Pickup arm complete, less escutcheon and pickup	4.75
3417	Armature—Pickup armature	.72
6346	Back—Pickup housing back	.45
3385	Coil—Pickup coil (L30)	.50
3386	Cover—Pickup cover	.56
3521	Cover—Magnetic pickup back cover	.18
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—5 sets	1.10
3516	Damper assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup base	.14
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6335	Pickup—Pickup unit complete	4.00
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3419	Screw—Pickup cover mounting screw—Package of 10	.40
	REPRODUCER ASSEMBLY	
4473	Board—Terminal board assembly	.26
9460	Coil—Field coil, magnet and cone support (L24)	6.00
8935	Cone—Reproducer cone (L23)—Package of 5	5.25
9527	Reproducer—Complete	8.00
4472	Transformer—Output transformer (T2)	1.40
	SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	$0.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 4	.50
6896	Switch—Eccentric automatic switch complete	2.50
3322	Switch—Motor switch (S15)	.75
	TURNTABLE ASSEMBLIES	
7084	Cover—Turntable cover	.40
7838	Turntable complete	2.15
	MISCELLANEOUS ASSEMBLIES	
3166	Bolt—Reproducer mounting assembly—Comprising 2 bolts, 2 nuts, 2 lockwashers and 1 plate	.50
4677	Bezel—Station selector (escutcheon) bezel	.56
3430	Box—Needle box with lid—Package of 2	.90
4696	Cable—2-conductor motor cable with section of connector plug—From receiver chassis to motor cord connector	.95
4695	Cable—3-conductor shielded cable with grid and female section of connector—From receiver chassis to volume control cable connector	1.05
7843	Cable—5-conductor shielded with male section of connector plug—From phonograph volume control to input transformer	.98
4153	Connector—Female section (4-contact) of connector for cable Stock No. 4695	.48
4573	Connector—Female section (2-contact) of connector plug for cable Stock No. 4696	.30
6614	Glass—Station selector dial glass	.30
3829	Knob—Phonograph volume control knob—Package of 5	1.10
4449	Knob—Station selector volume control, range switch or operating switch knob—Package of 5	.60
6123	Plug—Male section (4-prong) of phonograph volume control and input transformer cable plug	.30
3396	Receptacle—Needle receptacle	.52
4678	Ring—Dial retaining ring—Package of 5	.34
4393	Screw—8-32-5/16" headless set screw for knob No. 3829—Package of 10	.52
4698	Screw—Chassis mounting screw assembly—Comprising 1 screw, 1 lockwasher, 1 washer, 2 cushions and 1 spacer	.45
3391	Suspension spring and washer assembly—For motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 "C" washer and 1 nut	.50
7844	Transformer—Phonograph input transformer pack comprising one transformer, one reactor, one 4000 ohm and one 13,000 ohm resistor, one .01 mfd. and one .05 mfd. capacitor (T5, L31, R31, R32, C60, C61)	5.38
6766	Volume control—Phonograph volume control (R30, S16)	2.28

RCA MFG. CO., INC.

It should be noted that a small coupling capacitor C-50 is connected in series with C-39 during operation on bands B and C. This is to reduce the low frequency output on these bands, which ensures better operation. During record reproduction it is important that the band switch be at the A position.

Maximum Undistorted Output	1.9 Watts
Maximum Output	3.5 Watts
Pickup Impedance at 1000 Cycles	7 Ohms
Type of Tone Arm	Inertia
Turntable Speed	78 R. P. M. Only



ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts and 105–130/200–250 Volts (Double Range Transformer)
Frequency Rating	25, 30, 40, 50 and 60 Cycles
Power Consumption	130 Watts (60 Cycles)
Type and Number of Radiotrons	2 RCA-6D6, 1 RCA-6A7, 1 RCA-6B7, 1 RCA-41, 1 RCA-80—Total, 6
Tuning Frequency Range	Band A— 540 K. C.- 1720 K. C. Band B—1720 K. C.- 5400 K. C. Band C—5400 K. C.-18000 K. C.
Line-up Frequencies	460 K. C., 600 K. C., 1720 K. C., 5160 K. C., 18000 K. C.

MODEL 322 Duo
Chassis Wiring

RCA MFG. CO., INC.

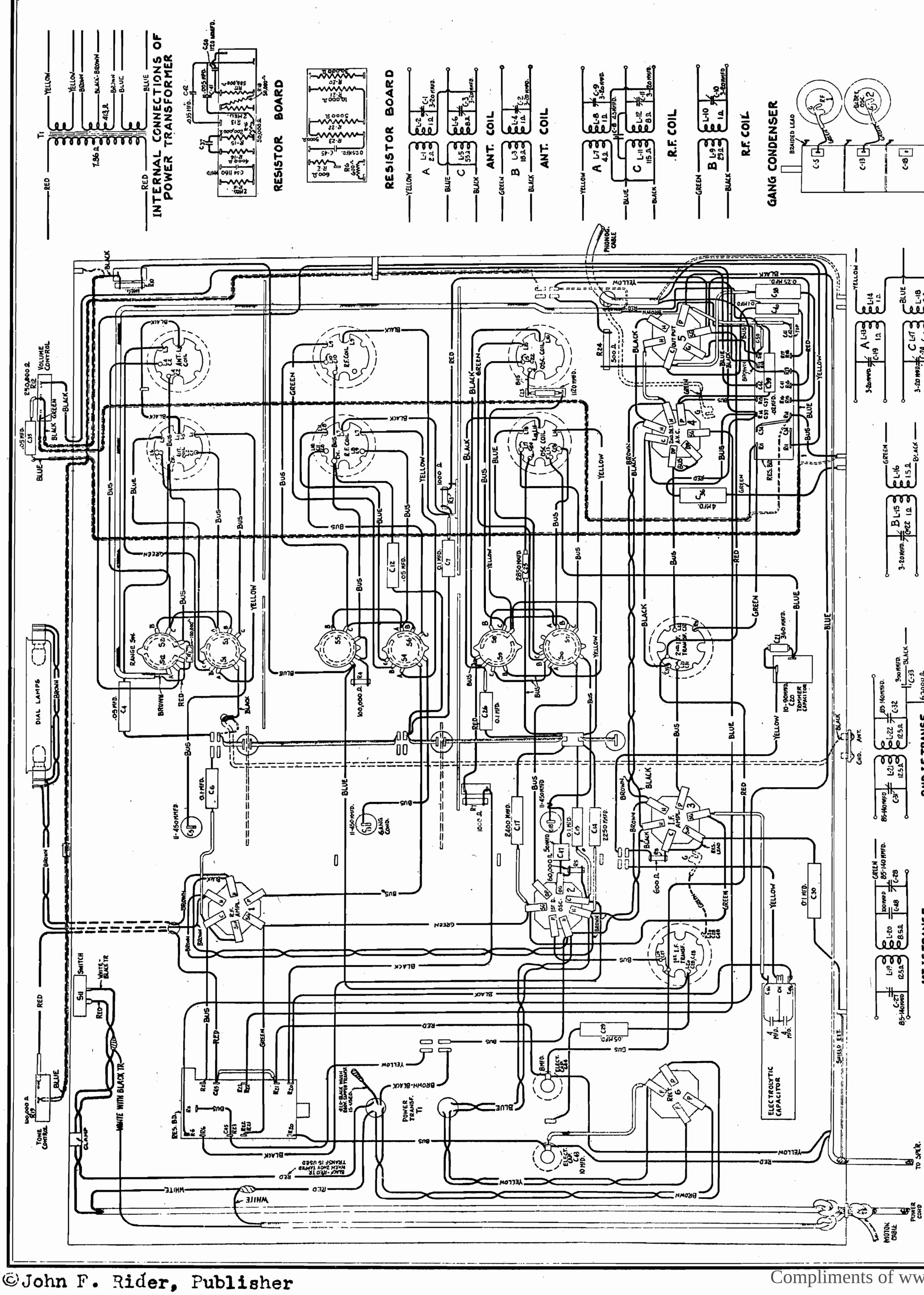


Figure 2—Chassis Wiring Diagram

MODEL 322 Duo
Assembly Wiring
Transformer Data

RCA MFG. CO., INC.

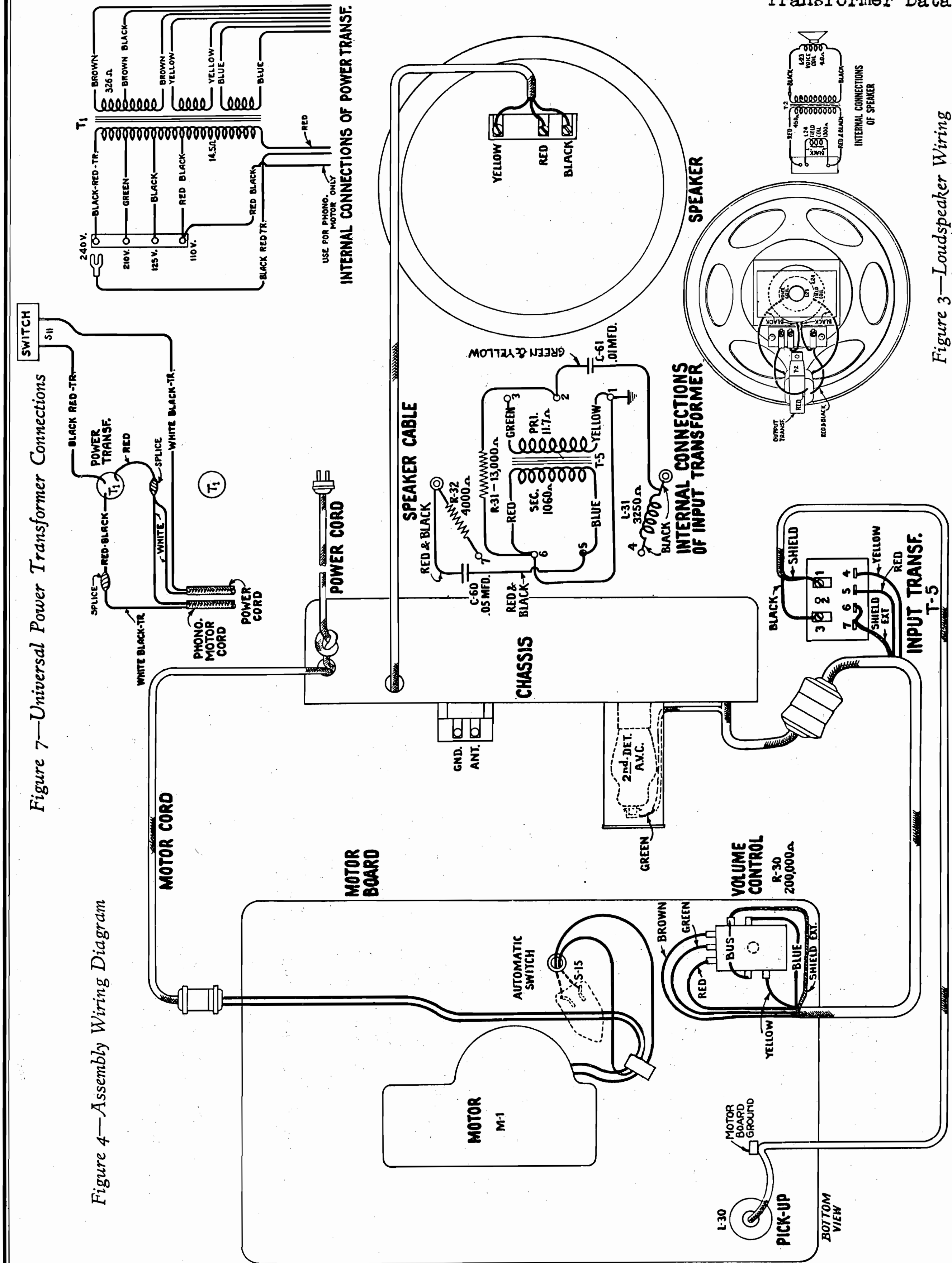


Figure 7—Universal Power Transformer Connections

Figure 4—Assembly Wiring Diagram

Figure 3—Loudspeaker Wiring

RCA MFG. CO., INC.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, which uses two transformers. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (band A) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in band "A." Three are required in bands "B" and "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency bands, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "A," while the other end should point to within ¼ inch of the horizontal line at the highest frequency end of band "A."

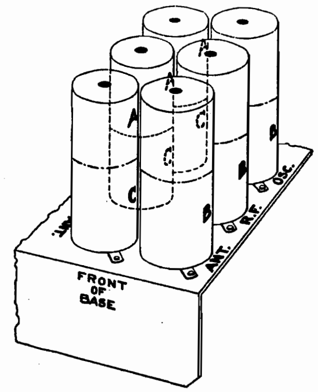


Figure 5—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

Band "A"

(a) Set the Band Switch at "A."

(b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

Band "B"

(a) Set the Band Switch at "B."

(b) Tune the external oscillator to 5,160 K. C., and set the pointer at 5,160 K. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 4,240 K. C. on the dial. It will be necessary to increase the external oscillator output for this check.

(d) The antenna and detector trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

Band "C"

(a) Set the Band Switch at "C."

(b) Tune the external oscillator to 18,000 K. C., set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 6 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

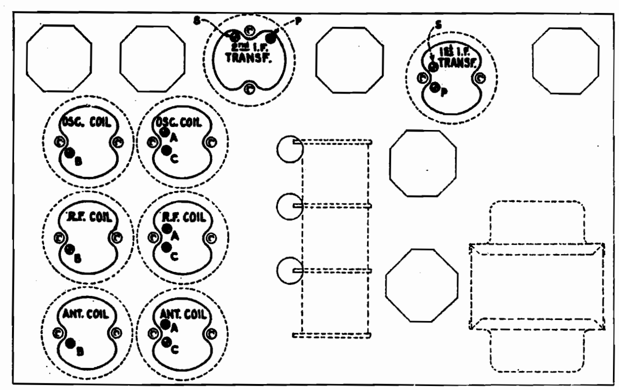
(5) VOLTAGE READINGS

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the actual voltage at each socket contact.

(6) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.



Figure—6 Location of Line-up Capacitors

MODEL 322 Duo
Pickup Data
Voltage, Socket

RCA MFG. CO., INC.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the

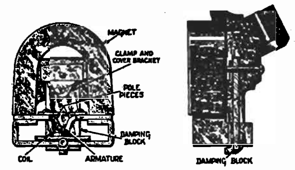


Figure 9—Details of Magnetic Pickup

armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(7) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 9), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

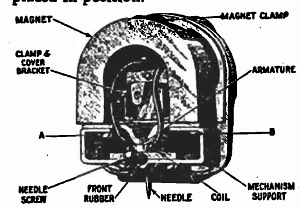


Figure 10—Pickup Nomenclature

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

(8) REPLACING THE DAMPING BLOCK

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place,

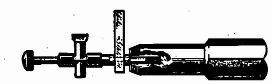


Figure 11—Special Soldering-Iron Tip

as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the air gap as explained under (h), section (7).

RADIOTRON SOCKET VOLTAGES

115-Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		6.0	105	265	9.0	6.3
RCA-6A7	Det.	6.0	105	265	3.5	6.3
	Osc.	—	—	220	4.5	
RCA-6D6—I. F.		6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector		3.0	50	90*	0.7	6.3
RCA-41—Power		16.5	265	245	30.0	6.3
RCA-80—Rectifier		—	—	690 (RMS—P to P)	70.0	5.0

* Voltage calculated from 265 v. + B.

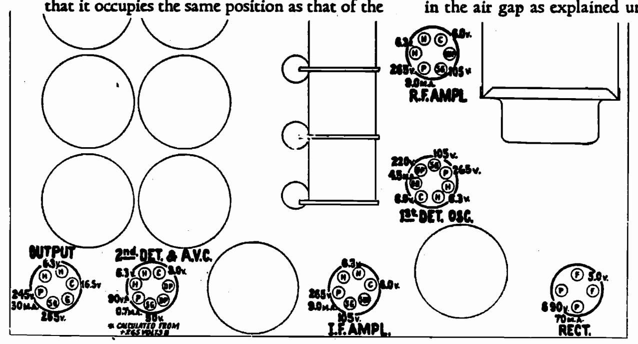


Figure 8
Tube Socket Voltages

ALL D. C. VOLTAGES ARE TO GROUND

MODEL 322-E Duo
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
4729	Cable—2-conductor shielded—From range switch to resistor board	.20
2747	Cap—Contact cap—Package of 5	.50
3861	Capacitor — Adjustable trimmer capacitor (C20)	.78
4442	Capa tor—50 mmfd. (C47)	.22
4672	Capacitor—80 mmfd. (C37)	.24
4413	Capacitor—360 mmfd. (C21)	.22
4634	Capacitor—1120 mmfd. (C50)	.35
4515	Capacitor—1160 mmfd. (C34)	.22
4670	Capacitor—2250 (C14)	.30
4523	Capacitor—2400 mmfd. (C17)	.26
4524	Capacitor—2850 mmfd. (C25)	.35
4435	Capacitor—.02 mfd. (C39)	.25
4518	Capacitor—.05 mfd. (C35)	.52
4417	Capacitor—.05 mfd. (C4, C12, C29)	.25
3877	Capacitor—.1 mfd. (C40)	.32
4415	Capacitor—.1 mfd. (C6, C15, C30)	.30
4645	Capacitor—.1 mfd. (C7, C26)	.25
3597	Capacitor—.25 mfd. (C38, C45)	.40
4525	Capacitor—4.0 mfd. (C36)	.70
4428	Capacitor—8 mfd. (C44)	1.05
7790	Capacitor—10 mfd. (C43)	1.05
4692	Capacitor pack—Comprising one 0.035 mfd. and one 0.005 mfd. capacitors (C41, C42)	.30
7589	Capacitor pack—Comprising two 4. mfd. capacitors (C16, C46)	1.64
4358	Clamp—Electrolytic capacitor mounting clamp	.15
4734	Coil—Antenna coil "A" (L26, L27, C51)	3.05
7803	Coil—Antenna coil "B & SW" (L1, L2, L5, L6, C1, C3)	1.82
4751	Coil—Detector coil "A" (L28, L29, C52)	2.38
7805	Coil—Detector coil "B & SW" (L7, L8, L11, L12, C8, C9, C11)	2.15
7807	Coil—Oscillator coil "B & SW" (L13, L14, L17, L18, C19, C24)	1.62
4733	Coil—Oscillator coil "A" (L30, L31, C53)	3.05
7801	Condenser—3-gang variable tuning condenser (C5, C13, C18)	4.42
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R24)—Package of 5	1.10
3218	Resistor—600 ohms—Carbon type—¼ watt (R2, R6, R8)—Package of 5	1.00
4370	Resistor—1000 ohms—Carbon type—¼ watt (R3, R7)—Package of 10	2.00
3997	Resistor—4000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
6318	Resistor—10,000 ohms (R21)	.80
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R16, R18)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R4)—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type—¼ watt (R15)—Package of 5	1.00

Stock No.	Description	List Price
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R17)—Package of 5	$1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R10)—Package of 5	1.00
6242	Resistor — 2 megohms — Carbon type — ¼ watt (R11, R13)—Package of 5	1.00
3413	Resistor—5000 ohms—Carbon type—½ watt (R22, R23)—Package of 5	1.00
4513	Resistor — 30,000 ohms — Carbon type — 3 watt (R20)	.25
4521	Shield—Antenna R. F. or oscillator coil shield	.42
3942	Shield—First detector or output Radiotron shield	.18
7487	Shield—I. F. amplifier Radiotron shield	.25
4705	Shield—R. F. amplifier Radiotron shield	.30
3782	Shield—Second detector Radiotron shield	.26
3529	Socket—Dial lamp socket	.32
3859	Socket—4-contact Radiotron socket	.30
6676	Socket—6-contact output Radiotron socket	.40
7485	Socket—6-contact Radiotron socket	.40
3572	Socket—7-contact Radiotron socket	.38
4379	Strip—Antenna terminal engraved "ANT-GND"	.20
4684	Switch—Operating switch (S11)	.45
4728	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	4.32
4517	Tone control (R19)	.90
4431	Transformer — First intermediate frequency transformer (L19, L20, C27, C28, C48)	2.28
4433	Transformer—Second intermediate frequency transformer (L21, L22, C31, C32, C33, R9)	2.15
9511	Transformer—Power transformer 105–125 volts, 50–60 cycles (T1)	4.78
9512	Transformer—Power transformer 105–125 volts, 25–40 cycles	6.58
9513	Transformer—Power transformer—105–250 volts—40–60 cycles	4.85
4519	Volume control (R12)	1.25
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
4422	Clutch—Clutch drive assembly for variable condenser drive	.88
4732	Dial—Station selector dial	.40
4510	Drive—Tuning condenser drive assembly	2.42
4704	Indicator—Band indicator (celluloid)	.12
4520	Indicator—Station selector indicator pointer	.18
3943	Screen—Dial light screen (celluloid)—Package of 2	.18
3993	Screw—Number 6–32–5/32" square head set screws for band indicator operating arm—Package of 10	.25
4669	Screw—Number 8–32–5/32" set screw for variable condenser drive assembly—Package of 10	.25
4377	Spring—Band indicator and arm tension spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud—Package of 5	.25

Stock No.	Description	List Price
	MOTOR ASSEMBLIES	
4577	Connector—Male section two-prong motor connector plug	$0.30
8989	Motor—105–125 volts—60 cycle motor complete	18.52
8990	Motor—105–125 volts—50 cycle motor complete	18.52
8991	Motor—105–125 volts—40 cycle motor complete	23.36
8992	Motor—105–125 volts—25 cycle motor complete	23.36
8993	Rotor and shaft—For 105–125 volt—60 cycle motor	7.00
8995	Rotor and shaft—For 105–125 volt—50 cycle motor	7.00
8999	Rotor and shaft—For 105–125 volt—25 cycle motor	8.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
3817	Stud—Motor mounting stud—Package of 3	.18
3398	Motor mounting—Spring and washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
	PICKUP AND ARM ASSEMBLIES	
7842	Arm—Pickup arm complete, less escutcheon and pickup	4.75
3417	Armature—Pickup armature	.72
6346	Back—Pickup housing back	.45
3385	Coil—Pickup coil (L30)	.50
3386	Cover—Pickup cover	.56
3521	Cover—Magnetic pickup back cover	.18
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—5 sets	1.10
3516	Damper assembly—Comprising one upper and one lower damper, one upper bushing and one lower bearing—Located in bottom of pickup base	.14
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6335	Pickup—Pickup unit complete	4.00
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3419	Screw—Pickup cover mounting screw—Package of 10	.40
	REPRODUCER ASSEMBLY	
4473	Board—Terminal board assembly	.26
9460	Coil—Field coil, magnet and cone support (L24)	6.00
8935	Cone—Reproducer cone (L23)—Package of 5	5.25
9527	Reproducer—Complete	8.00
4472	Transformer—Output transformer (T2)	1.40

Stock No.	Description	List Price
	SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	$0.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 4	.50
6896	Switch—Eccentric automatic switch complete	2.50
3322	Switch—Motor switch (S15)	.75
	TURNTABLE ASSEMBLIES	
7084	Cover—Turntable cover	.40
7838	Turntable complete	2.15
	MISCELLANEOUS ASSEMBLIES	
3166	Bolt — Reproducer mounting assembly — Comprising 2 bolts, 2 nuts, 2 lockwashers and 1 plate	.50
7837	Bezel—Station selector (escutcheon) bezel	.82
3430	Box—Needle box with lid—Package of 2	.90
4696	Cable—2-conductor motor cable with section of connector plug—From receiver chassis to motor cord connector	.95
4695	Cable—3-conductor shielded cable with grid and female section of connector—From receiver chassis to volume control cable connector	1.05
7843	Cable—5-conductor shielded with male section of connector plug—From phonograph volume control to input transformer	.98
4153	Connector—Female section (4-contact) of connector for cable Stock No. 4695	.48
4573	Connector—Female section (2-contact) of connector plug for cable Stock No. 4696	.30
6614	Glass—Station selector dial glass	.30
3829	Knob—Phonograph volume control knob—Package of 5	1.10
4449	Knob—Station selector volume control, range switch or operating switch knob—Package of 5	.60
6123	Plug—Male section (4-prong) of phonograph volume control and input transformer cable plug	.30
3396	Receptacle—Needle receptacle	.52
4678	Ring—Dial retaining ring—Package of 5	.34
4393	Screw—8–32–5/16" headless set screw for knob No. 3829—Package of 10	.25
4698	Screw—Chassis mounting screw assembly—Comprising 1 screw, 1 lockwasher, 1 washer, 2 cushions and 1 spacer	.45
3391	Suspension spring and washer assembly—For motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 "C" washer and 1 nut	.50
7844	Transformer—Phonograph input transformer pack comprising one transformer, one reactor, one 15,000 ohm and one 13,000 ohm resistor, one .01 mfd. and one .05 mfd. capacitor (T5, L31, R31, R32, C60, C61)	5.38
6766	Volume control—Phonograph volume control (R30, S16)	2.28

MODEL 322-E Duo
Schematic
Speaker Data

RCA MFG. CO., INC.

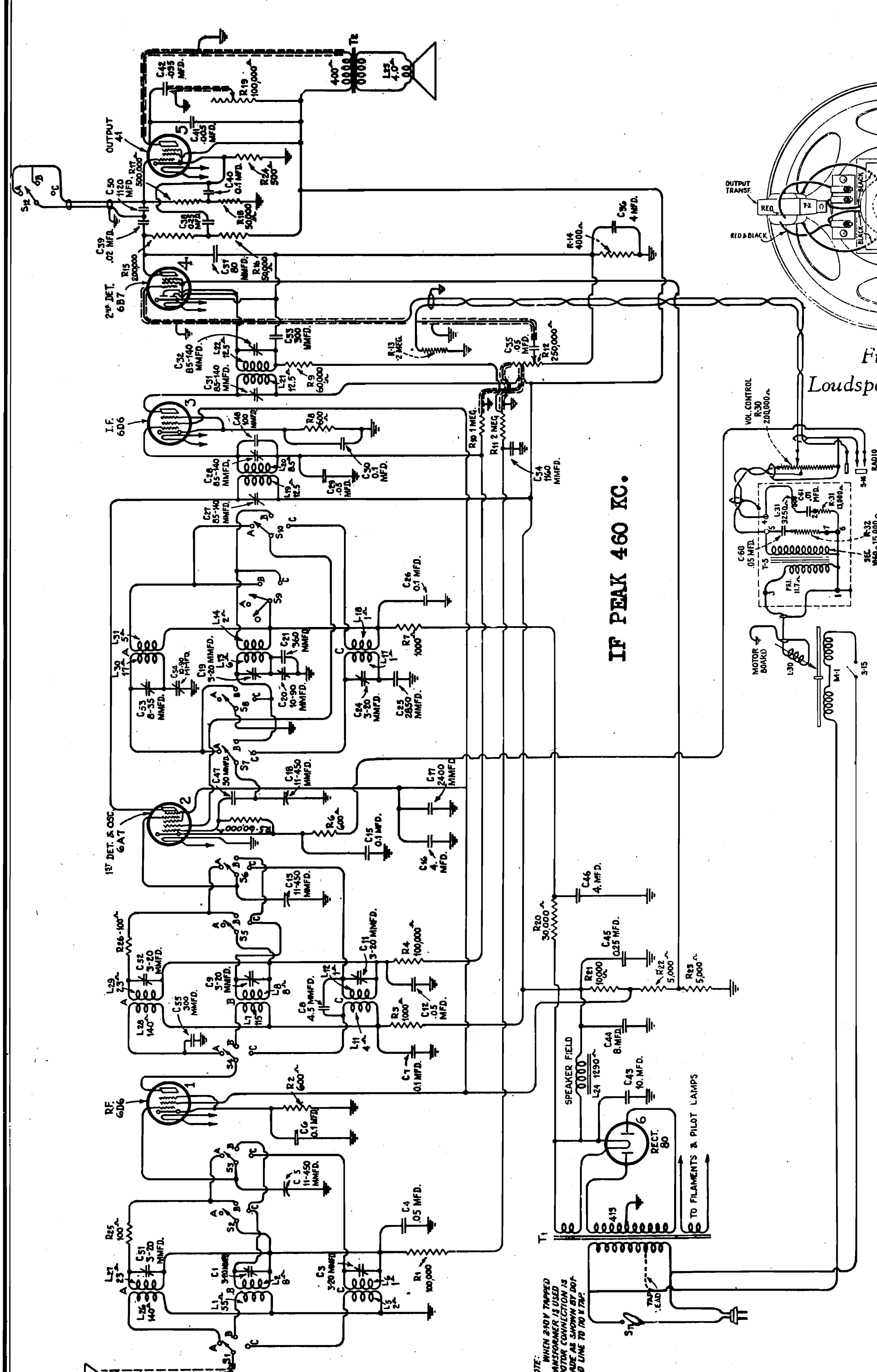


Figure 1—Schematic Circuit Diagram—Some models may have R-32 comprised of two resistors, one internal (4000-ohm) and one external (10,000-ohm)

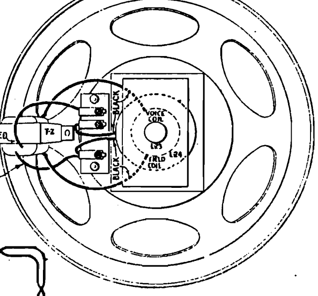
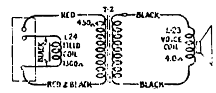


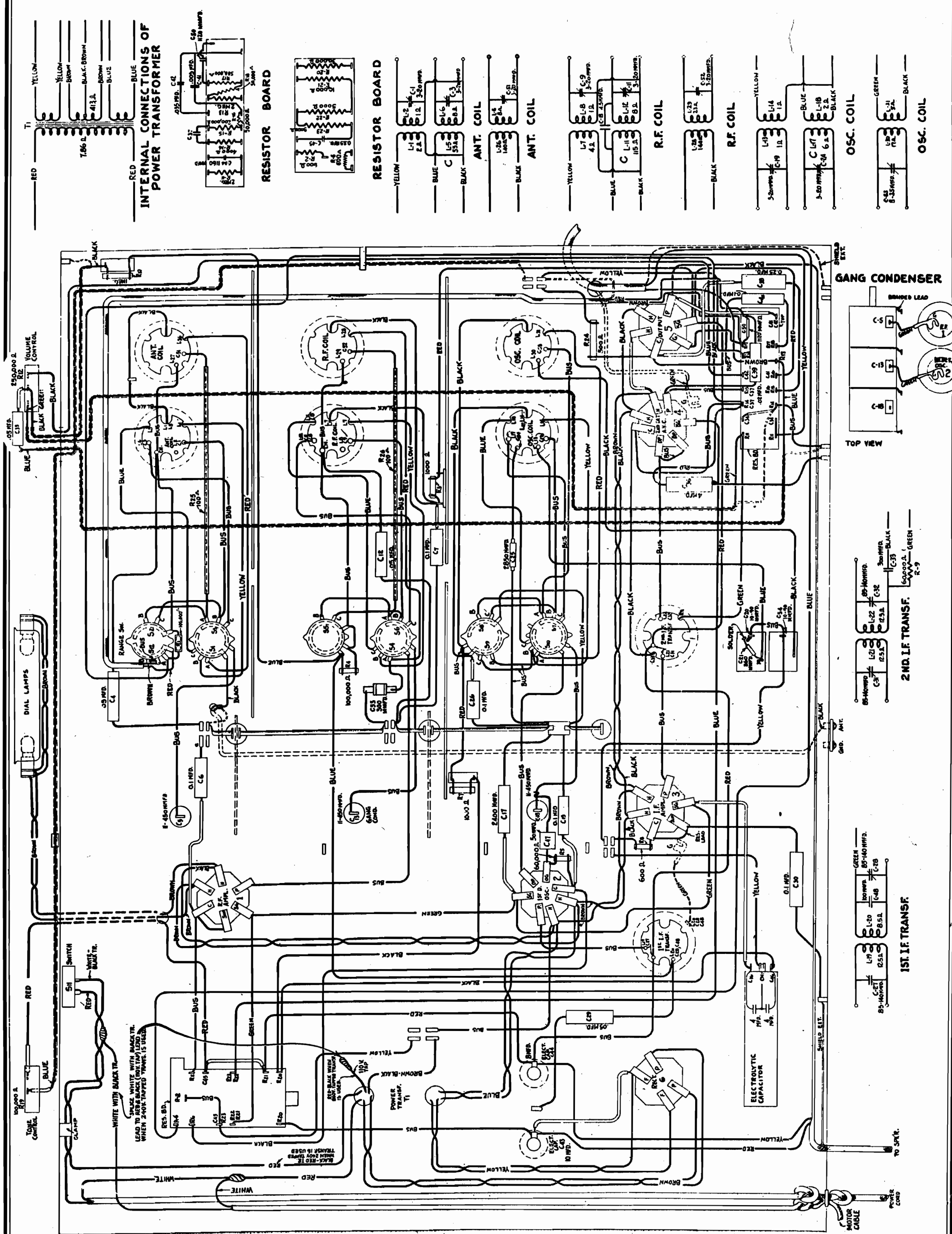
Figure 3—
Loudspeaker Wiring



INTERNAL CONNECTIONS OF SPEAKER

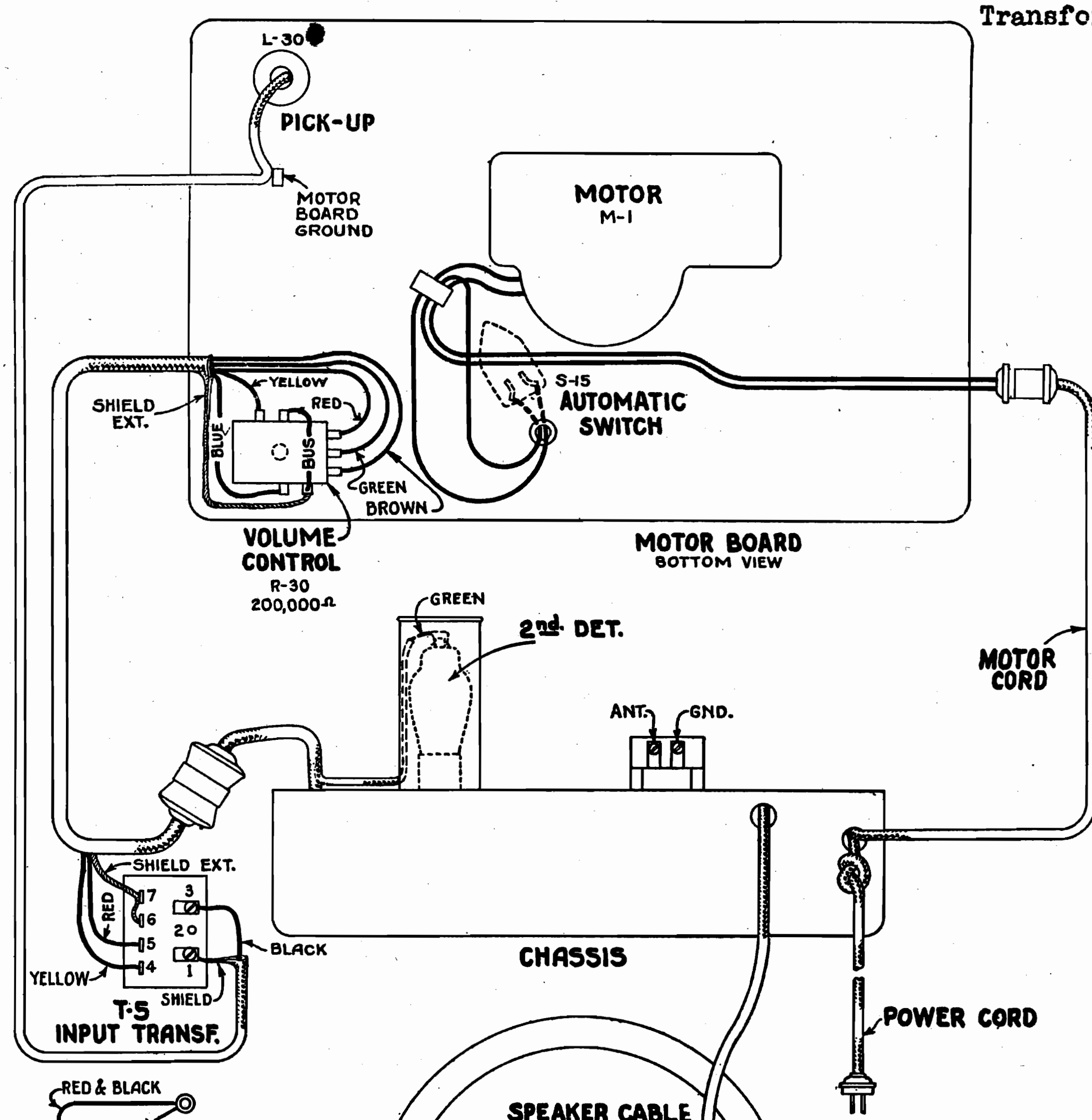
MODEL 322-E Duo
Chassis Wiring

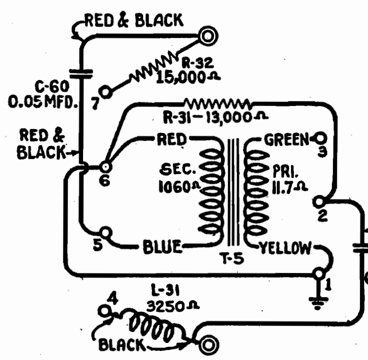
RCA MFG. CO., INC.



MODEL 322-E Duo
Assembly Wiring
Transformer Data

RCA MFG. CO., INC.





INTERNAL CONNECTIONS OF INPUT TRANSFORMER

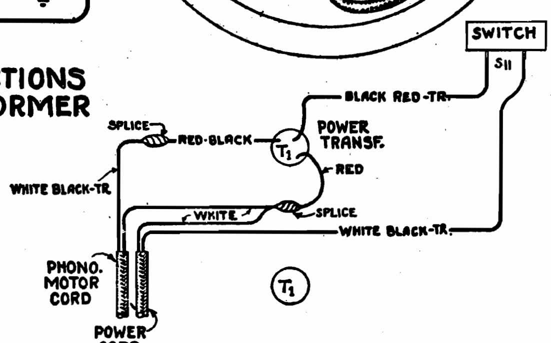
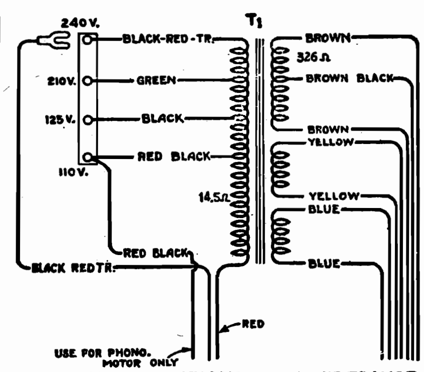


Figure 7—Universal Power Transformer Connections



INTERNAL CONNECTIONS OF POWER TRANSF.

RCA MFG. CO., INC.

The shields over the R. F. coil assembly have a hole at their top for entrance of the tuning wand. The location of the various coils inside of the shield is shown in Figure 5. An example of the proper manner of using the tuning wand would be to assume the external oscillator were set at 1720 and the signal tuned in, and the output indicator should be connected across the voice coil of the loudspeaker. Then the tuning wand would be inserted, first one end and then the other end, into the top of the three transformers at the left of the R. F. assembly, facing the front of the chassis. A perfect adjustment of the trimmer would be evidenced by a reduction in output when each end of the wand is inserted in each of the three transformers. If one end—for example, the iron end—when inserted in one coil caused an increase in output, then that circuit is low. An increase in the trimmer capacitance would be the proper remedy.

(2) I. F. TUNING CAPACITOR ADJUSTMENTS

This receiver has one I. F. stage, which uses two transformers. The transformers are all peaked at 460 K. C.

A detailed procedure for making this adjustment follows:

(a) Connect the output of an external oscillator tuned to 460 K. C. between the first detector grid and ground. Connect the output indicator across the voice coil of the loudspeaker.

(b) Place the oscillator in operation at 460 K. C. Place the receiver in operation and adjust the station selector until a point is reached (band B) where no signals are heard and turn the volume control to its maximum position. Reduce the oscillator input until a slight indication is obtained in the output indicator.

(c) Refer to Figure 6. Adjust each trimmer of the I. F. transformers until a maximum output is obtained. Go over the adjustments a second time.

This completes the I. F. adjustments. However, it is good practice to follow the I. F. adjustments with the R. F. and oscillator adjustments due to interlocking which always occurs.

(3) R. F. OSCILLATOR AND FIRST DETECTOR ADJUSTMENTS

Four R. F., oscillator and first detector adjustments are required in bands "A and B." Three are required in band "C."

To properly align the various bands, each band must be aligned individually. The preliminary set-up requires the external oscillator to be connected between the antenna and ground terminals of the receiver and the output indicator must be connected across the voice coil of the loudspeaker. The volume control must be at its maximum position and the input from the oscillator must be at the minimum value possible to get an output indication under these conditions. In the high-frequency band, it may be necessary to disconnect the oscillator from the receiver and place it at a distance in order to get a sufficiently low input to the receiver.

The dial pointer must be properly set before starting any actual adjustments. This is done by turning the variable capacitor until it is at its maximum capacity position. One end of the pointer should point exactly at the horizontal line at the lowest frequency end of band "B," while the other end should point to within ¼ inch of the horizontal line at the highest frequency end of band "B."

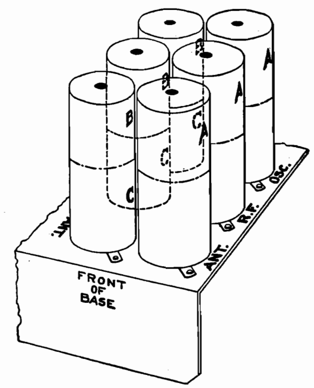


Figure 5—Location of Coils in Shields

Figure 6 shows the location of the trimmers for each band. Care must be exercised to merely adjust the trimmers in the band under test.

Band "A"

(a) Set the Band Switch at "A."

(b) Tune the external oscillator to 410 K. C., set the dial pointer at 410 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 175 K. C. Tune in the 175 K. C. signal irrespective of scale calibration and adjust the series trimmer, marked 175 K. C. on Figure 6, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 410 K. C. as described in (b).

Band "B"

(a) Set the Band Switch at "A."

(b) Tune the external oscillator to 1,720 K. C., set the pointer at 1,720 K. C. and adjust the oscillator, detector and R. F. trimmers for maximum output.

(c) Shift the external oscillator frequency to 600 K. C. Tune in the 600 K. C. signal, irrespective of scale calibration, and adjust the series trimmers, located on rear apron of chassis, for maximum output, at the same time rocking the variable tuning capacitor. Then readjust at 1,720 K. C. as described in (b).

Band "C"

(a) Set the Band Switch at "C."

(b) Tune the external oscillator to 18,000 K. C., and set the pointer at 18 M. C. Adjust the oscillator trimmer for maximum output. The trimmer should be set at the first peak obtained when increasing the trimmer capacitor from minimum to maximum.

(c) Check for the image signal, which should be received at approximately 17,080 on the dial. It may be necessary to increase the external oscillator output for this check.

(d) Reduce the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal disappears. The first detector circuit is then aligned with the oscillator circuit and the RCA-6A7 tube is blocked. Then increase the capacity of the detector trimmer, while rocking the tuning capacitor, until the signal is peaked for maximum output.

(e) The antenna trimmer should now be peaked for maximum output. It is not necessary to rock the main tuning capacitor while making this adjustment.

(4) POWER TRANSFORMER CONNECTIONS

The 220-volt power transformer furnished with some instruments includes taps for operating on 110-volt lines. Figure 6 shows the schematic circuit of the transformer and the proper voltage to be applied to the various taps. The taps are located on the power transformer assembly and are accessible without removing the chassis from the cabinet.

(5) VOLTAGE READINGS

The voltages on page 10 are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if low-resistance meters are used, such allowances must be made. Figure 8 shows the actual voltage at each socket contact.

(6) SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

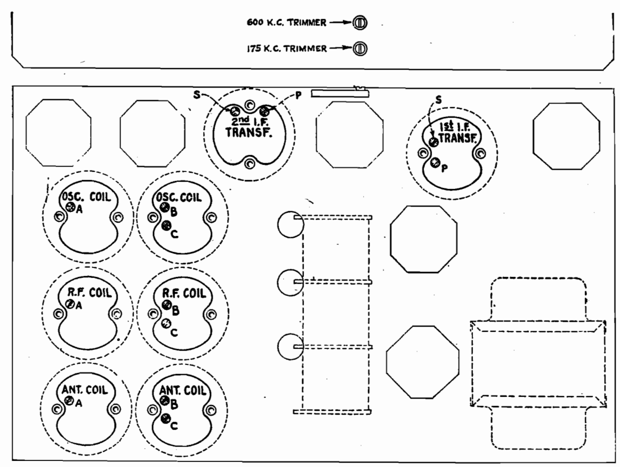


Figure 6—Location of Line-up Capacitors

MODEL 322-E Duo
Pickup Data
Voltage, Socket

RCA MFG. CO., INC.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be .009" on each side of the

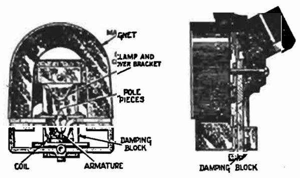


Figure 9—Details of Magnetic Pickup

armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

(7) REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective coil or the hardened pivot rubbers (see Figure 9), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

(d) Remove screws A and B, Figure 10, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

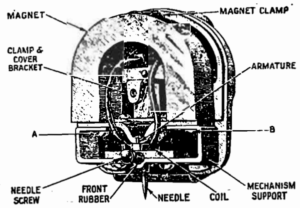


Figure 10—Pickup Nomenclature

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure 10), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

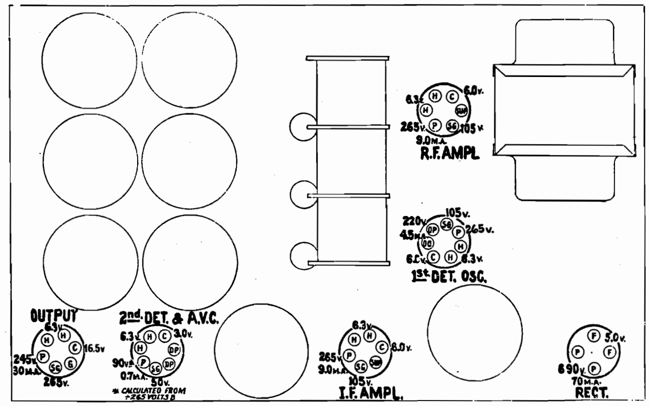
(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

Figure 11—Special Soldering-Iron Tip

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure 11, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.



ALL D. C. VOLTAGES ARE TO GROUND

Figure 8—Tube Socket Voltages

RADIOTRON SOCKET VOLTAGES

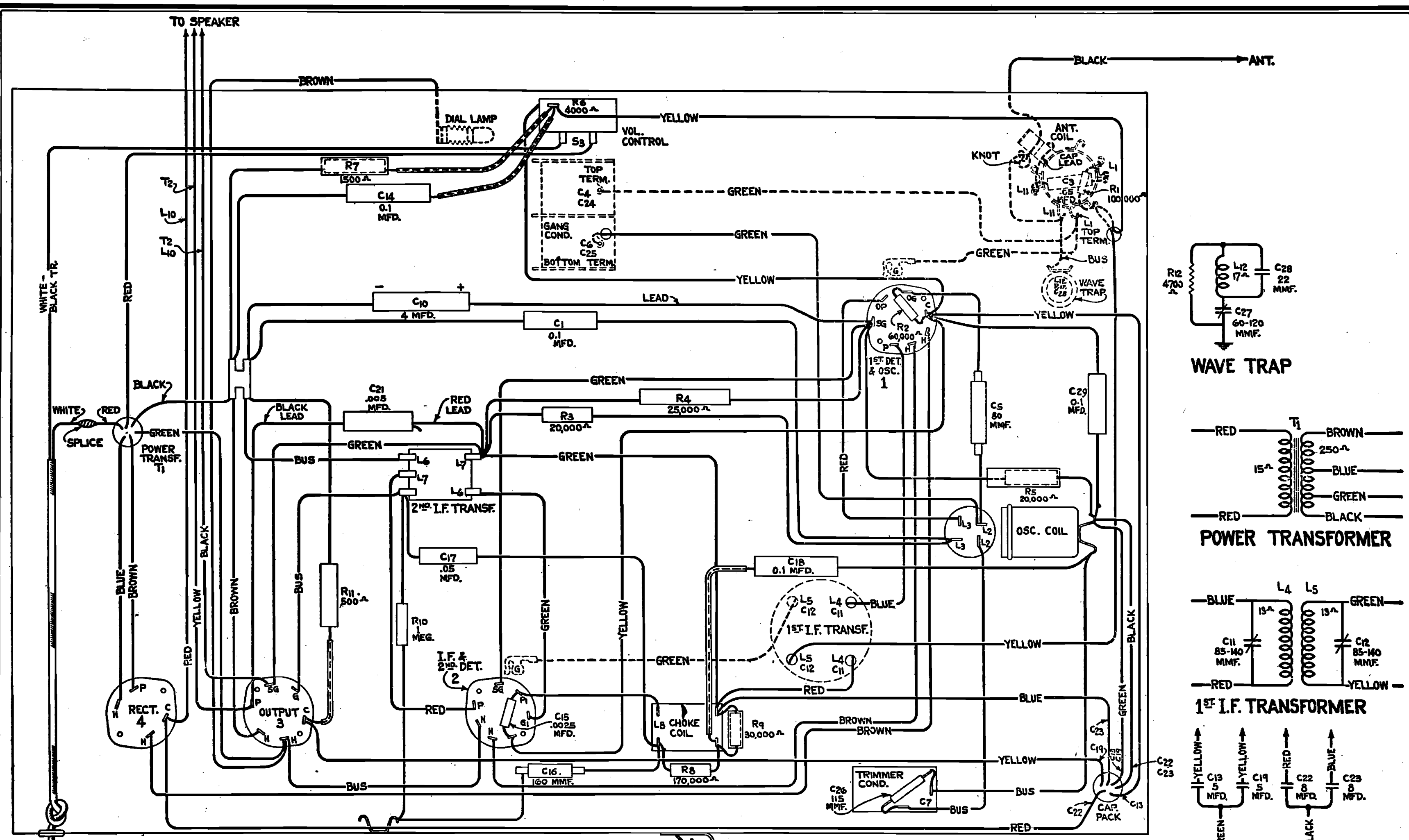
115 Volt A. C. Line—No Signal—Volume Control Maximum

Radiotron Number		Cathode to Ground, Volts, D. C.	Screen Grid to Ground, Volts, D. C.	Plate to Ground, Volts, D. C.	Plate Current, M. A.	Heater Volts, A. C.
RCA-6D6—R. F.		6.0	105	265	9.0	6.3
RCA-6A7	Det.	6.0	105	265	3.5	6.3
	Osc.	—	—	220	4.5	
RCA-6D6—I. F		6.0	105	265	9.0	6.3
RCA-6B7—2nd Detector		3.0	50	90*	0.7	6.3
RCA-41—Power		16.5	265	245	30.0	6.3
RCA-80—Rectifier		—	—	690 (RMS—P to P)	70.0	5.0

*Voltage calculated from 265 v. + B.

MODELS T4-8, T4-9
Chassis Wiring

RCA MFG. CO., INC.



Tuning Range..........540-1720 kc.
Intermediate Frequency..........460 kc.
Alignment Frequencies..........460 kc. (i.f.), 600 kc. (det., osc.), 1720 kc. (det., osc.)
Voltage and Frequency Ratings..........105-125 volts, 50-60 cycles; 105-125 volts, 25-60 cycles; 200-250 volts, 50-60 cycles
Power Consumption..........40 watts at 115 volts
Undistorted Audio Output..........1.75 watts
Maximum Audio Output..........2.50 watts
Loudspeaker..........6 inch, Electrodynamic

MODELS T4-8,T4-9
Schematic,Socket
Interference Note

RCA MFG. CO., INC.

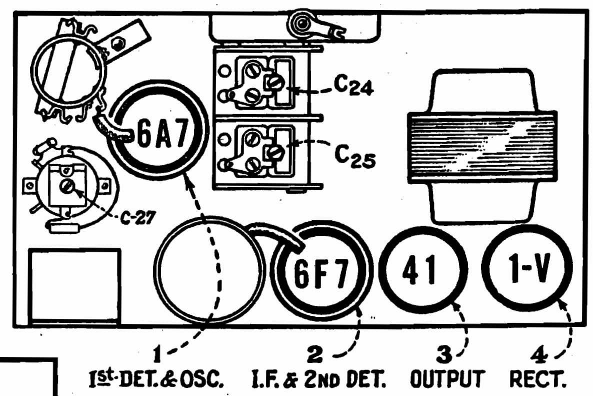
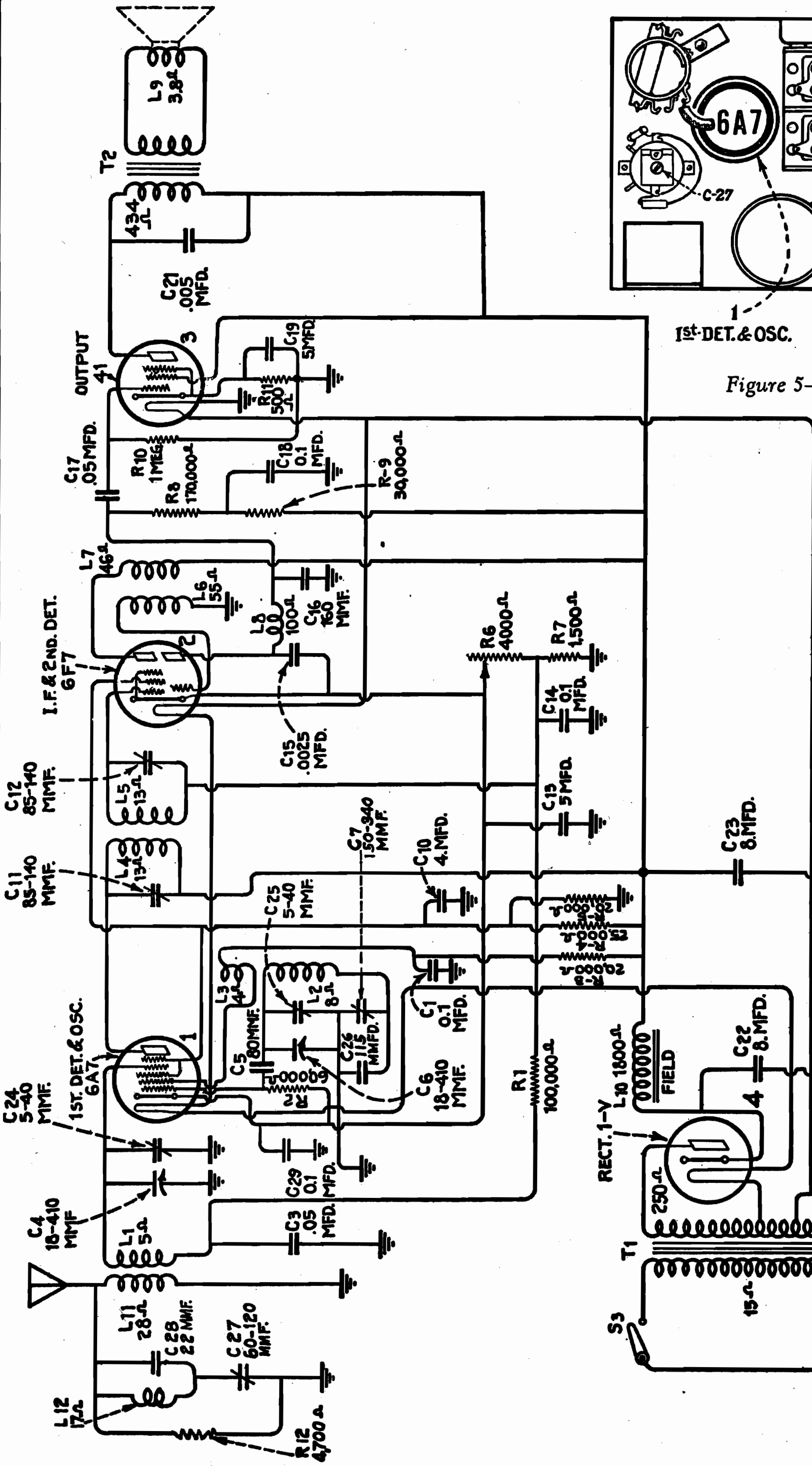


Figure 5—Radiotron Locations



Code Interference

In some localities near to high-powered, radio-telegraph communication stations, slight interference may be encountered. This trouble may be remedied by adjustment of the 460 kc. wave trap provided in the antenna circuit. Adjust the wave trap trimmer C-27 to produce a minimum of interference.

IF PEAK 460 KC

RCA MFG. CO., INC.

Alignment Procedure

Five aligning trimmers are provided, the physical locations of which are indicated on Figure 3. These trimmers are accurately adjusted during manufacturing tests and should remain in proper alignment indefinitely unless affected by abnormal conditions of temperature or humidity, or unless they have been altered for service purposes. Loss of sensitivity, improper tone quality and poor selectivity usually indicate necessity for re-alignment.

The correct performance of the receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. Such test apparatus as may be required for this operation should be in the hands of a skilled service engineer. The manufacturer of this receiver has available for sale through its distributors and dealers, a complete assortment of service test equipment. The instruments needed for alignment operations are illustrated and described on a separate page of this booklet.

An oscillator or signal generator is required as a source of the standard alignment frequencies recommended under Electrical Specifications. Visual indication of receiver output during the adjustments is very advantageous and may be accomplished by use of a Cathode Ray Oscillograph such as the RCA Victor Stock No. 9545. The method of alignment is explained in the instruction booklet for this instrument. Where an oscillograph is not available, an RCA Victor Neon Type Output Indicator may be used with good results. It should be connected to the voice coil circuit of the loudspeaker so as to be actuated by the audio signal voltage.

The following method of procedure should be followed in adjusting the various trimmer capacitors:—

(1) **Intermediate Frequency Amplifier**—The first i-f transformer has two trimmers identified as C-11 and C-12 on the diagram, Figure 3. Each must be tuned to *460 kc.* by feeding a signal of this frequency from the Full Range Oscillator into the RCA-6A7 control grid and chassis-ground and adjusting both trimmers to the point giving maximum output. The oscillator output and the receiver volume control should be regulated so as to produce a sensitive indication on the receiver output indicator. If interference is noticed from strong local stations during these adjustments, the station selector should be tuned to a point at which they will be subdued.

(2) **Detector and Oscillator**—A total of three adjustments are necessary on the detector and oscillator coil systems. Two of these are to be made at *1720 kc.* and the other at *600 kc.* The *1720 kc.* trimmers are mounted on the variable tuning condenser and are accessible from the top of the chassis. The *600 kc.* trimmer, which is associated with the oscillator system, is located on the rear apron of the chassis as shown by Figure 3. To align these

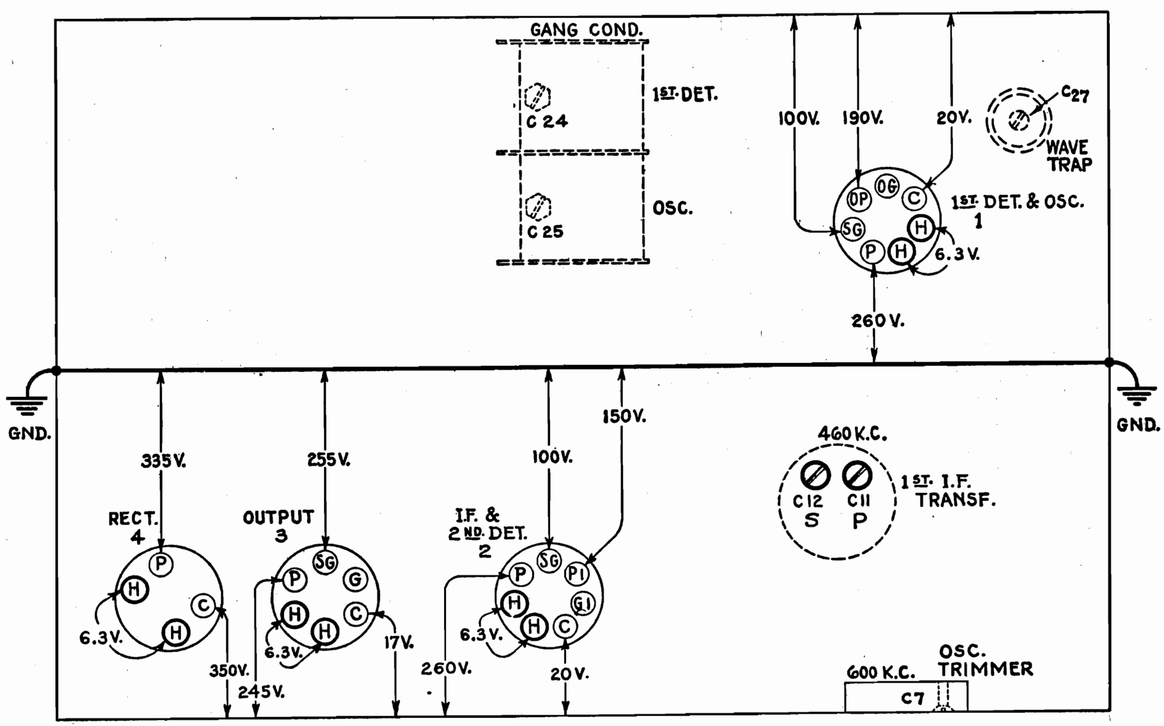


Figure 3—Trimmer Locations and Radiotron Socket Voltages to Chassis
Measured at 120 volts A-C Supply—No Signal — Volume Control Maximum

RCA MFG. CO., INC.

various trimmers, after correcting the i-f alignment, proceed in the following manner. Supply a 1720 kc. signal from the standard oscillator to the receiver imput (ant-gnd) terminals and accurately set the station selector to the 1720 kc. dial marking. (If for any reason, the dial pointer has slipped or been misplaced on the tuning shaft, it should be checked for proper calibration at full mesh of the variable condenser. With the station selector set to 1400 kc. adjust the trimmers C-25 and C-24 so that each produces maximum (peak) receiver output. Then shift the test oscillator frequency to 600 kc. and tune this standard signal on the receiver, disregarding the dial reading at which it is received. Adjust the 600 kc. oscillator trimmer C-7, simultaneously rocking the variable gang condenser backward and forward through the signal so

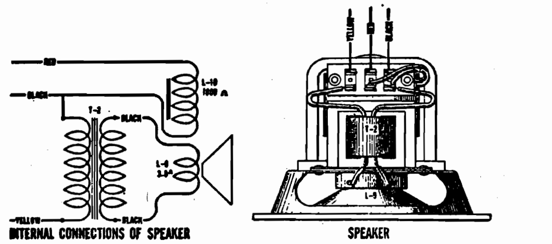


Figure 4—Loudspeaker Wiring

that maximum receiver output results from the combined operations. The point at which maximum output is obtained will not always be exactly at 600 kc. on the dial. The error should be disregarded. It is advisable to repeat the adjustments of C-24 and C-25 as explained above to correct for any reflective changes brought about by the adjustment of C-7.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4244	Cap—Grid contact cap—Package of 5	$0.20
4000	Capacitor—Adjustable capacitor (C7)	.78
3459	Capacitor—80 mmfd. (C5)	.44
11302	Capacitor—115 mmfd. (C26)	.15
3865	Capacitor—160 mmfd. (C16)	.30
5107	Capacitor—0.0025 mfd. (C15)	.16
6787	Capacitor—0.005 mfd. (C21)	.30
4836	Capacitor—0.05 mfd. (C3)	.30
4886	Capacitor—0.05 mfd. (C17)	.20
4835	Capacitor—0.1 mfd. (C1)	.28
4885	Capacitor—0.1 mfd. (C14, C18)	.28
4841	Capacitor—0.1 mfd. (C29)	.22
6832	Capacitor—4.0 mfd. (C10)	.85
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
5051	Coil—Antenna coil (L1, L11, C3, R1)	1.28
3857	Coil—Choke coil (L8)	.90
5050	Coil—Oscillator coil (L2, L3)	.56
6660	Condenser—Two-gang variable tuning condenser (C4, C6, C24, C25)	2.78
6667	Volume control (R6, S3)	1.58
11301	Dial—Station selector dial	.40
4340	Lamp—Dial lamp—Package of 5	.60
3632	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3047	Resistor—1500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	$1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3869	Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R10)—Package of 5	1.00
3584	Ring—Oscillator coil shield ring—Package of 5	.40
6665	Shield—Oscillator coil shield and bracket assembly	.34
3942	Shield—I. F. and second detector Radiotron shield	.18
8098	Socket—Dial lamp socket	.10
11187	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	1.72
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
9465	Transformer—Power transformer—105-125 volts—25-50 cycles	4.38
9464	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	3.20
9466	Transformer—Power transformer—200-250 volts—50-60 cycles	3.28
11224	Trap—Wave trap (R12, L12, C27, C28)	.90
	REPRODUCER ASSEMBLIES	
9548	Coil assembly—Comprising field coil, magnet and cone support (L10)	$3.08
9588	Cone—Reproducer cone—(L9)—Package of 5	3.55
9547	Reproducer—Complete	5.45
4447	Shield—Terminal board shield for reproducer	.18
4803	Transformer—Output transformer (T2)	1.45

MODEL T4-10
Socket, Alignment
Parts List, Data

RCA MFG. CO., INC.

SERVICE DATA

Two trimmer capacitors are mounted on the variable tuning condenser for alignment purposes. Their exact locations and identifications are given by Figure 3. It will be necessary to re-adjust these capacitors only when they have become altered from their original alignment by reason of change of parts for service purposes, effects of extreme climate, or possibly because of tampering. Poor all-round performance is the general indication of improper alignment.

To re-align the receiver, proceed as follows:—

(1) Place the receiver in operation with a standard signal generator (RCA Victor Stock No. 9595) connected to its antenna terminal. Correct the "zero" setting of the tuning knob so that it reads "0" when turned to its extreme left or full mesh of the variable condenser.

(2) Set the trimmer screws so that they are approximately equal at their medium capacity. This may be done by turning each the same number of turns from their maximum positions.

(3) Tune the external test oscillator to 1700 kc. and rotate the station selector until it is received. Adjust the output of the oscillator and volume control of the receiver to give the desired output level. It is advisable to use an output indicator attached to the speaker circuit. An RCA Stock No. 4317 Output Indicator is especially suitable.

(4) Adjust the two trimmers C-3 and C-14, at the same time observing the output indicator, until the maximum (peak) receiver output is obtained.

Radiotron Socket Voltages

The voltages indicated from the socket contacts to the chassis on Figure 3 will serve to assist in analyzing defective circuit conditions when existent. Each value specified should hold within ± 20% when the receiver is normally operative at the rated voltage. Variations in excess of this limit will usually be indicative of a faulty part. If all readings are incorrect, trouble should be investigated in the rectifier system. Defects occurring at other points in the circuits will affect a single or group of measurements related to that section.

Readings given are actual operating values and do not take into account measurement inaccurracies due to internal voltmeter resistance. A meter having a resistance of at least 1000 ohms per volt should be used. The amount of circuit resistance which shunts the meter will determine the accuracy obtained, the error increasing as the former becomes comparable to or less than the latter.

Antenna-Ground

The circuit of the receiver is arranged in such manner that the chassis is at negative high voltage. The usual ground connection is therefore omitted and the chassis mounted so that it is insulated. The r-f circuit to ground is by way of the negative d-c lead or neutral a-c lead.

Interference present on the power supply line may occasionally attain a bothersome level in the receiver. When being operated on a.c., some reduction of this noise may be brought about by reversal of the power plug. For more serious interference, either from an a-c or d-c line, an external ground should be made to the receiver chassis through a small series condenser (.001 mfd, 200 volts). The length of the grounding lead should be kept to an absolute minimum.

Power Cord

The resistance element of the power lead will produce a noticeable amount of heat while the receiver is in operation. This heating should not be regarded as abnormal. No changes should be made in the length of the cord. In case of failure, it should be replaced in its entirety by a standard part.

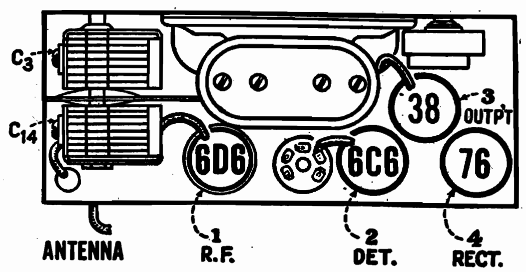


Figure 4—Tube Location Layout

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4244	Cap—Grid contact cap—Package of 5....	$0.20
11135	Capacitor—265 mmfd. (C8)...........	.15
5107	Capacitor—.0025 mfd. (C9)...........	.16
5005	Capacitor—.0035 mfd. (C11)...........	.16
4858	Capacitor—.01 mfd. (C1).............	.25
4836	Capacitor—.05 mfd. (C4).............	.30
4841	Capacitor—.1 mfd. (C7)..............	.22
11268	Capacitor pack—Comprising two 4.0 mfd. capacitors (C12, C13).............	.80
7956	Capacitor pack—Comprising two 5.0 mfd. capacitors (C6, C10)...............	.80
6821	Coil—Detector coil (L4, L5, L6)........	.96
11261	Coil—RF coil (L1, L2, L3)............	1.00
11260	Condenser—Two-gang variable tuning condenser (C2, C3, C5, C14)...........	1.75
11263	Volume control (R1, S1)..............	.88
11267	Cord—Power cord—315 ohms (R8).....	1.00
3537	Reactor—Filter reactor (L8)...........	1.10
4408	Resistor—1500 ohm—Carbon type—¼ watt (R7)—Package of 10................	2.00
3998	Resistor—15,000 ohm—Carbon type—¼ watt (R3)—Package of 5.............	$1.00
5108	Resistor—330,000 ohm—Carbon type—¼ watt (R2)—Package of 5.............	1.00
11172	Resistor—470,000 ohm—Carbon type—¼ watt (R5)—Package of 5.............	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R6)—Package of 5.............	1.00
11151	Resistor—2.2 megohm—Carbon type—¼ watt (R4)—Package of 5............	1.00
5129	Ring—Radiotron shield ring—Package of 5	.10
11265	Shield—Radiotron shield..............	.15
	REPRODUCER ASSEMBLIES	
9471	Cone—Reproducer cone—Package of 5...	3.50
7713	Mechanism—Reproducer mechanism—Complete	3.72
9470	Reproducer—Complete (L7)............	4.62
7712	Support—Cone support................	.50

MODEL T4-10
Schematic, Voltage
Trimmers

RCA MFG. CO., INC.

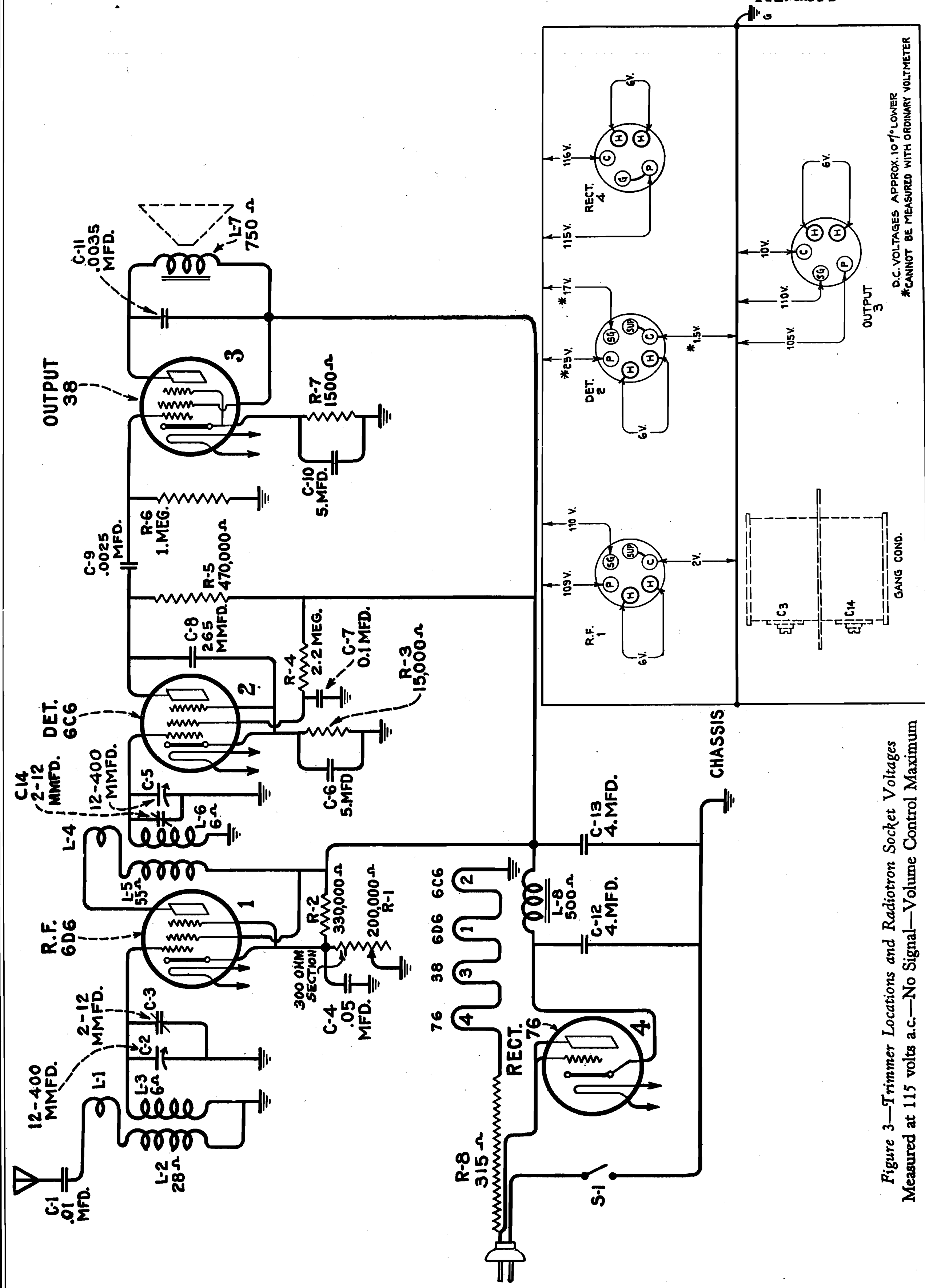
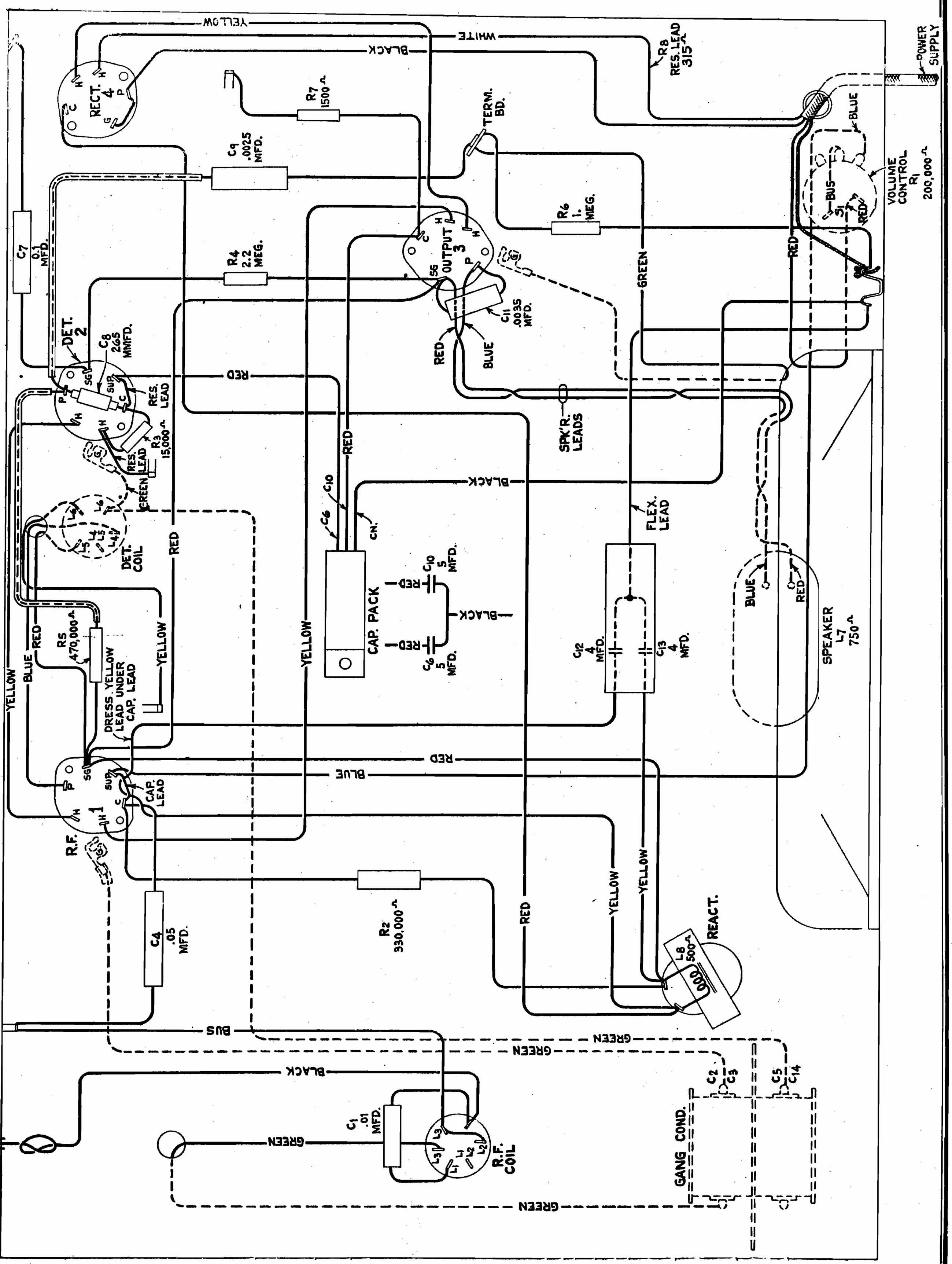


Figure 3—Trimmer Locations and Radiotron Socket Voltages
Measured at 115 volts a.c.—No Signal—Volume Control Maximum

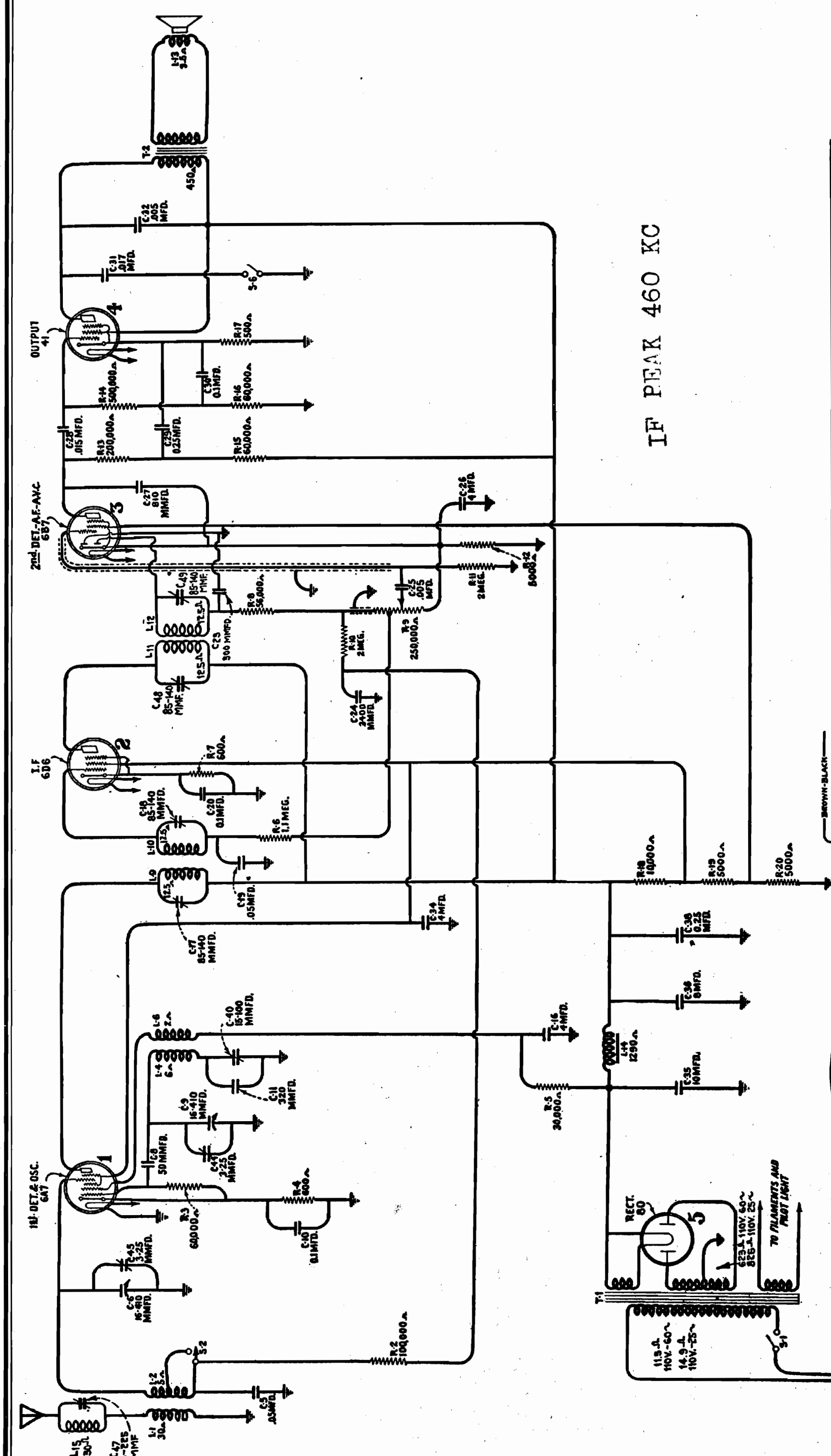
MODEL T4-10
Chassis Wiring

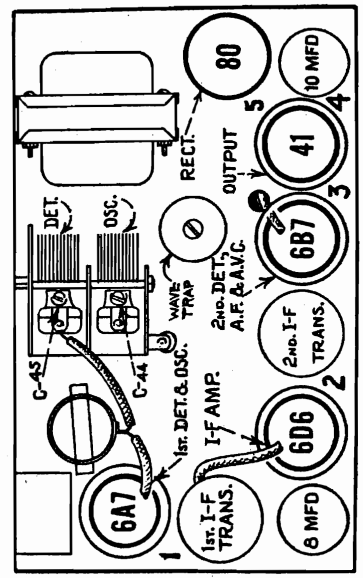
RCA MFG. CO., INC.

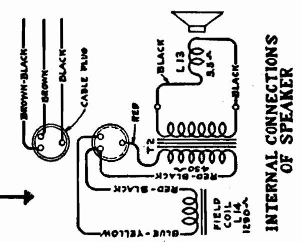


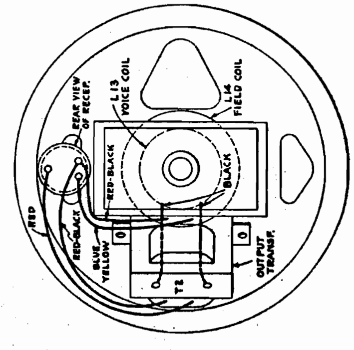
RCA MFG. CO., INC.

MODEL T5-2
Schematic, Socket
Speaker Data, Trimmers



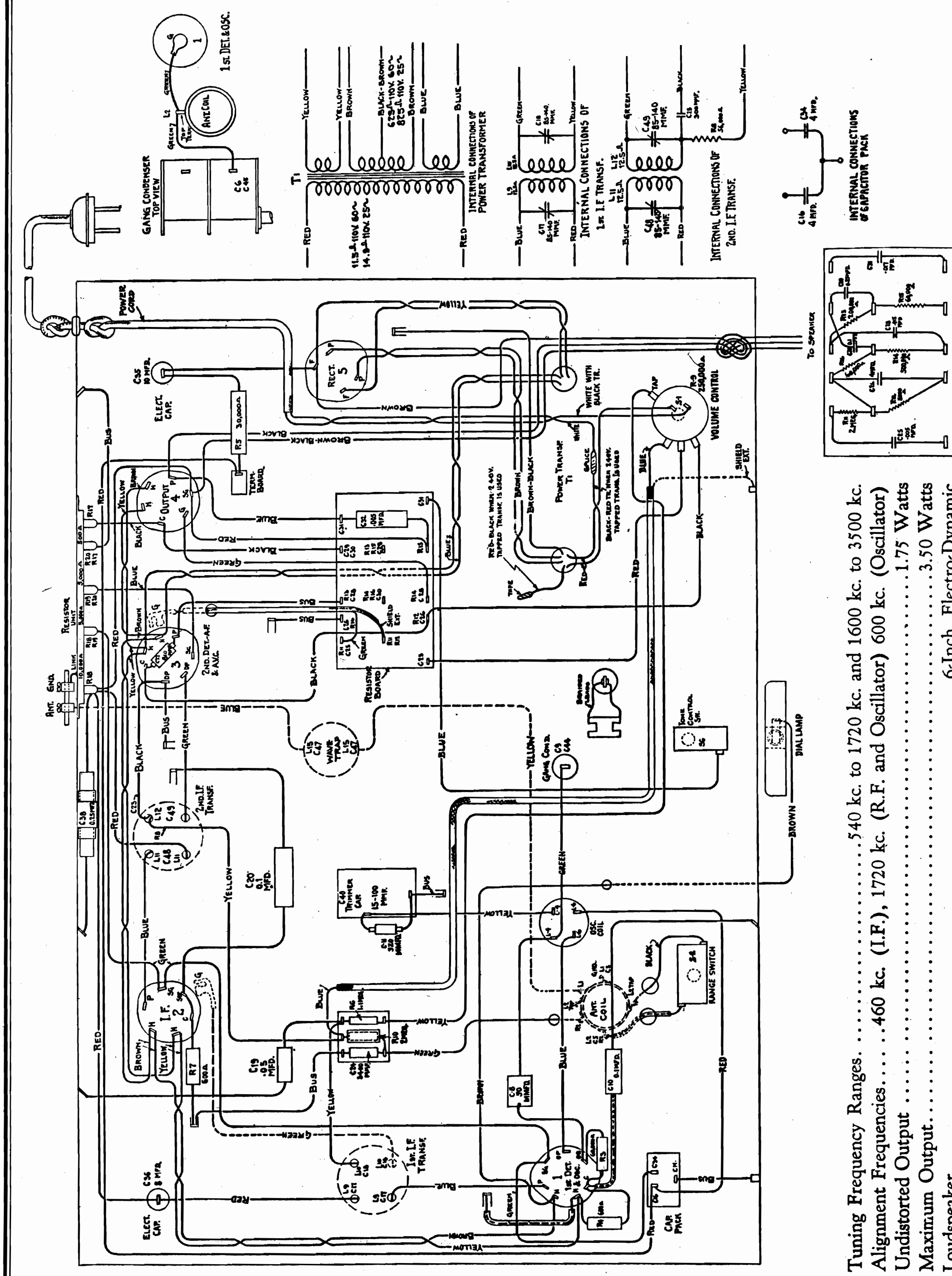






MODEL T5-2
Chassis Wiring

RCA MFG. CO., INC.



Tuning Frequency Ranges...........540 kc. to 1720 kc. and 1600 kc. to 3500 kc.
Alignment Frequencies......460 kc. (I.F.), 1720 kc. (R.F. and Oscillator) 600 kc. (Oscillator)
Undistorted Output..........................1.75 Watts
Maximum Output..............................3.50 Watts
Loudspeaker..............................6-Inch, Electro-Dynamic

RCA MFG. CO., INC.

SERVICE DATA

ALIGNMENT PROCEDURE

This receiver must be in correct electrical alignment in order to obtain maximum efficiency and best quality of performance. The circuits should be realigned after each major service or repair operation, and whenever there are positive indications that the adjustments have deviated from normal by ordinary usage. These indications will be present together and will have the nature of: low sensitivity, poor tone quality and irregular double-peaked tuning.

I-F Tuning Adjustments

There are two i-f transformers associated in the intermediate amplifier system. They are both tuned by accessible trimmers. To obtain the correct alignment proceed as follows:

(a) Short circuit the antenna and ground terminals and tune the receiver so that no signal is received. Set the volume control to its maximum position. Ground the receiver.

(b) Connect the output of the test oscillator between the first detector control grid and chassis ground. Attach an indicating meter, such as is illustrated, to the speaker circuit.

(c) Place the external oscillator into operation at 460 kc. Adjust the output so that a slight registration occurs on the output indicator. The output should be set at as low a value as will give a convenient indication during adjustment; this requirement is important in that the a.v.c. action is voided by such a method. Adjust the trimmers, C-49, C-48, C-18 and C-17 in order, for maximum receiver output.

R-F and Oscillator Adjustments

Three trimmers are provided, two for adjustment at 1720 kc. and one for oscillator line-up at 600 kc. No adjustments are required on the medium wave band. Locations of the trimmers are shown on Figure 3. They should be adjusted in the following manner:

(a) Connect the output of the modulated Full Range Oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer. It should set exactly on the radial line, adjacent to the dial reading of 540 when the tuning capacitor plates are at full mesh. After correcting the dial pointer, place the receiver in operation and set the selector at 1720 kc., advance the volume control to maximum and turn the range switch to its broadcast position.

(b) Adjust the frequency of the external oscillator to 1720 kc. and regulate its output until a perceptible indication appears on the output indicator. This indication should be held at a minimum during the adjustments. The trimmers C44 and C45 should then be tuned to the point giving peak receiver output.

(c) Re-tune the test oscillator, setting its frequency

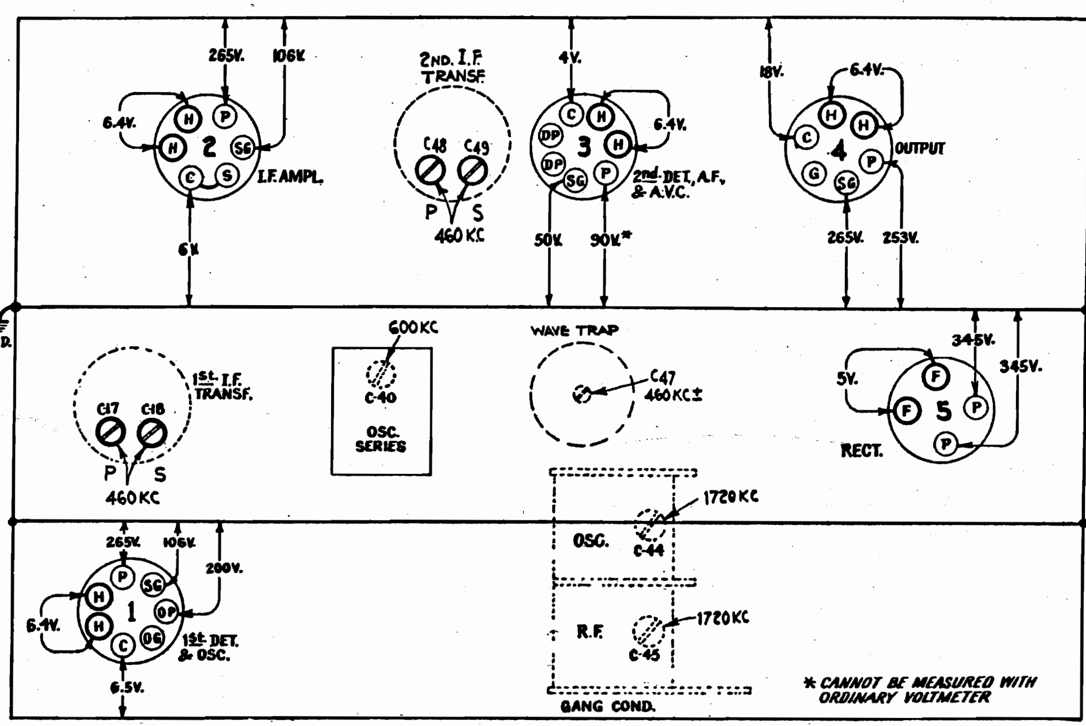


Figure 3—Trimmer Locations and Radiotron Socket Voltages (Measured at 115 volts A. C. Supply—Maximum Volume Control—No Signal)

RCA MFG. CO., INC

to 600 kc. Turn the receiver selector control to the point where the incoming oscillator signal is received best. *This point will not always be exactly at 600 on the dial.* Then adjust the low-frequency trimmer, C40, simultaneously rocking the tuning capacitor slowly through the signal until maximum receiver output results from these combined operations. This adjustment must be made irrespective of dial calibration. It is advisable to repeat the 1720 kc. adjustment of the oscillator trimmer C44, in order to correct for any change caused by the tuning of C40.

Wave Trap Adjustment

With receiver in operation using its normal antenna, tune the station selector to the point at which the intermediate-wave interference is most intense. Then adjust the wave-trap trimmer to the point which cause maximum suppression of the interference.

RADIOTRON SOCKET VOLTAGES

The various normal operating voltages are given on Figure 3. As specified, they are referred to the chassis ground. Accuracy of measurements will be a function of the internal resistance of the voltmeter used. It is advisable to employ a meter having at least 1000 ohms per volt, and for each reading use the highest range which will give an acceptably accurate reading. General deviations from the values given, due to line voltage difference, should not be taken as indicating a defective condition. The erratic departure from normal of a single value or group of values should form the basis of circuit diagnosis.

T 5-2 REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4244	Cap—Contact cap—Package of 5	$0.20
3861	Capacitor—Adjustable capacitor (C40)	.78
5094	Capacitor—50 MMfd. (C8)	.20
5151	Capacitor—320 MMfd. (C11)	.20
4297	Capacitor—400 MMfd. (C27)	.30
4881	Capacitor—3400 MMfd. (C24)	.20
4868	Capacitor—0.005 Mfd. (C25, C32)	.20
11315	Capacitor—0.015 Mfd. (C28)	.20
4906	Capacitor—0.017 Mfd. (C31)	.25
4836	Capacitor—0.05 Mfd. (C5, C19)	.30
4841	Capacitor—0.1 Mfd. (C10, C20, C30)	.22
3597	Capacitor—0.25 Mfd. (C29, C38)	.40
3796	Capacitor—4.0 Mfd. (C26)	.60
4428	Capacitor—8.0 Mfd. (C36)	1.05
7790	Capacitor—10.0 Mfd. (C35)	1.05
7589	Capacitor Pack—Comprising two 4.0 Mfd. capacitors (C16, C34)	1.64
4358	Clamp—Capacitor mounting clamp for Stock No. 4428 and No. 7790	.15
5051	Coil—Antenna coil (L1, L2, C5, R2)	1.28
5050	Coil—Oscillator coil (L4, L6)	.56
11475	Condenser—2-gang variable tuning condenser (C6, C9, C44, C45)	3.25
11476	Drive—Variable condenser drive	.65
3708	Resistor—600 Ohm—Carbon type—¼ watt (R4, R7)—Package of 5	1.00
4436	Resistor—5000 Ohm—Carbon type—¼ watt (R12)—Package of 10	2.00
2240	Resistor—30,000 Ohm—Carbon type—1 watt (R5)	.22
3602	Resistor—60,000 Ohm—Carbon type—¼ watt (R3, R15, R16)—Package of 5	1.00
3118	Resistor—100,000 Ohm—Carbon type—¼ watt (R2)—Package of 5	1.00
3116	Resistor—200,000 Ohm—Carbon type—¼ watt (R13)—Package of 5	1.00
6186	Resistor—500,000 Ohm—Carbon type—¼ watt (R14)—Package of 5	1.00
4783	Resistor—1,100,000 Ohm—Carbon type—¼ watt (R6)—Package of 5	1.00
6242	Resistor—2 Megohm—Carbon type—¼ watt (R10, R11)—Package of 5	1.00
4721	Resistor—Tapped resistor—One 500 Ohm, two 5,000 Ohm, and one 10,000 Ohm sections (R17, R18, R19, R20)	.88

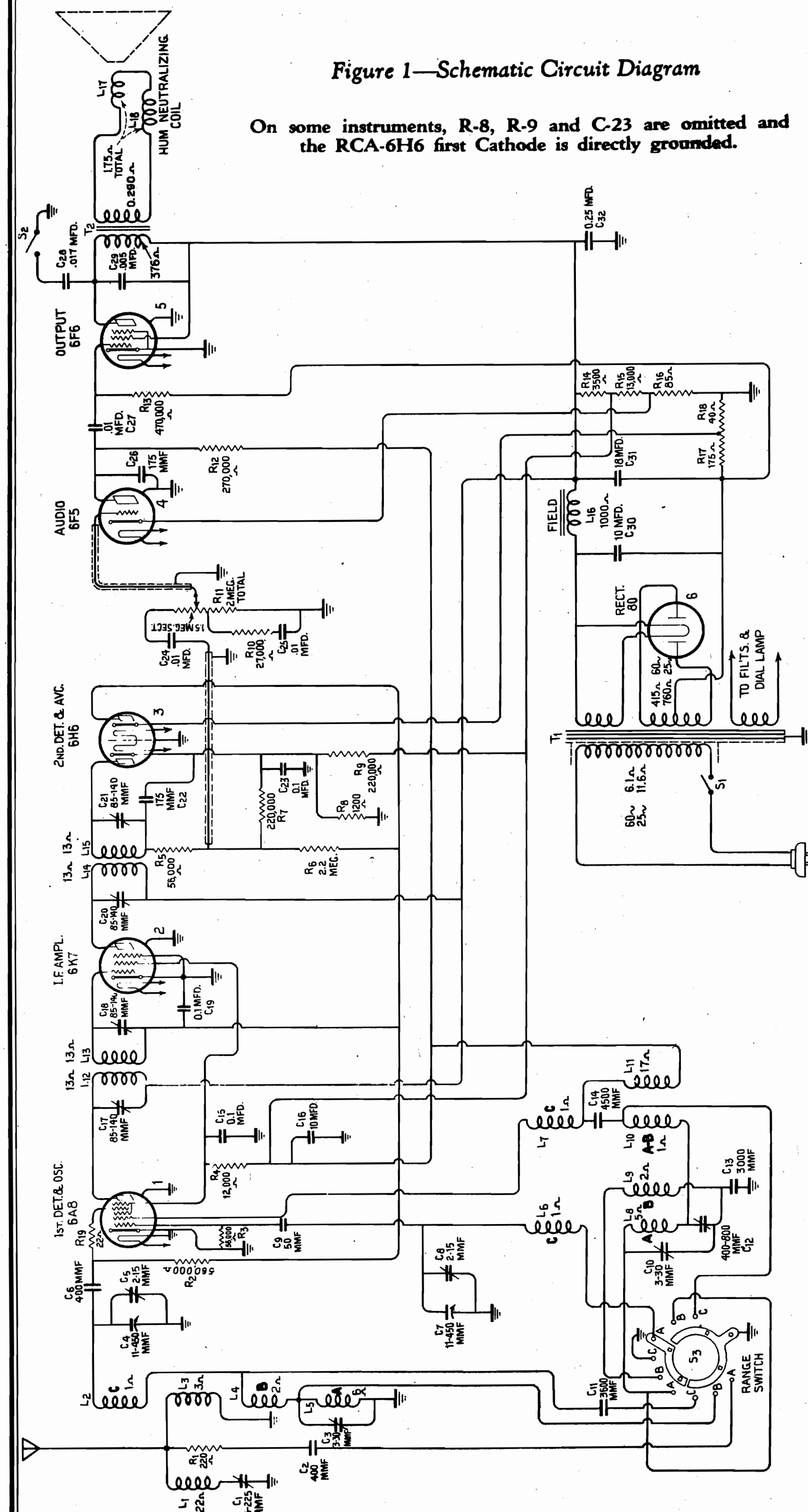
Stock No.	Description	List Price
3584	Ring—Oscillator coil retaining ring—Package of 5	$0.40
3623	Shield—Oscillator coil shield	.30
3942	Shield—First detector and output Radiotron shield	.18
3782	Shield—Second detector Radiotron shield	.26
7487	Shield—I.F. Radiotron shield	.25
5186	Shield—I.F. Transformer shield	.28
3858	Socket—Dial lamp socket	.26
4784	Socket—4-contact Radiotron socket	.15
4785	Socket—6-contact output Radiotron socket	.15
4786	Socket—6-contact Radiotron socket	.15
4787	Socket—7-contact Radiotron socket	.15
5053	Switch—Range switch (S2)	.50
4905	Switch—Tone control switch (S6)	.30
4900	Transformer—First intermediate frequency transformer—(L9, L10, C17, C18)	2.25
11477	Transformer—Second intermediate frequency transformer (L11, L12, C23, C48, C49, R8)	2.02
4898	Transformer—Power transformer—105-125 volts—25-60 cycles	5.55
4897	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	3.98
4899	Transformer—Power transformer—105-125/200-240 volts—40-60 cycles	4.05
11479	Trap—Wave trap (L15, C47)	1.02
4429	Volume Control—(R9, S1)	1.40
	REPRODUCER ASSEMBLIES	
9587	Coil—Field coil, magnet and cone support (L14)	2.18
9588	Cone—Reproducer cone (L13)—Package of 5	3.55
5118	Connector—3-contact male connector for reproducer cable	.25
5119	Connector—3-contact female connector for reproducer cable	.25
9586	Reproducer—Complete	5.95
4893	Transformer—Output transformer (T2)	1.48
	MISCELLANEOUS ASSEMBLIES	
5111	Dial—Station selector dial scale	.32
11478	Indicator—Station selector indicator pointer	.12
4340	Lamp—Station selector dial lamp—Package of 5	.60

RCA MFG. CO., INC.

Figure 1—Schematic Circuit Diagram

On some instruments, R-8, R-9 and C-23 are omitted and the RCA-6H6 first Cathode is directly grounded.

IF PEAK 460 KC



FREQUENCY RANGES

Band A..............540— 1625 kc.
Band B..............1625— 5700 kc.
Band C..............5700—18000 kc.

Intermediate Frequency..**460 kc.**

POWER SUPPLY RATINGS

Rating A..105—125 volts, 50—60 cycles, 85 watts
Rating B..105—125 volts, 25—60 cycles, 90 watts
Rating C..............100—130/140—160/195—250 volts, 40—60 cycles, 85 watts

POWER OUTPUT

Undistorted..............................2.0 watts
Maximum...................................4.5 watts

ALIGNMENT FREQUENCIES

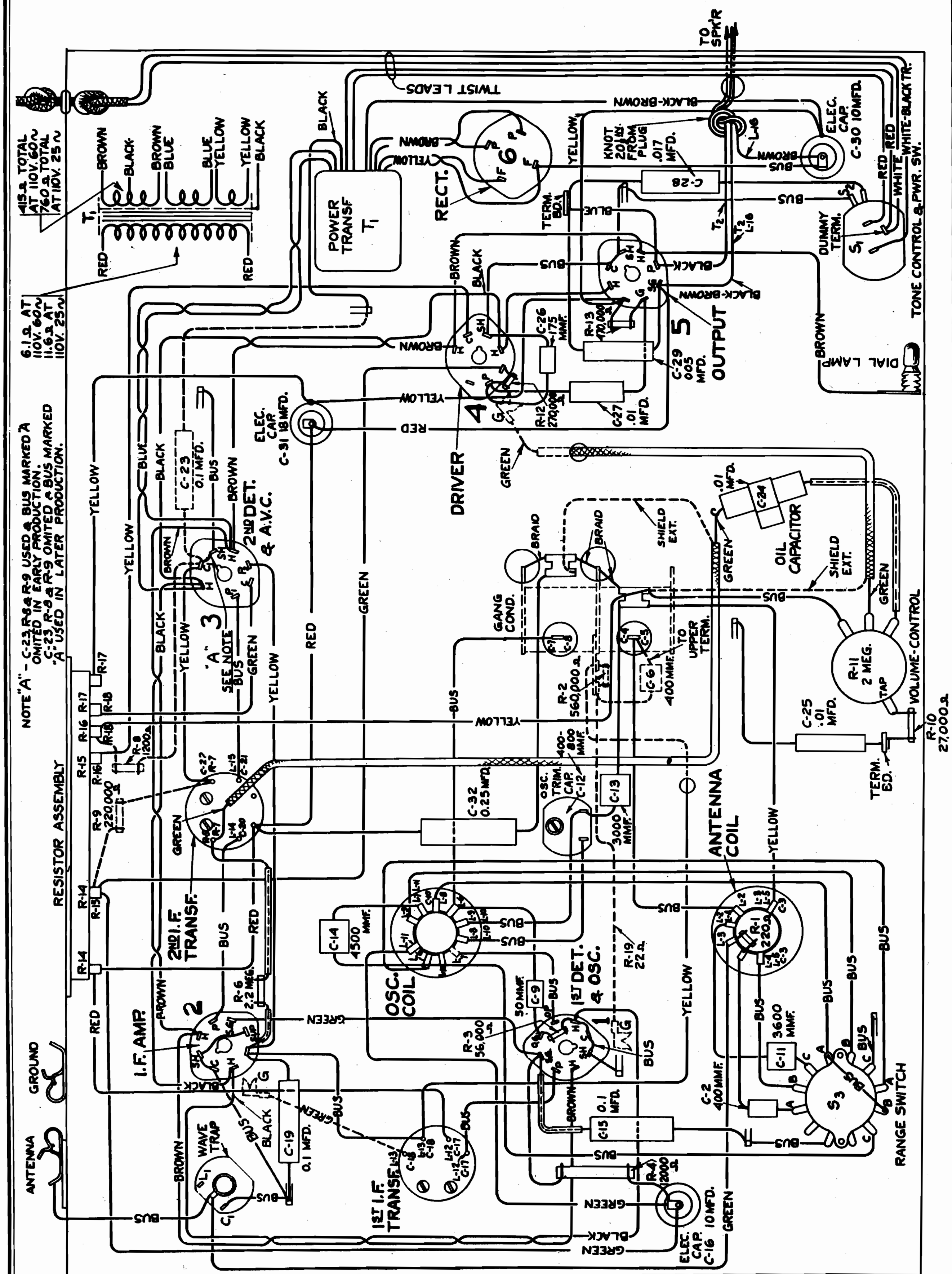
Band A..........600 kc. (osc.), 1400 kc. (osc., ant.)
Band B..None required
Band C..................................18000 kc. (osc., ant.)

LOUDSPEAKER

Type..Electrodynamic
Voice Coil Impedance...........2.25 ohms—400 cycles

MODELS T6-1, C6-2
Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

Circuit Arrangement

The conventional Superheterodyne type of circuit, consisting of a combined first detector-oscillator stage, a single i-f stage, a diode detector-automatic volume control stage, an audio voltage amplifier stage, an audio power output stage and a high voltage rectifier power supply stage is used.

Tuned Circuits

The antenna coil system consists of a single primary and three series connected secondary windings to provide the three ranges of tuning. The oscillator coil system is similarly wound on a single form. A range selector switch (S-3) is used for connecting the various sections of these two coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable two-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for Band "A." A series trimmer is also associated with the Band "A" oscillator coil.

The intermediate frequency amplifier system consists of an RCA-6K7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Each winding of both i-f transformers (input and output) is tuned by an adjustable trimmer.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f stage is detected by an RCA-6H6 double diode tube. The audio frequency secured by this process is transferred to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R-7, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter circuit. The second (auxiliary) diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current which flows through resistors R-6, R-7 and R-8, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias diode ceases to draw current and the a.v.c. diode takes over the biasing function. The cathode and anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c. controlled tubes when no signal is being received. (The cathode of the second detector diode is being grounded on later production to simplify manufacture and to minimize the number of component parts required. Two resistors, R-9 and R-8, and one condenser, C-23, of the first production models have accordingly been eliminated as is noted on the schematic and chassis wiring diagrams.)

Audio System

The manual volume control consists of an acoustically tapered potentiometer in the audio circuit between the output of the detector diode and the input grid of the audio voltage amplifier tube. This control has a tone compensating filter connected to it so that the correct aural balance will be obtained at different volume settings.

Resistance-capacitance coupling is used between the first audio stage and the power output stage. The output of the power amplifier is transformer-coupled into the dynamic loudspeaker. High frequency tone control is effected by a capacitor across the plate circuit of the output tube. This capacitor may be cut in or out of the circuit as desired by means of a switch (S-2).

Rectifier

The power required for operation of this receiver is supplied through transformer T-1. This transformer has an efficient static shield between its primary and secondary windings. This shield prevents interference which is on the power supply circuit from entering the receiver and conversely reduces the tendency of the receiver to re-radiate into the power circuit. An RCA-80 furnishes the high voltage necessary for plate, screen, cathode and grid potentials through a brute-force filter. The field winding of the loudspeaker is used as a reactor in this filter circuit from which it simultaneously receives its magnetizing current. The heaters of all Radiotrons are supplied from a low voltage (6.3 volt) winding on the power-transformer. One side of this winding is at ground potential.

SERVICE DATA

The various diagrams of this bulletin contain such information as will be needed to isolate causes for defective operation when such a condition develops. Ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R-3, L-2, C-1, etc., are provided for reference between the diagrams and the replacement parts list. Locating of the parts in the schematic circuit is facilitated by the fact that the numerical titles increase from left to right on the diagram. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only, and when the resistance is less than one ohm, no rating is given.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, three in the oscillator coil system and two in the antenna coil system. Each of these trimmers have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality and poor selectivity. These indications will generally be present together.

The correct performance of the receiver can only be obtained when the alignment is performed with adequate and reliable test apparatus. The manufacturer of this instrument has a complete assortment of such service equipment available. This equipment may be purchased from authorized distributors and dealers.

An oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The RCA Victor Stock No. 9595 Full Range Oscillator and the RCA Victor Stock No. 4317 Neon Output Indicator are especially suitable and fulfill the above requirements.

The following procedure should be followed in adjusting the various trimmer capacitors:

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by Figure 4. Each must be aligned to a basic frequency of **460 kc.** To do this, attach the Output Indicator across the voice coil circuit or across the output transformer primary. Connect the output of the test oscillator between the control grid of the RCA-6A8 first detector tube and chassis-ground. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Then adjust the two trimmers of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f trimmers a second time to assure that the interaction between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The two trimmers which are at all times directly in shunt with the variable tuning condenser necessitate that the high-frequency range (Band C) be aligned first. The range selector switch should, therefore, be turned to its Band C position for the first adjustment. The Output Indicator should be left connected to the output system. Attach the output terminals of the test oscillator to the antenna and ground terminals of the receiver input.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their full mesh (maximum capacity) position and adjusting the dial pointer so that its end points to the *horizontal* graduation (530 kc.) at the low frequency end of the Band A scale.

Proceed further as follows:

(a) Adjust the test oscillator to **18,000 kc.** and set the receiver tuning control to a dial reading of **18,000 kc.**

(b) Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the trimmer on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of *maximum trimmer capacitance* is correct and should be used. (The oscillator will be 460 kc. below the signal frequency at this adjustment point.)

(c) Adjust the trimmer of the antenna section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the **18,000 kc.** input signal, until maximum receiver output results from these combined operations. Rocking of the variable condenser will prevent inaccurate adjustment which would otherwise be caused by the inter-action between the heterodyne oscillator circuit and the antenna tuned circuit.

(d) Change the receiver range selector to its Band A position and set the receiver tuning control to a dial reading of **1400 kc.** Tune the test oscillator to this same frequency and regulate its output to produce a slight indication on the receiver output indicating device.

(e) Adjust the high frequency trimmers of the Band A oscillator and antenna coils, C-10 and C-3 respectively, to the points at which each produces maximum indicated receiver output.

(f) Shift the test oscillator frequency to **600 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.

(g) Tune the low frequency trimmer, C-12, of the oscillator Band A coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of C-10 and C-3 should be corrected at **1400 kc.** to compensate for any changes caused by the adjustment of the low frequency oscillator coil trimmer.

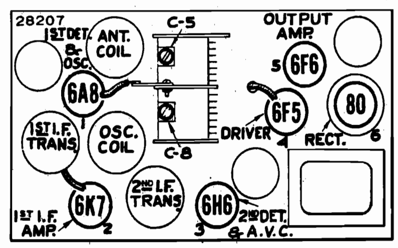


Figure 3—Radiotron and Coil Locations

MODELS T6-1, C6-2
Voltage, Data
Parts List

RCA MFG. CO., INC.

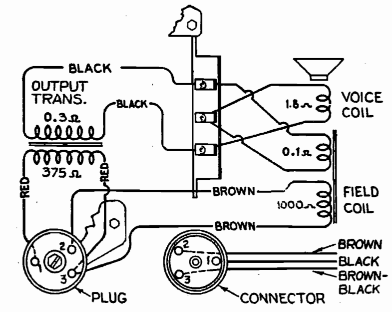


Figure 5—Loudspeaker Wiring

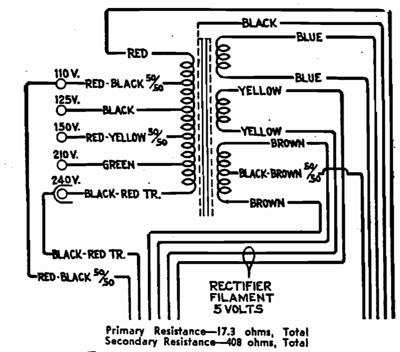
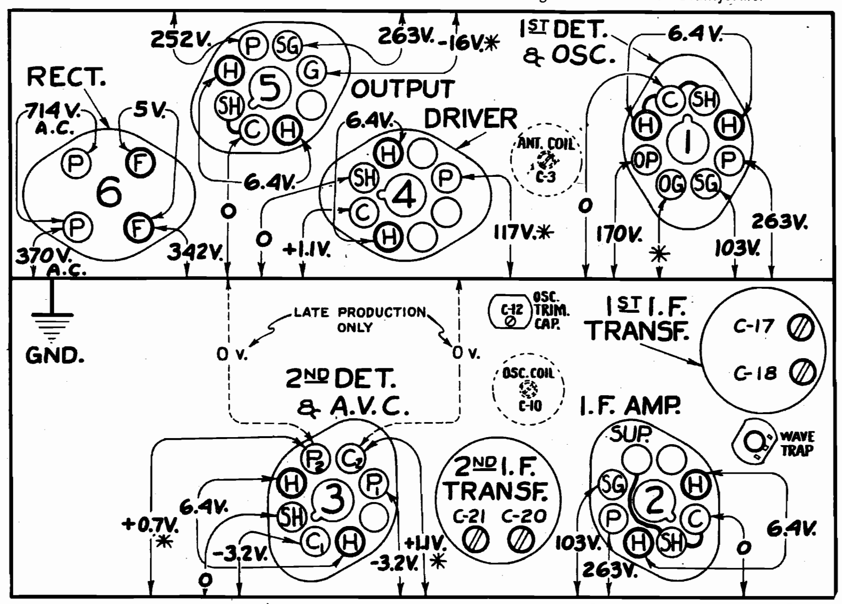


Figure 6—Universal Transformer



(✱) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Socket Voltages
Measured at 115 volts, 60 cycle supply—No signal being received

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
5237	Bushing—Variable tuning condenser mounting bushing—Package of 3	$0.43
11465	Capacitor—Adjustable capacitor—(C12)	.48
11289	Capacitor—50 MMfd.—(C9)	.26
11623	Capacitor—175 MMfd.—(C26)	.18
11290	Capacitor—400 MMfd.—(C2, C6)	.25
11622	Capacitor—3000 MMfd.—(C13)	.36
11621	Capacitor—3600 MMfd.—(C11)	.38
11287	Capacitor—4500 MMfd.—(C14)	.30
4868	Capacitor—.005 Mfd.—(C29)	.20
11395	Capacitor—.01 Mfd.—(C24)	.18
4858	Capacitor—.01 Mfd.—(C25, C27)	.25
4906	Capacitor—.017 Mfd.—(C28)	.25
4841	Capacitor—0.1 Mfd.—(C19, C23)*	.22
11414	Capacitor—0.1 Mfd.—(C15)	.20
5170	Capacitor—0.25 Mfd.—(C32)	.25
11387	Capacitor—10 Mfd.—(C16)	.86
11240	Capacitor—10 Mfd.—(C30)	1.08
5212	Capacitor—18 Mfd.—(C31)	1.16
11617	Coil—Antenna coil (L2, L3, L4, L5, C3, R1)	1.68
11618	Coil—Oscillator coil—(L6, L7, L8, L9, L10, L11, C10)	2.22
11612	Condenser—Two-gang variable tuning condenser—(C4, C5, C7, C8)	3.80
11615	Dial—Station selector dial	.60
11613	Drive—Variable tuning condenser drive	1.00
11376	Escutcheon—Station selector escutcheon and crystal	.70
11619	Foot—Chassis mounting foot and bracket assembly—Package of 2	.65
11396	Indicator—Station selector indicator pointer	.25
5226	Lamp—Dial lamp—Package of 5	.70
11466	Resistor—Voltage divider resistor—comprising one 3500 ohm, one 13000 ohm, one 85 ohm, one 40 ohm, and one 175 ohm sections—(R14, R15, R16, R17, R18)	.95
11624	Resistor—22 Ohms—Flexible type—complete with contact cap—(R19)	.22
11620	Resistor—220 Ohms—Carbon type—1/10 watt—(R1)—Package of 5	.75
11283	Resistor—1200 Ohms—Carbon type—1/4 watt—(R8)*—Package of 5	1.00
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11470	Coil—Field coil—(L16)	2.16
11469	Coil—Neutralizing coil—(L18)	.20
11258	Cone—Reproducer cone—(L17)—Package of 5	3.85
5118	Connector—Three contact male connector for reproducer	.25
5119	Connector—Three contact female connector for reproducer cable	.25
9622	Reproducer—Complete	7.16
11253	Transformer—Output transformer—(T2)	1.56
11230	Washer—Binders board "C" washer—used to hold field coil assembly—Package of 5	.18
	REPRODUCER ASSEMBLIES Table Model	
11232	Board—Terminal board assembly	.18

Stock No.	Description	List Price
3066	Resistor—12,000 Ohms—Carbon type—1 watt—(R4)—Package of 5	1.10
11400	Resistor—27,000 Ohms—Carbon type—1/4 watt—(R10)—Package of 5	1.00
5029	Resistor—56,000 Ohms—Carbon type—1/4 watt—(R3)—Package of 5	1.00
5158	Resistor—220,000 Ohms—Carbon type—1/4 watt—(R9)*—Package of 5	1.00
11453	Resistor—270,000 Ohms—Carbon type—1/10 watt—(R12)—Package of 5	.75
11452	Resistor—470,000 Ohms—Carbon type—1/10 watt—(R13)—Package of 5	.75
11397	Resistor—560,000 Ohms—Carbon type—1/10 watt—(R2)—Package of 5	.75
11626	Resistor—2.2 Megohms—Carbon type—1/4 watt—(R6)—Package of 5	1.00
11603	Shield—Antenna or oscillator coil shield	.26
11390	Shield—Intermediate frequency transformer shield	.25
11383	Shield—Rectifier Radiotron shield	.20
11614	Spring—Coil spring for large gears on variable tuning condenser—Package of 10	.70
11616	Switch—Range switch—(S3)	1.00
11460	Switch—Tone control and power switch—(S1, S2)	.95
5238	Terminal—Antenna terminal board, with clip	.14
11388	Transformer—First intermediate frequency transformer—(L12, L13, C17, C18)	1.90
11389	Transformer—Second intermediate frequency transformer—(L14, L15, C20, C21, C22, R5, R7)	3.02
11458	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	4.85
11585	Transformer—Power transformer—105-125 volts—25-50 cycles	7.00
11584	Transformer—Power transformer—100-130, 140-160, 195-250 volts—40-60 cycles	5.05
11391	Trap—Wave trap—(L1, C1)	1.22
11237	Volume Control—(R11)	1.20
	REPRODUCER ASSEMBLIES Console Model	
11232	Board—Terminal board assembly	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11470	Coil—Field coil—(L16)	2.16
11469	Coil—Neutralizing coil—(L18)	.20
11235	Cone—Reproducer cone—(L17)—Package of 5	3.50
5118	Connector—Three contact male connector for reproducer	.25
5119	Connector—Three contact female connector for reproducer cable	.25
9621	Reproducer—Complete	6.85
11253	Transformer—Output transformer—(T2)	1.56
11230	Washer—Binders board "C" washer—used to hold field coil assembly—Package of 5	.18

Universal Transformer

The special transformer used on some receivers of this type is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 6. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage available. Note that a 110-volt tap is brought out separately for supplying a phonograph motor.

Wave-Trap Adjustment

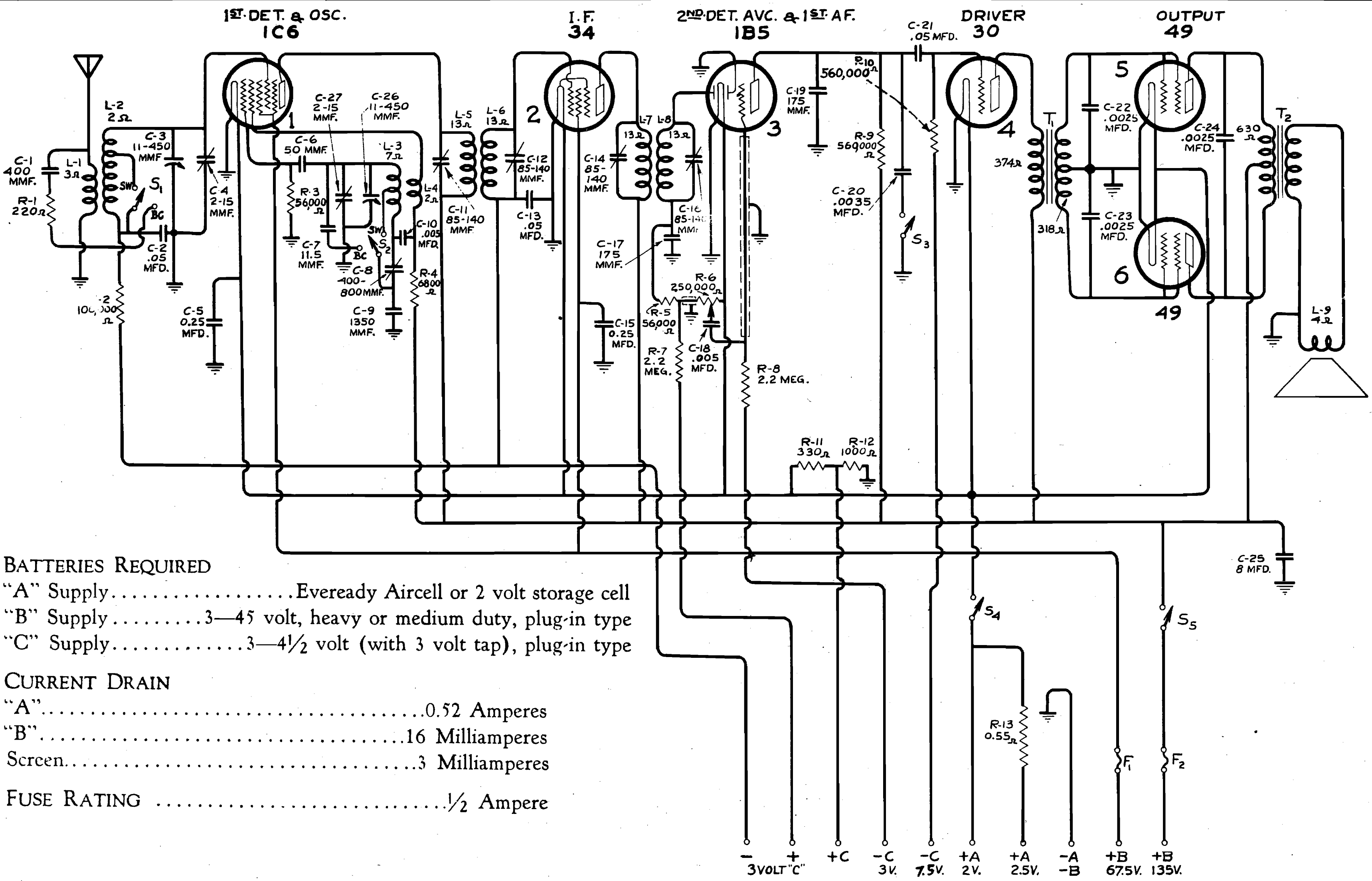
With the receiver in operation using its normal antenna, tune station selector to the point at which the intermediate frequency interference is most intense. Then adjust the wave trap trimmer to the point which causes maximum suppression of the interference.

— NOTES —

(1) Beat notes or heterodyning (whistles) may be encountered in some instances on these receivers due to excessive antenna capacitance. This condition may be corrected by reducing the size of the antenna or by inserting a 150 mmfd. capacitor in series with the antenna lead. This may be accomplished in the receiver by removing the bus lead which connects from the antenna terminal to the wave trap inductance L-1 and inserting the condenser between these points.

RCA MFG. CO., INC.

MODELS BT6-3,BC6-4,BT6-10
Schematic



BATTERIES REQUIRED

"A" Supply..................Eveready Aircell or 2 volt storage cell
"B" Supply.........3—45 volt, heavy or medium duty, plug-in type
"C" Supply............3—4½ volt (with 3 volt tap), plug-in type

CURRENT DRAIN

"A"...................................0.52 Amperes
"B"...................................16 Milliamperes
Screen................................3 Milliamperes

FUSE RATING ....½ Ampere

FREQUENCY RANGES

Broadcast......................... 540-1850 kc.
Shortwave.........................1850-6900 kc.

ALIGNMENT FREQUENCIES

Broadcast......600 kc. (osc.), 1720 kc. (osc., ant.)
Shortwave.......................None required

Intermediate Frequency...460 kc.

POWER OUTPUT

Undistorted.........................1.2 Watts
Maximum..........................2.2 Watts

October 1935

MODELS BT6-3, BC6-4, BT6-10
Chassis Wiring

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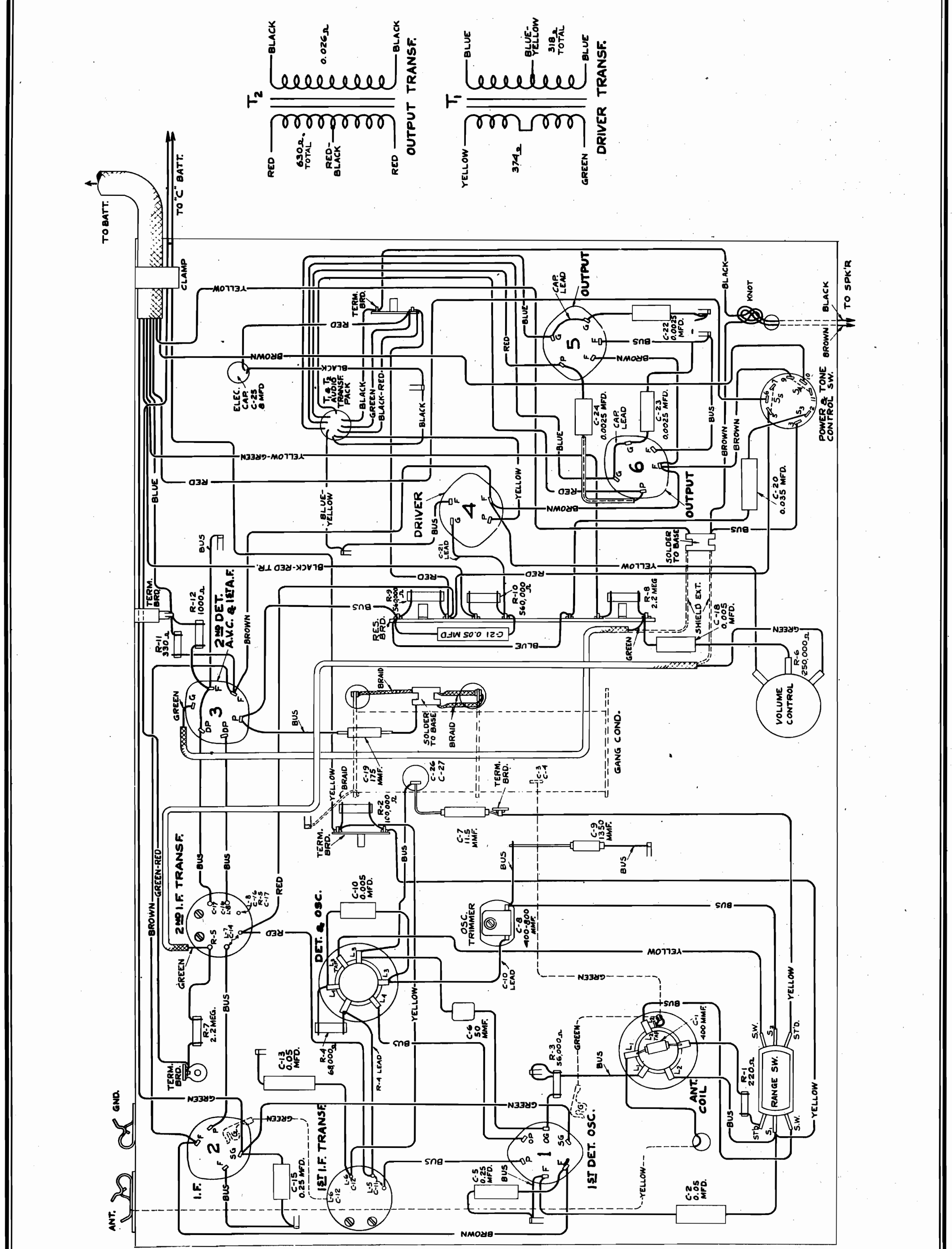

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Circuit Arrangement

The conventional Superheterodyne circuit is used. The first stage combines the local oscillator and first detector functions in one tube, an RCA-1C6. Coils of the detector input and oscillator are tuned by a two-section variable condenser and are aligned by a total of three adjustable trimmers. Each coil is tapped so that a portion of it may be shorted by the band switch in order to extend the tuning range to the higher frequencies. The oscillator operates at a fundamental frequency which is at all times above the incoming signal by 460 kc.

An RCA-34 is employed as i-f amplifier. Its input and output are coupled by transformers to the first detector and second detector, respectively. Each transformer has both its secondary and primary windings tuned to 460 kc. by adjustable trimmer capacitors.

The modulated signal as obtained from the output of the i-f system is detected by a diode of the RCA-1B5. Audio developed by such detection in the diode load resistor, R-6, is selected by the variable arm of the volume control (R-6) and passed on to the a-f system for amplification and final reproduction. The d.c. which occurs in resistor R-6, due to signal detection, is used for automatic volume control by varying the control grid bias on the first detector and i-f tubes.

Resistance-capacitance coupling is used between the RCA-1B5 and the RCA-30 driver tube. A high-frequency tone control, consisting of a switch in series with a condenser, is shunted across the plate circuit of the RCA-1B5. In the closed position of the switch, the high a-f frequencies are reduced.

The power output stage is arranged for Class "B" operation. The high level of power afforded, is fed to the permanent magnet, dynamic speaker through a step-down transformer.

Battery "On-off" control is by means of a double pole switch, one side of which is in the +A lead; the other side being in the 135 volt, +B lead. Two +A leads are provided in order to permit operation from either a standard 2 volt storage cell or an "Eveready 2.5 volt Aircell". A resistor (R-13) is in series with the +A, 2.5 volt lead to drop the voltage to the proper value. Fuse protection is incorporated in the screen and plate supply leads from the "B" batteries.

SERVICE DATA

Alignment Procedure

There are a total of seven trimmer adjustments provided. Four of these are located in the i-f system and the remainder are associated with the antenna and oscillator coils. They are precisely adjusted at the

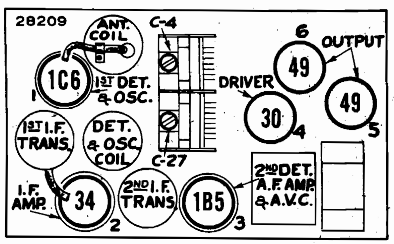


Figure 3—Radiotron and Coil Locations

factory to give the correct performance. Their settings should remain intact indefinitely when the receiver is used under ordinary conditions, however, necessity for readjustment may occasionally occur from continued extremes of climate, tampering, purported alteration for service purposes, or after repairs have been made to the r-f or i-f tuned circuits. Improper alignment usually causes the receiver to be insensitive, non-selective, and sub-normal in respect to tone quality. Such indications will usually exist simultaneously.

In re-adjusting the trimmers to their normal settings, it is quite important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator such as the RCA Stock No. 9595, will be required as a source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. This indication should be by means of an instrument such as the RCA Stock No. 4317 Neon Glow Indicator. Proceed with the alignment as follows:

Place the receiver in operation where it will be easily accessible. Attach the Output Indicator across the loudspeaker voice coil circuit, or across the output transformer primary. Advance the receiver volume control to its maximum position, letting it remain in such position for *all* adjustments. For each trimming operation, regulate the test oscillator output control so that the signal level is as low as possible and still observable at the receiver output. Use of such a small signal will obviate broadness of tuning which would otherwise result from A. V. C. action on a stronger one.

I-F Adjustments

(a) Connect the output of the test oscillator between the control grid cap of the i-f tube (RCA-34) and chassis-ground. Adjust the frequency of the oscillator to 460 kc. Tune the receiver to a point where no interference is received from the heterodyne oscillator or local station.

(b) Adjust the trimmers, C-16 and C-14, of the second i-f transformer so that each produces maximum (peak) receiver output as shown by the indicating device.

(c) Remove the oscillator from the i-f tube input and connect it between the control grid cap of the first detector tube (RCA-1C6) and chassis-ground. Allow its tuning to remain at 460 kc. Tune the receiver to avoid interference as in (a).

(d) Adjust the trimmers, C-12 and C-11, of the first i-f transformer for maximum (peak) receiver output. This completes the i-f transformer adjustments.

R-F Adjustments

(a) Check the calibration of the dial scale by rotating the tuning control until the variable condenser plates are in full mesh. (Maximum capacity). This will carry the dial pointer to its minimum frequency position. Then adjust the dial pointer until it points to the horizontal line at the low frequency end of the broadcast band scale.

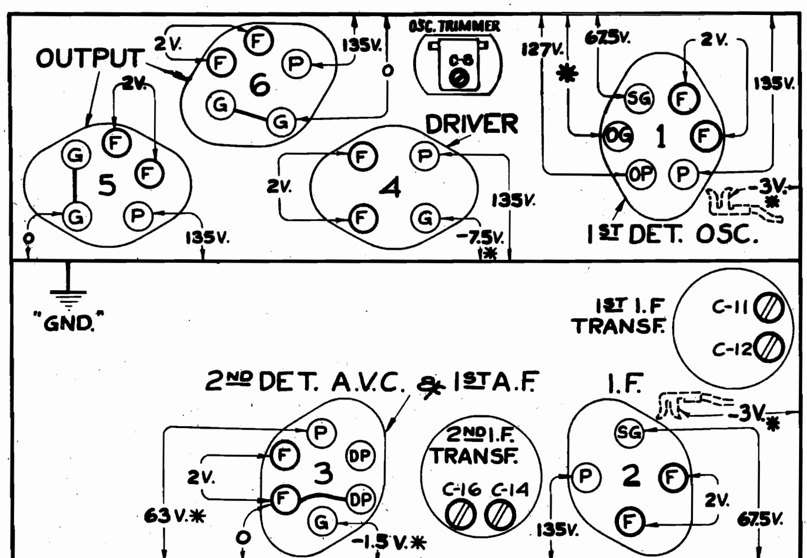
(b) Connect the output of test oscillator to the antenna-ground terminals of the receiver. Adjust the receiver range switch to its "Broadcast" position. Tune the oscillator to 1720 kc. Allow the output indicator to remain attached to the receiver output.

(c) Tune the receiver so that the dial reading is 1720 kc. Then adjust the oscillator and antenna coil trimmers. C-27 and C-4 respectively, tuning each to the point producing maximum indicated receiver output.

(d) Shift the oscillator frequency to 600 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. The oscillator series trimmer, C-8, should then be adjusted, simultaneously rocking the receiver tuning backward and forward through the signal until maximum receiver output results from the combined operations. The adjustment of C-27 should be repeated as in (c) to correct for any change in its alignment due to the adjustment of C-8.

Radiotron Socket Voltages

Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given in respect to chassis-ground excepting those appearing across the heaters (H-H). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests. The lower the meter resistance, the lower will be the degree of accuracy. Allowances must therefore be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.



(✱) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Socket Voltages and Trimmer Locations
Measured at Normal Battery Voltages No Signal Being Received

MODELS BT6-3,BC6-4,BT6-10
Battery Connections
Parts List

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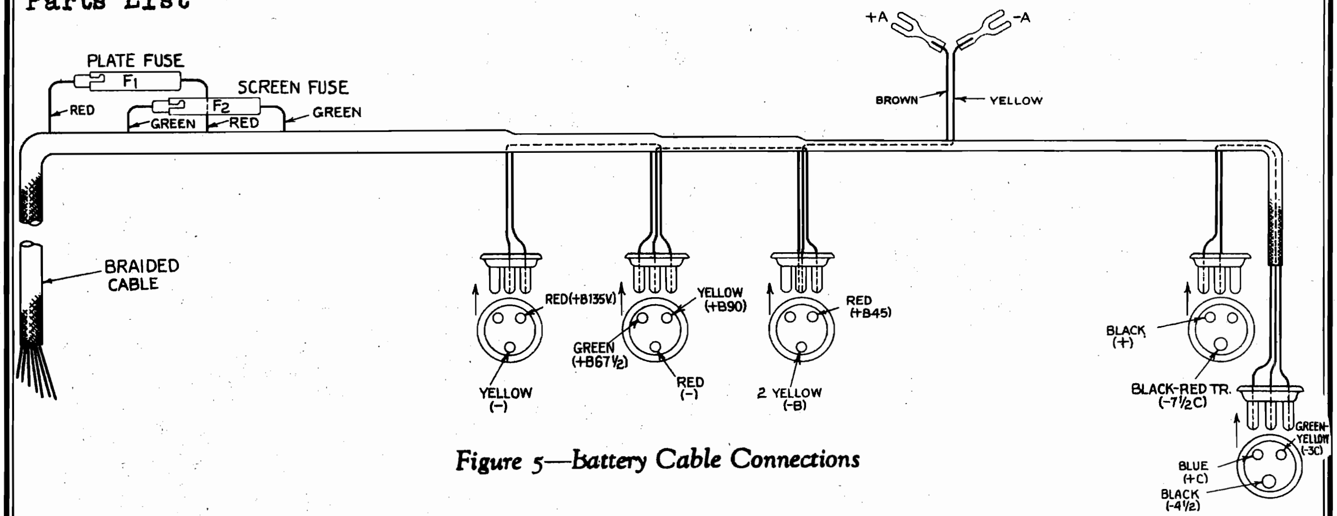

Figure 5—Battery Cable Connections

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
11465	Capacitor—Adjustable capacitor—(C-8)	$0.48
11450	Capacitor—11.5 MMfd.—(C7)	.14
11289	Capacitor—50 MMfd.—(C6)	.26
5116	Capacitor—175 MMfd.—(C19)	.18
11171	Capacitor—400 MMfd.—(C1)	.22
11597	Capacitor—1350 MMfd.—(C9)	.22
5107	Capacitor—.0025 Mfd.—(C22, C23, C24)	.16
5005	Capacitor—.0035 Mfd.—(C20)	.16
4868	Capacitor—.005 Mfd.—(C10, C18)	.20
4836	Capacitor—.05 Mfd.—(C2, C13, C21)	.30
4840	Capacitor—0.25 Mfd.—(C5, C15)	.30
11595	Capacitor—8 Mfd.—(C25)	1.04
11590	Coil—Antenna coil—(L1, L2)	1.70
11463	Coil—Oscillator coil—(L3, L4)	1.65
11457	Condenser—Two gang variable tuning condenser—(C3, C4, C26, C27)	3.46
11467	Indicator—Station selector indicator pointer	.10
11174	Resistor—220 Ohms—Carbon type—¼ watt—(R1)—Package of 5	1.00
11296	Resistor—330 Ohms—Carbon type—¼ watt—(R11)—Package of 5	1.00
5112	Resistor—1000 Ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11454	Resistor—6800 Ohms—Carbon type—¼ watt—(R4)—Package of 5	1.00
5029	Resistor—56,000 Ohms—Carbon type—¼ watt—(R3)—Package of 5	1.00
3118	Resistor—100,000 Ohms—Carbon type—¼ watt—(R2)—Package of 5	1.00
5035	Resistor—560,000 Ohms—Carbon type—¼ watt—(R9, R10)—Package of 5	1.00
11626	Resistor—2.2 Megohms—Carbon type—¼ watt—(R7, R8)—Package of 5	1.00
11464	Shield—Antenna or oscillator coil shield	.25
3682	Shield—First or Second detector Radiotron shield	.22
3056	Shield—Intermediate frequency Radiotron shield—Package of 2	.40
11390	Shield—Intermediate frequency transformer shield	.25
11461	Switch—Range switch—(S1, S2)	.56
11588	Switch—Tone control and power switch—(S3, S4, S5)	.90
5238	Terminal—Antenna terminal board with clip, insulation strip and rivets	.14
11594	Transformer—Audio driver and output transformer pack—(T1, T2)	4.10
11592	Transformer—First intermediate frequency transformer—(L5, L6, C11, C12)	2.55
11593	Transformer—Second intermediate frequency transformer—(L7, L8, C14, C16, C17, R5)	2.75
11589	Volume Control—(R6)	.85
	MISCELLANEOUS ASSEMBLIES	
4289	Body—Fuse connector body—Package of 10	.35
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector—complete	.16
11340	Connector—Three contact male connector with three small prongs—for "B" battery connections	.24
11341	Connector—Three contact male connector with two small and one large prong—for "C" battery connection	.24
11627	Dial—Station selector dial	.32
4286	Ferrule—Fuse connector—ferrule and bushing—Package of 10	.38
3748	Fuse—½ Ampere fuse—(F1, F2)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
11587	Resistor—0.55 Ohms—Flexible type, complete with terminal (R13)	.24
4284	Spring—Fuse connector spring—Package of 10	.30
4285	Washer—Fuse connector insulating washer—Package of 10	.22
	REPRODUCER ASSEMBLIES (Table Models BT 6-3, BT 6-10)	
9539	Cone—Reproducer cone—(L9)—Package of 5	4.30
9540	Magnet Assembly—Comprising cone bracket, core, and magnet	5.72
9538	Reproducer—Complete	7.65
	REPRODUCER ASSEMBLIES (Console Model BC 6-4)	
9432	Cone—Reproducer cone—complete with voice coil—(L9)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7819	Reproducer—Complete	12.18

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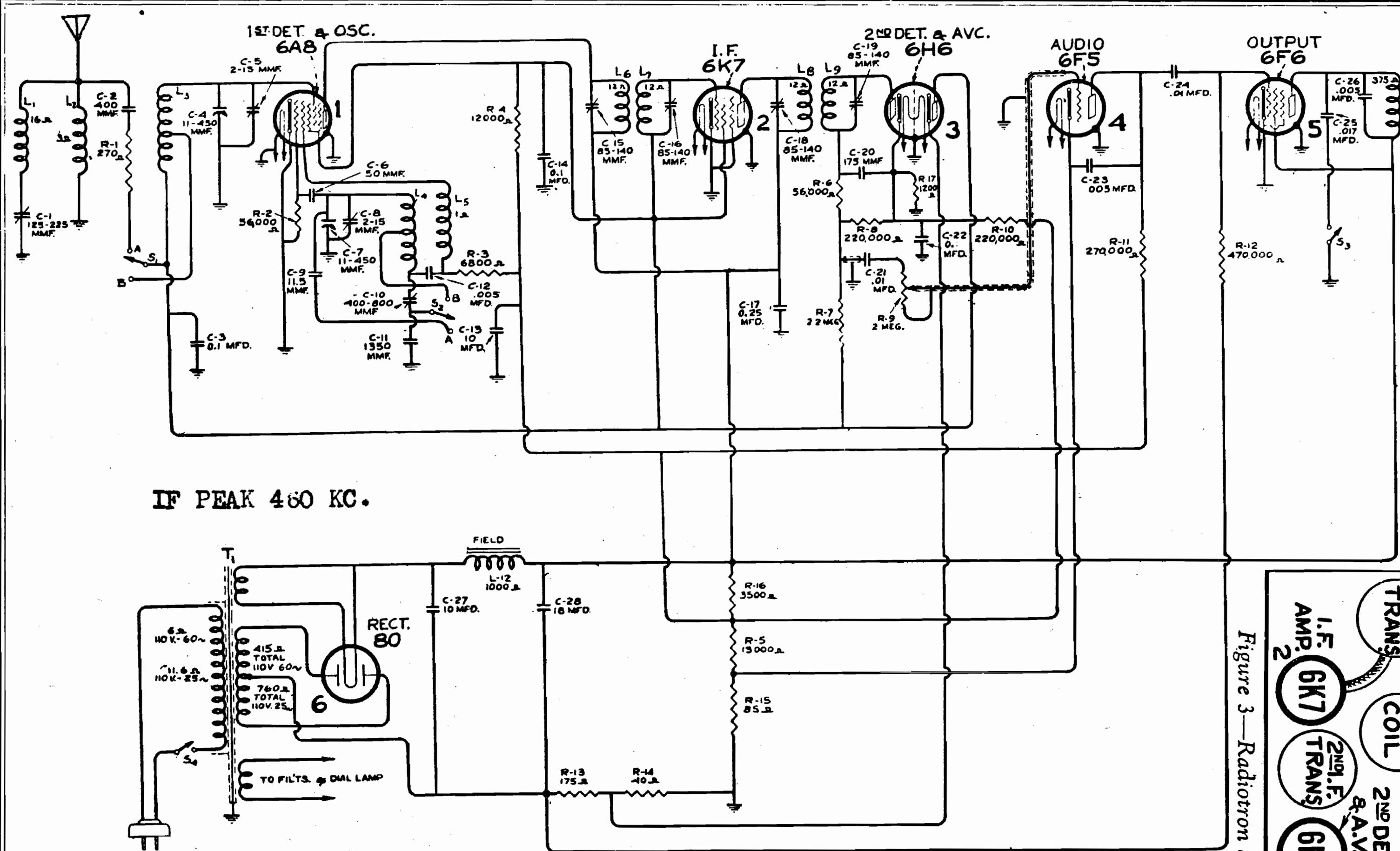

IF PEAK 460 KC.

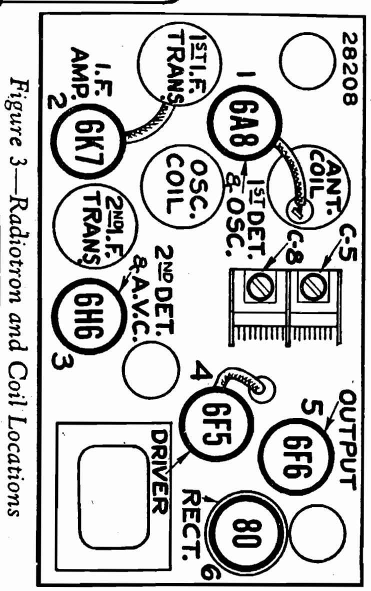

Figure 3—Radiotron and Coil Locations

Power Consumption .90 watts

Intermediate Frequency..............460 kc.

Power Output

Undistorted ....2.0 watts
Maximum ....4.5 watts

Loudspeaker

Type ....8 inch, Electrodynamic
Voice Coil Impedance.2.25 ohms at 400 cycles

Frequency Ranges

Broadcast Band (A) ..540-1850 kc.
Shortwave Band (B) ..1850-6900 kc.

Alignment Frequencies

Broadcast Band (A) .....600 kc. and 1720 kc.
Shortwave Band (B) No Adjustments Required

Voltage and Frequency

Rating A .... 105-125 volts, 50-60 cycles
Rating B .... 105-125 volts, 25-60 cycles
Rating C 100-130/140-160/195-250 volts, 40-60 cycles

MODEL T6-9
Chassis Wiring

RCA MFG. CO., INC.

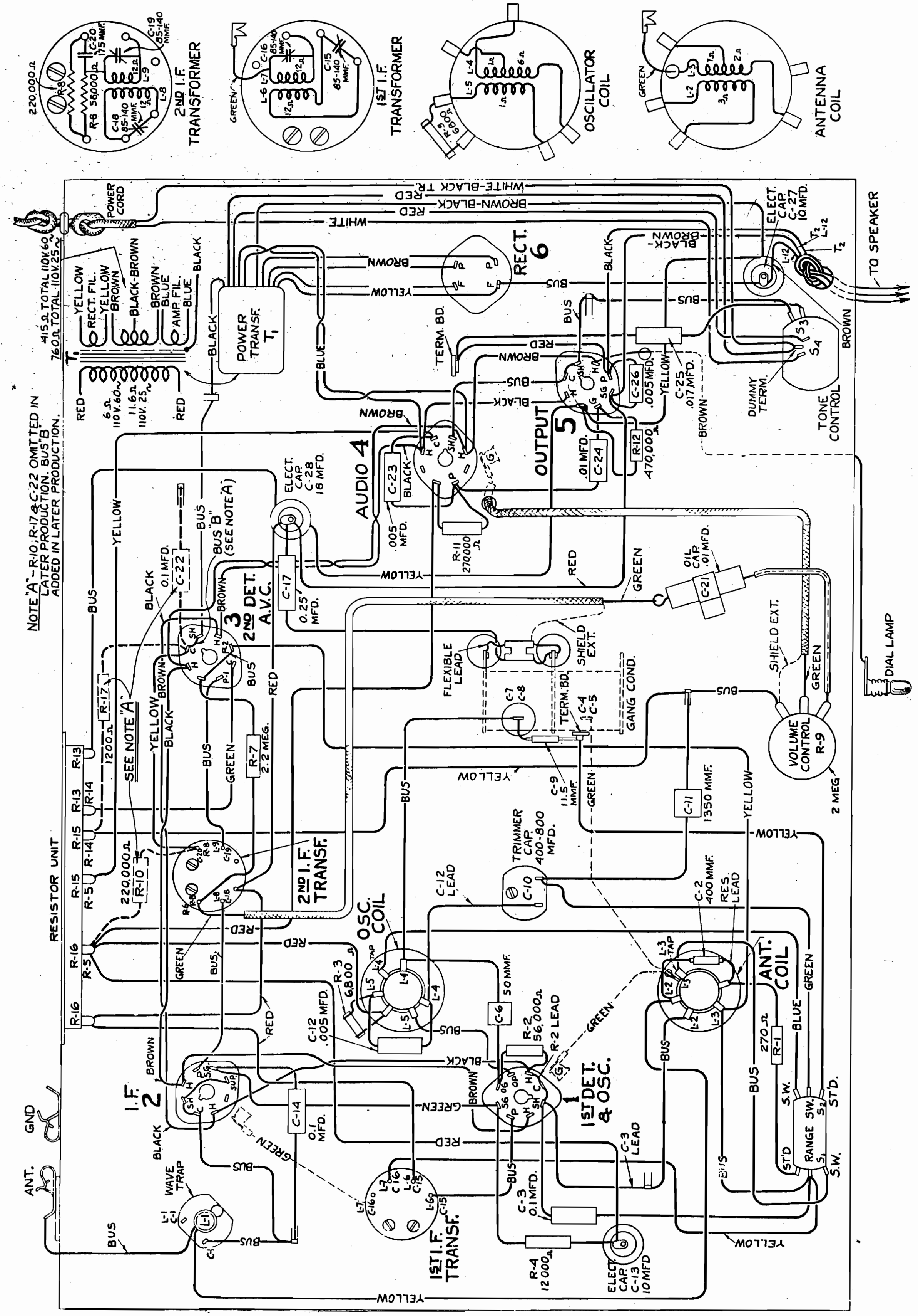

Figure 2—Chassis Wiring Diagram

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The first detector and oscillator functions are accomplished in a single tube, an RCA-6A8. The input of this tube is coupled to the antenna through a tuned transformer. A shunt (series tuned) wave-trap is connected across the primary of this transformer to prevent signals of intermediate frequency (460 kc) from being introduced into the first stage as interference. The two-section gang condenser which tunes the antenna transformer secondary and the heterodyne oscillator coil has adjustable trimmers for use in obtaining exact alignment. Each of these coils is tapped so that the range switch increases the range of tuning by decreasing the amount of inductance.

The intermediate frequency stage is coupled to the RCA-6A8 and to the RCA-6H6 second detector by means of tuned transformers. These transformers are adjusted to resonance at 460 kc. by means of trimmers.

The modulated signal as obtained from the output of the i-f system is detected by the RCA-6H6 double diode tube. Audio frequency secured by this process is passed on to the a-f system for amplification and final reproduction. The d-c voltage, which results from detection of the signal, is used for automatic volume control. This voltage, which develops across resistor R-8, is applied as automatic control grid bias to the first detector and i-f tubes through a suitable resistance filter. The second diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This auxiliary diode, under such conditions, draws current which flows through resistors R-7, R-8 and R-10, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias diode ceases to draw current and the a.v.c. diode takes over the biasing function. The cathode and anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c.-controlled tubes when no signal is being received.

Manual volume control is by means of an acoustically tapered potentiometer connected as a variable coupling element between the output of the second detector and the first audio control grid. After amplification by the RCA-6F5, the audio signal is transmitted by resistance-capacitance coupling to the input of the RCA-6F6 power output stage which in turn is transformer-coupled to the dynamic speaker. High-frequency tone control is provided by means of a shunt capacitor across the plate circuit of the output tube, which may be cut in or out of the circuit with a control switch (S3).

The power supply system consists of a RCA-80 rectifier tube which is supplied from an efficiently designed power transformer and which works into a suitable filter. The various potentials required for the plate, screen, control grid, and cathode circuits are obtained from the output of the filter on a resistance-divider system. The electrodynamic loudspeaker field coil is used as a filter reactor.

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only, and when the resistance is less than one ohm, no rating is given.

Alignment Procedure

There are three alignment trimmers provided in the antenna transformer and oscillator coil tuned circuits and four are used in the i-f system. All of these have been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus. The manufacturer of this receiver has available for sale through its distributors and dealers, a complete assortment of such service equipment as may be needed for the alignment operation. These instruments are illustrated and described on a separate page of this book.

An oscillator (signal generator), such as the RCA Stock No. 9595, is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of an indicator such as the RCA Victor Stock No. 4317 Neon Output Indicator.

The following method of procedure should be followed in adjusting the various trimmer capacitors:

I-F Trimmer Adjustment

The four trimmers of the two i-f transformers are located as shown by Figure 4. Each trimmer must be aligned to a basic frequency of **460 kc.** To do this, attach the output indicator across the voice coil or across the output transformer primary. Connect the output of the test oscillator between the control grid of the RCA-6A8 and chassis-ground. Tune the oscillator to **460 kc.** Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or from the heterodyne oscillator. Increase the output of the test oscillator until a slight indication is present on the output indicator. Then, adjust the two trimmers of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. will be avoided. It is advisable to repeat the adjustment of all i-f trimmers to assure that the interaction between them has not disturbed the original adjustment.

taneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at **1720 kc.** should then be repeated to correct for any change which may have been caused by the oscillator series trimmer adjustment.

MODEL T6-9
Alignment, Part 2
Voltage, Parts
Speaker & Transformer Data

RCA MFG. CO., INC.

R-F Trimmer Adjustment

Calibrate the tuning dial by setting pointer to horizontal line at low frequency end of broadcast band scale while variable condenser is at maximum capacity.

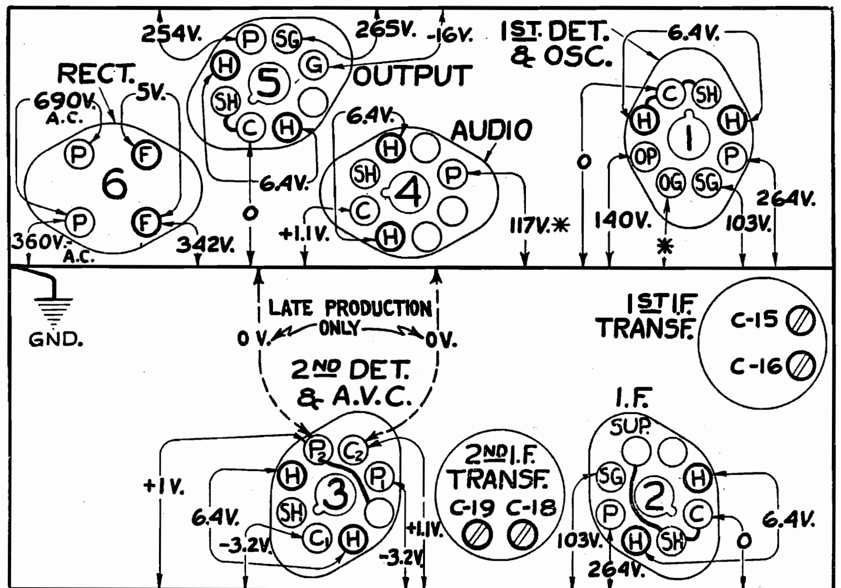
The output indicator should be left connected to the output system. Attach the output of the test oscillator between the antenna and ground terminals of the receiver input. Adjust the oscillator to **1720 kc.** and set the receiver tuning control to a dial reading of **1720 kc.** Leave the volume control of the receiver at its maximum position. Make sure that the range selector is at its broadcast position. Regulate the output of the test oscillator until a slight indication is perceptible at the receiver output. Then adjust the two trimmers of the oscillator and antenna transformer coils (mounted on the variable condenser) so that each produces maximum (peak) receiver output. After this maximum has been accurately obtained, shift the test oscillator to **600 kc.** Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then adjust the receiver oscillator series trimmer, simul-

Radiotron Socket Voltages

Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the heaters (H-H). The values shown are obtainable when the receiver is in normal operating condition with all tubes intact. They do not take into account inaccuracy caused by the resistance of the voltmeter used for the tests, the lower the voltmeter resistance, the lower the degree of accuracy. Allowance must, therefore, be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

Wave-Trap Adjustment

With the receiver in operation using its normal antenna, tune station selector to the point at which the intermediate frequency interference is most intense. Then adjust the wave trap trimmer to the point which causes maximum suppression of the interference.



(✱) CANNOT BE MEASURED WITH ORDINARY VOLTMETER

Figure 4—Radiotron Socket Voltages
Measured at 115 volts, 60 cycle supply—No signal being received

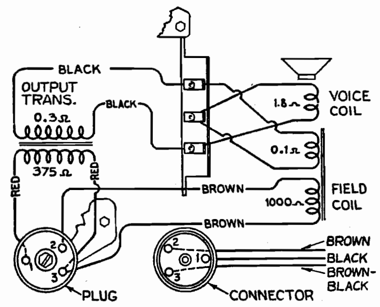
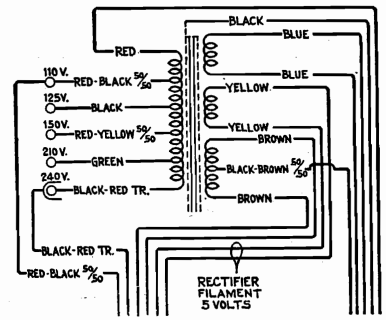


Figure 5—Loudspeaker Wiring



Primary Resistance—17.3 ohms, Total
Secondary Resistance—408 ohms, Total

Figure 6—Universal Transformer

T6-9 REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
11468	Bracket—Dial mounting bracket	$0.14
11465	Capacitor—Adjustable capacitor—(C10)	.48
11450	Capacitor—11.5 Mmfd. (C9)	.14
11289	Capacitor—50 Mmfd. (C6)	.26
4297	Capacitor—400 Mmfd. (C2)	.30
11449	Capacitor—1350 Mmfd. (C11)	.26
4868	Capacitor—0.005 Mfd. (C12, C23, C26)	.20
4858	Capacitor—0.01 Mfd. (C24)	.25
4624	Capacitor—0.01 Mfd. (C21)	.54
11451	Capacitor—0.017 Mfd. (C25)	.18
11414	Capacitor—0.1 Mfd. (C14)	.20
4841	Capacitor—0.1 Mfd. (C3, C22*)	.22
5170	Capacitor—0.25 Mfd. (C17)	.25
11387	Capacitor—10 Mfd. (C13)	.86
11240	Capacitor—10 Mfd. (C27)	1.08
5212	Capacitor—18 Mfd. (C28)	1.16
11462	Coil—Antenna coil (L2, L3)	1.85
11463	Coil—Oscillator coil (L4, L5)	1.65
11457	Condenser—Two-gang variable tuning condenser—complete with mounting bushing assembly (C4, C5, C7, C8)	3.46
11583	Dial—Dial scale	.40
11467	Indicator—Station selector indicator pointer	.10
5226	Lamp—Dial lamp—Package of 5	.70
11466	Resistor—Voltage divider resistor—comprising one 3,500 ohm, one 13,000 ohm, one 85 ohm, one 40 ohm and one 175 ohm sections (R5, R13, R14, R15, R16)	.95
6135	Resistor—270 Ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
11283	Resistor—1200 Ohms—Carbon type—¼ watt (R17*)—Package of 5	1.00
11454	Resistor—6800 Ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
3066	Resistor—12,000 Ohms—Carbon type—1 watt (R4)—Package of 5	1.10
5029	Resistor—56,000 Ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
11453	Resistor—270,000 Ohms—Carbon type—1/10 watt (R11)—Package of 5	.75
11452	Resistor—470,000 Ohms—Carbon type—1/10 watt (R12)—Package of 5	.75
5158	Resistor—220,000 Ohms—Carbon type—¼ watt (R10*)—Package of 5	1.00
11626	Resistor—2.2 Megohms—Carbon type—¼ watt (R7)—Package of 5	1.00
11464	Shield—Antenna or oscillator coil shield	.25
11390	Shield—Intermediate frequency transformer shield	.25
11383	Shield—Radiotron shield	.20
11461	Switch—Range switch (S1, S2)	.56
5238	Terminal—Antenna terminal board assembly—with clip, insulation strip and rivets	.14
11460	Tone Control—Tone control and power switch (S3, S4)	.95
11388	Transformer—First intermediate frequency transformer (L6, L7, C15, C16)	1.90
11389	Transformer—Second intermediate frequency transformer (L8, L9, C18, C19, C20, R6, R8)	3.02
11458	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	4.85
11585	Transformer—Power transformer—105-125 volts—25-50 cycles	7.00
11584	Transformer—Power transformer—100-130/140-160/195-250 volts—40-60 cycles	5.05
11391	Trap—Wave trap (L1, C1)	1.22
11459	Volume Control (R9)	.85
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board assembly with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11470	Coil—Field coil (L12)	2.16
11469	Coil—Neutralizing coil (L11)	.20
11235	Cone—Reproducer cone (L10)—Package of 5	3.50
5118	Connector—Three-contact male connector for reproducer	.25
5119	Connector—Three-contact female connector for reproducer cable	.25
9621	Reproducer—Complete	6.85
11253	Transformer—Output transformer (T2)	1.56
11230	Washer—Binders board "C" washer—Used to hold field coil assembly—Package of 5	.18

* C-22, R-10 and R-17 used in some models

MODELS BT7-8, BC7-9
Schematic, Socket,
Trimmers, Data

RCA MFG. CO., INC.

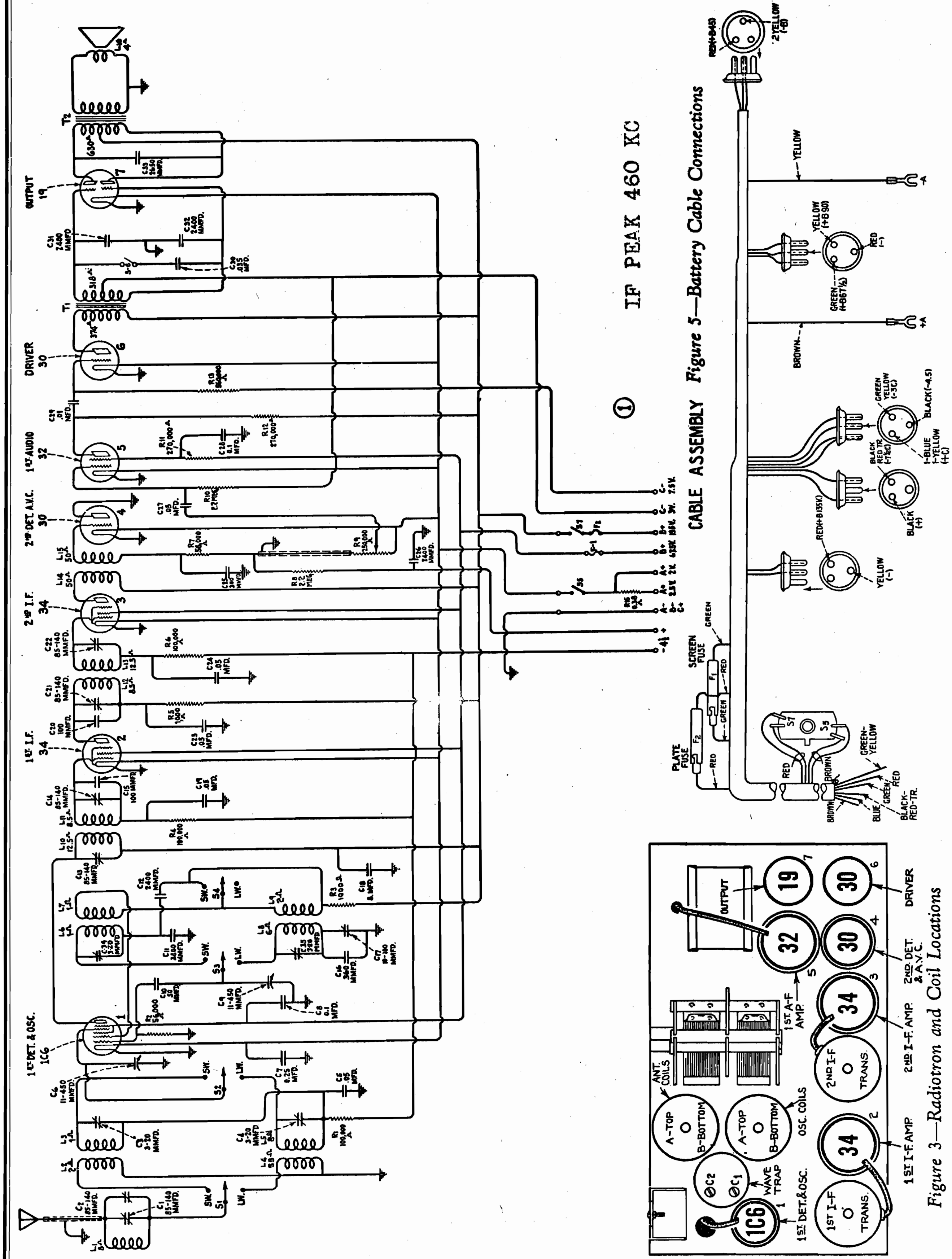


Figure 5—Battery Cable Connections

Figure 3—Radiotron and Coil Locations

MODELS BT7-8, BC7-9
Chassis Wiring

RCA MFG. CO., INC.

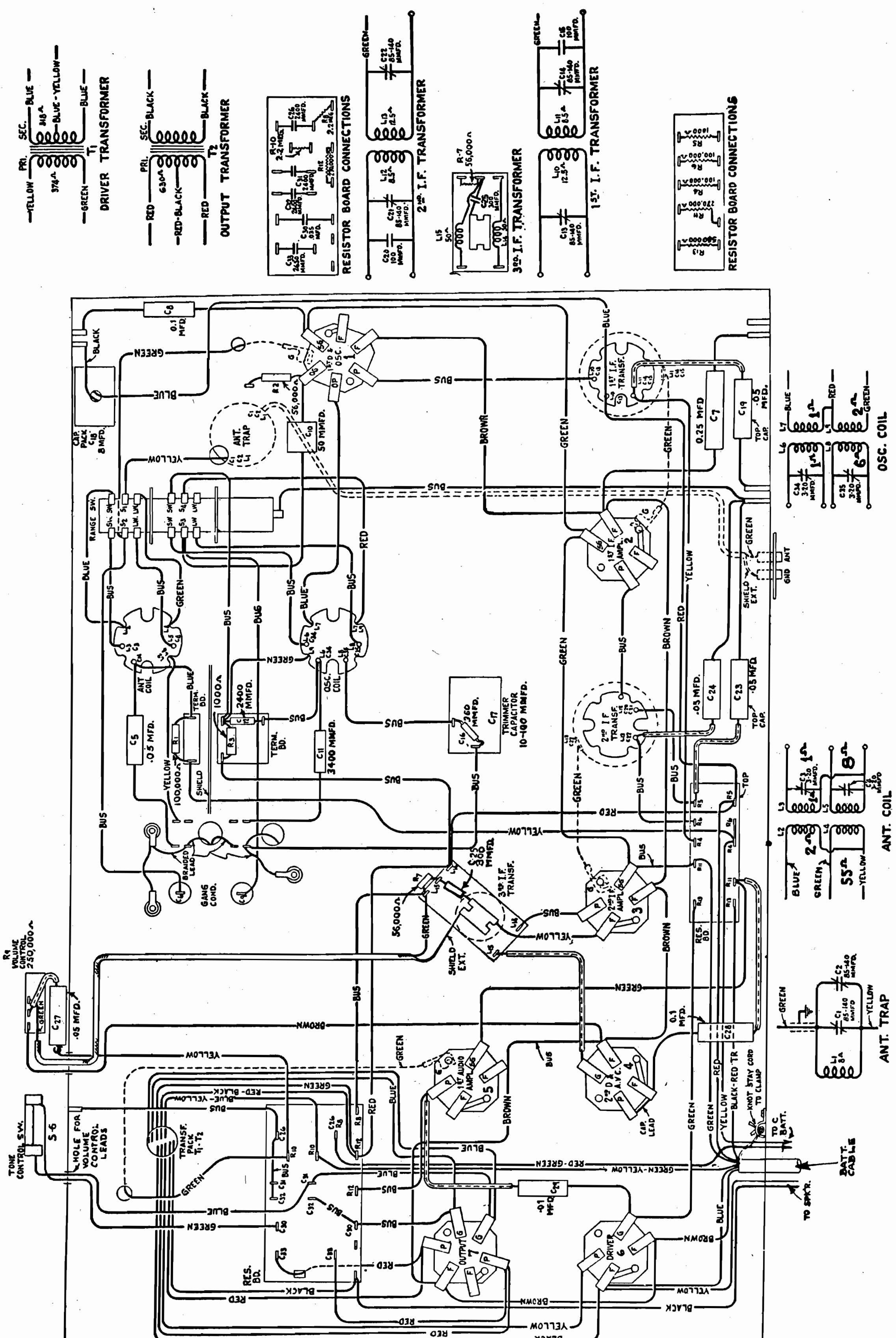


Figure 2—Chassis Wiring Diagram

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BT 7-8 and BC 7-9
REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
4244	Cap—Grid contact cap—Package of 5	.20
3861	Capacitor—Adjustable capacitor (C17)	.78
11289	Capacitor—50 MMfd. (C10)	.26
3794	Capacitor—100 MMfd. (C15, C20)	.30
3981	Capacitor—300 MMfd. (C25)	.30
4413	Capacitor—360 MMfd. (C16)	.22
4801	Capacitor—2400 MMfd. (C12, C31, C32)	.50
2749	Capacitor—2400 MMfd. (C26)	.35
4529	Capacitor—2650 MMfd. (C33)	.32
4439	Capacitor—3400 MMfd. (C11)	.35
5196	Capacitor—0.035 Mfd. (C30)	.18
4883	Capacitor—0.01 Mfd. (C29)	.20
4518	Capacitor—0.05 Mfd. (C27)	.52
4836	Capacitor—0.05 Mfd. (C5, C19, C23, C24)	.30
4841	Capacitor—0.1 Mfd. (C8, C28)	.22
4840	Capacitor—0.25 Mfd. (C7)	.30
11344	Capacitor—8 Mfd. (C18)	0.00
4430	Coil—Antenna coil (L2, L3, L4, L5, C3, C4)	1.92
4432	Coil—Oscillator coil (L6, L7, L8, L9, C34, C35)	1.65
4539	Coil and shield assembly—Antenna trap circuit	2.05
4504	Condenser—Two-gang variable tuning condenser (C6, C9)	2.78
11338	Volume control—(R9)	1.00
5112	Resistor—1000 Ohms—Carbon type—1/4 Watt—(R5)—Package of 5	1.00
5029	Resistor—56,000 Ohms—Carbon type—1/4 Watt—(R2, R7)—Package of 5	1.00
3118	Resistor—100,000 Ohms—Carbon type—1/4 Watt—(R1, R4, R6)—Package of 5	1.00
11323	Resistor—270,000 Ohms—Carbon type—1/4 Watt—(R11, R12)—Package of 5	1.00
5035	Resistor—560,000 Ohms—Carbon type—1/4 Watt—(R13)—Package of 5	1.00
11151	Resistor—2.2 Megohms—Carbon type—1/4 Watt—(R8, R10)—Package of 5	1.00
4521	Shield—Antenna, oscillator, or intermediate frequency coil shield	.42
3942	Shield—First detector, oscillator Radiotron shield	.18
7487	Shield—Second detector Radiotron shield	.25
3056	Shield—First or second intermediate frequency, or first audio Radiotron shield—Package of 2	.40
4532	Socket—4-contact first audio Radiotron socket	.28
6980	Socket—4-contact intermediate frequency, second detector or driver Radiotron socket	.20
4232	Socket—6-contact first detector, oscillator Radiotron socket	.35
4531	Socket—6-contact output Radiotron socket	.30
5053	Switch—Tone control switch (S6)	.50
11339	Switch—Operating switch—less knob (stock #3088) and escutcheon (stock #6176)—(S5, S7)	.80
4437	Switch—Range switch (S1, S2, S3, S4)	2.35
4533	Transformer—Audio transformer pack comprising driver and output transformer (T1, T2)	3.98
4431	Transformer—First intermediate frequency transformer—(L10, L11, C13, C14, C15)	2.28
7840	Transformer—Second intermediate frequency transformer (L12, L13, C20, C21, C22)	$2.35
4538	Transformer—Third intermediate frequency transformer (L14, L15, R7, C45)	2.15
	DRIVE ASSEMBLIES	
10194	Ball—Steel ball—Package of 20	.50
4422	Clutch—Tuning condenser drive clutch assembly—comprising shaft, balls, ring, spring and washers—assembled	1.00
11342	Dial—Station selector dial	.72
4586	Drive—Variable tuning condenser drive assembly—complete	2.42
4520	Indicator—Station selector indicator pointer	.18
4669	Screw—No. 8-32 5/32" set screw for variable condenser drive assembly—Package of 10	.25
	REPRODUCER ASSEMBLIES (TABLE MODEL—BT 7-8)	
9539	Cone—Reproducer cone—Package of 5—(L16)	4.30
9540	Magnet assembly—Comprising cone bracket, core, and magnet	5.72
9538	Reproducer—Complete—(L16)	7.65
	REPRODUCER ASSEMBLIES (CONSOLE MODEL—BC 7-9)	
9432	Cone—Reproducer cone—complete with voice coil (L16)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7819	Reproducer—Complete—(L16)	12.18
	MISCELLANEOUS ASSEMBLIES	
11343	Cable—Main battery cable complete with three stock #11340 connectors, two stock #11341, connectors, two stock #6516 fuse connectors, two stock #3748 fuses—except, less one stock #11339 switch	3.55
6516	Connector—Fuse connector	.16
11340	Connector—3-contact male connector with three small prongs—for "B" battery connections	.24
11341	Connector—3-contact male connector with two small and one large prong for "C" battery connections	.24
11337	Escutcheon—Station selector escutcheon	.70
6176	Escutcheon—Off-on operating switch escutcheon—Package of 5	.50
3748	Fuse—1/2 ampere F1—Package of 5	.40
6614	Glass—Station selector dial glass	.30
3088	Knob—Operating switch knob and screw—Package of 5	.50
4449	Knob—Station selector, volume control, tone or range switch knob—Package of 5	.60
4644	Resistor—.38 Ohms—Flexible type—Filament series resistor—(R15)—Package of 5	.80
4678	Ring—Dial glass retaining ring—Package of 5	.34
3238	Screw—No. 6-40 17/32" Knurled head screw for knob, stock 3088—Package of 10	.25
4945	Screw—Chassis mounting screw assembly—Console Model	.50
4446	Screw—Chassis mounting screw assembly—Table Model	.28
4613	Screw—No. 8-32 7/16" headless set screw for station selector volume control, tone control switch, or range switch knob—Package of 10	.25

Total "A" Battery Current	0.68 Ampere
Maximum "B" Battery Current	21 M. A.
Tuning Ranges	540-1720 kc. and 5400-18000 kc.
Maximum Undistorted Output	1.2 Watts
Maximum Output	2.2 Watts
Line-up Frequencies	460 kc., 600 kc., 1720 kc., and 18000 kc.

DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit is of the superheterodyne type and consists of a combined oscillator-detector stage, two i-f amplifying stages, a combined, second detector and automatic volume control, a two-stage audio amplifier and a Class "B" output stage. A two-pole operating switch opens the "+A" and "+B" battery leads when the switch is turned to the "off" position.

The signal enters the receiver through a shielded antenna lead and is applied through the antenna transformer to the grid circuit of the first detector which also serves as the local oscillator for producing a signal, 460 kc. higher in frequency than the incoming signal. The combined signals after passing through the first detector produce the i-f signal.

The volume control selects the desired amount of audio signal from the drop across R-9 and applies it to the grid circuit of the first audio stage, RCA-32.

The output of the first audio stage is resistance coupled to the grid circuit of the RCA-30 driver stage, which is transformer coupled to the Class "B" output stage. The output stage utilizes the twin amplifier Radiotron RCA-19, which has two separate sets of elements and eliminates the necessity of having two separate tubes for a Class "B" output stage. The plate circuit of this tube is transformer coupled to the cone coil of the permanent magnet, dynamic loudspeaker.

Plate, grid and filament voltages are supplied by individual batteries. Two +A leads are provided, one permitting operation on a 2-volt storage cell and the other used for operation on a 2.5-volt "Eveready Air Cell."

The i-f amplifier uses two RCA-34 Radiotrons in conjunction with three transformers. Two of the transformers are tuned very accurately to the i-f frequency (460 kc.) by means of suitable trimmer capacitors. The third transformer is untuned and couples the output of the second stage to the input of the second detector, an RCA-30, the plate of which is grounded.

Automatic volume control action is obtained from the voltage drop of a portion of the rectified signal across resistor R-9. The voltage drop constitutes the automatic bias voltage for the first detector and i-f stages and thereby gives the automatic volume control action of the receiver.

SERVICE DATA

ALIGNMENT PROCEDURE

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9595, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I-F Tuning Adjustments

The i-f amplifier comprises two stages including three transformers. The third transformer is untuned so that only a total of four circuits are to be adjusted. Refer to Figure 4 and proceed as follows:

(a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight glow is obtained in the output indicator.

(c) Adjust the secondary and primary of the second and then the first i-f transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight glow is obtained in the output indicator at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the i-f alignment.

(d) Connect Test Oscillator to antenna-ground terminals. Adjust wave trap trimmer, C-1, to give minimum receiver output.

R-F and Oscillator Adjustments

The important points to remember are the need for using the minimum oscillator output to obtain an indi-

RCA MFG. CO., INC.

cation in the output device with the volume control at its maximum position and the manner of obtaining the proper high-frequency oscillator and detector adjustments.

The r-f line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 kc. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.

(b) Then set the receiver band switch to its broadcast position, the Test Oscillator at 1720 kc., and the dial pointer at 1720. Adjust the oscillator output so that a slight glow will be obtained in the output indicator when the volume control is at its maximum position. Adjust the two trimmers, C-35 and C-4, under the two r-f coils, see Figure 4, until a maximum output is obtained. Then shift the Test Oscillator frequency to 600 kc. The trimmer capacitor, C-17, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 kc. adjustment.

(c) Change the receiver range switch to its high frequency (short wave) position and tune the Station Selector to a dial reading of 18,000 kc. Adjust the Test Oscillator to this same frequency and regulate its output to give a slight indication on the output meter. Then adjust trimmer C-34 to the point giving maximum receiver output. Two points may be found on the trimmer, C-34, which give this maximum. The one of least capacitance is correct and should be used. To assure that this point has been used, tune the receiver to a dial setting of 17,080 kc. and increase the output of the Test Oscillator. The "image" of the 18,000 kc. signal will be received, if the adjustment of C-34 has been properly made. *No adjustments are to be made during the "image" check.*

Return the receiver tuning to 18,000 kc., readjust C-34 if necessary, and then tune the antenna trimmer, C-3, simultaneously rocking the tuning control backward and forward through the signal, until maximum output is obtained. Two positions of the trimmer may be found which give this condition—the one of maximum capacitance is correct.

Radiotron Socket Voltages

Voltage and current values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the filaments (F-F). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests; the lower the voltmeter resistance, the lower the degree of accuracy.

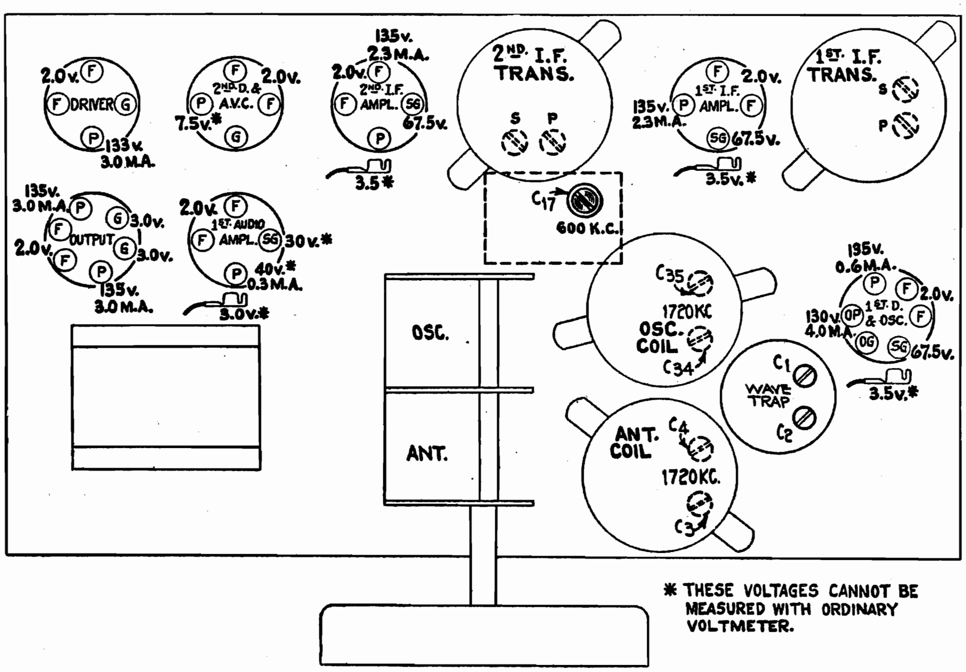

Figure 4—Line-Up Capacitor Locations and Voltage Values at Socket Contacts

Volume Control at Maximum—No Signal—135 Volt "B" Battery—
4.5 and 7.5-Volt Bias Batteries

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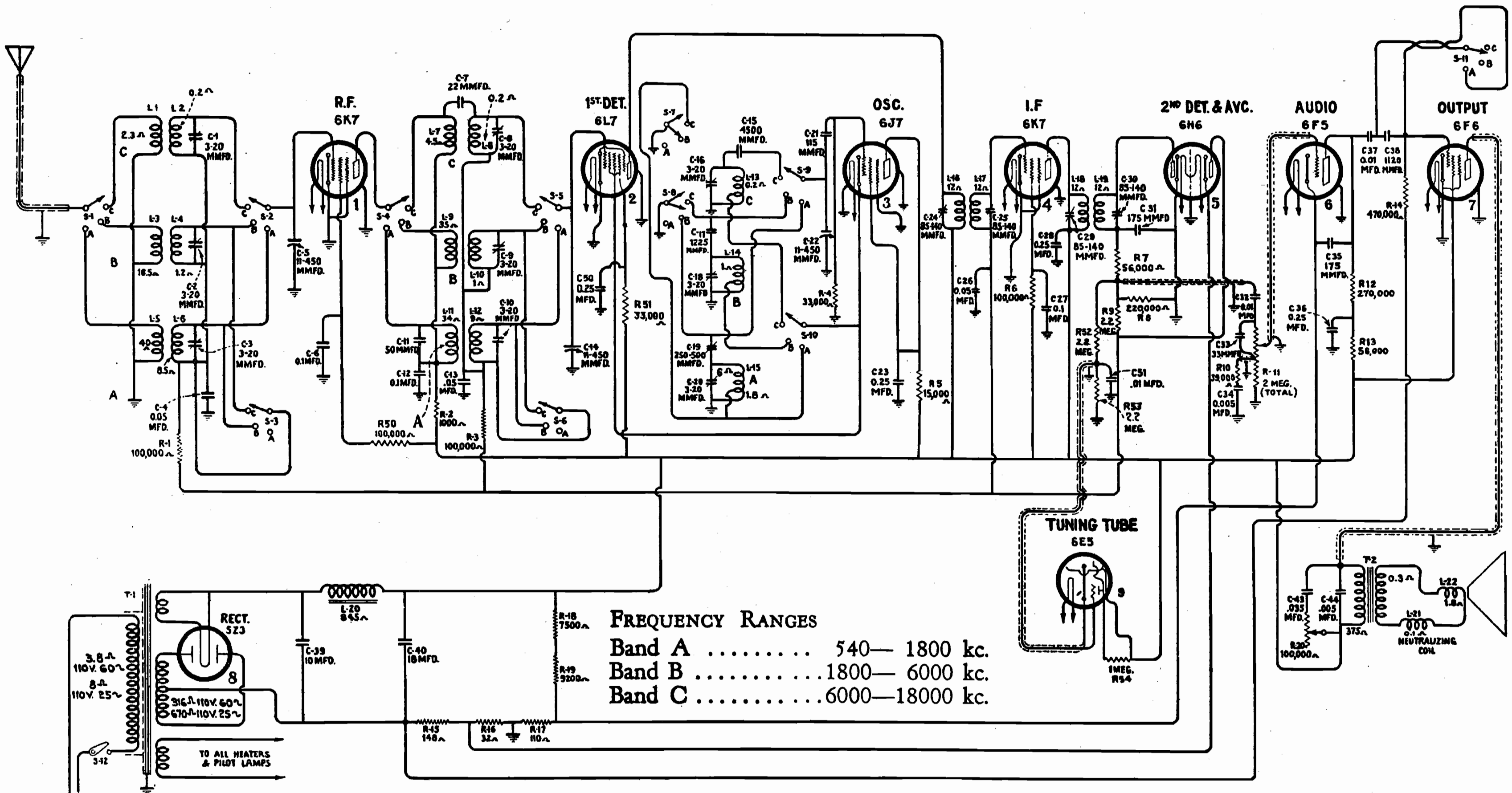


Frequency Ranges

Band A .... 540— 1800 kc.
Band B ....1800— 6000 kc.
Band C ....6000—18000 kc.

Power Consumption..............................105 watts

Undistorted Output..............................2 watts

Maximum Output..............................$4\frac{1}{2}$ watts
Loudspeaker ....12 inch, Electrodynamic
Voice Coil Impedance..............................$2\frac{1}{4}$ ohms at 400 cycles

Intermediate Frequency..............................460 kc.

Alignment Frequencies

Band A..................600 kc. (osc), 1720 kc. (osc, ant, det)
Band B..............................6132 kc. (osc, ant, det)
Band C..............................18000 kc. (osc, ant, det)

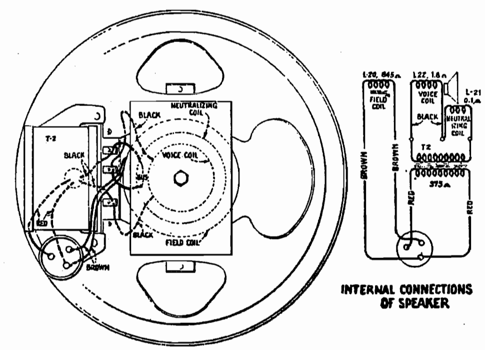
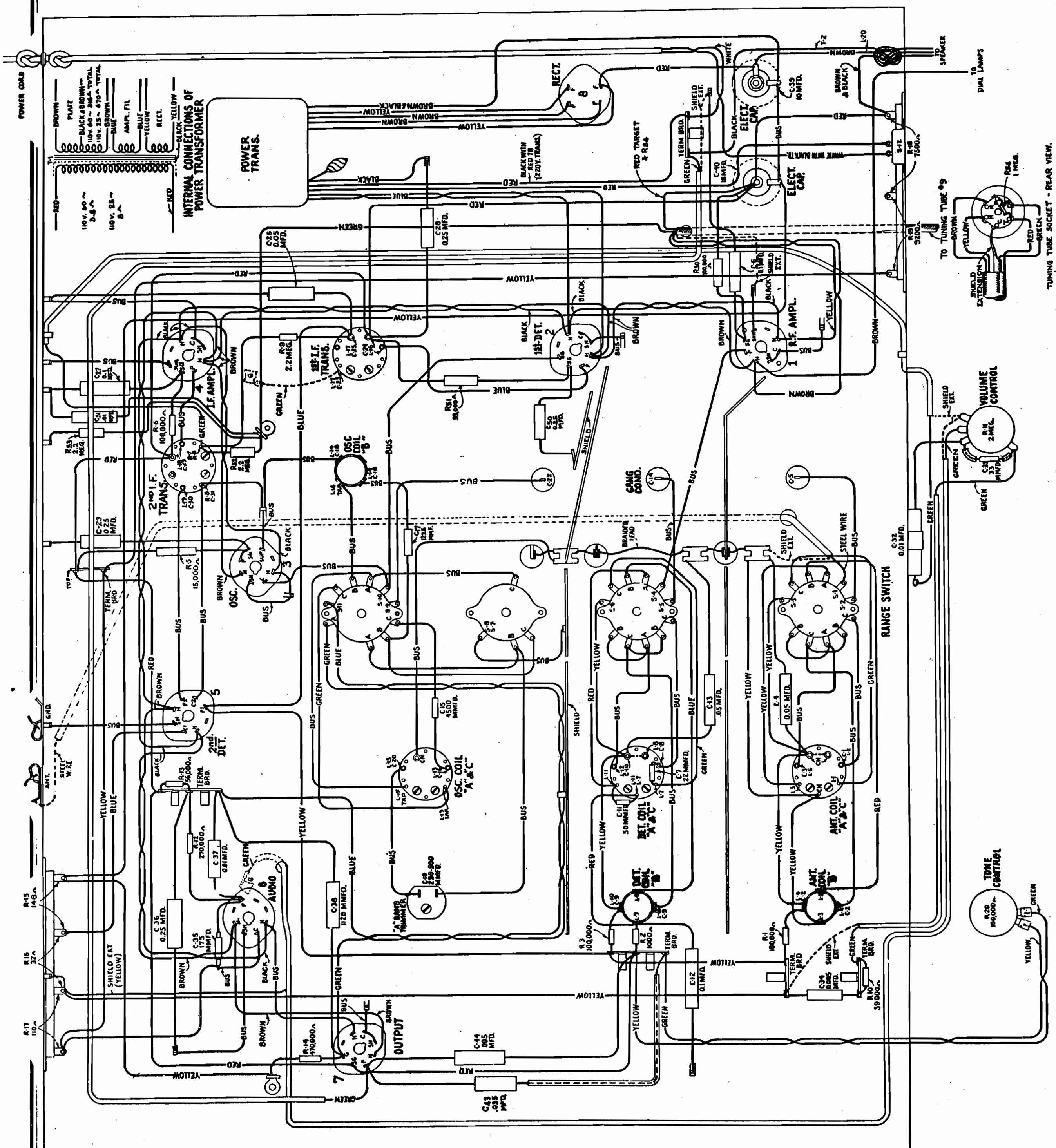


Figure 3—Loudspeaker Wiring

MODEL C9-4
Chassis Wiring

RCA MFG. CO., INC.



MODEL C9-4
Trimmers, Socket
Alignment Connections

RCA MFG. CO., INC.

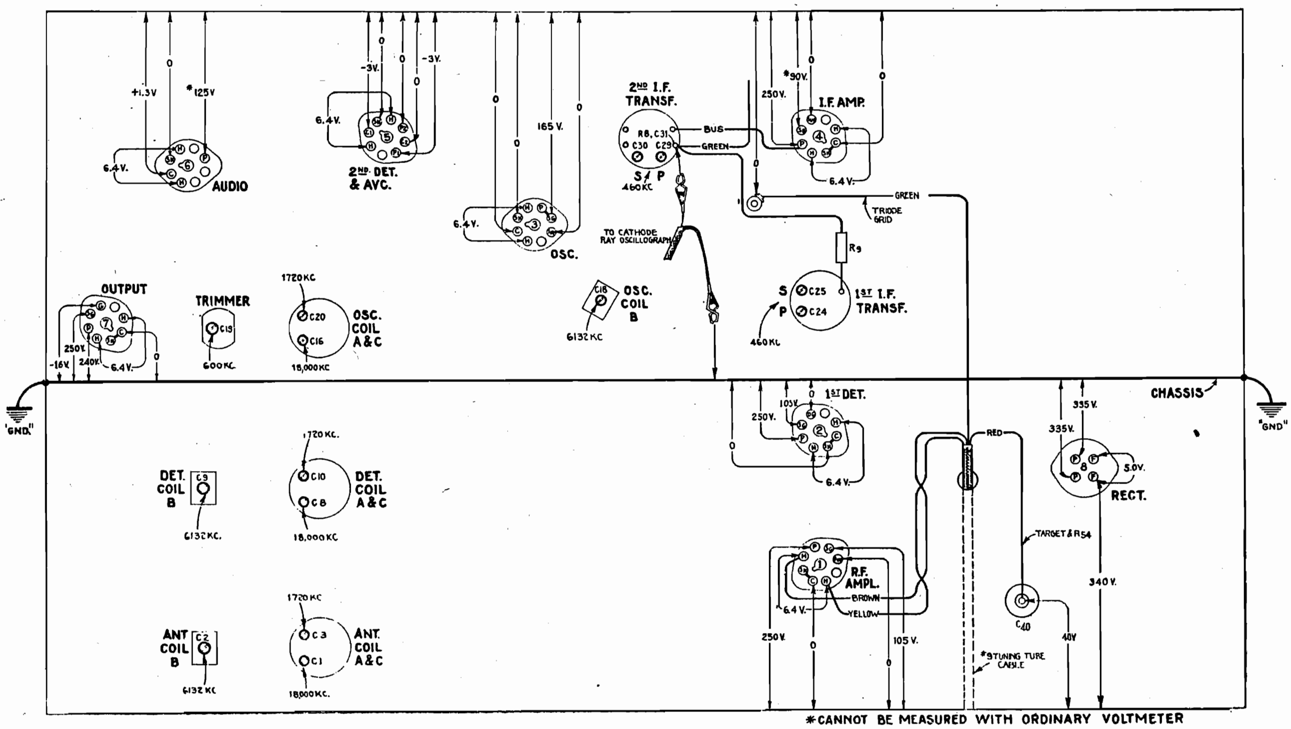


Figure 6—Trimmer Locations and Radiotron Socket Voltages
Measured at 115 volts A.C.—No Signal—Volume Control Maximum

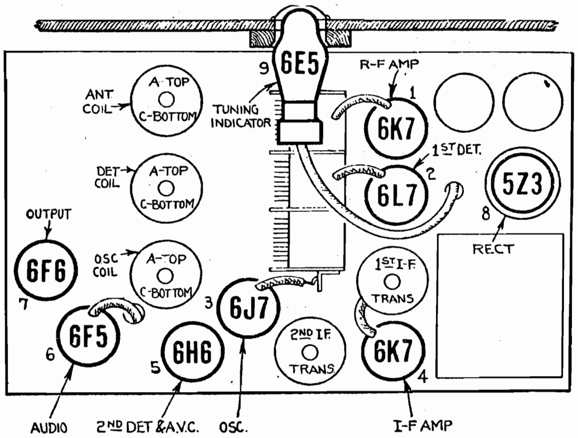


Figure 4—Coil and Radiotron Locations

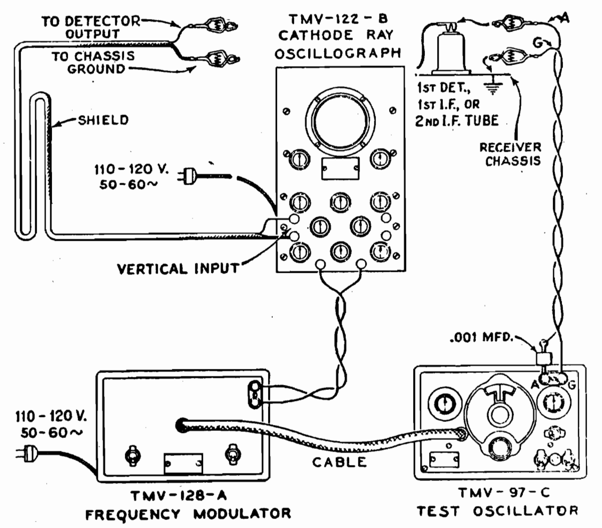


Figure 5—Alignment Apparatus Connections

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SERVICE DATA

The various diagrams of this booklet contain such information as will be needed for servicing the receiver. The ratings of all resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. The coils, reactors and transformer windings are rated in terms of their d-c resistances only and where the value is less than one ohm, no rating is given. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and replacement parts list.

Alignment Procedure

There are a total of fourteen adjustments necessary for obtaining proper alignment when such a process becomes necessary. Four of these are involved with the i-f system and the remainder are associated with the antenna, first detector and oscillator coils.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with excellent precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

The Tuning Wand consists of a bakelite rod having a small brass cylinder at one end and a core of finely divided iron at the other. It may be inserted into a tuned coil while a signal of the normal resonant frequency is being supplied to such coil to obtain an indication of the tuning. Holes are provided at the top of the r-f shield cans for entrance of the Wand. The presence of either end of the Wand will cause a change in tuning which will be indicated at the receiver output as an increase or decrease in signal level. If there is a decrease of output when either end is inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output while the iron end causes a decrease, reduction of inductance will be necessary to place the circuit in alignment. This is equivalent to decreasing the trimmer concerned. The following tabulation gives the various changes and the adjustments required:—

WAND	SIGNAL	TRIMMER
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

(I) CATHODE-RAY ALIGNMENT

Equipment

A standard source of the specified alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to make possible the visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by Figure 6. Each must be aligned to a basic frequency of 460 kc. The last transformer must be aligned firstly and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the juncture of R-7, R-8 and R-9 as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and the gain control kept at its maximum position. For each adjustment, the Oscillator output need be regulated so that the image obtained on the Oscillograph screen will be of sufficient size as to be accurately observable. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be picked up, shorting the antenna and ground terminals if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a straight line trace completely across the screen. Place the timing control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of the spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to **460 kc.** and set its modulation switch to "On". Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give the desired number of cycles. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-29 and C-30 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off". Change the timing control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. These curves will be found to occur at an Oscillator setting of *approximately 540 kc.* They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirements and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-29 and C-30 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-24 and C-25 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system. Each trimmer of the entire group should then be checked to assure that it is in correct alignment as indicated by the degree of coincidence and relative amplitude of the image on the Oscillograph screen.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to such a procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale.

Band A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the test Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers C-20, C-10 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and retune the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-20, C-10 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200—400 kc. range and use the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer C-19 should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect.
After completing this adjustment the trimmer C-20 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-19.

Band B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of **6132 kc.** Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." timing. Then adjust the oscillator trimmer C-18 to the point at which maximum amplitude of the image is obtained. Two points will be found for this trimmer which give such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at **5212 kc.** on the dial if the adjustment of C-18 has

RCA MFG. CO., INC.

been properly made. An increase in test Oscillator output may be necessary for this test, however, *its frequency should not be changed from* **6132 kc.** *nor any trimmer adjustments made on the receiver.*

(b) Return the station selector to the **6132 kc.** reading and align the detector, and antenna coil trimmers, C-9 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on this band.

Band C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to the same frequency (modulation "On" and Frequency Modulator disconnected) and regulate its output to the level required for convenient observation. Adjust the trimmer C-16 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to **17,080 kc.** The **18,000 kc.** signal of the Oscillator will be received at this point if the adjustment of C-16 has been properly made using the position of least capacitance which gives maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.,** re-align C-16 if necessary, and then adjust the detector and antenna trimmers, C-8 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

(2) ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode-Ray Oscillograph will require the use of a standard test Oscillator such as that recommended above for the source of signals and means of indication for the output. The RCA Neon Output Indicator, Stock No. 4317 will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

I-F Alignment

Connect the test Oscillator to the control grid cap of the i-f tube. Advance the volume control of the receiver to its full-on position. Tune the test Oscillator accurately to **460 kc.** and align the trimmers C-29 and C-30 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmers C-24 and C-25 for maximum receiver output.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna-ground terminals of the receiver and the manual volume control kept at its maximum position. For each adjustment the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal. **Band A** should be aligned by supplying a **1720 kc.** signal to the receiver, tuning the station selector to a dial reading of **1720** and adjusting the trimmers C-20, C-10 and C-3 to produce maximum receiver output. The Oscillator should then be shifted to **600 kc.** and the receiver tuned to resonate this signal, disregarding the reading at which it is best received. Trimmer C-19 must then be adjusted simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-20 should be rechecked to assure that its adjustment has not changed because of the trimming of C-19. **Band B**

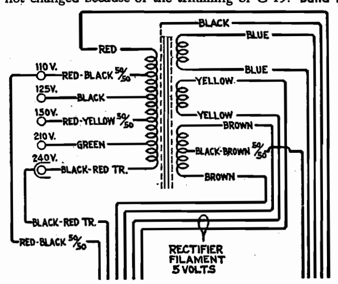


Figure 7—Universal Power Transformer Connections

Pri. Res.—10.3 Ohms, Total
Sec. Res.—383 Ohms, Total

must be aligned at **6132 kc.** by tuning the test Oscillator to such a frequency and turning the station selector to the same dial reading. Tune the trimmer C-18 to produce maximum receiver output, using the setting of least capacitance which causes same. The presence of the proper "image" may be checked by tuning the receiver to **5212 kc.** at which point the **6132 kc.** signal will be heard if the trimmer C-18 has been properly set to the position of least capacitance for maximum (peak) output. It may be necessary to increase the Oscillator output for this check. *No adjustments are to be made.* Return the station selector to the **6132 kc.** dial marking and trim capacitors C-9 and C-2 for maximum receiver output. No other adjustments are necessary on Band B. Change the receiver so that it is operative and the dial reads **18,000 kc.** on the **"C" Band.** Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-16 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at **17,080 kc.** by shifting the receiver tuning. If it is received at such a point, the trimmer C-16 has been correctly adjusted to the right peak. *No adjustments are to be made during this check.* Tune the receiver back to the **18,000 kc.** dial marking, re-adjust C-16 if necessary, and then tune the detector and antenna capacitors C-1 and C-8 for maximum receiver output. No further adjustments are necessary.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to chassis on Figure 6 will serve to assist in the location of causes for faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance becomes comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each reading is chosen as high as possible consistent with good readability.

Universal Transformer

The transformer used on some models of these receivers is adaptable to several ranges of voltage as given under rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 7. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage being used.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or high frequency tone control mounting bracket	$0.18
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3	.43
11350	Cap—Contact cap—Package of 5	.20
11223	Capacitor—Adjustable capacitor (C19)	.46
11292	Capacitor—22 MMfd. (C7)	.24
11321	Capacitor—33 MMfd. (C33)	.26
11289	Capacitor—50 MMfd. (C11)	.26
11291	Capacitor—115 MMfd. (C21)	.24
5116	Capacitor—175 MMfd. (C35)	.18
4409	Capacitor—1120 MMfd. (C38)	.35
11288	Capacitor—1225 MMfd. (C17)	.30
11287	Capacitor—4500 MMfd. (C15)	.30
4868	Capacitor—0.005 Mfd. (C34, C44)	.20
4624	Capacitor—0.01 Mfd. (C32)	.54
4858	Capacitor—0.01 Mfd. (C37, C51)	.25
5196	Capacitor—0.035 Mfd. (C43)	.18
4836	Capacitor—0.05 Mfd. (C4, C13, C26)	.30
4885	Capacitor—0.1 Mfd. (C6, C12, C27)	.28
5170	Capacitor—0.25 Mfd. (C23, C28, C36, C50)	.25
11240	Capacitor—10 Mfd. (C39)	1.08
5212	Capacitor—18 Mfd. (C40)	1.16
11272	Clamp—Antenna cable clamp—Located near antenna terminal	.10
5215	Coil—Antenna coil (A and C Bands)—(L1, L2, L5, L6, C1, C3)	$2.32
5245	Coil—Antenna coil (B Band)—(L3, L4, C2)	1.58
5216	Coil—Detector coil (A and C Bands)—(L7, L8, L11, L12, C8, C10)	2.34
5246	Coil—Detector coil (B Band)—(L9, L10, C9)	1.62
5217	Coil—Oscillator coil (A and C Bands)—(L13, L15, C16, C20)	2.20
5247	Coil—Oscillator coil (B Band)—(L14, C18)	1.44
11214	Condenser—3-Gang variable tuning condenser (C5, C14, C22)	4.20
11238	Tone Control—High frequency tone control (R20)	.96
11237	Volume Control—(R11)	1.20
4340	Lamp—Dial lamp—Package of 5	.60
8041	Plate—R.F. or I.F. coil shield locking plate—Package of 2	.12
11244	Resistor—Voltage divider resistor, comprising one 7500 ohm and one 9200 ohm section—(R18, R19)	1.08
11329	Resistor—Voltage divider resistor, comprising one 148 ohm, one 32 ohm and one 85 ohm section—(R15, R16, R17)	.52
5112	Resistor—1000 Ohm—Carbon Type—¼ Watt—(R2)—Package of 5	1.00
5114	Resistor—15,000 Ohm—Carbon Type—1 Watt—(R5)	$0.22
11300	Resistor—33,000 Ohm—Carbon Type—1/10 Watt—(R4)—Package of 5	.75
5033	Resistor—33,000 Ohm—Carbon Type—1 Watt—(R51)—Package of 5	1.10
11322	Resistor—39,000 Ohm—Carbon Type—¼ Watt—(R10)—Package of 5	1.00
5029	Resistor—56,000 Ohm—Carbon Type—¼ Watt—(R13)—Package of 5	1.00
3118	Resistor—100,000 Ohm—Carbon Type—¼ Watt—(R1, R3, R6, R50)—Package of 5	1.00
4669	Screw—No. 8-32-5/32" set screw for variable condenser drive assembly—Package of 10	$0.25
4377	Spring—Band indicator operating arm spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud and nut assembly—Package of 5	.25
	MISCELLANEOUS ASSEMBLIES	
11191	Bracket—Tuning Lamp mounting bracket—Less Clamp 11192	.12
11331	Cable—Tuning Lamp Cable—Complete with socket	1.28
11192	Clamp—Tuning Lamp Mounting Clamp—Less Bracket 11191	.12
11276	Escutcheon—Tuning Lamp Escutcheon	.40
11337	Escutcheon—Station selector escutcheon	.70
6614	Glass—Station selector dial glass	.30
11346	Knob—Station selector knob—Package of 5	.75
11347	Knob—Volume control, tone control, range switch or power switch knob—Package of 5	.75
11246	Foot—Chassis mounting foot and bracket assembly—Package of 2	.76
11382	Resistor—1 Megohm—Carbon Type—1/10 Watt—(R54)—Package of 5	.75
4678	Ring—Spring retaining ring for dial glass—Package of 5	.34
5210	Screw—Chassis mounting screw assembly—Package of 4	.16
11348	Screw—No. 8-32-7/16" headless cupped point set screw for knob, stock #11346—Package of 10	.32
11381	Socket—Tuning Lamp Socket and Cover	.45
11349	Spring—Retaining spring for knob, stock #11347—Package of 5	.15
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board assembly with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Output transformer mounting bracket	.14
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
11254	Coil—Field coil—L20	2.00
11233	Coil—Hum neutralizing coil—L21	.30
11258	Cone—Reproducer cone—L22—Package of 5	3.85
5118	Connector—3-contact male connector for reproducer	.25
5119	Connector—3-contact female connector plug for reproducer cable	.25
9619	Reproducer—Complete	6.05
11253	Transformer—Output transformer—T2	1.56
11230	Washer—"Binders board" "C" washer used to hold field coil assembly	.18
11323	Resistor—270,000 Ohm—Carbon Type—¼ Watt—(R12)—Package of 5	1.00
11172	Resistor—470,000 Ohm—Carbon Type—¼ Watt—(R14)—Package of 5	1.00
11151	Resistor—2.2 Megohms—Carbon Type—¼ Watt—(R9, R52, R53)—Package of 5	1.00
11273	Shield—Rectifier Radiotron shield	.25
11222	Socket—Dial lamp socket	.18
4794	Socket—4-contact rectifier Radiotron socket	.15
11313	Socket—5-contact Radiotron socket	.18
11198	Socket—7-contact Radiotron socket	.15
11236	Switch—Band switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11)	2.44
11133	Switch—Power switch—(S12)	.62
5238	Terminal—Antenna terminal clip assembly	.14
11216	Transformer—First intermediate frequency transformer (L16, L17, C24, C25)	2.15
11239	Transformer—Second intermediate frequency transformer—(L18, L19, C29, C30, C31, R7, R8)	2.72
11330	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	5.52
11242	Transformer—Power transformer—105-125 volts—25-60 cycles	6.52
11243	Transformer—Power transformer—100-130, 140-160, 195-250 volts—40-60 cycles	4.64
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, balls, ring, spring and washers—assembled	1.00
11328	Dial—Dial scale	.68
11252	Drive—Variable tuning condenser drive assembly	1.88
4520	Indicator—Station selector indicator pointer	.18
11226	Indicator—Band indicator pointer assembly comprising indicator pointer, arm, link and stud	.20
3993	Screw—No. 6-32-5/32" square head set screw for band indicator operating arm—Package of 10	.25

MODEL T10-1
Trimmers, Socket

RCA MFG. CO., INC.

Voltage, Speaker Data
Transformer Data

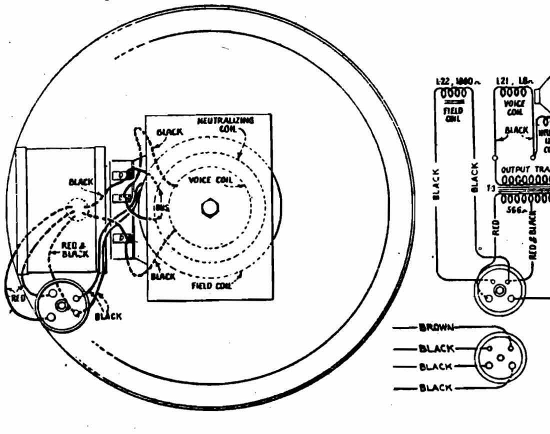


Figure 3—Loudspeaker Wiring

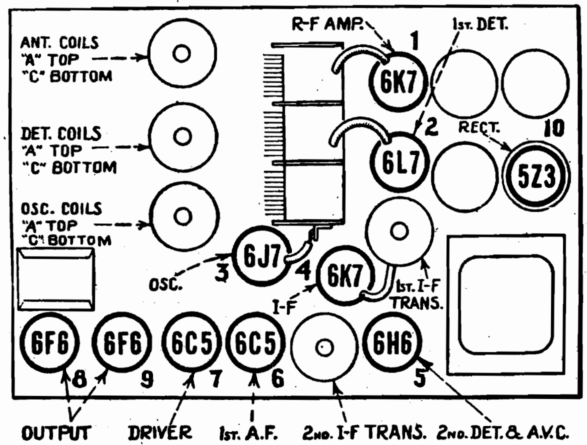


Figure 4—Coil and Radiotron Locations

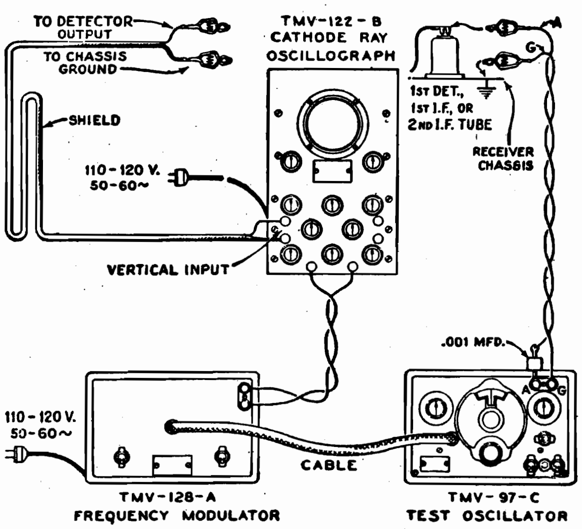


Figure 5—Alignment Apparatus Connections

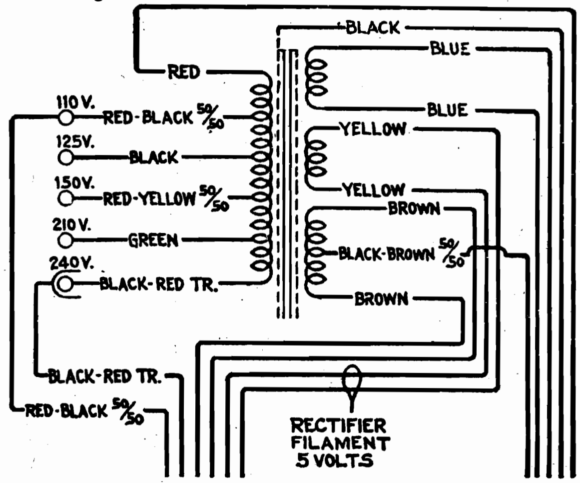


Figure 7—Universal Power Transformer Connections

Pri. Res.—7.42 ohms, total
Sec. Res.—274 ohms, total

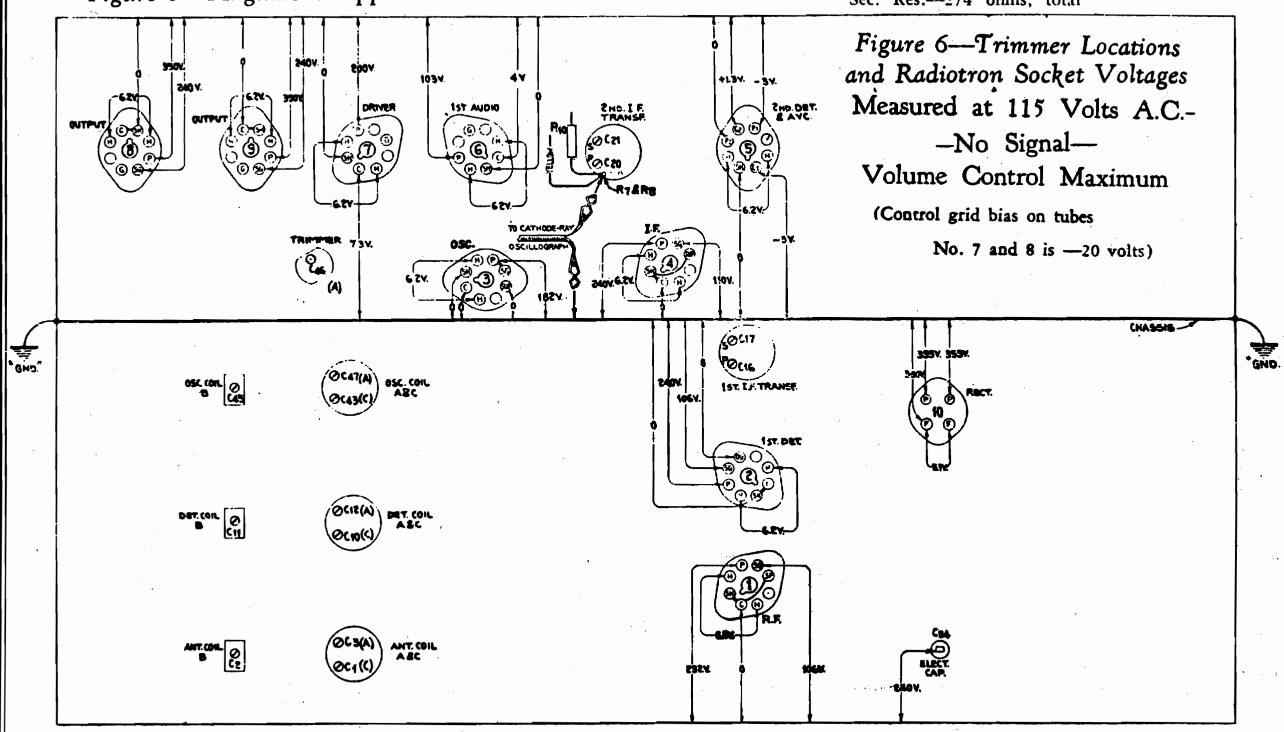
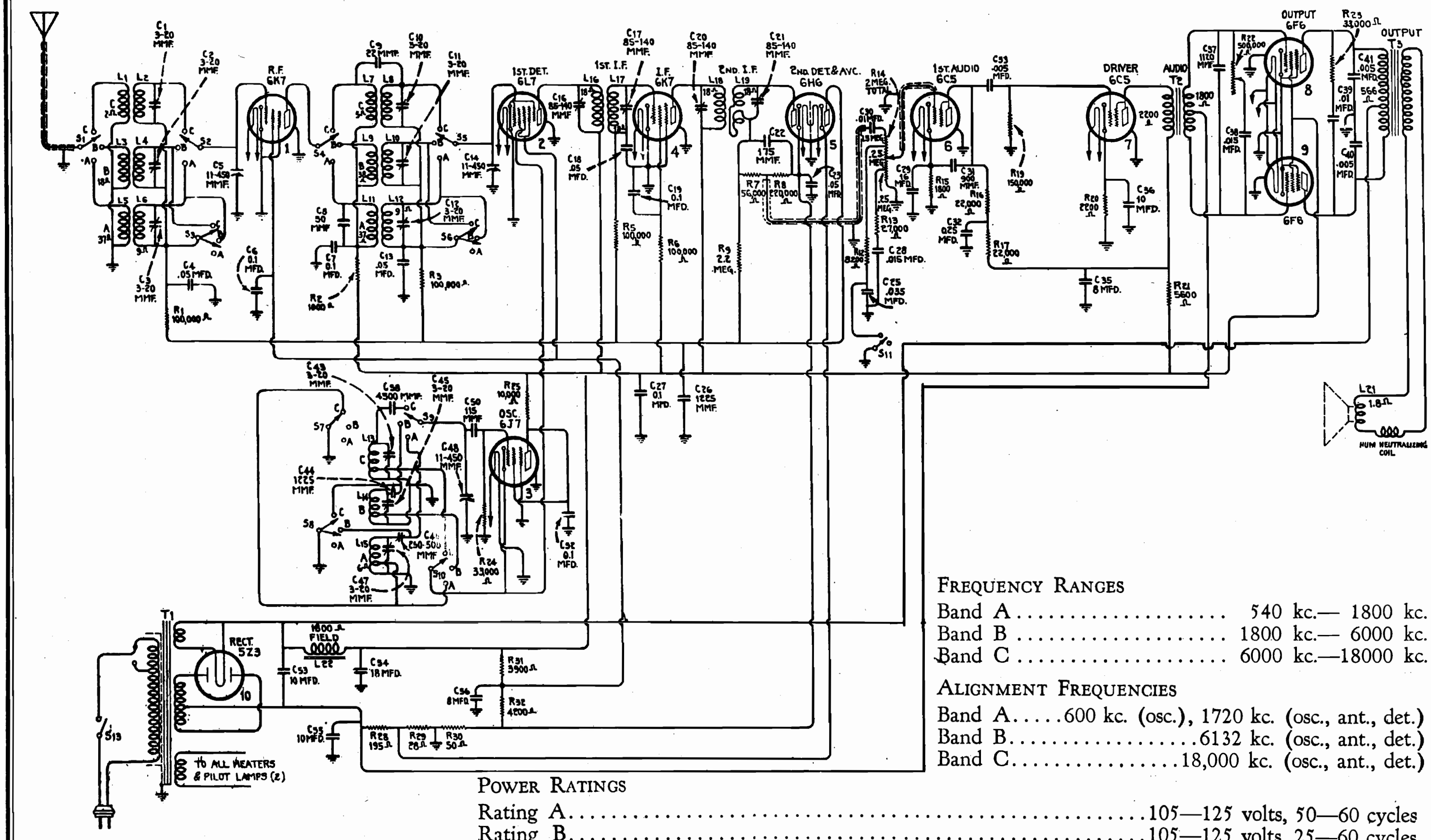


Figure 6—Trimmer Locations and Radiotron Socket Voltages
Measured at 115 Volts A.C.-
—No Signal—
Volume Control Maximum
(Control grid bias on tubes No. 7 and 8 is —20 volts)

MODEL T10-1
Schematic

RCA MFG. CO., INC.



POWER TRANSFORMER

Pri. Res.	Sec. Res.
3.8 ohms	335 ohms (60 cycle)
5.4 ohms	470 ohms (25 cycle)

FREQUENCY RANGES

Band A .... 540 kc.— 1800 kc.
Band B .... 1800 kc.— 6000 kc.
Band C .... 6000 kc.—18000 kc.

ALIGNMENT FREQUENCIES

Band A.....600 kc. (osc.), 1720 kc. (osc., ant., det.)
Band B..................6132 kc. (osc., ant., det.)
Band C................18,000 kc. (osc., ant., det.)

POWER RATINGS

Rating A.......................................105—125 volts, 50—60 cycles
Rating B.......................................105—125 volts, 25—60 cycles
Rating C.......................100—130/140—160/195—250 volts, 40—60 cycles
Power Consumption.. 135 watts

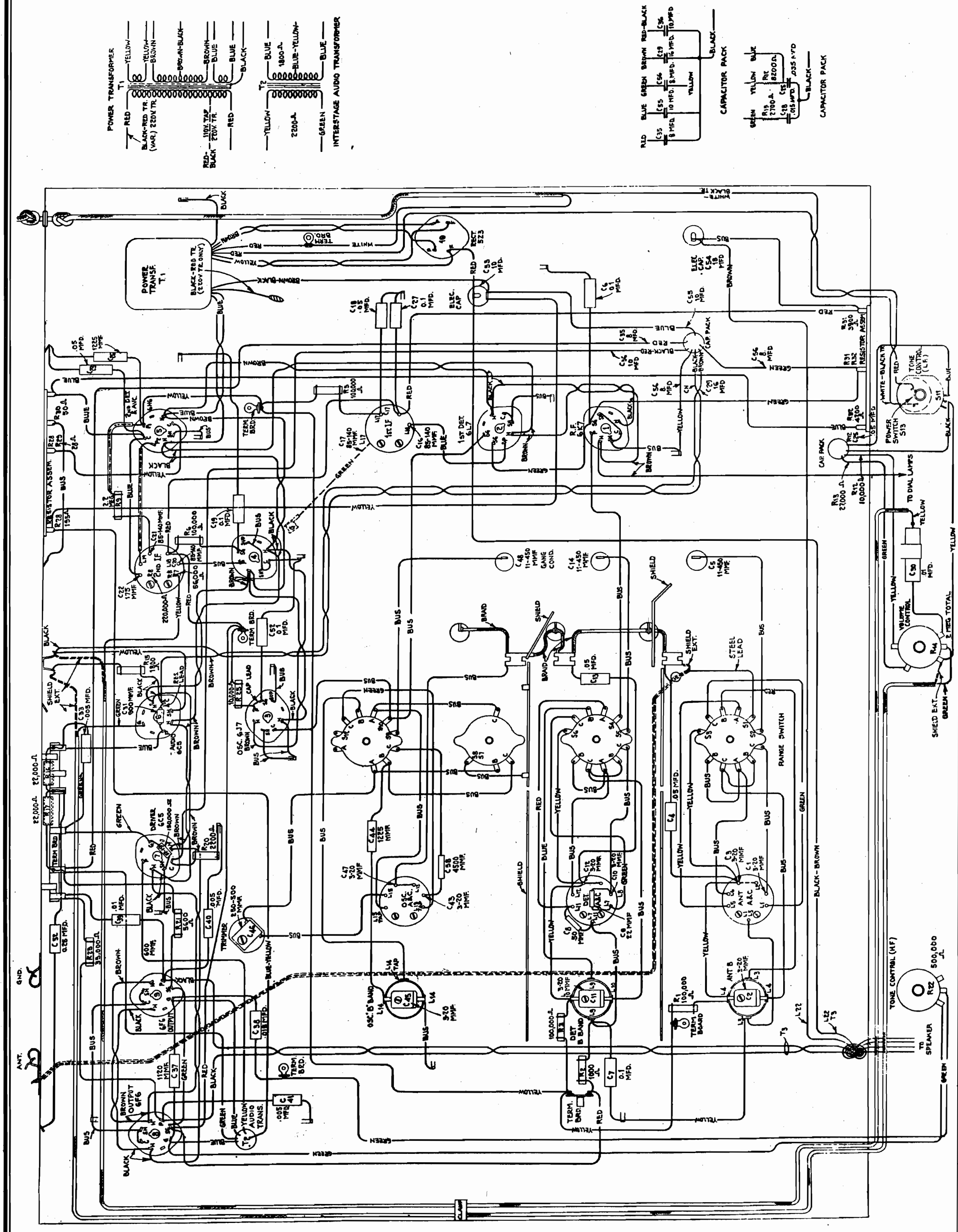
MISCELLANEOUS

Undistorted Output.......... 8.5 watts
Maximum Output .... 11.5 watts
Loudspeaker ....Electrodynamic—8 inch
Voice Coil Impedance.......2.25 ohms at 400 cycles

Intermediate Frequency...460 kc.

MODEL T10-1
Chassis Wiring

RCA MFG. CO., INC.



MODEL T10-1
Alignment
Parts List

RCA MFG. CO., INC.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—High or low frequency tone control or volume control mounting bracket.	$0.18
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
11223	Capacitor—Adjustable capacitor—(C46)	.46
11292	Capacitor—22 MMfd.—(C9)	.24
11289	Capacitor—50 MMfd.—(C8)	.26
11291	Capacitor—115 MMfd.—(C50)	.24
3784	Capacitor—900 MMfd.—(C31)	.30
4409	Capacitor—1120 MMfd.—(C37)	.35
11288	Capacitor—1225 MMfd.—(C44)	.30
11316	Capacitor—1225 MMfd.—(C26)	.40
11287	Capacitor—4500 MMfd.—(C58)	.30
4907	Capacitor—0.005 Mfd.—(C40, C41)	.38
4868	Capacitor—0.005 Mfd.—(C33)	.20
4624	Capacitor—0.01 Mfd.—(C30)	.54
4937	Capacitor—0.01 Mfd.—(C39)	.25
5215	Coil—Antenna coil—A and C Bands—(L1, L2, L5, L6, C1, C3)	2.32
5245	Coil—Antenna coil—B band—(L3, L4, C2)	1.58
5216	Coil—Detector coil—A and C bands—(L7, L8, L11, L12, C10, C12)	2.34
5246	Coil—Detector coil—B band—(L9, L10, (C11)	1.62
5217	Coil—Oscillator coil—A and C bands—(L13, L15, C43, C47)	2.20
5247	Coil—Oscillator coil—B band—(L14, C45).	1.44
11277	Compensating Pack—Comprising one 0.015 Mfd., one 0.035 Mfd. capacitor, one 27,000 ohm and one 8200 ohm resistor—(C25, C28, R12, R13)	.92
11214	Condenser—Three gang variable tuning condenser—(C5, C14, C48)	4.20
11205	Volume Control—(R14)	1.30
11219	Tone Control—High frequency tone control—(R22)	.90
8041	Plate—I. F. or R. F. coil shield locking plate with screw—Package of 2	.12
11220	Resistor—Voltage divider resistor—comprising one 3900 ohm and one 4200 ohm section—(R31, R32)	.84
11221	Resistor—Voltage divider resistor—comprising one 50 ohm, one 28 ohm and one 195 ohm section—(R28, R29, R30)	.48
5112	Resistor—1000 Ohm—Carbon type—¼ Watt—(R2)—Package of 5	1.00
3706	Resistor—1800 Ohm—Carbon type—¼ Watt—(R15)—Package of 5	1.00
5159	Resistor—2200 Ohm—Carbon type—¼ Watt—(R20)—Package of 5	1.00
5175	Resistor—5600 Ohm—Carbon type—½ Watt—(R21)—Package of 5	1.00
2731	Resistor—10,000 Ohm—Carbon type—1 Watt—(R25)—Package of 5	1.10
11305	Resistor—22,000 Ohm—Carbon type—¼ Watt—(R16, R17)—Package of 5	1.00
11300	Resistor—33,000 Ohm—Carbon type—1/10 Watt—(R24)—Package of 5	.75
5033	Resistor—33,000 Ohm—Carbon type—1 Watt—(R23)—Package of 5	1.10
3118	Resistor—100,000 Ohm—Carbon type—¼ Watt—(R1, R3, R5, R6)—Package of 5.	1.00
5027	Resistor—150,000 Ohm—Carbon type—¼ Watt—(R19)—Package of 5	1.00
11151	Resistor—2.2 Megohms—Carbon type—¼ Watt—(R9)—Package of 5	1.00
5249	Shield—R. F. coil shield	.20
11273	Shield—Radiotron shield	.25
5250	Shield—I. F. Transformer shield	.22
11222	Socket—Dial lamp socket	.18
4794	Socket—4-contact Radiotron socket	.15
11197	Socket—6-contact Radiotron socket	.14
11198	Socket—7-contact Radiotron socket	.15
5224	Switch—Low frequency tone control switch and power switch—(S11, S13)	1.00
11236	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	2.44
5238	Terminal—Antenna terminal assembly	.14
11218	Transformer—Audio driver transformer—(T2)	2.58
11216	Transformer—First intermediate frequency transformer—(L16, L17, C16, C17)	2.15
11217	Transformer—Second intermediate frequency transformer—(L18, L19, C20, C21, C22, R7, R8)	3.10
11213	Transformer—Power transformer—105-125-150-210-250 volts—40-60 cycles	5.10
11212	Transformer—Power transformer—105-125 volts—25-60 cycles	7.18
11315	Capacitor—0.015 Mfd.—(C38)	.20
4836	Capacitor—0.05 Mfd.—(C4, C13, C18, C23)	.30
4885	Capacitor—0.1 Mfd.—(C7, C19, C27, C52)	.28
4841	Capacitor—0.1 Mfd.—(C6)	.22
5170	Capacitor—0.25 Mfd.—(C32)	.25
11203	Capacitor—10 Mfd.—(C53)	1.18
5212	Capacitor—18 Mfd.—(C54)	1.16
11215	Capacitor Pack—Comprising one 16 Mfd., two 10 Mfd., and two 8 Mfd capacitors—(C29, C35, C36, C55, C56)	3.85
11201	Clamp—Cable clamp—located near variable tuning condenser—Package of 5	.20
11272	Clamp—Cable clamp—located above antenna terminal	.10
4693	Clamp—Electrolytic capacitor clamp—for stock #11215	.15
11211	Transformer—Power transformer—105-125 volts—50-60 cycles	4.88
	DRIVE ASSEMBLIES	
4362	Arm—Band indicator operating arm	$0.28
10194	Ball—Steel ball—Package of 20	.25
4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, balls, ring, spring and washers assembled	1.00
11375	Dial—Station selector dial scale	.68
11227	Drive—Variable tuning condenser drive complete—less dial scale	2.08
11228	Gear—Vernier pointer drive gear	.42
4827	Gear—Spring gear assembly	1.25
11303	Indicator	.22
11226	Indicator—Band indicator pointer assembly—comprising indicator, arm, link and stud	.20
4475	Indicator—Station selector indicator	.18
4340	Lamp—Dial lamp—Package of 5	.60
3993	Screw—No. 6-32-5/32″ set screw—for band indicator operating arm—Package of 10	.25
4669	Screw—No. 8-32-5/32″ Square head set screw—for tuning condenser shaft—Package of 10	.25
4377	Spring—Band indicator operating arm spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud assembly—Package of 5	.25
	MISCELLANEOUS ASSEMBLIES	
11337	Escutcheon—Station selector escutcheon	.70
6614	Glass—Station selector dial glass	.30
11346	Knob—Station selector knob—Package of 5	.75
11347	Knob—Volume control, range switch, tone control or power switch knob—Package of 5	.75
4678	Ring—Spring retaining ring for station selector dial glass—Package of 5	.34
11210	Screw—Chassis mounting screw assembly—Package of 4	.28
11348	Screw—No. 8-32-7/16″ Headless, cupped point, set screw for knob, Stock #11346—Package of 10	.32
11349	Spring—Retaining spring for knob, stock #11347—Package of 5	15
	REPRODUCER ASSEMBLIES	
11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Mounting bracket for output transformer and connector	.14
11304	Cable—Reproducer cable—complete with female connector	.80
11234	Coil—Field Coil—(L22)	2.15
11233	Coil—Neutralizing coil	.30
11235	Cone—Reproducer cone (L21)—Package of 5	3.50
5040	Connector—4-prong female connector socket for reproducer cable	.25
5039	Connector—4-prong male connector plug for reproducer	.25
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
9617	Reproducer—Complete	6.60
11229	Transformer—Output transformer—(T3)	1.66
11230	Washer—Binders board "C" washer—used to hold field coil securely—Package of 5.	.18

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only and where the resistance is less than one ohm, no rating is given.

Alignment Procedure

Ten alignment trimmers are provided in the r-f, first detector and oscillator tuning system and four are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with definite precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

CATHODE-RAY ALIGNMENT

Equipment

A standard source of alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by Figure 6. Each must be aligned to a basic frequency of **460 kc.** The last transformer must be aligned firstly and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the junction of R-7 and R-8, as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a straight line trace completely across the screen. Place the timing control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to **460 kc.** and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-20 and C-21 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

MODEL T10-1
Alignment, Part 2

RCA MFG. CO., INC.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off." Change the timing control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of *approximately 540 kc.* The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

CALIBRATION

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

BAND A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the test Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-47, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and retune the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-47, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer, C-46, should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment, the trimmer C-47 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-46.

BAND B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of **6132 kc.** Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." timing. Then adjust the oscillator trimmer, C-45, to the point at which maximum amplitude of the image is obtained. Two positions will be found for this trimmer which gives such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at **5212 kc.** on the dial if the adjustment of C-45 has been properly made. An increase in test Oscillator output may be necessary for this test. *Its frequency should not be changed from* **6132 kc.** *nor any trimmer adjustments made on the receiver.*

(b) Return the station selector to the **6132 kc.** reading and align the detector, and antenna coil trimmers, C-11 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on this band.

BAND C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to the same frequency (modulation "On" and Frequency Modulator (disconnected) and regulate its output to the level required for convenient observation. Adjust the trimmer C-43 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to **17,080 kc.** The **18,000 kc.** signal of the Oscillator will be received at this point if the adjustment of C-43 has been properly made by using the position of least capacitance which gives maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.**, re-align C-43 if necessary, and then adjust the detector and antenna trimmers, C-10 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode-Ray Oscillograph will require the use of a standard test Oscillator, such as that recommended above, for the source of signals and means of indication for the output. The RCA Neon Output Indicator, Stock No. 4317, will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

I-F Alignment

Connect the test Oscillator to the control grid cap of the i-f tube. Advance the volume control of the receiver to its full-on position. Tune the test Oscillator accurately to **460 kc.** and align the trimmers C-20 and C-21 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmers C-16 and C-17 for maximum receiver output.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna-ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal.

Band A—This band should be aligned by supplying a **1720 kc.** signal to the receiver, tuning the station selector to a dial reading of **1720** and adjusting the trimmers C-47, C-12 and C-3 to produce maximum receiver output. The Oscillator should then be shifted to **600 kc.** and the receiver tuned to resonate this signal, disregarding the reading at which it is best received. Trimmer C-46 must then be adjusted, simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-46.

Band B—This band must be aligned at **6132 kc.** by tuning the test Oscillator to such a frequency and turning the station selector to the **6132 kc.** dial reading. Then tune the trimmer C-45 to produce maximum receiver output, using the setting of least capacitance which causes same. The presence of the proper "image" may be checked by tuning the receiver to **5212 kc.** at which point the **6132 kc.** signal will be heard if the trimmer C-45 has been properly set to the position of least capacitance for maximum (peak) output. It may be necessary to increase the Oscillator output for this check. *No adjustments are to be made.* Return the station selector to the **6132 kc.** dial marking and trim capacitors C-11 and C-2 for maximum receiver output. No other adjustments are necessary on Band B.

Band C—Change the receiver so that it is operative and the dial reads **18,000 kc.** on the "C" Band. Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-43 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at **17,080 kc.** by shifting the receiver tuning. If it is received at such a point, the trimmer C-43 has been correctly adjusted to the right peak. *No adjustments are to be made during this check.* Tune the receiver back to the **18,000 kc.** dial marking, readjust C-43 if necessary, and then tune the detector and antenna capacitors C-10 and C-1 for maximum receiver output. No further adjustments are necessary.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to chassis on Figure 6 will serve to assist in the location of causes for faulty operation. Each value as specified should hold within ± 20% when the receiver is normally operative at its rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance becomes comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each reading is chosen as high as possible consistent with good readability.

Universal Transformer

The transformer used on some models of this receiver is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 7. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage being used. Note that a 110 volt tap is brought out separately for supplying a phonograph motor.

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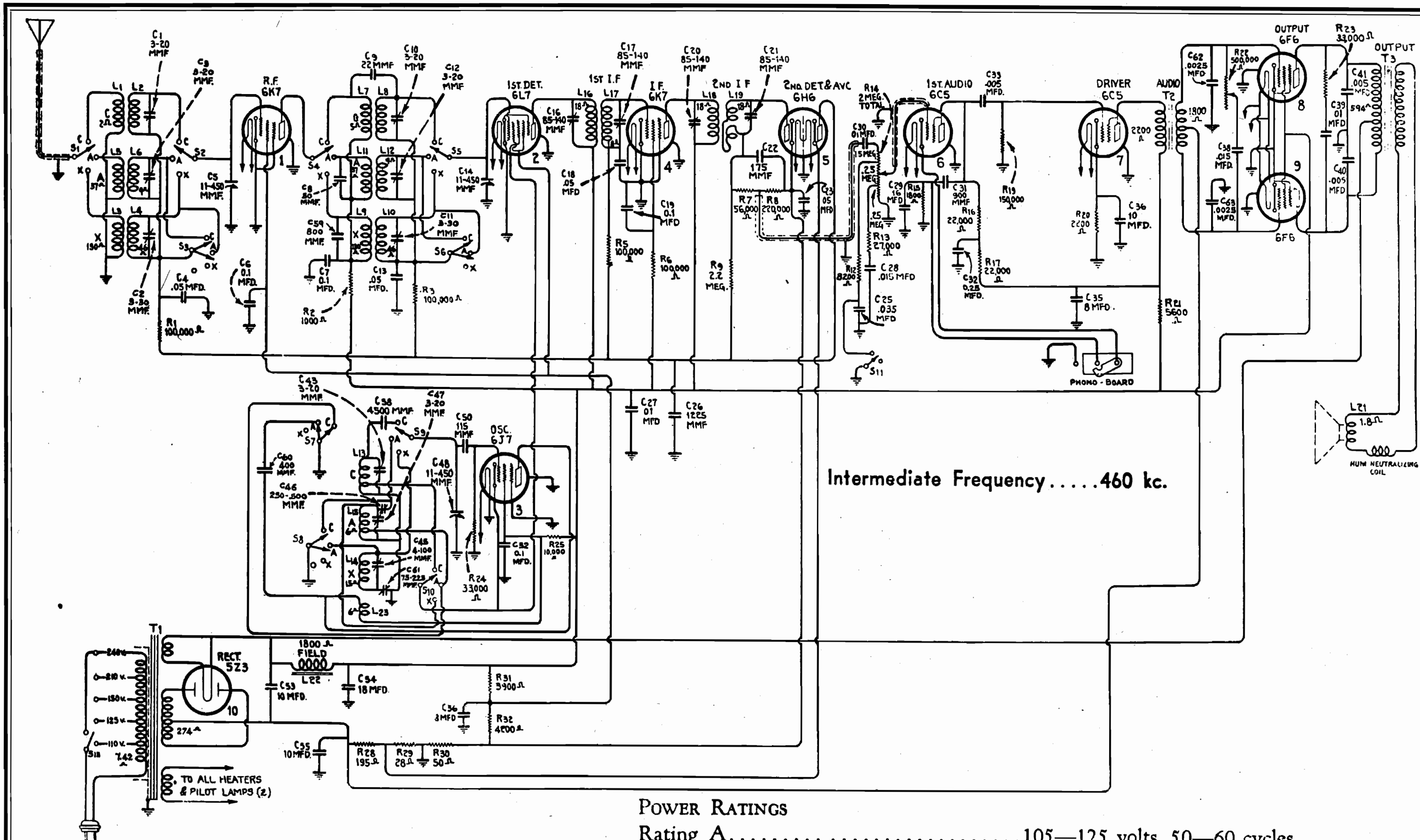

Intermediate Frequency.....460 kc.

Power Ratings

Rating A	105—125 volts, 50—60 cycles
Rating B	105—125 volts, 25—60 cycles
Rating C	100—130/140—160/195—250 volts, 40—60 cycles
Power Consumption	135 watts

Miscellaneous

Undistorted Output	8.5 watts
Maximum Output	11.5 watts
Loudspeaker	Electrodynamic—8 inch
Voice Coil Impedance	2.25 ohms at 400 cycles

Frequency Ranges

Band X	140 kc.— 410 kc.
Band A	540 kc.— 1800 kc.
Band C	5700 kc.—18000 kc.

Alignment Frequencies

Band X	150 kc. (osc.), 400 kc. (osc., ant., det.)
Band A	600 kc. (osc.), 1720 kc. (osc., ant., det.)
Band C	18000 kc. (osc., ant., det.)

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MODEL T10-3
Chassis Wiring

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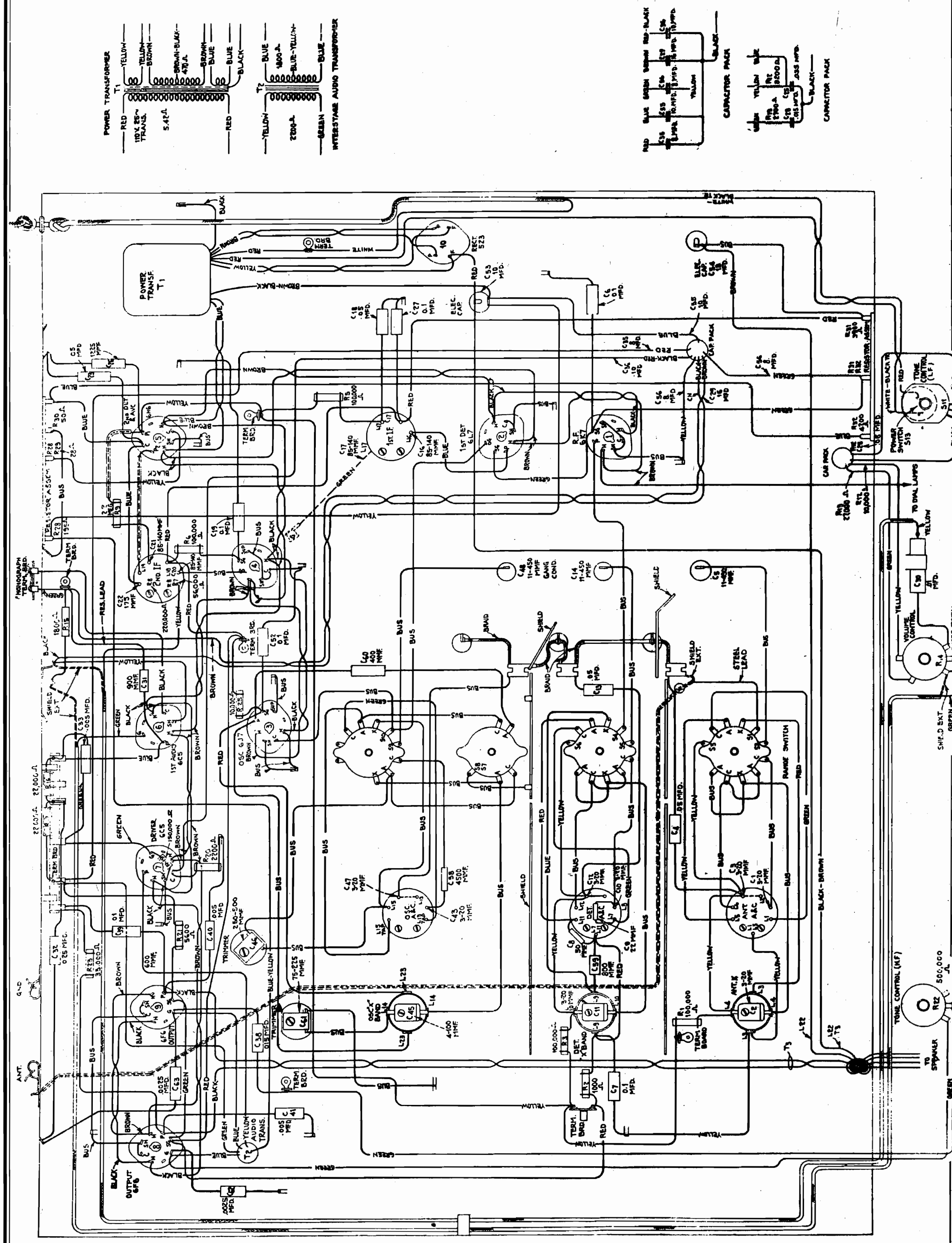

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MODEL T10-3
Socket, Trimmers
Speaker Data, Voltage

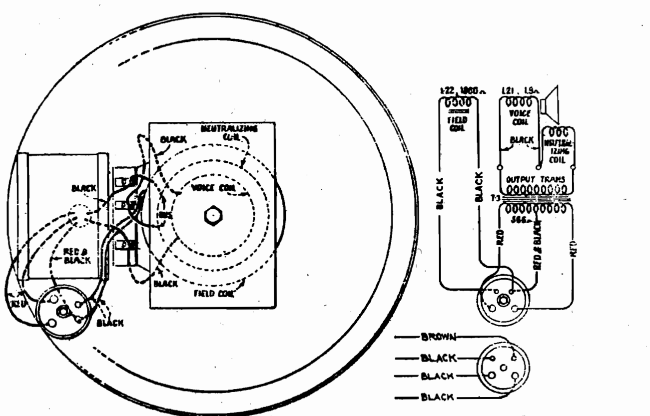

Figure 3—Loudspeaker Wiring

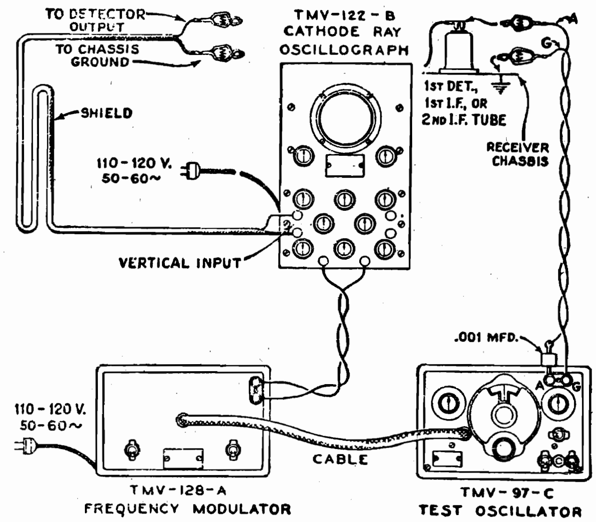

Figure 5—Alignment Apparatus Connections

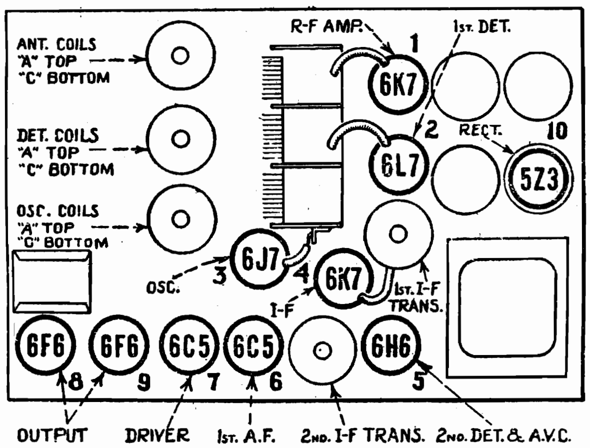

Figure 4—Coil and Radiotron Locations

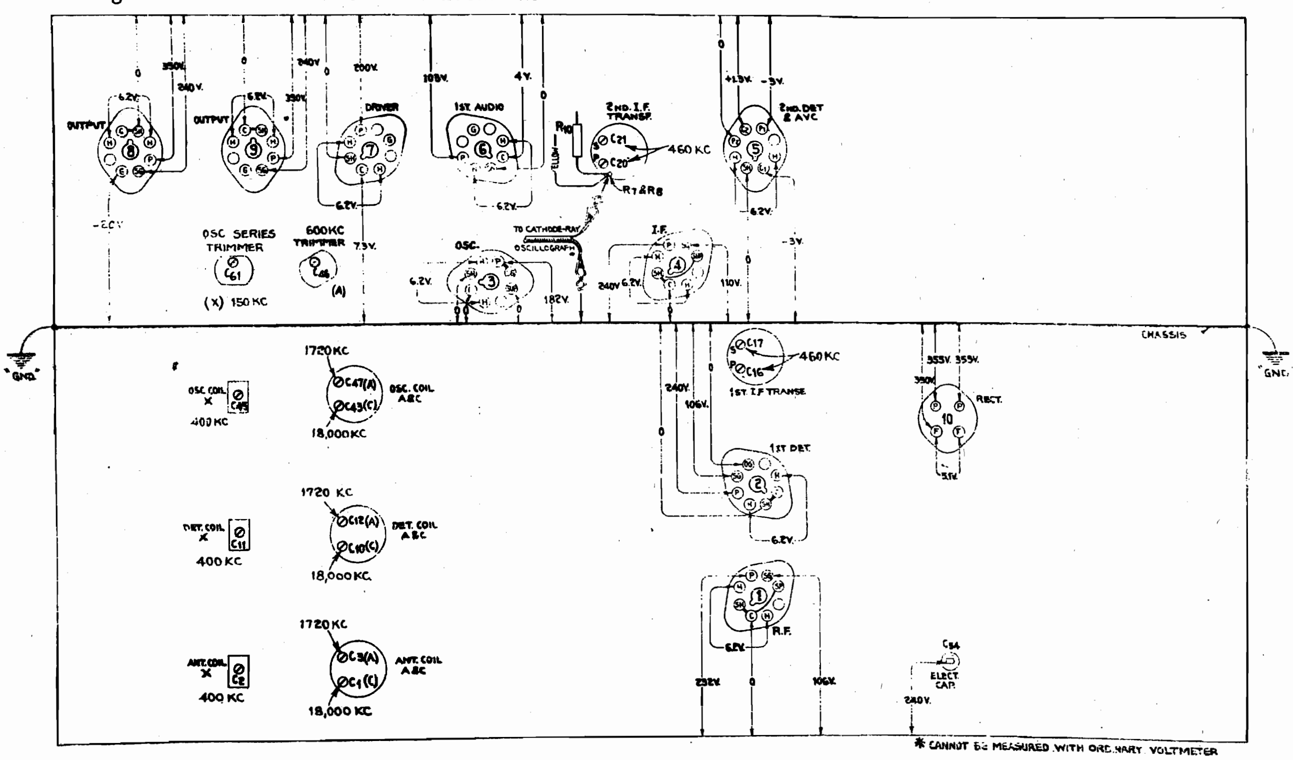

Figure 6—Trimmer Locations and Radiotron Socket Voltages
Measured at 115 Volts A.C.—No Signal—Volume Control Maximum

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CIRCUIT ARRANGEMENT

The Superheterodyne principle of operation forms the basis of the circuit design. A single, tuned r-f stage is used ahead of the first detector. The functions of oscillator and detector are performed by two separate tubes. One i-f stage is employed and designed to operate at 460 kc. The combined second detector and a.v.c. stage uses an RCA-6H6 double diode. The audio system consists of two single amplifier stages working in cascade with a push-pull power output stage. The loudspeaker is an electrodynamic type, receiving its field supply from the rectifier and filter system and simultaneously acting as a filter reactor. Full wave rectification is performed in the RCA-5Z3 tube. The outstanding features of electrical design are concerned with the following:—

Tuned Circuits

A total of seven circuits are tuned to provide gain and selectivity to the incoming signal. The variable gang condenser resonates the antenna transformer secondary, the detector transformer secondary and the oscillator coil. Alignment trimmers are included for each of these same circuits. Additional trimmers are used on the i-f transformers, tuning both the secondaries and primaries to 460 kc. There are separate groups of antenna, detector and oscillator coils for each of the tuning ranges. They are placed into operation by means of a rugged rotary switch.

First Detector

This stage has unusually good high frequency mixing efficiency. The tube used, an RCA-6L7, is a new hexode type. The signal is supplied to the first control grid and the oscillator is fed in on a second control grid, a screen grid separating the two. The arrangement of the grids prevents degenerative difficulties, particularly at the higher frequencies. The second grid is direct-connected to the cathode of the oscillator tube and has no d-c bias.

Oscillator

The oscillator circuit is worthy of careful study inasmuch as it is different from the type ordinarily employed. It has self-stabilizing properties which are very advantageous for short wave operation. The generated frequency remains substantially constant when the circuit is affected by variation of line voltage and other similar influences. Output also remains uniform over the individual tuning ranges. The switching of the tuning coils is arranged so as to short those not in use in order to prevent absorption or any reactive effects in the particular band being tuned.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f system is detected by an RCA-6H6 double diode tube. The audio frequency secured by this process is passed on to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal, is used for automatic volume control. This voltage, which develops across resistors R-7 and R-8, is applied as automatic control grid bias to the r-f, first detector and i-f tubes through suitable resistance-capacitance filter circuits. The second diode of the RCA-6H6 is used to supply residual bias for these controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current, which flows through resistors R-7, R-8 and R-9, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias diode ceases to draw current and the a.v.c. diode takes over the biasing function. The cathode and anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c. controlled tubes when no signal is being received.

Audio System

Manual volume control of the detected signal is effected by an acoustically tapered potentiometer in the grid circuit of the first a-f stage. This control has tone compensating filters connected to two points thereon. These filters effect the correct aural balance at different volume settings. A music-speech switch (low frequency tone control) is associated with one of the compensation filters. The purpose of this control is to make speech reproduction more intelligible and to reduce hum obtained from stray modulation on a carrier. The driver stage of the audio system uses an RCA-6C5 which is resistance coupled to the first a-f tube and transformer coupled into the push-pull power output stage. High-frequency tone control is obtained by use of a condenser and variable resistor in series across the grids of the output tubes. The field coil serves as a reactor in the high voltage filter circuit.

Rectifier

The a-c voltage supplied by the power line is stepped up by the transformer T-1 and applied to the 5Z3 full wave rectifier for production of high voltage d.c. to be used for plate and bias supply. Simultaneously, a step down takes place in the same transformer to provide the low voltage necessary for heaters. The current obtained from the rectifier is thoroughly filtered by large capacitors and the field coil reactance.

SERVICE DATA

Alignment Procedure

Ten alignment trimmers are provided in the r-f, first detector and oscillator tuning system and four are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with definite precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

The **Tuning Wand** consists of a bakelite rod having a small brass cylinder at one end and a core of finely divided iron at the other. It may be inserted into a tuned coil while a signal of the normal resonant frequency is being supplied to such coil to obtain an indication of the tuning. Holes are provided at the top of the r-f shield cans for entrance of the Wand. The presence of either end of the Wand will cause a change in tuning which will be indicated at the receiver output as an increase or decrease in signal level. If there is a decrease of output when either end is inserted, the tuning is correct and will require no adjustment. However should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output while the iron end causes a decrease, reduction of inductance will be necessary to place the circuit in alignment. This is equivalent to decreasing the trimmer concerned. The following tabulation gives the various changes and the adjustments required:—

WAND	SIGNAL	TRIMMER
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

CATHODE-RAY ALIGNMENT

Equipment

A standard source of alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by Figure 6. Each must be aligned to a basic frequency of **460 kc.** The last transformer must be aligned firstly and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the juncture of R-7 and R-8, as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a straight line trace completely across the screen. Place the timing control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of spot.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to **460 kc.** and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-20 and C-21 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off." Change the timing control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of *approximately* 540 kc. The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector

RCA MFG. CO., INC.

tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system.

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

Band A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the test Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-47, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and retune the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-47, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer, C-46, should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment, the trimmer C-47 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-46.

Band X

(a) Disconnect the Frequency Modulator and tune the test Oscillator (Modulation "On") to **400 kc.** Place the receiver range switch to its Band X position and tune the station selector to 400 kc. Turn Oscillograph timing control to "Int." Then align trimmers C-45, C-11 and C-2 for maximum indication at the Oscillograph. Place the Frequency Modulator in operation and attach it to the test Oscillator. Change the Oscillograph timing to "Ext." Increase Oscillator frequency (Modulation "Off") until the forward and reverse waves appear and become coincident at their highest point, approximately at 462 kc. These images may be made to remain stationary by manipulation of the Oscillograph range switch (No. 2 position) and frequency control (mid-position). Readjust trimmers C-45, C-11 and C-2 to give maximum amplitude and complete coincidence of the waves.

(b) Change the test Oscillator to **150 kc.** (Frequency Modulator disconnected). Tune this signal on the receiver, disregarding the dial reading at which it is best received. Then interconnect the Frequency Modulator and Oscillator. Retune the latter to the point at which the two similar waves appear on the screen. Adjust trimmer C-61 for maximum amplitude of the waves. Rocking of the tuning condenser will not be necessary for this operation as such is duplicated by the Frequency Modulator. Realign C-45 as in (a) to correct for any error caused by the adjustment of C-61.

Band C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to the same frequency (modulation "On" and Frequency Modulator disconnected) and regulate its output to the level required for convenient observation. Adjust the trimmer C-43 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to **17,080 kc.** The **18,000 kc.** signal of the Oscillator will be received at this point if the adjustment of C-43 has been properly made by using the position of least capacitance which gives maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.**, re-align C-43 if necessary, and then adjust the detector and antenna trimmers, C-10 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode-Ray Oscillograph will require the use of a standard test Oscillator, such as that recommended above, for the source of signals and means of indication for the output. The RCA Neon Output Indicator, Stock No. 4317, will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

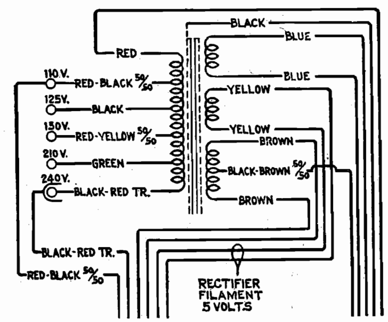

Figure 7—Universal Power Transformer Connections

Pri. Res.—7.42 ohms, total
Sec. Res.—274 ohms, total

I-F Alignment

Connect the test Oscillator to the control grid cap of the i-f tube. Advance the volume control of the receiver to its full-on position. Tune the test Oscillator accurately to **460 kc.** and align the trimmers C-20 and C-21 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmers C-16 and C-17 for maximum receiver output.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna-ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal.

Band A—This band should be aligned by supplying a **1720 kc.** signal to the receiver, tuning the station selector to a dial reading of **1720** and adjusting the trimmers C-47, C-12 and C-3 to produce maximum receiver output. The Oscillator should then be shifted to **600 kc.** and the receiver tuned to resonate this signal, disregarding the reading at which it is best received. Trimmer C-46 must then be adjusted, simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-46.

Band X—This band must be aligned at **400 kc.** and **150 kc.** Tune the test Oscillator to **400 kc.** and turn the receiver dial to the same reading. Adjust trimmers C-45, C-11 and C-2 for maximum (peak) receiver output. Then shift the Oscillator to **150 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Adjust trimmer C-61, simultaneously rocking the tuning condenser backward and forward through the signal, until maximum receiver output results from the combined operations. Repeat the alignment of C-45 as above to correct for any change which may have been caused by the adjustment of C-61.

Band C—Change the receiver so that it is operative and the dial reads **18,000 kc.** on the "C" Band. Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-43 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at **17,080 kc.** by shifting the receiver tuning. If it is received at such a point, the trimmer C-43 has been correctly adjusted to the right peak. *No adjustments are to be made during this check.* Tune the receiver back to the **18,000 kc.** dial marking, readjust C-43 if necessary, and then tune the detector and antenna capacitors C-10 and C-1 for maximum receiver output. No further adjustments are necessary.

Universal Transformer

The transformer used on some models of this receiver is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 7. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage being used. Note that a 110 volt tap is brought out separately for supplying a phonograph motor.

MODEL T10-3
Parts List

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RECEIVER ASSEMBLIES

4427	Bracket—High or low frequency tone control or volume control mounting bracket.	$0.18
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
11223	Capacitor—Adjustable capacitor (C46)	.46
5241	Capacitor—Adjustable capacitor (C61)	.40
11292	Capacitor—22 MMfd. (C9)	.24
11289	Capacitor—50 MMfd. (C8)	.26
11291	Capacitor—115 MMfd. (C50)	.24
11290	Capacitor—400 MMfd. (C60)	.25
11269	Capacitor—800 MMfd. (C59)	.30
3784	Capacitor—900 MMfd. (C31)	.30
11316	Capacitor—1225 MMfd. (C26)	.40
11287	Capacitor—4500 MMfd. (C58)	.30
5107	Capacitor—.0025 Mfd. (C62, C63)	.16
4907	Capacitor—0.005 Mfd. (C40, C41)	.38
4868	Capacitor—0.005 Mfd. (C33)	.20
4624	Capacitor—0.01 Mfd. (C30)	.54
4937	Capacitor—0.01 Mfd. (C39)	.25
11315	Capacitor—0.015 Mfd. (C38)	.20
4836	Capacitor—0.05 Mfd. (C4, C13, C18, C23)	.30
11327	Coil—Oscillator coil—X band—(L14, L23, C45)	$1.44
11277	Compensating Pack—Comprising one 0.015 Mfd., one 0.035 Mfd. capacitor, one 27,000 ohm and one 8200 ohm resistor—(C25, C28, R12, R13)	.92
11214	Condenser—Three gang variable tuning condenser—(C5, C14, C48)	4.20
11205	Volume Control—(R14)	1.30
11219	Tone Control—High frequency tone control—(R22)	.90
8041	Plate—I. F. or R. F. coil shield locking plate with screw—Package of 2	.12
11220	Resistor—Voltage divider resistor—comprising one 3900 ohm and one 4200 ohm section—(R31, R32)	.84
11221	Resistor—Voltage divider resistor—comprising one 50 ohm, one 28 ohm and one 195 ohm section—(R28, R29, R30)	.48
5112	Resistor—1000 Ohm—Carbon type—1/4 Watt—(R2)—Package of 5	1.00
3706	Resistor—1800 Ohm—Carbon type—1/4 Watt—(R15)—Package of 5	1.00
5159	Resistor—2200 Ohm—Carbon type—1/4 Watt—(R20)—Package of 5	1.00
5175	Resistor—5600 Ohm—Carbon type—1/2 Watt—(R21)—Package of 5	1.00
2731	Resistor—10,000 Ohm—Carbon type—1 Watt—(R25)—Package of 5	1.10
11305	Resistor—22,000 Ohm—Carbon type—1/4 Watt—(R16, R17)—Package of 5	1.00
11300	Resistor—33,000 Ohm—Carbon type—1/10 Watt—(R24)—Package of 5	.75
5033	Resistor—33,000 Ohm—Carbon type—1 Watt—(R23)—Package of 5	1.10
3118	Resistor—100,000 Ohm—Carbon type—1/4 Watt—(R1, R3, R5, R6)—Package of 5.	1.00
5027	Resistor—150,000 Ohm—Carbon type—1/4 Watt—(R19)—Package of 5	1.00
11151	Resistor—2.2 Megohms—Carbon type—1/4 Watt—(R9)—Package of 5	1.00
5249	Shield—R. F. coil shield	.20
11273	Shield—Radiotron shield	.25
5250	Shield—I. F. Transformer shield	.22
11222	Socket—Dial lamp socket	.18
4794	Socket—4-contact Radiotron socket	.15
11197	Socket—6-contact Radiotron socket	.14
11198	Socket—7-contact Radiotron socket	.15
5224	Switch—Low frequency tone control switch and power switch—(S11, S13)	1.00
11236	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10)	2.44
5238	Terminal—Antenna terminal assembly	.14
11218	Transformer—Audio driver transformer—(T2)	2.58
11216	Transformer—First intermediate frequency transformer—(L16, L17, C16, C17)	2.15
11217	Transformer—Second intermediate frequency transformer—(L18, L19, C20, C21, C22, R7, R8)	3.10
11213	Transformer—Power transformer—105-125-150-210-250 volts—40-60 cycles	5.10
11212	Transformer—Power transformer—105-125 volts—25-60 cycles	7.18
4885	Capacitor—0.1 Mfd. (C7, C19, C27, C52)	$0.28
4841	Capacitor—0.1 Mfd. (C6)	.22
5170	Capacitor—0.25 Mfd. (C32)	.25
11203	Capacitor—10 Mfd. (C53)	1.18
5212	Capacitor—18 Mfd. (C54)	1.16
11215	Capacitor pack—Comprising one 16 Mfd., two 10 Mfd., and two 8 Mfd. capacitors (C29, C35, C36, C55, C56)	3.85
11201	Clamp—Cable clamp—located near variable tuning condenser—Package of 5	.20
11272	Clamp—Cable clamp—located above antenna terminal	.10
4693	Clamp—Electrolytic capacitor clamp—for stock #11215	.15
5215	Coil—Antenna coil—A and C bands (L1, L2, L5, L6, C1, C3)	2.32
11325	Coil—Antenna coil—X band (L3, L4, C2)	1.56
5216	Coil—Detector coil—A and C bands (L7, L8, L11, L12, C10, C12)	2.34
11326	Coil—Detector coil—X band (L9, L10, C11)	1.60
5217	Coil—Oscillator coil—A and C bands (L13, L15, C43, C47)	2.20

DRIVE ASSEMBLIES

4362	Arm—Band indicator operating arm	.28
10194	Ball—Steel ball—Package of 20	$0.25
4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, balls, ring, spring and washers assembled	1.00
11333	Dial—Station selector dial scale	.60
11227	Drive—Variable tuning condenser drive complete—less dial scale	2.08
11228	Gear—Vernier pointer drive gear	.42
4827	Gear—Spring gear assembly	1.25
11303	Indicator	.22
11226	Indicator—Band indicator pointer assembly—comprising indicator, arm, link and stud	.20
4475	Indicator—Station selector indicator	.18
4340	Lamp—Dial lamp—Package of 5	.60
3993	Screw—No. 6-32-5/32" set screw—for band indicator operating arm—Package of 10	.25
4669	Screw—No. 8-32-5/32" Square head set screw—for tuning condenser shaft—Package of 10	.25
4377	Spring—Band indicator operating arm spring—Package of 5	.25
4378	Stud—Band indicator operating arm stud assembly—Package of 5	.25

MISCELLANEOUS ASSEMBLIES

11337	Escutcheon—Station selector escutcheon	.70
6614	Glass—Station selector dial glass	.30
11346	Knob—Station selector knob—Package of 5	.75
11347	Knob—Volume control, range switch, tone control or power switch knob—Package of 5	.75
4678	Ring—Spring retaining ring for station selector dial glass—Package of 5	.34
11210	Screw—Chassis mounting screw assembly—Package of 4	.28
11348	Screw—No. 8-32-7/16" Headless, cupped point, set screw for knob, Stock #11346—Package of 10	.32
11349	Spring—Retaining spring for knob, stock #11347—Package of 5	15

REPRODUCER ASSEMBLIES

11232	Board—Terminal board with two lead wire clips	.18
11231	Bolt—Yoke and core assembly bolt and nut	.16
8060	Bracket—Mounting bracket for output transformer and connector	.14
11304	Cable—Reproducer cable—complete with female connector	.80
11234	Coil—Field Coil—(L22)	2.15
11233	Coil—Neutralizing coil	.30
11235	Cone—Reproducer cone (L21)—Package of 5	3.50
5040	Connector—4-prong female connector socket for reproducer cable	.25
5039	Connector—4-prong male connector plug for reproducer	.25
11257	Clamp—Cone center suspension clamping nut and screw assembly—Package of 5	.25
9617	Reproducer—Complete	6.60
11229	Transformer—Output transformer—(T3)	1.66
11230	Washer—Binders board "C" washer—used to hold field coil securely—Package of 5.	.18

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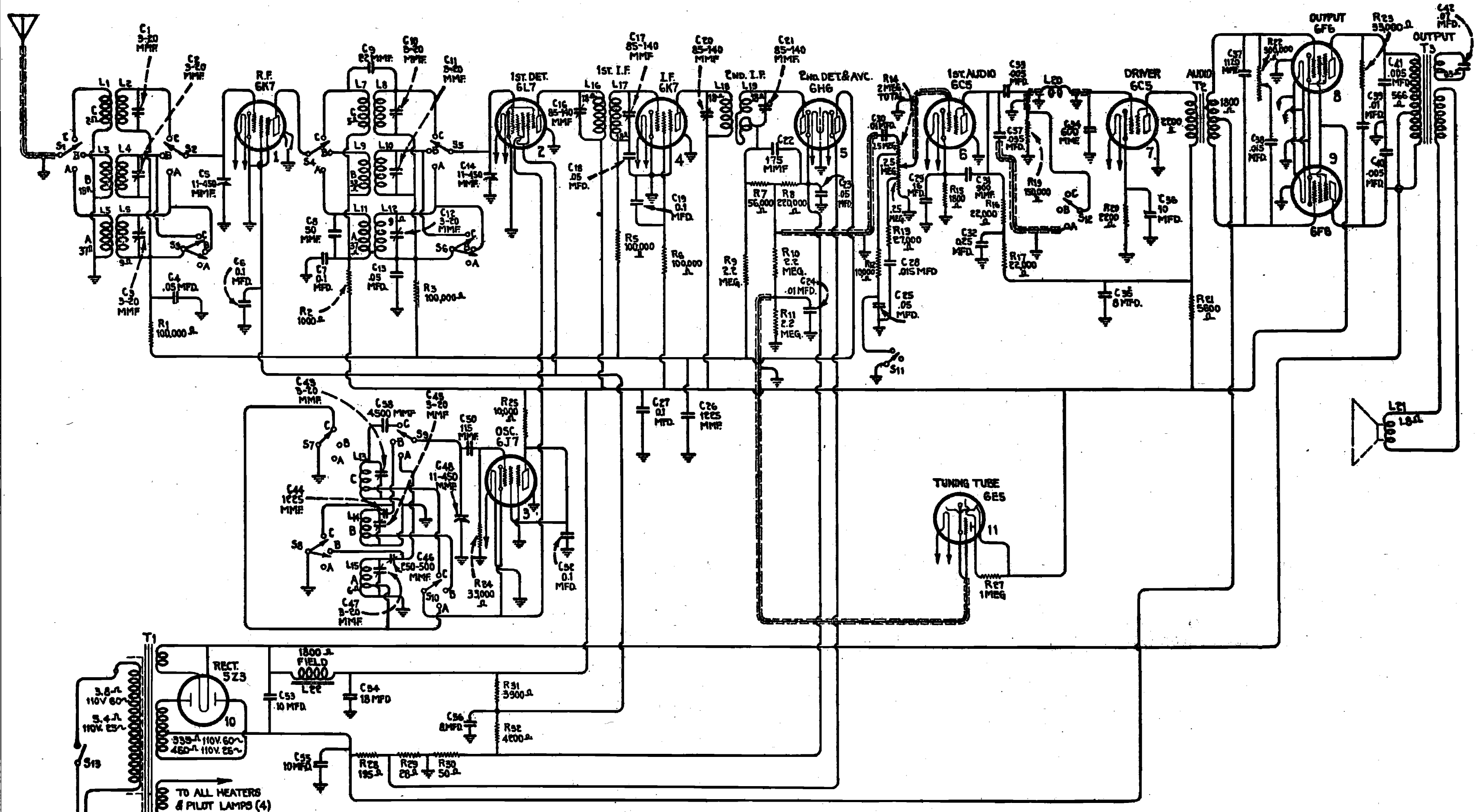


Figure 1—Schematic Circuit Diagram

(On some instruments—C-33 is .035 mfd. and C-57 is removed.)

POWER RATINGS

Rating A..........105—125 volts, 50—60 cycles
Rating B..........105—125 volts, 25—60 cycles
Rating C..........100—130/140—160/195—250 volts, 40—60 cycles
Power Consumption.......... 135 watts

MISCELLANEOUS

Undistorted Output.......... 8.5 watts
Maximum Output.......... 11.5 watts
Loudspeaker..........Electrodynamic—12 inch
Voice Coil Impedance..........7.5 ohms at 400 cycles

Intermediate Frequency..........460 kc.

FREQUENCY RANGES

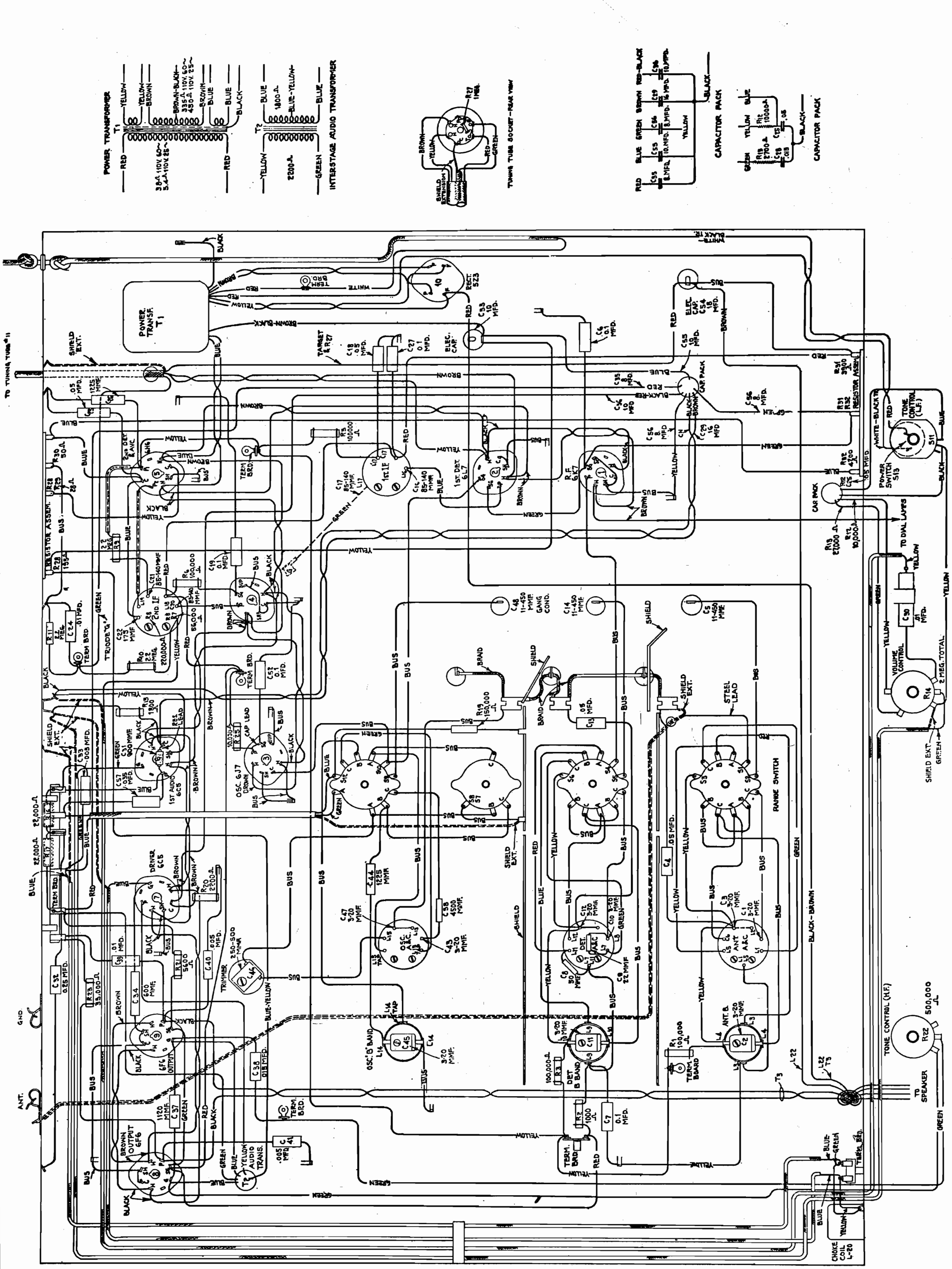
Band A.......... 540 kc.— 1800 kc.
Band B.......... 1800 kc.— 6000 kc.
Band C.......... 6000 kc.—18000 kc.

ALIGNMENT FREQUENCIES

Band A.....600 kc. (osc.), 1720 kc. (osc., ant., det.)
Band B..........6132 kc. (osc., ant., det.)
Band C..........18000 kc. (osc., ant., det.)

MODEL C11-1
Chassis Wiring

RCA MFG. CO., INC.



MODEL C11-1
Trimmers, Voltage
Speaker Data
Alignment Connections

RCA MFG. CO., INC.

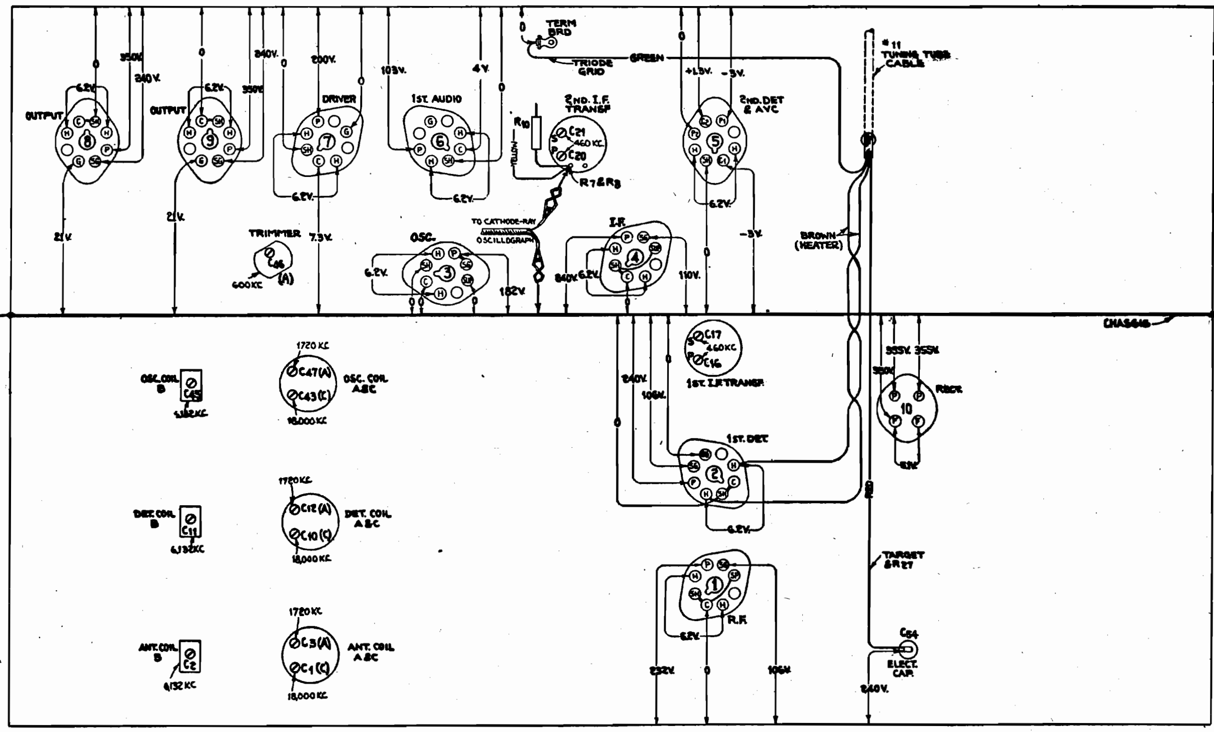


Figure 6—Trimmer Locations and Radiotron Socket Voltages
Measured at 115 Volts A.C.—No Signal—Volume Control Maximum

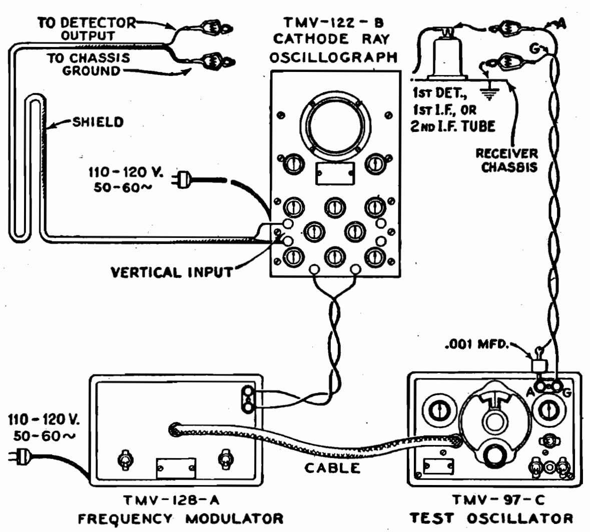


Figure 5—Alignment Apparatus Connections

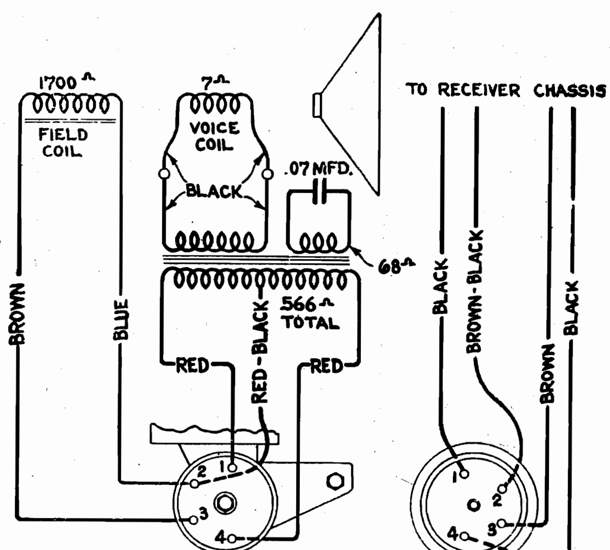


Figure 3—Loudspeaker Wiring

MODEL C11-1
Circuit Data
Alignment, Socket

RCA MFG. CO., INC.

Tuning Condenser

The variable tuning condenser is supported by a new design of shock-proof mount which has been developed by our engineers to prevent chassis vibration from producing audio frequency howl.

Loudspeaker

A super-sensitive 12 inch electrodynamic speaker is employed. It is correctly adapted to the cabinet design to assure the best possible acoustic performance. Electrical connection is made from the speaker to the chassis through a plug and connector attachment, permitting easy removal for servicing.

Dial Drive

The dial drive and station indicator system are of new and unique design. Five individual dial scales, each with full 180 degree band spread, are provided, one for use on each band. The scales are eccentrically arranged on a rotary disc and adapted to operate in connection with the band change switch so that as the switch is shifted to a certain band, the corresponding dial scale rotates into position. For other positions of the band switch, a similar scale selection takes place, there being only one scale visible at a time. The driving mechanism for the dial and condenser has tuning ratios of 10 to 1 and 50 to 1. Control may be interchanged between these two ratios by push-in operation of a positive action clutch which is actuated by the tuning knob. From the clutch and ratio controlling mechanism, the drive system interlinks with the tuning condenser, main dial pointer and vernier dial pointer through means of fibre and brass gears. The ratio of vernier rotation to the main pointer is 20 to 1. An intermediate gear is used in the system to reduce gear back-lash. This gear is suspended in position with two tension springs which maintain the proper mesh at all times. A flexible coupling disc is used between the drive and the condenser shaft.

CIRCUIT ARRANGEMENT

The Superheterodyne principle of operation forms the basis of the circuit design. A single, tuned r-f stage is used ahead of the first detector. The functions of oscillator and detector are performed by two separate tubes. One i-f stage is employed and designed to operate at 460 kc. The combined second detector and a.v.c. stage uses an RCA-6H6 double diode. The audio system consists of two single amplifier stages working in cascade with a push-pull power output stage. The loudspeaker is an electrodynamic type, receiving its field supply from the rectifier and filter system and simultaneously acting as a filter reactor. Full wave rectification is performed in the RCA-5Z3 tube. The outstanding features of electrical design are concerned with the following:—

Tuned Circuits

A total of seven circuits are tuned to provide gain and selectivity to the incoming signal. The variable gang condenser resonates the antenna transformer secondary, the detector transformer secondary and the oscillator coil. Alignment trimmers are included for each of these same circuits. Additional trimmers are used on the i-f transformers, tuning both the secondaries and primaries to 460 kc. There are separate groups of antenna, detector and oscillator coils for each of the tuning ranges. They are placed into operation by means of a rugged rotary switch.

First Detector

This stage has unusually good high frequency mixing efficiency. The tube used, an RCA-6L7, is a new hexode type. The signal is supplied to the first control grid and the oscillator is fed in on a second control grid, a screen grid separating the two. The arrangement of the grids prevents degenerative difficulties, particularly at the higher frequencies. The second grid is direct-connected to the cathode of the oscillator tube and has no d-c bias.

Oscillator

The oscillator circuit is worthy of careful study inasmuch as it is different from the type ordinarily employed. It has self-stabilizing properties which are very advantageous for short wave operation. The generated frequency remains substantially constant, the circuit being unaffected by variation of line voltage and other similar influences. Output also remains uniform over the individual tuning ranges. The switching of the tuning coils is arranged so as to short those not in use in order to prevent absorption or any reactive effects in the particular band being tuned.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f system is detected by an RCA-6H6 double diode tube. The audio frequency secured by this process is passed on to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal, is used for automatic volume control. This voltage, which develops across resistors R-7 and R-8, is applied as automatic control grid bias to the r-f, first detector and i-f tubes through suitable resistance-capacitance filter circuits. The second diode of the RCA-6H6 is used to supply residual bias for these controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current, which flows through resistors R-7, R-8 and R-9, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias diode ceases to draw current and the a.v.c. diode takes over the biasing function. The cathode and anode of the signal-a.v.c diode have positive potential in respect to chassis-ground and cathodes of the a.v.c. controlled tubes when no signal is being received.

Audio System

Manual volume control of the detected signal is effected by an acoustically tapered potentiometer in the grid circuit of the first a-f stage. This control has tone compensating filters connected to two points thereon. These filters effect the correct aural balance at different volume settings. A music-speech switch (low frequency tone control) is associated with one of the compensation filters. The purpose of this control is to make speech reproduction more intelligible and to reduce hum obtained from stray modulation on a carrier. The driver stage of the audio system uses an RCA-6C5 which is resistance coupled to the first a-f tube and transformer coupled into the push-pull power output stage.

Tuning Indicator

A cathode-ray tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube is of new design and comprises an amplifier section and a cathode-ray section built in the same glass envelope. The cathode-ray section consists of a conically shaped luminescent screen, upon which a pattern is formed by an effect of the detected signal after said effect has been amplified by the amplifier section which is fed from the detector diode circuit. The size of the pattern is determined by the strength of the signal voltage, so that any change of tuning may be readily observed in order to facilitate tuning to exact resonance.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when such develops. The ratings of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and the Replacement Parts List. The coils, reactors, and transformer windings are rated in terms of their d-c resistances only and where the resistance is less than one ohm, no rating is given.

Alignment Procedure

Ten alignment trimmers are provided in the r-f, first detector and oscillator tuning system and four are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

Two methods of alignment are applicable. One utilizes a Cathode-Ray Oscillograph as a means of output indication and the other follows former procedure where a glow type indicator or meter is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural method, but each adjustment can be made with definite precision. Both methods are hereinafter outlined so that alignment operations may be made according to the equipment available.

It is wise to determine the necessity for alignment as well as the direction of misalignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

The Tuning Wand consists of a bakelite rod having a small brass cylinder at one end and a core of finely divided iron at the other. It may be inserted into a tuned coil while a signal of the normal resonant frequency is being supplied to such coil to obtain an indication of the tuning. Holes are provided at the top of the r-f shield cans for entrance of the Wand. The presence of either end of the Wand will cause a change in tuning which will be indicated at the receiver output as an increase or decrease in signal level. If there is a decrease of output when either end is inserted, the tuning is correct and will require no adjustment. However should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output while the iron end causes a decrease, reduction of inductance will be necessary to place the circuit in alignment. This is equivalent to decreasing the trimmer concerned. The following tabulation gives the various changes and the adjustments required:—

WAND	SIGNAL	TRIMMER
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

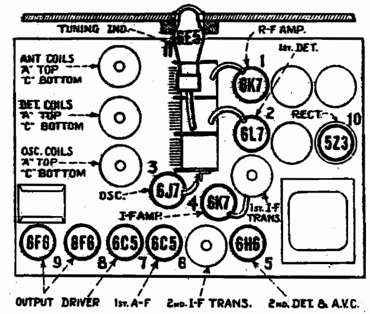


Figure 4—Coil and Radiotron Locations

CATHODE-RAY ALIGNMENT

Equipment

A standard source of alignment frequencies is required. Such a source should consist of an RCA Full Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Stock No. 9545 Cathode-Ray Oscillograph. An RCA Stock No. 9558 Frequency Modulator will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by Figure 6. Each must be aligned to a basic frequency of 460 kc. The last transformer must be aligned firstly and the first transformer aligned secondly. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each transformer and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The proper point of connection of the Oscillograph is with its vertical "high" input terminal attached to the juncture of R-7 and R-8, as illustrated in Figure 6, and with the "0" or ground terminal to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as shown by Figure 5. A .001 mfd. capacitor installed in series with the Oscillator "Ant." lead will prevent the voltages of the stage under alignment from becoming upset. The vertical "A" amplifier should be "On" for the ensuing adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a straight line trace completely across the screen. Place the timing control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of spot.

RCA MFG. CO., INC.

(b) Attach the output of the test Oscillator between the control grid cap of the RCA-6K7 i-f tube and chassis ground as shown typically by Figure 5. Tune the Oscillator to **460 kc.** and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern, on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-20 and C-21 of the second i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the special shielded patch cord. Figure 5 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off." Change the timing control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of *approximately 540 kc.* The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-20 and C-21 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as in (c), change the Oscillator output to the control grid cap of the RCA-6L7 first detector tube. Then adjust the first i-f transformer trimmers C-16 and C-17 so that the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the overall tuning characteristic of the i-f system

R-F Trimmer Adjustments

Locations of the various antenna, detector and oscillator coil trimmers are shown by Figure 6. The test Oscillator should be removed from connection with the i-f system and its output connected to the antenna-ground terminals of the receiver. No changes are to be made in the connections of the Oscillograph at the second detector. During the following adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate the broadness of tuning that would result from a.v.c. action on a stronger signal. Proceed with the adjustments as follows:—

CALIBRATION

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

BAND A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the test Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-47, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 5. Turn the modulation switch of the Oscillator to "Off" and retune the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-47, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer, C-46, should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment, the trimmer C-47 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-46.

BAND B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of **6132 kc.** Set the test Oscillator to this same frequency (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." timing. Then adjust the oscillator trimmer, C-45, to the point at which maximum amplitude of the image is obtained. Two positions will be found for this trimmer which gives such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at **5212 kc.** on the dial if the adjustment of C-45 has been properly made. An increase in test Oscillator output may be necessary for this test. *Its frequency should not be changed from* **6132 kc.** *nor any trimmer adjustments made on the receiver.*

(b) Return the station selector to the **6132 kc.** reading and align the detector, and antenna coil trimmers, C-11 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on this band.

BAND C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to the same frequency (modulation "On" and Frequency Modulator disconnected) and regulate its output to the level required for convenient observation. Adjust the trimmer C-43 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of the proper "image" signal by tuning the receiver to **17,080 kc.** The **18,000 kc.** signal of the Oscillator will be received at this point if the adjustment of C-43 has been properly made by using the position of least capacitance which gives maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.**, re-align C-43 if necessary, and then adjust the detector and antenna trimmers, C-10 and C-1, for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on this band.

ALIGNMENT WITH OUTPUT METER

To align the receiver by means of an output indicator other than a Cathode-Ray Oscillograph will require the use of a standard test Oscillator, such as that recommended above, for the source of signals and

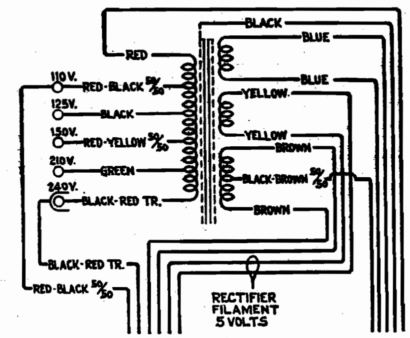


Figure 7—Universal Power Transformer Connections

Pri. Res.—7.42 ohms, total
Sec. Res.—274 ohms, total

means of indication for the output. The RCA Neon Output Indicator, Stock No. 4317, will be found very satisfactory for such use. It should be connected across the voice coil circuit of the loudspeaker or across the output transformer primary.

I-F Alignment

Connect the test Oscillator to the control grid cap of the i-f tube. Advance the volume control of the receiver to its full-on position. Tune the test Oscillator accurately to **460 kc.** and align the trimmers C-20 and C-21 to give maximum receiver output. Regulate the Oscillator output during this adjustment so that the output indication is as small as can be conveniently observed. After completing the adjustments of these trimmers, re-connect the Oscillator so that it will feed into the control grid circuit of the RCA-6L7 first detector. Then tune the first i-f transformer trimmers C-16 and C-17 for maximum receiver output.

R-F Alignment

After completing the i-f adjustments, it is advisable to correct the line-up of the circuits ahead of the first detector. The test Oscillator should be connected to the antenna-ground terminals of the receiver and the manual volume control turned to its maximum position. For each adjustment, the Oscillator output should be maintained as low as possible in order to avoid broadness of tuning which would result from a.v.c. action on a stronger signal.

Band A—This band should be aligned by supplying a **1720 kc.** signal to the receiver, tuning the station selector to a dial reading of **1720** and adjusting the trimmers C-47, C-12 and C-3 to produce maximum

MODEL C11-1
Alignment, Part 3
Parts List

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receiver output. The Oscillator should then be shifted to **600 kc.** and the receiver tuned to resonate this signal, disregarding the reading at which it is best received. Trimmer C-46 must then be adjusted, simultaneously while rocking the station selector backward and forward through the signal until the maximum output results from the combined operations. C-47 should be rechecked to assure that its adjustment has not changed because of the trimming of C-46.

Band B—This band must be aligned at **6132 kc.** by tuning the test Oscillator to such a frequency and turning the station selector to the **6132 kc.** dial reading. Then tune the trimmer C-45 to produce maximum receiver output, using the setting of least capacitance which causes same. The presence of the proper "image" may be checked by tuning the receiver to **5212 kc.** at which point the **6132 kc.** signal will be heard if the trimmer C-45 has been properly set to the position of least capacitance for maximum (peak) output. It may be necessary to increase the Oscillator output for this check. *No adjustments are to be made.* Return the station selector to the **6132 kc.** dial marking and trim capacitors C-11 and C-2 for maximum receiver output. No other adjustments are necessary on Band B.

Band C—Change the receiver so that it is operative and the dial reads **18,000 kc.** on the "C" Band. Tune the test Oscillator to this same frequency. Then adjust the oscillator trimmer C-43 to produce maximum (peak) output. Two positions of this trimmer will be found which conform with this requirement. The one of least capacitance is correct. Check for the presence of "image" response at **17,080 kc.** by shifting the receiver tuning. If it is received at such a point, the trimmer C-43 has been correctly adjusted to the right peak. *No adjustments are to be made during this check.* Tune the receiver back to the **18,000 kc.** dial marking, readjust C-43 if necessary, and then tune the detector and antenna capacitors C-10 and C-1 for maximum receiver output. No further adjustments are necessary.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to chassis on Figure 6 will serve to assist in the location of causes for faulty operation. Each value as specified should hold within + 20% when the receiver is normally operative at its rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance becomes comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each reading is chosen as high as possible consistent with good readability.

Universal Transformer

The transformer used on some models of this receiver is adaptable to several ranges of voltage as given under Rating C of Electrical Specifications. Its schematic and wiring are shown by Figure 7. Terminals are provided at the top of the transformer case for changing the primary connections to suit the voltage being used. Note that a 110 volt tap is brought out separately for supplying a phonograph motor.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—High or low frequency tone control or volume control mounting bracket	$0.18
5237	Bushing—Variable condenser mounting bushing assembly—Package of 3	.43
11223	Capacitor—Adjustable capacitor (C46)	.46
11292	Capacitor—22 MMfd. (C9)	.24
11289	Capacitor—50 MMfd. (C8)	.26
11291	Capacitor—115 MMfd. (C50)	.24
11317	Capacitor—600 MMfd. (C34)	.30
3784	Capacitor—900 MMfd. (C31)	.30
4409	Capacitor—1120 MMfd. (C37)	.35
11288	Capacitor—1225 MMfd. (C44)	.30
11316	Capacitor—1225 MMfd. (C26)	.40
11287	Capacitor—4500 MMfd. (C58)	.30
4907	Capacitor—0.005 Mfd. (C40, C41)	.38
4868	Capacitor—0.005 Mfd. (C33)	.20
4858	Capacitor—0.01 Mfd. (C24)	.25
4624	Capacitor—0.01 Mfd. (C30)	.54
4937	Capacitor—0.01 Mfd. (C39)	.25
11315	Capacitor—0.015 Mfd. (C38)	.20
5196	Capacitor—0.035 Mfd. (C57)	.18
4836	Capacitor—0.05 Mfd. (C4, C13, C18, C23)	.30
4885	Capacitor—0.1 Mfd. (C7, C19, C27, C52)	.28
4841	Capacitor—0.1 Mfd. (C6)	.22

Stock No.	Description	List Price
5170	Capacitor—0.25 Mfd. (C32)	$0.25
11203	Capacitor—10 Mfd. (C53)	1.18
5212	Capacitor—18 Mfd. (C54)	1.16
11215	Capacitor pack—Comprising one 16 Mfd., two 10 Mfd., and two 8 Mfd. capacitors (C29, C35, C36, C55, C56)	3.85
11318	Capacitor pack—Comprising one .015 Mfd., one .05 Mfd., one 10,000 Ohm resistor and one 27,000 Ohm resistor (C25, C28, R12, R13)	1.30
11201	Clamp—Cable clamp—located near variable tuning condenser—Package of 5	.20
11272	Clamp—Cable clamp—located above antenna terminal	.10
4693	Clamp—Electrolytic capacitor clamp—for stock #11215	.15
5215	Coil—Antenna coil—A and C bands (L1, L2, L5, L6, C1, C3)	2.32
5245	Coil—Antenna coil—B band (L3, L4, C2)	1.58
11320	Coil—Choke coil (L20)	1.00
5216	Coil—Detector coil—A and C bands (L7, L8, L11, L12, C10, C12)	2.34
5246	Coil—Detector coil—B band (L9, L10, C11)	1.62
5217	Coil—Oscillator coil—A and C bands (L13, L15, C43, C47)	2.20

REPLACEMENT PARTS (Continued)

Stock No.	Description	List Price
5247	Coil—Oscillator coil—B band (L14, C45)	$1.44
5214	Condenser—Three gang variable tuning condenser—(C5, C14, C48)	4.42
11205	Volume control (R14)	1.30
11219	Tone Control—High frequency tone control (R22)	.90
5226	Lamp—Pilot lamp—Package of 5	.70
8041	Plate—I.F. or R.F. coil shield locking plate with screw—Package of 2	.12
11220	Resistor—Voltage divider resistor—comprising one 3900 Ohm and one 4200 Ohm section (R31, R32)	.84
11221	Resistor—Voltage divider resistor—comprising one 50 Ohm, one 28 Ohm and one 195 Ohm section (R28, R29, R30)	.48
5112	Resistor—1000 Ohm—Carbon type—¼ watt—(R2)—Package of 5	1.00
3706	Resistor—1800 Ohm—Carbon type—¼ watt—(R15)—Package of 5	1.00
5159	Resistor—2200 Ohm—Carbon type—¼ watt—(R20)—Package of 5	1.00
5175	Resistor—5600 Ohm—Carbon type—½ watt—(R21)—Package of 5	1.00
2731	Resistor—10,000 Ohm—Carbon type—1 watt—(R25)—Package of 5	1.10
11305	Resistor—22,000 Ohm—Carbon type—¼ watt—(R16, R17)—Package of 5	1.00
11300	Resistor—33,000 Ohm—Carbon type—1/10 watt—(R24)—Package of 5	.75
5033	Resistor—33,000 Ohm—Carbon type—1 watt—(R23)—Package of 5	1.10
3118	Resistor—100,000 Ohm—Carbon type—¼ watt—(R1, R3, R5, R6)—Package of 5	1.00
5027	Resistor—150,000 Ohm—Carbon type—¼ watt—(R19)—Package of 5	1.00
11151	Resistor—2.2 Megohm—Carbon type—¼ watt—R9, R10, R11)—Package of 5	1.00
11250	Shield—Choke coil shield	.20
5249	Shield—R.F. coil shield	.20
11273	Shield—Radiotron shield	.25
5250	Shield—I.F. Transformer shield	.22
11222	Socket—Dial lamp socket	.18
4794	Socket—4-contact Radiotron socket	.15
11197	Socket—6-contact Radiotron socket	.14
11198	Socket—7-contact Radiotron socket	.15
5224	Switch—Low frequency tone control with power switch—(S11, S13)	1.00
11236	Switch—Range switch (S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S12)	2.44
5238	Terminal—Antenna terminal assembly	.14
11218	Transformer—Audio driver transformer (T2)	2.58
11216	Transformer—First intermediate frequency transformer (L16, L17, C16, C17)	2.15
11217	Transformer—Second intermediate frequency transformer (L18, L19, C20, C21, C22, R7, R8)	3.10
11213	Transformer—Power Transformer—105/125/150/210/250 volts—40-60 cycles	5.10
11212	Transformer—Power transformer—105-125 volts—25-50 cycles	7.18
11211	Transformer—Power transformer (T1)—105-125 volts—50-60 cycles	4.88
	DRIVE ASSEMBLIES	
5243	Arm—Band indicator operating arm	.42
10194	Ball—Steel ball for drive assembly—Package of 20	.25
8054	Cam—Five position cam for station selector drive assembly	.28
4422	Clutch—Tuning condenser drive clutch assembly—comprising shaft, balls, ring, spring and washers assembled	1.00

Stock No.	Description	List Price
8048	Coupling—Flexible coupling for variable capacitor—(includes indicator shaft)	$0.70
11334	Dial—Dial scale with mounting rivets	.75
8045	Disc—Drive disc and gear assembly	.46
11631	Drive—Tuning condenser drive assembly complete	6.35
8044	Escutcheon—Dial escutcheon with vernier scale	1.08
8046	Gear—Indicator shaft drive gear and vernier idler with one spring	.72
8050	Gear—Gear sector and band indicator operating link—(link connects to arm on band switch)	.15
8053	Indicator—Station selector indicator pointer	.12
8051	Link—Complete with roller and spring	.30
8049	Pinion—Vernier pointer drive pinion and shaft	.55
4669	Screw—No. 8-32 5/32" square head set screw—for variable condenser drive assembly—Package of 10	.25
8047	Spring—Coil spring for indicator shaft drive gear and vernier idler (Stock #8046)	.12
8052	Spring—Coil spring for link—Package of 5	.32
8042	Stud—Band indicator operating arm stud—Package of 5	.25
	REPRODUCER ASSEMBLIES	
8059	Board—Reproducer terminal board—(2 terminals)	.14
8060	Bracket—Output transformer mounting bracket	.14
11304	Cable—Reproducer cable—complete with connector	.80
8058	Clamp—Cone rim clamp—Package of 4	.44
11189	Coil—Field coil, magnet and cone housing (L22)	10.60
8056	Cone—Reproducer cone (L21)	1.58
5039	Connector—4-prong male connector plug for reproducer	.25
5040	Connector—4-contact female connector socket for reproducer cable	.25
9620	Reproducer—Complete	16.32
8057	Transformer—Output transformer—(T3, C42)	3.22
	MISCELLANEOUS ASSEMBLIES	
5211	Bolt—Speaker mounting bolt assembly—Package of 2	.24
11191	Bracket—Radiotron tuning lamp mounting bracket—less clamp (Stock #11192)	.12
11319	Cable—Radiotron tuning lamp cable and plug—approximately 25" long	1.38
11192	Clamp—Radiotron tuning lamp mounting clamp—less bracket (Stock #11191)	.12
11276	Escutcheon—Radiotron tuning lamp escutcheon	.40
11379	Escutcheon—Station selector escutcheon and crystal	1.08
11346	Knob—Station selector knob—Package of 5	.75
11347	Knob—Volume control, tone control, power switch or range switch knob—Package of 5	.75
11382	Resistor—1 Megohm—Carbon type—1/10 watt (R27)—Package of 5	.75
5210	Screw—Chassis mounting screw assembly—Package of 4	.16
11348	Screw—No. 8-32 7/16" Headless cupped point set screw for knob (Stock #11346)—Package of 10	.32
11193	Shield—Reproducer cover (shield)	.82
11381	Socket—Tuning lamp socket and cover	.45
11349	Spring—Retaining spring for knob (Stock #11347)—Package of 5	.15

MODEL C13-2
Schematic

RCA MFG. CO., INC.

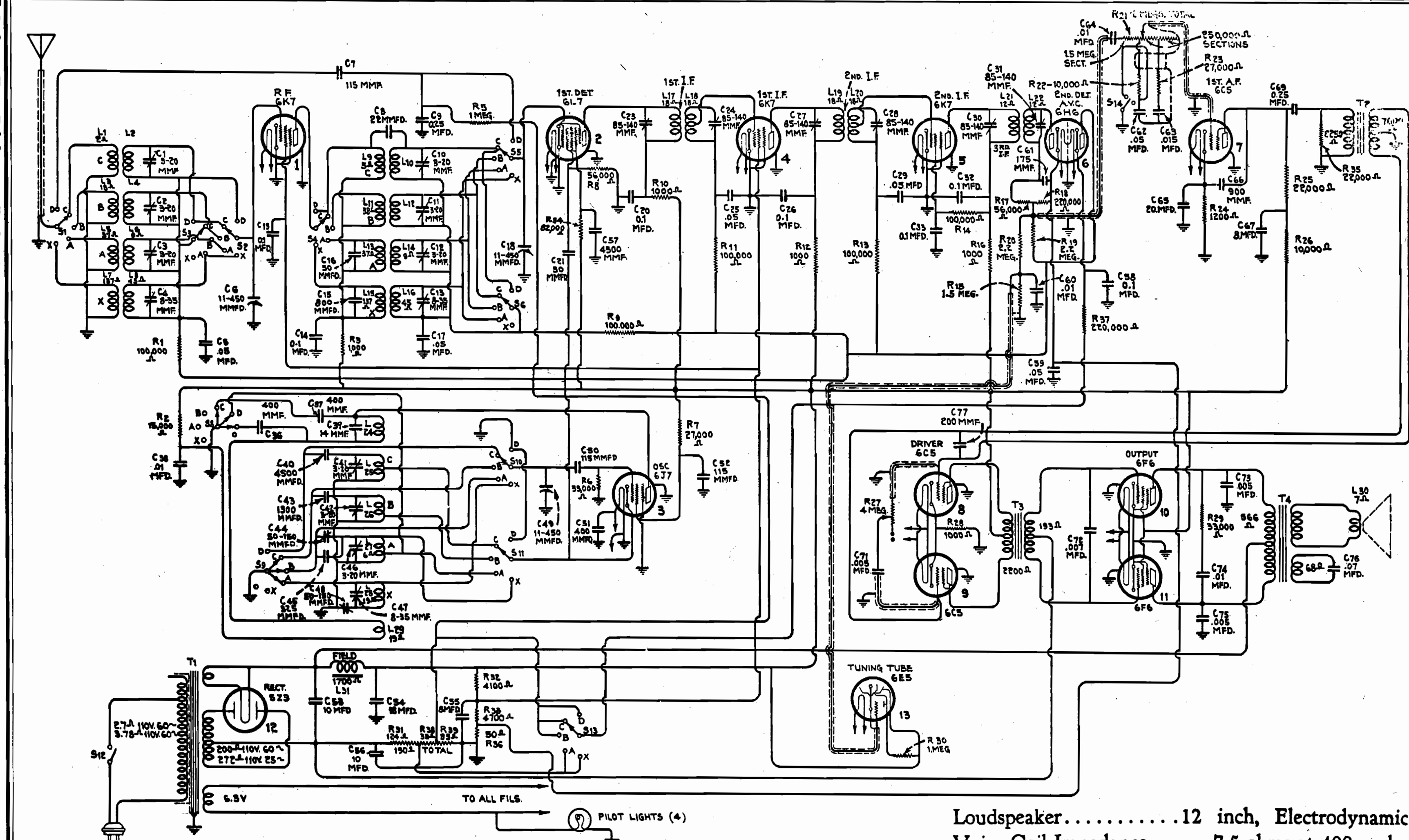

Figure 1—Schematic Circuit Diagram

Loudspeaker...........12 inch, Electrodynamic
Voice Coil Impedance......7.5 ohms at 400 cycles
Intermediate Frequency................460 kc.

Power Consumption......140 watts
Undistorted Output........10 watts
Maximum Output.........15 watts

Frequency Ranges

Band X	140—	410 kc.
Band A	540—	1,800 kc.
Band B	1,800—	6,000 kc.
Band C	6,000—	18,000 kc.
Band D	18,000—	60,000 kc.

Alignment Frequencies

Band X......150 kc. (osc.), 400 kc. (osc., det., ant.)
Band A.....600 kc. (osc.), 1,720 kc. (osc., det., ant.)
Band B.................6,132 kc. (osc., det., ant.)
Band C...............18,000 kc. (osc., det., ant.)
Band D.................No adjustments required

MODEL C13-2
Chassis Wiring

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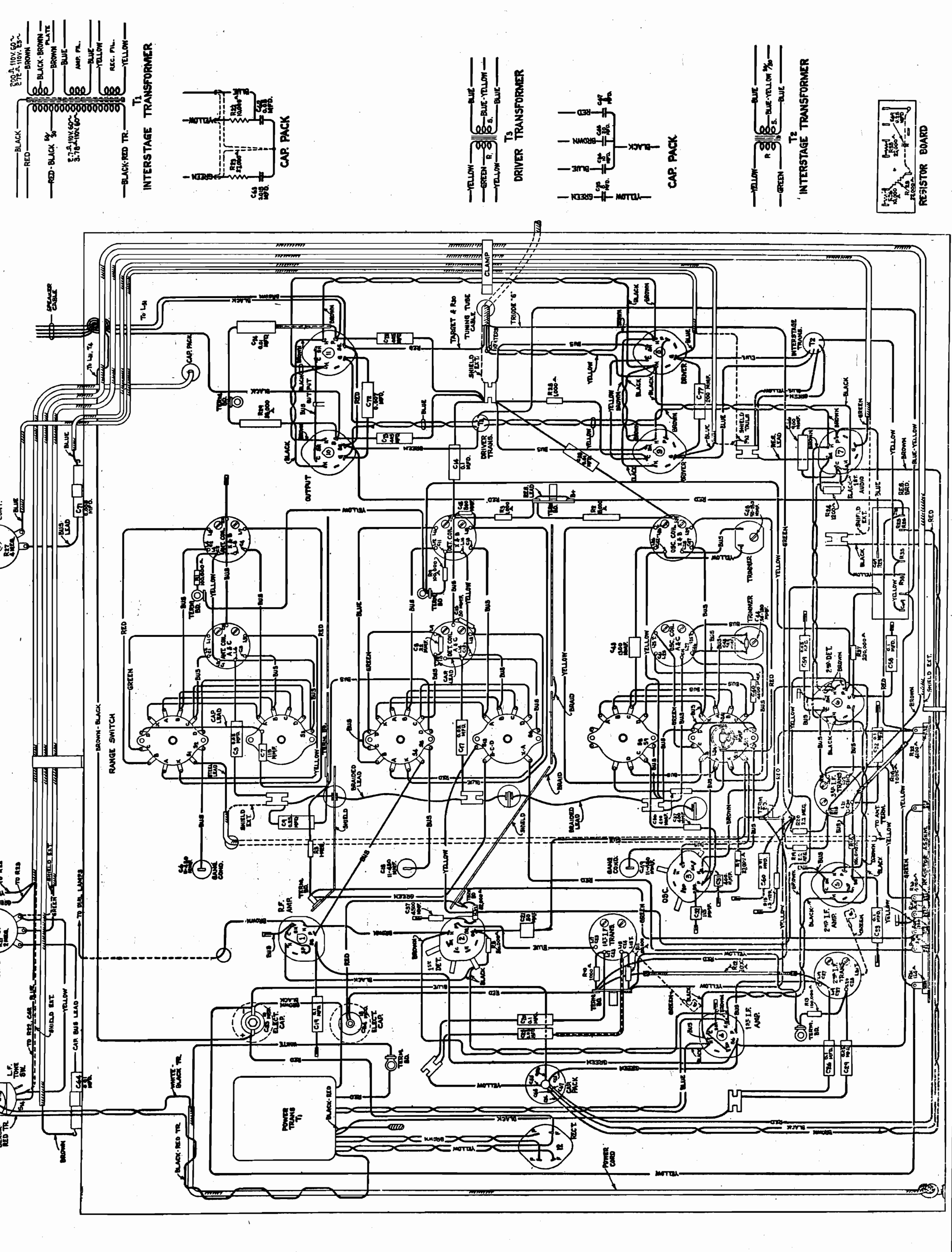

MODEL C13-2
Trimmers, Voltage
Circuit Data

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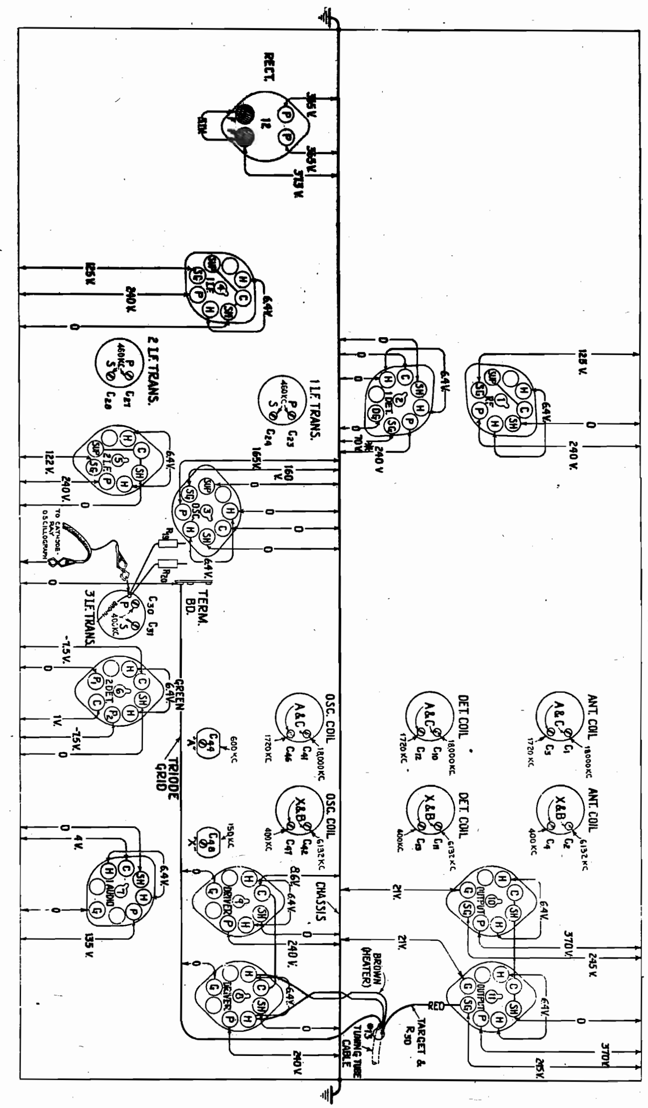

Figure 7—Trimmer Locations and Radiotron Socket Voltages

Measured at 120 volts A.C.—No Signal—All Tubes Intact—Volume Control Maximum—Band Switch on "A"

* Measured on 250 Volt Range of 1000 Ohm Per Volt Meter

GENERAL FEATURES

Metal Tubes

This receiver uses the new metal tubes which are much smaller in size than the corresponding glass types. The high frequency efficiency of these metal tubes is greater because of the shorter lengths of leads, lesser interelectrode capacitance and the more complete shielding of the metallic envelopes. Their rugged construction prevents breakage and reduces microphonic tendencies. The bases and sockets of all types have a standardized arrangement of connecting prongs.

Receiver Chassis

Service convenience has been a controlling factor in the layout of the chassis parts and wiring. The assembly of these various elements is such that the number of conductors is minimized with all important connections being readily accessible. Further accessibility to all parts of the chassis is due to the open construction of the base and mounting supports. Trimmer adjustments are easily reached from the underside of the chassis. The r-f, detector and oscillator coils are identified by markings on their bases, which for example read "AAO" to indicate the Band A, "antenna" and "oscillator" coils.

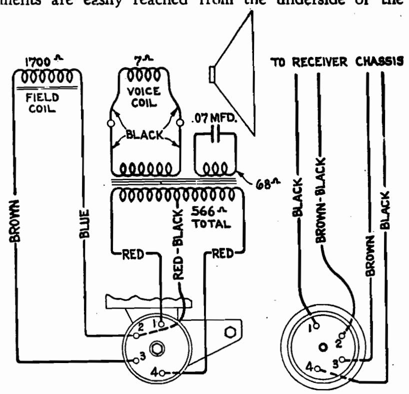

Figure 3—Loudspeaker Schematic and Wiring

Dial Drive

The dial drive and station indicator system are of new and unique design. Five individual dial scales, each with full 180 degree band spread, are provided, one for use on each band. The scales are eccentrically arranged on a rotary disc and adapted to operate in connection with the band change switch so that as the switch is shifted to a certain band, the corresponding dial scale rotates into position. For other positions of the band switch, a similar scale selection takes place, there being only one scale visible at a time. The driving mechanism for the dial and condenser has tuning ratios of 10 to 1 and 50 to 1. Control may be interchanged between these two ratios by push-in operation of a positive action clutch which is actuated by the tuning knob. From the clutch and ratio controlling mechanism, the drive system interlinks with the tuning condenser, main dial pointer and vernier dial pointer through means of fibre and brass gears. The ratio of vernier rotation to the main pointer is 20 to 1. An intermediate gear is used in the system to reduce gear back-lash. This gear is suspended in position with two tension springs which maintain the proper mesh at all times. A flexible coupling disc is used between the drive and the condenser shaft permitting the dial drive mechanism to be rigidly mounted to the chassis base.

Tuning Condenser

The variable tuning condenser is supported by a new design of shock-proof mount which has been developed by our engineers to minimize audio-frequency "howl" produced by chassis vibration.

Power Transformer

The transformer is assembled flat against the chassis base which acts as a radiating fin to disseminate the heat developed in the windings. An improved electrostatic shield is used between the primary and secondary windings to reduce a-c line disturbances and to prevent the receiver from radiating into the line.

Loudspeaker

A super-sensitive 12 inch electrodynamic speaker is employed. It is correctly adapted to the cabinet design to assure the best possible acoustic performance. Electrical connection is made from the speaker to the chassis through a plug and connector attachment, permitting easy removal for servicing.

ELECTRICAL CIRCUIT

The circuit is based upon the Superheterodyne principle. The radio frequency and audio frequency amplification are balanced in such manner that the maximum of performance is obtained. The following general items cover the circuit arrangement and notable features involved:—

Tuned Circuits

Six adjustable tuned circuits are used in the i-f system, each resonating at 460 kc. A three section variable condenser tunes the secondary of the antenna transformer, the secondary of the detector input transformer and the oscillator coil on all bands with the exception of D, which has only its detector and oscillator tuned. Each tuning range has its own group of r-f and oscillator coils, they being selected as desired by operation of the band-change switch. Trimmer condensers are provided on all of the tuned circuits for use in obtaining precise alignment.

Band D Tuning

Special notice should be taken of the manner of tuning this band. The r-f stage is unused when the range switch is turned to its Band D position and the signal is fed from the antenna directly to the first detector input circuit. The inductance of this circuit consists of a short length of bus wire to which the antenna lead is tapped at a definite predetermined point. The

MODEL C13-2
Circuit Data, Part 2
Alignment, Socket

RCA MFG. CO., INC.

total length of this inductive wire from the stator of the tuning capacitor to ground represents the secondary of a high frequency autotransformer, while the inductive section included between the antenna lead tap and ground forms the primary. Alteration of the dimensions and position of this wiring will change the tuning and alignment of the circuit, resulting in total

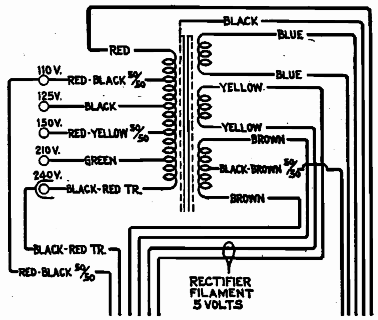

Figure 4—Universal Transformer Schematic and Wiring
Pri. Res.—4.89 Ohms, Total
Sec. Res.—165 Ohms, Total

lack of operation or seriously poor operation. *It is therefore necessary when servicing to avoid changes in the wiring which includes Band D detector and oscillator r-f circuits unless the arrangement is restored to its exact original condition.* Similar caution should be observed when exchanging by-pass condensers in these same circuits, since their values, physical positions, length of leads, quality of dielectric etc. are critical and variations will definitely affect operation of the receiver. The small heater by-pass condensers and ground terminals installed at the tube sockets are very important in this respect.

Oscillator Stage

The heterodyne oscillator circuit used in this receiver is an improved type, having exceptional frequency stability and uniformity of output over its various tuning ranges. It operates on fundamental frequencies which are fed to the first detector hexode tube (RCA-6L7) on an auxiliary mixing grid. The oscillator generates a signal which is at all times above the frequency of the incoming signal by 460 kc. As shown by the schematic diagram, the cathode of the oscillator tube is above ground potential for r.f., while the plate is effectively at ground potential. This particular arrangement, together with the plate and screen series resistors, makes the circuit independent of supply voltage variations in regard to stability and uniformity of output. Separate coils are used for each of the tuning ranges. The switching of the different bands is such as to short circuit certain unused coils which would absorb energy from the circuits used.

Intermediate Amplifier

Two stages of i-f amplification comprising three tuned transformers and two RCA-6K7 tubes are arranged in cascade to operate at 460 kc. The transformers have their primaries as well as secondaries tuned by adjustable trimmer capacitors. These trimmers are designed to resist moisture, temperature and other detrimental factors which may affect their adjustments. Litz wire is used for the windings of the third transformer in order to provide the proper efficiency in driving the diode second detector.

Detection and A. V. C.

The modulated signal as obtained from the output of the i-f system is detected by an RCA-6H6 double diode tube. The audio frequency secured by this process is passed on to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R-18, is applied as automatic control grid bias to the r-f, first detector and i-f tubes through suitable resistance-capacitance filter circuits. The second diode of the RCA-6H6 is used to supply residual bias for these controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current, which flows through R-18, R-19, and R-37, thereby maintaining the desired minimum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias diode ceases to draw current and the a.v.c. diode takes over the biasing function. The cathode and the anode of the signal-a.v.c. diode have positive potential in respect to chassis-ground and cathodes of the a.v.c. controlled tubes when no signal is being received.

Audio System

Several stages of audio amplification provide excellent fidelity and wide range of volume both for short wave as well as on the standard and long wave bands. The high gain of the system has necessitated thorough shielding and careful manufacture. All wiring, transformers, etc., should always be placed as originally installed if it has been necessary to remove such for service purposes. Hum difficulties are likely to occur if this caution is not observed. Manual volume control is by means of an acoustically tapered potentiometer which conveys the audio output of the second detector to the first a-f amplifier stage. This control has tone compensation produced by filters connected to two points thereon. This gives the correct aural balance at different volume settings. A music-speech switch is provided in one of the volume control filter circuits for use in obtaining good speech intelligibility. On the speech position, the low frequency tones are reduced. A push-pull driver stage is used between the first a.f. and the Class AB output amplifier. A continuously variable high frequency tone control is shunted across the grids of the driver tubes. A sharp, high audio frequency cut-off is obtained by a tertiary winding on the audio output transformer and by the correct design of the driver and interstage transformers. This cut-off feature results in quieter operation by the reduction of high frequency noise, especially on weaker stations.

Rectifier and Filter

An RCA-5Z3 full-wave rectifier tube is employed in the high voltage supply system. The loudspeaker field coil serves as a filter reactor in conjunction with high capacity, electrolytic condensers. Fixed bias voltages are made available at the filter output on a divider system, which is likewise well filtered with large capacitors.

Tuning Indicator

A cathode-ray tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube is of new design and comprises an amplifier section and a cathode-ray section built in the same glass envelope. The cathode-ray section consists of a conically shaped luminescent screen, upon which a pattern is formed by an effect of the detected signal after said effect has been amplified by the amplifier section which is fed from the detector diode circuit. The size of the pattern is determined by the strength of the signal voltage, so that any change of tuning may be readily observed in order to facilitate tuning to exact resonance.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation. In general, the ratings of the resistors, capacitors, coils, etc. are indicated adjacent to the symbols signifying these parts. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and Replacement Parts List. The coils, reactors and transformer windings are rated in terms of their d-c resistances. Where the value is not given, the resistance is less than one ohm.

Alignment Procedure

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied, the normal performance of the instrument will be obtained.

Circuits aligned by use of Cathode-Ray equipment will be as near to perfection as possible, hence this method is to be preferred in all cases. Alignment by other methods is oftentimes an approximation unless extreme care is taken and a good deal of time expended. The oscillographic method is particularly advantageous for trimming the i-f tuned circuits to obtain

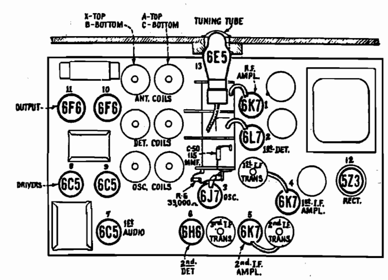

Figure 5—Radiotron and Coil Locations

the utmost in tone quality and at the same time the maximum of selectivity. Procedure to be followed when using a Cathode-Ray Oscillograph is therefore given in detail. Should this type of equipment be unavailable, a substitute indicator may be used, the procedure necessary being covered on page 12.

Equipment

The instruments required for placing this receiver in proper alignment should consist of an RCA Cathode-Ray Oscillograph, an RCA Full Range Oscillator, an RCA Frequency Modulator, a Tuning Wand and a non-metallic screw driver. These devices are illustrated and described on a separate page of this book. The Cathode-Ray Oscillograph is to be used as an output indicator to show precisely when the circuits are correctly aligned. The Full Range Oscillator is required as the source of standard alignment signals at the various frequencies. Visual alignment is made possible through use of the Frequency Modulator, which in conjunction with the Oscillograph and Oscillator, causes the characteristic wave shape of the circuit under test to be formed on the Oscillograph screen. The necessity for alignment and direction of required change may be tested with a Tuning Wand. It's use is as follows:—

The Tuning Wand, which consists of a bakelite rod having a small brass cylinder installed at one end, and a core of finely divided iron at the other, may be inserted into a tuned coil to obtain an indication of the tuning. With a signal being supplied to the receiver at the alignment frequency of the circuit concerned, each end of the Wand should be placed through the center of the coil. Holes are provided in the r-f coil shields for this test. A change in tuning will be produced by the presence of the brass cylinder or iron core and consequent change of receiver output occurs. If there is a decrease of output when either of the two ends are inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output, while the iron end causes a decrease, reduction of inductance will be necessary to bring the circuit into alignment. This will be equivalent to decreasing the trimmer concerned.

End of Wand Used	Change of Signal Output	Change Req'd in Trimmer Capacity
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

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I-F TRIMMER ADJUSTMENT

Six trimmers are associated with the three i-f transformers. Their locations on the chassis are shown by Figure 7. Each must be aligned to a basic frequency of **460 kc.** The last i-f transformer should be adjusted first, the one preceding it second and the operation carried through successive stages until the first transformer has been aligned. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The most convenient point for connection of the Oscillograph is at the detector diode load circuit, with the vertical "Hi" terminal attached to the juncture of R-17, R-18 and R-19, and the "Gnd" to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as illustrated in Figure 6. A .001 mfd. capacitor installed in series with the Oscillator "Ant." output lead will prevent the voltage constants of the stage being aligned from becoming upset. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver volume control to maximum and the range switch to Band "A". Tune the station selector to a point where no interference is caused by local stations or the local oscillator, removing the 6J7 tube if necessary. Turn the Oscillograph vertical "A" amplifier to "On" and advance the vertical gain control to its maximum position. Set the horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a trace completely across the screen. Have the timing control adjusted to "Int."

(b) Attach the output of the test Oscillator to the control grid cap of the second i-f tube (RCA-6K7) and chassis ground. Tune the Oscillator

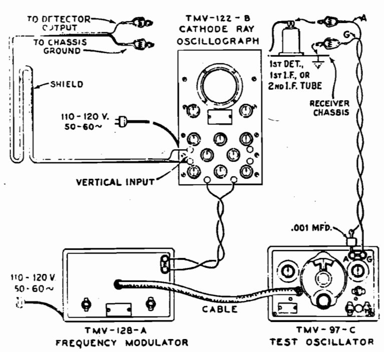

Figure 6—Alignment Apparatus Connections

to **460 kc.** having its modulation switch turned to "On". Regulate the output control until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph frequency and range controls to give several complete cycles, the amplitude of which will afford an accurate peak indication. Cause the image formed to stand still on the screen by manipulation of the "Sync." control. Use as low a signal output from the Oscillator as can be accurately observed at the Oscillograph. Then tune the two trimmers. C-30 and C-31 of the third i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition, the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the shielded patch cord provided. Figure 6 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off". Change the timing (Sync.) control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become coincident at their highest points. These curves will be found to occur at an Oscillator setting of *approximately* 540 kc. They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with these requirements and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-30 and C-31 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as above, change the Oscillator output to the control grid cap of the first i-f tube (RCA-6K7). Adjust the two trimmers C-27 and C-28 of the second i-f transformer until the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.

(e) Change the test Oscillator output to the control grid of the first detector tube (RCA-6L7) without disturbing the connections and adjustments of the other apparatus. Then align the trimmers C-23 and C-24 of the first i-f transformer to produce waves of maximum coincidence and maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the over-all tuning characteristic of the i-f system.

ANTENNA, DETECTOR AND OSCILLATOR

For Bands A and X, adjustments must be made at the high and low frequency ends of the range. On Bands B and C, alignment is required only at the high frequency end. Band D is permanently adjusted during manufacture, hence no alignment will be necessary in this range. Locations of the various antenna, detector and oscillator trimmers are shown on Figure 7. The test Oscillator should be removed from connection with the i-f system and its output attached to the antenna-ground terminals of the receiver. No changes are to be made in the attachment of the Oscillograph at the second detector. During the adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Such procedure will obviate apparent broadness of tuning which would result from a.v.c. action on a stronger signal. The sequence of alignment should be Band A, Band X, Band B and Band C. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning capacitor plates are in full mesh (maximum capacity). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

Band A

(a) With the receiver range switch on its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-46, C-12 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. Then shift the timing control to "Ext." and place the Frequency Modulator into operation with its connections to the Oscillator and Oscillograph as shown on Figure 6. Retune the test Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-46, C-12 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator until the similar forward and reverse waves appear on the screen. It is advisable to shift the Oscillator to its 200—400 kc. range and use the third harmonic of the generated signal in order to obtain the desired range of sweep for this adjustment. The trimmer C-44 should then be adjusted until a point is reached where the waves have the greatest amplitude. It will be unnecessary to rock the tuning condenser for this operation inasmuch as the Frequency Modulator is automatically producing the same effect. After completing this adjustment, the trimmer C-46 should be realigned as in (a) to correct for any change in the oscillator high frequency tuning which has been caused by the adjustment of C-44.

Band X

(a) Disconnect the Frequency Modulator and tune the test Oscillator to a frequency of **400 kc.** (Modulation "On"). Place the receiver range switch in its Band X position and turn the station selector until the dial pointer reads **400 kc.** Adjust the Oscillograph timing control to "Int." Then align each of the trimmers C-47, C-13 and C-4 to the point producing maximum output at the Oscillograph. Place the Frequency Modulator in operation and attach it to the Oscillator in the normal manner. Change the Oscillograph timing to "Ext." Increase the frequency of the Oscillator (modulation "Off") until the two waves appear and become coincident at their highest points, *approximately at 462 kc.*. They may be made to remain stationary on the screen by manipulation of the Oscillograph range switch and frequency control. Readjust the three trimmers C-47, C-13 and C-4 to give maximum amplitude and complete coincidence of the waves.

(b) Change the test Oscillator so that it delivers a signal of **150 kc.** with the Frequency Modulator disconnected. Tune this signal on the receiver which has previously been set to Band X, disregarding the dial reading at which the signal is best received. Then interconnect the Frequency Modulator with the Oscillator and retune the latter to the point at which the two similar waves appear on the screen. Adjust the trimmer C-48, for maximum amplitude of the wave images. Rocking of the tuning condenser will not be necessary as the Frequency Modulator duplicates such an operation. Repeat the alignment of C-47 as outlined in (a) to correct for any reflective error brought about by the adjustment of C-48.

Band B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of **6132 kc.** Set the test Oscillator to this same frequency (Modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. Then adjust the trimmer C-42 to the point producing the maximum amplitude of the image. Two positions will be found on this trimmer which causes maximum amplitude. The one of least capacitance is correct and should be used. Check for the "image" signal, which will be received at **5212 kc.** on the dial if the adjustment of C-42 has been properly made. An increase in Oscillator output may be necessary for this test, however *its frequency should not be changed nor any trimmer adjustments made on the receiver.*

MODEL C13-2
Alignment, Part 3
Dial Data, Transformer Data

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(b) Return the station selector to the **6132 kc.** reading and align the detector and antenna trimmers C-11 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on Band B.

Band C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to this same frequency (Modulation "On" and Frequency Modulator disconnected), regulating its output to the level required for convenient observation. Adjust the trimmer C-41 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of "image" signal by tuning the receiver to **17,080 kc. The 18,000 kc. signal** of the Oscillator will be received at this point if the adjustment of C-41 has been properly made, using the position of minimum capacitance giving maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.**, realign C-41 if necessary, and then adjust the detector and antenna trimmers C-10 and C-1 for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on Band C.

Band D

No adjustments are required on this band.

Output Meter Alignment

To align the receiver by other methods than that explained above will require the use of a standard test oscillator, such as the Stock No. 9595, and a suitable output indicator, such as the Stock No. 4317. The indicator should be connected either to the voice coil circuit or across the output transformer primary. For each adjustment, the volume control should be maintained at maximum and the Oscillator output regulated until the indication is barely perceptible. The smaller the amount of glow, the more accurate will be the indication. The signal level will also be below the range of the receiver a.v.c., preventing broadness of tuning.

I-F Adjustments—Connect the output of the test Oscillator from the RCA-6L7 first detector control grid to chassis-ground and adjust its frequency to **460 kc.** Tune the receiver to Band "A", setting the station selector at a point where no interference is received from local stations or the local oscillator. Then tune the i-f trimmers C-31, C-30, C-28, C-27, C-24 and C-23 in order, each for maximum indicated receiver output.

R-F Adjustments—Connect the Oscillator output to the antenna-ground terminals of the receiver. Keep the output indicator attached to the receiver output as above. For each adjustment, use the minimum signal which will give a perceptible indication on glow indicator.

BAND A

(a) Set the range switch of the receiver to its Band A position and tune the selector to a dial reading of **1720 kc.** Tune the Oscillator to this same frequency and adjust trimmers C-46, C-12 and C-3 to produce maximum indicated receiver output.

(b) Shift the Oscillator to **600 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then adjust trimmer C-44, simultaneously rocking the tuning control backward and forward through the signal, until maximum output is obtained from the combined operations. Repeat the alignment of C-46 as in (a) to correct for any change caused by adjustment of C-44.

BAND X

(a) Change the range switch to its Band "X" position. Tune the receiver to read **400 kc.** and set the Oscillator to produce this same frequency. Adjust trimmers C-47, C-13 and C-4 to produce maximum receiver output.

(b) Shift the Oscillator frequency to **150 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then tune the oscillator series trimmer C-48, simultaneously rocking the tuning control (receiver) backward and forward through the signal, until maximum output results from the combined operations. Repeat the alignment of C-47 as in (a) to correct for any change caused by the adjustment of C-48.

BAND B

Place the receiver range switch in its Band "B" position and tune the station selector to a dial reading of **6132 kc.** Set the frequency of the Oscillator to **6132 kc.**

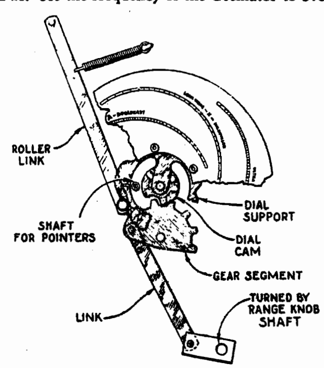

Figure 8—Selector Dial Change Mechanism

Then adjust trimmer C-26 to give maximum receiver output. Two positions may be found which fulfill this condition. The one of least capacitance is correct. To assure that the right peak has been used; tune the *receiver* to **5212 kc.** and increase the Oscillator output. The "image" of **6132 kc.** will be received at this point if C-26 has been adjusted to the proper point of maximum output. *No trimmer adjustments are to be made during this check.* Return the receiver tuning to **6132 kc.**, readjust C-26 if necessary, and then tune the detector and antenna coil trimmers, C-11 and C-2 to produce maximum (peak) receiver output as indicated on the glow meter.

BAND C

Turn the receiver range switch to its Band "C" position and set the tuning control to a dial reading of **18,000 kc.** Tune the Oscillator to this same frequency. Adjust the oscillator parallel trimmer C-41 to produce maximum receiver output. Two positions of the trimmer will be found which fulfill such a condition. The one of least capacitance is correct. To assure that the right position has been used, check for the "image" of the **18,000 kc.** signal which will be received at **17,080 kc.** on the dial if C-41 is correctly adjusted. An increase in Oscillator output may be necessary. *No trimmer adjustments should be made during this check.* Return the receiver tuning to **18,000 kc.**, readjust C-41 if necessary, and then tune the detector and antenna trimmers C-10 and C-1 to give maximum receiver output.

Dial Adjustment

Figure 8 illustrates the relations of the various parts of the dial mechanism when it is in its A–Broadcast position and the range switch is likewise turned to its Band A setting. In re-assembling the dial after repair, see that the gears are meshed in accordance with the diagram, at the same time noting that the lever which is attached to the range switch shaft is in the position as shown.

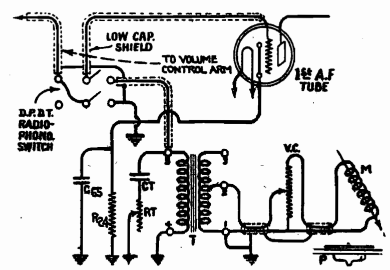

Figure 9—General Phonograph Connections

INSTALLATION

Change the receiver circuits and add phonograph connections to conform with the above schematic. Thoroughly shield leads where indicated, keeping them clear of a-c circuits and transformers. Place transformer T so as to obtain minimum lengths of secondary leads and mount it in the position which does not cause hum.

PARTS REQUIRED

M—Magnetic Pickup —Low Impedance
VC—Volume Control —100 ohms
T—Phono Input Transformer—Stock No. 7445
P—Phono Turntable Mechanism
CT—Condenser—.05 mfd.
RT—Variable Resistor —0 to 10,000 ohms

Phonograph Attachment

The audio system of this receiver may be adapted for use in the reproduction of phonograph records by proper connection and arrangement of an external turntable and its associated accessories. The relatively high amplification due to the number of a-f stages employed, necessitates that great care be taken when the circuits are changed for phonograph input. It is recommended that the turntable used be fed directly to the grid circuit of the first audio stage, with suitable switching installed for changing between radio and phonograph operation. Diagrams covering suggested methods of phonograph attachment are given in Figures 9 and 10 with installation details. Hum may possibly be encountered from lack of shielding and improper placement and shielding of the input transformer if these items are not taken care of during re-arrangement of the circuits. All wiring should be installed in a substantial and permanent manner.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to ground on Figure 7 will serve to assist in locating causes for faulty operation when existent. Each value as specified should hold within ± 20% when the receiver is normally operative at the rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given on the diagram are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance is comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each check is chosen as high as possible consistent with good readability.

Universal Transformer

The wiring of the special transformer used in some models of this receiver is given by Figure 4. This transformer is adaptable to several ranges of voltage, hence, in cases of receiver inoperation, the connections should be checked to assure that they are correct for the voltage being used.

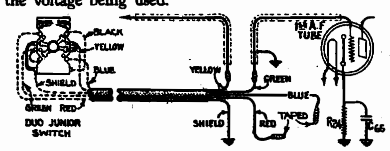

Figure 10—Duo Junior Connections

INSTALLATION

Arrange connections from Duo Junior output cable to receiver so that completed wiring is in accordance with schematic above. Add two jumpers shown by heavy full line, to Duo Junior Radio-Phono switch. Keep all leads as short as possible and well shielded where indicated.

PARTS REQUIRED
Model R-93—Duo Junior Phonograph

RCA MFG. CO., INC.

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Low frequency tone control switch, volume control or high frequency tone control mounting bracket	$0.18
5237	Bushing—Variable capacitor mounting assembly—Package of 3	.43
11255	Cable—Radiotron tuning lamp cable complete with socket	1.20
5241	Capacitor—Adjustable capacitor—(C44, C48)	.40
11286	Capacitor—14 Mmfd. (C39)	.24
11292	Capacitor—22 Mmfd. (C8)	.24
11289	Capacitor—50 Mmfd. (C16,C21)	.26
11291	Capacitor—115 Mmfd. (C7, C50, C52)	.24
11295	Capacitor—200 Mmfd. (C77)	.30
11294	Capacitor—325 Mmfd. (C45)	.32
11290	Capacitor—400 Mmfd. (C36, C37, C51)	.25
11269	Capacitor—800 Mmfd. (C15)	.30
11293	Capacitor—900 Mmfd. (C66)	.40
11335	Capacitor—1300 Mmfd. (C43)	.30
11287	Capacitor—4500 Mmfd. (C40, C57)	.30
4838	Capacitor—.005 Mfd. (C73, C75)	.20
5242	Capacitor—.005 Mfd. High frequency tone control capacitor (C71)	.52
5148	Capacitor—.007 Mfd. (C72)	.20
4624	Capacitor—.01 Mfd. (C64)	.54
4883	Capacitor—.01 Mfd. (C38, C60)	.20
4937	Capacitor—.01 Mfd. (C74)	.25
4836	Capacitor—.05 Mfd. (C5, C17, C25, C29, C59)	.30
4841	Capacitor—.1 Mfd. (C19, C58)	.22
4885	Capacitor—.1 Mfd. (C14, C20, C26, C32, C33)	.28
4840	Capacitor—.25 Mfd. (C9)	.30
3597	Capacitor—.25 Mfd. (C69)	.40
11203	Capacitor—10 Mfd. (C53)	1.18
5212	Capacitor—18 Mfd. (C54)	1.16
11204	Capacitor Pack—Comprising one 10 Mfd., one 20 Mfd., and two 8 Mfd. capacitors C55, C56, C65, C67)	3.44
11208	Capacitor Pack—Comprising one .015 Mfd. and one .05 Mfd. capacitor and one 27,000 ohm and one 10,000 ohm resistors C62, C63, R22, R23)	1.32
11272	Clamp—Cable clamp—Located on top surface of chassis near variable tuning condenser	.10
4693	Clamp—Electrolytic capacitor mounting clamp—for Stock No. 11204	.15
5215	Coil—Antenna coil—A and C Bands—(L1, L2, L5, L6, C1, C3)	2.32
5218	Coil—Antenna coil—X and B Bands—(L3, L4, L7, L8, C2, C4)	2.58
5216	Coil—Detector coil—A and C Bands—L9, L10, L13, L14, C10, C12)	2.34
5219	Coil—Detector coil—X and B Bands—(L11, L12, L15, L16, C11, C13)	2.58
5217	Coil—Oscillator coil—A and C Bands—(L25, L27, C41, C46)	2.20
5220	Coil—Oscillator coil—X and B Bands—(L26, L28, L29, C42, C47)	2.24
5221	Coil—Oscillator coil—D Band—(L24)	.64
5214	Condenser—3 gang variable tuning condenser—(C6, C18, C49)	4.42
5226	Lamp—Pilot lamp—Package of 5	.70
8041	Plate—I.F. or R.F. coil shield locking plate—Package of 2	.12
5112	Resistor—1000 ohms—Carbon type—¼ watt (R3, R10, R28)—Package of 5	1.00
11285	Resistor—1000 ohms—Flexible type—(R12, R16)—Package of 5	1.00
11283	Resistor—1200 ohms—Carbon type—¼ watt—(R24)—Package of 5	$1.00
3381	Resistor—10,000 ohms—Carbon type—¼ watt (R26)—Package of 5	1.00
5114	Resistor—15,000 ohms—Carbon type—1 watt (R2)	.22
8070	Resistor—22,000 ohms—Carbon type—½ watt (R25)—Package of 5	1.00
11305	Resistor—22,000 ohms—Carbon type—¼ watt (R35)—Package of 5	1.00
8065	Resistor—27,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
5033	Resistor—33,000 ohms—Carbon type—1 watt (R29)—Package of 5	1.10
11300	Resistor—33,000 ohms—Carbon type—1/10 watt (R6)—Package of 5	.75
11282	Resistor—56,000 ohms—Carbon type—1/10 watt (R8)—Package of 5	.75
8064	Resistor—82,000 ohms—Carbon type—½ watt (R34)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R11, R13, R14)—Package of 5	1.00
11281	Resistor—100,000 ohms—Carbon type—1/10 watt (R1, R9)—Package of 5	.75
5158	Resistor—220,000 ohms—Carbon type—¼ watt (R37)—Package of 5	1.00
3033	Resistor—1 megohm—Carbon type—¼ watt (R5)—Package of 5	1.00
4241	Resistor—1.5 Megohms—Carbon type—¼ watt (R15)—Package of 5	1.00
11151	Resistor—2.2 megohm—Carbon type—¼ watt (R19, R20)—Package of 5	1.00
11209	Resistor—Voltage divider resistor—Comprising one 4100 ohm, one 4700 ohm, one 50 ohm, two 33 ohm and one 124 ohm sections—(R31, R32, R33, R36, R38, R39)	1.16
5249	Shield—Antenna, Dectector or Oscillator coil shield	.20
5250	Shield—Intermediate frequency transformer shield	.22
11273	Shield—Rectifier Radiotron shield	.25
4794	Socket—4 contact rectifier Radiotron socket	.15
11197	Socket—6 contact Radiotron socket—For first audio or driver radiotrons—(6C5)	.14
11198	Socket—7 contact Radiotron socket—For 6K7, 6H6, or 6F6 radiotrons	.15
11278	Socket—7 contact oscillator Radiotron (6J7) socket	.20
11279	Socket—7 contact First Detector Radiotron (6L7) socket	.20
11199	Socket—Dial lamp socket	.14
5224	Switch—Low frequency tone control switch and power switch (S12, S14)	1.00
5225	Switch—Range switch—(S1, S2, S3, S4, S5, S6, S8, S9, S10, S11, S13)	3.75
5238	Terminal—Antenna terminal board and clip with insulating strip and rivets	.14
5222	Tone Control—High frequency tone control—(R27)	1.04
5232	Transformer—Audio driver transformer—(T3)	2.50
5228	Transformer—First Intermediate frequency transformer—(L17, L18, C23, C24)	1.80
5234	Transformer—Interstage Audio transformer—(T2)	3.40
8061	Transformer—Power transformer—105-125 volts 50/60 cycles—(T1)	6.75
8062	Transformer—Power transformer—105/125 volts 25/50 cycles	9.84
11194	Transformer—Power transformer—105/125/150/210/250 volts 40/60 cycles	7.08
11206	Transformer—Second Intermediate frequency transformer—(L19, L20, C27, C28)	1.82
5230	Transformer—Third Intermediate frequency transformer—(L21, L22, C30, C31, C61, R17, R18)	2.76
11205	Volume Control—Complete (R21)	1.30
	DRIVE ASSEMBLIES	
5243	Arm—Band indicator operating arm	.42
10194	Ball—Steel ball for drive assembly—Package of 20	.25
8054	Cam—Five position cam—For station selector drive assembly	.28
4422	Clutch—Tuning condenser drive clutch assembly—Comprising drive shaft, balls, ring, spring and washers assembled	1.00
8048	Coupling—Flexible coupling for variable capacitors—Includes indicator shaft	.70
11336	Dial—Dial scale with mounting rivets	.60
8045	Disc—Drive disc and gear assembly	.46
11380	Drive—Tuning condenser drive assembly complete	6.35
8044	Escutcheon—Dial escutcheon and vernier label	1.08
8050	Gear—Gear sector and band indicator operating link—(Link connects to arm on band switch)	.15
8046	Gear—Indicator shaft drive gear and vernier idler with one spring	.72
8053	Indicator—Station selector pointer	.12
8051	Link—Complete with roller and spring	.30
8049	Pinion—Vernier pointer drive pinion and shaft	.55
4669	Screw—8-32x5/32" Square head set screw for drive assembly—Package of 10	.25
8047	Spring—Coil spring for indicator shaft drive gear and vernier idler (Stock No. 8046)	.12
8052	Spring—Coil spring for link—Package of 5	.32
8042	Stud—Band indicator operating arm stud—Package of 5	.25
	MISCELLANEOUS ASSEMBLIES	
5211	Bolt—Reproducer mounting bolt assembly—Package of 2	.24
11191	Bracket—Radiotron tuning lamp mounting bracket—Less clamp	.12
11192	Clamp—Radotron tuning lamp mounting clamp—Less bracket	.12
11193	Cover—Reproducer cover	.82
11276	Escutcheon—Radiotron tuning lamp escutcheon	.40
11379	Escutcheon—Station selector escutcheon and crystal	1.08
11346	Knob—Station selector knob—Package of 5	.75
11347	Knob—Volume control, tone control range switch or power switch knob—Package of 5	.75
11382	Resistor—1 megohm—Carbon type—1/10 watt—Used in tuning tube socket—Package of 5 (R30)	.75
5210	Screw—Chassis mounting screw assembly—Package of 4	.16
11348	Screw—8-32x7/16" Headless cupped point set screw for knob No. 11346—Package of 10	.32
11381	Socket—Radiotron tuning tube socket and cover	.45
11349	Spring—Retaining spring for knob (Stock No. 11347)—Package of 5	.15
	REPRODUCER ASSEMBLIES	
8059	Board—Terminal board (2 terminals)	.14
8060	Bracket—Output transformer mounting bracket	.14
11200	Cable—Reproducer cable	.50
8058	Clamp—Cone rim clamp—Package of 4	.44
11189	Coil—Field coil—magnet and cone housing (L31)	10.60
8056	Cone—Reproducer cone (L30)	1.58
5039	Connector—4 contact male connector for reproducer	.25
5040	Connector—4 contact female connector for reproducer cable	.25
9620	Reproducer—Complete	16.32
8057	Transformer—Output transformer (T4, C76)	3.22

MODEL C15-3
Parts List

RCA MFG. CO., INC.

MODEL C15-3
REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Low frequency tone control switch, volume control or high frequency tone control mounting bracket	$0.18
5237	Bushing—Variable capacitor mounting bushing assembly—Package of 3	.43
11255	Cable—Radiotron tuning lamp cable complete with socket	1.20
5241	Capacitor—Adjustable capacitor—C23, C27	.40
11286	Capacitor—14 Mmfd. capacitor—C19	.24
11292	Capacitor—22 Mmfd. capacitor—C11	.24
11289	Capacitor—50 Mmfd. capacitor—C8, C30	.26
11291	Capacitor—115 Mmfd. capacitor—C62, C65	.24
11295	Capacitor—200 Mmfd. capacitor—C55	.30
11294	Capacitor—325 Mmfd. capacitor—C24	.32
11290	Capacitor—400 Mmfd. capacitor—C9, C18, C20, C49, C64	.25
11299	Capacitor—600 Mmfd. capacitor—C48	.26
3784	Capacitor—900 Mmfd. capacitor—C69	.30
11335	Capacitor—1300 Mmfd. capacitor—C22	.30
11287	Capacitor—4500 Mmfd. capacitor—C21, C77	.30
4838	Capacitor—.005 Mfd. capacitor—C58, C59	.20
5242	Capacitor—.005 Mfd. High frequency tone control capacitor—C56	.52
5148	Capacitor—.007 Mfd. capacitor—C57	.20
4937	Capacitor—.01 Mfd. capacitor—C60	.25
4858	Capacitor—.01 Mfd. capacitor—C17, C47, C68	.25
4836	Capacitor—.05 Mfd. capacitor—C5, C16, C35, C40, C70	.30
4835	Capacitor—.1 Mfd. capacitor—C31	.28
4841	Capacitor—.1 Mfd. capacitor—C7, C28, C36, C41, C67	.22
4885	Capacitor—.1 Mfd. capacitor—C10, C34, C39, C42, C43	.28
3597	Capacitor—.25 Mfd. capacitor—C51	.40
11203	Capacitor—10 Mfd. capacitor—C71	1.18
5212	Capacitor—18 Mfd. capacitor—C72	1.16
5213	Capacitor Pack—Comprising one 4. Mfd., one 10 Mfd. and one 8. Mfd. capacitors—C50, C73, C74	2.94
5236	Capacitor Pack—Comprising two .5 Mfd., capacitors, one 680 ohm resistor and one 820 ohm resistor—C53, C54, R23, R27	1.36
4693	Clamp—Electrolytic capacitor mounting clamp (For stock No. 5213)	.15
5215	Coil—Antenna coil—A and C Bands—L1, L2, L5, L6, C1, C3	2.32
5218	Coil—Antenna coil—X and B Bands—L3, L4, L7, L8, C2, C4	2.58
5216	Coil—Detector coil—A and C Bands—L9, L10, L13, L14, C12, C14	2.34
5219	Coil—Detector coil—X and B Bands—L11, L12, L15, L16, C13, C15	2.58
5217	Coil—Oscillator coil—A and C Bands—L18, L20, C25, C75	2.20
5220	Coil—Oscillator coil—X and B Bands—L19, L22, C26, C76	$2.24
5221	Coil—Oscillator coil—D Band—L17	.64
5214	Condenser—3 gang variable tuning condenser—C6, C29, C63	4.42
5240	Cover—Fuse cover plate	.24
11202	Foot—Chassis mounting foot and bracket assembly—Package of 2	.78
10907	Fuse—3 ampere fuse—F1—Package of 5	.40
5226	Lamp—Dial lamp—Package of 5	.70
5239	Mounting—Fuse mounting for 110 volt instrument	.36
5244	Mounting—Fuse mounting for 220 volt instrument	.32
8041	Plate—I.F. or R.F. coil shield locking plate—Package of 2	.12
5233	Reactor—Coupling reactor—L29	2.32
11296	Resistor—330 ohms—Carbon type—¼ watt (R2, R12)—Package of 5	1.00
11285	Resistor—1000 ohms—Flexible type resistor (R13, R17, R36)—Package of 5	1.00
5112	Resistor—1000 ohms—Carbon type—¼ watt (R4, R10, R15, R29)—Package of 5	1.00
11283	Resistor—1200 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
4408	Resistor—1500 ohms—Carbon type—¼ watt (R8)—Package of 10	2.00
5159	Resistor—2200 ohms—Carbon type—¼ watt (R35)—Package of 5	1.00
11298	Resistor—5600 ohms—Carbon type—1 watt (R21)	.22
8043	Resistor—10,000 ohms—Carbon type—2 watts (R22)	.25
3998	Resistor—15,000 ohms—Carbon type—¼ watt (R30)—Package of 5	1.00
5114	Resistor—15,000 ohms—Carbon type—1 watt (R5)	.22
8065	Resistor—27,000 ohms—Carbon type—½ watt (R33)—Package of 5	1.00
11300	Resistor—33,000 ohms—Carbon type—1/10 watt (R32)—Package of 5	.75
5033	Resistor—33,000 ohms—Carbon type—1 watt (R31)—Package of 5	1.10
11282	Resistor—56,000 ohms—Carbon type—1/10 watt (R9)—Package of 5	.75
8064	Resistor—82,000 ohms—Carbon type—½ watt (R43)—Package of 5	1.00
5145	Resistor—100,000 ohms—Carbon type—¼ watt (R16)—Package of 5	1.00
5027	Resistor—150,000 ohms—Carbon type—¼ watt (R37)—Package of 5	1.00
11297	Resistor—330,000 ohms—Carbon type—1/10 watt (R1, R6)—Package of 5	.75
5108	Resistor—330,000 ohms—Carbon type—¼ watt (R11, R14, R38)—Package of 5	1.00
3033	Resistor—1 Megohm—Carbon type—¼ watt (R7)—Package of 5	1.00
11151	Resistor—2.2 Megohm—Carbon type—¼ watt (R20)—Package of 5	1.00
5235	Resistor—Voltage divider resistor—3 sections—4100 ohms, 4750 ohms and 190 ohms (R40, R41, R42)	$1.15
5249	Shield—Antenna, detector or oscillator coil shield	.20
5250	Shield—Intermediate frequency transformer shield	.22
11273	Shield—Radiotron shield	.25
4794	Socket—4 contact Radiotron socket—For Radiotron 5Z3	.15
11197	Socket—6 contact Radiotron socket—For Radiotron 6C5	.14
11198	Socket—7 contact Radiotron socket—For Radiotron 6K7, 6H6 (2nd Detector only) or 6F6	.15
11278	Socket—7 contact Radiotron socket—For Radiotron 6J7 (oscillator)	.20
11280	Socket—7 contact Radiotron socket—For Radiotron 6L7 (First detector)	.14
11196	Socket—8 contact Radiotron socket—For Radiotron 6H6 (as AVC only)	.15
11199	Socket—Dial lamp socket	.14
5224	Switch—Low frequency tone control and power switch—S13, S14	1.00
5225	Switch—Range switch—S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11	3.75
5238	Terminal—Antenna terminal board with clip, insulating strip and rivets	.14
5222	Tone Control—High frequency tone control (R28)	1.04
5232	Transformer—Audio driver transformer—(T3)	2.50
5228	Transformer—First intermediate frequency transformer (L23, L24, C32, C33)	1.80
5231	Transformer—Fourth intermediate frequency transformer (L31, L32)	1.50
5234	Transformer—Interstage transformer (T2)	3.40
8061	Transformer—Powes transformer 105-125 volts 50/60 cycles (T1)	6.75
8062	Transformer—Power transformer 105-125 volts 25-50 cycles	9.84
11194	Transformer—Power transformer 105/125/150/210/250 volts—40-60 cycles	7.08
5229	Transformer—Second intermediate frequency transformer (L25, L26, C37, C38, C66, R34)	2.42
5230	Transformer—Third intermediate frequency transformer (L27, L28, C44, C45, C46, R18, R19)	2.76
5223	Volume Control—(R24, R25, R26)	1.22
	DRIVE ASSEMBLIES	
5243	Arm—Band indicator operating arm	.42
10194	Ball—Steel ball for drive assembly—Package of 20	.25
8054	Cam—Five position cam for station selector drive assembly	.28
4422	Clutch—Tuning condenser drive clutch assembly comprising shaft, balls, ring, spring and washers assembled	1.00
8048	Coupling—Flexible coupling for variable capacitor (includes indicator shaft)	.70
11336	Dial—Dial scale with mounting rivets	.60
8045	Disc—Drive disc and gear assembly	.46
11380	Drive—Tuning condenser drive assembly complete	$6.35
8044	Escutcheon—Dial escutcheon with vernier scale	1.08
8046	Gear—Indicator shaft drive gear and vernier idler with one spring	.72
8050	Gear—Gear sector and band indicator operating link (link connects to arm on band switch)	.15
8053	Indicator—Station selector indicator pointer	.12
8051	Link—Complete with roller and spring	.30
8049	Pinion—Vernier pointer drive pinion and shaft	.55
4669	Screw—Square head No. 8-32x5/32 set screw—Package of 10	.25
8047	Spring—Coil spring for indicator shaft drive gear and vernier idler (Stock No. 8046)	.12
8052	Spring—Coil spring for link—Package of 5	.32
8042	Stud—Band indicator operating arm stud—Package of 5	.25
	LOUDSPEAKER ASSEMBLY	
8059	Board—Reproducer terminal board (2 terminals)	.14
8060	Bracket—Output transformer mounting bracket	.14
11200	Cable—Reproducer cable—Complete with connector	.50
8058	Clamp—Cone rim clamp—Package of 4	.44
11189	Coil—Field coil, magnet and cone housing (L33)	10.60
8056	Cone—Reproducer cone (L30)	1.58
5039	Connector—4 prong male connector plug for reproducer	.25
5040	Connector—4 contact female connector socket for reproducer cable	.25
9620	Reproducer—Complete	16.32
8057	Transformer—Output transformer (T4, C61)	3.22
	MISCELLANEOUS ASSEMBLY	
5211	Bolt—Speaker mounting bolt assembly—Package of 2	.24
11191	Bracket—Radiotron tuning lamp mounting bracket—less clamp (Stock No. 11192)	.12
11192	Clamp—Radiotron tuning lamp mounting clamp—less bracket (Stock No. 11191)	.12
11193	Cover—Reproducer cover	.82
11276	Escutcheon—Tuning lamp escutcheon	.40
11379	Escutcheon—Station selector escutcheon and crystal	1.08
11346	Knob—Station selector knob—Package of 5	.75
11347	Knob—Volume control, tone control, power switch or range switch knob—Package of 5	.75
11382	Resistor—1 Megohm—Carbon type—1/10 watt (R39)—Package of 5	.75
11348	Screw—8-32-7/16" headless set screw for knob (Stock No. 11346)—Package of 10	.32
5210	Screw—Chassis mounting screw assembly—Package of 4	.16
11381	Socket—Tuning tube socket and cover	.45
11349	Spring—Retaining spring for knob (Stock No. 11347)—Package of 5	.15

MODEL C15-3
Schematic

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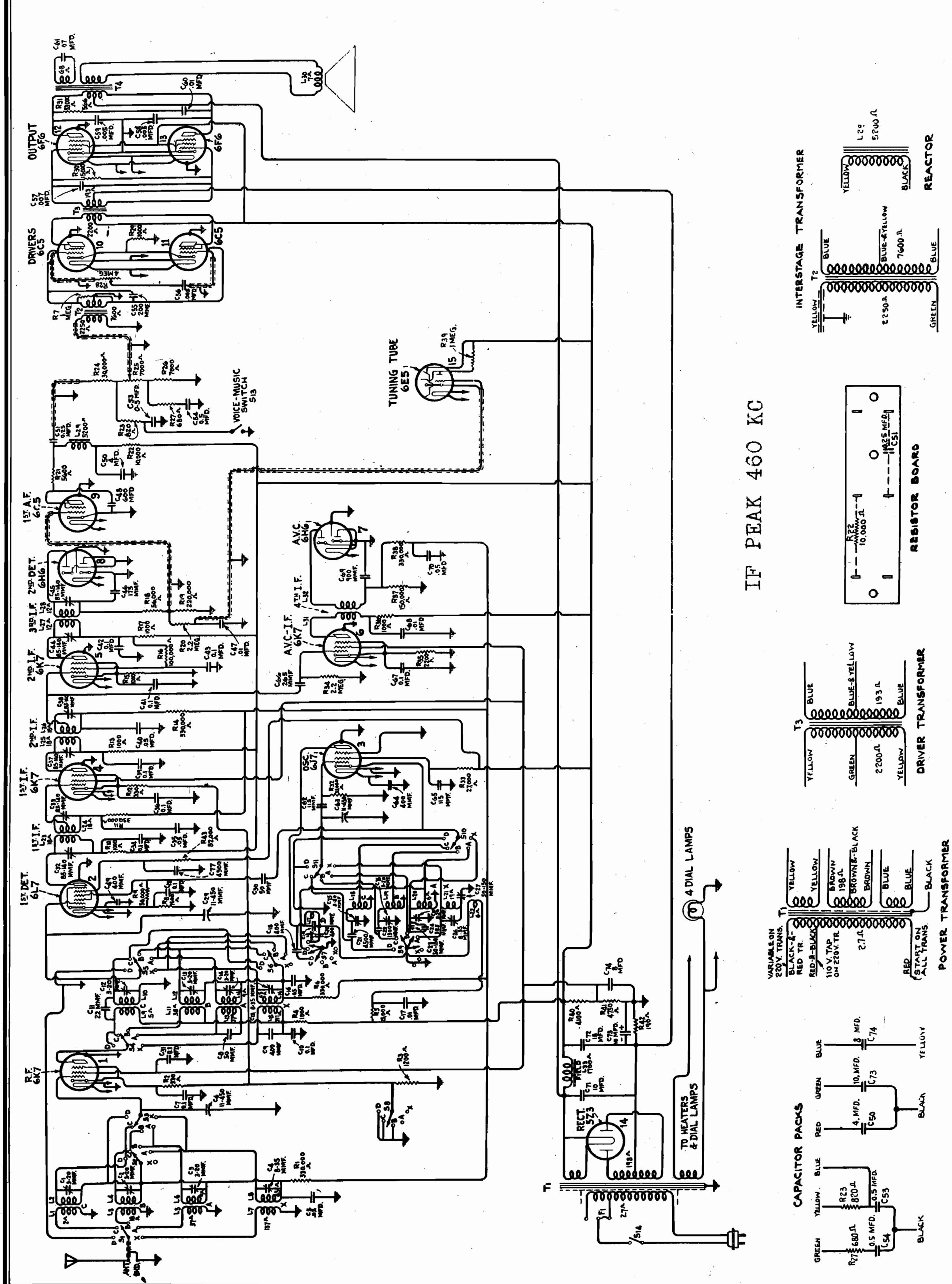
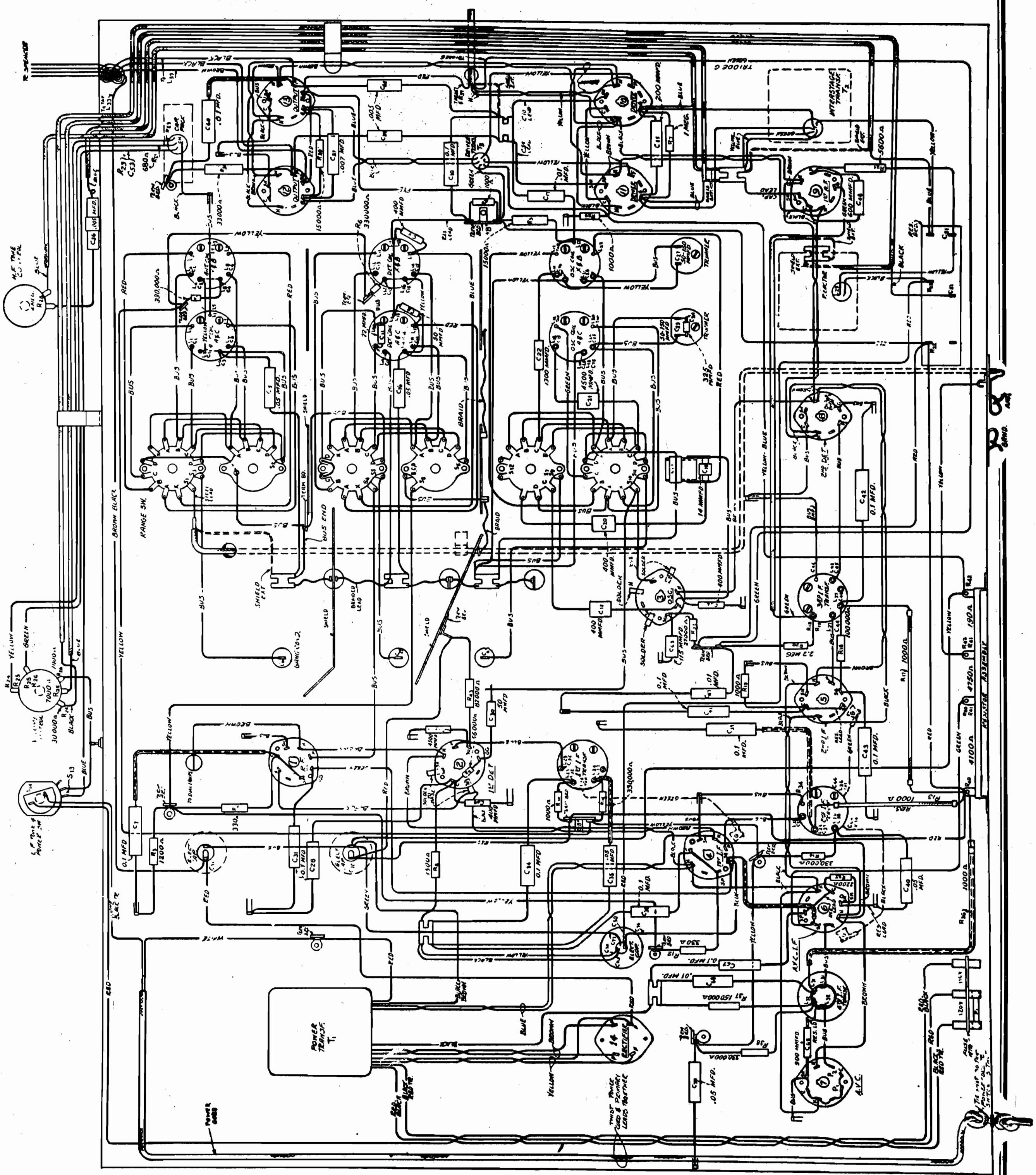


MODEL C15-3
Chassis Wiring

RCA MFG. CO., INC.



MODEL C15-3
Trimmers, Voltage
Speaker Data,
Transformer Data

RCA MFG. CO., INC.

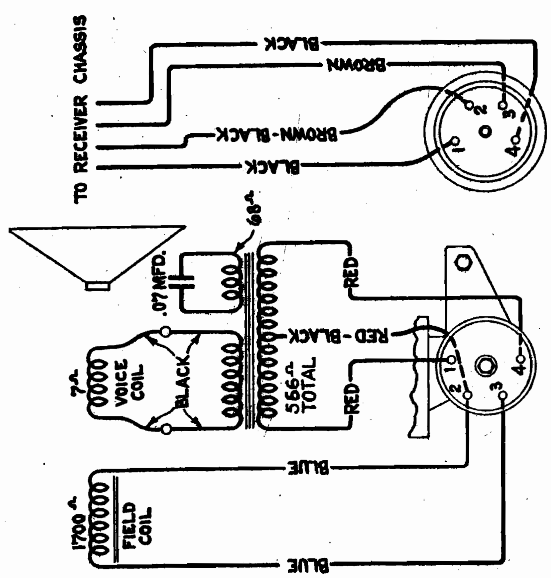


Figure 3—Loudspeaker Schematic and Wiring

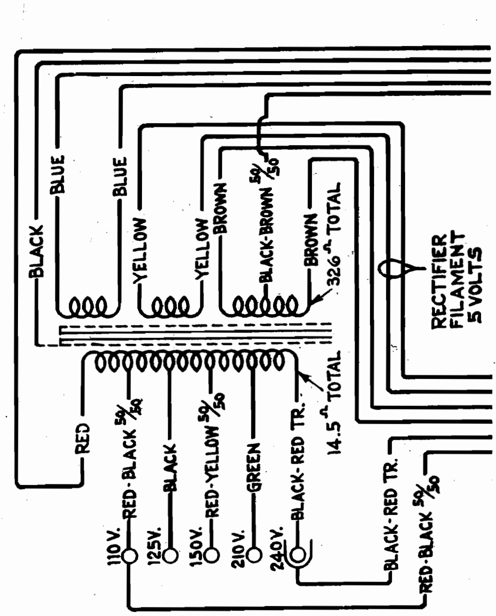


Figure 4—Universal Transformer Schematic and Wiring

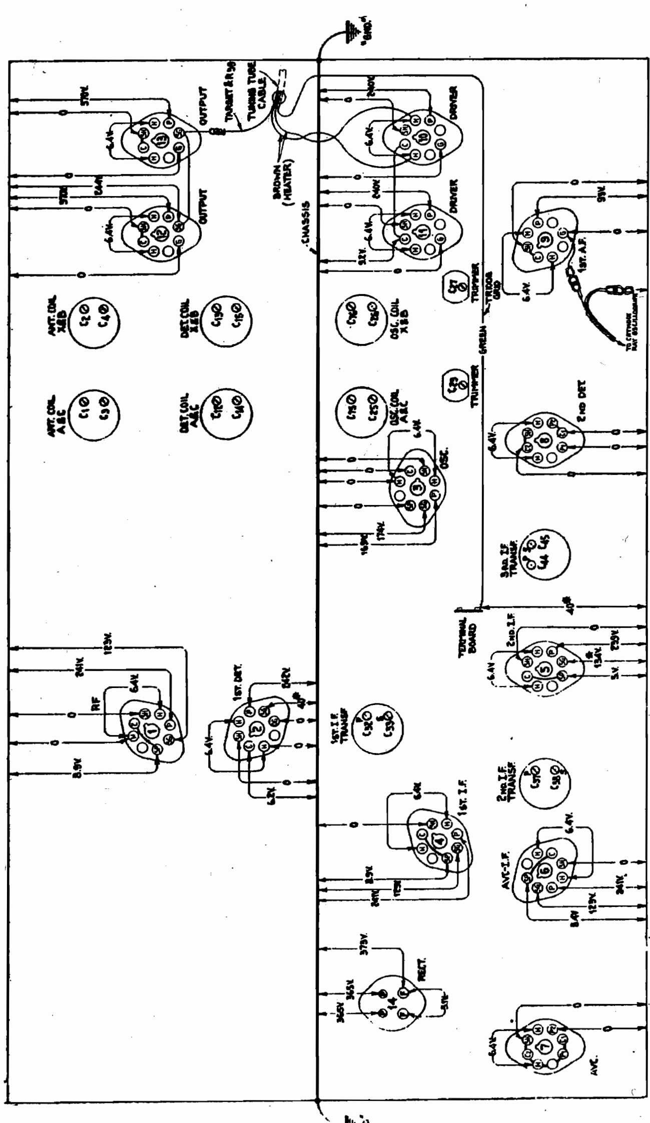


Figure 8—Trimmer Locations and Radiotron Socket Voltages

Measured at 120 volts A.C.—No Signal—All Tubes Intact—Volume Control Maximum—Band Switch on "A"

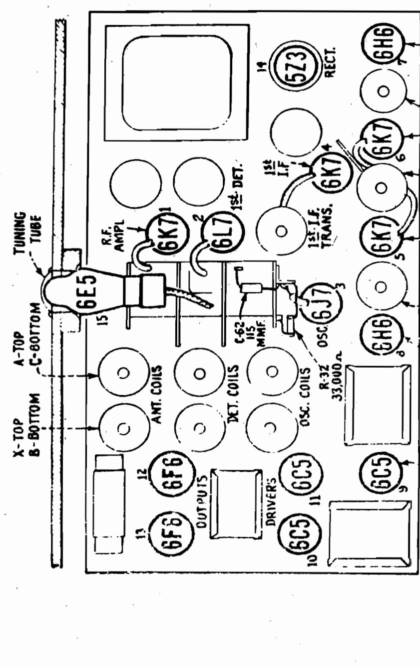


Figure 5—Radiotron and Coil Locations

MODEL C15-3
Circuit Data
Alignment

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Band D Tuning

Special notice should be taken of the manner of tuning this band. The r-f stage is unused when the range switch is turned to its Band D position and the signal is fed from the antenna directly to the first detector input circuit. The inductance of this circuit consists of a short length of bus wire to which the antenna lead is tapped at a definite predetermined point. The total length of this inductive wire from the stator of the tuning capacitor to ground represents the secondary of a high frequency autotransformer, while the inductive section included between the antenna lead tap and ground forms the primary. Alteration of the dimensions and position of this wiring will change the tuning and alignment of the circuit, resulting in total lack of operation or seriously poor operation. *It is therefore necessary when servicing to avoid changes in the wiring which includes Band D detector and oscillator r-f circuits unless the arrangement is restored to its exact original condition.* Similar caution should be observed when exchanging by-pass condensers in these same circuits, since their values, physical positions, length of leads, quality of dielectric etc. are critical and variations will definitely affect operation of the receiver. The small heater by-pass condensers and ground terminals installed at the tube sockets are very important in this respect.

Oscillator Stage

The heterodyne oscillator circuit used in this receiver is an improved type, having exceptional frequency stability and uniformity of output over its various tuning ranges. It operates on fundamental frequencies which are fed to the first detector hexode tube (RCA-6L7) on an auxiliary mixing grid. The oscillator generates a signal which is at all times above the frequency of the incoming signal by 460 kc. As shown by the schematic diagram, the cathode of the oscillator tube is above ground potential for r.f., while the plate is effectively at ground potential. This particular arrangement, together with the plate and screen series resistors, makes the circuit independent of supply voltage variations in regard to stability and uniformity of output. Separate coils are used for each of the tuning ranges. The switching of the different bands is such as to short circuit certain unused coils which would absorb energy from the circuits used.

Intermediate Amplifier

Two stages of i-f amplification comprising three tuned transformers and two RCA-6K7 tubes are arranged in cascade to operate at 460 kc. The transformers have their primaries as well as secondaries tuned by adjustable trimmer capacitors. These trimmers are designed to resist moisture, temperature and other detrimental factors which may affect their adjustments. Litz wire is used for the windings of the third transformer in order to provide the proper efficiency in driving the diode second detector.

Second Detector

Signal detection is brought about by the rectifying action of the RCA-6H6 double diode tube. Audio signal obtained from the voltage drop across resistor R-19 in the diode circuit, is transmitted to the first audio stage by direct coupling. The direct signal component across resistor R-19 is used for bias for the RCA-6C5 first audio tube.

Automatic Volume Control

The a.v.c. operates as a parallel system, being fed from the first i-f output through an auxiliary amplifier tube, an RCA-6K7. This stage has an untuned input and broadly resonated output, as accomplished in the natural period fourth i-f transformer. A double diode RCA-6H6 receives the signal at i-f frequency from the No. 6 stage and rectifies it in order to obtain the d-c component required for a.v.c. This component, which develops across resistor R-37, is applied to the control grids of the r-f, first detector and i-f tubes through resistor-condenser filter systems. The value of the bias obtained by this process varies with the intensity of the received signal and in turn governs the amplification of the receiver, thereby automatically regulating the output to the same level when there are fading tendencies and similarly when tuning from station to station.

Audio System

Several stages of audio amplification provide excellent fidelity and wide range of volume both for short wave as well as on the standard and long wave bands. The high gain of the system has necessitated thorough shielding and careful manufacture. All wiring, transformers, etc., should always be placed as originally installed if it has been necessary to remove such for service purposes. Hum difficulties are likely to occur if this caution is not observed. Manual volume control is by means of an acoustically tapered potentiometer which conveys the audio output of the first a-f stage to the interstage coupling transformer. This control has tone compensation produced by filters connected to two points thereon. This gives the correct aural balance at different volume settings. A music-speech switch is provided in one of the volume control filter circuits for use in obtaining good speech intelligibility. On the speech position, the low frequency tones are reduced. A push-pull driver stage is used between the first a.f. and the Class AB output amplifier. A continuously variable high frequency tone control is shunted across the grids of the driver tubes. A sharp, high audio frequency cut-off is obtained by a tertiary winding on the audio output transformer and by the correct design of the driver and interstage transformers. This cut-off feature results in quieter operation by the reduction of high frequency noise, especially on weaker stations.

Rectifier and Filter

An RCA-5Z3 full-wave rectifier tube is employed in the high voltage supply system. The loudspeaker field coil serves as a filter reactor in conjunction with high capacity, electrolytic condensers. Fixed bias voltages are made available at the filter output on a divider system, which is likewise well filtered with large capacitors.

Tuning Indicator

A cathode-ray tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube is of new design and comprises an amplifier section and a cathode-ray section built in the same glass envelope. The cathode-ray section consists of a conically shaped luminescent screen, upon which a pattern is formed by an effect of the detected signal after said effect has been amplified by the amplifier section which is fed from the detector diode circuit. The size of the pattern is determined by the strength of the signal voltage, so that any change of tuning may be readily observed in order to facilitate tuning to exact resonance.

Alignment Procedure

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied, the normal performance of the instrument will be obtained.

Circuits aligned by use of Cathode-Ray equipment will be as near to perfection as possible, hence this method is to be preferred in all cases. Alignment by other methods is oftentimes an approximation unless extreme care is taken and a good deal of time expended. The oscillographic method is particularly advantageous for trimming the i-f tuned circuits to obtain the utmost in tone quality and at the same time the maximum of selectivity. Procedure to be followed when using a Cathode-Ray Oscillograph is therefore given in detail. Should this type of equipment be unavailable, a substitute indicator may be used, the procedure being the same but without the sweeping operations.

Equipment

The instruments required for placing this receiver in proper alignment should consist of an RCA Cathode-Ray Oscillograph, an RCA Full Range Oscillator, an RCA Frequency Modulator, a Tuning Wand and an Alignment Tool. All of these devices are illustrated and described on a separate page of this booklet. The Cathode-Ray Oscillograph is to be used as an output indicator to precisely show when the circuits are correctly aligned. The Full Range Oscillator is required as the source of standard alignment signals at the various frequencies. Visual alignment is made possible through use of the Frequency Modulator, which in conjunction with the Oscillograph and Oscillator, causes the characteristic wave shape of the circuit under test to be formed on the Oscillograph screen. Adjustments must be made with an insulated screw driver, the Alignment Tool fitting such a requirement. The necessity for alignment and direction of required change may be tested with the Tuning Wand. Its use is as follows:—

The Tuning Wand, which consists of a bakelite rod having a small brass cylinder installed at one end and a core of finely divided iron at the other, may be inserted into a tuned coil to obtain an indication of the tuning. With a signal being supplied to the receiver at the particular frequency of the circuit concerned, each end of the Wand should be placed through the center of the coil. Holes are provided in the coil shields for this test. A change in tuning will be produced by the presence of the brass cylinder or iron core and consequent change of receiver output occurs. If there is a decrease of output when either of the two ends are inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into line. The trimmer involved should therefore be increased accordingly. If the brass cylinder end causes an increase in output, while the iron end causes a decrease, reduction of inductance will be necessary to bring the circuit into alignment. This will be equivalent to decreasing the trimmer concerned.

Changes Indicated by Tuning Wand

Wand	Signal	Trimmer
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

I-F TRIMMER ADJUSTMENT

Six trimmers are associated with the three i-f transformers. Their locations on the chassis are shown by Figure 8. Each must be aligned to a basic frequency of **460 kc.** The last i-f transformer should be adjusted first, the one preceding it second and the operation carried through successive stages until the first transformer has been aligned. For such a process, it is necessary to feed the output of the Full Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each and observing the effect at the second detector output on the Cathode-Ray Oscillograph. The most convenient point for connection of the Oscillograph is at the control grid of the RCA-6C5 first audio tube, with the vertical "Hi" input terminal attached to the grid connection and the "Gnd" to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as illustrated in Figure 7. A .001 mfd. capacitor installed in series with the Oscillator "Ant." output lead will prevent the voltage constants of the stage being aligned from becoming upset. Proceed further as follows:—

(a) Place the receiver, Oscillograph and test Oscillator in operation. Set the receiver volume control to maximum and the range switch to Band "A". Tune the station selector to a point where no interference is caused by local stations or the local oscillator, removing the 6J7 tube if necessary. Turn the Oscillograph vertical "A" amplifier to "On" and advance the vertical gain control to its maximum position. Set the horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a trace completely across the screen. Have the timing control adjusted to "Int."

(b) Attach the output of the test Oscillator to the control grid cap of the second i-f tube (RCA-6K7) and chassis ground. Tune the Oscillator to **460 kc.** having its modulation switch turned to "On". Regulate the output control until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph frequency and range controls to give the desired number of cycles. Cause the image formed to stand still on the screen by manipulation of the "Sync." control. Use as low a signal

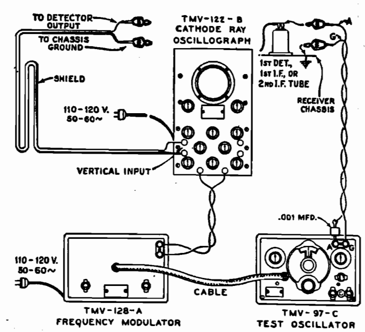

Figure 7—Alignment Apparatus Connections

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MODEL C15-3
Alignment, Part 2
Cathode-Ray Oscillograph Images for Alignment

output from the Oscillator as can be accurately observed at the Oscillograph. Then tune the two trimmers C-44 and C-45 of the third i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition, the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full Range Oscillator by means of the shielded patch cord provided. Figure 7 shows the proper arrangement. Set the Frequency Modulator sweep range switch to its "Lo" position and turn the Oscillator modulation switch to "Off". Change the timing (Sync.) control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become coincident at their highest points. These curves will be found to occur at an Oscillator setting of *approximately* 540 kc. They will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with these requirements and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-44 and C-45 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as above, change the Oscillator output to the control grid cap of the first i-f tube (RCA-6K7). Adjust the two trimmers C-37 and C-38 of the second i-f transformer until the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.

(e) Change the test Oscillator output to the control grid of the first detector tube (RCA-6L7) without disturbing the connections and adjustments of the other apparatus. Then align the trimmers C-32 and C33 of the first i-f transformer to produce waves of maximum coincidence and maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the over-all tuning characteristic of the i-f system.

ANTENNA, DETECTOR AND OSCILLATOR

For Bands A and X, adjustments must be made at the high and low frequency ends of the range. On Bands B and C, alignment is required only at the high frequency end. Band D is permanently adjusted during manufacture, hence no alignment will be necessary in this range. Locations of the various antenna, detector and oscillator trimmers are shown on Figure 8. The test Oscillator should be removed from connection with the i-f system and its output attached to the antenna-ground terminals of the receiver. No changes are to be made in the attachment of the Oscillograph at the second detector. During the adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Such procedure will obviate apparent broadness of tuning which would result from a.v.c. action on a stronger signal. The sequence of alignment should be Band A, Band X, Band B and Band C. Proceed with the adjustments as follows:—

Calibration

Set the receiver range switch to Band A and rotate the station selector until the tuning capacitor plates are in full mesh (maximum capacity). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the and A scale. Correct the setting of the vernier second hand pointer to read zero.

Band A

(a) With the receiver range switch on its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector and antenna trimmers, C-25, C-14 and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. Then shift the timing control to "Ext." and place the Frequency Modulator into operation with its connections to the Oscillator and Oscillograph as shown on Figure 7. Retune the test Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-25, C-14 and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator until the two similar forward and reverse waves appear on the screen. It is advisable to shift the Oscillator to its 200—400 kc. range and use the third harmonic of the generated signal in order to obtain the desired range of sweep for this adjustment. The trimmer C-23 should then be adjusted until a point is reached where the waves have the greatest amplitude. It will be unnecessary to rock the tuning condenser for this operation inasmuch as the Frequency Modulator is automatically producing the same effect. After completing this adjustment, the trimmer C-25 should be realigned as in (a) to correct for any change in the oscillator high frequency tuning which has been caused by the adjustment of C-23.

Band X

(a) Disconnect the Frequency Modulator and tune the test Oscillator to a frequency of **400 kc.** (Modulation "On"). Place the receiver range switch in its Band X position and turn the station selector until the dial pointer reads **400 kc.** Adjust the Oscillograph timing control to "Int." Then align each of the trimmers C-26, C-15 and C-4 to the point producing maximum output at the Oscillograph. Place the Frequency Modulator in operation and attach it to the Oscillator in the normal manner. Change the Oscillograph timing to "Ext." Increase the frequency of the Oscillator (modulation "Off") until the two waves appear and become coincident at their highest points, *approximately at 462 kc.*. They may be made to remain stationary on the screen by manipulation of the Oscillograph range switch and frequency control. Readjust the three trimmers C-26, C-15 and C-4 to give maximum amplitude and complete coincidence of the waves.

(b) Change the test Oscillator so that it delivers a signal of **150 kc.** with the Frequency Modulator disconnected. Tune this signal on the receiver which has previously been set to Band X, disregarding the dial reading at which the signal is best received. Then interconnect the Frequency Modulator with the Oscillator and retune the latter to the point at which the two similar waves appear on the screen. Adjust the trimmer C-27, for maximum amplitude of the wave images. Rocking of the tuning condenser will not be necessary as the Frequency Modulator duplicates such an operation. Repeat the alignment of C-26 as outlined in (a) to correct for any reflective error brought about by the adjustment of C-27.

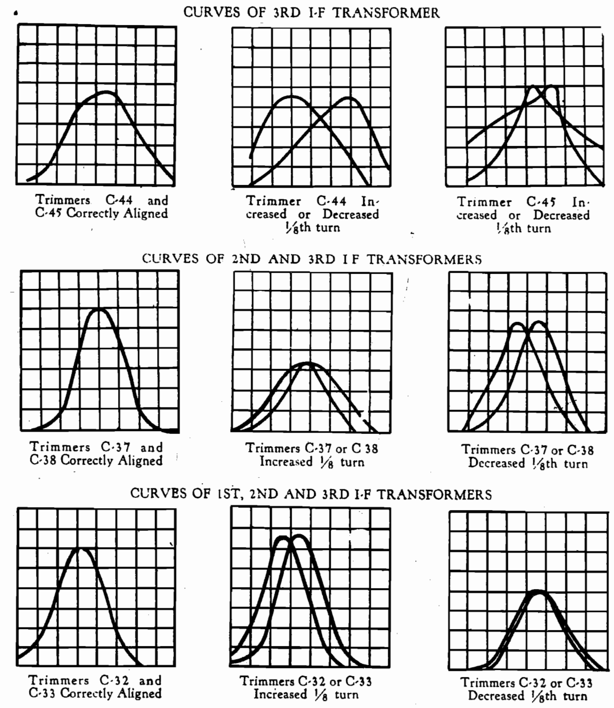


Figure 6—Cathode-Ray Images for I-F System

Band B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of **6132 kc.** Set the test Oscillator to this same frequency (Modulation "ON" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. Then adjust the trimmer C-76 to the point producing the maximum amplitude of the image. Two positions will be found on this trimmer which causes maximum amplitude. The one of least capacitance is correct and should be used. Check for the "image" signal, which will be received at **5212 kc.** on the dial if the adjustment of C-76 has been properly made. An increase in Oscillator output may be necessary for this test, however its frequency should not be changed nor any trimmer adjustments made on the receiver.

(b) Return the station selector to the **6132 kc.** reading and align the detector and antenna trimmers C-13 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on Band B.

MODEL C15-3
Alignment, Part 3
Phonograph, Dial,
Transformer Notes

RCA MFG. CO., INC.

Band C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to this same frequency (Modulation "On" and Frequency Modulator disconnected), regulating its output to the level required for convenient observation. Adjust the trimmer C-75 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of "image" signal by tuning the receiver to **17,080 kc.** The **18,000 kc.** signal of the Oscillator will be received at this point if the adjustment of C-75 has been properly made, using the position of minimum capacitance giving maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.**, re-align C-75 if necessary, and then adjust the detector and antenna trimmers C-12 and C-1 for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on Band C.

Band D

No adjustments are required on this band.

To align the receiver by other means than those explained in the above procedure will require the use of an output indicator and a suitable test oscillator. The output device should be connected at the receiver output, either to the voice coil circuit or to the output transformer primary. Successive points of connection of the test Oscillator will be identical to those specified for Cathode-Ray alignment, the same test frequencies being used in each case. The process of sweeping the frequency of the test Oscillator with the Frequency Modulator will of course be omitted, instead, the trimmers throughout the system should be adjusted to produce maximum indication at the output. It will be essential to rock the tuning condenser for the low frequency adjustments of Bands X and A, but to cause maximum output rather than the type of indication afforded by the Oscillograph. The receiver volume control must be kept at its maximum setting and for each test, the Oscillator output regulated to maintain an indication which will be as small as possible. Under this condition, the receiver will be operating at maximum gain, but receiving only a weak signal of insufficient strength to cause appreciable a.v.c. action. This requirement is of importance in either method of procedure, since the a.v.c. will have a definite effect on the indication if a more intense input is used.

Dial Drive

The dial drive and station indicator system are of new and unique design. Five individual dial scales, each with full 180 degree band spread, are provided, one for use on each band. The scales are eccentrically arranged on a rotary disc and adapted to operate in connection with the band change switch so that as the switch is shifted to a certain band, the corresponding dial scale rotates into position. For other positions of the band switch, a similar scale selection takes place, there being only one scale visible at a time. The driving mechanism for the dial and condenser has tuning ratios of 10 to 1 and 50 to 1. Control may be interchanged between these two ratios by push-in operation of a positive action clutch which is actuated by the tuning knob. From the clutch and ratio-controlling mechanism, the drive system interlinks with the tuning condenser, main dial pointer and vernier dial pointer through means of fibre and brass gears. The ratio of vernier rotation to the main pointer is 20 to 1. An intermediate gear is used in the system to reduce gear back-lash. This gear is suspended in position with two tension springs which maintain the proper mesh at all times. A flexible coupling disc is used between the drive and the condenser shaft.

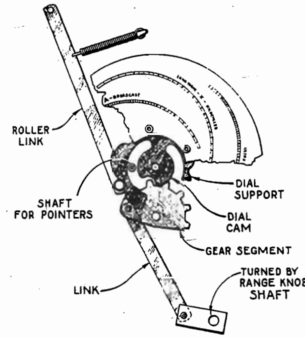


Figure 9—Selector Dial Change Mechanism

Dial Adjustment

Figure 9 illustrates the relations of the various parts of the dial mechanism when it is in its A—Broadcast position and the range switch is likewise turned to its Band A setting. In re-assembling the dial after repair, see that the gears are meshed in accordance with the diagram, at the same time noting that the lever which is attached to the range switch shaft is in the position as shown.

Phonograph Attachment

The audio system of this receiver may be adapted for use in the reproduction of phonograph records by proper connection and arrangement of an external turntable and its associated accessories. The relatively

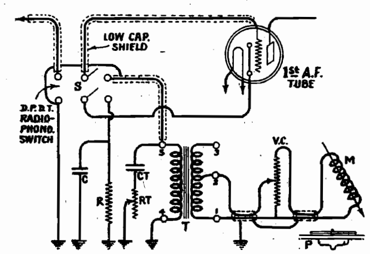


Figure 10—General Phonograph Connections

INSTALLATION

Change the receiver circuits and add phonograph connections to conform with the above schematic. Resistor R and capacitor C must be used to provide the proper bias. Thoroughly shield leads where indicated, keeping them clear of a-c circuits and transformers. Place transformer T so as to obtain minimum lengths of secondary leads and mount it in the position which does not cause hum.

PARTS REQUIRED

M—Magnetic Pickup —Low Impedance	T—Phono Input Transformer—Stock No. 7445
VC—Volume Control —100 ohms	P—Phono Turntable Mechanism
R—Biasing Resistor— 2500 ohms	C_t—Condenser—.05 mfd.
C—By-pass Condenser —10 mfd.	R_t—Variable Resistor —0 to 10,000 ohms

high amplification due to the number of a-f stages employed, necessitates that great care be taken when the circuits are changed for phonograph input. It is recommended that the turntable used be fed directly to the grid circuit of the first audio stage, with suitable switching installed for changing between radio and phonograph operation. Bias of the stage must be maintained by addition of a resistor, to be shorted out for the radio position of the switch. This resistor should be by-passed by a condenser of appropriate rating. Diagrams covering suggested methods of phonograph attachment are given in Figures 10 and 11 with installation details. Hum may possibly be encountered from lack of shielding and improper placement and shielding of the input transformer if these items are not taken care of during re-arrangement of the circuits. All wiring should be installed in a substantial and permanent manner.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to ground on Figure 8 will serve to assist in locating causes for faulty operation when existent. Each value as specified should hold within + 20% when the receiver is normally operative at the rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. The voltages given on the diagram are actual operating values and do not allow for inaccuracies which may be caused by the loading effect of a voltmeter's internal resistance. This resistance should be duly considered for all readings. The amount of circuit resistance shunting the meter during measurement will determine the accuracy to be obtained, the error increasing as the meter resistance is comparable to or less than the circuit resistance. For the majority of readings, a meter having an internal resistance of 1000 ohms per volt will be satisfactory when the range used for each check is chosen as high as possible consistent with good readability.

Universal Transformer

The wiring of the special transformer used in some models of this receiver is given by Figure 4. This transformer is adaptable to several ranges of voltage, hence, in cases of receiver inoperation, the connections should be checked to assure that they are correct for the voltage being used.

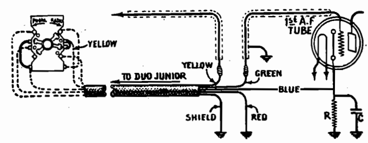


Figure 11—Duo Junior Connections

INSTALLATION

Arrange connections from Duo Junior output cable to receiver so that completed wiring is in accordance with schematic above. Add two jumpers shown by heavy full lines to Duo Junior Radio-Phono switch. Resistor R and capacitor C must be added to receiver circuit to maintain bias. Keep all leads as short as possible and well shielded where indicated.

PARTS REQUIRED

Model R-93—Duo Junior Phonograph	R—Biasing Resistor— 2500 ohms
	C—By-pass Condenser —10 mfd.

FREQUENCY RANGES

Band X	140— 410 kc.
Band A	540— 1,800 kc.
Band B	1,800— 6,000 kc.
Band C	6,000—18,000 kc.
Band D	18,000—60,000 kc.

ALIGNMENT FREQUENCIES

Band X	150 kc. and 400 kc.
Band A	600 kc. and 1720 kc.
Band B	6132 kc.
Band C	18000 kc.
Band D	*none required*

MISCELLANEOUS

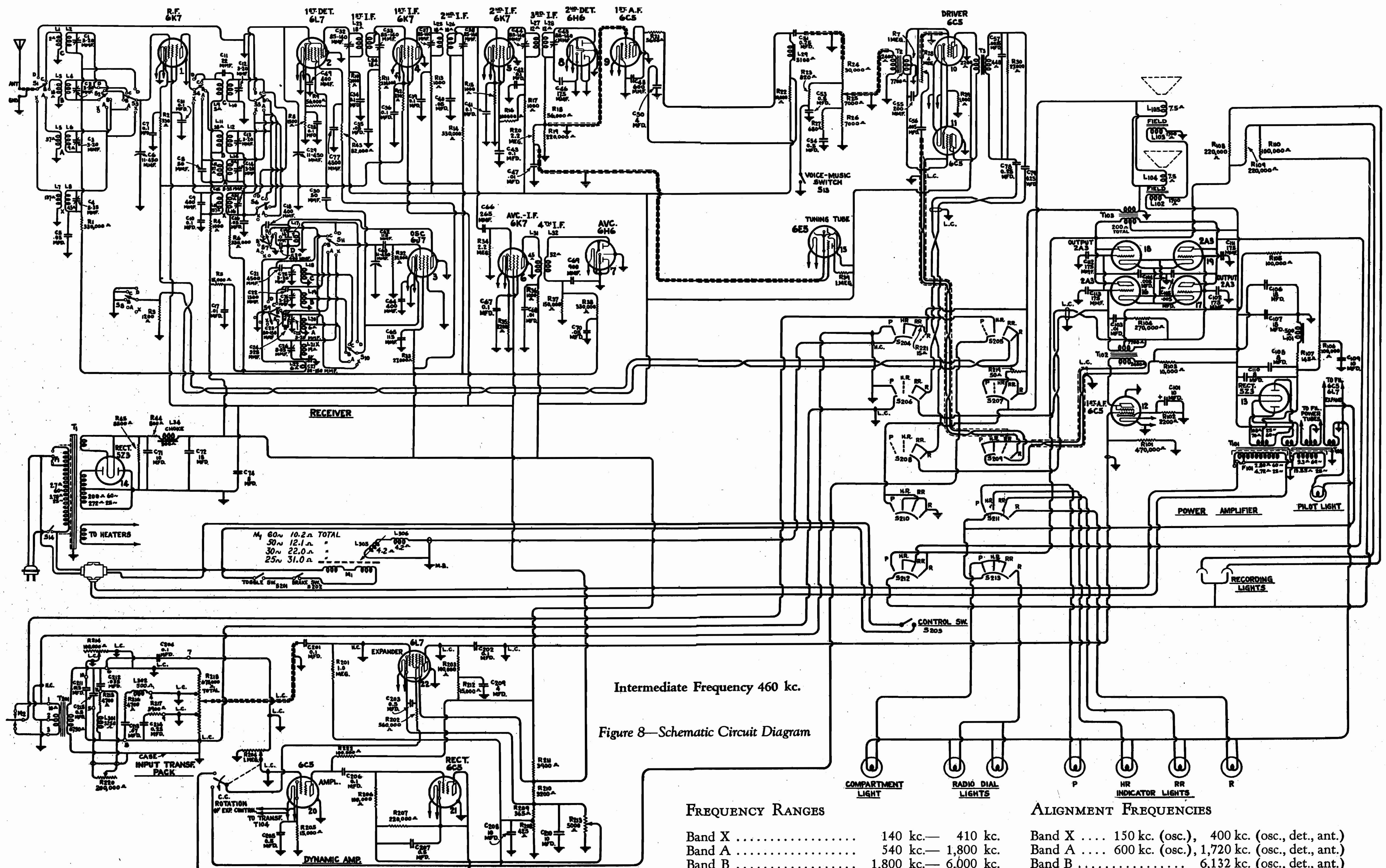
Power Consumption	145 watts
Undistorted Output	10 watts
Maximum Output	15 watts
Loudspeaker	12 inch, Electrodynamic
Voice Coil Impedance	7.5 ohms at 400 cycles
Intermediate Frequency	460 kc.

VOLTAGE AND FREQUENCY

Rating A	105—125 volts, 50—60 cycles
Rating B	105—125 volts, 25—60 cycles
Rating C	100—130/140—160/195—250 volts, 40—60 cycles

MODEL D22-1
Schematic

RCA MFG. CO., INC.



Intermediate Frequency 460 kc.

Figure 8—Schematic Circuit Diagram

Frequency Ranges

Band X	140 kc.— 410 kc.
Band A	540 kc.— 1,800 kc.
Band B	1,800 kc.— 6,000 kc.
Band C	6,000 kc.—18,000 kc.
Band D	18,000 kc.—60,000 kc.

Alignment Frequencies

Band X	150 kc. (osc.), 400 kc. (osc., det., ant.)
Band A	600 kc. (osc.), 1,720 kc. (osc., det., ant.)
Band B	6,132 kc. (osc., det., ant.)
Band C	18,000 kc. (osc., det., ant.)
Band D	No adjustments necessary

MODEL D22-1
Chassis Wiring

RCA MFG. CO., INC.

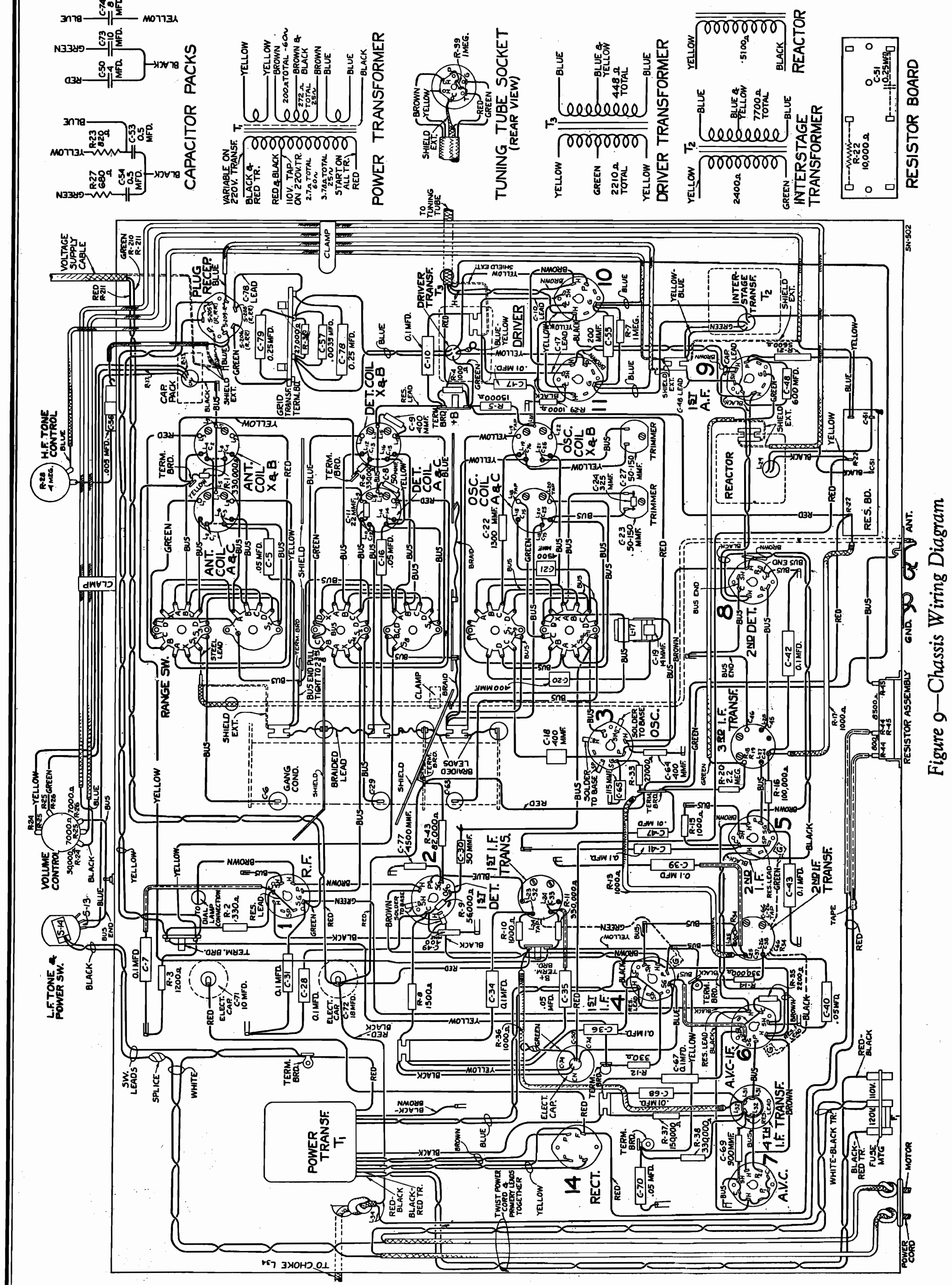


Figure 9—Chassis Wiring Diagram

MODEL D22-1
Power Amplifier
Chassis Wiring

RCA MFG. CO., INC.

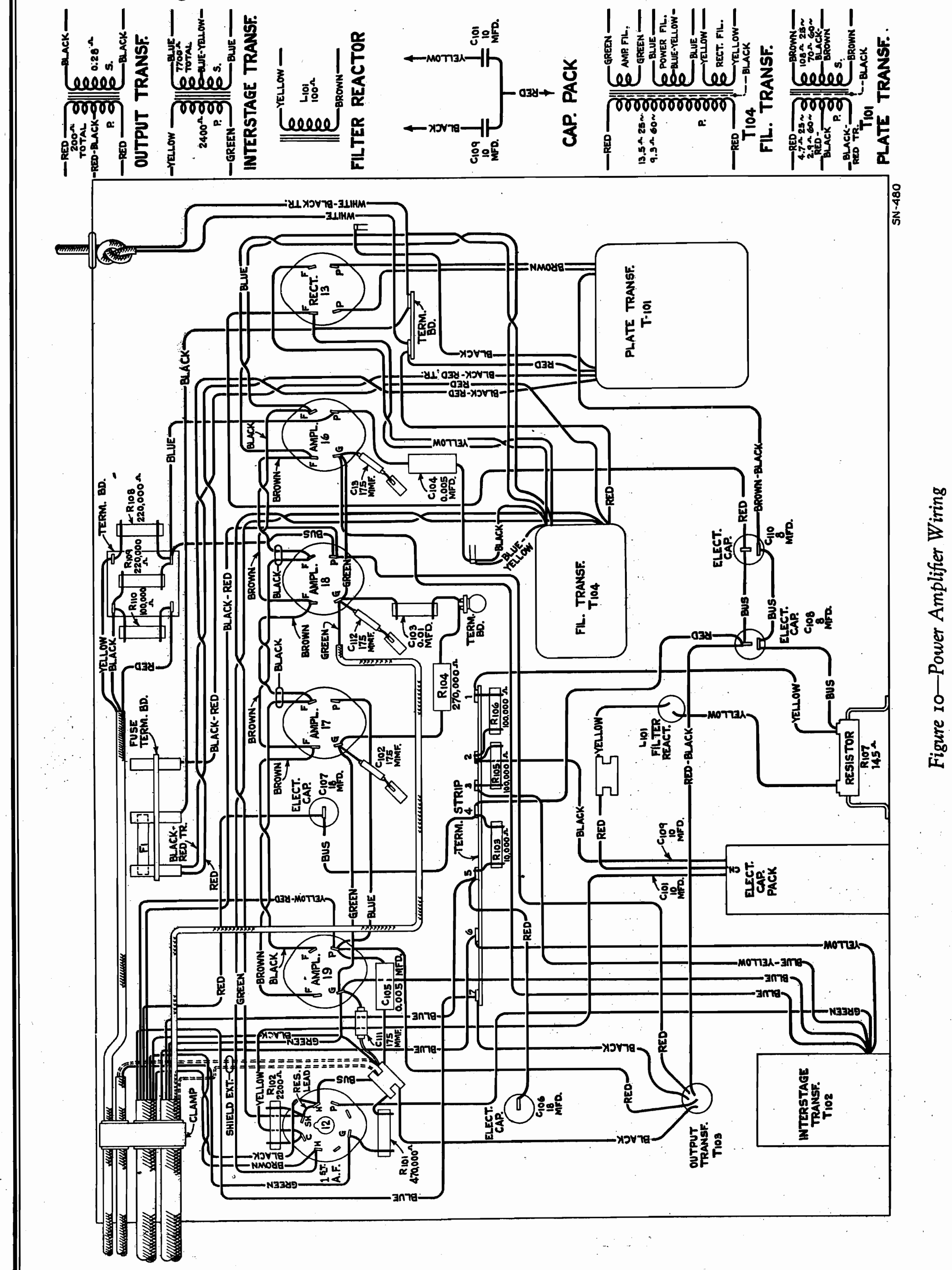
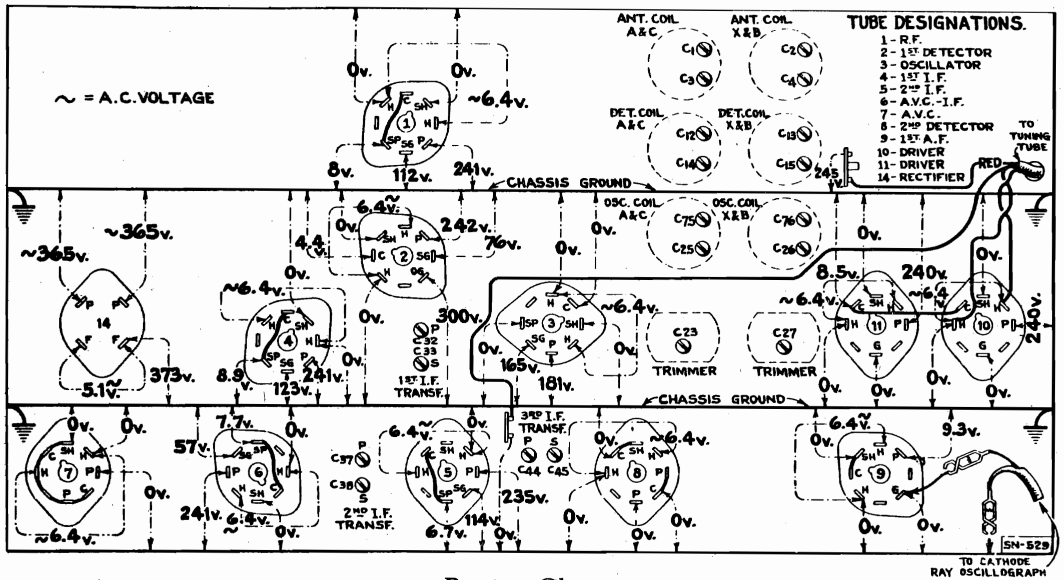


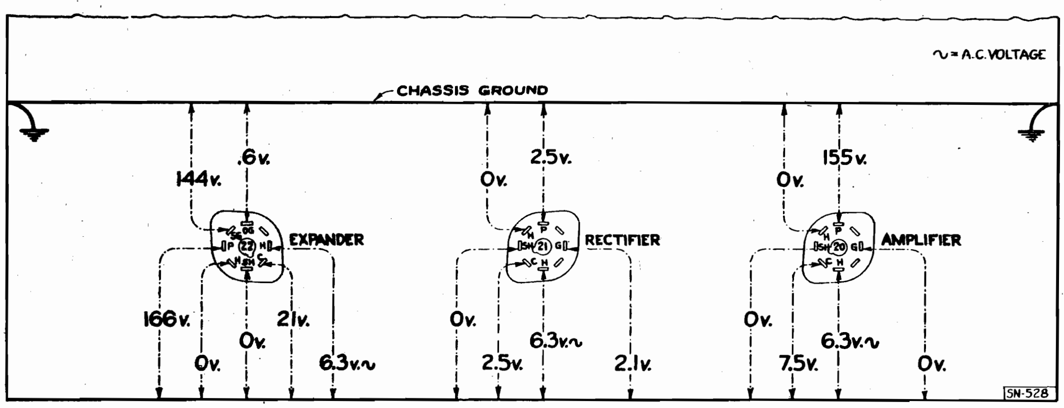
Figure 10—Power Amplifier Wiring

MODEL D22-1
Voltage, Socket

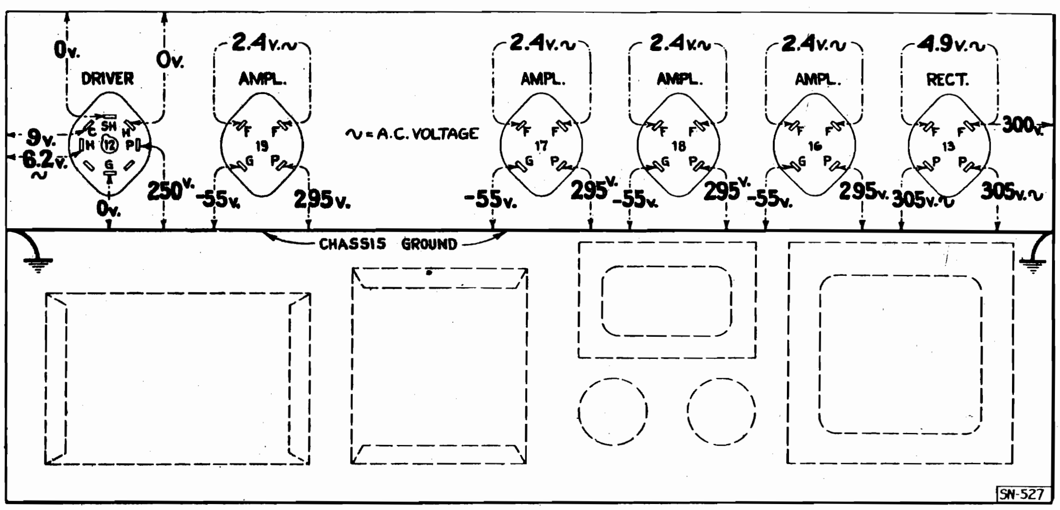
RCA MFG. CO., INC.



Receiver Chassis



Dynamic Amplifier



Power Amplifier

Figure 4—Radiotron Socket Voltages
Measured at 115 volts, 60 cycle supply—No signal being received

MODEL D22-1
Dynamic Amplifier Wiring
Pickup Details, Transformer
Dial Mechanism Details

RCA MFG. CO., INC.

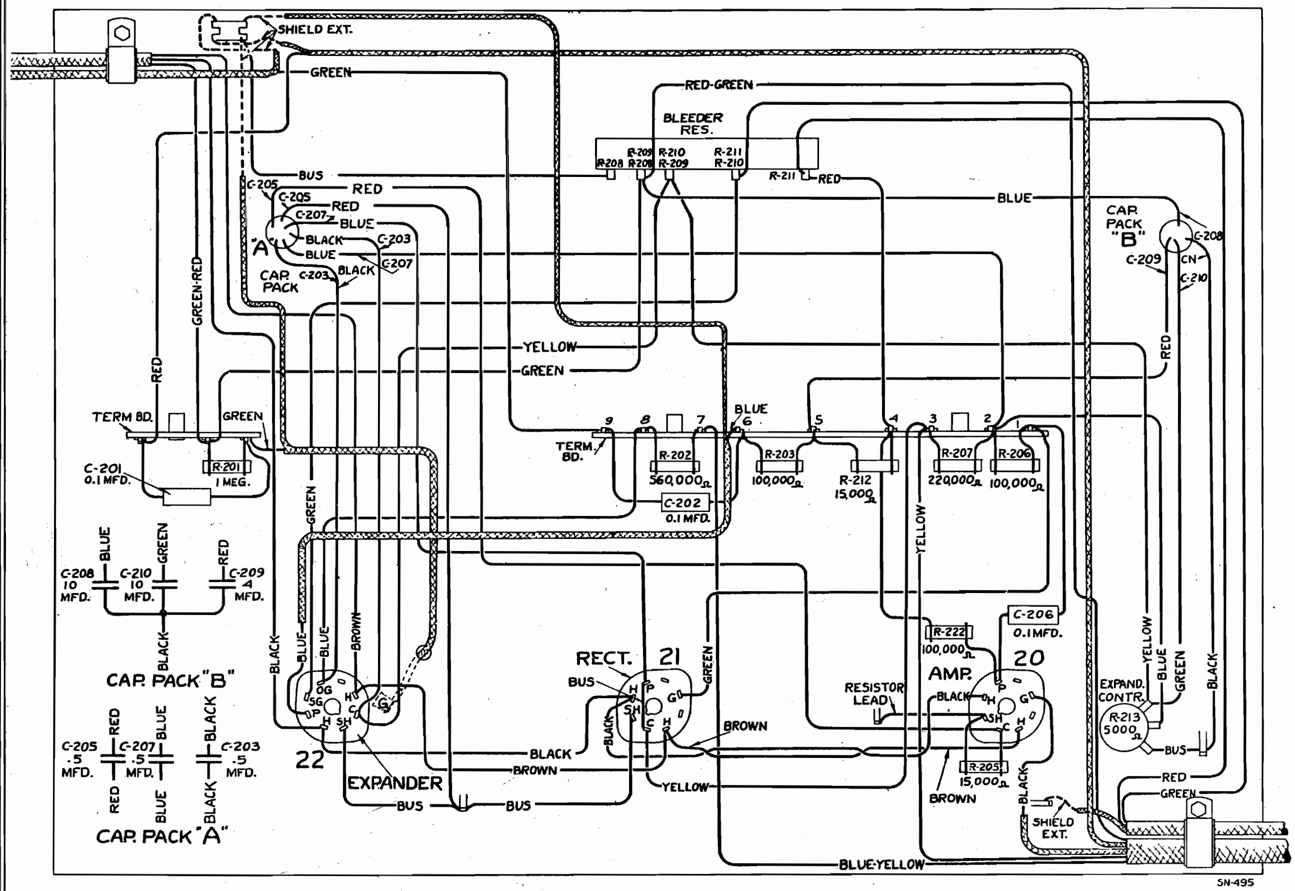


Figure 12—Dynamic Amplifier Wiring

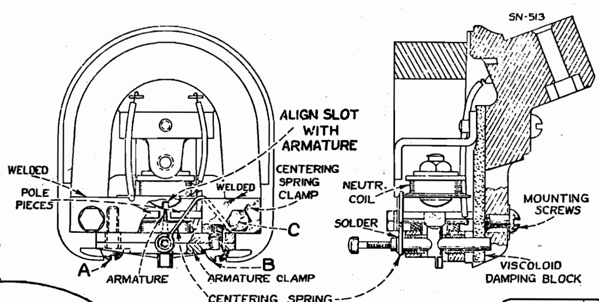


Figure 16—Details of Pickup

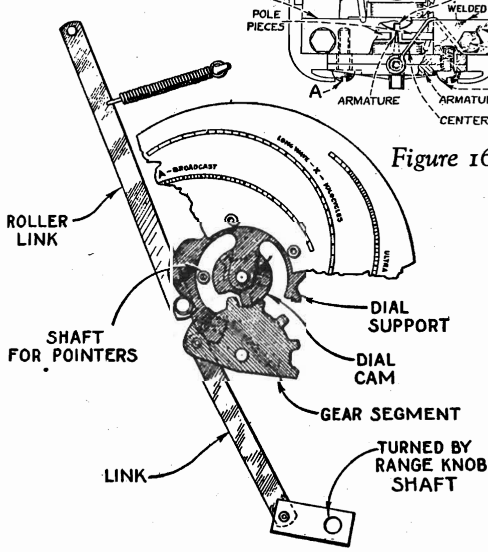


Figure 6—Selector Dial Change Mechanism

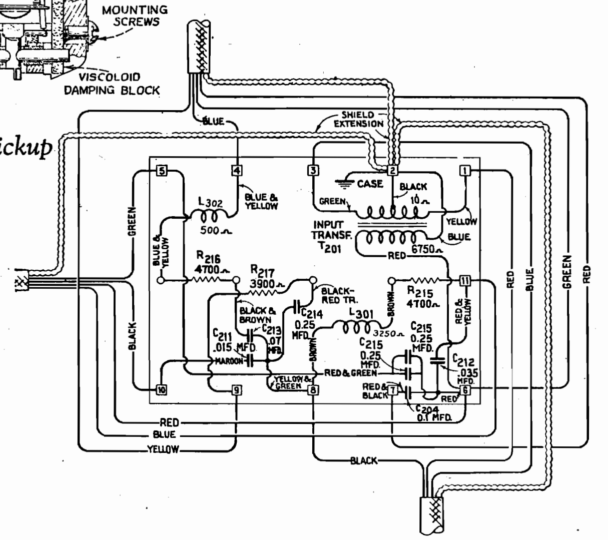


Figure 7—Input Transformer Wiring

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General Description

The RCA Victor Model D 22-1 is an instrument of de luxe quality and performance. It consists of a thirteen-tube, five-band radio receiver; a six-tube, high-level power output amplifier; and a three-tube dynamic amplifier. An automatic phonograph is part of the assembly. Home recording facilities are provided so that recordings may be made direct of a radio program, or, by means of a microphone included with the equipment, of any desired speech or music. The high level of sound energy obtainable from the output of the instrument is capably handled by two of the new Super-Sensitive, twelve-inch, dynamic loudspeakers. The important features which make this instrument outstanding are as follows:—

Dynamic Amplifier

Limitations imposed by present methods of disc recording necessitate a constricted range of sound intensity which may be recorded. The *minimum* intensity of sound which may be recorded is determined by unavoidable record surface-noise which masks the recorded sound when such sound approaches down towards the intensity of the noise. The *maximum* sound intensity which may be recorded is determined by the thickness of the record groove-wall into which the record cutting stylus makes an impression of the original sound. The depth of cutting is, therefore, regulated so that the stylus will not break over into the adjacent groove. It is because of these upper and lower limits that the sound reproduction cannot be identical to the original sound which is produced in the recording studio. To keep the recorded sound within the limiting intensities, the recording control engineer regulates the recording amplifiers accordingly.

The dynamic amplifier of this reproducing instrument is designed to compensate for the recording limitations of intensity range. It serves to restore the original intensity relations of the recorded sound by varying the amplification of the reproducing amplifier in direct accordance with the average intensity value of the sound. Thus, when there is a prevailing rise in the intensity of the recorded sound, the dynamic amplifier increases in gain accordingly, and conversely when there is a prevailing tendency toward a decrease of the recorded sound, the dynamic amplifier decreases in gain. The functions of the dynamic amplifier are particularly advantageous in the reproduction of symphonic and certain other types of music where very great ranges of sound intensity are encountered. The dynamic amplifier causes the very loud or fortissimo and the very soft or pianissimo passages to be reproduced in their natural relations, although they may have been somewhat modified in the actual recording.

Power Amplifier

In order that the dynamic amplifier may bring about its designed purpose, the amplifier and reproducing system into which it works must have an undistorted range of amplification consistent with the degree of volume expansion provided in the dynamic amplifier. The power amplifier is, therefore, designed to have a maximum output of 25 watts. This unusually high level is obtainable from four RCA-2A3 Radiotrons which are arranged in a parallel push-pull Class "A" system. The two twelve-inch loudspeakers faithfully reproduce the amplified sound at all intensities from the minimum to the maximum.

Automatic Record Changer

An improved automatic mechanism is used in this model. It is of the record ejector type, having a record capacity of seven for the ten-inch type, and a capacity of eight for the twelve-inch type. The turntable speed is fixed at 78 r.p.m. by the design of the drive motor and the intermediate gear mechanism. *This speed is invariable and does not vary as long as the supply line frequency remains constant.* The instrument may be purchased with any one of five ratings as specified under Electrical Specifications. *It is very important that a machine of any particular rating be operated at the frequency for which it is designed and rated.* Attempts to operate at other frequencies will result in improper reproduction from the phonograph system. The ejecting mechanism is arranged so that it will trip on various types of records. This is obtained by having a trip mechanism which is actuated by the rate of needle acceleration toward the center of the record.

Magic Brain

The radio receiver includes the "Magic Brain" unit for maximum all-around efficiency. This unit is a scientifically correct co-ordination of all the parts for the r-f, oscillator, and first detector functions of a Superheterodyne Receiver. Such design of the important head end, or "Magic Brain" unit, gives greater efficiency in the short-wave ranges as all lead lengths are kept as short as possible, and all sockets and other parts are located for best possible operation.

Magic Eye

A cathode-ray tube whose fluorescent screen has the appearance of a human eye, is used for visually indicating when the receiver is accurately tuned to the incoming signal. This tube is of new design. It contains two groups of elements; one group operates as an amplifier and the other group operates as a cathode-ray tube.

The cathode-ray section consists of a conically shaped luminescent screen, a cathode, and a control electrode. The detected signal from the receiver is applied through the amplifier section of the tuning tube to the control electrode of the cathode-ray section. This control electrode, in turn, affects the electron stream emitted by the cathode in such a manner as to cause a triangular shadow on the luminescent screen. The size of the shadow caused by the control electrode is determined by the strength of the incoming signal, so that a change-of-tuning is readily exhibited on the cathode-ray screen, and therefore tuning to exact resonance can be definitely obtained.

RCA All-Metal Tubes

The new metal tubes are used in the radio receiver unit, in the dynamic amplifier unit, and in one stage of the power amplifier unit. These tubes make possible a greater range of stable amplification not previously attainable with corresponding glass types. Their metal envelopes form a perfect electrostatic and electromagnetic shield, precluding the former necessity for elaborate shielding by means of cans. The metal tubes are especially adaptable to the modern, extended-range receivers because of their efficient shielding and their favorable internal characteristics.

Selector Dial

The dial drive and station indicator system are of unique design. There are five individual dial scales, each with full 180 degree band spread, one for use on each of the five tuning bands. These scales are eccentrically arranged on a rotary disc which operates in conjunction with the range-selector switch, so that as the switch is shifted to a particular band, the corresponding dial scale rotates into position, leaving the remaining four scales concealed. The driving mechanism for the dial pointer and the variable gang-condenser has tuning ratios of 10 to 1 and 50 to 1. Control may be interchanged between these two ratios by a push-pull operation of a positive-action clutch which is actuated by the tuning control knob. A vernier dial with an auxiliary pointer (band-spreader) is provided for the accurate tuning required for short-wave reception. The vernier pointer is geared to the main dial-shaft through a mechanism which causes it to rotate twenty times to a single rotation of the main dial-pointer. The dial-drive mechanism connects to the variable gang-condenser by means of a flexible coupling. This coupling arrangement together with the new shock-proof condenser mounting makes possible the rigid attachment of the drive mechanism to the receiver-chassis base without causing serious microphonic coupling between the base and the tuning condenser.

Electrical Circuits

The circuits of this instrument are arranged so that for the radio function, the incoming signal is amplified and detected in the normal process and is then transmitted to the power output amplifier through a driver stage which is part of the radio chassis. The phonograph function is accomplished through a system which includes the dynamic amplifier, a separate driver stage, and the same power amplifier as used for radio. These circuits are controlled by means of a ganged rotary-switch which is attached to the motor board in the record-playing compartment. An indicating system of pilot lamps behind engraved windows, readily displays to the operator the position of the change-over switch. It is to be noted that the dynamic amplifier works only in conjunction with the phonograph function. A control is included so that "dynamic amplification" may be eliminated if desired by the listener. The following features of electrical design are of particular importance:

Dynamic Amplifier

The purpose of this unit has been previously described. Electrically, it consists of an RCA-6L7 operating as an audio expander, an RCA-6C5 operating as an audio amplifier which, in turn, feeds another RCA-6C5 operating as an audio rectifier. The audio signal obtained from the magnetic pick-up is boosted by the input transformer and then fed to the paralleled inputs of the RCA-6L7 expander and the RCA-6C5 audio amplifier. Compensation filters are associated with the input-transformer circuit to correct the frequency response of the reproducing system so as to compensate for the recording characteristic. The signal from the input transformer is supplied to the first control-grid of the RCA-6L7 through the manual volume-control potentiometer (R-218), and is simultaneously applied through the expander control (R-204) to the control-grid of the first RCA-6C5. The signal applied to this latter tube is first amplified and then fed to the RCA-6C5 audio-rectifier stage. This latter stage rectifies the audio signal by operating as a diode. Its output is of the nature of a pulsating direct current, the amount varying in direct relation with the average value of intensity of the audio signal. The pulsating voltage due to rectification in the RCA-6C5 appears across resistor (R-207) and is applied through a delay filter (R-202 and C-203), to an auxiliary control-grid of the RCA-6L7. The value of the bias on this auxiliary control-grid determines the amplification of the RCA-6L7 expander stage. The gain of the dynamic amplifier is, therefore, automatically regulated by the average intensity of the audio signal.

Power Amplifier

The power amplifier unit contains four RCA-2A3 Radiotrons and a single RCA-5Z3 rectifier Radiotron. The amplifier tubes are arranged in parallel push-pull and are operated with fixed bias. Their grids are coupled to the radio chassis directly through a coupling transformer (T-3). The same grids are coupled to the phonograph driver-stage (RCA-6C5) through another transformer (T-102). There are two power transformers in the power-supply system; one supplying the high voltage necessary for the plate circuits, and the other supplying the heater voltages for the tubes of the power amplifier and dynamic amplifier. The home-recording level-indicator lamps are supplied from the plate circuit of the power-amplifier stage. The high level of audio energy from the output stage is delivered to the two heavy-duty, super-sensitive, electrodynamic loudspeakers through a step-down matching transformer. Suitable switching is incorporated in the voice-coil circuit for connecting in the pickup as a cutting-head for home recording.

Automatic Signal Stabilizer

The heterodyne oscillator circuit used in the radio receiver is an improved type having exceptional frequency stability and uniformity of output over its various tuning ranges. It operates on fundamental frequencies and the output is fed to the first-detector hexode tube (RCA-6L7) on an auxiliary mixing grid. The oscillator signal is at all times above the frequency

MODEL D22-1
Circuit Data, Part 2
Alignment, Socket

RCA MFG. CO., INC.

of the incoming signal by 460 kc. As shown by the schematic diagram, the cathode of the oscillator tube is above ground potential for r.f. while the plate is effectively at ground potential. This particular arrangement, together with the plate and screen series resistors, makes the circuit independent of supply voltage variations in regard to stability and uniformity of output. Separate oscillator coils are used for each of the tuning ranges. The switching between the ranges is such as to short-circuit certain unused coils which would absorb energy from the operative coils because of their natural tuning in the band being used.

Automatic Sensitivity Booster

The sensitivity on the short-wave bands, B, C, and D is higher than that of bands A and X. This difference is necessary because of the weaker signal strength normally encountered in the short-wave bands as compared to those of the longer-wave bands. Change in sensitivity from band to band is accomplished by variations of the fixed d-c bias on the r-f and i-f tubes. This change is automatically made by the range switch when it is rotated.

Automatic Volume Control

The a.v.c. operates as a parallel system, being fed from the i-f output through an auxiliary amplifier tube, an RCA-6K7. This stage has an untuned input and broadly resonated output, accomplished by the natural-period fourth i-f transformer. A double-diode RCA-6H6 operates as the a.v.c.-detector. It receives the incoming signal at 460 kc. from the a.v.c. i-f stage and rectifies it. This causes a signal d-c component to appear across the diode load resistor (R-37). This d-c component is applied to the control-grid of the r-f, first detector, and i-f tubes through resistor-condenser filters. The value of the bias obtained by this process is in accordance with the intensity of the received signal and governs the amplification of the r-f, first detector, and i-f stages, thereby maintaining the same level of input to the second-detector stage whenever there are fading tendencies, and similarly when tuning from station to station. For a given percentage of modulation, therefore, and within the range of the automatic-volume-control system, a constant output level will be obtained at the output of the receiver.

Band D Tuning

Special notice should be taken of the manner of tuning the ultra-high-frequency band of this receiver. The r-f stage is unused when the range switch is turned to its Band D position and the signal is fed directly from the antenna to the first-detector grid circuit. The inductance of the circuit consists of a short length of bus wire to which the antenna lead is attached at a definite predetermined point. The total length of this inductive wire, from the stator of the tuning capacitor to ground, represents the secondary of a high-frequency autotransformer, while the inductive section included between the antenna lead-tap and ground forms the primary. Alteration of the dimensions and position of this wiring will change the tuning and alignment of the circuit, resulting in poor operation or complete failure of operation. *It is therefore necessary when servicing to avoid any changes in the wiring which includes Band D detector and oscillator r-f circuits. If unavoidable, the arrangement must be restored to its exact original condition.* Similar caution should be observed when exchanging by-pass condensers in these same circuits, since their values, physical position, length of leads, quality of dielectric, etc., are critical, and variation will definitely affect operation of the receiver. The small heater by-pass condensers and ground terminals at the tube socket are very important in this respect.

Power Supply

The voltages for the radio receiver and plate voltage for the dynamic amplifier are supplied separately from

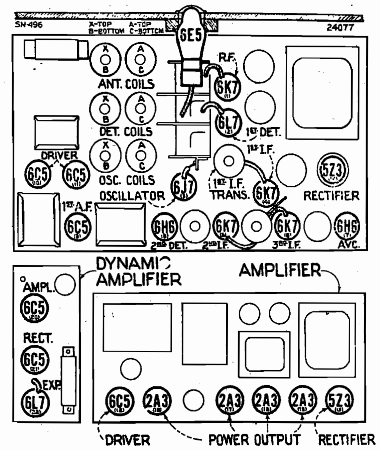


Figure 1—Radiotron and Coil Locations

a power transformer and an RCA-5Z3 rectifier stage. The voltages for the power amplifier and the filament voltages for the dynamic amplifier are supplied from two power transformers and a single RCA-5Z3 rectifier tube.

An efficient electro-static shield is placed in each of the power-supply transformers to isolate the primary and secondary for radio frequency. This isolation prevents r-f disturbances which are on the supply line from entering the receiver circuit and causing interference, and at the same time eliminates the tendency of the receiver to re-radiate into the line.

Compensated Volume Controls

Manual volume control of the radio is by means of an acoustically tapered potentiometer which conveys the audio output of the first a-f stage to the interstage coupling transformer. This control has tone compensation produced by filters connected to two points thereon. These filters give the correct aural balance at different volume settings. A music-speech control is provided in one of the volume control filter circuits for use in obtaining good speech intelligibility. On the speech position, the low-frequency tones are reduced. The phonograph volume control is likewise compensated at two points. A high-frequency tone control is connected from grid to grid of the RCA-6C5 driver tubes of the radio chassis to enable reduction of static and incidental noises which interfere with reception. Two tone controls are used in the phonograph system, one of which (left-hand in record compartment when facing cabinet) reduces low-frequency response (*maximum lows — counter-clockwise,*) and the other (right-hand) reduces high-frequency response (*maximum highs — clockwise*). Each is continuously variable and may be adjusted by the listener to produce the balance of tone which is most pleasing.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to isolate causes for defective operation when such develops. The values of the various resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles such as R-3, L-2, C-1, etc., are provided for reference between the illustrations and the Replacement Parts List. These identifications are in a sequence which begins at the left of the diagram (antenna) and they increase numerically from left to right as a signal would proceed through the circuit, thus facilitating location of such parts on the schematic diagram. The coils, reactors, and transformer windings are rated in terms of their d-c resistance only. Resistances of less than 1 ohm are generally omitted.

Alignment Procedure

Fourteen alignment trimmers are provided in the r-f, first detector, and oscillator tuning system and six are used in the i-f system. All of these are accurately adjusted during manufacture and should remain in proper alignment unless affected by abnormal conditions of climate or have been altered by other means. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

Correct performance of the receiver can only be obtained when the trimmer adjustments have been made by a skilled service man with the use of adequate and reliable test equipment. Such apparatus as may be required for alignment of this particular instrument is illustrated and described on a separate page of this booklet.

The extensive frequency range of this receiver necessitates a more or less involved method of alignment. However, if the following directions are carefully applied, normal performance of the instrument will be obtained.

Two methods of alignment are applicable. One utilizes a cathode-ray oscillograph as a means of output indication and the other follows former procedure where a glow-type indicator, or meter, is used. The oscillographic method is much to be preferred, since greater accuracy is possible from the type of indication afforded. There are no approximations necessary as with the meter or aural methods, but each adjustment can be made with definite precision. Both methods are hereinafter outlined so that the alignment operations may be made in accordance with the equipment available.

It is wise to determine the necessity for alignment, as well as the direction of mis-alignment before making adjustments. The RCA Tuning Wand is an instrument designed particularly for such a purpose.

Its use is outlined as follows:—

The Tuning Wand consists of a bakelite rod having a small brass cylinder at one end and a core of finely divided iron at the other. It may be inserted into a tuned coil while a signal of the normal resonant frequency is being supplied to such a coil in order to obtain an indication of the accuracy of the tuning. Holes are provided at the top of r-f shield-cans for entrance of the Wand. The presence of either end of the Wand will cause a change in tuning which will be indicated at the receiver output as an increase or decrease in signal level. If there is a decrease of output when either end is inserted, the tuning is correct and will require no adjustment. However, should there be an increase of output due to the iron core and a decrease with the brass cylinder, an increase in inductance or capacitance is indicated as necessary to bring the circuit into alignment. The trimmer involved should, therefore, be increased in capacitance. If the brass-cylinder end causes an increase in output while the iron end causes a decrease, reduction of inductance or capacity will be necessary to place the circuit in alignment. Therefore, the associated trimmer should be decreased in capacitance. The following tabulation gives the various changes and the adjustments required:

Wand	*Signal*	*Trimmer*
Brass	Decrease	None
Iron	Decrease	
Brass	Increase	Decrease
Iron	Decrease	
Brass	Decrease	Increase
Iron	Increase	

CATHODE-RAY ALIGNMENT

Equipment

A standard source of alignment frequencies is required. Such a source should consist of an RCA Full-Range Oscillator, Stock No. 9595. Output indication should be by means of an RCA Cathode-Ray Oscillograph, Stock No. 9545. An RCA Frequency Modulator, Stock No. 9558, will be needed to sweep the generated signal and synchronize it with the Oscillograph in order to obtain visual representation of the resonant characteristic of the circuit being tuned on the cathode-ray fluorescent screen.

RCA MFG. CO., INC.

I-F Trimmer Adjustments

Six trimmers are associated with the three i-f transformers. Their locations on the chassis are shown by Figure 4. Each must be aligned to a basic frequency of **460 kc.** The last i-f transformer should be adjusted first, the one preceding it second and the operation carried through successive stages until the first transformer has been aligned. For such a process, it is necessary to feed the output of the Full-Range Oscillator to the stages in their order of alignment, adjusting the trimmers of each and observing the effect at the second-detector output on the Cathode-Ray Oscillograph. The most convenient point for connection of the Oscillograph is at the control-grid of the RCA-6C5 first audio tube, with the vertical "Hi" input terminal attached to the grid connection and the "Gnd" to the chassis. The "Ext. Sync." terminals of the Oscillograph should be connected to the Frequency Modulator as illustrated in Figure 2. A .001 mfd. capacitor installed in series with the Oscillator "Ant." output lead will prevent the voltage constants of the stage being aligned, from becoming upset.

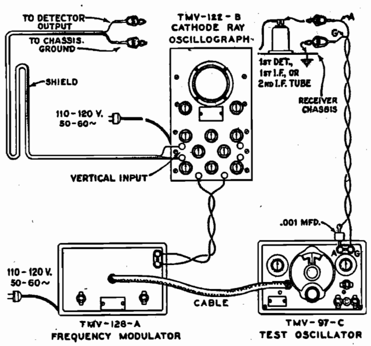


Figure 2—Alignment Apparatus Connections

The vertical "A" amplifier should be "On" for the ensuing adjustments and its gain control kept at maximum. For each adjustment, the Oscillator output must be regulated so that the image obtained on the Oscillograph screen will be of the minimum size convenient for accurate observation. Proceed fur[illegible] as follows:—

(a) Place the Receiver, Oscillograph, and Test Oscillator in operation. Set the receiver range switch to Band "A" and tune the station selector to a point where no interference will be encountered from signal pickup or from the RCA-6J7 oscillator, removing the tube if necessary. Set the Oscillograph horizontal "B" amplifier to "Timing" and control its gain so that the luminescent spot sweeps a straight line trace completely across the screen. Place the timing control to "Int." Adjust the intensity and focusing controls of the Oscillograph to produce the correct size and strength of spot.

(b) Attach the output of the test Oscillator between the control-grid cap of the second i-f tube (RCA-6K7) and chassis ground as shown typically by Figure 2. Tune the Oscillator to **460 kc.** and set its modulation switch to "On." Regulate its output until the signal produces a wave pattern on the Oscillograph screen, adjusting the Oscillograph controls to give a shape which is convenient for peak indications. Cause the image to stand still on the screen by manipulation of the frequency and synchronizing controls. Then carefully tune the two trimmers C-44 and C-45 of the third i-f transformer to produce maximum amplitude (vertical deflection) of the oscillographic image. Under this condition the transformer will be sharply resonated to 460 kc.

(c) The Frequency Modulator should then be placed in operation and interconnected with the Full-Range Oscillator by means of the special shielded patch cord. Figure 2 shows the proper arrangement. Set the Frequency Modulator sweep-range switch to its "Lo" position and turn the Oscillator modulation switch to "Off." Change the timing control of the Oscillograph to "Ext." and place the range switch to its No. 2 position. Then carefully shift the tuning of the Oscillator so as to increase its frequency, until two distinct and similar waves appear on the Oscillograph screen and become exactly coincident at their highest points. This condition will be found to occur at an Oscillator setting of *approximately 540 kc.* The curves will be identical in shape but appearing in reversed positions. Adjust the frequency control of the Oscillograph in order to cause the waves to conform with the above requirement and to make them remain motionless on the screen. This will require a setting of approximately ½ clockwise rotation of the frequency control. The trimmers C-44 and C-45 should then be re-adjusted so that the two curves move together and become exactly coincident throughout their lengths, maintaining the maximum amplitude at which this condition can be brought about.

(d) Leaving the equipment connected and adjusted as above, change the Oscillator output to the control-grid cap of the first i-f tube (RCA-6K7). Adjust the two trimmers C-37 and C-38 of the second i-f transformer until the forward and reverse waves appearing on the Oscillograph coincide throughout their lengths and have maximum amplitude.

(e) Change the test Oscillator output to the control-grid of the first detector tube (RCA-6L7) without disturbing the connections and adjustments of the other apparatus. Then align the trimmers C-32 and C-33 of the first i-f transformer to produce waves of maximum coincidence and maximum amplitude. The shape of the composite wave obtained from this operation is a true representation of the over-all tuning characteristic of the i-f system.

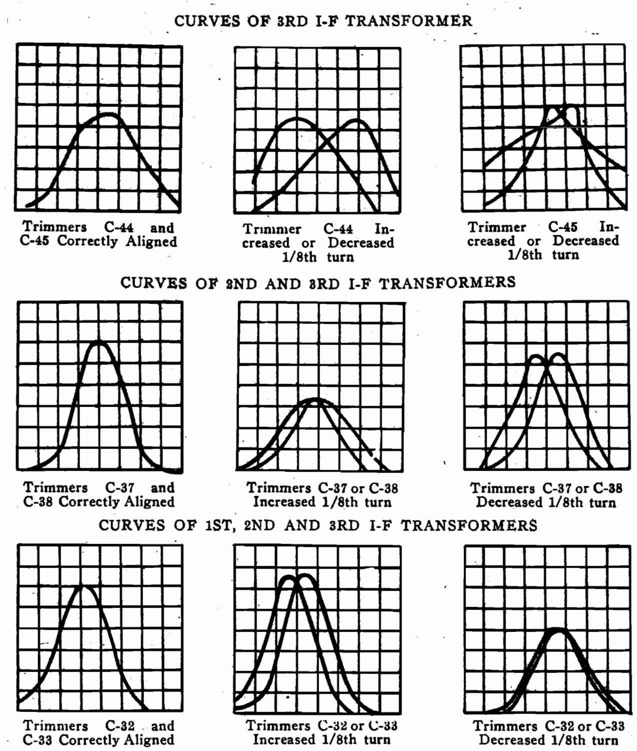


Figure 3—Cathode-Ray Images for I-F System

R-F Trimmer Adjustments

For Bands A and X, adjustments must be made at the high and low frequency ends of the range. On Bands B and C, alignment is required only at the high frequency end. Band D is permanently adjusted during manufacture, hence no alignment will be necessary in this range. Locations of the various antenna, detector, and oscillator trimmers are shown on Figure 4. The test Oscillator should be removed from connection with the i-f system and its output attached to the antenna-ground terminals of the receiver. No changes are to be made in the attachment of the Oscillograph at the second detector. During the adjustments, the Oscillator output should be regulated as often as is necessary to keep the oscillographic image as low as is practically observable. Adherence to this procedure will obviate apparent broadness of tuning which would result from a.v.c. action on a stronger signal. The sequence of alignment should be Band A, Band X, Band B, and Band C. Proceed with the adjustments as follows:—

CALIBRATION

Set the receiver range switch to Band A and rotate the station selector until the tuning condenser plates are in full mesh (maximum capacitance). Then move the main dial pointer until it points exactly to the horizontal line at the low frequency end of the Band A scale. Correct the setting of the vernier second hand pointer to read zero.

MODEL D22-1
Alignment, Part 3
Output Meter Alignment
Speaker Wiring

RCA MFG. CO., INC.

Band A

(a) With the receiver range switch in its Band A position, tune the station selector until the dial pointer is at a reading of **1720 kc.** Adjust the test Oscillator to **1720 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output to produce a registration on the Oscillograph. Carefully align the oscillator, detector, and antenna trimmers, C-25, C-14, and C-3 respectively, so that each brings about maximum amplitude of output as shown by the wave on the Oscillograph. It will be necessary to have the timing control of the Oscillograph on "Int." for this operation. After each trimmer has been peaked, the Oscillograph timing control should be set to "Ext." and the Frequency Modulator placed into operation with its connections to the Oscillator and Oscillograph made in accordance with Figure 2. Turn the modulation switch of the Oscillator to "Off" and retune the Oscillator (increase frequency) until the forward and reverse waves show on the Oscillograph and become coincident at their highest points. Adjust the trimmers C-25, C-14, and C-3 again, setting each to the point which produces the best coincidence and maximum amplitude of the wave images.

(b) Remove the Frequency Modulator cable from the Oscillator and shift the signal frequency to **600 kc.** Place the modulation switch to "On". Tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then insert the Frequency Modulator plug and retune the Oscillator (modulation "Off") until the two similar forward and reverse waves appear on the screen. For this adjustment, it is advisable to shift the Oscillator to its 200-400 kc. range using the third harmonic of the generated signal in order to obtain the desired range of sweep. The oscillator series trimmer, C-23, should then be adjusted to produce maximum amplitude of the images. No rocking will be necessary on the station selector inasmuch as the signal frequency is being "wobbled" by the Frequency Modulator to produce the same effect. After completing this adjustment, the trimmer C-25 should be re-aligned as in (a) to correct for any change brought about by the adjustment of C-23.

Band X

(a) Disconnect the Frequency Modulator and tune the test Oscillator to a frequency of **400 kc.** (Modulation "On"). Place the receiver range switch in its Band X position and turn the station selector until the dial pointer reads **400 kc.** Adjust the Oscillograph timing control to "Int." Then align each of the trimmers C-26, C-15, and C-4 to the point producing maximum output at the Oscillograph. Place the Frequency Modulator in operation and attach it to the Oscillator in the normal manner. Change the Oscillograph timing to "Ext." Increase the frequency of the Oscillator (modulation "Off") until the two waves appear and become coincident at their highest points, *approximately at 462 kc.* They may be made to remain stationary on the screen by manipulation of the Oscillograph range switch and frequency control. Readjust the three trimmers C-26, C-15, and C-4 to give maximum amplitude and complete coincidence of the waves.

(b) Change the test Oscillator so that it delivers a signal of **150 kc.** with the Frequency Modulator disconnected. Tune this signal on the receiver which has previously been set to Band X, disregarding the dial reading at which the signal is best received. Then interconnect the Frequency Modulator with the Oscillator and retune the latter to the point at which the two similar waves appear on the screen. Adjust trimmer C-27, for maximum amplitude of the wave images. Rocking of the tuning condenser will not be necessary as the Frequency Modulator duplicates such an operation. Repeat the alignment of C-26 as outlined in (a) to correct for any reflective error brought about by the adjustment of C-27.

Band B

(a) Advance the receiver range switch to its Band B position and tune the station selector to a dial reading of **6132 kc.** Set the test Oscillator to **6132 kc.** (modulation "On" and Frequency Modulator disconnected) and increase its output until a suitable indication is apparent on the Oscillograph. The Oscillograph should be adjusted for "Int." timing. Then adjust the oscillator trimmer, C-76, to the point at which maximum amplitude of the image is obtained. Two positions will be found for this trimmer which gives such a maximum. The one of least capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received at **5212 kc.** on the dial if the adjustment of C-76 has been properly made. An increase in the test Oscillator output may be necessary for this test. *Its frequency should not be changed from* **6132 kc.** *nor any trimmer adjustments made on the receiver.*

(b) Return the station selector to the **6132 kc.** reading and align the detector, and antenna coil trimmers, C-13 and C-2 respectively, for maximum (peak) output as shown by the Oscillograph. No further adjustments are to be made on this band.

Band C

(a) Turn the range switch of the receiver to its Band C position and tune the station selector until the dial pointer reads **18,000 kc.** Set the test Oscillator to **18,000 kc.** (Modulation "On" and Frequency Modulator disconnected), regulating its output to the level required for convenient observation. Adjust trimmer C-75 to the point producing maximum output as indicated on the Oscillograph. Check for the presence of "image" signals by tuning the receiver to **17,080 kc.** The **18,000 kc.** signal of the Oscillator will be received at this point if the adjustment of C-75 has been properly made, using the position of minimum capacitance giving maximum receiver output. It may be necessary to increase the output of the Oscillator in order to get an indication of the "image". *No adjustments should be made during this check.*

(b) Return the receiver tuning to **18,000 kc.**, re-align C-75 if necessary, and then adjust the detector and antenna trimmers C-12, and C-1 for maximum signal output as evidenced by the oscillographic image. No further adjustments are to be made on Band C.

Band D

No adjustments are required on this band.

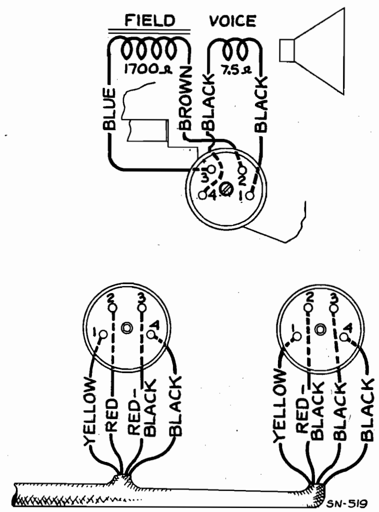


Figure 5—Loudspeaker Wiring

OUTPUT METER ALIGNMENT

To align the receiver by other methods than that explained above will require the use of a standard test oscillator, such as the Stock No. 9595, and a suitable output indicator, such as the Stock No. 4317. The indicator should be connected either to the voice coil circuit or across the output transformer primary. For each adjustment, the volume control should be maintained at maximum and the Oscillator output regulated until the indication is barely perceptible. The smaller the amount of glow, the more accurate will be the indication. The signal level will also be below the range of the receiver a.v.c., preventing broadness of tuning.

I-F Adjustments—Connect the output of the test Oscillator from the RCA-6L7 first detector control-grid to chassis-ground and adjust its frequency to **460 kc.** Tune the receiver to Band "A", setting the station selector at a point where no interference is received from local stations or the local oscillator. Then tune the i-f trimmers C-45, C-44, C-38, C-37, C-33, and C-32 in order, each for maximum indicated receiver output.

R-F Adjustments—Connect the Oscillator output to the antenna-ground terminals of the receiver. Keep the output indicator attached to the receiver output as above. For each adjustment, use the minimum signal which will give a perceptible indication on the glow indicator.

Band A

(a) Set the range switch of the receiver to its Band A position and tune the selector to a dial reading of **1720 kc.** Tune the Oscillator to this same frequency and adjust trimmers C-25, C-14, and C-3 to produce maximum indicated receiver output.

(b) Shift the Oscillator to **600 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then adjust trimmer C-23, simultaneously rocking the tuning control backward and forward through the signal, until maximum output is obtained from the combined operations. Repeat the alignment of C-25 as in (a) to correct for any change caused by adjustment of C-23.

Band X

(a) Change the range switch to its Band "X" position. Tune the receiver to read **400 kc.** and set the Oscillator to produce this same frequency. Adjust trimmers C-26, C-15, and C-4 to produce maximum receiver output.

(b) Shift the Oscillator frequency to **150 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. Then tune the oscillator series trimmer, C-27, simultaneously rocking the tuning control (receiver) backward and forward through the signal, until maximum output results from the combined operations. Repeat the alignment of C-26 as in (a) to correct for any change caused by the adjustment of C-27.

Band B

Place the receiver range switch in its Band "B" position and tune the station selector to a dial reading of **6132 kc.** Set the frequency of the Oscillator to **6132 kc.** Then adjust trimmer C-76 to give maximum receiver output. Two positions may be found which fulfill this condition. The one of least capacitance is correct. To assure that the right peak has been used, tune the *receiver* to **5212 kc.** and increase the Oscillator output. The "image" of **6132 kc.** will be received at this point if C-76 has been adjusted to the proper point of maximum output. *No trimmer adjustments are to be made during this check.* Return the receiver tuning to **6132 kc.**, readjust C-76 if necessary, and then tune the detector and antenna coil trimmers, C-13 and C-2 to produce maximum (peak) receiver output as indicated on the glow meter.

MODEL D22-1
Alignment, Part 4
Automatic Record Changer Notes

RCA MFG. CO., INC.

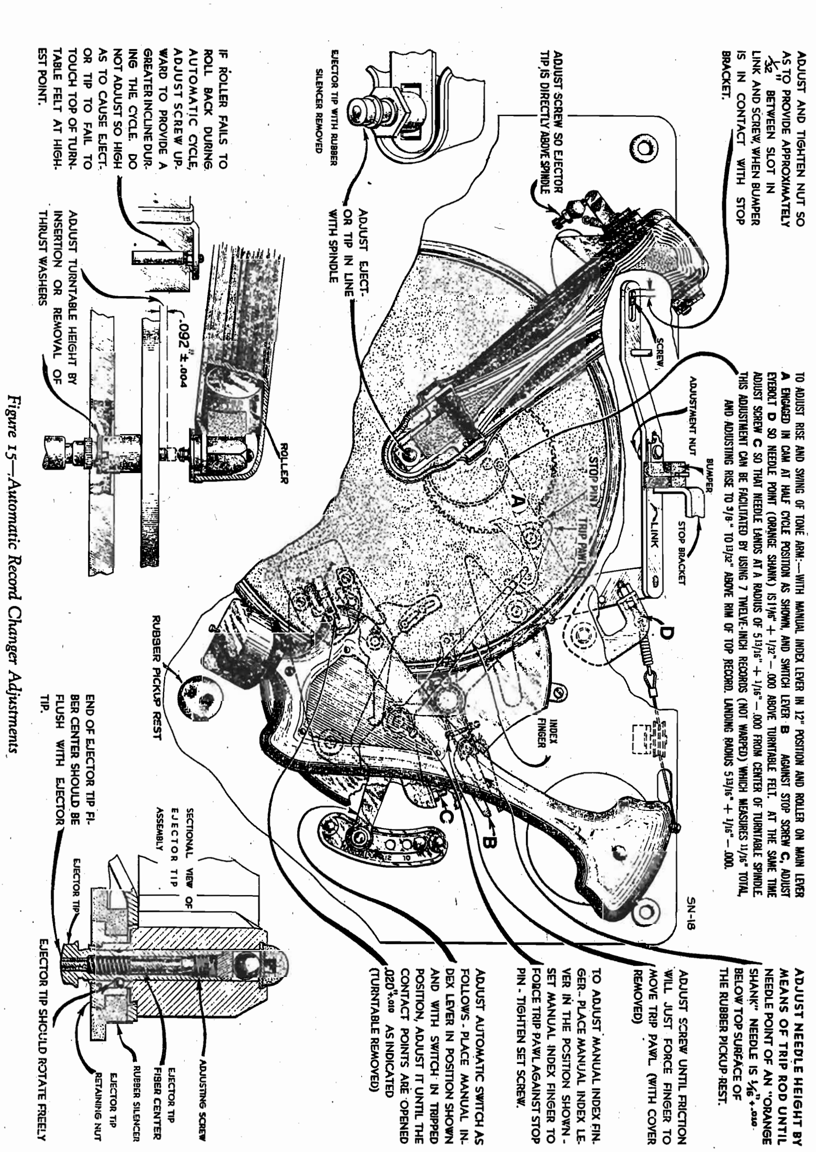


Figure 15—Automatic Record Changer Adjustments

BAND C

Turn the receiver range switch to its Band "C" position and set the tuning control to a dial reading of **18,000 kc.** Tune the Oscillator to this same frequency. Adjust the oscillator parallel trimmer C-75 to produce maximum receiver output. Two positions of the trimmer will be found which fulfill such a condition. The one of least capacitance is correct. To assure that the right position has been used, check for the "image" of the **18,000 kc.** signal which will be received at **17,080 kc.** on the dial if C-75 is correctly adjusted. An increase in Oscillator output may be necessary. *No trimmer adjustments should be made during this check.* Return the receiver tuning to **18,000 kc.**, readjust C-75 if necessary, and then tune the detector and antenna trimmers, C-12 and C-1 to give maximum receiver output.

Dial Adjustment

Figure 6 illustrates the relations of the various parts of the dial mechanism when it is in its A—Broadcast position and the range switch is likewise turned to its Band A setting. In re-assembling the dial after repairs, see that the gears are meshed in accordance with the diagram, at the same time noting that the lever which is attached to the range-switch shaft is in the position as shown.

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts to ground and appearing across the heaters (H-H) on Figure 4 will serve to assist in locating causes for faulty operation when existent. Each value as specified should hold within ± 20% when the receiver is normally operative at the rated supply voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits.

The voltages given on this diagram are actual measured voltages, and are the results obtained after the loading of the circuit, by the voltmeter, has taken place.

To fulfill the conditions under which these d-c voltages were measured it requires a 1,000-ohm-per-volt voltmeter having ranges of 30, 300, and 600 volts.

For all d-c voltages under 30, measure on the 30-volt scale; all d-c voltages between 30 and 300, measure on the 300-volt scale; and all d-c voltages between 300 and 600, measure on the 600-volt scale.

For meters of the 1,000-ohm-per-volt type, but ranges other than above, use the nearest ranges to those specified. If the range is higher the voltage *may be* higher, and if the range is lower the voltage *may be* lower; either condition depending on the percentage of circuit current drawn by the meter.

Dynamic Amplifier

It is essential that the correct voltages and currents exist at the RCA-6L7 audio expander stage in order that the expanding function may take place in the proper manner. A screw-driver adjustment (see Figure 14) is accordingly provided for regulating the fixed bias of the RCA-6L7 auxiliary grid so that the plate current may be adjusted to the correct value under a no-signal condition. This current should be adjusted to a value of 0.10—0.13 ma. with no signal input to the dynamic amplifier and with a normal voltage of 275 volts appearing across the resistance-divider system (R-211, R-210, R-209, and R-208).

A substitute method for adjusting the RCA-6L7 no-signal characteristic is by means of a voltmeter having an internal resistance of 600,000 ohms (600 volt range, 1,000-ohms-per-volt). This voltmeter should be used to set the plate (of the RCA-6L7) to chassis voltage. The plate voltage as indicated by the specified meter should be adjusted to exactly 195 volts, with a power line supply-voltage of 115 volts.

An indication of the operation of the dynamic amplifier may be obtained by playing a record which has predominating loudness. Such a record is Victor Red Seal Record No. 8651, "Die Fledermaus"—Overture. The plate current during the playing of such a record should increase from the static value of 0.10-0.13 ma. to a minimum of 0.55 ma.

Variations of the Radiotron (RCA-6L7) in the audio expander stage may affect operation of the circuit. Several tubes of such type should therefore be tried when correct performance is not obtainable from a single tube. The various voltages of the dynamic amplifier under a no-signal condition are indicated in Figure 4. It is very important that these voltages be as near to the specified values as possible.

If excessive hum is encountered, it is recommended that a different RCA-6L7 be tried in the expander unit. If this does not reduce the hum to a low enough value try reversing the power-line supply cord plug and/or the power amplifier supply plug to obtain a condition of minimum hum. The continuity of ground connections between chassis, expander unit, and power amplifier should be of very low resistance to maintain minimum hum.

Automatic Record Ejector

The record changing mechanism is designed to be simple and fool-proof. Under normal operating conditions, service difficulties should be negligible. Occasionally, however, certain adjustments may be required. These adjustments are illustrated and explained in Figure 15.

It is important when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and possibly broken parts may result.

The tip of the record ejector is adjustable in relation to the turntable spindle, the two being exactly coaxial when properly adjusted. To align the tip, remove the rubber silencer of the ejector assembly, loosen ejector tip retaining nut and slide the tip assembly to the position where it is in true-line with the axis of the turntable spindle. This adjustment may be simplified by placing several records on the turntable, depressing the spindle through the top record hole and lining up the ejector tip in the spindle hole of the record.

To insure that the ejector tip rotates freely, apply a slight amount of oil to the shank of the tip at the point where it is in contact with the ball bearing.

Magnetic Pickup

The pickup used in the phonograph unit is of an improved design, having several variations from the usual type of pickup. The magnetic assembly is one rigid piece. The horseshoe magnet is solidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and provides a damping effect on the move-

MODEL D22-1
Phonograph Data
Assembly Wiring
Cable Connectors

RCA MFG. CO., INC.

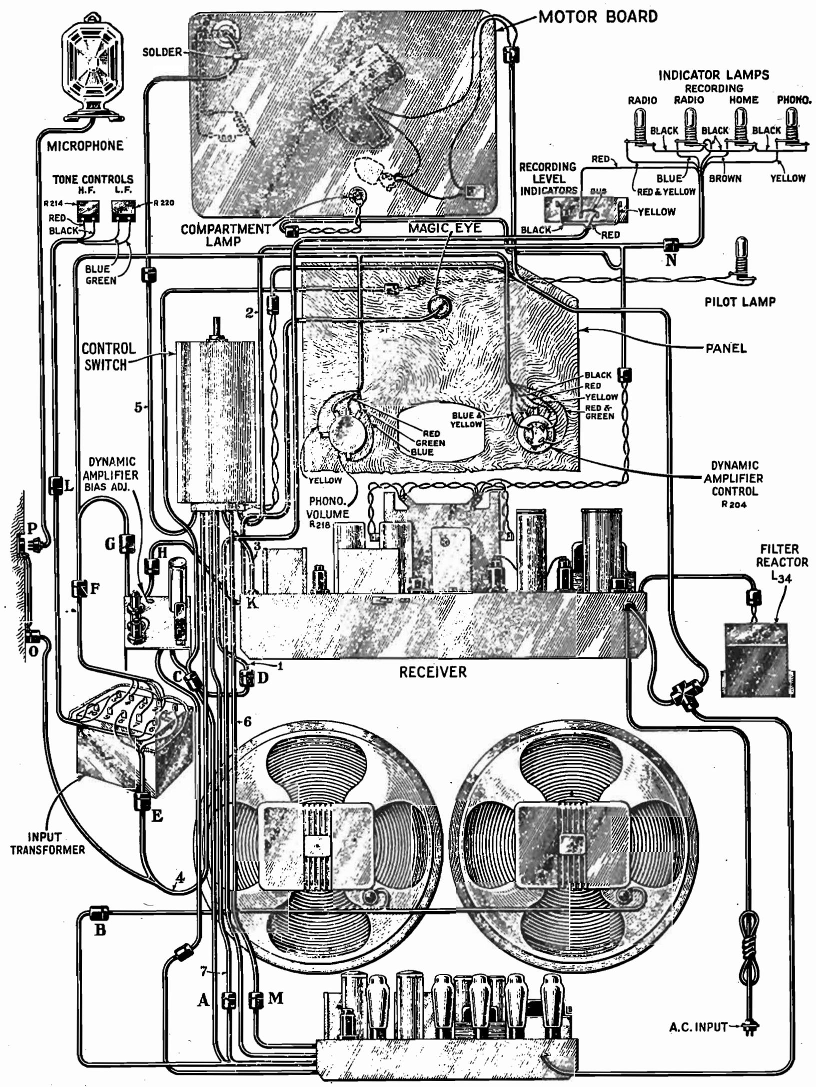


Figure 14—Assembly Wiring

ment of the armature. A neutralizing coil is mounted in the magnet assembly in such manner that it balances out hum induced by stray magnetic fields but does not affect the audio signal. The frequency response is uniform over a wide range.

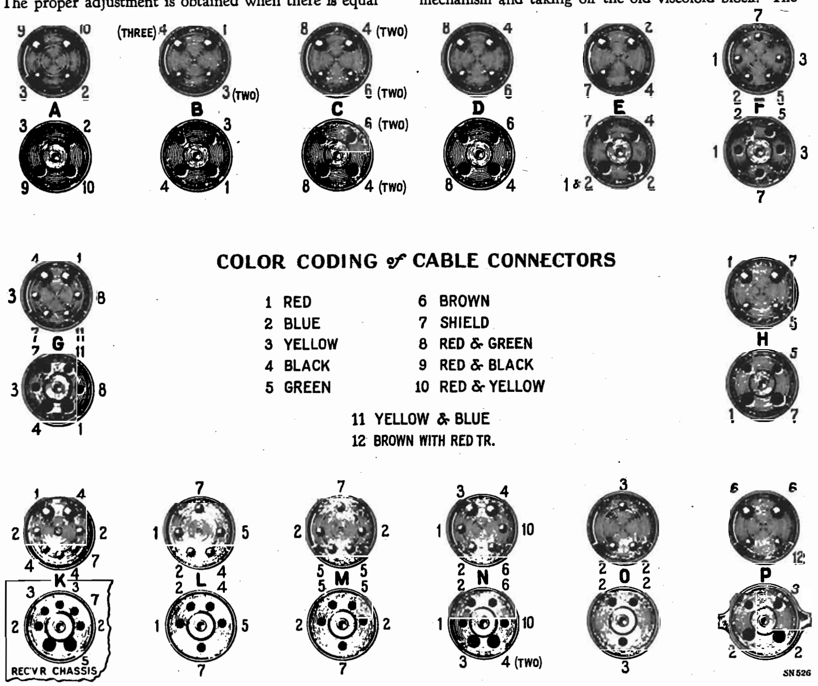
Service operations which may be necessary on the pickup are as follows:—

Centering Armature

Refer to Figure 16 showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed, the screws A, B, and C should be loosened and the armature clamp adjusted to the point where the vertical axis of the armature is at right angles to the horizontal axis of the pole pieces, and centered between them. This centering operation may be facilitated by inserting a small rod or nail into the armature needle hole, using it as a lever to test the angular movement of the armature. The limitations of the movement in each direction will be caused by the armature striking the pole pieces. The proper adjustment is obtained when there is equal angular displacement of the armature and adjustment rod or nail to each side of the vertical axis of the magnet and coil assembly. The screws A and B should then be secured, observing care not to disturb the adjustment of the armature clamp. Then place the pickup in a vise and secure the centering spring-clamp by means of the screw C, allowing the centering spring to remain in the position at which the armature is exactly centered between the pole pieces. With a little practice, the correct adjustment of the armature may be readily obtained. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other such foreign materials which would obstruct the movement of the pickup armature.

Damping Block

The viscoloid block which is attached to the back end of the armature shank serves as a mechanical filter to eliminate undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, it may be done by removing the armature and viscoloid assembly from the mechanism and taking off the old viscoloid block. The



COLOR CODING of CABLE CONNECTORS

1 RED	6 BROWN
2 BLUE	7 SHIELD
3 YELLOW	8 RED & GREEN
4 BLACK	9 RED & BLACK
5 GREEN	10 RED & YELLOW

11 YELLOW & BLUE
12 BROWN WITH RED TR.

Figure 13—Socket and Plug Details of Assembly Wiring
(Refer to Figure 14)

RCA MFG. CO., INC.

MODEL D22-1
Phonograph Data, Part 2
Change-Over Switch Wiring
Parts List

surface of the armature which is in contact with the viscoloid should be thoroughly cleaned with fine emery cloth and then inserted into the new block so that it occupies the same position as it did originally. Make certain that the block is in correct vertical alignment with the armature. The hole in the new viscoloid block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the viscoloid aligned on the armature, heat should be applied to the armature (viscoloid side) so that the viscoloid block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron constructed as shown in Figure 17 will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block and cause a small bulge on both sides. The pickup should then be carefully re-assembled and the armature centered as previously explained.

Replacing Coils

Whenever there is defective operation due to open or shorted pickup coils, these coils should both be replaced. The method of replacement will be obvious upon inspection of the pickup assembly and by study of the cut-a-way illustrations. It is important to readjust the armature as previously explained after reassembly of the mechanism. It is also necessary to have the hum and signal coils mounted in proper relation to each other in order that there may be the intended neutralization between them. Make certain that the slot in the center screw of the neutralizing coil is aligned directly over the armature tip, as illustrated. Only rosin core solder should be used for soldering the coil leads in the pickup. This same type of solder should be used when necessary for soldering the centering spring to the armature.

Magnetizing

Loss of magnetization will not usually occur when the pickup has received normal care, due to the fact that the magnet and pole pieces are one unit and the magnetic circuit remains closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. This should

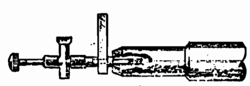
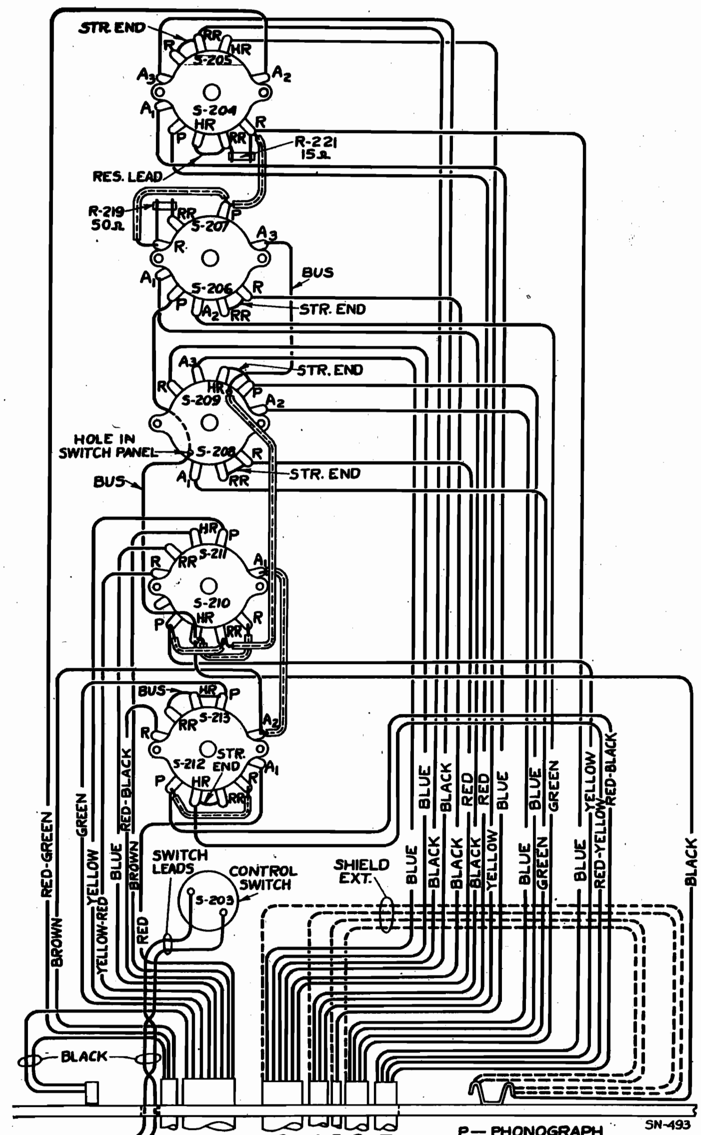


Figure 17—Special Soldering-Iron Tip

be done by placing the pickup assembly on the poles of a standard pickup magnetizer and charging the pickup in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to re-magnetize it so that the same polarity is maintained.



P— PHONOGRAPH
HR-HOME RECORDING
RR-RADIO RECORDING
R—RADIO

Figure 11—Change-Over Switch Wiring

Power Supply Ratings

Rating A-6.....105-125 Volts, 60 Cycles, 400 Watts
Rating A-5.....105-125 Volts, 50 Cycles, 405 Watts
Rating B-4.....105-125 Volts, 40 Cycles, 410 Watts
Rating B-3.....105-125 Volts, 30 Cycles, 405 Watts
Rating B-2.....105-125 Volts, 25 Cycles, 410 Watts

Power Output Ratings

Undistorted .... 20 Watts
Maximum .... 25 Watts

Loudspeakers (2)

Type .... 12-inch Electrodynamic
Voice Coil Impedance...... 7.5 Ohms at 400 Cycles
Field Coil Rating.......... 1,700 Ohms—90 M.A.

Phonograph

Type....................Automatic Record Ejector
Record Capacity.....Eight 10-inch or Seven 12-inch
Turntable Speed.......................78 R.P.M.
Type of Pickup..Improved Low-Impedance Magnetic
Pickup Impedance.........18 Ohms at 1,000 Cycles

REPLACEMENT PARTS

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
5243	Arm—Band indicator operating arm with stud, set screws, nut, and washer	$0.42
4427	Bracket—High frequency tone control, low frequency tone or power switch or volume control mounting bracket	.18
11591	Button—Plug button	.10
11489	Cable—Two conductor cable with three way connector plug—Stock No. 11490	.66
11487	Cable—Two conductor shielded cable with female section of two contact connector plug—Stock No. 11488—To choke—(L34)	.42
11486	Cable—Two conductor shielded voltage supply cable with female section of four contact connector plug—Stock No. 4153—To (1) Terminal board and R19, (1) Terminal board, R3 and S8 shield to S205—Expander unit	1.08
11255	Cable—Four conductor tuning tube cable with connector socket—Stock No. 11381	1.20
5241	Capacitor—Adjustable capacitor—(C23, C27)	.40
5242	Capacitor—High frequency tone capacitor—.005 Mfd.—(C56)	.52
11286	Capacitor—14 MMfd.—(C19)	.24

Stock No.	Description	List Price
11292	Capacitor—22 MMfd.—(C11)	.24
11289	Capacitor—50 MMfd.—(C8, C30)	.26
11291	Capacitor—115 MMfd.—(C62, C65)	.24
11295	Capacitor—200 MMfd.—(C55)	.30
11294	Capacitor—325 MMfd.—(C24)	.32
11290	Capacitor—400 MMfd.—(C9, C18, C20, C49, C64)	.25
11299	Capacitor—600 MMfd.—(C48)	.26
3784	Capacitor—900 MMfd.—(C69)	.30
11335	Capacitor—1300 MMfd.—(C22)	.30
11287	Capacitor—4500 MMfd.—(C21, C77)	.30
5005	Capacitor—0.0035 Mfd.—(C57)	.16
4858	Capacitor—0.01 Mfd.—(C17, C47, C68)	.25
4836	Capacitor—0.05 Mfd.—(C5, C16, C35, C40, C70)	.30
11414	Capacitor—0.1 Mfd.—(C31)	.20
4885	Capacitor—0.1 Mfd.—(C10, C34, C39, C42, C43)	.28
4841	Capacitor—0.1 Mfd.—(C7, C28, C36, C41, C67)	.22
5170	Capacitor—0.25 Mfd.—(C78, C79)	.25
3597	Capacitor—0.25 Mfd.—(C51)	.40
11203	Capacitor—10 Mfd.—(C71)	1.18
5212	Capacitor—18 Mfd.—(C72)	1.16
5213	Capacitor Pack—Comprising one 4. Mfd., one 8. Mfd., and one 10. Mfd. capacitors—(C50, C73, C74)	2.94

MODEL D22-1
Parts List
Part 2

RCA MFG. CO., INC.

REPLACEMENT PARTS—Continued

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES—Continued	
5236	Capacitor Pack—Comprising two 0.5 Mfd. capacitors, one 680 ohm resistor and one 820 ohm resistor—(C53, C54, R23, R27)	1.36
5215	Coil—Antenna coil for "A" and "C" band—(L1, L2, L5, L6, C1, C3)	2.32
5218	Coil—Antenna coil for "X" and "B" band—(L3, L4, L7, L8, C2, C4)	2.58
5216	Coil—Dectector coil for "A" and "C" band—(L9, L10, L13, L14, C12, C14)	2.34
5219	Coil—Detector coil for "X" and "B" band—(L11, L12, L15, L16, C13, C15)	2.58
5217	Coil—Oscillator coil for "A" and "C" band—(L18, L20, C25, C75)	2.20
5221	Coil—Oscillator coil—"D" band—Located on Range Switch	.64
5220	Coil—Oscillator coil for "X" and "B" band—(L19, L21, L22, C26, C76)	2.24
5214	Condenser—Three gang variable tuning condenser—(C6, C29, C63)	4.42
5222	Control—Tone control—High frequency tone control—(R28)	1.04
5223	Control—Volume control—(R24, R25, R26)	1.22
5240	Cover—Fuse cover	.24
11202	Foot—Chassis mounting (bracket) foot—Package of 2	.78
10907	Fuse—Three ampere fuse—(F1)—Package of 5	.40
5226	Lamp—Dial lamp—Package of 5	.70
5239	Mounting—Fuse mounting	.36
4153	Plug—Female section four-contact connector plug—used on cables—Stock Nos. 11486, 11503, 11569	.48
11490	Plug—Three-way plug for cable—Stock No. 11489	.26
5233	Reactor—Coupling reactor—(L29)	2.32
11488	Receptacle—Two-contact female section of connector—used with cables.—Stock Nos. 11487, 11502, 11513, 11567, 11571	.14
11718	Resistor—Wire wound resistor—800-8500 Ohms—(R44, R45)	1.08
11296	Resistor—330 Ohms—Carbon type—¼ watt—(R2, R12)—Package of 5	1.00
11285	Resistor—1000 ohms—Flexible type resistor—(R13, R17, R36)—Package of 5	1.00
5112	Resistor—1000 ohms—Carbon type—¼ watt—(R4, R10, R15, R29)—Package of 5	1.00
11283	Resistor—1200 Ohms—Carbon type—¼ watt—(R3, R31)—Package of 5	1.00
4408	Resistor—1500 Ohms—Carbon type—¼ watt—(R8)—Package of 10	2.00
5159	Resistor—2200 Ohms—Carbon type—¼ watt—(R35)—Package of 5	1.00
11298	Resistor—5600 Ohms—Carbon type—1 watt—(R21)	.22
8043	Resistor—10,000 Ohms—Carbon type—2 watts—(R22)	.25
5114	Resistor—15,000 Ohms—Carbon type—1 watt—(R5)	.22
11400	Resistor—27,000 Ohms—Carbon type—¼ watt—(R30)—Package of 5	1.00
8065	Resistor—27,000 Ohms—Carbon type—½ watt—(R33)—Package of 5	1.00
11300	Resistor—33,000 Ohms—Carbon type—1/10 watt—(R32)—Package of 5	.75
11282	Resistor—56,000 Ohms—Carbon type—1/10 watt—(R9)—Package of 5	.75
8064	Resistor—82,000 Ohms—Carbon type—½ watt—(R43)—Package of 5	1.00
3118	Resistor—100,000 Ohms—Carbon type—¼ watt—(R16)—Package of 5	1.00
5027	Resistor—150,000 Ohms—Carbon type—¼ watt—(R37)—Package of 5	1.00
5108	Resistor—330,000 Ohms—Carbon type—¼ watt—(R11, R14, R38)—Package of 5	1.00
11297	Resistor—330,000 Ohms—Carbon type—1/10 watt—(R1, R6)—Package of 5	.75

Stock No.	Description	List Price
3033	Resistor—1 Megohm—Carbon type—¼ watt—(R7)—Package of 5	1.00
11382	Resistor—1 Megohm—Carbon type—1/10 watt—(R39)—Located in tuning tube cable—Package of 5	.75
11626	Resistor—2.2 Megohm—Carbon type—¼ watt—(R20)—Package of 5	1.00
4669	Screw—No. 8—32—5/32" Set screw for indicator operating arm—Package of 10	.25
5249	Shield—Metal shield case for antenna, detector, or oscillator coils	.20
11273	Shield—Radiotron shield	.25
11381	Socket—Tuning tube cable connector socket	.45
11598	Socket—Dial lamp socket	.14
4794	Socket—Four-contact socket for 5Z3 Radiotron—(No. 14)	.15
11197	Socket—Six-contact socket for 6C5 Radiotrons—(Nos. 9, 10, 11)	.14
11278	Socket—Seven-contact socket for 6J7 Radiotron—(No. 3)	.20
4787	Socket—Seven-contact socket for Cable Stock—(No. 11568)	.15
11198	Socket—Seven-contact socket for 6K7, 6H6, Radiotrons—(Nos. 2, 4, 5, 6 and 8)	.15
11280	Socket—Seven-contact socket for 6L7 Radiotron—(No. 2)	.14
5225	Switch—Range switch—(S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11)	3.75
11507	Switch—Low frequency tone or power switch—(S13, S14)	.92
11508	Transformer—Driver transformer—T3	2.75
5234	Transformer—Interstage transformer—T2	3.40
5228	Transformer—First intermediate frequency transformer—(L23, L24, C32, C33)	1.80
5229	Transformer—Second intermediate frequency transformer—(L25, L26, C37, C38, C66, R34)	2.42
5230	Transformer—Third intermediate frequency transformer—(L27, L28, C44, C45, C46, R18, R19)	2.76
5231	Transformer—Fourth intermediate frequency transformer—(L31, L32)	1.50
8062	Transformer—Power transformer—105-125 volts—25-50 cycles	9.84
8061	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)	6.75
	CONDENSER DRIVE ASSEMBLIES	
5243	Arm—Band indicator operating arm	.42
10194	Ball—Steel ball for drive assembly—Package of 20	.25
8054	Cam—Five-position cam for station selector drive assembly	.28
4422	Clutch—Tuning condenser drive clutch assembly—comprising shaft, balls, ring, spring and washers assembled	1.00
8048	Coupling—Flexible coupling for variable capacitor—includes indicator shaft	.70
11336	Dial—Dial scale with mounting rivets	.60
8045	Disc—Drive disc and Micarta gear assembly	.46
11380	Drive—Tuning condenser drive assembly—complete	6.35
8044	Escutcheon—Dial escutcheon with vernier scale	1.08
8046	Gear—Indicator shaft, Micarta drive gear and Brass vernier idler with one spring	.72
8050	Gear—Gear sector and band indicator operating link—(link connects to arm on band switch)	.15
8053	Indicator—Station selector vernier indicator pointer	.12
8051	Link—Complete—with roller and spring	.30
8049	Pinion—Vernier pointer drive pinion and shaft	.55
4669	Screw—No. 8—32—5/32" Square head set screw—Package of 10	.25
8047	Spring—Coil spring for indicator shaft drive gear and vernier idler—(Stock No. 8046)	.12
8052	Spring—Coil spring for link—Package of 5	.32
8042	Stud—Band indicator operating arm stud—Package of 5	.25

Stock No.	Description	List Price
	AMPLIFIER ASSEMBLIES	
11502	Cable—Single conductor shielded cable with female section of connector—Stock No. 11488)—Connects to Grid of first audio socket in amplifier—to expander unit—(C202)	.74
11501	Cable—Three conductor cable—Connects from R108, R109 and R110 in amplifier—to Neon indicator lamp	.64
11504	Cable—Four conductor shielded cable with five contact female connector plug—Stock No. 11506—connects to Amplifier "G," sockets No. 18 and No. 19—(T102, C106)—Terminals	.20
11503	Cable—Eight conductor cable with four female sections of connectors—(Stock No. 4153)—From (C107)—Amplifier Plate—(C111)—and "H" of first "AF" in Amplifier—to expander, control switch and reproducers	3.70
11500	Capacitor—175 MMfd.—(C102, C111, C112, C113)	.18
4838	Capacitor—0.005 Mfd.—(C104, C105)	.20
4858	Capacitor—0.01 Mfd.—(C103)	.25
11497	Capacitor—8 Mfd.—(C108, C110)	1.04
11496	Capacitor—18 Mfd.—(C106, C107)	1.15
11498	Capacitor Pack—Comprising two 10 Mfd. capacitors—(C101, C109)	1.00
4358	Clamp—Capacitor clamp for capacitor—(Stock No. 11498)	.15
11488	Connector—Female section—two contact connector—used on cables—(Stock Nos. 11502, 11513, 11487, 11567 and 11571)	.14
4153	Connector—Female section—four contact connector—used on cables—Stock Nos. 11503, 11486, 11569	.48
5240	Cover—Fuse cover	.24
10907	Fuse—Three ampere fuse—Package of 5—(F1)	.40
5239	Mounting—Fuse mounting	.36
11493	Reactor—Power filter reactor—(L101)	3.70
11506	Receptacle—Female section—five prong plug—used on cable—Stock Nos. 11504, 11517, 11518	.65
11499	Resistor—Wire wound—145 ohms—(R107)	.74
5159	Resistor—2200 Ohms—Carbon type—¼ watt—Package of 5—(R102)	1.00
3078	Resistor—10,000 Ohms—Carbon type—½ watt—(R103)—Package of 5	1.00
3118	Resistor—100.000 Ohms—Carbon type—¼ watt—(R106, R105, R110)—Package of 5	1.00
5158	Resistor—220,000 Ohms—Carbon type—¼ watt—(R108, R109)—Package of 5	1.00
11323	Resistor—270,000 Ohms—Carbon type—¼ watt—(R104)—Package of 5	1.00
11172	Resistor—470,000 Ohms—Carbon type—¼ watt—(R101)—Package of 5	1.00
4794	Socket—Four contact socket—for 2A3 and 5Z3 Radiotrons	.15
11198	Socket—Seven contact socket—for 6C5 Radiotron	.15
11492	Transformer—Filament transformer—105-125 volts—50-60 cycle—(T104)	6.10
11879	Transformer—Filament transformer—105-125 volts—25-50 cycle—(T104)	3.50
11878	Transformer—Plate transformer—105-125 volts—25-50 cycle—(T101)	5.55
11495	Transformer—Interstage transformer—(T102)	3.16
11494	Transformer—Output transformer—(T103)	5.65
11491	Transformer—Plate transformer—105-125 volts—50-60 cycle—(T101)	6.00
	EXPANDER ASSEMBLIES	
11514	Cable—Single conductor shielded cable—with male section of two-prong plug—Stock No. 4674—From (C202) and ground terminal	1.00
11516	Cable—Two conductor shielded cable—with male section of four-prong plug—Stock No. 6123—To (R211) and capacitor pack—(C208, C209 and C210)	.68

Stock No.	Description	List Price
11513	Cable—Three conductor cable—with one male section of connector and one female section of connector—Stock Nos. 6123, 11488—To (R208) and "H-H"—Socket No. 22	1.06
11515	Cable—Five conductor shielded cable—with male section six-prong connector—Stock No. 4574—To (R202), (R207), "G Amplifier 20," (C201), (R206) and ground terminal	1.50
11350	Cap—Grid control contact cap—Package of 5	.20
11414	Capacitor—0 1 Mfd.—(C202, C206)	.20
4841	Capacitor—0.1 Mfd.—(C201)	.22
11509	Capacitor Pack—Comprising three 0.5 Mfd. capacitors—(C203, C205, C207)	1.75
11608	Capacitor Pack—Comprising two 10 Mfd. and one 4 Mfd. capacitors—(C208, C209, C210)	1.98
4358	Clamp—Capacitor clamp	.15
11488	Connector—Two contact female section of connectors—used with cables—Stock Nos. 11513, 11502, 11567, 11487, 11571	.14
11512	Control—Expander bias control—(R213)	.78
11511	Foot—Chassis mounting (bracket) foot	.50
4674	Plug—Male section two prong connector—used with cables—Stock Nos. 11514, 11524	.25
6123	Plug—Male section four prong plug—used with cables—Stock Nos. 11513, 11516, 11526, 11525, 11572	.30
4574	Plug—Six prong male section of connector plug—used with cables—Stock Nos. 11515, 11522	.48
5158	Resistor—220,000 Ohms—Carbon type—¼ watt—(R207)—Package of 5	1.00
3998	Resistor—15,000 Ohms—Carbon type—¼ watt—(R205, R212)—Package of 5	1.00
3118	Resistor—100.000 Ohms—¼ watt—Carbon type—(R203, R206)—Package of 5	1.00
3252	Resistor—100,000 Ohms—Carbon type—½ watt—(R213)—Package of 5	1.00
5035	Resistor—560,000 Ohms—Carbon type—¼ watt—(R202)—Package of 5	1.00
3033	Resistor—1 Megohm—Carbon type—¼ watt—(R201)—Package of 5	1.00
11510	Resistor—Wire wound—425, 365, 3200 and 3900 Ohms—(R208, R209, R210, R211)	.74
11197	Socket—Six-contact socket for 6C5 Radiotron	.14
11198	Socket—Seven-contact socket for 6L7 Radiotron	.15
	MISCELLANEOUS CABLE AND PLUGS	
11524	Cable—Two-conductor cable with two-prong male section of connector plug—Stock No. 4674—From pilot lamp to cable—Stock 11567	.36
11526	Cable—Three-conductor shielded cable with four-prong male section of connector plug Stock No. 6123 and three terminals—connects from input transformer terminals Nos. 1, 3 and 8 to cable—Stock No. 11527	1.02
11527	Cable—Three-conductor cable with one four-contact microphone socket and one three-prong male section of connector plugs—Stock Nos. 4592, 5118	.50
11523	Cable—Three-conductor cable with two female two-contact and one male section of connector plugs—Stock Nos. 2308, 4573—From power cable, Stock No. 11489 to motor leads, and leads from control switch S203	2.22
11517	Cable—Four-conductor shielded cable with female section of connector plug—Stock No. 11506—Connects from tone controls, R214 and R220, to input transformer cable—Stock No. 11521	2.15
11518	Cable—Four-conductor shielded cable with female section of connector plug—Stock No. 11506—From input transformer terminals, Nos. 2, 5, 6 and 10, to cable—Stock No. 11519	1.92
11521	Cable—Four-conductor shielded cable with five-prong male section of connector—Stock No. 11520—From input transformer terminals Nos. 4, 5, 7 and 9 to cable—Stock No. 11517	1.12

RCA MFG. CO., INC.

REPLACEMENT PARTS—Continued

Stock No.	Description	List Price
	MISCELLANEOUS CABLE AND PLUGS—Continued	
11522	Cable—Six-conductor cable, with Connector Stock No. 4574, from Radio-Phonograph, Home and Radio Recording indicator lamps, to cable—Stock No. 11567 from control switch	1.18
11525	Cable—Seven-conductor cable with one four-contact male and two four-contact female sections of connectors—Stock Nos. 5040, 6123—connects from Reproducers to cable—Stock No. 11503 amplifier	1.98
11519	Cable—Nine-conductor shielded cable with one six-contact female and one five-prong male section of connector plugs—Stock Nos. 4151, 11520—From expander control (R204) and phonograph volume control (R218) to expander and input transformer cable—Stock No. 11518	4.50
4577	Plug—Two-prong male section of motor connection plug—Connects to cable—Stock No. 11523	.30
4674	Plug—Two-contact male section of connector plug for cable—Stock Nos. 11524, 11514	.25
2308	Plug—Two-contact male section of connector plug for cable—Stock No. 11523	.55
5118	Plug—Three-prong male section of connector plug for cable—Stock No. 11527	.25
6123	Plug—Four-prong male section of connector for cable—Stock No. 11525 and Stock Nos. 11526, 11516, 11513, 11572	.30
11520	Plug—Five-prong male section of connector plug for cable—Stock No. 11519 and Stock Nos. 11521, 11630	.34
4574	Plug—Six-contact male section of connector for cable—Stock Nos. 11522, 11515	.48
4573	Receptacle—Two-contact female section of connector plug for cable—Stock No. 11523	.30
5040	Receptacle—Four-contact female section of connector for cable—Stock No. 11525	.25
11506	Receptacle—Five-contact female section of connector for cable—Stock No. 11517 and Stock Nos. 11518, 11504	.65
4151	Receptacle—Six-contact female section of connector for cable—Stock Nos. 11519, 11567	.60
4593	Socket—Four-contact microphone socket for cable—Stock No. 11527	.42
	EJECT ARM ASSEMBLIES	
11541	Arm—Eject arm—complete	.82
11533	Ball—1/16" diameter steel ball—Package of 10	.20
10129	Ball—3/16" diameter steel ball—Package of 20	.25
11529	Bearing—Ejector tip bearing and nut	.32
11538	Bracket—Eject arm bracket	1.72
11537	Collar—Eject arm shaft collar and set screw	.24
11540	Cover—Eject arm cover	1.52
11536	Cushion—Counter balance roller cushion—Located inside of eject arm	.14
4055	Post—Vertical adjustment post—Located on eject arm bracket	.30
3729	Roller—Eject arm counter balance roller—Located inside of eject arm	.45
4580	Screw—No. 6—32—3/16" Square head set screw for eject arm collar—Package of 10	.25
11534	Screw—No. 8—36—7/32" Special screw for eject arm tip center adjustment—Package of 10	.14
11535	Shaft and Collar—Eject arm vertical action shaft and collar assembly	.15
11528	Silencer—Ejector tip silencer	.14
4067	Spring—Eject arm bracket spring—Package of 10	.30
11531	Spring—Ejector tip spring—Package of 10	.42
11530	Tip—Ejector tip with tip center, adjusting screw and cap	.32
11539	Yoke—Eject arm yoke assembly	.94

Stock No.	Description	List Price
	PICKUP AND ARM ASSEMBLIES	
11482	Arm—Pickup arm complete—less pickup mounting screw, escutcheon and pickup unit	4.80
11543	Armature—Pickup armature	.72
11548	Back—Pickup back	.52
4064	Cable—Pickup arm operating cable—Package of 5	1.00
11544	Coil—Pickup coil—(L305)	.80
11532	Coil—Pickup hum bucking coil—(L306)	.60
4674	Connector—Two-prong male section of pickup cable connector plug—Stock Nos. 11514, 11524	.25
11545	Cover—Pickup front cover	.22
11546	Cover—Pickup back cover with mounting screws	.14
3737	Damper—Pickup damper—Package of 5	.65
11481	Pickup—Pickup unit complete	4.80
11549	Screw—Pickup front cover screw—Package of 10	.42
3387	Screw, nut and washer for mounting pickup to arm—Package of 10	.40
11547	Screw—Pickup needle screw—Package of 10	.42
11550	Weight—Home recording weight	1.50
	MOTOR BOARD ASSEMBLIES	
11553	Escutcheon—Index escutcheon engraved Manual—12–10	.44
3764	Nut—Cap nut for motor board suspension assembly—Package of 4	.40
3672	Pin—Manual index pin	.42
11551	Rest—Pickup rest	.14
3654	Roller—Pickup arm cable guide roller—comprising bracket roller and guide pin	.34
3763	Suspension Spring—Suspension spring, washer and bolt assembly, for motor board—comprising one bolt, two cup washers, two springs, two "C" washers and one cap nut	.42
4671	Switch—Operating switch—toggle type—(S201)	.72
11542	Cover—Turntable cover	.88
11599	Turntable—complete	2.90
	MOTOR ASSEMBLIES	
9479	Motor—105-125 volts—25 cycles—(M1)	36.48
9478	Motor—105-125 volts—50 cycles—(M1)	25.88
9477	Motor—105-125 volts—60 cycles—(M1)	25.88
4562	Suspension Spring—Motor mounting spring, washer, and stud assembly—comprising six springs, six cup washers, three spring washers and three studs	.58
	AUTOMATIC SWITCH ASSEMBLIES	
3994	Cover—Motor switch cover	.26
10184	Plate—Automatic brake latch plate—Package of 5	.40
10174	Springs—Automatic brake springs—Package of 2	.50
6805	Switch Assembly—Automatic switch complete	1.90
3322	Switch—Motor switch—(S202)	.75
	OPERATING MECHANISM	
6502	Cam—Cam and gear assembly	1.18
6808	Clutch—Trip lever friction clutch	.30
11558	Cover—Metal cover for trip lever and friction finger assembly	.36
6809	Finger—Manual index lever finger assembly	.25
3670	Finger—Friction finger assembly	.32
11554	Lever—Manual index lever—less pin	.62
11556	Lever—Main lever and link assembly	2.10
11557	Lever—Main spring lever	.42
3677	Lever—Pickup arm cable lever assembly—comprising lever with cable screw, spring and nut	.40
11555	Lever—Trip lever and friction clutch assembly	.94
6503	Pawl—Trip pawl assembly	.40
4124	Plate—Eject arm actuating plate assembly	.50
4563	Screw—Cable lever screw and nut—Package of 10	.60

Stock No.	Description	List Price
	OPERATING MECHANISM—Continued	
4564	Screw—Manual index lever finger set screw—Package of 10	.20
4059	Screw—Trip lever clutch tension adjustment screw—Package of 10	.22
4566	Screw—Special screw used to fasten main lever and link assembly bushing—Package of 10	.30
11559	Spacer—Pickup arm mounting spacer	.28
4127	Spring—Actuating spring—Package of 10	.24
3666	Spring—Cable lever tension spring—Package of 10	.44
4565	Spring—Manual index lever finger tension spring—Package of 10	.30
4061	Spring—Main spring lever, tension spring—Package of 10	.38
2893	Spring—Trip lever latch plate tension spring—Package of 10	.30
2917	Washer—Spring washer "U" type—Package of 10	.25
	MICROPHONE ASSEMBLIES	
7534	Cable—Microphone cable	.70
11561	Cover—Microphone cover—Package of 2	.32
11560	Frame—Microphone frame	1.00
7533	Mechanism—Microphone mechanism	6.80
11480	Microphone—complete—(M2)	7.05
11562	Plug—Microphone plug	.25
4158	Socket—Microphone socket	.40
	RECORDING SWITCH ASSEMBLIES	
11571	Cable—Single conductor shielded cable with one female section of connector—Stock No. 11488—To S204, shield grounded to terminal lug—To cable from pickup arm assembly—Stock No. 11482	.64
11566	Cable—Three-conductor cable with male section of four-prong plug—Stock No. 11570—To S213, S205 and terminal lug—and cable—Stock No. 11503	.72
11572	Cable—Four-conductor cable with male section of four-prong plug—Stock No. 6123—To (1) S204, (1) S210, (2) S212 and cable—Stock No. 11503	.88
11569	Cable—Four-conductor shielded cable with one female section of four-contact plug—Stock No. 4153—and one female section of three-contact plug—Stock No. 5119—To (1) S204, (1) S205, (1) S206, (2) three-contact receptacle, shield grounded to terminal lug—and cable—Stock Nos. 11526 and 11527	2.45
11630	Cable—Four-conductor shielded cable with one five-prong male section of plug—Stock No. 11520—To (1) S206, (1) S208, (2) S209—shield grounded to terminal and cable—Stock No. 11504	1.18
11568	Cable—Six-conductor shielded cable—with male section of seven-prong connector plug—Stock No. 4602—To (2) S205, (1) S206, (1) S208, (2) S209 and shield grounded to terminal—Receptacle—Stock No. 4787 on receiver chassis	1.40
11567	Cable—Ten-conductor cable with two-contact female section of plug—Stock No. 11488—and one female section of six-contact plug—Stock No. 4151—To (1) S212, (2) S213, (4) S211 and (1) to terminal lug and cable—Stock No. 11522	.26
11347	Knob—Control switch knob—Package of 5	.75
4577	Plug—Two-prong male section of connector plug—Part of connector cord from S203	.30
6123	Plug—Four-contact male section of connector plug—used with cables—Stock Nos. 11572, 11516, 11513, 11526, 11525	.30
11570	Plug—Male section of four-prong connector plug for cable—Stock No. 11566	.32
11520	Plug—Five-prong male section of connector plug for cable—Stock Nos. 11519, 11521, 11630	.34
4602	Plug—Seven-prong male section of connector plug—used with cable—Stock No. 11568	.56

Stock No.	Description	List Price
11488	Receptacle—Two-contact female section of connector plug—used with cables—Stock Nos. 11567, 11571, 11487, 11502, 11513	.14
5119	Receptacle—Female section—three-contact plug receptacle for cable—Stock No. 11569	.25
4153	Receptacle—Female section—four-contact plug receptacle for cable—Stock No. 11569	.48
4151	Receptacle—Six-contact female section of connector plug used with cables—Stock Nos. 11519, 11567	.60
11564	Resistor—47 Ohms—Carbon type—1/10 watt—Package of 5—(R219)	.75
11565	Resistor—15 Ohms—Carbon type—1/4 watt—(R221)—Package of 5	1.00
11563	Switch—Phonograph, Radio, Home Recording and Phonograph recording switch—complete—(S203, S204, S205, S206, S207, S208, S209, S210, S211, S212, S213)	4.80
	INDICATOR ASSEMBLIES	
11522	Cable—Six-conductor indicator assembly cable with male section of six-prong connector plug—Stock No. 4574	1.18
4340	Lamp—Indicator lamp—Package of 5	.60
4574	Plug—Six-prong male section of connector plug—for use with cables—Stock Nos. 11515, 11522	.48
11719	Screen—Indicator lamp screen—Package of 5	.34
11573	Socket—Indicator lamp socket	.28
	RECORDING INDICATOR ASSEMBLIES	
11574	Escutcheon—Recording indicator escutcheon	.32
4161	Lamp—Neon lamp	.56
4164	Screen—Indicator lamp screen	.18
11575	Screw—Screen escutcheon and terminal board mounting screw assembly—comprising two screws, two spacers, two nuts and two lockwashers	.12
	REPRODUCER ASSEMBLIES	
11577	Coil—Field coil magnet and cone support—(L102, L103)	12.00
11576	Cone—Reproducer cone—(L104, L105)—Package of 5	6.85
5039	Plug—Male section of four-prong plug	.25
9629	Reproducer—Complete	14.55
	MISCELLANEOUS ASSEMBLIES	
11881	Base—Phonograph compartment lamp base	.55
4391	Box—Needle box	.70
11606	Cap—Pilot lamp cap—Package of 5	.22
11884	Control—Expander control—(R204)	1.16
11580	Cover—Pilot lamp cover	.12
11379	Escutcheon—Station selector escutcheon and crystal	1.08
11347	Knob—Phonograph or Radio high or low frequency tone control, Radio volume control, Range switch, Selector switch knob—Package of 5	.75
11582	Knob—Expander control or Phonograph volume control knob—Package of 5	.50
11346	Knob—Station selector knob—Package of 5	.75
11605	Pad—Home recording pad	.45
11578	Reactor—Filter reactor—(L34)	3.70
11607	Receptacle—Receptacle for new needles	.38
11711	Shade—Phonograph compartment lamp shade	.16
11579	Tone Control—Phonograph low frequency tone control	.98
11581	Tone Control—Phonograph high frequency tone control	.98
11883	Transformer—Microphone and pickup input transformer pack—(R215, R216, R217, C204, C211, C212, C213, C214, C215, L301, L302, T201)	10.45
11877	Volume Control—Phonograph volume control—(R28)	1.42

MODEL RK-24
Schematic,Parts
Chassis Wiring
Assembly

RCA MFG. CO., INC.

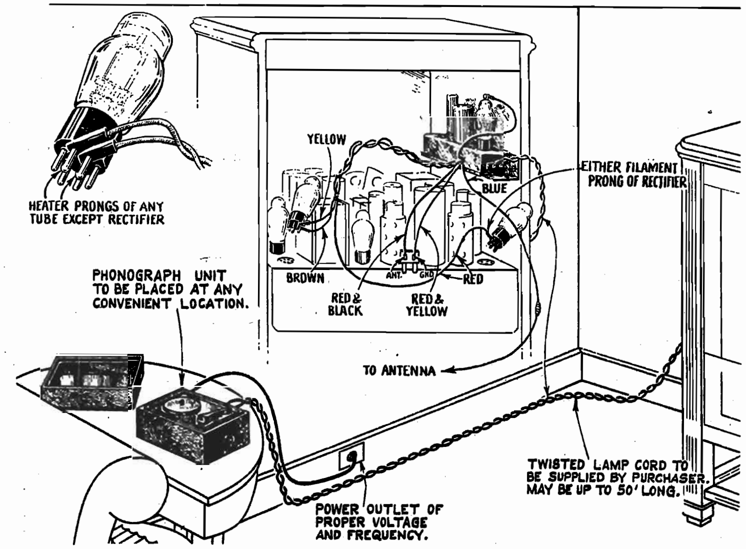


Figure 1—Typical Connections of RK-24 Phonograph Oscillator to Model R-93 Record Player

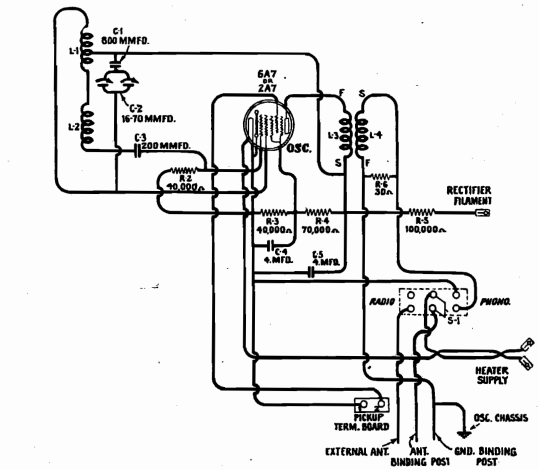


Figure 2—Schematic Circuit Diagram

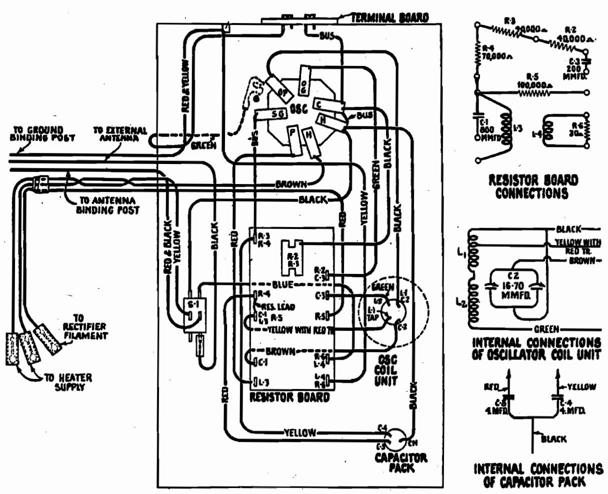


Figure 3—Chassis Wiring

ELECTRICAL SPECIFICATIONS

Type of Oscillator Circuit . . . . . Modified Hartley
Type of Modulation . . . . . Pentode Control Grid
Type of Radiotrons . . . . . RCA-2A7 or RCA-6A7
Heater Current . . . . . 0.3 or 1.0 (Depending on Tube Used)
Heater Voltage . . . . . 2.5 or 6.3 Volts (Depending on Tube Used)
Plate Voltage . . . . . 150 Volts to 400 Volts
Plate Current . . . . . 2.0 M. A. at 250 Volts
Input Pickup Impedance . . . . . 2450 Ohms at 1000 Cycles
Output Impedance . . . . . 30 Ohms
Tuning Frequency Range . . . . . 1400 K. C. to 1700 K. C.

The RCA Victor RK-24 Phonograph Oscillator is a modulated R. F. oscillator designed for use in conjunction with the RCA Victor Record Player Model R-93. The purpose of the RK-24 Oscillator is to facilitate and ensure the proper connection and operation of the R-93 when connected to a radio receiver of any type and manufacture.

The Oscillator uses Radiotron RCA-2A7 or RCA-6A7, depending on the heater voltage of the receiver with which it is to be used. This Radiotron is of the dual purpose variety and functions both as an oscillator and a modulator. The modulation is of the pentode control grid type and results in excellent quality throughout the audio range of the pickup.

A typical connection of the RK-24 in conjunction with the R-93 Record Player is shown in Figure 1.

Figure 2 shows the schematic circuit diagram, while Figure 3 shows the chassis wiring diagram.

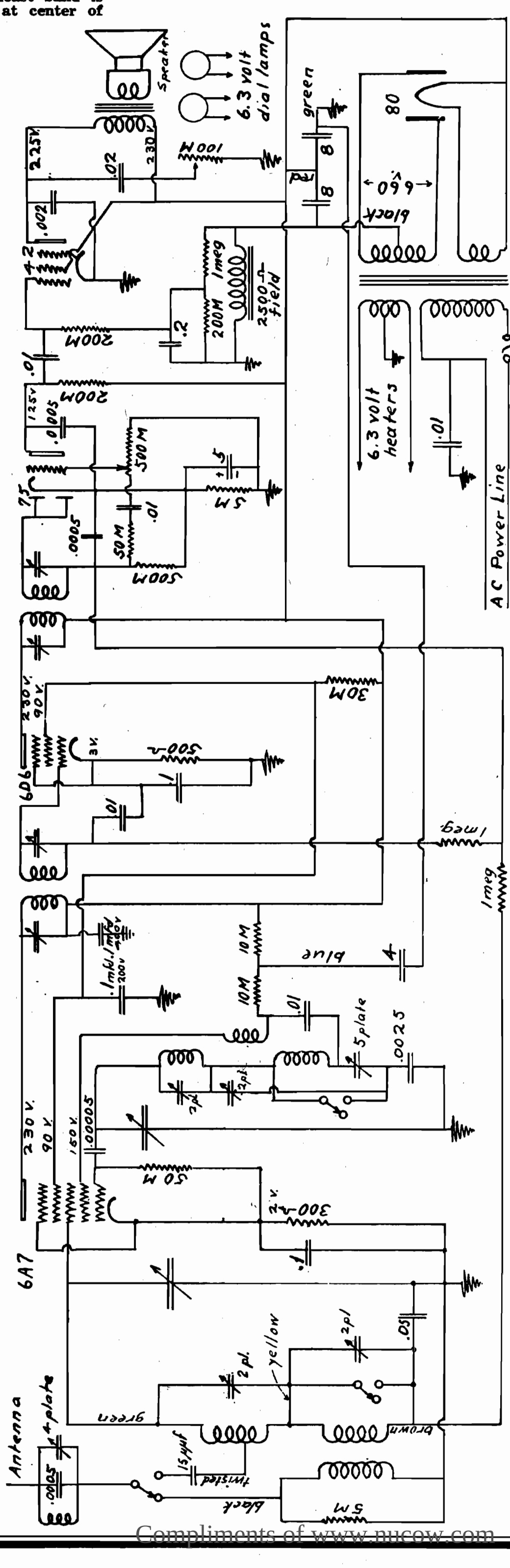
Stock No.	Description	List Price	Stock No.	Description	List Price
4749	Board—Terminal board assembly	$0.48	3400	Resistor—30 ohms—Carbon type—½ watt (R6)—Package of 5	$1.00
4013	Capacitor—200 mmfd. (C3)	.30	6143	Resistor—40,000 ohms—Carbon type—½ watt (R2, R3)—Package of 5	1.00
4027	Capacitor—800 mmfd. (C1)	.44	3464	Resistor—70,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
4745	Capacitor pack—Comprising two 4.0 mfd. capacitors (C4, C5)	1.28	3058	Resistor—100,000 ohms—Carbon type (R5)—Package of 5	1.10
4748	Clamp—Electrolytic capacitor clamp	.15	6300	Socket—4-contact Radiotron socket	.35
4747	Coil—Oscillator coil and shield assembly (L1, L2, C2)	2.18	4750	Switch—Operating switch	.94
9554	Oscillator—Complete	7.75	4746	Transformer—Output transformer (L3, L4)	.48

MODEL 5-Tube Dual Battery A-W. Superhet.
MODEL 5-Tube Dual A-C. A-W. Super.
Schematics, Alignment

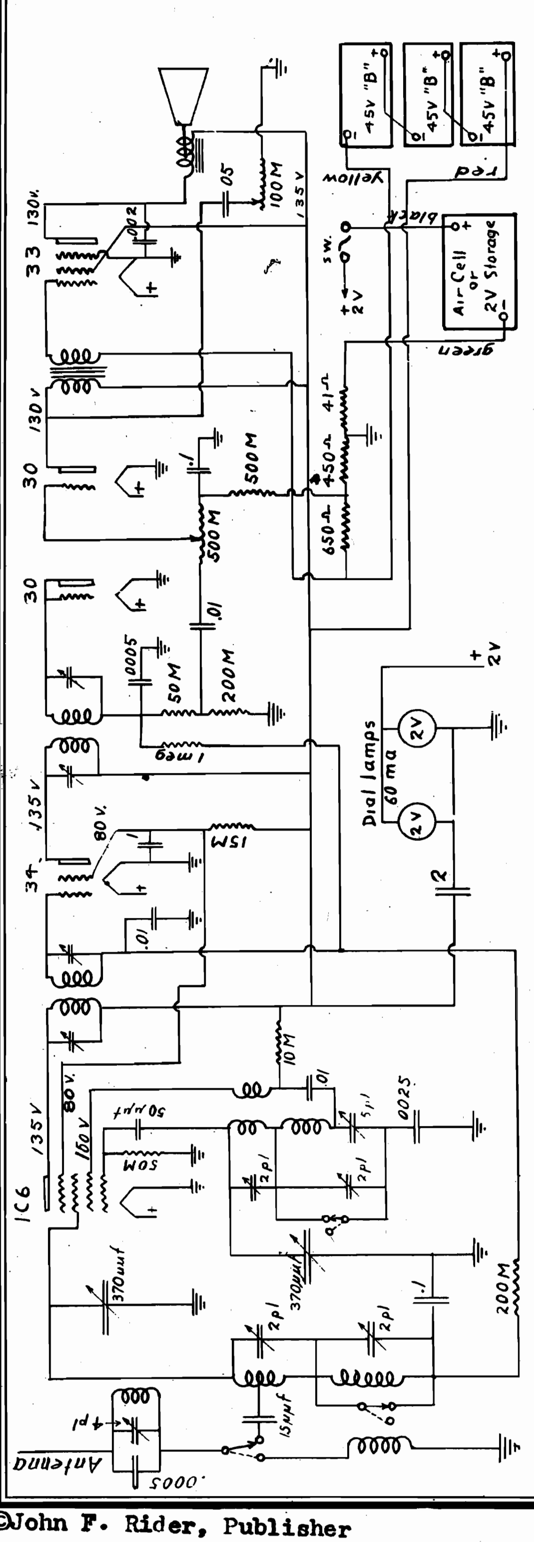
RADIO CIRCULAR CO.

The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary, attach the output lead from a 456 KC test oscillator to the grid cap of he 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two tall cans to loudest volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 MC should be used to rephase the R. F. The test oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set, and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the oscillator trimmer connected between the end of the oscillator coil and the porcelain base trimmer. Next trim the Broadcast R. F. by the trimmer connecting to the band switch. The broadcast band is next trimmed at the 550 KC end of the dial by adjusting the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.

ACE 5-TUBE DUAL ALL-WAVE SUPERHETRODYNE



ACE 5-TUBE BATTERY DUAL ALL-WAVE SUPERHETRODYNE



The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary attach the output lead from a 456 KC test oscillator to the grid cap of the 1C6 tube, keep the signal to a very low audible value and carefully adjust the screws in the top of each of the two tall cans to loudest volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 MC should be used to rephase the R. F. and the oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band; setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.

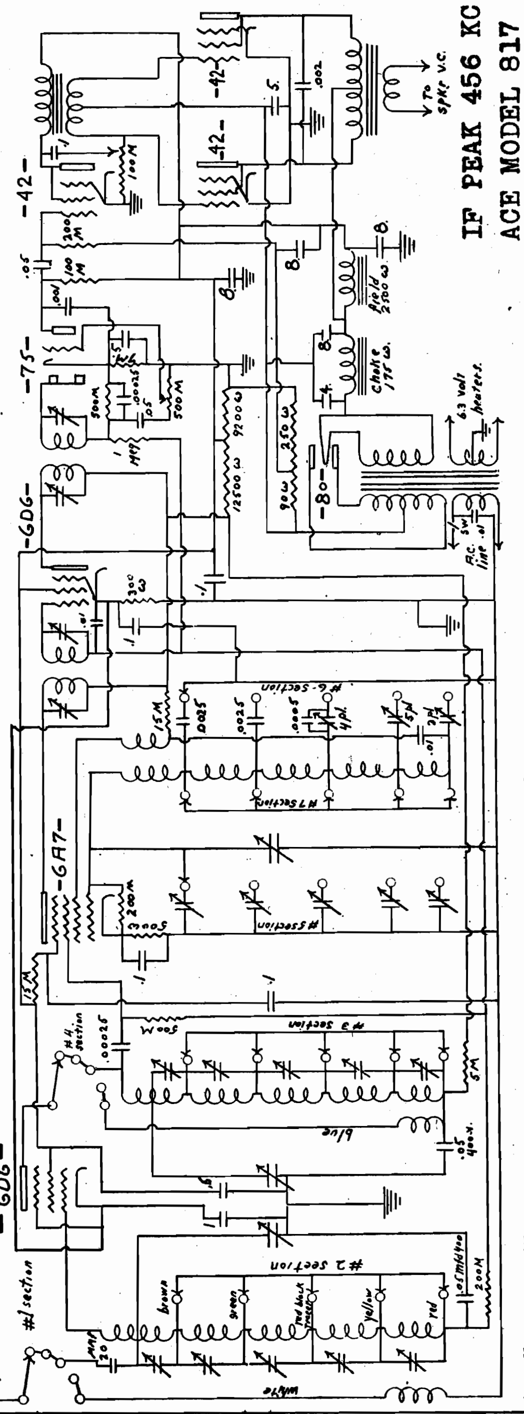
PHONOGRAPH.—Install a single pole double throw toggle switch in rear flange of chassis near right-hand end. Disconnect .01 mfd condenser from volume control and connect to one side of switch, connect volume control to center terminal of switch, connect one side of phonograph pickup to other side of switch and remaining pickup terminal to remaining outside volume control terminal.

MODEL 5-Tube AC-DC Dual A-W. Superheterodyne
MODEL 817
Schematics, Alignment

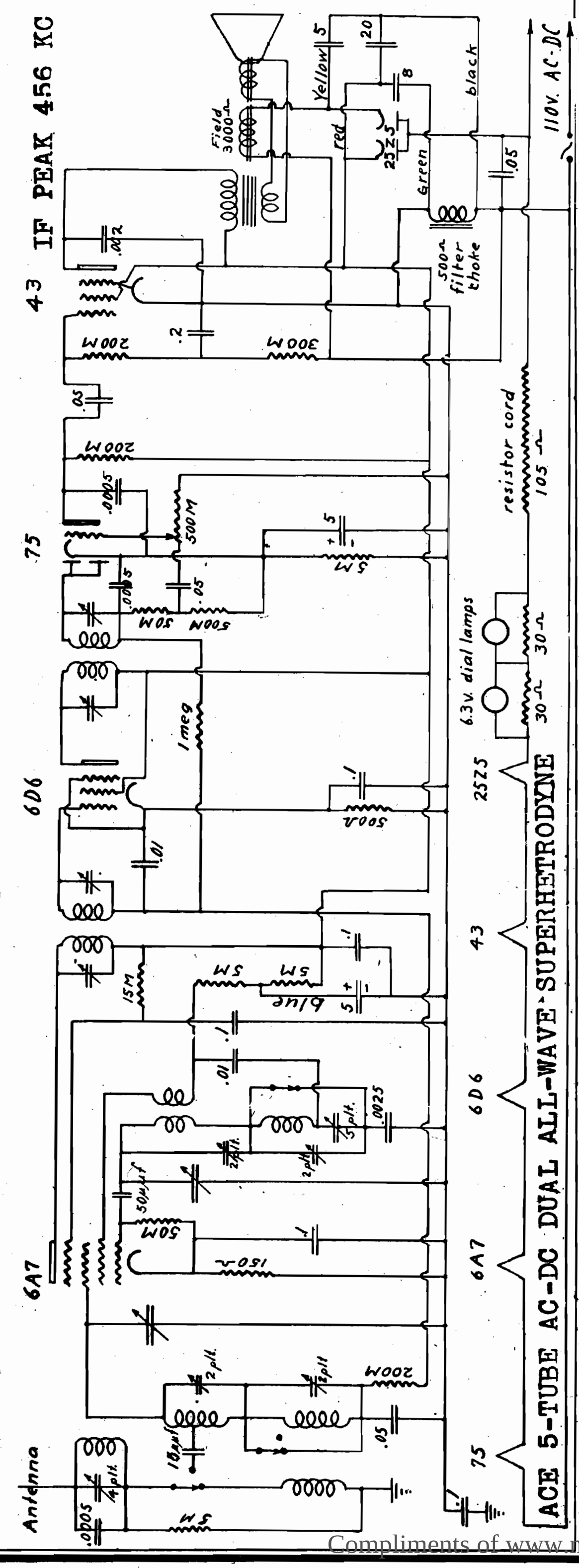
RADIO CIRCULAR CO.

Short-wave oscillator trimmer attaches between the two ends of the oscillator coil located at the right. Broadcast oscillator trimmer is the lower section of the dual trimmer at the end of the chassis. Short-wave R. F. trimmer is at the lower end of the oscillator coil and the broadcast R. F. trimmer is to the left of this same coil.

PHONOGRAPH—Install a single pole double-throw toggle switch in rear of chassis, nearest the 75 tube. Disconnect the .01 mfd. condenser from volume control and attach to one side of toggle switch, connect middle terminal of switch to terminal of volume control just disconnected, connect one side of phonograph pickup to remaining terminal of switch and other side to "B" minus.

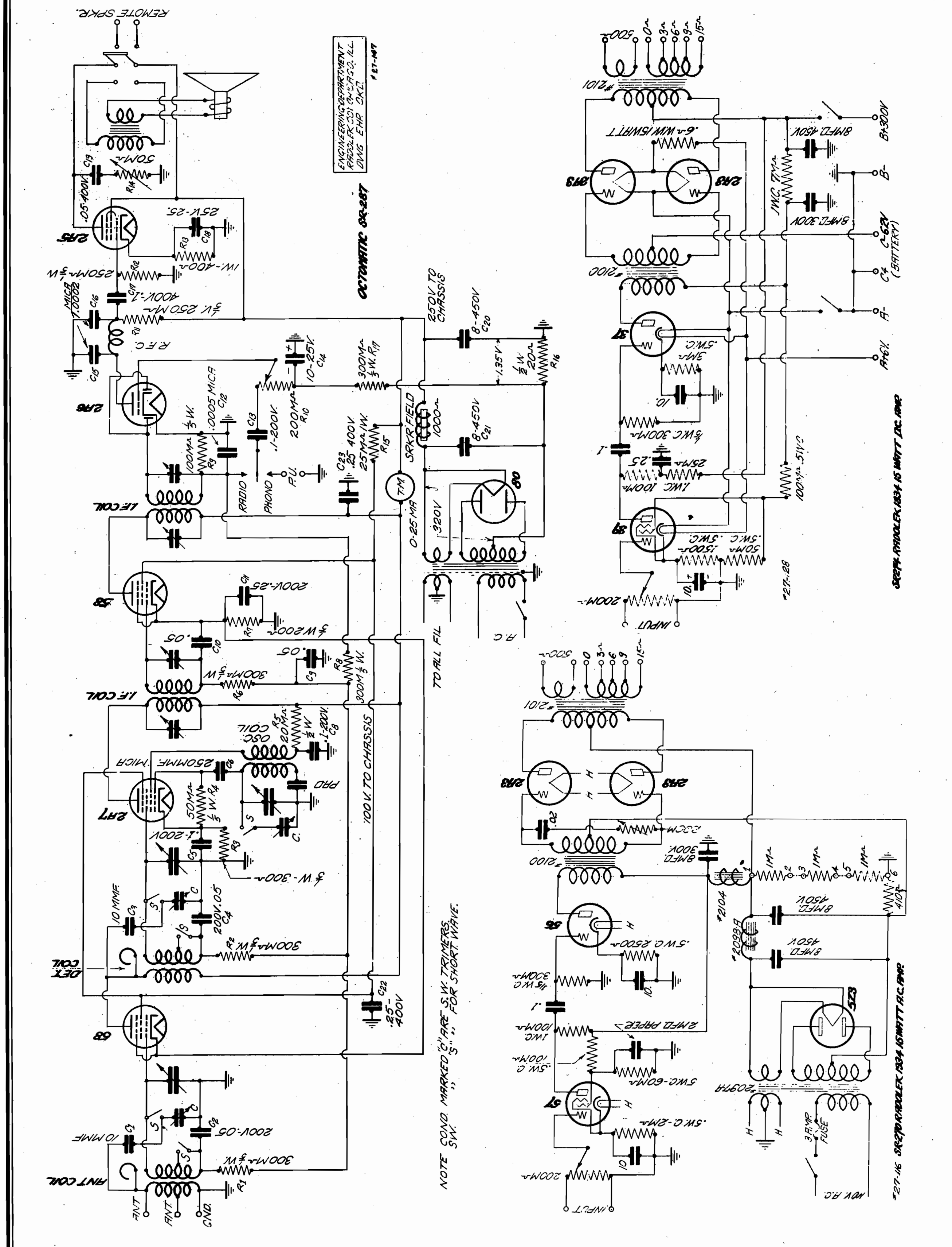


An all-wave oscillator having a range from 150 KC to 20 MC will be necessary to rephase the frequency bands. The oscillator output is attached to the aerial lead of the set and oscillator output kept always at a law audible level. The R. F. coil trimmers are reached through a series of five (5) holes in the side of the R. F. shield cans and correspond to frequency band Nos. 1, 2, 3, 4, and 5, from top down. The oscillator parallel trimmers are seen on the under side of the set when the front of it is raised and are located along side the band switch, No. 1 being the one nearest the back of chassis and No. 5 nearest the front. The dual porcelain trimmers at back of chassis are series padders, the left hand for band No. 2 and the right hand one for band No. 1. The series padder for band No. 3 is the single trimmer at the center of the chassis. Each band is trimmed first at the minimum end of its range, band No. 5 being first, No. 4 second, then No. 3, etc. Bands 3, 2, and 1 are also tracked near their maximum ranges, or with the tuning condenser turned well in, by adjusting that series padder belonging to the particular band being used, location of which is given above.



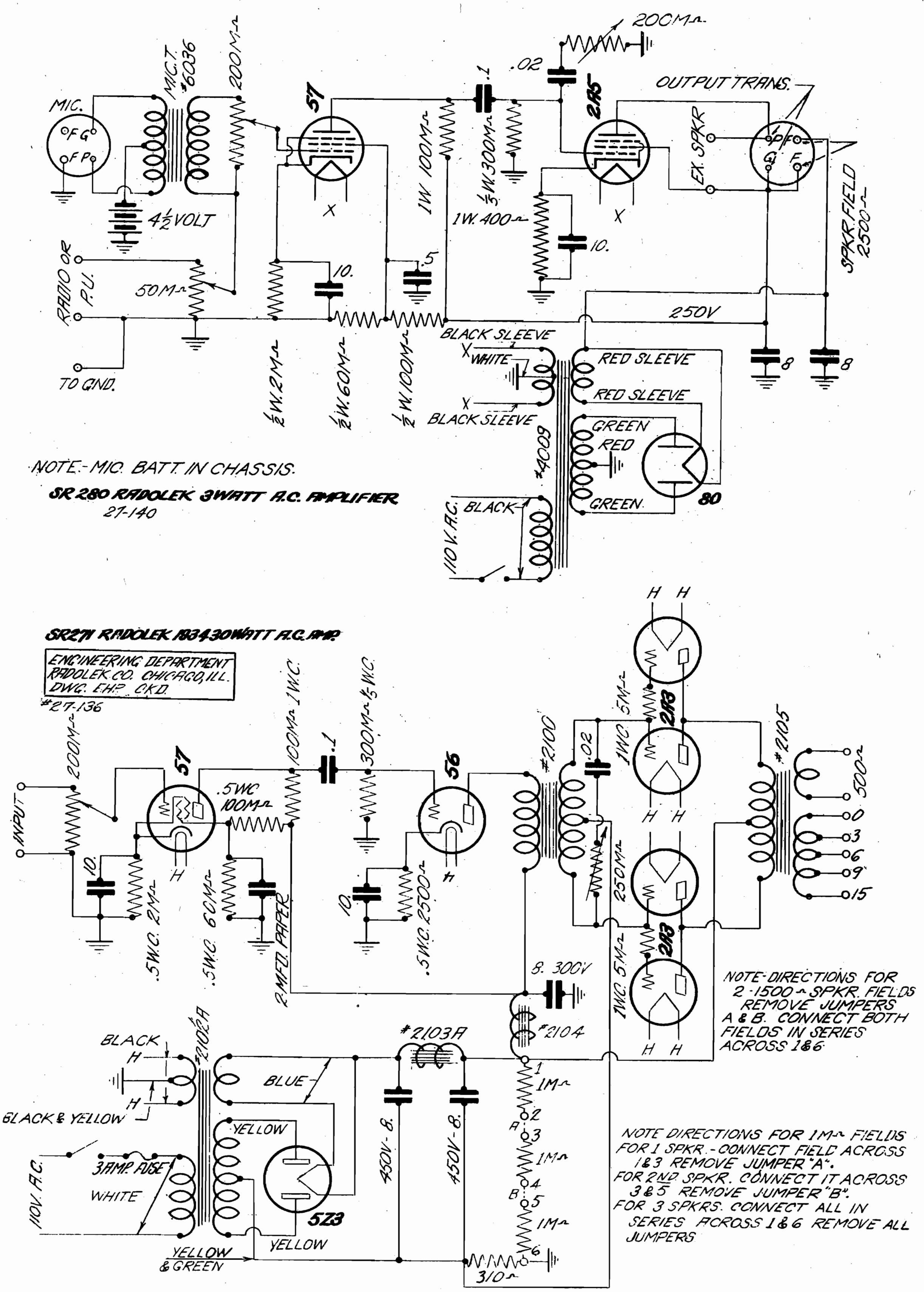
RADOLEK CO.

MODEL Octomatic
MODEL 15-Watt A-C.Amplifier
MODEL 15-Watt D-C.Amplifier
Schematics



MODEL 3-Watt A-C. Amplifier
MODEL 30-Watt A-C. Amplifier
Schematics

RADOLEK CO.



REMLER COMPANY, LTD.

MODEL 26
Above Serial 54760
Schematic, Voltage
Alignment

MODEL 26

GENERAL DESCRIPTION:

This five tube superheterodyne is of the universal type and is equipped with a six inch full dynamic speaker and two wave ranges.

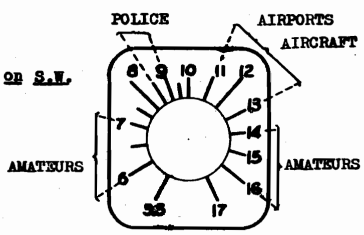
INSTALLATION:

The receiver is designed for operation from a power supply of 110 to 125 volts A.C. or D.C. A resistor voltage reducer may be secured for operation from 220 volt sources. The antenna supplied with the receiver should be extended to its full length and connected to the black wire extending from the back of the cabinet. This indoor antenna may be concealed under a rug or along a molding. An outdoor antenna up to one hundred feet in length may be used where the indoor type is not satisfactory.

OPERATION:

The knob at the left controls the volume and operates the ON and OFF switch at the extreme left position. The knob on the right is the station selector. The dial is calibrated in hundreds of kilocycles. The lower frequency police band may be tuned in near 17 on the dial with the wave range switch on the back of the cabinet in the L.W., or broadcast, position. When this switch is placed on the S.W. position, a range of from 1700 to 4100 kilocycles is covered by the selector knob. The location of the principal short wave bands are noted in the figure following.

<u>Short-wave bands with switch on S.W.</u>



SERVICE DATA:

The plate supply is rectified directly from the power source and the filaments of the tubes are connected in series and through a series resistor to this source. The chassis is directly connected to the power line, and contact between chassis and ground should be avoided.

To take the chassis out of the cabinet - first, remove the knobs, then the back, and finally the hold down screw in the base of the cabinet. To replace tubes it is only necessary to remove the back.

The back may be plugged on the chassis after removal from the cabinet for testing and aligning.

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

TUBES:

6A7 Converter (mixer oscillator)
78 I. F. amplifier
77 Detector
43 Power amplifier
25Z5 Rectifier
Dial light 6-8 volt.

VOLTAGE READINGS: (When operated on A.C.)

Line	- 120	volts
Filaments:		
43 and 25Z5	24	"
6A7, 78, 77 each	6	"
Across series resistor	54	"

(Filament voltages may vary with tubes)

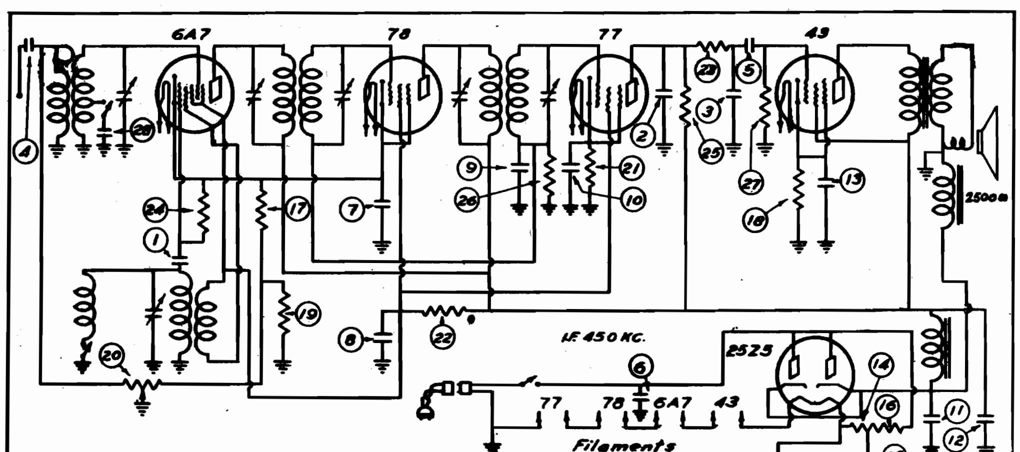
D.C. VOLTAGES - On full volume - No signal

From Chassis to:

25Z5 Rectifier	tube	cathode	105	volts
43 Power	"	plate	83	"
43 "	"	screen grid	92	"
43 "	"	cathode	12	"
6A7 Mixer Osc.	"	plate	92	"
6A7 " "	"	screen grid	35	"
6A7 " "	"	cathode	3	"
6A7 " "	"	osc. plate	35	"
78 I.F.	"	plate	92	"
78 I.F.	"	screen grid	35	"
78 I.F.	"	cathode	2	"
* 77 Detector	"	plate	36	"
77 "	"	screen grid	35	"
77 "	"	cathode	2	"

* Due to small current, meter readings will be inaccurate on detector tube plate.

D.C. voltage readings when connected to a D.C. source of 120 volts will be slightly less than those above.



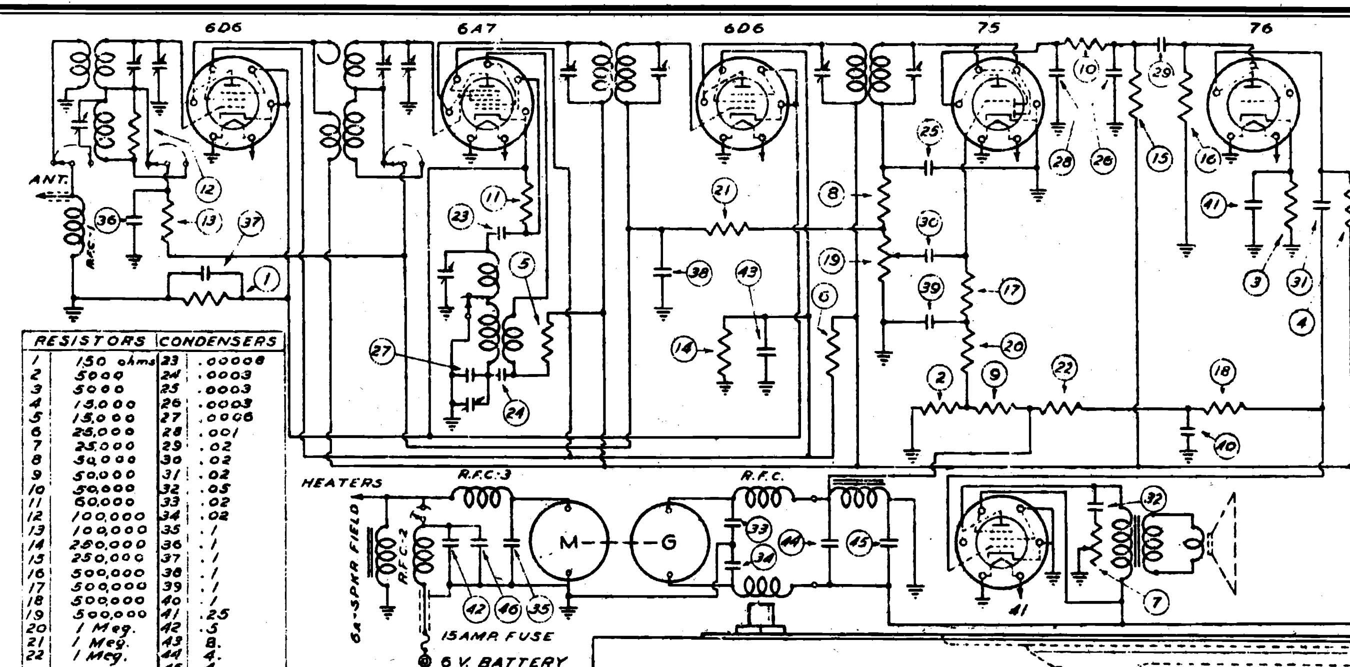
CONDENSERS				RESISTORS			
1	.00006	9	.1	14	30	22	25,000
2	.0003	10	.25	15	40	23	50,000
3	.0003	11	8	16	170	24	60,000
4	.001	12	8	17	300	25	250,000
5	.02	13	10	18	600	26	250,000
6	.05	28	.0009	19	2000	27	500,000
7	.1			20	12000		
8	.1			21	25000		

MODEL 36
Schematic, Chassis
Voltage

REMLER COMPANY, LTD.

REMLER
MODEL 36 AUTO RADIO

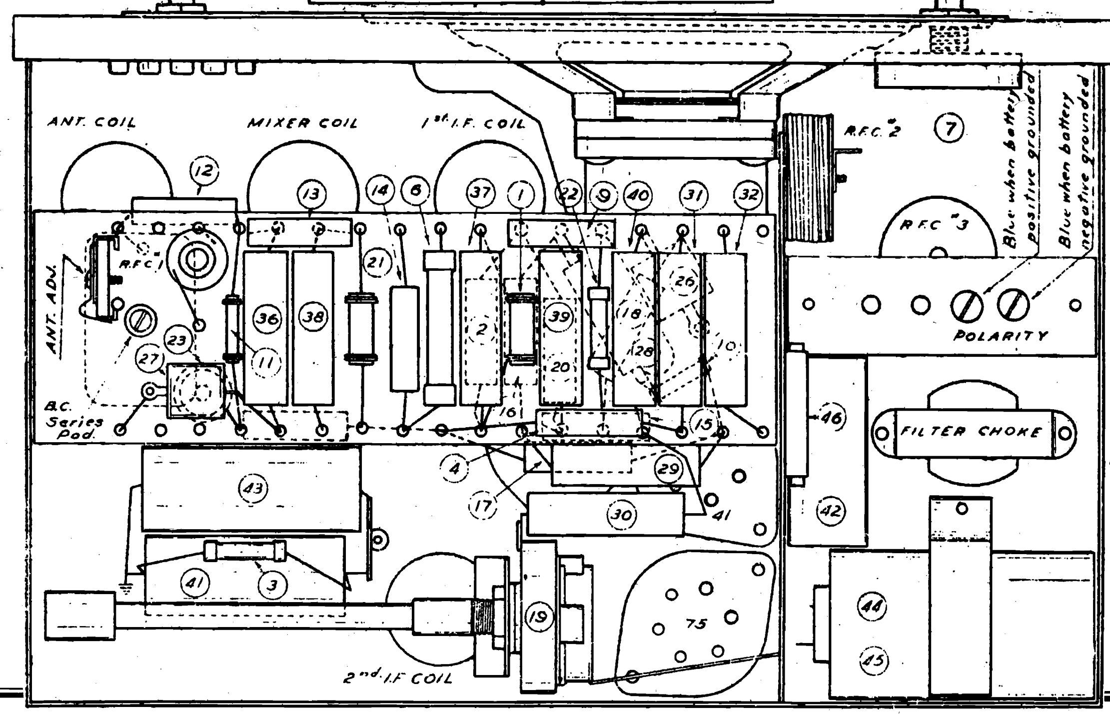
IF PEAK 250 KC.



RESISTORS		CONDENSERS	
1	150 ohms	23	.00008
2	5000	24	.0003
3	5000	25	.0003
4	15,000	26	.0003
5	15,000	27	.0006
6	25,000	28	.001
7	25,000	29	.02
8	50,000	30	.02
9	50,000	31	.02
10	50,000	32	.05
11	60,000	33	.02
12	100,000	34	.02
13	100,000	35	.1
14	250,000	36	.1
15	250,000	37	.1
16	500,000	38	.1
17	500,000	39	.1
18	500,000	40	.1
19	500,000	41	.25
20	1 Meg.	42	.5
21	1 Meg.	43	8.
22	1 Meg.	44	4.
		45	4.
		46	.002

VOLTAGE TO CHASSIS-NO SIGNAL

Plate supply from dynamotor	215 v.
6D6-RF Plate	215
6D6-RF Screen	80
6D6-RF Cathode	3
6A7-Mixer Plate	215
6A7-Mixer Screen	80
6A7-Mixer Cathode	3
6A7-Oscillator Plate	150
6D6-IF Plate	215
6D6-IF Screen	80
6D6-IF Cathode	3
75 -Det.AVC Plate	85
75 -Det.AVC Grid	1.5
76 -AF Plate	155
76 -AF Cathode	9
41 -Power Plate	195
41 -Screen 215v. Grid	15



MODEL 40
Above Serial 53410
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.

MODEL 40

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes four tubes, two of which are of the double purpose type. It is equipped with a six inch full dynamic speaker and two wave ranges.

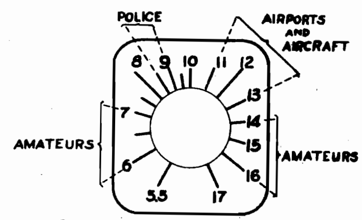
INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110 to 125 volts, 50 or 60 cycles.

Flexible leads for connecting antenna and ground extend from the back of the cabinet. A good ground connection to the black lead is essential for best performance. This lead should be as short as possible and preferably attached to a water pipe. Two antenna connections are provided. The antenna supplied with the receiver should be connected to the red lead and extended to its full length. It may be concealed under a rug or along a molding. An outdoor antenna up to 100 feet in length may be used when the indoor type is not satisfactory. In rural locations, where a longer antenna may be used, connection to the green wire is recommended.

OPERATION:

The knob at the left controls the volume and operates the ON and OFF switch at the extreme left position. The knob on the right is the station selector. The dial is calibrated in hundreds of kilocycles. The lower frequency police band may be tuned in near 17 on the dial with the wave range switch on the back of the cabinet in the L.W., or broadcast, position. When this switch is placed on the S.W. position, a range of from 1700 to 4100 kilocycles is covered by the selector knob. The location of the principal short wave bands are noted in the figure following.



Short-wave bands with switch on SW.

SERVICE DATA:

The antenna and mixer coils are in the aluminum shield at the back of the variable condenser. The mixer coil is trimmed by the back section trimmer. The oscillator coil is within the chassis and is trimmed by the front section trimmer on the variable condenser. The first I.F. transformer is mounted with the oscillator coil and is trimmed by the condensers accessible from the back of the chassis. The second I.F. transformer is also located within the chassis and may be trimmed by the condensers mounted thereon. The intermediate frequency used is 450 kilocycles.

Tubes:

6A7	Converter (mixer-oscillator)
6F7	I.F. Amplifier and detector
41	Power amplifier
84	Full wave rectifier

A. C. VOLTAGES:

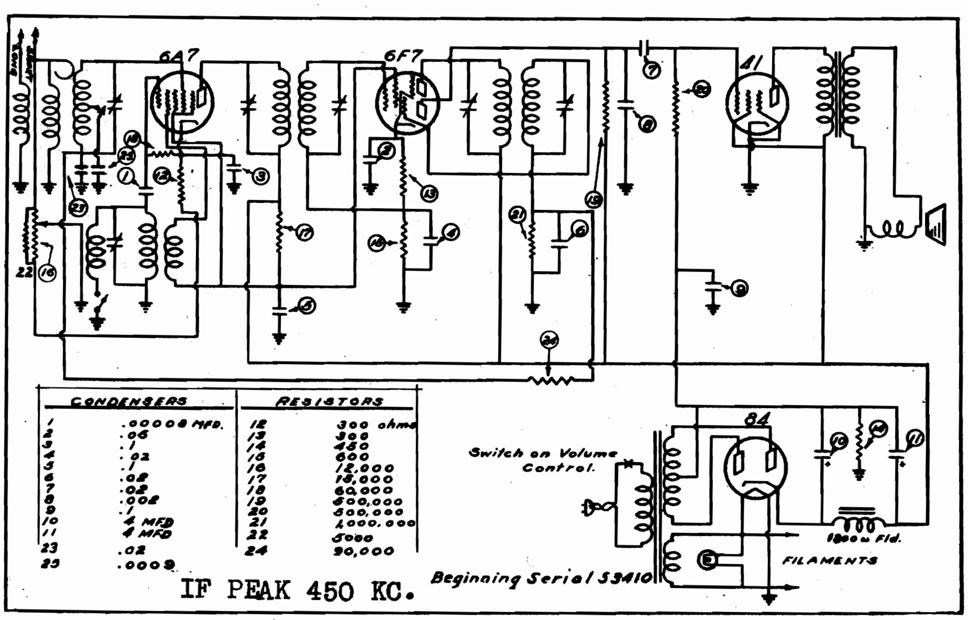
Line	- 120 volts
Filaments	6.3 "

D. C. VOLTAGES:

From ground to:

#84	Rectifier cathode	- 330 volts
#41	Plate	240 "
#41	Screen grid	250 "
#41	Grid	20 "
#6F7	Triode plate	100 "
#6F7	Pentode plate	250 "
#6F7	Screen grid	100 "
#6F7	Cathode	8 "
#6F7	Pentode grid	5 "
#6A7	Plate	250 "
#6A7	Screen grid	100 "
#6A7	Oscillator plate	100 "
#6A7	Cathode	3½ - 23 volts

Due to current taken by voltmeter used, readings of detector plate and grid voltages may be slightly less than values shown above.



CONDENSERS		RESISTORS	
1	.00008 MFD.	12	300 ohms
2	.05	13	300
3	.1	14	450
4	.02	15	600
5	.1	16	12,000
6	.02	17	15,000
7	.02	18	60,000
8	.002	19	500,000
9	.1	20	500,000
10	4 MFD	21	1,000,000
11	4 MFD	22	5000
23	.02	24	90,000
25	.0009		

IF PEAK 450 KC.

MODEL 42
Above Serial 53968
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.

MODEL 42

This is a six tube superheterodyne receiver with automatic volume control, tone compensator and police call switch. It is designed to operate from a 110 to 125 volt, 50 or 60 cycle, alternating current power supply.

INSTALLATION:

An antenna of from twenty-five to a hundred feet in length should be connected to the blue wire extending from the back of the set. The antenna and lead-in wire should be kept clear of all metal objects such as pipes and wires, and be run in as straight a line as possible. An indoor antenna may be used to receive local stations or where the receiver is used in an isolated wooden building.

A good ground is essential for clearest reception. Connect the black wire at the back of the set to a water or steam pipe. The pipe should first be scraped clean before attaching the ground wire.

CONTROLS:

The knob on the left is the volume control and also operates the ON and OFF switch in the extreme left position.

The selector knob is at the right. The dial is calibrated in hundreds of kilocycles and covers a range of from 540 to 1720 K. C. The lower frequency police band is tuned from 16 to 17 on the dial. Police calls from stations on the higher frequency band may be received by shifting the police call switch on the back of the receiver to the right and tuning from 15 to 17 on the dial. Police radio stations operate intermittently to suit their particular needs and do not operate continuously as do the broadcast stations.

A tone control switch is located on the back of the receiver. When shifted to the right the higher audio frequencies are suppressed and static and interfering noises are reduced.

OPERATION:

With the line plug connected, turn the volume control to the right. The dial lights should light up brightly. Allow about one half minute for the tubes to warm up and slowly turn the selector knob until the desired program is heard. If too loud reduce the volume by turning the volume control to the left. For best quality the selector knob should be adjusted to the center of the range on the dial within which the station is heard and the volume adjusted with the volume control only.

SERVICE DATA:

The following tubes are used in this receiver:

6D6 - R. F. amplifier
6A7 - Converter (mixer-oscillator)
6D6 - I. F. amplifier
75 - Diode detector and audio amplifier
42 - Output amplifier
80 - Rectifier
Dial lights 6 - 8 volts.

SERVICE DATA - Cont'd.

The antenna and R. F. coils are in the shielding can nearest the front of the chassis and the mixer coil is in the shield within the chassis. The first I.F. transformer and oscillator are mounted in the shield between the 6A7 and 6D6 tubes; while the second I. F. transformer is located on the under side of the chassis. The oscillator trimmer condenser is nearest the back of the variable condenser and the mixer and R. F. trimmers are next in order toward the front of the chassis.

Trimmers for the I. F. transformers are adjustable through holes in the shield can, and on the I. F. transformer within the chassis. The intermediate frequency is 450 K.C. Use a weak signal or oscillator input when adjusting the trimmers. In removing the chassis from the cabinet pry off the knobs with a wooden screw driver with a piece of cardboard against the cabinet and pull off the pointer from the condenser shaft.

Voltage readings for service work follow:

A. C. VOLTAGES:

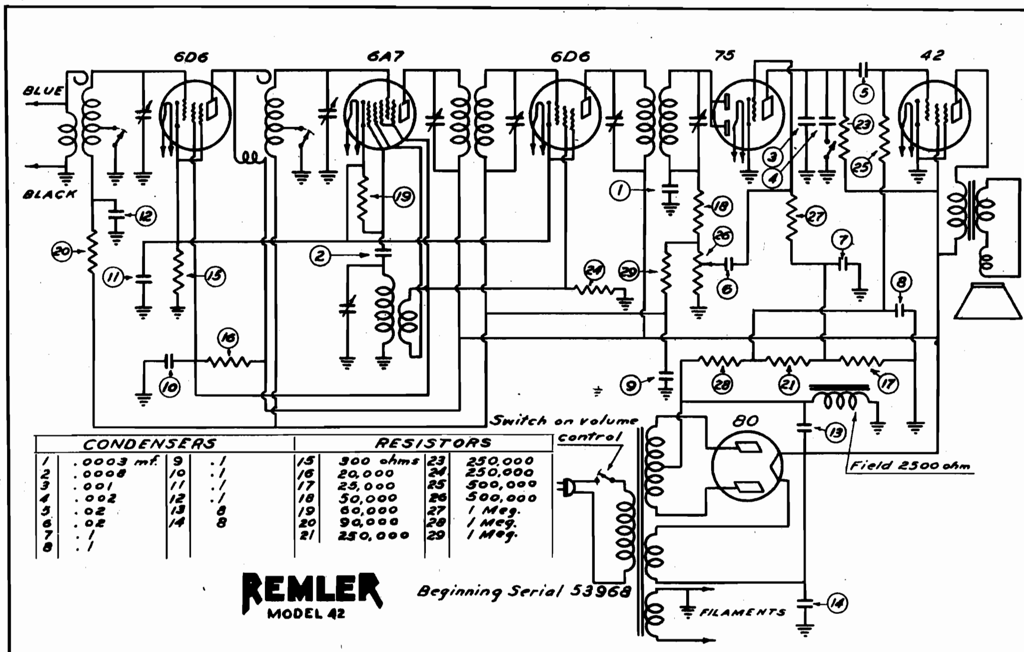
Line	120 volts
Filaments 6A7, 6D6's, 75 and 42	6.3 "
Filaments 80	5.2 "

D. C. VOLTAGES: (no signal)

From ground to:

80 Rectifier filament	270 volts
42 Plate	260 "
42 Screen grid	270 "
42 Grid	18 "
75 Plate	140 "
75 Grid	3 "
6D6 I. F. plate	270 "
6D6 I. F. screen grid	110 "
6D6 I. F. Cathode	5 "
6A7 Plate (mixer)	270 "
6A7 Screen grid	110 "
6A7 Cathode	5 "
6A7 Plate (oscillator)	110 "
6D6 R. F. plate	270 "
6D6 R. F. screen grid	110 "
6D6 R. F. cathode	5 "
Speaker field	120 "

Due to current taken by voltmeter used, readings of 75 and 42 grid voltages will be less than those above.



CONDENSERS				RESISTORS			
1	.0003 mf.	9	.1	15	300 ohms	23	250,000
2	.0008	10	.1	16	20,000	24	250,000
3	.001	11	.1	17	25,000	25	500,000
4	.002	12	.1	18	50,000	26	500,000
5	.02	13	8	19	60,000	27	1 Meg.
6	.02	14	8	20	90,000	28	1 Meg.
7	.1			21	250,000	29	1 Meg.
8	.1						

IF PEAK 450 KC.

MODEL 53
Above Serial 54862
Schematic, Voltage
Alignment

REMLER COMPANY, LTD.

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes five tubes, two of which are of the double purpose type. It is equipped with a six inch full dynamic speaker and receives all police calls.

INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110 to 125 volts, 50 or 60 cycles.

Flexible leads for connecting antenna and ground extend from the back of the cabinet. A good ground connection to the black lead is essential for best performance. This lead should be as short as possible and preferably attached to a water pipe. Under ordinary conditions an outdoor antenna of approximately 100 feet in length should be connected to the blue wire. Where the receiver is installed near broadcast stations, a shorter antenna may be used to improve selectivity. An antenna longer than 100 feet may be used in rural locations.

OPERATION:

The lower knob controls the volume and operates the ON and OFF switch at the extreme left position. The dial is calibrated in hundreds of kilocycles, that is - a station transmitting on 700 kilocycles is tuned in at 7 on the dial.
The lower frequency police band may be tuned in near 17 on the dial while police calls from stations on the higher frequency band are tuned in from 15 to 16. These stations are on the air intermittently to suit their particular needs and are not operated continuously as are the broadcast stations.

SERVICE DATA:

The antenna and mixer coils are located in the protecting shield on the top of the chassis. The mixer coil is trimmed by the trimmer condenser nearest the back of the variable condenser. The oscillator coil is within the chassis and is trimmed by the front trimmer on the variable condenser.

The I. F. transformers have untuned secondaries and are located within the chassis. The trimmers for the primary windings are attached to the transformers. The intermediate frequency used is 450 K.C.

TUBES:

6A7	Converter (mixer-oscillator)
6D6	I.F. amplifier
53	Diode detector and audio amplifier
42	Power amplifier
80	Full wave rectifier
	Dial light 3.8 volt

A. C. VOLTAGES:

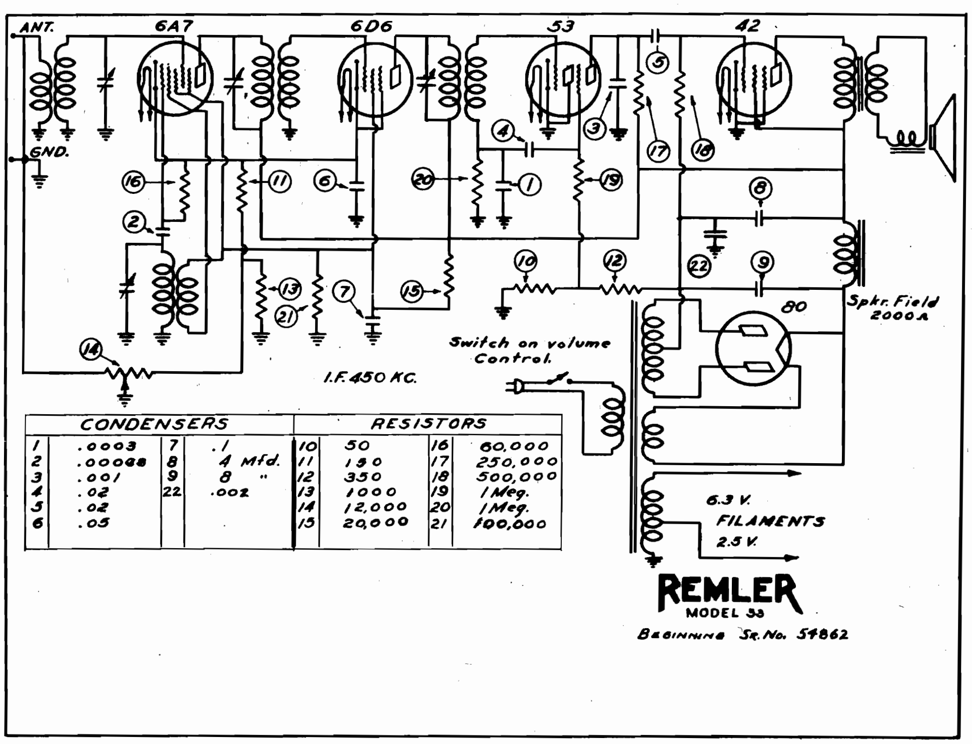
Line	120 volts
Filaments - #80	5 "
#53 and dial light	2.4 "
#42, 6A7 and 6D6	6.2 "

D. C. VOLTAGES: Full volume, no signal

From ground to:

80	Rectifier filament	325 volts
42	Plate	215 "
42	Screen grid	220 "
42	Cathode	0 "
42	Grid	18 "
53	Second section plate	100 "
53	Second section grid	2.5 "
53	Cathode	0 "
6D6	Plate	220 "
6D6	Screen grid	105 "
6D6	Cathode	3 "
6A7	Pentode plate	220 "
6A7	Screen grid	105 "
6A7	Oscillator plate	105 "
6A7	Cathode	3 "

Due to current taken by the voltmeter used, readings of the 42 grid and 53 plate voltages will be less than values shown above.



CONDENSERS				RESISTORS			
1	.0003	7	.1	10	50	16	60,000
2	.00068	8	4 Mfd.	11	150	17	250,000
3	.001	9	8 "	12	350	18	500,000
4	.02	22	.002	13	1000	19	1 Meg.
5	.02			14	12,000	20	1 Meg.
6	.05			15	20,000	21	100,000

MODEL 53-C
Above Serial 56208
Schematic,Voltage
Alignment

REMLER COMPANY, LTD.

GENERAL DESCRIPTION:

This radio receiver employs the superheterodyne circuit and utilizes five tubes, one of which is of the double purpose type. It is equipped with a six inch full dynamic speaker and receives all police calls.

INSTALLATION:

The receiver is designed for operation from an alternating current (A.C.) power supply of 110 to 125 volts, 50 or 60 cycles.

Flexible leads for connecting antenna and ground extend from the back of the cabinet. A good ground connection to the black lead is essential for best performance. This lead should be as short as possible and preferably attached to a water pipe. Under ordinary conditions an outdoor antenna of approximately 100 feet in length should be connected to the blue wire. Where the receiver is installed near broadcast stations, a shorter antenna may be used to improve selectivity. An antenna longer than 100 feet may be used in rural locations.

OPERATION:

The knob on the left controls the volume and operates the ON and OFF switch at the extreme left position. The dial is calibrated in tens of kilocycles, that is, a station on 700 KC is tuned in at 70 on the dial. The lower frequency police band may be tuned in near 170 on the dial, while police calls from stations on the higher frequency band are tuned in between 150 and 160. These stations are on the air to suit their particular needs and are not operated continously as are the broadcast stations. The knob on the right operates the tone control.

SERVICE DATA:

The antenna and mixer coils are located in the protecting shield on the top of the chassis. The mixer coil is trimmed by the trimmer condenser nearest the back of the variable condenser. The oscillator coil is within the chassis and is trimmed by the front trimmer on the variable condenser.

The I. F. Transformers are located within the chassis and may be trimmed by the adjusting screws on the rear of the chassis. The intermediate frequency is 450 KC

TUBES:

6A7	Converter (mixer-oscillator)
6D6	I. F. Amplifier
76	Detector
42	Power amplifier
80	Full wave rectifier
	Dial light 6.8 volt

A. C. VOLTAGES:

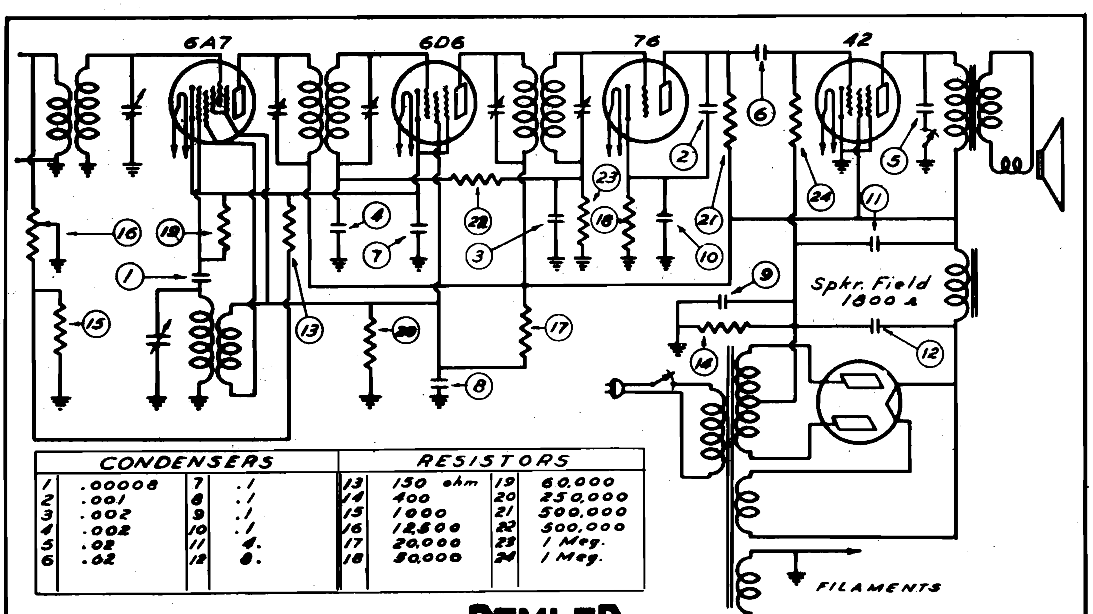
Line	120 volts
Filaments - #80	5.0 "
#42, 6A7, 76, 6D6 and dial light	6.3 "

D. C. VOLTAGES: Full volume, no signal

From ground to:

80 Rectifier filament	310 volts
42 Plate	205 "
42 Screen grid	215 "
42 Cathode	0 "
42 Grid	19.5 "
76 Plate	70 "
76 Cathode	8 "
6D6 Plate	215 "
6D6 Screen grid	90 "
6D6 Cathode	2.5 "
6A7 Pentode Plate	215 "
6A7 Screen grid	90 "
6A7 Oscillator plate	90 "
6A7 Cathode	2.5 "

Due to current taken by the voltmeter used, reading of the 42 grid and 76 plate voltages will be less than values shown above.



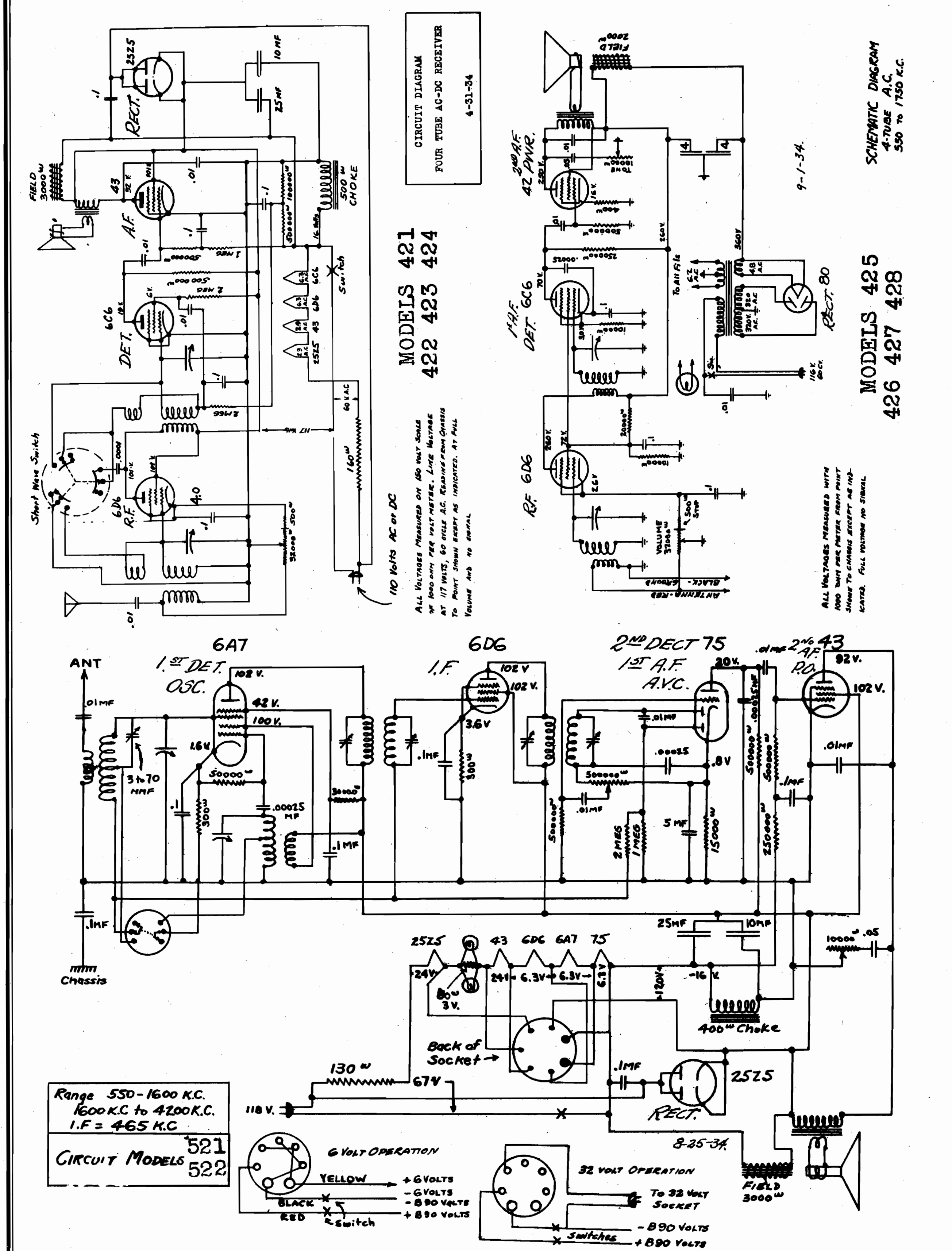
CONDENSERS				RESISTORS			
1	.00008	7	.1	13	150 ohm	19	60,000
2	.001	8	.1	14	400	20	250,000
3	.002	9	.1	15	1000	21	500,000
4	.002	10	.1	16	12,500	22	500,000
5	.02	11	4.	17	20,000	23	1 Meg.
6	.02	12	8.	18	50,000	24	1 Meg.

Beginning serial number #56208

REMLER
MODEL 53C

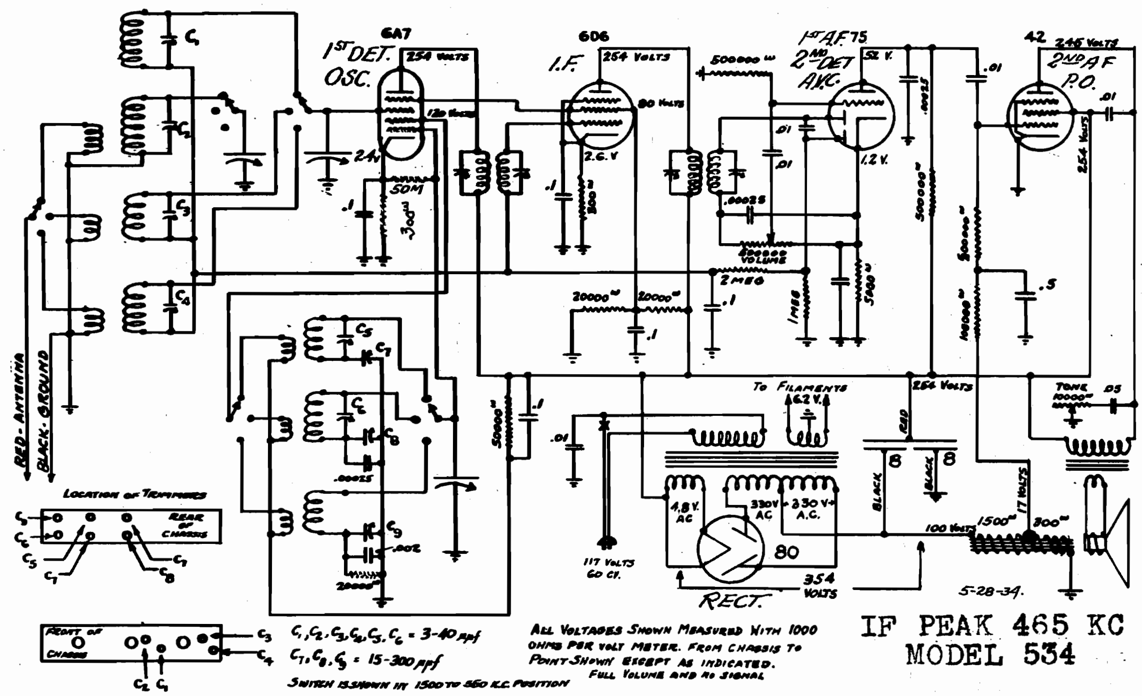
RK RADIO LABORATORIES, INC.

MODELS 421,422,423,424
MODELS 425,426,427,428
MODELS 521,522
Schematics,Voltage

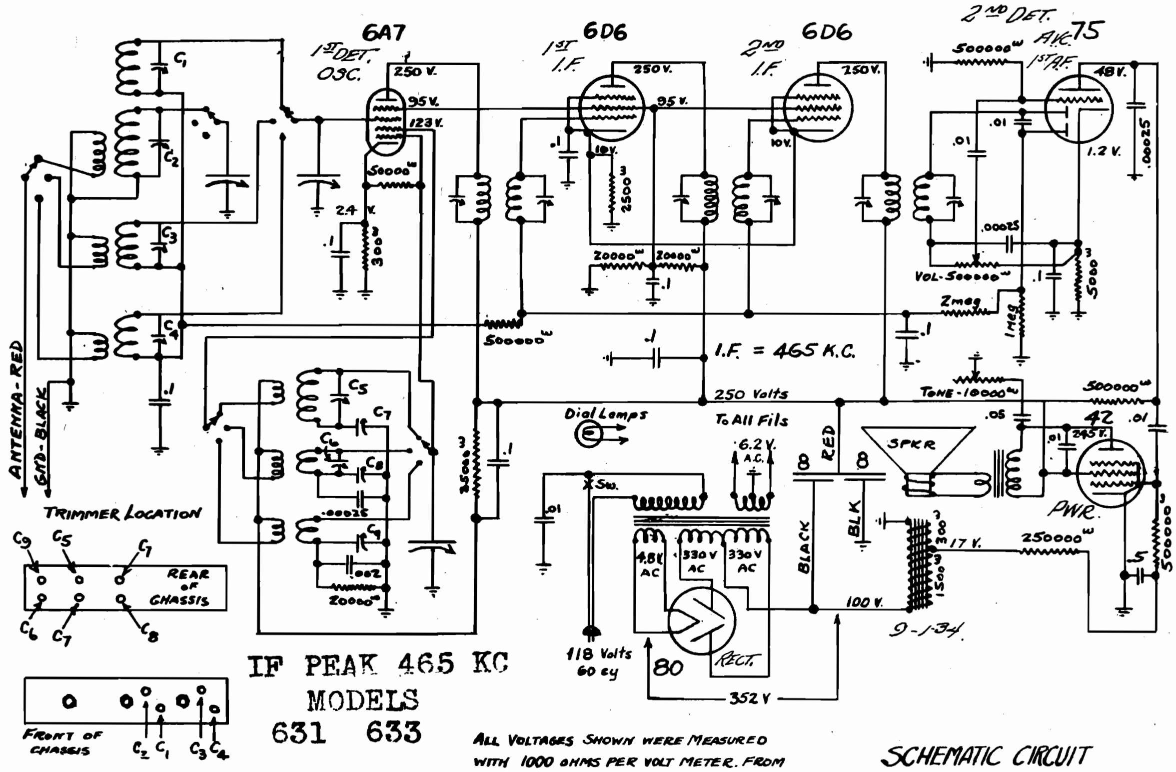


MODEL 534
MODELS 631, 633
Schematics, Voltage

RK RADIO LABORATORIES, INC.



IF PEAK 465 KC
MODEL 534



IF PEAK 465 KC
MODELS
631 633

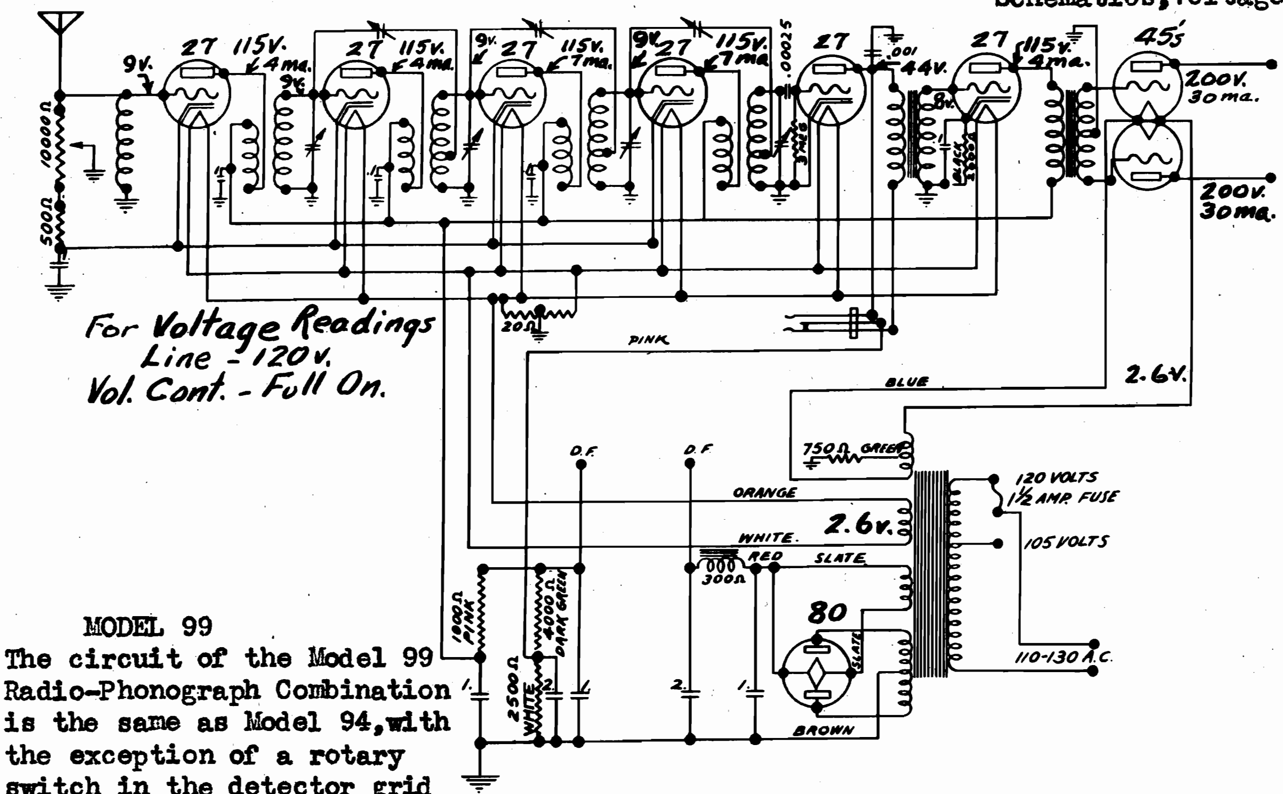
$C_1, C_2, C_3, C_4, C_5, C_6$ = 3-40 MMF
C_7, C_8, C_9 = 15-300 MMF
SWITCH SHOWN IN 1500 TO 550 KC POS.

ALL VOLTAGES SHOWN WERE MEASURED WITH 1000 OHMS PER VOLT METER. FROM CHASSIS TO POINT SHOWN EXCEPT AS INDICATED AT FULL VOLUME, NO SIGNAL

SCHEMATIC CIRCUIT
6-TUBE 3-BAND CHASSIS

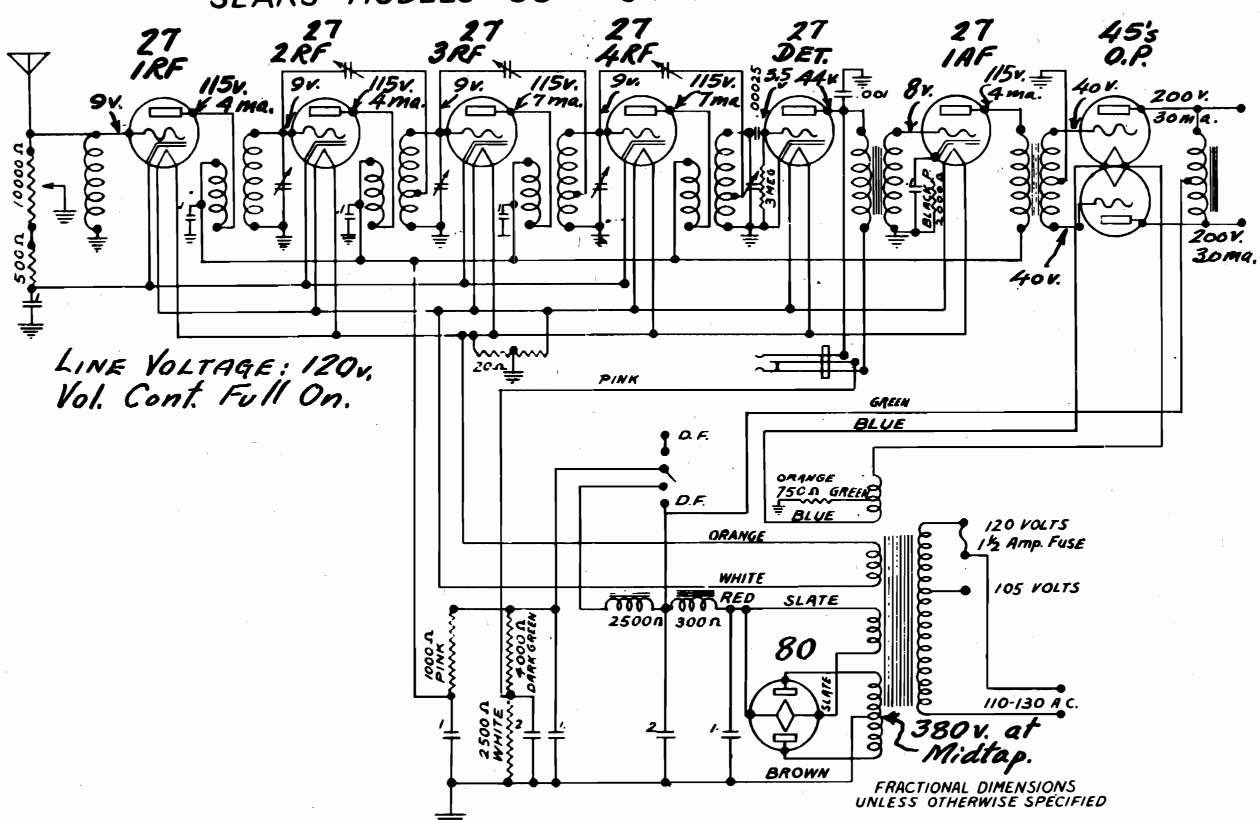
MODELS 52,95
MODELS 53,54,94,99
Schematics,Voltage

SEARS-ROEBUCK & CO.



MODEL 99
The circuit of the Model 99 Radio-Phonograph Combination is the same as Model 94, with the exception of a rotary switch in the detector grid circuit.

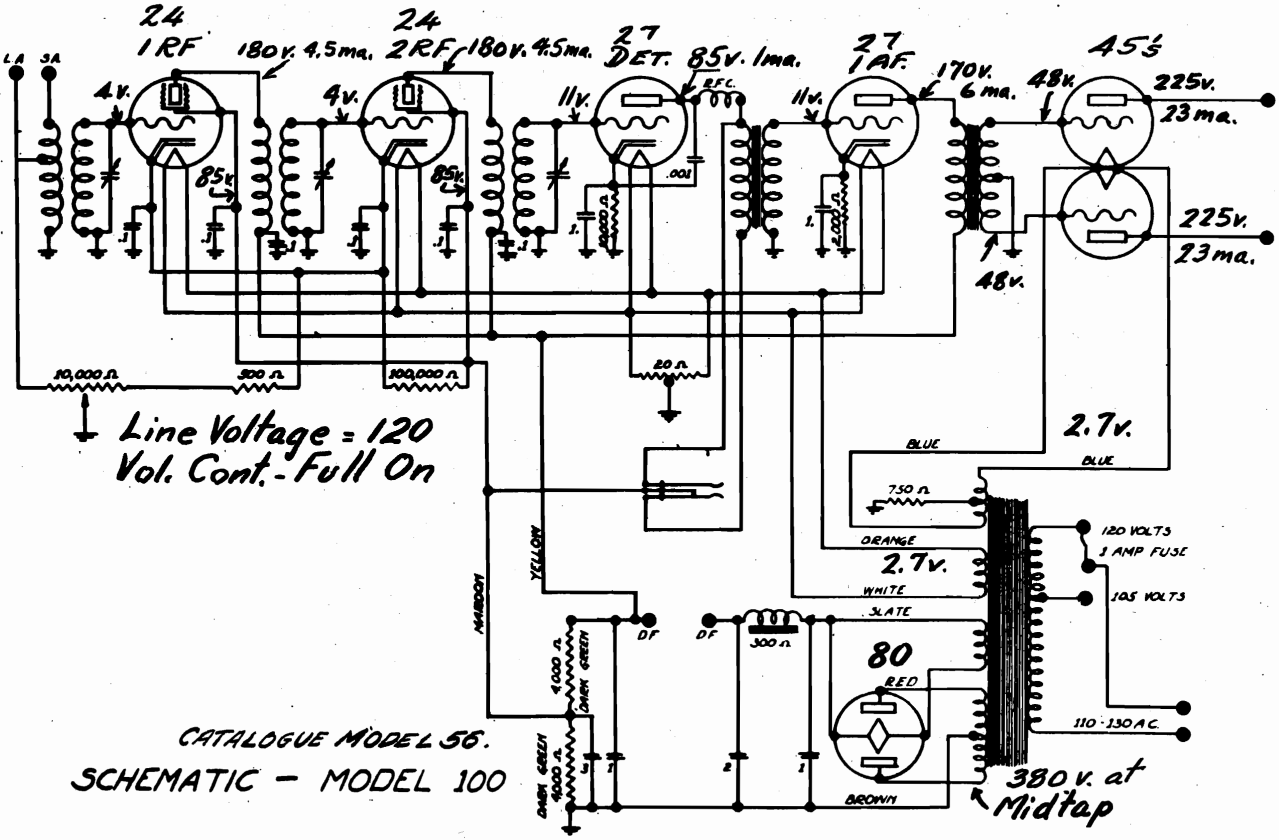
SCHEMATIC DIAGRAM
SEARS MODELS 53 AND 54-FACTORY MODEL 94



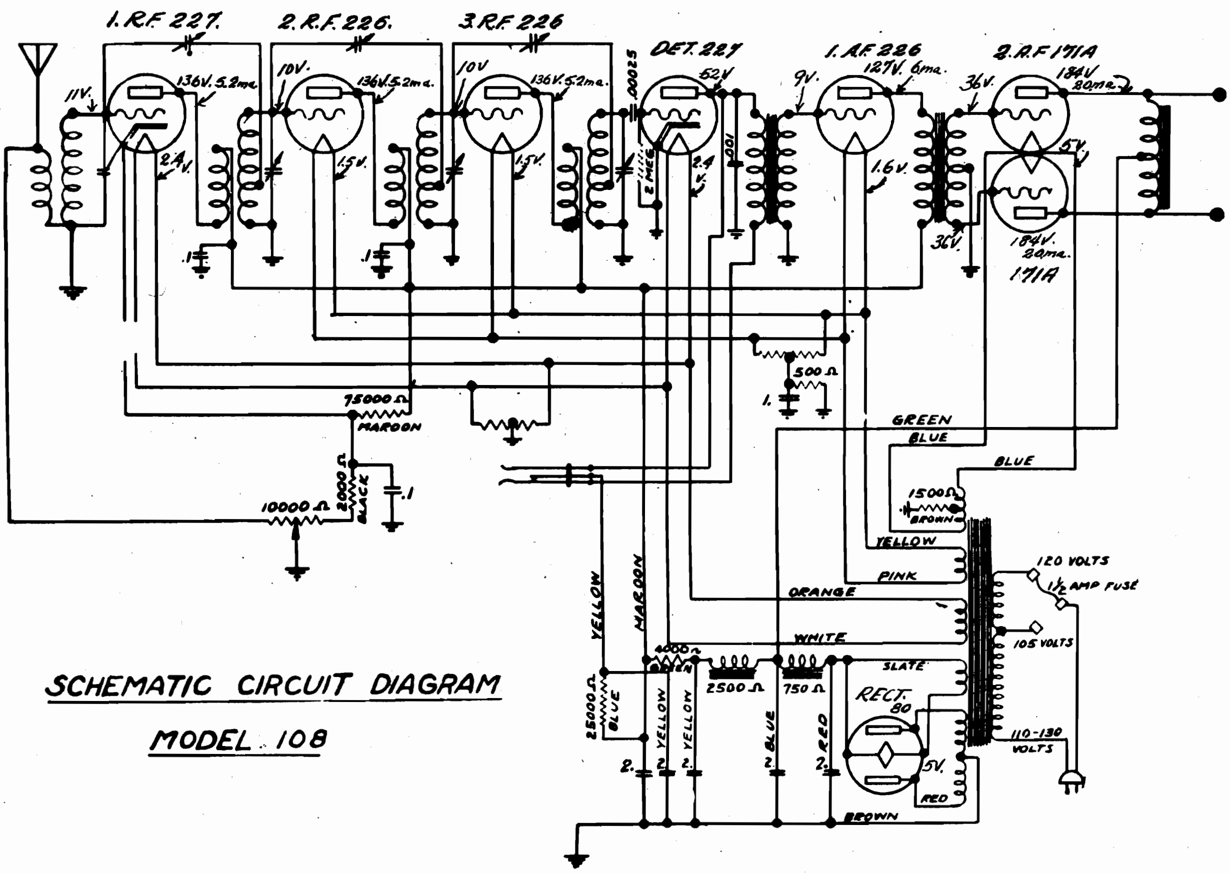
SCHEMATIC DIAGRAM
SEARS MODEL 52 FACTORY MODEL 95

MODELS 56,100
MODEL 108
Schematics,Voltage

SEARS-ROEBUCK & CO.



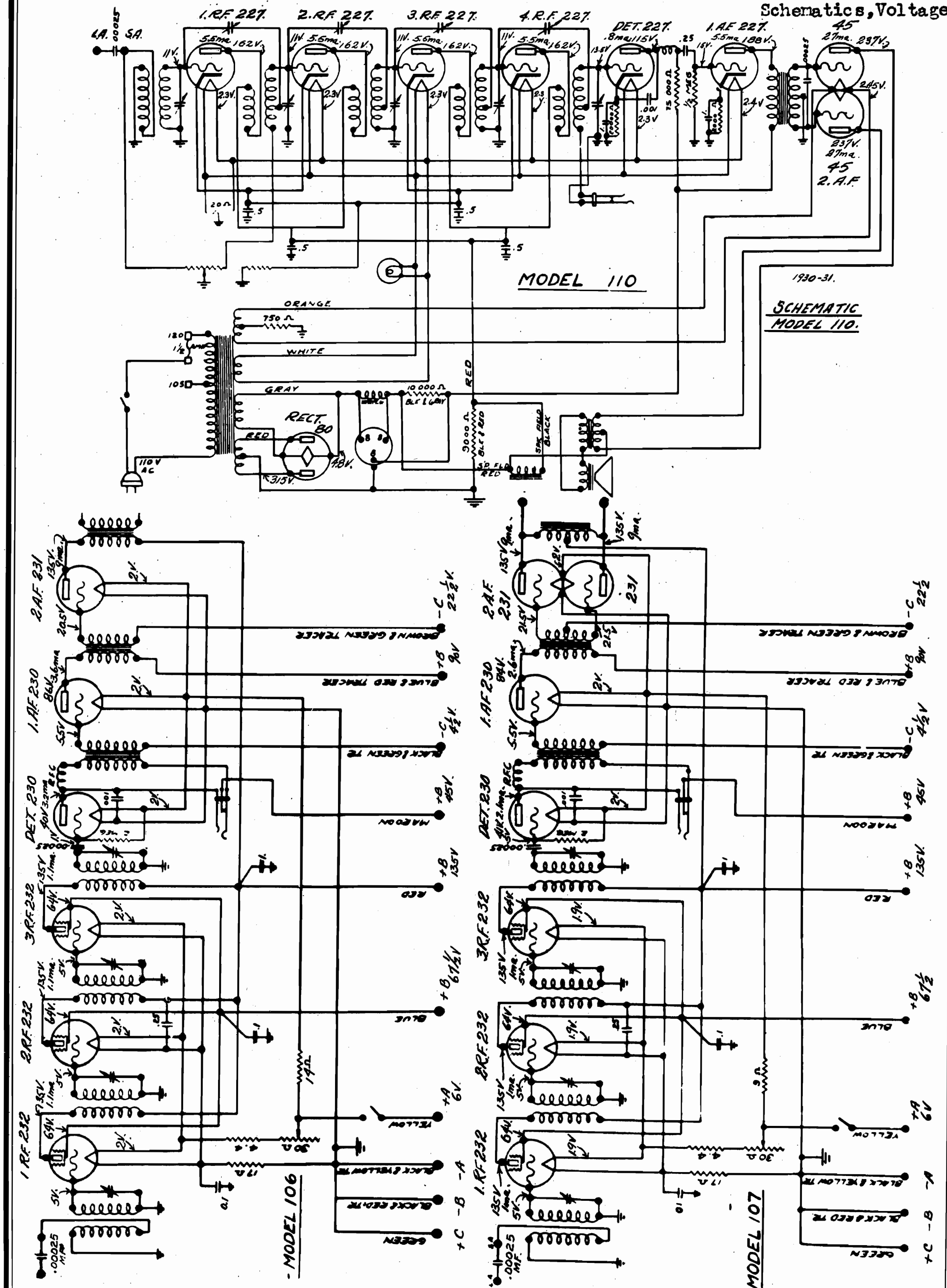
CATALOGUE MODEL 56.
SCHEMATIC - MODEL 100



SCHEMATIC CIRCUIT DIAGRAM
MODEL 108

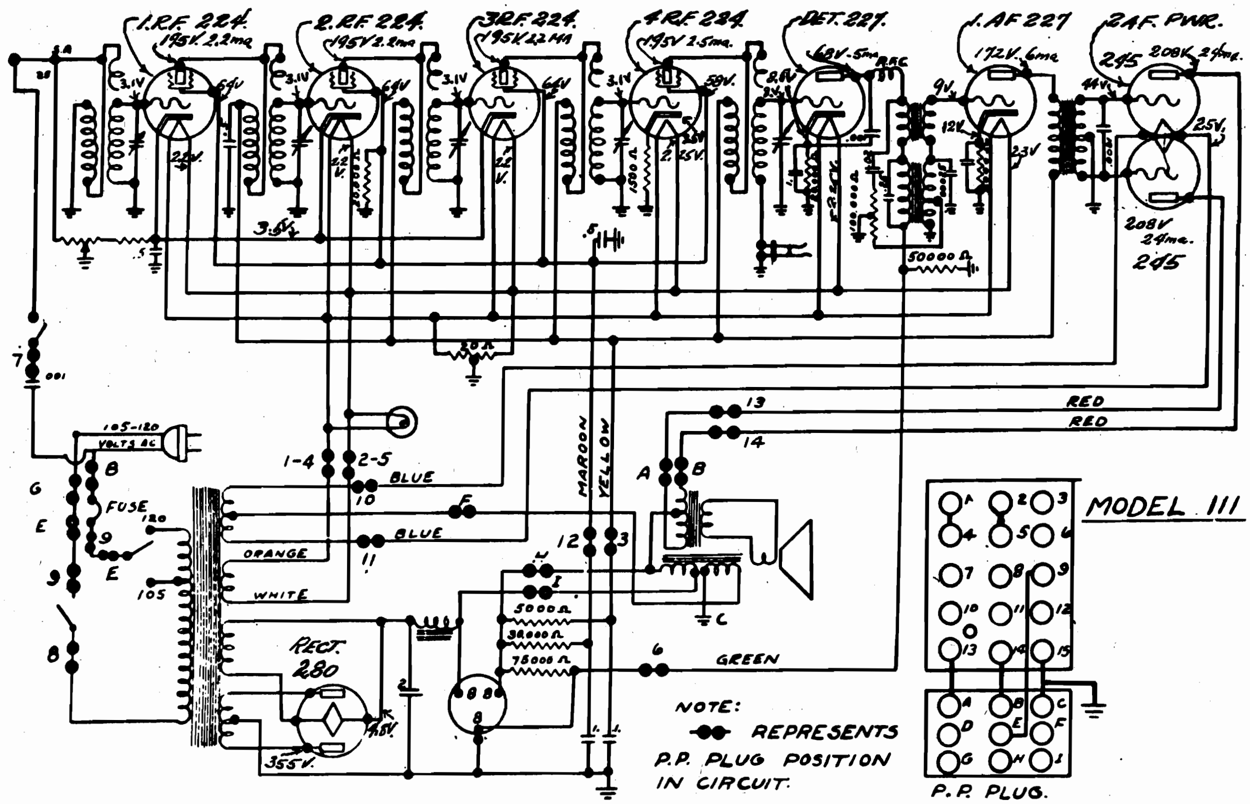
MODEL 106
MODEL 107
MODEL 110
Schematics, Voltage

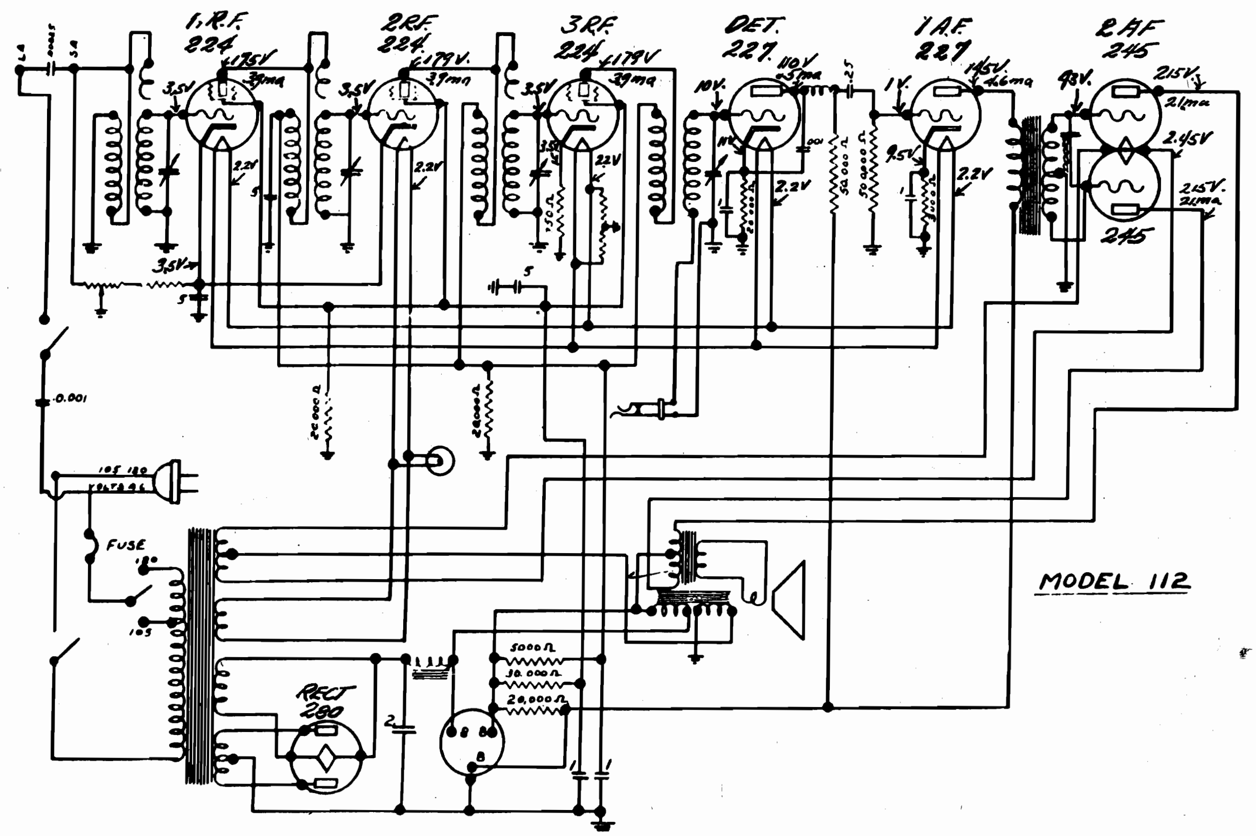
SEARS-ROEBUCK & CO.



MODEL 111
MODEL 112
Schematics, Voltage

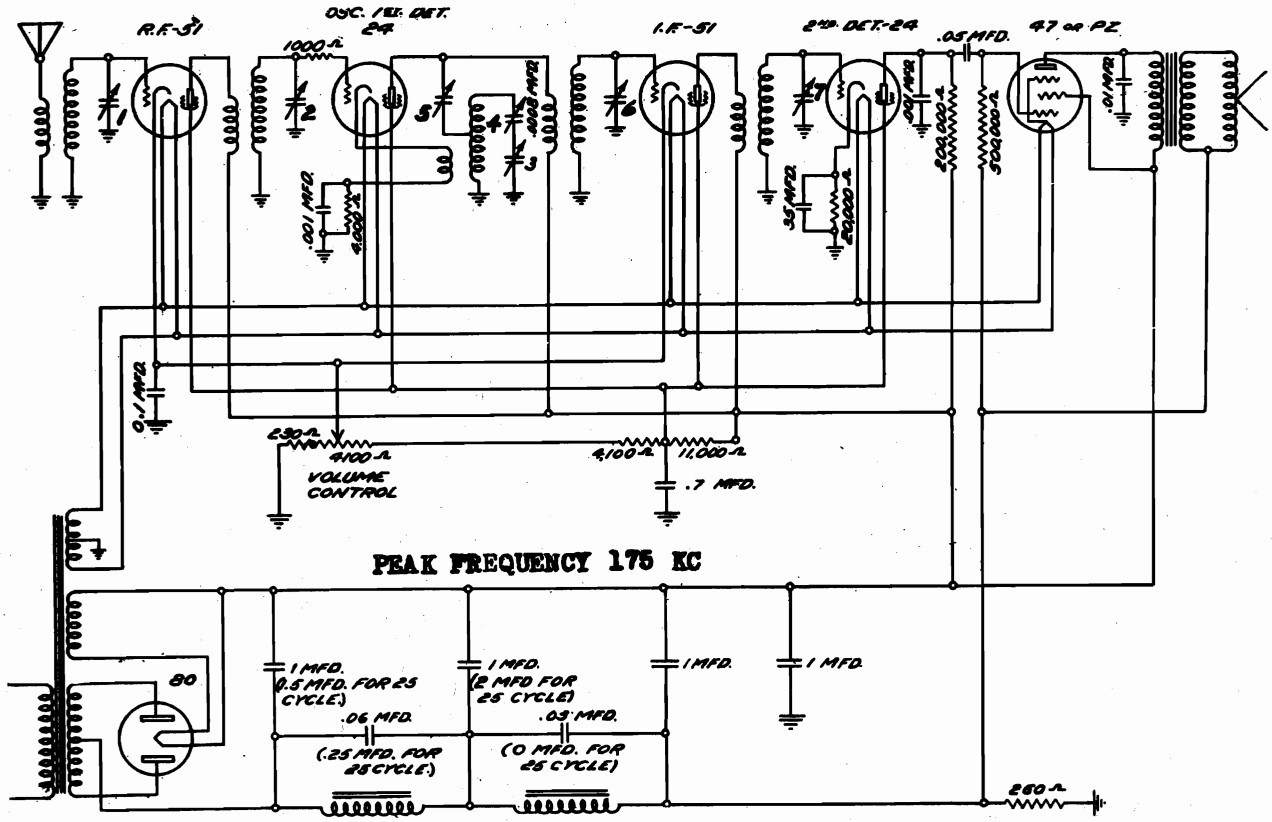
SEARS-ROEBUCK & CO.





MODEL 1506
Schematic
Voltage

SEARS-ROEBUCK & CO.



READING TAKEN WITH WESTON MODEL 565 ANALYZER

MODEL No. CUSTOMER BY

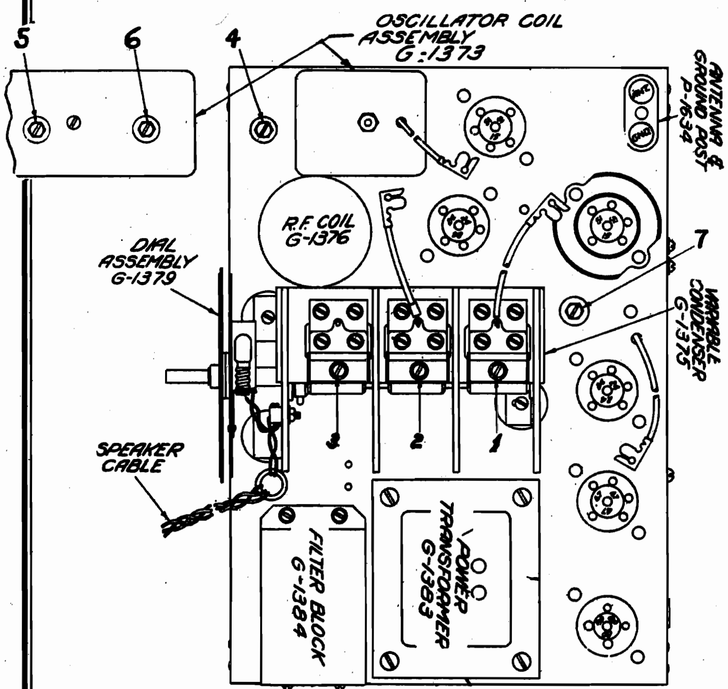
No.	Stage	Type Tube	"A" Volts	"B" Volts	Cont. Grid Volt	Cath. Volts	S. G. Volts	Ip Norm.
1	R. F.	51	2.15	235	2.4	2.5	80.	5.0
2	Autodyne	24	2.15	225	5.0	6.0	75.	3.0
3	I. F.	51	2.15	230	2.4	2.5	75.	4.0
4	2nd Det.	24	2.15	104	10.	15.	65.	0.6
5	Audio	47	2.25	250	16	0	260	30.
6	Rect.	80	4.4					57.5

Line Voltage 115. Order of Test: 1 Rect., 2 Power, 3 Det., Etc.
Volume Control Position, Full On.

NOTE: Since resistance tolerances in the sets are plus or minus 10% and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

MODEL 1506
Trimmers, Socket
Alignment

SEARS-ROEBUCK & CO.



READJUSTING TRIMMERS

Number 1 is the antenna trimmer.

Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.

Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).

Number 4 is the oscillator padding trimmer.

Number 5 is the Super-autodyne plate trimmer.

Number 6 is the I. F. grid trimmer.

Number 7 is the second detector grid trimmer.

To readjust the trimmer, it will be necessary that a good design of 175 k. c. oscillator be employed, and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency, and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid cap clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known high frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. should be chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration therefore more accurate.

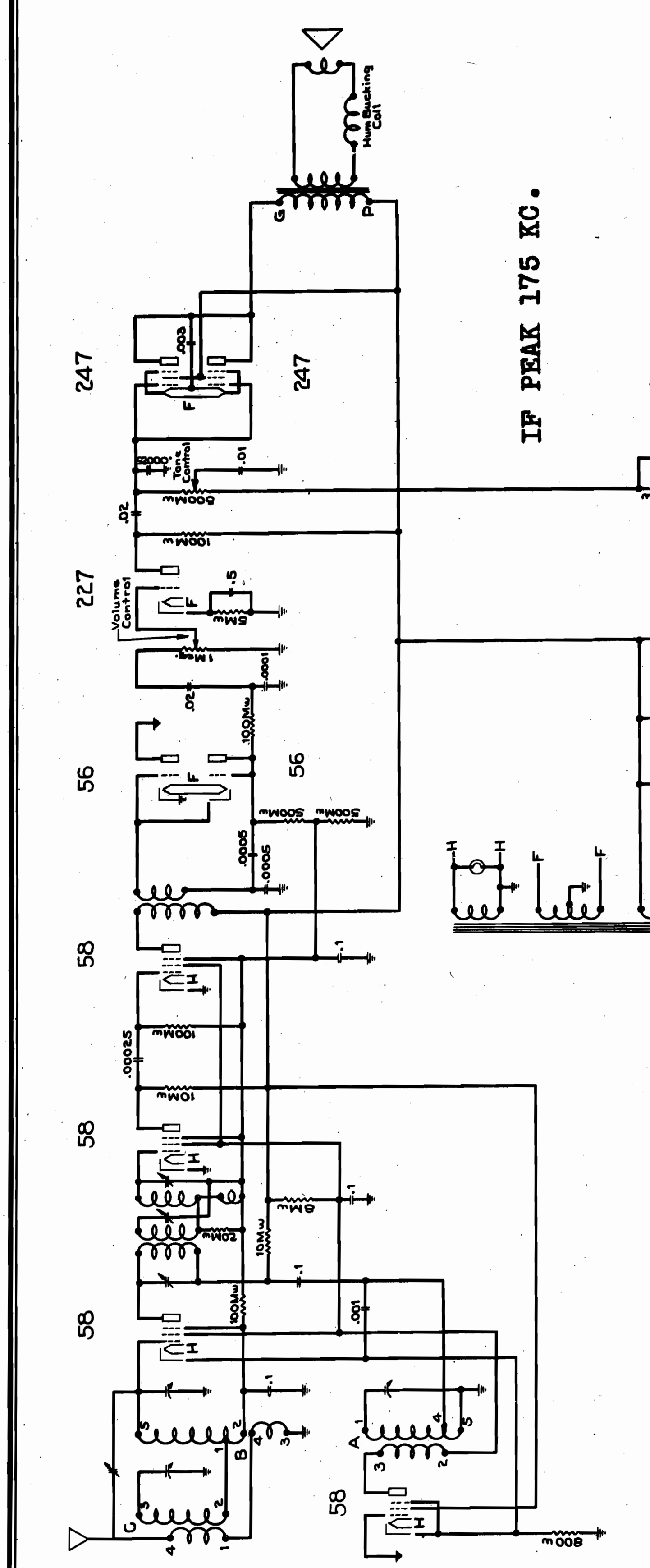
The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f, and first detector stages.

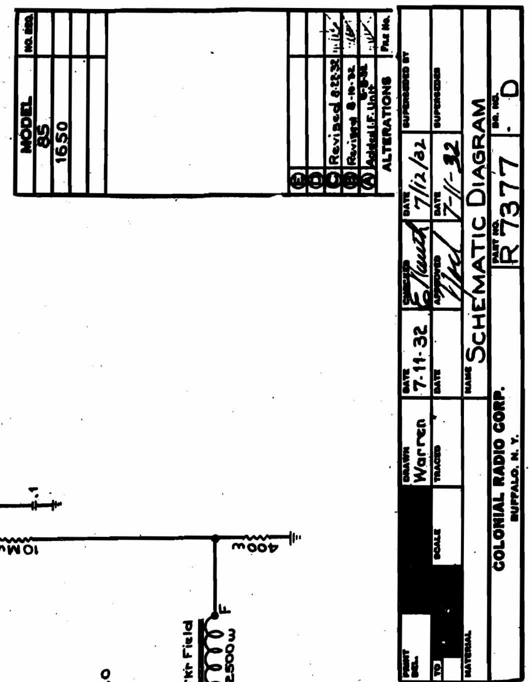
Tune the external broadcast test oscillator and the receiver both to 600 k.c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k.c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

MODEL 1650
Schematic

SEARS-ROEBUCK & CO.





Occasionally, a 58 oscillator tube refuses to function at the low frequency end of the scale. Try each of the other type 58 tubes in the oscillator socket until one is found which operates properly. Some receivers of this model use an 800 ohm (R7441) resistor instead of the 1000 ohm (R6154) in the oscillator cathode circuit to secure better functioning of the oscillator. If difficulty is experienced in finding a suitable 58 oscillator tube, replace the 1000 ohm resistor with the 800 ohm one.

MODEL 1650
Voltage
Transformer Data

SEARS-ROEBUCK & CO.

TUBE VOLTAGE and CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
58 - Oscillator	100	220	-15	10	4
58 - Translator	210	100	*	1	.4
58 - 1st I.F.	145	100	*	8	2
58 - 2nd I.F.	220	100	*	10	2.5
227 - 1st A.F.	95	--	-7	1.5	--
247 - Output	215	220	*	11.5	2
280 - Rectifier	Max. d.c. volts = 415 volts			Plate Current 30 m.a. each plate	

* High series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Because the A.V.C. action would change voltages and currents, no signal should be received when readings are taken. These are average values. Usually, deviations up to 20% are permissable and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation.

POWER TRANSFORMER COLOR CODE

PRIMARY

Green; Black. Stranded wire leads.

RECTIFIER FILAMENT

Red. Solid wire leads.

RECTIFIER PLATE

Red; Blue. Slate center tap. Stranded wire leads.

R.F. FILAMENTS

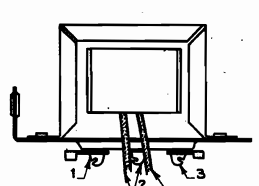
Yellow. Solid wire leads.

A.F. FILAMENTS

Orange. Solid wire leads.

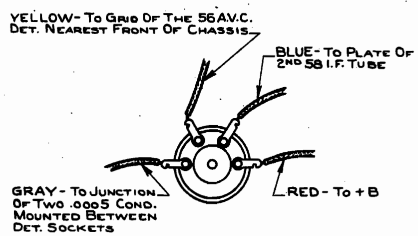
MODEL 1650
Socket, Trimmers Transformer Data

SEARS-ROEBUCK & CO.



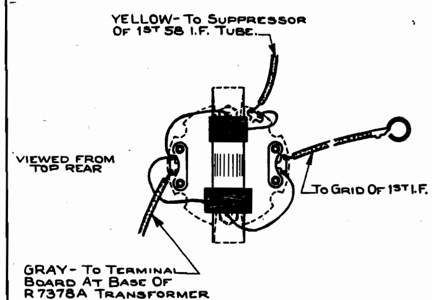
1 - To Voice Coil & Hum Bucking Coil.
2 - To Hum Bucking Coil & Secondary.
3 - To Secondary & Voice Coil.

OUTPUT TRANSFORMER
S6317A

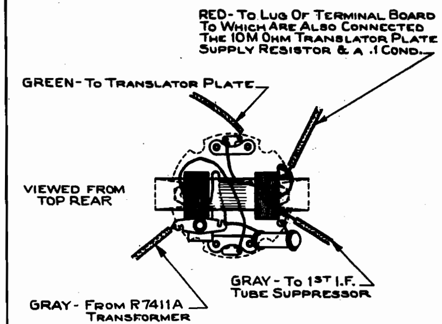


(MOUNT WITH TERMINAL BOARD FACING REAR OF CHASSIS.)

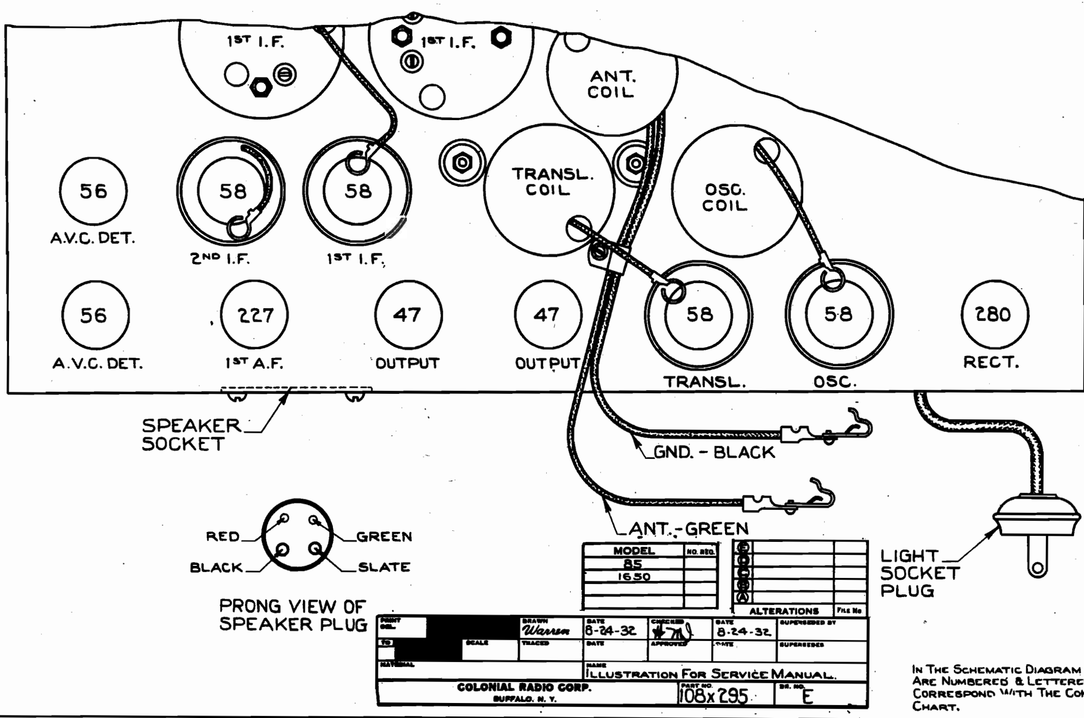
I.F. OUTPUT TRANSFORMER
R7056D



1ST I.F. INPUT TRANSFORMER
R7411A



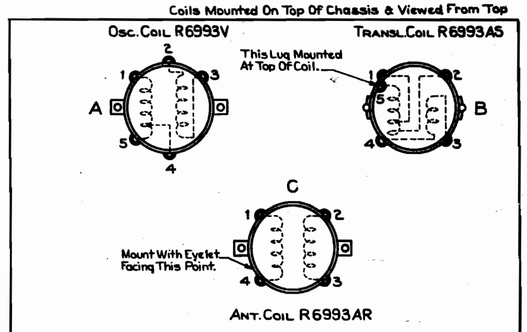
1ST I.F. INPUT TRANSFORMER
R7378A



In The Schematic Diagram The Coils Are Numbered & Lettered To Correspond With The Connection Chart.

ILLUSTRATION FOR CONTINUITY CHECKING OF COIL WINDINGS AND CONNECTION CHART FOR INSTALLING REPLACEMENT COILS

Coils Mounted On Top Of Chassis & Viewed From Top



Front Of Chassis

COIL "A"
- Lug #1 - To Stator Of #3 Variable Tuning Condenser Unit (Unit Furthest From Dial).
- Lug #2 - To Screen of Translator Tube.
- Lug #3 - To Plate Of Oscillator Tube.
- Lug #4 - To Terminal Board To Which Are Also Connected A .001 & .1 Condenser.
- Lug #5 - To Variable Tuning Condenser Frame (Gnd.)

COIL "B"
- Lug #1 - To Coil "C", Lug #2.
- Lug #2 - To Terminal Board To Which Are Also Connected A Lead To The Translator Suppressor & A 100M Ohm Resistor.
- Lug #3 - To Ground.
- Lug #4 - To Coil "C", Lug #1.

COIL "C"
- Lug #1 - To Coil "B", Lug #4.
- Lug #2 - To Coil "B", Lug #1.
- Lug #3 - To Stator, Variable Tuning Condenser #1.
- Lug #4 - To Antenna Lead & Image Suppressor Condenser

MODELS 1652,1654
Voltage,Transformer Data

SEARS-ROEBUCK & CO.

TUBE VOLTAGE and CURRENT CHART

TUBE	PLATE VOLTAGE	SCREEN VOLTAGE	GRID VOLTAGE	PLATE M. A.	SCREEN M. A.
58 - Translator	190	85	-9 *	1.5	.1
58 - Oscillator	85	210	-12	10	5
58 - 1st IF	130	95	*	9	2
58 - 2nd IF	215	95	*	9	2
227 - 1st AF	80		*	1.2	
46 - Driver	230		*	5	2
46 - Output	375	+3.5	+3.5	15	
280 - Rectifier	Max. d.c. volts = 375			Plate Current 20m.a. per plate of ea.tube	

* High series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings should be taken with antenna and ground leads shorted together lest a signal should cause the A.V.C. action to change voltages and currents. These are average values. Usually, deviations up to 20% are permissable and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Ordinarily, touching a finger to the grid or plate will stop oscillation.

The receiver should be turned on long enough for the speaker field to become hot before taking readings. Readings taken with the field coil cold will have higher values.

TRANSFORMER COLOR CODES

POWER TRANSFORMER

Primary:- Green; Black

Hi-Voltage Secondary:- Red; Blue; Slate center tap, stranded leads.

Rectifier Filaments:- Red. Heavy wire leads.

Secondary "F":- Yellow. Solid wire leads.

Secondary "H":- Orange. Solid wire leads. Brown. Center tap.

CLASS "B" INPUT

Primary:- Blue; Red

Secondary:- Green; Yellow; Slate center tap

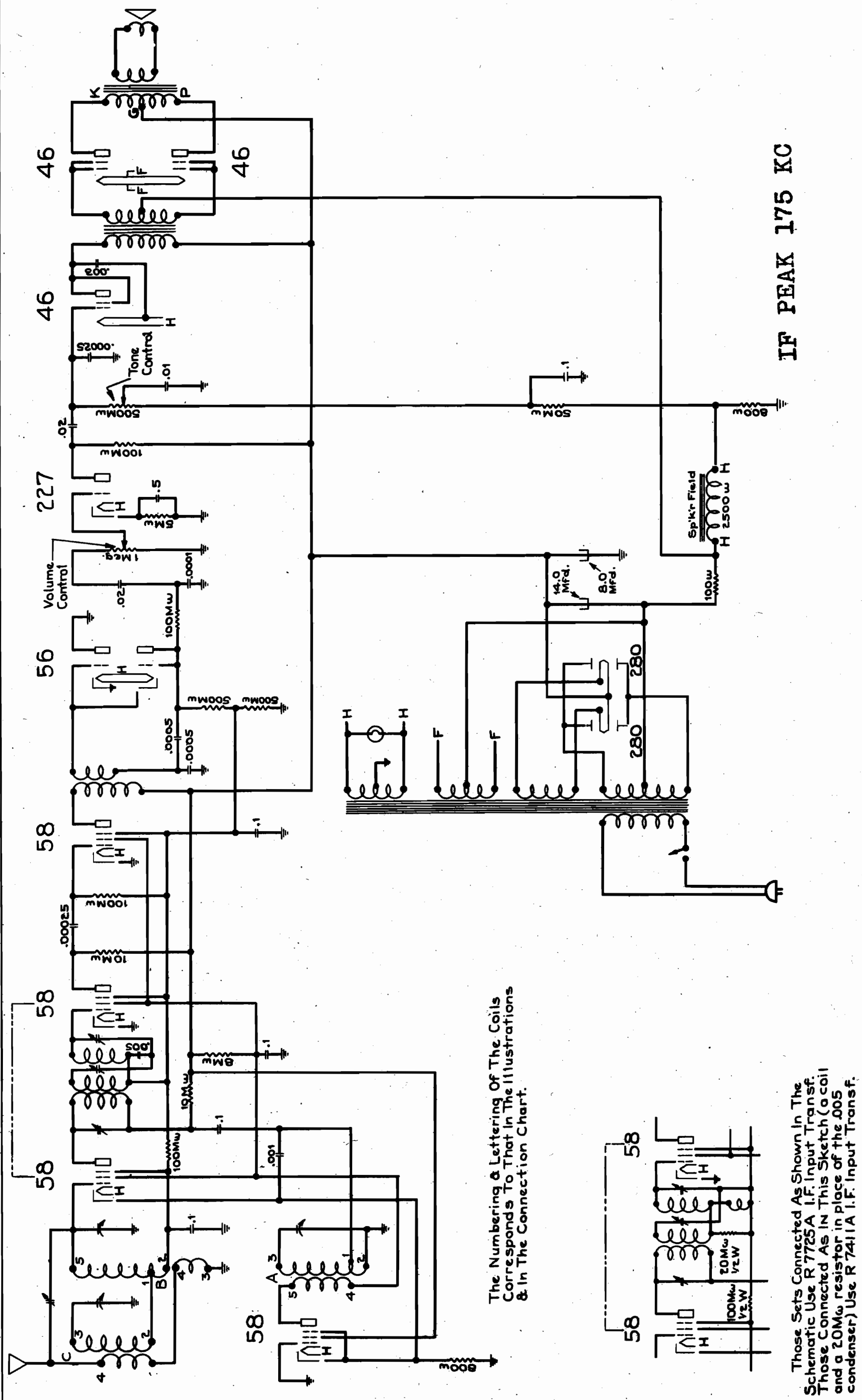
CLASS "B" OUTPUT

Primary:- Green; Blue; Red - center tap

Secondary:- Enamelled wire leads.

MODELS 1652,1654
Schematic

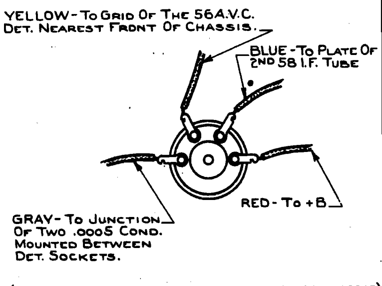
SEARS-ROEBUCK & CO.



The A.V.C. action should be rendered inoperative when peaking the IF stages. This can be done by connecting a 3 volt battery across R2, with the positive terminal connected to ground and the negative terminal to point (5). R2 is the green resistor with black tip and yellow dot mounted across the 2nd IF tube socket and connected from suppressor to cathode.

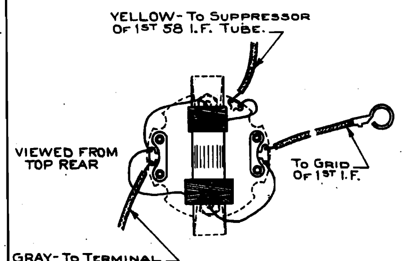
MODELS 1652,1654
Socket, Trimmers
Transformer Data
Coil Data

SEARS-ROEBUCK & CO.

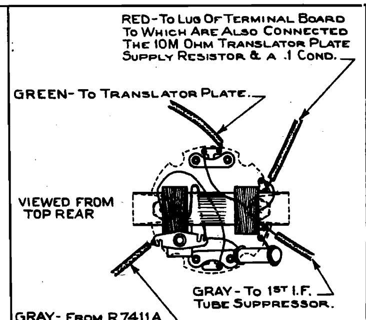


(MOUNT WITH TERM. BOARD FACING REAR OF CHASSIS)

I.F. OUTPUT TRANSFORMER
R 7056 D



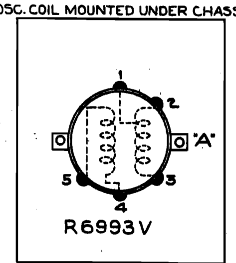
1ST I.F. INPUT TRANSFORMER
R 7411 A



1ST I.F. INPUT TRANSFORMER
R 7378 A

ILLUSTRATION FOR COIL REPLACEMENT AND CONTINUITY CHECKING

OSC. COIL MOUNTED UNDER CHASSIS

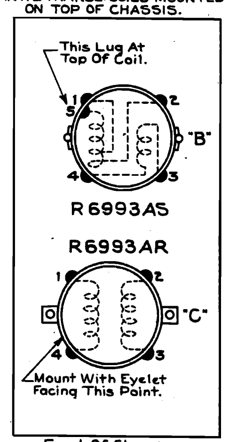


Bottom Of Chassis

COIL "A"

LUG #1 TO TERMINAL BOARD TO WHICH ARE ALSO CONNECTED A .001 & .1 CONDENSER.
LUG #2 TO VARIABLE TUNING CONDENSER FRAME. (GND.)
LUG #3 TO STATOR OF #3 VARIABLE TUNING COND. UNIT. (UNIT FURTHEST FROM THE DIAL)
LUG #4 TO 8M CANDOHM SCREEN SUPPLY RESISTOR; .1 COND. & SCREEN OF TRANSLATOR TUBE.
LUG #5 TO PLATE OF OSCILLATOR TUBE.

ANT. & TRANSL. COILS MOUNTED ON TOP OF CHASSIS.



Front Of Chassis

COIL "B"

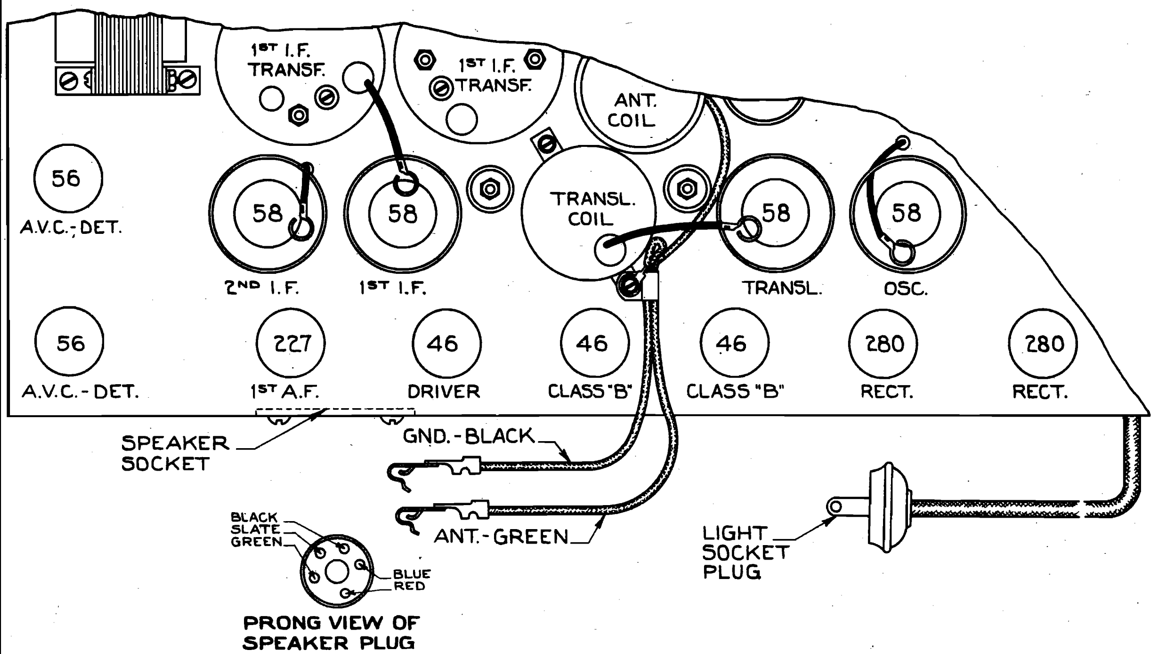
LUG #1 TO COIL "C", LUG #2.
LUG #2 TO TERM. BOARD TO WHICH ARE ALSO CONNECTED A LEAD TO THE TRANSLATOR SUPPRESSOR; A 100M OHM RESISTOR & A .1 CONDENSER.
LUG #3 TO GROUND.
LUG #4 TO COIL "C", LUG #1.

COIL "C"

LUG #1 TO COIL "B", LUG #4.
LUG #2 TO COIL "B", LUG #1.
LUG #3 TO STATOR, VARIABLE TUNING CONDENSER #1.
LUG #4 TO ANTENNA LEAD & IMAGE SUPPRESSOR CONDENSER.

Lug Positions Are Viewed From Top Of Coils.

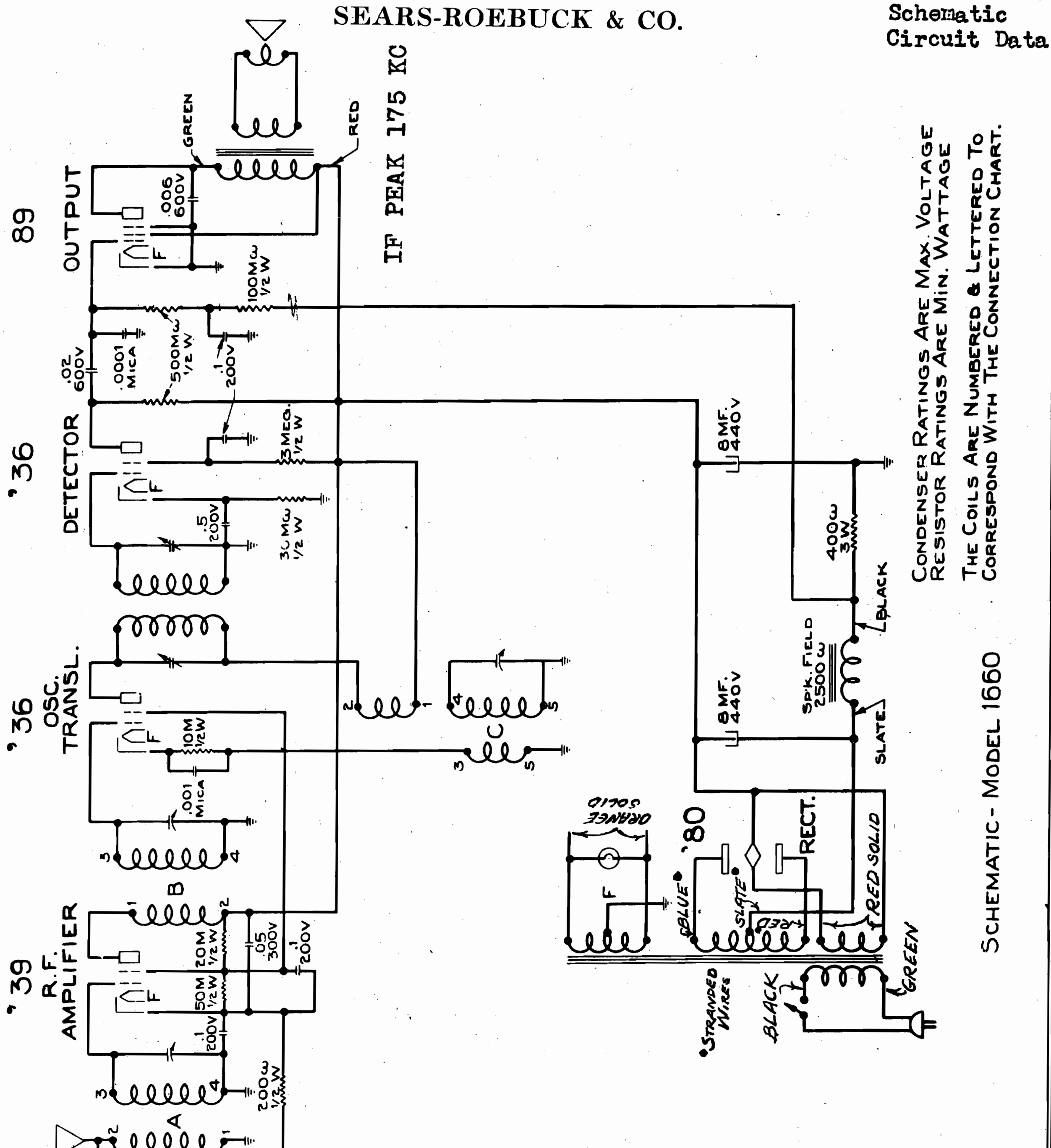
In The Schematic Diagram The Coils Are Numbered & Lettered To Correspond With This Connection Chart.



DRAWN: Tolanan. DATE: 10-6-32. CHECKED: [illegible]. DATE: 10-7-32. APPROVED: [illegible]. DATE: 10-13-32.
NAME: ILLUSTRATION FOR SERVICE MANUAL.
COLONIAL RADIO CORP. BUFFALO, N.Y. 108 x 310 E

MODEL 1660
Schematic
Circuit Data

SEARS-ROEBUCK & CO.

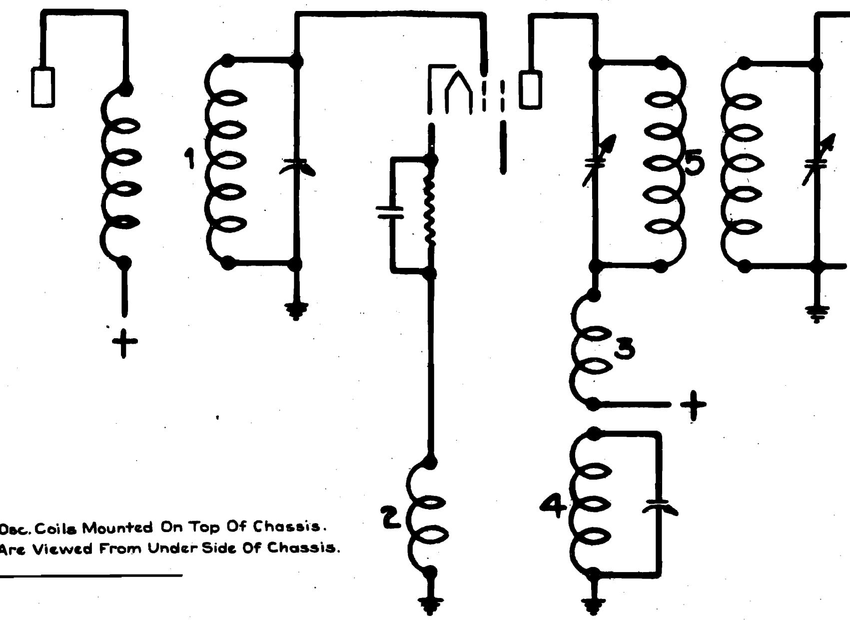


SELF OSCILLATING TRANSLATOR

Coils (1) and (2) comprise the grid circuit of the 236 oscillating-translator; coils (3), (4) and (5) the plate circuit. The amplified broadcast signal is applied to the grid by coil (1) which is tuned to the broadcast signal's frequency. Because coil (2) and (3) are coupled together through coil (4) feedback occurs and the tube is made to oscillate. The frequency of oscillation, determined by the tuned coil (4), is made 175 kc higher than the frequency of the broadcast signal and of coil (1). Since both the broadcast signal and a frequency 175 kc higher are impressed on the tube's grid, a 175 kc I.F. signal is created in the plate circuit of the tube. This 175 kc signal is selected by the tuned coil (5) and coupled to the detector grid.

MODEL 1660
Socket, Trimmers
Coil Data

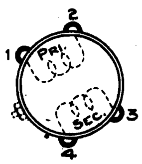
SEARS-ROEBUCK & CO.



Ant., Transl. & Osc. Coils Mounted On Top Of Chassis.
Luq Positions Are Viewed From Under Side Of Chassis.

Illustration For Coil Replacement and Continuity Checking

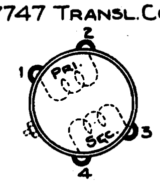
R7746 Ant. Coil



Coil "A"

Lug #1 – To Middle Terminal Of Volume Control And Ground Lead.
Lug #2 – To Antenna Lead & Volume Control.
Lug #3 – To #1 Stator, Variable Tuning Condenser (Stator Nearest Dial)
Lug #4 – To Variable Tuning Condenser Frame. (Gnd.)

R7747 Transl. Coil

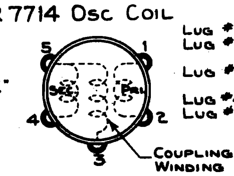


Coil "B"

Lug #1 – To Plate Prong Of 239 R.F. Amplifier
Lug #2 – To B+
Lug #3 – To #2 Stator, Variable Tuning Condenser.
Lug #4 – To Variable Tuning Condenser Frame. (Gnd.)

In The Schematic Diagram The Coils Are Numbered & Lettered To Correspond With This Connection Chart.

R7714 Osc Coil



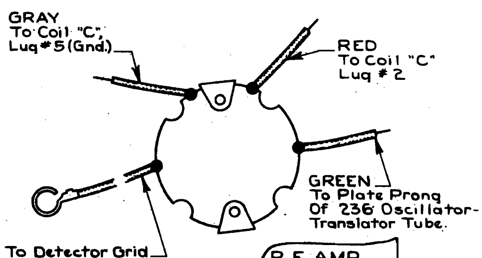
Coil "C"

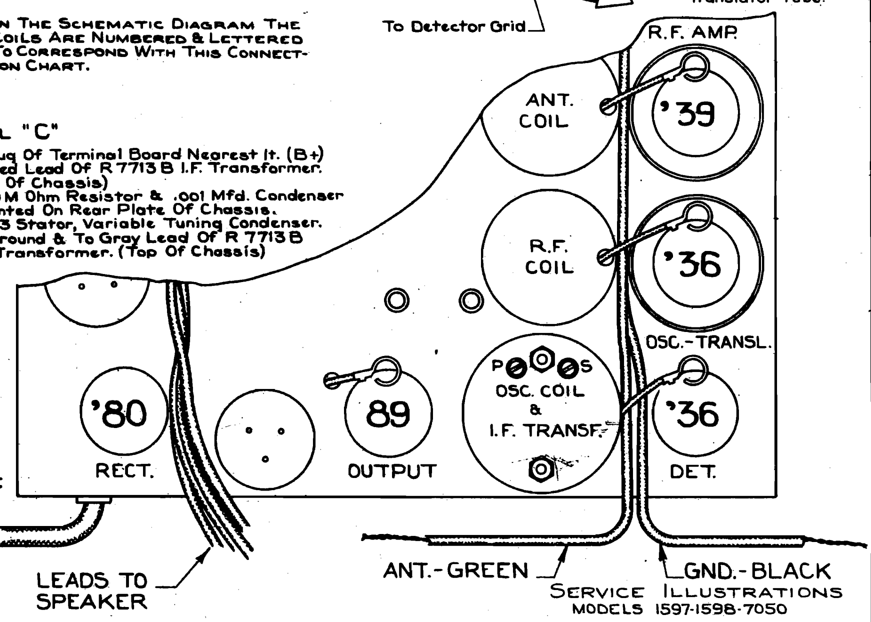
Lug #1 – To Lug Of Terminal Board Nearest It. (B+)
Lug #2 – To Red Lead Of R7713B I.F. Transformer. (Top Of Chassis)
Lug #3 – To 10M Ohm Resistor & .001 Mfd. Condenser Mounted On Rear Plate Of Chassis.
Lug #4 – To #3 Stator, Variable Tuning Condenser.
Lug #5 – To Ground & To Gray Lead Of R7713B I.F. Transformer. (Top Of Chassis)

Rear Of Chassis

I.F. Transformer R7713B

Mounted On Top Of R7714 Oscillator Coil

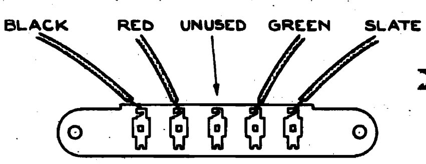




Service Illustrations
Models 1597-1598-7050

Connections To Speaker Terminal Strip

Viewed From Rear



MODEL 1660
Voltage
Hum Data
Alignment

SEARS-ROEBUCK & CO.

TUBE	Plate Voltage Vol. Cont. at Max.	Min.	Screen Voltage Vol. Cont. at Max.	Min.	Grid Voltage Vol. Cont. at Max.	Min.	Plate m.a. Vol.Cont. at Max.	Min.	Screen m.a. Vol.Cont.at Max.	Min.
239 - R. F.	155	135	90	90	-3.5	-30	0.5	0	1.4	0
236 - Osc. - Transl.	150	160	85	120	-5.3	-7.5	.6	.8	(a)	-(a)
236 - Detector	65*	75*	25*	25*	-5	-5	.2	.2	(a)	(a)
89 - Output	145	150	160	170	* (-13 Actual)	* (-13 Actual)	21	26	4	5
280 - Rectifier	Max. d.c. = 275v.						Plate Current = 20 m.a. per plate			

Speaker field voltage = 100v. (a) - Too low to read * - High series resistance Watts = 45

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values. Ordinarily, deviations up to 20% are permissable and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at the rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation. These readings were taken with the speaker field hot. Readings taken when the field is cold will be higher because of the lowered field resistance.

HUM

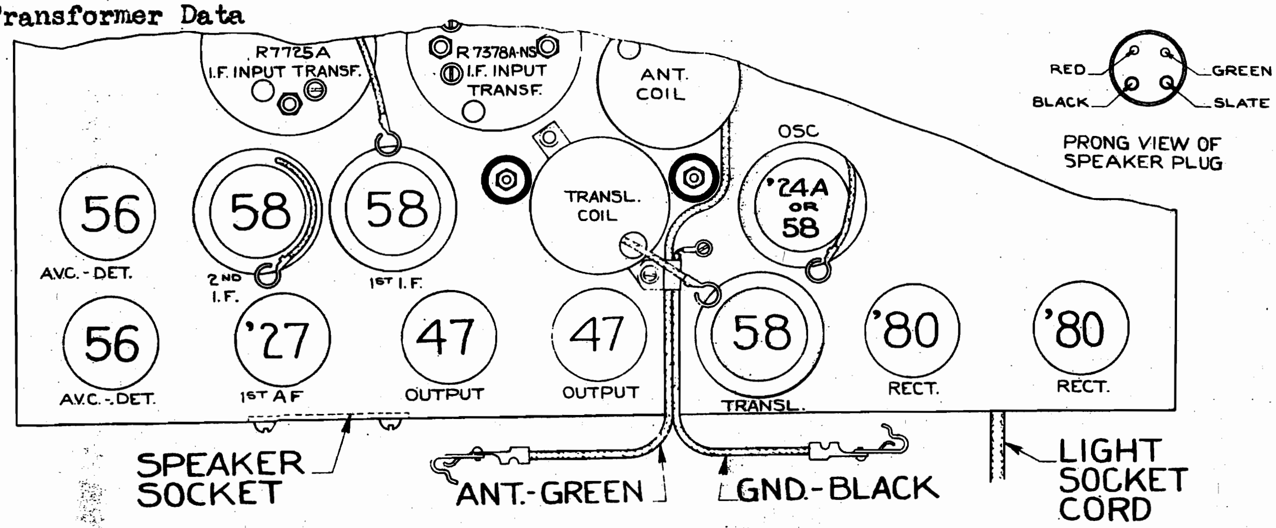
Occasionally objectionable hum is encountered. Examine the 236 detector tube. Some tubes of this type have a U shaped heater and others have a reversed helix heater. The U shaped heater sometimes causes hum.

ALIGNMENT OF THE OSCILLATOR TRANSLATOR

If it becomes necessary to align the oscillator-translator and R.F. stages, it should be done at about 1250 kc and then "touched up" at about 1600 kc. Trouble may be experienced if an attempt is made to secure alignment at 1600 kc without having obtained approximate alignment at 1250 kc. At 1600 kc the capacity of the oscillator-translator trimmer may be sufficient to tune the oscillator-translator stage to the same frequency as the R.F. stage, resulting in feedback and violent oscillation.

MODEL 1670
Trimmers, Socket
Coil Data
Transformer Data

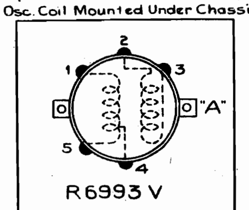
SEARS-ROEBUCK & CO.



PRONG VIEW OF SPEAKER PLUG

ILLUSTRATION FOR COIL REPLACEMENT AND CONTINUITY CHECKING

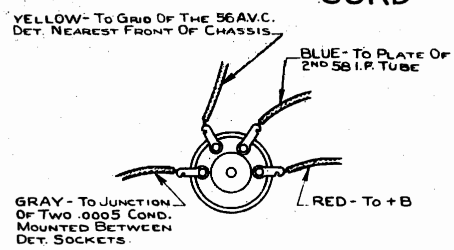
Osc. Coil Mounted Under Chassis



Bottom Of Chassis

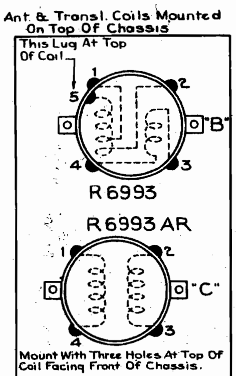
COIL "A"

Lug #1 To Stator Of #3 Variable Tuning Cond. Unit. (Unit Furthest From Dial)
Lug #2 To 10 M Ohm Translator & Oscillator Plate Supply Resistor. (When 224A Osc. Is Used)
Lug #2 To Screen Of Translator Tube. (When 58 Oscillator Is Used)
Lug #3 To Plate Of Oscillator Tube
Lug #4 To .1 & .001 Condensers
Lug #5 To Variable Tuning Condenser Frame (Gnd.)



(MOUNT WITH TERMINAL BOARD FACING REAR OF CHASSIS.)

Ant. & Transl. Coils Mounted On Top Of Chassis



Front Of Chassis

COIL "B"

Lug #1 To Coil "A", Lug #2
Lug #2 To Lug On Terminal Board Are Also Connected a Lead To The Translator Suppressor, a 00M Ohm Resistor & a .1 Condenser.
Lug #3 To Ground.
Lug #4 To Coil "C", Lug #1.
Lug #5 To Translator Grid Lead & Stator Or #2 Variable Tuning Condenser Unit.

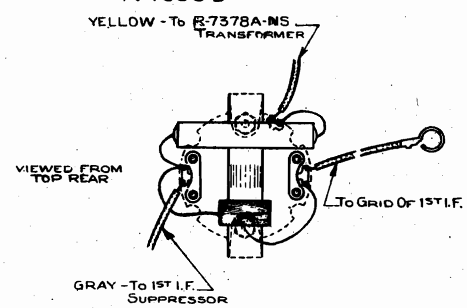
COIL "C"

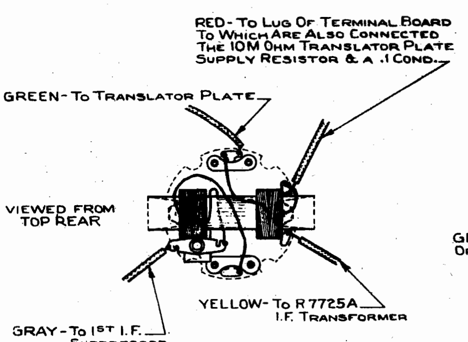
Lug #1 To Coil "B", Lug #4.
Lug #2 To Coil "B", Lug #1.
Lug #3 To Stator Of #1 Variable Tuning Condenser Unit.
Lug #4 To Antenna Lead & Image Suppressor Condenser.

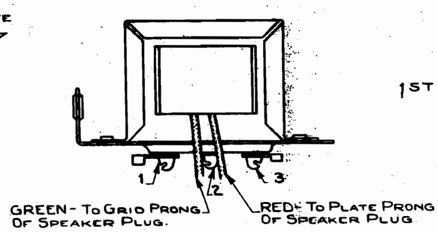
Lug Positions Are Viewed From Top Of Coils.

In The Schematic Diagram The Coils Are Numbered & Lettered To Correspond With This Connection Chart.

I.F. OUTPUT TRANSFORMER
R 7056 D

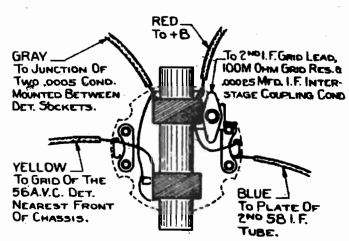






1ST I.F. INPUT TRANSFORMER
R7725A

CONNECTIONS OF R6415R I.F. OUTPUT TRANSFORMER (MOUNTED UNDER CHASSIS)



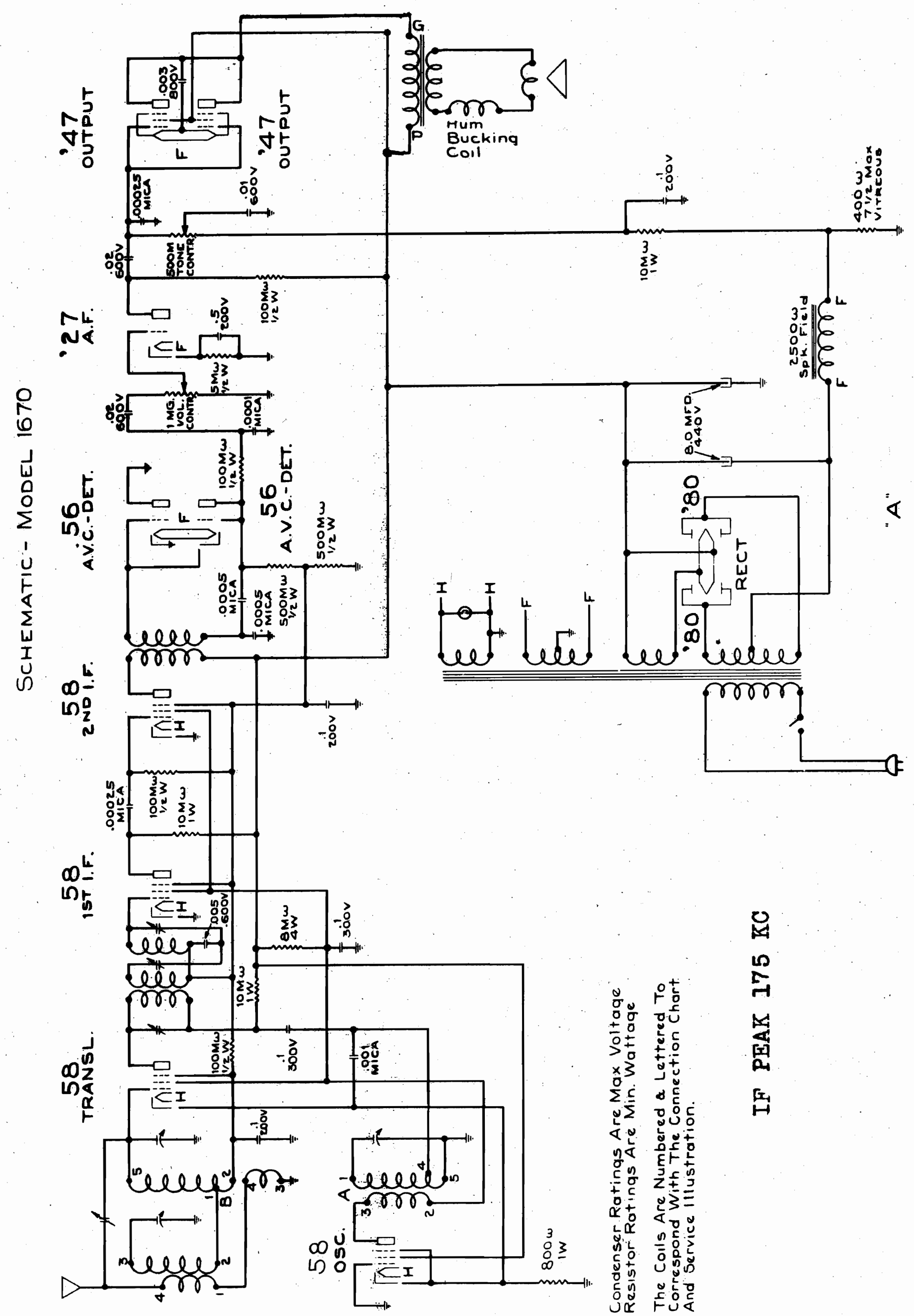
1 - To Voice Coil & Hum Bucking Coil.
2 - To Hum Bucking Coil & Secondary.
3 - To Secondary & Voice Coil.

1ST I.F. INPUT TRANSFORMER
R7378A-NS

OUTPUT TRANSFORMER
S6317A

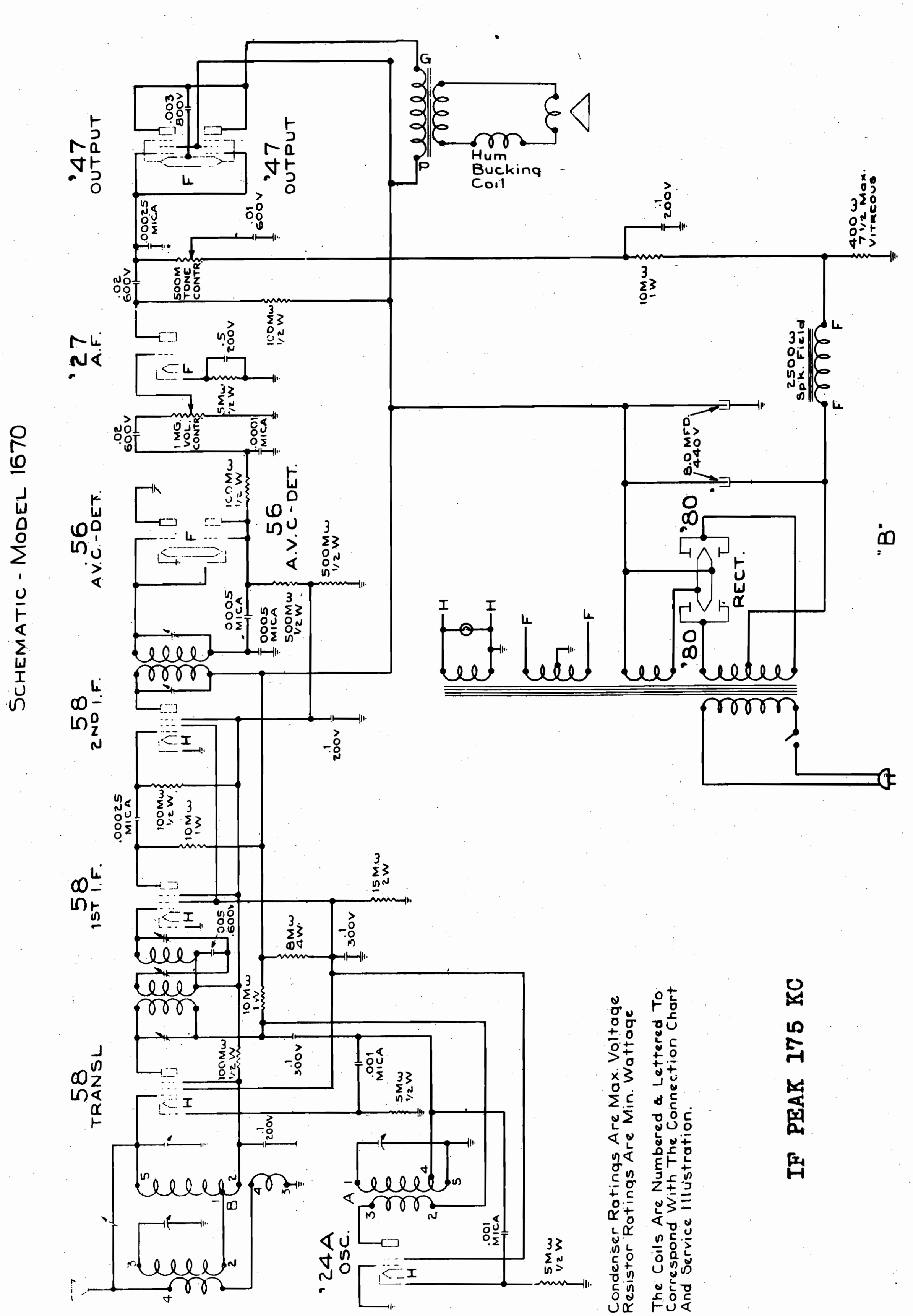
MODEL 1670 (Early)
Schematic "A"

SEARS-ROEBUCK & CO.



MODEL 1670 (Late)
Schematic "B"

SEARS-ROEBUCK & CO.



MODEL 1670
Voltage
Changes

SEARS-ROEBUCK & CO.

TUBE VOLTAGE AND CURRENT CHART

TUBE	Plate Voltage	Screen Voltage	Grid Voltage	Plate m.a.	Screen m.a.
58 - Oscillator	90	200	-12.5	8	3
224A- Oscillator	175	90	-10	1.3	.4
58 - Translator (with 58 Oscillator)	190	90	-6*	.9	.3
58 - Translator (with 224A Oscillator)	175	90	-6*	.9	.3
58 - 1st I. F.	115	95	*	7.5	2
58 - 2nd I.F.	210	95	*	8	2
227 - A. F.	70		-6 (Vol. Control At Minimum)	1.3	
247 - Output	200	210	-7 * (-24 Actual)	6.5	1.1
280 - Rectifier	Max. d.c. = 365v.			Plate current=13m.a. per plate of each tube	

Watts = 100
Speaker field voltage = 135v.
* - Reading low because of high series resistance

Model 1670 receivers are eleven tube superheterodynes, identical in circuit with Model 1650 receivers except that they use two type 280 rectifier tubes.

Original production used a 58 oscillator and a self-tuned I.F. output transformer (R-7056D). Later production receivers have a 224A oscillator and a condenser tuned I.F. output transformer (R-6415R) and are somewhat more selective.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values. Ordinarily, deviations up to 20% are permissable and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at the rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation. These readings were taken with the speaker field hot. Readings taken when the field is cold will be higher because of the lowered field resistance.

MODELS 1805A,1808A
1826A,1841
Alignment

SEARS-ROEBUCK & CO.

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator to the control grid of the 58 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.

6. In order to secure greater accuracy, repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment (Broadcast):

1. Couple the output of the test oscillator to the green antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1740 kc. Its signal should be tuned in when the variable condenser plates are opened all the way. If the signal cannot be reached, the plate and grid leads to the oscillator coil, socket and wave switch, must be moved away from the chassis to reduce their capacity.

3. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the broadcast translator coil trimmer, mounted within the coil shield (See Service Illustration) and the trimmer on the antenna section of the variable condenser, for maximum output.

4. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder, mounted under the chassis, for maximum output.

5. Repeat the 1740 kc. and 1400 kc. adjustments.

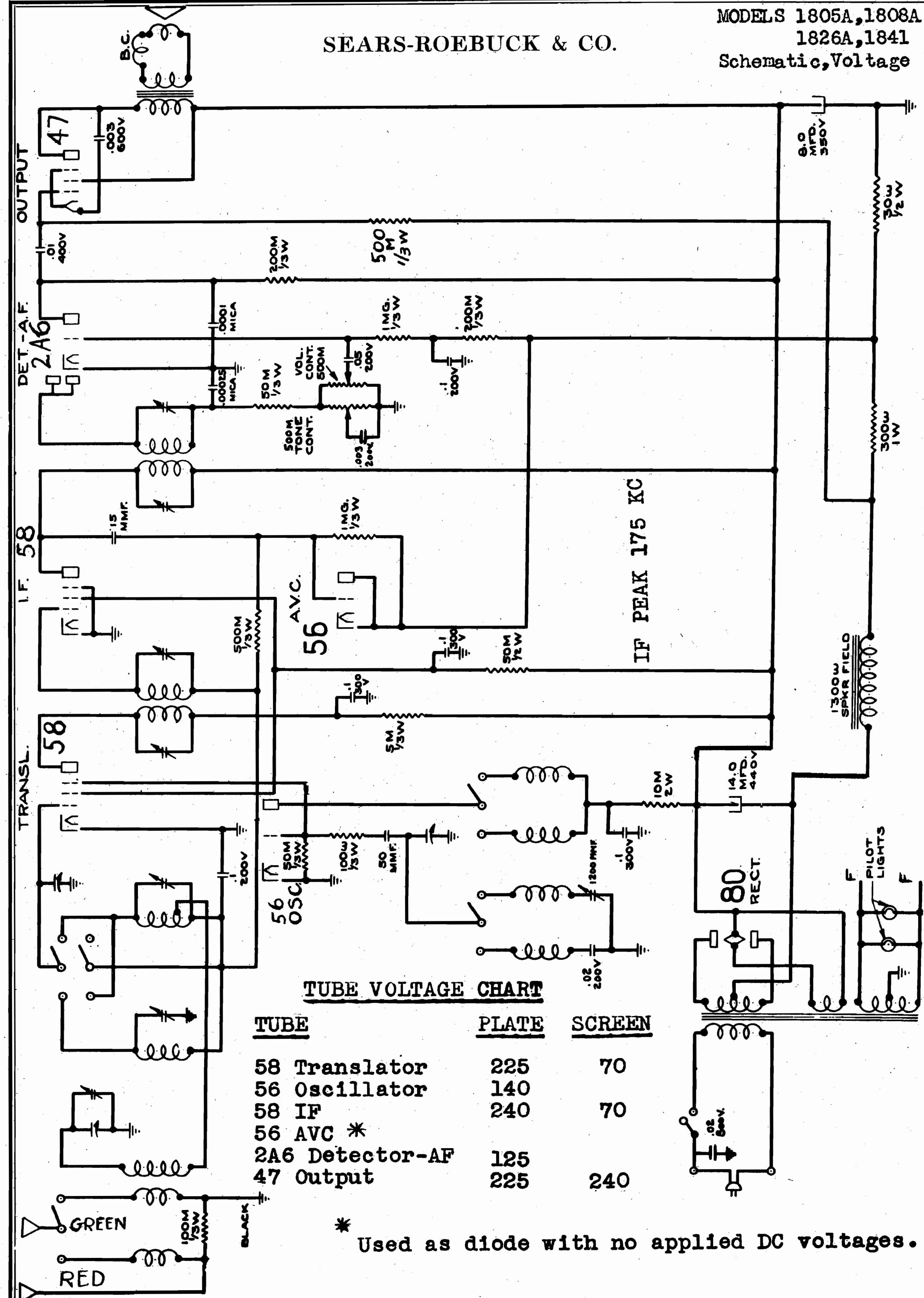
Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead, as for broadcast alignment.

2. Set the test oscillator to 15000 kc. and adjust the short wave translator coil trimmer for maximum output.

SEARS-ROEBUCK & CO.

MODELS 1805A,1808A
1826A,1841
Schematic,Voltage



TUBE VOLTAGE CHART

TUBE	PLATE	SCREEN
58 Translator	225	70
56 Oscillator	140	
58 IF	240	70
56 AVC *		
2A6 Detector-AF	125	
47 Output	225	240

* Used as diode with no applied DC voltages.

MODELS 1809,1811
1833,1845
Alignment,Socket
Trimmers,Voltage

SEARS-ROEBUCK & CO.

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator to the control grid of the 58 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.

6. In order to secure greater accuracy, repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative. The volume control of the receiver should always be in its full "on" position.

RF Alignment (Broadcast):

1. Couple the output of the test oscillator to the green antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1725 kc. Its signal should be tuned in when the variable condenser plates are opened all the way. If the signal cannot be reached, the plate and grid leads to the oscillator coil, socket and wave switch, must be moved away from the chassis to reduce their capacity.

3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the broadcast translator coil trimmer, mounted within the coil shield (See Service Illustration) and the trimmer on the antenna section of the variable condenser, for maximum output.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder, mounted under the chassis, for maximum output.

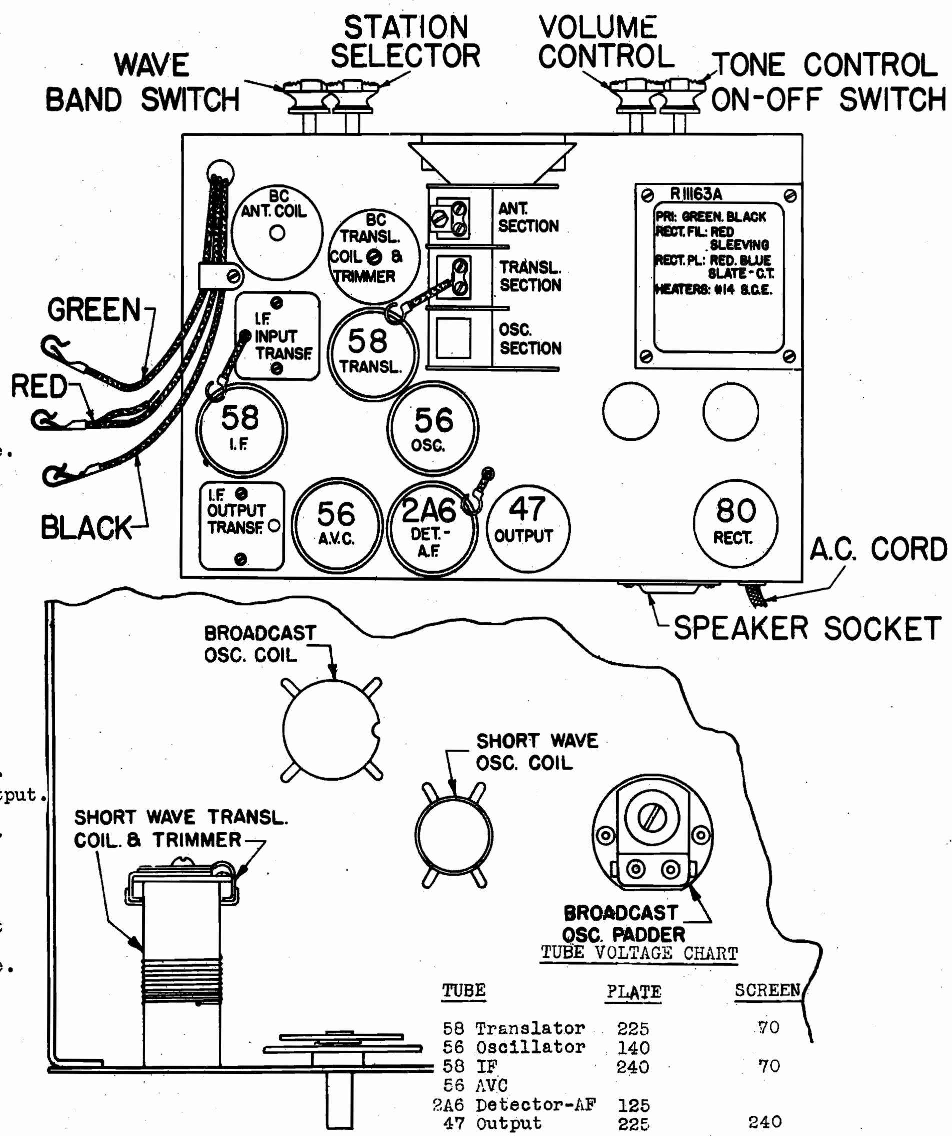
5. Repeat the 1725 kc and 1400 kc adjustments. Be sure that the receiver volume control is always on full and that the output from the test oscillator is kept to the lowest possible value.

Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead, as for broadcast alignment.

2. Set the test oscillator to 14,000 kc and adjust the short wave translator coil trimmer for maximum output.

Parts for this model may be ordered from Colonial Radio Corp., 254 Rano St., Buffalo, N. Y.



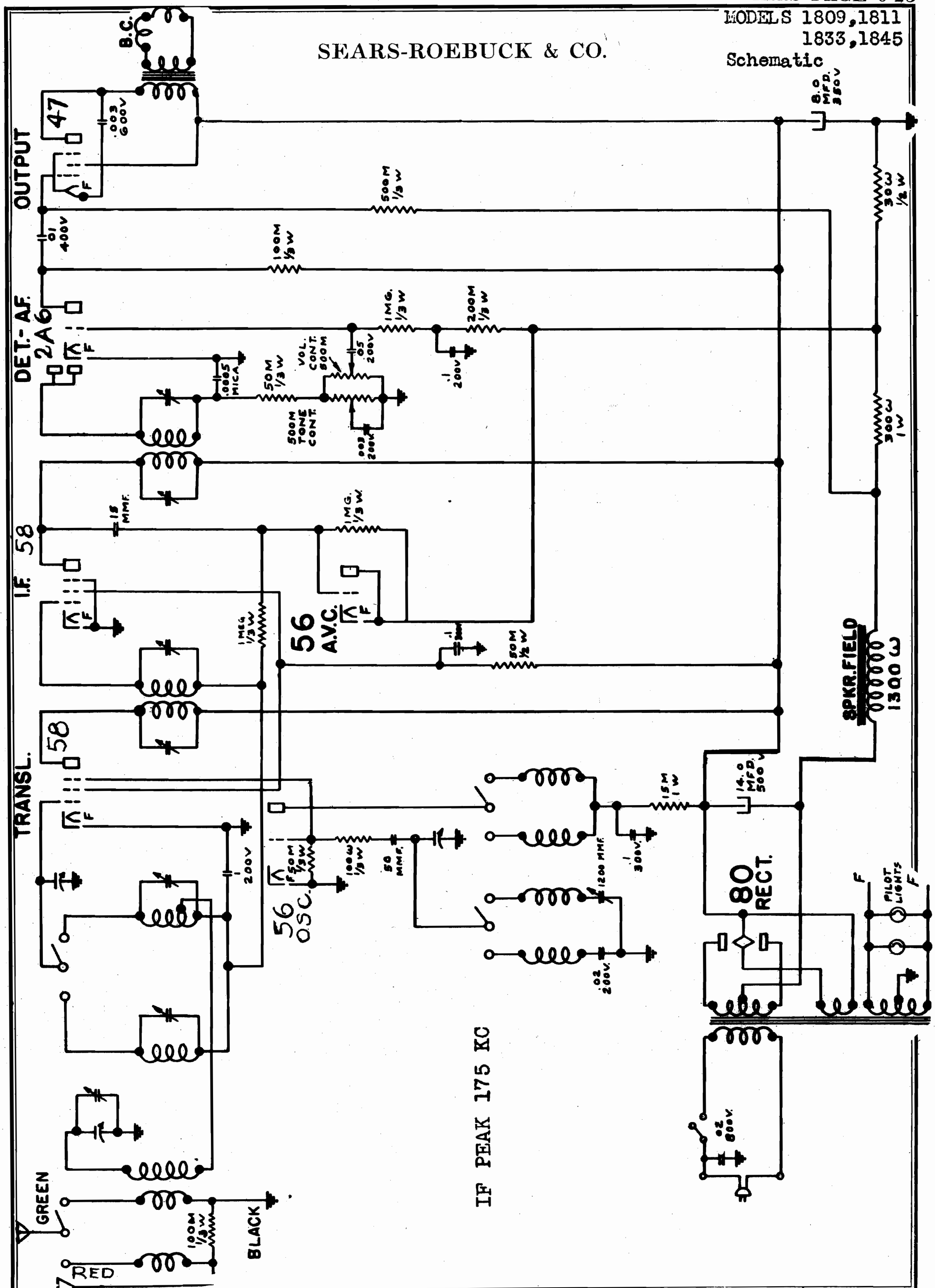
TUBE VOLTAGE CHART

TUBE	PLATE	SCREEN
58 Translator	225	70
56 Oscillator	140	
58 IF	240	70
56 AVC		
2A6 Detector-AF	125	
47 Output	225	240

Used as diode with no applied DC voltages.

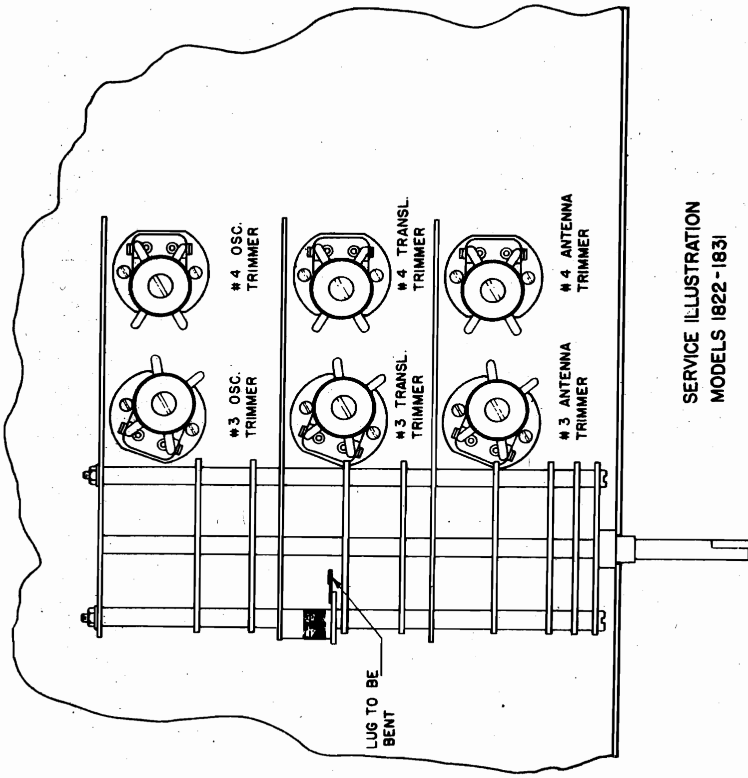
MODELS 1809,1811
1833,1845
Schematic

SEARS-ROEBUCK & CO.

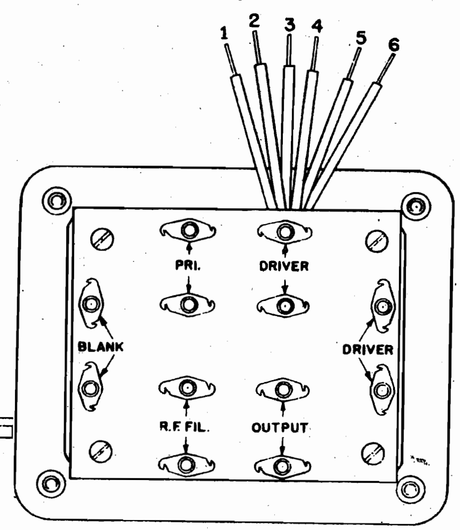


MODELS 1822,1831
Socket,Trimmers
Transformer Data

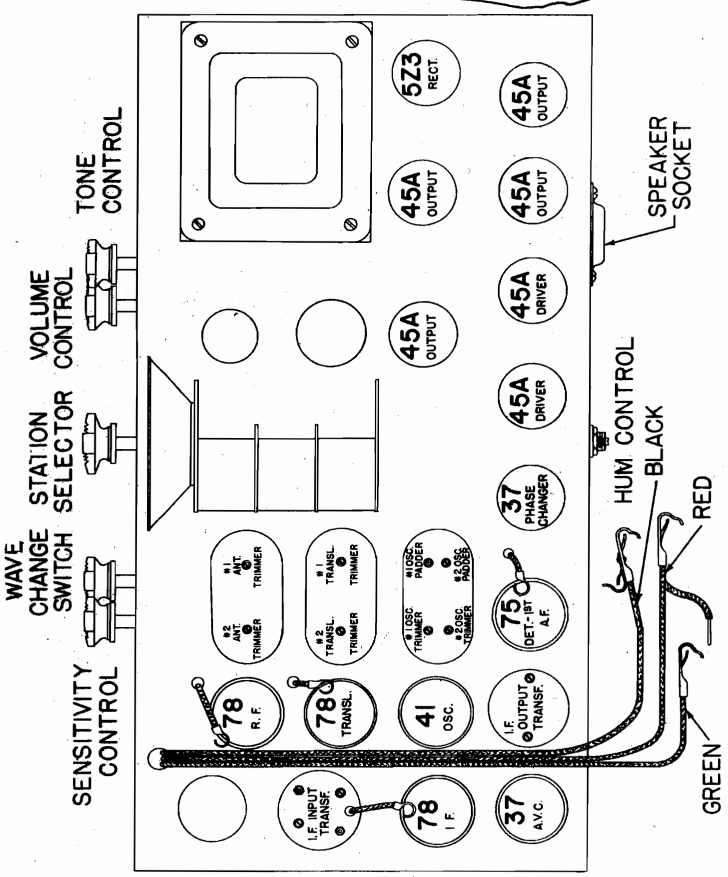
SEARS-ROEBUCK & CO.



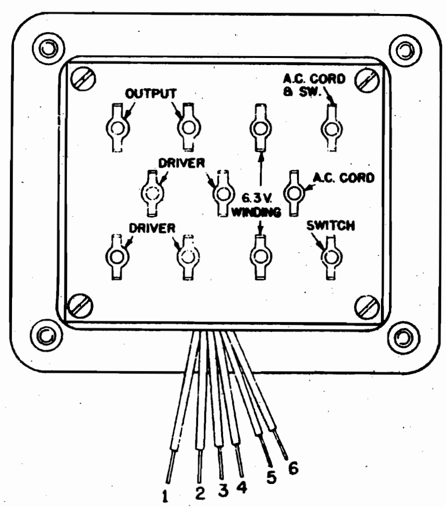
POWER TRANSFORMER
TERMINAL BOARD CONNECTIONS
MODELS 1822-1831



1-RED-RECT. PL.
2-BLUE-RECT. PL.
3-SLATE-RECT. C.T.
4-RED TRACER-RECT. FIL.
5-RED TRACER-RECT. FIL.
6-GREEN TRACER-R.F.-C.T.



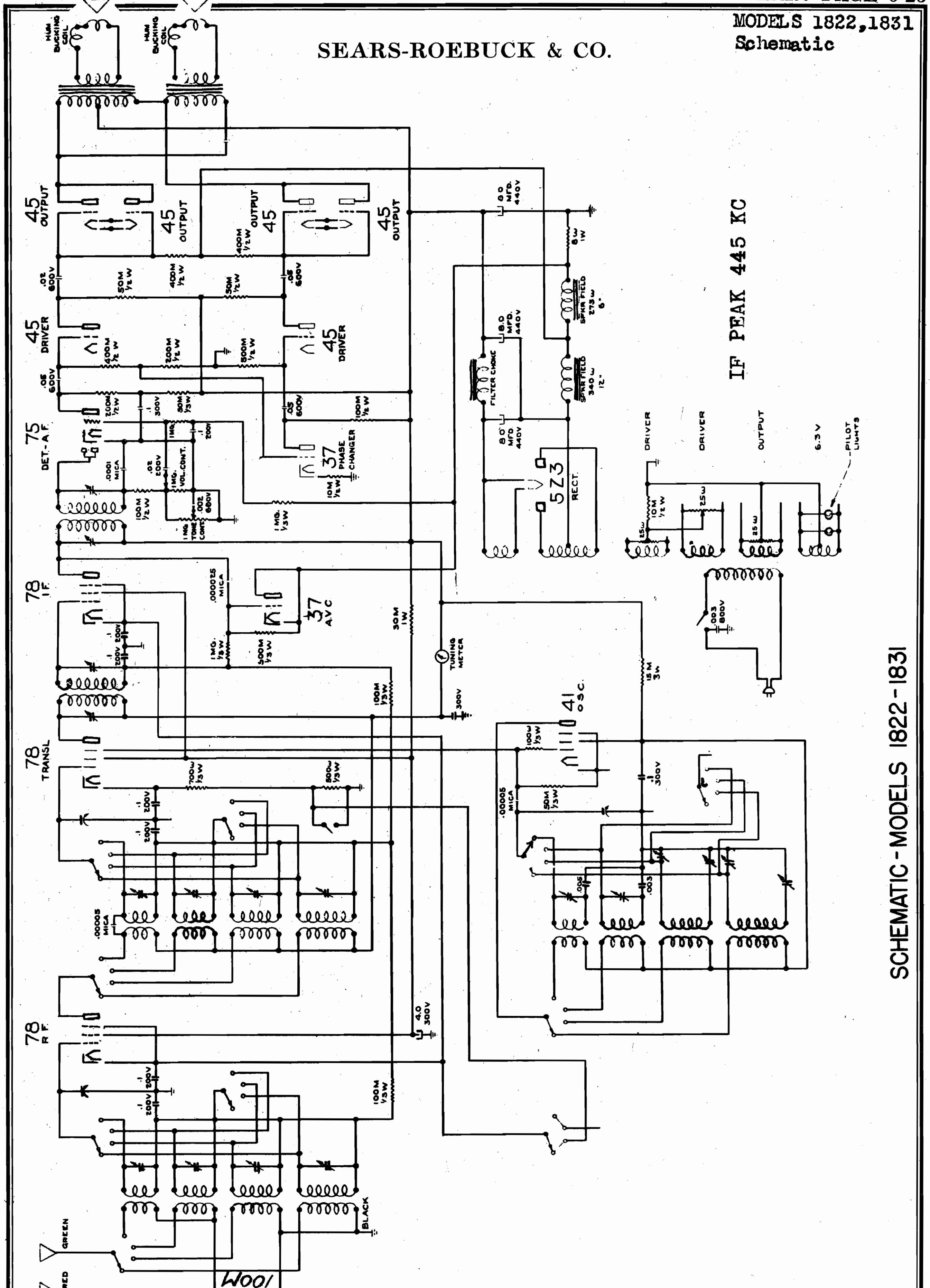
POWER TRANSFORMER
TERMINAL BOARD CONNECTIONS
MODELS 1822-1831



1-RED-RECT. PL.
2-BLUE-RECT. PL.
3-SLATE-RECT. C.T.
4-RED TRACER-RECT. FIL.
5-RED TRACER-RECT. FIL.
6-TAP FOR 6.3V. WINDING

MODELS 1822,1831
Schematic

SEARS-ROEBUCK & CO.



SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative.

RF Alignment; #1 Band (Broadcast):

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1520 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.

6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.

#2 Band:

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.

2. Set the test oscillator to 4250 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator padder for maximum output.

#3 Band:

1. Set the test oscillator to 10 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. As shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.

3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 translator trimmer for maximum output.

4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

#4 Band:

1. Set the test oscillator to 19 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

CAUTION: Care must be taken during the RF Alignment Procedure, that alignment is not made at the image frequency. See Service Manual Supplement #13.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube. The Wave Band switch should be in the Broadcast position.

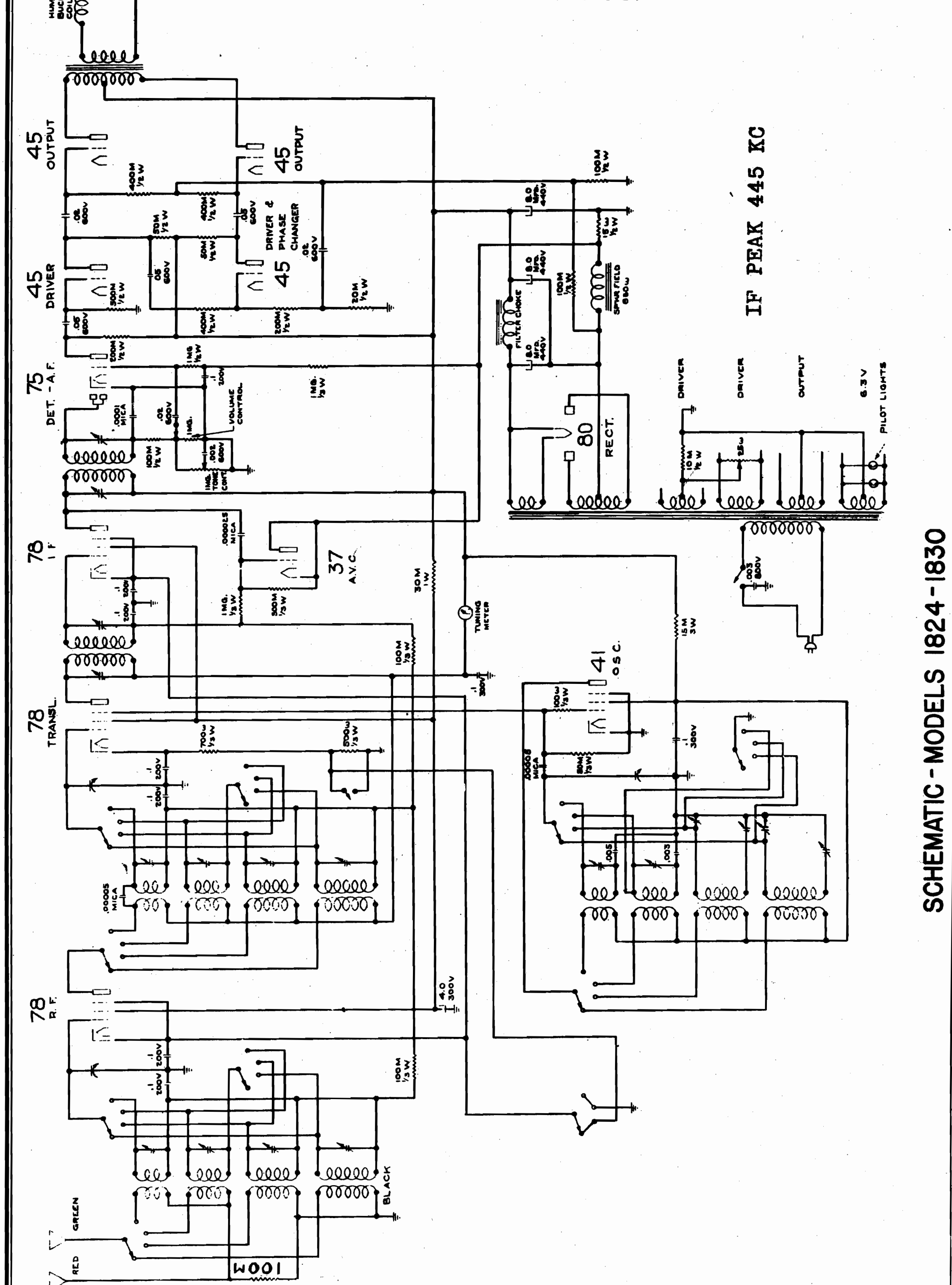
TUBE	PLATE	SCREEN	CATHODE
78 - RF	255	100	
41 - Oscillator	90	90	
78 - Translator	255	100	
78 - IF	260	100	
37 - AVC	Used as diode with no applied DC voltage		
75 - Detector-AF	115		
37 - Phase Changer	120		12
45 - Drivers	160		37
45 - Output	250		0
5Z3 - Rectifier			285

REPLACEMENT PARTS AND PRICE LIST

PART NO.	DESCRIPTION
R10521	Bezel
R8297A	Board - Terminal, double
R8308A	Board - Terminal, triple
R9446A	Board - Terminal, 4 terminals
R10760	Card - Operating
R10729	Choke - RF plate, #4 range
R10793A	Choke - Filter
R11043	Clip - Grid
R7011A	Clip - Red and green antenna leads
R7011B	Clip - Black ground lead
R10731	Coil - Antenna, broadcast
R10730	Coil - Oscillator, broadcast
R10732	Coil - Translator, broadcast
R6973K	Coil - Antenna, short wave #2 range
R10993A	Coil - Antenna, short wave, #3 range
R10993D	Coil - Antenna, short wave, #4 range
R6973M	Coil - Oscillator, short wave, #2 range
R10993C	Coil - Oscillator, short wave, #3 range
R10993F	Coil - Oscillator, short wave, #4 range
R6973L	Coil - Translator, short wave, #2 range
R10993B	Coil - Translator, short wave, #3 range
R10993E	Coil - Translator, short wave, #4 range
R10735	Condenser - Variable
R10735A	Condenser - Variable, complete with drive assembly
D4758P	Condenser - 8 mfd. electrolytic
R9237	Condenser - 4 mfd. electrolytic
R9426	Condenser - Padding, 1200 mmf.
R10884	Condenser - Padding, 475 mmf.
R10737	Condenser - Padding, 75 mmf.
R10197	Condenser - Trimmer
R10736	Condenser - Trimmer, double
R6138	Condenser - .1 mfd. 300 volts
R6444	Condenser - .1 mfd. 200 volts
R9145	Condenser - .05 mfd. 600 volts
R6629	Condenser - .02 mfd. 200 volts
R6761	Condenser - .02 mfd. 600 volts
R6954	Condenser - .005 mfd. 600 volts
R10739	Condenser - .003 mfd. 600 volts
R10738	Condenser - .003 mfd. 800 volts
R6933	Condenser - .002 mfd. 600 volts
R4303	Condenser - .0001 mfd. mica
R10794	Condenser - .00005 mfd. mica
R8711	Condenser - .000025 mfd. mica
R10740	Control - Tone and volume
R6989	Cord - Power supply
R10429A	Dial light diffusing disk
R10522	Escutcheon
R10982	Folder - Short wave
R10641	Glass - Escutcheon
R10980	Grommet - Variable condenser mounting
R10796B	Indicator - With mounting ring
R10827	Instruction leaflet
R10479	Knob
R10543	Knob with dot
R2288	Lamp - Pilot
R5487C	Lead - Antenna, red
R5346B	Lead - Antenna, green
R5345A	Lead - Ground, black
R10860	Meter - Tuning
R10462RA	Pointer
R10463W	Reflector
R10986	Resistor - Center tapped
R10800	Resistor - Variable, 25 ohms, hum adjuster
R7585	Resistor - 1 megohm, 1/3 watt carbon
R5823	Resistor - 1 megohm, 1/2 watt carbon
R6179	Resistor - 500 M ohms, 1/2 watt carbon
R7228	Resistor - 500 M ohms, 1/3 watt carbon
R5822	Resistor - 400 M ohms, 1/2 watt carbon
R5830	Resistor - 200 M ohms, 1/2 watt carbon
R5819	Resistor - 100 M ohms, 1/2 watt carbon
R7586	Resistor - 100 M ohms, 1/3 watt carbon
R6637	Resistor - 50 M ohms, 1/3 watt carbon
R6445	Resistor - 50 M ohms, 1/2 watt carbon
R6689	Resistor - 30 M ohms, 1 watt carbon
R6152	Resistor - 10 M ohms, 1/2 watt carbon
R8037	Resistor - 700 ohms, 1/3 watt carbon
R10142	Resistor - 500 ohms, 1/3 watt carbon
R8922	Resistor - 100 ohms, 1/3 watt carbon
R10907	Resistor - 15 M ohms, Candohm
R8684	Resistor - 8 ohms, 1 watt, flexible
R10802A	Transformer - IF input
R10758	Transformer - IF output
R10825A	Transformer - Power - 60 cycle
R10825B	Transformer - Power - 60 cycle, complete with choke assembly
R10826A	Transformer - Power - 25 cycle

MODELS 1824,1830
Schematic

SEARS-ROEBUCK & CO.



MODELS 1824,1830
Alignment,Parts

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative

RF Alignment; #1 Band (Broadcast):

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1520 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 translator trimmer for maximum output.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator padder for maximum output.

6. Repeat the 1520 kc and 1400 kc adjustments for greater accuracy.

#2 Band:

1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.

2. Set the test oscillator to 4250 kc.

3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.

4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 translator trimmer for maximum output.

5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator padder for maximum output.

#3 Band:

1. Set the test oscillator to 10 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. As shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.

3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 translator trimmer for maximum output.

4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since they will have been affected by shifting of the turns.

#4 Band:

1. Set the test oscillator to 19 megacycles.

2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.

3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 translator trimmer for maximum output.

4. Set the test oscillator to 9 megacycles and tune in its signal. If necessary, shift turns on the antenna and translator coils to secure maximum sensitivity. Be sure to cement the turns in place.

5. If turns have been shifted, repeat the 19 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

CAUTION: Care must be taken during the RF Alignment Procedure, that alignment is not made at the image frequency. See Service Manual Supplement #13.

TUBE VOLTAGE CHART

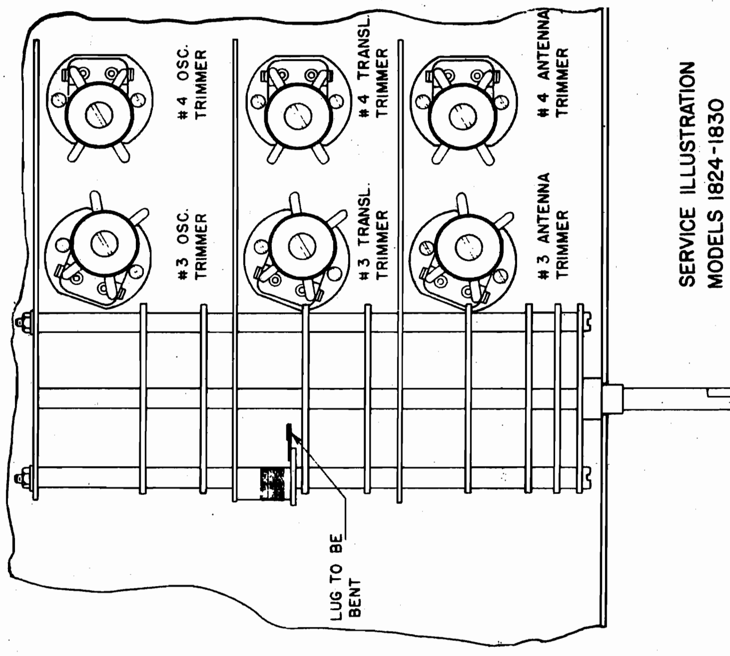
All readings are to be taken between the chassis and the respective element of each tube. The Wave Band switch should be in the Broadcast position.

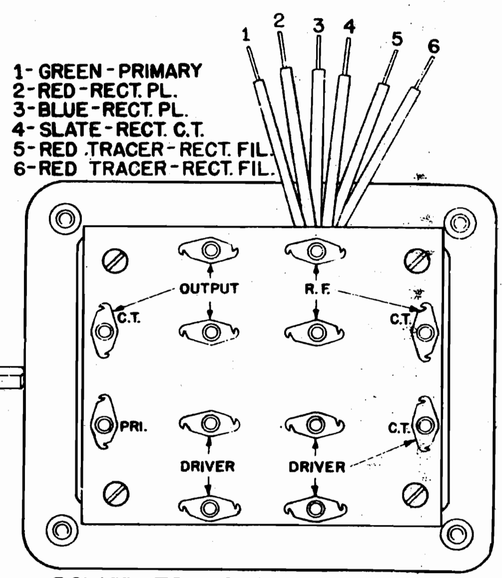
TUBE	PLATE	SCREEN
78 - RF	240	80
41 - Oscillator	95	95
78 - Translator	240	80
78 - IF	245	80
37 - AVC	Used as diode with no applied DC voltage	
75 - Detector-AF	120	
2-45 - Drivers	145	
2-45 - Output	240	

R10731	Coil - Antenna, broadcast
R6973K	Coil - Antenna, short wave, #2 range
R10993A	Coil - Antenna, short wave, #3 range
R10993D	Coil - Antenna, short wave, #4 range
R10730	Coil - Oscillator, broadcast
R6973M	Coil - Oscillator, short wave, #2 range
R10993C	Coil - Oscillator, short wave, #3 range
R10993F	Coil - Oscillator, short wave, #4 range
R10732	Coil - Translator, broadcast
R6973L	Coil - Translator, short wave, #2 range
R10993B	Coil - Translator, short wave, #3 range
R10993E	Coil - Translator, short wave, #4 range
R10793A	Choke - Filter
R10735	Condenser - Variable
R10735A	Condenser - Variable, with drive assembly
R9426	Condenser - Padding, 1200 mmf.
R10884	Condenser - Padding, 475 mmf.
R10737	Condenser - Padding, 75 mmf.
R10197	Condenser - Trimmer
R10736	Condenser - Trimmer, double
D4758P	Condenser - 8 mfd. electrolytic
R9237	Condenser - 4 mfd. dry, electrolytic
R6444	Condenser - .1 mfd. 200 volts
R6138	Condenser - .1 mfd. 300 volts
R9145	Condenser - .05 mfd. 600 volts
R6761	Condenser - .02 mfd. 600 volts
R6954	Condenser - .005 mfd. 600 volts
R10739	Condenser - .003 mfd. 600 volts
R10738	Condenser - .003 mfd. 800 volts
R6933	Condenser - .002 mfd. 600 volts
R4303	Condenser - .001 mfd. mica
R10794	Condenser - .00005 mfd. mica
R8711	Condenser - .000025 mfd. mica
R10740	Control - Tone and Volume
R6989	Cord - AC line
R2288	Lamp - Pilot
R5346B	Lead - Antenna, green
R5487A	Lead - Antenna, red
R5345C	Lead - Ground, black
R10860	Meter - Tuning
R10462RA	Pointer
R10463W	Reflector
R7585	Resistor - 1 megohm, 1/3 watt carbon
R5823	Resistor - 1 megohm, 1/2 watt carbon
R7228	Resistor - 500 M ohm, 1/3 watt carbon
R6179	Resistor - 500 M ohm, 1/2 watt carbon
R5822	Resistor - 400 M ohm, 1/2 watt carbon
R5830	Resistor - 200 M ohm, 1/2 watt carbon
R5819	Resistor - 100 M ohm, 1/2 watt carbon
R7586	Resistor - 100 M ohm, 1/3 watt carbon
R6637	Resistor - 50 M ohm, 1/3 watt carbon
R6445	Resistor - 50 M ohm, 1/2 watt carbon
R6689	Resistor - 30 M ohms, 1 watt carbon
R5821	Resistor - 20 M ohms, 1/2 watt carbon
R10907	Resistor - 15 M ohms, Candohm
R6152	Resistor - 10 M ohms, 1/2 watt carbon
R8037	Resistor - 700 ohms, 1/3 watt carbon
R10142	Resistor - 500 ohms, 1/3 watt carbon
R8922	Resistor - 100 ohms, 1/3 watt carbon
R10752	Resistor - 15 ohms, 1/2 watt, flexible
R10800	Resistor - 25 ohms, hum adjuster
R10484	Rubber - Tube, cushion, chassis mounting
R10488	Rubber - Washer, cushion, chassis mounting
R10445A	Shaft - Dial drive assembly
R8395	Shield - Tube base
R10440	Shield - Tube top
R10441	Shield - Tube cap
R6450	Shield - Electrolytic condenser
R10753A	Shield - Coil
R10754A	Shield - Oscillator coil
R8315	Socket - 4 prong
R8253	Socket - 5 prong
R8367	Socket - 5 prong speaker
R8092	Socket - 6 prong
R10549	Socket - Pilot light
R10807	Speaker
R10755A	Switch - Wave
R10756	Switch - "On - Off" and Sensitivity

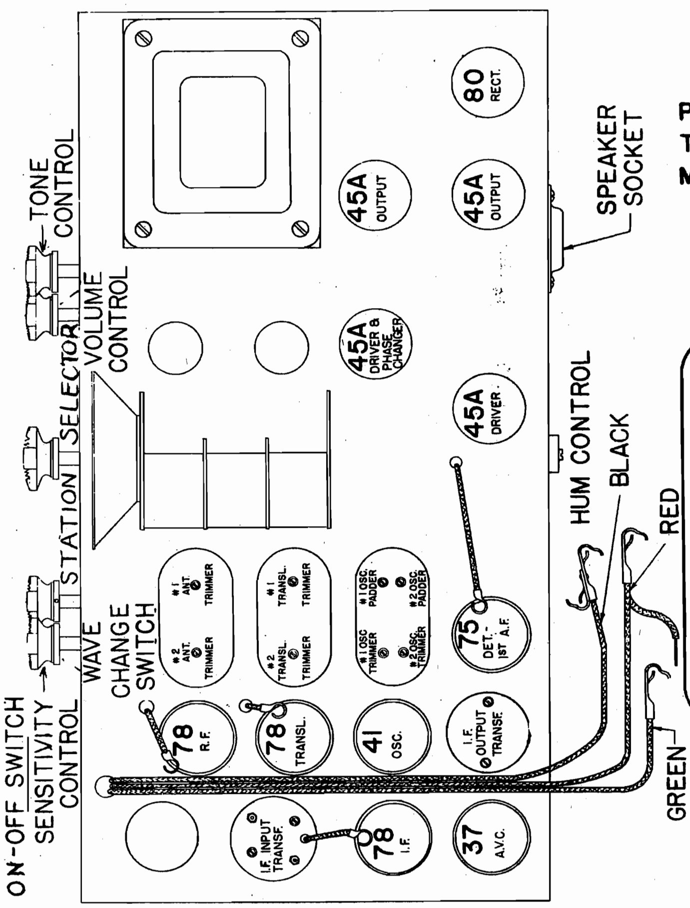
MODELS 1824,1830
Socket,Trimmers
Transformer Data

SEARS-ROEBUCK & CO.

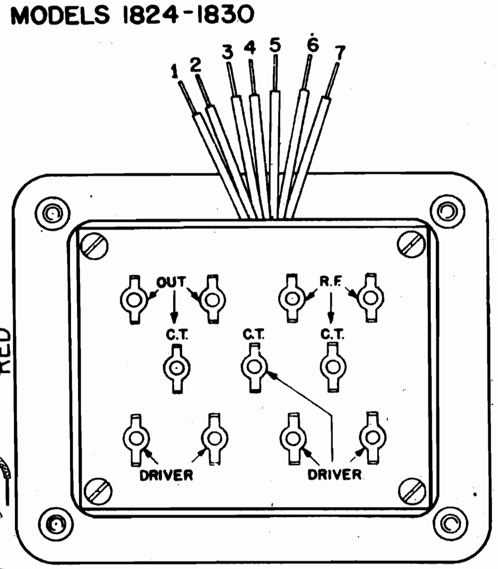




POWER TRANSFORMER
TERMINAL BOARD CONNECTIONS
MODELS 1824-1830



POWER TRANSFORMER
TERMINAL BOARD CONNECTIONS
MODELS 1824-1830



1- GREEN-PRIMARY
2- BLACK-PRIMARY
3- RED-RECT.PL.
4- BLUE-RECT. PL.
5- SLATE-RECT. C.T.
6- RED SLEEVING-RECT. FIL.
7- RED SLEEVING-RECT. FIL.

MODEL 1825-A
Alignment, Voltage
Socket, Trimmers

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer. Use the lowest possible output from the test oscillator.

The IF stages are resistance-capacity coupled to each other, so that no tuned interstage transformer is used.

RF Alignment Broadcast:

1. Couple the output of the test oscillator to the green antenna lead of the set with the antenna connected.

2. Set the test oscillator to 1400 kc and adjust the broadcast translator coil trimmer and the trimmer on the antenna section of the variable condenser for maximum output. The locations of the trimmers are shown in the Service Manual Illustrations.

3. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder for maximum output.

4. Repeat the 1400 kc adjustments to secure greater accuracy. Always use the lowest possible output from the test oscillator.

TUBE VOLTAGE CHART

TUBE	PLATE	SCREEN
78 - Translator	200	90
76 - Oscillator	100	
78 - First IF	175	90
78 - Second IF	215	90
76 - AVC	Used as diode with no applied DC voltage	
75 - Det-AF	100	
76 - Phase Changer	130	
2-45 - Drivers	130	
4-45 - Output	210	

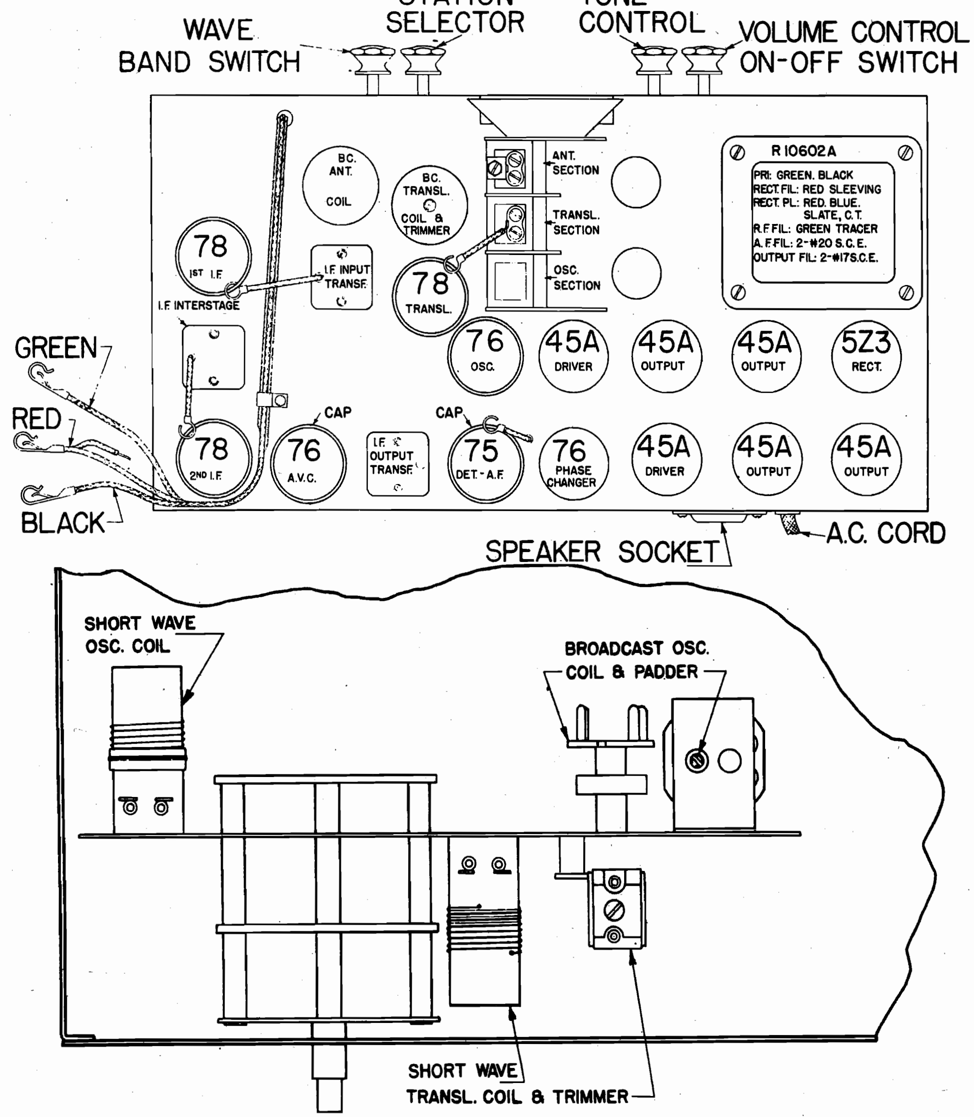
All readings are to be taken between the chassis and the respective element of each tube.

Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.

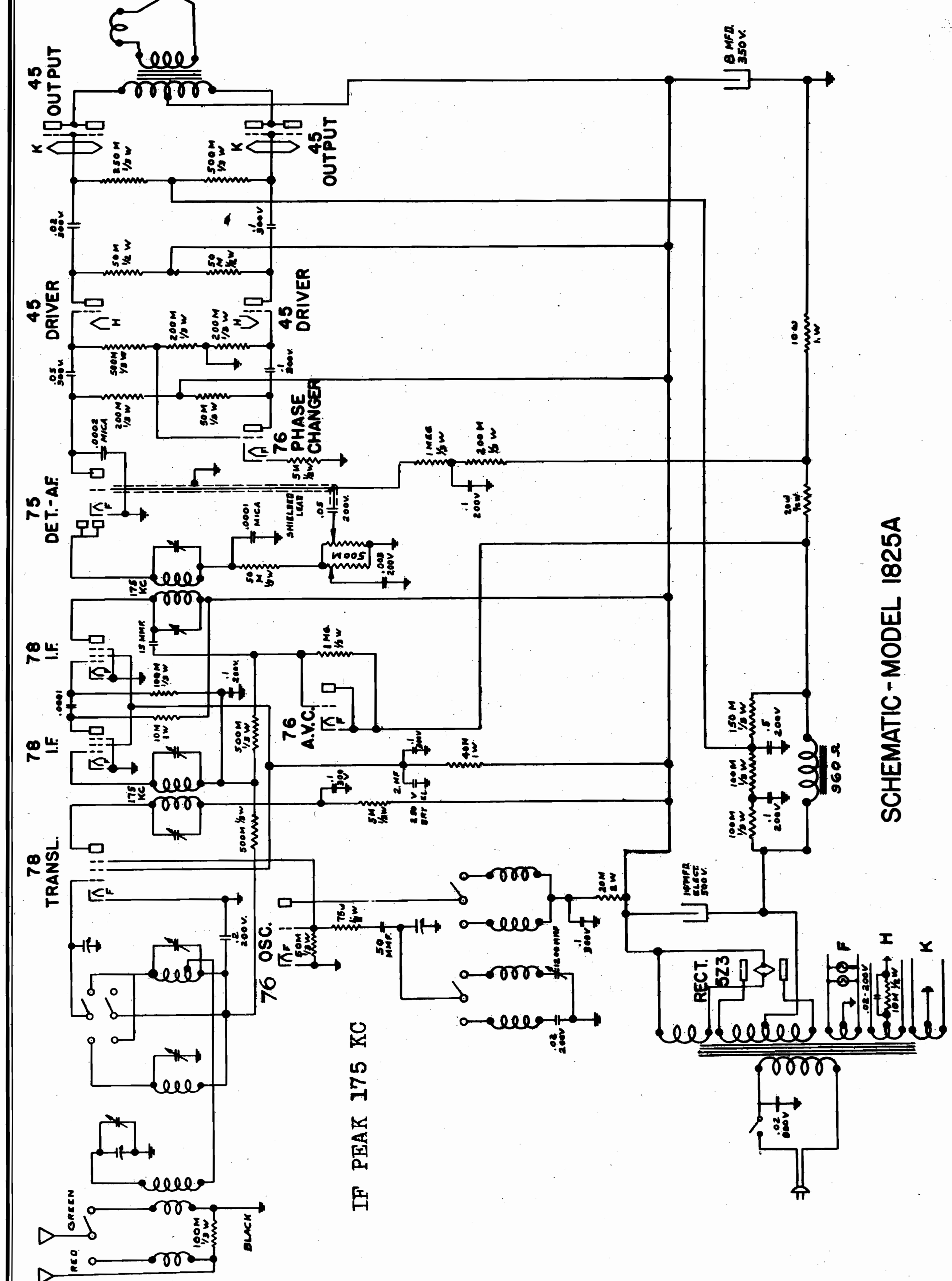
2. Set the test oscillator to 15,000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.

3. Set the test oscillator to 6000 kc and tune in its signal. If necessary, turns may be shifted on the short wave translator coil to secure maximum output. If turns are shifted, it will be necessary to repeat the 15,000 kc adjustment.



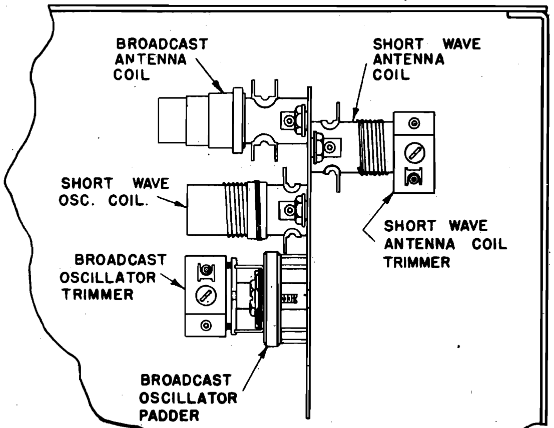
MODEL 1825-A
Schematic

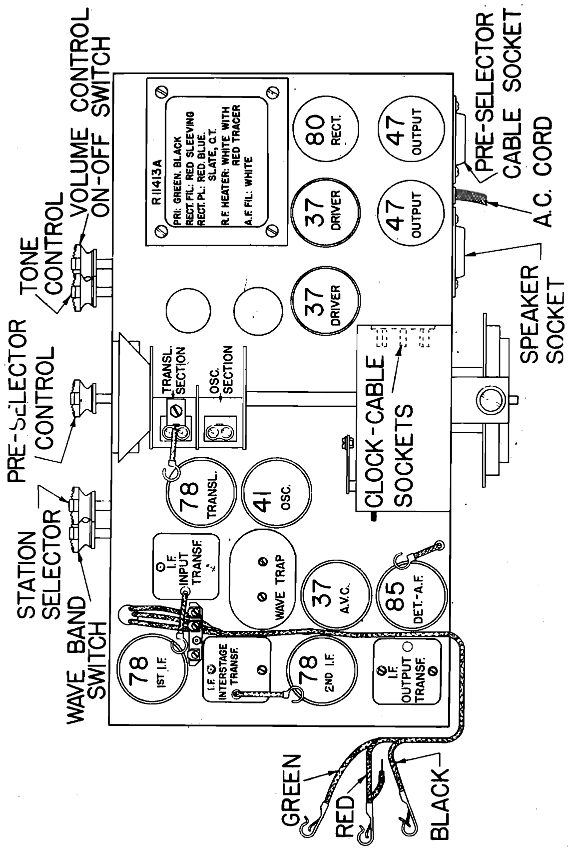
SEARS-ROEBUCK & CO.



MODEL 1832
Socket, Trimmers
Clock Unit Tests
Drive Unit Test

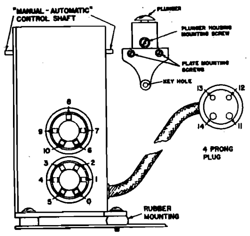
SEARS-ROEBUCK & CO.





TEST CHARTS

These tests are to be made with a continuity meter or ohmeter except where otherwise indicated. If the "Improper Effect" is "Open Circuit", the trouble may be either in the unit or else may be due to a break in one of the cables, possibly right at the plug. If no such break is apparent, return the unit for repair or replacement to the Operadio Manufacturing Company, St. Charles, Ill.



DRIVE UNIT

TEST, IF FINGER FAILS TO STOP

6 Prong Socket:

Test	Proper Effect	Trouble if Improper Effect is had
#1 contact to #1 finger	Closed Circuit	Open Circuit
#2 contact to #2 finger	Closed Circuit	Open Circuit
#3 contact to #3 finger	Closed Circuit	Open Circuit
#4 contact to #4 finger	Closed Circuit	Open Circuit
#5 contact to #5 finger	Closed Circuit	Open Circuit
#0 contact to #0 finger	Closed Circuit	Open Circuit

TEST WITH FOUR PRONG PLUG IN CHASSIS & 110 VOLTS CONNECTED

5 Prong Socket:

Test	Proper Effect	Trouble if Improper Effect is had
#9 contact to #7	110 v. AC. reading	Open Circuit
#10 contact to #6 (Automatic Control on)	Closed	Open Circuit in Impulse switch

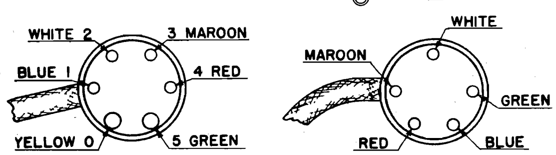
ABOVE TESTS O. K. BUT HUB DOES NOT ROTATE

4 Prong Plug:

Test	Proper Effect	Trouble if Improper Effect is had
#13 to #14	Closed Circuit	Open Circuit
#13 to #12 (to test off switch when hub is turned clockwise to end of rotation)	Closed Circuit	Open Circuit
#11 to #14 (with #7 & #9 shorted)	Closed Circuit	Open Circuit

IMPULSE BUTTON

Test	Proper Effect	Trouble if Improper Effect is had
With 4 prong plug in chassis, with 5 & 6 prong plugs out, 110 volts on, and automatic control on, press the impulse button	Hub should oscillate	Defective drive unit



CLOCK PLUGS
PRONG VIEWS

CLOCK UNIT TEST CHART

6 Prong Plug:

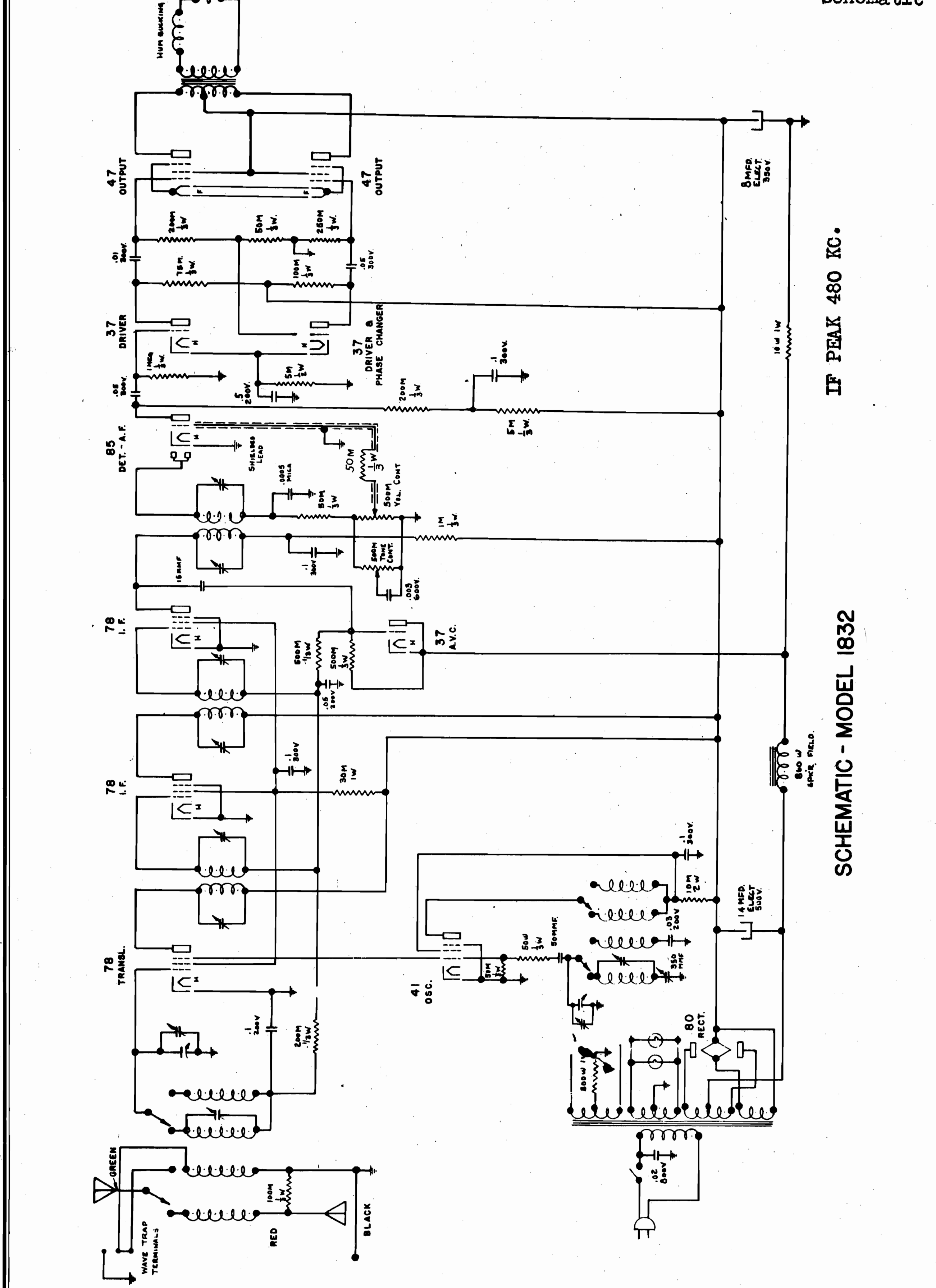
Test	Proper Effect	Trouble if Improper Effect is had
#1 (blue wire) to case	Closed	Open Circuit
#2 (white wire) to case	Closed	Open Circuit
#3 (maroon wire) to case	Closed	Open Circuit
#4 (red wire) to case	Closed	Open Circuit
#5 (green wire) to case	Closed	Open Circuit
#0 (yellow wire) to case	Closed	Open Circuit

5 Prong Plug:

Test	Proper Effect	Trouble if Improper Effect is had
White to case	Closed	Open Circuit
Maroon to green (with clock about 7 minutes off quarter hour positions and "On-Off" switch in "Off" position).	Closed	Open Circuit or defective switch
Red to blue (with clock on a quarter hour position).	Closed	Open Circuit

SEARS-ROEBUCK & CO.

MODEL 1832
Schematic



MODEL 1832
Alignment
Pre-Selector Data

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connections to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

RF Alignment (Broadcast)

1. Before proceding with the alignment of the receiver the wave trap must be disconnected. Connect a jumper between the yellow wire terminal and the blue wire terminal of the trap and disconnect the white lead from its terminal. Do not forget to reconnect the trap after finishing the alignment of the receiver.

2. Set the test oscillator to 1785 kc.

3. Loosely couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. The locations of the trimmers are indicated in the Service Illustrations.

5. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.

7. Repeat the 1785 kc and 1500 kc adjustments.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary turns may be shifted on the short wave antenna coil to secure accurate alignment at this frequency. Should it be found necessary to shift turns, the antenna coil trimmer will have to be readjusted at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	-	255	80
41 - Oscillator	-	120	120
78 - First IF	-	255	80
78 - Second IF	-	250	80
37 - AVC	-	Used as diode with no applied DC voltage	
75 - Det-AF	-	105	
37 - Phase Changer	-	130	
45 - Drivers	-	150	
45 - Output	-	250	

AUTOMATIC PRE-SELECTOR

There are two units comprising the Automatic Pre-selector. One is the clock unit and the other is the Drive Unit, mounted on the chassis. Under no circumstances attempt to take the units apart since special tools and gages are required.

Should the Drive Unit fail to operate properly there are several external adjustments that can be made to it:

1. The OFF finger on the rotating hub at the rear of the Drive Unit should turn the receiver off just as the finger makes contact with the plunger while the hub is turning in a clockwise direction, as one faces the rear of the chassis. If the finger stops as it touches the plunger but the receiver does not switch off, loosen the hex head screw that positions the OFF finger. The head of this screw is located behind the large knurled turning ring. Also loosen the large knurled locking ring. Then move the OFF finger slightly forward and tighten the hex head screw and the knurled locking ring. If the OFF position still fails to operate properly, loosen the knurled locking ring and the hex head screw again and move the OFF finger backward from its original position. Then re-tighten the ring and screw. Two or three trials may be necessary before the correct position is determined.

2. If the receiver is tuned properly by some of the fingers but is not brought to the peak of resonance by other of the fingers, these fingers may have become shifted slightly and should be reset as described in the Instruction Booklet. If the set is not tuned properly by any of the fingers, the triangular plate at the rear of the unit may have become shifted. To correct this proceed as follows:

Set the pin for the next quarter hour interval to the #3 position. Then turn the hands of the clock so that the receiver is tuned automatically by the #3 finger. When the finger has stopped, insert the key in its key hole in the triangular plate. The tip of the key should enter the hole in the #3 finger without moving the finger. If it fails to do so, loosen the two screws that mount the triangular plate and shift the plate so that the key enters the hole in the finger. Then tighten the plate mounting screws. Care must be taken that the finger does not become moved during the operation. The adjustment should be checked by setting the pin for the next quarter hour interval to the #3 position and again testing for exact alignment between the key hole and the hole in the #3 finger. If the holes line up this time the setting is correct and should be so for all the fingers.

3. When any finger comes to its stop under the plunger the screw head of the plunger should be raised about .01 inches, approximately the thickness of a postal card, above its housing. If the plunger does not raise above its housing, the screw that positions the housing should be loosened. Then reset the housing so that the plunger does raise the required distance above it when pushed by any of the fingers, and re-tighten the screw.

Caution: Do not make this adjustment unless it is necessary since all of the fingers have to be reset slightly when the plunger adjustment is changed.

If the fore-going adjustments fail to correct the trouble the Drive Unit should be tested as indicated in the chart that follows. If these tests show that the unit is defective it should be removed from the chassis. To do so proceed as follows:

1. Remove the receiver chassis from the cabinet.

2. Remove the clip that holds the two plugs in their sockets on the side of the Drive Unit and pull the plugs from their sockets.

3. Loosen the set screws in the Drive Unit end of the coupling.

4. Remove the three screws that hold the unit to its mounting plate.

5. Disconnect the Manual Control Lever and slide the Drive Unit out of the coupling.

Defective units should be returned to the Operadio Manufacturing Company, St. Charles, Ill. for repair or replacement.

The receiver can be operated manually without the Drive Unit by plugging a four prong plug, with grid and plate prongs shorted together, into the four prong socket at the rear of the chassis.

When the new Drive Unit is being mounted, care must be taken that the shafts and coupling line up properly so that the condenser will turn freely. The front mounting foot of the Drive Unit is made of rubber so the necessary alignment adjustment can be had. The two rear feet, which are of steel, should be tightened after the front one has been adjusted.

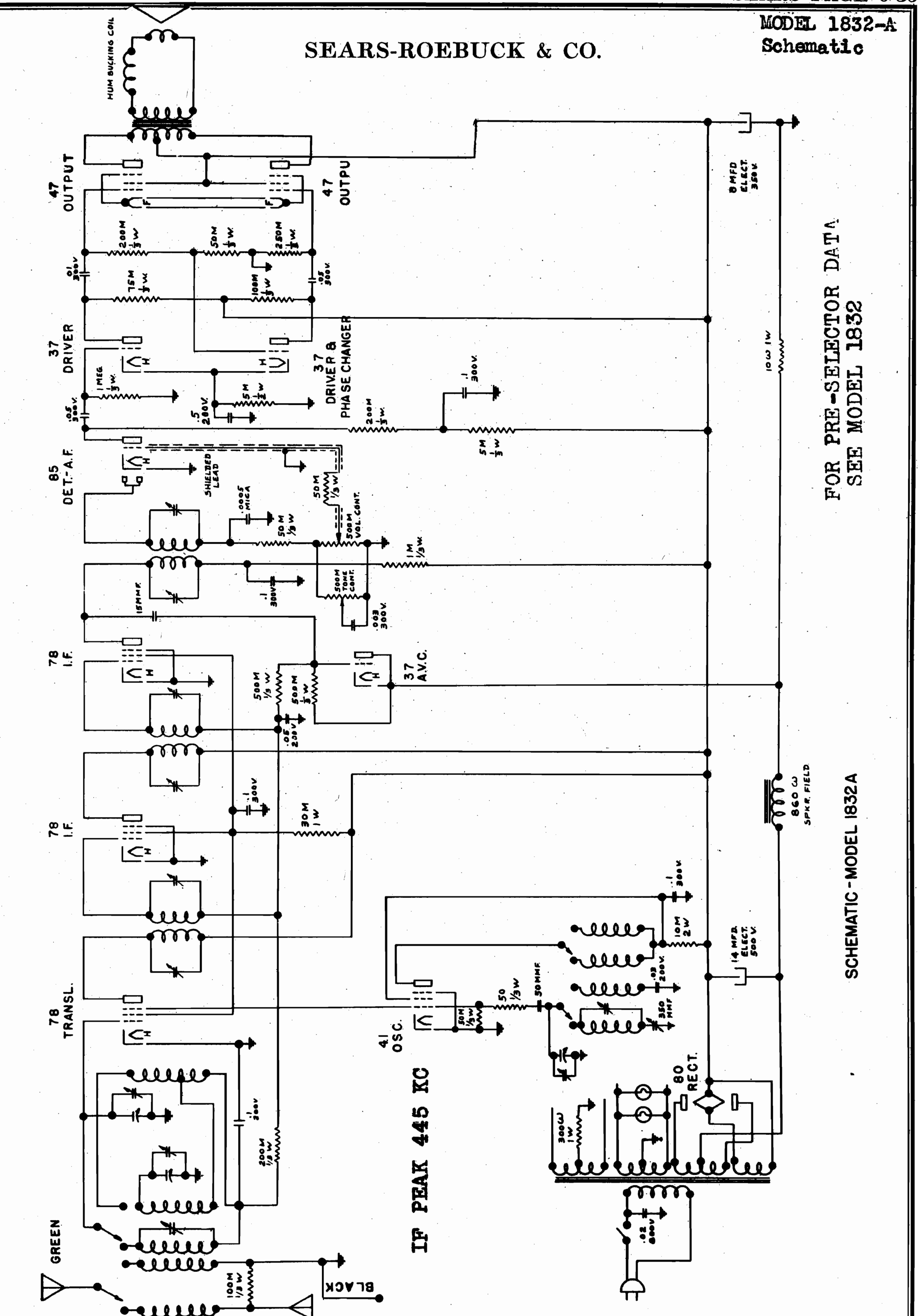
Turn the variable condenser so that its plates are fully meshed. Then turn the knurled turning ring all the way in the same direction and tighten the set screws in the coupling. If the setting is made correctly, three distinct clicks will be heard when the knurled turning ring is turned all the way in one direction. Three more clicks will be heard at the end of travel in the opposite direction. Turn the Automatic-Manual control shaft on the **Drive Unit** so that the flat surface of the projection of the shaft faces upward. Turn the control knob on the chassis to the Automatic position and connect the lever.

The Clock Unit

If the tests listed in the chart indicate that the Clock Unit is defective it should be removed from the cabinet and returned to the Operadio Company for repair or replacement. Pull the plugs out of the Drive Unit and loosen the clock clamping-ring screw sufficiently to allow the clock to slide out of the front of the cabinet. The receiver can be operated manually even though the Clock Unit is removed. However, the four prong plug from the Drive Unit must be inserted in its socket at the rear of the chassis.

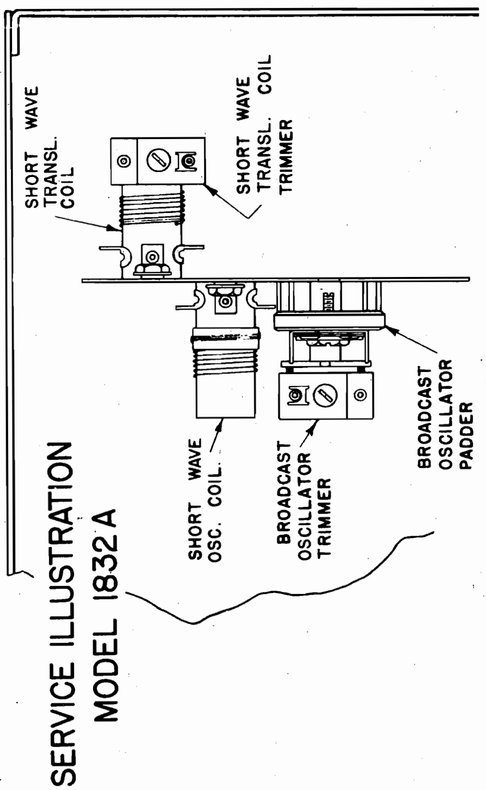
MODEL 1832-A
Schematic

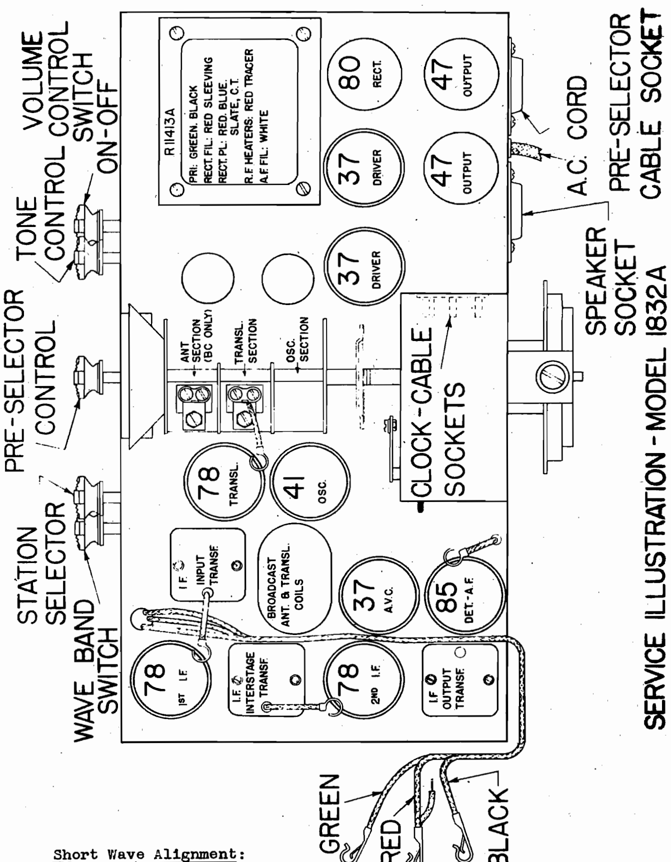
SEARS-ROEBUCK & CO.



MODEL 1832-A
Alignment, Socket
Trimmers, Voltage

SEARS-ROEBUCK & CO.





ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 78 second IF tube. The grid clip should be left attached to the cap. Turn the volume control of the receiver to its full "on" position.

4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connection to the control grid cap of the 78 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations starting with the IF output transformer. Always use the lowest possible output from the test oscillator.

RF Alignment; Broadcast:

See Manual #13 for general alignment information. The broadcast band must be aligned before the short wave band.

1. Set the test oscillator to 1750 kc and loosely couple its output to the receiver's antenna lead, with the antenna connected.

2. Turn the variable condenser plates all the way out. Then adjust the broadcast oscillator trimmer for maximum output. The locations of all of the trimmers are indicated in the Service Illustrations.

3. Set the test oscillator to 1400 kc and adjust the trimmers on the antenna and translator sections of the variable condenser.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.

5. Repeat the 1750 kc adjustment and then the 1400 kc adjustment, using the lowest possible output from the test oscillator.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the receiver's antenna lead as for broadcast alignment.

2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave translator coil for maximum output.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

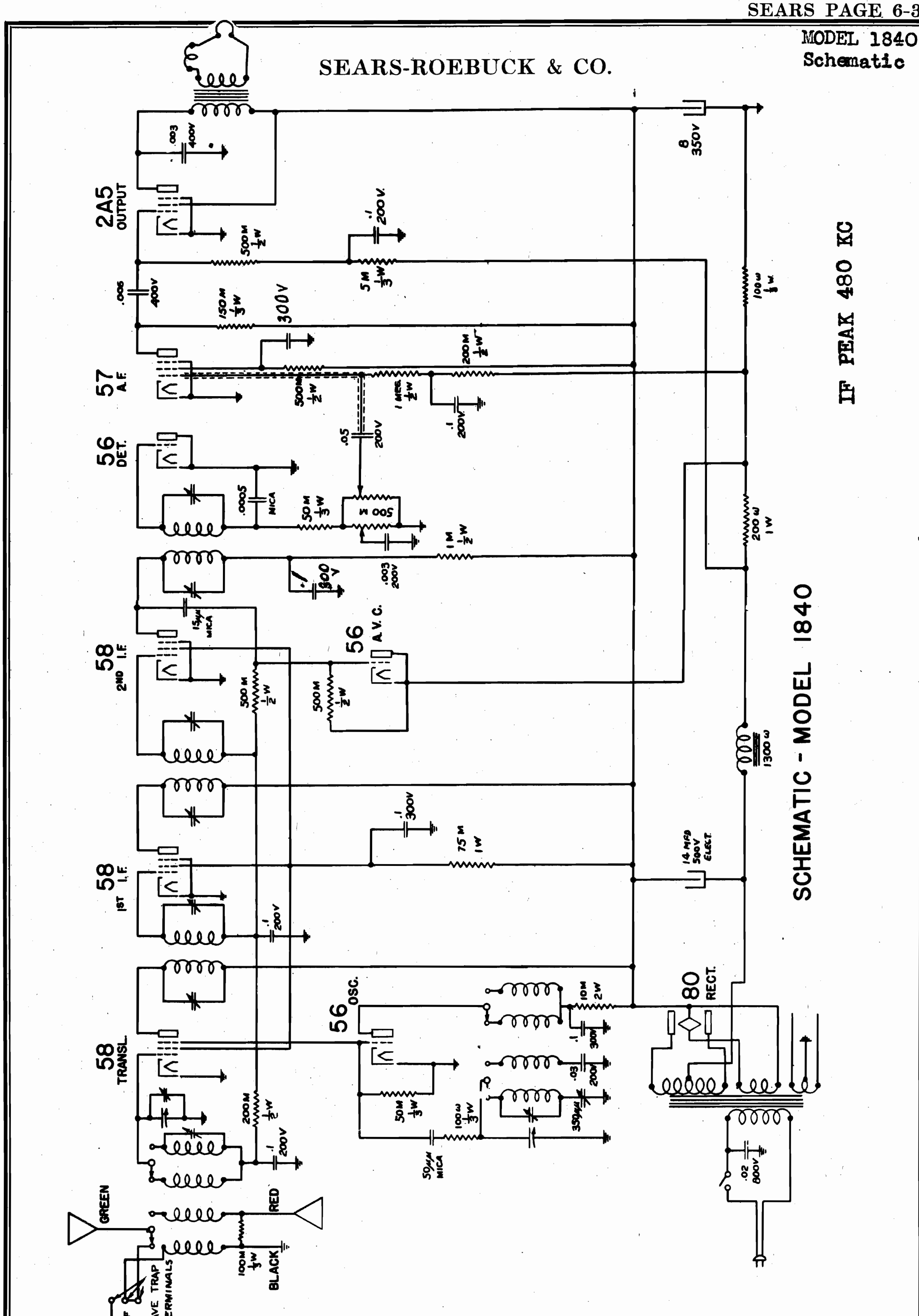
TUBE	PLATE VOLTAGE	SCREEN VOLTAGE
78 - Translator	255	80
41 - Oscillator	120	120
78 - First IF	255	80
78 - Second IF	250	80
37 - AVC	Used as diode with no applied DC voltage	
75 - Det-AF	105	
37 - Phase Changer	130	
45 - Drivers	150	
45 - Output	250	

The audio circuit, including the 85 tube, the two 37 drivers and the two output tubes is such that, in effect, it constitutes a first audio stage feeding into a push-pull driver stage, which in turn feeds the push-pull output stage. The phase changing circuit eliminates the need for audio coupling transformers.

The 37 AVC tube, which is used as a diode with plate grounded, is fed from the plate of the 78 second IF tube by means of the 15 mmf. condenser. The voltage drop created across the 500 M ohm resistor, connected between grid and cathode, is used for AVC voltage.

MODEL 1840
Schematic

SEARS-ROEBUCK & CO.



MODEL 1840
Wave Trap Data
Alignment, Voltage

SEARS-ROEBUCK & CO.

WAVE TRAP CONNECTIONS

In locations near the coast, where code interference from ship stations may be experienced, a wave trap can be added (Part #R11099). Some of the receivers already have this wave trap incorporated. It is mounted directly behind the IF output transformer. In receivers in which a trap is not already incorporated, a terminal board is provided so that one can be added, as indicated in Fig. 1.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the BROADCAST position, fully mesh the variable condenser plates.

2. If the interfering signal can be picked up, adjust the two tuning condensers of the wave trap until the interfering signal disappears.

3. If the frequency of the interfering signal is known, the adjustment can be made more quickly and accurately by means of a test oscillator. Set the oscillator to the interfering frequency and couple its output to the antenna lead. The oscillator should be adjusted to give high output. Then adjust the wave trap until the oscillator signal disappears. Usually, the frequency of the interfering signal is very close to 500 kc and this frequency should be used if the interference is not heard at the time of the service call.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a .1 mfd. condenser, to the control grid of the 58 second IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 480 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 58 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.

RF Alignment (Broadcast):

1. Disconnect the wave trap, if one is used. In receivers in which the trap is connected to a screw terminal board, the trap can be disconnected by replacing the jumper between the yellow wire terminal and the blue wire terminal and disconnecting the green lead of the trap from its terminal. In receivers in which the trap has been built in as original equipment, the same thing must be done by connecting a jumper between the blue and yellow leads of the trap and unsoldering the green lead.

2. Set the test oscillator to 1785 kc.

3. Couple the output of the oscillator loosely to the antenna lead of the set with the antenna connected.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. This trimmer is mounted on the terminal board of the broadcast oscillator coil, as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output. The location of this padding condenser is shown in the Service Illustrations.

6. Repeat the adjustment of the oscillator trimmer at 1785 kilocycles.

7. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the translator section of the variable condenser for maximum output. In some of the receivers, this trimmer has been removed from the variable condenser, in which case this step in the alignment procedure may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcast alignment.

2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave translator coil for maximum output.

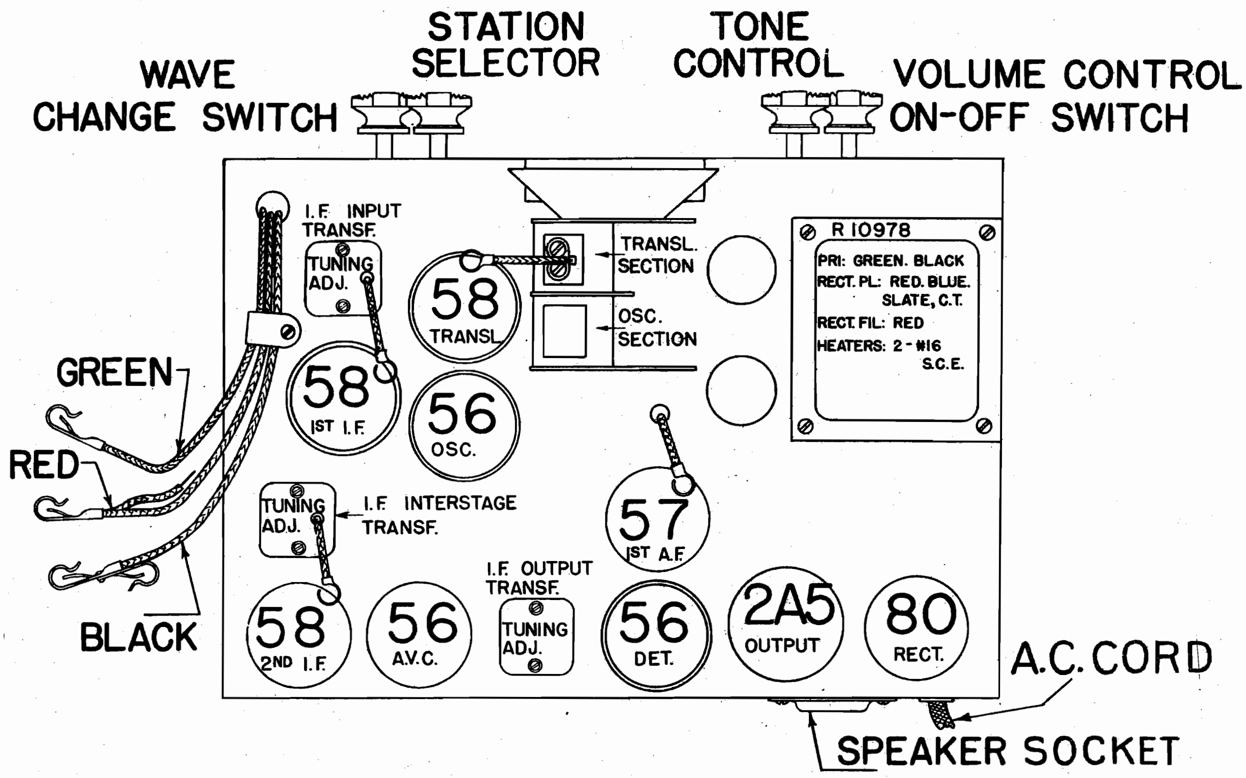
3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turns may be shifted on the short wave translator coil to secure accurate alignment on this frequency. Should it be found necessary to shift turns, it will also be necessary to readjust the translator trimmer at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

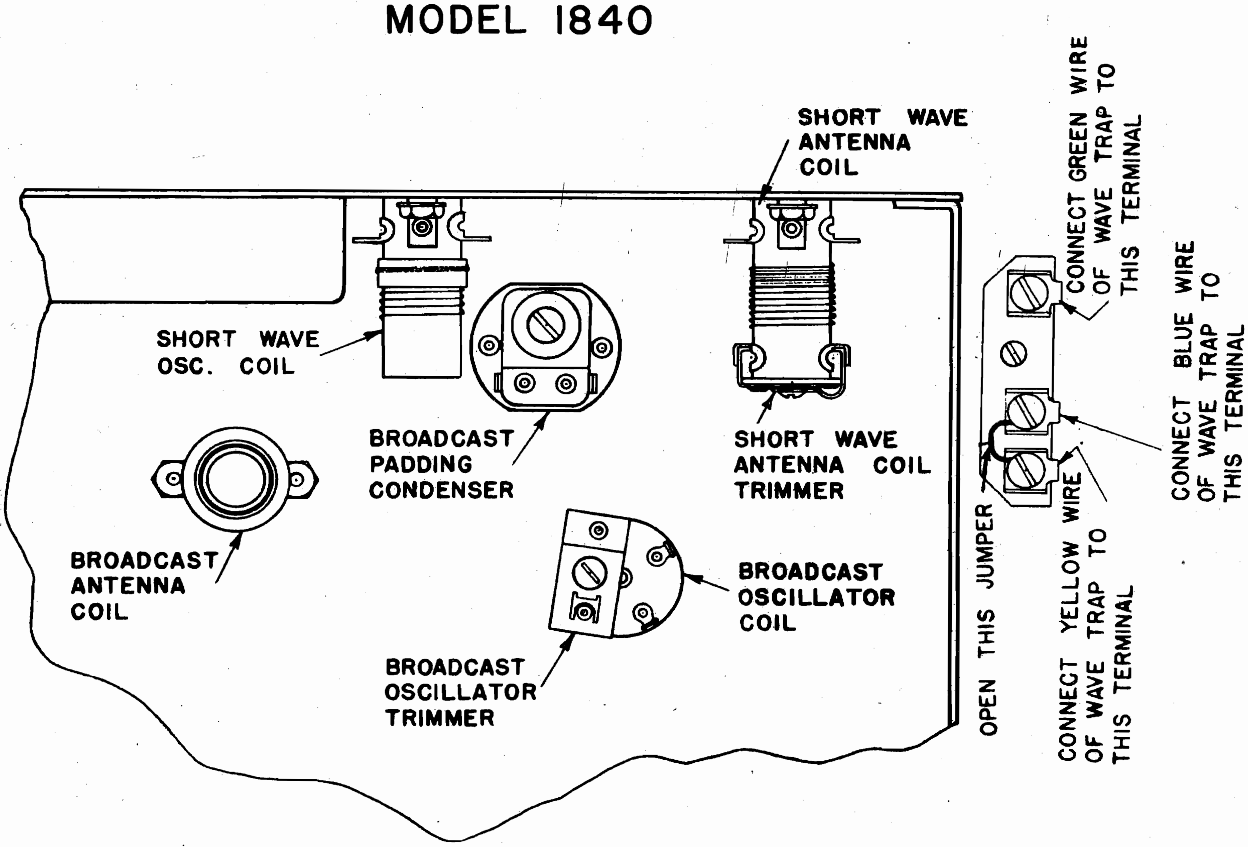
All readings are to be taken between the chassis and the respective element of each tube.

TUBE		PLATE	SCREEN
58 - Translator	-	260	95
56 - Oscillator	-	140	
58 - First IF	-	260	95
58 - Second IF	-	255	95
56 - AVC	-	Used as diode with no applied DC voltage.	
56 - Detector-AF	-	Used as diode with no applied DC voltage.	
57 - Audio	-	95	85
2A5 - Output	-	250	260

SEARS-ROEBUCK & CO.

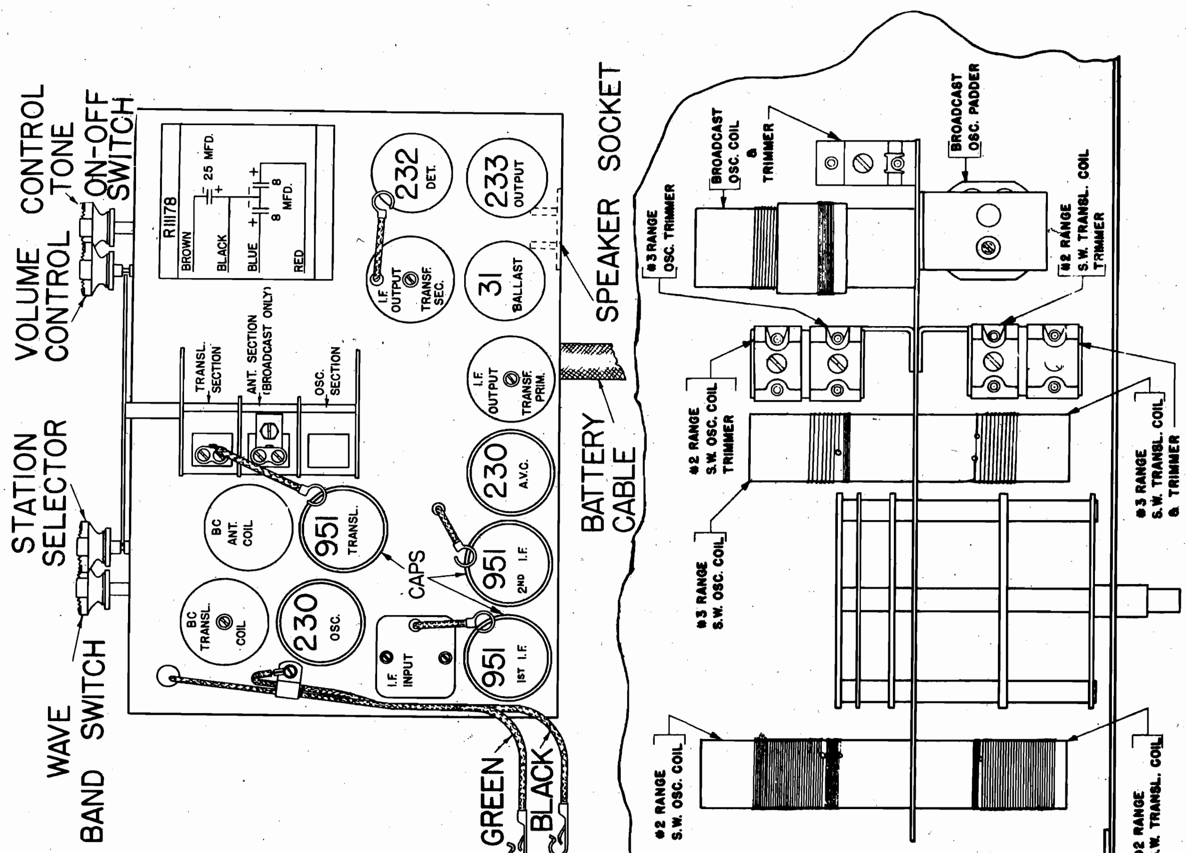


SERVICE ILLUSTRATION - MODEL 1840



MODEL 1857-A
Socket, Trimmers
Alignment, Voltage

SEARS-ROEBUCK & CO.



ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the grid of the first IF tube. Leave the grid clips attached to the caps.

4. Set the test oscillator to 175 kc and tune the IF output transformer, primary and secondary. Be sure the volume control is turned all the way on.

5. Change the test oscillator connection to the control grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. Start with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the receiver inoperative.

Broadcast Alignment; #1 Range:

1. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected.

2. Set the test oscillator to 1700 kc.

3. With the wave switch turned to the broadcast position, open the variable condenser plates all the way. Then adjust the broadcast oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.

4. Set the test oscillator to 1400 kc and tune in its signal.

5. Adjust the broadcast translator coil trimmer and then the trimmer on the antenna section of the variable condenser for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator padder for maximum output.

7. Repeat the 1700 kc and 1400 kc adjustments. Always use the lowest possible output from the test oscillator.

Short Wave Alignment; #2 Range:

1. Leave the test oscillator coupled to the set's antenna lead as for broadcast alignment.

2. Open the variable condenser plates all the way and peak the #2 range oscillator trimmer at 5250 kc.

3. Set the test oscillator to 4500 kc and tune in its signal. Then adjust the #2 range translator trimmer for maximum output.

4. Set the test oscillator to 1750 kc and tune in its signal. If necessary, turns may be shifted on the translator coil to secure maximum output. If turns are shifted it will be necessary to repeat the 5250 kc and 4500 kc adjustments.

Short Wave Alignment; #3 Range:

1. Leave the test oscillator coupled to the set's antenna lead as for the lower frequency ranges.

2. Open the variable condenser plates all the way and peak the #3 range oscillator coil trimmer at 15,500 kc.

3. Set the test oscillator to 14,000 kc and tune in its signal. Then adjust the #3 range translator coil trimmer for maximum output.

4. Set the test oscillator to 5225 kc and tune in its signal. If necessary turns may be shifted on the #3 range translator coil to secure maximum output. If turns are shifted it will be necessary to repeat the 15,500 kc and 14,000 kc adjustments.

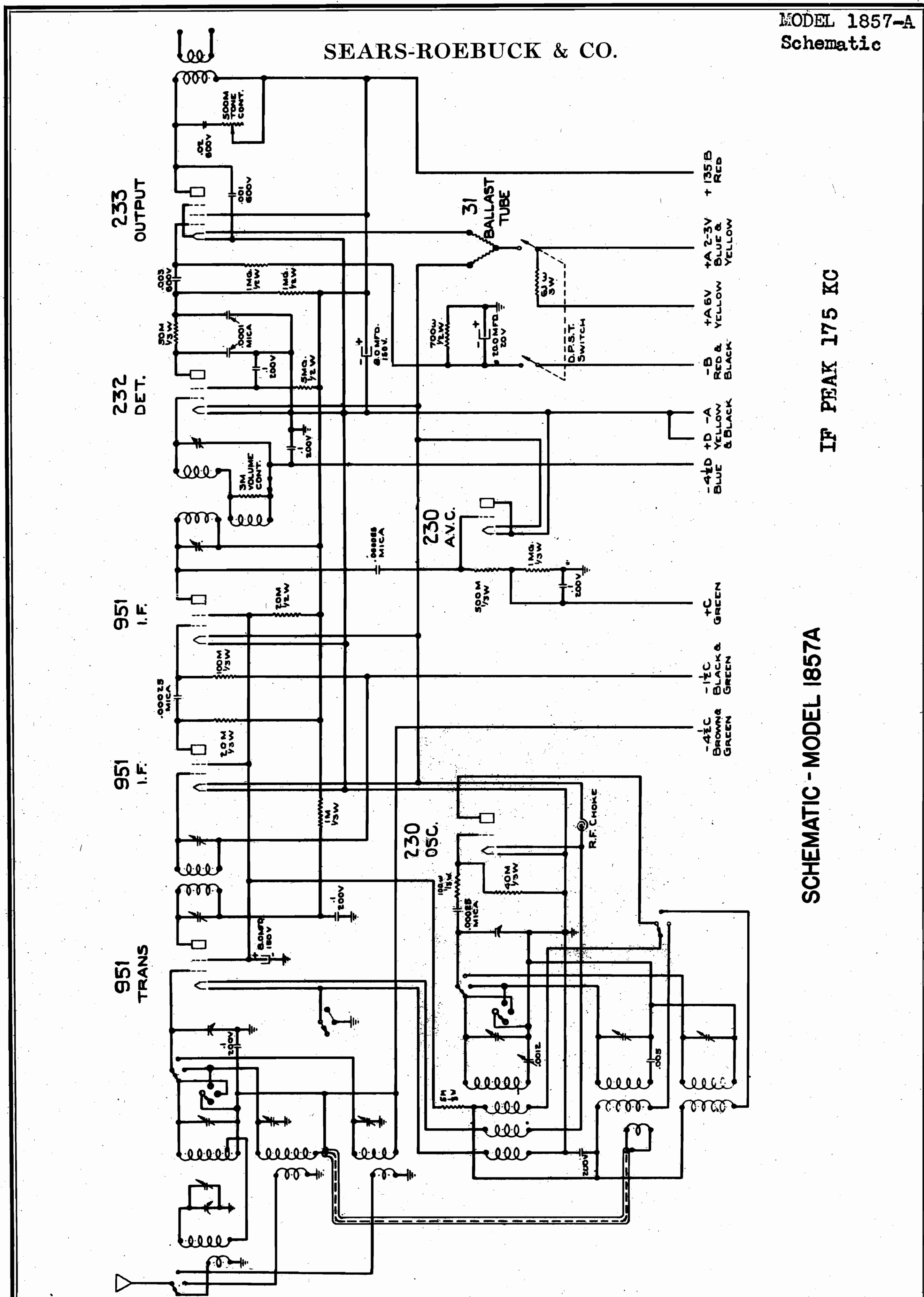
TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

Tube	Plate Voltage	Screen Voltage
951 - Translator	120	50
230 - Oscillator	35	
951 - First IF	90	50
951 - Second IF	120	50
230 - AVC	Used as diode with no applied DC voltages.	
232 - Detector	*	*
233 - Output	115	120

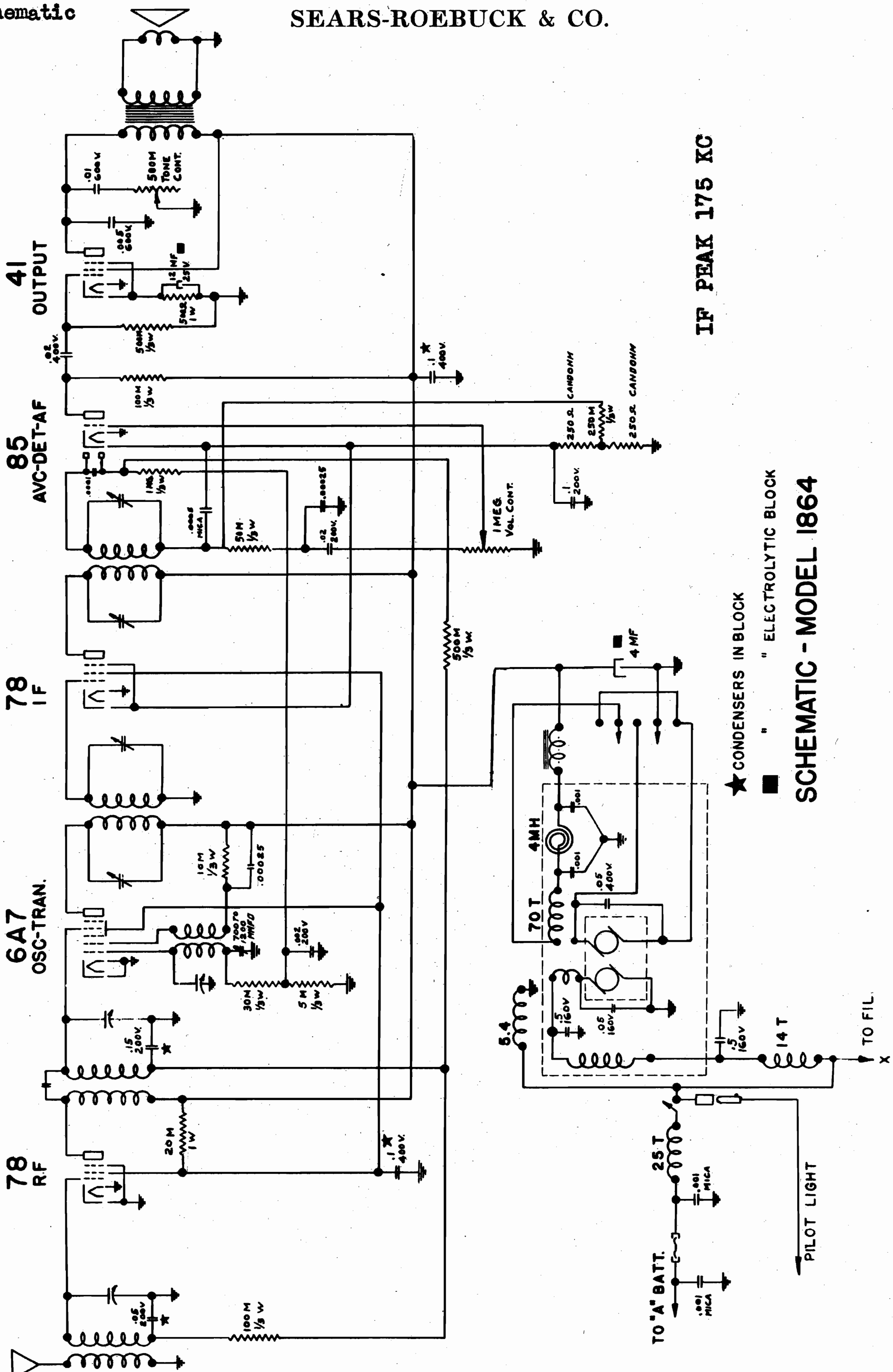
* - Indicates low reading due to high series resistance in circuit

MODEL 1857-A
Schematic



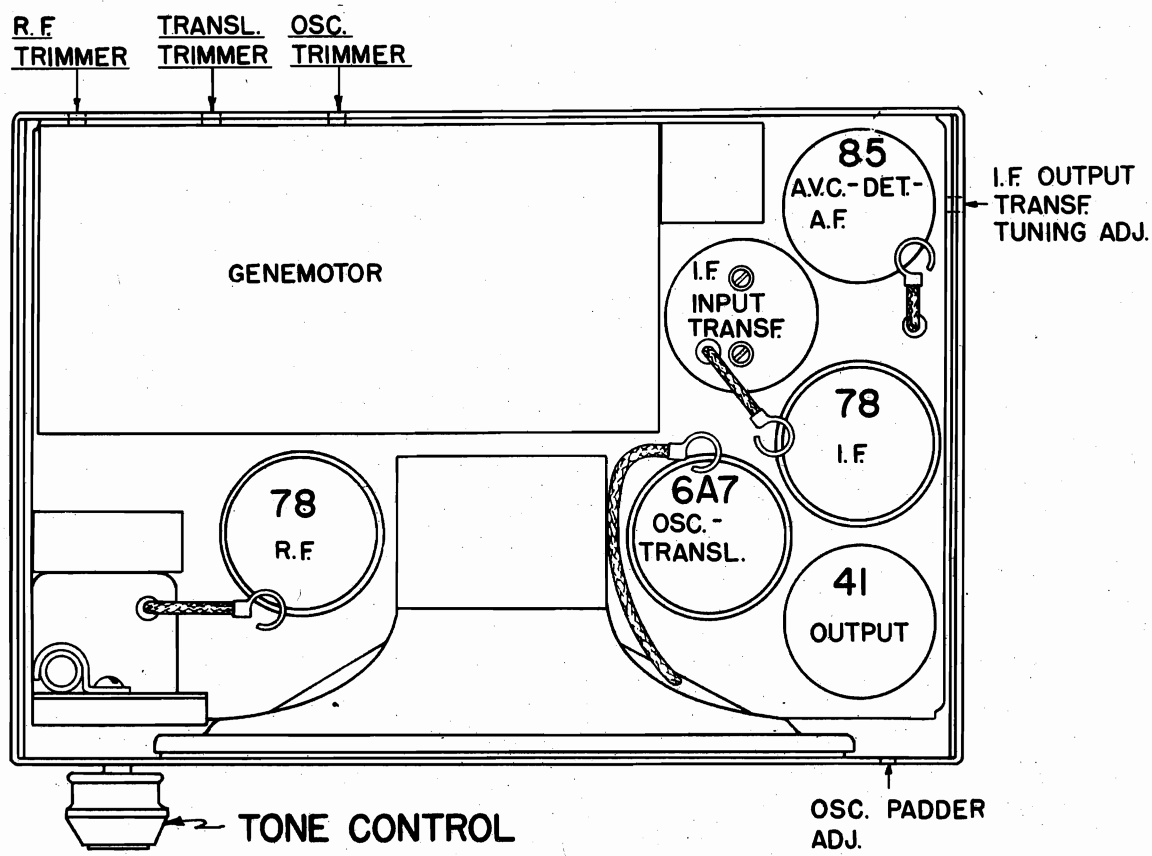
MODEL 1864
Schematic

SEARS-ROEBUCK & CO.



MODEL 1864
Alignment
Socket, Trimmers

SEARS-ROEBUCK & CO.



SERVICE ILLUSTRATION - MODEL 1864

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis and its adjustments are accessable through the hole in the right end of the chassis, as indicated in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. The volume control of the receiver should be turned to its full "on" position and the output from the test oscillator kept as low as possible in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .0002 mfd. condenser.

2. Set the test oscillator to 1520 kc. Open the variable condenser plates all the way and adjust the oscillator trimmer for maximum output.

3. Set the test oscillator to 1400 kc and adjust the RF and translator trimmers.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padder until maximum output is obtained.

5. Repeat the 1520 kc and 1400 kc adjustments. Always leave the receiver's volume control on full and the test oscillator's output at the lowest possible value.

TUBE VOLTAGE CHART

Readings taken with 1000 ohms per volt meter from chassis to indicated tube element.

TUBE	PLATE	SCREEN	OSC. PLATE
78 - RF	230	95	
6A7 - Osc-Transl	230	95	160
78 - IF	230	95	
85 - AVC-Det-AF	65		
41 - Output	230	220	

MODELS 1904,1904-A,1906 1914,1954,1964,1964-A Alignment,Chassis Layout

SEARS-ROEBUCK & CO.

In some of the sets, the 40 ohm resistor, R14, is omitted and a grounded center tap on the transformer used instead.

In earlier production, R3 was a 20M ohm, 1/2 watt resistor. In later production, this was changed to a 5M ohm, 1/3 watt resistor. In sets using a 20M ohm resistor, if troublo is experienced due to the set's not operating at the low frequency end of the C Band, which will be due to the oscillator "stalling", replace the 20M ohm resistor with a 5M ohm one.

The coupling between primary and secondary of the IF output transformer is variable and serves as the volume control.

R7 is the resistor which supplies AVC voltage. Residual bias is furnished by R13.

POWER TRANSFORMER COLOR CODE

RECTIFIER PLATE:RED. CENTER TAP, GREEN.
PRIMARY:BLUE.
HEATER:BLACK.

ALIGNMENT PROCEDURE

General:

During all of the alignment procedure, the volume control should be turned either all the way on, or else retarded slightly from the full "on" position, if retarding it is found to sharpen adjustments. The ground lead of the test oscillator should be connected to the chassis through a .1 mfd. condenser. The other lead of the test oscillator is to be connected in the manner described in the procedure. Where connection is made to a control grid cap, it is important to leave the grid clip attached to the grid cap and to leave the tube shields in place. No attempt should be made to "kill" the oscillator section of the 6A7 during the alignment.

The output from the test oscillator always should be kept at the lowest possible value that will give a satisfactory output meter reading and the coupling between the test oscillator and the receiver should be made as loose as possible. In the case of RF alignment on any of the bands, where the test oscillator is coupled to the antenna lead of the receiver with an antenna connected, alignment will be most accurate if the coupling to the antenna lead is made very loose. (The antenna lead and the oscillator lead separated.) If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and then decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. If an actual antenna is not used and is replaced by a condenser or resistor, as described in the procedure, the input to the receiver should be kept low by decreasing the power output from the test oscillator.

When peaking the antenna and translator trimmers, for all wave bands, the variable condenser should be "rocked" back and forth a degree or two while the trimmer is being adjusted. This should not be done when peaking the oscillator trimmers; in this case, the variable condenser is turned so that the plates are completely out of mesh and left in this position during the adjustment. When adjusting the oscillator trimmers, if it is found that two peaks can be obtained, use the one in which the trimmer is screwed further out (less capacity). When adjusting the antenna and translator trimmers, if two peaks are found, use the adjustment in which the trimmer is screwed in furthest. Note that this is exactly opposite to the procedure for the oscillator trimmers.

Sequence of Alignment:

1. Align IF amplifier.
2. Align short wave, Band C.
3. Align short wave, Band B.
4. Align broadcast, Band A.

IF Alignment:

1. Set the test oscillator to 175 kc and connect its output lead to the control grid cap of the 6A7 tube.

2. Peak the IF output transformer tuning condensers, C13 and C14. These are mounted under the chassis, as shown in the Location of Parts Diagram.

3. Peak the IF input transformer, mounted on top of the chassis.

4. Repeat the adjustments to secure greater accuracy.

RF Alignment; Band C:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected directly to the antenna lead of the receiver, in series with a 400 ohm resistor and with no antenna connected to the receiver.

2. Set the test oscillator to 14500 kc and tune in its signal. Then adjust C3 for maximum output.

RF Alignment; Band B:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected directly to the antenna lead of the receiver, in series with a 400 ohm resistor and with no antenna connected to the receiver.

2. Set the test oscillator to 4500 kc and tune in its signal. Then adjust C2 for maximum output.

RF Alignment; Broadcast, Band A:

1. Couple the test oscillator to the antenna lead of the receiver, with the antenna connected; or connect the oscillator directly to the receiver antenna lead, in series with a .00025 mfd. condenser and with no antenna connected.

2. Set the test oscillator to 1400 kc and tune in its signal. Then adjust C1 and the trimmer on the middle section of the variable condenser for maximum output.

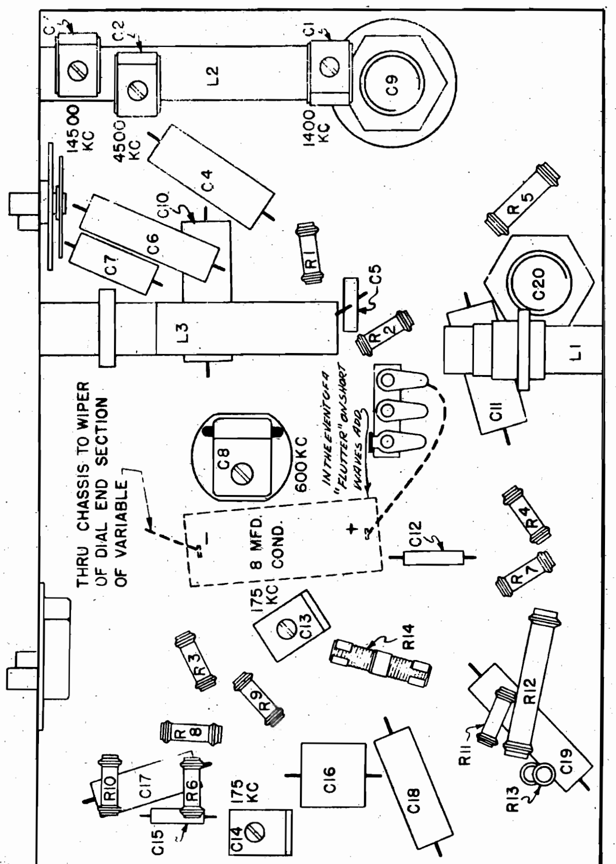
3. Set the test oscillator to 600 kc and tune in its signal. Then adjust the padding condenser, C8, for maximum output. The variable should be "rocked" back and forth a degree or two while making this adjustment.

4. Repeat the 1400 kc adjustment and then the 600 kc adjustment.

FAILURE OF THE VOLUME CONTROL TO REDUCE THE VOLUME SUFFICIENTLY

The Volume Control in these models consists of variable coupling between the primary and secondary of the IF output transformer. It sometimes happens that the movable coil slips on its shaft with the result that the volume cannot be reduced to zero, or else that it passes through zero and then begins to increase again as the Volume Control knob is turned counter clockwise. This condition can be corrected as follows:

1. **Tune in a strong local station.**
2. **Slightly loosen the set screw that holds the movable coil bracket to the Volume Control shaft, so that the coil can be slipped around the shaft.**
3. **Turn the Volume Control shaft all the way counter-clockwise.**
4. **Leaving the shaft in this full counter-clockwise position, slip the movable coil around the shaft to the point of minimum volume.**
5. **Securely tighten the set screw.**
6. **If, with the coil turned to the point of minimum volume the volume still is too high, it can be reduced by rearranging the flexible leads. If improperly arranged, the capacity coupling of these leads may prevent a low enough minimum volume. However, it is a simple matter to shift the leads and so reduce the volume.**

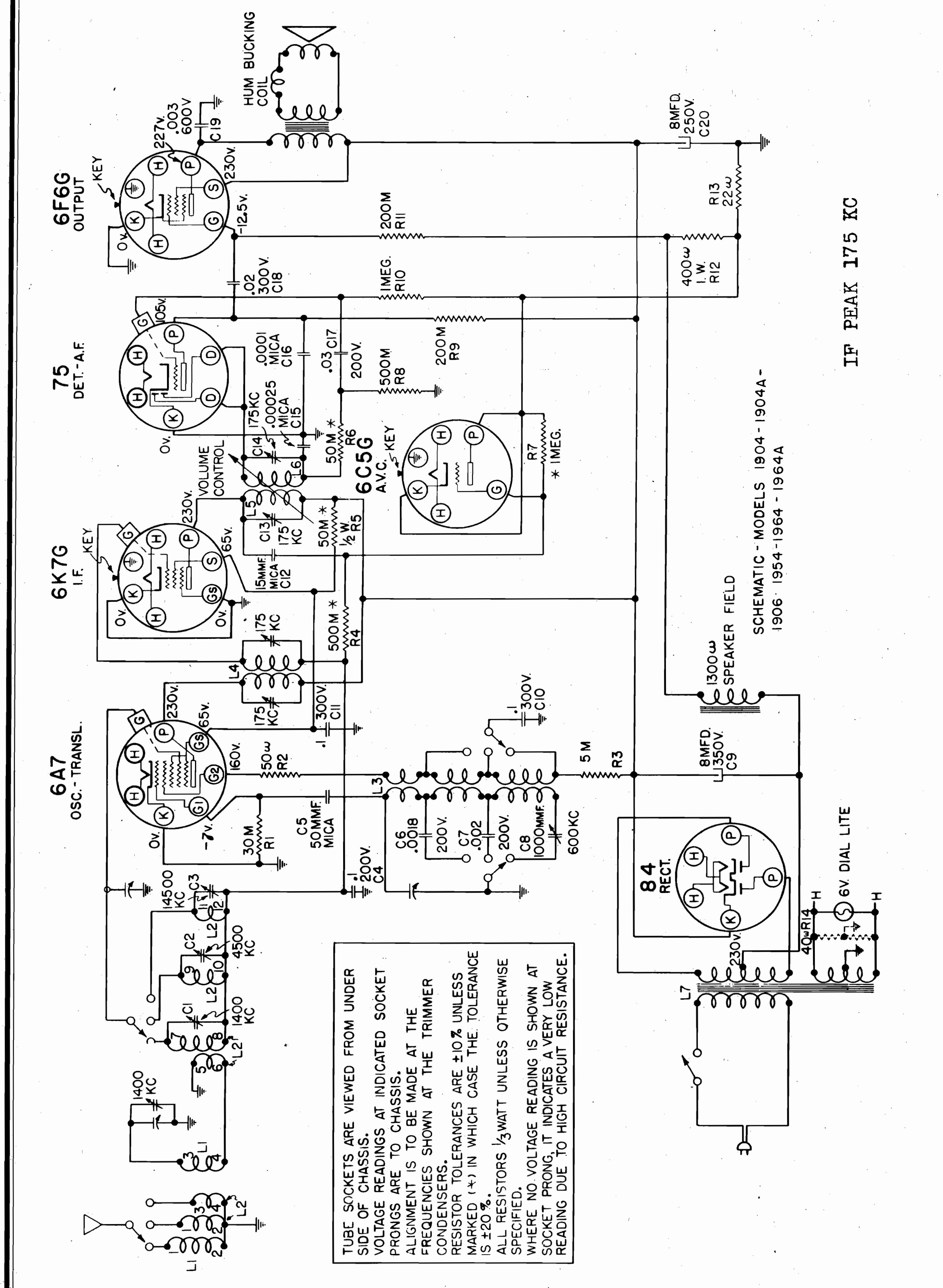


NOTE: L4, L5, L6 ARE MOUNTED ON TOP OF THE CHASSIS.

LOCATIONS OF PARTS - MODELS 1904-1904A-1906-1914-1954-1964-1964A

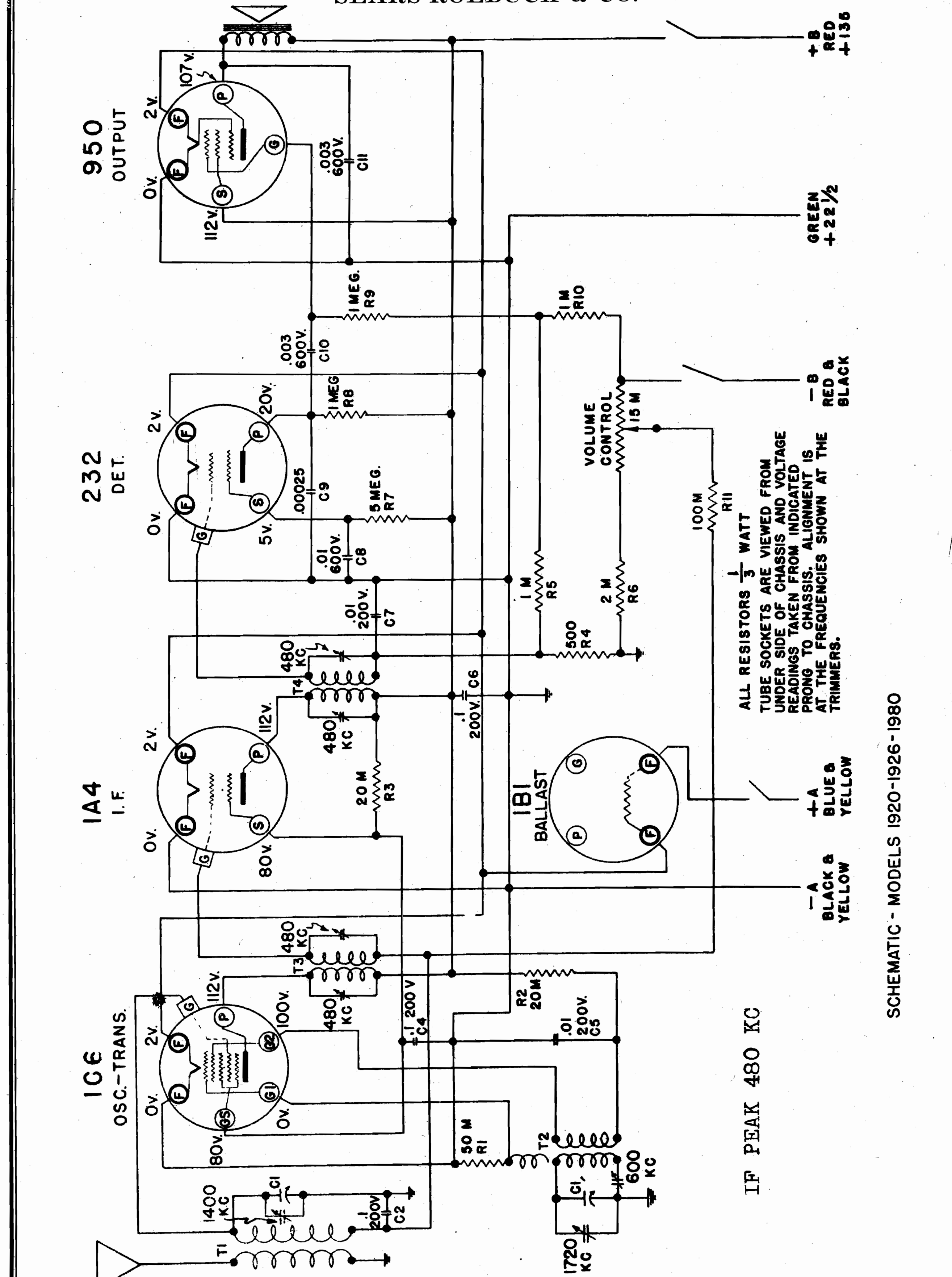
MODELS 1904,1904-A,1906
1914,1954,1964,1964-A
Schematic

SEARS-ROEBUCK & CO.



MODELS 1920,1926,1980
Schematic

SEARS-ROEBUCK & CO.



MODELS 1920,1926,1980
Alignment,Chassis Parts

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the high scale of the output meter across the loud speaker.

2. Connect a 480 kc test oscillator, in series with a .1 mfd. condenser, between the control grid of the 1C6 and the chassis.

3. Adjust the IF output transformer and the IF input transformer for maximum output. Adjustments should be repeated for greater accuracy.

Broadcast Alignment:

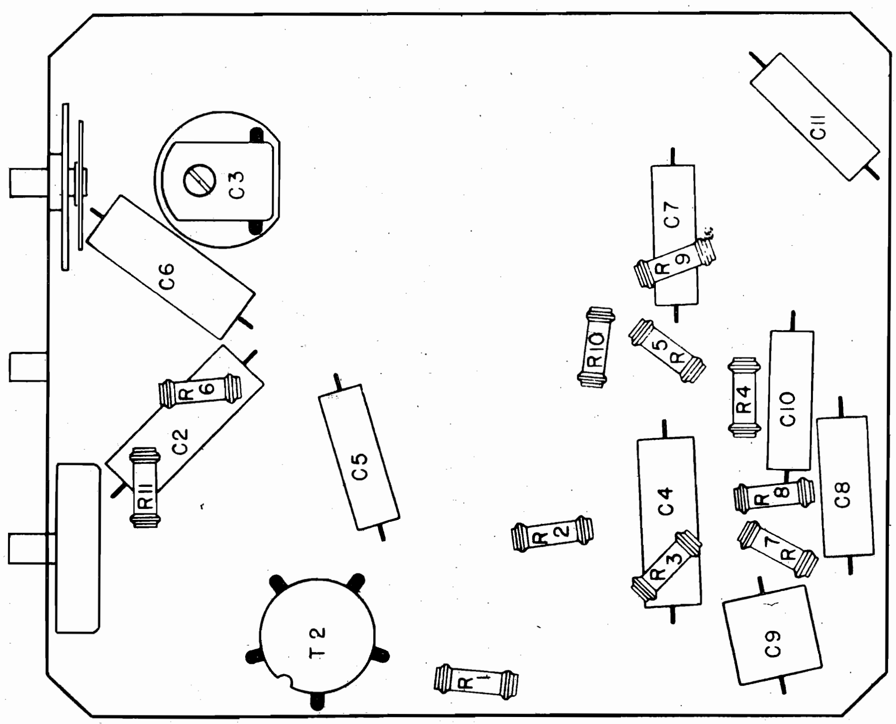
1. The output meter should be left connected as for IF alignment. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected.

2. Set the test oscillator to 1720 kc. Open the variable condenser plates all the way and adjust the trimmer on the oscillator section for maximum output. The oscillator section is the one further from the dial.

3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the other section of the variable condenser for maximum output. The variable should be rocked back and forth a degree or two while making this adjustment.

4. Set the test oscillator to 600 kc and tune in its signal. Then adjust the oscillator padder, C3, for maximum output. The variable should be rocked back and forth a degree or two while making this adjustment.

5. Repeat the 1720 kc and 1400 kc adjustments for greater accuracy.



NOTE: T1, T3, AND T4 ARE MOUNTED ON TOP OF CHASSIS.

LOCATIONS OF PARTS - MODELS 1920-1926-1980

REPLACEMENT PARTS AND PRICE LIST FOR SILVERTONE MODELS 1920, 1926, 1980.

SCHEMATIC LOCATION	PART NO.	DESCRIPTION
	R10562A	Bushing - Rubber
	R12160	Cable - Battery
	R11043	Clip - Grid
T1	R9973	Coil - Antenna
T2	R12161	Coil - Oscillator
T3	R12167A	Transformer - IF Input
T4	R12168A	Transformer - IF Output
C1	R12162	Condenser - Variable, 1920, 1980
C1	R12628	Condenser - Variable, Model 1926
C3	R9975	Condenser - Oscillator padder
C2,C4,C6	R6444	Condenser - .1 mfd. 200 volts
C5,C7	R8432	Condenser - .01 mfd. 200 volts
C8	R7070	Condenser - .01 mfd. 600 volts
C10,C11	R7681	Condenser - .003 mfd. 600 volts
C9	R4592	Condenser - .00025 mfd. mica
	R12163	Control - Volume
R7	R8393	Resistor - 5 megohms, 1/3 watt carbon
R8,R9	R7585	Resistor - 1 megohm, 1/3 watt carbon
R11	R7586	Resistor - 100M ohms, 1/3 watt carbon
R1	R6637	Resistor - 50M ohms, 1/3 watt carbon
R2,R3	R6640	Resistor - 20M ohms, 1/3 watt carbon
R6	R6634	Resistor - 2M ohms, 1/3 watt carbon
R5,R10	R6636	Resistor - 1M ohms, 1/3 watt carbon
R4	R10142	Resistor - 500 ohms, 1/3 watt carbon

MODELS 1922-A,1932-A 1982-A,1992-A

Alignment, Socket Trimmers, Chassis

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

General:

During all of the Alignment Procedure, the Volume Control should be turned all the way on and the Tone Control should be turned all the way to the right to its brilliant position. The ground lead of the test oscillator is to be connected to the chassis through a .1 mfd. condenser. This prevents shorting of the grid bias of the tubes. The other lead of the test oscillator is to be connected in the manner described in the procedure. Where connection is made to a control grid cap, it is important to leave the grid clip attached to the grid cap and to leave the tube shields in place. No attempt should be made to "kill" the oscillator section of the 1C6 during the alignment.

The output from the test oscillator always should be kept at the lowest possible value that will give a satisfactory output reading. During the RF alignment, the coupling between the test oscillator and the antenna lead of the receiver should be made as loose as possible. (The antenna lead and the oscillator lead separated.) If the test oscillator has a variable control for its power output, turn this control to its high position and then decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. If an actual antenna is not used, and is replaced by a condenser or resistor, as described in the procedure, the input to the receiver should be kept low by decreasing the power output from the test oscillator.

When peaking the antenna and translator trimmers, the variable condenser should be "rocked" back and forth a degree or two while the trimmer is being adjusted. This should not be done when peaking the oscillator trimmers. In this case, the variable condenser is turned so that the plates are completely out of mesh and left in this position during the adjustment. When adjusting the oscillator trimmers, if it is found that two peaks can be obtained, use the one in which the trimmer is screwed further out (less capacity). When adjusting the antenna and translator trimmers, if two peaks are found, use the adjustment in which the trimmer is screwed in furthest. Note that this is exactly opposite to the procedure for the oscillator trimmers.

Sequence Of Alignment:

1. Align IF Amplifier,
2. Align Broadcast Band, Band A
3. Align Short Wave Band, Band B

IF Alignment:

1. Set the test oscillator to 175 kc and connect its output lead to the control grid cap of the 1C6 tube.

2. Peak the IF input transformer. This is the square can unit on top of the chassis.

3. Peak the IF output transformer secondary. This is the round can unit with the single adjusting screw mounted at the top rear of the chassis.

4. Peak the IF output transformer primary. This trimmer adjustment is C21 in the Location of Parts Diagram.

5. It is advisable to repeat the alignment for greater accuracy.

Broadcast RF Alignment; Band A:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected, in series with a .00025 mfd. condenser, directly to the antenna lead of the receiver.

2. Set the test oscillator to 1600 kc. Open the variable condenser plates all the way and adjust C2, the Broadcast oscillator trimmer, for maximum output.

3. Set the test oscillator to 1400 kc and tune in its signal. Peak the Broadcast antenna and translator trimmers. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is the one in the round can unit mounted next to the square can IF unit on top of the chassis.

4. Set the test oscillator to 600 kc and tune in its signal. Then adjust C6, the Broadcast oscillator padder, The variable should be "rocked" back and forth a degree or two during the adjustment.

5. Repeat the 1600 and 1400 kc adjustments.

Short Wave RF Alignment; Band B:

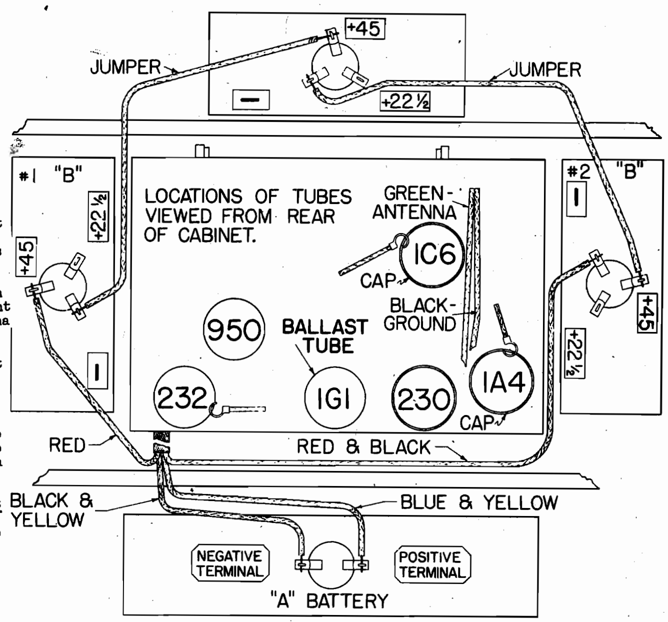
1. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected, in series with a 400 ohm resistor, directly to the antenna lead of the receiver.

2. Set the test oscillator to 16000 kc. Open the variable condenser plates all the way and peak C3, the Short Wave oscillator trimmer.

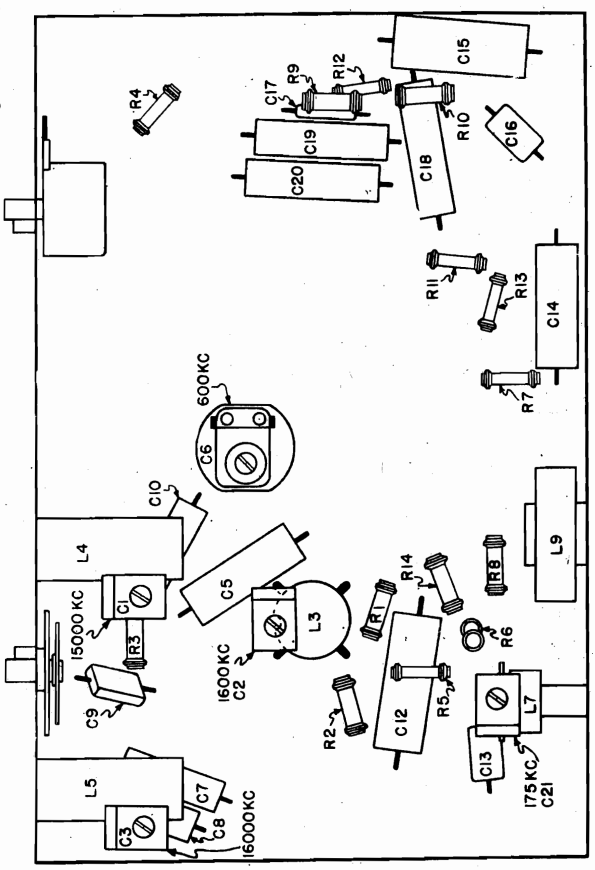
3. Set the test oscillator to 15000 kc and tune in its signal. Peak C1, the Short Wave translator trimmer.

Microphonic Howl:

Be sure that the wooden strips, inserted for shipping purposes, are removed from under the chassis. Also be certain that neither the control shafts nor knobs touch the cabinet. The chassis must float freely on its cushion rubber mountings, to prevent microphonics, particularly on Short Waves.



TUBE POSITIONS & BATTERY CONNECTIONS
MODELS - 1922A - 1982A

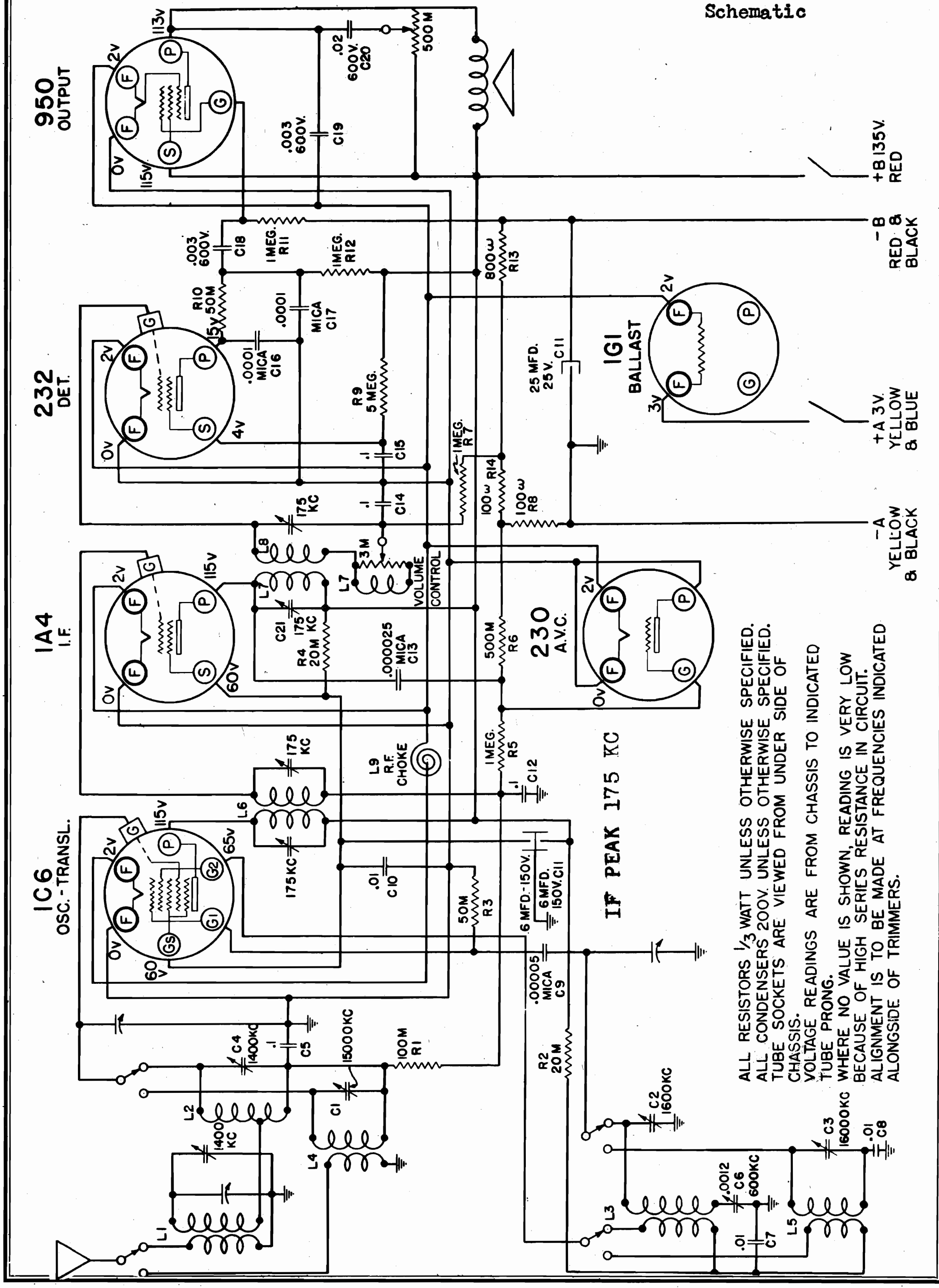


LOCATION OF PARTS - MODELS 1922A-1932A-1982A-1992A

SEARS-ROEBUCK & CO.

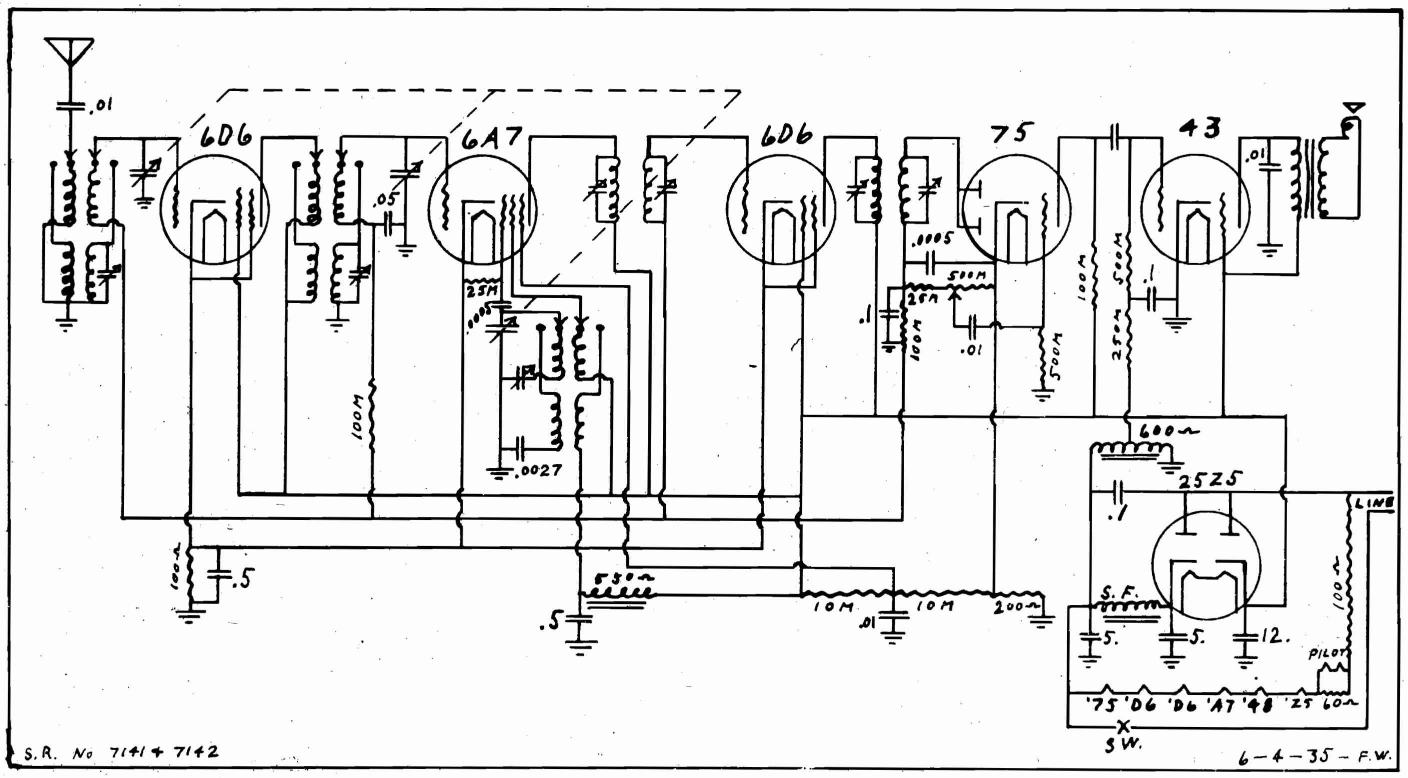
MODELS 1922-A, 1932-A
1982-A, 1992-A

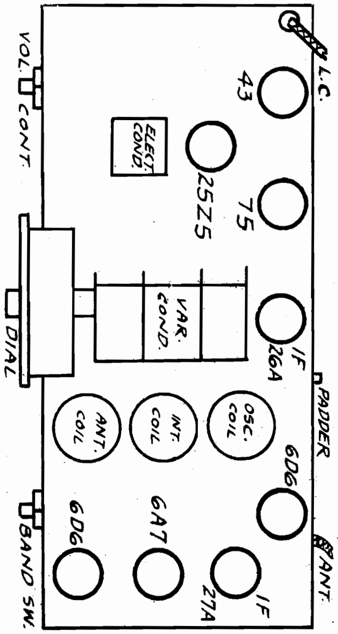
Schematic



MODELS 7141,7142
Schematic,Socket
Trimmers,Voltage

SEARS-ROEBUCK & CO.





SOCKET LAYOUT

Socket voltages with 1000 ohm per volt D.C. meter - Line voltage 115V.

Type	Position	EF	EK	EG2	EG3	EP
6D6	RF & IF Amp.	6.3	2.2	85	2.2	85
6A7	1st Det.& Osc.	6.3	2.2	35	85•	85
75	2nd Det.& AVC	6.3	.8			55
43	Power output	30.	-.4#	85		80

• Osc. plate
43 grid
F Filament

K - Cathode
G2- Screen grid
G3- Suppressor grid

P - Plate

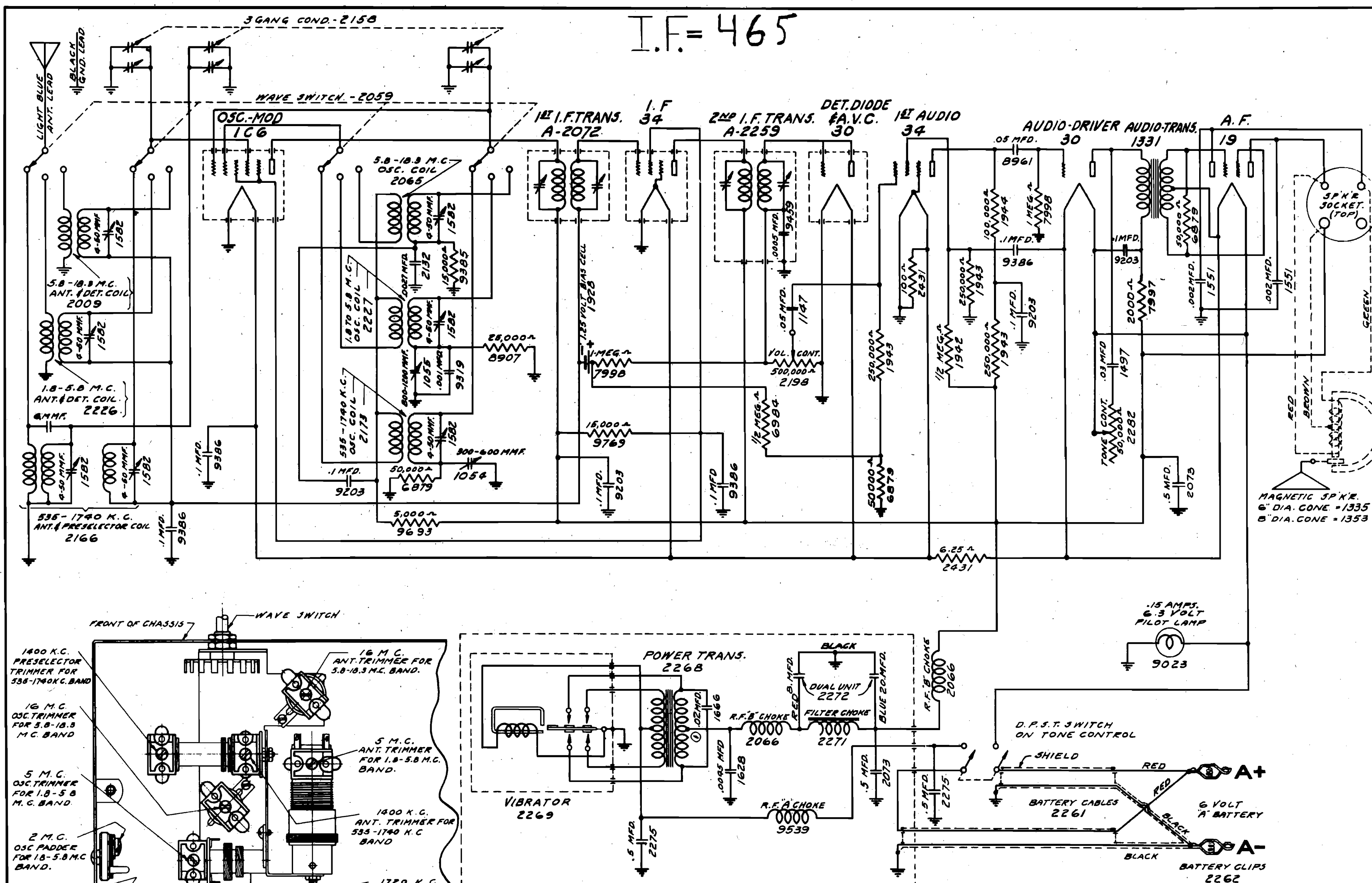
Alignment

1. I-f peaked at 456 kc.
2. Oscillator trimmer (beneath chassis) and gang condenser trimmers adjusted at 1720 kc.
3. Oscillator padding condenser adjusted at 600 kc. Rock tuning condenser.
4. Check alignment at 1400 kc.
5. Check short wave alignment at 12. megacycle

Parts for this model may be ordered from Echophone Radio Corporation
2611 Indiana Avenue, Chicago, Ill.

MODEL 31-B
Schematic, Voltage
Trimmers

SENTINEL RADIO CORP.



TUBE		FILAMENT	PLATE	SCREEN	GRID NO. 1	GRID NO. 2	GRID NO. 3 & 5
1C6	1ST DETECTOR & OSCILLATOR	2	135	70	2.5	110	70
34	I. F. AMPLIFIER	2	135	70			
30	2ND DETECTOR & AVC	2					
34	1ST AUDIO	2	15	12*			
30	AUDIO DRIVER	2	125				
19	OUTPUT	2	135 EACH PLATE	6			

TOTAL "B" CURRENT - 25 M.A. "A" BATTERY DRAIN - 1.5 AMP. *COMPARATIVE VOLTAGE ONLY.

READ ALL VOLTAGES FROM SOCKET TO CHASSIS. WHEN MAKING TUBE VOLTAGE CHECKS USE BATTERY THAT DELIVERS FULL VOLTAGE WITH THE RECEIVER TURNED ON.

MODEL 31-B
Alignment
Parts List

SENTINEL RADIO CORP.

PART NUMBER		LIST PRICE
2166	535-1740 K.C. BAND ANTENNA AND PRESELECTOR COIL	$1.30
2173	535-1740 K.C. BAND OSCILLATOR COIL	.65
2226	1.8-5.8 M.C. BAND ANTENNA COIL	.70
2227	1.8-5.8 M.C. BAND OSCILLATOR COIL	.55
2009	5.8-18.3 M.C. BAND ANTENNA COIL	.60
2065	5.8-18.3 M.C. BAND OSCILLATOR COIL	.65
2072	FIRST I. F. TRANSFORMER	1.55
2259	SECOND I. F. TRANSFORMER	1.60
2282	TONE CONTROL WITH OFF AND ON SWITCH	1.24
2198	VOLUME CONTROL	.85
2059	WAVE SWITCH	.75
2272	8 & 20 MFD. DRY ELECTROLYTIC CONDENSER	1.95
2268	POWER TRANSFORMER	2.35
2271	FILTER CHOKE	1.00
2066	R. F. CHOKE	.28
9530	R.F. "A" CHOKE	.15
2269	VIBRATOR	6.00

PART NUMBER		LIST PRICE
6984	500,000 OHM 1/3 WATT RESISTOR	$ .19
6879	50,000 OHM 1/3 WATT RESISTOR	.19
9693	5,000 OHM 1/3 WATT RESISTOR	.19
9769	15,000 OHM 1/2 WATT RESISTOR	.19
8907	25,000 OHM 1/3 WATT RESISTOR	.19
9285	15,000 OHM 1/3 WATT RESISTOR	.19
9431	100 OHM 1/3 WATT RESISTOR	.19
9319	.001 MFD. MOULDED CONDENSER	.21
9458	.00025 MFD. MOULDED CONDENSER	.21
9459	.0005 MFD. MOULDED CONDENSER	.21
2132	.0027 MFD. MOULDED CONDENSER	.21
1628	.0045 MFD. MOULDED CONDENSER	.21
9386	.1 MFD. 200 VOLT CONDENSER	.19
9203	.1 MFD. 400 VOLT CONDENSER	.20
1147	.05 MFD. 200 VOLT CONDENSER	.15
8961	.05 MFD. 400 VOLT CONDENSER	.19
1551	.002 MFD. 600 VOLT CONDENSER	.18
1497	.03 MFD. 600 VOLT CONDENSER	.19
2275	.5 MFD. 100 VOLT CONDENSER	.50
1666	.03 MFD. 600 VOLT CONDENSER	.18
2073	.5 MFD. 400 VOLT CONDENSER	.56
2261	BATTERY CABLE (SINGLE SECTION)	.65

SIX VOLT BATTERY OPERATED
SIX TUBE SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: REALIGNMENT OF THIS RECEIVER SHOULD NEVER BE NECESSARY UNLESS ONE OF THE OSCILLATOR, ANTENNA, OR R.F. COILS HAS BEEN REPLACED. LACK OF SENSITIVITY, SELECTIVITY, AND POOR TONE QUALITY MAY BE DUE TO ANY ONE OR A COMBINATION OF CAUSES, SUCH AS WEAK OR DEFECTIVE TUBES, BATTERY, OR SPEAKER, INADEQUATE OR EXCESSIVELY LONG ANTENNA, OPEN OR GROUNDED BIAS RESISTOR, BYPASS CONDENSER, ETC. UNDER NO CIRCUMSTANCES SHOULD REALIGNMENT BE ATTEMPTED UNTIL ALL OTHER POSSIBLE SOURCES HAVE BEEN FIRST THOROUGHLY INVESTIGATED AND HAVE BEEN DEFINITELY PROVEN NOT TO BE THE CAUSE. IF AN I.F. TUBE IS REPLACED IT IS ADVISABLE TO REALIGN THE I.F. AMPLIFIER, PARTICULARLY IF THE REPLACEMENT TUBE IS ONE OF A DIFFERENT MANUFACTURE THAN THE ONE IN THE RECEIVER. IT IS IMPORTANT WHEN ALIGNING TO CAREFULLY FOLLOW THE PROCEDURE IN THE ORDER GIVEN, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT. IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. CONNECT THE HIGH SIDE OF THE TEST OSCILLATOR OUTPUT TO THE CONTROL GRID OF THE 1C6 MODULATOR TUBE THROUGH A .02 MFD. CONDENSER. LEAVE THE GRID CAP CONNECTED TO THE GRID TERMINAL OF THE TUBE, AND CONNECT THE GROUND SIDE OF THE TEST OSCILLATOR TO THE RECEIVER GROUND.

2. SET THE TEST OSCILLATOR FREQUENCY TO 465 KILOCYCLES (THIS MUST BE ACCURATE).

3. ALIGN THE SECOND INTERMEDIATE TRANSFORMER BY TURNING ONE OF THE TRIMMER SCREWS ACCESSIBLE THROUGH HOLES IN THE TOP OF THE TRANSFORMER SHIELDS UP AND DOWN (INCREASING AND DECREASING CAPACITY) UNTIL MAXIMUM READING IS OBTAINED ON THE OUTPUT METER, AFTER WHICH ADJUST THE OTHER TRIMMER SCREW OF THE SAME TRANSFORMER FOR MAXIMUM SENSITIVITY.

4. ADJUST THE FIRST INTERMEDIATE TRANSFORMER IN THE SAME MANNER AS THE SECOND I. F. TRANSFORMER.

TO ALIGN THE VARIABLE CONDENSER: IT IS IMPORTANT WHEN ALIGNING THE GANG CONDENSER, PADDING AND TRIMMER CONDENSERS TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE PADDING AND TRIMMER CONDENSERS LOCATED UNDERNEATH THE CHASSIS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE CIRCUIT DIAGRAM.

1. CONNECT THE HIGH OUTPUT SIDE OF THE TEST OSCILLATOR THROUGH A 400 OHM RESISTOR TO THE RECEIVER ANTENNA LEAD AND THE LOW SIDE TO THE SET GROUND.

2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE 18.3 TO 5.8 MEGACYCLE BAND, TUNE THE RECEIVER DIAL TO 16 MEGACYCLES, AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 16 MEGACYCLES. THEN TUNE IN THE 16 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 16 MEGACYCLE OSCILLATOR TRIMMER. WHEN ADJUSTING THIS TRIMMER TWO PEAKS, THE FUNDAMENTAL AND THE IMAGE PEAK, WILL BE NOTICED. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 16 MEGACYCLES. ALWAYS BACK OFF THE TRIMMER TO MINIMUM CAPACITY, THEN SCREW DOWN THE TRIMMER (ADD CAPACITY) UNTIL THE FIRST PEAK WHICH IS THE FUNDAMENTAL AND THE PROPER ONE TO USE IS TUNED IN. IF THE TRIMMER IS SCREWED DOWN BEYOND THE POINT WHERE THE FIRST PEAK IS RECEIVED, THE INCORRECT IMAGE PEAK WILL BE TUNED IN. AFTER COMPLETING ADJUSTMENT OF THE OSCILLATOR TRIMMER AT 16 MEGACYCLES ALWAYS CHECK TO SEE IF THE PROPER PEAK HAS BEEN USED. TO DO THIS LEAVE THE TEST OSCILLATOR FREQUENCY AT 16 MEGACYCLES, INCREASE THE OUTPUT OF THE TEST OSCILLATOR AND TUNE THE RECEIVER DIAL TO APPROXIMATELY 15 MEGACYCLES. THEN VARY THE RECEIVER DIAL SLIGHTLY TO THE RIGHT AND LEFT OF 16 MEGACYCLES, AND IF THE FUNDAMENTAL PEAK WAS USED IN ALIGNING AT 16 MEGACYCLES THE TEST OSCILLATOR SIGNAL WILL BE HEARD AT APPROXIMATELY 15 MEGACYCLES ON THE RECEIVER DIAL. IF IT IS NOT POSSIBLE TO RECEIVE THE SIGNAL, THEN THE FUNDAMENTAL PEAK WAS NOT USED AND THE 16 MEGACYCLE OSCILLATOR TRIMMER MUST BE PROPERLY READJUSTED. AFTER PROPERLY ADJUSTING THE 16 MEGACYCLE OSCILLATOR TRIMMER ADJUST THE 16 MEGACYCLE ANTENNA TRIMMER FOR MAXIMUM 16 MEGACYCLE SENSITIVITY.

3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE 1.8 TO 5.8 MEGACYCLE BAND, TUNE THE RECEIVER DIAL, AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 5 MEGACYCLES. BRING IN THE 5 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 5 MEGACYCLE TRIMMER. NEXT ADJUST THE 5 MEGACYCLE ANTENNA TRIMMER FOR MAXIMUM 5 MEGACYCLE RESPONSE.

4. LEAVE THE BAND SELECTOR SWITCH FOR OPERATION ON THE 1.8 TO 5.8 MEGACYCLE BAND AND TUNE THE RECEIVER DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO APPROXIMATELY 2 MEGACYCLES. WHILE ROCKING THE GANG CONDENSER SLIGHTLY TO THE RIGHT AND LEFT, ADJUST THE 2 MEGACYCLE OSCILLATOR PADDER CONDENSER FOR MAXIMUM SENSITIVITY.

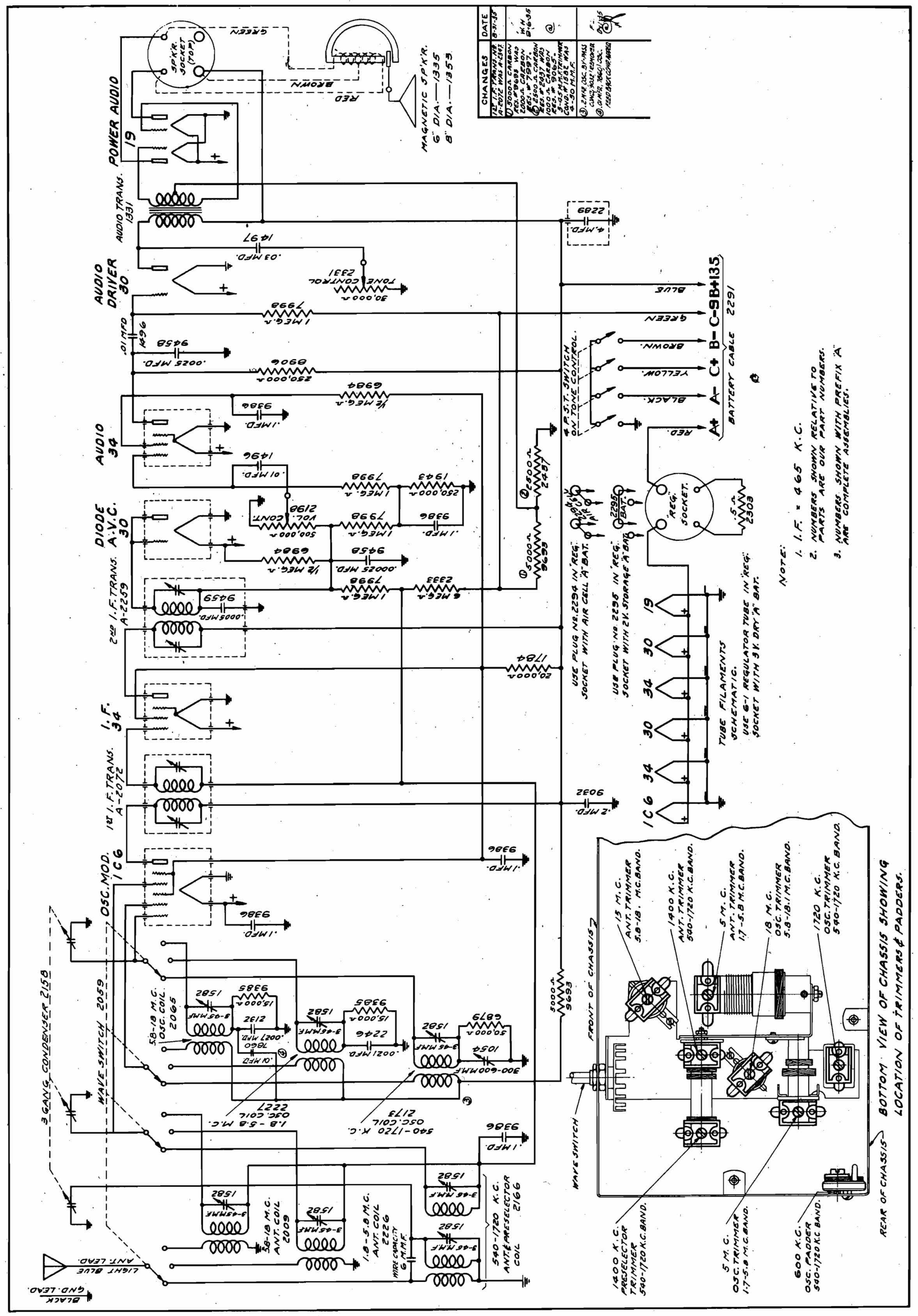
5. REPLACE 400 OHM RESISTOR IN SERIES WITH TEST OSCILLATOR LEAD WITH 200 MMFD. CONDENSER, PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE 535-1740 KILOCYCLE BAND, AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 1720 KILOCYCLES. ROTATE GANG CONDENSER SO THAT PLATES ARE COMPLETELY OUT OF MESH. ADJUST 1720 KILOCYCLE OSCILLATOR TRIMMER TO BRING IN 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT

6. WITH BAND SELECTOR SWITCH PLACED FOR OPERATION ON 535-1740 KILOCYCLE BAND, SET THE TEST OSCILLATOR FREQUENCY AND RECEIVER DIAL TO EXACTLY 1400 KILOCYCLES. ADJUST THE 1400 KILOCYCLE PRESELECTOR AND ANTENNA TRIMMERS FOR MAXIMUM 1400 KILOCYCLE SIGNAL SENSITIVITY.

7. LEAVE BAND SELECTOR SWITCH SET FOR OPERATION ON 535-1740 KILOCYCLE BAND AND TUNE RECEIVER DIAL AND SET THE TEST OSCILLATOR TO APPROXIMATELY 600 KILOCYCLES. WHILE ROCKING THE GANG CONDENSER SLIGHTLY TO THE RIGHT AND LEFT ADJUST THE 600 KILOCYCLE OSCILLATOR PADDER FOR MAXIMUM SENSITIVITY.

MODEL 35-B
Schematic,Trimmers

SENTINEL RADIO CORP.



MODEL 35-B
Alignment
Parts List

SENTINEL RADIO CORP.

Part Number		List Price
2166	Antenna Coil for the 1720-540 Kilocycle Band	$1.30
2173	Oscillator Coil for the 1720-540 Kilocycle Band	.65
2009	5.8 to 18 Megacycle Band Antenna Coil	.60
2065	5.8 to 18 Megacycle Band Oscillator Coil	.65
2226	1.7 to 5.8 Megacycle Band Antenna Coil	.70
2227	1.7 to 5.8 Megacycle Band Oscillator Coil	.55
2072	First I. F. Transformer	1.55
2259	Second I. F. Transformer	1.60
2158	Three Gang Condenser	3.60
1331	Audio Transformer	1.40
2289	Wet Electrolytic Condenser	.85
2198	Volume Control	.85
2331	Tone Control and Off and On Switch	1.25
1054	Padding Condenser	.55
1582	Trimmer Condenser	.21
2295	Plug Marked "Use With Two Volt Battery"	$ .15
9458	.00025 Mfd. Mica Condenser	.21
9459	.0005 Mfd. Mica Condenser	.21
2132	.0027 Mfd. Mica Condenser	.21
2246	.0021 Mfd. Mica Condenser	.28
9386	.1 Mfd. 200 Volt Condenser	.19
9032	.2 Mfd. 200 Volt Condenser	.23
1496	.01 Mfd. 600 Volt Condenser	.18
1497	.03 Mfd. 600 Volt Condenser	.19
7860	.01 Mfd. 400 Volt Condenser	.17
2303	.5. Ohm 1/4 Watt Flexible Resistor	.19
1943	250 000 Ohm 1/3 Watt Resistor Insulated Type	.19
2333	6 Meg Ohm 1/3 Watt Resistor	.19
7998	1 Meg Ohm 1/3 Watt Resistor	.19
6984	500,000 Ohm 1/3 Watt Resistor	.19
8906	250.000 Ohm 1/3 Watt Resistor	.19
1784	20.000 Ohm 1/3 Watt Resistor	.19
9693	5,000 Ohm 1/3 Watt Resistor	.19
9385	15,000 Ohm 1/3 Watt Resistor	.19
6879	50.000 Ohm 1/3 Watt Resistor	.19
2437	2,500 Ohm 1/3 Watt Resistor	.19

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes, battery or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

It is imperative that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 1C6 modulator tube through a .02 mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18 megacycle band, tune the receiver dial, and set the test oscillator frequency to **exactly 18 megacycles.**

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18 **megacycle signal to maximum output by adjusting the 18 megacycle oscillator trimmer.** When adjusting this trimmer, two peaks, the fundamental and the image peak will be noticed. **Care must be taken that the fundamental peak and not the image peak is used for aligning the receiver at 18 megacycles.** Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17 megacycles. Then vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal **will be heard at approximately 17 megacycles** on the receiver dial. If it is not possible to receive the signal, then the fundamental **peak was not used and the 18 megacycle oscillator trimmer must be properly readjusted.**

3. **With band selector switch set for operation** on 5.8 to 18 megacycle band **tune the receiver dial and set test oscillator** frequency to **exactly 15 megacycles and adjust 15 megacycle antenna trimmer for maximum 15 megacycle signal sensitivity**
4. **Place band selector switch for operation on 1.7 to 5.8** megacycle band, **tune the receiver dial, and set test oscillator frequency to exactly 5.8 megacycles.**

Rotate gang condenser so that plates are completely out of mesh and **bring in 5.8 megacycle signal to maximum output by** adjusting the 5.8 megacycle oscillator trimmer.

5. Replace the 400 ohm resistor in series with test oscillator lead with a 200 mmfd condenser, **place the band selector** switch for operation on the 540 to 1720 kilocycle band and set test oscillator frequency to **exactly 1720 kilocycles.**

Rotate gang condenser so that plates are completely out of mesh and **bring in the 1720 kilocycle signal to maximum output by adjusting 1720 kilocycle oscillator trimmer.**

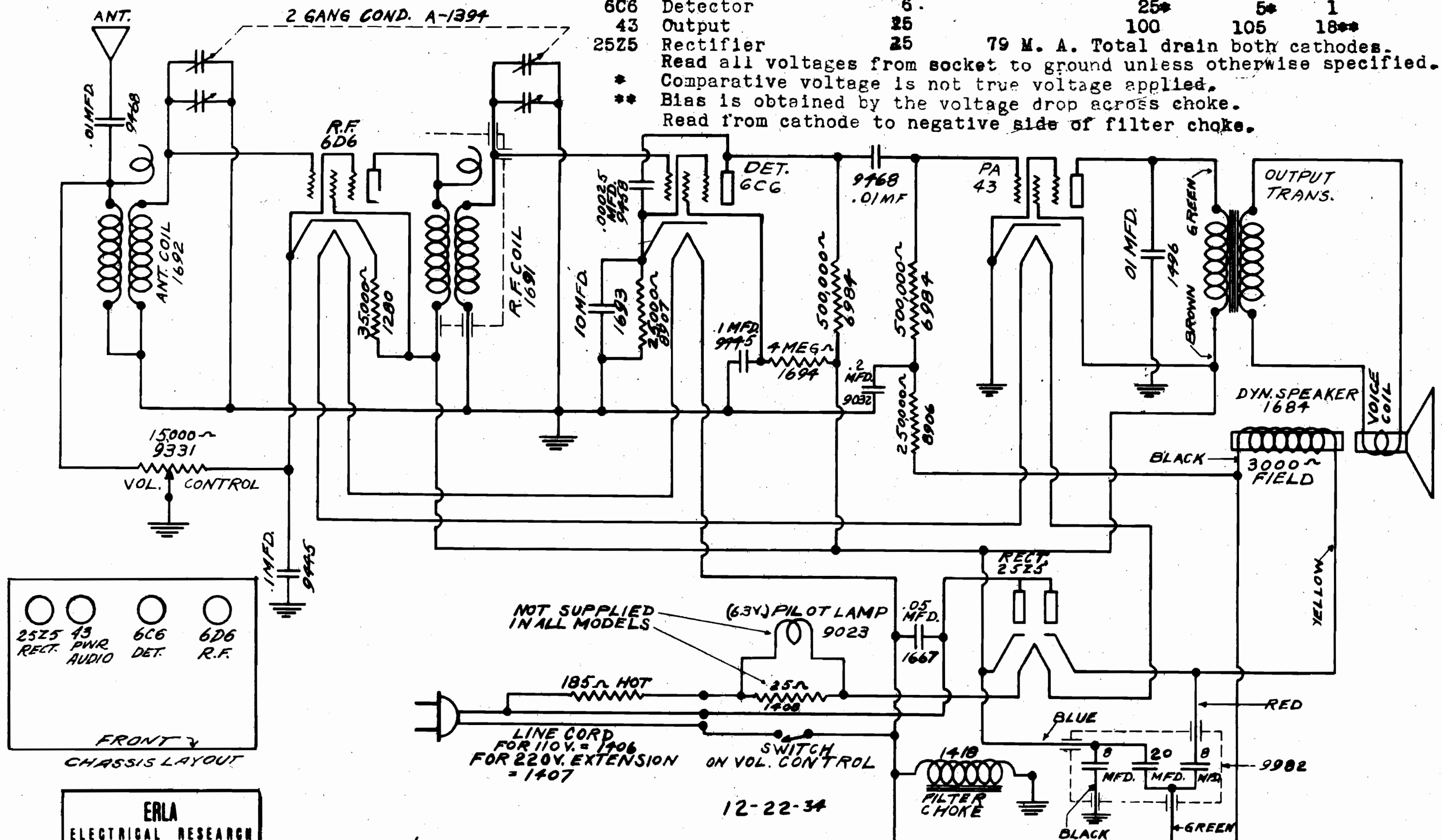
6. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to **exactly 1400 kilocycles.** Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
7. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. **While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.**

MODEL 4100-B
Schematic, Voltage
Socket, Alignment

SENTINEL RADIO CORP.

TUBE		FILAMENT	PLATE	SCREEN	CATHODE
6D6	Radio Frequency	6	105	105	3.5
6C6	Detector	6	25*	5*	1
43	Output	25	100	105	18**
25Z5	Rectifier	25	79 M. A. Total drain both cathodes.		

Read all voltages from socket to ground unless otherwise specified.
* Comparative voltage is not true voltage applied.
** Bias is obtained by the voltage drop across choke.
Read from cathode to negative side of filter choke.



ERLA
ELECTRICAL RESEARCH LABORATORIES, INC. CHICAGO

SCALE	DRAWN T.R.
CHECKED	APPR.

NOTE:
1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

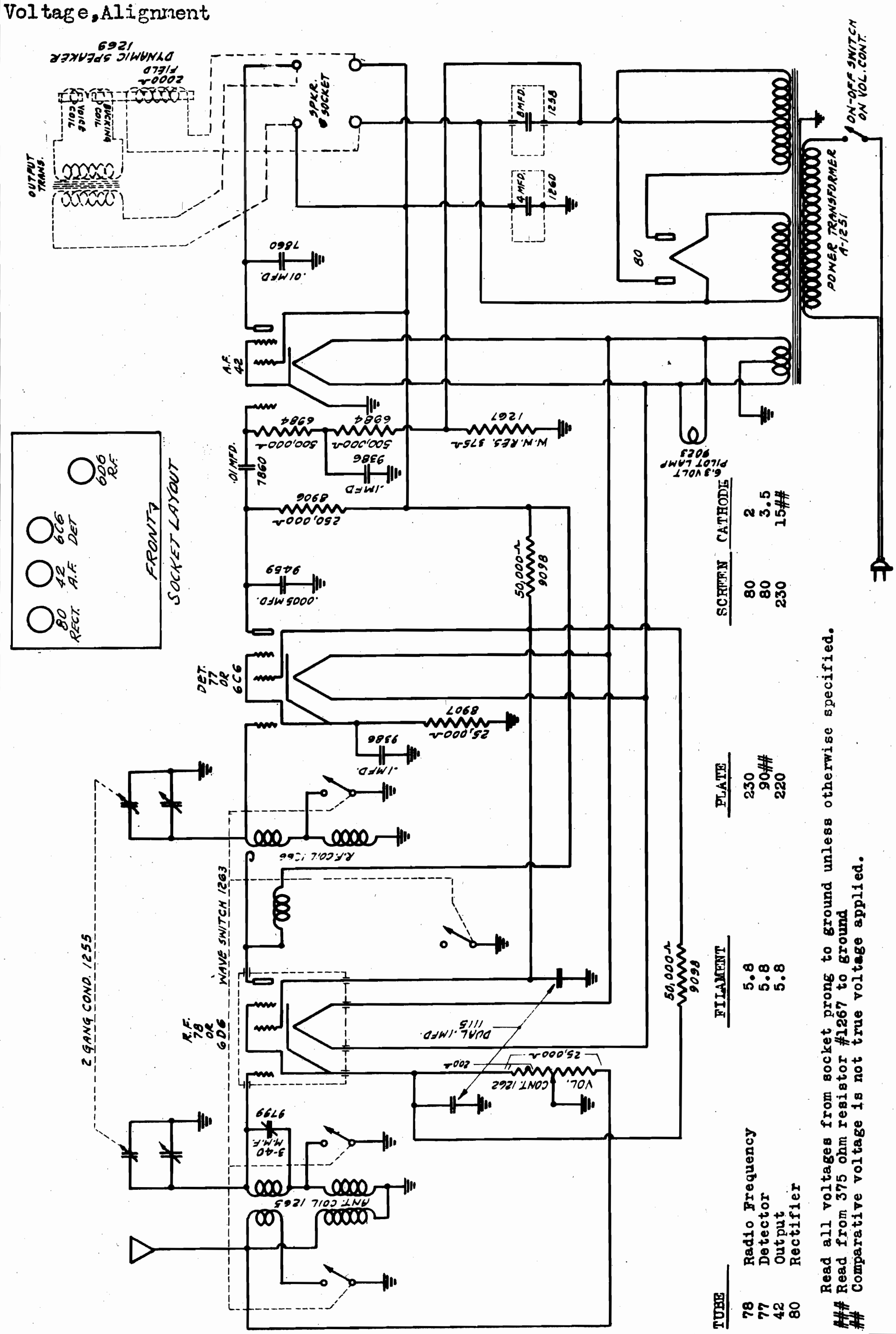
DO NOT SCALE THIS DRAWING WORK TO DIMENSIONS SHOWN

DIMENSION TOLERANCES	MATERIAL	
FRACTIONAL DIM. HAVE A TOL. OF ± .005"	USED ON MODEL 4100B	
DRILL HOLE SIZES HAVE A TOL. OF + .003" - .001"	FINISH	REQ'D.
REAMED HOLE SIZES HAVE A TOL. OF .000" + .0005"		
DECIMAL DIM. MUST HAVE LIMITS SHOWN, OR IF NOT SPECIFIED SIZES HAVE A TOL. OF ± .001 EXCEPT BETWEEN CENTERS AND THEN A TOL. OF ± .0005" IS ALLOWED		

2. Place the band selector switch for operation on the broadcast band, tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to 1400 kilocycles. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.

MODEL 4500
Schematic, Socket
Voltage, Alignment

SENTINEL RADIO CORP.



TUBE		FILAMENT	PLATE	SCREEN	CATHODE
78	Radio Frequency	5.8	230	80	2
77	Detector	5.8	90##	80	3.5
42	Output	5.8	220	230	15###
80	Rectifier				

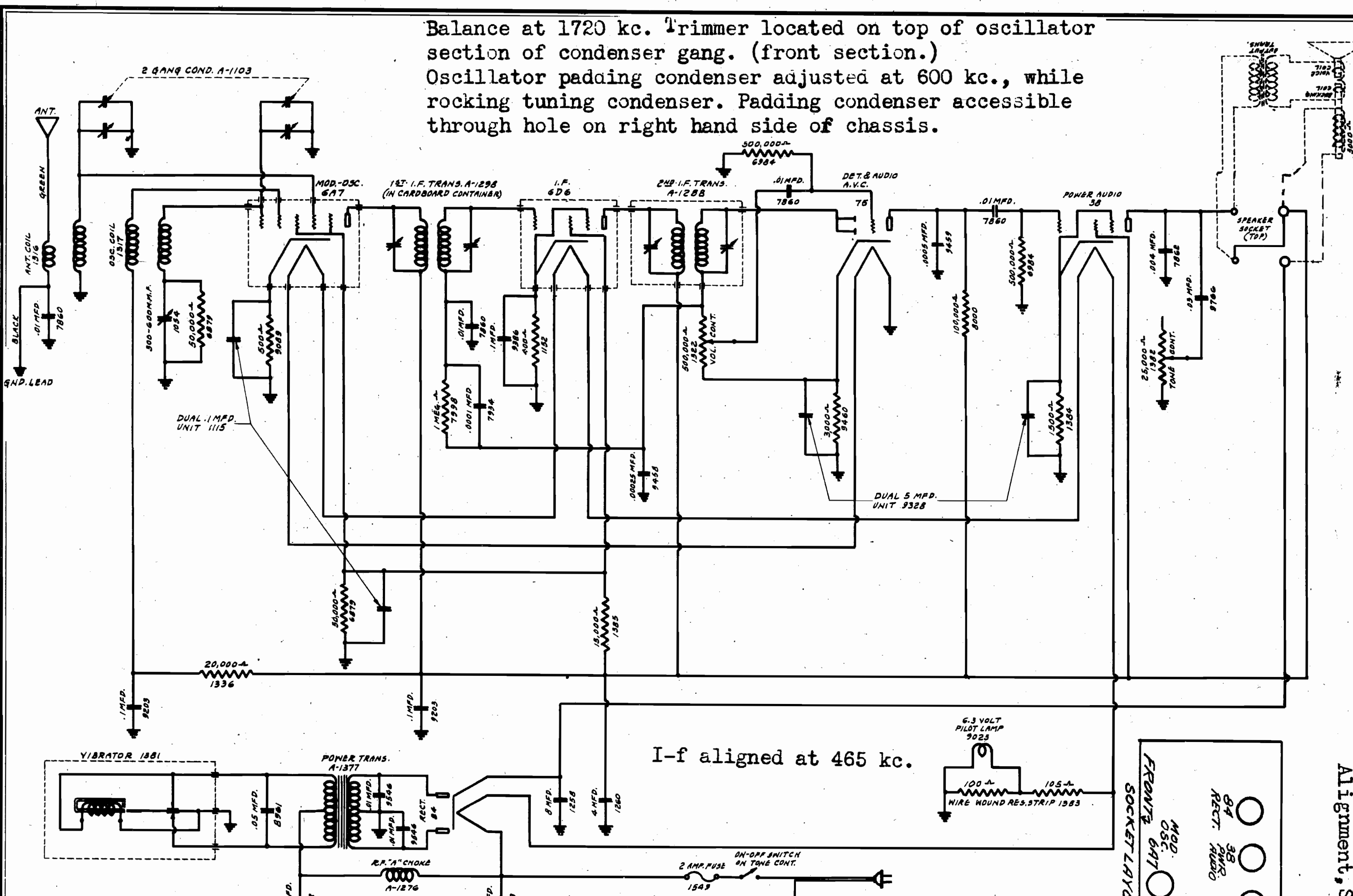
Read all voltages from socket prong to ground unless otherwise specified.
Read from 375 ohm resistor #1267 to ground
Comparative voltage is not true voltage applied.

Balance at 1400 kc. Trimmers on top of gang condenser
Short wave adjustment at 4 mc. Trimmer on top of coil on top of chassis

SENTINEL RADIO CORP.

MODEL 5600
Schematic, Voltage
Alignment, Socket

Balance at 1720 kc. Trimmer located on top of oscillator section of condenser gang. (front section.)
Oscillator padding condenser adjusted at 600 kc., while rocking tuning condenser. Padding condenser accessible through hole on right hand side of chassis.



I-f aligned at 465 kc.

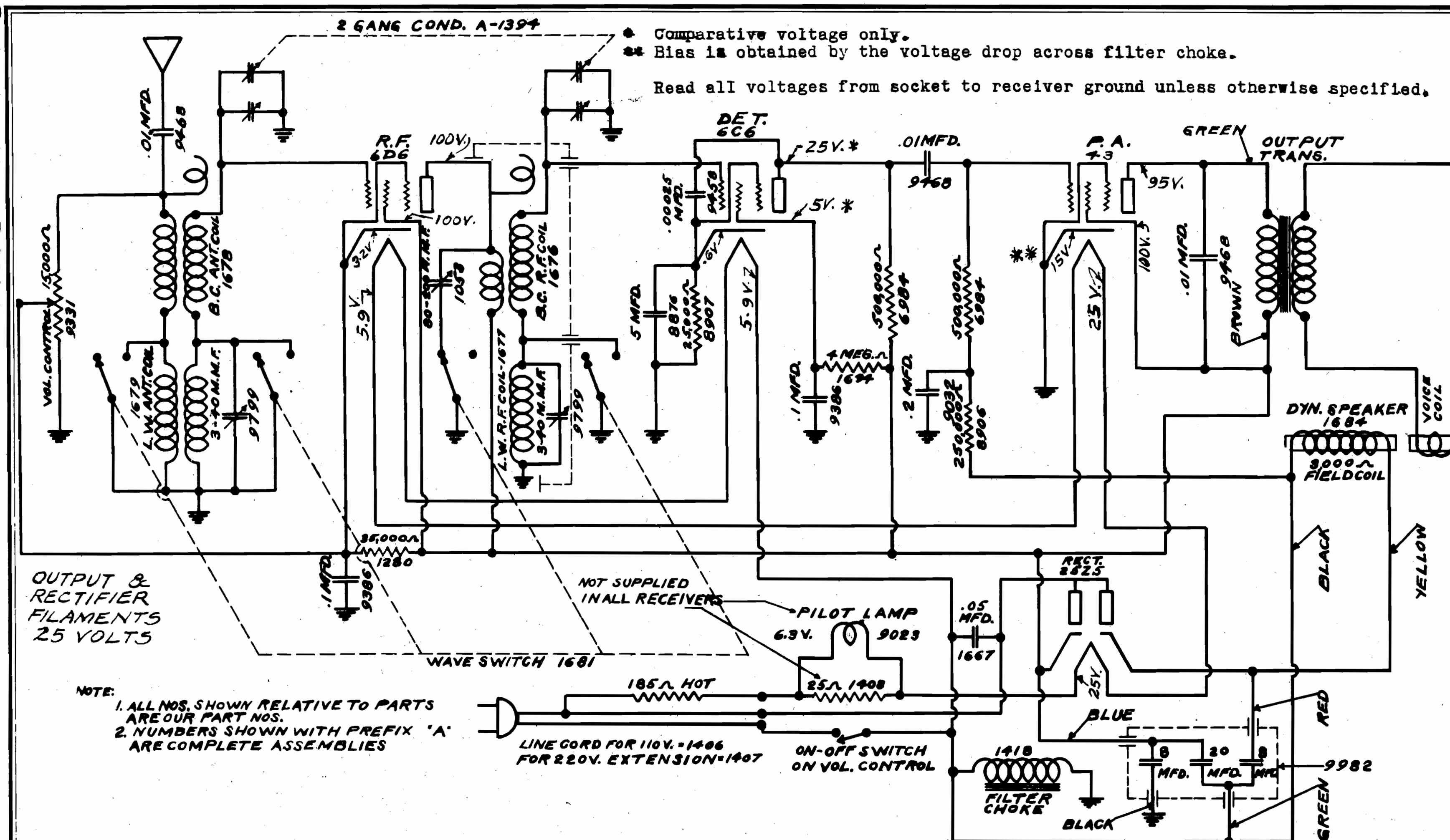
TUBE	FILAMENT	PLATE	SCREEN	GRID NO. 2	GRID NO. 3 & 5	CATHODE
6A7	6.4	195	93	123	93	4
6D6	6.4	195				3.5
75	6.4	110#				1.5
38	6.4	187	195			18.5
84	6.4	450 ea plate				300 D. C.

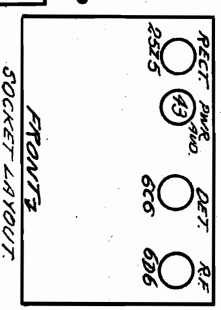
MODEL 4800
Schematic, Socket
Alignment, Voltage

SENTINEL RADIO CORP.

* Comparative voltage only.
** Bias is obtained by the voltage drop across filter choke.

Read all voltages from socket to receiver ground unless otherwise specified.





2. Place the band selector switch for operation on the 1500-540 kilocycle band, tune the receiver dial and set the test oscillator frequency to exactly 1400 kilocycles. Next adjust the two trimmer condensers located on top of the gang condenser for maximum 1400 kilocycle signal sensitivity.

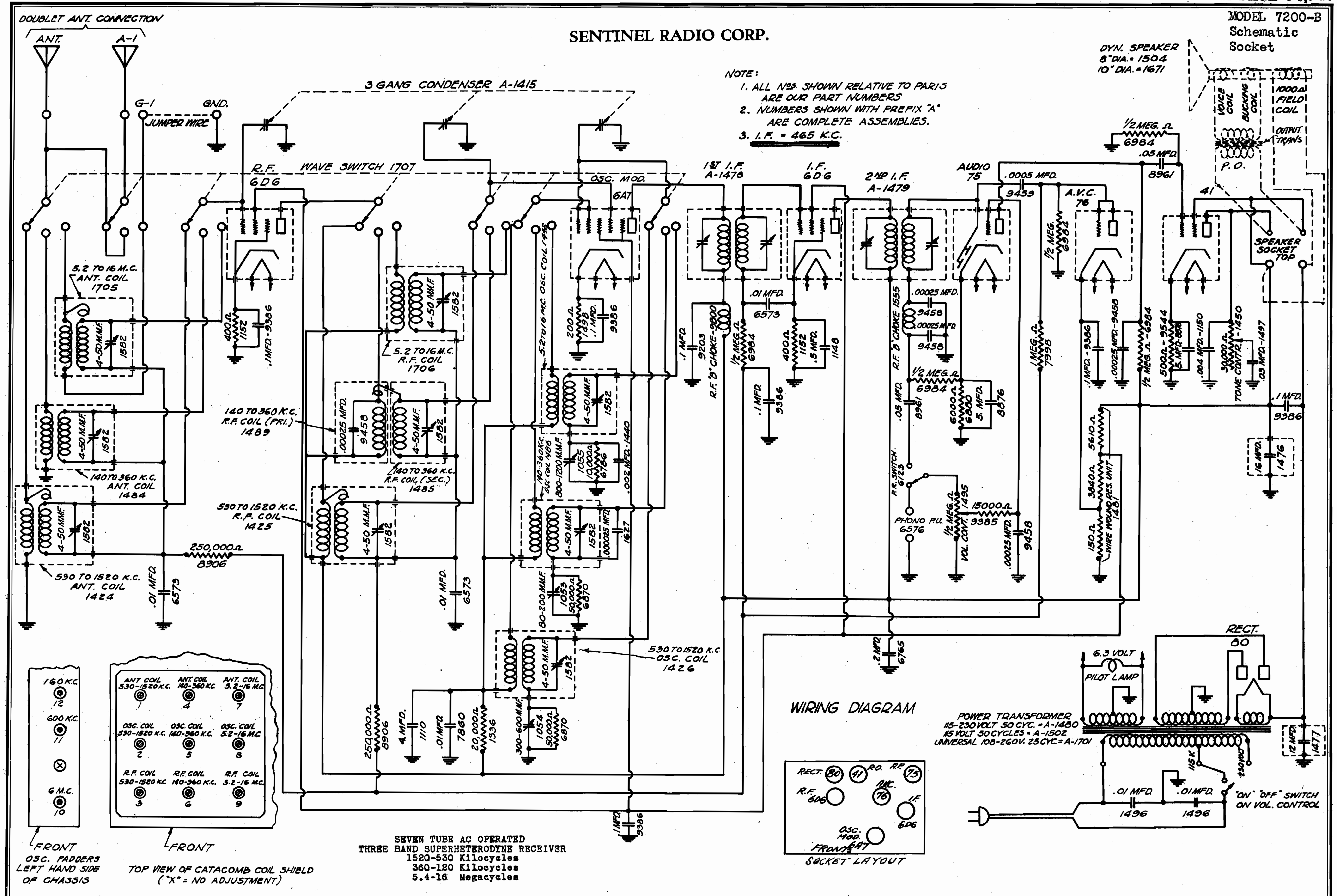
3. Adjust the band selector switch for operation on the 350-140 kilocycle band, set the receiver dial and the test oscillator frequency to EXACTLY 150 kilocycles. Then bring in the 150 kilocycle signal to maximum output by adjusting the trimmer condenser located on and accessible through the hole in the back of the chassis. If adjustment of this trimmer causes the receiver to oscillate always adjust to the point where oscillation does not occur.

4. Leave the band selector switch for operation on the same band (350-140 kilocycles) and set the receiver dial and the test oscillator frequency to 340 kilocycles. Bring in this 340 kilocycle signal to maximum output by adjusting the trimmer condenser located on the coil underneath the chassis.

5. With the band selector switch, the test oscillator frequency, and the receiver dial set at 340 kilocycles, adjust the trimmer condenser mounted on the coil located above the chassis underneath the metal shield for maximum sensitivity.

MODEL 7200-B
Schematic
Socket

SENTINEL RADIO CORP.



SEVEN TUBE AC OPERATED
THREE BAND SUPERHETERODYNE RECEIVER
1520-530 Kilocycles
360-120 Kilocycles
5.4-16 Megacycles

SENTINEL RADIO CORP.

MODEL 7200-B
Alignment
Voltage

INTERMEDIATE ALIGNMENT:

Set the test oscillator frequency to 465 kilocycles. (This must be accurate).

Align the first intermediate transformer by turning one of the trimmer screws up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

Adjust the other intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield, one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used, the procedure is the same.

TO ALIGN THE VARIABLE CONDENSER:

Adjustment of the trimmer condensers located inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left hand front corner of the receiver) and the padder condensers mounted on the left hand side of the chassis, will be referred to by numbers as indicated on the circuit diagram showing the relative location of these trimmers.

1. Connect the high output side of the test oscillator to the receiver antenna post and the ground to the ground post.

2. Place the band selector switch for operation on the 1520 to 535 kilocycle (broadcast) band. Tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to EXACTLY 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER MARKED NO. 2 ON CATACOMB DIAGRAM, after which adjust No. 1 and No. 3 trimmers in the order named for maximum sensitivity.

3. Leave the band selector switch for operation on the broadcast band (1520 to 535 kilocycles) and tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser No. 11, which is located on and accessible through the hole in the left hand side of the chassis, for maximum sensitivity. As this adjustment is quite critical, it is necessary to rock the variable condenser slightly to the right and to the left to find the point of greatest sensitivity.

4. Recheck the alignment at 1400 kilocycles as the 600 kilocycle adjustment may have changed the alignment at 1400 kilocycles.

5. Place the band selector switch for operation on the 360 to 120 kilocycle band and set the oscillator frequency and tune the receiver dial to EXACTLY 350 KILOCYCLES. THEN TUNE IN THIS 350 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING CATACOMB TRIMMER NO. 5, next adjust trimmers No. 4 and 6 for maximum sensitivity.

6. With the band selector switch in the same position, tune the receiver dial and set the oscillator frequency to approximately 150 kilocycles and then while rocking the variable condenser slightly to the right and left, adjust the 150 kilocycle trimmer No. 12 (located on the left hand side of the chassis) for maximum sensitivity.

7. Recheck 350 kilocycle adjustments.

8. Adjust the band selector switch for operation on the 5.4 to 16 megacycle band and tune the receiver dial and set the oscillator frequency to exactly 15 megacycles. When adjusting catacomb trimmer No. 8 two peaks (the fundamental and the image peak) will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 15 MEGACYCLES. First back off catacomb trimmer No. 8 to minimum capacity, next screw down the trimmer (add capacity) until the first peak which is the fundamental and the one you are to use is tuned in. If the trimmer is screwed down beyond the point where this first peak is received, the incorrect image peak will be tuned in. When the first peak has been located adjust catacomb trimmer No. 8 TO BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 15 megacycles and increase the output of the test oscillator and then tune the receiver dial to approximately 14 megacycles. Vary the receiver dial slightly to the right and left of 14 megacycles and if the fundamental peak was used in aligning at 15 megacycles the test oscillator signal will be heard at approximately 14 megacycles on the set dial. If it is not possible to receive the signal then the fundamental peak was not used and the 15 megacycle adjustment of trimmer No. 8 must be gone over and properly adjusted. After correctly completing catacomb trimmer No. 8 adjustment adjust catacomb trimmers No. 7 and 9 for maximum sensitivity.

9. Leave the band selector switch for operation on 5.4 to 16 megacycle band, set the oscillator frequency and tune the receiver dial to approximately 6 megacycles. While rocking the variable condenser slightly to the right and left, adjust the 6 megacycle trimmer No. 10 (located on the left hand side of the chassis) for maximum sensitivity.

10. Recheck 15 megacycle adjustments

This completes the alignment and it is recommended that all of the adjustments be gone over again. Generally it will be found that improved results can be obtained if this is done. Assuming that all tubes and component parts of the set are okeh, extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent, proceed to realign, starting at the IF alignment and carefully follow each step in the order given.

VOLTAGE TABLE

Line Voltage : 115 volt 60 cycle
Volume Control : Full on
Wave Band : Broadcast

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID NO. 3 & 5
6A7	Oscillator & 1st Detector	6.2	250	94	2.5	4.5	175	94
6D6	Radio Frequency	6.2	250	94	3.4			
6D6	Intermediate Frequency	6.2	250	94	3.2			
75	2nd Detector & 1st Audio	6.2	70*		1.2			
76	Automatic Volume Control	6.2			3.4			
41	Output	6.2	250	94	15			
80	Rectifier	4.9		80 M. A. Total Drain				

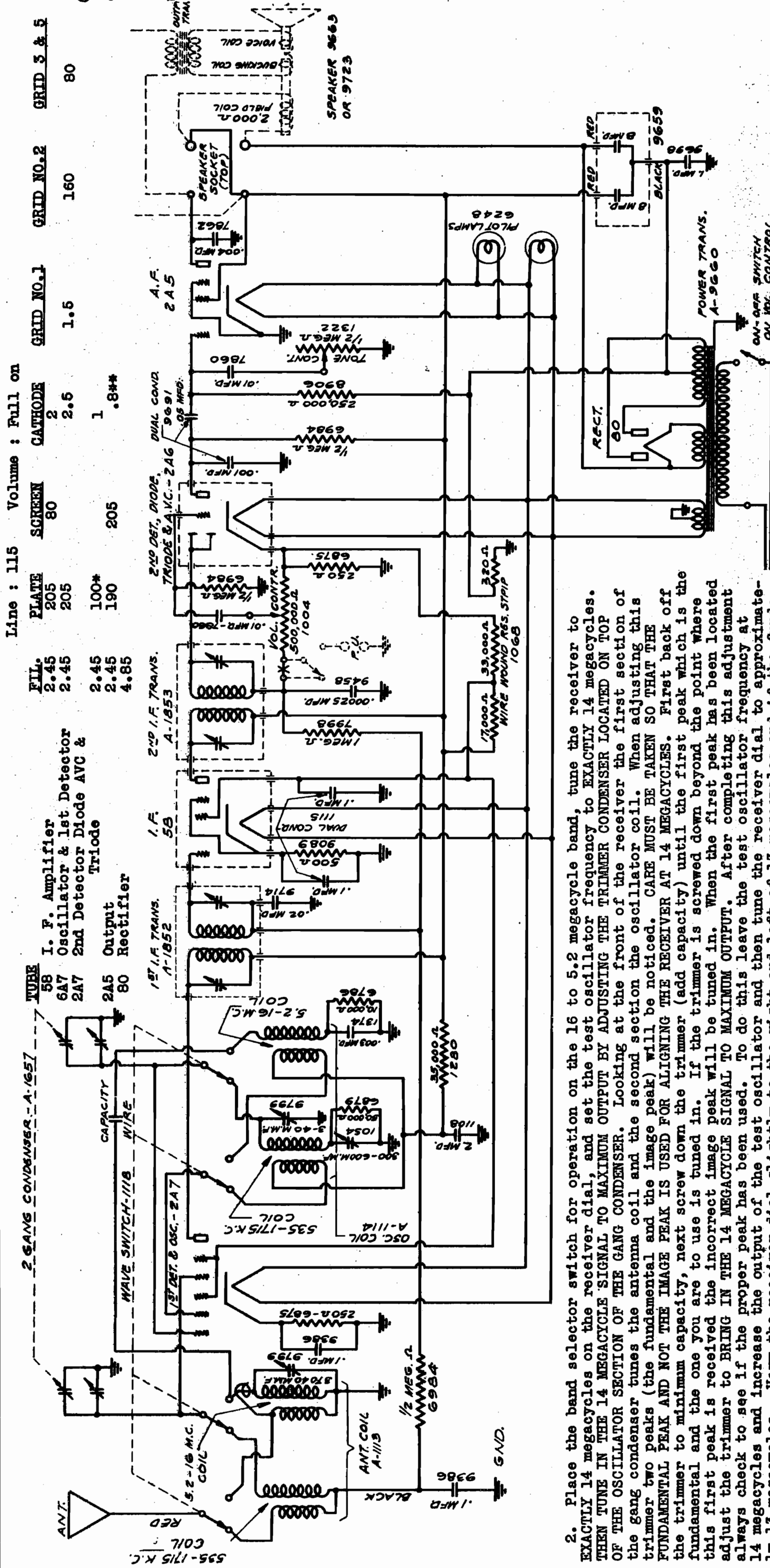
* Triode Plate
Read all voltages from socket to chassis with 1000 ohm per volt voltmeter.

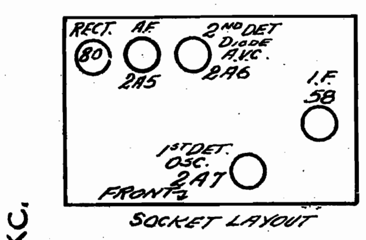
MODEL 5700-B
Schematic, Socket
Voltage, Alignment

SENTINEL RADIO CORP.

Line : 115 Volume : Full on

TUBE		FIL.	PLATE	SCREEN	CATHODE	GRID NO.1	GRID NO.2	GRID 3 & 5
58	I. F. Amplifier	2.45	205	80	2			
6A7	Oscillator & 1st Detector	2.45	205		2.5	1.5	160	80
2A7	2nd Detector Diode AVC & Triode	2.45	100*		1			
2A5	Output	2.45	190	205	.8**			
80	Rectifier	4.85						





I.F. PEAK 465 KC.

* Triode Plate
** From grid to chassis

2. Place the band selector switch for operation on the 16 to 5.2 megacycle band, tune the receiver to EXACTLY 14 megacycles on the receiver dial, and set the test oscillator frequency to EXACTLY 14 megacycles. THEN TUNE IN THE 14 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSER LOCATED ON TOP OF THE OSCILLATOR SECTION OF THE GANG CONDENSER. Looking at the front of the receiver the first section of the gang condenser tunes the antenna coil and the second section the oscillator coil. When adjusting this trimmer two peaks (the fundamental and the image peak) will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 14 MEGACYCLES. First back off the trimmer to minimum capacity, next screw down the trimmer (add capacity) until the first peak which is the fundamental and the one you are to use is tuned in. If the trimmer is screwed down beyond the point where this first peak is received the incorrect image peak will be tuned in. When the first peak has been located adjust the trimmer to BRING IN THE 14 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 14 megacycles and increase the output of the test oscillator and then tune the receiver dial to approximately 13 megacycles. Vary the receiver dial slightly to the right and left of 13 megacycles and if the fundamental peak was used in aligning at 14 megacycles the test oscillator signal will be heard at approximately 13 megacycles on the set dial. If it is not possible to receive the signal then the fundamental peak was not used and the 14 megacycle adjustment of the trimmer must be gone over and properly adjusted.

3. Place the band selector switch for operation on the 1715 to 535 kilocycle band, set the oscillator to EXACTLY 1400 kilocycles and tune the receiver dial to EXACTLY 1400 kilocycles. BRING IN THIS 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE SMALL TRIMMER CONDENSER which is located underneath near the center and towards the front of the chassis.

4. Next adjust the trimmer condenser on top of the antenna section of the gang condenser (front section) for maximum 1400 kilocycle signal output.

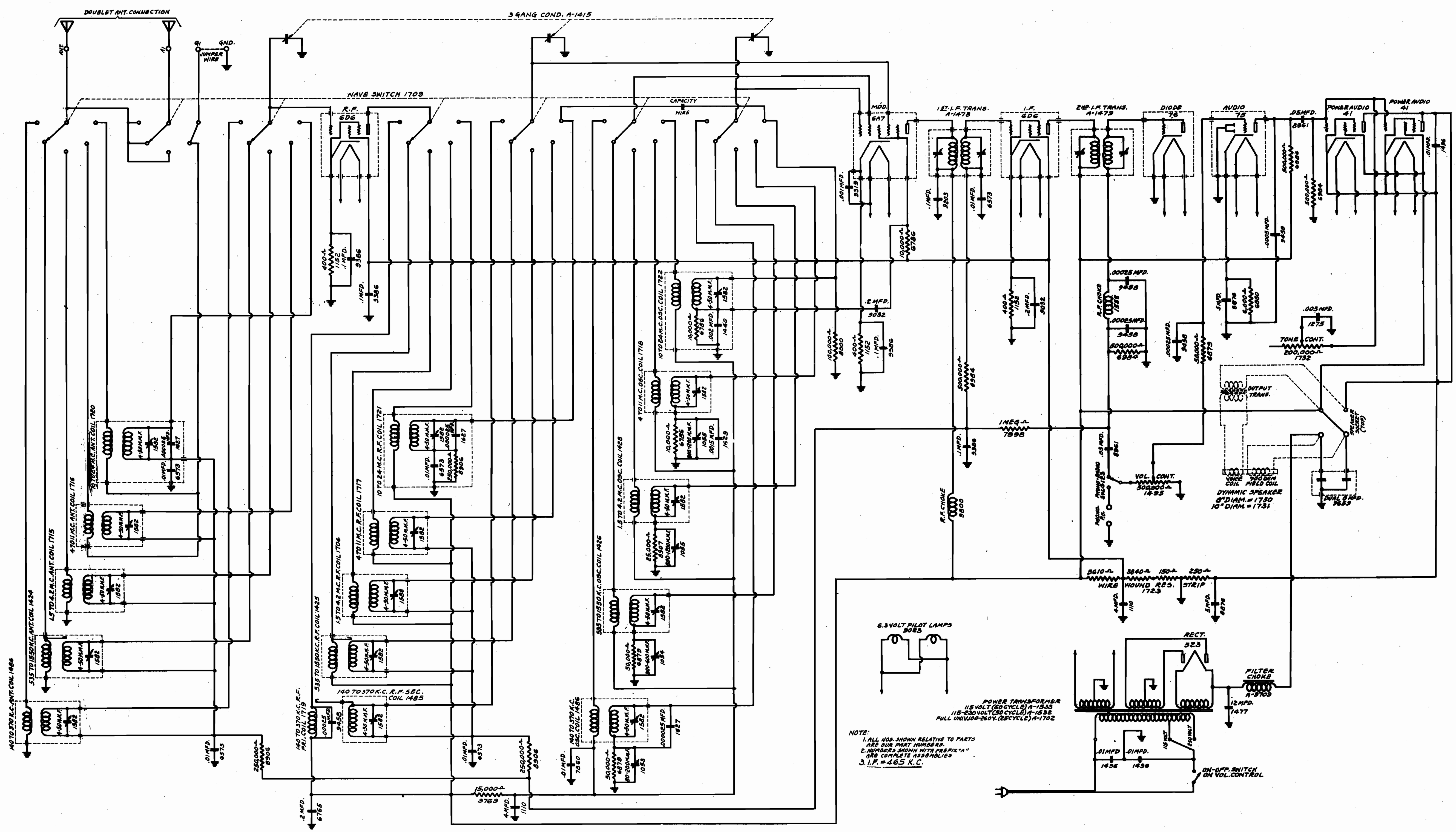
5. Leave the band selector switch for operation on the 1715 to 535 kilocycle band, set the test oscillator frequency to approximately 600 kilocycles, and adjust the receiver dial to approximately 600 kilocycles. Then while rocking the variable condenser slightly to the right and left adjust the 600 kilocycle padding condenser, which is located below the speaker and accessible through the hole in the front of the chassis for maximum output.

6. Recheck the 1400 kilocycle adjustment.

7. Place the band selector switch for operation on the 16 to 5.2 megacycle band, tune the receiver dial and set the oscillator frequency to EXACTLY 14 megacycles. Then adjust the trimmer condenser, which is located underneath and near the center of the right hand side of the chassis for maximum 14 megacycle signal output.

MODEL 8200-B
Schematic

SENTINEL RADIO CORP.



MODEL 8200-B
Alignment

SENTINEL RADIO CORP.

SERVICE NOTES
for the
FIVE BAND
EIGHT TUBE ALL WAVE AC SUPERHETERODYNE RECEIVER

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or RF coils has been replaced, and then only the frequency band in which that coil is used will require realignment. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have definitely proven not to be the cause. If an IF tube is replaced it is advisable to realign the IF amplifier, particularly if the replacement tube is one of a different manufacture than the one in the receiver. IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 6A7 oscillator & modulator tube. Leave the grid cap disconnected and connect a 1 meg ohm resistor from the modulator grid to the chassis base.

2. Set the test oscillator frequency to 465 kilocycles. (This must be accurate).

3. Align the first intermediate transformer by turning one of the trimmer screws accessible through the holes in the top of the coil shield up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the other intermediate transformer in the same manner.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the gang condensers, padder condensers, and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The trimmer and padder condensers will be referred to by number as indicated on the diagram which shows their relative locations on the chassis.

1. Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the set antenna post, and the ground to the set ground.

2. Place the band selector switch for operation on the 10 to 24 megacycle band, tune the receiver dial to EXACTLY 22 MEGACYCLES AND SET THE TEST OSCILLATOR FREQUENCY TO EXACTLY 22 MEGACYCLES. THEN TUNE IN THE 22 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 14. Next rock the gang condenser slightly to the right and left and adj st trimmers No. 13 and 15 for maximum 22 megacycle signal sensitivity. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 22 MEGACYCLES. When adjusting trimmer No. 14 always back off the trimmer to minimum capacity and then screw down the trimmer (add capacity) until the first peak, which is the fundamental and the one you are to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of trimmers No. 14, 13, and 15 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 22 megacycles, increase the output of the test oscillator, and tune the receiver dial to approximately 21 megacycles. Vary the receiver dial slightly to the right and left of 21 megacycles and if the fundamental peak was used in aligning at 22 megacycles the test oscillator signal will be heard at approximately 21 megacycles on the receiver dial. If it is not possible to receive the signal at approximately 21 megacycles, then the fundamental peak was not used and the 22 megacycle adjustment of trimmers No. 13, 14, and 15 must be gone over and properly adjusted.

3. Place the band selector switch for operation on the 4 to 11 megacycle band and set the receiver dial and the test oscillator frequency to EXACTLY 9.5 MEGACYCLES. When adjusting trimmer No. 10 the fundamental and the image peak will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 9.5 MEGACYCLES. First back off trimmer No. 10 to minimum capacity then screw down the trimmer (add capacity) until the first peak, which is the fundamental and the proper one to use is tuned in. When the first peak has been located adjust trimmer No. 10 TO BRING IN THE 9.5 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. Next adjust trimmers No. 9 and 11 for maximum 9.5 megacycle sensitivity. After completing adjustment of trimmers No. 10, 11 and 9 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 9.5 megacycles and increase the test oscillator output. Vary the receiver dial slightly to the right and left of 8.5 megacycles and if the fundamental peak of trimmer No. 10 was used in aligning at 9.5 megacycles the test oscillator signal will be heard at approximately 8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 9.5 megacycle adjustment of trimmers No. 9, 10, and 11 must be gone over and properly adjusted.

4. Leave the band selector switch for operation on the 4 to 11 megacycle band and tune the receiver and set the test oscillator frequency to approximately 4.6 megacycles. Then while rocking the gang condenser slightly to the right and left adjust padder condenser No. 12 for maximum sensitivity.

5. Place the band selector switch for operation on the 1.5 to 4.2 megacycle band and tune the receiver dial and set the test oscillator frequency to EXACTLY 3.8 MEGACYCLES. THEN BRING IN THE 3.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 6, after which adjust trimmers No. 5 and 7 for maximum 3.8 megacycle signal sensitivity.

6. With the band selector switch in the same position (1.5 to 4.2 megacycle band) tune the receiver dial and set the test oscillator frequency to approximately 1.6 megacycles. Then while rocking the gang condenser slightly to the right and left, adjust padder condenser No. 8 for maximum 1.6 megacycle signal sensitivity.

7. Adjust the band selector switch for operation on the 1550 to 535 kilocycle band, tune the receiver dial and set the test oscillator frequency to EXACTLY 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 2, after which adjust trimmers No. 1 and 3 for maximum sensitivity

8. With the band selector switch set for operation on the 1550 to 535 kilocycle band tune the receiver dial and set the test oscillator frequency to approximately 600 kilocycles. Next while rocking the gang condenser slightly to the right and left adjust padder condenser No. 4 for maximum 600 kilocycle signal response.

9. Place the band selector switch for operation on the 140 to 370 kilocycle band, tune the receiver dial and set the test oscillator frequency to EXACTLY 340 KILOCYCLES. BRING IN THE 340 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING TRIMMER NO. 17, after which adjust trimmers No. 16 and 18 for maximum sensitivity.

10. With the band selector switch set for operation on the 140 to 370 kilocycle band tune the receiver dial and set the test oscillator frequency to approximately 160 kilocycles. While rocking the gang condenser slightly to the right and left adjust trimmer No. 19 for maximum 160 kilocycle signal response.

Alignment of all bands will rarely be necessary. If a coil on any one of the bands should become defective and replacement is necessary, then only the band in which the coil was replaced will require realignment. Wherever complete realignment has been made it is recommended that all of the adjustments be gone over again. Generally it will be found that improved results can be obtained if this is done. Assuming that all tubes and component parts of the set are okeh, then extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent proceed to realign and carefully follow each step in the order given.

MODEL 8200-B
Voltage, Parts
Trimmers

SENTINEL RADIO CORP.

TUBE		FILAMENT	PLATE	SCREEN	CATHODE	GRID NO. 2	GRID NO. 3 & 5
6A7	Oscillator & Modulator	6.1	225		2.6	65	85
6D6	Radio Frequency	6.1	225	85	2.8		
6D6	Intermediate Frequency	6.1	225	85	2.8		
76	Automatic Volume Control	6.1			3.2		
75	2nd Detector & Audio	6.1	55*		.8		
41	Output	6.1	220	225	15		
41	Output	6.1	220	225	15		
5Z3	Rectifier	4.8	Total Drain 118 M.A.				

VOLUME CONTROL - FULL ON

WAVE BAND - 535-1550 K.C.

LINE VOLTAGE - 115 VOLTS

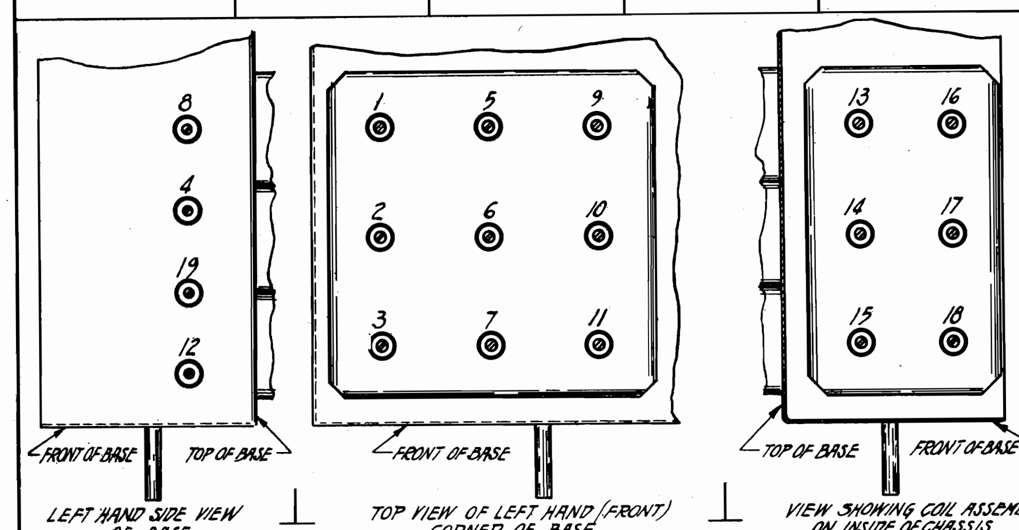
* Triode plate comparative voltage.
Read all voltages from socket to chassis with 1000 ohm per volt voltmeter.

PART NUMBER		LIST PRICE	PART NUMBER		LIST PRICE
1424	1550-535 K.C. Band Antenna Coil	$ .90	1055	Padding Condenser	$ .55
1425	1550-535 K.C. Band R. F. Coil	.95	1495	Volume Control & Off & On Switch	1.25
1426	1550-535 K.C. Band Oscillator Coil	.75	1732	Tone Control	.83
1715	1.5-4.2 M.C. Band Antenna Coil	1.00	9800	R. F. Choke	.22
1704	1.5-4.2 M.C. Band R. F. Coil	.95	1555	R. F. Choke	.70
1428	1.5-4.2 M.C. Band Oscillator Coil	.55	9458	.00025 Mfd. Moulded Condenser	.21
1716	4-11 M.C. Band Antenna Coil	1.00	9459	.0005 Mfd. Moulded Condenser	.21
1717	4-11 M.C. Band R. F. Coil	.95	9319	.001 Mfd. Moulded Condenser	.21
1718	4-11 M.C. Band Oscillator Coil	.95	1627	.000025 Mfd. Moulded Condenser	.21
1720	10-24 M.C. Band Antenna Coil	1.00	1628	.002 Mfd. Moulded Condenser	.21
1721	10-24 M.C. Band R. F. Coil	1.10	1629	.001 Mfd. Moulded Condenser	.21
1722	10-24 M.C. Band Oscillator Coil	.95	6765	.2 Mfd. 400 Volt Condenser	.26
1484	140-370 K.C. Band Antenna Coil	1.15	9203	.1 Mfd. 400 Volt Condenser	.20
1485	140-370 K.C. Band R. F. Coil	.90	8961	.05 Mfd. 400 Volt Condenser	.18
1719	140-370 K.C. Band R.F. (Pri.) Coil	.95	9386	.1 Mfd. 200 Volt Condenser	.19
1486	140-370 K.C. Band Oscillator Coil	.90	9032	.2 Mfd. 200 Volt Condenser	.23
1478	First I. F. Transformer	2.10	6573	.01 Mfd. 200 Volt Condenser	.17
1479	Second I. F. Transformer	2.10	1496	.01 Mfd. 600 Volt Condenser	.18
1415	Three Gang Condenser	4.40	1275	.005 Mfd. 400 Volt Condenser	.18
1709	Wave Switch	2.85	7860	.01 Mfd. 400 Volt Condenser	.17
9659	Dual 8 Mfd. Dry Electrolytic Condenser	2.80	1723	Vitreous Enameled Resistor	1.70
1477	12 Mfd. Wet Electrolytic Condenser	1.25	8906	250,000 Ohm 1/3 Watt Resistor	.19
1110	4 Mfd. Dry Electrolytic Condenser	1.14	6879	50,000 Ohm 1/3 Watt Resistor	.19
8876	5 Mfd. Dry Electrolytic Condenser	.85	8907	25,000 Ohm 1/3 Watt Resistor	.19
1532	115 Tapped 230 Volts 50-60 Cycle		6786	10,000 Ohm 1/3 Watt Resistor	.19
	Power Transformer	6.25	9769	15,000 Ohm 1/3 Watt Resistor	.19
1533	115 Volt 50-60 Cycle Power Transformer	5.75	8000	100,000 Ohm 1/3 Watt Resistor	.19
1702	Full Universal Power Transformer	9.50	7998	1 Meg Ohm 1/3 Watt Resistor	.19
9709	Choke	1.60	6984	500,000 Ohm 1/3 Watt Resistor	.19
1420	Antenna and Ground Terminal Post Strip	.28	6880	6,000 Ohm 1/3 Watt Resistor	.19
6576	Phono Jacks	.14	1152	400 Ohm 1/3 Watt Resistor	.19
6123	Phono-Radio Switch	.55	6786	10,000 Ohm 1/3 Watt Resistor	.19
1514	Tuning Dial complete with Glass	2.75	1730	8" Dynamic Speaker	9.50
	Glass for above dial	.35	1731	10" Dynamic Speaker	11.00
1505	Two Speed Planetary Drive	1.10	1567	Large Bottom Section Tuning Knob	.30
9023	6.3 Volt .15 Ampere Pilot Light	.19	1568	Small Top Section Tuning Knob	.25
1582	Trimmer Condenser	.21	1571	Tone Control Knob	.25
1054	Padding Condenser	.55	1570	Band Selector Switch Knob	.30
1053	Padding Condenser	.50	1569	Volume Control Knob	.25

Prices are subject to change without notice.

Part No. 8200-B

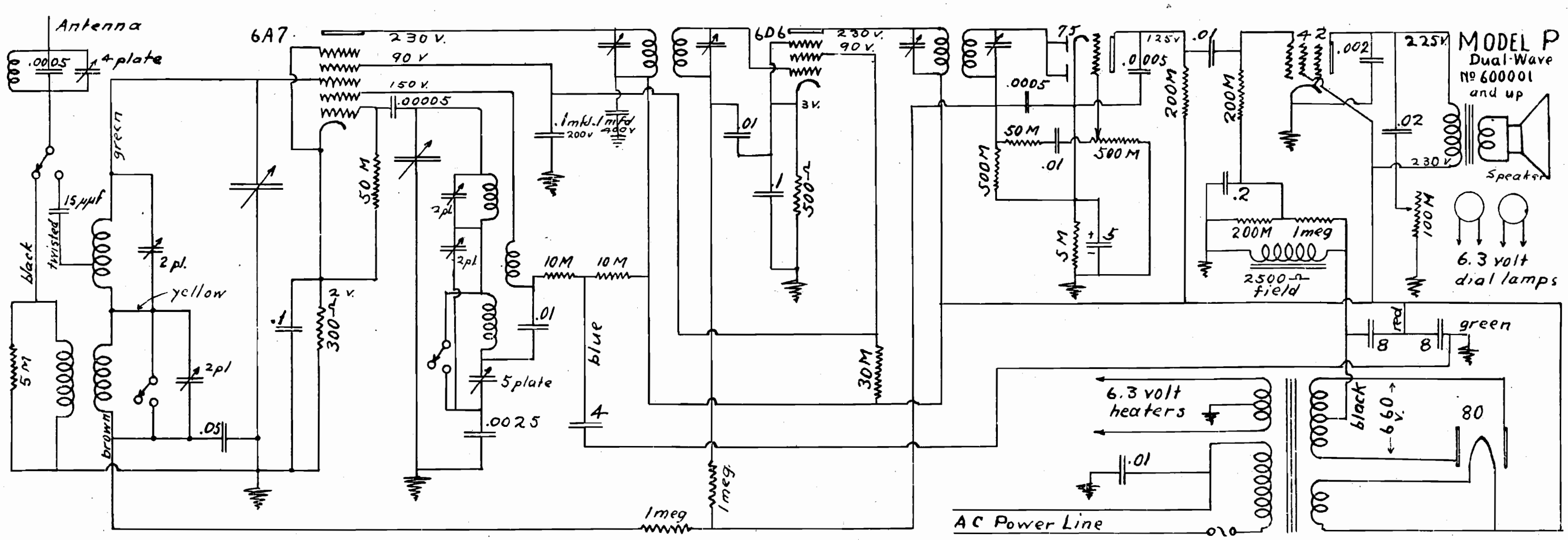
535-1550 K.C. BAND	1.5-4.2 M.C. BAND	4.0-11 M.C. BAND	10-24 M.C. BAND	140-370 K.C. BAND
1 = ANT. TRIMMER	5 = ANT. TRIMMER	9 = ANT. TRIMMER	13 = ANT. TRIMMER	16 = ANT. TRIMMER
2 = OSC. " "	6 = OSC. " "	10 = OSC. " "	14 = OSC. " "	17 = OSC. " "
3 = R.F. " "	7 = R.F. " "	11 = R.F. " "	15 = R.F. " "	18 = R.F. " "
4 = 600 K.C. OSC. PADDER	8 = 1.6 M.C. OSC. PADDER	12 = 4.6 M.C. OSC. PADDER		19 = 160 K.C. OSC. PADDER



VIEWS SHOWING ARRANGEMENT & LOCATION OF TRIMMERS & PADDERS.

MODEL P Dual Band
Above Serial 600001
Schematic, Voltage
Alignment

SIMPLEX RADIO CO.



IF PEAK 456 KC

OPERATING INSTRUCTIONS — MODEL P DUAL-BAND — Foreign and Domestic

CAUTION—Do not attempt to operate on current other than that noted on the instrument.

INSTALLATION—A good aerial, 25 to 50 feet long, well away from surrounding metal structures and power lines, is essential for best results. Power noise interferes especially with short-wave reception. If the set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. A good ground connection (water pipe or equivalent) will also contribute to quieter reception.

CONTROL KNOBS—The left hand knob is, initially, the power switch, and thereafter, tone control. The second knob from the left is band selector switch. The third knob from the left is tuning control. The right hand knob is volume control.

SERVICE NOTES—If the radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have the tubes checked. (2) Remove the chassis from the cabinet and check for loose connections. (3) Have a competent "Radio Service Man" check over entirely. Do not return unless you have made the above tests. This set left the factory carefully inspected.

The intermediate stages are carefully phased to 456 KC at the factory. Should rephasing be necessary, attach the output lead from a 456 KC test oscillator to the grid cap of he 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two tall cans to loudest volume. If an output meter is available it should be used across the two black leads at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 MC should be used to rephase the R. F. The test oscillator output is attached to the aerial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the large (oscillator) coil looking at the under side of the set, and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the oscillator trimmer connected between the end of the oscillator coil and the porcelain base trimmer. Next trim the Broadcast R. F. by the trimmer connecting to the band switch. The broadcast band is next trimmed at the 550 KC end of the dial by adjusting the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.

NOTE—Should it be necessary to write to the factory for parts or information, always give the serial number of the set as stamped on the back of the chassis.

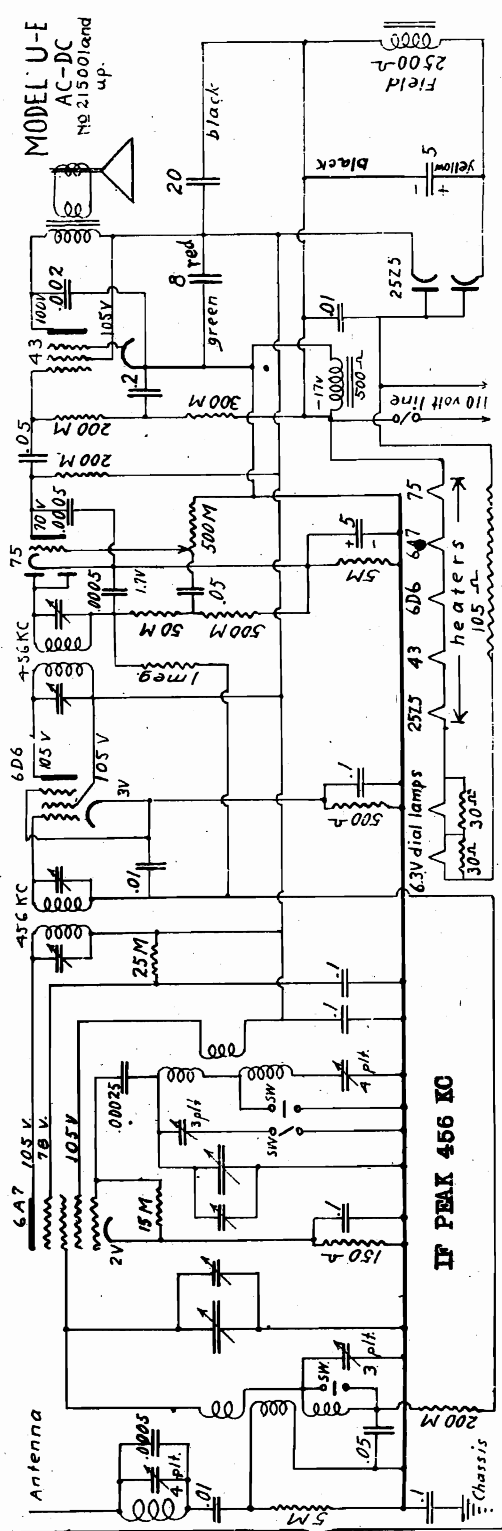
PHONOGRAPH—Install a sigle pole double-throw toggle switch near the 75 tube, disconnect the .01 mfd. condenser from the volume control and connect to one side of switch, connect the volume control to center terminal of the switch, connect one side of the phonograph pickup to remaining side of the switch and the other side of the pickup to "B" minus.

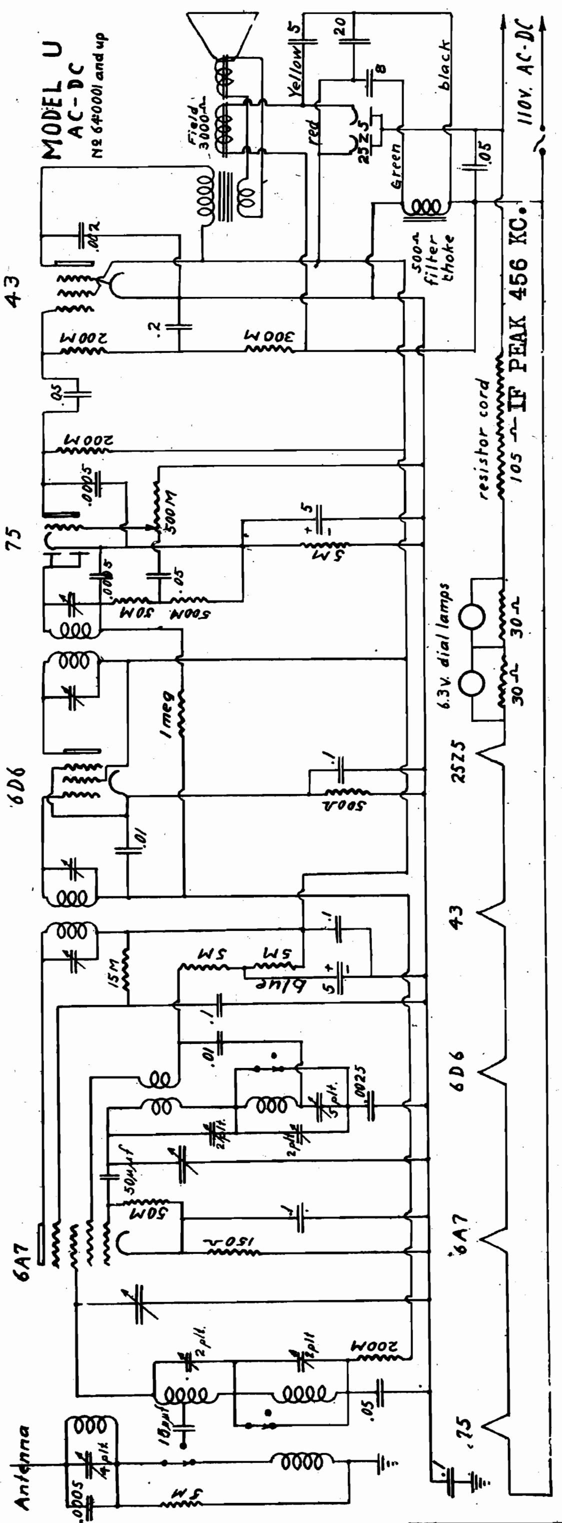
MODEL U AC-DC
Above Serial 640001
MODEL U-E, AC-DC
Above Serial 215001

SIMPLEX RADIO CO.

Schematics, Voltage Alignment

To rebalance set, remove from cabinet. Intermediates are first balanced by feeding a 456 KC signal into grid of 6A7 tube and adjusting trimmers in top of the two tall cans to greatest volume. Adjust wave trap in rear flange of chassis by turning the trimmer screw until a 456 KC signal applied to the antenna lead cannot be heard. Next, set band switch to broadcast position (counter-clock), turn tuning knob to 1400 KC, feed a 1400 KC signal into antenna lead and adjust trimmers on tuning condenser to greatest volume. Next, set band switch to long-wave (clockwise), turn tuning knob to 350 KC, feed a 350 KC signal into the antenna lead and adjust the two 3-plate trimmers on the under side of the panel to greatest volume. Turn tuning knob to 150 KC, set test oscillator to this frequency and adjust the 4-plate section of dual trimmer to maximum volume. Repeat the operations at 350 KC and 150 KC until trimming at one frequency does not affect the other.





PHONOGRAPH—Install a single pole double-throw toggle switch in rear of chassis nearest the 75 tube. Disconnect the .01 mfd. condenser from volume control and attach to one side of toggle switch, connect middle terminal of switch to terminal of volume control just disconnected, connect one side of phonograph pickup to remaining terminal of switch and other side to "B" minus.

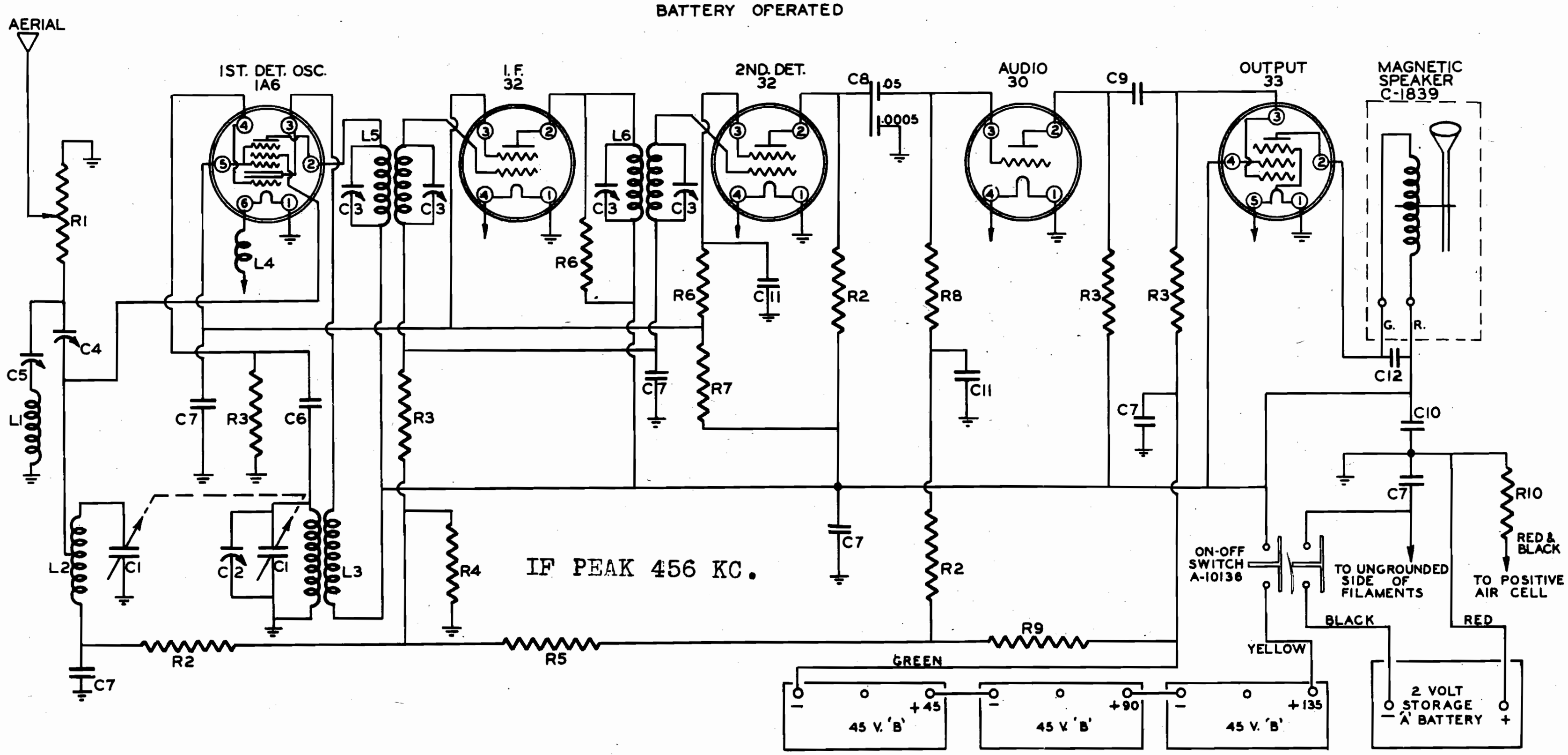
Short-wave oscillator trimmer attaches between the two ends of the oscillator coil located at the right. Broadcast oscillator trimmer is the lower section of the dual trimmer at the end of the chassis. Short-wave R. F. trimmer is at the lower end of the oscillator coil and the broadcast R. F. trimmer is to the left of this same coil.

MODEL 58
Schematic
Parts List

SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON MODEL 58 SUPERHETERODYNE
COUNTRY HOME RECEIVER

BATTERY OPERATED



C1	VARIABLE CONDENSER		B-5650-1
C2	ADJUSTABLE CONDENSER		
C3	I. F. TRANSFORMER TRIMMERS		
C4	ANTENNA TRIMMER		A-7809-2
C5	EQUALIZING TRIMMER		A-7809-3
C6	.00025 MFD. MOLDED		A-5175
C7	.2 MFD.	200 V.	A-6869-A
C8	.05-.0005 MFD.	200 V.	A-9576
C9	.025 MFD.	200 V.	A-10206
C10	2 MFD.	150 V.	A-10318
C11	.05 MFD.	200 V.	A-9919
C12	.006 MFD.	600 V.	A-4434

R1	25,000 Ω	VOLUME CONTROL		A-10316
R2	250,000 Ω	.25 W.		B-5737-1
R3	50,000 Ω	.25 W.		B-5737-4
R4	200 Ω	WIREWOUND		B-5243-2
R5	100 Ω	WIREWOUND		B-5243-14
R6	500,000 Ω	.25 W.		B-5737-5
R7	25,000 Ω	.5 W.		B-4114-18
R8	100,000 Ω	.25 W.		B-5737-2
R9	750 Ω	WIREWOUND		B-5243-8
R10	.47 Ω	WIREWOUND		A-10000-3

L1	ANT. CHOKE COIL	A-9750
L2	NO. 1 R.F. COIL	A-11564
L3	OSCILLATOR COIL	A-10330
L4	CATHODE CHOKE	A-10401
L5	NO. 1 I.F. TRANSFORMER	A-10229-4
L6	NO. 2 I.F. TRANSFORMER	A-10356-1

MODEL 58
Voltage, Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE OCTOBER 3, 1934

Sparton Model 58 Country Home Superheterodyne

(Battery Operated)

Schematic Drawing and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

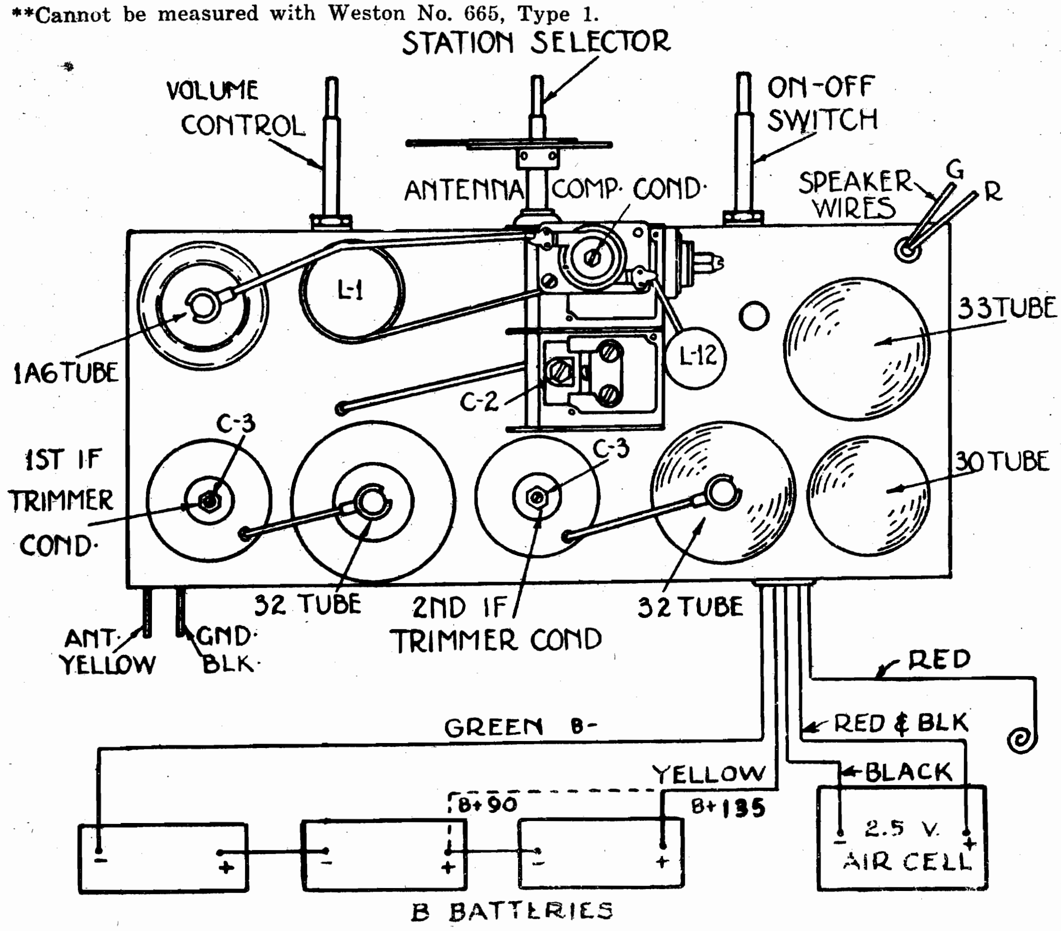
Condition of "A" Battery—Good
Condition of "B" Batteries—Good

Position of Volume Control—Full with Antenna Disconnected

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
1A6	1st Detector-Oscillator	Volts	2.	115	115	*	50	0	1
		Ohms	0	*	*	65,000	*	0	300,000
32	I-F Amplifier	Volts	2.	120	40	0	—		.6
		Ohms	0	*	*	0	—		500,000
32	2d Detector-A.V.C.	Volts	2.	25	20	0	—		**
		Ohms	0	*	*	0	—		500,000
30	1st A. F. Amplifier	Volts	2.	50	1	0	—		—
		Ohms	0	*	600,000	0	—		—
33	Power Amplifier	Volts	2.	110	5	115	0		—
		Ohms	0	*	65,000	*	0		

NOTES: Voltage and resistance readings are for schematic diagram shown. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

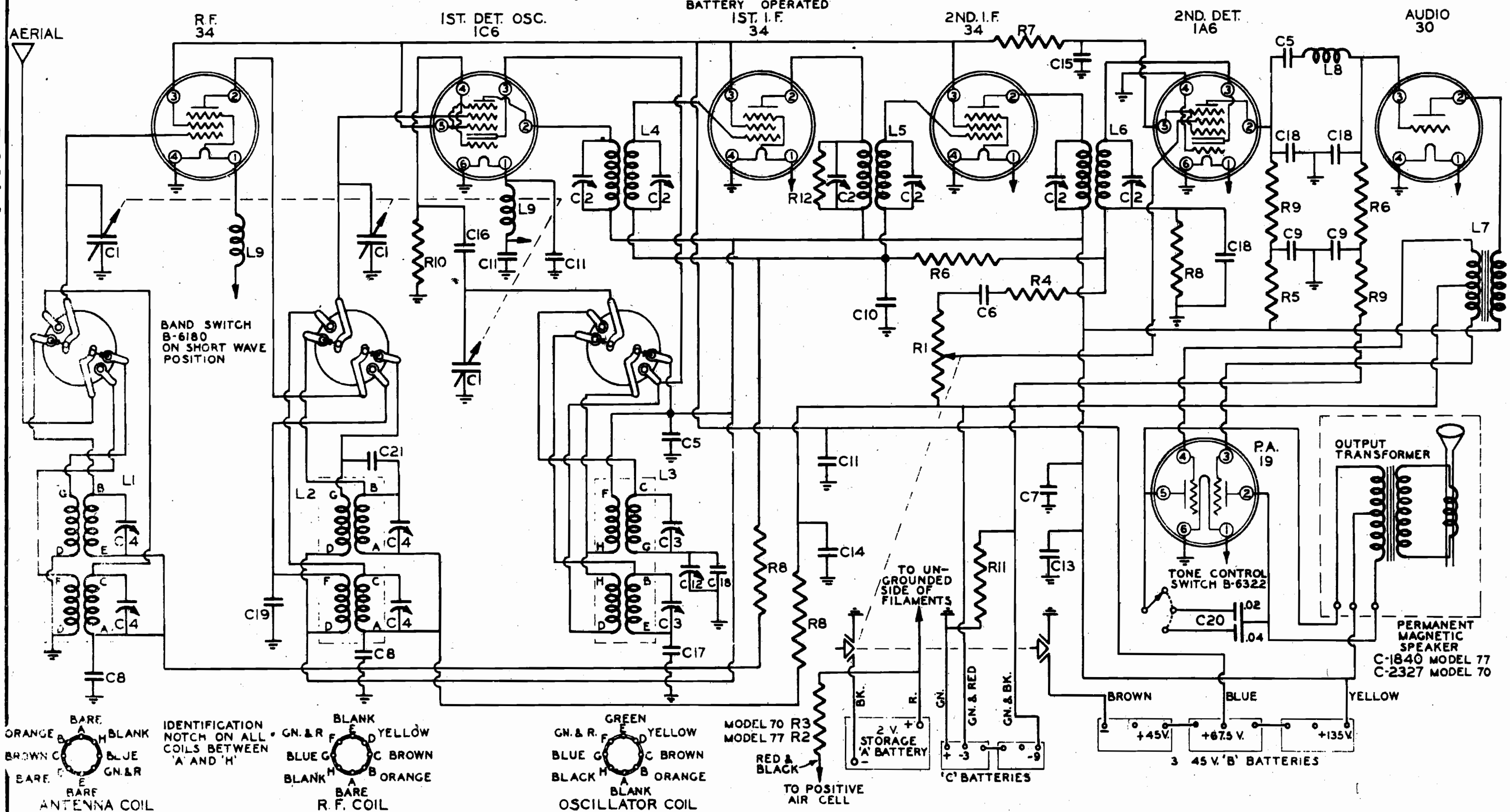
* Open **Cannot be measured with Weston No. 665, Type 1.



SPARKS-WITHINGTON CO.

IF PEAK 345 KC.

SCHEMATIC DIAGRAM
SPARTON MODELS 70 AND 77 SUPERHETERODYNE COUNTRY HOME RECEIVER
BATTERY OPERATED



BOTTOM VIEW OF R.F. COILS SHOWING TERMINAL ARRANGEMENT

C1	VARIABLE CONDENSER		B-6212
C2	I.F. TRIMMERS ON COILS		
C3	R.F. TRIMMER & BRACKET		A-11289
C4	R.F. TRIMMERS		A-11454
C5	.01 MFD.	400 V.	A-9611
C6	.025 MFD.	400 V.	A-11409
C7	5 MFD.	200 V.	A-11086-5
C8	.05 MFD.	200 V.	A-9919
C9	1 MFD.	200 V.	A-10207
C10	.2 MFD.	200 V.	A-9922
C11	.2 MFD.	200 V.	A-7420
C12	100-300 MMF. PADDER		A-7809-5
C13	8 MFD ELECTROLYTIC		A-11623
C14	10 MFD ELECTROLYTIC		A-10377
C15	.1 MFD	100 V.	A-11130-1
C16	.00005 MFD. MOLDED		A-5175-1
C17	.0032 MFD. MOLDED		A-7038-8
C18	.00025 MFD MOLDED		A-9578-5
C19	.0001 MFD. MOLDED		A-9578-6
C20	.02-.04 MFD	400 V.	A-9612
C21	8 TO 9 MMF.		A-11261

R1	250,000 Ω V.C. AND 2 POLE SWITCH		A-11575
R2	39 TO .4 Ω WIREWOUND		A-10000-6
R3	.3 TO .31 Ω WIREWOUND		A-10000-5
R4	50,000 Ω	.25 W.	B-5737-4
R5	10,000 Ω	.25 W.	B-5737-12
R6	500,000 Ω	.25 W.	B-5737-5
R7	25,000 Ω	.25 W	B-5737-9
R8	250,000 Ω	.25 W.	B-5737-1
R9	100,000 Ω	.25 W.	B-5737-2
R10	50,000 Ω	.25 W.	B-5458-31
R11	20,000 Ω	.25 W.	B-5458-6
R12	100,000 Ω	.25 W.	B-5458-2

L1	NO.1 R.F. COIL	A-11231
L2	NO.2 R.F. COIL	A-11232
L3	NO.3 R.F. COIL	A-11233
L4	NO.1 I.F. TRANSFORMER	A-6313-6
L5	NO.2 I.F. TRANSFORMER	A-6313-7
L6	NO.3 I.F. TRANSFORMER	A-6313-8
L7	AUDIO TRANSFORMER	A-11574
L8	16 M.H. CHOKE	A-3506
L9	CHOKE COIL .5 Ω	A-10401

MODELS 70,77
Voltage,Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE NOVEMBER 7, 1933

Sparton Models 70 and 77 Country Home Superheterodyne

(Battery Operated)

Schematic Diagram and Voltage Resistance Chart

VOLTAGE-RESISTANCE CHART

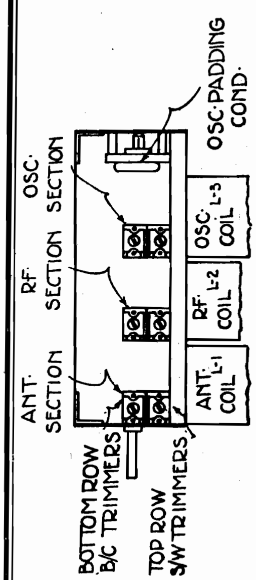
Condition of "A", "B" and "C" Batteries—Good

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

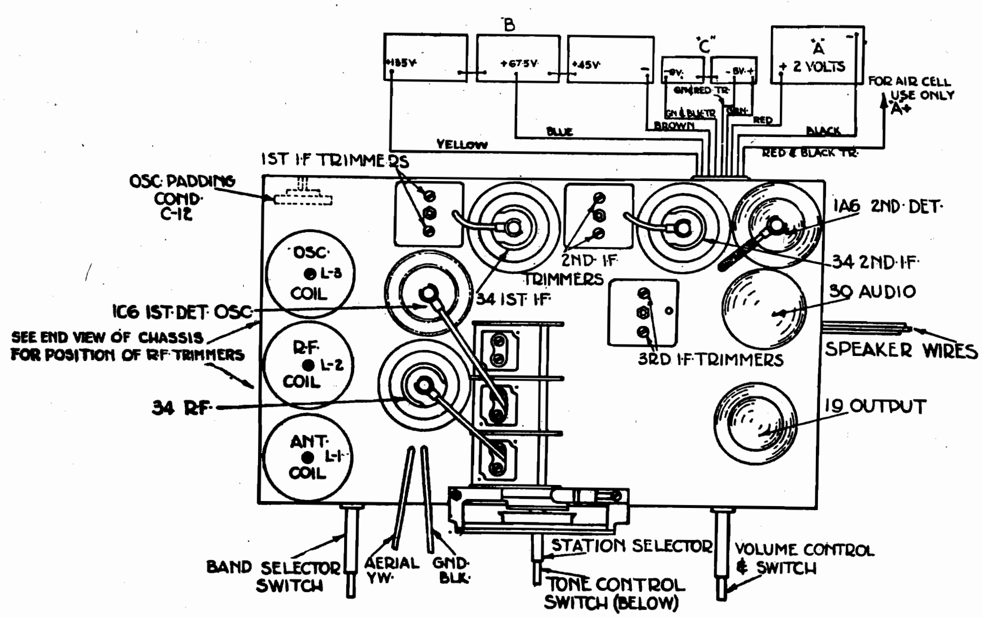
Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
34	R. F. Amplifier.	Volts	2.	130	45	0	—	—	1
		Ohms	0	250,000	*	0	—	—	300,000
1C6	First Detector-Oscillator.	Volts	2.	130	130	0	45	0	.5
		Ohms	0	*	*	55,000	*	0	300,000
34	First I. F.-Amplifier.	Volts	2.	130	45	0	—	—	1
		Ohms	0	*	*	0	—	—	600,000
34	Second I. F.-Amplifier.	Volts	2.	135	45	0	—	—	1
		Ohms	0	*	*	0	—	—	600,000
1A6	Second Detector-A. V. C.	Volts	2.	90	0	0	20	0	.5
		Ohms	0	*	300,000	0	*	0	9,000
30	First Audio Amplifier.	Volts	2.	130	1	0	—	—	—
		Ohms	0	*	600,000	0	—	—	—
19	Power Amplifier	Volts	2.	130	1	1	130	0	—
		Ohms	0	*	9,000	9000	*	0	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

* Open



End View of Chassis



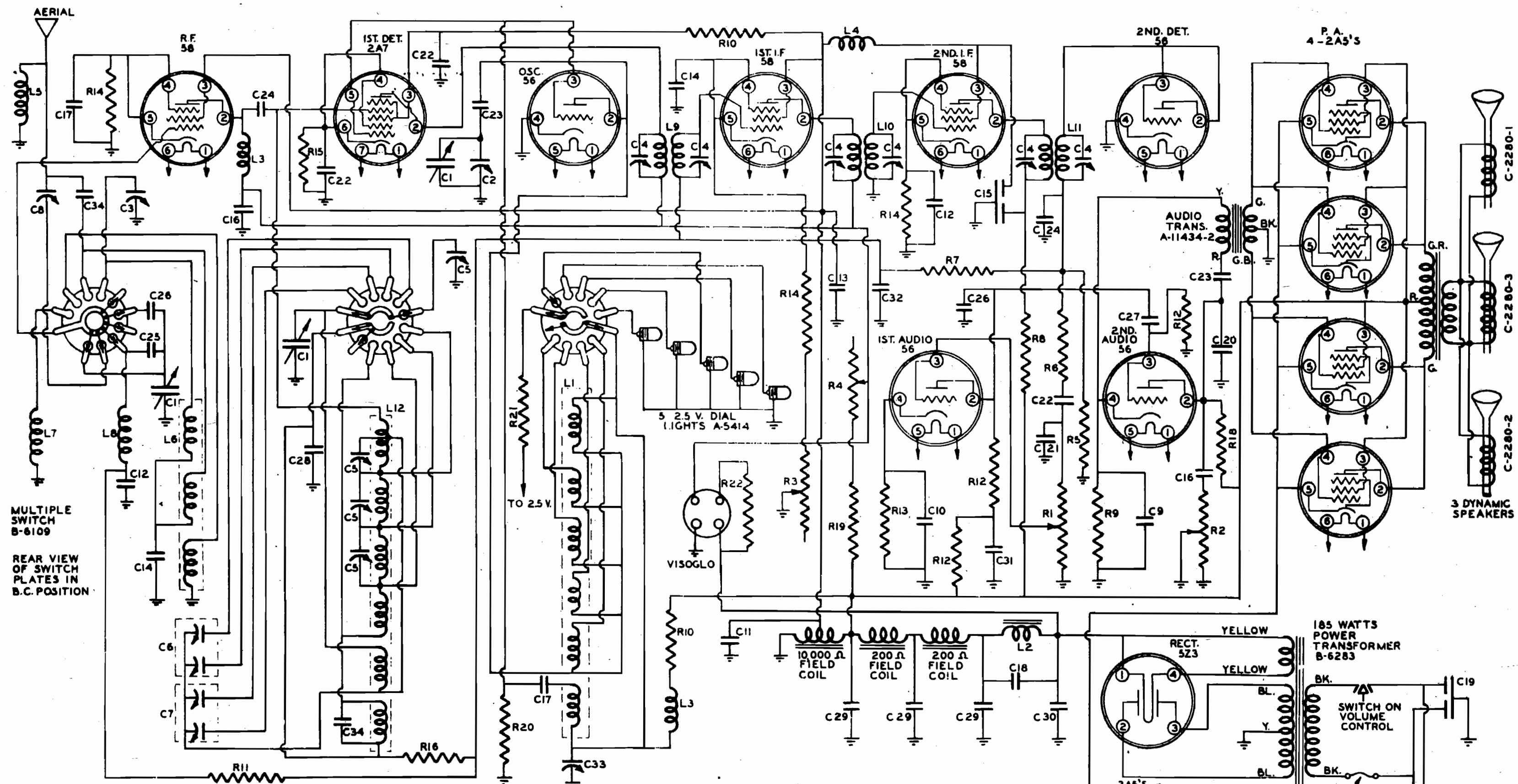
Top View of Chassis.

CHASSIS DIAGRAM MODELS 70 AND 77

MODELS 134,136
Schematic
Parts List

SPARKS-WITHINGTON CO.

SPARTON MODELS 134 AND 136 SUPERHETERODYNE
SCHEMATIC DIAGRAM
INTERMEDIATE FREQUENCY 456 KILOCYCLES
(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



C1	VARIABLE CONDENSER	C-1994
C2	EQUALIZING CONDENSER	
C3	S.W. ANT. EQUAL. COND.	A-10520
C4	I.F. TRIMMING COND.	A-6580-1
C5	TRIMMING CONDENSERS	A-7809-2
C6	TANDEM TRIMMER	A-10846-4
C7	TANDEM TRIMMER	A-10846-3
C8	B.C. BAND ANT. EQ. COND.	A-7809-2
C9	10 MFD. 25 V.	A-10377
C10	10 MFD. 25 V.	A-11582
C11	10 MFD. 200 V.	A-6316-1
C12	.1 MFD. 200 V.	A-7224
C13	.2 MFD. 200 V.	A-7005
C14	.05 MFD. 200 V.	-10205
C15	.05-.05 MFD. 400 V	A-9920
C16	.05 MFD. 400 V	A-6927
C17	.006 MFD. 400 V.	A-9916
C18	.5 MFD. 400 V.	A-10758-3
C19	.006-.006 MFD. 600 V.	A-7878
C20	.002 MFD. MOLDED	A-9578-1
C21	.00025 MFD. MOLDED	A-9578-5
C22	.025 MFD. 200 V.	A-10206-1
C23	.025 MFD. 400 V.	A-9575
C24	.00025 MFD. MOLDED	A-5175
C25	.001 MFD. MOLDED	A-7038-2
C26	.0005 MFD. MOLDED	A-9578
C27	.025 MFD. 400 V.	A-10758-2
C28	.05 MFD. 100 V.	A-6315-1
C29	5 MFD. 400 V.	A-6611-A
C30	4 MFD. 500 V.	A-8123-1
C31	2 MFD. 250 V.	A-10609-1
C32	.1 MFD. 100 V.	A-11130-1
C33	PADDING CONDENSER	A-9941
C34	.000012 MFD.	A-10896

R1	250,000 Ω	VOL. CONTROL		A-10447
R2	100,000 Ω	TONE CONTROL		A-10418
R3	100,000 Ω	SENSITIVITY CONT.		A-10446
R4	5,000 Ω	VOLT. REGULATOR		A-11381
R5	300,000 Ω		.25 W.	B-5458-4
R6	50,000 Ω		.25 W.	B-5458-5
R7	500,000 Ω		.25 W.	B-5458-12
R8	3,000 Ω		.25 W.	B-5458-21
R9	1,700 Ω	WIREWOUND		B-5243-27
R10	10,000 Ω		.5 W.	B-4114-7
R11	10,000 Ω		.25 W.	B-5458-20
R12	100,000 Ω		.25 W.	B-5458-34
R13	5,000 Ω		.5 W.	B-4114-20
R14	400 Ω	WIREWOUND		B-5243-41
R15	500 Ω	WIREWOUND		B-5243-32
R16	2,000 Ω		.25 W.	B-5458-14
R17	170 Ω	WIREWOUND		B-6061-6
R18	20,000 Ω		5 W.	B-4114-24
R19	7,000 Ω	WIREWOUND		B-6061-7
R20	25,000 Ω		.25 W.	B-5458-17
R21	1 Ω	RESISTANCE WIRE		A-10717
R22	1,000,000 Ω		.25 W.	B-5737-6

L1	OSCILLATOR COIL	A-10629
L2	CHOKE COIL	A-8572-2
L3	16 M.H. CHOKE COIL	A-3506
L4	CATHODE CHOKE COIL	A-7209
L5	ANT. CHOKE COIL	A-8145-1
L6	NO. 2,3,4 S.W. ANT. COIL	A-10893
L7	NO. 5 S.W. ANT. COIL	A-10853
L8	NO. 1 R.F. COIL	A-10605
L9	NO. 1 I.F. TRANSFORMER	A-10454
L10	NO. 2 I.F. TRANSFORMER	A-10455
L11	NO. 3 I.F. TRANSFORMER	A-10456
L12	R.F. TRANSFORMER	A-10885

MODELS 134,136
Voltage,Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE OCTOBER 12, 1934

Sparton Models 134 and 136 A. C. Superheterodyne

Schematic Diagram and Voltage-Resistance Chart

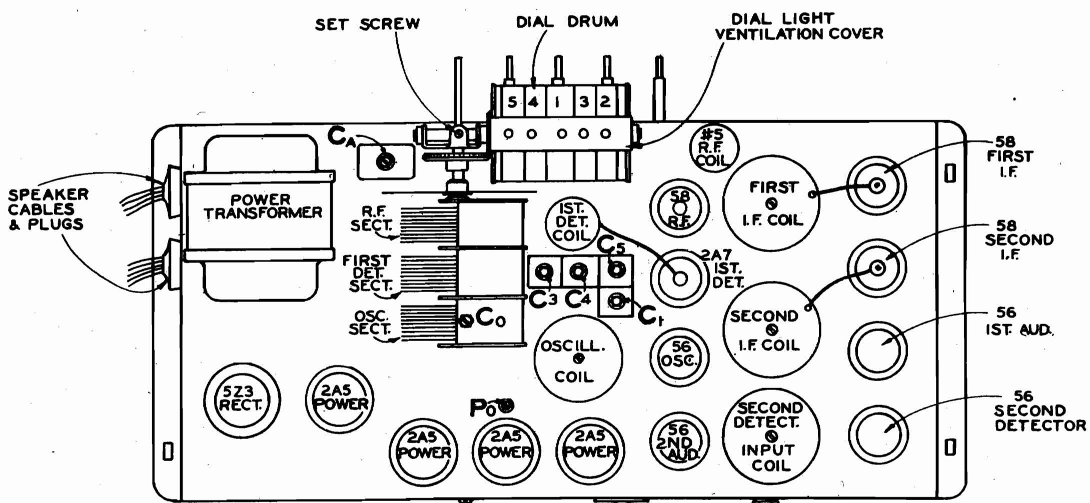
VOLTAGE-RESISTANCE CHART

Line Voltage — 120
Position of Viso-Glo Regulator — Full
Position of Tone Control — Full

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Broadcast
Position of Inter-Station Noise Suppressor — Full

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measure-ment	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
58	R. F. Amplifier	Volts	2.5	220	110	3.8	3.8	0	—	0
		Ohms	0	17000	4000	400	400	0	—	—
2A7	Converter	Volts	2.5	220	65	3.8	65	3.8	0	0
		Ohms	0	17,000	13,000	500	25,000	500	0	600,000
56	Oscillator	Volts	2.5	195	38	0	0	—	—	—
		Ohms	0	20,000	25,000	0	0	—	—	—
58	1st I. F. Amplifier	Volts	2.5	220	110	1.5	1.5	0	—	0.4
		Ohms	0	17,000	4000	400	400	0	—	750,000
58	2nd I. F. Amplifier	Volts	2.5	300	110	4.5	4.5	0	—	0
		Ohms	0	12,000	4000	400	400	0	—	0
56	2nd Detector-A. V. C.	Volts	2.5	0	0	0	0	—	—	—
		Ohms	0	300,000	300,000	0	0	—	—	—
56	1st A. F. Amplifier	Volts	2.5	45	0	3.7	0	—	—	—
		Ohms	0	200,000	250,000	5,000	0	—	—	—
56	2nd A. F. Amplifier	Volts	2.5	200	0	8	0	—	—	—
		Ohms	0	37,000	100,000	1700	0	—	—	—
(4) 2A5	Power Amplifier	Volts	25	330	330	0	20	0	—	—
		Ohms	0	9000	9000	1500	175	0	—	—
5Z3	Rectifier	Volts	480	420	420	480	—	—	—	—
		Ohms	9500	35	35	9500	—	—	—	—

NOTES: Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665. Type 1.

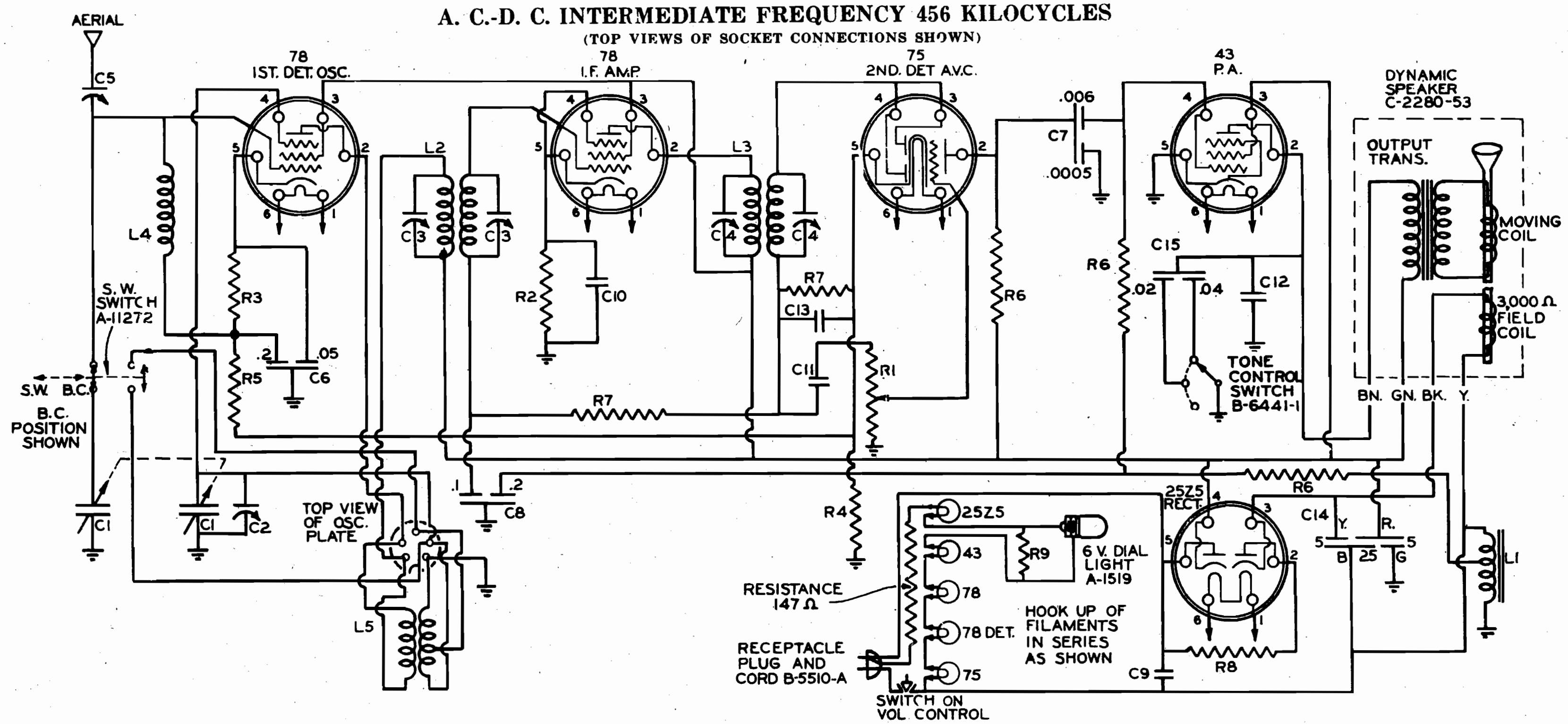


MODELS 134 AND 136 CHASSIS DIAGRAM
(Top View)

SPARKS-WITHINGTON CO.

SPARTON MODEL 506 SUPERHETERODYNE
SPARTON MODEL 594 SUPERHETERODYNE
SCHEMATIC DIAGRAM
A. C.-D. C. INTERMEDIATE FREQUENCY 456 KILOCYCLES

(TOP VIEWS OF SOCKET CONNECTIONS SHOWN)



C1	VARIABLE CONDENSER	B-5509
C2	ADJUSTABLE CONDENSER	
C3	NO. 1 I.F. TRIMMER	A-11474
C4	NO. 2 I.F. TRIMMER	A-9553
C5	ANTENNA TRIMMER	A-11499
C6	.05-.2 MFD. 100 V.	A-11092-7
C7	.006-.0005 MFD. 400 V.	A-11092-2

C8	.1-.2 MFD. 100 V.	A-11092-6
C9	.025 MFD. 400 V.	A-11086-4
C10	.1 MFD. 100 V.	A-11130-1
C11	.006 MFD. 400 V.	A-11130-4
C12	.01 MFD. 200 V.	A-11130-7
C13	.0005 MFD. MOLDED	A-9578
C14	5-25-5 MFD. ELECTROLYTIC	A-11093-1
C15	.04-.02 MFD 200 V.	A-9612-1

R1	500,000 Ω VOL. CONTROL	A-11480
R2	400 Ω WIREWOUND	B-5243-30
R3	290 Ω WIREWOUND	B-5243-36
R4	100 Ω WIREWOUND	B-5243-37
R5	2,200 Ω WIREWOUND	B-5243-13
R6	300,000 Ω .25 W.	B-5737-3
R7	500,000 Ω .25 W.	B-5737-5
R8	50 Ω WIREWOUND	B-6061-1
R9	25 Ω WIREWOUND	A-9647

L1	TAPPED CHOKE	A-9566
L2	NO. 1 I.F. TRANSFORMER	A-11476
L3	NO. 2 I.F. TRANSFORMER	A-11477
L4	PRE SELECTOR COIL	A-9601
L5	OSCILLATOR COIL	A-11504

MODELS 506,594
Voltage,Socket
Trimmers

SPARKS-WITHINGTON CO.

(First Revision) EFFECTIVE SEPTEMBER 11, 1935

Sparton Model 506 A. C.-D. C. Superheterodyne
Sparton Model 594 A. C.-D. C. Superheterodyne
Schematic Drawing and Voltage-Resistance Chart

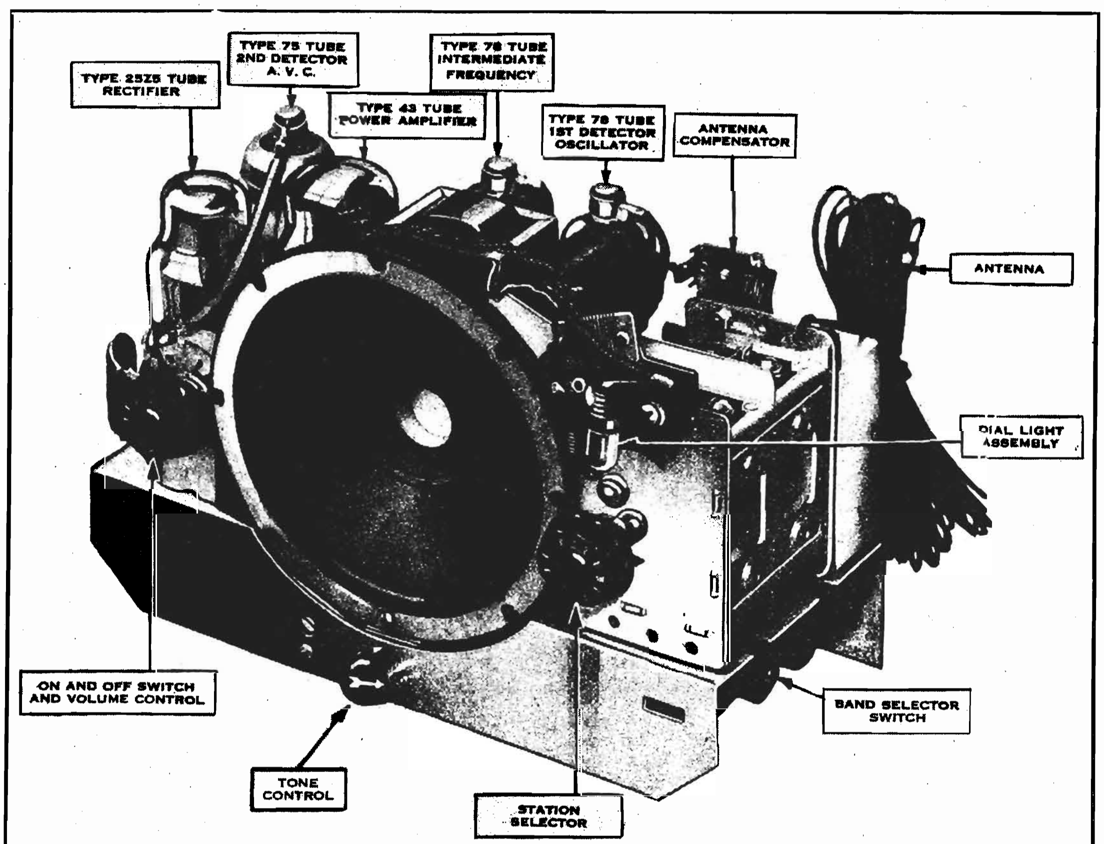
VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	31	115	115	**	22	31	15
		Ohms	700	70.000	70.000	**	2500	700	2100
78	I-F Amplifier	Volts	31	115	115	4	4	31	**
		Ohms	700	50,000	50,000	300	300	700	1,000,000
75	2d Detector-A.V.C.	Volts	31	**	**	**	**	31	**
		Ohms	700	500,000	500,000	500.000	100	700	500.000
43	Power Amplifier	Volts	31	107	115	**	**	31	——
		Ohms	700	50.000	50,000	500.000	0	700	——
25Z5	Rectifier	Volts	31	118	115	95	116	31	——
		Ohms	700	850	45,000	3500	900	700	——

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.



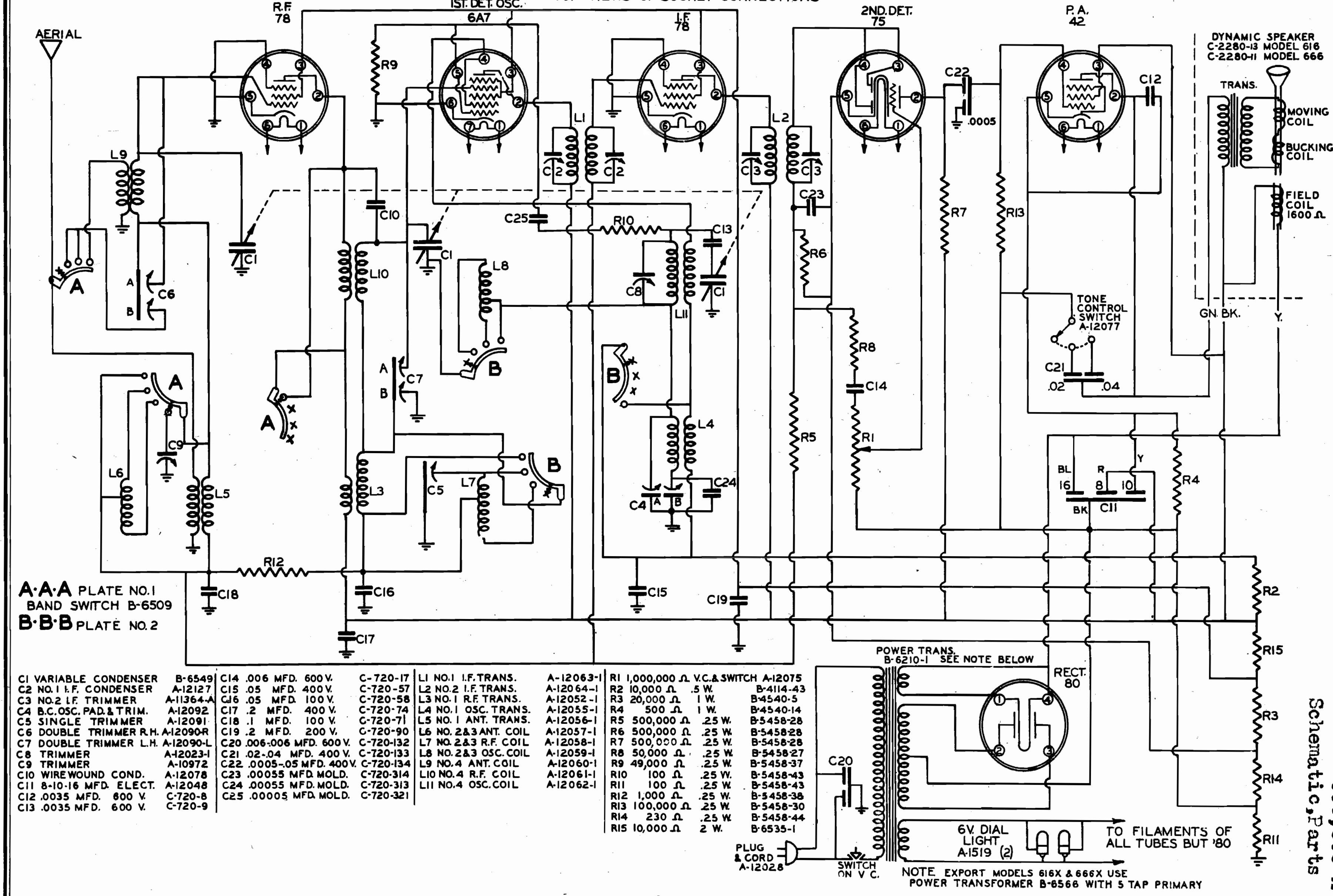
MODEL 594 CHASSIS

SPARKS-WITHINGTON CO.

MODELS 616, 616-X
666, 666-X
Schematic, Parts

SPARTON SUPERHETERODYNE MODELS 616, 616X, 666 & 666X
INTERMEDIATE FREQUENCY 345KC.

TOP VIEWS OF SOCKET CONNECTIONS



A·A·A PLATE NO. 1
BAND SWITCH B-6509
B·B·B PLATE NO. 2

C1 VARIABLE CONDENSER	B-6549	C14 .006 MFD. 600 V.	C-720-17	L1 NO. 1 I.F. TRANS.	A-12063-1	R1 1,000,000 Ω V.C. & SWITCH	A-12075
C2 NO. 1 I.F. CONDENSER	A-12127	C15 .05 MFD. 400 V.	C-720-57	L2 NO. 2 I.F. TRANS.	A-12064-1	R2 10,000 Ω .5 W.	B-4114-43
C3 NO. 2 I.F. TRIMMER	A-11364-A	C16 .05 MFD. 100 V.	C-720-58	L3 NO. 1 R.F. TRANS.	A-12052-1	R3 20,000 Ω 1 W.	B-4540-5
C4 B.C. OSC. PAD. & TRIM.	A-12092	C17 .2 MFD. 400 V.	C-720-74	L4 NO. 1 OSC. TRANS.	A-12055-1	R4 500 Ω 1 W.	B-4540-14
C5 SINGLE TRIMMER	A-12091	C18 .1 MFD. 100 V.	C-720-71	L5 NO. 1 ANT. TRANS.	A-12056-1	R5 500,000 Ω .25 W.	B-5458-28
C6 DOUBLE TRIMMER R.H.	A-12090-R	C19 .2 MFD. 200 V.	C-720-90	L6 NO. 2 & 3 ANT. COIL	A-12057-1	R6 500,000 Ω .25 W.	B-5458-28
C7 DOUBLE TRIMMER L.H.	A-12090-L	C20 .006-.006 MFD. 600 V.	C-720-132	L7 NO. 2 & 3 R.F. COIL	A-12058-1	R7 500,000 Ω .25 W.	B-5458-28
C8 TRIMMER	A-12023-1	C21 .02-.04 MFD. 400 V.	C-720-133	L8 NO. 2 & 3 OSC. COIL	A-12059-1	R8 50,000 Ω .25 W.	B-5458-27
C9 TRIMMER	A-10972	C22 .0005-.05 MFD. 400 V.	C-720-134	L9 NO. 4 ANT. COIL	A-12060-1	R9 49,000 Ω .25 W.	B-5458-37
C10 WIREWOUND COND.	A-12078	C23 .00055 MFD. MOLD.	C-720-314	L10 NO. 4 R.F. COIL	A-12061-1	R10 100 Ω .25 W.	B-5458-43
C11 8-10-16 MFD. ELECT.	A-12048	C24 .00055 MFD. MOLD.	C-720-313	L11 NO. 4 OSC. COIL	A-12062-1	R11 100 Ω .25 W.	B-5458-43
C12 .0035 MFD. 600 V.	C-720-8	C25 .00005 MFD. MOLD.	C-720-321			R12 1,000 Ω .25 W.	B-5458-38
C13 .0035 MFD. 600 V.	C-720-9					R13 100,000 Ω .25 W.	B-5458-30
						R14 230 Ω .25 W.	B-5458-44
						R15 10,000 Ω 2 W.	B-6535-1

MODELS 616,616-X
666,666-X
Voltage,Socket
Trimmers

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE SEPTEMBER 11, 1935

Sparton Superheterodyne Models
616 616-X 666 666-X
Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

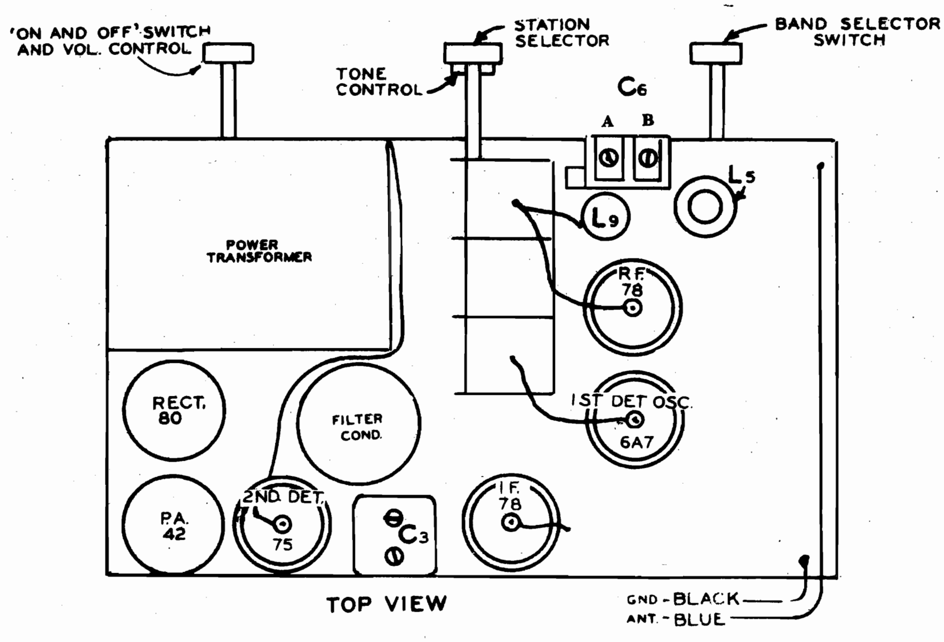
Line Voltage — 119
Position of Tone Control — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	*	310	160	0	0	*	—	**
		Ohms	0	28,000	18,000	0	0	0	—	1,000,000
6A7	1st Detector-Oscillator	Volts	*	300	160	235	7	0	*	**
		Ohms	0	28,000	18,000	38,000	5,000	0	0	1,000,000
78	I-F Amplifier	Volts	*	295	160	0	0	*	—	**
		Ohms	0	28,000	18,000	0	0	0	—	1,000,000
75	2d Detector-A.V.C.	Volts	*	140	**	**	0	*	—	**
		Ohms	0	500 000	600,000	600,000	350	0	—	1,000,000
42	Power Amplifier	Volts	*	280	300	0	18	*	—	—
		Ohms	0	28 000	28,000	135,000	500	0	—	—
80	Rectifier	Volts	440	405	410	440	—	—	—	—
		Ohms	30,000	250	250	30,000	—	—	—	—

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero or 6.0 volts A. C., depending on twist of filament hook-up wire. When Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 Tube) should read 6.0, and vice versa.

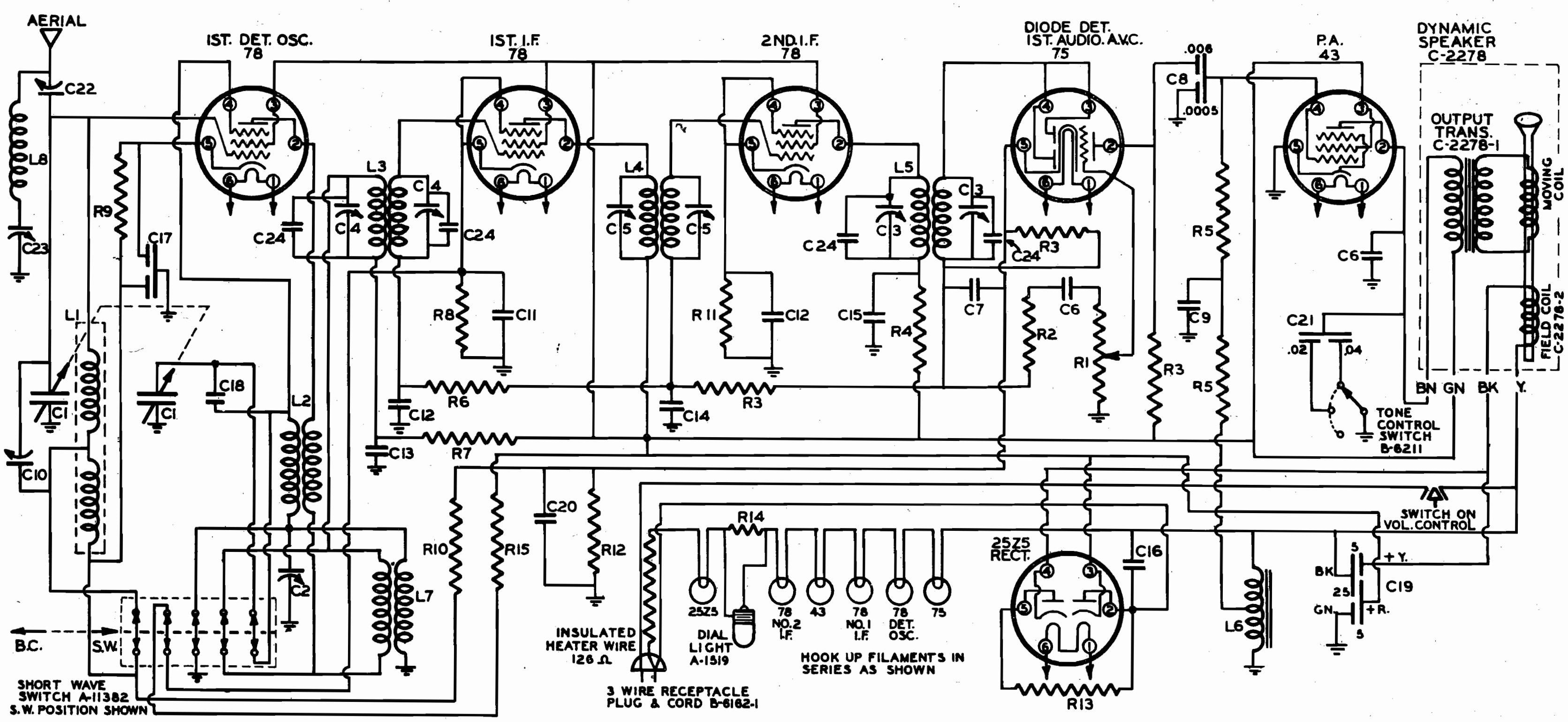
**Cannot be measured with Weston No. 665, Type 1.



CHASSIS DIAGRAM

SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON MODEL 655 SUPERHETERODYNE
AC-DC INTERMEDIATE FREQUENCY 456KC.
TOP VIEWS OF SOCKET CONNECTIONS SHOWN



C1	VARIABLE CONDENSER	B-6153	C13	.05 MFD. 200 V.	C-720-49	R1	250,000 Ω VOL. CONTROL	A-11069	R13	50 Ω 2 W.	B-6061-2
C2	B.C. OSCILLATOR TRIMMER	A-10972	C14	.1 MFD. 100 V.	C-720-66	R2	50,000 Ω .25 W.	B-5458-27	R14	25 Ω WIREWOUND	A-9647
C3	ADJUSTABLE CONDENSER	A-11474	C15	.05 MFD. 200 V.	C-720-52	R3	500,000 Ω .25 W.	B-5458-28	R15	20,000 Ω .5 W.	B-4114-24
C4	ADJUSTABLE CONDENSER	A-10977	C16	.025 MFD. 400 V.	C-720-41	R4	3,000 Ω .25 W.	B-5458-19			
C5	ADJUSTABLE CONDENSER	A-11697	C17	.05-.05 MFD. 100 V.	C-720-108	R5	300,000 Ω .25 W.	B-5458-29	L1	PRE-SELECTOR COIL	A-11045
C6	.006 MFD. 400 V.	C-720-13	C18	.0005 MFD. MOLDED	A-9578-14	R6	100,000 Ω .25 W.	B-5458-30	L2	FOREIGN BAND OSC. COIL	A-11047
C7	.0005 MFD. MOLDED	A-11095-1	C19	5-25-5 MFD. ELECTROLYTIC	A-11093	R7	15,000 Ω .5 W.	B-4114-23	L3	NO.1 I.F. TRANSFORMER	A-11686
C8	.006-.0005 MFD. 400 V.	C-720-109	C20	.1 MFD. 100 V.	C-720-62	R8	1,000 Ω .25 W.	B-5458-35	L4	NO.2 I.F. TRANSFORMER	A-11687
C9	.5 MFD. 100 V.	C-720-94	C21	.02-.04 MFD. 200 V.	C-720-131	R9	290 Ω WIREWOUND	B-5243-36	L5	NO.3 I.F. TRANSFORMER	A-11688
C10	S.W. ANTENNA TRIMMER	A-11071	C22	B.C. ANTENNA TRIMMER	A-11484	R10	2,200 Ω WIREWOUND	B-5243-13	L6	CHOKE COIL	A-11038
C11	.1 MFD. 100 V.	C-720-69	C23	I.F. WAVE TRAP TRIMMER	A-11693	R11	600 Ω .25 W.	B-5243-23	L7	BROADCAST OSC. COIL	A-11763
C12	.05 MFD. 100 V.	C-720-51	C24	.0001 MFD. MOLDED	A-11095-3	R12	100 Ω WIREWOUND	B-5243-37	L8	I.F. WAVE TRAP COIL	A-11692

MODEL 655
Voltage, Socket

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE FEBRUARY 1, 1935

Sparton Model 655 A. C.-D. C. Superheterodyne Schematic Diagram and Voltage-Resistance Chart

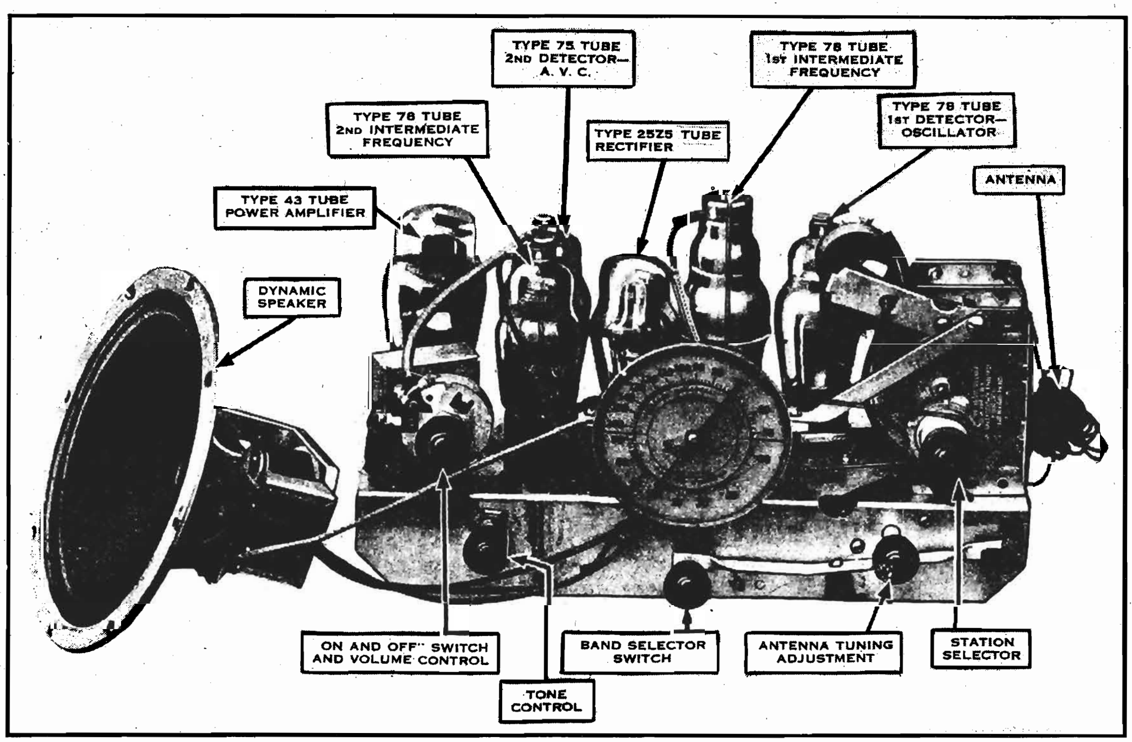
VOLTAGE-RESISTANCE CHART

Line Supply — A. C.
Line Voltage — 119

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)							
		Measurement	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Grid Cap
78	1st Detector-Oscillator	Volts	29	80	105	0	17.5	29	17.5
		Ohms	700	35,000	20,000	0	2500	700	2400
78	1st I-F Amplifier	Volts	29	105	105	7.5	7.5	29	0
		Ohms	700	20,000	20,000	1700	1700	700	800,000
78	2nd I-F Amplifier	Volts	29	80	100	3.3	3.3	29	0
		Ohms	700	22,000	20,000	600	600	700	800,000
75	2nd Det.-A.V.C.	Volts	29	**	**	**	.64	29	0
		Ohms	700	500,000	500,000	500,000	100	700	250,000
43	Power Amplifier	Volts	29	95	105	**	**	29	——
		Ohms	700	20,000	20,000	750,000	0	700	——
25Z5	Rectifier	Volts	29	28	105	74	30	29	——
		Ohms	700	700	20,000	3000	700	700	——

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Cannot be measured with Weston No. 665, Type 1.



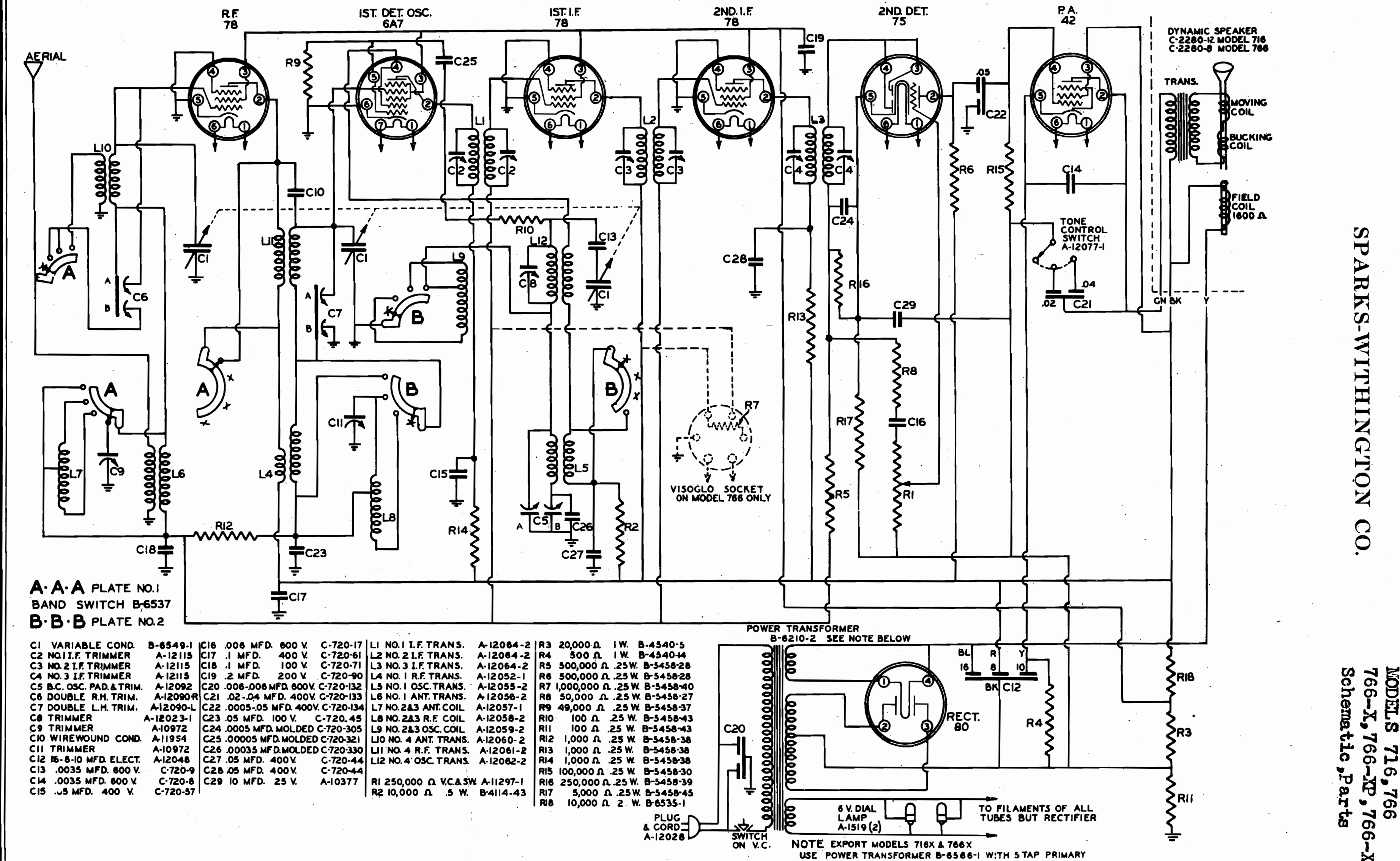
MODEL 655 CHASSIS

MODELS 716, 766
766-X, 766-XP, 766-XS
Schematic, Parts

SPARKS-WITHINGTON CO.

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODELS 716X, 766 & 766X
INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF SOCKET CONNECTIONS



A·A·A PLATE NO.1
BAND SWITCH B-6537
B·B·B PLATE NO.2

C1 VARIABLE COND.		B-6549-1
C2 NO.1 I.F. TRIMMER		A-12115
C3 NO.2 I.F. TRIMMER		A-12115
C4 NO.3 I.F. TRIMMER		A-12115
C5 B.C. OSC. PAD. & TRIM.		A-12092
C6 DOUBLE R.H. TRIM.		A-12090-R
C7 DOUBLE L.H. TRIM.		A-12090-L
C8 TRIMMER		A-12023-1
C9 TRIMMER		A-10972
C10 WIREWOUND COND.		A-11954
C11 TRIMMER		A-10972
C12 16-8-10 MFD. ELECT.		A-12048
C13 .0035 MFD.	600 V.	C-720-9
C14 .0035 MFD.	600 V.	C-720-8
C15 .05 MFD.	400 V.	C-720-57
C16 .006 MFD.	600 V.	C-720-17
C17 .1 MFD.	400 V.	C-720-61
C18 .1 MFD.	100 V.	C-720-71
C19 .2 MFD.	200 V.	C-720-90
C20 .006-.006 MFD.	600V.	C-720-132
C21 .02-.04 MFD.	400V.	C-720-133
C22 .0005-.05 MFD.	400V.	C-720-134
C23 .05 MFD.	100 V.	C-720.45
C24 .0005 MFD. MOLDED		C-720-305
C25 .00005 MFD. MOLDED		C-720-321
C26 .00035 MFD. MOLDED		C-720-330
C27 .05 MFD.	400V.	C-720-44
C28 .05 MFD.	400V.	C-720-44
C29 10 MFD.	25 V.	A-10377

L1 NO.1 I.F. TRANS.		A-12064-2
L2 NO.2 I.F. TRANS.		A-12064-2
L3 NO.3 I.F. TRANS.		A-12064-2
L4 NO.1 R.F. TRANS.		A-12052-1
L5 NO.1 OSC. TRANS.		A-12055-2
L6 NO.1 ANT. TRANS.		A-12056-2
L7 NO.2 & 3 ANT. COIL		A-12057-1
L8 NO.2 & 3 R.F. COIL		A-12058-2
L9 NO.2 & 3 OSC. COIL		A-12059-2
L10 NO.4 ANT. TRANS.		A-12060-2
L11 NO.4 R.F. TRANS.		A-12061-2
L12 NO.4 OSC. TRANS.		A-12062-2
R1 250,000 Ω	V.C. & SW.	A-11297-1
R2 10,000 Ω	.5 W.	B-4114-43

R3	20,000 Ω	1 W.	B-4540-5
R4	500 Ω	1 W.	B-4540-14
R5	500,000 Ω	.25 W.	B-5458-28
R6	500,000 Ω	.25 W.	B-5458-28
R7	1,000,000 Ω	.25 W.	B-5458-40
R8	50,000 Ω	.25 W.	B-5458-27
R9	49,000 Ω	.25 W.	B-5458-37
R10	100 Ω	.25 W.	B-5458-43
R11	100 Ω	.25 W.	B-5458-43
R12	1,000 Ω	.25 W.	B-5458-38
R13	1,000 Ω	.25 W.	B-5458-38
R14	1,000 Ω	.25 W.	B-5458-38
R15	100,000 Ω	.25 W.	B-5458-30
R16	250,000 Ω	.25 W.	B-5458-39
R17	5,000 Ω	.25 W.	B-5458-45
R18	10,000 Ω	2 W.	B-6535-1

MODELS 716, 766
766-X, 766-XP, 766-XS
Voltage, Socket
Trimmers, Phonograph Data

SPARKS-WITHINGTON CO.

(ORIGINAL) EFFECTIVE SEPTEMBER 11, 1934

Sparton Superheterodyne Models

716-X 766 766-X 766-XP 766-XS

Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

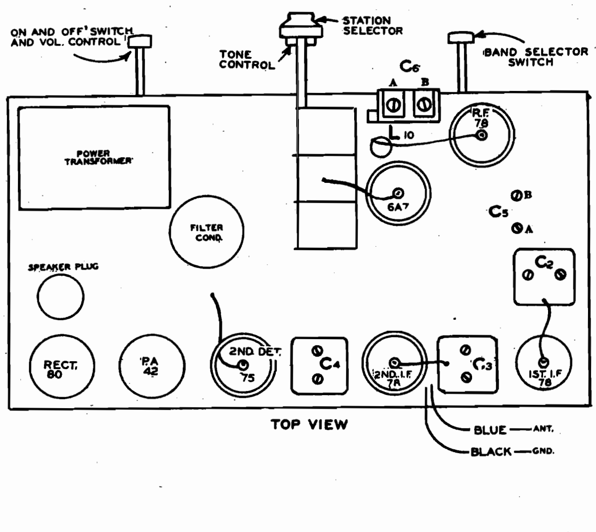
Line Voltage — 119
Position of Tone Control — Full
Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

Tube	Function	Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Measure-ment	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Grid Cap
78	R-F Amplifier	Volts	*	275	170	0	0	*	—	**
		Ohms	0	29,000	20,000	0	0	0	—	1,000,000
6A7	Converter	Volts	*	275	170	210	5	3.8	*	**
		Ohms	0	29,000	20,000	40,000	55,000	900	0	1,000,000
78	1st I-F Amplifier	Volts	*	275	170	0	0	*	—	**
		Ohms	0	29,000	20,000	0	0	0	—	1,000,000
78	2d I-F Amplifier	Volts	*	275	170	0	0	*	—	**
		Ohms	0	29,000	20,000	0	0	0	—	1,000,000
75	2d Detector-A.V.C.	Volts	*	**	**	**	**	*	—	**
		Ohms	0	1,000,000	300,000	300,000	5,000	0	—	250,000
42	Power Amplifier	Volts	*	280	170	**	16	*	—	—
		Ohms	0	29,000	29,000	100,000	500	0	—	—
80	Rectifier	Volts	410	365	365	410	—	—	—	—
		Ohms	29,000	250	250	29,000	—	—	—	—

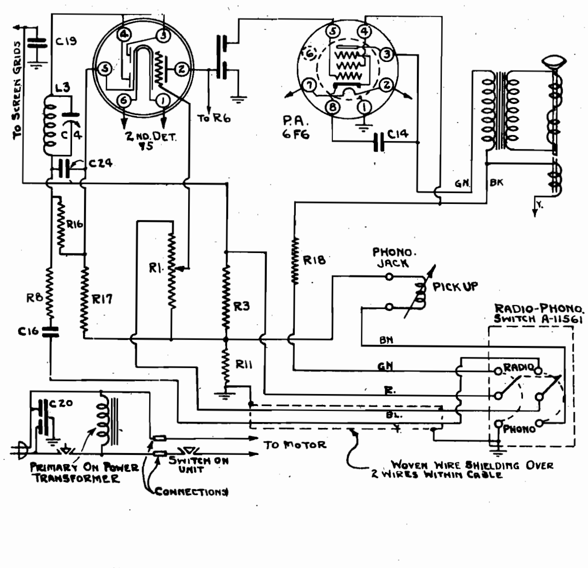
NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero or 6.0 volts, depending on twist of filament hook-up wire. If Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7) should read 6.0 volts, and vice versa.

**Cannot be measured with Weston No. 665, Type 1.



CHASSIS DIAGRAM

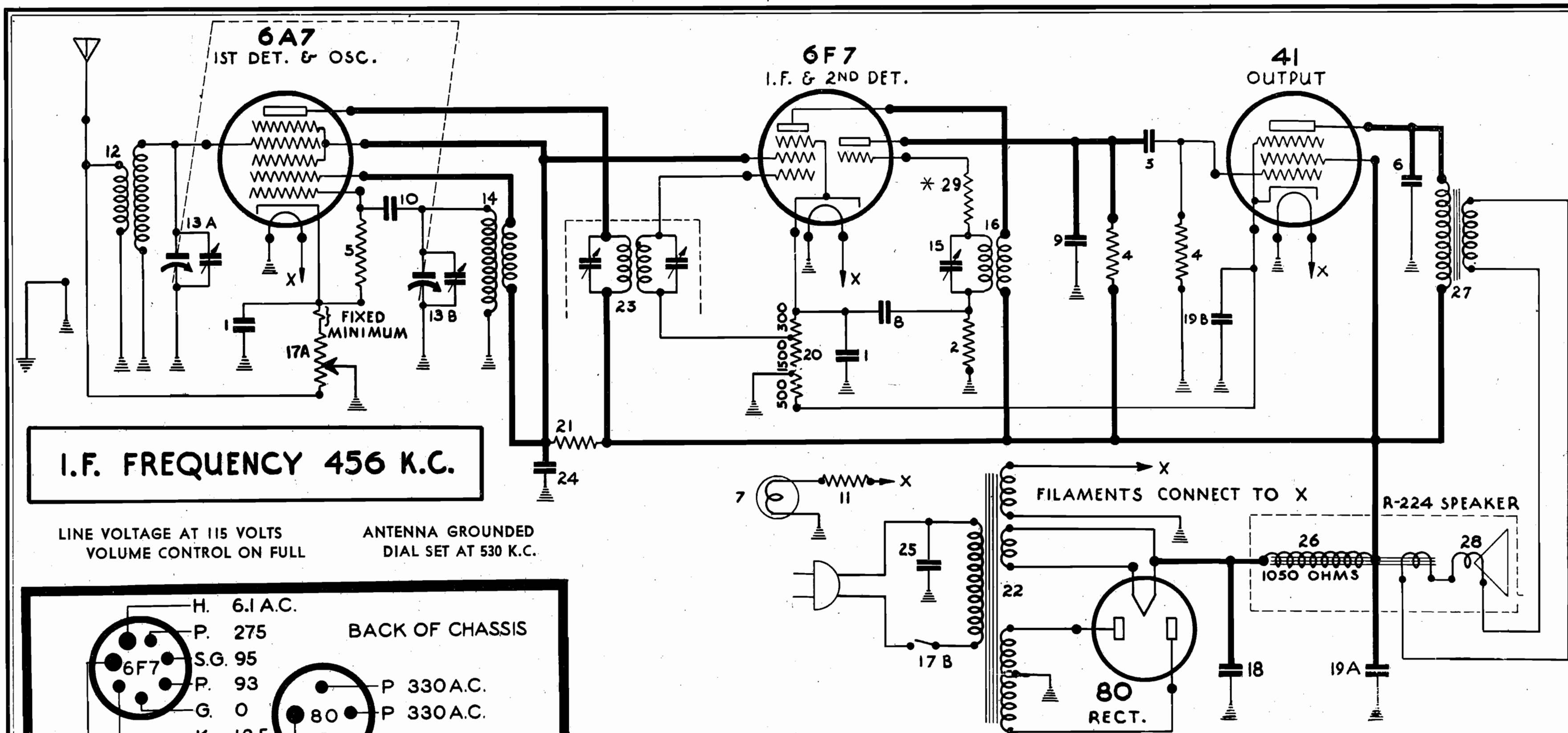


CIRCUIT FOR PHONOGRAPH PICK-UP

Schematic, Socket, Voltage Parts List

STEWART WARNER CORP.

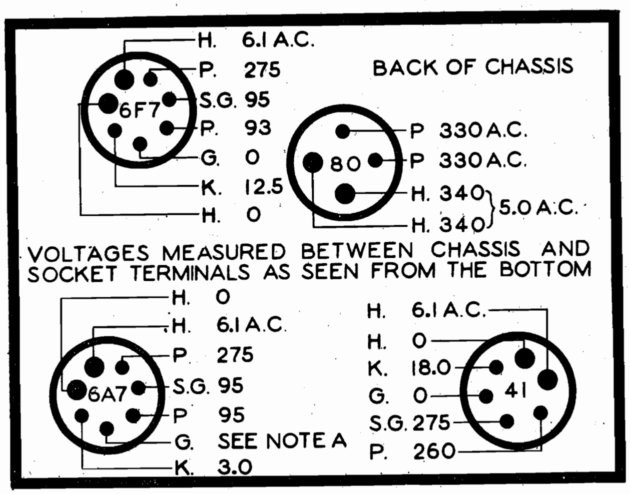
MODELS 1231 to 1239
Chassis R-123



I.F. FREQUENCY 456 K.C.

LINE VOLTAGE AT 115 VOLTS
VOLUME CONTROL ON FULL

ANTENNA GROUNDED
DIAL SET AT 530 K.C.



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

All bias voltages change with position of volume control. Use maximum position.

6F7 Pentode Grid Cap to ground 10 volts D.C.

Speaker field voltage with coil warm is 65 volts D.C.

NOTE A: The oscillator grid voltage with the dial set at 530 K.C. and volume control on full should be approximately —4 volts (300 volt scale).

R-123 PARTS LIST

(SEE OTHER SIDE FOR MISCELLANEOUS PARTS)

Diag. No.	Part No.	Description	List Price
1	81630	.1 mfd. 100 volt paper condenser	$0.30
2	81682	1.1 megohm, ¼ w. carbon resistor	.20
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83072	510,000 ohm, ¼ w. carbon resistor	.20
5	83080	51,000 ohm, ¼ w. carbon resistor	.20
6	83219	.01 mfd. 600 volt paper condenser	.30
7	83278	6.3 volt dial light bulb	.15
8	83353	.05 mfd. 100 volt paper condenser	.30
9	83436	.002 mfd. 1000 v. paper condenser	.25
10	83539	.00026 mfd. mica condenser	.25
11	83566	10 ohm, flexible resistor	.25
12	83948	Antenna coil	.80
13A, 13B	83949	Two section gang condenser	2.00
14	83950	Oscillator coil	.65
15	83952	2nd I.F. trimmer condenser	.30
16	83953	2nd I.F. transformer coil	.60
17A, 17B	83959	7500 ohm vol. cont. (with 350 ohm fixed minimum) and line switch	1.15
18	83960	6 mfd. 400 v. wet elec. condenser	.85
19A, 19B	83962	5 mfd. 350 v. dry electro. cond.; 10 mfd. 25 v. dry electro. cond. — Model R-123-A only; Also see 84399	
20	83963	Metal clad tapped bias resistor	
21	83964	25,000 ohm, 2 watt carbon resistor	
22	83966	Power trans., 115 volts, 60 cycles (Model R-123-A) (See No. 84400 & 84402 for other voltages & freq.)	
23	83973	1st I.F. transformer	
24	83974	.1 mfd. 200 volt paper condenser	
25	83976	.012 mfd. 1000 volt shielded paper condenser	
26	83987	Field coil and housing (1050 ohms)	
27	84009	Output transformer	
28	84010	Diaphragm and shell assembly	
29	84236	2500 ohm, ¼ watt carbon resistor	
	84399	5 mfd. 350 v. dry electro. cond.; 10 mfd. 25 v. dry electro. cond. — R-123-B & W only	
	84400	Power transformer, 115 volts, 25 to 133 cycles (Model R-123-B)	
	84402	Power transformer 100 to 260 volts, 40 to 133 cycles (Model R-123-W)	
	R-224	6 inch dynamic speaker with output transformer	

* Diag. No. 29, 2500 ohm resistor is used on small proportion of sets.

MODELS 1231 to 1239
Chassis R-123
Circuit Data,Alignment
Trimmers,Parts List

STEWART WARNER CORP.

STEWART-WARNER MODEL R-123 CHASSIS

USED IN RECEIVER MODELS 1231 TO 1239

CIRCUIT DESCRIPTION

Tte Stewart-Warner Model R-123 Chassis is a four tube superheterodyne, having a tuning range of 530 to 1720 kc. The incoming signal goes to the tuned first detector circuit, and there its frequency is converted to 456 kc. in the 6A7 combination first detector and oscillator tube. This particular frequency is chosen to prevent image frequency interference.

The 456 kc. intermediate frequency signal is amplified by the pentode section of the 6F7 tube. The plate of the pentode section is coupled thru an I. F. transformer to the grid of the triode section, this section operating as the second detector. The triode is then resistance-coupled to the 41 pentode power output tube.

The volume control is double acting. It simultaneously reduces antenna output and increases the bias on the 6A7 tube.

The R-123-A chassis is designed for operation on 105 to 125 volt, 50 to 60 cycle power circuits. The R-123-B Chassis is made for use on 105 to 125 volt, 25 to 133 cycle lines while the R-123-W has a universal power transformer for operation on voltages ranging from 100 to 260 volts and any frequency from 40 to 133 cycles. This universal transformer in the R-123-W has a tapped primary which must be connected for the proper line voltage as shown on the tag attached to the chassis.

CALIBRATION AND ALIGNMENT

TEST EQUIPMENT

A high grade modulated service oscillator and an output meter are absolutely essential in order to properly align the R-123 chassis.

The oscillator should be capable of generating frequencies of 456 and 1400 kc.

PRECAUTIONS

When using your oscillator, do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

When aligning, keep the oscillator output low so that the second detector does not overload. Use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

PRELIMINARY STEPS

To align the R-123 Chassis proceed as follows:

Remove the chassis from cabinet.

Connect the output meter from the 41 plate to chassis through a .25 mfd. condenser. The output meter can be connected across the voice coil terminals on the speaker if the meter is sensitive enough to provide at least half-scale reading.

Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

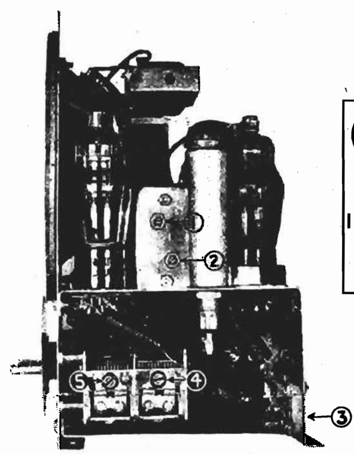
1. }
2. } First I. F. transformer trimmers.
3. Second I. F. transformer trimmer.
4. Oscillator calibration trimmer.
5. Detector shunt trimmer.

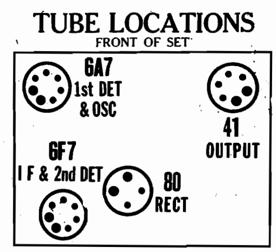
ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to **exactly** 456 kc.
   (b) Connect the output leads of the oscillator to the 6A7 control grid and chassis.
   (c) Make certain that no station is tuned in.
   (d) Carefully adjust the I. F. transformer trimmers No. 1, 2 and 3 for maximum output meter reading.
   (e) Repeat the three adjustments, since the adjustment of each trimmer has some effect on the others.

DIAL CALIBRATION

2. Check the position of the dial on the condenser shaft by turning the rotor plates of the gang condenser to full mesh. The dial should then read 530 kc.
3. A broadcast station between 1300 and 1420 kc. should be used to calibrate the dial. If no such station can be heard, you can use a 1400 kc. signal from your oscillator provided its calibration is accurately known. Proceed as follows:
   (a) Tune the receiver dial to the exact frequency reading of the signal (either a station or the oscillator.)
   (b) Carefully adjust the oscillator calibration trimmer No. 4 until the signal may be tuned in with maximum volume at its correct frequency setting.





ALIGNMENT

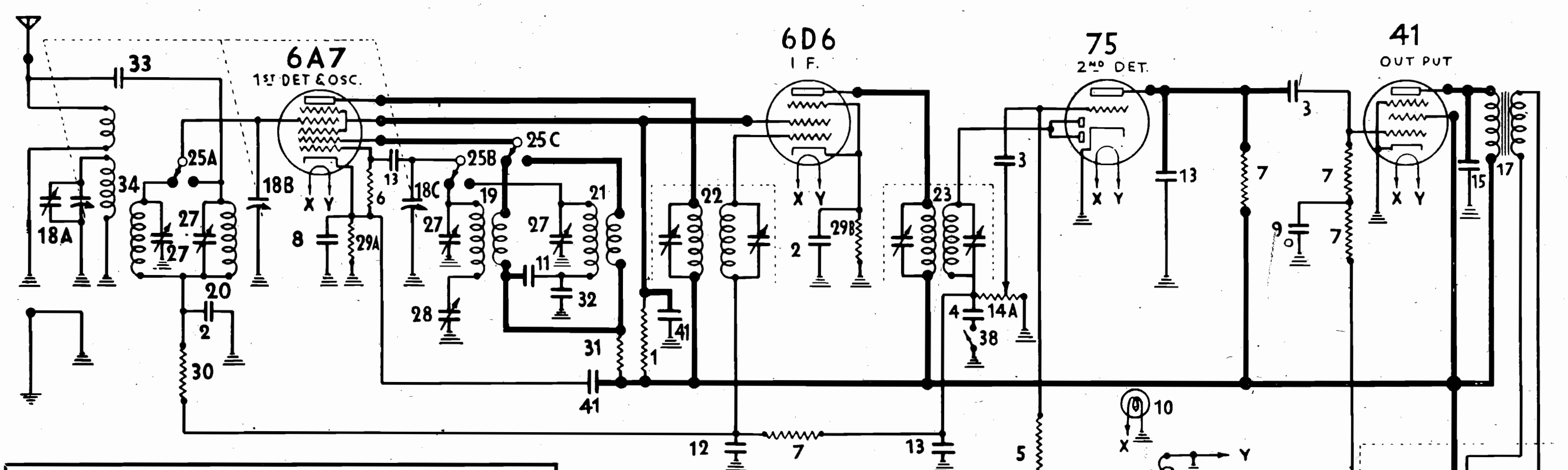
4. (a) **Connect a 400 to 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor is necessary to secure proper alignment of the detector trimmer.**
   (b) Ground the receiver chassis and connect the oscillator ground lead to the chassis.
   (c) Set the test oscillator to about 1400 kc. and carefully tune the receiver to the signal.
   (d) Adjust trimmer No. 5 (detector shunt trimmer) for maximum output meter reading.
   (e) Retune the receiver dial to a peak and readjust the trimmer.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

Part No.		List Price
17615	Volume Control Mtg. Lock Washer (3/8")	$0.01
31622	Tuning Dial Set Screw	.02
67034	Volume Control Mtg. Nut (3/8"-32)	.03
67263	No. 6 x 1/4" Self Tapping Screw	.03
81834	Six Prong Tube Socket	.10
81837	Four Prong Tube Socket	.15
81949	Seven Prong Tube Socket	.10
83552	Chassis Mtg. Screw (No. 10 x 7/8" Self Tapping)	.03
83574	Dial Light Socket and Bracket	.15
83578	Escutcheon Mtg. Wood Screw (No. 1 x 1/4" R.H.)	.01
83587	Front Plate Mtg. Screw (No. 8 x 1 1/4" Ornamental Head)	.01
83624	No. 8 x 1/4" Self Tapping Screw	.01
83941	Tuning Dial and Bushing	.40
83945	Volume Control Dial & Bracket	1.10
83970	Escutcheon Plate	.25
84015	Knob Washer (Paper 5/8" O.D.)	.01
84016	Rubber Washer (3/4" O.D.)	.02
84017	Knob (Model 1231)	.14
84130	Metal Front Grill (Model 1235 Only)	.80
84343	Knob (Model 1235 & 1236)	.18
84541	Wave Trap (to Eliminate 456 K.C. Code Interference)	1.00

MODELS 1251 to 1259
Chassis R-125
Schematic, Socket Voltage, Parts

STEWART WARNER CORP.



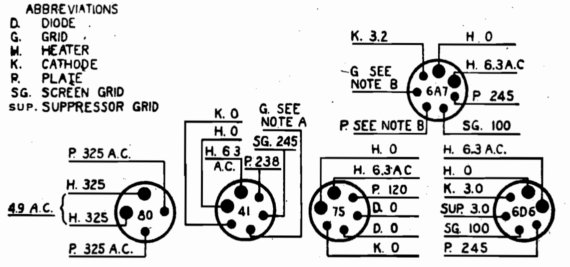
I. F. FREQUENCY 456 K. C.

SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS Volume Control on Full ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION DIAL SET AT 530 K. C.

VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINALS AS SEEN FROM THE BOTTOM

ABBREVIATIONS
D. DIODE
G. GRID
H. HEATER
K. CATHODE
P. PLATE
SG. SCREEN GRID
SUP. SUPPRESSOR GRID



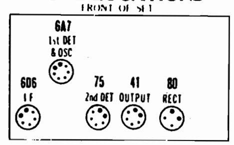
IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Speaker field voltage with coil warm is 73 volts D. C.

NOTE A: The actual bias on the 41 output tube is —16.5 volts measured across the metal clad bias resistor 43C and 43D. The grid bias on the 75 2nd detector tube is —1.5 volts measured across the metal clad bias resistor 43C.

NOTE B: The oscillator plate voltage with the range switch on broadcast position and with the dial set at 530 K.C. should be approximately 172 volts. The oscillator grid voltage under similar conditions should be approximately —22 volts.

TUBE LOCATIONS
FRONT OF SET



R-125 PARTS LIST

Diag. No.	Part No.	DESCRIPTION	List Price
1	62183	30,000 ohm, 1 watt carbon resistor	$0.20
2	81630	.1 mfd. 100 volt paper condenser	.30
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83011	.004 mfd. 600 volt paper condenser	.30
5	83072	510,000 ohm, 1/4 watt carbon resistor	.20
6	83080	51,000 ohm, 1/4 watt carbon resistor	.20
7	83082	260,000 ohm, 1/4 watt carbon resistor	.20
8	83214	.25 mfd. 250 volt paper condenser	.30
9	83219	.01 mfd. 600 volt paper condenser	.30
10	83278	6.3 volt Dial Light bulb	.15
11	83352	.015 mfd. 600 volt paper condenser	.35
12	83353	.05 mfd. 100 volt paper condenser	.30
13	83539	.00026 mfd. molded mica condenser	.25
14-A, 14-B	83551	500,000 ohm volume control and line switch	1.25
15	83706	.006 mfd. 600 volt paper condenser	.35
16	83976	.012 mfd. 1000 volt shielded paper condenser	.35
17	84153	Output transformer (for R-226 8 inch speaker) (See 84312 for 12 inch speaker transformer)	2.25
18-A, 18-B, 18-C	84174	Three gang variable condenser	4.00
19	84180	Broadcast Oscillator Coil	.60
20	84183	Short Wave Antenna Coil	.50
21	84185	Short Wave Oscillator Coil	.80
22	84187	1st I. F. Transformer	1.75
23	84188	2nd I. F. Transformer	1.75
24	84189	Power Transformer 115 volts 60 cycles, R-125-A only (See No. 84408 for other voltages and frequencies)	4.00
25-A, 25-B, 25-C	84191	Range Switch	$0.75
26	84193	16 mfd. 350 volt Wet Electrolytic Condenser	1.50
27	84194	R. F. Trimmer Condenser (3 to 23 mmfd.)	.15
28	84195	Oscillator Padding Trimmer (300-600 mmfd.)	.50
29-A, 29-B, 29-C, 29-D	84196	300 ohm resistor; 300 ohm resistor; 25 ohm resistor; 275 ohm resistor	.65
30	84198	110,000 ohm 1/4 watt carbon resistor	.20
31	84199	16,000 ohm 1/4 watt carbon resistor	.20
32	84200	.004 mfd. molded mica condenser	.50
33	84220	Antenna Coupling Condenser (20 mmfd.)	.15
34	84229	Broadcast Pre-Selector Coil Assembly consists of No. 84175 and 84178 coils	1.00
	84312	Output Transformer (on R-227 12" Speaker)	2.50
	84404	Phonograph Switch (D.P.D.T.) (R-125-X only)	1.10
	84407	Phonograph Terminal Strip (R-125-X only)	.12
	84408	Power Transformer (100 to 240 volts, 25 to 133 cycles, R-125-X only)	7.00
38	84420	Tone Control Switch	.30
39	84504	Diaphragm and Shell Assembly for R-226 8" Speaker (Also see 84506)	2.50
40	84505	Field Coil and Housing for R-226 8" Speaker	3.75
	84506	Diaphragm and Shell Assembly for R-227 12" Speaker	3.25
	84507	Field Coil and Housing, for R-227 12" Speaker	4.00
41	84601	.25 mfd. 300 volt paper condenser	.30

MODELS 1251 to 1259
Chassis R-125
Alignment, Trimmers

STEWART WARNER CORP.

MODEL R-125 CHASSIS (Receiver Models 1251 to 1259)

ALIGNING EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R125 cannot be properly aligned by ear or "on the air". **An output meter and a high grade modulated service oscillator are absolutely essential.**

The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C., and a short wave range extending to 4000 K.C. or more.

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

PRELIMINARY STEPS

To align the R125 chassis proceed as follows:

1. Remove the chassis from the cabinet.
2. Connect the output meter across the primary of the output transformer on the dynamic speaker (center and blue wires on terminal strip.)
3. Turn the volume control to maximum volume position.

ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 K.C.

(b) Connect the output leads of the oscillator to the 6A7 control grid and ground.

(c) Set the range switch (right hand knob) to the broadcast position (fully clockwise). Make certain that no station is tuned in.

(d) Carefully adjust the I.F. Transformer trimmers Nos. 1, 2, 3, and 4 for maximum output meter deflection.

(e) Repeat the four trimmer adjustments since the adjustment of each trimmer has some effect on the others.

BROADCAST RANGE CALIBRATION

1. Check the position of the dial on the condenser shaft by **pushing** the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be **pushed** with the fingers and **not turned** by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Calibrate the set at the high frequency end. Use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided its calibration is accurately known.

(a) Turn the set dial to the exact frequency setting of the signal (either a station or the oscillator).

(b) Carefully adjust trimmer No. 5 (broadcast oscillator calibration trimmer) until the signal may be tuned in with maximum volume at its correct frequency. setting.

BROADCAST RANGE ALIGNMENT

4. CONNECT A 400 OR 500 OHM, 1 WATT CARBON RESISTOR IN SERIES WITH THE TEST OSCILLATOR OUTPUT AND THE RECEIVER ANTENNA LEAD. THIS RESISTOR MUST REMAIN CONNECTED FOR ALL BROADCAST AND SHORT WAVE ADJUSTMENTS IN ORDER TO SECURE PROPER ALIGNMENT OF THE ANTENNA STAGE. GROUND THE RECEIVER CHASSIS AND CONNECT THE OSCILLATOR GROUND LEAD TO THE CHASSIS.

5. (a) Set the test oscillator to approximately 1400 K.C. and carefully tune the receiver to the signal.

(b) Adjust trimmers No. 6 and No. 7 (broadcast detector shunt trimmer and broadcast pre-selector shunt trimmer respectively) for maximum output meter reading.

(c) Retune the receiver and check the adjustments of trimmers No. 6 and No. 7. Do not touch trimmer No. 5 since this will change the calibration.

6. (a) Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal.

(b) Adjust Trimmer No. 8 (broadcast oscillator padding trimmer) to get maximum output meter deflection.

(c) Retune the receiver dial to a peak and readjust the trimmer.

(d) Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. **This procedure must be followed or the receiver will not be properly aligned.**

7. Repeat 5 a, 5 b, and 5 c.

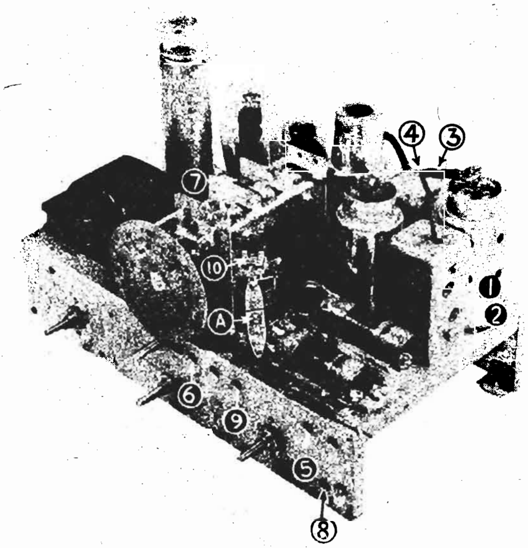
SHORT WAVE RANGE CALIBRATION

1. Turn the receiver range switch to the short wave band position (counter-clockwise).

2. Adjust the test oscillator to **exactly** 16,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 8000 K.C., the third harmonic of 5333 K.C., or the fourth harmonic of 4000 K.C., all of which will give a 16,000 K.C. signal.

3. (a) Set the receiver dial at 16.0 M.C. on the dial scale and adjust trimmer No. 9 (shortwave range oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum volume. Usually there will be two peaks. The proper one is that with the trimmer screw farthest out.

(b) To be sure you have not adjusted trimmer No. 9 to the image frequency, check this point by setting the receiver dial to the image frequency, approximately 15.1 M.C., and see if the image signal can be heard. **(The image frequency is always the signal frequency minus twice the I.F. frequency or in this case 16,000 — 912 = 15,088 K.C. or approximately 15.1 M.C.)** If no signal can be heard at 15.1 M.C. dial setting even with greatly increased test oscillator output, but can be heard at 16.9 M.C. dial setting, Trimmer No. 9 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After readjusting trimmer No 9, again check to see that the image comes in at 15.1 M.C. dial setting and not at 16.9 M.C. dial setting.



SHORT WAVE RANGE ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency, 16.0 M.C. for maximum output meter reading.

(b) Adjust trimmer No. 10 (second shortwave range detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 10 slightly and retuning the receiver dial. Continue detuning trimmer No. 10 and retuning the set until maximum output meter deflection is secured.

IMPORTANT: The antenna coupling condenser marked "A" in the diagram is adjusted to a definite capacity at the factory and should not require any further adjustment. Therefore do not adjust trimmer "A" unless it is found that trimmer No 10 will not peak or if maximum output is obtained with No 10 either all the way out or all the way in. If it is necessary to adjust trimmer "A", turn its adjusting screw all the way in and then turn it out just far enough to give a satisfactory peak on No. 10 when trimmer No. 10's adjusting screw is almost all the way out.

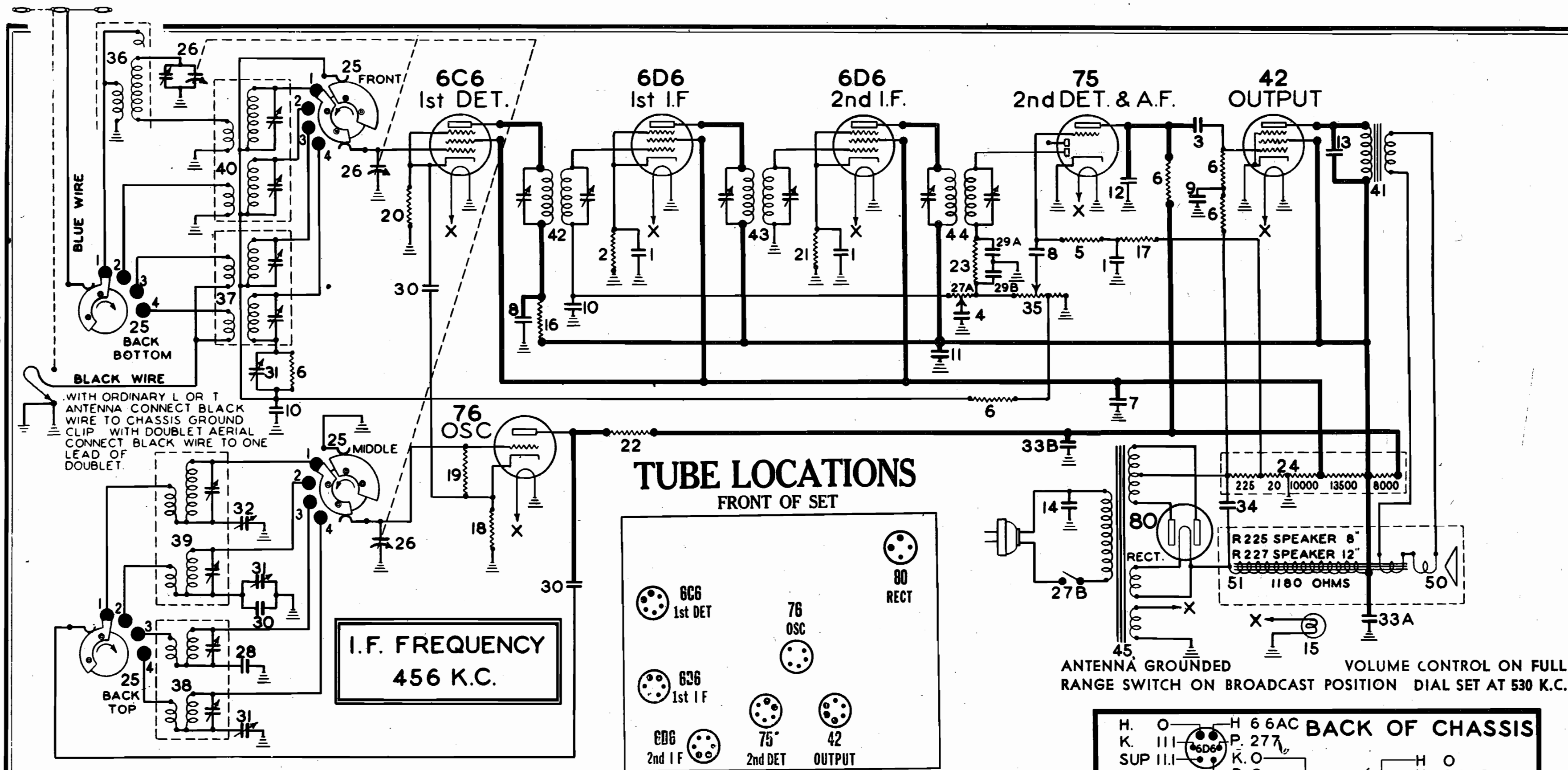
Always readjust No. 10 after adjusting trimmer "A".

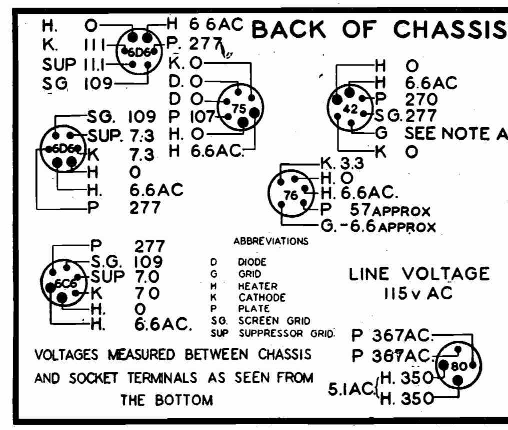
(c) Check the adjustment of trimmer No. 10 by tuning the receiver to 15.1 M.C. and noting if the image signal is much weaker than the 16.0 M.C. signal. If the signal at 15.1 M.C. dial setting is equal to or stronger than the 16.0 M.C. signal, trimmer No. 10 is not set to the proper peak and must be reset as in 4 (b) until a re-check shows that the signal at the 16.0 M.C. dial setting is much stronger than that at the 15.1 M.C. image dial setting.

NOTE: To prevent the trimmers from being jarred out of adjustment use Duco Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.

STEWART WARNER CORP.

MODELS 1261 to 1269
Chassis R-126
Schematic, Socket Voltage, Parts





Diag. No.	Part No.	Description
1	81630	.1 mfd. 100 v. cond.
2	81829	1500 ohm. ¼ w. res.
3	83007	.02 mfd. 600 v. cond.
4	83011	.004 mfd. 600 v. cond.
5	83072	510,000 ohm ¼ w. res.
6	83082	260,000 ohm ¼ w. res.
7	83214	.25 mfd. 250 v. cond.
8	83219	.01 mfd. 600 v. cond.
9	83352	.015 mfd. 600 v. cond.
10	83353	.05 mfd. 100 v. cond.
11	83440	.1 mfd. 400 v. cond.
12	83539	.00026 mfd. mica cond.
13	83706	.006 mfd. 600 v. cond.
14	83976	.012 mfd. 1000 v. cond.
15	84058	Dial bulb (6-8 volt)
16	84199	16,000 ohm, ¼ w. res.
17	84235	1.1 meg., ¼ w. res.
18	84237	510 ohm, ¼ w. res.
19	84238	11,000 ohm, ¼ w. res.
20	84239	6,100 ohm, ¼ w. res.
21	84240	4,000 ohm, ¼ w. res.
22	84241	31,000 ohm, ½ w. res.

Diag. No.	Part No.	Description
23	84242	31,000 ohm, ¼ w. res.
24	84273	Voltage divider
25	84274	Range switch
26	84275	3 gang variable condenser
27A, 27B	84279	300,000 ohm tone control and line switch
28	84280	.006 mfd. mica condenser
29A, 29B	84281	Dual .00026 mfd. mica cond.
30	84282	.001 mfd. mica condenser
31	84283	Short wave padding trimmer
32	84284	Broadcast padding trimmer
33A, 33B	84286	8 mfd. 450 v.cond. / 2 mfd. 400 v.cond.
34	84288	14 mfd. 475 v. cond.
35	84289	500,000 ohm vol. cont. (tap at 125,000 ohms from ground)
36	84290	Broadcast antenna coil
	84295	Coil trimmer condenser
37	84298	No. 3 ant. coil and trimmer / No. 4 ant. coil and trimmer
38	84302	No. 3 osc. coil and trimmer / No. 4 osc. coil and trimmer
39	84305	Broadcast osc. coil & trimmer / No. 2 osc. coil and trimmer

Diag. No.	Part No.	Description
40	84308	B.C. 1st det. coil & trimmer / No. 2 ant. coil and trimmer
41	84312	Output transformer
42	84320	1st I.F. trans. (or sub. 84187)
43	84321	2nd I.F. trans. (or sub. 84187)
44	84322	3rd I.F. trans. (or sub. 84188)
45	84324	Power transformer (115 volts 60 cycles) (R-126-A only) (See 84410 for 100-240 volts)
46	84404	Phono. switch (R-126-X only)
47	84407	Phonograph Terminal Strip (R-126 x only)
	84410	Power trans. (100 to 240 volts, 25 to 133 cycles) (R-126-P & X)
49	84412	Phonograph Terminal Strip (R-126-P only)
50	84504	Diaphragm and shell assem. for 8" speaker (also see 84506)
51	84505	Field coil assem. R-225 speaker
	84506	Diaphragm and shell assem. for R-227 12" speaker
	84507	Field coil assem. R-227 speaker
	R-225	8" speaker and output trans.
	R-227	12" speaker and output trans.

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

Speaker field voltage with coil warm is 75 volts.

Note A: The actual bias on the 42 tube is —17.5 V. measured across the 225 and 20 ohm sections of the voltage divider. The grid bias on the 75 tube is —1.4 V. volts measured across the 20 ohm section of the voltage divider.

MODELS 1261 to 1269
Chassis R-126
Circuit Data, Trimmers
Alignment

STEWART WARNER CORP.

STEWART-WARNER MODEL R-126 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-126 chassis is a seven-tube all-wave superheterodyne, covering a frequency range from 530 kilocycles to 23 megacycles in four tuning ranges, which can be selected by means of the range switch. This range switch is used to connect proper coils into the antenna and oscillator circuits, different coils being used for each range. Trimmer condensers are provided on each coil so that each circuit can be properly adjusted to give maximum efficiency on every frequency range. The spacing between the two coils wound on each form is sufficient to prevent coupling. To further guard against dead spots due to the absorption effects of the unused coils, the range switch is provided with contact arms which short circuit all coils of the ranges lower in frequency than the one in use.

Special, electrically symmetrical, antenna coils are employed so that efficient, relatively noise-free shortwave reception can be secured with a doublet-type of antenna without the use of any additional coupling devices. These coils are also designed so that a standard antenna having a single wire lead-in can be used where the noise level is low on the shortwave ranges.

A tuned pre-selector circuit is used only on the broadcast range to improve selectivity. After passing through this circuit, the signal is fed into the 6C6 first detector tube where it beats with the output of the 76 oscillator tube to produce a 456 kc. intermediate frequency signal. This particular frequency is chosen as the best value for an all-wave receiver, since it reduces image interference on the shortwave ranges.

The 456 kc. signal is amplified by the two-stage, high-gain I.F. amplifier using two 6D6 tubes. The amplified signal is then rectified by the 75 diode, producing a modulated D.C. voltage drop across the 500,000 ohm volume control. Any selected part of this voltage is impressed on the triode section of the 75 tube.

The triode section of the 75 tube operates as an audio frequency amplifier, which is resistance coupled to the 42 pentode power output tube.

The A.V.C. voltage is secured by smoothing out the modulated D.C. voltage drop across the volume control and applying it to the control grid of the first I.F. tube. To improve the A.V.C. action part of the voltage is also applied to the control grid of the 6C6 first detector tube.

CALIBRATION AND ALIGNMENT

TEST EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-126 cannot be properly aligned by ear or "on the air." **A high grade modulated service oscillator and an output meter are absolutely essential.**

The oscillator should be capable of generating the frequencies of 456 kc., 600 kc., 1400 kc., and a short wave range extending to 4000 kc., or more. This oscillator must provide a wide range of signal output—very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics may be used.

PRECAUTIONS

When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

At all times during calibration and alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

For making trimmer adjustments use a bakelite aligning tool which has only a small metal screw driver tip.

Very Important: In aligning all but the I.F. stages it is absolutely necessary to have a 400 to 500 ohm CARBON resistor in series with the antenna lead to the oscillator. Do not omit this resistor or the alignment will be incorrect!

PRELIMINARY STEPS

To align the R-126 chassis proceed as follows:
Remove the chassis from the cabinet.
Connect the output meter across the primary of the output transformer on the dynamic speaker. (Center and blue wires on terminal strip.)
Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

I. F. AMPLIFIER

1., 2. } 1st I.F. transformer trimmers
3., 4. } 2nd I.F. transformer trimmers
5., 6. } 3rd I.F. transformer trimmers

530 TO 1540 K.C. BROADCAST RANGE

7. Range No. 1 (Broadcast) oscillator calibration trimmer
8. Range No. 1. (Broadcast) detector shunt trimmer
9. Range No. 1 (Broadcast) pre-selector shunt trimmer
10. Range No. 1 (Broadcast) oscillator padding trimmer

1500 TO 4600 K.C. SHORTWAVE RANGE

11. Range No. 2 oscillator calibration trimmer
12. Range No. 2 detector shunt trimmer
13. Range No. 2 oscillator padding trimmer

4.3 TO 12.6 MC. SHORTWAVE RANGE

14. Range No. 3 oscillator calibration trimmer
15. Range No. 3 detector shunt trimmer

11.0 TO 23.0 MC. SHORTWAVE RANGE

16. Range No. 4 oscillator calibration trimmer
17. Range No. 4 detector shunt trimmer
18. Range No. 4 oscillator padding trimmer
19. Range No. 4 detector padding trimmer

CALIBRATION AND ALIGNMENT

The following procedure on the proper adjustment of the various trimmers is divided into two classifications, **calibration** and **alignment. Calibration** consists of the adjustment of trimmers so that the signals can be received at the proper dial settings. Calibration on the R-126 is made at the high frequency end of the dial. In addition, there is also a calibration adjustment at the low frequency end of range No. 4. **Alignment** consists of adjustment of trimmers such that the antenna and oscillator circuits are tuned to give maximum sensitivity. Alignment thus does not concern the dial setting so that it is often only necessary to check calibration. However, if a re-calibration is made it is always necessary to go over the alignment. The calibration and alignment of each range is independent of all others so that one range may be re-calibrated or re-aligned without necessitating going over the trimmer adjustments on any of the other ranges.

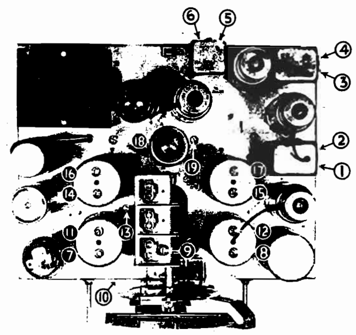
ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 kc.
(b) Connect the output leads of the oscillator to the 6C6 control grid and ground.
(c) Set the range switch (lower center knob) to the broadcast position (dial pointer on black dial scale). Make certain that no station is tuned in.
(d) Carefully adjust the I.F. Transformer trimmers No. 1, 2, 3, 4, 5, and 6 for maximum output meter deflection.
(e) Repeat the six trimmer adjustments since the adjustment of each trimmer has some effect on the others.

RANGE NO. 1 (BROADCAST) CALIBRATION

2. Check the position of the dial on the condenser shaft by turning the rotor plates of the gang condenser to full mesh. The dial should then read 530 kc. (The last division at low frequency end of the broadcast range.)
3. Leave the range switch in the broadcast position.

4. **Use a broadcast station signal between 1300 and 1420 kc. to calibrate the receiver dial on the broadcast range. If** no such station can be heard, you can use a 1400 kc. signal from your oscillator provided its calibration is accurately known. Proceed as follows:
(a) Set the receiver dial pointer to the exact frequency setting of the signal (either a station or the oscillator.)
(b) Carefully adjust trimmer No. 7 (Range No. 1 broadcast oscillator calibration trimmer) until the signal may be tuned in with maximum volume at its correct frequency setting.



RANGE NO. 1 (BROADCAST) ALIGNMENT

5. **CONNECT A 400 OR 500 OHM, 1 WATT CARBON RESISTOR IN SERIES WITH THE TEST OSCILLATOR OUTPUT AND THE RECEIVER ANTENNA LEAD. THIS RESISTOR MUST REMAIN CONNECTED FOR ALL BROADCAST AND SHORT WAVE ADJUSTMENTS IN ORDER TO SECURE PROPER ALIGNMENT OF THE ANTENNA STAGE. GROUND THE RECEIVER CHASSIS AND CONNECT THE OSCILLATOR GROUND LEAD TO THE CHASSIS.**

6. (a) Set the test oscillator to approximately 1400 kc. and carefully tune the receiver to the signal.
(b) Adjust trimmers No. 8 and No. 9 (Range No. 1 broadcast detector shunt trimmer and Range No. 1 broadcast pre-selector shunt trimmer, respectively) for maximum output meter reading.
(c) Retune the receiver and check the adjustments of trimmers No. 8 and No. 9. Do not touch trimmer No. 7 since this will change the calibration.

7. (a) Set the test oscillator to approximately 600 kc. and tune the receiver to the signal.
(b) Adjust trimmer No. 10 (Range No. 1 broadcast oscillator padding trimmer) to get maximum output meter deflection.
(c) Retune the receiver dial to a peak and readjust the trimmer.
(d) Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. **This procedure must be followed or the receiver will not be properly aligned.**

8. Repeat 6 a, 6 b, and 6 c.

RANGE NO. 2 CALIBRATION

9. Turn receiver range switch to the range No. 2 position. (Dial pointer on red dial scale.)

10. (a) Adjust the oscillator to exactly 4000 kc.
(b) Set the receiver dial pointer to exactly 4000 kc. on the red dial scale and adjust trimmer No. 11 (range No. 2 oscillator calibration trimmer) until the signal comes in with maximum volume. If there are two peaks, the proper one is that with the trimmer screw farthest out.
(c) To be sure you have not adjusted trimmer No. 11 to the image frequency, check this point by tuning the receiver dial to the image frequency, approximately 3100 kc. and see if the image signal can be heard. **(The image frequency is the signal frequency minus twice the I.F. frequency or in this case 4000 — 912 = 3088 kc. or approximately 3100 kc.)** If no signal can be heard at about 3100 kc. dial setting even with greatly increased test oscillator output, trimmer No. 11 is evidently improperly adjusted and so must be reset to a new peak with the screw farther out. After re-adjusting trimmer No. 11 again check to see that the image comes in at 3100 kc. dial setting.

RANGE NO. 2 ALIGNMENT

11. (a) Tune the set very carefully to the oscillator signal at 4000 kc. for maximum output meter reading.
(b) Adjust trimmer No. 12 (range No. 2 detector shunt trimmer) to a peak.
(c) Check the adjustment of trimmer No. 12 by tuning the receiver to the image at about 3100 kc. and noting if the image signal is much weaker than the 4000 kc. signal. If the signal at 3100 kc. dial setting is equal to or stronger than the 4000 kc. signal trimmer No. 12 is not set to the proper peak and must be reset until a recheck shows that the signal at 4000 kc. dial setting is much stronger than at the 3100 kc. image dial setting.

12. (a) Set the test oscillator to approximately 1750 kc. and tune the receiver to the signal.
(b) Adjust trimmer No. 13 (range No. 2 oscillator padding trimmer) to get maximum output meter deflection.
(c) Retune the receiver dial to a peak and readjust the trimmer.
(d) Continue this procedure of adjusting the trimmer and retuning the dial until the output meter reading cannot be further increased.

RANGE NO. 3 CALIBRATION

13. Turn the receiver range switch to the range No. 3 position, (dial pointer on green dial scale).

14. (a) Adjust the test oscillator to **exactly** 12,000 kc. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 6000 kc., the third harmonic of 4000 kc., or the fourth harmonic of 3000 kc., all of which will give a 12,000 kc. signal.
(b) Set the receiver dial pointer at **exactly** 12.0 mc. on the green dial scale and adjust trimmer No. 14 (range No. 3 oscillator calibration trimmer) until the signal is tuned in with maximum volume. Usually there will be two peaks. The proper one is that with the trimmer screw farthest out.
(c) To be sure you have not adjusted trimmer No. 14 to the image frequency, check this point by tuning the receiver dial to the image frequency, approximately 11.1 mc., and see if the image signal can be heard. If no signal can be heard at 11.1 mc. dial setting even with greatly increased test oscillator output, trimmer No. 14 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After re-adjusting trimmer No. 14, again check to see that the image comes in at 11.1 mc. dial setting.

RANGE NO. 3 ALIGNMENT

15. (a) Tune the set very carefully to the oscillator signal at 12.0 mc. for maximum output meter reading.
(b) Adjust trimmer No. 15 (range No. 3 detector shunt trimmer) to a peak. After this is done try to increase the output meter by detuning trimmer No. 15 slightly and retuning the receiver dial. Continue detuning trimmer No. 15 and retuning the set until maximum output meter deflection is secured.
(c) Check the adjustment of trimmer No. 15 by tuning the receiver to the image at 11.1 mc. and noting if the image signal is much weaker than the 12.0 mc. signal. If the signal at 11.1 mc. dial setting is equal to or stronger than the 12.0 mc. signal, trimmer No. 15 is not set to the proper peak and must be reset as in 15 (b), until a recheck **shows that the** 12.0 mc. dial setting is much stronger that **at the** 11.1 **mc.** image dial setting.

MODELS 1261 to 1269
Chassis R-126
Alignment,Part 2
Parts List
MODELS R-126-P,R-126-X
Data

STEWART WARNER CORP.

RANGE NO. 4 CALIBRATION

16. Turn the receiver range switch to the No. 4 position, (dial pointer on purple dial scale).

17. Leave the test oscillator set to **exactly** 12,000 kc.

(a) Set the receiver dial pointer to **exactly** 12.0 mc. on the purple dial scale.

(b) Adjust trimmer No. 18 (range No. 4 oscillator padding trimmer) until the signal gives maximum output meter reading.

(c) To be sure that you have not adjusted trimmer No. 18 on the image frequency, tune in the image signal at approximately 11.1 mc. on the receiving dial. If no signal can be heard at 11.1 mc. even with greatly increased test oscillator output, but can be heard at 12.9 mc. dial setting, trimmer No. 18 is evidently adjusted to the image frequency and so must be reset to the proper peak with the trimmer screw farther out. After re-adjusting trimmer No. 18, again check to see that the image comes in at 11.1 mc. dial setting and not at the 12.9 mc. dial setting.

18. (a) Set the test oscillator to **exactly** 20,000 kc. If your oscillator cannot reach this frequency, use the 2nd harmonic of 10,000 kc., the third harmonic of 6666 kc., the fourth harmonic of 5000 kc., or the fifth harmonic of 4000 kc. all of which will give a 20,000 kc. signal

(b) Set the receiver dial pointer to **exactly** 20.0 mc. on the purple dial scale.

(c) Adjust trimmer No. 16 (range No. 4 oscillator calibration trimmer) until the signal is tuned in with maximum volume. In adjusting the trimmer, there usually will be two peaks. The proper one is that with the trimmer screw farthest out.

(d) To be sure you have not adjusted trimmer No. 16 to the image frequency, check this point by tuning the receiver dial to the image frequency, approximately 19.1 mc. and see if the image signal can be heard. If no signal can be heard at 19.1 mc. dial setting even with greatly increased test oscillator output, but can be heard at 20.9 mc. dial setting, trimmer No. 16 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After re-adjusting trimmer No. 16 again check to see that the image comes in at 19.1 mc. dial setting and not at 20.9 mc. dial setting.

RANGE NO. 4 ALIGNMENT

19. (a) Tune the set very carefully to the oscillator frequency, 20.0 mc., for maximum output meter reading.

(b) Adjust trimmer No. 17 (range No. 4 detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 17 slightly and retuning the receiver dial. Continue detuning trimmer No. 17 and retuning the set until maximum output meter deflection is secured.

(c) Check the adjustment of trimmer No. 17 by tuning the receiver to 19.1 mc. and noting if the image signal is much weaker than the 20.0 mc. signal. If the signal at 19.1 mc. dial setting is equal to or stronger than the 20.0 mc. signal, trimmer No. 17 is not set to the proper peak and must be reset as in 19b until a recheck shows that the signal at the 20.0 mc. dial setting is much stronger than that at the 19.1 mc. image dial setting.

20. (a) Set the test oscillator to about 12,000 kc. or use the second harmonic of 6000 kc., the third harmonic of 4000 kc., or the fourth harmonic of 3000 kc., all of which give a 12,000 kc. signal.

(b) Tune the set very carefully to the oscillator signal at 12.0 mc. to get maximum output meter reading.

(c) Adjust trimmer No. 19 (range No. 4 detector padding trimmer) to get maximum output meter deflection.

(d) Retune the receiver dial to a peak and readjust the trimmer.

(e) Continue this procedure of adjusting the trimmer and retuning the receiver until the output meter reading cannot be increased.

(f) Check the adjustment of padding trimmer No. 19 by tuning the receiver dial to the image signal at 11.1 mc. and noting if the image signal is much weaker than the 12 mc. signal. In case the signal at the 11.1 mc. dial setting is equal to or stronger than the signal at 12.0 mc., padding trimmer No. 19 must be re-adjusted to a different peak as in 20 (c), 20 (d) and 20 (e), so that the 11.1 mc. dial setting signal is much weaker than the 12.0 mc. dial setting signal.

NOTE: To prevent the trimmers from being jarred out of adjustment, use Duco Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

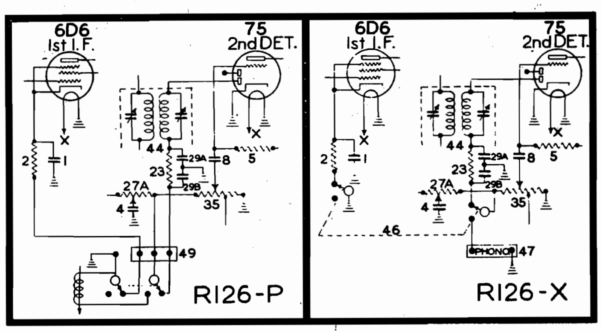
PART No.	DESCRIPTION	LIST PRICE
17615	Lock Washer for range switch	.01
67034	Mtg. nut for range switch, tone and volume controls	.03
67263	No. 6 x ¼" hex. head self tapping screw	.03
67567	Large terminal lug for No. 84288 wet electrolytic condenser	.05
67568	Extruded insulating washer for No. 84288 electrolytic condenser	.05
67681	Plain insulating washer for No. 84288 electrolytic condenser	.03
67977	Chassis mounting screw (No. 14 self tapping)	.03
81090	Escutcheon mounting screws (No. 1 x ¼") per 100	.60
81091	Speaker mounting screw (Console models only)	.01
81214	Set screw (for No. 84430 knob)	.02
81433	Set screw (for No. 84431 lever knob)	.02
81723	Ground clip	.10
81834	6 prong tube socket	.10
81837	4 prong tube socket	.15
81951	5 prong tube socket	.10
83249	Felt knob washer	.01
83318	Rubber grommet for mtg. gang condenser	.03
83497	Knob for volume and tone control	.20
83560	Tube shield	.15
83587	Baffle mounting screw (ornamental head)	.01
83614	Mtg. nut for No. 84286 Dual electrolytic condenser	.03
83668	Mtg. nut for No. 84288 Wet electrolytic condenser	.03
84203	2 lug terminal strip	.05
84234	Tube shield cap	.05
84270	Dial Escutcheon	.65
84287	Lock washer for No. 84286 Dual electrolytic condenser	.01
84318	Shielded control grid lead and clip	.20
84328	Shielded volume control cable	.30
84339	Cardboard filler (Models 1261 and 1262 only)	.05
84405	Knurled nut for phonograph switch	.02
84406	Escutcheon for phonograph switch	.02
84421	Lock washer for phonograph switch	.01
84428	Chassis mounting rubber washer	.03
84430	Knob for tuning control	.25
84431	Lever knob for range switch	.35

MODEL R-126 TUNING DRIVE PARTS

PART No.	DESCRIPTION	LIST PRICE
81108	Shaft Positioning Spring	.01
81109	Small Rubber Drive Ring	.03
81114	Gear Sector and Dial Disc Set Screw	.04
84246	Large Rubber Drive Ring	.02
84252	Vernier Drive Shaft with Drive Rings	.40
84253	Knob Drive Shaft and Knurled Drive	.20
84256	Dial Disc and Bushing	.30
84257	Gear Sector and Bushing	.20
84258	Dial Pointer and Bracket	.50
84259	Dial Light Bracket and Socket	.20
84260	Dial, Frame, and Rack Assembly	.75
84265	Dial Guide Bracket	.15
84272	Front Variable Condenser and Drive Mtg. Bracket	.15
84276	Dial only	.45

MODEL R126-P AND R126-X

100 TO 260 VOLTS, 25 TO 133 CYCLES



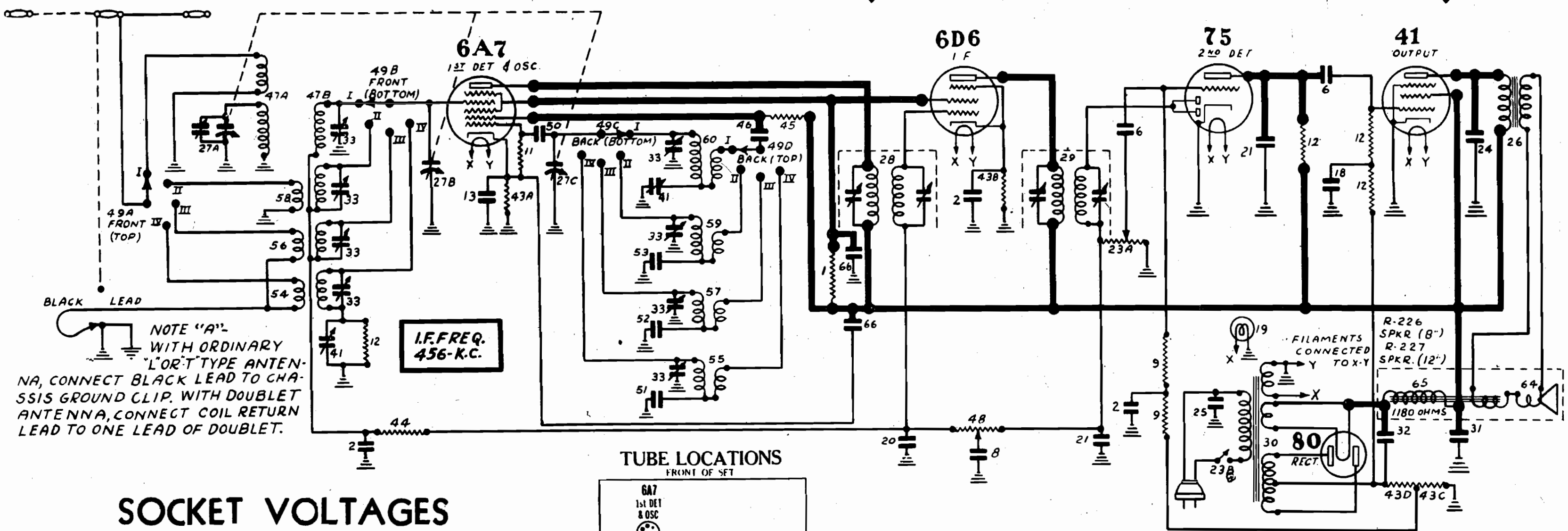
SEE PARTS LIST ON FIRST PAGE FOR PART NUMBERS, DESCRIPTIONS AND PRICES.

PHONOGRAPH AND UNIVERSAL POWER TRANSFORMER CONNECTIONS IN MODEL R-126-P AND R-126-X CHASSIS.

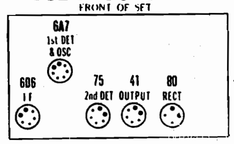
MODELS 1271 to 1279
Chassis R-127
Schematic, Socket
Voltage, Parts

STEWART WARNER CORP.

STEWART-WARNER MODEL R-127 CHASSIS (RECEIVER MODELS 1271 to 1279)



TUBE LOCATIONS

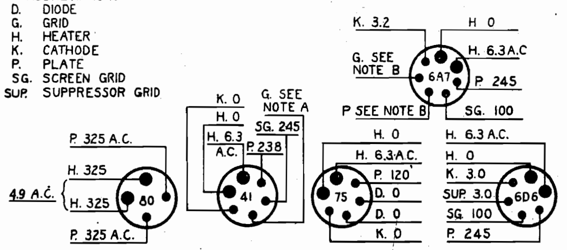


SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS Volume Control on Full ANTENNA GROUNDED
RANGE SWITCH SET ON BROADCAST POSITION DIAL SET AT 530 K. C.

VOLTAGES MEASURED BETWEEN CHASSIS AND
SOCKET TERMINALS AS SEEN FROM THE BOTTOM

ABBREVIATIONS
D. DIODE
G. GRID
H. HEATER
K. CATHODE
P. PLATE
SG. SCREEN GRID
SUP. SUPPRESSOR GRID



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Speaker field voltage with coil warm is 73 volts D. C.

NOTE A: The actual bias on the 41 output tube is —16.5 volts measured across the metal clad bias resistor 43C and 43D. The grid bias on the 75 2nd detector tube is —1.5 volts measured across the metal clad bias resistor 43C.

NOTE B: The oscillator plate voltage with the range switch on broadcast position and with the dial set at 530 K.C. should be approximately 188 volts. The oscillator grid voltage under similar conditions should be approximately —14 volts.

R-127 PARTS LIST

SEE FOURTH PAGE FOR MISCELLANEOUS PARTS

Diag. No.	Part No.	DESCRIPTION	List Price
1	62183	30,000 ohm, 1 watt carbon resistor	$0.20
2	81630	.1 mfd. 100 volt paper condenser	.30
6	83007	.02 mfd. 600 volt paper condenser	.35
8	83011	.004 mfd. 600 volt paper condenser	.30
9	83072	510,000 ohm, 1/4 watt carbon resistor	.20
11	83080	51,000 ohm, 1/4 watt carbon resistor	.20
12	83082	260,000 ohm, 1/4 watt carbon resistor	.20
13	83214	.25 mfd. 250 volt paper condenser	.30
18	83219	.01 mfd. 600 volt paper condenser	.30
19	83278	6.3 volt dial light bulb	.15
20	83353	.05 mfd. 100 volt paper condenser	.30
21	83539	.00026 mfd. molded mica condenser	.25
23-A, 23-B	83551	500,000 ohm volume control and line switch	1.25
24	83706	.006 mfd. 600 volt paper condenser	.35
25	83976	.012 mfd. 1000 volt shielded paper condenser	.35
26	84153	Output transformer (for R-226 8" speaker). See 84312 for 12 inch speaker transformer.	2.25
27-A, 27-B, 27-C	84174	3-gang variable condenser	4.00
28	84187	1st I. F. Transformer	1.75
29	84188	2nd I. F. Transformer	1.75
30	84189	Power Transformer (110 volts, 60 cycle) (R-127-A only)	4.00
31	84192	16 mfd. 350 volt wet electrolytic condenser (sub. No. 84193)	
32	84193	16 mfd. 350 volt wet electrolytic condenser	1.50
33	84194	R. F. trimmer condenser (3 to 23 mmfd.)	.15
41	84195	Trimmer Condenser (300-600 mmfd.)	.50
43-A, 43-B, 43-C, 43-D	84196	300 ohm resistor, 300 ohm resistor, 25 ohm resistor, 275 ohm resistor, in one unit	.65
44	84198	110,000 ohm 1/4 watt carbon resistor	.20
45	84199	16,000 ohm 1/4 watt carbon resistor	$0.20
46	84200	.004 mfd. molded mica condenser	.50
47-A, 47-B	84229	Broadcast Pre-Selector Coil Assembly	1.00
	84312	Output transformer (for R-227 12" speaker)	2.50
48	84368	300,000 ohm variable tone control	.80
49-A, 49-B, 49-C, 49-D	84369	Range Switch	1.50
50	84370	.0001 mfd. molded mica condenser	.15
51	84371	.0004 mfd. molded mica condenser	.20
52	84372	.006 mfd. molded mica condenser	.60
53	84373	.0015 mfd. molded mica condenser	.25
54	84377	No. 4 band antenna coil	.90
55	84380	No. 4 band oscillator coil	.95
56	84381	No. 3 band antenna coil	.75
57	84383	No. 3 band oscillator coil	.85
58	84385	No. 2 band antenna coil	.55
59	84387	No. 2 band oscillator coil	.55
60	84389	Broadcast oscillator coil	.60
61	84404	Phonograph Switch (D.P.D.T.) (R-127-X only)	1.10
62	84407	Phonograph Terminal Strip (R-127-X only)	.12
63	84408	Power Transformer (100 to 240 volts, 25 to 133 cycles) (R-127-X only)	7.00
64	84504	Diaphragm and Shell Assembly (For R-226 8" speaker) (Also see No. 84506)	2.50
65	84505	Field Coil and Housing (For R-226 8" speaker)	3.75
	84506	Diaphragm and Shell Assembly (For R-227 12" speaker)	3.25
	84507	Field Coil and Housing (For R-227 12" speaker)	4.00
66	84601	.25 mfd. 300 volt paper condenser	.30
	R-226	8" Dynamic Speaker with output transformer	7.50
	R-227	12" Dynamic Speaker with output transformer	9.00

STEWART WARNER CORP.

MODELS 1271 to 1279
Chassis R-127
Circuit Data, Trimmers
Alignment

Service Data for Stewart-Warner R-127 Chassis
RECEIVER MODELS 1271 to 1279

STEWART-WARNER R-127 CHASSIS

CIRCUIT DESCRIPTION

The Stewart Warner Model R127 Chassis is a five tube all wave superheterodyne. It covers a frequency range from 530 kilocycles to 23 megacycles in four tuning ranges, which can be selected at will thru the medium of a range switch. This range switch is used to connect proper coils into the antenna and oscillator circuits, different coils being used for each range. The use of individual coils results in better performance since they eliminate dead spots in the tuning range which are due to absorption effects encountered when several coils are wound on the same form.

The R127A Chassis is constructed for use on 105 to 125 volts 50 to 60 cycle power circuits and the R127X is arranged for use on 100 to 260 volt lines at any frequency from 25 to 133 cycles. The universal transformer in the R-127X used for these wide ranges of voltage and frequency has a tapped primary which must be connected as shown on the tag attached to the chassis.

A special electrically symmetrical antenna coil is employed so that efficient, relatively noise free short wave reception can be secured with a doublet type of antenna without the use of any additional coupling devices. During the reception of broadcast stations the incoming signal from the antenna enters the antenna and pre-selector coils and then goes to the 6A7 combination first detector and oscillator. The pre-selector coil is not used during the reception of short wave signals. The oscillator is designed so that it generates a frequency higher than the signal such that the signal and oscillator voltages "mix" within the 6A7 pentagrid converter and always produce a resultant frequency of 456 K.C. to which the I.F. amplifier is exactly tuned. This 456 K.C. frequency of the I.F. amplifier has been chosen as the best all round value for an all wave receiver. It is particularly advantageous in reducing image interference on the short wave bands.

The 456 K.C. signal from the 6A7 enters the pre-tuned, high gain, high selectivity, I.F. amplifier employing a 6D6 type tube. The amplified signal is then rectified by the 75 diodes so that a modulated D.C. voltage drop is produced across the 500,000 ohm volume control. The volume is then controlled by impressing any selected part of this voltage on the triode section of the 75 tube. In the triode of the 75 tube the audio signal is greatly amplified and fed by resistance coupling to the 41 tube for additional amplification and power output to the loud speaker.

CALIBRATION AND ALIGNMENT OF MODEL R127 CHASSIS

TEST EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R127 cannot be properly aligned by ear or "on the air". An output meter and a high grade modulated service oscillator are absolutely essential.

The oscillator should be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C., and a short wave range extending to 4000 K.C. or more. This oscillator must provide a wide range of signal output—very weak for proper alignment of the various bands so that the A.V.C. circuit will not be actuated and very strong for use when the receiver is badly out of adjustment or for shortwave alignment where harmonics may be used.

PRECAUTIONS

1. When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies by comparison with broadcast station signals.

2. At all times during calibration and alignment use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

3. For making trimmer adjustments use a bakelite aligning tool which has only a small metal screw driver tip.

4. **VERY IMPORTANT: IN ALIGNING ALL BUT THE I.F. STAGES IT IS ABSOLUTELY NECESSARY TO HAVE A 400 TO 500 OHM CARBON RESISTOR IN SERIES WITH THE ANTENNA LEAD TO THE OSCILLATOR. DO NOT OMIT THIS RESISTOR OR THE ALIGNMENT WILL BE INCORRECT!**

PRELIMINARY STEPS

To align the R-127 chassis proceed as follows:
1. Remove the chassis from the cabinet.
2. Connect the output meter across the primary of the output transformer on the dynamic speaker (center and blue wires on terminal strip.)
3. Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

I. F. AMPLIFIER

1., 2. } 1st. I. F. transformer trimmers

3., 4. } 2nd. I. F. transformer trimmers

530 TO 1600 K.C. BROADCAST RANGE

5. Range No. 1 Broadcast oscillator calibration trimmer
6. Range No. 1 Broadcast detector shunt trimmer
7. Range No. 1 Broadcast pre-selector shunt trimmer
8. Range No. 1 Broadcast oscillator padding trimmer

1.54 TO 4.4 M.C. SHORTWAVE RANGE

9. Range No. 2 oscillator calibration trimmer
10. Range No. 2 detector shunt-trimmer

4.17 TO 12.5 M.C. SHORTWAVE RANGE

11. Range No. 3 oscillator calibration trimmer
12. Range No. 3 detector shunt trimmer

10.6 TO 23.0 M.C. SHORTWAVE RANGE

13. Range No. 4 oscillator calibration trimmer
14. Range No. 4 detector shunt trimmer
15. Range No. 4 detector padding trimmer

CALIBRATION AND ALIGNMENT

The following procedure on the proper adjustment of the various trimmers is divided into two classifications, calibration and alignment. Calibration consists of the adjustment of trimmers so that the signals can be received at the proper dial settings. Calibration on the R127 is always made at the high frequency end of the dial. Alignment consists of adjustment of trimmers such that the antenna and oscillator circuits are tuned to give maximum sensitivity. Alignment thus does not concern the dial setting so that it is often only necessary to check calibration. However, if a re-calibration is made it is always necessary to go over the alignment. The calibration and alignment of each range is independent of all others so that one range may be re-calibrated or re-aligned without necessitating going over the trimmer adjustments on any of the other ranges.

ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 K.C.
(b) Connect the output leads of the oscillator to the 6A7 control grid and ground.
(c) Set the range switch (right hand knob) to the broadcast position (fully clockwise). Make certain that no station is tuned in.
(d) Carefully adjust the I.F. Transformer trimmers Nos. 1, 2, 3, and 4 for maximum output meter deflection.
(e) Repeat the four trimmer adjustments since the adjustment of each trimmer has some effect on the others.

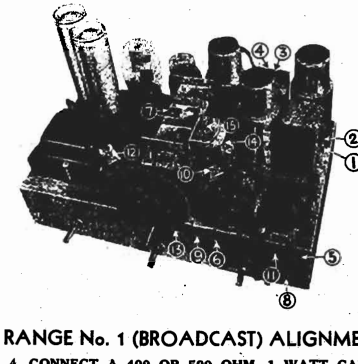
RANGE No. 1 (BROADCAST) CALIBRATION

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 53 (530 K.C.). Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.

2. Turn the range switch (right hand knob) to the maximum clockwise position, which is the broadcast setting.

3. Calibrate the set at the high frequency end. Use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided its calibration is accurately known.

(a) Turn the set dial to the exact frequency setting of the signal (either a station or the oscillator).
(b) Carefully adjust trimmer No. 5 (Range No. 1 broadcast oscillator calibration trimmer) until the signal may be tuned in with maximum volume at its correct frequency setting.



RANGE No. 1 (BROADCAST) ALIGNMENT

4. **CONNECT A 400 OR 500 OHM, 1 WATT CARBON RESISTOR IN SERIES WITH THE TEST OSCILLATOR OUTPUT AND THE RECEIVER ANTENNA LEAD. THIS RESISTOR MUST REMAIN CONNECTED FOR ALL BROADCAST AND SHORT WAVE ADJUSTMENTS IN ORDER TO SECURE PROPER ALIGNMENT OF THE ANTENNA STAGE. GROUND THE RECEIVER CHASSIS AND CONNECT THE OSCILLATOR GROUND LEAD TO THE CHASSIS.**

5. (a) Set the test oscillator to approximately 1400 K.C. and carefully tune the receiver to the signal.
(b) Adjust trimmers No. 6 and No. 7 (Range No. 1 broadcast detector shunt trimmer and Range No. 1 broadcast pre-selector shunt trimmer respectively) for maximum output meter reading.
(c) Retune the receiver and check the adjustments of trimmers No. 6 and No. 7. Do not touch trimmer No. 5 since this will change the calibration.

6. (a) Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal.
(b) Adjust trimmer No. 8 (Range No. 1 broadcast oscillator padding trimmer) to get maximum output meter deflection.
(c) Retune the receiver dial to a peak and readjust the trimmer.
(d) Continue this procedure of adjusting the trimmer and retuning the set until the output meter reading cannot be increased. **This procedure must be followed or the receiver will not be properly aligned.**

7. Repeat 5 a, 5 b, and 5 c.

RANGE No. 2 CALIBRATION

1. Turn receiver range switch to range No. 2 position, which is the third position of the right hand knob when turning it in a clockwise direction.

2. Adjust the oscillator to exactly 4000 K.C.

3. (a) Set the receiver dial at 4.0 megacycles on the red dial scale and adjust trimmer No. 9 (Range No. 2 oscillator calibration trimmer) until the signal comes in with maximum volume. If there are two peaks, the proper one is that with the trimmer screw farthest out.
(b) To be sure you have not adjusted trimmer No. 9 to the image frequency check this point by setting the receiver dial to the image frequency, approximately 3.1 M.C. and see if the image signal can be heard. **(The image frequency is always the signal frequency minus twice the I.F. frequency or in this case 4000 — 912 = 3088 K.C. or approximately 3.1 M.C.)** If no signal can be heard at 3.1 M.C. dial setting even with greatly increased test oscillator output, trimmer No. 9 is evidently improperly adjusted and so must be reset to a new peak with the screw farther out. After re-adjusting trimmer No. 9 again check to see that the image comes in at 3.1 dial setting.

RANGE No. 2 ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency, 4.0 M.C. for maximum output meter reading.
(b) Adjust trimmer No. 10 (Range No. 2 detector shunt trimmer) to a peak.
(c) Check the adjustment of trimmer No. 10 by tuning the receiver to 3.1 M.C. and noting if the image signal is much weaker than the 4.0 signal. If the signal at 3.1 M.C. dial setting is equal to or stronger than the 4.0 signal, trimmer No. 10 is not set to the proper peak and must be reset until a re-check shows that the signal at the 4.0 M.C. dial setting is much stronger than that at the 3.1 M.C. image dial setting.

RANGE No. 3 CALIBRATION

1. Turn the receiver range switch to range No. 3 position, which is the second position in a clockwise direction.

2. Adjust the test oscillator to exactly 12,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal.

3. (a) Set the receiver dial at 12.0 M.C. on the green dial scale and adjust trimmer No. 11 (Range No. 3 oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum volume. Usually there will be two peaks. The proper one is that with the trimmer screw farthest out.
(b) To be sure you have not adjusted trimmer No. 11 to the image frequency check this point by setting the receiver dial to the image frequency, approximately 11.1 M.C., and see if the image signal can be heard. If no signal can be heard at 11.1 M.C. dial setting even with greatly increased test oscillator output, trimmer No. 11 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After re-adjusting trimmer No. 11 again check to see that the image comes in at 11.1 dial setting.

RANGE No. 3 ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency, 12.0 M.C. for maximum output meter reading.
(b) Adjust trimmer No. 12 (Range No. 3 detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 12 slightly and retuning the receiver dial. Continue detuning trimmer No. 12 and retuning the set until maximum output meter deflection is secured.
(c) Check the adjustment of trimmer No. 12 by tuning the receiver to 11.1 M.C. and noting if the image signal is much weaker than the 12.0 M.C. signal. If the signal at 11.1 M.C. dial setting is equal to or stronger than the 12.0 M.C. signal, trimmer No. 12 is not set to the proper peak and must be reset as in 4 (b) until a re-check shows that the signal at the 12.0 M.C. dial setting is much stronger than that at the 11.1 M.C. image dial setting.

RANGE No. 4 CALIBRATION

1. Turn the receiver range switch to range No. 4 position, which is the farthest counter-clockwise position.

2. Set the test oscillator to give a 20,000 K.C. signal. If your oscillator cannot reach this frequency, use the 2nd harmonic of 10,000 K.C., the third harmonic of 6666 K.C., the fourth harmonic of 5000 K.C., or the fifth harmonic of 4000 K.C., all of which will give a 20,000 K.C. signal.

3. (a) Set the receiver dial at 20.0 M.C. on the purple dial scale and adjust trimmer No. 13 (Range No. 4 oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum volume. Usually there will be two peaks. The proper one is that with the trimmer screw farthest out.

MODELS 1271 to 1279
Alignment, Part 2, Parts
MODEL R-127-X
Data

STEWART WARNER CORP.

(b) To be sure you have not adjusted trimmer No. 13 to the image frequency check this point by setting the receiver dial to the image frequency, approximately 19.1 M.C. and see if the image signal can be heard. If no signal can be heard at 19.1 M.C. dial setting even with greatly increased test oscillator output, but can be heard at 20.9 M.C. dial setting, trimmer No. 13 is evidently improperly adjusted to the image frequency and so must be reset to the proper peak with the screw farther out. After re-adjusting trimmer No. 13 again check to see that the image comes in at 19.1 M.C. dial setting and not at 20.9 M.C. dial setting.

RANGE No. 4 ALIGNMENT

4. (a) Tune the set very carefully to the oscillator frequency 20.0 M.C. for maximum output meter reading.

(b) Adjust trimmer No. 14 (Range No. 4 detector shunt trimmer) to a peak. After this is done try to increase the output meter reading value by detuning trimmer No. 14 slightly and retuning receiver dial. Continue detuning trimmer No. 14 and retuning the set until maximum output meter deflection is secured.

(c) Check the adjustment of trimmer No. 14 by tuning the receiver to 19.1 M.C. and noting if the image signal is much weaker than the 20.0 M.C. signal. If the signal at 19.1 M.C. dial setting is equal to or stronger than the 20.0 M.C. signal, trimmer No. 14 is not set to the proper peak and must be reset until a re-check shows that the signal at the 20.0 M.C. dial setting is much stronger than that at the 19.1 M.C. image dial setting.

5. (a) Adjust the test oscillator to 12,000 K.C., or use the second harmonic of 6000 K.C., the third harmonic of 4000 K.C., or the fourth harmonic of 3000 K.C., all of which will give a 12,000 K.C. signal. Carefully tune the dial to the signal at about 12 M.C. on the purple dial scale.

(b) Adjust trimmer No. 15 (Range No. 4 oscillator padding trimmer) for maximum output meter reading and then retune the dial.

(c) Repeat this procedure of adjusting the trimmer and retuning the dial until it does not increase the output meter reading.

6. Check the adjustment of padding trimmer No. 15 by tuning the receiver dial to the image signal, 11.1 M.C. In case the signal at the 11.1 M.C. dial setting is equal to or stronger than the signal at 12.0 M.C. dial setting, padding trimmer No. 15 must be re-adjusted to a different peak so that the 11.1 M.C. dial setting signal is much weaker than the 12.0 M.C. dial setting signal.

7. Set the oscillator to exactly 20,000 K.C. and repeat 4 a, 4 b and 4 c.

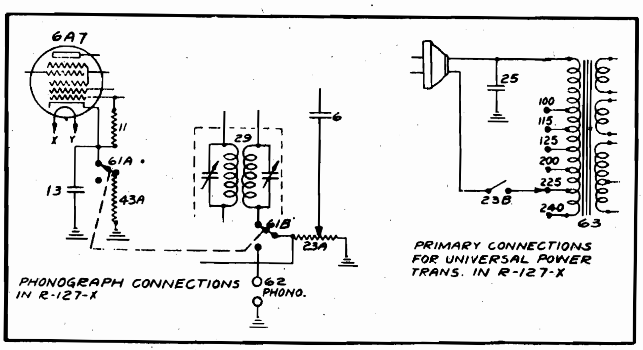
NOTE: To prevent the trimmers from being jarred out of adjustment use Duco Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAMS

Part No.	DESCRIPTION	List Price
17615	Range Switch, volume control, and tone control lock washer (3/8")	$0.01
67034	Range Switch, volume control, and tone control mtg. nut (3/8"-32)	.03
67263	No. 6x1/4" self tapping screw	.03
67567	Electrolytic condenser terminal lug (large)	.05
67568	Electrolytic condenser extruded insulating washer	.05
67681	Electrolytic condenser plain insulating washer	.03
81091	Speaker mounting screw (model 1274 only)	.01
81148	3 lug terminal strip	.06
81346	1 lug terminal strip	.04
81723	Ground clip	.10
81834	6 prong tube socket	.10
81837	4 prong tube socket	.15
81949	7 prong tube socket	.10
83249	Felt knob washer	.01
83560	Tube shield	.15
83578	Dial escutcheon screws	.01
83587	Baffle mtg. screws	.01
83668	Electrolytic condenser mtg. nut	.03
83718	Gang condenser mtg. cup washer	.01
83722	Gang condenser mtg. rubber grommet	.03
84203	Two lug terminal strip	.05
84205	Dial light socket and bracket	.25
84213	Dial drive shaft and bearing	.35
84234	Tube shield cap	.05
84390	Dial face and bushing	.65
84405	Phonograph switch knurled nut (R-127 x only)	.02
84406	Phonograph switch escutcheon (R-127 x only)	.02
84421	Phonograph switch lock washer (R-127 x only)	.01
84428	Rubber chassis mtg. washer	.03
84486	Dial escutcheon	.25
84493	Chassis mtg. screw	.03
84494	Tuning, volume, and tone control knob	.15
84495	Range switch knob	.15

MODEL R127-X CHASSIS

FOR OPERATION ON 100-260 VOLTS, 25 TO 133 CYCLES



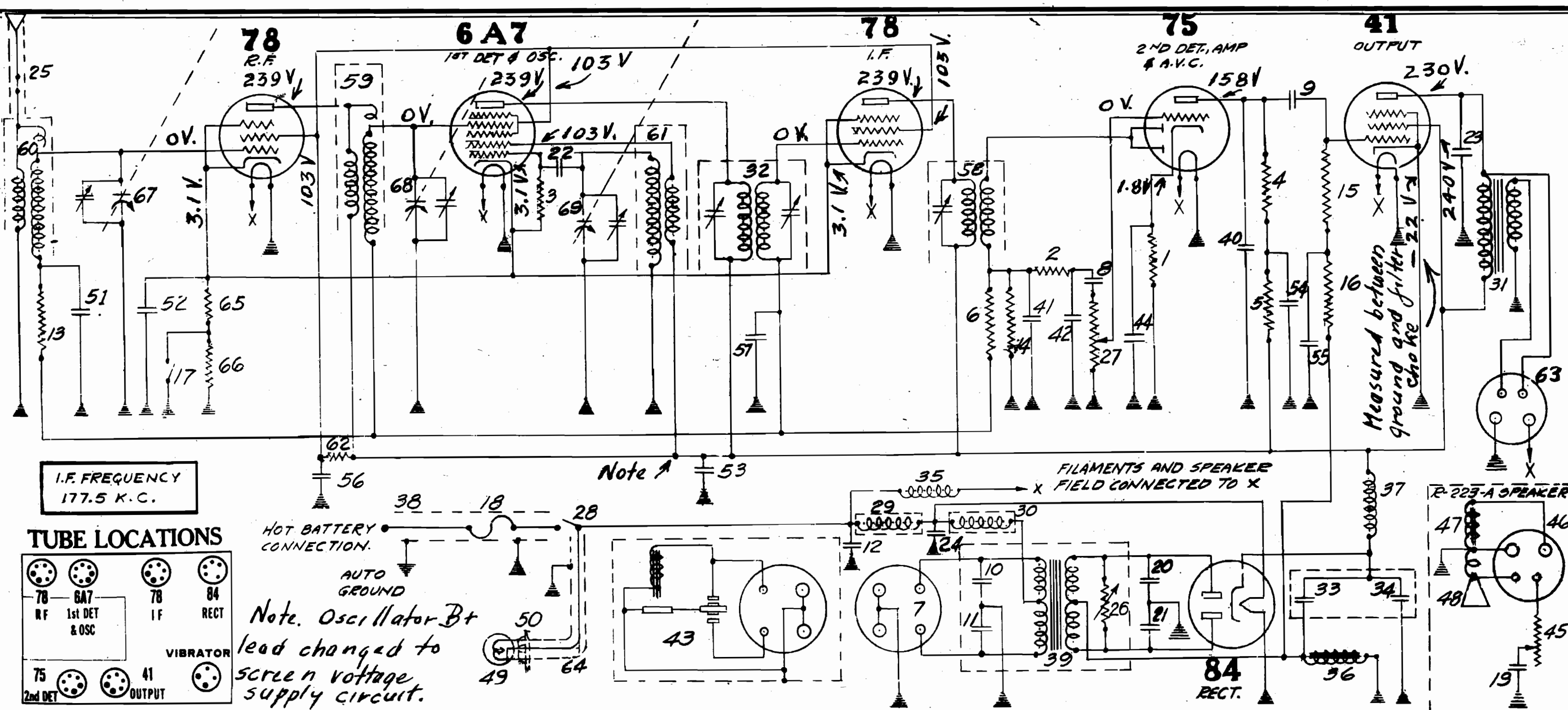
SEE PARTS LIST ON FIRST PAGE FOR PART NUMBERS, DESCRIPTIONS AND PRICES.

PHONOGRAPH AND UNIVERSAL POWER TRANSFORMER CONNECTIONS IN MODEL R127-X

STEWART WARNER CORP.

MODELS 1181,1182,1183
Chassis R-118
Schematic, Socket
Parts List

Form No. 6237 7-16-34 Printed in U.S.A.



MODEL R-118 PARTS LIST

DIAG. NO.	PART NO.	DESCRIPTION
1	67580	6000 ohm 1/4 watt carbon resistor
2	81152	10,000 ohm 1/4 watt carbon resistor
3	81645	50,000 ohm 1/4 watt carbon resistor
4	81645	50,000 ohm 1/4 watt carbon resistor
5	81645	50,000 ohm 1/4 watt carbon resistor
6	81682	1.1 megohm 1/4 watt carbon resistor
7	81837	Vibrator socket (standard 4 prong)
8	83007	.02 mfd. 600 volt paper condenser
9	83007	.02 mfd. 600 volt paper condenser
10	83058	.25 mfd. 100 volt paper condenser
11	83058	.25 mfd. 100 volt paper condenser
12	83063	.5 mfd. 100 volt paper condenser
13	83082	260,000 ohm 1/4 watt carbon resistor
14	83082	260,000 ohm 1/4 watt carbon resistor
15	83082	260,000 ohm 1/4 watt carbon resistor
16	83082	260,000 ohm 1/4 watt carbon resistor
17	83179	Local distance switch (SPST)
18	83207	15 ampere fuse
19	83217	.04 mfd. 600 volt paper condenser
20	83352	.015 mfd. 600 volt paper condenser
21	83352	.015 mfd. 600 volt paper condenser
22	83539	.00026 mfd. molded mica condenser
23	83706	.006 mfd. 600 volt paper condenser
24	83714	1.5 mfd. 100 V. shielded paper cond.
25	83723	Antenna lead and plug
26	83725	Special Globar resistor
27)	83728	(500,000 ohm volume control) In One
28)		(On-off switch) Unit

DIAG NO.	PART NO.	DESCRIPTION
29	83730	Vibrator R.F. choke
30	83730	Vibrator R.F. choke
31	83731	Output transformer
32	83732	First I.F. transformer
33)	83734	(Dual 8 mfd. 350 volt dry)
34)		(Electrolytic Condenser)
35	83742	Filament R.F. choke
36	83760	Filter choke
37	83770	B supply R.F. choke
38	83777	Battery lead and fuse housing
39	83780	Power transformer
40	83784	.0011 mfd. molded mica condenser
41)	83785	Dual .0005 mfd molded mica cond.
42)		
43	83800	Plug-in vibrator
44	83803	12 mfd 25 V. dry Electrolytic Condenser
45	83812	35,000 ohm tone control variable resistor
46	83845	Male speaker plug and bracket
47	83850	Speaker field coil and housing (5.5 ohms)
48	84021	Diaphragm & Shell assem. (R-223 Spkr)
49	84058	6-8 volt dial light bulb (Mazda #50)
50	84076	Dial light socket and button
51)		(.05 mfd. 100 V. cond., black lead) In one
52)		(.05 mfd. 100 V. cond., black lead) Unit.
53)		(.5 mfd. 100 V. cond., blue lead) Common
54)	84077	(.1 mfd. 400 V. cond., red lead) Terminal
55)		(.1 mfd. 400 V. cond., red lead) grounded
56)		(.25 mfd. 100 V. cond., green lead) to can
57)		(.25 mfd. 300 V. cond., brown lead)
58	84079	2nd. I.F. transformer
59	84080	R.F. (B) coil
60	84081	Antenna (A) coil

DIAG. NO.	PART NO.	DESCRIPTION
61	84082	Oscillator (O) coil
62	84088	12,000 ohm 2 watt carbon resistor
63	84091	Speaker cable and female plug
64	84099	Dial light cable
65	84129	100 ohm, 1/2 watt flexible resistor
66	84131	400 ohm, 1/2 watt flexible resistor
67)	84224	3- gang variable condenser with mounting plate and shaft coupling
68)		
69)		
	R-223-A	Dynamic speaker

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

PART NO.	DESCRIPTION
12606	Receiver mtg. nut, (5/16-18 hex.)
81346	1 lug terminal strip
83144	15,000 ohm spark plug suppressor
83145	10,000 ohm distributor suppressor
83242	#8 x 1/4" self tapping screws (dark finish) (for mtg.back cover and casing brackets)
83319	Fuse insulating tube
83624	#8 x 1/4 self tapping screw (Cad.Plate)
83711	8 lug terminal strip
83719	Front cover mtg. spade bolt (8-32)
83720	4 lug terminal strip
83721	Battery lead plug rubber grommet
83727	Back cover
83737	Front cover knurled nuts
83771	Receiver mounting stud
83772	Receiver mounting dash support washer
83806	Speaker grill cloth
83816	Aluminum vibrator shield
83836	Front cover & speaker grill cloth

PART NO.	DESCRIPTION
83889	Shaft casing mtg. bracket
83892	Variable condenser shaft coupling
83904	Generator condenser
83937	Tone control knob
84094	Case assembly, less covers

MODEL 1181 REMOTE CONTROL HEAD PARTS

PART NO.	DESCRIPTION
15214	Long mtg. strap screw (10-32 x 1-1/4" RHMS)
84050	Bezel only, less glass
84052	Glass retainer ring
84053	Glass only
84054	Bezel gasket (blotting paper)
84058	Pilot light bulb (Mazda #50, 6-8 volts)
84059	Case Screw (4-40 x 3/16")
84060	Flexible casing set screw
84067	Steering post mounting bracket
84068	Steering post mounting strap
84076	Dial light button and socket
84100	Remote control head (less flexible shafts)
84106	Volume control knob
84309	Instrument panel mounting accessories

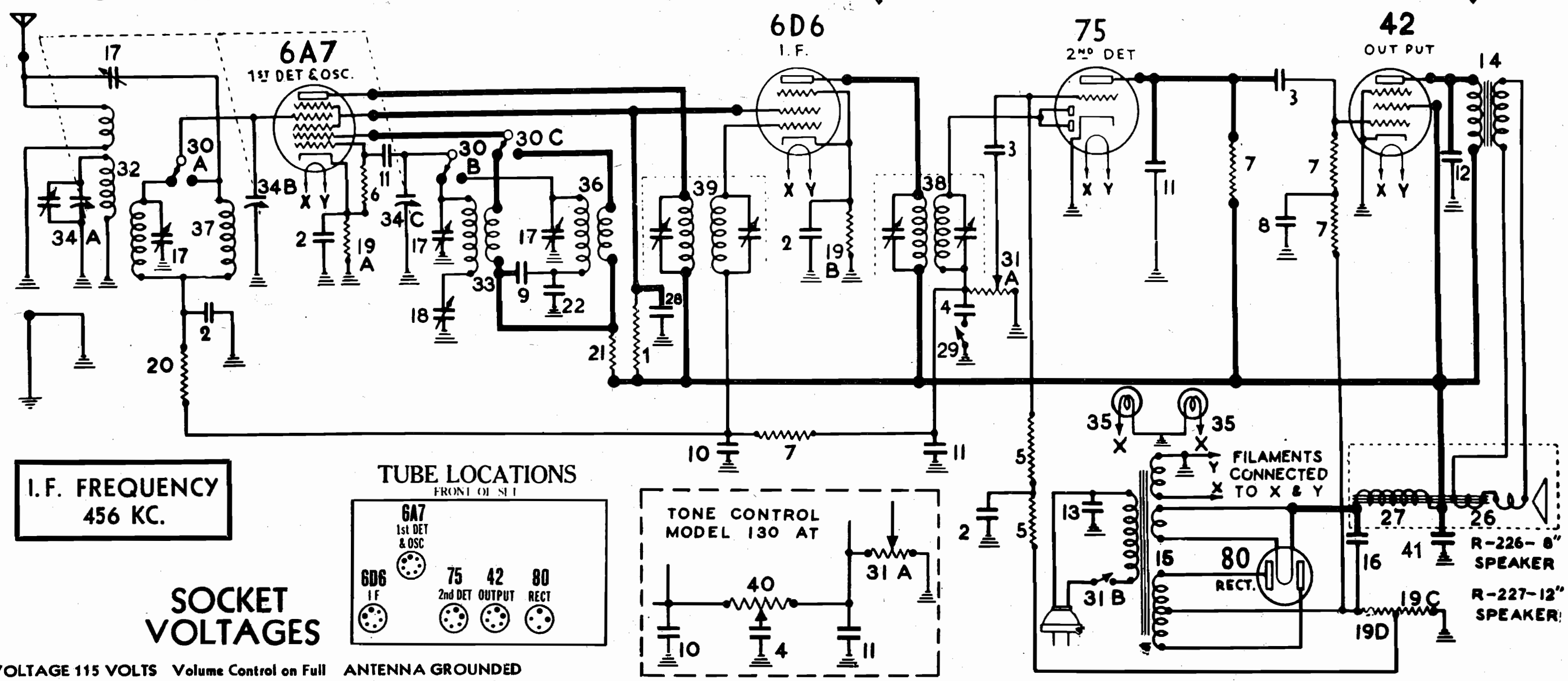
MODEL 1181 FLEXIBLE SHAFTS

PART NO.	DESCRIPTION
84065	Special tuning shaft, 28½ inches long
84066	Special volume control shaft, 28½ inches long
84110	Standard volume control shaft, 24½ inches long
84111	Standard tuning shaft, 24½ inches long
84127	Special tuning shaft, 36 inches long
84128	Special volume control shaft, 36 inches long

MODELS 1301 to 1309
Chassis R-130
Schematic, Voltage
Socket, Parts List

STEWART WARNER CORP.

STEWART-WARNER MODEL R-130 CHASSIS (RECEIVER MODELS 1301 to 1309)



I.F. FREQUENCY
456 KC.

TUBE LOCATIONS
FRONT OF SET

6A7
1st DET & OSC
6D6
IF
75
2nd DET
42
OUTPUT
80
RECT

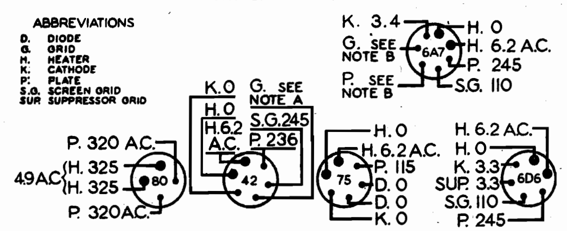
SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS Volume Control on Full RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED DIAL SET AT 530 KC.

VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINALS AS SEEN FROM THE BOTTOM
FRONT OF CHASSIS

ABBREVIATIONS
D. DIODE
G. GRID
H. HEATER
K. CATHODE
P. PLATE
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID



IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked for second detector plate voltage.

Speaker field voltage with coil warm is 70 volts D. C.

NOTE A: The bias on the 42 output tube is —17 volts measured across the metal-clad bias resistor 19C and 19D. The grid bias on the 75 second detector is —1.5 volts measured across the bias resistor 19C.

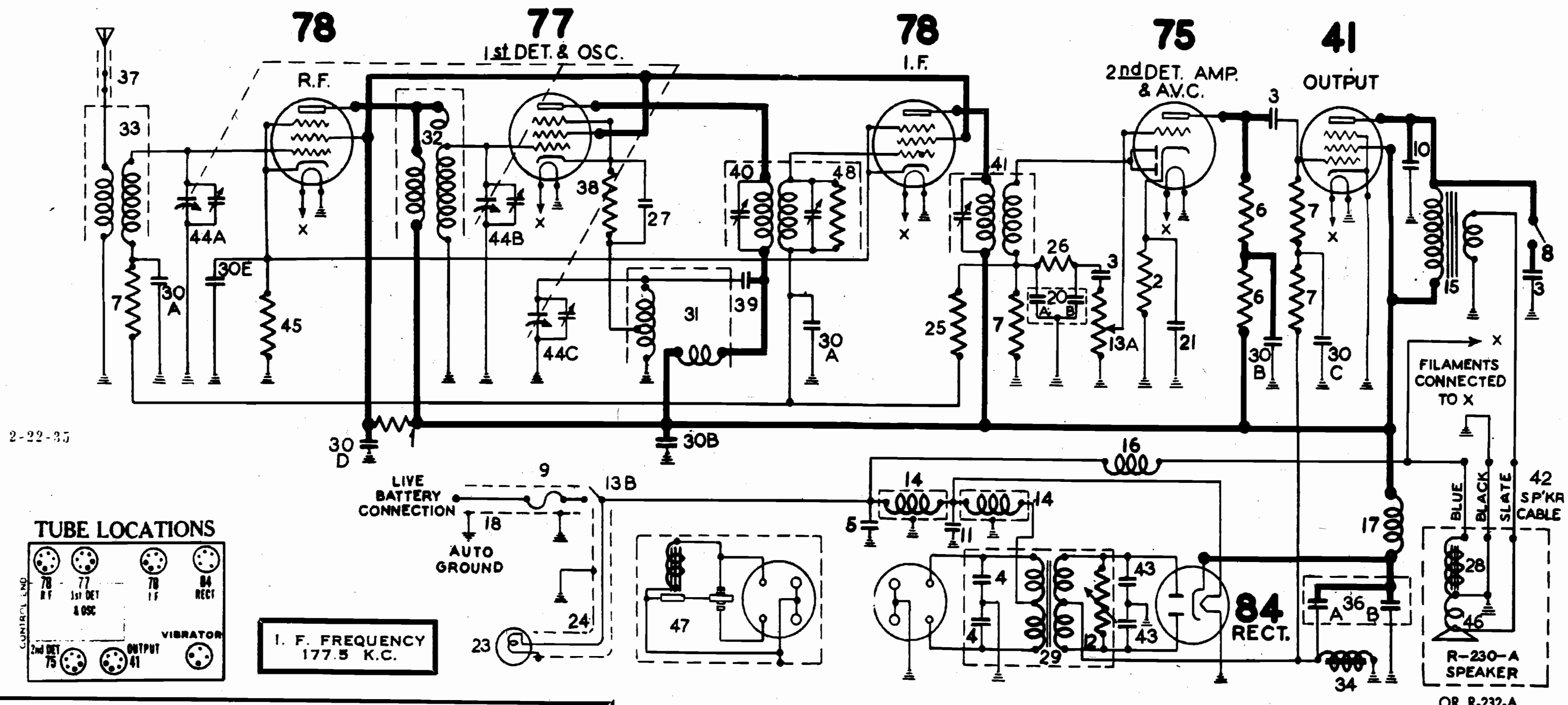
NOTE B: The oscillator plate voltage for the broadcast range setting with the dial set at 530 KC should be approximately 180 volts. The oscillator grid voltage under the same conditions should be about —18 volts.

R-130 PARTS LIST

Diag. No.	Part No.	Description	LIST PRICE
1	62183	30,000 ohm, 1 watt carbon resistor	.20
2	81630	.1 mfd. 100 volt paper condenser	.30
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83011	.004 mfd. 600 volt paper condenser	.30
5	83072	510,000 ohm, 1/4 watt carbon resistor	.20
6	83080	51,000 ohm, 1/4 watt carbon resistor	.20
7	83082	260,000 ohm, 1/4 watt carbon resistor	.20
8	83219	.01 mfd. 600 volt paper condenser	.30
9	83352	.015 mfd. 600 volt paper condenser	.35
10	83353	.05 mfd. 100 volt paper condenser	.30
11	83539	.00026 mfd. molded mica condenser	.35
12	83706	.006 mfd. 600 volt paper condenser	.35
13	83976	.012 mfd. 1000 volt shielded paper condenser	.35
14	84153	Output transformer (for R-226-8 inch speaker) (See 84312 transformer for 12 inch speaker)	2.25
15	84189	Power transf. 115 volts, 60 cycles, R-130-A only (See 84408 for other voltages and frequencies)	4.00
16	84193	16 mfd. 350 volt wet electrolytic condenser	1.50
17	84194	R.F. trimmer condenser (3 to 30 mmfd.)	.15
18	84195	Oscillator padding trimmer (300-600 mmfd.)	.50
19A	84196	300 ohm resistor	.65
19B	84196	300 ohm resistor	.65
19C	84196	25 ohm resistor	.65
19D	84196	275 ohm resistor	.65
20	84198	110,000 ohm 1/4 watt carbon resistor	.20
21	84199	16,000 ohm 1/4 watt carbon resistor	.20
22	84200	.004 mfd. molded mica condenser	.50
	84312	Output transformer (on R-227 12" speaker)	2.50
23	84404	Phonograph switch (D.P.D.T.) (R-130-X only)	1.10
24	84407	Phonograph terminal strip (R-130-X only)	.12
25	84408	Power transformer (100 to 240 volts, 25 to 133 cycles) (R-130-X only)	7.00
26	84504	Diaphragm and shell assembly (For R-226 8" speaker) (Also see 84506)	2.50
27	84505	Field coil and housing (For R-226 8" speaker) (Also see 84507)	3.75
	84506	Diaph'm and shell as'mby (For R-227 12" spkr.)	3.25
	84507	Field coil and housing (For R-227 12" speaker)	4.00
28	84601	.25 mfd. 300 volt paper condenser	.30
29	84737	Tone control switch	.35
30	84738	Range switch	.75
31A, 31B	84739	500,000 ohm volume control and line switch	1.25
32	84746	Broadcast preselector coil assembly	1.15
33	84749	Broadcast oscillator coil	.50
34	84750	Three gang variable condenser	4.50
35	84759	6-8 volt dial light bulb	.20
36	84763	Short wave oscillator coil	.60
37	84765	Short wave antenna coil	.50
38	84776	2nd I.F. transformer	2.00
39	84777	1st I.F. transformer	2.00
40	84942	300,000 ohm Tone Control (AT and XT models only)	.75
41	85112	16 mfd. 300 volt wet electrolytic cond.	1.50

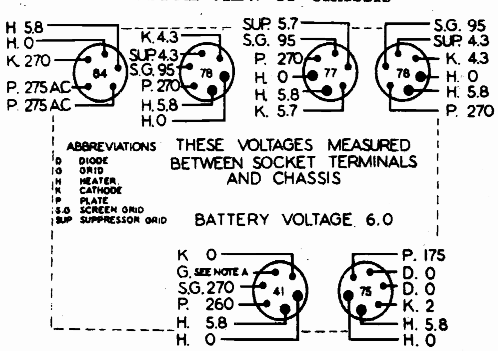
MODELS 1311 to 1319
Chassis R-131
Schematic, Voltage
Socket, Parts List

STEWART WARNER CORP.



SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

MODEL R-131 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67580	6,000 ohm ¼ watt carbon resistor	.25
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83058	.25 mfd. 100 volt paper condenser	.35
5	83063	.5 mfd. 100 volt paper condenser	.45
6	83080	51,000 ohm ¼ watt carbon resistor	.20
7	83082	260,000 ohm ¼ watt carbon resistor	.20
8	83179	Tone control switch	.30
9	83207	15 ampere fuse	.05
10	83706	.006 mfd. 600 volt paper condenser	.35
11	83714	1.5 mfd. 100 volt shielded condenser	.80
12	83725	Special Globar resistor	.45
14	83730	Vibrator R.F. Choke	.25
15	83731	Output transformer	2.00
16	83742	Filament R.F. choke	.16
13A 13B	83728	500,000 ohm volume control Line Switch	1.20
17	83770	"B" supply R.F. choke	.40
18	83777	Battery lead and fuse housing	.50
20	83785	Dual .0005 mfd. molded mica condenser	.32
21	83803	12 mfd. 25 volt dry electrolytic condenser	.80
23	84058	6 - 8 volt dial light bulb	.15
24	84099	Dial light cable	.35
25	84235	1.1 megohm carbon resistor	.20
26	84238	11,000 ohm ¼ watt carbon resistor	.20
27	84282	.001 mfd. molded mica condenser	.25
28	84791	Field coil and housing (R-230A only) (Part 85118 for R-232A)	2.50
29	84798	Power transformer	3.50
30A 30B 30C 30D 30E	84806	.05 mfd. 300 volt paper cond. (green-white) .1 mfd. 400 v. paper cond. (red or red-white) .25 mfd. 100 volt paper cond. (green lead) .25 mfd. 300 volt paper cond. (white lead) .5 mfd. 100 volt paper cond. (orange lead)	2.50
31	84814	Oscillator (O) coil and shield assembly	1.50
32	84822	R.F. (B) coil and shield assembly	1.50
33	84825	Antenna (A) coil and shield assembly	1.40
34	84827	"B" supply filter choke	1.25
36A 36B	84829	4 mfd.—400 volt dry electrolytic condenser 8 mfd.—400 volt dry electrolytic condenser	2.50
37	84831	Antenna lead and plug	.10
38	85051	8000 ohm ¼ watt carbon resistor	.20
39	84833	.00007 mfd. molded mica condenser	.20
40	84838	1st. I.F. transformer assembly	2.75
41	84842	2nd. I.F. transformer assembly	2.60
42	84845	Speaker cable	.50
43	84850	.03 mfd. 750 volt paper condenser	.25
44A 44B 44C	84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
45	84888	300 ohm. ½ watt flexible wire resistor	.20
46	84891	Diaphragm, voice coil, and shell assembly (R-230A only) (Part 85119 for R-232A)	2.10
47	84904	Vibrator	5.00
48	83072	510,000 ohms ¼ watt resistor	.20
38	85051	8000 ohm ¼ watt carbon resistor	.20
28	85118	Field coil and housing (R-232A only)	2.50
46	85119	Diaphragm. and shell assembly (R-232A only)	2.10

MODELS 1311 to 1319
Alignment, Parts List
Circuit Data,

STEWART WARNER CORP.

SERVICE DATA FOR STEWART-WARNER R-131 CHASSIS

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube.

The 177.5 KC. signal is amplified in the I.F. stage, using a 78 type tube, and then rectified in the diode section of the 75 second detector tube. The rectified current produces a modulated D.C. voltage across the diode load resistor No. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	$0.02
17166	Single hole mtg. nut	.05
81346	1 lug terminal strip	.04
83144	15,000 ohm spark plug suppressor	.35
83145	10,000 ohm distributor suppressor	.35
83242	No. 8 x 1/4" self tapping screws (dark finish for mtg. back cover and casing brackets)	.02
83319	Fuse insulating tube	.02
83624	No. 8 x 1/4" self tapping screw (Cad. plate. for mtg. power transformer)	.01
83711	8 lug terminal strip	.12
83719	Front cover mtg. spade bolt (8-32)	.01
83720	4 lug terminal strip	.08
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nuts	.06
83771	Receiver mounting stud	.08
83772	Receiver mounting dash support washer	.04
83806	Speaker grill cloth	.12
83892	Variable condenser shaft coupling	.10
83893	Volume control shaft guide bushing	.05
83904	Generator condenser	.70
84853	Front cover assembly	1.00
84855	Dial Face (Model 1311)	.20
84869	Case assembly, less covers	3.75
84941	Aluminum vibrator shield assembly	.50
84990	Single hole mtg. plate	.80
85012	Single hole mtg. bolt	.06
85021	Case assembly (less covers) (1314 only)	4.00
85022	Back cover (model 1314)	1.00
85024	Front cover assembly (model 1314)	1.25
85037	Dial face (model 1314)	.20

REMOTE CONTROL HEAD PARTS

Part No.	Description	List Price
15214	Long mtg. strap screw (10/32 x 1 1/4" R.H.M.S.)	.01
84059	Case screw (4-40 x 3/16") Per hundred	.80
84060	Flexible casing set screw	.02
84067	Steering post mtg. bracket	.25
84068	Steering post mtg. strap	.15
84075	Bezel and glass	.50
84076	Dial light button and socket	.25
84106	Volume control knob	.25
84309	Instrument panel mounting accessories	.15
84854	Complete accessories for installation	5.00

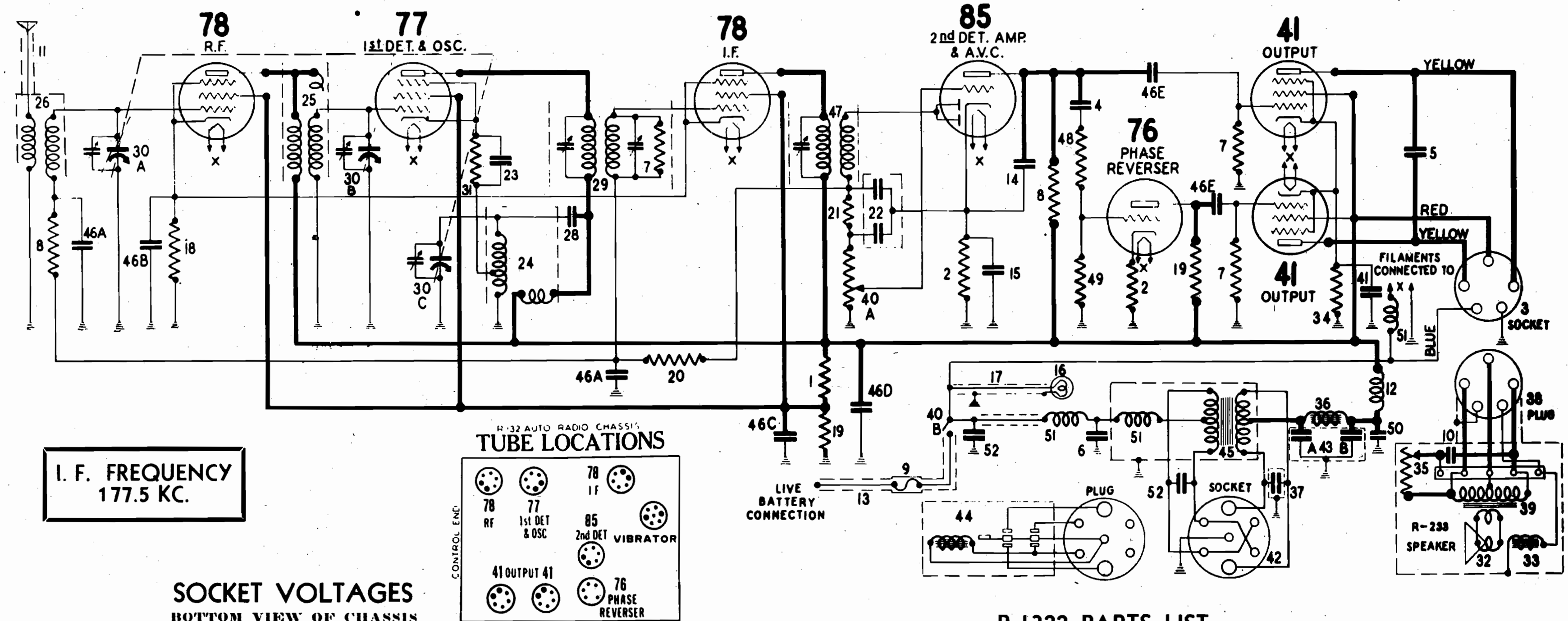
FLEXIBLE SHAFTS

Part No.	Description	List Price
84871	Tuning shaft, 24 inches long	1.50
84873	Volume control shaft, 24 inches long	1.50
84882	Tuning shaft, 36 inches long	2.00
84883	Volume control shaft, 36 inches long	2.00
84886	Tuning shaft, 30 inches long	2.00
84887	Volume control shaft, 30 inches long	2.00

Voltage,Parts List

STEWART WARNER CORP.

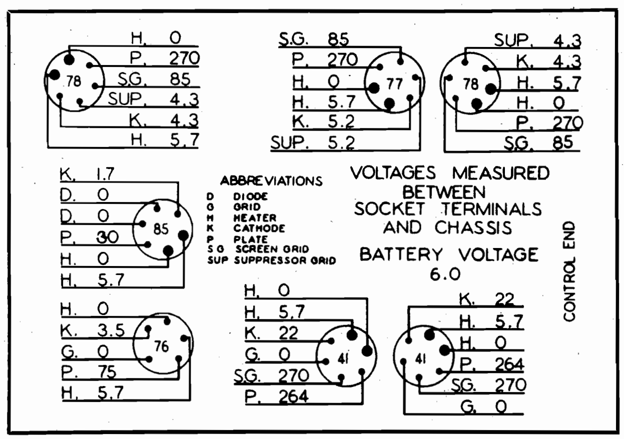
MODEL Firestone R-1322
Chassis R-132
Schematic, Socket



I. F. FREQUENCY
177.5 KC.

SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



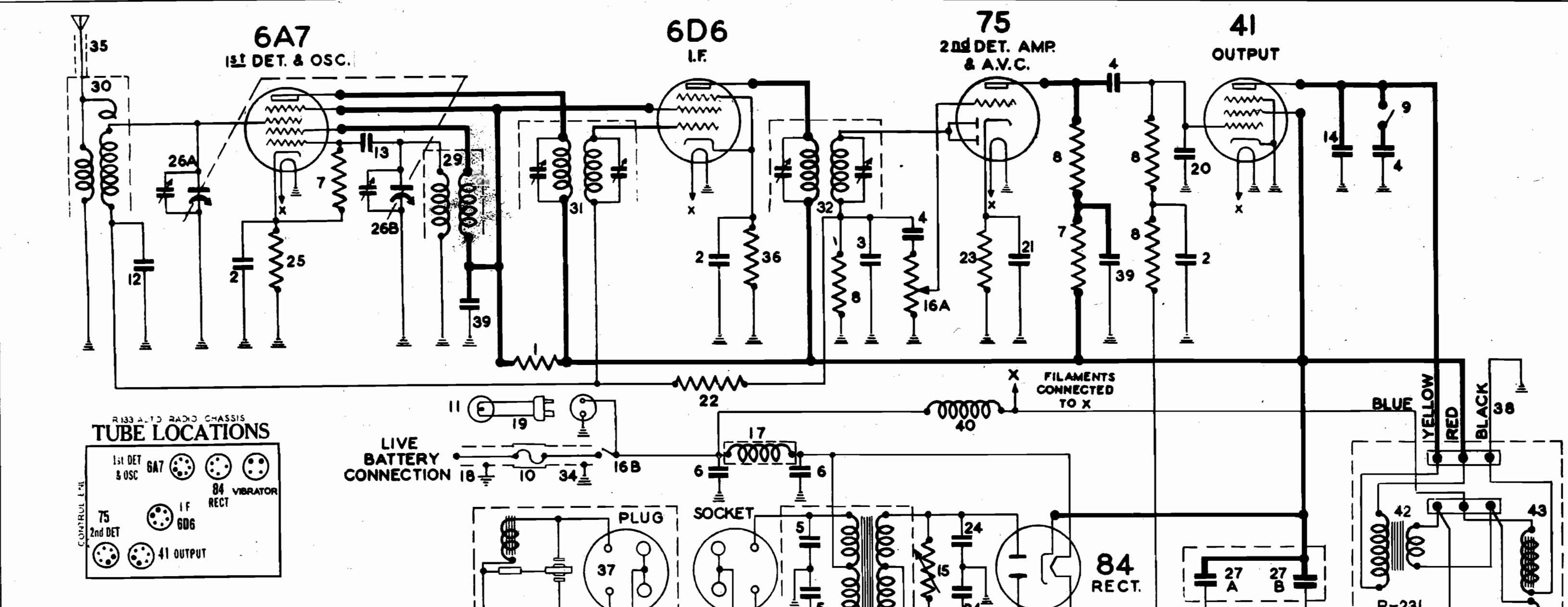
IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

R-1322 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67303	2,000 ohm 1/4 watt carbon resistor	.25
3	81951	Speaker socket	.10
4	83007	.02 mfd. 600 volt paper condenser	.35
5	83011	.004 mfd. 600 volt paper condenser	.30
6	83063	.5 mfd. 100 volt paper condenser	.45
7	83072	510,000 ohm 1/4 watt carbon resistor	.15
8	83082	260,000 ohm 1/4 watt carbon resistor	.20
9	83207	15 ampere fuse	.05
10	83219	.01 mfd. 600 volt paper condenser	.30
11	83723	Antenna lead	.75
12	83770	"B" supply R. F. choke	.40
13	83777	Shielded battery lead and fuse housing	.50
14	83784	.0011 mfd. mica condenser	.22
15	83803	12 mfd. 25 volt dry electrolytic condenser	.80
16	84058	Pilot lamp	.15
17	84099	Pilot light cable	.35
18	84131	400 ohm 1/2 watt resistor	.20
19	84198	110,000 ohm 1/4 watt resistor	.20
20	84235	1.1 meg. 1/4 watt carbon resistor	.20
21	84238	11,000 ohm 1/4 watt carbon resistor	.20
22	84281	Dual .00026 mfd. mica condenser	.35
23	84282	.001 mfd. mica condenser	.25
24	84814	Oscillator coil	1.50
25	84822	R. F. coil	1.50
26	84825	Antenna coil	1.40
28	84833	.00007 mfd. mica condenser	.20
29	84838	1st I. F. transformer	2.75
30A, 30B, 30C	84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
31	85051	8000 ohm 1/4 watt carbon resistor	.20
32	85058	Diaphragm and shell assembly	3.50
33	85098	Field coil and bracket assembly	3.25
34	85114	500 ohm 2 watt resistor	.25
35	85179	80,000 ohm tone control	.90
36	85183	Filter choke	1.50
37	85190	.005 mfd. 1200 volt paper condenser	.85
38	85193	Speaker plug and cable assembly	1.25
39	85195	Output transformer	3.25
40A, 40B	85215	250,000 ohm volume control; On-off switch	1.20
41	85216	10 mfd. 50 volt dry electrolytic condenser	.80
42	85217	Vibrator Socket	.15
43	85237	Dual 8 mfd. electrolytic condenser	3.00
44	85243	Vibrator	6.50
45	85256	Power transformer	5.00
46A	85259	.05 mfd. 300 volt cond. (green-white lead)	2.75
46B	85259	.5 mfd. 100 v. cond. (orange lead)	
46C	85259	.25 mfd. 300 v. cond. (white lead)	
46D	85259	.1 mfd. 400 v. cond. (red lead)	
46E	85259	.02 mfd. 600 v. cond. (yellow & green leads)	
47	85262	2nd I. F. transformer	2.50
48	85265	600,000 ohm 1/4 watt carbon resistor	.20
49	85266	70,000 ohm 1/4 watt carbon resistor	.20
50	85267	.01 mfd. mica condenser	.50
51	85391	R. F. choke assembly	.30
52	85394	.0005 mfd. mica condenser	.25

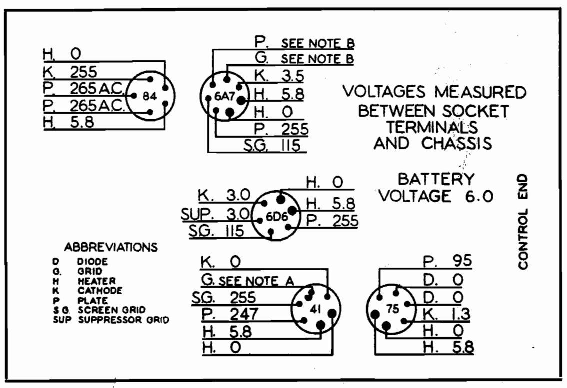
MODEL Firestone R-1332
Chassis R-133
Schematic, Socket
Voltage, Parts List

STEWART WARNER CORP.



SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowance for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

NOTE B: The oscillator grid voltage varies from about —3 at 1500 KC. to —5.0 at 530 KC. The oscillator anode voltage may vary from 115 at 1500 KC. to 120 at 530 KC.

I.F. FREQUENCY 456 KC.

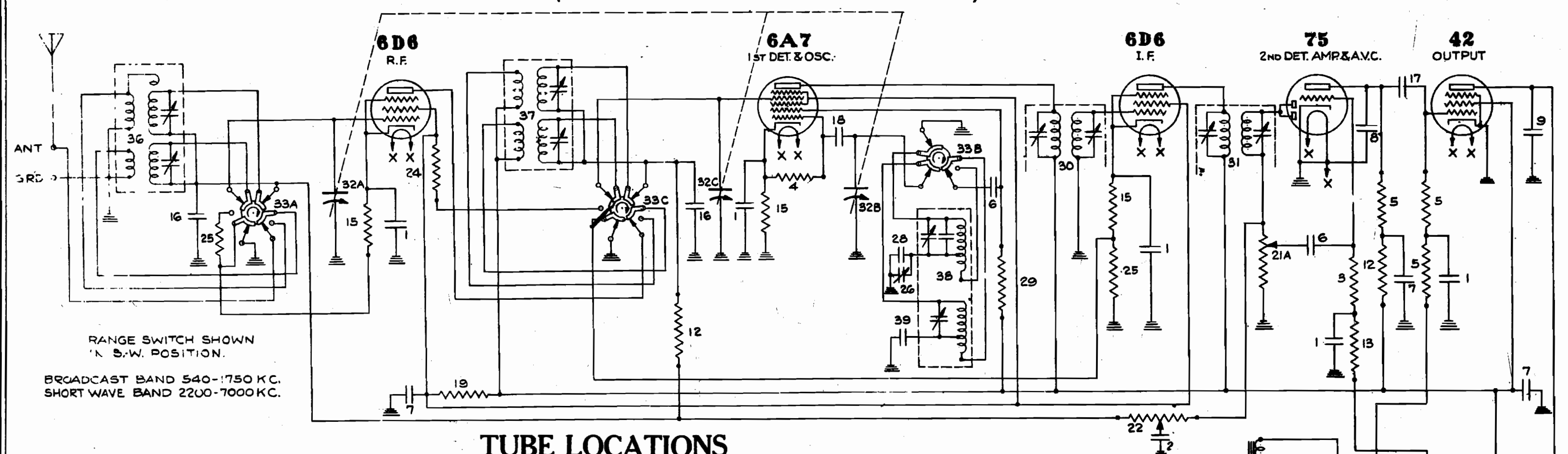
R-1332 PARTS LIST

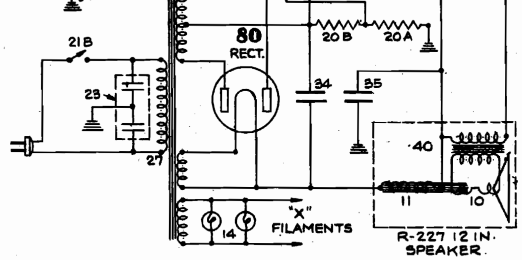
Diag. No.	Part No.	Description	List Price
1	66875	16,000 ohm 1 watt carbon resistor	$0.50
2	81630	.1 mfd. 100 volt paper condenser	.30
3	81812	.00051 mfd. mica condenser	.25
4	83007	.02 mfd. 600 volt paper condenser	.35
5	83058	.25 mfd. 100 volt paper condenser	.35
6	83063	.5 mfd. 100 volt paper condenser	.45
7	83080	51,000 ohm 1/4 watt resistor	.20
8	83082	260,000 ohm 1/4 watt resistor	.20
9	83179	Tone Control switch	.30
10	83207	Fuse	.05
11	83278	Pilot lamp	.15
12	83353	.05 mfd. 100 volt paper condenser	.30
13	83539	.00026 mfd. mica condenser	.25
14	83706	.006 mfd. 600 volt condenser	.35
15	83725	0-500,000 globar resistor	.45
16A, 16B	83728	Volume Control, On-Off Switch	1.20
17	83730	R. F. Choke	.25
18	83777	Battery lead and fuse housing	.50
19	83778	Light cable and plug assembly	.50
20	83783	.00011 mfd. mica condenser	.16
21	83803	12 mfd. 15 volt electrolytic condenser	.80
22	84235	1.1 meg. 1/4 watt resistor	.20
23	84240	4000 ohm 1/4 watt resistor	.20
24	84850	.03 mfd. 750 volt paper condenser	.25
25	84888	300 ohm 1/2 watt resistor	.20
26A, 26B	84958	Two-gang variable condenser with shaft coupling	4.50
27A, 27B	84961	4 mfd. 400 volt electrolytic condenser, 8 mfd. 400 volt electrolytic condenser	2.50
28	84962	Filter choke	1.25
29	84963	Oscillator coil assembly	1.00
30	84969	Antenna coil and shield assembly	1.25
31	84972	1st I.F. transformer assembly	2.75
32	84974	2nd I.F. transformer assembly	2.75
33	84975	Power transformer	3.50
34	84977	Battery lead and cap (to chassis)	.34
35	84978	Antenna lead	.40
36	84979	250 ohm 1/2 watt resistor	.15
37	84995	Vibrator	5.00
38	85027	Speaker cable	.30
39	85029	.1 mfd. 300 volt paper condenser	.40
40	85048	Filament R.F. Choke	.25
41	85376	Diaphragm and voice coil assembly	2.00
42	85378	Output transformer	2.00
43	85379	Field coil	1.25

STEWART WARNER CORP.

MODELS 1341 to 1349
Chassis R-134 (Temporary)
Schematic, Voltage, Socket Trimmers, Parts List

STEWART—WARNER MODEL R-134 CHASSIS (RECEIVER MODELS 1341 to 1349)
(TEMPORARY CIRCUIT DIAGRAM)



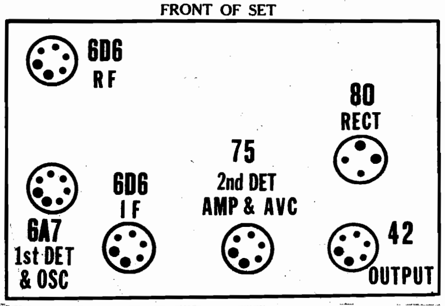


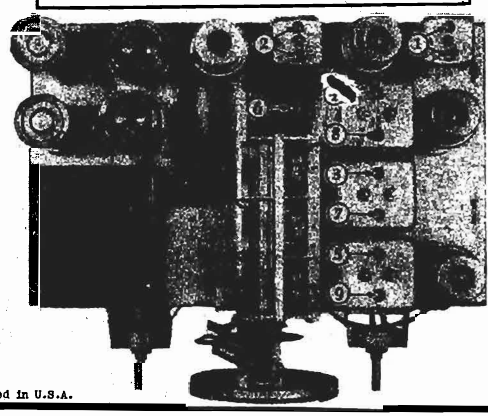
RANGE SWITCH SHOWN
IN S.W. POSITION.

BROADCAST BAND 540-1750 K.C.
SHORT WAVE BAND 2200-7000 K.C.

I.F. FREQUENCY
456 KC.

TUBE LOCATIONS
FRONT OF SET

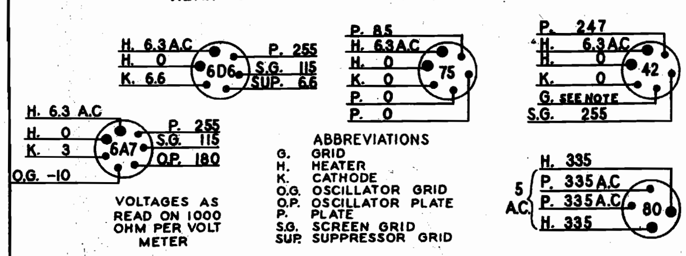




ITEM	PART Nº	DESCRIPTION
1	81630	.1 MFD.-175V PAPER COND.
2	83011	.004 MFD.-600V PAPER COND.
3	83072	310,000 OHM 1/4 W CARBON RES.
4	83080	51,000 OHM 1/4 W CARBON RES.
5	83082	260,000 OHM 1/4 W CARBON RES.
6	83218	.01 MFD-600V. PAPER COND.
7	83440	1 MFD-400V PAPER COND
8	83539	.00026 MFD MICA COND
9	83706	.006 MFD-600V. PAPER COND.
10	84506	DIAPHRAGM & SHELL ASSEM. FOR R-227-A SPEAKER
11	84507	FIELD COIL & HOUSING FOR R-227-A SPEAKER
12	84198	110,000 OHM 1/4 W. CARBON RES.
13	84285	1.1 MEGOHM 1/4 W. CARBON RES.
14	84759	PILOT LAMP
15	84888	300 OHM 1/2 W. W.W RES.
16	85058	.05 MFD.-100V. PAPER COND.
17	85059	.05 MFD.-300V PAPER COND.
18	85061	.000051 MFD. MICA COND.
19	85063	15,000 OHM-2 W. CARBON RES.
20A	85067	BIAS RESISTOR - 20 OHM
20B		- 220 OHM
21A	85073	VOLUME CONTROL 250,000 OHM
21B		ON-OFF SWITCH
22	85074	TONE CONTROL 500,000 OHM
23	85075	DUAL .01 MFD.-750V PAPER COND
24	85116	25,000 OHM 1/2 W. CARBON RES.
25	85117	1000 OHM 1/2 W. CARBON RES.
26	85285	PADDING TRIMMER
27	85428	POWER TRANS. (115V-60 CYCLE) (85900 POWER TRANS 115V-25C USED ON MODEL 134-B)
28	85441	.00042 MFD. MICA COND
29	85442	21,000 OHM 1/2 W. CARBON RES.
30	85788	1ST I.F TRANSFORMER
31	85789	2ND I.F TRANSFORMER
32A TO C	85790	THREE GANG COND.
33A TO C	85791	RANGE SWITCH
34	85792	16 MFD.-475V ELECT COND
35	85793	16 MFD-475V ELECT COND
36	85829	ANT. COIL & SHIELD ASSEM
37	85830	R F COIL & SHIELD ASSEM
38	85831	OSC COIL & SHIELD ASSEM
39	85837	.00194 MFD MICA COND
40	84312	OUTPUT TRANS. (R-227-A SPEAKER)

1. 1st I.F. TRANS. TRIMMERS
2. 2nd I.F. TRANS. TRIMMERS
3. BROADCAST OSCILLATOR SHUNT TRIMMER
4. BROADCAST DETECTOR SHUNT TRIMMER
5. BROADCAST ANTENNA SHUNT TRIMMER
6. BROADCAST OSCILLATOR SERIES PADDER
7. S.W. BAND OSCILLATOR SHUNT TRIMMER
8. S.W. BAND DETECTOR SHUNT TRIMMER
9. S.W. BAND ANTENNA SHUNT TRIMMER

SOCKET VOLTAGES
REAR OF CHASSIS — BOTTOM VIEW



VOLTAGES AS READ ON 1000 OHM PER VOLT METER

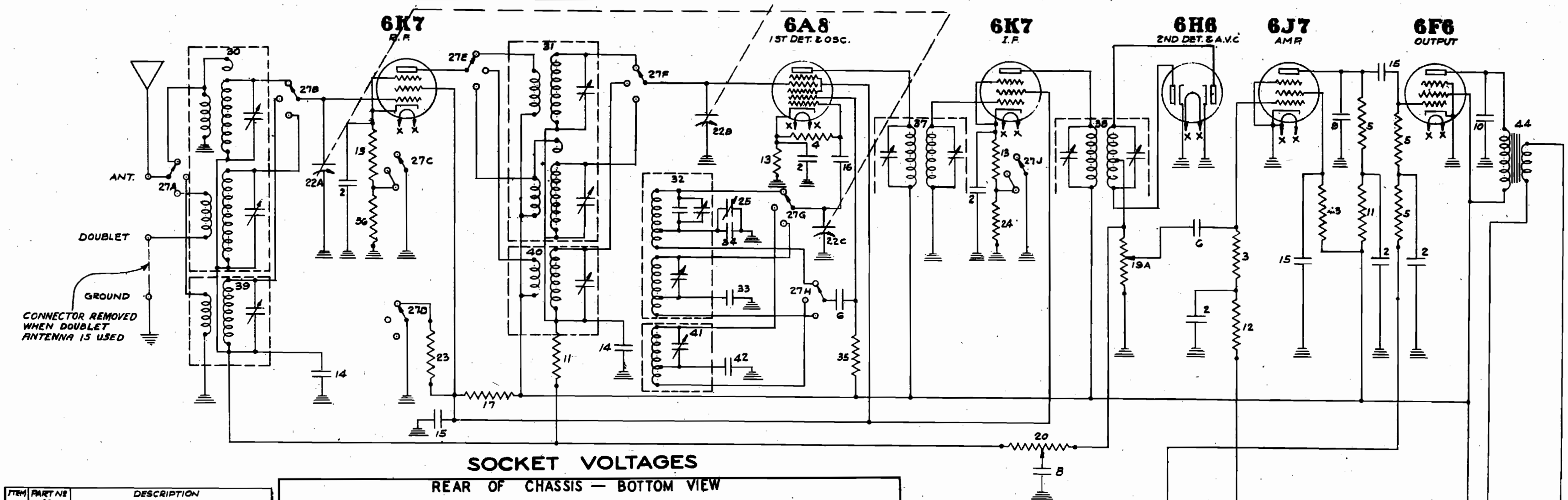
ABBREVIATIONS
G. GRID
H. HEATER
K. CATHODE
O.G. OSCILLATOR GRID
O.P. OSCILLATOR PLATE
P. PLATE
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS
LINE VOLTAGE 115 RANGE SWITCH IN **BROADCAST** POSITION

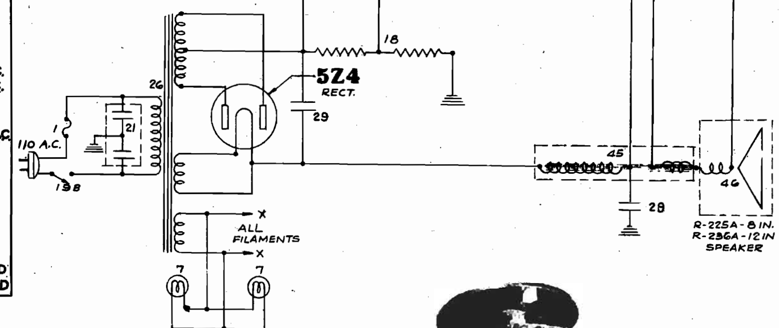
NOTE : GRID BIAS MEASURED ACROSS RESISTOR 20A&B IS -16 VOLTS, ACROSS 20A -1.2 VOLTS

Form 7296 Printed in U.S.A.

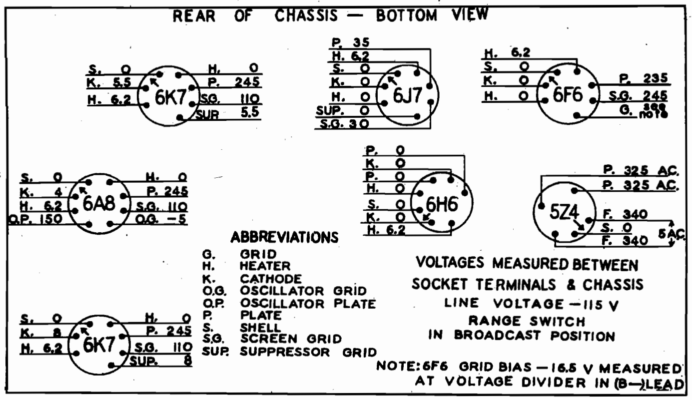
MODELS 1361 to 1369
Chassis R-136 (Temporary) STEWART WARNER CORP.
Schematic, Socket, Parts
Trimmers



I.F. FREQUENCY 456 KC.



SOCKET VOLTAGES



ABBREVIATIONS
G. GRID
H. HEATER
K. CATHODE
O.G. OSCILLATOR GRID
O.P. OSCILLATOR PLATE
P. PLATE
S. SHELL
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID

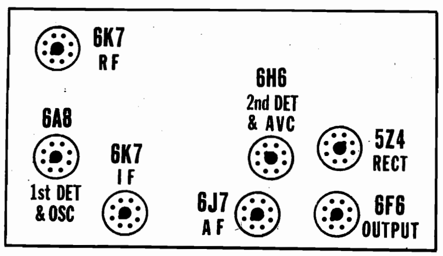
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS
LINE VOLTAGE — 115 V
RANGE SWITCH IN BROADCAST POSITION

NOTE: 6F6 GRID BIAS — 16.5 V MEASURED AT VOLTAGE DIVIDER IN (B—) LEAD

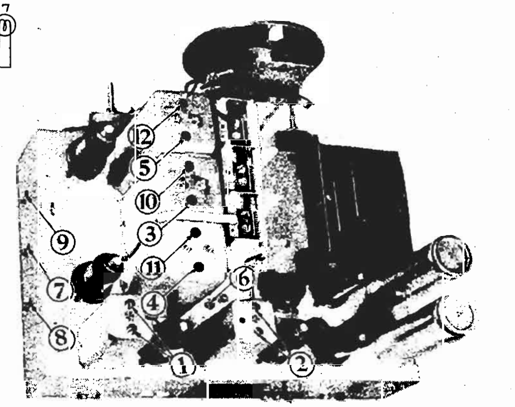
ITEM	PART No	DESCRIPTION
1	38841	FUSE
2	81630	.1 MFD.-100 VOLT PAPER CONDENSER
3	83072	510,000 OHM 1/4 W. CARBON RESISTOR
4	83080	51,000 OHM 1/4 W. CARBON RESISTOR
5	83082	260,000 OHM 1/4 W CARBON RESISTOR
6	83219	.01 MFD - 600 V. PAPER CONDENSER
7	83278	DIAL LAMP
8	83352	.015 MFD. - 600 V. PAPER CONDENSER
9	83539	.00026 MFD. MICA CONDENSER
10	83706	.006 MFD. - 600 V. PAPER CONDENSER
11	84198	110,000 OHM 1/4 W. CARBON RESISTOR
12	84235	1.1 MEG OHM 1/4 W. CARBON RESISTOR
13	84888	300 OHM 1/2 W. WIRE WOUND RESISTOR
14	85053	.05 MFD.-100 V. PAPER CONDENSER
15	85059	.05 MFD.- 300 V. PAPER CONDENSER
16	85061	.000051 MFD. MICA CONDENSER
17	85063	15,000 OHM 2 W. CARBON RESISTOR
18	85067	BIAS RESISTOR STRIP (TAPPED)
19A	85073	VOLUME CONTROL
19B		LINE SWITCH
20	85074	TONE CONTROL
21	85075	.01 MFD - 750 A.C. PAPER CONDENSER
22A, 22B, 22C	85084	VARIABLE CONDENSER (3 GANG)
23	85116	25,000 OHM 1/2 W. CARBON RESISTOR
24	85117	1,000 OHM 1/2 W. CARBON RESISTOR
25	85285	PADDING CONDENSER
26	85428	POWER TRANSFORMER
27A, 27B, 27C, 27D, 27E, 27F, 27G, 27H, 27J	85429	RANGE SWITCH
28	85430	16 MFD. - 300 V. ELECTROLYTIC COND.
29	85431	16 MFD.- 400 V. ELECTROLYTIC COND.
30	85432	ANTENNA COIL & SHIELD ASSEM.
31	85433	R.F. COIL & SHIELD ASSEM.
32	85434	OSC. COIL & SHIELD ASSEM
33	85440	.00351 MFD.- MICA CONDENSER
34	85441	.00042 MFD.- MICA CONDENSER
35	85442	21,000 OHM 1/2 W CARBON RESISTOR
36	85443	2,000 OHM 1/2 W. CARBON RESISTOR
37	85452	1ST I.F. TRANSFORMER
38	85453	2ND. I.F. TRANSFORMER
39	85455	ANTENNA COIL ASSEM (POLICE BAND)
40	85456	R.F. COIL ASSEMBLY (POLICE BAND)
41	85457	OSC. COIL ASSEMBLY (POLICE BAND)
42	85467	.00137 MFD. MICA CONDENSER
43	85472	1.6 MEG OHM 1/4 W. CARBON RESISTOR
44	84312	OUTPUT TRANS. (R-225A - 8 IN. SPEAKER)
	85482	OUTPUT TRANS. (R-236A - 12 IN SPEAKER)
45	84505	FIELD PLATE BRKT & COIL ASSEM. (R-225A)
	85478	FIELD PLATE BRKT. & COIL ASSEM. (R-236A)
46	84504	DIAPH. & SHELL ASSEM. (R-225A)
	85592	DIAPH & SHELL ASSEM (R-236A)

TUBE LOCATIONS

FRONT OF SET



1. 1st I.F. TRANS. TRIMMERS
2. 2nd I.F. TRANS. TRIMMERS
3. BROADCAST OSCILLATOR SHUNT TRIMMER
4. BROADCAST DETECTOR SHUNT TRIMMER
5. BROADCAST ANTENNA SHUNT TRIMMER
6. BROADCAST OSCILLATOR SERIES PADDER
7. BAND NO. 2 OSCILLATOR SHUNT TRIMMER
8. BAND NO. 2 DETECTOR SHUNT TRIMMER
9. BAND NO. 2 ANTENNA SHUNT TRIMMER
10. BAND NO. 3 OSCILLATOR SHUNT TRIMMER
11. BAND NO. 3 DETECTOR SHUNT TRIMMER
12. BAND NO. 3 ANTENNA SHUNT TRIMMER



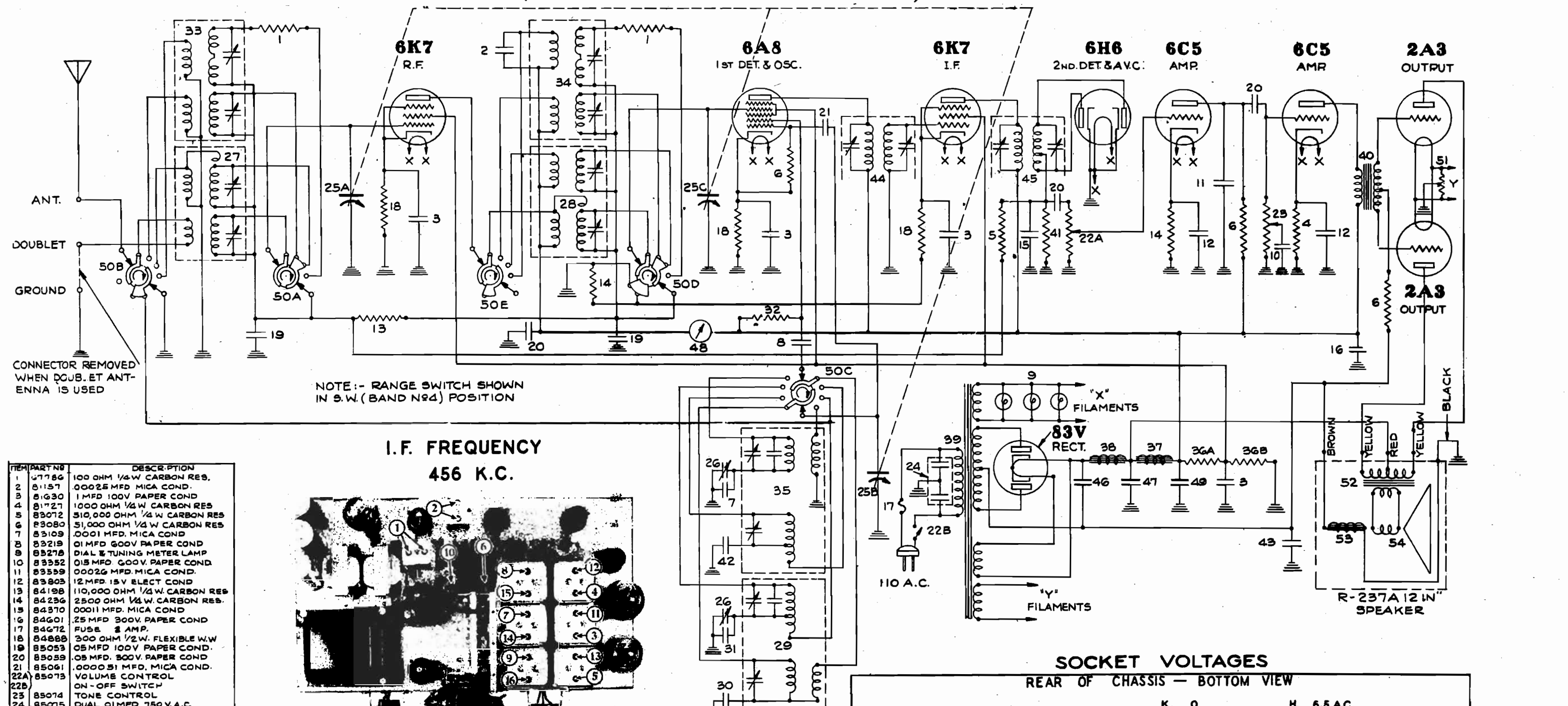
FORM 7210 PRINTED IN U.S.A.

MODELS 1371 to 1379
Chassis R-137 (Temporary)
Schematic, Socket, Parts Trimmers

STEWART WARNER CORP.

STEWART-WARNER MODEL R-137 CHASSIS (RECEIVER MODELS 1371 to 1379)

(TEMPORARY CIRCUIT DIAGRAM)



I.F. FREQUENCY
456 K.C.

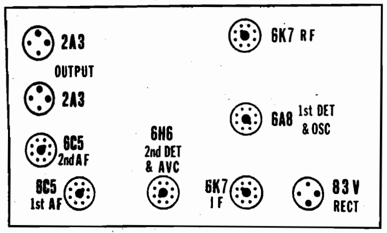
ITEM	PART No	DESCRIPTION
1	67786	100 OHM 1/4 W CARBON RES.
2	81157	.00025 MFD MICA COND.
3	81630	1 MFD 100V PAPER COND
4	81727	1000 OHM 1/4 W CARBON RES
5	83072	510,000 OHM 1/4 W CARBON RES
6	83080	51,000 OHM 1/4 W CARBON RES
7	83109	.0001 MFD. MICA COND
8	83219	01 MFD 600V PAPER COND
9	83278	DIAL & TUNING METER LAMP
10	83352	015 MFD. 600 V. PAPER COND.
11	83539	00026 MFD. MICA COND.
12	83803	12 MFD. 15 V ELECT COND
13	84198	110,000 OHM 1/4 W. CARBON RES
14	84236	2500 OHM 1/4 W. CARBON RES.
15	84370	00011 MFD. MICA COND
16	84601	.25 MFD 300V. PAPER COND
17	84672	FUSE 2 AMP.
18	84888	300 OHM 1/2 W. FLEXIBLE W.W
19	85053	05 MFD 100V PAPER COND.
20	85059	.05 MFD. 300 V. PAPER COND
21	85061	.000051 MFD. MICA COND.
22A	85073	VOLUME CONTROL
22B		ON-OFF SWITCH
23	85074	TONE CONTROL
24	85075	DUAL .01 MFD 750 V.A.C PAPER CONDENSER
25A TO C	85084	GANG CONDENSER
26	85285	PADDING TRIMMER
27	85432	ANTENNA COIL & SHIELD ASSEM
28	85433	R.F COIL & SHIELD ASSEM
29	85434	OSC. COIL & SHIELD ASSEM
30	85440	.00351 MFD. MICA COND.
31	85441	.00042 MFD MICA COND
32	85442	21,000 OHM 1/2 W. CARBON RES.
33	85515	ANT COIL & SHIELD ASSEM. (LONG WAVE & POLICE BAND)
34	85516	R.F. COIL & SHIELD ASSEM (L.W. & P.)
35	85517	OSC COIL & SHIELD ASSEM (L.W. & P.)
36A	85538	WIRE WOUND RES. 5200 OHMS
36B		4300 OHMS
37	85546	CHOKE ASSEM.
38	85549	IMPUT CHOKE ASSEM
39	85556	POWER TRANSFORMER ASSEM.
40	85560	AUDIO COUPLING TRANS.
41	85561	200,000 OHM 1/4 W. RES.
42	85562	00144 MFD. MICA COND
43	85565	40 MFD. 100V. ELECT. COND.
44	85566	1ST I.F. TRANS. ASSEM
45	85567	2ND I.F. TRANS. ASSEM.
46	85583	16 MFD. 450V. ELECT. COND.
47	85584	16 MFD. 350V. ELECT. COND
48	85587	TUNING METER
49	85588	16 MFD 300V. ELECT. COND.
50A TO E	85589	RANGE SWITCH
51	85605	20 OHM 1/2 W W.W.- CENTER-TAPPED RES.
52	G-85553	OUTPUT TRANSFORMER
53	G-85593	FIELD PLATE, BRKT & COIL ASSEM.
54	G-85601	DIAPHRAGM & SHELL ASSEM.

1. 1st I.F. TRANS. TRIMMERS
2. 2nd I.F. TRANS. TRIMMERS
3. BAND NO. 1 OSCILLATOR SHUNT TRIMMER
4. BAND NO. 1 DETECTOR SHUNT TRIMMER
5. BAND NO. 1 ANTENNA SHUNT TRIMMER
6. BAND NO. 1 OSCILLATOR SERIES PADDER
7. BROADCAST OSCILLATOR SHUNT TRIMMER
8. BROADCAST DETECTOR SHUNT TRIMMER
9. BROADCAST ANTENNA SHUNT TRIMMER
10. BROADCAST OSCILLATOR SERIES PADDER
11. BAND NO. 3 OSCILLATOR SHUNT TRIMMER
12. BAND NO. 3 DETECTOR SHUNT TRIMMER
13. BAND NO. 3 ANTENNA SHUNT TRIMMER
14. BAND NO. 4 OSCILLATOR SHUNT TRIMMER
15. BAND NO. 4 DETECTOR SHUNT TRIMMER
16. BAND NO. 4 ANTENNA SHUNT TRIMMER

FORM NO. 7233 PRINTED IN U.S.A.

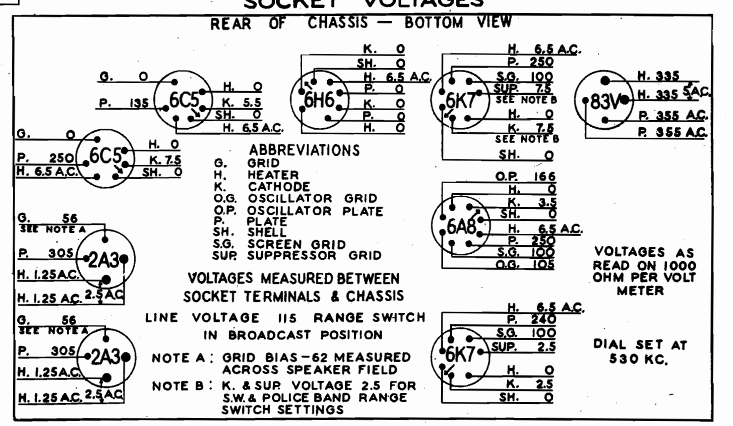
TUBE LOCATIONS

FRONT OF SET



SOCKET VOLTAGES

REAR OF CHASSIS — BOTTOM VIEW



ABBREVIATIONS
G. GRID
H. HEATER
K. CATHODE
O.G. OSCILLATOR GRID
O.P. OSCILLATOR PLATE
P. PLATE
SH. SHELL
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS

LINE VOLTAGE 115 RANGE SWITCH IN BROADCAST POSITION

NOTE A: GRID BIAS -62 MEASURED ACROSS SPEAKER FIELD

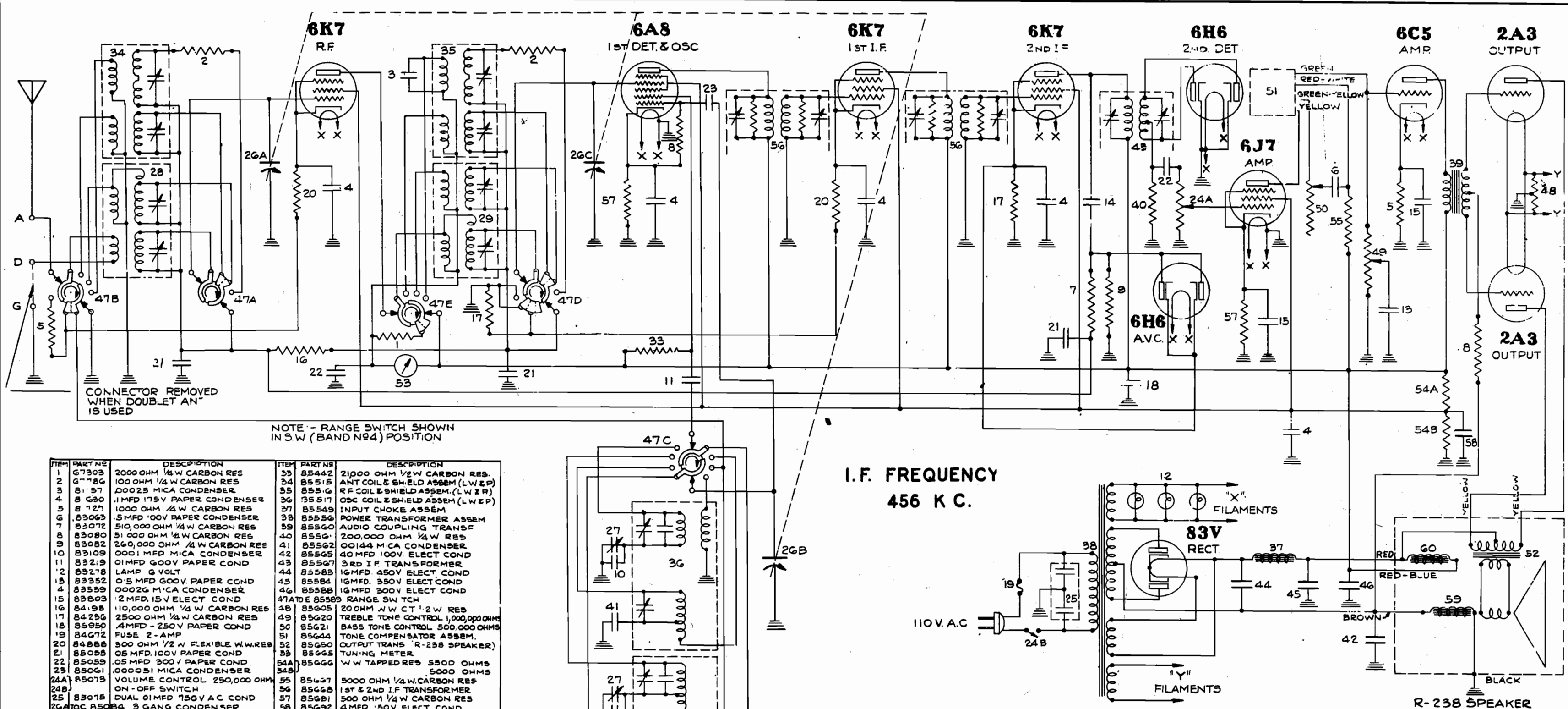
NOTE B: K. & SUP. VOLTAGE 2.5 FOR S.W. & POLICE BAND RANGE SWITCH SETTINGS

VOLTAGES AS READ ON 1000 OHM PER VOLT METER

DIAL SET AT 530 KC.

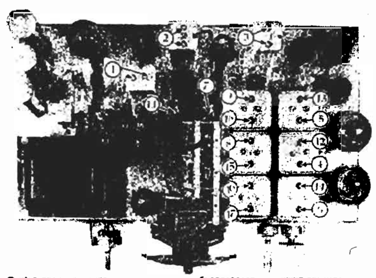
MODELS 1381 to 1389
Chassis R-138 (Temporary)
Schematic, Socket, Parts
Trimmers

STEWART WARNER CORP.



ITEM	PART Nº	DESCRIPTION	ITEM	PART Nº	DESCRIPTION
1	67303	2000 OHM 1/4 W CARBON RES	33	85442	21000 OHM 1/2 W CARBON RES.
2	6⁻⁻86	100 OHM 1/4 W CARBON RES	34	85515	ANT COIL & SHIELD ASSEM (L.W & P)
3	81·57	.00025 MICA CONDENSER	35	855·6	R F COIL & SHIELD ASSEM. (L W & R)
4	8 630	.1 MFD 175 V PAPER CONDENSER	36	35517	OSC COIL & SHIELD ASSEM (L W & P)
5	8 727	1000 OHM 1/4 W CARBON RES	37	85549	INPUT CHOKE ASSEM
6	.83063	.5 MFD 100V PAPER CONDENSER	38	85556	POWER TRANSFORMER ASSEM
7	83072	510,000 OHM 1/4 W CARBON RES	39	85560	AUDIO COUPLING TRANSF
8	83080	51 000 OHM 1/4 W CARBON RES	40	8556·	200,000 OHM 1/4 W RES
9	83082	260,000 OHM 1/4 W CARBON RES	41	85562	.00144 MICA CONDENSER
10	83109	.0001 MFD MICA CONDENSER	42	85565	40 MFD 100V. ELECT COND
11	832·9	.01 MFD 600V PAPER COND	43	85567	3RD I.F. TRANSFORMER
12	83278	LAMP 6 VOLT	44	85583	16 MFD. 450V ELECT COND
13	83352	0.5 MFD 600 V. PAPER COND	45	85584	16 MFD. 350 V ELECT COND
14	83539	.00026 MICA CONDENSER	46	85588	16 MFD 300 V ELECT COND
15	83803	12 MFD. 15 V ELECT COND	47A TO E	85589	RANGE SWITCH
16	84·98	110,000 OHM 1/4 W CARBON RES	48	85605	20 OHM W W C T 1/2 W RES
17	84236	2500 OHM 1/4 W CARBON RES	49	85620	TREBLE TONE CONTROL 1,000,000 OHMS
18	85950	.4 MFD - 250 V PAPER COND	50	85621	BASS TONE CONTROL 500,000 OHMS
19	84672	FUSE 2-AMP	51	85644	TONE COMPENSATOR ASSEM.
20	84888	300 OHM 1/2 W FLEXIBLE W.W. RES	52	85650	OUTPUT TRANS (R-238 SPEAKER)
21	85058	.05 MFD. 100 V PAPER COND	53	85665	TUNING METER
22	85059	.05 MFD 300 V PAPER COND	54A, 54B	85666	W W TAPPED RES 5500 OHMS, 5000 OHMS
23	85061	.000051 MICA CONDENSER	55	85667	5000 OHM 1/4 W. CARBON RES
24A, 24B	85073	VOLUME CONTROL 250,000 OHM, ON-OFF SWITCH	56	85668	1st & 2nd I.F TRANSFORMER
25	85075	DUAL .01 MFD 750 V A C COND	57	85681	500 OHM 1/4 W CARBON RES
26A TO C	85084	3 GANG CONDENSER	58	85692	4 MFD 50 V ELECT COND
27	85285	PADDING TRIMMER		85700	DIAPH. V C & SHELL ASSEM (R-239 SPK)
28	85432	ANTENNA COIL & SHIELD ASSEM	59	85703	FIELD PL. BRKT & COIL ASSEM (R-238 SPK)
29	85433	R F COIL & SHIELD ASSEM.	60	85712	FILTER CHOKE (R-238 SPEAKER)
30	85434	OSC COIL & SHIELD ASSEM		85741	FIELD COIL (R-239 SPEAKER)
31	85540	.00351 MICA CONDENSER		85744	OUTPUT TRANS (R-239 SPEAKER)
32	85541	.00042 MICA CONDENSER		85747	DIAPH. V.C. & SHELL ASSEM. (R-239 SPK)

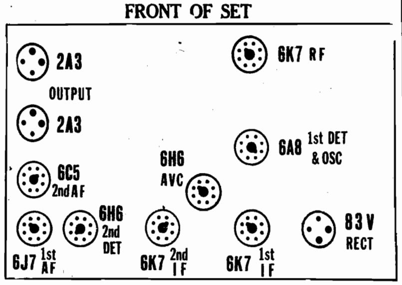
NOTE - R-240-A HIGH-FREQUENCY SPEAKER USED WITH R-238-A ON TWO SPEAKER MODEL; AND R-240-A FIELD COIL REPLACES ITEM Nº60 FILTER CHOKE.



1. 3rd I.F. TRANS. TRIMMERS
2. 2nd I.F. TRANS. TRIMMERS
3. 1st I.F. TRANS TRIMMERS
4. LONG WAVE BAND OSC. SHUNT TRIMMER
5. LONG WAVE BAND OSC. SERIES PADDER
6. LONG WAVE BAND DET. SHUNT TRIMMER
7. LONG WAVE BAND ANT. SHUNT TRIMMER
8. BROADCAST OSC SHUNT TRIMMER
9. BROADCAST DET SHUNT TRIMMER
10. BROADCAST ANT. SHUNT TRIMMER
11. BROADCAST OSC. SERIES PADDER
12. 1st S.W. BAND OSC. SHUNT TRIMMER
13. 1st S.W. BAND DET. SHUNT TRIMMER
14. 1st S.W. BAND ANT. SHUNT TRIMMER
15. 2nd S.W. BAND OSC. SHUNT TRIMMER
16. 2nd S.W. BAND DET. SHUNT TRIMMER
17. 2nd S.W. BAND ANT. SHUNT TRIMMER

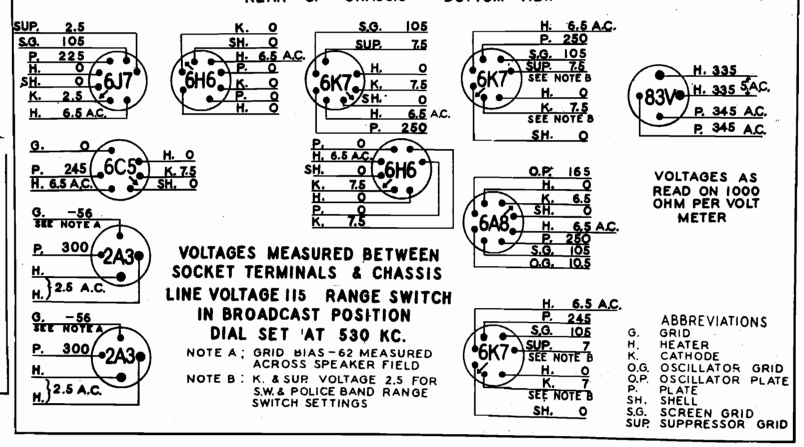
TUBE LOCATIONS

FRONT OF SET



SOCKET VOLTAGES

REAR OF CHASSIS — BOTTOM VIEW



VOLTAGES AS READ ON 1000 OHM PER VOLT METER

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS
LINE VOLTAGE 115 RANGE SWITCH IN BROADCAST POSITION
DIAL SET AT 530 KC.

NOTE A: GRID BIAS -62 MEASURED ACROSS SPEAKER FIELD

NOTE B: K. & SUP. VOLTAGE 2.5 FOR S.W. & POLICE BAND RANGE SWITCH SETTINGS

ABBREVIATIONS
G. GRID
H. HEATER
K. CATHODE
O.G. OSCILLATOR GRID
O.P. OSCILLATOR PLATE
P. PLATE
SH. SHELL
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID

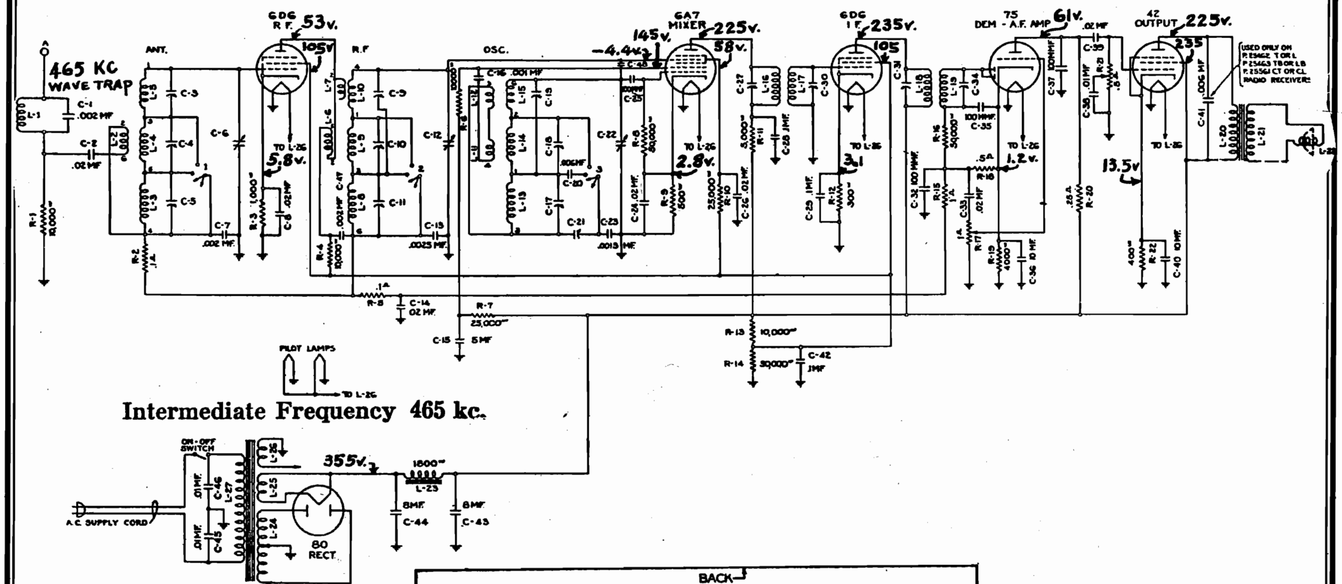
(TEMPORARY CIRCUIT DIAGRAM)

FORM NO. 7871 PRINTED IN U.S.A.

Schematic, Voltage Trimmers, Chassis

MODELS 58L, 58LB, 58T 58TB, 58W, 58WB

STROMBERG-CARLSON TEL. MFG. CO.



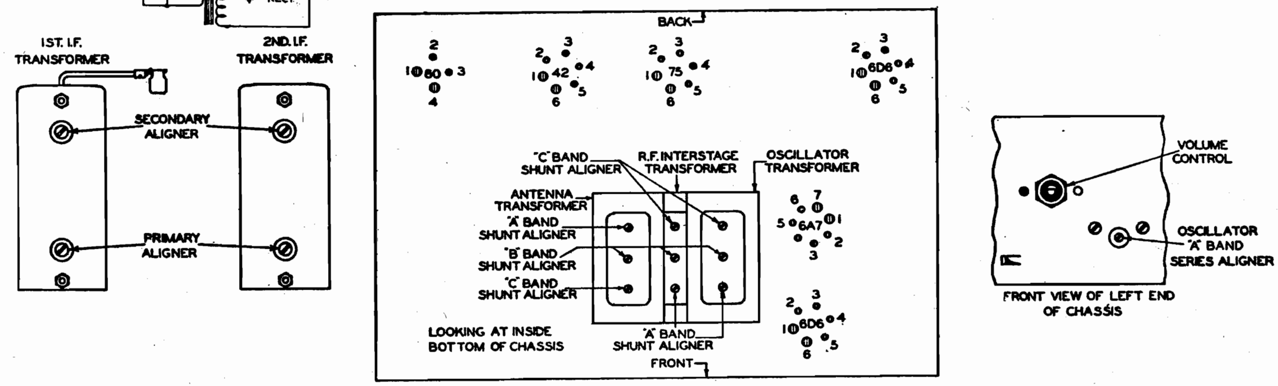


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

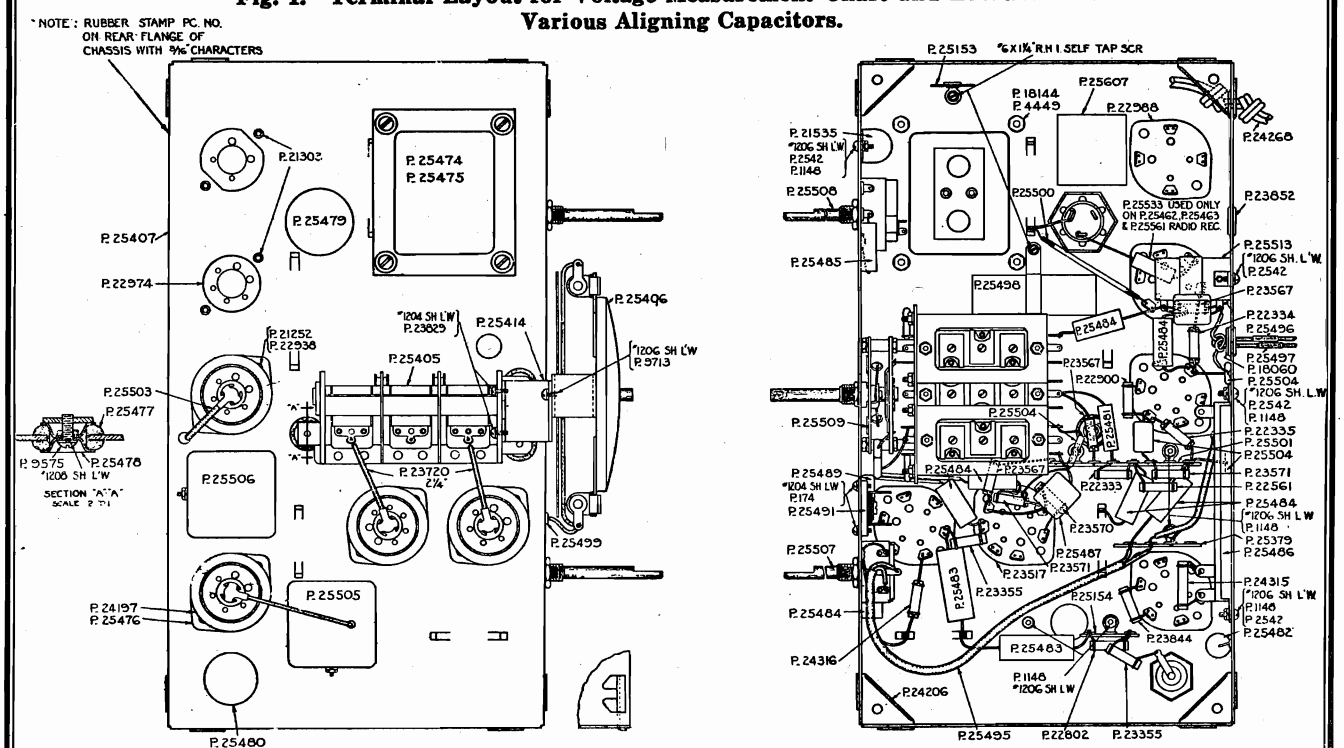
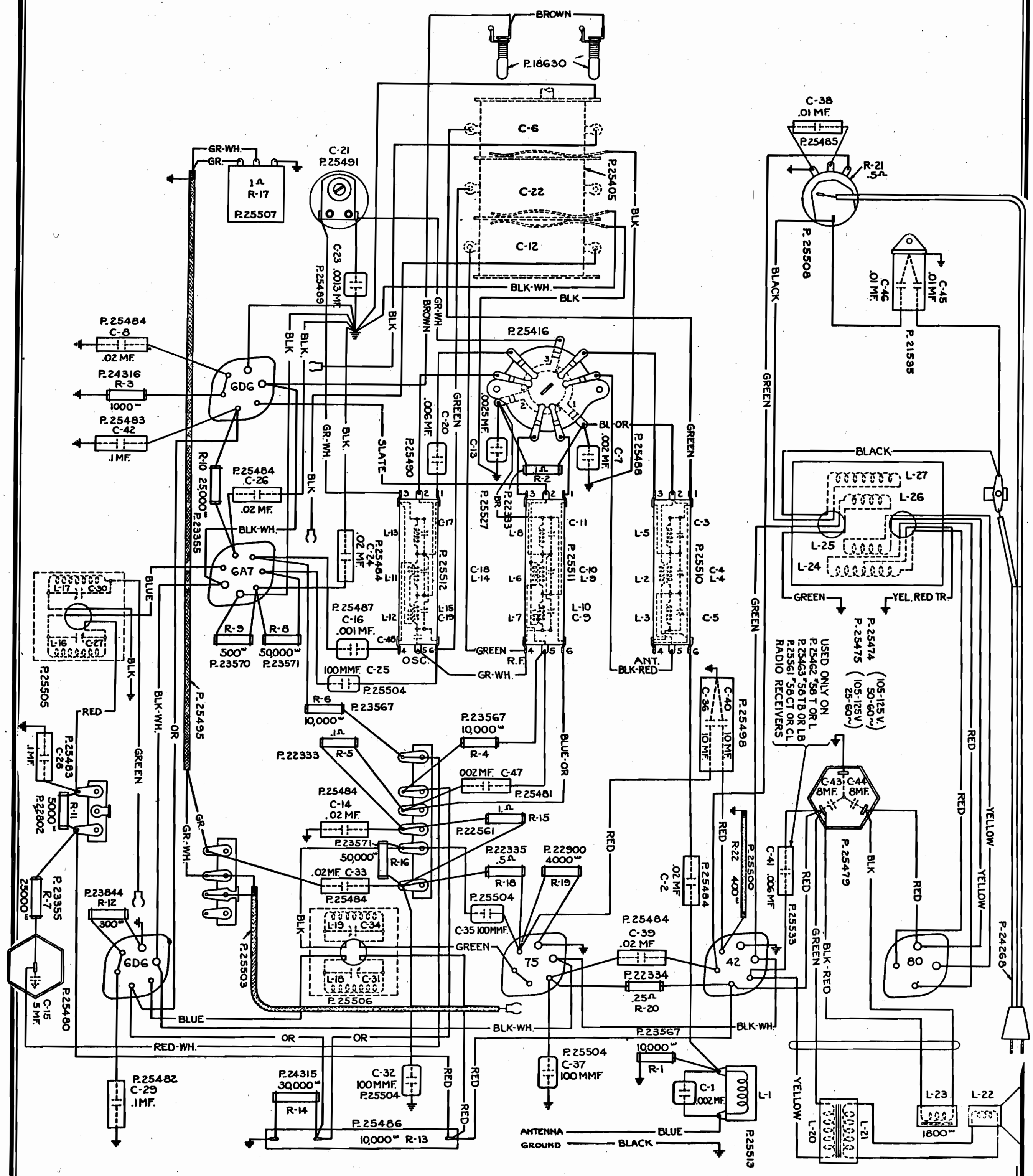


Fig. 3. Chassis Assembly.

MODEL 58 Series
Chassis Wiring
List of Models

STROMBERG-CARLSON TEL. MFG. CO.



No. 58-T	50-60 Cycles	P-25462 Chassis; P-25464 Loud Speaker
No. 58-TB	25-60 Cycles	P-25463 Chassis; P-25464 Loud Speaker
No. 58-L	50-60 Cycles	P-25462 Chassis; P-25464 Loud Speaker
No. 58-LB	25-60 Cycles	P-25463 Chassis; P-25464 Loud Speaker
No. 58-W	50-60 Cycles	P-25604 Chassis; P-25601 Loud Speaker
No. 58-WB	25-60 Cycles	P-25605 Chassis; P-25601 Loud Speaker

STROMBERG-CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit -------- Superheterodyne
Tuning Ranges -------- A—.54 to 1.7 megacycles; B—1.7 to 5.4 megacycles; C—5.4 to 18 megacycles
Number and Type of Tubes -------- 3 No. 6K7, 1 No. 6A8, 1 No. 6H6, 2 No. 6F6, 1 No. 5Z3
Voltage Rating -------- 105 to 125 volts
Frequency Rating -------- 25-60 cycles and 50-60 cycles
Wattage Rating -------- 105 watts
Intermediate Frequency -------- 465 kc.

APPARATUS SPECIFICATIONS

No. 62 Receiver -------- 50-60 Cycles -------- P-25432 Chassis; P-25687 Loud Speaker
No. 62-B Receiver -------- 25-60 Cycles -------- P-25433 Chassis; P-25687 Loud Speaker
No. 63 Receiver -------- 50-60 Cycles -------- P-25684 Chassis; P-25687 Loud Speaker
No. 63-B Receiver -------- 25-60 Cycles -------- P-25685 Chassis; P-25687 Loud Speaker

CIRCUIT DESCRIPTION

Eight tubes, A. C. operated, Superheterodyne receiver employing metal tubes and having three tuning ranges. These three tuning ranges cover all the important broadcasts and special service bands of both American and Foreign stations. These receivers are also equipped with a high fidelity control providing high fidelity reception by means of a special band widener device and single unit high fidelity speaker. The No. 63 Receiver chassis is the same as the No. 62 Receiver chassis except for the addition of the Visual Tuning Meter. See P-25675, Installation and Operating Instructions, for properly installing and operating the No. 62 Receiver and P-25768, Installation and Operating Instructions, for properly installing and operating the No. 63 Receiver.

The various tubes in this receiver are used as follows: One of the No. 6K7 tubes functions as an R. F. Amplifier, another No. 6K7 is used in the I. F. Amplifier Stage, and the other No. 6K7 operates as an Audio Driver tube. The No. 6A8 tube is used as an Oscillator and also as a Modulator. The No. 6H6 tube is used as a Demodulator—Automatic Volume Control tube. The audio power output stage uses the two No. 6F6 tubes, and the No. 5Z4 is used as the rectifier in the power supply unit.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

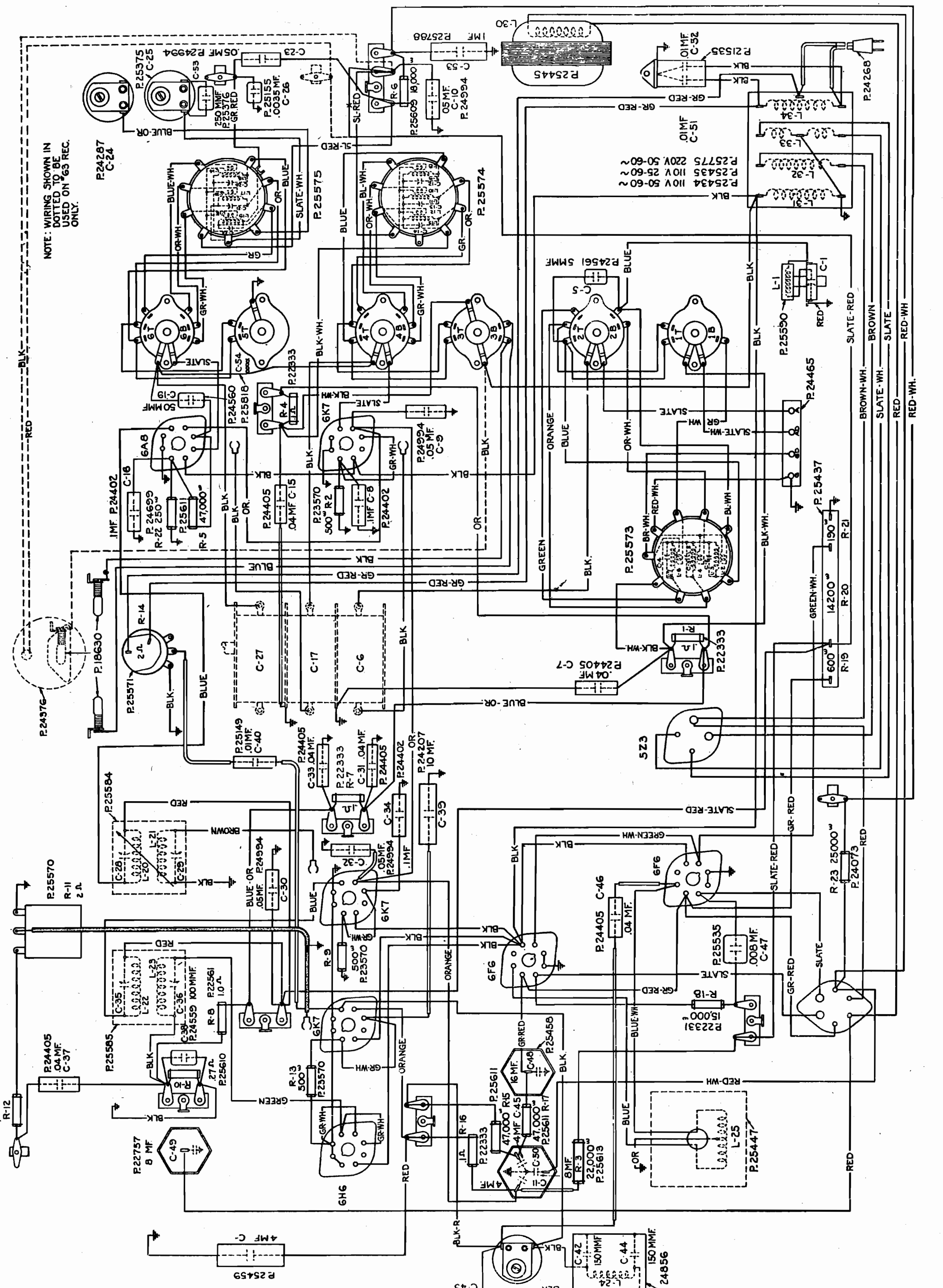
Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

Tube	Circuit	Cap.	Terminal Sockets								Heater Voltages Between Terminal Nos. at Volts
			1	2	3	4	5	6	7	8	
6K7	R. F. Amp.	0	0	—	+230	+ 95	+ 3	—	—	+ 3	2–7, *6.3* volts
6A8	Mod.-Osc.	0	0	—	+235	+ 95	0	+150	—	+ 3	2–7, *6.3* volts
6K7	I. F. Amp.	0	0	—	+230	+ 95	+ 3.5	—	—	+ 3.5	2–7, *6.3* volts
6H6	Dem.-A. V. C.	—	0	—	0	0	0	—	—	—	2–7, *6.3* volts
6K7	A. F. Amp.	0	0	—	+ 25	+ 35	+1.5	—	—	+ 1.5	2–7, *6.3* volts
6F6	Output	—	0	0	+250	+260	0	—	0	+16	2–7, *6.3* volts
5Z3	Rectifier	—	+428	*405*	*405*	+428					1–4, *4.85* volts
Speaker Socket			+260	+400	+430	+430	+260	+260			

Set tuned to 1000 kc., no signal. A. C. voltages are indicated by italics.

MODELS 62,63
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.



MODELS 62, 63
Schematic
Chassis Assembly

STROMBERG-CARLSON TEL. MFG. CO.

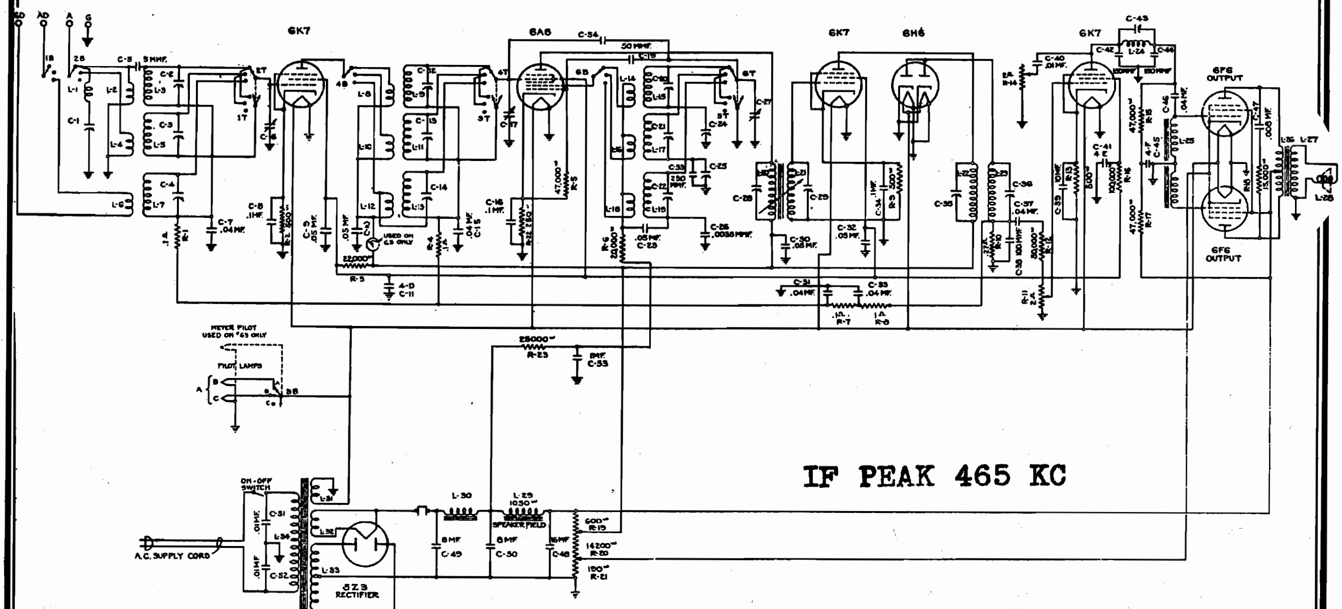


Fig. 2. Schematic Circuit of Receiver.

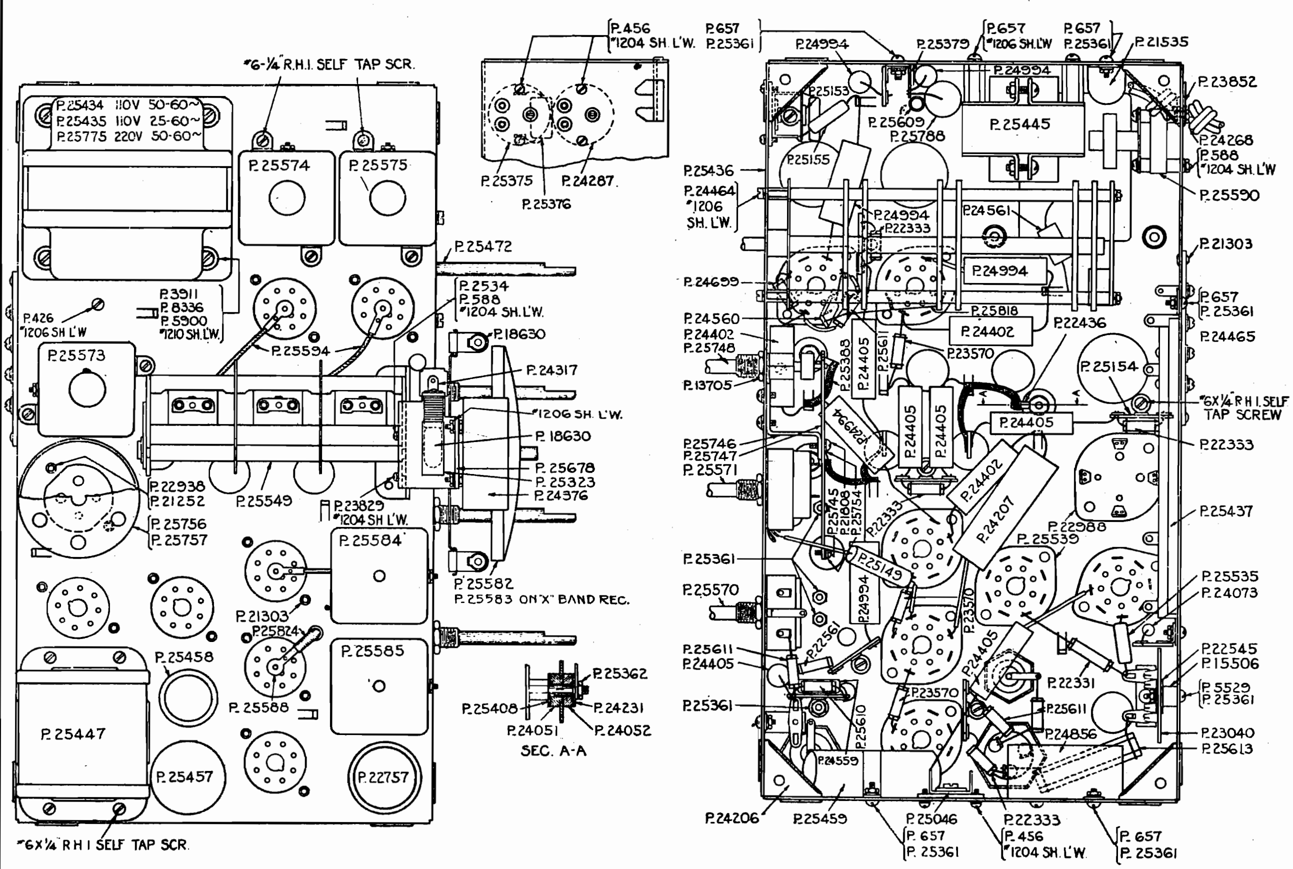


Fig. 3. Chassis Assembly.

MODELS 62,63
Socket,Trimmers
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

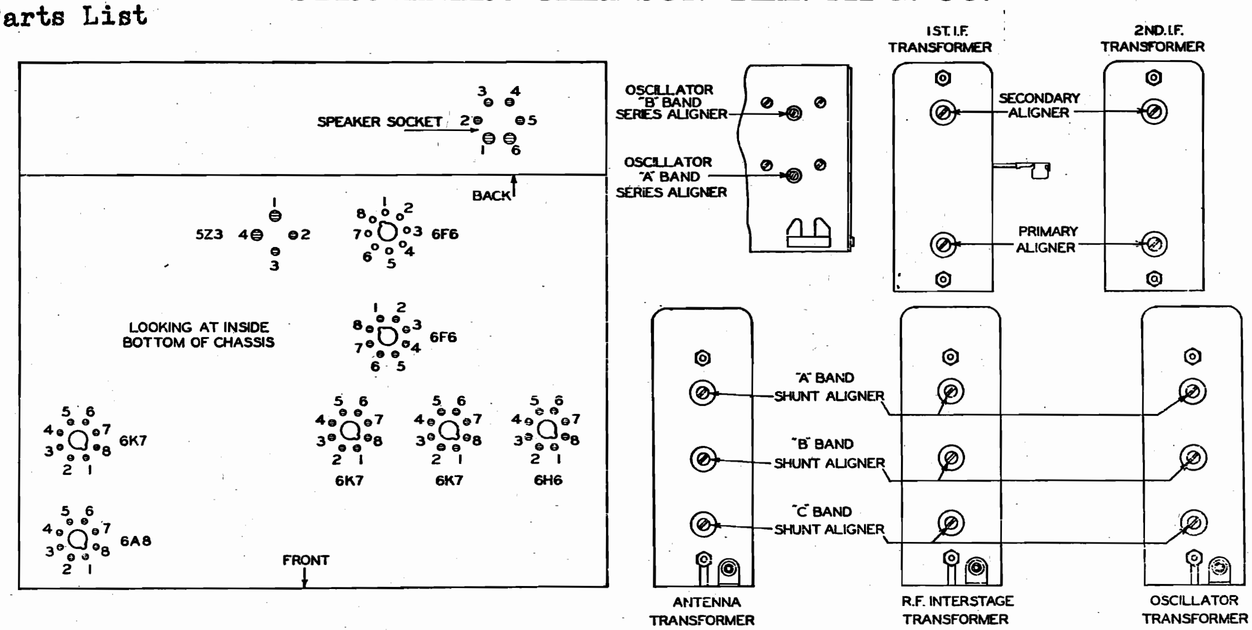


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors. CAUTION—Never Attempt to Align Receiver With Fidelity Control Set At Any Position Other Than the Maximum Counter-Clockwise Position.

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24465	Binding Post Assembly	Antenna and Ground	1	$ .40
P-25746	Bracket	Fidelity Control	1	.10
P-25458	Capacitor	Electrolytic	1	1.35
P-25457	Capacitor	Electrolytic	1	3.05
P-22757	Capacitor	Electrolytic	1	1.50
P-24207	Capacitor	Electrolytic	1	.85
P-25459	Capacitor	Electrolytic	1	.90
P-25788	Capacitor	Electrolytic	1	.95
P-24402	Capacitor	0.1 MF.	3	.45
P-24994	Capacitor	0.05 MF.	6	.45
P-24405	Capacitor	0.04 MF.	6	.45
P-21535	Capacitor	Two, 0.01 MF.	1	.80
P-25149	Capacitor	0.01 MF.	1	.30
P-25535	Capacitor	Type 3, 0.008 MF.	1	.60
P-25155	Capacitor	0.0035 MF.	1	.40
P-25376	Capacitor	Type O, 250 MMF.	1	.25
P-24559	Capacitor	Type O, 100 MMF.	1	.25
P-24560	Capacitor	Type O, 50 MMF.	1	.25
P-24561	Capacitor	Type O, 5 MMF.	1	.20
P-25046	Capacitor	Aligning, 220 MMF.	1	.50
P-24287	Capacitor	Aligning, 525 MMF.	1	.60
P-25375	Capacitor	Aligning, 1350 MMF.	1	1.00
P-25445	Choke Coil Assembly		1	2.75
P-25573	Coil Assembly	Antenna	1	3.75
P-25574	Coil Assembly	R. F. Stage	1	3.75
P-25575	Coil Assembly	Oscillator	1	3.75
P-24268	Cord	A. C. Supply	1	.75
P-25590	Filter Assembly	Antenna Wave Trap	1	.55
P-24856	Filter Assembly	Audio Cut-off Filter	1	2.50
P-18630	Lamp	Pilot	2	.13
P-25747	Lever	Fidelity Control	1	.10
P-25570	Potentiometer	Volume Control	1	.85
P-25571	Potentiometer	Tone Control and "On-Off" Switch	1	1.15
P-24699	Resistor	Type D, 250 ohms	1	.37
P-23570	Resistor	Type D, 500 ohms	3	.37
P-22331	Resistor	Type C, 15,000 ohms	1	.37
P-25609	Resistor	Type C, 18,000 ohms	1	.37
P-25613	Resistor	Type F, 22,000 ohms	1	.37
P-24073	Resistor	Type B, 25,000 ohms	1	.37
P-25611	Resistor	Type D, 47,000 ohms	4	.37
P-22333	Resistor	Type D, 0.1 megohm	4	.37
P-25610	Resistor	Type D, 0.27 megohm	1	.37
P-22561	Resistor	Type D, 1 megohm	1	.37
P-25437	Resistor	"B" Voltage Divider	1	.60
P-25748	Shaft Assembly	Fidelity Control	1	.50
P-25745	Shoulder Screw	Fidelity Control	1	.05
P-21808	Shoulder Screw	Fidelity Control	1	.05
P-22988	Socket	Tube, 4 Prong	1	.15
P-23040	Socket	Tube, 6 Prong	1	.15
P-25539	Socket	Tube, 8 Prong	7	.15
P-25687	Speaker	High Fidelity Loud Speaker	1	17.75
P-25472	Switch Assembly	Frequency Range	1	3.90
P-25447	Transformer Assembly	Audio Driver Stage	1	4.00
P-25688	Transformer Assembly	Audio Power Output	1	2.90
P-25584	Transformer Assembly	1st I. F.	1	4.25
P-25585	Transformer Assembly	2nd I. F.	1	1.95
P-25434	Transformer	Power, 50-60 Cycles, 110 Volts	1	6.75
P-25435	Transformer	Power, 25-60 Cycles, 110 Volts	1	12.85

Additional Parts used only on the No. 63 Receivers

P-24376	Meter	Visual Tuning	1	2.75
P-18630	Lamp	Pilot	1	.13

STROMBERG-CARLSON TEL. MFG. CO.

Engineering Data
Stromberg-Carlson No. 70 Series Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne
Tuning Ranges	A-520 to 1600 Kc.; B-1500 to 4200 Kc.; C-3700 to 10,000 Kc.; D-8500 to 23,000 Kc.
Type and Number of Tubes; No. 70 and 72	4 No. 6D6, 1 No. 6A7, 1 No. 76, 2 No. 6C6, 1 No. 6B7, 1 No. 42, 2 No. 2A3, 1 No. 5Z3.
No. 74	4 No. 6D6, 1 No. 6A7, 1 No. 76, 2 No. 6C6, 1 No. 6B7, 1 No. 42, 4 No. 2A3, 2 No. 5Z3.
Voltage Rating	105-125 Volts
Frequency Rating	25-60 Cycles and 50-60 Cycles
Wattage Rating: No. 70	160 Watts
No. 72	225 Watts
No. 74	300 Watts
Intermediate Frequency	200 or 370 Kc.

APPARATUS SPECIFICATIONS

No. 70 Receiver ....50-60 Cycles....P-24783 Chassis; P-24777 Bass Loud Speaker; P-24819 Treble Loud Speaker

No. 70-B Receiver ....25-60 Cycles....P-24784 Chassis; P-24777 Bass Loud Speaker; P-24819 Treble Loud Speaker

No. 72 Receiver ....60 Cycles....P-24783 Chassis; P-24777 Bass Loud Speaker; P-24819 Treble Loud Speaker; No. 5-A Phonograph Assembly

No. 72-D Receiver ....50 Cycles....Same as 60 Cycles except No. 5-D Phonograph Assembly

No. 72-B Receiver ....25 Cycles....Same as 60 Cycles except P-24784 Chassis and No. 6-B Phonograph Assembly

No. 74 Receiver ....60 Cycles....P-24785 Chassis; P-24855 Auditorium Type Loud Speaker; P-24819 Treble Loud Speaker; No. 6-A Phonograph Assembly

No. 74-D Receiver ....50 Cycles....Same as 60 Cycles except No. 5-D Phonograph Assembly

No. 74-B Receiver ....25 Cycles....Same as 60 Cycles except P-24786 Chassis; P-25378 Auditorium Type Loud Speaker and No. 6-B Phonograph Assembly

CIRCUIT DESCRIPTION

No. 70 and 72 RECEIVERS

Thirteen tubes, A. C. operated, All-wave superheterodyne, having four tuning ranges. See P-25252, Installation and Operating Instructions, for installation and operating procedure.

One 6D6 functions as an R. F. high frequency amplifier only on the "C" and "D" bands. On the other two lower bands this tube is shorted out and the tuning system functions as a "bi-resonator" system. The next 6D6 is used as an R. F. Amplifier. The remaining two 6D6 tubes are used as I. F. Amplifiers. The 6A7 is used as a modulator tube only. This is done in order to obtain maximum freedom of detrimental coupling between the oscillator and modulator.

The 76 tube functions as the oscillator. One 6C6 tube is used in a vacuum tube voltmeter circuit, resonance being indicated by the meter in the plate circuit of this tube, while the other 6C6 tube is used in the automatic noise suppression or "Q" circuit. The 6B7 tube acts as a demodulator, automatic volume control tube, and a triode first audio tube.

The No. 42 tube is operated as a triode audio driver tube for the No. 2A3 power output tubes. The 5Z3 tube is the rectifier tube in the power supply.

No. 74 RECEIVER

The arrangement and type of tubes used in this receiver is the same as in the No. 70 and 72 Receivers except for the addition of two more 2A3 tubes in the audio power output stage, and the additional 5Z3 rectifier tube in the power unit of the auditorium type loud speaker.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE TREBLE LOUD SPEAKER USED IN THE NO. 70, NO. 72 AND NO. 74 RECEIVERS

Unplug the speaker cord and remove the four machine screws holding the speaker to the baffle.

Care should be exercised in handling this speaker. Do not drop it face down on a flat surface or the center may be damaged due to the resulting air compression. Later speakers are provided with a stud on the front ring which prevents their being damaged in this manner. This stud may readily be removed from speakers to be used for replacement service, if the baffle is not provided with a hole for its accomodation.

The driving coil leads on these speakers are made of fine aluminum wire in order to reduce the mass to the value necessary for the reproduction of high frequencies. Avoid touching them as they are delicate and easily broken. Do not attempt to blow dust or chips from these speakers with compressed air as lead breakage may result.

The movement of the cone in actual service is only a few thousandths of an inch and is adequately taken care of by the thin aluminum center suspension. Do not force the cone back and forth with the fingers as you would an ordinary dynamic speaker or the center suspension may be damaged.

CENTERING THE DRIVING COIL OF TREBLE SPEAKER

Once the coil is correctly centered, it should never need readjustment. However, in case the center screw should be inadvertently loosened and the adjustment lost, the following instructions are given:

Provide three strips of clean, smooth paper, .006" to .008" thick, about ¼" wide, and about 3" long, for use as gauges. With the cone center clamping screw loosened, insert one end of each of the paper strips in the gap between the outside of the driving coil and the hole in the front plate, spacing the strips equidistantly around the coil. This may easily be done if the ends of the paper are cut to a point and tweezers are used for inserting them. Now, tighten the center clamping screw and "feel" the paper strips by pulling them with the tweezers to determine if any are pinched tightly in the gap. If this is found to be the case, the center screw should be loosened, and the cone moved slightly sidewise in a direction to relieve the pinched strip. Then, the screw should be retightened. The coil is considered centered when the three strips are equally free in the gap. Remove the strips by grasping them with the tweezers close to the front plate, rather than by pulling on the end of the strip, otherwise the paper may tear off against the edge of the hole, and thus a piece may be left in the gap.

In performing the centering operation, use great care not to damage the driving coil leads.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE BASS LOUD SPEAKER USED IN THE NO. 70 AND NO. 72 RECEIVERS

After unplugging the cords, remove the housings on each side of the speaker by taking out the necessary retaining screws and lifting off the housings. (In some models, the dividing network box is mounted astride the housings and must first be removed.) Then, take off the three clamps holding the cone ring to the baffle board. The four nuts which clamp the speaker to the labyrinth may now be removed with a flat wrench and the speaker lifted out.

In replacing the speaker, see that the cone ring is pushed firmly forward against the baffle, and that the housings are tight against the sides of the cone bracket.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE AUDITORIUM TYPE BASS LOUD SPEAKER USED IN THE NO. 74 RECEIVER

Two different methods of fastening the bass speaker to the floor of the cabinet have been used in this receiver. In the first method, the mounting screws are inserted from the inside of the cabinet and are screwed into metal sockets mounted in the bottom board. To remove the speaker, the acoustical labyrinths and the upper half of the cone housing must be removed to permit access to the hexagonal heads of the speaker mounting screws. First, remove the following wood screws:

(a) The six screws passing from the back through the two wooden cleats each side of the speaker, and into the cone housing.

(b) Two screws which fasten the two metal brackets on top half of cone housing to the baffle board.

(c) All screws which secure the labyrinth retaining brackets to the sides and bottom of cabinet.

(d) Two screws which pass through from the front of the baffle (near the bottom) into the labyrinths. The heads of these screws are just behind the lower edge of the skirt at the front of the cabinet.

The treble speaker should now be removed by taking out its four mounting screws, and unplugging the cord from the dividing network.

Now, the upper half of the cone housing and the labyrinths may be removed, after unplugging the remaining speaker cords. A wide chisel will be found handy for prying the labyrinths up off the cabinet floor sufficient to obtain a hand-hold on them. Have a small box ready to rest the right-hand labyrinth on to keep strain off the cord of the phonograph transformer.

Next, remove the four clamps holding the cone bracket to the baffle, and also the four hexagonal headed screws holding the speaker to the floor of the cabinet. The speaker may now be lifted straight up and out over the lower half of the cone housing.

In replacing the speaker, push it forward firmly against the baffle, and note if the foot brackets rest evenly on the cabinet floor. If not, wooden wedges should be placed under them so that the cone bracket will not be strained when the speaker is bolted down. When replacing the labyrinths, see that they are pushed over into firm contact with the ends of the cone housing.

In the second method, which is that used in more recent production, the bass speaker is fastened down by four hexagonal headed screws inserted from the bottom of the cabinet, and threaded into metal bars which clamp down the speaker mounting feet. These screws may be removed by reaching under the cabinet with a wrench. Then, remove the upper half of the cone housing after taking out its four retaining screws. This will expose the two clamps holding the cone bracket to the baffle. After these are removed, and the cords are unplugged, the speaker may be lifted out of the cabinet. In replacing the speaker, observe the same precautions as to wedging the base, if necessary, as were mentioned under the first method.

TO REMOVE RECTIFIER TUBE SHIELD FROM BASS SPEAKER (NO. 74 RECEIVER ONLY)

The tube shield is provided with keyhole mounting slots and is held by spring pressure against its mounting screws, which are left slack. To remove the shield, lift it straight up and then unhook from the mounting screws by pulling toward the left.

REDUCTION OF OUTPUT HUM

The amount of hum in the output of these receivers will be found to vary. This is due to the characteristics of the No. 2A3 tubes used in the output stage. Therefore, if a particular receiver is found to have excessive hum, it is recommended that several No. 2A3 tubes be tried. In this way a suitable set of matched tubes can be obtained which will give minimum hum.

REPLACEMENT PARTS

Parts Used on the Nos. 70, 72, and 74 Receivers:

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24465	Binding Post Assembly	Antenna and Ground	1	$ .40
P-24858	Capacitor Assembly	4 MF., Filter, 60 cycles	1	2.00
P-24535	Capacitor Assembly	Electrolytic	1	3.50
P-24866	Capacitor Assembly	By-pass	1	6.00
P-24402	Capacitor Assembly	0.1 MF.	6	.45
P-24405	Capacitor Assembly	0.04 MF.	11	.45
P-24904	Capacitor Assembly	0.05 MF.	11	.45
P-24307	Capacitor Assembly	Electrolytic	2	.85
P-21535	Capacitor Assembly	Two, 0.01 MF.	1	.30
P-25335	Capacitor Assembly	Used only on receivers for 25 cycles	1	3.25
P-25149	Capacitor Assembly	0.01 MF.	3	.30
P-25150	Capacitor Assembly	0.02 MF.	2	.40
P-24561	Capacitor	Type O, 5 MMF.	1	.30
P-24314	Capacitor	Type O, 10 MMF.	1	.25
P-24186	Capacitor	Type O, 25 MMF.	1	.25
P-24569	Capacitor	Type O, 50 MMF.	1	.25
P-24530	Capacitor	Type O, 100 MMF	2	.25
P-25190	Capacitor	Type J, 500 MMF.	1	.25
P-24534	Capacitor	Type W, 700 MMF.	1	.35
P-24661	Capacitor	Type J, 0.004 MF.	1	.50
P-24698	Capacitor	Type W, 0.005 MF.	1	.60
P-23040	Capacitor	Aligning, 140 MMF.	1	2.10
P-24972	Capacitor	Aligning, 550 MMF.	1	.60
P-24350	Capacitor	Aligning, 1700 MMF.	1	1.30
P-24560	Capacitor	Aligning, 2000 MMF.	1	1.35
P-24787	Coil Assembly	Antenna, "A" and "C" Bands	1	4.50
P-24788	Coil Assembly	Bi-Resonator, "A" and "C" Bands	1	4.50
P-24789	Coil Assembly	R. F., "A" and "C" Bands	1	4.50
P-25354	Coil Assembly	Oscillator, "A" and "C" Bands	1	4.50
P-24791	Coil Assembly	Antenna, "B" and "D" Bands	1	4.50
P-24792	Coil Assembly	Bi-Resonator, "B" and "D" Bands	1	4.50
P-24793	Coil Assembly	R. F., "B" and "D" Bands	1	4.50
P-25355	Coil Assembly	Oscillator, "B" and "D" Bands	1	4.50
P-19812	Connector	A. C. Supply	1	.70
P-24899	Shaft Assembly	Tuning	1	.55
P-24903	Shaft Assembly	Vernier Tuning	1	.40
P-24855	Filter Assembly		1	2.50
P-22554	Fuse Block		1	.30
P-19532	Jack Assembly	Phonograph	1	.37
P-18417	Jack Assembly	To-lek-tor Meter Circuit	1	1.08
P-18830	Lamp	Pilot, 6 Volts	5	.12
P-24868	Meter	Tuning	1	2.75
P-24848	Potentiometer	Tone Control and A. C. Switch	1	1.25
P-24957	Potentiometer and Shaft Assembly	High Fidelity Control	1	2.00
P-18704	Resistor	Type B, 15,000 Ohms	1	.37
P-22327	Resistor	Type C, 600 Ohms	1	.37
P-25055	Resistor	Type C, 1,500 Ohms	1	.37
P-22329	Resistor	Type C, 6,500 Ohms	1	.37
P-22344	Resistor	Type D, 300 Ohms	1	.37
P-22908	Resistor	Type D, 600 Ohms	8	.37
P-22572	Resistor	Type D, 2,000 Ohms	1	.37
P-22960	Resistor	Type D, 4,000 Ohms	1	.37
P-22874	Resistor	Type D, 20,000 Ohms	1	.37
P-22355	Resistor	Type D, 25,000 Ohms	1	.37
P-23571	Resistor	Type D, 50,000 Ohms	4	.37
P-22354	Resistor	Type D, 75,000 Ohms	1	.37
P-22338	Resistor	Type D, 0.1 Megohm	7	.37
P-22334	Resistor	Type D, 0.25 Megohm	1	.37
P-22335	Resistor	Type D, 0.5 Megohm	1	.37
P-22561	Resistor	1 Megohm	3	.37
P-22971	Resistor	2 Megohms	1	.37
P-24819	Speaker	High Frequency	1	8.50
P-17380	Switch	"Q" Circuit	1	.75
P-24967	Switch Assembly	Phonograph	1	2.00
P-25044	Switch Assembly	Range	1	3.25
P-24317	Socket	Pilot Lamp	5	.15
P-24822	Socket	Tube, 4 Prong	3 used on the No. 70 and No. 72, 5 used on the No. 74	.17
P-23039	Socket	Tube, 5 Prong	2	.17
P-23040	Socket	Tube, 6 Prong	3	.17
P-23065	Socket	Tube, 7 Prong	2	.17
P-23060	Socket	Tube, 5 Prong	1	.17
P-24069	Transformer Assembly	Driver Stage	1	4.75
P-25347	Transformer Assembly	1st I. F.	1	9.50
P-25348	Transformer Assembly	2nd I. F.	1	9.80
P-25349	Transformer Assembly	Meter I. F.	1	9.80
P-25350	Transformer Assembly	Diode I. F.	1	9.80

Parts Used Only on the Nos. 70 and 72 Receivers:

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24816	Choke Assembly		1	4.25
P-19582	Cord	A. C. Supply	1	1.00
P-22234	Fuse	2½ Ampere	1	.10
P-24889	Network Assembly	For dividing circuits of Speakers	1	9.75
P-25020	Potentiometer	Volume Control	1	2.10
P-24873	Resistor	"B" Voltage Divider	1	1.00
P-24777	Speaker	Low Frequency	1	25.00
P-21805	Transformer Assembly	Output Stage	1	8.75
P-24837	Transformer	Power, 50-60 Cycles, 110 Volts	1	12.50
P-24838	Transformer	Power, 25-60 Cycles, 110 Volts	1	23.00

Parts Used Only on the No. 74 Receiver:

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24817	Choke Assembly	A. C. Supply	1	4.25
P-25255	Cord		1	1.00
P-25156	Fuse	3 Ampere	1	.12
P-24890	Network Assembly	For dividing circuits of Speakers	1	13.00
P-21972	Potentiometer	Volume Control	1	2.10
P-21934	Resistor	"B" Voltage Divider	1	1.00
P-24855	Speaker	Low Frequency	1	47.00
P-21896	Transformer Assembly	Output Stage	1	8.75
P-24839	Transformer	Power, 50-60 Cycles, 110 Volts	1	14.00
P-24840	Transformer	Power, 25-60 Cycles, 110 Volts	1	[illegible]

MODEL 70 Series
Chassis Assembly

STROMBERG-CARLSON TEL. MFG. CO.

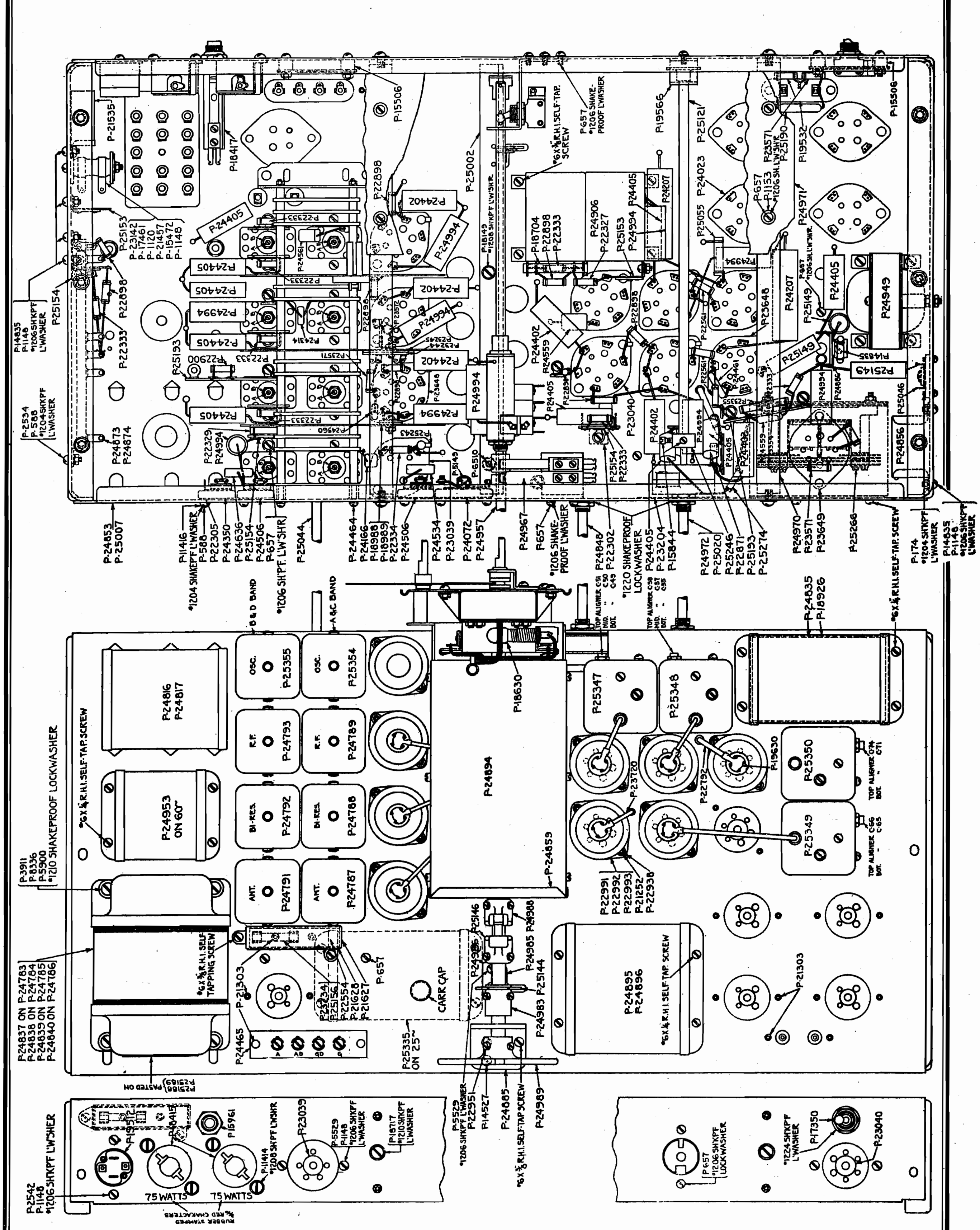


Fig. 4. Chassis Assembly.

MODEL 70 Series
Schematic

STROMBERG-CARLSON TEL. MFG. CO.

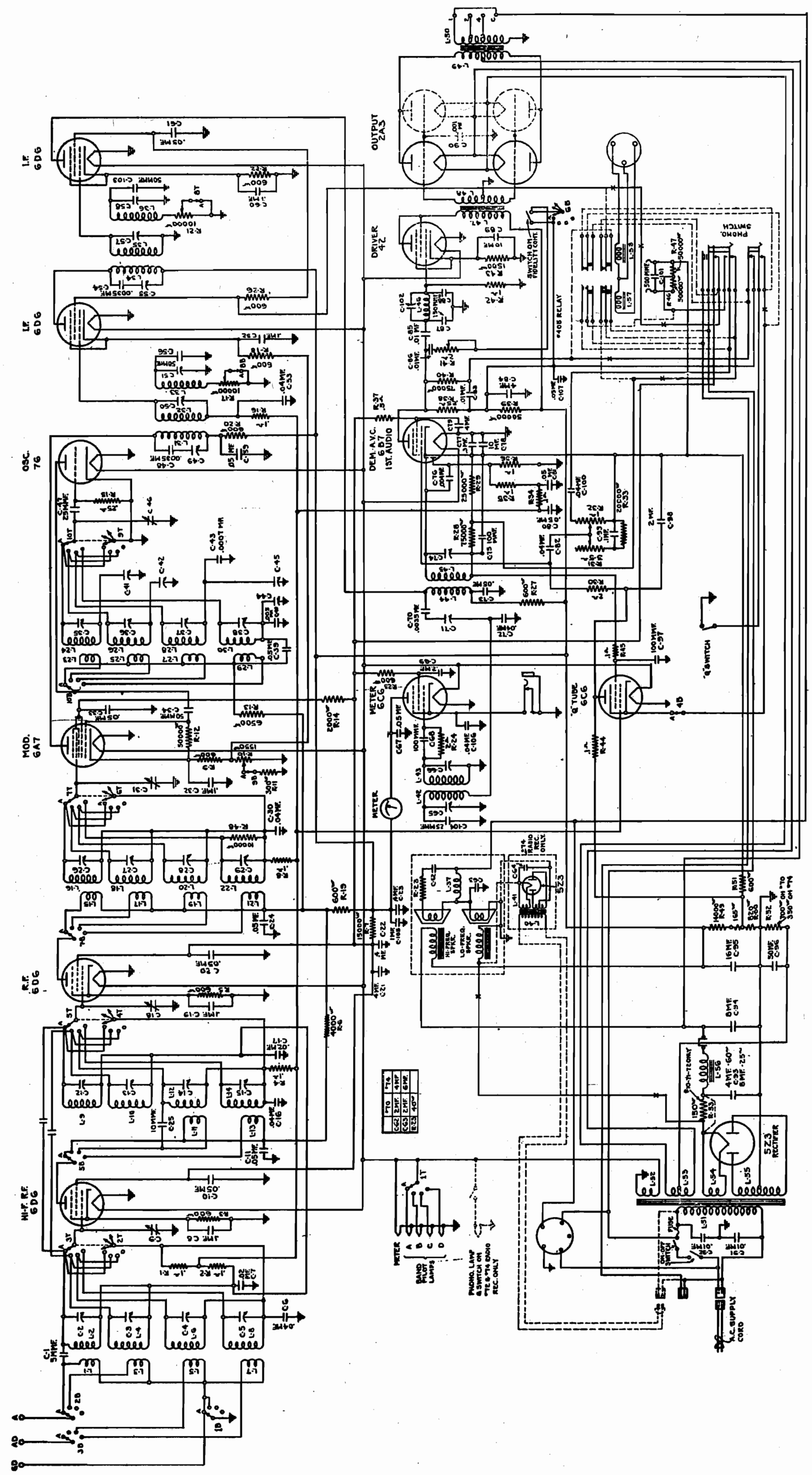


Fig. 2. Schematic Circuit of Receiver.

No. 405 Relay is furnished on special order for Tel-ek-tor equipped receivers.

MODEL 70 Series
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

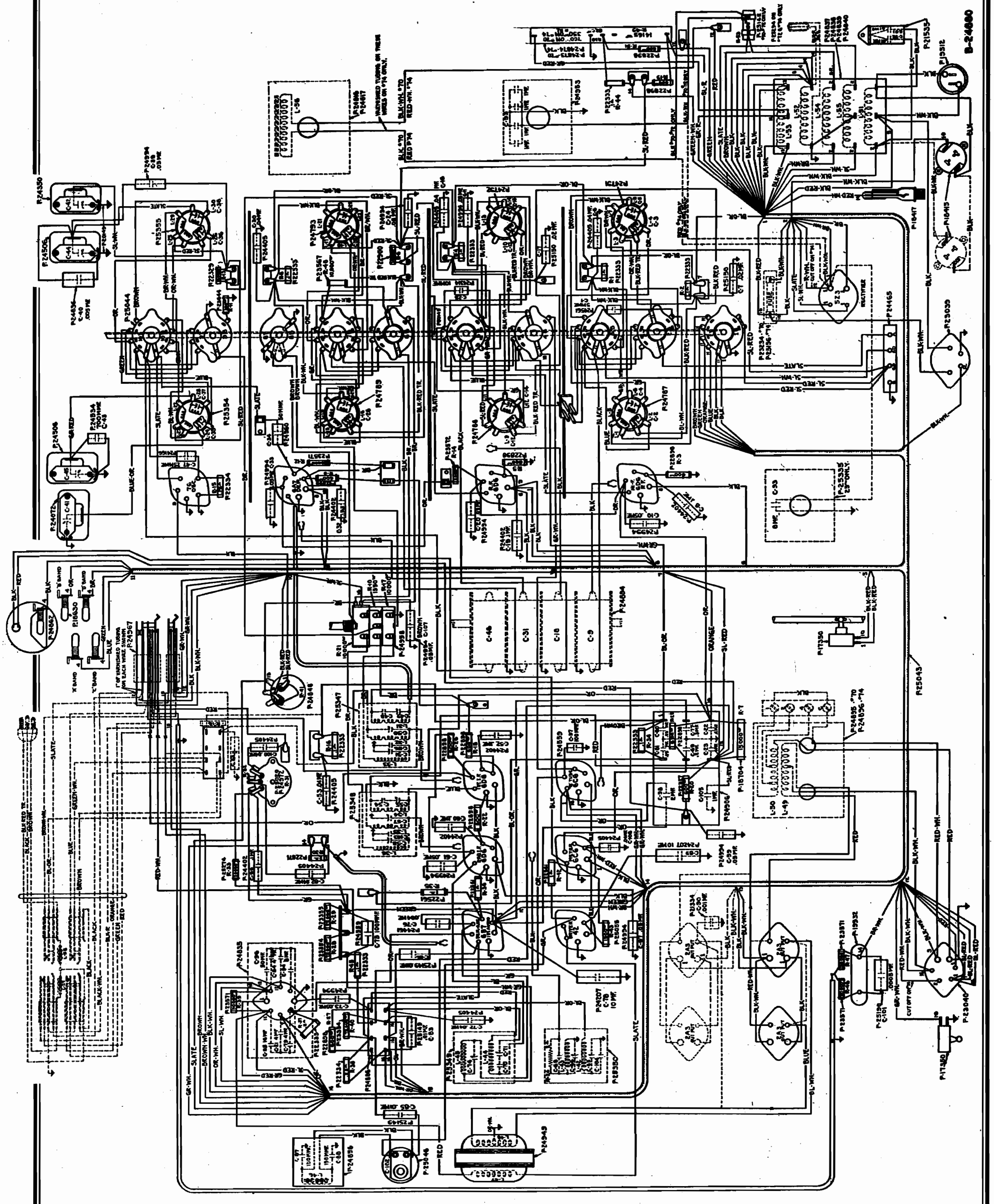


Fig. 3. Wiring Diagram of Chassis.

MODEL 70 Series
Voltage

STROMBERG-CARLSON TEL. MFG. CO.

These voltage readings are obtained by measuring between the various tube socket contacts and the base; with the tubes in place. The Receiver is, therefore, in operation when the measurements are made. Fig. 1, shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages.

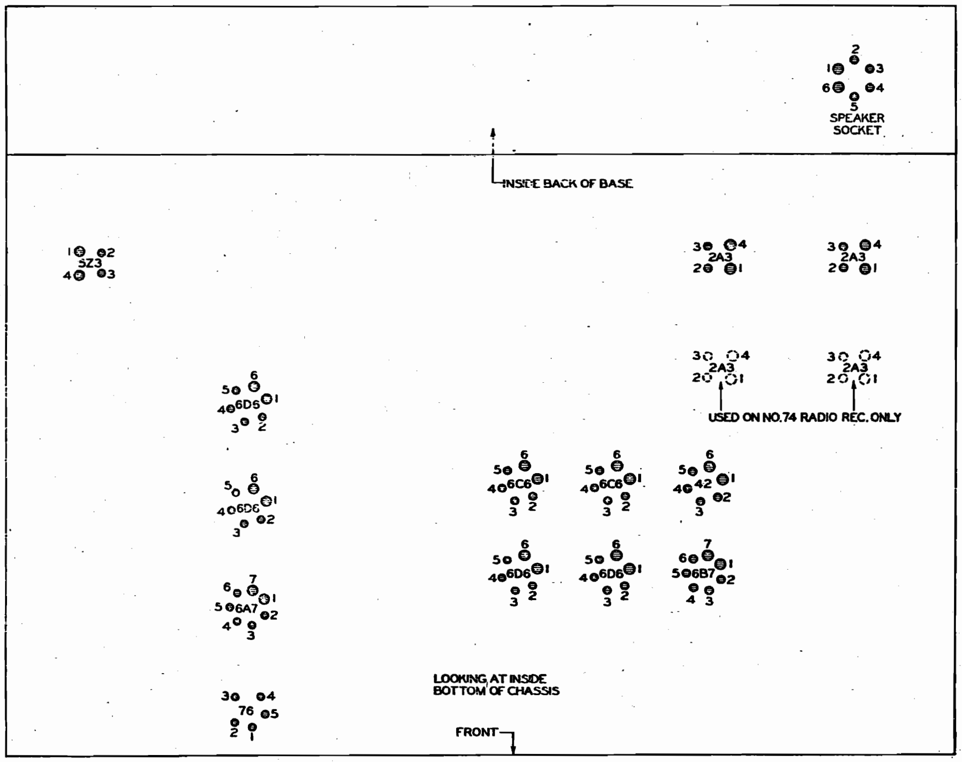


Fig. 1. Terminal Layout for Voltage Measurement Chart

Tube	*Circuit*	*Cap.*	*Terminals of Sockets* 1	2	3	4	5	6	7	*Heater Voltages Between Terminal Nos. at 120 Volts*
6D6	Hi-F, R. F.	0		+200	+ 87	+3.5	+3.5		—	1-6, *6.3* volts
6D6	R. F. Amp.	0		+220	+ 87	+3.5	+3.5		—	1-6, *6.31* volts
6A7	Mod.	0		+225	+ 75	+ 75	— 10			1-7, *6.31* volts
76	Osc.	—		+180	—25	0		—	—	1-5, *6.31* volts
6D6	1st I. F. Amp.	0		+225	+ 87	+ 10	+ 10		—	1-6, *6.32* volts
6D6	2nd I. F. Amp.	0		+225	+ 87	+3.5	+3.5		—	1-6, *6.32* volts
6B7	Dem.-Aud.	3		+130	+ 25	+ 12	0			1-7, *6.32* volts
6C6	"Q"	0		+ 12	+ 12	0	0		—	1-6, *6.32* volts
6C6	Meter	0		+225	+ 87	0	0			1-6, *6.32* volts
42	2nd Audio	—		+220	+220	0	+ 20		—	1-6, *6.32* volts
2A3s'	Output	—	+ 60	+375	0	+ 60	—	—	—	1-4, *2.53* volts
5Z3	Rectifier		+410	*405*	*405*	+410	—	—	—	1-4, *4.81* volts
Speaker			0	+388	+228	+365	+388	0	—	

Set tuned to 1000 kc., "A" Band, "Hi" Fidelity Control not operated, "Q" Switch Off, A. C. voltages are indicated by italics

MODEL 70 Series
Trimmers

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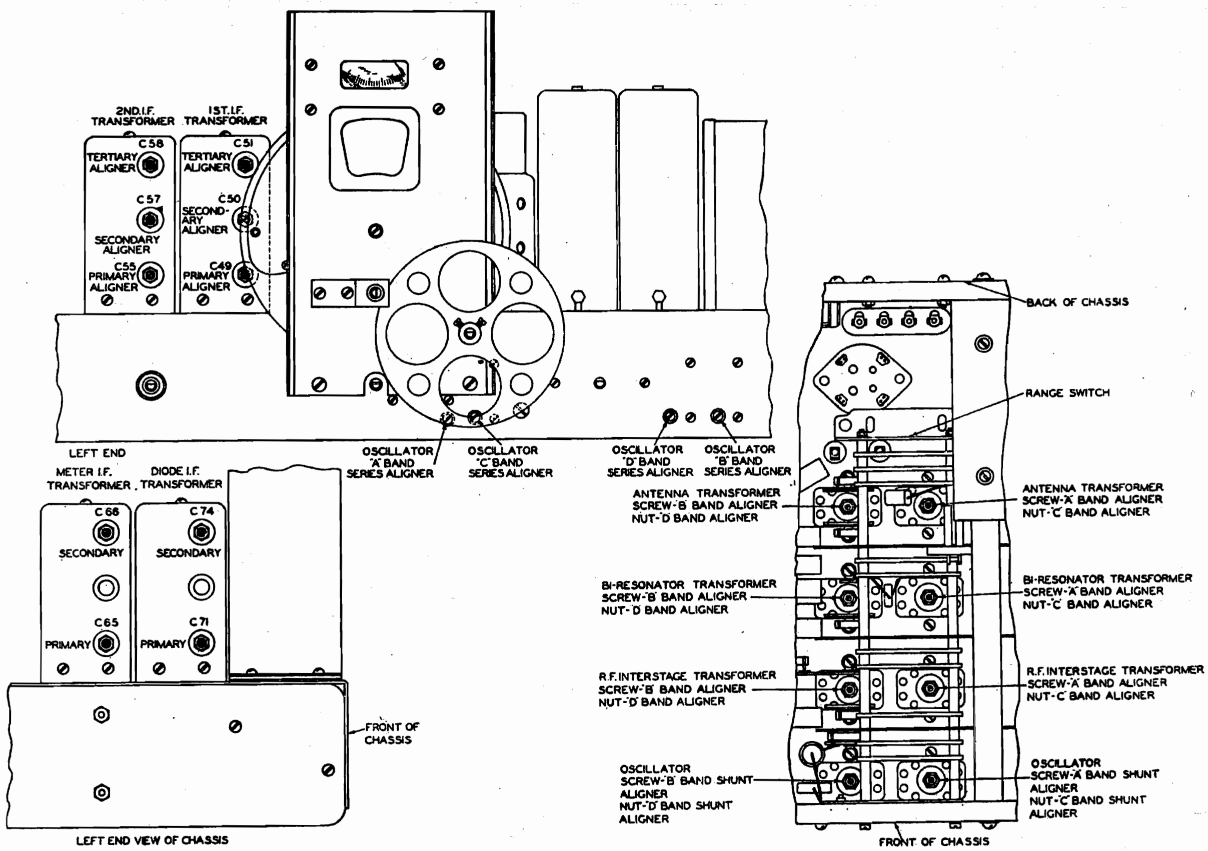

Fig. 5. Showing the Location of the Various Aligning Capacitors. For all R. F., I. F., and Tertiary Circuits.

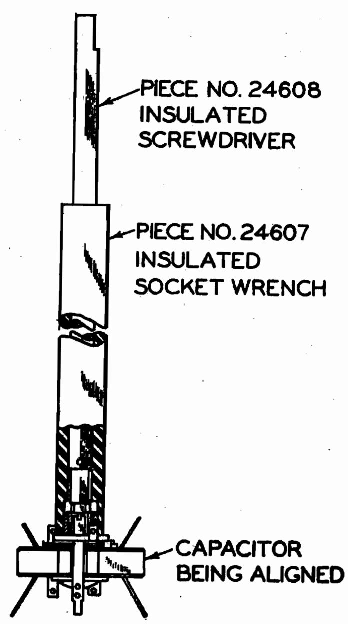

Fig. 6. Showing How the Special Aligning Tools Facilitate Making the Adjustments on the Aligning Capacitors.

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ALIGNMENT INSTRUCTIONS

The unexcelled performance of a High Fidelity receiver cannot be obtained unless the receiver is properly aligned. In order to obtain this performance, it is necessary that these adjustments be carefully done. In the High Fidelity type of receiver, these adjustments will, of necessity, be more critical than in the standard radio receiver.

In making these adjustments, it is necessary that a good signal generator be used. In conjunction with the use of this signal generator, a good voltage output meter must be used in order to determine when resonance in the various circuits is obtained. An artificial antenna (dummy) of some sort should also be used. For most practical cases, a 250 micromicrofarad capacitor may be connected in series with the high side terminal of the signal generator. This capacitor should be connected as closely as possible to this terminal. CAUTION: Because of the different type circuit employed in these receivers for operating the visual tuning meter, it will not be possible to make the aligning adjustments by noting the action of this meter.

1. Remove the chassis from the cabinet but have it near enough to the cabinet so that the cords of the loud speakers may be plugged in. Then, turn the power switch to the "On" position. Make sure that the "Q" circuit switch is in the "Off" position and that the High Fidelity control is set for the normal selectivity position. Set the range switch to the "A" band position, and operate the volume control to the maximum position. Also operate the tone control to the normal position.

   Connect the ground or low side output terminal of the signal generator to the "Gd" and "G" binding posts on the receiver chassis. From the remaining terminal of the artificial antenna connect a wire to the "A" and "AD" binding posts on the receiver chassis.

2. **R. F. Adjustments.**

   Noting the various designated aligning capacitors shown in **Figure 5, proceed in the following manner for aligning the radio frequency and meter circuits.**

   (a) Operate the range switch on the chassis, to the "A" band position (full clockwise rotation). **Align** the receiver at 1500 Kc., aligning in the following sequence: Oscillator, R. F. Amplifier, "Bi" Resonator, Antenna.

   Align the oscillator's low frequency aligner (series aligning capacitor) at 600 Kc. on this "A" band. **Only the oscillator should be aligned at this frequency.**

   Check the alignment of all the R. F. circuits again at 1500 Kc.

   (b) Operate the range switch on the chassis, one position counter-clockwise from the "A" band position. This will be the position for the "B" band operation.

   Align the receiver at 4 megacycles in the same manner as was done for the 1500 Kc. of the "A" band.

   Align the oscillator's low frequency aligner (series aligning capacitor) at 1500 Kc. on this "B" band. **Only the oscillator should be aligned at this frequency.**

   Check the alignment of all the R. F. circuits again at 4 megacycles.

   (c) Operate the range switch on the chassis, one position counter-clockwise from the "B" band position. This will be the position for the "C" band operation.

   Align the receiver at 10 megacycles in the same manner as was done for the 1500 Kc. of the "A" band.

   Align the oscillator's low frequency aligner (series aligning capacitor) at 4 megacycles on this "C" band. **Only the oscillator should be aligned at this frequency.**

   Check the alignment of all the R. F. circuits again at 10 megacycles.

   (d) Operate the range switch on the chassis, one position counter-clockwise from the "C" band position. This will be the position for the "D" band operation.

   Align the receiver at 19.8 megacycles in the same manner as was done for the 1500 Kc. of the "A" band.

   Align the oscillator's low frequency aligner (series aligning capacitor) at 10 megacycles on this "D" band. **Only the oscillator should be aligned at this frequency.**

   Check the alignment of all the R. F. circuits again at 19.8 megacycles.

   NOTE: It will be noted that no instructions are given for aligning the receivers at other than two frequencies for any band. Every receiver is given an exacting check for "tracking" at various frequencies in each band before leaving the factory. It is felt by the manufacturers that should any receiver through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

3. **Meter Circuit Adjustment**

   Adjust the signal generator to 600 Kc. and tune in this signal on the radio receiver. Be sure to tune for the maximum or peak as indicated on the visual meter of the chassis. Before adjusting the aligning capacitors of this circuit, make sure that the volume control is at the maximum volume position and the high fidelity control must be in the normal selectivity position. Also, release the locking nuts of the aligning capacitors. Then adjust the two aligning capacitors of this circuit, obtaining maximum indication on the visual tuning meter. After this adjustment, tighten the lock-nuts of these capacitors.

4. **I. F. Alignment**

   Because of the necessity of obtaining the proper shape of resonance curve of these stages, it is recommended that, unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system, which allows the operator to see the exact shape of the resonance curve. For this reason, it is better to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

   Set the signal generator to exactly 260 Kc., or 370 Kc., depending upon the intermediate frequency of the particular receiver stamped on the chassis. Operate the range switch of the receiver to the "A" band position. Set the receiver tuning dial at its extreme low frequency position and operate the tone control to the normal position. **Turn the high fidelity control to the normal selectivity position.** Never attempt to adjust the I. F. stages with the high fidelity control set at the high fidelity position. Before proceeding with the aligning, remove the 250 micromicrofarad capacitor (artificial antenna) from the signal generator lead and substitute for it a capacitor having a value of at least 0.25 microfarad. Now, connect this lead to the grid cap of the 6D6 tube used in the second I. F. amplifier stage. Do not remove the grid lead from the chassis connecting to this tube. Before attempting to adjust any of the I. F. aligning capacitors, release the locking-nuts and, after completing the adjustment, make sure that these lock-nuts are securely tightened.

   (a) Now, note from Figure 5, the aligning capacitors C-74 and C-71, and adjust these capacitors in the order given for maximum output reading on the output meter.

   (b) Move the signal generator lead and capacitor from the grid cap of the 6D6 tube used in the second I. F. amplifier stage to the grid cap of the 6D6 tube used in the first I. F. amplifier stage and adjust the aligning capacitors C-57 and C-55 (in this sequence), for maximum output reading on the output meter.

   (c) Move the signal generator lead from the grid cap of the first 6D6 tube used in the first I. F. amplifier stage, to the grid cap of the 6A7 tube. Now, adjust the aligning capacitors C-50 and C-49 for maximum output reading on the output meter. This completes the necessary adjustments on the I. F. stages for normal operation of these High Fidelity receivers.

5. **Adjusting the I. F. Tertiary Circuits**

   In the High Fidelity receiver, some means must be used to obtain that selectivity which will give the necessary band width for High Fidelity reproduction. In these receivers, it will be noted from the schematic diagram that the first and second I. F. transformers are made up of three tuned circuits: the primary, secondary, and a third which we call the tertiary circuit. Included in each tertiary circuit is a variable resistance in series with the coil. Incorporated in these variable resistances is a switch which opens or closes this circuit. When the fidelity control is turned counter-clockwise as far as it is possible, the receiver functions with normal selectivity because the switches (incorporated in the variable resistors) are open. When the fidelity control is operated in a clockwise direction as far as it is possible, minimum resistance is inserted in series with the coil, resulting in the tertiary circuits acting as a heavy load across the secondary circuits, which, of course, results in broader tuning. As the fidelity control is operated in the opposite direction, more resistance is added in series with the tertiary coils which makes these circuits less effective, resulting in greater selectivity.

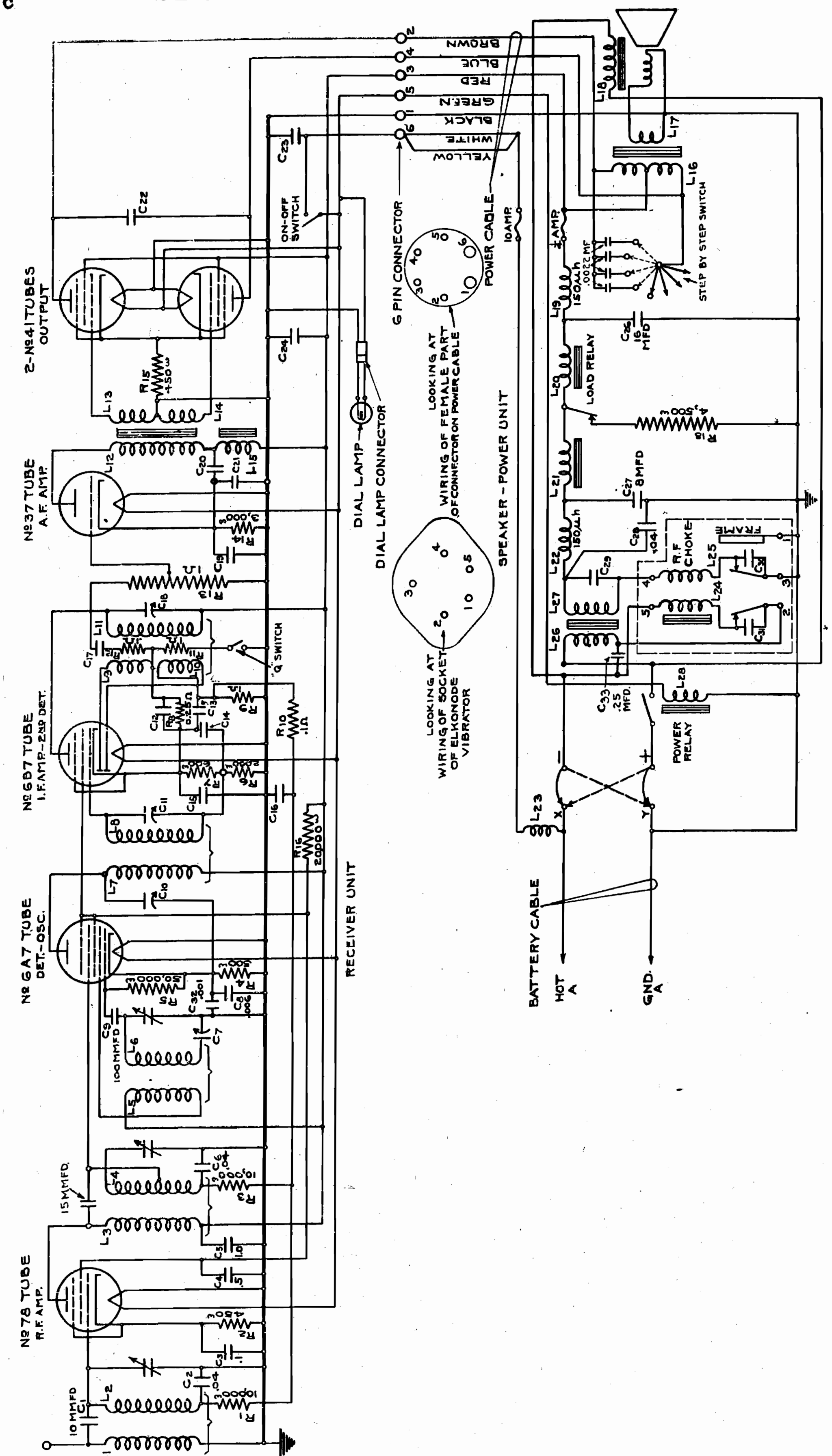
   When the R. F. and I. F. circuits are carefully aligned, operate the high fidelity control to the high fidelity position (maximum clockwise rotation). Now note from Figure 5 the location of the aligning capacitors in each tertiary circuit. Then, with the signal generator still set at the intermediate frequency, and its lead connected to the grid cap of the 6A7 tube, adjust these capacitors. Adjust the first I. F. tertiary aligning capacitor, C-51, until a minimum reading is obtained on the output meter. Then, adjust the second I. F. tertiary aligning capacitor, C-58, in the same manner.

   In order to make all these aligning adjustments in the most satisfactory manner, it is recommended that the service man use the special aligning tools manufactured by this company and listed as follows:

   1—Piece No. 24607 Insulated Aligning Wrench.
   1—Piece No. 24608 Insulated Aligning Screw Driver.
   See Figure 6.

MODEL 33-A
Schematic

STROMBERG-CARLSON TEL. MFG. CO.



STROMBERG-CARLSON TEL. MFG. CO.

Engineering Data
Stromberg-Carlson No. 82 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit ---- Superheterodyne
Tuning Ranges ---- A-520 to 1600 Kc.; B-1500 to 4200 Kc.; C-3700 to 10,000 Kc.; D-8500 to 23,000 Kc.
Number and Type of Tubes ---- 3 No. 6D6, 1 No. 6A7, 2 No. 76, 3 No. 42, 1 No. 5Z3
Voltage Rating ---- 105-125 Volts
Frequency Rating ---- 25-60 Cycles and 50-60 Cycles
Wattage Rating ---- 136 Watts
Intermediate Frequency ---- 465 Kc.

APPARATUS SPECIFICATIONS

No. 82 Receiver ---- 50-60 Cycles ---- P-22723 Chassis; P-22738 Loud Speaker
No. 82-B Receiver ---- 25-60 Cycles ---- P-22724 Chassis; P-22738 Loud Speaker

CIRCUIT DESCRIPTION

Ten tubes, A. C. operated, All-wave superheterodyne receiver having four tuning ranges. See Pc-25385, Installation and Operating Instructions, for properly installing and operating this receiver.

One No. 6D6 tube functions as an R. F. Amplifier, another No. 6D6 tube is used in the I. F. Amplifier stage and the other No. 6D6 tube operates in the first audio stage which is resistance-coupled to the second audio stage. The No. 6A7 tube is used as a modulator tube only. This is done in order to obtain maximum freedom from detrimental coupling between this modulator and the oscillator tube. One No. 76 tube functions as the oscillator and the other No. 76 tube operates as a Demodulator and Automatic Volume Control tube. One No. 42 tube is operated as a triode audio driver tube for the power output tubes composed of two No. 42 tubes. These output tubes are also connected as triodes. The No. 5Z3 tube is used as the rectifier in the power supply unit.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the base with the tubes in place. The Receiver is therefore in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages.

Tube	*Circuit*	*Cap.*	*Terminals of Sockets*							*Heater Voltages Between Terminals Nos. at 120 Volts*
			1	2	3	4	5	6	7	
6D6	R. F. Amp.	0		+240	+ 95	+ 4	0			1-6, *6.4* volts
6A7	Mod.	0		+240	+ 95	+ 95	— 2	+3.1	0	1-7, *6.4* volts
76	Osc.	—		+195	+ 30	0				1-5, *6.4* volts
6D6	I. F. Amp.	0		+240	+ 95	+3.5	+3.5			1-7, *6.4* volts
76	Demod-A. V. C.	—		0	0	0				1-5, *6.4* volts
6D6	1st Audio	0		+ 68	+ 20	+ 1	+ 1			1-6, *6.4* volts
42	2nd Audio	—		+230	+230	0	+ 21			1-6, *6.4* volts
42	Output	—		+390	+390	0	+ 37			1-6, *6.4* volts
5Z3	Rectifier	—	+410	*398*	*398*	+410				1-4, *4.75* volts
Speaker Socket			0	+245	+400	+400	+390	0		

Set tuned to 1000 Kc., "A" Band, A. C. voltages are indicated by italics

P-25502 Form 1887 Issue 1 Printed in U. S. A.

MODELS 82,82-B
Chassis Assembly

STROMBERG-CARLSON TEL. MFG. CO.

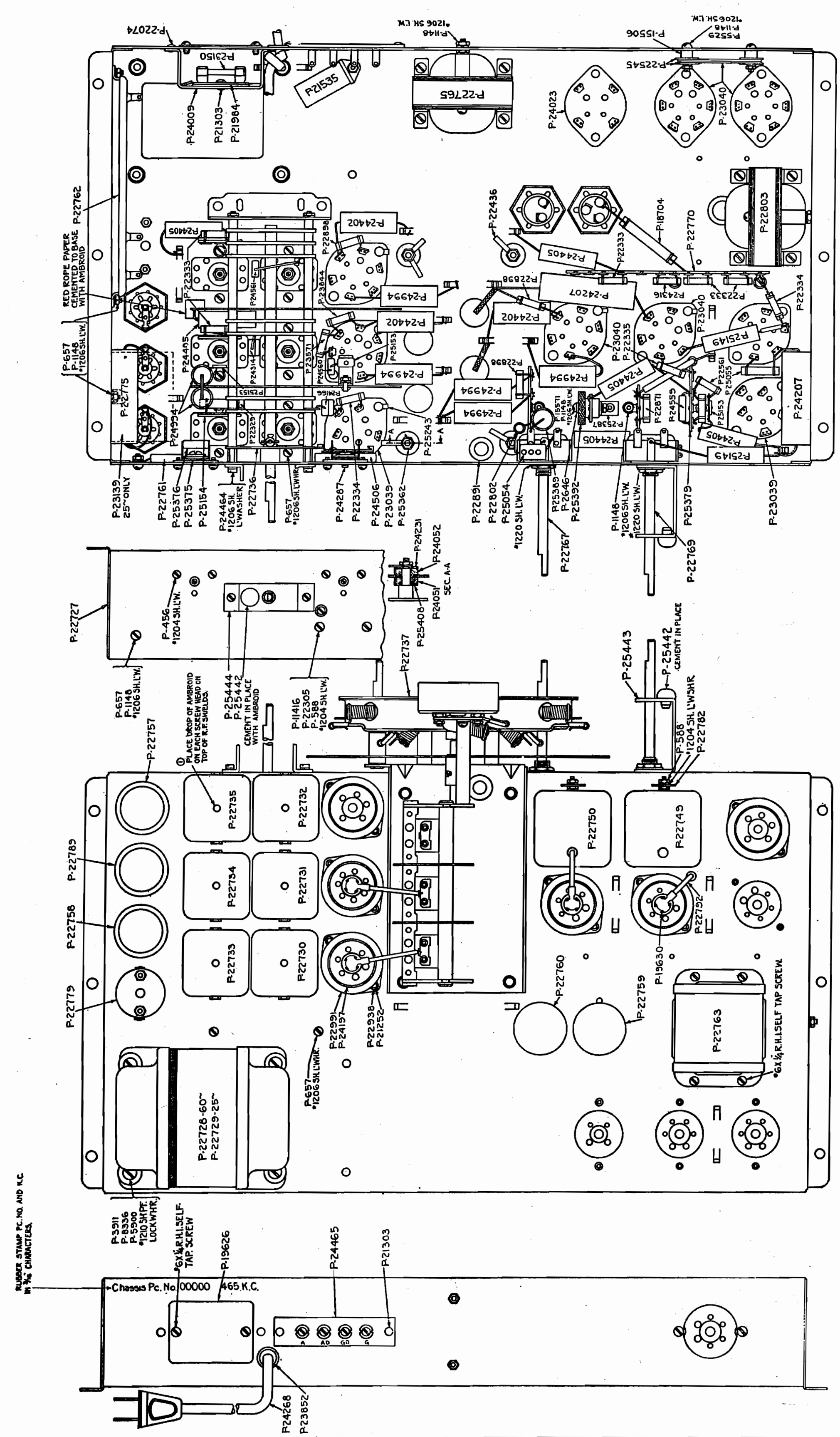


Fig. 4. Chassis Assembly.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 82,82-B
Schematic
Chassis Wiring

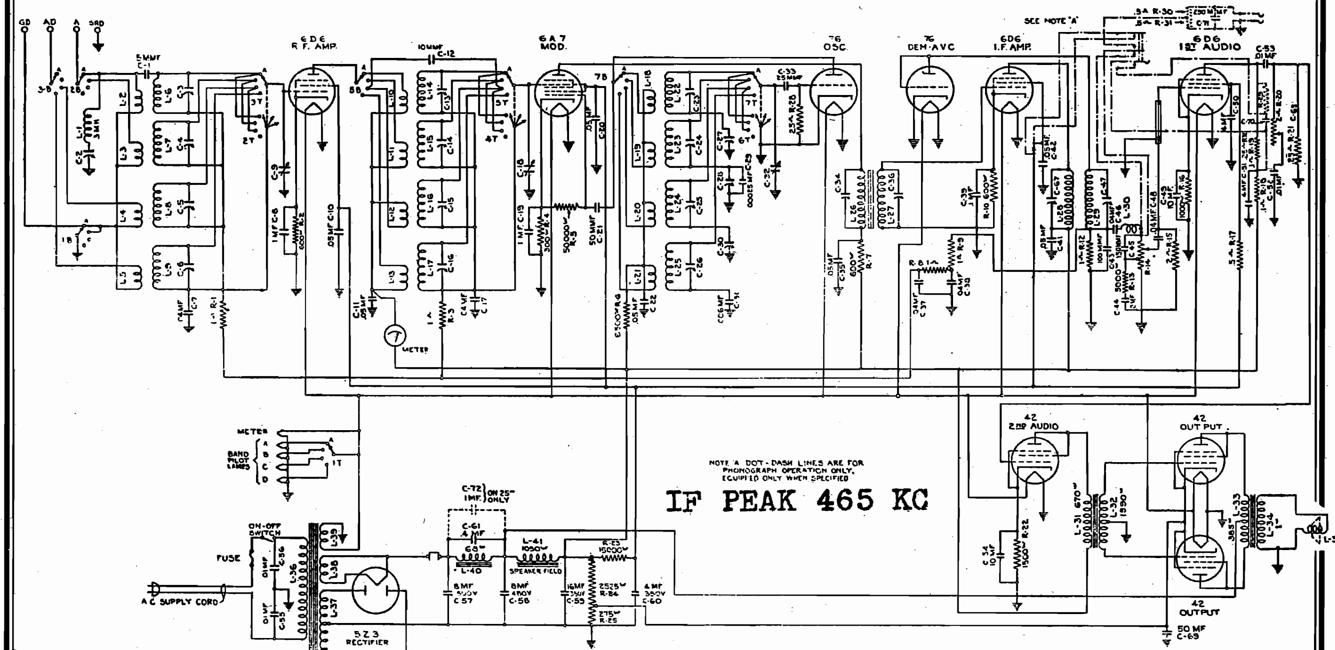


Fig. 2. Schematic Circuit of Receiver.

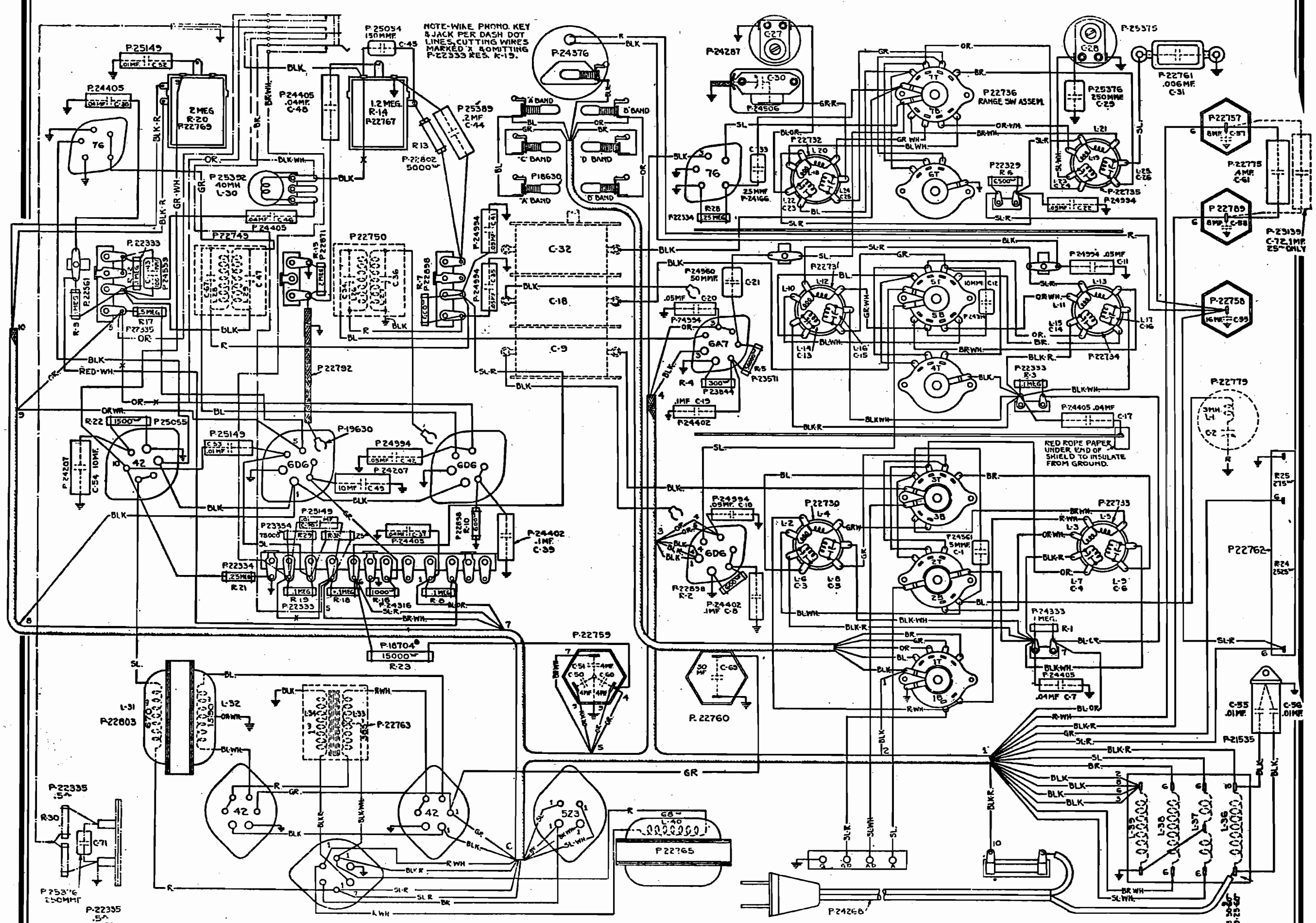


Fig. 3. Wiring Diagram of Chassis.

MODELS 82,82-B
Socket,Trimmers
Parts List

STROMBERG-CARLSON TEL. MFG. CO.

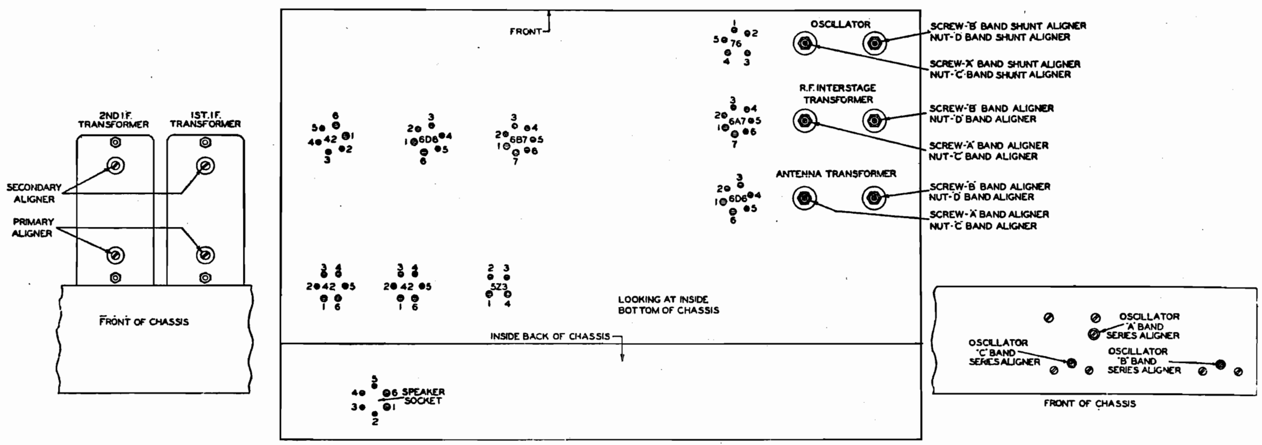


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

REPLACEMENT PARTS

Piece Number	Parts	Description of Parts	Required per Receiver	List Price Each
P-24465	Binding Post Assembly	Antenna and Ground	1	$ .40
P-23139	Capacitor Assembly	Used only on Receivers for 25 Cycles	1	1.00
P-22757	Capacitor	Electrolytic	1	1.50
P-22758	Capacitor	Electrolytic	1	1.50
P-22759	Capacitor	Electrolytic	1	3.00
P-22760	Capacitor	Electrolytic	1	2.50
P-22789	Capacitor	Electrolytic	1	1.50
P-24207	Capacitor	Electrolytic	2	.85
P-22775	Capacitor	0.4 MF	1	.35
P-25389	Capacitor	0.2 MF	1	.75
P-24402	Capacitor	0.1 MF	3	.45
P-24994	Capacitor	0.05 MF	7	.45
P-24405	Capacitor	0.04 MF	6	.45
P-21535	Capacitor	Two, 0.01 MF	1	.80
P-25149	Capacitor	0.01 MF	2	.30
P-22761	Capacitor	Type J, 0.006 MF	1	.75
P-25376	Capacitor	Type O, 250 MMF	1	.25
P-25054	Capacitor	Type O, 150 MMF	1	.25
P-24559	Capacitor	Type O, 100 MMF	1	.25
P-24560	Capacitor	Type O, 50 MMF	1	.25
P-24166	Capacitor	Type O, 25 MMF	1	.25
P-24314	Capacitor	Type O, 10 MMF	1	.25
P-24561	Capacitor	Type O, 5 MMF	1	.20
P-24287	Capacitor	Aligning, 525 MMF	1	.60
P-25375	Capacitor	Aligning, 1350 MMF	1	1.00
P-24506	Capacitor	Aligning, 2500 MMF	1	1.25
P-22765	Choke Coil Assembly		1	3.00
P-22730	Coil Assembly	Antenna, "A" and "C" Bands	1	4.50
P-22731	Coil Assembly	R. F., "A" and "C" Bands	1	4.50
P-22732	Coil Assembly	Oscillator, "A" and "C" Bands	1	4.50
P-22733	Coil Assembly	Antenna, "B" and "D" Bands	1	4.50
P-22734	Coil Assembly	R. F., "B" and "D" Bands	1	4.50
P-22735	Coil Assembly	Oscillator, "B" and "D" Bands	1	4.50
P-25392	Coil Assembly	40 Millihenry	1	1.75
P-24268	Cord	A. C. Supply	1	.75
P-22779	Filter Assembly	Antenna	1	1.00
P-23150	Fuse	2 Amperes	1	.12
P-21984	Fuse Block		1	.20
P-18630	Lamp	Pilot, 6 Volts	7	.13
P-24376	Meter	Visual Tuning	1	2.75
P-22767	Potentiometer	Volume Control	1	1.50
P-22769	Potentiometer	Tone Control and A. C. Switch	1	1.25
P-23844	Resistor	Type D, 300 ohms	1	.37
P-22898	Resistor	Type D, 600 ohms	3	.37
P-24316	Resistor	Type D, 1,000 ohms	1	.37
P-25055	Resistor	Type C, 1,500 ohms	1	.37
P-22802	Resistor	Type D, 5,000 ohms	1	.37
P-22329	Resistor	Type C, 6,500 ohms	1	.37
P-18704	Resistor	Type B, 15,000 ohms	1	.37
P-23571	Resistor	Type D, 50,000 ohms	1	.37
P-22333	Resistor	Type D, 0.1 Megohm	6	.37
P-22334	Resistor	Type D, 0.25 Megohm	2	.37
P-22335	Resistor	Type D, 0.5 Megohm	1	.37
P-22561	Resistor	Type D, 1 Megohm	1	.37
P-22871	Resistor	Type D, 2 Megohm	1	.37
P-22762	Resistor	"B" Voltage Divider	1	.75
P-24023	Socket	Tube, 4 Prong	1	.17
P-23039	Socket	Tube, 5 Prong	2	.17
P-23040	Socket	Tube, 6 Prong	6	.17
P-23648	Socket	Tube, 7 Prong	2	.17
P-22736	Switch Assembly	Frequency Range	1	5.00
P-22803	Transformer Assembly	Audio Driver Stage	1	4.00
P-22750	Transformer Assembly	1st I. F.	1	3.00
P-22749	Transformer Assembly	2nd I. F.	1	2.00
P-22728	Transformer	Power, 50-60 Cycles, 110 Volts	1	11.00
P-22729	Transformer	Power, 25-60 Cycles, 110 Volts	1	20.00

STROMBERG-CARLSON TEL. MFG. CO.

Engineering Data
Stromberg-Carlson No. 83 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit ---------- Superheterodyne
Tuning Ranges ---------- A—520 to 1600 kc.; B—1500 to 4200 kc.; C—3.7 to 10 megacycles; D—8.5 to 23 megacycles
Number and Type of Tubes ---------- 3 No. 6K7, 1 No. 6A8, 1 No. 6C5, 1 No. 6H6, 3 No. 6F6, 1 No. 5Z3
Voltage Rating ---------- 105 to 125 volts
Frequency Rating ---------- 25 to 60 cycles and 50 to 60 cycles
Wattage Rating ---------- 135 watts
Intermediate Frequency ---------- 465 kc.

APPARATUS SPECIFICATIONS

No. 83 Receiver ---------- 50 to 60 Cycles ---------- P-25680 Chassis; P-25683 Loud Speaker
No. 83-B Receiver ---------- 25 to 60 Cycles ---------- P-25681 Chassis; P-25683 Loud Speaker

CIRCUIT DESCRIPTION

Ten tubes, A. C. operated, Superheterodyne receiver, equipped with four tuning ranges. These four tuning ranges cover all the important broadcasts and special service bands of both American and Foreign stations. High fidelity reproduction is obtained in this receiver by the use of a special band widener device and a Carpinchoe high fidelity speaker. See P-25701, Installation and Operating Instructions, for properly installing and operating this receiver.

The tubes used in this receiver are as follows: One No. 6K7 tube functions as an R. F. Amplifier, another No. 6K7 tube is used in the I. F. Amplifier and the other No. 6K7 tube operates in the First Audio Amplifier. The No. 6A8 tube is used as a Modulator tube only. The No. 6C5 tube is used as the Oscillator tube. The No. 6H6 tube is used as a Demodulator-Automatic Volume Control tube. One No. 6F6 tube is used in the Second Audio Amplifier which drives the two No. 6F6 tubes used in the audio power output stage. The No. 5Z3 tube is the rectifier tube of the power supply unit.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

			Terminals of Sockets								*Heater Voltages Between*
Tube	*Circuit*	*Cap.*	1	2	3	4	5	6	7	8	*Terminals Nos. at 120 Volts*
6K7	R. F. Amp.	0	0	—	+250	+ 70	+ 3	0	—	+ 3	2–7, *6.4* Volts
6A8	Mod.	0	0	—	+250	+ 70	—	+ 70	—	+ 2.5	2–7, *6.4* Volts
6C5	Osc.	—	0	—	+210	0	—	—	—	—	2–7, *6.4* Volts
6K7	I. F. Amp.	0	0	—	+250	+ 70	+ 3	—	—	+ 3	2–7, *6.4* Volts
6H6	Dem.—A. V. C.	—	0	—	—	—	—	—	—	—	2–7, *6.4* Volts
6K7	1st Audio	0	0	—	+100	+ 35	+ 1	—	—	+ 1	2–7, *6.4* Volts
6F6	2nd Audio	—	0	—	+240	+240	0	—	—	+20	2–7, *6.4* Volts
6F6	Output	—	0	—	+390	+390	0	—	—	+35	2–7, *6.4* Volts
5Z3	Rectifier	—	+410	*395*	*395*	+410					1–4, *4.75* Volts
Speaker Socket			0	+250	+410	+410	+395	0			

Set tuned to 1000 kc., no signal. A. C. voltages are indicated by italics.

MODELS 83, 83-B
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

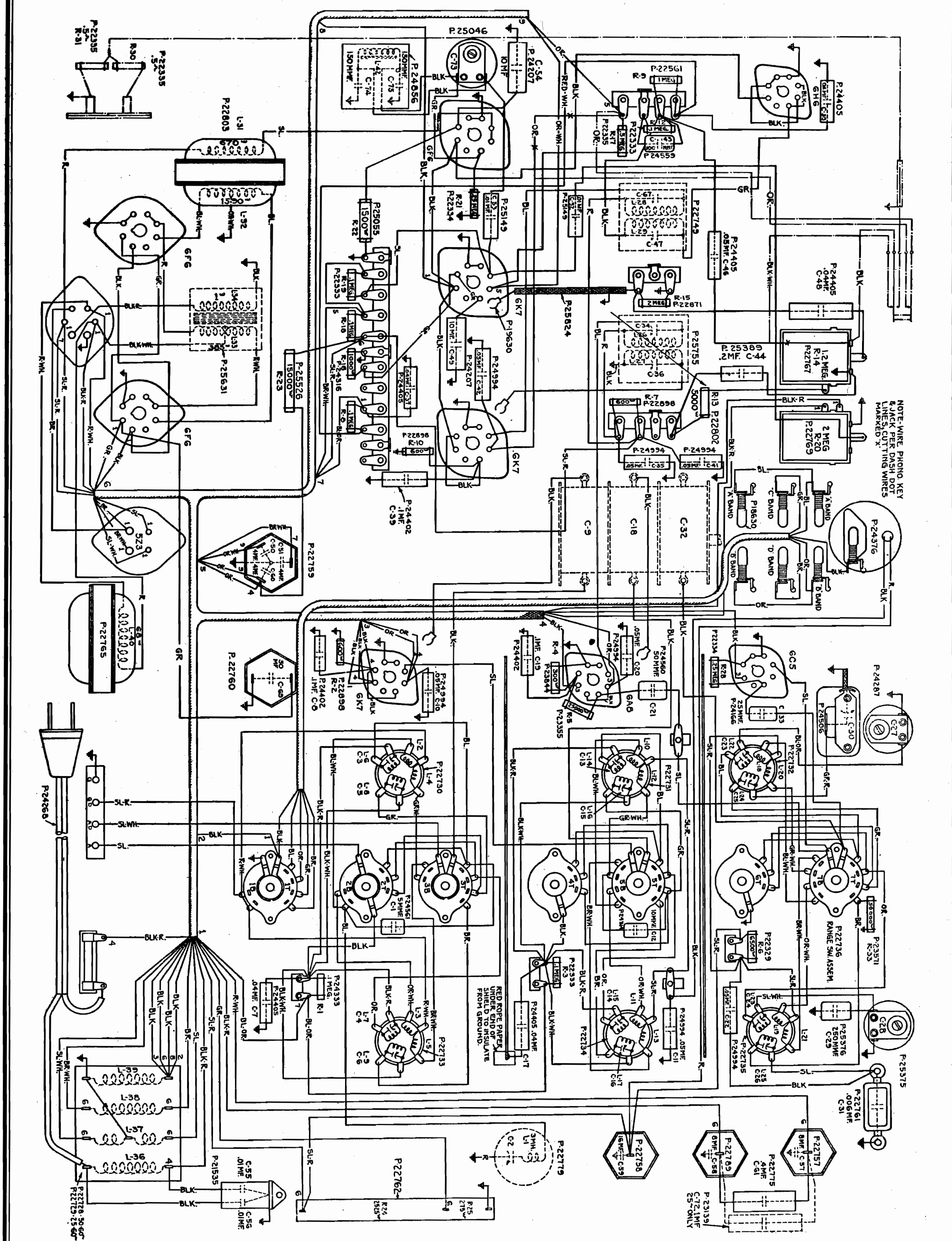


Fig. 4. Wiring Diagram of Chassis.

MODELS 83,83-B
Schematic
Chassis Assembly

STROMBERG-CARLSON TEL. MFG. CO.

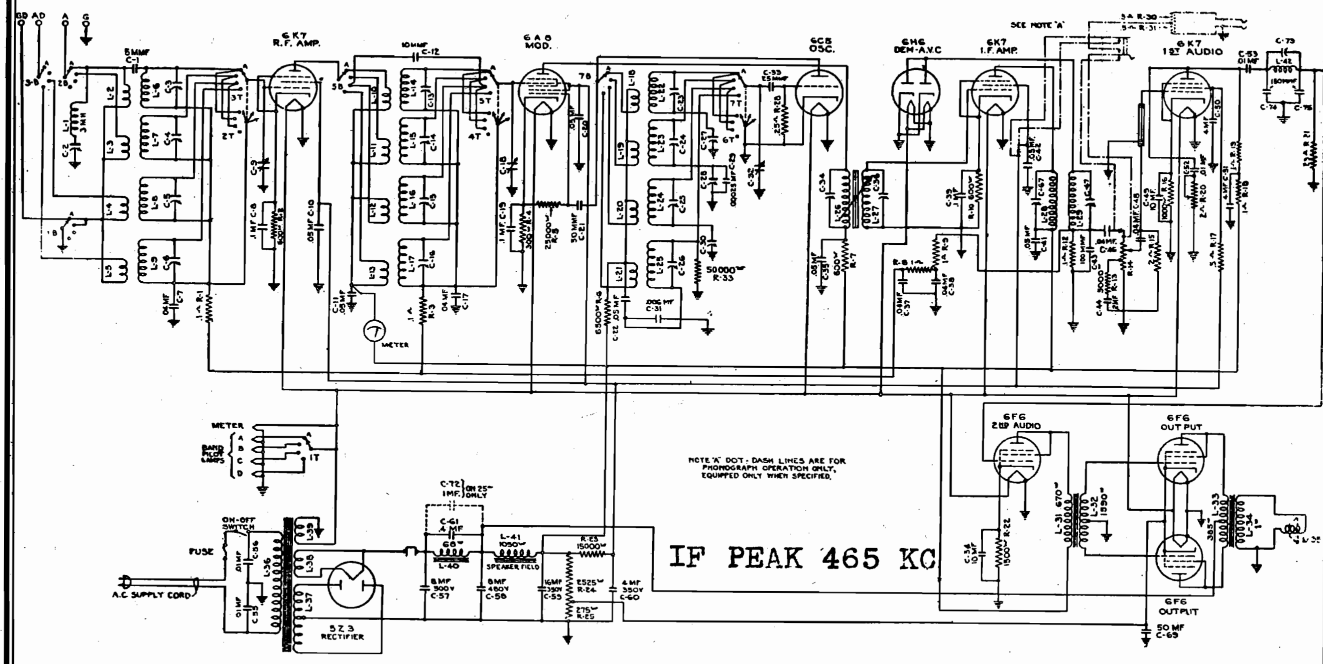


Fig. 2. Schematic Circuit of Receiver.

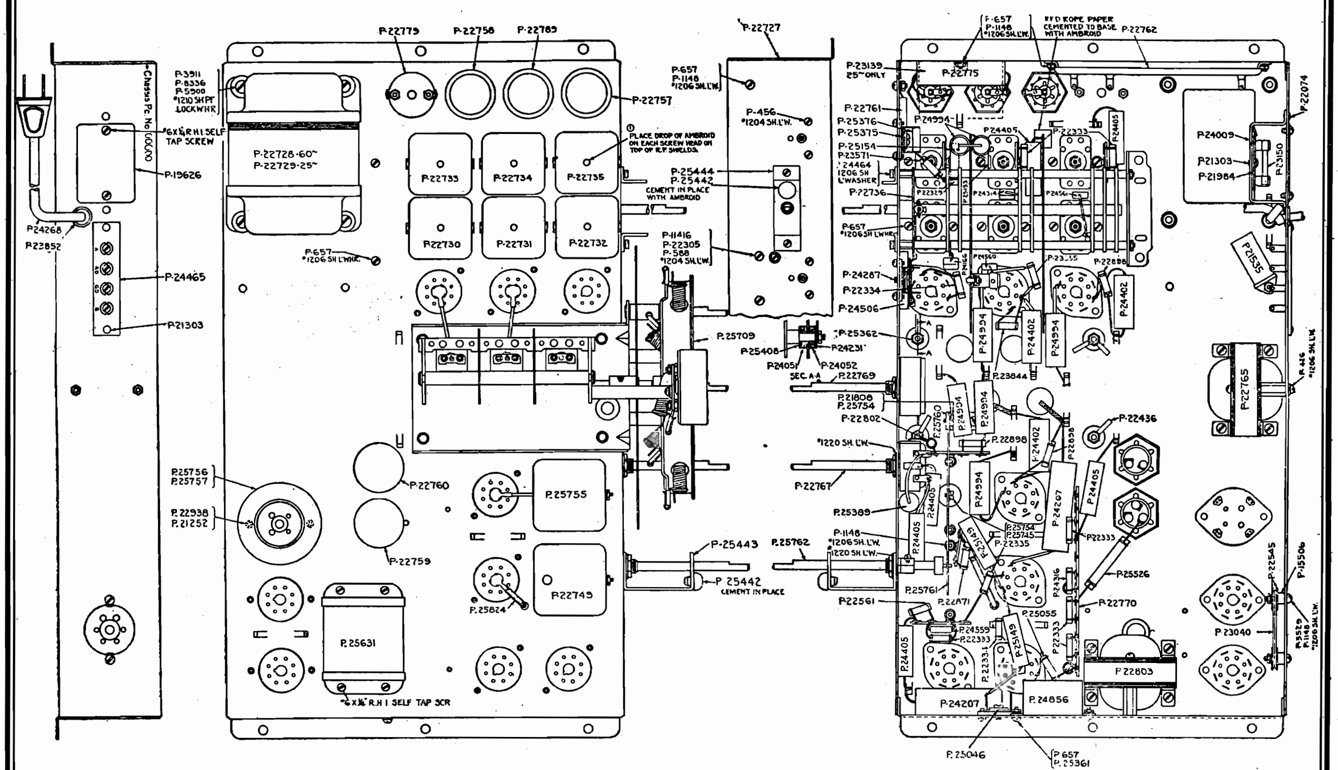


Fig. 3. Chassis Assembly.

STROMBERG-CARLSON TEL. MFG. CO.

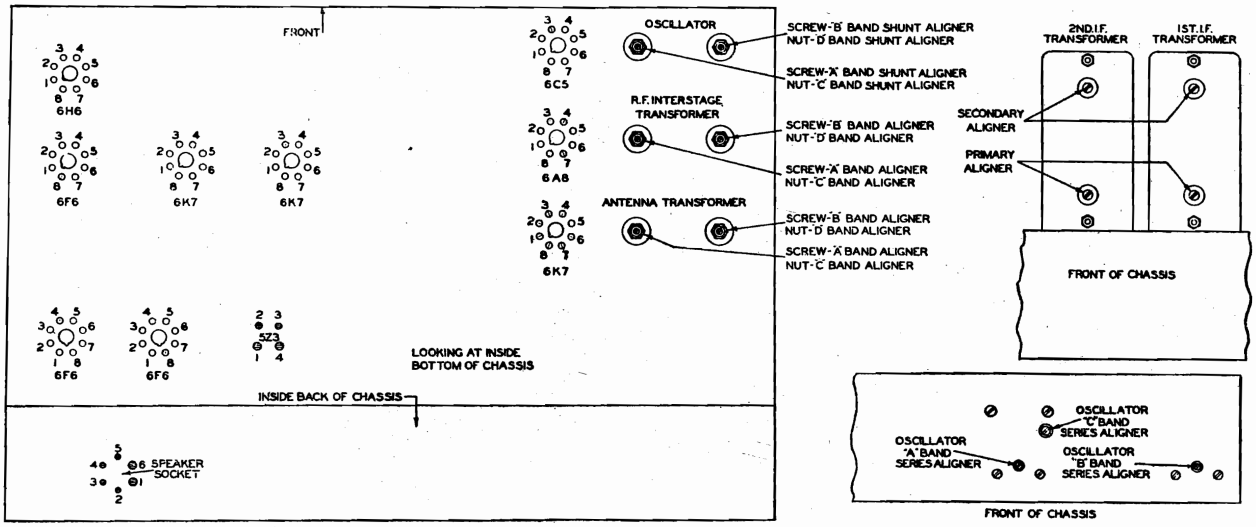
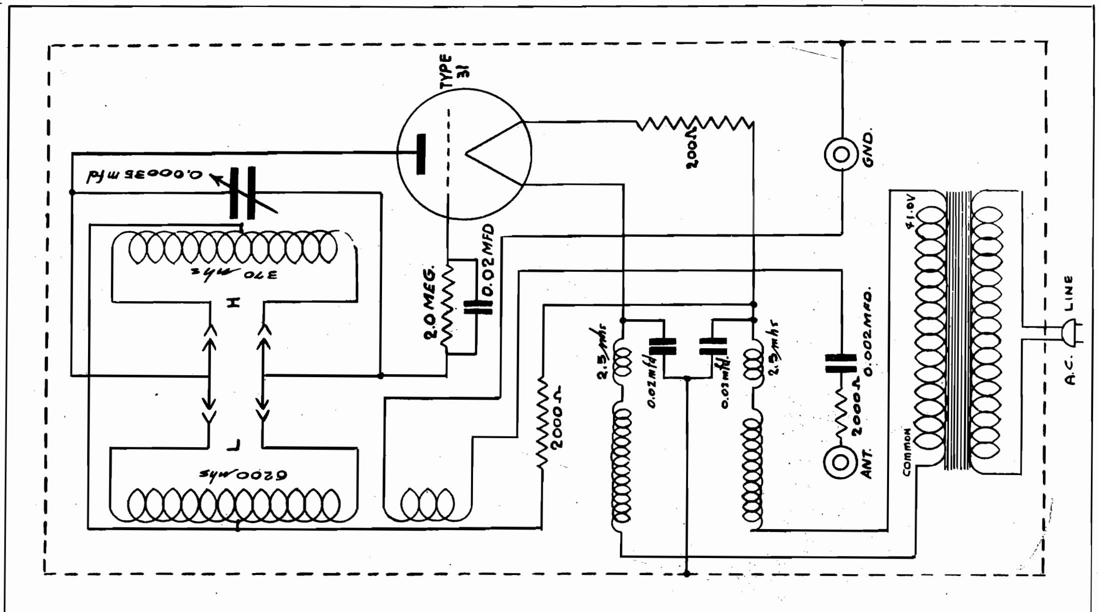


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors. CAUTION—Never Attempt to Align Receiver With Fidelity Control Set At Any Position Other Than the Maximum Counter-Clockwise Position.

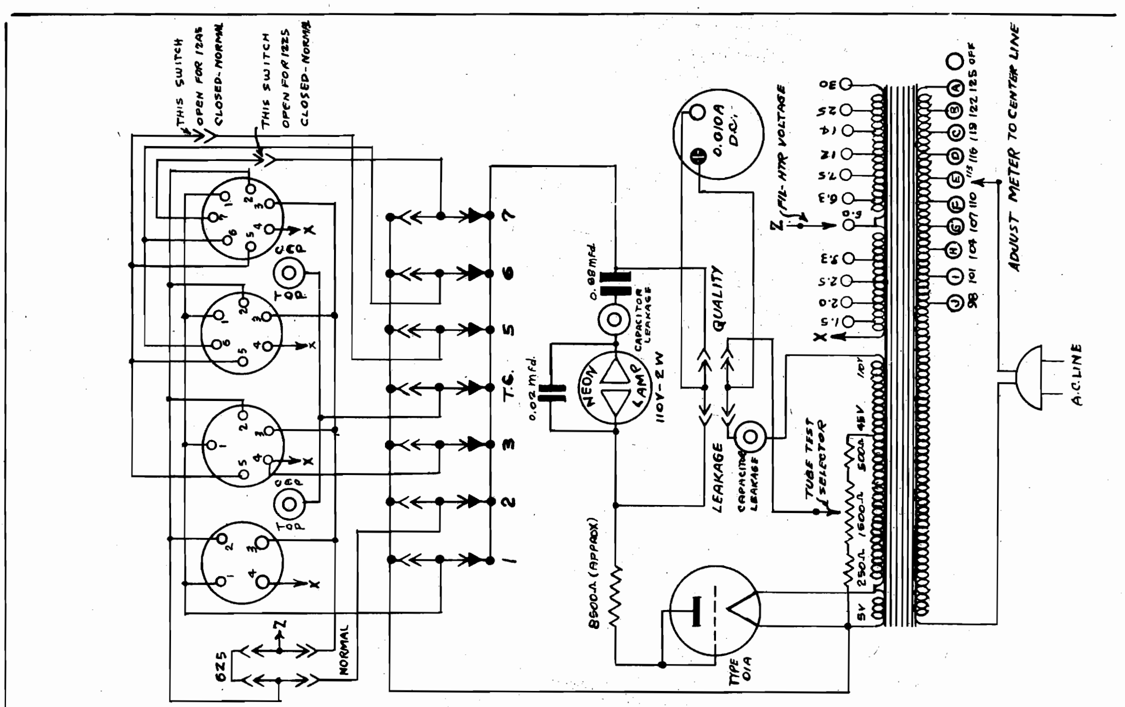
Piece Number	Parts	Description of Parts
P-24465	Binding Post Assembly	Antenna and Ground
P-22760	Capacitor	Electrolytic
P-22758	Capacitor	Electrolytic
P-22759	Capacitor	Electrolytic
P-22757	Capacitor	Electrolytic
P-22789	Capacitor	Electrolytic
P-24207	Capacitor	Electrolytic, 10 MF., 25v
P-23139	Capacitor	1 MF. (Used only on Receivers for 25-60 cycles)
P-22775	Capacitor	0.4 MF.
P-25389	Capacitor	0.2 MF.
P-24402	Capacitor	0.1 MF.
P-24994	Capacitor	0.05 MF.
P-24405	Capacitor	0.04 MF.
P-21535	Capacitor	Two, 0.01 MF.
P-25149	Capacitor	0.01 MF.
P-22761	Capacitor	0.006 MF.
P-25376	Capacitor	Type O, 250 MMF.
P-24559	Capacitor	Type O, 100 MMF.
P-24560	Capacitor	Type O, 50 MMF.
P-24166	Capacitor	Type O, 25 MMF.
P-24314	Capacitor	Type O, 10 MMF.
P-24561	Capacitor	Type O, 5 MMF.
P-24506	Capacitor	Aligning, 2,500 MMF.
P-25375	Capacitor	Aligning, 1,350 MMF.
P-24287	Capacitor	Aligning, 525 MMF.
P-25046	Capacitor	Aligning, 220 MMF.
P-22765	Choke Coil Assembly	Plate Voltage Supply Filter
P-22730	Coil Assembly	Antenna, "A" and "C" Bands
P-22731	Coil Assembly	R. F., "A" and "C" Bands
P-22732	Coil Assembly	Oscillator, "A" and "C" Bands
P-22733	Coil Assembly	Antenna, "B" and "D" Bands
P-22734	Coil Assembly	R. F., "B" and "D" Bands
P-22735	Coil Assembly	Oscillator, "B" and "D" Bands
P-24268	Cord	A. C. Supply
P-22779	Filter Assembly	Antenna
P-21984	Fuse Block	
P-23150	Fuse	2 Amperes
P-18630	Lamp	Pilot, 6 Volt
P-24376	Meter	Visual Tuning
P-22767	Potentiometer	Volume Control
P-22769	Potentiometer	Tone Control and A. C. Switch
P-23844	Resistor	Type D, 300 ohms
P-22898	Resistor	Type D, 600 ohms
P-24316	Resistor	Type D, 1,000 ohms
P-25055	Resistor	Type C, 1,500 ohms
P-22802	Resistor	Type D, 5,000 ohms
P-22329	Resistor	Type C, 6,500 ohms
P-25526	Resistor	Type F, 15,000 ohms
P-23355	Resistor	Type D, 25,000 ohms
P-23571	Resistor	Type D, 50,000 ohms
P-22333	Resistor	Type D, 0.1 megohm
P-22334	Resistor	Type D, 0.25 megohm
P-22335	Resistor	Type D, 0.5 megohm
P-22561	Resistor	Type D, 1 megohm
P-22871	Resistor	Type D, 2 megohm
P-22762	Resistor	"B" Voltage Divider
P-25756	Shield	Rectifier Tube
P-22988	Socket	Tube, 4 Prong
P-23040	Socket	Tube, 6 Prong
P-25539	Socket	Tube, 8 Prong
P-22736	Switch Assembly	Frequency Range
P-25755	Transformer Assembly	1st I. F.
P-22749	Transformer Assembly	2nd I. F.
P-22803	Transformer Assembly	Audio Driver Stage
P-25631	Transformer Assembly	Audio Power Output
P-22728	Transformer	Power, 50-60 cycles, 110 volts
P-22729	Transformer	Power, 25-60 cycles, 110 volts

MODEL 61
MODEL 85-PL
Schematics

SUPREME INSTRUMENTS CORP.



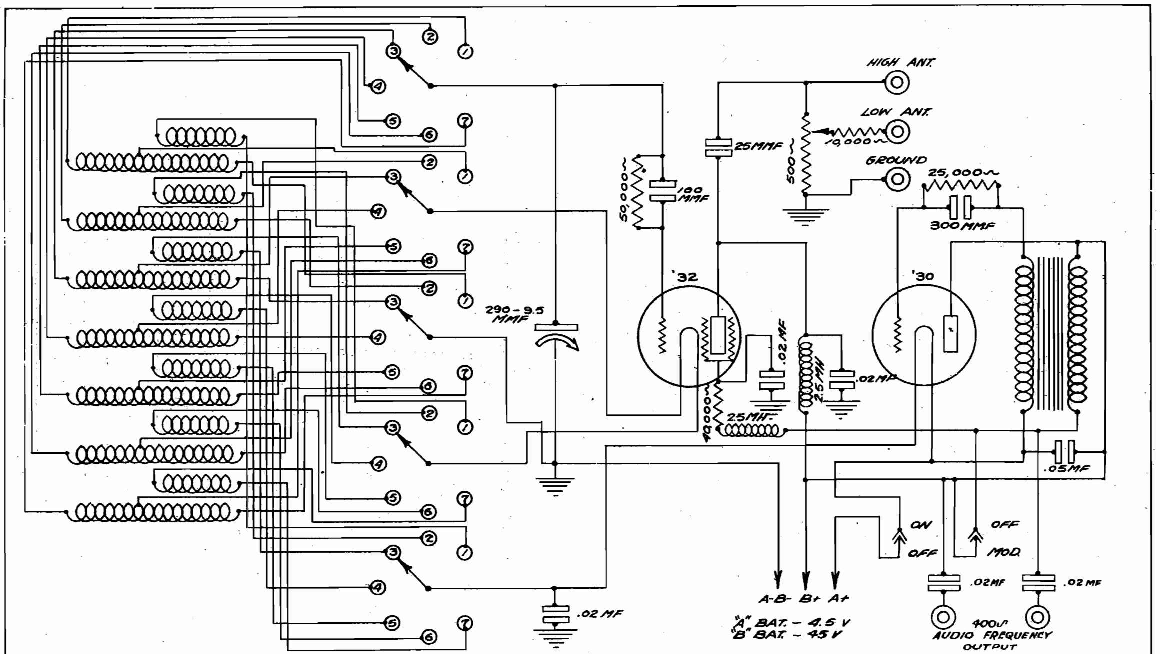
DRAWN Ashcroft / TRACED Bilello	SUPREME INSTRUMENTS CORP. GREENWOOD, MISS.
CHECKED W. H. Ashcroft	Schematic Model 61
APPROVED	July 3, 1934 — 803A



DRAWN Ashcroft / TRACED Bilello	SUPREME INSTRUMENTS CORP. GREENWOOD, MISS.
CHECKED	SCHEMATIC WIRING DIAGRAM MODEL 85 PL
APPROVED	11-20-34 — 866A

MODEL 180
MODEL DeLuxe 333
Schematics

SUPREME INSTRUMENTS CORP.



Revised - 12-20-34
400~ Audio Frequency Output Added
"B" Batt. Vol. Changed from 22.5 V to 45 V

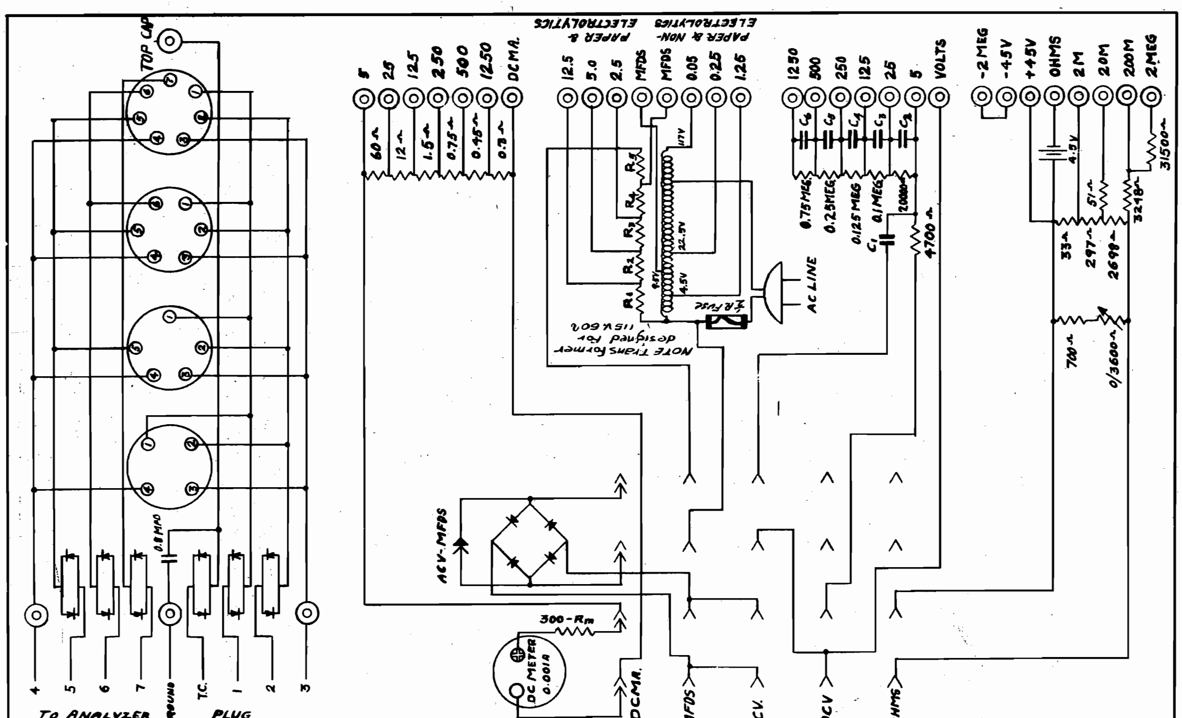
DRAWN & TRACED
CHECKED
APPROVED

SUPREME INSTRUMENTS CORP.
GREENWOOD, MISS.

Schematic Diagram
Model 180

6-11-34

795B



f	CAPACITORS - MFDS.						RESISTORS - OHMS				
	C_1	C_2	C_3	C_4	C_5	C_6	R_1	R_2	R_3	R_4	R_5
60~	0.88	0.109	0.0242	0.0193	0.0103	0.00317	139	195	319	2069	1019
50~	0.9	0.067	0.0215	0.014	0.0074	0.002	122	181	280	1778	559
40~	1.3	0.08	0.0271	0.022	0.0103	0.002	254	363	568	3336	302
25~	1.85	0.14	0.04	0.0335	0.0175	0.0065	456	634	899	2876	1.3

DRAWN & TRACED W. H. Ashcraft
CHECKED
APPROVED

SUPREME INSTRUMENTS CORP.
GREENWOOD - MISS.

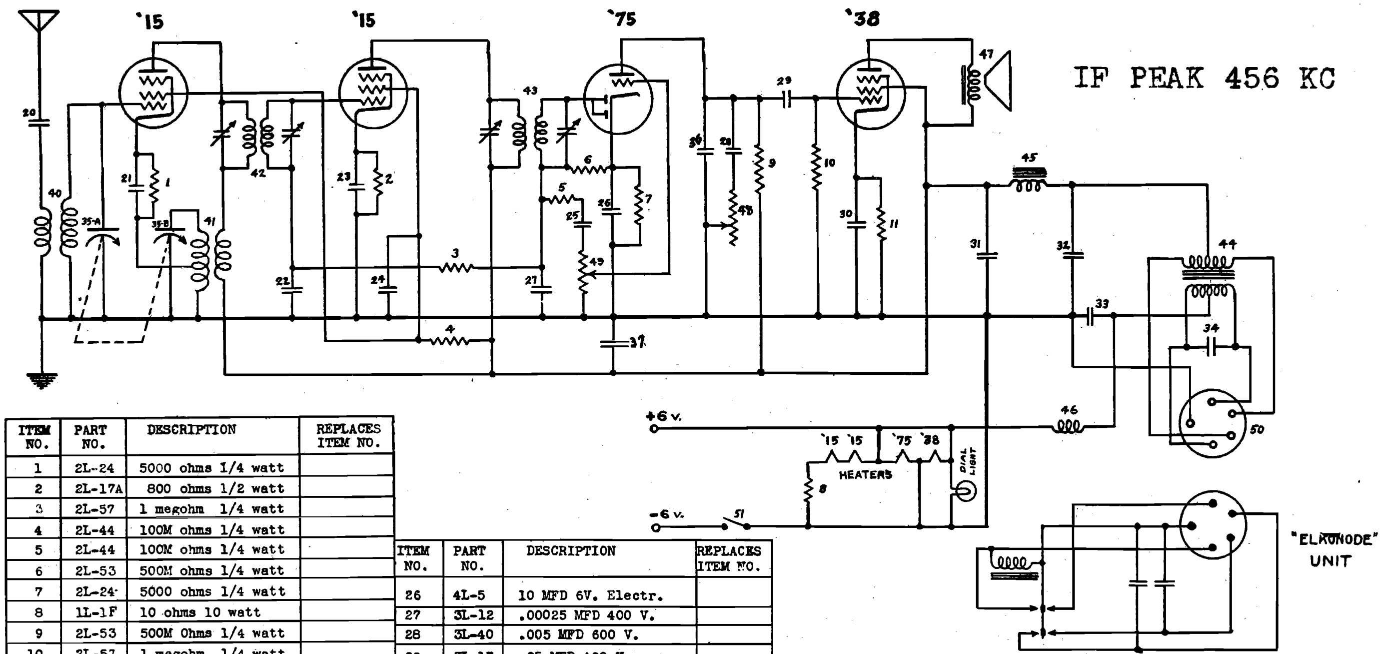
SCHEMATIC WIRING DIAGRAM
DELUXE MODEL 333

8-28-34

824-A

MODELS H-465, I-465
Schematic, Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-24	5000 ohms 1/4 watt	
2	2L-17A	800 ohms 1/2 watt	
3	2L-57	1 megohm 1/4 watt	
4	2L-44	100M ohms 1/4 watt	
5	2L-44	100M ohms 1/4 watt	
6	2L-53	500M ohms 1/4 watt	
7	2L-24	5000 ohms 1/4 watt	
8	1L-1F	10 ohms 10 watt	
9	2L-53	500M Ohms 1/4 watt	
10	2L-57	1 megohm 1/4 watt	
11	2L-19A	1500 ohms 1/2 watt	
12			
13			
14			
15			
16			
17			
18			
19			
20	3L-16	.02 MFD 400 V.	
21	3L-24	.0015 MFD 600 V.	
22	3L-17	.05 MFD 400 V.	
23	3L-18	.10 MFD 400 V.	
24	3L-18	.10 MFD 400 V.	
25	3L-16	.02 MFD 400 V.	

ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
26	4L-5	10 MFD 6V. Electr.	
27	3L-12	.00025 MFD 400 V.	
28	3L-40	.005 MFD 600 V.	
29	3L-17	.05 MFD 400 V.	
30	4L-11	10 MFD 25v. Electr.	
31	4L-1	8 MFD 250v. Electr.	
32	4L-1	8 MFD 250v. Electr.	
33	3L-60	1 MFD 200v.	
34	3L-10H	.5 MFD 200 V.	
35A	7L-1	Ant. section V. C.	
35B	7L-1	Osc. section V. C.	
36	3L-23	.0005 MFD 600 V.	
37	3L-17	.05 MFD 400 V.	
38			
39			
40	8L-1	Antenna Coil	
41	8L-2	Osc. Coil with item 42	
42	8L-2	Comp. I F trans. 456	
43	8L-3	2nd I F trans. 456 KC	

ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
44	9L-1	Power transformer	
45	9L-11	Filter choke AF	
46	8L-4	RF Filter choke	
47	18L-1	Magnetic speaker	
48	10L-11	Tone Control	
49	10L-1	Volume Control	
50	13L-2	5 prong socket	
51		Switch with item 49	

L'TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL H & I CIRCUIT DIAGRAM
DRAWN BY — T.E.B.
CHECKED BY — [illegible]
APPROVED BY — [illegible]
RELEASED — 11-16-34
CIRCUIT DRAWING № 3A1

The Model H & I is a low drain highly efficient 4 tube superheterodyne receiver operating from a 6 volt storage battery, and requires no B or C batteries. The six volt current from the battery is converted by means of an efficient rectifying vibrator and power transformer to the high voltage necessary for B and C supply. The two type '15 tube filaments are connected in series so that failure of type '15 filament will cause both type '15 tubes to become inoperative.

The colored "A" battery lead must be connected to the positive terminal of the storage battery, or the set will be inoperative and will draw abnormal battery current.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts are also best checked by the substitution method.

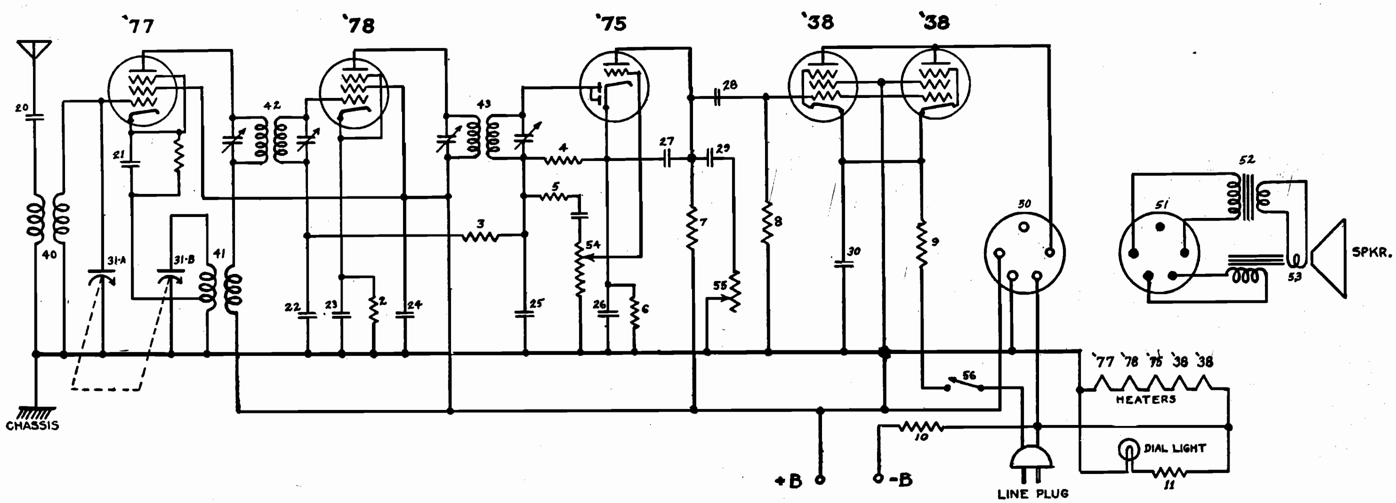
Tube socket voltage readings:

Tube	Use	(a) cathode	screen	* plate
'15	1st det.	3.5 v.	72 v.	154 v.
'15	IF ampl.	1.6 v.	72 v.	154 v.
'75	2nd det.	0.5 v.	(none)	42 v.
'38	Output.	13.5 v.	154 v.	144 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.
All measurements made from points indicated to chassis.

MODELS A-525,B-525
Schematic,Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-24	5000 ohms 1/4 watt		20	3L-16	.02 mfd 400 v.		40	8L-1	Antenna coil	
2	2L-13	400 ohms 1/4 watt		21	3L-24	.0015 mfd 600 v.		41	8L-2	Osc. coil, with item 42	
3	2L-57	1 megohm 1/4 watt		22	3L-17	.05 mfd 400 v.		42	8L-2	Composite IF trans. 456	
4	2L-53	500M ohms 1/4 watt		23	3L-18	.10 mfd 400 v.		43	8L-3	2nd IF trans. 456 KC.	
5	2L-33	30M ohms 1/4 watt		24	3L-18	.10 mfd 400 v.		44			
6	2L-24	5000 ohms 1/4 watt		25	3L-12	.00025 mfd 400 v.		45			
7	2L-53	500M ohms 1/4 watt		26	4L-5	10 mfd 6v. electr.		46			
8	2L-57	1 megohm 1/4 watt		27	3L-23	.0005 mfd 600 v.		47			
9	2L-17A	800 Ohms 1/2 watt		28	3L-17	.05 mfd 400 v.		50	13L-6	Speaker socket (5 pin)	
10	1L-5F	25 ohms 10 watt		29	3L-40	.005 mfd 600 v.		51		Spkr plug pt of item 53	
11	1L-13F	200 ohms 10 watt		30	4L-11	10 mfd 25v. electr.		52		Output trans.(item 53)	
12				31A	7L-1	Antenna section V. C.		53	18L-2	Dynamic speaker	
13				31B	7L-1	Osc. section V. C.		54	10L-1	Volume control	
14				32				55	10L-11	Tone Control	
15				33				56		Switch, part of item 55	
16				34				57			
17				35				58			
18				36				59			

L'TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL A&B CIRCUIT DIAGRAM
DRAWN BY— J.E.B.
CHECKED BY—
APPROVED BY—
RELEASED — 11-28-34
CIRCUIT DRAWING
№ 3A2

The normal I. F. frequency is 456 KC.

The Model A & B chassis is an efficient 5 tube superheterodyne receiver operating from 32 volt farm lighting systems, and employes a 45 volt B battery to increase the output power without the use of transformers or vibrators.

The heaters of the five tubes are connected in series across the 32 volt line. The failure of one filament will therefore cause all the tubes to become inoperative.

If all the tubes light and the receiver fails to operate, make sure that the 45 volt B battery is connected in the proper direction and try reversing the plug connection to the 32 volt line. If the operation is then unsatisfactory check the tubes one at a time in a normal operating receiver, and replace all defective tubes.

Tube socket voltage readings: (with B battery connected)

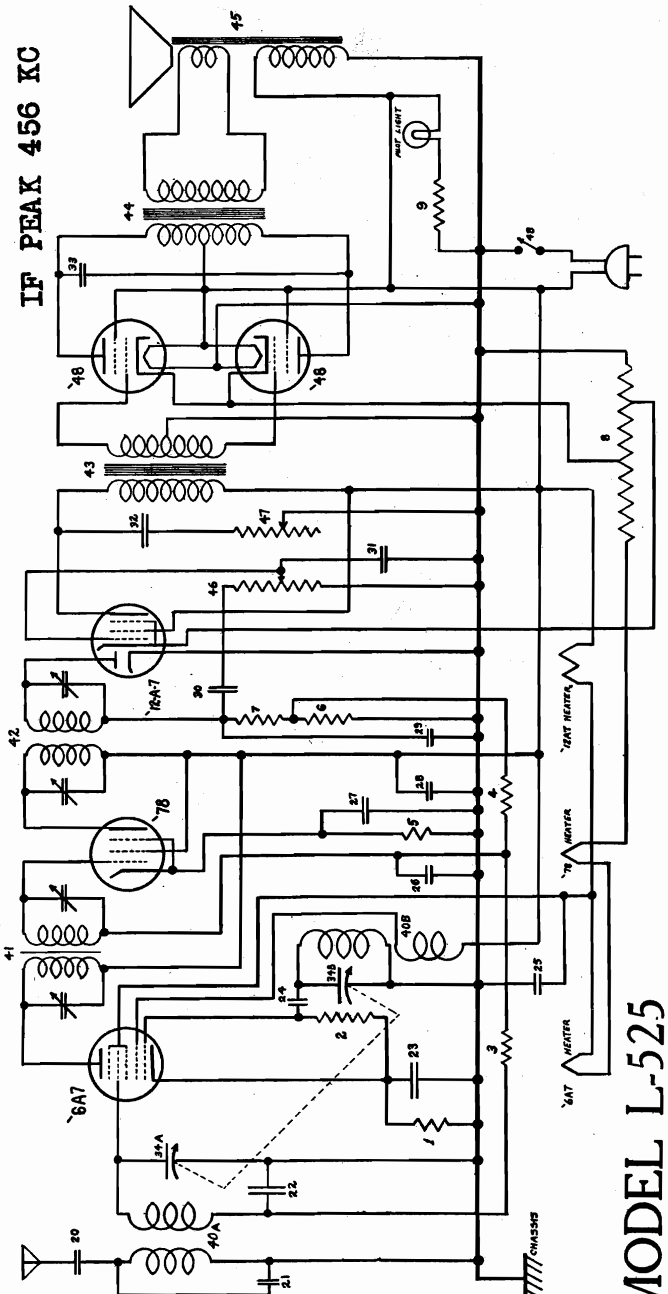
Tube	Use	(a) cathode	screen	* plate
'77	1st det.	3.2 v.	77 v.	77 v.
'78	IF ampl.	2.0 v.	77 v.	77 v.
'75	2nd det.	0.5 v.	(none)	38 v.
'38's	Output.	7.0 v.	77 v.	73 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.
All measurements made from points indicated to chassis.

MODEL L-525
Schematic, Voltage
Parts. Data

L. TATRO PRODUCTS CORP.

IF PEAK 456 KC



MODEL L-525

L' TATRO
PRODUCTS CORPORATION
DECORAH IOWA
MODEL 'L' CIRCUIT DIAGRAM
DRAWING NUMBER 3A6
DRAWN BY
APPROVED BY 9-2-35.

TUBE SOCKET VOLTAGE READINGS TO CHASSIS

Tube	Use	Cathode	Grid	Screen	Plate
6A7	1st Det.	.1 V	0 (Cap)	19V (grid No. 4-5)	32V
	Oscillator		0 (grid No. 1)		32V (grid No. 2)
78	I. F. Ampl.	.1 V	0	32V	32V
12A7	2nd Det.	0 (Diode)			—.5 (diode)
	1st A. F. Ampl.	1.5 (Pentode)	0 (Cap)	32V	32V
48's	Output	3.5	0	32V	32V

The Model L Chassis is an efficient 5-tube superheterodyne receiver operating directly from 32-volt farm lighting systems, without the use of "B" batteries, transformer or vibrator.

The heaters of type 6A7, 78 and 12A7 in series with 22 Ohm resistor (item No. 9 above) are connected directly across the 32-volt line. Failure of either tube or the resistor will cause the other tubes to become inoperative. The heaters of the type 48 output tubes are in parallel connection across the 32-volt line. Failure of one tube (48) will not cause the set to become inoperative but will greatly reduce volume.

If all the tubes light and the receiver fails to operate, try reversing the plug connection to the 32-volt line. If the operation is then unsatisfactory, check the tubes one at a time in a normal operating receiver and replace all defective tubes.

All measurements taken with a volt meter having a resistance of 100,000 Ohms and with no signal applied to receiver

Drawing No. 3A6 shows the complete circuit diagram with itemized parts list. In ordering replacements parts always use the part number shown to facilitate filling orders and to eliminate mistakes and delay.

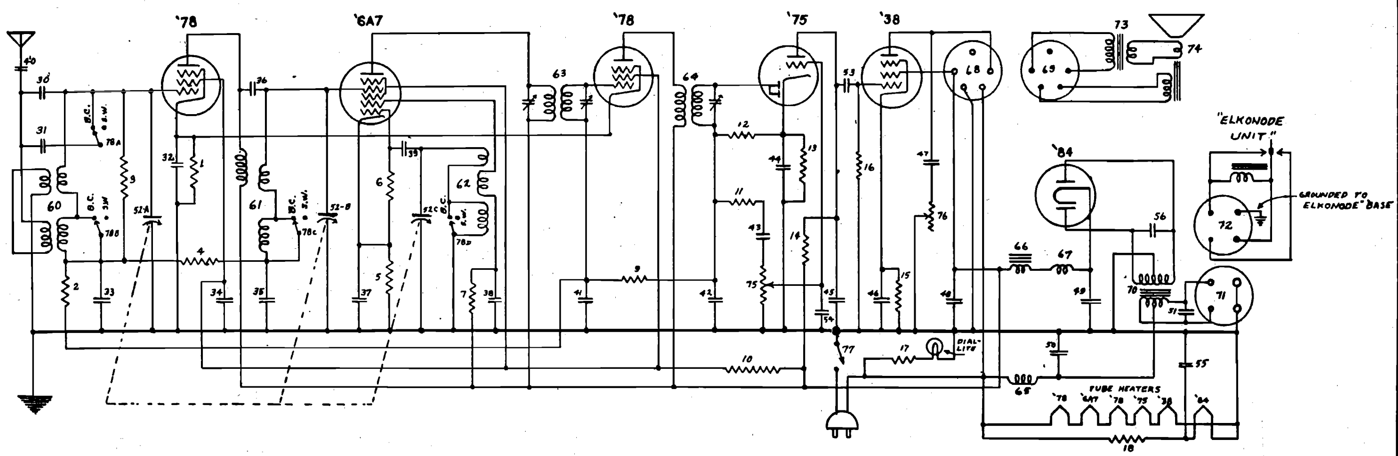
No adjustments are to be made to any trimmer condenser, either I. F. or R. F. without the aid of a correctly calibrated signal generator used in conjunction with a high resistance output meter connected from plate to plate of the type 48 output tubes.

The normal I. F. frequency is 456 K. C.

Item No.	Part No.	Description	
1	2L–62	110 Ohm	¼ Watt
2	2L–49	250 M	¼ Watt
3	2L–49	250 M	¼ Watt
4	2L–57	1 Meg	¼ Watt
5	2L–62	110 Ohm	¼ Watt
6	2L–49	250 M	¼ Watt
7	2L–49	250 M	¼ Watt
8	1L–22G	22 Ohm	Wire wound
9	1L–13F	200 Ohm	10 Watt
20	3L–16	.025 Mfd	400 V
21	5L–2	.0001 Mfd	Mica
22	3L–17	.05 Mfd	400 V
23	3L–18	.1 Mfd	400 V
24	5L–2	.0001 Mfd	Mica
25	3L–18	.1 Mfd	400 V
26	3L–17	.05 Mfd	400 V
27	3L–18	.1 Mfd	400 V
28	3L–18	.1 Mfd	400 V
29	3L–12	.00025	400 V
30	3L–16	.025 Mfd	400 V
31	3L–23	.0005 Mfd	600 V
32	3L–25	.01 Mfd	600 V
33	3L–25	.01 Mfd	600 V
34A	7L–1	Antenna Section V. C.	
34B	7L–1	Oscillator Section V. C.	
40A	8L–11	Antenna Coil	
40B	8L–11	Oscillator Coil	
41	8L–12	1st I. F. Transformer	
42	8L–3	2nd I. F. Transformer	
43	9L–21	Input Audio Transformer	
44	9L–31	Output Audio Transformer with item 45	
45	18L–2	Dynamic Speaker	
46	10L–3	Volume Control	1 Meg
47	10L–12	Tone Control	100 M
48		Switch with item 47	

MODELS C-625,D-625
Schematic,Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-17A	800 ohms 1/2 watt		30		Part of item 60		56	3L-42H	.006 mfd 1600 v.	
2	2L-49	250M ohms 1/4 watt		31	5L-1	.00005 mfd mica		57			
3	2L-44	100M ohms 1/4 watt		32	3L-18	.10 mfd 400 v.		58			
4	2L-49	250M ohms 1/4 watt		33	3L-17	.05 mfd 400 v.		59			
5	2L-13	400 ohms 1/4 watt		34	3L-18	.10 mfd 400 v.		60	8L-5	Antenna coil)	
6	2L-37	50M ohms 1/4 watt		35	3L-17	.05 mfd 400 v.		61	8L-6	Interstage coil	
7	2L-31	20M ohms 1/4 watt		36		Part of item 61		62	8L-7	Oscillator coil	
8				37	3L-18	.10 mfd 400 v.		63	8L-8	1st IF trans. 175 KC.	
9	2L-49	250M ohms 1/4 watt		38	3L-18	.10 mfd 400 v.		64	8L-9	2nd IF trans. 175 KC.	
10	2L-35	38M ohms 1/4 watt		39	5L-2	.0001 mfd mica		65	8L-4	RF choke	
11	2L-44	100M ohms 1/4 watt		40	3L-16	.02 mfd 400 v.		66	9L-11	AF choke	
12	2L-49	250M ohms 1/4 watt		41	3L-17	.05 mfd 400 v.		67	8L-10	RF choke (universal)	
13	2L-24	5000 ohms 1/4 watt		42	3L-23	.0005 mfd 600 v.		68	13L-6	5 P. spkr socket	
14	2L-53	500M ohms 1/4 watt		43	3L-16	.02 mfd 400 v.		69		speaker plug	
15	2L-19A	1500 ohms 1/2 watt		44	4L-5	10 mfd 6v. electr.		70	9L-2	power transformer	
16	2L-57	1 Megohm 1/4 watt		45	3L-23	.0005 mfd 600 v.		71	13L-1	4 P. Elkonode socket	
17	1L-13F	200 ohms 10 watt		46	4L-11	10 mfd 25 v.		72	15L-2	Elkonode type 51.	
18	1L-9G	50 ohms 20 watt		47	3L-17	.05 mfd 400 v.		73		Out. trans. with item 74	
19				48	4L-3	8 mfd 450 v. electr.		74	18L-4	Dynamic speaker	
20				49	4L-3	8 mfd 450 v. electr.		75	10L-1	volume control	
21				50	3L-50	1 mfd s 200 v.		76	10L-11	tone control	
22				51	3L-9H	.25 mfd 200 v.		77		switch with item 75.	
23				52	7L-2	3 gang variable cond.		78	16L-1	CCT Selector sw. 4PDT.	
24				53	3L-17	.05 mfd 400 v.		79			
25				54	3L-23	.0005 mfd 600 v.		80			
26				55	3L-18	.10 mfd 400 v.		81			

The normal I. F. frequency is 177.5 KC.

L' TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL C & D CIRCUIT DIAGRAM —
DRAWN BY J.E.B.
CHECKED BY C.A.H.
APPROVED BY E.A.H. 12-10-34
DRAWING № 3A4

Note: The circuit selector switch wave range designations in the diagram above are reversed, the short wave position should be to the left, and the broadcast position to the right.

Model C & D is an efficient all electric 32 volt 6 tube superheterodyne receiver covering 2 wave ranges and requires no batteries. The thirty-two volt current from the light plant is converted by means of a vibrator, transformer, and rectifier tube to the high voltage necessary for B & C supply. The 75, two 78's, 6A7 and 38 tube filaments are connected in series. Failure of one filament in this series will therefore cause the other four tubes in the string to become inoperative. The 84 tube is fed thru a separate resistor so that failure of its filament may be located immediately.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

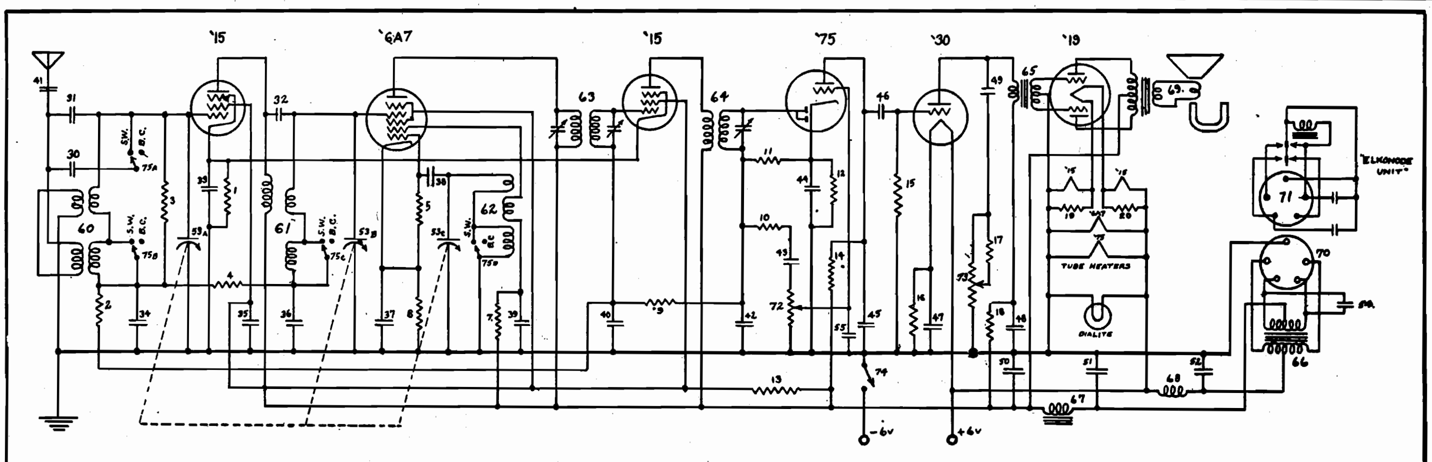
Tube socket voltage readings:

Tube	Use	(a) cathode	(b) screen	(b) plate
'78	RF ampl.	6.0 v.	88.0 v.	210 v.
'6A7	1st det.	3.0 v.	88.0 v.	210.v. *155 v.
'78	IF ampl.	6.0 v.	88.0 v.	210 v.
'75	2nd det.	1.05 v.	(none)	52 v.
'38	Output.	22.0 v.	210 v.	202 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.
All measurements made from point indicated to chassis.

MODELS J-665, K-665
Schematic, Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.	ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-17A	800 Ohms 1/2 watt		27				53A	7L-2	Antenna section V. C.	
2	2L-49	250M ohms 1/4 watt		28				53B		Det. section V.C. (7L-2)	
3	2L-44	100M ohms 1/4 watt		29				53C		Osc. section V.C. (7L-2)	
4	2L-49	250M ohms 1/4 watt		30	5L-1	.00005 mfd mica.		54	3L-16	.50 mfd 200 v.	
5	2L-37	50M ohms 1/4 watt		31		part of item 60		55	3L-12	.00025 mfd 400 v.	
6	2L-13	400 ohms 1/4 watt		32		part of item 61		56			
7	2L-29	15M ohms 1/4 watt		33	3L-18	.10 mfd 400 v.		57			
8				34	3L-17	.05 mfd 400 v.		58			
9	2L-49	250M Ohms 1/4 watt		35	3L-18	.10 mfd 400 v.		59			
10	2L-44	100M ohms 1/4 watt		36	3L-17	.05 mfd 400 v.		60	8L-5	Antenna coil	
11	2L-49	250M ohms 1/4 watt		37	3L-18	.10 mfd 400 v.		61	8L-6	Interstage coil	
12	2L-24	5000 ohms 1/4 watt		38	5L-2	.0001 mfd mica.		62	8L-7	Oscillator coil	
13	2L-35	36M Ohms 1/4 watt		39	3L-18	.10 mfd 400 v.		63	8L-8	1st IF transformer 175	
14	2L-53	500M ohms 1/4 watt		40	3L-17	.05 mfd 400 v.		64	8L-9	2nd IF trans. 175 KC	
15	2L-57	1 Megohm 1/4 watt		41	3L-40	.005 mfd 600 v.		65	9L-81	AF push pull transf.	
16	2L-5A	68 ohms 1/2 watt		42	3L-23	.0005 mfd 600 v.		66	9L-1	Power transformer	
17	2L-24	5000 ohms 1/4 watt		43	3L-16	.02 mfd 400 v.		67	9L-11	AF choke	
18	2L-29	15M ohms 1/4 watt		44	4L-5	10 mfd 6v. electrolytic		68	8L-4	RF choke	
19	2L-4A	53 ohms 1/2 watt		45	3L-12	.00025 mfd 400 v.		69	18L-3	Perm. Mag. Dyn Spk & tr.	
20	2L-4A	53 ohms 1/2 watt		46	3L-17	.05 mfd 400 v.		70	13L-2	5 prong socket	
21				47	4L-6	20 mfd 6 v. electr.		71	15L-1	Elkonode '75' vibrator.	
22				48	3L-18	.10 mfd 400 v.		72	10L-1	volume control	
23				49	3L-16	.02 mfd 400 v.		73	10L-11	tone control	
24				50	4L-1	8 mfd 250 v. electr.		74		switch with item 72	
25				51	4L-1	8 mfd 250 volt electr.		75	16L-1	Cct. selector sw. 4PDT.	
26				52	3L-50	1 mfd s. 200 v.		76			

The normal I. F. frequency is 177.5 KC.

L' TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL J&K CIRCUIT DIAGRAM
DRAWN BY— J.E.B.
CHECKED BY— [signature]
APPROVED BY— [signature] 12-7-34
CIRCUIT DRAWING
№ 3A3

Model J & K is a DeLuxe low drain 6 volt battery superheterodyne receiver covering two wave ranges and requires no B or C batteries. The six volt current from the storage battery is converted by means of an efficient rectifying vibrator and power transformer to the high voltage necessary for B & C supply. The two type 15 tube filaments with appropriate shunt resistors are connected in series with the type 19 tube filament so that failure of one of these tube filaments automatically causes the other two tubes to become inoperative.

The colored 'A' battery lead must be connected to the positive terminal of the storage battery, or the set will be inoperative and will draw abnormal battery current.

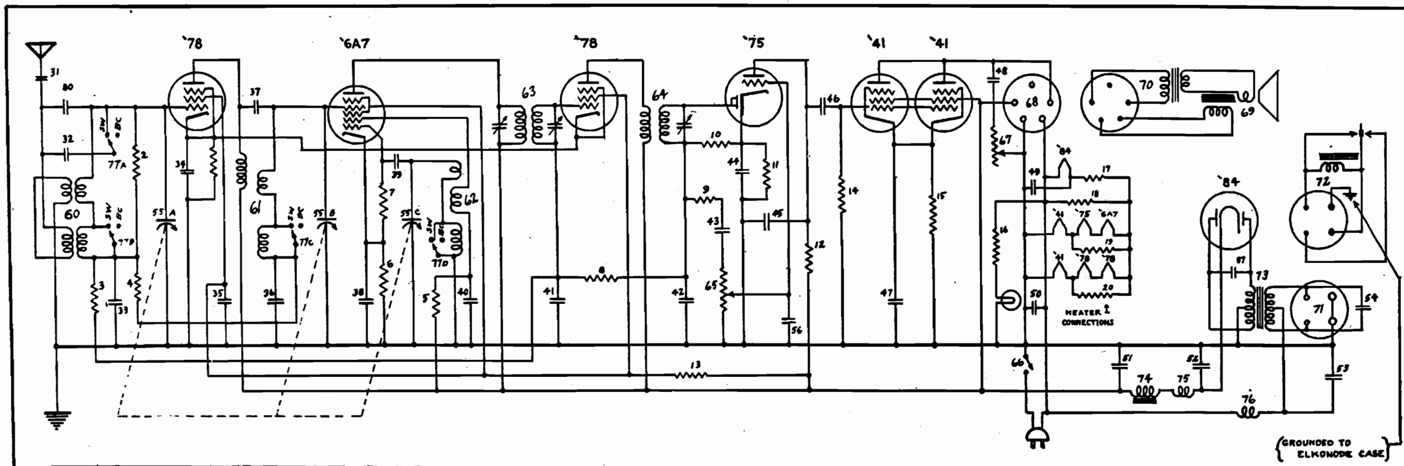
If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

Tube	Use	(a) cathode	(b) screen	(b) plate
'15	RF ampl.	2.2 v.	55.0 v.	145 v.
'6A7	1st det.	2.2 v.	55.0 v.	145 v.
				*115 v.
'15	IF ampl.	2.2 v.	55.0 v.	145 v.
'75	2nd det.	0.6 v.	(none)	37 v.
'30	1st AF.	(c) 4.0 v.	(none)	88 v.
'19	Output.	(d) 2.0 v.	(none)	(e) 143 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.
(c) drop across filament resistor.
(d) negative filament to chassis.
(e) both plates of '19 tube.
All measurements made from points indicated to chassis.

MODEL F-725
Schematic, Voltage
Parts, Data

L. TATRO PRODUCTS CORP.



ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
1	2L-17A	800 ohms 1/2 watt	
2	2L-44	100M ohms 1/4 watt	
3	2L-49	250M Ohms 1/4 watt	
4	2L-49	250M ohms 1/4 watt	
5	2L-31	20M ohms 1/4 watt	
6	2L-13	400 ohms 1/4 watt	
7	2L-3[illegible]	50M ohms 1/4 watt	
8	2L-49	250M ohms 1/4 watt	
9	2L-44	100M ohms 1/4 watt	
10	2L-49	250M ohms 1/4 watt	
11	2L-24	5000 ohms 1/4 watt	
12	2L-53	500M ohms 1/4 watt	
13	2L-35	38M ohms 1/4 watt	
14	2L-57	1 megohm 1/4 watt	
15	2L-14A	450 ohms 1/2 watt	
16	1L-13F	200 ohms 10 watt	
17	1L-15F	13.8 ohms 10 watt	
18	1L-7F	44.0 ohms 10 watt	
19	1L-11F	125 ohms 10 watt	
20	1L-11F	125 ohms 10 watt	
21			
22			
23			
24			
25			
26			
27			
28			
29			

ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
30		part of item no. 60	
31	3L-16	.02 mfd 400 v.	
32	5L-1	.00005 mfd mica cond.	
33	3L-17	.05 mfd 400 v.	
34	3L-18	.10 mfd 400 v.	
35	3L-18	.10 mfd 400 v.	
36	3L-17	.05 mfd 400 v.	
37		part of item no. 61	
38	3L-18	.10 mfd 400 v.	
39	5L-2	.0001 mfd mica cond.	
40	3L-18	.10 mfd 400 v.	
41	3L-17	.05 mfd 400 v.	
42	3L-23	.0005 mfd 600 v.	
43	3L-16	.02 mfd 400 v.	
44	4L-5	10 mfd 6 v. electrolytic.	
45	3L-23	.0005 mfd 600 v.	
46	3L-17	.05 mfd 400 v.	
47	4L-11	10 mfd 25 v. electrolytic.	
48	3L-17	.05 mfd 400 v.	
49	3L-18	.10 mfd 400 v.	
50	4L-14	20 mfd 40 v. N.P. electr.	
51	4L-4	16 mfd 450 v. electrolytic.	
52	4L-3	8 mfd 450 v. electrolytic.	
53	3L-50	1.0 mfd S 200 v.	
54	3L-9h	.25 mfd 200 v.	
55	7L-2	Three gang variable cond.	
56	3L-23	.0005 mfd 600 v.	
57	3L-42h	.005 mfd 1600 v.	
58			

ITEM NO.	PART NO.	DESCRIPTION	REPLACES ITEM NO.
59			
60	8L-5	Antenna coil	
61	8L-6	Interstage coil	
62	8L-7	Oscillator coil	
63	8L-8	1st IF transformer 175 KC.	
64	8L-9	2nd IF transformer 175 KC.	
65	10L-1	volume control	
66		switch with item no. 65	
67	10L-11	tone control	
68	13L-6	5 prong speaker socket	
69	18L-5	Dynamic speaker	
70		Out. trans & plug with #69	
71	13L-1	4 prong socket,	
72	15L-2	Elkonode type 51	
73	9L-2	Power transformer	
74	9L-11	A.F. choke	
75	8L-10	R.F. choke (universal)	
76	8L-4	R.F. choke	
77	16L-1	Cct. selector switch 4PDT	
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			

IF PEAK 177.5 KC

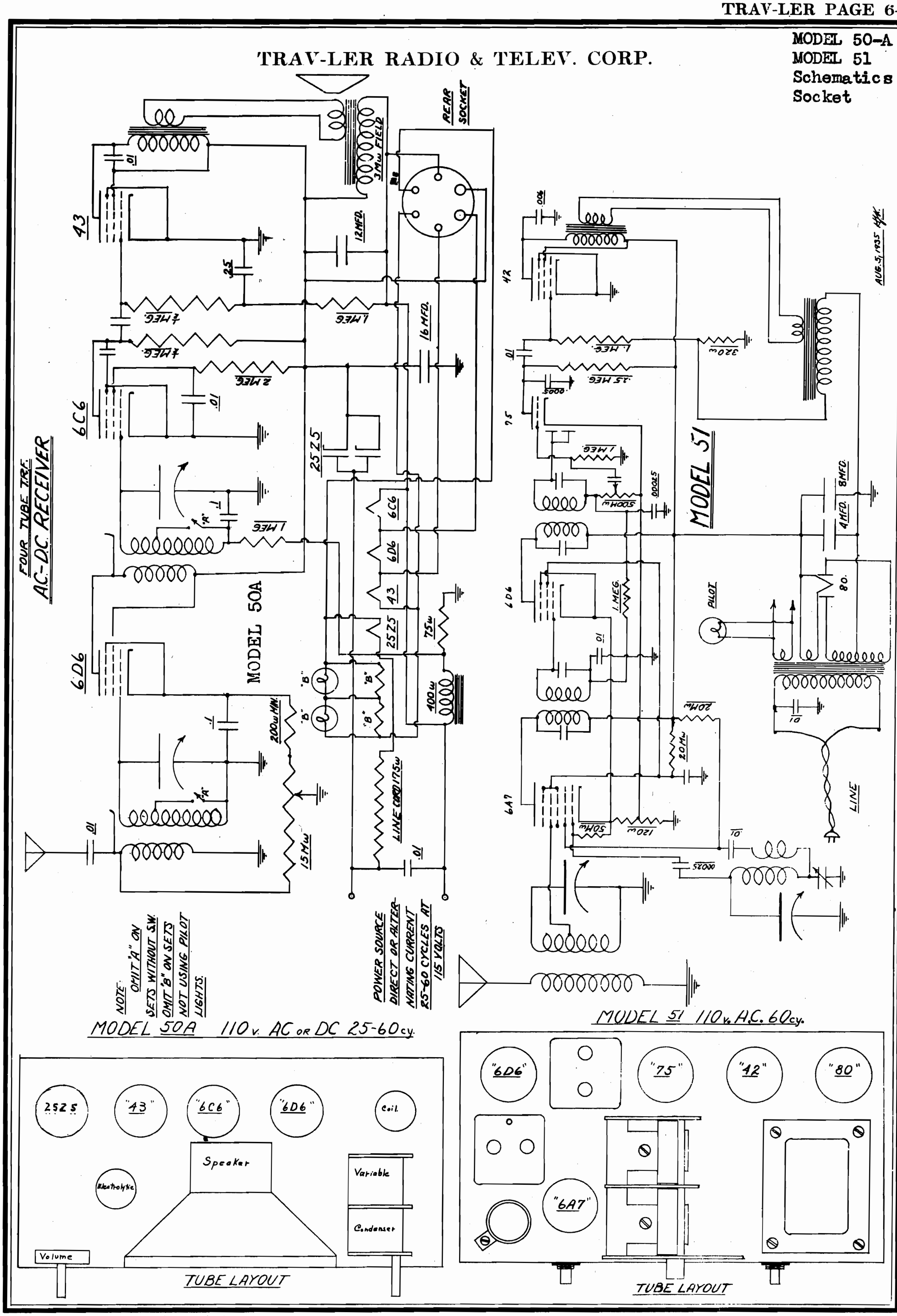
L TATRO PRODUCTS CORPORATION
DECORAH IOWA
MODEL F CIRCUIT DIAGRAM
DRAWN BY
CHECKED BY
APPROVED BY
DRAWING No 3A5

The Model F is a DeLuxe 7 tube 32 volt receiver of the superheterodyne type covering two wave ranges. It operates from a 32 volt source without the use of B or C batteries. High voltage B supply current is obtained by means of an efficient vibrator used in conjunction with a transformer and rectifier tube. There are two series filament circuits which are connected in parallel, this combination in turn being in series with the type 84 tube with appropriate series and shunt resistors. Failure of any one tube filament will cause the other tube filaments to operate at incorrect voltages, and operation of the receiver with any tube removed is not recommended.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

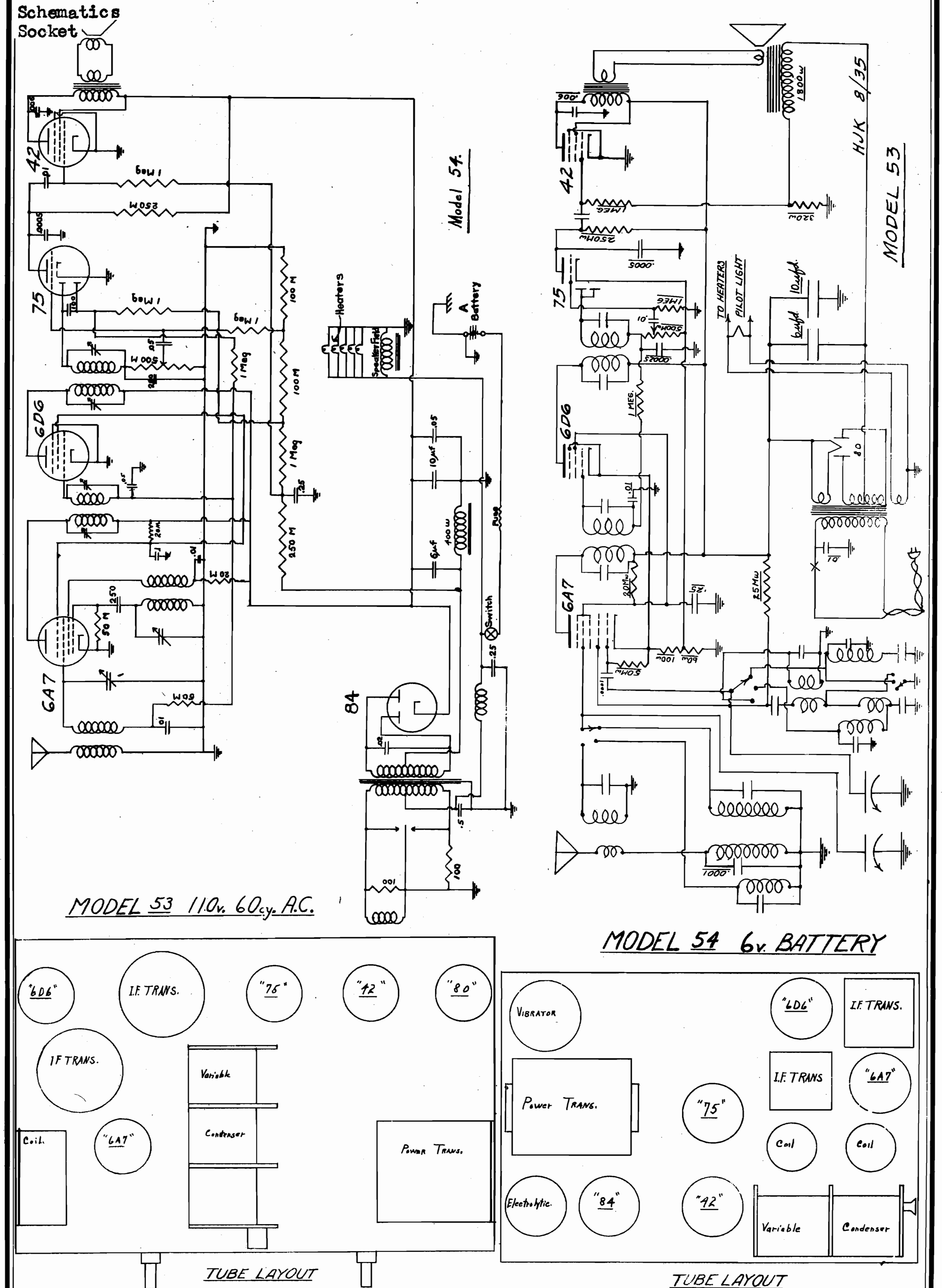
Tube	Use	(a) cathode	(b) screen	(b) plate
'78	RF ampl.	4.5 v.	73.0 v.	190 v.
'6A7	1st det.	2.5 v.	73.0 v.	190 v.
				*130 v.
'78	IF ampl.	4.5 v.	73.0 v.	190 v.
'75	2nd det.	0.9 v.	(none)	48 v.
(2) '41's	Output	16.0 v.	190 v.	187 v.

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.
All measurements made from point indicated to chassis.


TRAV-LER RADIO & TELEV. CORP.
MODEL 50-A
MODEL 51
Schematics
Socket
FOUR TUBE T.R.F.
A.C.-D.C. RECEIVER
MODEL 50A
MODEL 51
REAR SOCKET
3 Mw FIELD
12 MFD.
16 MFD.
8 MFD.
4 MFD.
43
6C6
6D6
25Z5
42
75
6A7
80.
PILOT
LINE
LINE CORD 175w
AUG. 5, 1935
NOTE: OMIT "A" ON SETS WITHOUT S.W. OMIT "B" ON SETS NOT USING PILOT LIGHTS.
POWER SOURCE DIRECT OR ALTERNATING CURRENT 25-60 CYCLES AT 115 VOLTS
MODEL 50A 110 v. AC or DC 25-60 cy.
MODEL 51 110 v. A.C. 60 cy.
252 5
"43"
"6C6"
"6D6"
Coil
Speaker
Electrolytic
Variable
Condenser
Volume
TUBE LAYOUT
"6D6"
"75"
"42"
"80"
"6A7"
TUBE LAYOUT

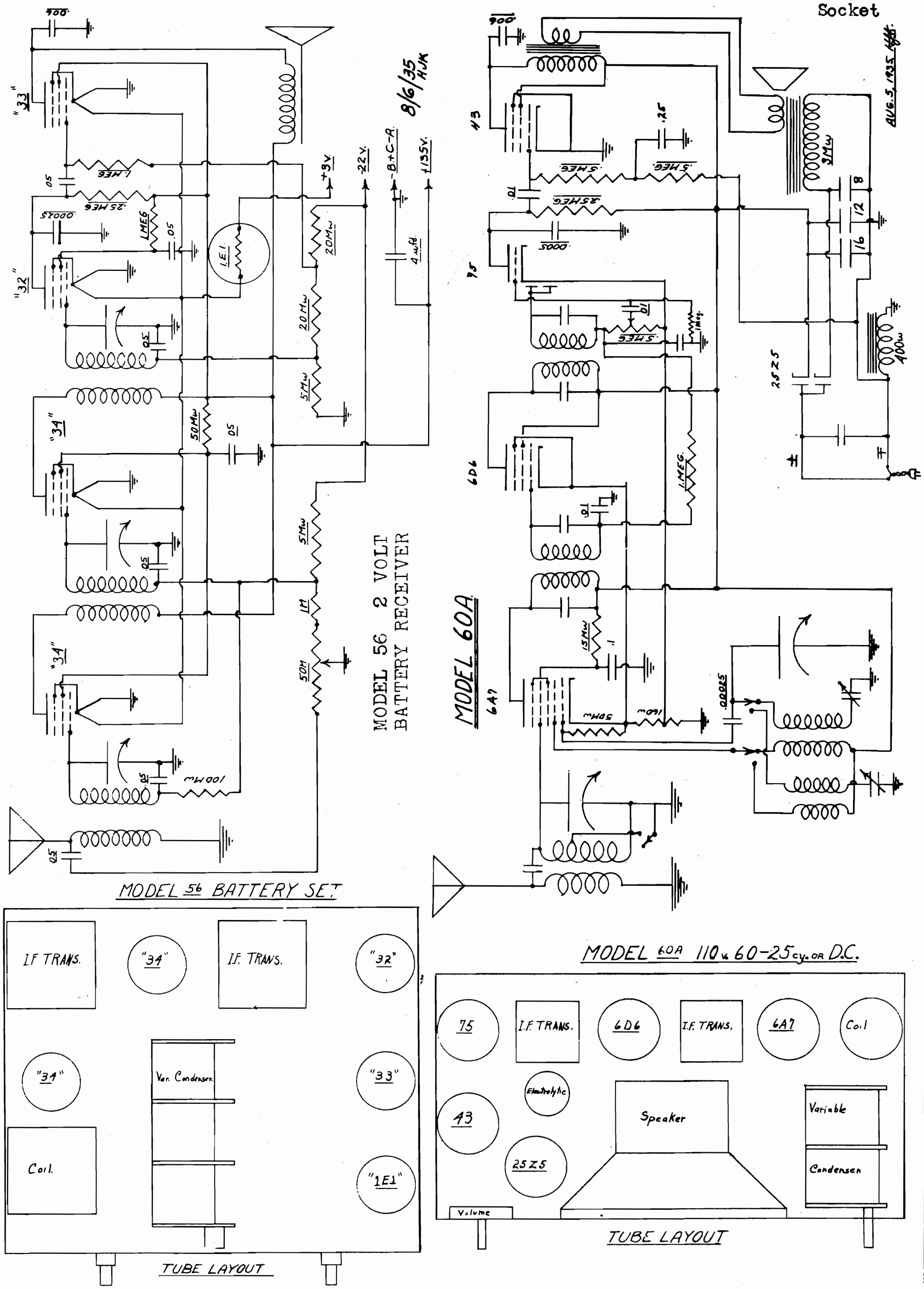
MODEL 53
MODEL 54
Schematics

TRAV-LER RADIO & TELEV. CORP.



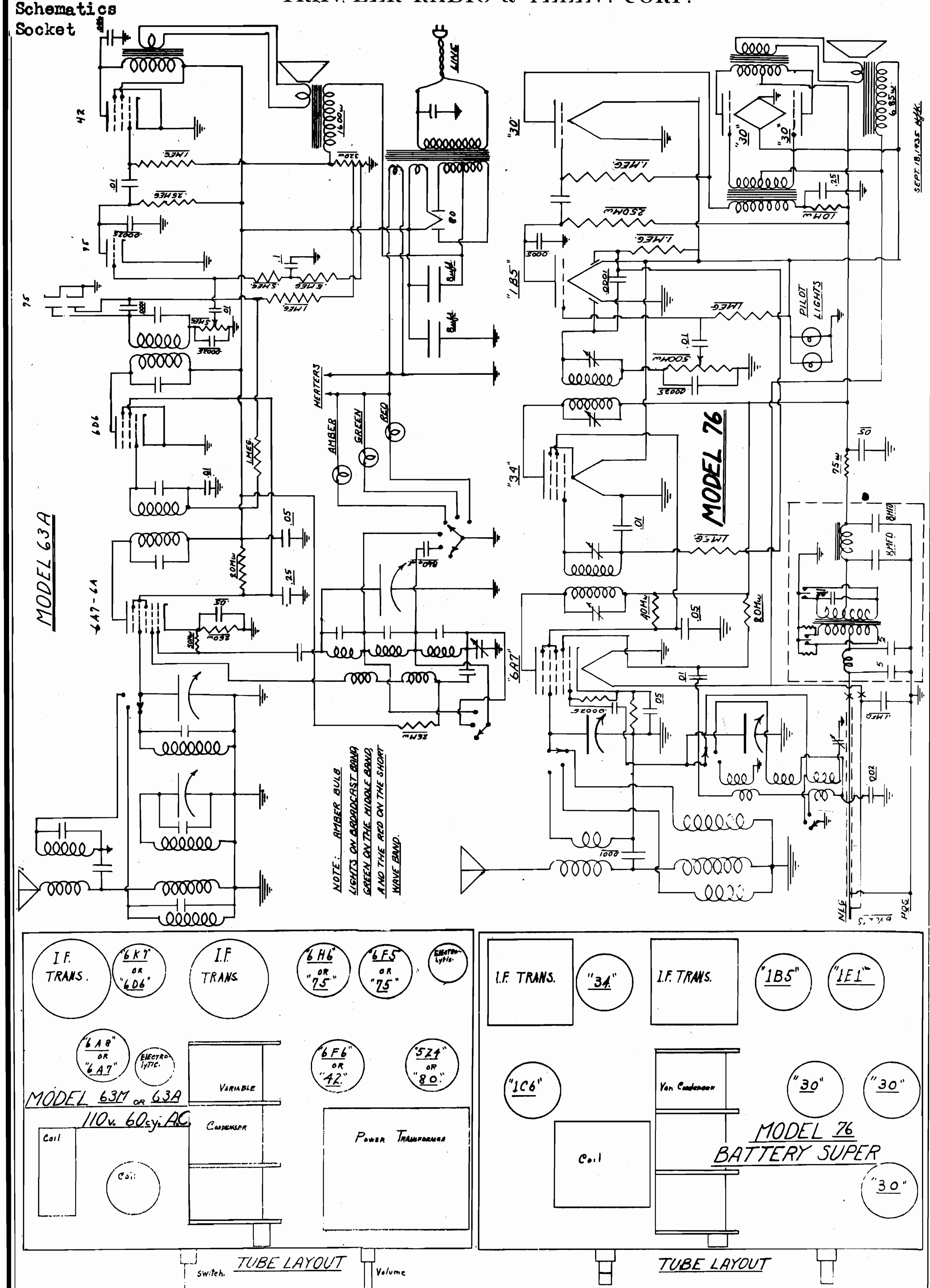
MODEL 56
MODEL 60-A
Schematics
Socket

TRAV-LER RADIO & TELEV. CORP.



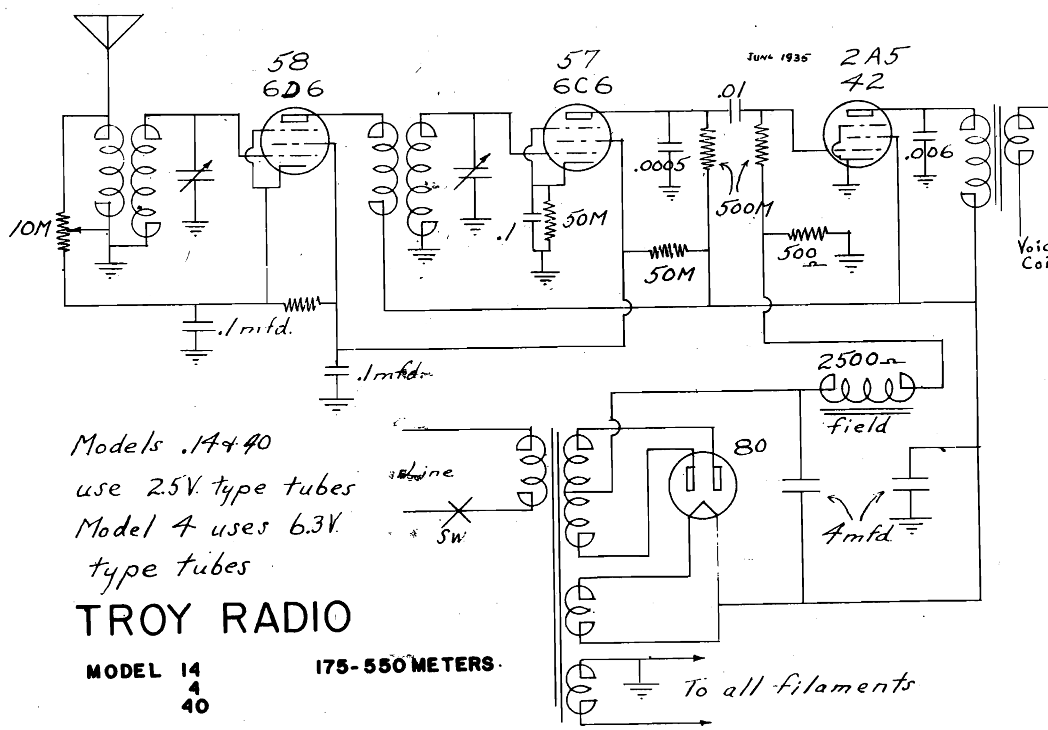
MODEL 63-A
MODEL 76
Schematics
Socket

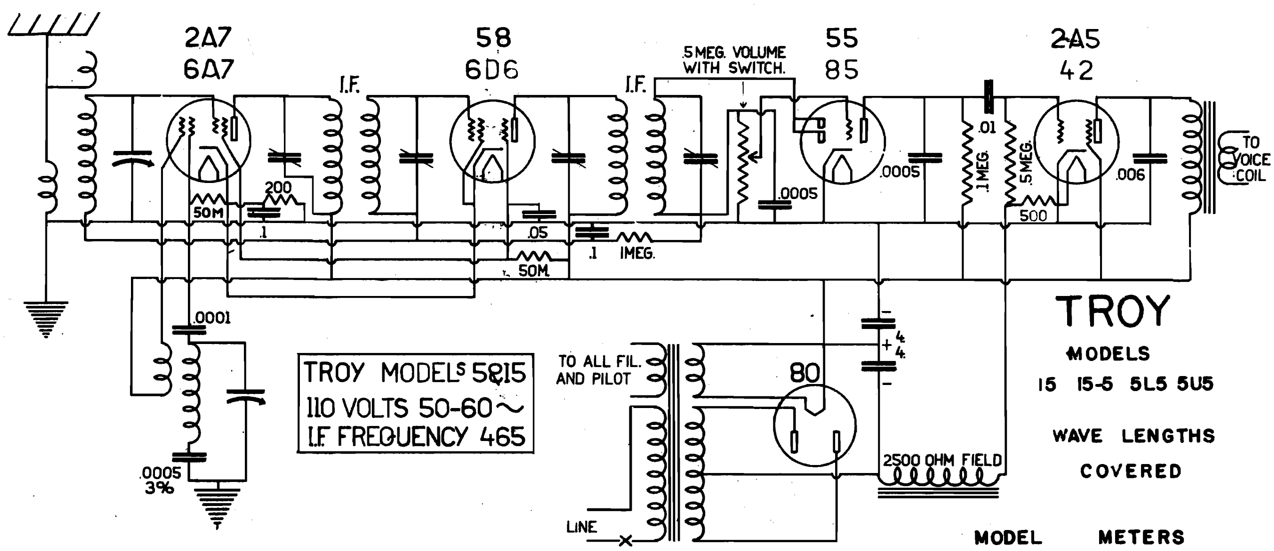
TRAV-LER RADIO & TELEV. CORP.

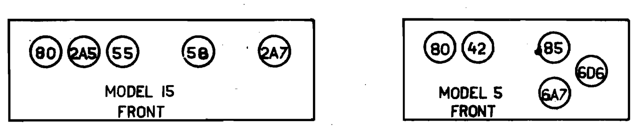


TROY RADIO MFG. CO.

MODELS 4,14,40
MODELS 5L5,5U5,15,15-5
Schematics, Socket





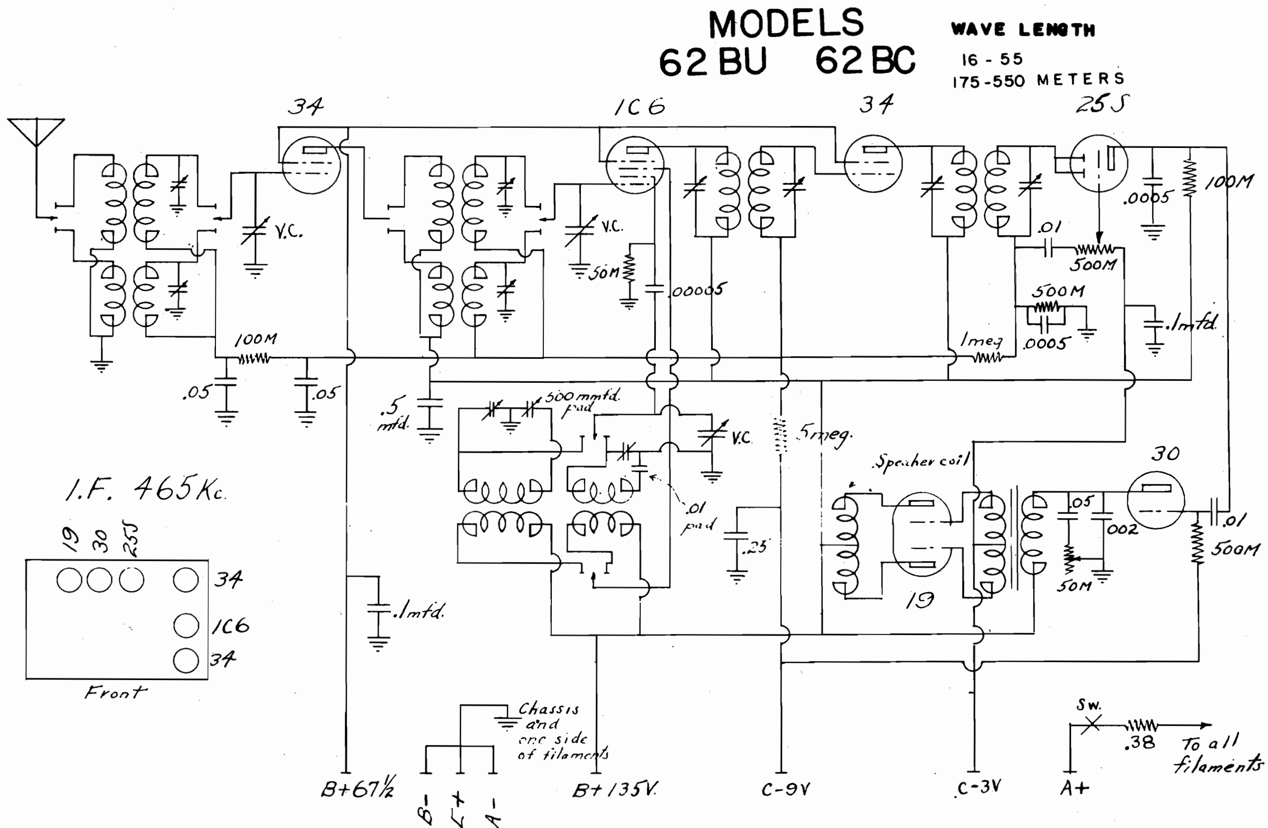


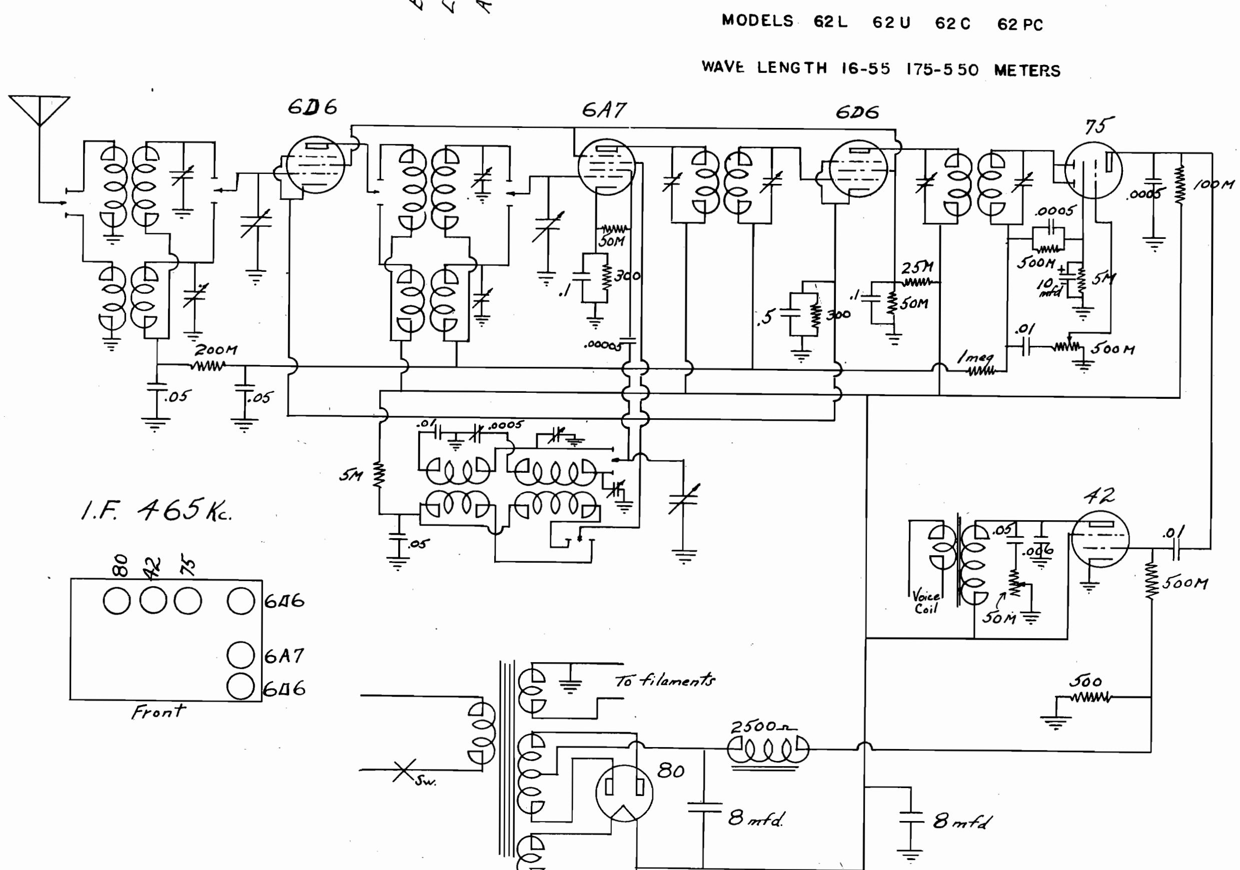
TROY
MODELS
15 15-5 5L5 5U5
WAVE LENGTHS COVERED

MODEL	METERS	
15	175-550	
15-5	16-55	200-550
5 L5	16-55	200-550
5U5	16-55	200-550

MODELS 62BC,62BU
MODELS 62C,62PC,62L,62U
Schematics,Socket

TROY RADIO MFG. CO.

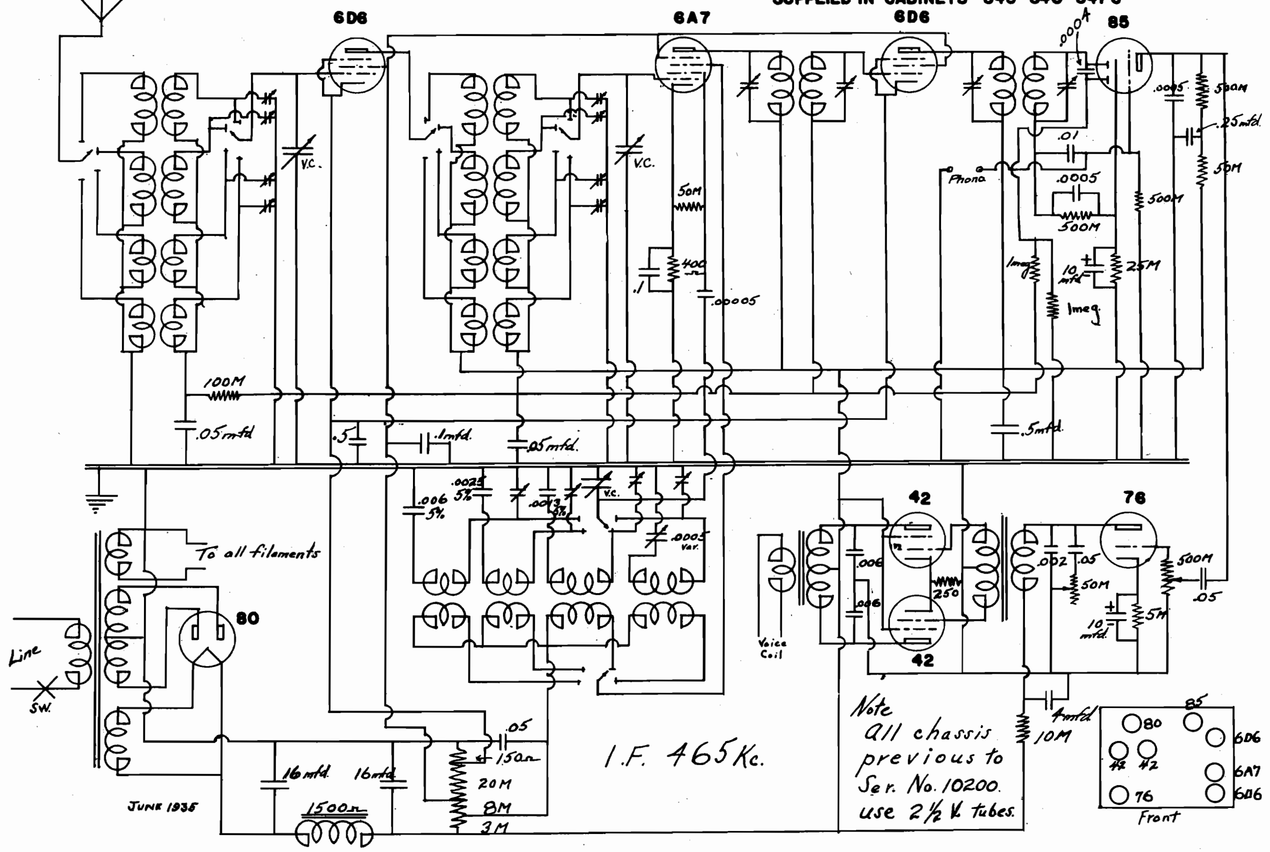


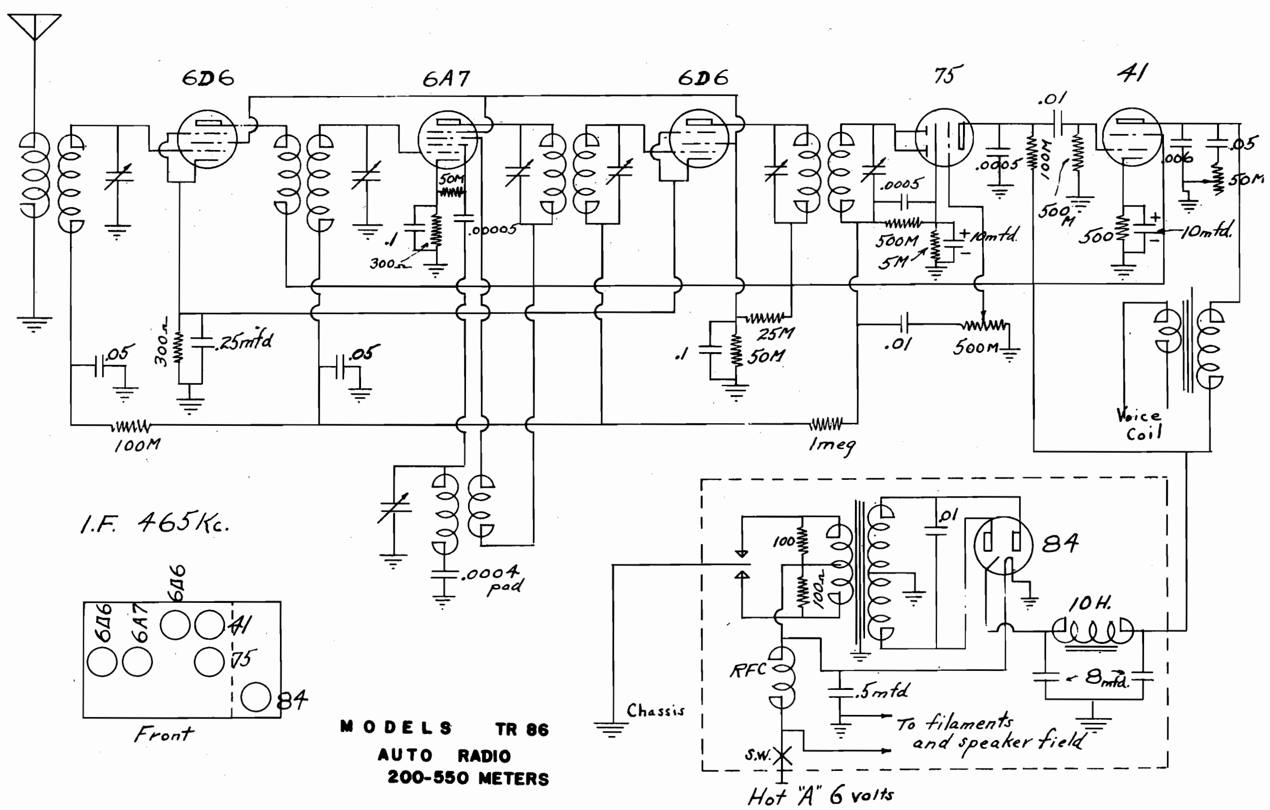


TROY RADIO MFG. CO.

MODELS 84C, 84PC, 84U
MODEL TR-86
Schematics, Socket

CHASSIS MODEL TR 84 15-550 METERS
SUPPLIED IN CABINETS 84U 84C 84PC



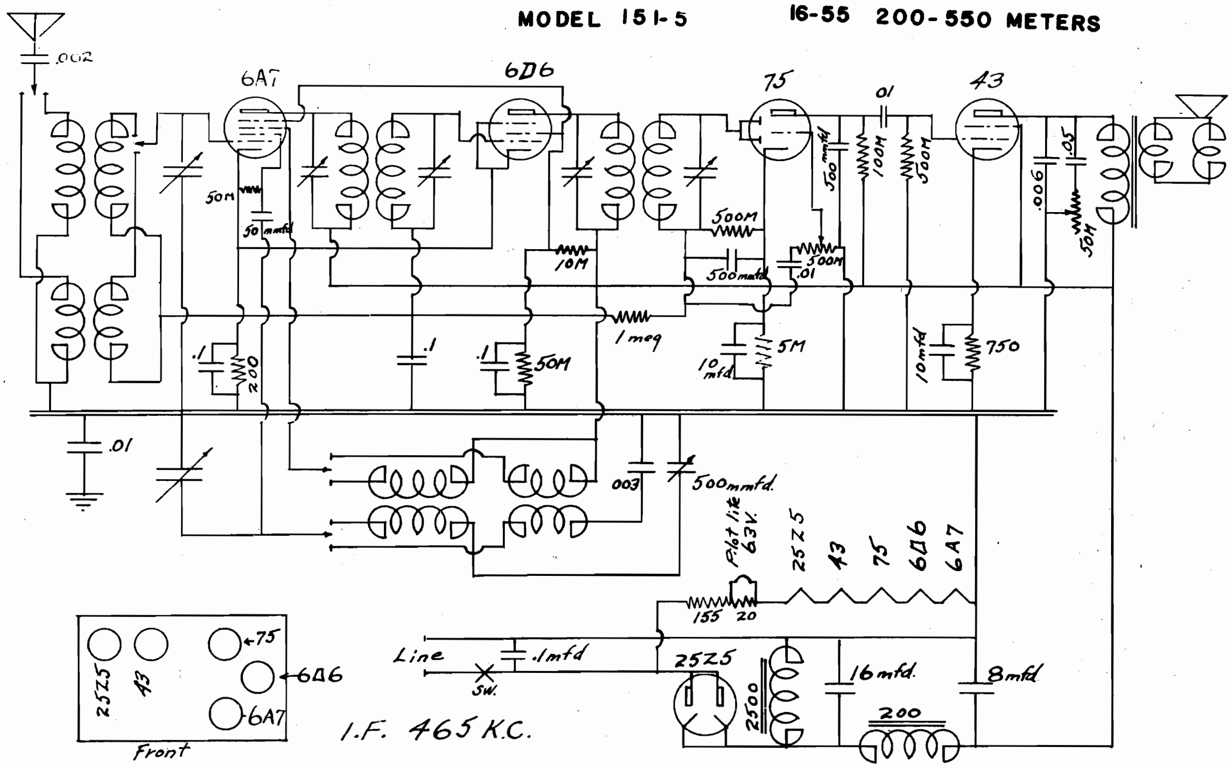


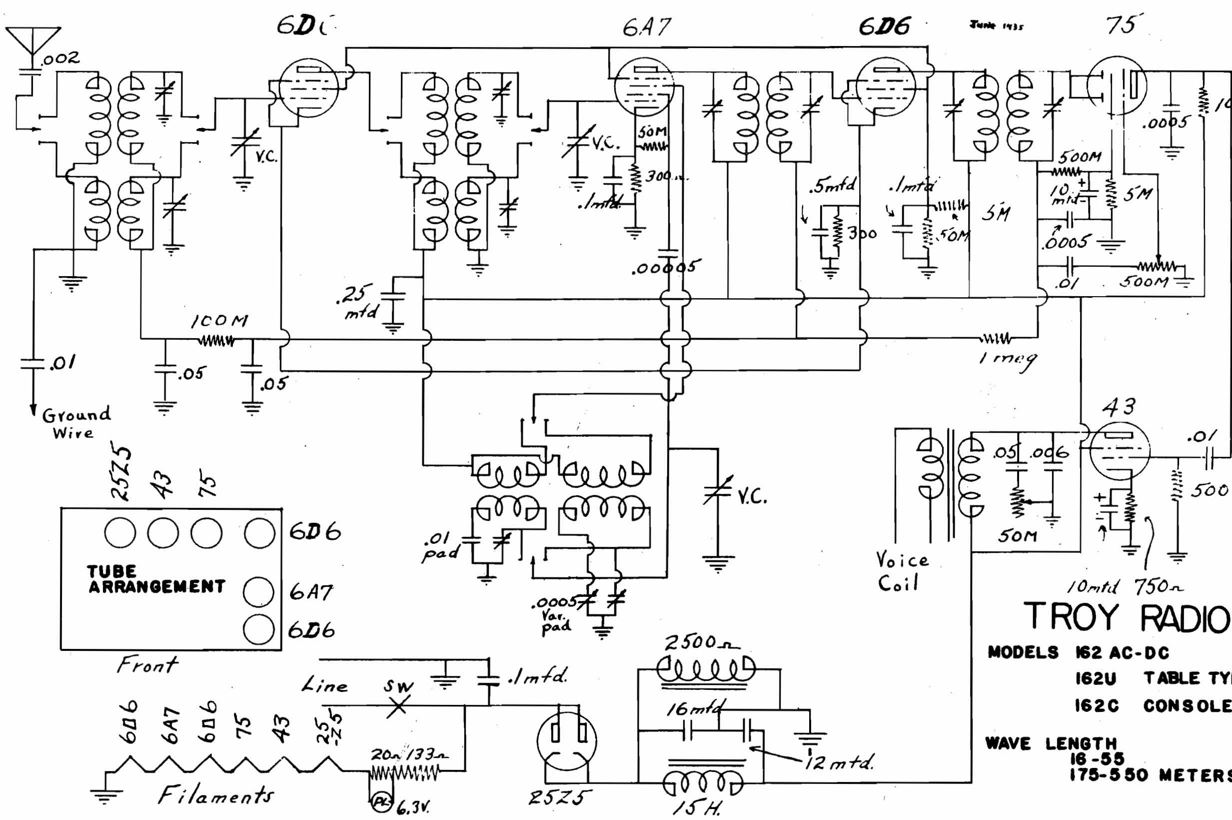
MODELS TR 86
AUTO RADIO
200-550 METERS

MODEL 151-5
MODELS 162C, 162U
Schematics, Socket

TROY RADIO MFG. CO.

MODEL 151-5 16-55 200-550 METERS





TROY RADIO

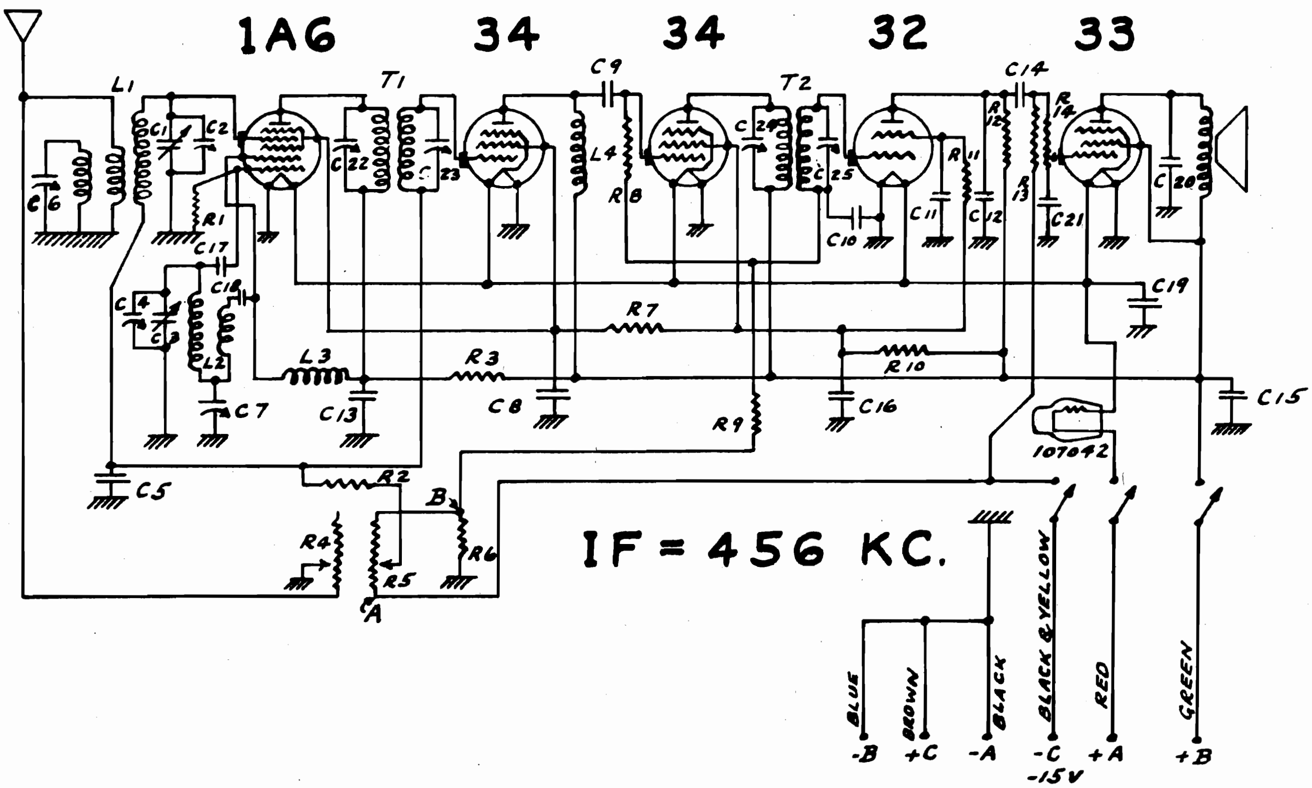
MODELS 162 AC-DC
162U TABLE TYPE
162C CONSOLE

WAVE LENGTH
16-55
175-550 METERS

MODELS 376BT,376F
376S
Schematic,Parts

UNITED AMERICAN BOSCH CORP.

SCHEMATIC WIRING DIAGRAM



SERVICE PARTS LIST

Battery Radio Receiver Model 376BT (Table Model)
Battery Radio Receiver Model 376S (Console Model)
Battery Radio Receiver Model 376F (Console Model)

Part No.	Dia. #	Description of Parts	Part No.	Dia. #	Description of Parts
		CONDENSERS			RESISTORS
	(C1)				
	(C2)	Variable condenser with	105278	R1	100,000 ohms - 1/4 W
106815	(C3)	trimmers	105278	R2	100,000 ohms - 1/4 W
	(C4)		105267	R3	1,000 ohms - 1/4 W
106386	C5	.05 mf - 200 V.		(R4)	10,000 var. vol.
106382	(C6	60-250 mmf	106829	(R5)	control
	(C7	200-525 mmf	105270	R6	2500 ohms - 1/4 W
106386	C8	.05 mf - 200 V.	105267	R7	1000 ohms - 1/4 W
106417	C9	.0001 mica	105278	R8	100,000 ohms - 1/4 W
106386	C10	.05 mf - 200 V.	105281	R9	1 meg. - 1/4 W
102497	C11	.25 mf - 200 V.	102875	R10	15,000 ohms - 1/2 W
106417	C12	.0001 mica	105281	R11	1 meg. - 1/4 W
106386	C13	.05 mf - 200 V.	105246	R12	1/2 meg. - 1/4 W
103659	C14	.005 mf - 350 V.	105281	R13	1 meg. - 1/4 W
107029	(C15	4 mfd. 250 V.	106823	R14	500,000 var. tone
Ed-2	(C16	2 mfd. 250 V.			control
101143	C17	.0001 mica			
106386	C18	.05 mf - 200 V.			
106720	C19	1 mfd - 200 V.			COILS
103659	C20	.005 mf - 350 V.			
107043	C21	.0005 mica	107040	L1	Antenna coil assembly
	(C22)		107033	L2	Osc. coil assembly
	(C23)	35-130 mmf- part of	107020	L3	Choke coil assembly
	(C24)	106835	107021	L4	Choke coil assembly
	(C25)		106835	T1-2	I.F. coil assembly

MODELS 376BT,376F
376S
Socket,Trimmers
Alignment,Voltage

UNITED AMERICAN BOSCH CORP.

Part No.	Description of Parts
	CABLES & CABLE ASSEMBLIES
107037	Cable assembly, brown & black-chassis to spkr. Model 376BT
107038	Cable assembly, yellow, green, red - chassis to speaker - Model 376BT
107039	Cable assembly, brown, black, blue - chassis to battery - Model 376BT
107045	Antenna cable assembly
104445	Ground cable assembly
107541	Cable assembly, brown, black, blue - Model 376S
107543	Cable assembly black and brown, Model 376S
107479	Cable lead 6" long
107546	Cable lead 9" long

General Description

The American-Bosch Model 376 is a five-tube battery operated superheterodyne receiver. Its circuit comprises a combined first detector oscillator, two stages of intermediate frequency amplifier, a second detector and a power pentode output amplifier.

The tuning range of this receiver extends from 540 to 1650 kilocycles.

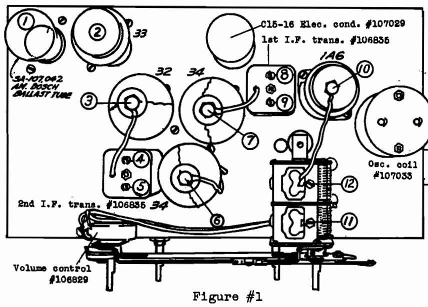


Figure #1

NOMENCLATURE

#1 Ballast tube (107042)
#2 Power output pentode
#3 Second detector
#4 I.F. trimmer
#5 I.F. trimmer
#6 2nd I.F. tube
#7 1st I.F. tube
#8 I.F. trimmer
#9 I.F. trimmer
#10 1st detector oscillator tube
#11 Oscillator trimmer condenser
#12 Antenna trimmer condenser
#13 Oscillator lag. condenser
#14 Wave trap trimmer (456 K.C.)

ALIGNMENT INSTRUCTIONS

To align the Model 376 chassis, it is essential to use a high grade modulated oscillator the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

The Model 376 uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of a speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4,000 ohms.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

ALIGNING THE I.F. (456 K.C.)

1. Connect in series with high side of test oscillator leads a blocking condenser of at least .25 mfd. to prevent short circuit of receiver batteries in subsequent aligning operations.

2. Set volume control on full.

3. Tone control should be in bass position.

4. Short circuit antenna and ground leads to prevent local stations from interfering with subsequent aligning operations.
5. Connect output meter across loud speaker terminals (see note above).

6. Set test oscillator to 456 K.C. and adjust its output to produce measurable reading on output meter when test oscillator between frame of chassis and the grid of 34 I.F. tube #6.

7. Adjust #4 and #5 to maximum output, reducing signal oscillator output as stage is brought into resonance.

8. Connect test oscillator to grid of 1A6 tube #10 and adjust #8 and #9 to maximum output.

ALIGNING WAVE TRAP (Direct Signal 456 K.C.)

An adjustable wave trap is provided in series with the antenna circuit to prevent interference due to direct transmission of telegraphic signals at the intermediate frequency (456 K.C.).

1. With test oscillator still set at 456 K.C., connect oscillator leads to the antenna and ground terminals through a .0002 mfd. antenna condenser.

2. Set dial scale to 540 K.C. and adjust test oscillator output to obtain full scale reading on output meter.

3. Adjust wave trap trimmer #14 until a null or minimum reading of output meter is obtained.

ALIGNING OSCILLATOR AND R.F.

1. Connect test oscillator to grid of 1A6 first detector tube #10 and set test oscillator to 1500 K.C.

2. Set dial scale to maximum mark beyond 540 K.C. calibration point when gang is entirely closed.

3. Set scale at 1500 K.C. and adjust #11 to maximum output.

4. Connect test oscillator to antenna through a .0002 mfd. condenser and with scale still set at 1500 K.C., adjust #11 and #12 to maximum output.

5. Set scale and test oscillator to 600 K.C. and adjust #13 simultaneously, change this adjustment and the station selector of chassis for maximum output.

6. With test oscillator and scale set at 1500 K.C., readjust #11 and #12, since previous operations may have altered oscillator trimmer setting.

7. Check sensitivity across scale.

SOCKET VOLTAGES

Tube	Stage	Filament	Plate	Screen	Bias
33	Output	6.2	135	140	15. ("A" to ground)
32	2nd Oscillator	6.2	135	12	25. ("B" to ground)
34	I.F. trimmer	6.2	140	70	2.5 ("B" to ground)
34	I.F. trimmer	6.2	140	70	2.5 ("B" to ground)
1A6	1st detector	6.2	140	70	2.5 ("B" to ground)
	Oscillator		145		Total "B" voltage - 140

Note: The above readings were taken with fresh batteries. Corresponding reductions are to be expected as battery voltage drops due to use. The bias circuit serves to discharge the "C" battery at the proper rate to maintain quality and extend useful "B" battery life. The bias readings are measured between points "A" or "B" and the chassis frame, since high circuit resistances would make accurate readings at the grid prong of the tubes difficult. All of the above readings were taken with a voltmeter of 1,000 ohms per volt. Plate and screen measurements were taken on the 250 volt scale and will vary with other ranges.

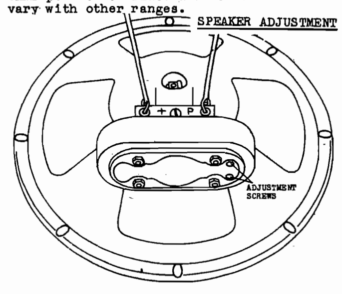


Figure #4

SPEAKER ADJUSTMENT

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).

2. Uncover the two holes shown in Fig. #4 by piercing the paper label.

3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

ADAPTATION OF VARIOUS TYPES OF "A" BATTERY SUPPLY

The receiver is supplied without batteries. Any one of the following three types of "A" supply may be used.

1. Dry Cell Pack: A ballast tube (#107042) is provided with the receiver to accommodate the voltage drop of the dry cell pack which varies from slightly over 3 volts for a fresh battery to less than 2 volts for a battery near the end of its useful life.

2. Storage Battery Operation: When using a single cell of a storage battery whose terminal voltage is 2 volts, it is important that the ballast tube be replaced by an accessory which serves to short circuit the ballast tube socket terminal. Such an accessory will be supplied as service part #108015. Greater satisfaction will result when using the new low discharge type of battery which has been specifically developed for radio receiver use.

3. Air Cell Operation: The air cell, unlike the dry cell pack, does not vary greatly in terminal voltage during its useful life, and while the ballast tube may be used, it does not allow the total life of the aid cell to be realized because its use results in low filament voltage.

A service accessory #108014 which consists of a low fixed resistance should be used to replace the ballast tube when using the air cell.

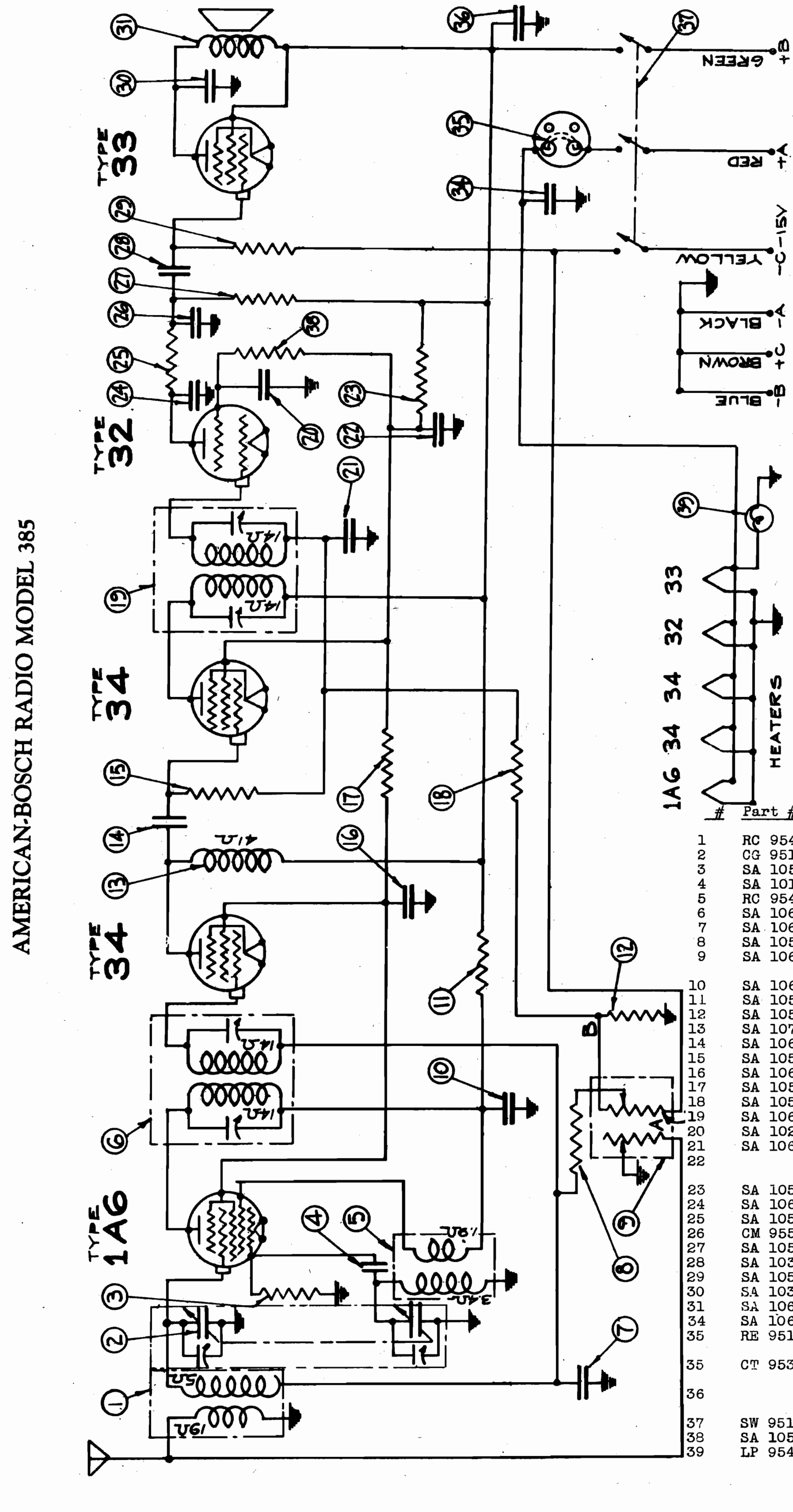
IMPORTANT

If the electrolytic condenser 107029 is of the polarized type (Ed. 1), it should be replaced by a non-polarized filter 107029 Ed. 2.

The first production lot of the Model 376 was equipped with an Ed. 1 filter. We have found that if the owner does not follow our instructions in making correct "B" battery connections serious damage may result to the receiver.

UNITED AMERICAN BOSCH CORP.

MODEL 385
Schematic, Voltage
Parts



SOCKET VOLTAGES

TUBE	STAGE	FIL.	PLATE	SCREEN	BIAS
33	OUTPUT	6.2	135	140	15. 'A' TO GROUND
32	2ND DET.	6.2	135	12	25. 'B' TO GROUND
34	INT. FREQ.	6.2	140	70	2.5 'B' TO GROUND
34	INT. FREQ.	6.2	140	70	2.5 'B' TO GROUND
1AG	1ST DECTECT.	6.2	140	70	2.5 'B' TO GROUND
	OSCILLATOR		145	TOTAL 'B' VOLTAGE - 140	

INT. FREQ. 463KC.

#	Part #	Description of Parts
1	RC 9546	Ant. coil assembly
2	CG 9515	Variable condenser assy.
3	SA 105278	100,000 ohms, ¼ W. res.
4	SA 101143	.0001 mfd., mica cond.
5	RC 9547	Oscillator coil assembly
6	SA 106835	I.F. Coil Assembly
7	SA 106386	.05 mfd., 200 V. cond.
8	SA 105278	100,000 ohms, ¼ W. res.
9	SA 106829	Dual volume control (10,000 ohms per unit)
10	SA 106386	.05 mfd., 200 V. cond.
11	SA 105267	1000 ohms, ¼ W. res.
12	SA 105270	2500 ohms, ¼ W. res.
13	SA 107021	Choke coil assembly
14	SA 106417	.0001 mfd., mica cond.
15	SA 105278	100,000 ohms ¼ W. res.
16	SA 106386	.05 mfd., 200 V. cond.
17	SA 105267	1000 ohms, ¼ W. res.
18	SA 105281	1 meg., ¼ W. res.
19	SA 106835	I.F. coil assembly
20	SA 102497	.25 mfd., 200 V. cond.
21	SA 106386	.05 mfd., 200 V. cond.
22		2 mfd., 200 V. cond. (part of CE 959)
23	SA 105254	15,000 ohms, ¼ W. res.
24	SA 106417	.0001 mfd., mica cond.
25	SA 105276	50,000 ohms, ¼ W. res.
26	CM 955	.000025 mfd., mica cond.
27	SA 105246	½ meg., ¼ W. resistor
28	SA 103659	.005 mfd., 400 V. cond.
29	SA 105281	1 meg., ¼ W. resistor
30	SA 103659	.005 mfd., 400 V. cond.
31	SA 106918	Speaker assembly
34	SA 106720	1 mfd., 200 V. condenser
35	RE 9515	Adaptor socket resistance lead
35	CT 953	Adaptor socket short circuit link
36		4 mfd., 200 V. cond. (part of CE 959)
37	SW 9513	Switch assembly
38	SA 105281	1 meg., ¼ W. resistor
39	LP 954	Dial lamp

MODEL 385
Socket, Trimmers
Alignment

UNITED AMERICAN BOSCH CORP.

LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 ohms.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #3 and #4, and should be carefully studied before the actual work is started.

I.F. ADJUSTMENT (463 K.C.)

1. Set volume control on full.

2. Short circuit the antenna and ground leads to prevent local stations from interfering with subsequent aligning operations.

3. Connect output meter across the loud speaker terminals (see note above).

4. Set test oscillator to 463 K.C. and apply test signal to grid of 34 second I.F. tube thru a .25 mfd. blocking condenser and adjust the two trimmers on top of I.F. coil #19 to maximum output reducing output of test oscillator as required.

5. Apply test signal to grid of 1A6 detector-oscillator tube and adjust the two trimmers on top of I.F. coil #6 to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set test oscillator and dial scale to 1500 K.C.

2. With test signal still applied to the grid of 1A6 tube, adjust trimmer "A" to maximum output.

3. Apply test signal to antenna lead of chassis thru a .0002 mfd. condenser and with dial scale still set at 1500 K.C. adjust trimmer "B" to maximum output.

4. Check sensitivity and calibration at several points of dial scale.

SPEAKER ADJUSTMENT

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

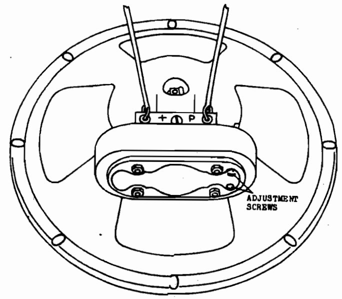


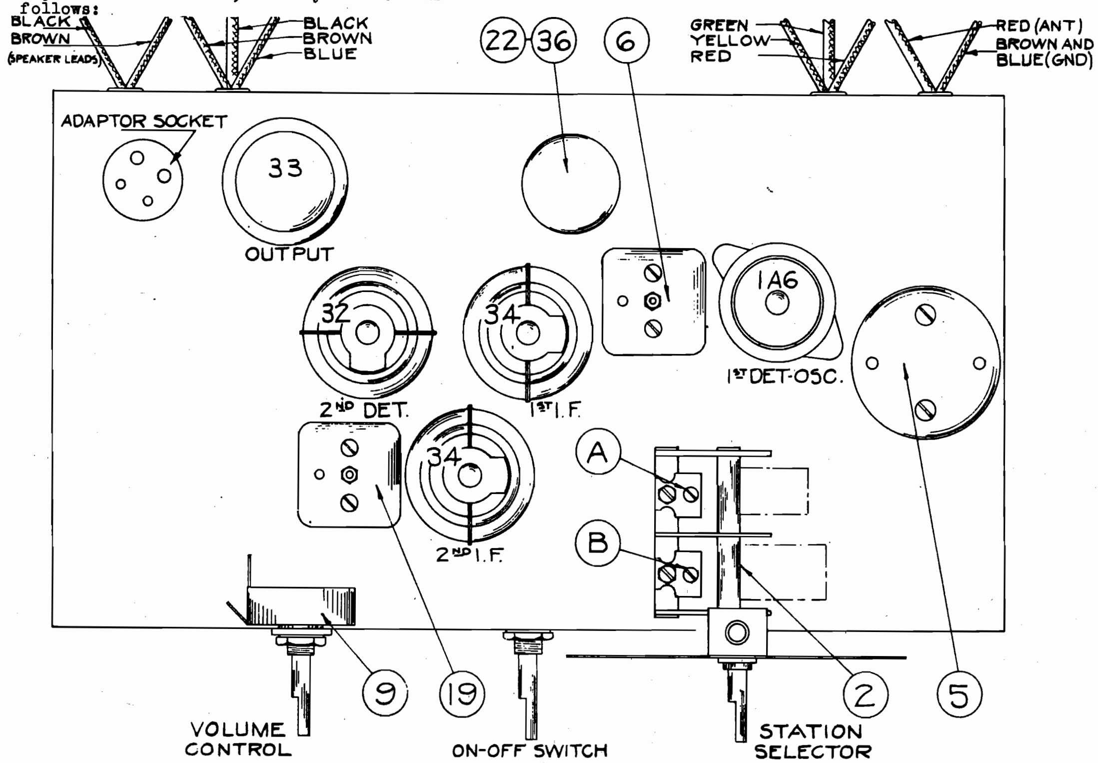
Figure No. 2

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).

2. Uncover the two holes shown in Fig. #2 by piercing the paper label.

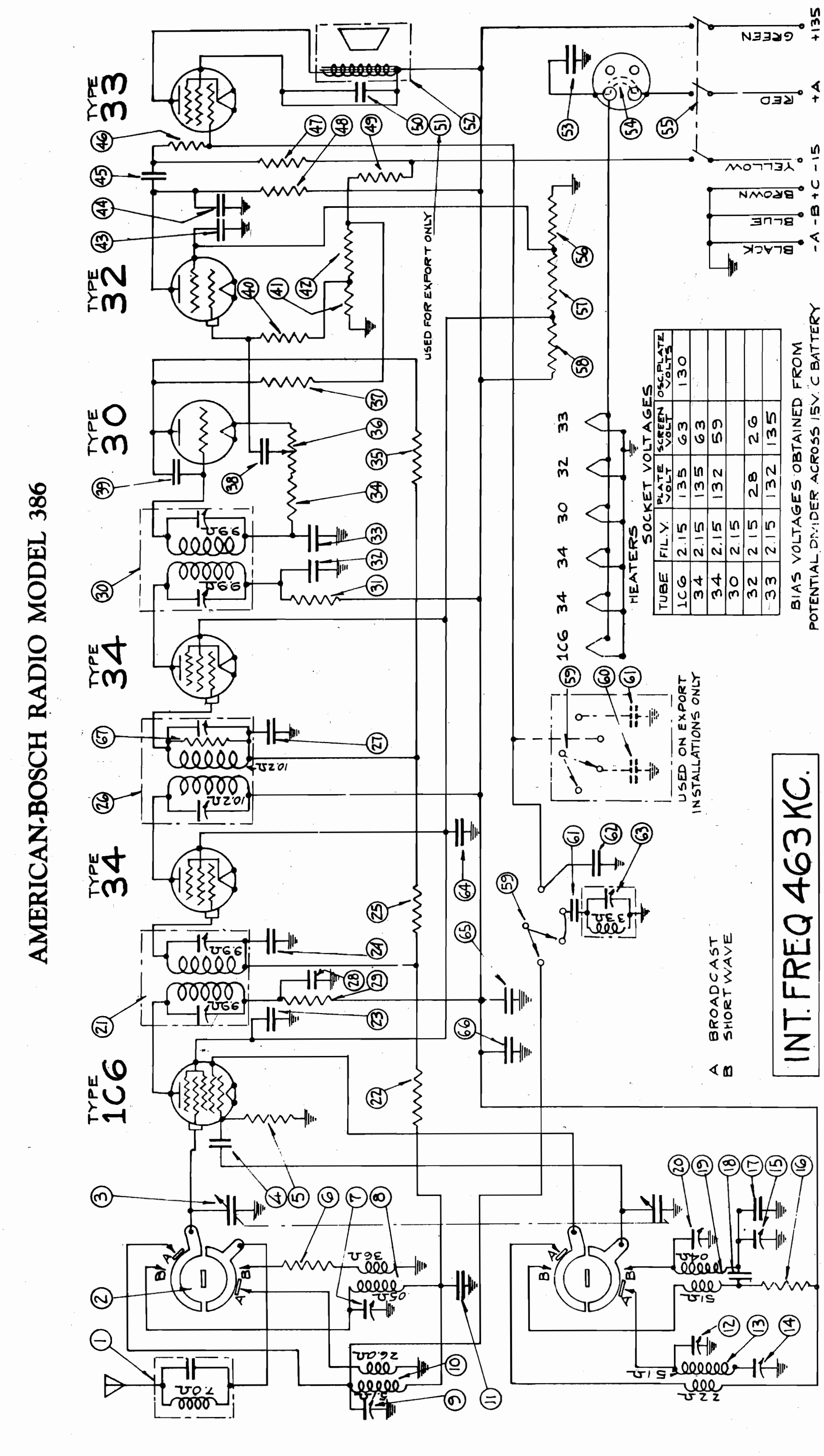
3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

Type and Number of Tubes --1 #1A6, 2 #34, 1 #32, 1 #33 - Total 5
Total "A" Battery Current -------------------------- .56 Amperes
Maximum "B" Battery Current-------------------------- 29. M. A.
Tuning Range -------------------------------- 540 to 1620 K. C.
Maximum Undistorted Output -------------------------- .7 Watts
Maximum Output -------------------------------------- .9 Watts
Line-Up Frequencies ---------- 463 K.C., 600 K.C., and 1500 K.C.



MODEL 386
Schematic
Voltage

UNITED AMERICAN BOSCH CORP.



SOCKET VOLTAGES

TUBE	FIL. V.	PLATE VOLT	SCREEN VOLT	OSC. PLATE VOLTS
1C6	2.15	135	63	130
34	2.15	135	63	
34	2.15	132	59	
30	2.15			
32	2.15	28	26	
33	2.15	132	135	

MODEL 386
Socket, Trimmers
Alignment

UNITED AMERICAN BOSCH CORP.

ADJUSTMENT OF I.F. (463 K.C.)

1. Set volume control on full.
2. Set tone control (center knob) at right hand or bass position.
3. Connect output meter across speaker terminals through a .5 mfd. series condenser.
4. Connect in series with high side of test oscillator leads a .25 mfd. blocking condenser.
5. Set test oscillator at 463 K.C. and adjust its output to produce measureable reading on output meter when test oscillator leads are connected between frame of chassis and grid of 34 second I.F. tube.
6. Adjust trimmers on I.F. coil #30 to maximum output.
7. Connect test oscillator to grid of 34 first I.F. tube and adjust trimmers on I.F. coil #26 to maximum output.
8. Connect test oscillator to grid of 1C6 first detector and adjust trimmers on first I.F. coil #21 to maximum output.
9. With test oscillator still connected to grid of 1C6, readjust trimmers on coils #26 and #30 for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. With test oscillator on grid of 1C6 tube, set its output to 1500 K.C.
2. With gang condenser in maximum position, adjust dial pointer until either end is directly over the long horizontal lines on the dial scale.
3. Now set dial pointer to 1500 K.C. and adjust #12 (Fig. #4) to maximum output.
4. Connect test oscillator to antenna through a .0002 mfd. condenser and with dial pointer still set at 1500 K.C., adjust #12 and #9 to maximum output.
5. Set dial pointer and test oscillator to 550 K.C. and adjust #14 to maximum output. Reset dial pointer in either direction from the 550 K.C. mark and readjust #14 until greatest sensitivity is obtained.
6. Return to 1500 K.C. setting and readjust #9 and #12 for maximum output. Check sensitivity and calibration across scale.

ADJUSTMENT OF POLICE BAND

1. Set combination tone control-police switch (center knob) on first or left hand position.
2. Leave wave change switch in standard broadcast position.
3. Set test oscillator at 2400 K.C. and tune in signal at approximately 1500 K.C. on dial scale.
4. Adjust trimmer on coil #63 to maximum output.

ADJUSTMENT OF SHORT-WAVE BAND

1. Set tone control to right-hand or bass position and set wave change switch (lower right-hand knob) to left hand position.
2. Set test oscillator and dial pointer to 16 M.C.
3. Connect test oscillator to antenna through a .0002 mfd. condenser and a 400 ohm resistor in series (this condenser-resistor combination is the approximate equivalent of a short-wave antenna).
4. Adjust trimmer #20 until signal is tuned in.
5. Adjust trimmer #7 and station selector alternately until maximum sensitivity is obtained. (This is necessary as the adjustment of #7 affects the oscillator frequency slightly.)
6. Set test oscillator and dial pointer to 6 M.C. and adjust #15 to maximum output.
7. Check sensitivity across scale.

LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 ohms.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #3 and #4, and should be carefully studied before the actual work is started.

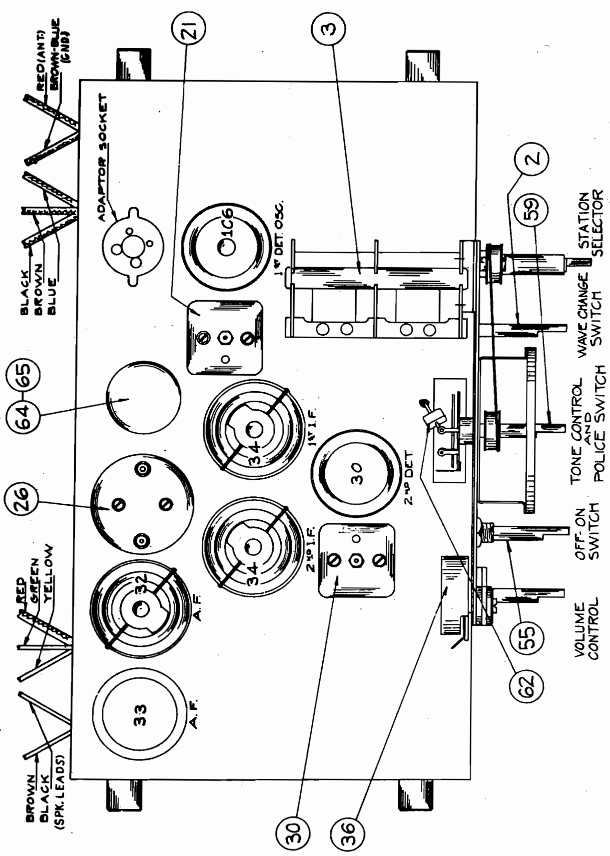
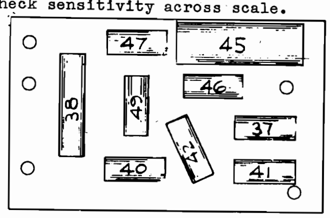
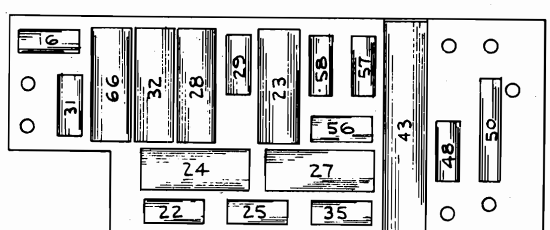


Figure No. 3



71 INSULATION PLATE 1S-9548



70 INSULATION PLATE 1S-9549

MODEL 386
Speaker Data
Trimmers,Parts

UNITED AMERICAN BOSCH CORP.

Dia. #	Part #	Description of Parts
1	RC 9544	Antenna trap coil assy.
2	SW 9510	Wave switch
3	CG 956	Variable condenser
4	SA 101143	100 mmf. mica condenser
5	SA 105276	50,000 ohms 1/4 W. resistor
6	SA 105255	50 ohms 1/4 W. resistor
7	SA 108080	1.5-10 mmf. condenser
8	RC 9542	S.W. antenna coil
9	CS 9510	1-6 mmf. condenser
10	RC 9540	B.C. antenna coil
11	SA 106386	.05 mfd. 200 V. condenser
12	SA 107503	3-25 mmf. condenser
13	RC 9541	B.C. oscillator coil
14)	SA 108001	300-600 mmf. condenser
15)		750-1500 mmf. condenser
16	SA 105267	1,000 ohms 1/4 W. resistor
17	SA 103775	1,000 mmf. mica condenser
18	SA 106386	.05 mfd. 200 V. condenser
19	RC 9543	S.W. oscillator coil
20	SA 108080	1.5 - 10 mmf. condenser
21	IC 9514	1st I.F. transformer
22	SA 105276	100,000 ohms 1/4 W.resistor
23	SA 106386	.05 mfd. 200 V. condenser
24	SA 106386	.05 mfd. 200 V. condenser
25	SA 105278	100,000 ohms 1/4 W.resistor
26	IC 9515	2nd I. F. transformer
27	SA 106386	.05 mfd. 200 V. condenser
28	SA 106386	.05 mfd. 200 V. condenser
29	SA 105283	4,000 ohms 1/4 W. resistor
30	IC 9516	Diode transformer
31	SA 105267	1,000 ohms 1/4 W. resistor
32	SA 106386	.05 mfd. 200 V. condenser
33	SA 106417	100 mmf. mica condenser
34	SA 105276	50,000 ohms 1/4 W. resistor
35	SA 105246	0.5 meg. 1/4 W. resistor
36	VR 954	Volume control (500,000 ohms)
37	SA 105281	1 meg. 1/4 W. resistor
38	SA 103659	.005 mmf. 350 V. condenser
39	SA 106417	100 mmf. mica condenser
40	SA 105281	1 meg. 1/4 W. resistor
41	SA 105264	500 ohms 1/4 W. resistor
42	SA 105245	2,000 ohms 1/4 W. resistor
43	SA 102497	.25 mfd. 200 V. condenser
44	SA 106417	100 mmf. mica condenser
45	SA 106386	.05 mfd. 200 V. condenser
46	SA 105246	0.5 meg. 1/4 W. resistor
47	SA 105246	0.5 meg. 1/4 W. resistor
48	SA 105279	250,000 ohms 1/4 W.resistor
49	SA 105249	5,000 ohms 1/4 W. resistor
50	CW 952	.005 mfd. 350 V. condenser
51	SA 105743	.003 mfd. 500 V. condenser
52	SA 106918	Speaker
53	SA 103828	2 mfd. 200 V. condenser
54		Adapter socket jumper
55	SA 106824	Battery switch
56	SA 105275	25,000 ohms 1/4 W. resistor
57	SA 105284	30,000 ohms 1/4 W. resistor
58	SA 105254	15,000 ohms 1/4 W. resistor
59	SW 956	Tone control
60	CM 956	250 mmf. mica condenser
61	CM 954	500 mmf. mica condenser
62	SA 106417	100 mmf. mica condenser
53	RC 9562	Police coil assembly
64)	CE 959	2 mfd. 200 V. condenser
65)		4 mfd. 200 V. condenser
66	SA 106386	.05 mfd. 200 V. condenser
67	RE 9514	350,000 ohms 1/8 W.resistor

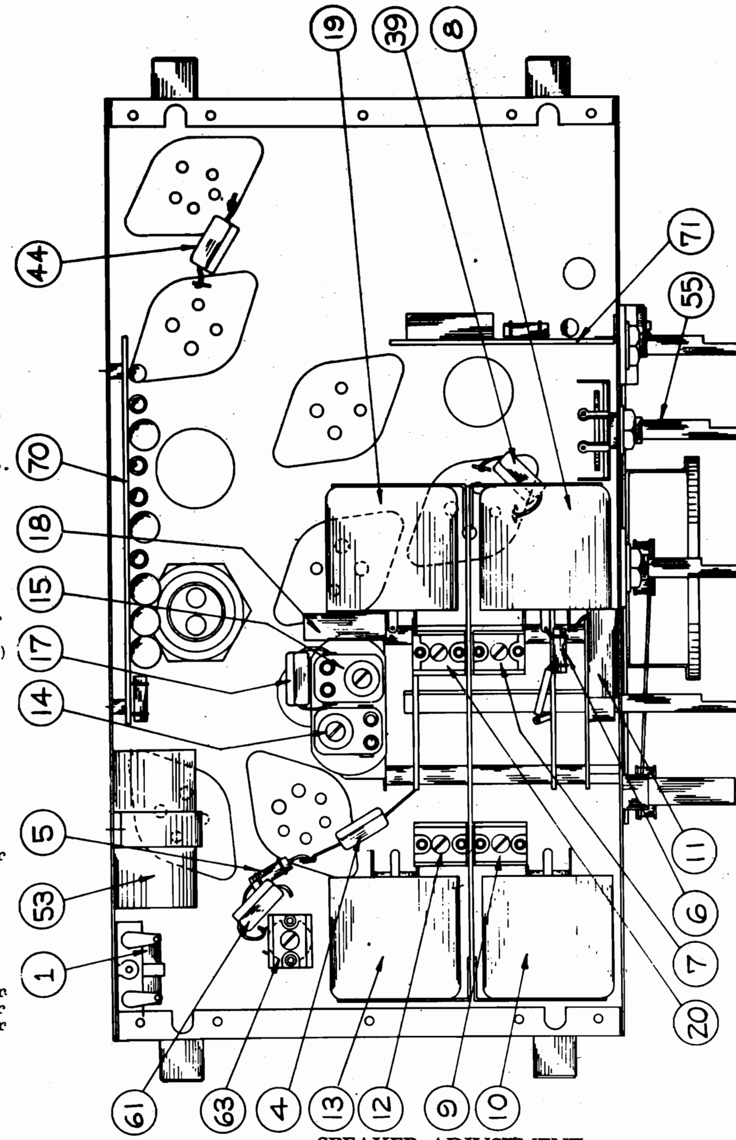


Figure No. 4

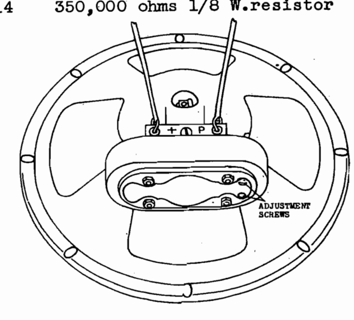


Figure No. 2

SPEAKER ADJUSTMENT

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).

2. Uncover the two holes shown in Fig. #2 by piercing the paper label.

3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .... 1 #1C6, 2 #34, 1 #30, 1 #32, 1#33 - Total 6
Total "A" Battery Current .... 620 M.A.
Maximum "B" Battery Current .... 29 M.A.
Tuning Ranges .... 530 to 1720 K.C., 2300 to 2600 K.C., 5800 to 19000 K.C.
Maximum Undistorted Output .... .7 Watts
Maximum Output .... .9 Watts
Line-Up Frequencies .. I.F.463 K.C., 550 K.C., 1500 K.C., 2400 K.C., 6000 K.C., 16000 K.C.

MODEL 04
Schematic
Voltage,Parts

UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH RADIO MODEL 04

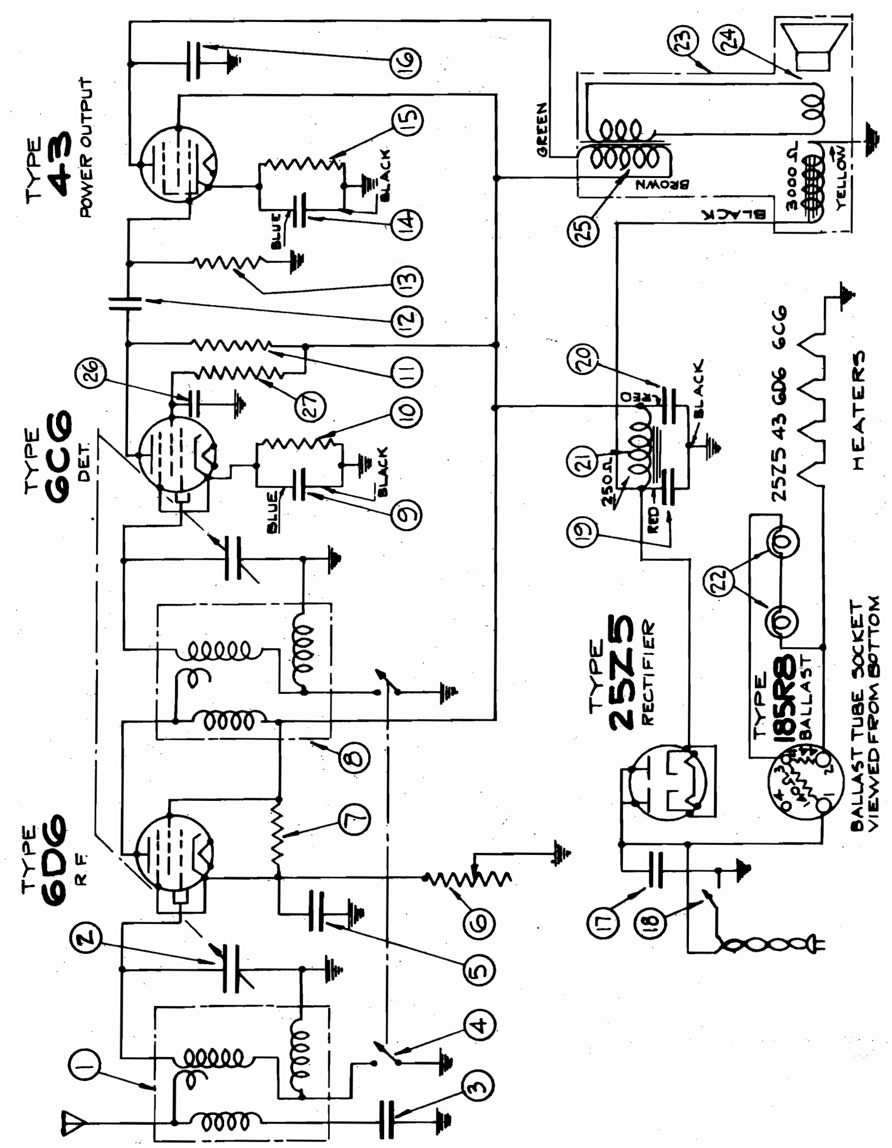
Four-Tube, Two Band, AC-DC, T. R. F. Receiver

1	ANT. COIL ASSY	RC 95112
2	VARI. COND (2 GANG)	CG 9533
3	COND. .01 400V	SA-106277
4	WAVE CHANGE SW	SW 9532
5	COND. .1 200V	CW 951A
6	VOL. CONT.	VR 9515
7	RES 50,000Ω ½W	SA-100512
8	R F COIL ASSY.	RC 95113
9	COND (ELECT) 5MF 35P.V.	PT OF CE9520
10	RES. 25000Ω ¼W	SA-105275
11	RES. 500,000Ω ¼W	SA-105246
12	COND. .01 400V	SA-106277
13	RES. 500,000Ω ¼W	SA-105246
14	COND (ELECT 5MF 35P.V.	PT OF CE9520
15	RES 600Ω 1W.	SA-105004
16	COND .01 400V	SA-106277
17	COND. .1 200V	CW 951A
18	SWITCH (ON-OFF)	PT OF VR 9515
19	COND (ELECT) 12MF 200P.V.	PT. OF CE 9520
20	COND (ELECT) 12MF 200P.V.	PT. OF CE 9520
21	CHOKE 250Ω	CL 9541
22	LAMPS (2) 6-8V	SA-95572
23	SPEAKER	SK 9516
24	DIAPH & COIL ASSY	PT. OF SK9516
25	OUTPUT TRANS.	PT OF SK9516
26	COND. .1MF-200V.	CW951A
27	RES. 500,000Ω ¼W	SA 105246

SOCKET VOLTAGES

TUBE	STAGE	SCREEN	PLATE	CATH □	FIL. △
25Z5	RECTIFIER		117		62
43	POWER OUTPUT	110	100	14	37
6C6	DET.	14	50*	1.0	6.0
6D6	R.F	110	110	6.0	12

ALL VOLTAGES TAKEN TO BASE PLATE.
LINE VOLTAGE = 115V-AC.
* TAKEN WITH 600,000 OHM VOLTMETER.
□ TAKE WITH VOLUME CONTROL FULL ON.
△ FILAMENT VOLTAGES READ TO BASE PLATE.



MODEL 402
Ed.1,2,3
Schematic, Socket
Trimmers

UNITED AMERICAN BOSCH CORP.

SERVICE INSTRUCTIONS

for

AMERICAN-BOSCH MODEL 402 RECEIVER

SCHEMATIC WIRING DIAGRAM

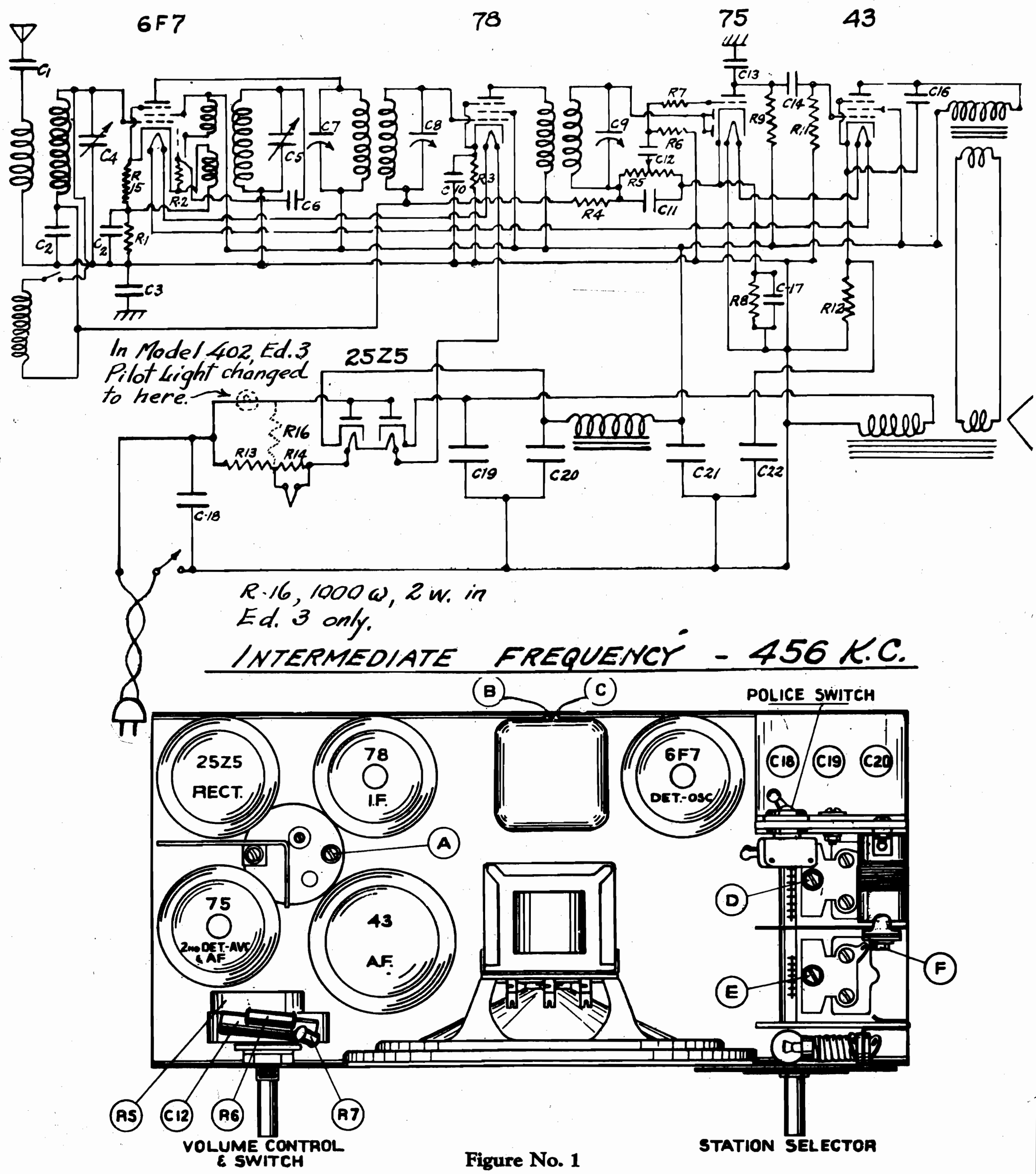


Figure No. 1

MODEL 402
Ed.1,2,3
Alignment, Voltage
Parts, Data

UNITED AMERICAN BOSCH CORP.

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #6F7, 1 #78, 1 #75, 1 #43, 1 #25Z5 - Total 5
Power Supply Characteristics	105 to 125 volt, 60 cycle A.C. or D.C.
Power Consumption	45 Watts
Tuning Range	550 to 1750 K.C. and Ed.2 and Ed.3 2400 to 2500 K.C.
Maximum Undistorted Output	1 Watt
Line-Up Frequencies	456 K.C., 1500 K.C., 2400 K.C.

GENERAL DESCRIPTION

The Model 402 is a five tube, A.C. - D.C., superheterodyne receiver whose circuits consist of a combined first detector-oscillator, a stage of intermediate frequency amplification, a combined second detector - automatic volume control and audio amplifier, a power output stage and a rectifier.

Model 402 Ed. 2 varies from Model 402Ed. 1 in that it is equipped with a police band.

Model 402 Ed.3 varies from Model 402 Ed. 2 in that the dial light is connected in the low side of the plate circuit instead of the filiment circuit. This will prevent high voltage on the dial light when the receiver is first turned on, for the dial light will not light until the tubes heat up and start to operate. Should any short occur in the plate circuit the dial light will act as a fuse and burn out thus protecting the rectifier tube.

The Model 402 Ed. 1 is designed to operate on frequencies from 550 to 1750 K.C.

The Models 402 Ed. 2 & 3 are designed to operate on the frequencies from 550 to 1750 K.C. and from 2400 to 2500 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the Model 402 chassis, it is essential to use a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

I. F. ADJUSTMENT 456 K.C.

Note: The signal generator or alignment oscillator should have no external ground connection of the low potential side of its output either to ground or to the power line and the low potential output terminal may be connected to the frame of the receiver. An external ground of the receiver frame will result in a loud hum making alignment impossible.

1. Connect volume indicator across moving coil of speaker (speaker impedance is 4.5 ohms).
2. Set volume control at maximum.
3. Set the test oscillator to 456 K.C. and apply test signal to the grid of the 78 I.F. tube.
4. Adjust second I.F. alignment condenser "A" to maximum output.
5. Apply the test signal to the grid of the 6F7 first detector-oscillator tube.
6. Adjust alignment condensers "B" and "C" to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set dial scale to maximum mark beyond the 550 K.C. point with the gang condenser entirely closed.
2. Set the test oscillator and dial scale to 1500 K.C. and apply test signal to the antenna of the receiver.
3. Adjust the oscillator and antenna alignment condensers "D" and "E" to maximum output.
4. Check sensitivity over scale.

POLICE BAND ADJUSTMENT
On Model 402 Ed. 2 and Ed. 3 only

1. Set the test oscillator to 2400 K.C. and turn the switch of receiver to police band.
2. Tune in signal with receiver. (About 1500 K.C.)
3. Adjust alignment condenser "F" for maximum output.

VOLTAGE READINGS

Note: Since no circuits are directly connected to the metal chassis as in the usual A.C. radio sets, it is necessary to measure voltages to the negative side of the circuit designated as "A" on the wiring diagram. A high resistance voltmeter must be used or readings will be inaccurate.

The following voltage readings were taken with the receiver supplied by 115 volts 60 cycle alternating current. Voltage readings will be slightly lower when D.C. is used and will vary with the type of meter used.

I. - A.C. MEASUREMENT

Stage	Tube	Filament	Plate	Screen	Cathode
1st Detector	6F7	6.0	115	115	12
Oscillator			115		
I. F.	78	6.0	115	115	2.8
2nd Detector Amplifier	75	5.9	30	-	0.7
Power	43	22	115	115	17
Rectifier	25Z5	25	125	-	-

Line Voltage	115	Dynamic Field	108 Volts
Power in Watts	47	Filter Choke Drop	8.8 Volts
Dial Lamp Volts	6.0		
Resistor Strip Volts	47		

II. - D.C. MEASUREMENT

Stage	Tube	Filament	Plate	Screen	Cathode
1st Detector	6F7	6.2	102	102	8.7
Oscillator			102		
I. F.	78	5.9	102	102	2.5
2nd Detector Amplifier	75	5.8	27	-	0.6
Power	43	24	102	102	13
Rectifier	25Z5	27	110	-	-

Line Volts	115	Resistance Strip Volts	47
Dial Lamp Volts	6	Dynamic Field Volts	115

PARTS LIST MODEL 402

R1	2500 - 1/4 watt	105270
R2	100,000 - 1/4 watt	105278
R3	300 - 1/4 watt	105260
R4	500,000 - 1/4 watt	105246
R5	500,000- variable	105308
R6	1 meg. 1/4 watt	105281
R7	100,000 - 1/4 watt	105278
R8	10,000 - 1/4 watt	105272
R9	500,000 - 1/4 watt	105246
R11	500,000 - 1/4 watt	105246
R12	600 - 1/2 watt	101211
R13	130)	
R14	28)	105319
R15	4,000 - 1/4 watt	105283
C1	.005 - 350 V	103659
C2	.05 - dual	105327
C3	.25 - 200 V	102497
C4	Two gang condenser	105728
C5	with trimmers	
C6	.0001 mica	101143
C7)		
C8)	Mica I.F. trimmers	105721
C9	Mica I.F. trimmers	105318
C10	.05 - 200 V	102493
C11	.0001 mica	101143
C12	.005 - 350 V	103659
C13	.0001 mica	101143
C14	.005 - 350 V	103659
C16	.01 - 500 V	103695
C17	.25 - 200 V	102497
C18	.01 - 500 V	103695
C19	4 M.F. 150 V)	
C20	12 M.F. 150 V)	
C21	8 M.F. 150 V)	105722
C22	5 M.F. 25 V)	

COILS AND TRANSFORMERS

SA 105725	Antenna coil assembly
SA 105318	2nd I.F. coil assembly
SA 105721	I.F. detector and oscillator coil assembly
SA 105724	choke coil assembly
SA 107952	Speaker output transformer
SA 107954	Speaker field coil

MAIN ASSEMBLIES

SA 105729	Chassis assembly
RK 107474	Cabinet
SA 105726	Speaker

MODEL 402 Ed. 2

Service parts for Model 402 Ed.2 are the same as for Model 402 except for the following parts:

MAIN ASSEMBLY

SA 108002 Chassis assembly

MISCELLANEOUS

SA 108049	Dial scale assembly
SA 107972	Switch for police band
SA 107963	Coil for police band

MODEL 402 Ed. 3

Service parts for Model 402 Ed.3 are the same as for Model 402 except for the following parts:

Dia. #	Part #	Description
R 16	RE 956	1000 ohm 2 W. resistor
C 19)		4 mfd. 150 V. electr. cond.
C 20)	CE 957	12 mfd. 150 V. electr. cond.
C 21)		8 mfd. 150 V. electr. cond.
C 22	CE 958	5 mfd. 25 V. electr. cond.

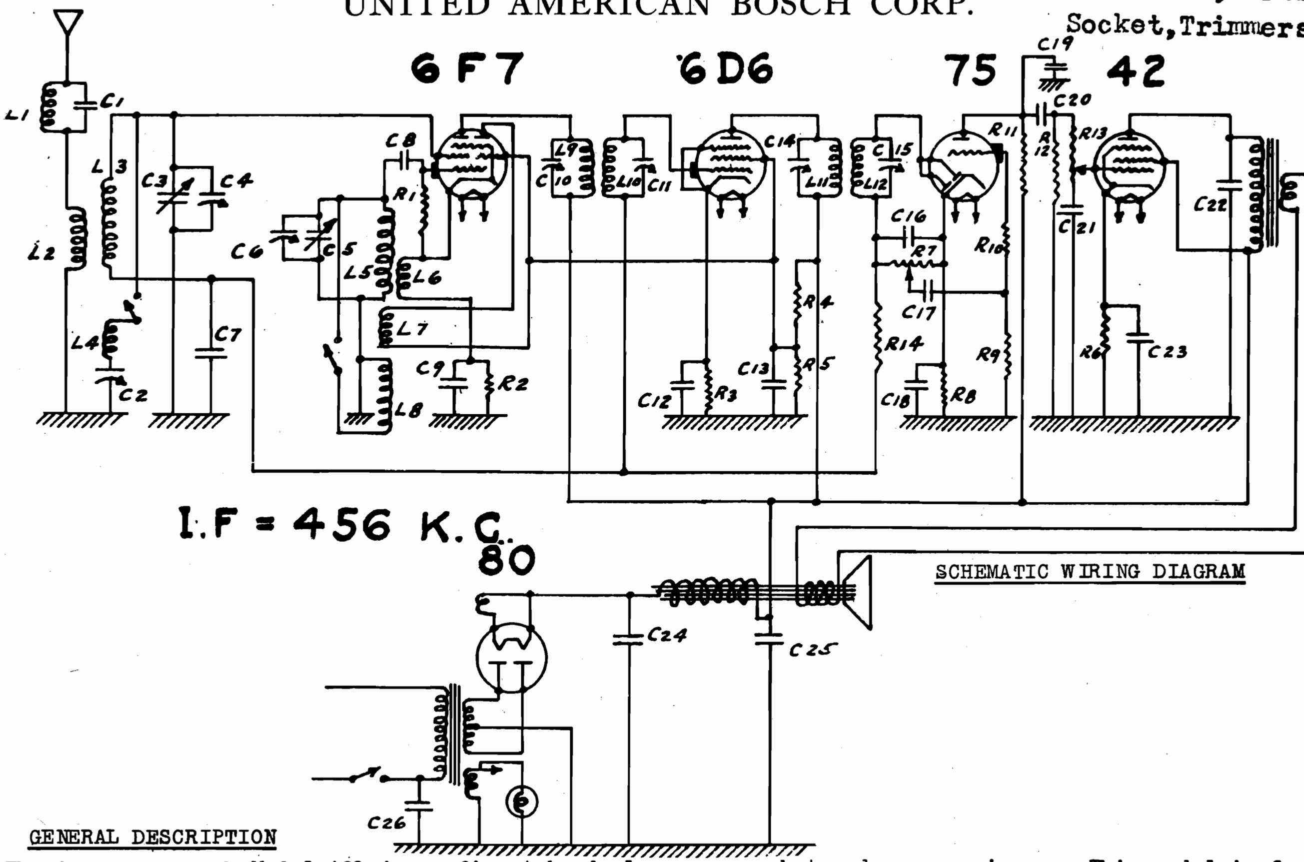
MAIN ASSEMBLY

CH 9522 Chassis assembly

MISCELLANEOUS

SA 108049	Dial scale assembly
SA 95572	Dial lamp
SA 107972	Switch for police band
SA 107963	Coil for police band

UNITED AMERICAN BOSCH CORP.



GENERAL DESCRIPTION

The American-Bosch Model 420 is a five-tube dual wave superheterodyne receiver. This model is for 110 volt 60 cycle operation and the Model 421 is for 110 volt 25 cycle operation.

The tuning range of this receiver is from 540 to 1,600 kilocycles as indicated on the lower portion of the dial scale, and from 1600 to 3600 kilocycles as indicated on the upper portion of the scale.

ELECTRICAL VALUES

R1	100,000 - 1/4 W	105278
R2	3,000 - 1/4 W	105271
R3	500 - 1/4 W	105264
R4	12,000)	
R5	13,000)	107291
R6	600)	
R7	500,000 variable ...	107253
R8	2,000 - 1/4 W	105245
R9	1 meg. 1/4 W	105281
R10	100,000 - 1/4 W	105278
R11	100,000 - 1/4 W	105278
R12	1/4 meg - 1/4 W	105279
R13	1/4 meg - tone cont.	107251
R14	1/2 meg - 1/4 W	105246
C1	.0005 mf. mica- part of	107434
C2	295-525 mmf	107289

C3	Variable gang)	
C4	condenser)	107445
C5	with)	
C6	trimmers)	
C7	.05 mf - 200 V	106386
C8	.0001 mf mica	101143
C9	.05 mf 200 V	106386
C10	Part of	107415
C11	Part of	107415
C12	.05 mf 200 V	106386
C13	.05 mf 200 V	106386
C14	Part of	107416
C15	Part of	107416
C16	.0001 mf. mica	106417
C17	.005 mf 350 V	103659
C18	.5 mf 200 V	102499
C19	.002 mf. 500 V	103852
C20	.005 mf. 350 V	103659

C21	.001 mf 500 V	106403
C22	.01 mf 350 V	102500
C23	10 mfd. 25 V)	
C24	8 mfd. 475 V)	107288
C25	8 mfd. 450 V)	
C26	.01 mf 500 V	107615
L1	Wave trap	107434
L2	Antenna)	
L3	Coil)	107414
L4	assembly)	
L5	Oscillator)	
L6	coil)	107413
L7	assembly)	
L8	)	
L9	1st I. F.)	107415
L10	assembly)	
L11	2nd I.F.)	107416
L12	assembly)	

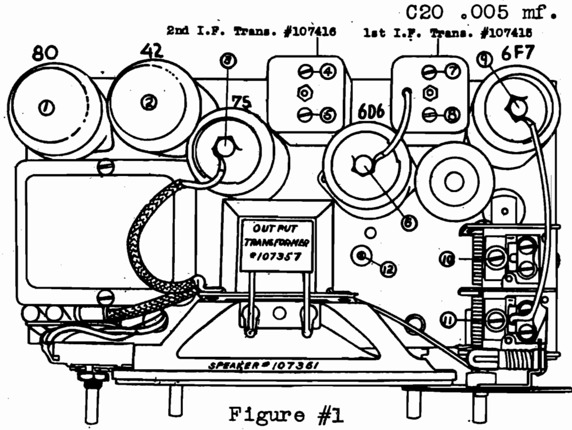


Figure #1

NOMENCLATURE

#1 Rectifier tube
#2 Power Pentode output tube
#3 Second det., A.V.C. and A.F. tube
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. tube
#7 I.F. trimmer condenser
#8 I.F. trimmer condenser
#9 Detector oscillator tube
#10 Oscillator trimmer condenser
#11 Antenna trimmer condenser
#12 Police Band Lag. condenser

MODELS 420,421
Trimmers,Voltage
Alignment,Parts

UNITED AMERICAN BOSCH CORP.

ALIGNING

To align the 420 chassis, it is essential to use a high grade modulated oscillator and sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

ALIGNING THE I. F. (456 KC)

1. Set volume control on full.
2. Tone control should be on bass position.
3. Short circuit antenna and ground leads to prevent local stations from interfering with subsequent alignment operations.
4. Connect output meter across voice coil of loud speaker (speaker impedence is 3.5 ohms).
5. Set test oscillator to 456 KC and adjust its output to produce measurable reading on output meter when test oscillator is connected between frame of the chassis and the grid of 6D6 I.F. tube #6.
6. Adjust #4 and #5 to maximum output, reducing signal oscillator output as stage is brought into resonance.
7. Connect test oscillator to grid of 6F7 (#9) and adjust #7 and #8 to maximum output.

ALIGNING B.C. OSC. AND R.F.

1. Set wave change switch to broadcast position.
2. Connect test oscillator to grid of first detector tube 6F7 (#9) and adjust test oscillator to 1500 K. C.
3. Set dial scale to maximum mark beyond 540 KC calibration point when gang is entirely closed.
4. Set scale at 1500 KC and adjust #10 to maximum output.
5. Connect test oscillator to antenna through .0002 mfd. condenser and with scale still set at 1500 KC adjust condensers #10 and 11 to maximum output.
6. Check sensitivity across band.

ALIGNING S. W. OSCILLATOR

1. Set wave change switch to short wave position.
2. Set test oscillator to 1700 KC and adjust #12 and tuning control to a "max-max" as follows:

   Tune receiver with left hand by means of tuning knob and adjust #12 in either direction and then without changing it, tune the receiver through a maximum, noting the value of output meter reading. Change #12 further in same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of #12, continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #12 are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few moments.

3. Check sensitivity across band.

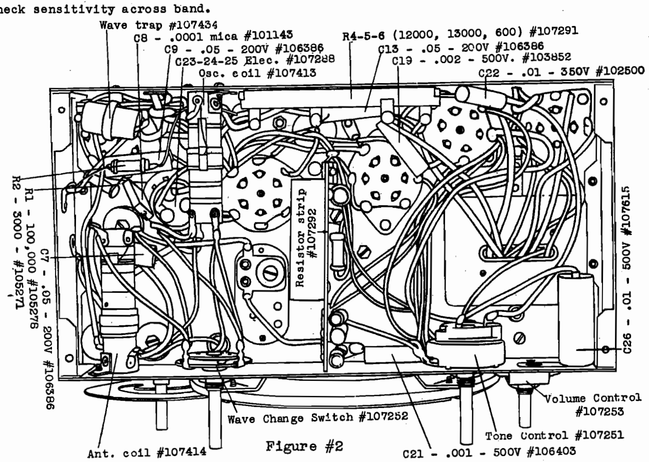


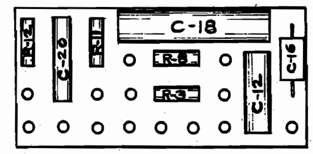
Figure #2

SOCKET VOLTAGES

Tube	Stage	Fil.	Plate	Screen	Cathode
80	Rectifier	4.9	377		
42	Power output	6.2	253	268	19.4
75	2nd det. AVC. & A.F.	6.2	145		1.28
6D6	I. F.	6.2	268	110	4.8
6F7	1st det.	6.2	265	108	12.3
	Oscillator		108		

Line voltage = 111

RESISTOR STRIP



SERVICE PARTS LIST
Model 420 (110 Volt - 60 Cycle AC)
Model 421 (110 Volt - 25 Cycle AC)

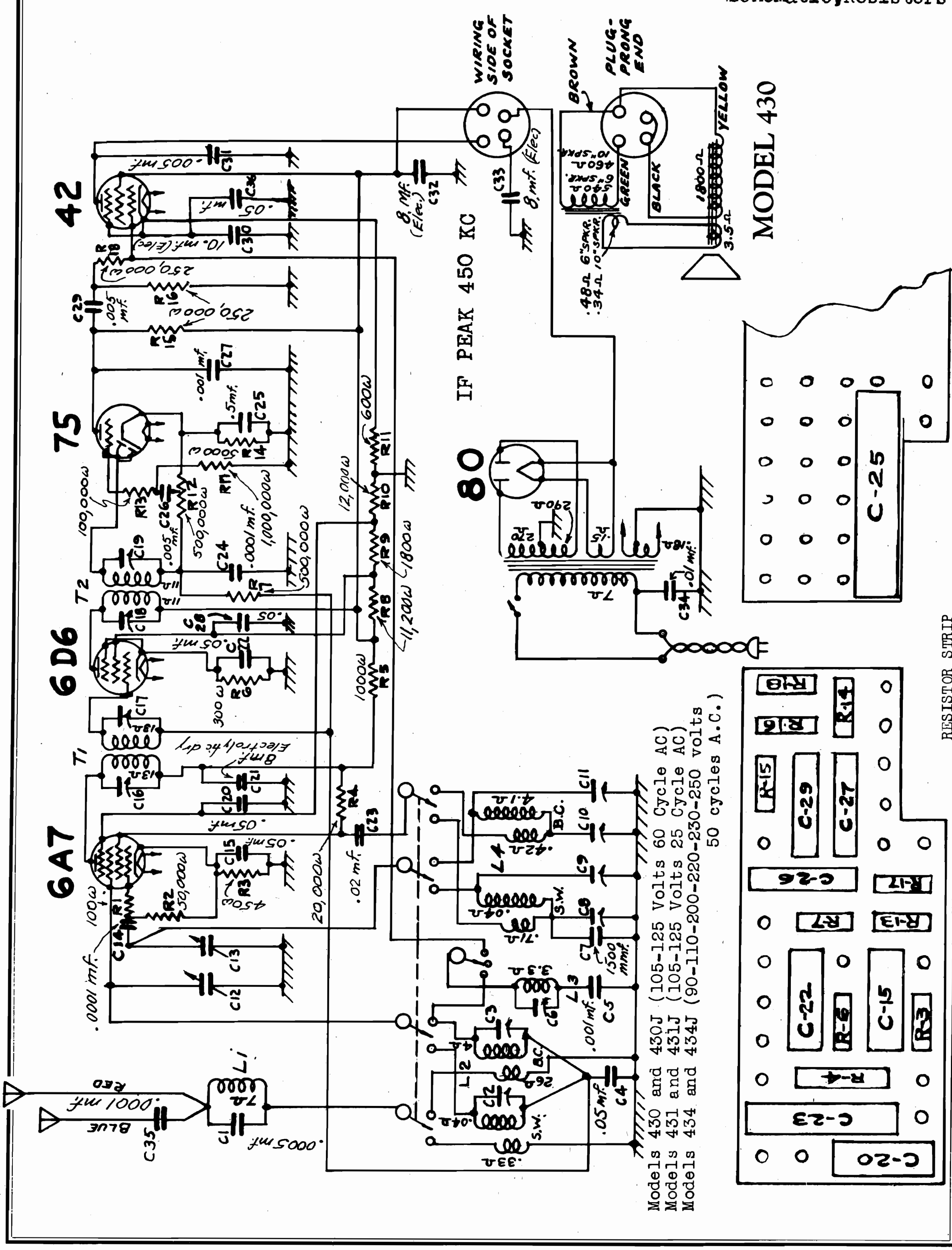
Part No.	Description of Parts
	MAIN ASSEMBLIES
107420	Chassis - Model 420
107711	Chassis - Model 421
107361	Speaker
107375	Cabinet
	BRACKETS, CLIPS AND CLAMPS
107166	Bracket - speaker
	COILS
107414	Antenna coil assembly
107413	Oscillator coil assembly
107415	1st I.F. coil assembly
107416	2nd I.F. coil assembly
107434	Antenna trap coil assembly
	CONDENSERS
107445	Variable condenser assembly, complete
107289	Trimmer condenser assembly
105931	Buffer condenser
107162	Variable condenser only
107288	Electrolytic condenser
103659	Condenser .005 - 350 V
106386	Condenser .05 - 200 V
102499	Condenser .05 - 200 V
106417	Condenser .0001 mica
103852	Condenser .002- 500 V
102500	Condenser .01 - 350 V
106403	Condenser .001 - 500 V
101143	Condenser .0001 mica
	TUBES
6F7	Oscillator first detector
6D6	Intermediate frequency amplifier
75	2nd detector, A.V.C., 1st audio amplifier
42	Power pentode
80	Rectifier
	TUBE SOCKETS & TUBE SHIELDS
104615	Tube socket - 4 prong
104617	Tube socket - 6 prong
103513	Tube socket - 6 prong
105624	Tube socket - 7 prong
103257	Tube shield
	NUTS
105795	Nut - power transformer
103039	Nut - volume, tone, switch
68226	Nut - I.F. Coils, dial lamp bracket
	SCREWS
106283	Fastening screw - dial lamp bracket
101700	Fastening screw - #6 Parker Kalon
104387	Fastening screw - coils, resistor strip
53052	Fastening screw - speaker bracket
97704	Fastening screw - trimmer condenser
102441	Set screw - dial assembly
101865	Fastening screw - variable condenser
95225	Fastening screw - insulation assembly
105642	Fastening screw - speaker
107347	Fastening screw - dial and name plate

Part No.	Description of Parts
	RESISTORS
107292	Resistor strip assembly
107293	Resistor strip assembly
105264	Resistor 500 ohms
105245	Resistor 2,000 ohms
105278	Resistor 100,000 ohms
105279	Resistor 250,000 ohms
105246	Resistor 500,000 ohms
105281	Resistor 1 meg.
105271	Resistor 3,000 ohms
	CABLES AND CABLE ASSEMBLIES
106405	Variable condenser ground cable
104445	Ground cable assembly
107448	Line cable assembly
105952	Antenna cable assembly
	TRANSFORMER
107242	Power transformer - Model 420
107766	Power transformer - Model 421
	MISCELLANEOUS
107291	Muter resistance
107290	Dial scale assembly
107955	Shaft & pinion assembly- var. cond.
107253	Volume control
107251	Tone control
107252	Switch assembly
106349	Dial lamp bracket assembly
106809	Dial lamp
106055	Grid lead assembly (shielded)
104249	Insulation assembly
101856	Insulation assembly
106338	Insulation - coil can
107346	Dial plate
107345	Name plate
101869	Felt foot
107389	Knob
107751	Reinforcement for power trans.-Mdl 421
	WASHERS, BUSHINGS & SPACERS
79304	Plain washer - dial lamp bracket
80589	Lock washer - volume, tone. switch
53544	Lock washer #6
108	Lock washer #8 - power transformer
100377	Spacer - insulation assembly
103996	Washer - tube shield
95702	Washer - variable condenser
105144	Rubber bushing - variable condenser
105145	Rubber washer - variable condenser
108003	Felt washer - under knobs
	SPEAKER PARTS (107361)
106617	Diaphragm and voice coil assembly
95226	Centralizer screw plain washer
107357	Speaker output transformer
99005	Centralizer screw
106498	Diaphragm housing
106496	Steel plate
107358	Speaker field coil
107359	Core and frame assembly
106495	Speaker transformer bracket
101856	Insulation plate assembly
106677	Fastening screw - housing to frame
74084	Fastening screw lock washer
107273	Copper washer assembly

MODELS 430,430J,430T
431,431J,431T
434,434J,434T

UNITED AMERICAN BOSCH CORP

Schematic,Resistors



MODELS 430,430J,430T
431,431J,431T
434,434J,434T

Trimmers,Socket,Parts
Alignment

UNITED AMERICAN BOSCH CORP.

CIRCUIT DESCRIPTION

The American-Bosch Model 430 is a five tube, three band superheterodyne receiver. The tuning range of this receiver covers a broadcast band extending from 540 to 1750 kilocycles, which includes one band of police frequencies, a higher frequency police band of 2400 to 2600 k.c. and a short wave broadcast band extending from 5900 to 18,200 kilocycles.

The circuit consists of a combined detector oscillator (type 6A7); an intermediate frequency amplifier (type 6D6) including four tuned I. F. circuits of the "High Q" type; a combined second detector, A.V.C. and audio stage (type 75) and a power output pentode (type 42).

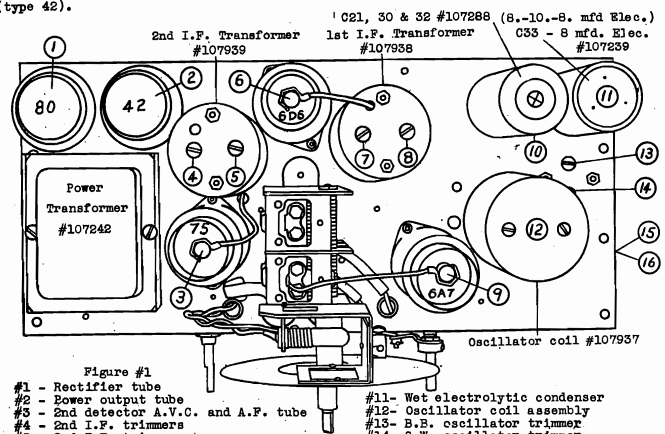


Figure #1

#1 - Rectifier tube
#2 - Power output tube
#3 - 2nd detector A.V.C. and A.F. tube
#4 - 2nd I.F. trimmers
#5 - 2nd I.F. trimmers
#6 - I.F. tube
#7 - 1st I.F. trimmers
#8 - 1st I.F. trimmers
#9 - 1st detector tube
#10- Dry electrolytic condenser.
#11- Wet electrolytic condenser
#12- Oscillator coil assembly
#13- B.B. oscillator trimmer
#14- S.W. oscillator trimmer
#15- B.B. oscillator lag. (top)
#16- S.W. oscillator lag. (bottom)
#17- B.B. antenna trimmer (Fig. #2)
#18- S.W. antenna trimmer (Fig. #2)
#19- P.B. trimmer (Fig. #2)

ALIGNING POLICE BAND

1. Set combination tone control - police band - switch (lower center knob) on first or left hand position.

2. Leave wave change switch in standard broadcast position.

3. Set dial scale at 1500 K.C. (this is reception point for 2400 K.C. on range marked "police switch").

4. Set test oscillator to 2400 K.C. and tune in signal with station selector.

5. Adjust trimmer condenser #19 to maximum output. (Continued on page 104d.)

ALIGNING S.W. OSCILLATOR AND R.F.

1. Set wave change switch to short wave or lower dial scale position.

2. Connect test oscillator to antenna through .0002 mf. and 400 ohms resistor in series (this condenser and resistor is the approximate equivalent of a short wave antenna).

3. Set test oscillator and dial scale to 16 M.C. (16000 K.C.) and adjust trimmers #14 and #18 to obtain reading on output meter.

4. Simultaneously adjust station selector and #18 in the same manner as described under operation #6 of B.C. Alignment (this is necessary because sufficient coupling exists in the 6A7 tube to cause a serious shift in the frequency of the oscillator as #18 is adjusted).

5. Set test oscillator and dial scale to 6 M.C. (6000 K.C.) and adjust "max-max" #16.

6. Repeat operation #4 as operation #5 may have disturbed oscillator adjustment.

7. Check sensitivity across band.

ALIGNING INSTRUCTIONS

To align the Model 430 chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

ALIGNING THE I.F. 450 K.C.

1. Set volume control on full.

2. Set tone control (lower center knob) at center position or treble.

3. Connect output meter across voice coil of loud speaker (speaker impedance is 3.5 ohms).

4. Connect in series with high side of the test oscillator output leads a blocking condenser of at least .25 mfd. Set test oscillator to 450 kilocycles and adjust its output to produce a measurable reading on output meter when test oscillator is connected between frame of chassis and grid of 6D6 I.F. amplifier tube #6.

5. Adjust #4 and #5 to maximum output, reducing test oscillator output as stage is brought into resonance.

6. Connect test oscillator to grid of 6A7, 1st detector (#9) and adjust #7 and #8 to maximum output.

ALIGNING B.C. OSCILLATOR AND R.F.

1. Set wave change switch to broadcast scale position.

2. Set test oscillator to 1500 K.C. and connect to grid of 1st detector tube 6A7 (#9).

3. Set dial scale to maximum mark beyond 540 K. C. calibration point when the gang is entirely closed.

4. Set dial scale at 1500 K.C. and adjust #13 to maximum output.

5. Connect test oscillator to antenna through a .0002 mfd. condenser and with scale still set at 1500 K.C. adjust condensers #13 and #17 to maximum output.

6. Set scale and test oscillator to 550 K. C. and adjust #15 simultaneously changing this adjustment and the station selector of the chassis for maximum output. This type of adjustment is known as "max-max" and is obtained in the following manner:

Tune receiver with left hand by means of tuning knob and adjust #15 in either direction and then without changing it, tune the receiver through a maximum, noting the value of output meter reading. Change #15 further in same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of #15, continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #15 are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few moments.

7. With test oscillator and scale set at 1500 K.C. readjust #13 and #17 since previous operations may have altered oscillator trimmer setting.

8. Check sensitivity across band.

Description of Parts

Part No.	Dia.#	
		CONDENSERS
	C1	.0005 mf. (part of 107434)
107995	C2	Trimmer condenser
108080	C3	Trimmer condenser
106386	C4	.05 mf - 2 ply - 200 V.
106403	C5	.001 mf - 4 ply - 500 V.
107995	C6	10-55 mmf
107422	C7	1500 mmf - mica
	C8	1100-2000 mmf (part of 108001)
107237	C9	Trimmer condenser
	C10	300-600 mmf (part of 108001)
107237	C11	Trimmer condenser
107921	C12)	Variable condenser gang
107921	C13)	
106417	C14	.0001 mf - mica
106386	C15	.05 mf - 2 ply - 200 V.
	C16)	Part of 107938
	C17)	
	C18)	Part of 107937
	C19)	
106386	C20	.05 mf - 2 ply - 200 V.
	C21	8 mf elec. dry (part of 107288)
106386	C22	.05 mf - 2 ply - 200 V.
102504	C23	.02 mf - 3 ply - 350 V.
106417	C24	.0001 mf - mica
102499	C25	.5 mf - 2 ply - 200 V.
103659	C26	.005 mf - 3 ply - 350 V.
106403	C27	.001 mf - 4 ply - 500 V.
102493	C28	.05 mf - 2 ply - 200 V.
103659	C29	.005 mf - 3 ply - 350 V.
	C30	10 mf - elec. (part of 107288)
103659	C31	.005 mf - 3 ply - 350 V.
	C32	8 mf elec. dry (part of 107288)
107239	C33	8 mf elec. wet
107615	C34	.01 mf - 4 ply - 500 V.
106417	C35	.0001 mf - mica
106386	C36	.05 - 2 ply - 200 V.
		RESISTORS
107614	R1	100 ohms 1/4 watt
105276	R2	50000 ohms 1/4 watt
105262	R3	450 ohms 1/4 watt
100813	R4	20000 ohms 1/2 watt
105267	R5	1000 ohms 1/4 watt
105260	R6	300 ohms 1/4 watt
105246	R7	.5 meg. 1/4 watt
	(R8	11200 ohms
	(R9	1800 ohms
107916	(R10	12000 ohms
	(R11	600 ohms
107951	R12	.5 meg. volume control
105278	R13	.1 meg. 1/4 watt
105249	R14	5000 ohms 1/4 watt
105279	R15	.25 meg. 1/4 watt
105279	R16	.25 meg. 1/4 watt
105281	R17	1 meg. 1/4 watt
105279	R18	.25 meg. 1/4 watt
		COILS
107434	L1	Trap coil assembly
107936	L2	Antenna coil assembly
107963	L3	Police coil assembly
107937	L4	Oscillator coil assembly
107938	T1	1st I. F. coil assembly
107939	T2	2nd I. F. coil assembly

MAIN ASSEMBLIES

CH 952	Chassis assembly - Models 431T, 431J
108030	Chassis assembly - Models 430T, 430J
108024	Speaker - Models 430T, 431T, 434T
107369	Speaker - Models 430J, 431J, 434J
108022	Cabinet - Models 430T, 431T, 434T
108033	Cabinet - Models 430J, 431J, 434J
CH 953	Chassis assembly - Models 434T, 434J

TRANSFORMERS

107242	Power transformer assembly - 430T, 430J
107765	Power transformer - 431T, 431J
107912	Power transformer - 434T, 434J

CABLE AND CABLE ASSEMBLIES

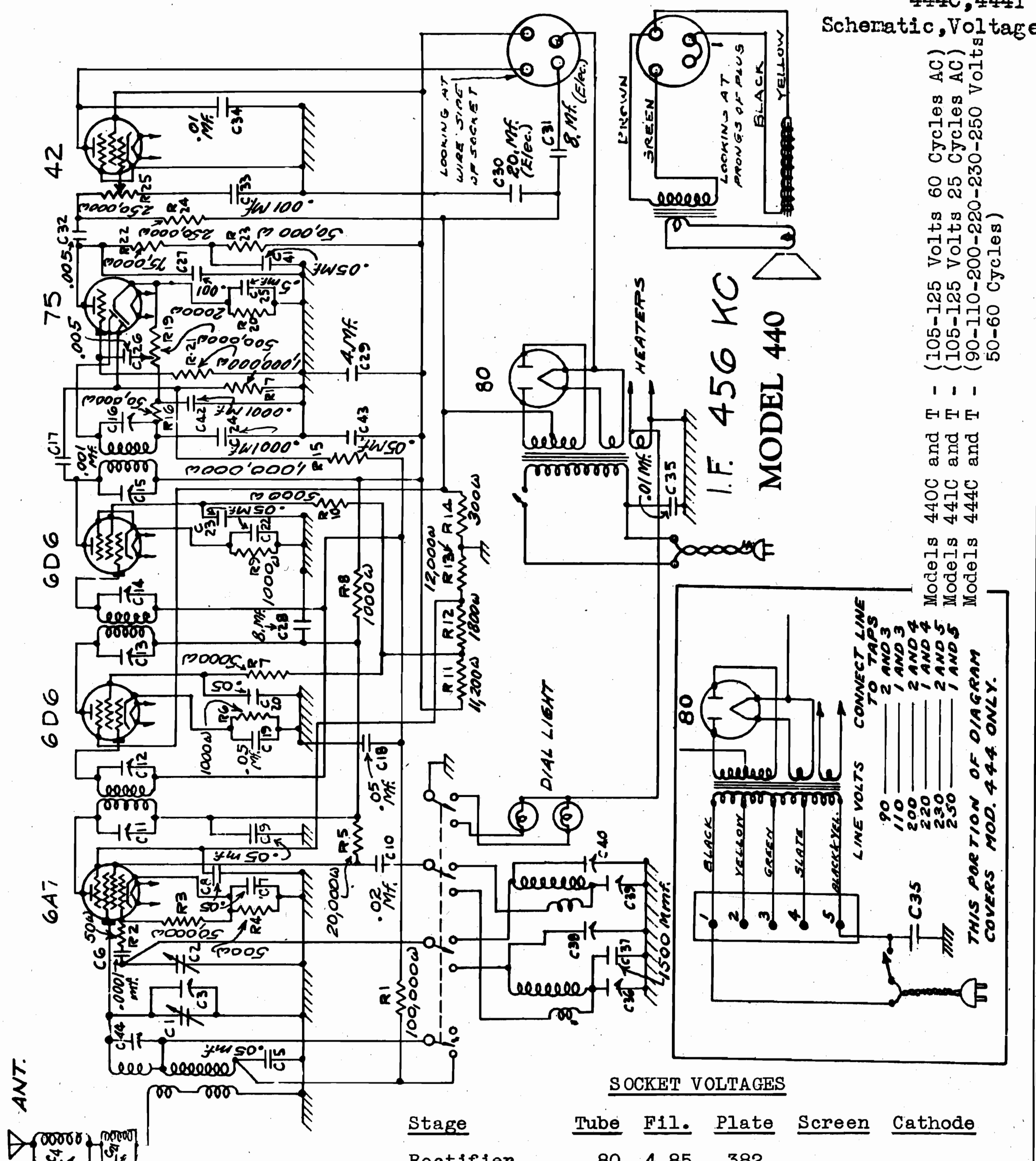
101711	Line cable assembly
105952	Antenna cable assembly (Red)
104445	Ground cable assembly
107768	Antenna cable assembly (Blue)

SPEAKER (108024) PARTS-Models 430T,431T,434T

SPEAKER (107369) PARTS-Models 430J, 431J, 434J

MODELS 440C,440T
441C,441T
444C,444T
Schematic,Voltage

UNITED AMERICAN BOSCH CORP.



SOCKET VOLTAGES

Stage	Tube	Fil.	Plate	Screen	Cathode
Rectifier	80	4.85	382		
Power output	42	6.1	234	245	18
2nd Detector	75	6.1	126		0.87
1st I.F.	6D6	6.1	245	99	5.6
2nd I.F.	6D6	6.1	245	96	5.6
Oscillator	6A7	6.1	236-136	87	4.7

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage = 112.

MODELS 440C,440T
441C,441T
444C,444T
Socket,Trimmers
Parts,Alignment

UNITED AMERICAN BOSCH CORP.

CIRCUIT DESCRIPTION

The Model 440 is a six tube, dual wave-band receiver, designed to operate over the frequency ranges from 1,570 to 540 kilocycles and 15,500 to 5,700 kilocycles. The circuits comprise an R. F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplification (456 K. C.) with double tuned circuits coupling each stage, a combination second detector, A.V.C., and first audio stage, a power output stage and a rectifier tube.

The wave change switch serves to change the electrical circuits to the wave band desired and in addition operates to illuminate the particular dial scale in use.

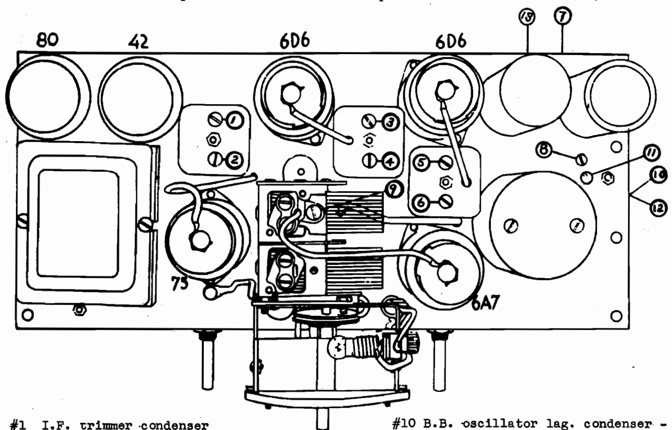


Figure #1

#1 I.F. trimmer condenser
#2 I.F. trimmer condenser
#3 I.F. trimmer condenser
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. trimmer condenser
#7 Wave trap tuning cond. (456 K.C.)
#8 B.B. oscillator trim. condenser
#9 Selector trimmer condenser
#10 B.B. oscillator lag. condenser - top screw
#11 S.W.B. oscillator trim condenser
#12 S.W.B. oscillator lag. condenser (bottom screw)
#13 Wave trap tuning condenser (2400 K.C.)
#14 R. F. trimmer condenser - (see Fig. #2)

ALIGNING THE CHASSIS

To properly align the chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

A- I. F. ADJUSTMENT

1. Set test oscillator to 456 K. C.
2. Connect A.C. voltmeter (output meter) across voice coil of speaker.
3. Connect test oscillator to grid of 2nd I.F. tube (6D6 in rear of condenser gang) and frame of chassis.
4. Adjust #1 and #2 to maximum output on output meter.
5. Connect test oscillator to grid of 1st I.F. tube (6D6 - rear right hand tube).
6. Adjust #3 and #4 to maximum output.
7. Connect test oscillator to grid of 1st detector (6A7).
8. Adjust #5 and #6 to maximum output.

This completes the I. F. adjustment.

B- R. F. ADJUSTMENT (Broadcast Band)

1. Connect test oscillator to antenna and ground leads. Set wave change switch to broadcast band position as indicated by the dial light. Set station selector to 540 K. C.
2. With test oscillator still adjusted to 456 K.C., increase signal strength of test oscillator until signal is heard in loud speaker.
3. Adjust #7 (through small hole in right hand rear panel of chassis) until signal disappears or goes through a null. If signal disappears, increase signal output from test oscillator and readjust #7 until a definite minimum is obtained. The purpose of this adjustment is to correctly adjust a wave trap installed to block direct transmission of 456 K.C. (usually ship telegraph signals) from antenna to first detector.
4. Set test oscillator to 2400 K. C. and adjust #13 in the same manner described above. The purpose of this adjustment is to correctly adjust a second wave trap installed to prevent interference from powerful local police signals.
5. Set test oscillator and station selector to 1400 K.C.
6. Adjust #8 to maximum output.
7. Adjust #9 to maximum output.
8. Set test oscillator and station selector to 600 K. C.
9. Adjust #10 (top screw) to maximum output.
10. Set test oscillator and station selector to 1400 K. C. and readjust #8 and #9 for correct calibration.

C- R.F. ADJUSTMENT (Short Wave Band)

1. Set wave change switch to short wave band position.
2. Set test oscillator and station selector to 15,000 K.C.
3. Adjust #11 until signal is tuned in.
4. Adjust #14 R.F. trimmer condenser (mounted underneath chassis on R.F. coil) to maximum output. (See Fig. #2)
5. Set test oscillator and station selector to 6000 K.C.
6. Adjust #12 (bottom screw) to maximum output.
7. Set test oscillator and station selector to 15,000 K.C. and readjust #11 and #14 trimmer for correct calibration.

This completes the lining up process.

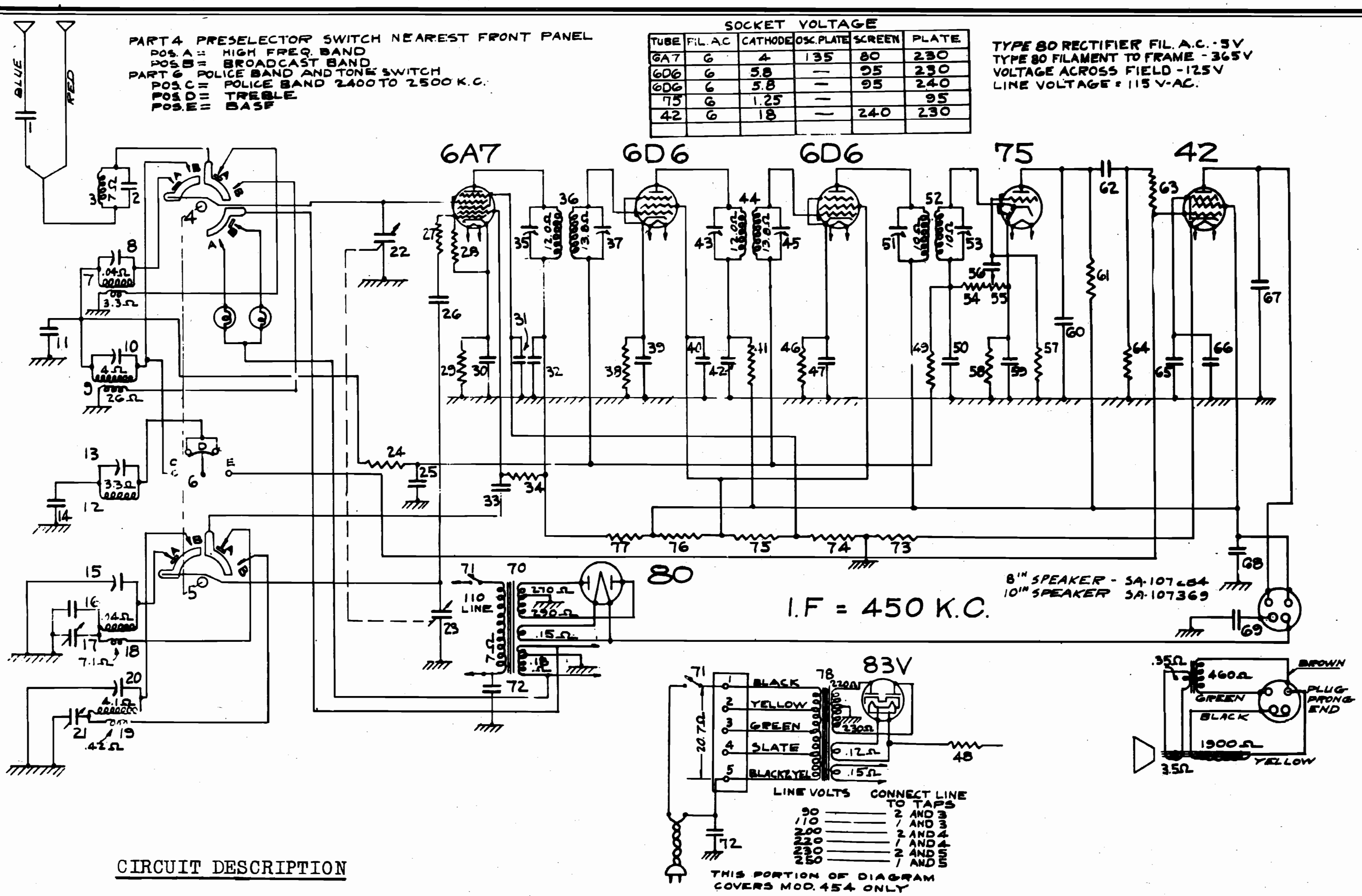
Part No.	Dia. #	Description of Parts
		CONDENSERS
107256	(C1) (C2) (C3)	Variable gang with trimmer
107238	C4	600 mmf. variable
106386	C5	.05 mf. 200 V.
106417	C6	.0001 mf. mica
106386	C7	.05 mf. 200 V.
102493	C8	.05 mf. 200 V.
102492	C9	.05 mf. 350 V.
102504	C10	.02 mf. 350 V.
	C11) C12)	Part of 107247
	C13) C14)	Part of 107248
	C15) C16)	Part of 107249
106417	C17	.001 mica
106386	(C18) (C19) (C20)	.05 mf. 200 V.
	C21	10 to 55- see 107842
106386	(C22) (C23)	.05 mf. 200 V.
	C24	.0001 mica-part of 107249
102499	C25	.5 mf. 200 V.
103659	C26	.005 mf. 350 V.
106403	C27	.001 mf. 500 V.
107239	C28	8 mf - electrolytic
	C29	4 mf. electrolytic
106665	C30	20 mf. electrolytic
	C31	8 mf. electrolytic
103659	C32	.005 mf. 350 V.
106403	C33	.001 mf. 500 V.
103695	C34	.01 mf. 500 V.
105931	C35	.01 mf. 500 V.
107241	C36	425 mmf. variable
107422	C37	1500 mmf. mica
107237	C38	Trimmer condenser
107241	C39	425 mmf. variable
107237	C40	Trimmer condenser
102492	C41	.05 mf. 350 V.
106417	C42	.0001 mica
102492	C43	.05 mf. 350 V.
	C44	4-40 mmf. variable - part of 107246
		RESISTORS
105278	R1	.1 meg. 1/4 W.
105255	R2	50 ohms 1/4 W.
105276	R3	50,000 ohms 1/4 W.
105264	R4	500 ohms 1/4 W.
100813	R5	20,000 ohms 1/2 W.
105267	R6	1,000 ohms 1/4 W.
105249	R7	5,000 ohms 1/4 W.
105267	R8	1,000 ohms 1/4 W.
105267	R9	1,000 ohms 1/4 W.
105249	R10	5,000 ohms 1/4 W.
107236	(R11 (R12 (R13 (R14	11,200 ohms / 1,800 ohms / 12,000 ohms / 300 ohms
105281	R15	1 meg. 1/4 W.
	R16	50,000 1/4 watt - part of 107249
105281	R17	1 meg. 1/4 W.
105562	R19	.5 meg. variable
105245	R20	2,000 ohms 1/4 W.
105281	R21	1 meg. 1/4 W.
105277	R22	75,000 ohms 1/4 W.
105276	R23	50,000 ohms 1/4 W.
105279	R24	.25 meg. 1/4 W.
107250	R25	.25 meg. variable
		MAIN ASSEMBLIES
107440		Chassis assembly- Mdls 440C & T
107744		Chassis assembly- Mdls 444C & T
107741		Chassis assembly- Mdls 441C & T
107369		Speaker - Models 440C,441C,444C
107284		Speaker - Models 440T,441T,444T
107374		Cabinet - Models 440C,441C,444C
107373		Cabinet - Models 440T,441T,444T
101711		Line cable
105952		Antenna cable
104445		Ground cable
		TRANSFORMERS
107242		Power transformer - 440C, 440T
107765		Power transformer - 441C, 441T
107912		Power transformer - 444C, 444T
		COILS
107245		Oscillator coil assembly
107246		Antenna coil assembly
107247		I.F. coil assembly #1
107248		I.F. coil assembly #2
107249		I.F. coil assembly #3
107232		Coil spark trap

SPEAKER (107369) PARTS 440C

SPEAKER (107284) PARTS 440T

MODELS 450L,450H
451L,451H
454L,454H
Schematic,Voltage

UNITED AMERICAN BOSCH CORP.



SOCKET VOLTAGE

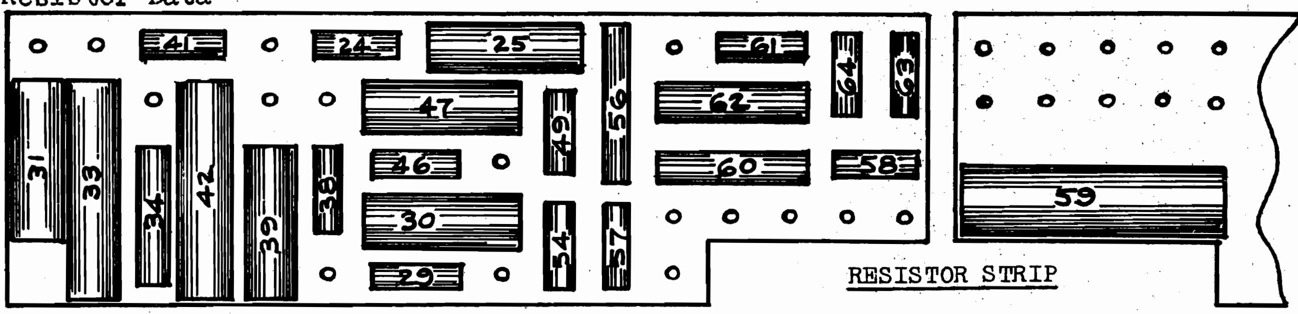
TUBE	FIL. A.C.	CATHODE	OSC. PLATE	SCREEN	PLATE
6A7	6	4	135	80	230
6D6	6	5.8	—	95	230
6D6	6	5.8	—	95	240
75	6	1.25	—		95
42	6	18	—	240	230

CIRCUIT DESCRIPTION

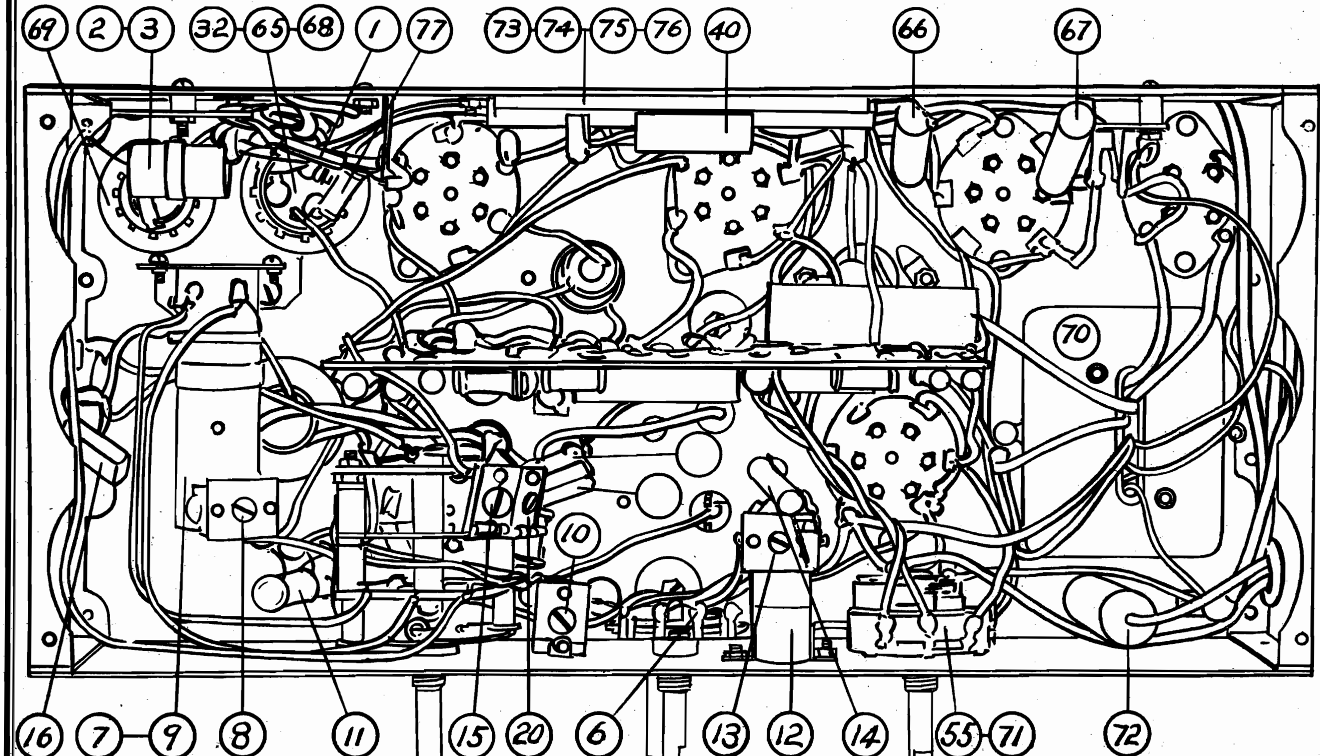
The Model 450 is a six tube, three band superheterodyne receiver. The tuning range of this receiver covers a broadcast band extending from 540 to 1750 kilocycles, which includes one band of police frequencies, a higher frequency police band of 2200 to 2600 kilocycles and a short wave broadcast band extending from 5900 to 18000 kilocycles.
The circuits comprise a R. F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplification (450 K.C.) with double tuned circuits coupling each stage, a combination second detector, A.V.C., and first audio stage, a power output stage and a rectifier tube.

MODELS 450L, 450H
451L, 451H
454L, 454H
Socket, Trimmers
Resistor Data

UNITED AMERICAN BOSCH CORP.



RESISTOR STRIP



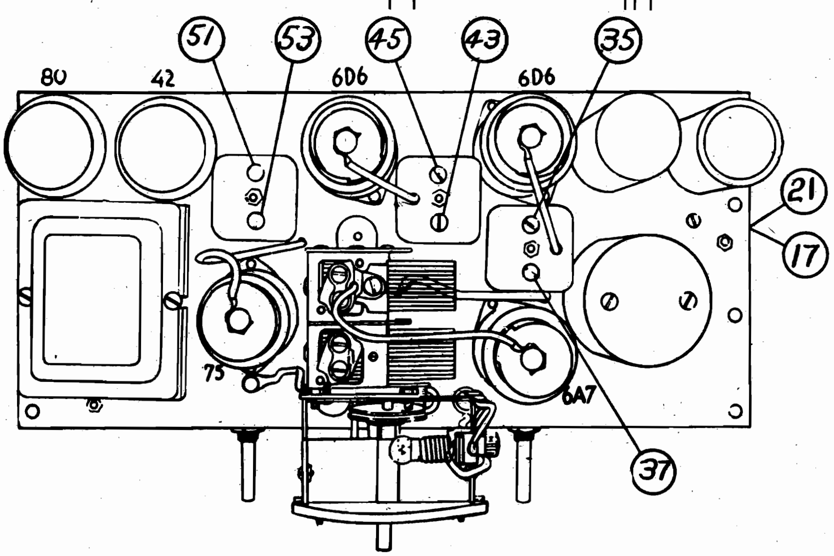


Figure #1

Alignment Nomenclature

#8 Short wave preselector trimmer*
#10 Broadcast preselector trimmer*
#13 Police preselector trimmer*
#15 Short wave oscillator trimmer*
#17 Short wave osc. lag (bottom screw)
#20 Broadcast oscillator trimmer*
#21 Broadcast osc. lag (top screw)
#35 First I.F. trimmer
#37 First I.F. trimmer
#43 Second I.F. trimmer
#45 Second I.F. trimmer
#51 Third I.F. trimmer
#53 Third I.F. trimmer
* See Figure #2

MODELS 450L, 450H
451L, 451H
454L, 454H
Alignment, Parts

UNITED AMERICAN BOSCH CORP.

ALIGNMENT PROCEDURE

To properly align the receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the location of the tubes and the various alignment condensers. The top and bottom view of the chassis are shown in Figure #1 and #2 and should be carefully studied before the actual work is started.

A - I.F. ADJUSTMENT (450 K.C.)

1. Set test oscillator to 450 K.C.

2. Connect output meter across voice coil of speaker. (Impedance 3.5 ohms.)

3. Connect in series with high side of test oscillator leads a blocking condenser of at least .25 mfd.

4. Connect test oscillator to grid of 1st I. F. tube (6D6 in rear of condenser gang) and adjust #51 and #53 to maximum output reducing test oscillator as required.

5. Connect test oscillator to grid of 1st I. F. tube (6D6 rear right hand tube) and adjust #43 and #45 to maximum output.

6. Connect test oscillator to grid of 1st detector (6A7 and adjust #35 and #37 to maximum output. This completes the I. F. adjustment.

B - ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to broadcast scale position.

2. Set test oscillator to 1500 K.C. and connect to grid of 1st detector (6A7).

3. Adjust dial scale to maximum mark beyond 540 K.C. calibration point when the gang is entirely closed.

4. Set dial scale at 1500 K.C. and adjust #20 to maximum output.

5. Connect test oscillator to antenna and ground leads of the receiver (red and brown) through a .0002 mfd. condenser and with scale still set at 1500 K. C. adjust #10 and #20 to maximum output.

6. Set dial scale and test oscillator to 600 K. C. and adjust #21 simultaneously changing this adjustment and the station selector for maximum output. This type of adjustment is known as "max-max" and is obtained in the following manner:

Tune the receiver with your left hand by means of tuning knob and adjust #21 in either direction and then without changing it, tune the receiver through a maximum noting the value of output meter reading. If output drops with second adjustment reverse direction of the adjustment of #21. Continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #21 are changed. While this procedure may appear difficult, facility can be easily acquired and the operation requires only a few moments.

7. With test oscillator and scales set at 1500 K. C. readjust #10 and #20 since previous operations may have altered oscillator trimmer setting.

8. Check sensitivity across band.

C - ADJUSTMENT OF POLICE BAND

1. Set combination tone control - police band switch (lower center knob) on first or left-hand position.

2. Leave wave change switch on standard broadcast position.

3. Set dial scale at 1500 K. C. (this is the reception point for 2400 K.C. on range marked "police switch" on dial scale).

4. Set test oscillator to 2400 K. C. and tune in signal with station selector.

5. Adjust #13 to maximum output.

D - ADJUSTMENT OF SHORT-WAVE BAND

1. Set wave change switch to short wave or lower dial scale position.

2. Connect test oscillator to antenna thru a .0002 mfd. condenser and a 400 ohm resistor in series. (This resistor-condenser combination is the approximate equivalent of a short wave antenna.)

3. Set test oscillator and dial to 16 M. C. (16,000 K. C.) and adjust #15 and #9 to obtain reading on output meter.

4. Simultaneously adjust station selector, knob and #8 trim condenser in the same manner as described under operation #6 of broadcast alignment. (This is necessary because sufficient coupling exists in the 6A7 tube to cause a serious shift to the frequency of the oscillator as #8 is adjusted.)

5. Set test oscillator and dial scale to 6 M.C.(6000 K.C.) and adjust "max-max" #16.

6. Repeat operation #4 as operation #5 may have disturbed oscillator adjustment.
7. Check sensitivity across band.

SERVICE PARTS LIST

Models 450L & H (105-125 Volts 60 Cycles AC)
Models 451L & H (105-125 Volts 25 Cycles AC)
Models 454L & H (90-250 Volts 50 Cycles AC)

Part No.	Dia. #	Description of Parts
106417	1	100 Mfd. mica
	2	.005 mfd. mica)part of
	3	Trap coil-)107434
	4	Preselector switch)part of
	5	Osc. switch)SW 954
107904	6	Tone control switch
	7	H.F. pres. coil)part of
	8	0-60 mmf. 107936
	9	B.C. pres. coil - part of 107936
107995	10	0-15 mmf.
106386	11	.05 - 2 ply
	12	Police band coil)part of
	13	10-55 mmf.)RC95248
106403	14	.001 - 4 ply
107995	15	0-15 mmf.
107422	16	1500 mmf. mica
	17	1100-2000 mmf)part of 108001
	18	H.F. osc. coil)part of
	19	B.C. osc. coil)RC9523A
107503	20	0-25 mmf.
	21	300-600 mmf part of 108001
	22	Var. gang part of CG 957
	23	Var. gang part of CG 957
105278	*24	.1 meg. 1/4 W.
106282	*25	.05 - 2 ply
106417	26	100 mmf. mica
107614	27	100 - 1/4 W.
105276	28	50,000 - 1/4 W.
105264	*29	500 - 1/4 W.
106386	*30	.05 - 2 ply
106386	*31	.05 - 2 ply
	32	8 mfd. elec. (dry) part of 107288
102504	33	.02 mfd. - 3 ply
100813	*34	20,000 - 1/2 W.
	35	.30 mmf. part of IC952A
	36	I.F. trans. part of IC952A
	37	35-130 mmf. part of IC952A
105267	*38	1000 - 1/4 W.
106386	*39	.05 - 2 ply
106386	40	.05 - 2 ply
105267	*41	1000 - 1/4 W.
102492	*42	.05 - 3 ply
	43	35-130 mmf.
	44	I.F. trans. coil- part of IS952A
	45	35-130 mmf.- part of IC 952A
105267	*46	1000 - 1/4 W.
106386	*47	.05 - 2 ply
103062	48	400 - 1 W.
105246	*49	5 meg. - 1/4 W.
106417	50	.0001 mmf. mica
	51	30-130 mmf.) part of
	52	3rd IF coil) IC954 A
	53	30-130 mmf.)
105278	*54	.1 meg. 1/4 W.
107951	55	.5 meg. vol. cont.
103659	*56	.005 mfd. - 3 ply
105281	*57	1 meg. 1/4 W.
105249	*58	5000 - 1/4 W
102499	*59	.5 - 2 ply
106403	*60	.001 - 4 ply
105279	*61	.25 meg. 1/4 W.
103659	*62	.005 mfd - 3 ply
105279	*63	.25 meg. 1/4 W.
105279	*64	.25 meg. 1/4 W.
	65	10 mfd. elec. part of 107288
106386	66	.05 - 2 ply
103659	67	.005 - 3 ply
	68	8 mfd. elec. dry - part of 107288
107239	69	8 mfd. elec. wet
107242	70	Power transformer
	71	On-Off switch part of 107951
107615	72	.01 - 4 ply
	(73	600 ohms resistor
	(74	1200 ohms resistor
107916	(75	1800 ohms resistor
	(76	11200 ohms resistor
105267	77	1000 - 1/4 W.
107912	78	Power transformer

MAIN ASSEMBLIES

CH9512A	Chassis assembly- Mdls 454L & H
CH9517A	Chassis assembly- Mdls 451L & H
CH9511A	Chassis assembly- Mdls 450L & H
107369	Speaker - Mdls 450L, 451L, 454L
107284	Speaker - Mdls 450H, 451H, 454H
KA 956	Cabinet - Mdls 450L, 451L, 454L
KA 955	Cabinet - Mdls 450H, 451H, 454H

* These parts are on IS9530A.

TRANSFORMERS

107242	Power trans. assembly - 450 L&H
107765	Power trans. assembly - 451 L&H
107912	Power trans. assembly - 454 L&H

SPEAKER (107369)
(450L, 451L, 454L)

SPEAKER (107284)
(450H, 451H, 454H)

CABLES & CABLE ASSEMBLIES

CB9512	Line cable
105952	Antenna cable - Red
107768	Antenna cable - Blue
CB9510A	Ground cable
98511	Cable for dial pulley

MODEL 05
Schematic, Voltage
Parts

UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH RADIO MODEL 05

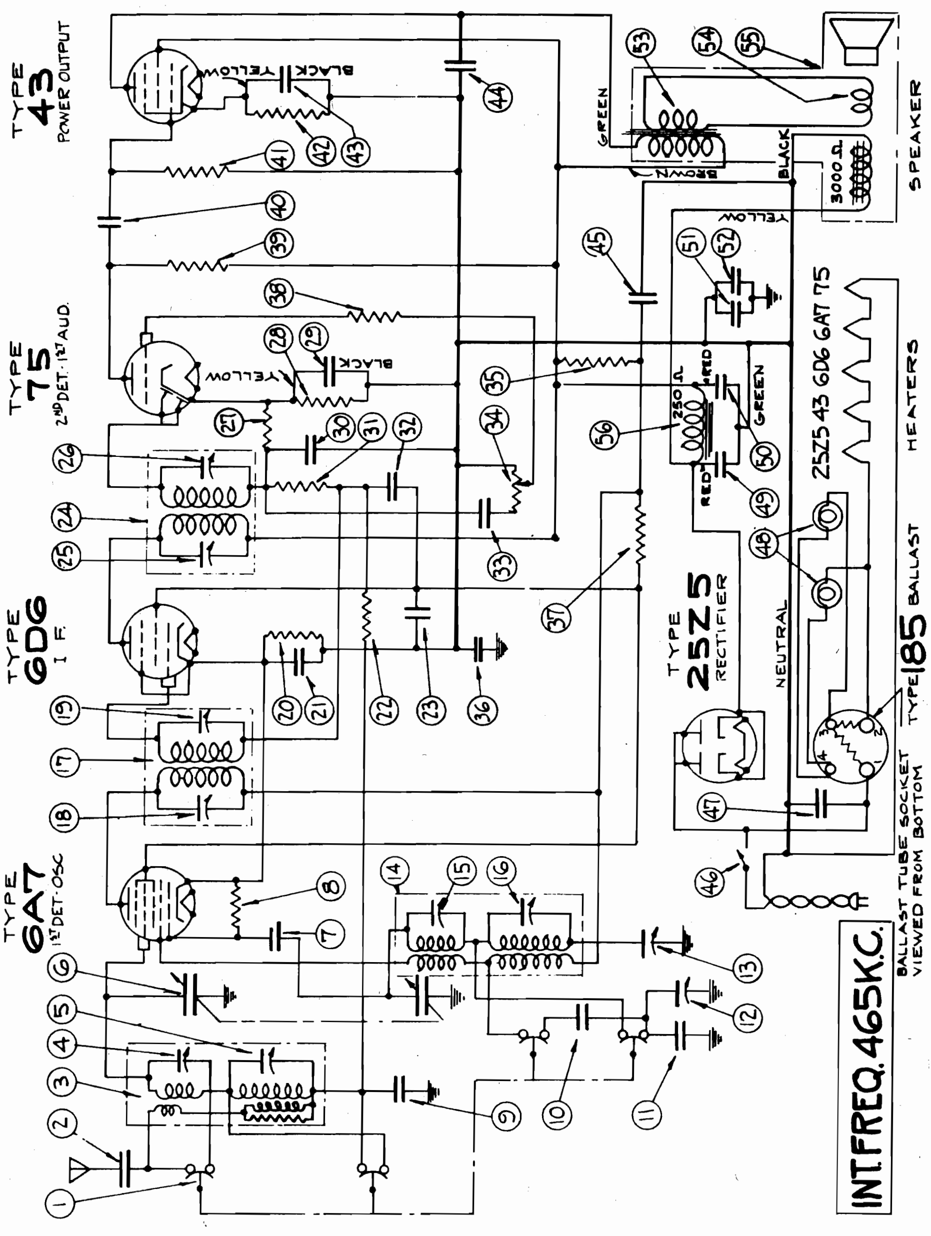
Five-Tube, Two Band, AC-DC, Superheterodyne Receiver

1	WAVE CHANGE SW.	SW 9531
2	COND. .00025 MICA	CM 956
3	RF COIL ASSY	RC 95110
4	TRIM COND 35 MMF	PT OF RC95110
5	TRIM COND 35 MMF	PT OF RC95110
6	COND (2 GANG)	CG 9534
7	COND .0001 MICA	SA-106417
8	RES 25000Ω 1/4W	SA-105275
9	COND .1MF 200V	CW 951A
10	COND .01MF 400V	SA 106277
11	COND .001 MF MICA	SA-103775
12	LAG COND 18 MMF	PT OF CS 9526
13	LAG COND 436 MMF VAR	PT OF CS 9526
14	OSCILL COIL ASSY	RC 95111
15	TRIM COND 35 MMF	PT OF RC95111
16	TRIM COND 35 MMF	PT OF RC95111
17	1ST I F TRANS	IC 9539
18	TRIM COND 35 MMF	PT OF IC 9539
19	TRIM COND 35 MMF	" " "
20	RES 300Ω 1/4W	SA 105260
21	COND .1MF 200V	CW 951A
22	RES 500,000Ω 1/4W	SA-105246
23	COND .1MF 200V	CW 951A
24	2ND I F TRANS	IC 9540
25	TRIM COND 35 MMF	PT OF IC 9540
26	TRIM COND 35 MMF	" " "
27	RES 500,000Ω 1/4W	SA 105246
28	RES 20,000Ω 1/4W	SA-105274
29	COND (ELECT) 10MF	PT OF CE 9519
30	COND (MICA) .00025	CM 956
31	RES 500,000Ω 1/4W	SA 105246
32	COND .1MF 200V	CW 951A
33	COND .01 MF 400V	SA 106277
34	VOL CONT	VR 9514
35	RES 5000Ω 1/2W	SA 100824
36	COND .02 600V	CW 9514
37	RES 25,000Ω 1/4W	SA 105275
38	RES 250,000Ω 1/4W	SA 105279
39	RES 500,000Ω 1/4W	SA .05246
40	COND .01 400V	SA-106277
41	RES 500,000Ω 1/4W	SA-105246
42	RES 600Ω 1W	SA-105004
43	COND (ELECT) 10MF	PT OF CE9519
44	COND .01MF 400V	SA 106277
45	COND .. 200V	CW 951A
46	SWITCH ON-OFF	PT OF VR9514
47	COND .1 200V	CW 951A
48	LAMPS (2) 6-8	SA 95572
49	COND (ELECT) 20MF	PT OF CE9519
50	COND (ELECT) 20MF	" " "
51	COND .1 600V	CW 9515
52	COND .1 600V	CW 9515
53	OUTPUT TRANS	PT OF SK9515
54	BUTTON & COIL ASSY	PT OF SK9515
55	SPEAKER ASSY.	SK 9515
56	CHOKE	CL 9541

SOCKET VOLTAGES

TUBE	STAGE	SCREEN	PLATE	CATH.	FIL
25Z5	RECTIFIER		125		60
43	POWER OUTPUT	117	110	15	38
75	2ND DET. 1ST AUD.		27*	10	6
6D6	I F.	40	117	2.5	17
6A7	1ST DET.-OSC.	40	OSC. 41 AMP. 90	2.5	12

LINE VOLTAGE 115 A.C.
VOLTAGES READ TO NEUTRAL
* READ ON 600,000 OHM VOLTMETER



MODELS 460 A,B,R
461 A,B,R
464 A,B,R

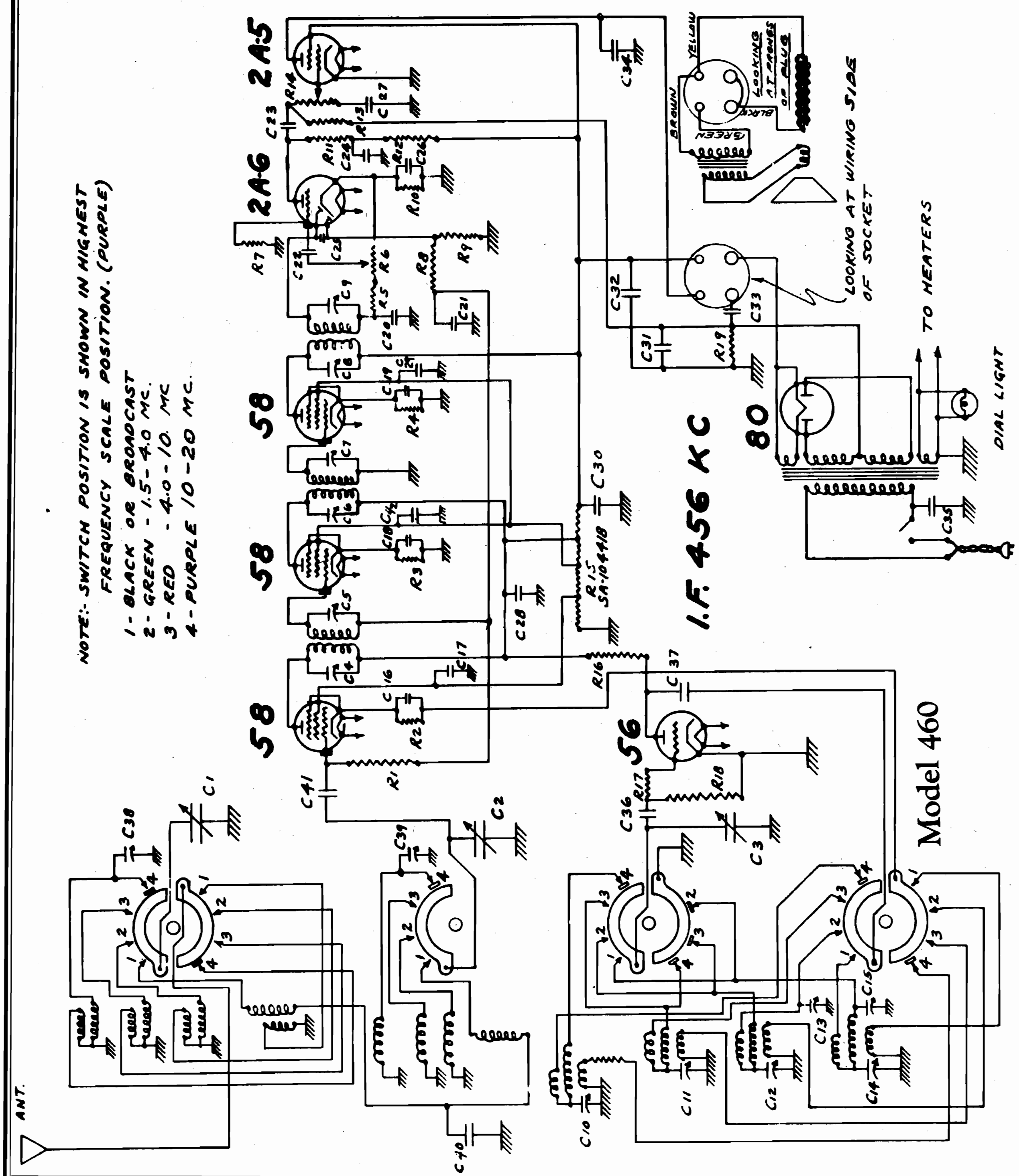
UNITED AMERICAN BOSCH CORP.

Ed.1
Circuit Data, Schematic

CIRCUIT DESCRIPTION

The Model 460 is a seven tube superheterodyne receiver whose circuit comprises a first detector, an oscillator, two stages of I. F. amplification, a combined double diode second detector and first audio amplifier, a power amplifier and rectifier tube.

Selectivity is provided by a double tuned antenna selector and three double tuned I.F. transformers, comprising eight selective circuits in all. The double tuned antenna selector is important in the broadcast band for reasons well known, and is all the more important on the short wave band in order to prevent "repeat points", that is, reception of the same station at two points on the scale.



SCHEMATIC WIRING DIAGRAM

MODELS 460 A,B,R
461 A,B,R
464 A,B,R

Ed.1
Socket,Trimmers,
Alignment,Voltage
Parts List

UNITED AMERICAN BOSCH CORP.

ALIGNING THE CHASSIS

To properly align the Model 460 chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. A top view of the chassis is shown in Fig. #1 and should be carefully studied before the actual work is started.

A- ALIGNING THE I.F. (456 K.C.)

1. Set test oscillator to 456 K.C.

2. Connect test oscillator to grid of second I.F. tube #5 and adjust #14 and #15 to maximum output, reducing test oscillator as required.

3. Connect test oscillator to grid of first I.F. amplifier #6 and adjust #16 and #17 to maximum output.

4. Connect test oscillator to grid of first detector #11 and adjust #18 and #19 to maximum output.

5. Recheck the above four operations for accuracy.

B- ALIGNING THE R. F.

1. Set test oscillator to 1500 K. C. and connect to grid of first detector #11. Place pointer of radio to 1.5 mark on dial. Adjust #20 until signal is tuned in. This adjusting screw is usually designated by a Red color dot. Having obtained tune at this point, set test oscillator to 600 K. C. and tune station selector to .6 mark on dial. Adjust #21 until the signal is tuned in. Now return to 1500 K. C. point with set and test oscillator and make the resetting of #20 to obtain accurate adjustment to scale reading.

2. Connect test oscillator to antenna lead, making sure the equivalent (200 mmf.) is in the circuit.

3. Continue setting of 1500 K. C. Adjust #22 and #23 for maximum output. Check sensitivity and calibration at several points on dial. Set should come correctly to kilocycle settings of important broadcasting stations.

C- ALIGNING THE GREEN BAND

1. Set test oscillator to 3600 K.C. and indicator of radio at 3.6 mark on dial.

2. Adjust #24 until signal is tuned in. This trim condenser is usually marked with a Red color dot. Set test oscillator at 1600 K. C. and tune set to 1.6 mark. Adjust #25 to maximum output. Return to 3600 K. C. and repeat adjustment. In adjusting the 3600 K. C. point it is possible to obtain two settings for different position of the trim condenser. This denotes merely the plug and minus frequency between oscillator and test oscillator which will give the correct I. F. frequency. The correct setting of the trim condenser is the one wherein the screw is turned furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity when the set and test oscillator are tuned to 2500 K.C. (mid-band).

D- ALIGNING THE RED BAND

1. Set test oscillator to 8000 K. C. marking and tune receiver in region of 8.0 on dial scale. Note when signal is received. Next set test oscillator to 4000 K. C. setting and tune set to 4.0 on dial scale. Adjust #26 on right side of chassis until signal is heard.

2. Retune set and test oscillator to 8000 K. C. and observe pointer setting and sensitivity. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil to switch.

E- ALIGNING THE PURPLE BAND

1. Set test oscillator to 20,000 K. C. or if this is not available, then adjust to highest possible frequency, which preferably should be at least 15,000 K. C. Tune set to this frequency and note where set oscillator is received on dial scale. Then place test oscillator on 10,000 K.C. and adjust #27 on right of chassis until test oscillator is tuned at 10. on dial scale. Now return both test oscillator and radio set to high frequency. Located underneath the base and adjacent to the switch and high frequency selector coils are two trim condensers #28 and #29 which are used for correct adjustment at this high frequency.

Increase setting of test oscillator until signal generator can be tuned in at two points on dial (say 20 and 19). Then with pointer of set at 20 adjust #28 and #29 for maximum output decreasing test signal as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 20 on dial while a feeble signal or none at all is observed at 19. This is a practical illustration of the effectiveness of preselection as outlined in the first part of this description.

The adjustment instructions just given apply to the Model 460 receiver which is in reasonable operating condition, but in some manner has been thrown out of adjustment. Obviously, before the radio service man can go through with the adjustments given here, he must assure himself that defective tubes, injured parts, such as punctured condensers, shorted variable condensers, open resistors, scratched high frequency coils, etc., are not such as to cause the set to be inoperative on one or more bands of frequencies.

SOCKET VOLTAGES

Tube	Stage	Fil.	Plate	Screen	Cathode	Grid
58	1st Det.	2.65	220	40	2.8	-
58	1st I.F.	2.65	220	95	2.0	-
58	2nd I.F.	2.65	240	95	2.7	-
56	Osc.	2.65	75	-	0	25
2A6	2nd Det.	2.65	90	-	1.4	-
2A5	Output	2.65	235	240	0	-
80	Rectifier	4.8	-	-	-	-

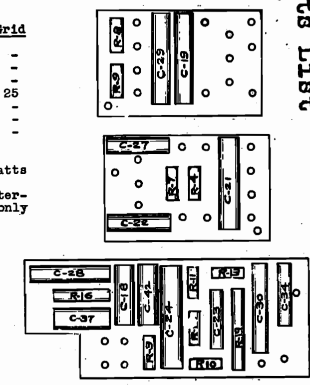
Bias on 2A5 (across 400 ohms) - 22 volts
Output of rectifier - - - - - - 360 volts

Line volts - - - - 115
Power - - - - - - 60 watts

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed.

Part No.	Dia. #	Description of Parts
		CONDENSERS
106352	(C1) (C2) (C3)	Variable condenser
	C4) C5)	Part of 105695
	C6) C7)	Part of 105695
	C8) C9)	Part of 105696
103800	(C10) (C11)	2000 mmf. variable
105683	(C12	7-70 mmf.
	(C13	1200 mmf. variable
105684	(C14	7-70 mmf.
	(C15	300 mmf. variable
102493	C16	.05 mf - 200 V.
102493	C17	.05 mf - 200 V.
106386	C18	.05 mf - 200 V.
102493	C19	.05 mf - 200 V.
106417	C20	100 mmf. - mica
102493	C21	.05 mf. 200 V.
103659	C22	.005 mf. 350 V.
102504	C23	.02 mf. 350 V.
102494	C24	.1 mf. 350 V.
101143	C25	100 mmf. mica
102499	C26	.5 mf. 200 V.
106403	C27	.001 mf. 500 V.
102492	C28	.05 mf. 350 V.
102493	C29	.05 mf. 200 V.
102492	C30	.05 mf. 350 V.
	(C31	20 mf. electrolytic
106665	(C32	4 mf. electrolytic
	(C33	8 mf. electrolytic
106277	C34	.01 mf. 350 V.
105931	C35	.01 mf. 500 V.
101143	C36	100 mmf. mica
106386	C37	.05 mf. 200 V.
105705	C38	Trimmer condenser
105705	C39	Trimmer condenser
102493	C40	.05 mf. 200 V.
101143	C41	100 mmf. mica
106386	C42	.05 - 200 V.
		RESISTORS
105246	R1	1/2 meg. 1/4 W.
105245	R2	2000 ohms 1/4 W.
105267	R3	1000 ohms 1/4 W.
105267	R4	1000 ohms 1/4 W.
105276	R5	50,000 ohms - 1/4 W.
105562	R6	500,000 volume
105281	R7	1 meg. 1/4 W.
105246	R8	1/2 meg. 1/4 W.
105281	R9	1 meg. 1/4 W.
105245	R10	2000 - 1/4 W.
107363	R11	70,000 - 1/4 W.
107363	R12	70,000 - 1/4 W.
105279	R13	1/4 meg. 1/4 W.
105561	R14	Variable
104418	R15	Multiple
100197	R16	25,000 - 1/2 W.
100814	R17	50 - 1/2 W.
105274	R18	20,000 - 1/4 W.
103062	R19	400 - 1 W.
		COILS
105684		Oscillator coil - broadcast
105683		Oscillator coil - green band
105689		Oscillator coil - red band
105687		Oscillator coil - purple band

	TRANSFORMERS	
105781	Power trans. - Mdls. 460A,B,R	
106098	Power trans. - Mdls. 461A,B,R	
107875	Power trans. - Mdls. 464A,B,R	
105690	Preselector coil - broadcast	
105691	Preselector coil - broadcast	
105685	Preselector coil - green band	
105686	Preselector coil - red band	
105688	Preselector coil - purple band	
105695	Intermediate coil	
105696	Intermediate coil	
	MAIN ASSEMBLIES	
107460	Chassis assembly for 460A,B,R	
107761	Chassis assembly for 461A,B,R	
107878	Chassis assembly for 464A,B,R	
107284	Speaker-460A-B,461AOB,461A-B	
107369	Speaker-460R,461R,464R	
107370	Cabinet - Mod. 460A, 461A, 464A	
107371	Cabinet - Mod. 460B, 461B, 464B	
107372	Cabinet - Mod. 460R, 461R, 464R	



RESISTOR STRIPS

SPEAKER (107369) (460R & 461R)
SPEAKER (107284) (460A & B)
(461A & B)

CABLES AND CABLE ASSEMBLIES

101711	Line cable assembly
105952	Antenna cable assembly
104445	Ground cable assembly

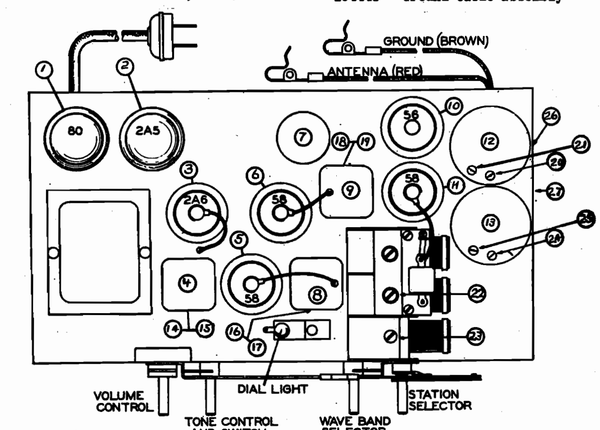
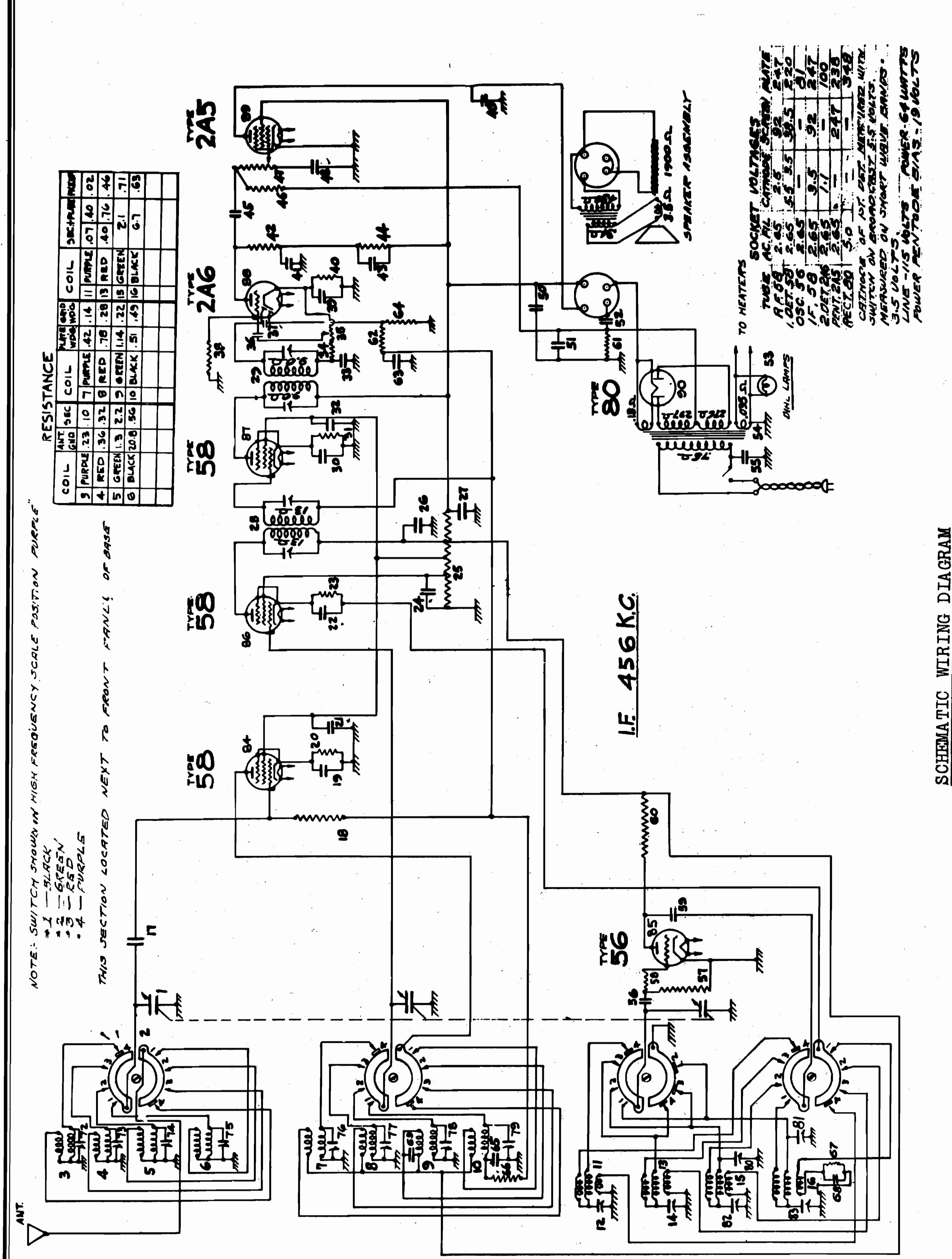


Figure #1

#1 Type 80 rectifier
#2 Type 2A5 output pentode
#3 Type 2A6 2nd det. A.V.C. & 1st A.F.
#4 3rd I.F. transformer
#5 Type 58 I.F. tube
#6 Type 58 I.F. tube
#7 Filter condenser
#8 2nd I.F. transformer
#9 1st I.F. transformer
#10 Type 56 oscillator
#11 Type 58 1st detector
#12 Broadcast oscillator coil
#13 Green band oscillator coil
#14-#15 3rd I.F. trimmer
#16 2nd I.F. trimmer
#17 2nd I.F. trimmer
#18 1st I.F. trimmer
#19 1st I.F. trimmer
#20 Broadcast oscillator trim. cond.
#21 Broadcast oscillator lag. cond.
#22 Preselector trimmer
#23 Preselector trimmer
#24 Green band trimmer
#25 Green band lagging
#26 Red band lagging
#27 Purple band lagging
#28) Purple band trimmers (underneath
#29) chassis) (See Figure #2)

MODELS 460 A,B,R
Ed. 2
Schematic,Resistances

UNITED AMERICAN BOSCH CORP.



RESISTANCE

COIL		ANT. GND	SEC	COIL		PLATE WDG	GRID WDG	COIL		SEC.	PLATE	[illegible]
3	PURPLE	.23	.10	7	PURPLE	.42	.14	11	PURPLE	.07	.40	.02
4	RED	.36	.32	8	RED	.78	.28	13	RED	.40	.76	.46
5	GREEN	1.3	2.2	9	GREEN	1.14	.22	15	GREEN	2.1		.71
6	BLACK	20.8	.56	10	BLACK	.51	.49	16	BLACK	6.7		.63

SOCKET VOLTAGES

TUBE	AC. FIL	CATHODE	SCREEN	PLATE
R.F. 58	2.65	2.5	92	247
1. DET. 58	2.65	5.5 3.5	38.5	220
OSC. 56	2.65	—	—	81
I.F. 58	2.65	3.5	92	247
2. DET. 2A6	2.65	1.1	—	100
PENT. 2A5	2.65	—	247	238
RECT. 80	5.0	—	—	348

CATHODE OF 1ST. DET. MEASURED WITH SWITCH ON BROADCAST 5.5 VOLTS. MEASURED ON SHORT WAVE BANDS 3.5 VOLTS.
LINE - 115 VOLTS POWER - 64 WATTS
POWER PENTODE BIAS - 19 VOLTS

SCHEMATIC WIRING DIAGRAM

MODELS 460 A,B,R
Ed.2
Socket,Trimmers
Alignment,Parts

UNITED AMERICAN BOSCH CORP.

Model 460 Ed2 American-Bosch Radio Receiver

CIRCUIT DESCRIPTION

The Model 460 Ed. 2 is a seven-tube superheterodyne all-wave receiver whose circuit comprises an R. F. amplifier stage, a first detector, an oscillator, a stage of I. F. amplification, a combination second detector, A.V.C. and first A. F. amplifier, a power output stage and a rectifier tube. Selectivity is provided by antenna tuning, R. F. stage tuning and four I.F. tuned circuits.

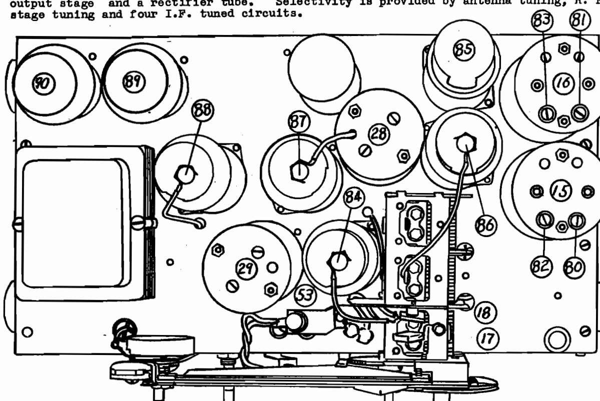


Figure #1

ALIGNMENT NOMENCLATURE

#12 Purple osc. lag condenser*
#14 Red osc. lag condenser*
#15 Green band osc. coil
#16 Broadcast osc. coil
#28 First I.F. transformer
#29 Second I.F. transformer
#72 Purple ant. trim condenser*
#73 Red ant. trim condenser*
#74 Green ant. trim. condenser*
#75 Broadcast ant. trim. condenser*
#76 Purple R.F. trim condenser*
#77 Red R.F. trim condenser*
#78 Green R.F. trim condenser*
#79 Broadcast R.F. trim condenser*
#80 Green osc. trim condenser
#81 Broadcast osc. trim. condenser
#82 Green osc. lag condenser
#83 Broadcast osc. lag condenser
#84 Type 58 R.F. amplifier
#85 Type 56 oscillator
#86 Type 58 first detector
#87 Type 58 I.F. amplifier
#88 Type 2A6 2nd detector, A.V.C., 1st A.F.
#89 Type 2A5 power pentode
#90 Type 80 rectifier
* Trimmers are shown in Fig. #2

ALIGNMENT PROCEDURE

To properly align the Model 460 Ed. 2 receiver, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. Top and bottom view of the chassis is shown in the Figures #1 and #2 and should be carefully studied before the actual work is started.

A - ALIGNING THE I.F. (456 K.C.)

1. Set test oscillator to 456 K.C.

2. Connect test oscillator leads through a .25 mfd. condenser between grid of I. F. tube #87 and frame of the chassis.

3. Adjust trimmers on I. F. coil #29 to maximum output, reducing output of test oscillator as required.

4. Connect test oscillator to grid of first detector tube #86 and adjust trimmers on I.F. coil #28 to maximum output.

B - ALIGNING THE R.F.

1. Set test oscillator to 1500 K. C. and connect to grid of first detector #86. Set station indicator to 1500 K.C.

2. Adjust #81 until signal is tuned in. This adjustment screw is designated by a color dot. Having obtained tune at this point set test oscillator and station selector to 600 K. C. and adjust #83 until the signal is tuned in. Now return to 1500 K.C. point with set and test oscillator and readjust #81 to obtain accurate adjustment to scale reading.

3. Connect test oscillator to antenna lead, making sure the capacity equivalent of .0002 mfd. is in the circuit.

4. Continue setting of 1500 K. C. and adjust #75 and #79 to maximum output. Check sensitivity and calibration at several points on the dial. Receiver should come correctly to kilocycle settings of important broadcasting stations.

C - ALIGNING THE GREEN BAND

1. Set test oscillator and station selector to 3600 K.C.

2. Adjust #80 until signal is tuned in. This adjustment screw is marked with a color dot.

3. Set test oscillator and station selector to 1600 K. C. and adjust #82 to maximum output.

4. Return to 3600 K. C. setting and repeat adjustment of #80. In adjusting the 3600 K.C. point, it is possible to obtain two different positions of the trimmer condenser. This denotes merely the plus and minus frequency between the set oscillator and test oscillator which will give the I. F. frequency. The correct setting of the trimmer condenser is the one wherein the adjustment screw is furthest out. In any event, any incorrect setting will always be denoted by lack of sensitivity and calibration when the receiver and test oscillator are tuned to 2500 K.C. (mid-band).

5. With station selector and test oscillator both adjusted to 3600 K.C., align the antenna and R.F. circuits by adjusting #74 and #78 to maximum output.

D - ALIGNING THE RED BAND

1. Set test oscillator to 8000 K. C. and tune receiver in region of 8000 K. C. on dial scale. Note where signal is tuned in. Next set test oscillator and receiver to 4000 K.C. and adjust #14 (on right side of chassis) until signal is heard.

2. Retune set and test oscillator to 8000 K. C., and observe pointer setting. Slight deviations from calibration can be compensated by manipulating the stiff wires connecting the oscillator coil #13 to the switch.

3. With set and test oscillator both adjusted to 8000 K.C., align the antenna and R.F. circuits by adjusting #73 and #77 to maximum output.

E - ALIGNING THE PURPLE BAND

1. Set test oscillator to 18,000 K.C. or if this is not available then adjust to highest frequency preferably 15,000 K. C. Tune set to this frequency a d observe where signal is received on the dial scale. Then place test oscillator on 10,000 K. C. and adjust #12 (on right side of chassis) until signal is tuned in at 10. on dial scale.

2. Now return both test oscillator and receiver to 18,000 K. C. Increase setting of test oscillator until signal can be turned in at two points on dial (say 18. and 17.), then with pointer of set at 18. adjust #72 and #76 for maximum output decreasing test signal as signal becomes better tuned. At correct adjustment a very loud signal will be obtained at 18 on the dial while a feeble signal will be observed at 17. This is a practical illustration of the effectiveness of preselection.

The adjustment instructions just given apply to the Model 460 Ed-2 receiver which is in reasonable operating condition, but in some manner has been thrown out of adjustment. Obviously, before the radio service man can go through with the instructions given here, he must assure himself that defective tubes, injured parts, such as punctured condensers, shorted variable condensers, opened resistors, damaged high frequency coils, etc., are not such as to cause the set to be inoperative on one or more bands of frequencies.

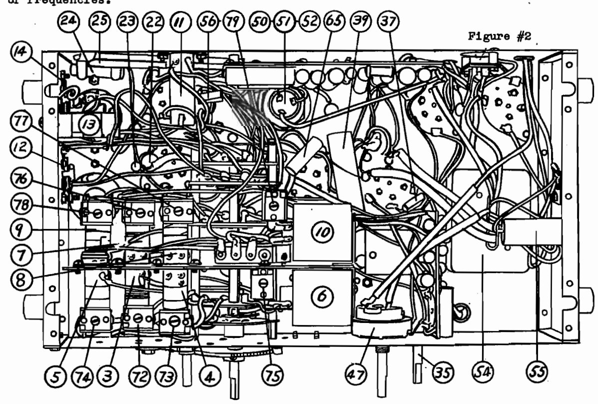


Figure #2

SERVICE PARTS LIST

Model 460 Ed.2

Part No.	Dia. #	Description of Parts
108056	1	Variable condenser
108057	2	Wave switch
108077	3	Ant. Transf. (purple)
108075	4	Ant. Transf. (red)
108073	5	Ant. Transf. (green)
108070	6	Ant. Transf. (black)
108076	7	R.F. Transf. (purple)
108074	8	R.F. Transf. (red)
108072	9	R.F. Transf. (green)
108071	10	R.F. Transf. (black)
105687	11	Osc. coil (purple)
103800	12	Comp. condenser
105689	13	Osc. coil (red)
103800	14	Comp. condenser
105683	15	Osc. assembly (green)
105684	16	Osc. assembly (black)
106417	VC 17	100 mmf. mica
105246	VC 18	.5 megohm
106386	RS 19	.05 mf. 90 V.
105260	RS 20	300 ohms
106386	C 21	.05 mf. 90 V.
106386	C 22	.05 mf. 90 V.
105245	C 23	2000 ohms
106386	C 24	.05 mf. 90 V.
104418	C 25	Tapped resistor
102492	RL 26	.05 mf. 250 V.
102492	RL 27	.05 mf. 250 V.
108063	28	I.F. transformer
108064	29	I.F. transformer
106386	RL 30	.05 mf. 90 V.
105260	RL 31	300 ohms
106386	RS 32	.05 mf. 90 V.
101143	IF 33	100 mmf. mica
105276	IF 34	50,000 ohms
105562	35	Vol. Cont. 5 meg.
103659	RS 36	.005 mf. 250 V.
101143	C 37	100 mf. mica
105281	RS 38	1 megohm
102499	C 39	.5 mf. 90 V.
105249	RL 40	5000 ohms
102494	RL 41	.1 mf. 250 V.
105279	RL 42	.25 megohm
106386	RL 43	.05 mf. 90 V.
107363	RL 44	70,000 ohms
102504	RL [illegible]	.02 mf. 250 V.
105279	RL 46	.25 megohm
107250	47	Tone Cont. .25 meg.
106403	RS 48	.001 mf. 500 V.
106277	RL 49	.01 mf. 450 V.
	(50	4 mf. 450 V.

Part No.	Dia. #	Description of Parts
106665	Ed2(51	20 mf. 25 V.
	(52	8 mf. 475 V.
98713	53	Dial light
105781	54	Power transformer
107615	C 55	.01 mf. 500 V.
101143	C 56	100 mmf. mica
105274	C 57	20,000 ohms
100814	C 58	500 ohms
106386	RL 59	.05 mf. 90 V.
99777	RL 60	25,000 ohms 1 W.
103062	RL 61	400 ohms 1 W.
105246	RS 62	.5 megohm
102493	RS 63	.05 mf. 90 V.
105281	RS 64	1 megohm
106386	C 65	.05 mf. 90 V.
105278	RS 66	100,000 ohms
105272	67	10,000 ohms
106386	68	.05 mf. 90 V.
108043	C 69	.0001 mmf. mica
103062	C 70	400 ohms 1 W.
107875	C 71	Power transformer
107503	72	4-25 mmf.
107503	73	4-25 mmf.
107503	74	4-25 mmf.
107503	75	4-25 mmf.
107503	76	4-25 mmf.
107503	77	4-25 mmf.
107503	78	4-25 mmf.
107503	79	4-25 mmf.
	80	7-70 mmf. part of 106321
	81	7-70 mmf. part of 106333
	82	1500 mmf. part of 106321
	83	270-600 mmf. part of 106333
58	84	R.F. tube
56	85	Oscillator tube
58	86	1st detector tube
58	87	I.F. tube
2A6	88	2nd detector tube
2A5	89	Output tube
80	90	Rectifier tube

MAIN ASSEMBLIES

107960	Chassis assembly - 460 Ed-2 A,B,R
107370	Cabinet - Model 460 Ed. 2 A
107371	Cabinet - Model 460 Ed. 2 B
107372	Cabinet - Model 460 Ed. 2 R
107284	Speaker - Model 460 Ed. 2 A & B
107369	Speaker - Model 460 Ed. 2 R

Parts marked "RL" are on Large Resistance Strip.
Parts marked "RS" are on Small Resistance Strip.
Parts marked "C" are on chassis.
Parts marked "VC" are on Variable Condenser.

CABLES & CABLE ASSEMBLIES

101711	Line cable
105952	Antenna cable assembly
104445	Ground lead assembly

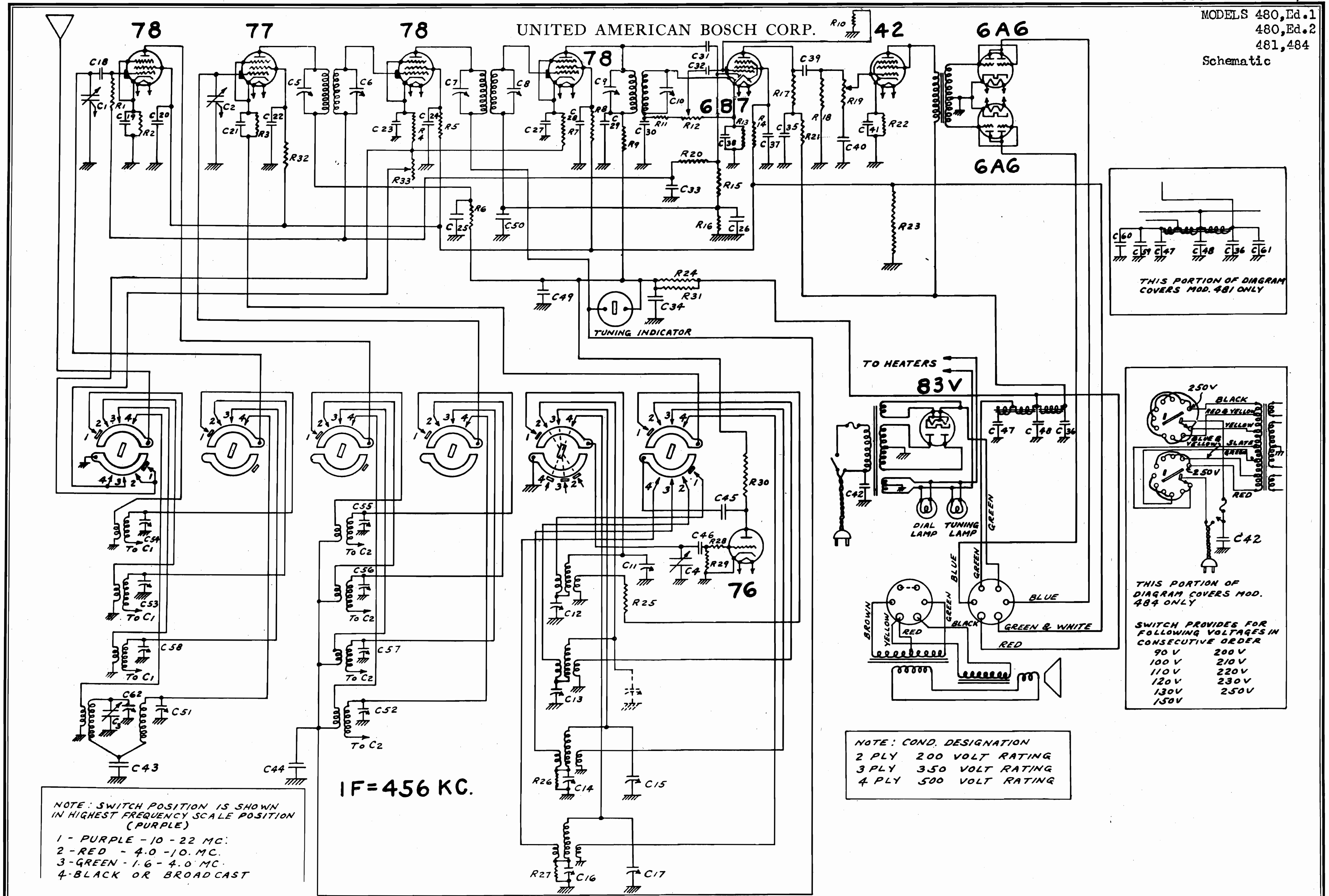
TRANSFORMERS

105781 Power trans. - Model 460 Ed-2

SPEAKER (107284) 460 Ed. 2A

SPEAKER (107369) 460 Ed. 2 R

RESISTOR STRIP


MODELS 480,Ed.1
480,Ed.2
481,484
Schematic
UNITED AMERICAN BOSCH CORP.
78
77
78
78
42
6A6
6B7
6A6
TUNING INDICATOR
TO HEATERS
83V
DIAL LAMP
TUNING LAMP
76
IF=456 KC.
THIS PORTION OF DIAGRAM COVERS MOD. 481 ONLY
THIS PORTION OF DIAGRAM COVERS MOD. 484 ONLY
SWITCH PROVIDES FOR FOLLOWING VOLTAGES IN CONSECUTIVE ORDER
90 V 200 V
100 V 210 V
110 V 220 V
120 V 230 V
130 V 250 V
150 V
NOTE: SWITCH POSITION IS SHOWN IN HIGHEST FREQUENCY SCALE POSITION (PURPLE)
1 - PURPLE - 10 - 22 MC.
2 - RED - 4.0 - 10. MC.
3 - GREEN - 1.6 - 4.0 MC.
4 - BLACK OR BROADCAST
NOTE: COND. DESIGNATION
2 PLY 200 VOLT RATING
3 PLY 350 VOLT RATING
4 PLY 500 VOLT RATING
BLUE
GREEN
GREEN & WHITE
RED
BLACK
BROWN
YELLOW
250V
RED & YELLOW
BLUE & YELLOW
SLATE

MODELS 470 G,U
471 G,U
474 G,U
Schematic,Voltage
Resistor Data

UNITED AMERICAN BOSCH CORP.

MAIN ASSEMBLIES

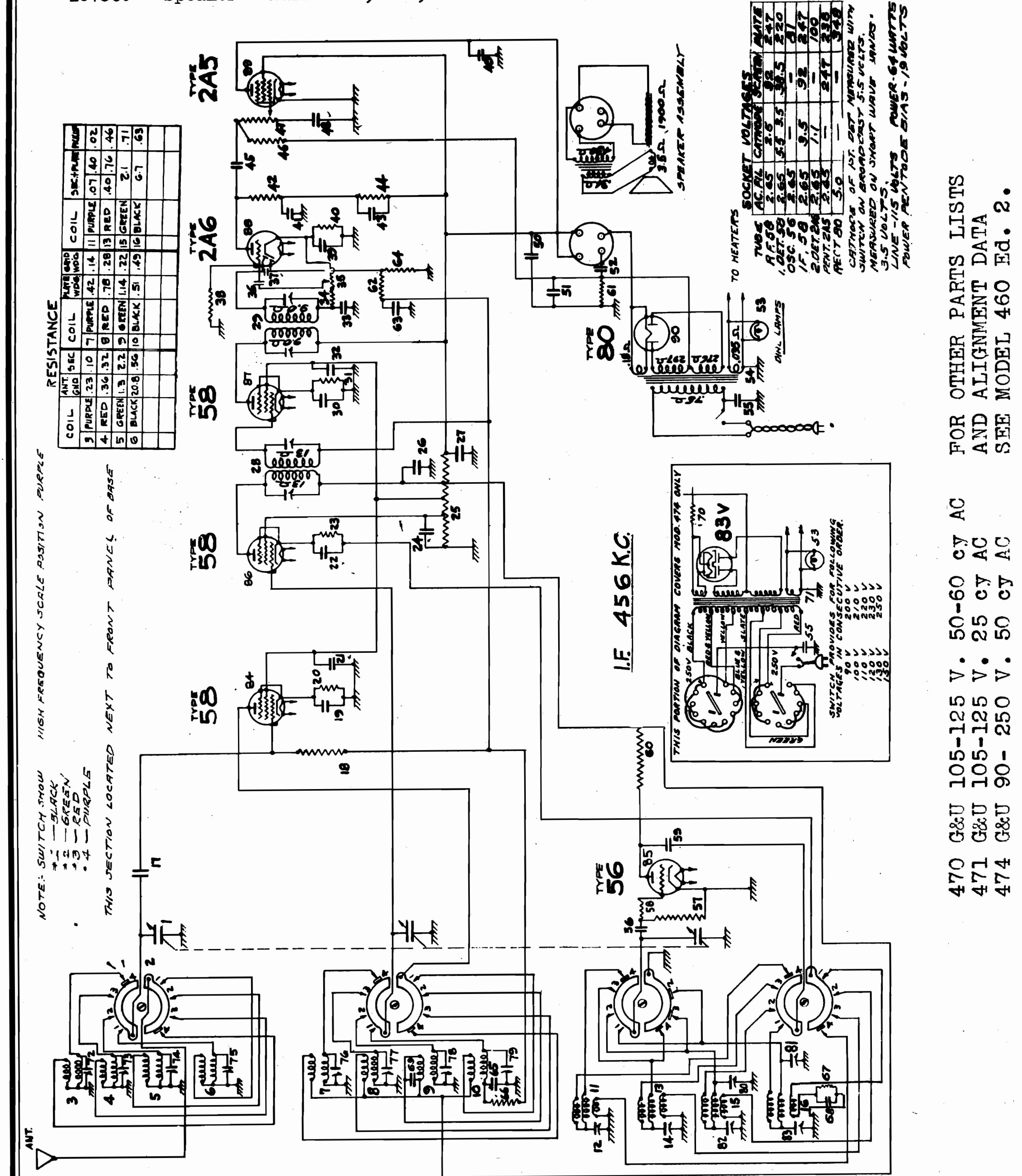
CH9513A	Chassis assembly - 474G & U	
CH9516A	Chassis assembly - 471G&U	
CH 959A	Chassis assembly - 470G & U	
KA 952	Cabinet - Mdls 470U,471U,474U	
KA 953	Cabinet - Mdls 470G,471G,474G	
107284	Speaker - Mdls 470U,471U,474U	
107369	Speaker - Mdls 470G,471G,474G	

CABLES & CABLE ASSEMBLIES

CB9512	Line cable

TRANSFORMERS

105781	Power trans.- Mdls 470G & U
106098	Power trans.- Mdls 471G & U
107875	Power trans.- Mdls 474G & U



MODELS 480,Ed.1
480,Ed.2
481,484
Socket,Trimmers
Alignment,Parts

UNITED AMERICAN BOSCH CORP.

Model 480 Ed1 and 2 American-Bosch Radio Receiver

CIRCUIT DESCRIPTION

The Model 480 is a ten-tube all-wave receiver capable of receiving radiophone transmission in the complete frequency range between 540 kilocycles and 22,000 kilocycles. The receiver is designed to have four wave bands, namely, the Black band which covers the frequency range of 540 to 1550 K.C., the Green band, 1550 to 4000 K.C., the Red band, 4,000 to 10,000 K.C., and the Purple band, 10,000 to 22,000 K.C.

The circuit comprises an R. F. stage, a first detector, an oscillator, two stages of I. F. (456 K. C.), a combination second detector, A.V.C., and first audio stage, an audio driver stage and a power output stage of two tubes in parallel push-pull.

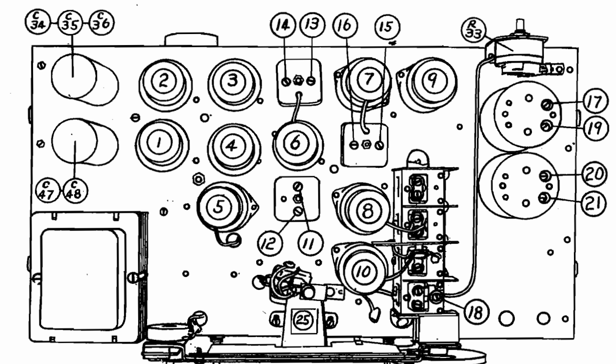


Figure #1

NOMENCLATURE

#1 83V rectifier tube
#2 6D6 Push-pull output tube
#3 6D6 Push-pull output tube
#4 42 driver tube
#5 6B7 2nd det. A.V.C., 1st A.F. tube
#6 78 2nd I.F. tube
#7 78 1st I.F. tube
#8 77 1st detector tube
#9 76 Oscillator tube
#10 78 R.F. ampl. tube
#11 3rd I.F. trimmer
#12 3rd I.F. trimmer
#13 2nd I.F. trimmer
#14 2nd I.F. trimmer
#15 1st I.F. trimmer
#16 1st I.F. trimmer
#17 B.B. oscillator trim. (color coded)
#18 B.B. antenna trimmer
#19 B.B. Osc. lag. cond.
#20 G.B. Osc. trimmer (color coded)
#21 G.B. Osc. lag. cond.
C11 P.B. Osc. trimmer *
C12 P.B. Osc. lag. cond. *
C13 R.B. Osc. lag. cond. *
C54 B.B. preselector trim.*
C55 B.B. R.F. trimmer *
C56 R.B. antenna trimmer *
C57 P.B. antenna trimmer *
C58 P.B. R.F. trimmer *
C59 R.B. R.F. trimmer *
C60 G.B. R.F. trimmer *
C61 G.B. antenna trimmer *
* Trimmers shown in Fig. #2

ALIGNING THE RECEIVER

To properly align the Model 480 chassis, it is essential to use a high grade modulated test oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be relatively weak or it will cause the A.V.C. to function making a correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment condensers. Top and bottom views are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

A- I.F. ADJUSTMENT (456 K.C.)

1. Set test oscillator to 456 K.C.

2. Adjust sensitivity control (rear right-hand corner of chassis) to maximum sensitivity position.

3. Connect output meter across voice coil of speaker.

4. Connect in series with side of test oscillator leads, a .25 mfd. blocking condenser.

5. Connect test oscillator to grid of 2nd I. F. tube #6 and adjust #11 and #12 to maximum output reducing test oscillator signal as required.

6. Connect test oscillator to grid of 1st I. F. tube #7 and adjust #13 and #14 to maximum output.

7. Connect test oscillator to grid of 1st detector tube #8 and adjust #15 and #16 to maximum output.

B- ADJUSTMENT OF BROADCAST BAND

Note: Because of the sensitivity of the receiver, it is difficult to make an accurate R.F. adjustment unless the set sensitivity is reduced. This is accomplished by turning the sensitivity control (R33) so that the set is in its least sensitive position. This sensitive control is operative on the Broadcast and Green bands and is switched out on the Red and Purple bands.

1. Set test oscillator and station indicator to 1400 K.C.

2. Connect test oscillator to grid of 1st detector tube #8 and adjust #17 (color coded) until signal is tuned in.

3. Connect test oscillator to antenna and ground leads of the chassis making sure that capacity equivalent of .0002 mfd. is in series with high side of test oscillator leads.

4. Adjust #18 and the two trimmers located underneath the chassis C54 and C55 (see Fig. #2) until signal is correctly tuned in.

5. Set test oscillator and station indicator to 600 K.C. and adjust #19 to maximum output.

6. Return to 1400 K.C. setting and readjust #17 for correct calibration.

C- ADJUSTMENT OF GREEN BAND

1. Adjust wave change switch to Green band position and set test oscillator and station indicator to 3600 K.C.

2. Adjust #20 (color coded) until signal is tuned in.

Note: In adjusting the 3600 K.C. point it is possible to obtain two different positions of the trimmer condenser. This denotes, merely, the plus and minus frequency between the set oscillator and test oscillator which will give the I.F. frequency. The correct setting of the trimmer condenser is the one wherein the adjustment screw is furthest out. In any event, an incorrect setting will always be denoted by lack of sensitivity and incorrect calibration when the receiver and test oscillator are tuned to 2500 K. C. (mid-band).

3. Adjust trimmers C60 and C61 to maximum output.

4. Set test oscillator and station indicator to 1800 K.C. and adjust #21 until signal is at maximum.

5. Return to 3600 K.C. setting and readjust #20 for correct calibration.

D- ADJUSTMENT OF RED BAND

1. Adjust wave change switch to Red band position.

2. Set test oscillator and station indicator to 9000 K.C.

Note: Underneath the chassis fastened to the back plate is the Red band oscillator coil assembly #22. A Green wire twisted around a Green and White wire will be noticed. This twist serves to make the slight adjustment necessary to bring this band to correct calibration. If the receiver is not on calibration, an increase or decrease of the twist will serve to readjust the calibration. This adjustment will serve for about one-half a scale division in either way. If the receiver is initially off more than this, it indicates a fault in the oscillator circuit such as a poor or incorrect connection, open resistor, defective oscillator tube or other major fault.

Assuming that the correction can be made, the set is now placed on its proper setting and adjustment is made of the preselector trimmers C56 and C59 for maximum output.

3. Set test oscillator and station selector to 5000 K.C. and adjust C13 to maximum output.

4. Return to 9000 K.C. setting and check calibration.

E- ADJUSTMENT OF PURPLE BAND

1. Adjust wave change switch to Purple band position.

2. Set test oscillator and station indicator to 20,000 K. C. and adjust C11 to maximum output.

3. Adjust C57 and C58 for maximum output.

4. Set test oscillator and station indicator to 12,000 K.C. and adjust C12 until signal is tuned in.

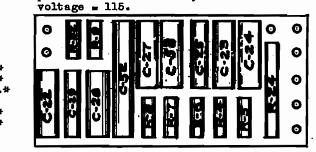
5. Return to 20,000 K.C. setting and recheck C11, C57 and C58.

Note: Make sure that correct adjustment is made at 20,000 K. C. by observing that the image is received at approximately 19,000 K. C. on the dial when the input signal from the test oscillator is increased to force the signal through the selector circuits.

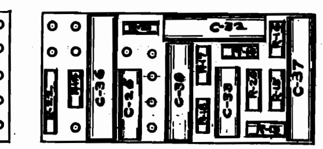
SOCKET VOLTAGES

Tube	Stage	Filament	Plate	Screen	Cathode
83V	Rectifier	5.0			340
6A6	Audio power output	6.0	305		
6A6	Audio power output	6.0	305		
42	Audio driver	6.0	280	280	30
6B7	2nd Det., AVC, 1st audio	6.0	12	55	3.8
78	I.F. amplifier	6.0	240	100	4.5
78	I.F. amplifier	6.0	230	100	4.5
78	I.F. amplifier	6.0	240	100	2.5
77	1st Detector	6.0	240	100	4.5
76	Oscillator	6.0	95		

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and the type of meter employed. Line voltage = 115.



Resistor Strip #107508



Resistor Strip #107509

SERVICE PARTS LIST

Model 480 Ed. 1 (105-125 Volts 60 Cycle AC)
Model 480 Ed. 2 (105-125 Volts 60 Cycle AC)
Model 481 - - - (105-125 Volts 25 Cycle AC)
Model 484 - - - (90-250 Volts 50 Cycle AC)

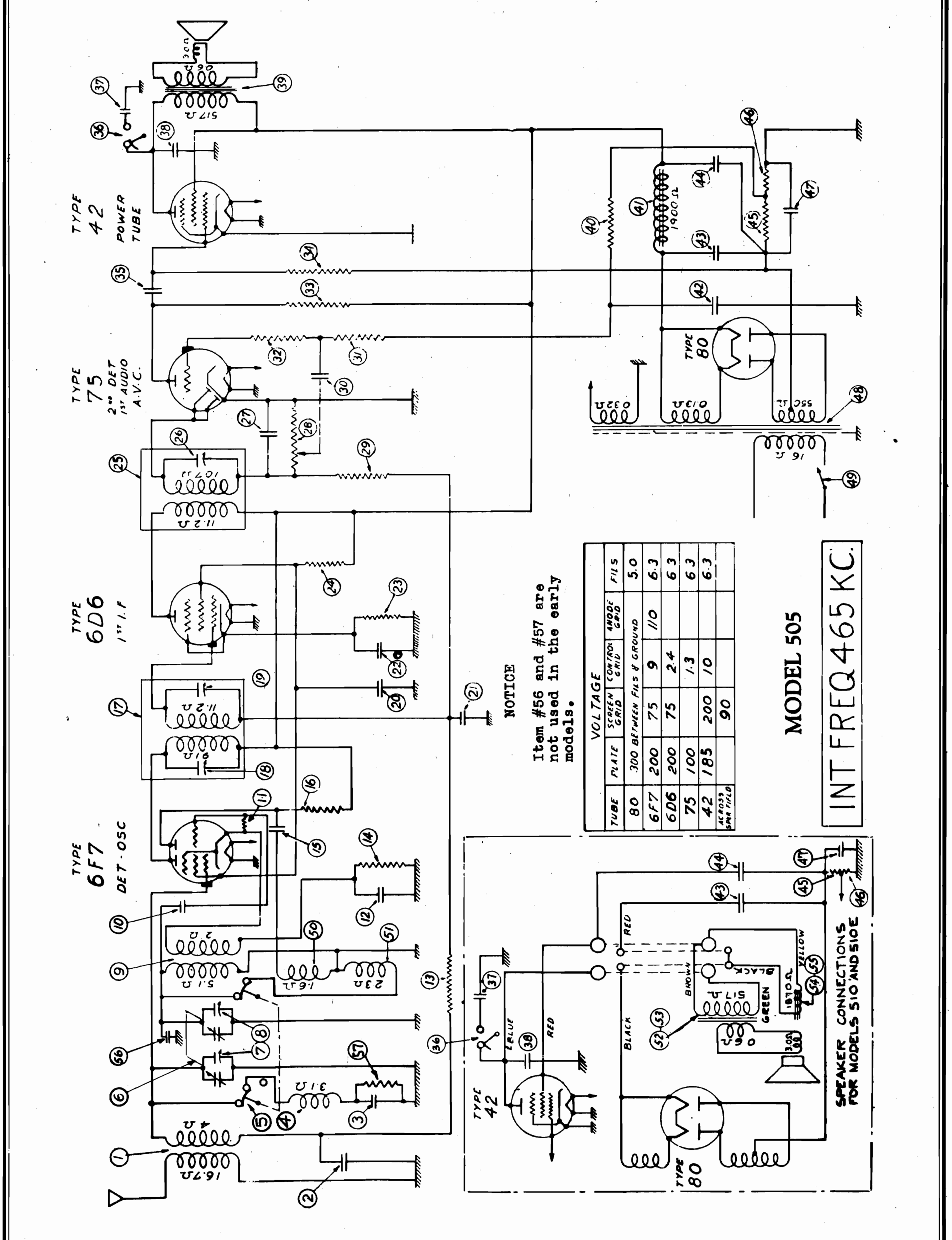
Part No.	Dia. #	Description of Parts
		CONDENSERS
106883	C1, C2, C3, C4	Variable condenser
	C5, C6	Part of 107494
	C7, C8	Part of 107495
	C9, C10	Part of 107496
107529	C11	7-70 mmf.
103800	C12	1000-2000 mmf.
107530	C13	500-1000 mmf.
	C14	400-800 mmf.) Part of
	C15	3-40 mmf.) 107482
	C16	270-600 mmf.) Part of
	C17	7-70 mmf.) 107481
106417	C18	100 mmf. mica
106386	C19	.05 mf. 200 V.
106386	C20	.05 mf. 200 V.
106386	C21	.05 mf. 200 V.
106386	C22	.05 mf. 200 V.
106386	C23	.05 mf. 200 V.
102492	C24	.05 mf. 350 V.
103659	C25	.005 mf. 350 V.
106386	C26	.05 mf. 200 V.
106386	C27	.05 mf. 200 V.
106386	C28	.05 mf. 200 V.
103659	C29	.005 mf. 350 V.
106417	C30	100 mmf. mica
106417	C31	100 mmf. mica
102504	C32	.02 mf. 350 V.
106386	C33	.05 mf. 200 V.
107510	C34	4 mfd. electrolytic
	C35	4 mfd. electrolytic
	C36	8 mfd. electrolytic
102499	C37	.5 mf. 200 V.
102499	C38	.5 mf. 200 V.
102504	C39	.02 mf. 350 V.
106403	C40	.001 mf. 500 V.
107516	C41	10 mfd. 25V.
107615	C42	.01 mf. 500 V.
106386	C43	.05 mf. 200 V.
102504	C44	.02 mf. 350 V.
102504	C45	.02 mf. 350 V.
106417	C46	100 mmf. mica
CE 955	C47	8 mfd. electrolytic
	C48	8 mfd. electrolytic
106805	C49	.1 mfd. 350 V.
106386	C50	.05 mf. 200 V.
	C51	4-25 mmf.) Part of
	C52	4-25 mmf.) 107138
	C53	4-25 mmf. Part of 107487
	C54	7-70 mmf.) Part of
	C55	7-70 mmf.) 107506
	C56	4-25 mmf. Part of 107492
	C57	4-25 mmf. Part of 107491
	C58	4-25 mmf. Part of 107486
	C59	8 mfd. elec.) Mod.481
	C60	4 mfd. elec.) Part of
	C61	4 mfd. elec.) 107510
	C62	Part of 106883
		RESISTORS
105246	R1	1/2 meg. 1/4 W.
105260	R2	300 ohms 1/4 W.
105249	R3	5000 ohms 1/4 W.
105267	R4	1000 ohms 1/4 W.
105249	R5	5000 ohms 1/4 W.
105267	R6	1000 ohms 1/4 W.
105267	R7	1000 ohms 1/4 W.
105249	R8	5000 ohms 1/4 W.

Part No.	Dia. #	Description of Parts
		RESISTORS (Cont'd)
105267	R9	1000 ohms 1/4 W.
105281	R10	1 meg. 1/4 W.
	R11	50,000 ohms 1/4 W. Part of 107496
107585	R12	1/2 meg. vol. cont.
105245	R13	2000 ohms 1/4 W.
105276	R14	50,000 ohms 1/4 W.
105281	R15	1 meg. 1/4 W.
105279	R16	250,000 ohms 1/4 W.
105276	R17	50,000 ohms 1/4 W.
105279	R18	250,000 ohms 1/4 W.
107584	R19	1/4 meg. tone control
105281	R20	1 meg. 1/4 W.
105278	R21	100,000 ohms 1/4 W.
105270	R22	2500 ohms 1/2 W.
107583	R23	1800 ohms 30 W.
107572	R24	5000 ohms 1 W.
107614	R25	100 ohms 1/4 W.
	R26	5000 ohms 1/4 W. part of 107482
	R27	2000 ohms 1/4 W. part of 107481
105255	R28	50 ohms 1/4 W.
105274	R29	20,000 ohms 1/4 W.
102345	R30	20,000 ohms 1 W.
107572	R31	5,000 ohms 1 W.
105249	R32	5,000 ohms 1/4 W.
VR 953	R33	10,000 ohms variable
		MAIN ASSEMBLIES
107780		Chassis assembly - 480D Ed. 2
107480		Chassis assembly - 480
107781		Chassis assembly - 481
107784		Chassis assembly - 484
107377		Cabinet
107594		Speaker assembly
		COILS
107488		Antenna coil - purple band
107493		R.F. coil - purple band
107487		Antenna coil - red band
107492		R.F. coil - red band
107486		Antenna coil - green band
107491		R.F. coil - green band
107485		Antenna coil - broadcast band
107489		Preselector coil - broadcast band
107490		R.F. coil - broadcast band
107494		1st I.F. coil assembly
107495		2nd I.F. coil assembly
107496		3rd I.F. coil assembly
107481		Osc. coil assemb.- broadcast band
107482		Osc. coil assembly- green band
107483		Osc. coil assembly- red band
107484		Osc. coil assembly- purple band
		TRANSFORMERS
107105		Power transformer - 480
107709		Power transformer - 480 Ed. 2
107870		Power transformer - 484
107719		Power transformer - 481
107504		Iron core filter choke- 3 leads
103554		Iron core filter choke- 2 leads
107564		Input transformer assembly
		CABLES & CABLE ASSEMBLIES
105952		Antenna cable assembly
104445		Ground cable assembly
101711		Line cable assembly

SPEAKER (107594) PARTS

UNITED AMERICAN BOSCH CORP.

MODEL 505
Schematic
Voltage



NOTICE

Item #56 and #57 are not used in the early models.

VOLTAGE

TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS
80	300 BETWEEN FILS & GROUND				5.0
6F7	200	75	9	110	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SPKR FIELD		90			

MODEL 505
Socket, Trimmers
Alignment, Parts

UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH RADIO MODEL 505

Five Tube, Two Band, Superheterodyne Receiver

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes	1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply	105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption	46 Watts
Tuning Ranges	530 to 1500 K.C. and 1500 to 3300 K.C.
Maximum Undistorted Output	1.5 Watts
Maximum Output	2.8 Watts
Line-Up Frequencies	I.F. 465 K.C., 1400 K.C.

GENERAL DESCRIPTION

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 530 to 1500 K.C. and a police band which extends from 1500 to 3300 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A onventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full and turn tone control knob to the right hand position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .25 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

SERVICE PARTS LIST MODEL 505

Dia. #	Part #	Description
1	RC 9588	Antenna coil assy.
2		.05 mfd. 200 V. cond. - part of SA 105327
3	CM 958	400 mmfd. mica cond.
4		Police pre-selector coil-part of RC 9588
5	SW 9519	Switch assembly
6	CG 9522	Variable gang condenser
7-8		Trimmer condensers - part of CG 9522
9	RC 9589	Oscillator coil assy.
10	SA 106417	100 mmfd. mica condenser
11	SA 105276	50,000 ohm ½ W. resistor
12	SA 106386	.05 mfd. 200 V. cond.
13	SA 105279	250,000 ohm ½ W. res.
14	SA 105269	1800 ohm ½ W. resistor
15	SA 106277	.01 mfd. 400 V. cond.
16	SA 100197	25,000 ohm ½ W. resistor
17	IC 9532	1st I.F. transformer
18-19		I.F. trimmer condensers - part of IC 9532
20	SA 102494	.1 mfd. 400 V. condenser
21-22		.05 mfd. 200 V. condensers - part of SA 105327
23	SA 105264	500 ohm ½ W. resistor
24	SA 101163	75,000 ohm ½ W. resistor
25	IC 9533	2nd I.F. transformer
26		I.F. trimmer condenser - part of IC 9533
27	SA 106417	100 mmfd. mica condenser
28	VR 957	Volume control and line switch (500,000 ohm)
29	SA 105281	1 meg. ½ W. resistor
30	CW 9512	.02 mfd. 400 V. condenser
31	SA 105281	1. meg. ½ W. resistor
32	SA 105278	100,000 ohm ½ W. resistor
33	SA 105279	250,000 ohm ½ W. resistor
34	SA 100195	250,000 ohm ½ W. resistor
35	CW 9512	.02 mfd. 400 V. condenser
36		Tone control switch - part of SW 9519
37	CW 9512	.02 mfd. 400 V. condenser
38	SA 103695	.01 mfd. 600 V. condenser
39	SA 107357	Speaker output trans.
40	SA 105276	50,000 ohm ½ W. resistor
41	SA 107358	Speaker field coil - (1900 ohm)
42		.05 mfd. 200 V. condenser - part of SA 105327
43	CE 9512	12 mfd. electrolytic cond.
44	CE 9511	8 mfd. electrolytic cond.
45		320 ohm resistor - part of RE 9513
46		30 ohm resistor - part of RE 9513
47	CE 958	10 mfd. electrolytic cond.
48	TR 9511	Power transformer
49		Line switch-part of VR957
50		Oscillator feed back coil - part of RC 9589
51		Police oscillator coil - part of RC 9589
56	SA 108043	.00001 mfd. mica cond.
57	SA 105272	10,000 ohm ½ W. res.

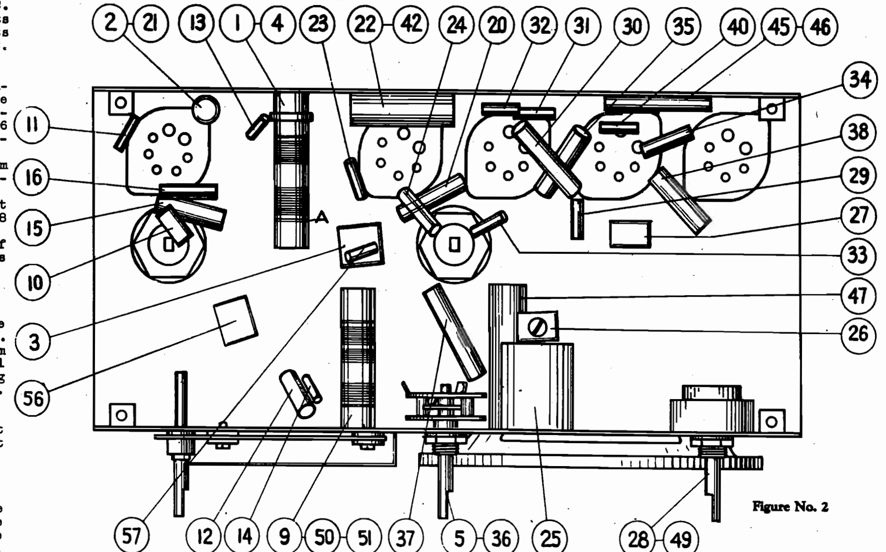


Figure No. 2

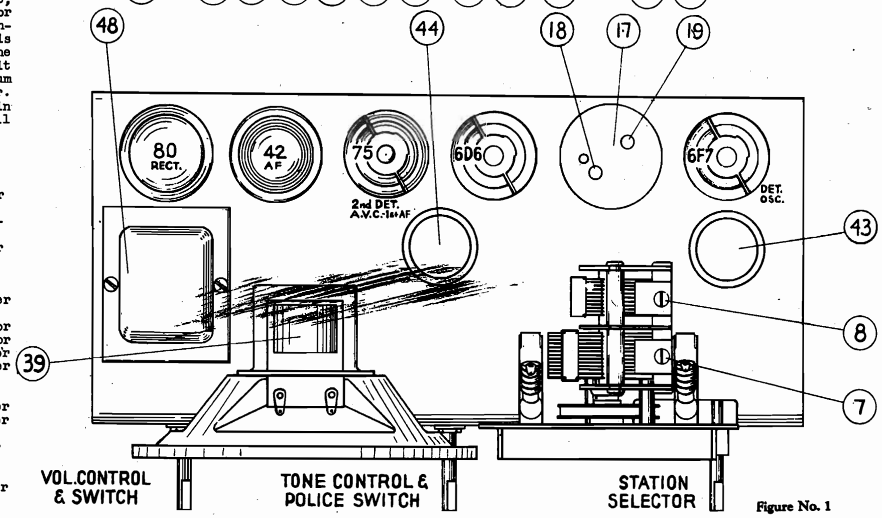
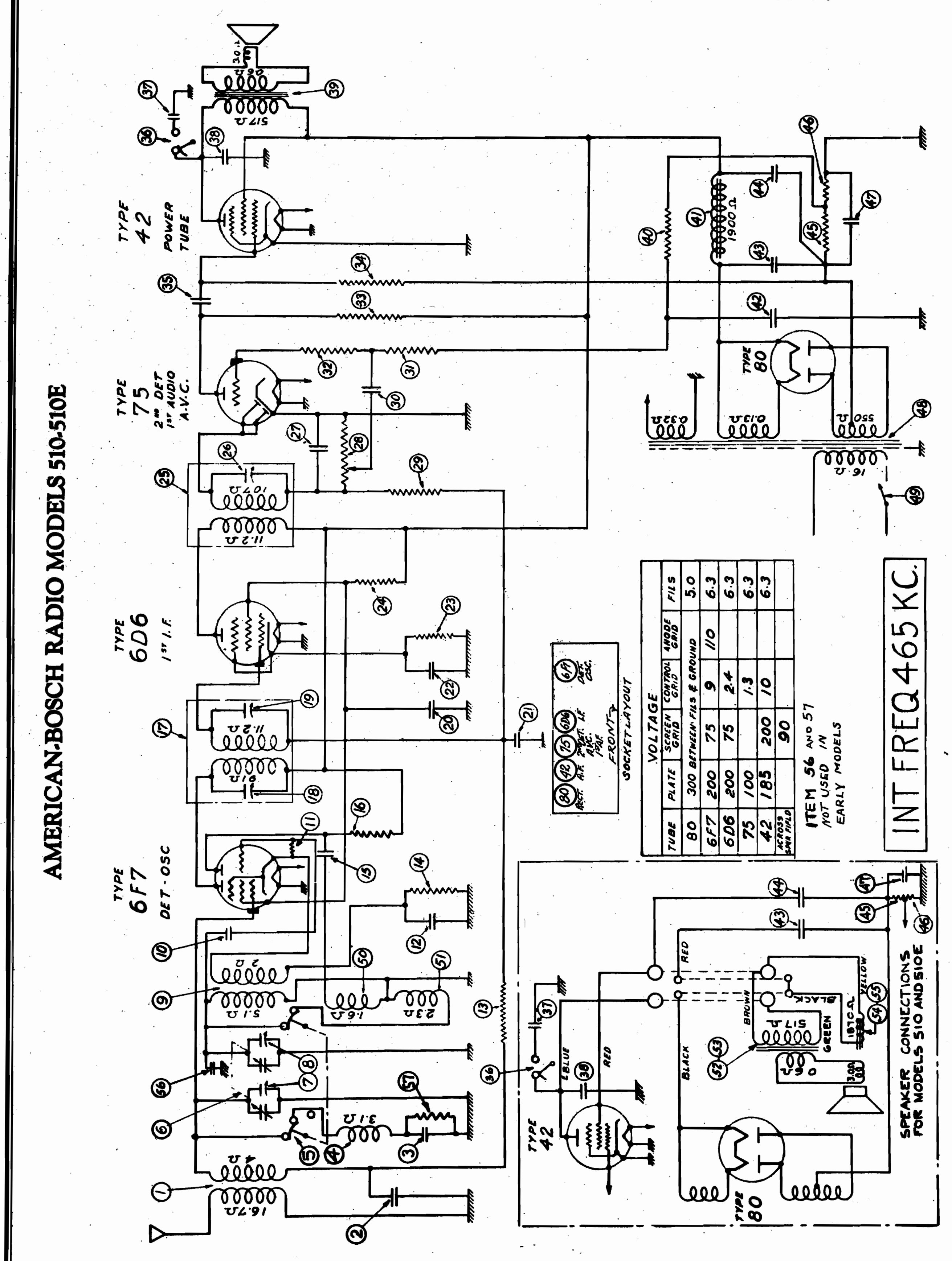


Figure No. 1

UNITED AMERICAN BOSCH CORP.

MODELS 510, 510E
Schematic, Voltage Socket

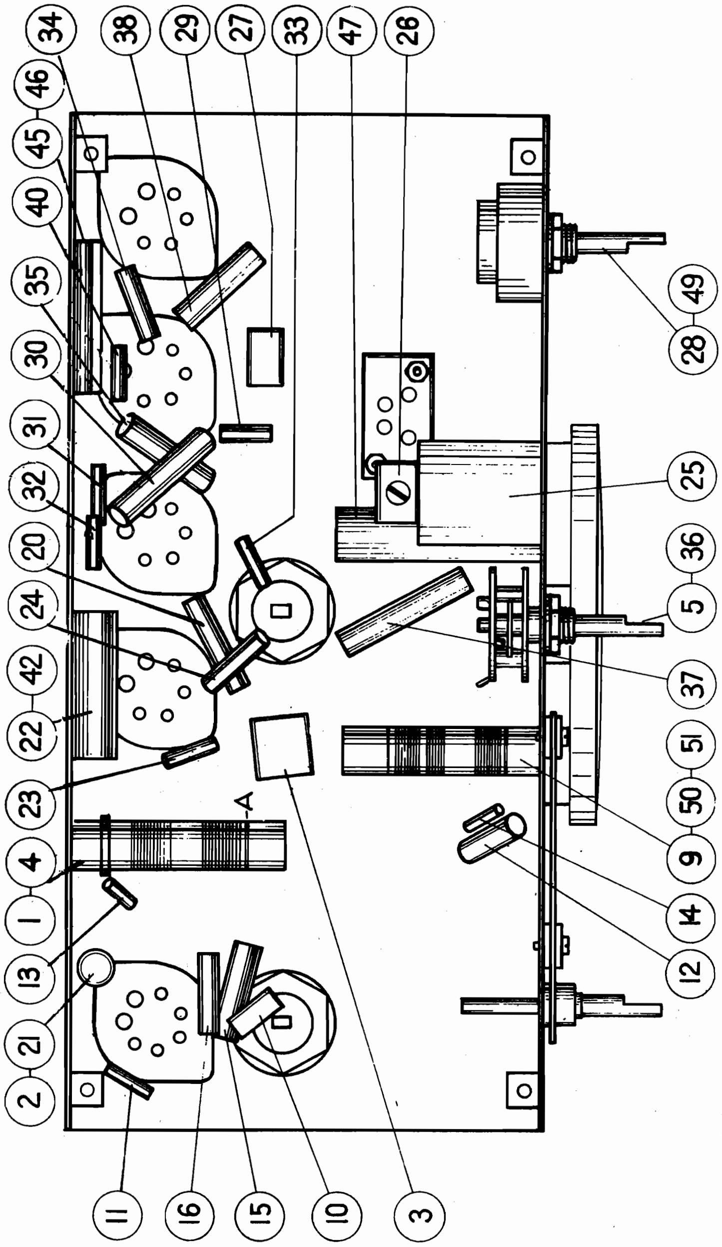


VOLTAGE

TUBE	PLATE	SCREEN GRID	CONTROL GRID	ANODE GRID	FILS
80	300 BETWEEN FILS & GROUND				5.0
6F7	200	75	9	110	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SPKR FIELD		90			

MODELS 510,510E
Trimmers,Alignment

UNITED AMERICAN BOSCH CORP.



LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in figures #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full and turn tone control knob to the right hand position.
2. Connect output meter across voice coil
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test oscillator is applied to the grid of the 6D6 I.F. tube thru a .25 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (see Fig.#1) to maximum output.
6. With test signal still on the grid of the 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. series condenser and adjust trimmer #7 to maximum output.

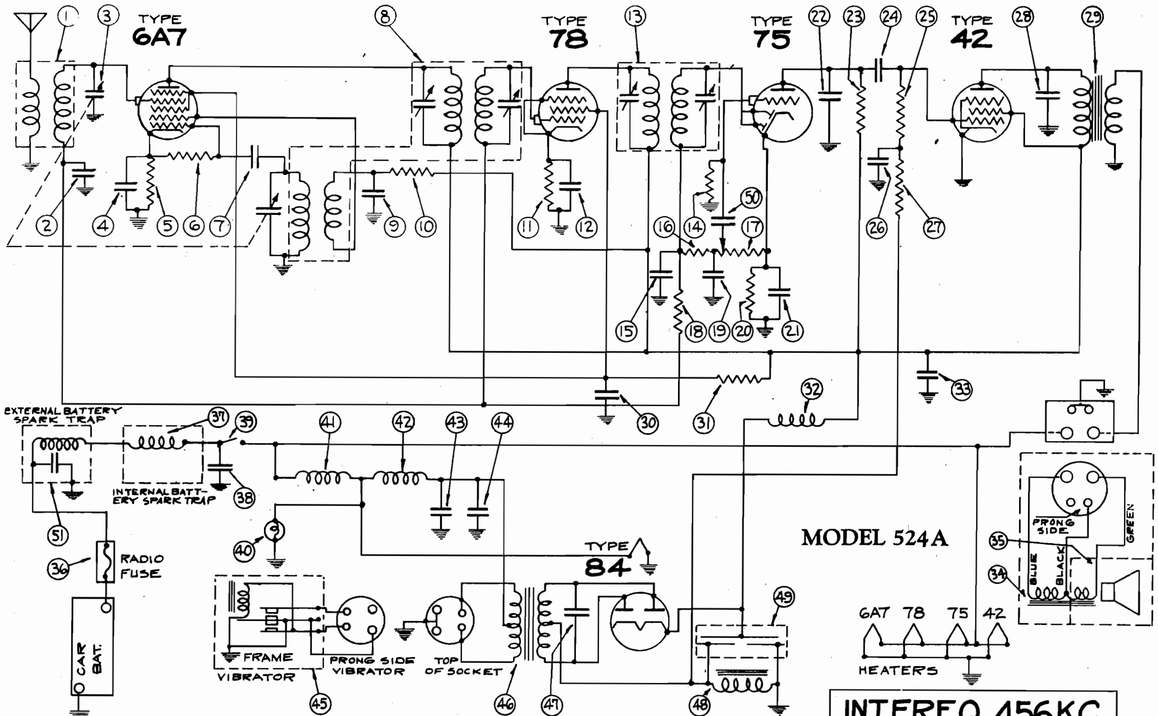
ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil has been changed.
In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

Type and Number of Tubes	1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply	105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption	46 Watts
Tuning Ranges	530 to 1500 K.C. and 1500 to 3300 K.C.
Maximum Undistorted Output	1.5 Watts
Maximum Output	2.8 Watts
Line-Up Frequencies	I.F. 465 K.C., 1400 K.C.

UNITED AMERICAN BOSCH CORP.

MODEL 524A
Editions 1,2,2D,2G
Schematic,Voltage
Socket,Trimmers
Resistor Data

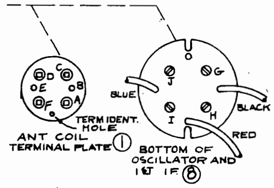


INT.FREQ.456KC

WINDING RESISTANCE

* REFER TO SKETCHES

PART	FUNCTION	PRIMARY RESIST.	PRIMARY IDENT. *	SECONDARY RESIST.	SECONDARY IDENT. *
1	ANT. COIL	2 Ω	C TO D	4 Ω	A TO F
8	OSCILLATOR	3 Ω	G TO I	4 Ω	H TO J
8	1ST I F	13 Ω	RED TO BLUE	13.5 Ω	GREEN TO BLACK
13	2ND I F	14 Ω	RED TO BLUE	13 5 Ω	GREEN TO BLACK
29	OUTPUT	550 Ω	GREEN TO BROWN		
46	POWER	0.3 Ω	BLACK TO GREEN	860 Ω	RED TO BLUE
48	CHOKE	350 Ω	BLACK TO GND.		



SOCKET VOLTAGE

TUBE	STAGE	FIL.	PLATE	CATH	SCREEN	TRIODE	OUTPUT GRID BIAS MEASURED ACROSS POWER PACK CHOKE (48)
6A7	DET. OSC.	6 0	235	3.2	97.0	175	
78	IF	6 0	240.5	2.5	98.0		
75	2ND DET	6.0	146.5	1.5			
84	RECTIFIER	6 0					
42	POWER	6.0	227.5		243		16.5

NOTE: ALL VOLTAGE READINGS WITH A VOLTMETER HAVE A RESISTANCE OF 1000 Ω PER VOLT

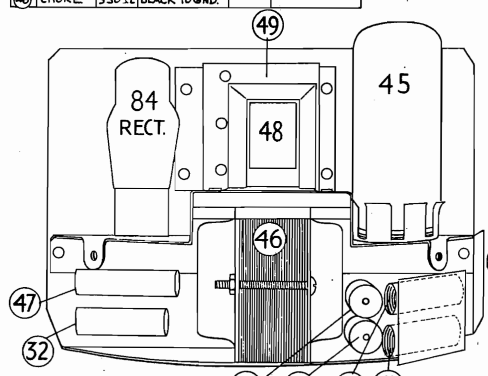


Figure No. 3

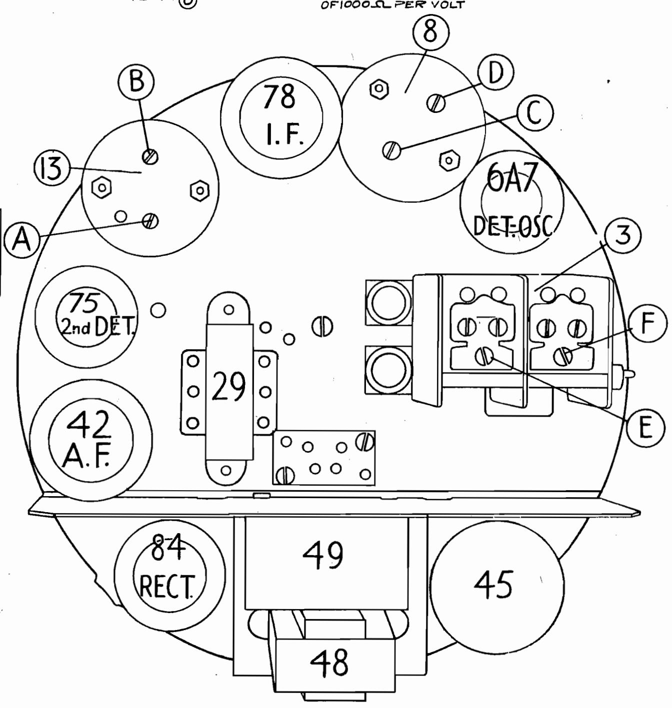


Figure No. 2

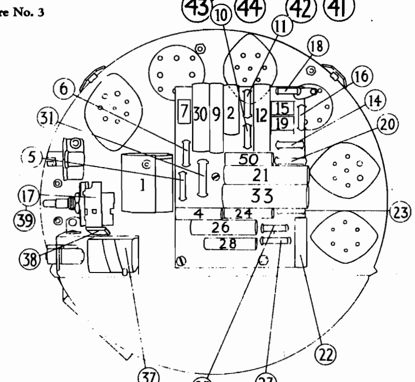


Figure No. 4

MODEL 524A
Editions 1,2,2D,2G
Service Data, Parts
Alignment

UNITED AMERICAN BOSCH CORP.

AMERICAN-BOSCH CAR-RADIO MODEL 524A

Ed 1 Ed 2 Ed 2D Ed 2G

Five-Tube, Superheterodyne Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes .... 1 #6A7, 1 #78, 1 #75, 1 #42, 1 #84 - Total 5
Battery Current (6.3 Volt Battery) .... 6.5 Amperes
Tuning Range .... 540 to 1500 K.C.
Maximum Undistorted Output .... 3. Watts
Maximum Output .... 4. Watts
Line-up Frequencies .... I.F. 456 K.C., 1400 K.C., 1500 K.C.

GENERAL DESCRIPTION

The Model 524A Car-Radio has been designed, manufactured and tested with special regard for the requirements of automobile radio. The electrical, mechanical and acoustical features of the set have been decided upon after extensive tests in automobiles to determine the proper requirements for satisfaction. This Car-Radio is a single unit compact radio chassis, power pack, and speaker with a separate remote control. The set is contained in a cylindrical housing and provided with many features which result in improved tone quality, attractive appearance, mechanical stability and desirable service features.

CIRCUIT DESCRIPTION

The circuit is of the superheterodyne type employing five tubes as follows: a type 6A7 as a combined first detector-oscillator, a type 78 as an intermediate frequency amplifier, a type 75 as a combination second detector-A.V.C. and first audio amplifier, a type 42 as a final audio amplifier and a type 84 as a rectifier in the power supply.

The Model 524A Ed. 1 has been designed with an internal tuned spark trap in the battery circuit to assist in suppression of ignition interference.

The Model 524A Ed. 2 has an additional spark trap connected externally in the battery cable. These two spark traps make the use of spark plug suppressors unnecessary in many installations.

SERVICE DATA

COMMON TROUBLES THAT CAN BE EASILY LOCATED AND REMEDIED WITHOUT REMOVING RECEIVER FROM CAR OR FROM ITS HOUSING.

DIAL LIGHT DOES NOT LIGHT

Dial light loose in socket, broken or burnt out.

Socket on end of lead in rear of control head pulls straight out.

SET INOPERATIVE AND TUBES DO NOT LIGHT

Check fuse in container on receiver ammeter lead. Remove speaker cover and disconnect speaker plug. Remove vibrator, all tubes and disconnect dial light cable from set. Check with ohmmeter from Hot A side of battery cable (male bayonet connector inside the housing that the fuse container engages) to ground. Should ohmmeter show an open circuit when line switch is closed, obviously a tube or the vibrator is shorted and these parts can be checked separately to determine the defective one. On the other hand, if ohmmeter shows a short circuit, the chassis should be removed from its housing and checked.

INTENSIVE OR WEAK

Check car antenna for poor connections and grounds. Also check tubes and the receiver alignment.

INTERMITTENT RECEPTION

This is usually caused by a poor connection from the set antenna lead to the car antenna lead-in, and this point should always be checked when intermittent reception occurs.

MICROPHONIC OR INTERMITTENT

Tap each tube lightly with a small piece of wood or an insulated screw driver handle. The offending tube, when tapped, will usually howl very loudly if microphonic, or will give intermittent results if defective.

LOW POWER OUTPUT

Check tubes and vibrator. Usually caused by the latter.

RECEPTION CUTS OFF AT CERTAIN POINTS OF DIAL SCALE

Usually caused by some foreign metallic substance shorting a section of the condenser gang. These particles are often too small to be seen but can be removed by blowing them out with an air pressure hose or an ordinary hand pump. Great care must be exercised not to destroy the thin mica insulators assembled under the trimmers on top of condenser gang.

POOR TONE QUALITY

Foreign material is apt to become lodged in between the speaker voice coil and the field core. This hampers the movement of the speaker diaphragm. As the rear of the speaker diaphragm is open, it can be blown out clean with an air hose.

BUZZING SOUND IN SPEAKER

This can be remedied in many cases by the method described above, but can also be caused by a loose winding on the voice coil. The turns of the winding should be pushed together and a thin coat of collodion or coil cement should be applied to hold the windings in place.

RATTLES

Check receiver for loose cover thumb screws, tube shield and housing screws. Rattles seemingly in the radio receiver, are often traced to loose parts on the bulkhead or dashboard of the car.

SET INOPERATIVE

TUBES LIGHT AND VIBRATOR BUZZES

A. Check B voltage (approximately 240 volts) from middle terminal of electrolytic filter condenser #49 to ground. This point is easily reached with the speaker cover removed. If no voltage or low voltage is obtained, test the vibrator and 84 tube. If voltage is still incorrect, the receiver should be removed from its housing for further checking.

B. With the speaker plugged in, remove the clip from the grid of the 75 tube and touch the clip to the grid cap of the tube several times in succession. A clicking noise should be heard in the speaker. This is a practical test for the audio amplifier and speaker. If this clicking noise is not heard, the 75 and 42 tubes should be tested and the voltages checked at the plates of these tubes. The speaker should be also checked with an ohmmeter by testing across the prongs of the plug for continuity. While making this test, the cable should be worked back and forth to show up a possible intermittent open circuit in the speaker cable. Check the voice coil and the field coil for continuity.

If the audio and speaker are still dead, the chassis should be removed from its housing.

If the audio and speaker are working correctly, test the remaining tubes and check the voltage at each socket.

In the event the chassis has to be removed from the car for repairs, this can easily be done as follows:

Disconnect all chassis cables and the flexible control shafts from the receiver. Remove the speaker cover and pull out the speaker plug. Remove the screws around the outside of the housing and pull the chassis straight out. Because of this feature, the chassis can be removed in many cars without unbolting the chassis housing from the car.

LOCATING TROUBLE IN CHASSIS

In locating a short, open or defective unit that results in low or no B voltage, disconnect the power pack from the receiver section by removing the Red lead coming from coil #32 (see Fig. #3) and soldered to the terminal at the end of resistor #23 shown in Figure #4. Check the voltage at the free end of this Red lead (should be approximately 250 volts.) If the voltage is incorrect, the trouble is definitely in the power pack and all component parts should then be checked.

Conversely, if the voltage reading proves to be correct, the trouble is in the receiver section and all parts should be checked. In locating a short or open in the filament circuit, the power pack may be disconnected from the filament supply of the receiver section by removing the red wire on the top terminal of the "off" and "on" switch that goes to the 42 tube. This will connect only the power pack in the filament circuit and if the short or open is corrected, it will prove that the trouble is in the receiver section.

WEAK OR INSENSITIVE AFTER REALIGNMENT

Check coils and associated circuits for resistance in deficient stage.

LOW POWER OUTPUT WITH B VOLTAGE CORRECT

Check speaker field coil, voice coil and associated audio circuit for resistance continuity and defective condensers. All riveted component parts can be removed by merely punching out the rivets with a small diameter straight side punch. Replacement parts can be secured with small machine screws and nuts.

In changing the power transformer, it is only necessary to remove the four drive screws, two located directly over the resistor and condenser strip, and the other two in back of the condenser gang on the power pack shield. In replacing the power transformer be sure to tighten the screws securely and replace the shield braid bond or vibrator noise will be present.

INSTRUCTIONS FOR ADJUSTING VIBRATOR

Just like automobile ignition contacts, the Tungsten contact points of vibrators will show evidence of wear after they have been in service for a long period of time. This wear progresses very gradually and, as long as the vibrator is capable of operation, any amount of wear up to this point has no influence whatsoever on the performance of the radio set or on the voltage supplied to the tubes.

After a long period of service, the vibrator may refuse to start and if this point is ever reached in the life history of the radio set, it is indicative of excessively worn Tungsten in the contact points. However, the vibrator has been designed with a generous reserve of Tungsten in the contact points and this reserve is available for giving the vibrator a new lease of life, provided one single adjustment is made. This is done as follows:

1. Remove the vibrator unit from its housing by removing the tension spring with a pair of round nose pliers.

2. Remove the rubber sock, being careful not to bend the wires at the soldered connection.

3. Lay the vibrator on a piece of white paper so that when viewed from above it appears exactly like in the following drawing.

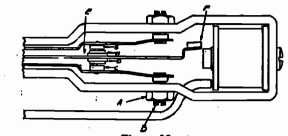


Figure No. 1

4. Loosen lock nut A and turn screw B clockwise until .005" of light can be seen between contacts C and D. If the contact points are somewhat roughened, light cannot be seen across their entire diameter, even though they are correctly re-spaced, that is, within .005" of touching each other.

5. A simple check on the correctness of the spacing adjustment is gotten by pressing lightly against the center of the reed with a small nail in the direction and location shown by arrow "E". When the reed is thus moved so as to close contacts "C" and "D", the weight "F" on the free end of the reed should move 1/64" from its "at rest" position. This check should be made after lock nut "A" has been firmly retightened.

6. Do not readjust the spacing between contacts G and H unless the Tungsten is nearly all worn away. In this case, readjustment may be made the same as for contacts C and D.

7. In re-inserting the vibrator into its rubber sock, be very careful to turn the "flats" of the sock hole so that they are parallel to the flat side of the vibrator frame. This provides ample space in the sock for the free movement of the reed. Make certain that the slot in the prong terminal plate engages the small projection on the inside edge of the housing. Then replace the tension spring.

THESE INSTRUCTIONS DO NOT APPLY TO ANY OTHER TYPES OF VIBRATORS.

LINE-UP CAPACITOR ADJUSTMENTS

All the adjustable capacitors, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed, or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary and a high grade modulated oscillator is available, then proceed as follows and refer to Fig. #2.

1. Set test oscillator to 456 K.C.

2. Set condenser gang to approximately 600 K.C. This will be at a point where the condenser plates are nearly all in mesh.

3. Connect output meter across voice coil of speaker. This may be done by connecting one lead of the output meter to the blue lead of the speaker terminal strip and the other lead to any metal part of the chassis. (The impedance of the voice coil is 3. ohms.)

4. Apply test signal to grid of 78 I.F. tube through a .5 mfd. blocking condenser and adjust trimmers A and B to maximum output reducing output of test oscillator as required.

5. Apply test signal to grid of 6A7 detector-oscillator tube and adjust trimmers C and D to maximum output.

6. Set test oscillator to 1500 K.C. and turn condenser gang until the rotor plates are wide open. Then place a piece of thin paper (approximately .015 thick) between the rotor and stator at the bottom of the gang, and then close the rotor down to this spacing. This is the exact setting of the condenser gang for the receiver oscillator at 1500 K.C. and should be carefully set as the resultant alignment of the receiver is directly dependent upon it.

7. Adjust trimmer E to maximum output and then remove the paper gauge.

8. Set test oscillator and condenser gang to 1400 K.C.

9. Apply test signal to antenna lead through a .0002 mfd. condenser and adjust trimmer F to maximum output. This completes the adjustment of the receiver.

SERVICE PARTS LIST

Dia. #	Part #	Description of Parts
1	RC 9525	Antenna coil assembly
2	SA 106386	.05 mfd. 200 V. cond.
3	CG 953	Condenser gang assy.
4	SA 106386	.05 mfd. 200 V. cond.
5	SA 105260	300 ohms 1/4 W. resistor
6	SA 105276	50,000 ohms 1/4 W. res.
7	SA 106417	.0001 mfd. mica cond.
8	RC 9526	Composite coil assembly
9	SA 102500	.01 mfd. 350 V. cond.
10	SA 105272	10,000 ohms 1/4 W. res.
11	SA 105258	200 ohms 1/4 W. res.
12	CW 951	.1 mfd. 200 V. cond.
13	IC 955	2nd I.F. coil assy.
14	SA 105281	1 meg. 1/4 W. res.
15	SA 106417	.0001 mfd. mica cond.
16	SA 105276	50,000 ohms 1/4 W. res.
17	VR 951	Vol. control-500000 ohms
18	SA 105246	.5 meg. 1/4 W. resistor
19	SA 106417	.0001 mfd. mica cond.
20	SA 105249	5,000 ohms 1/4 W. res.
21	SA 102497	.25 mfd. 200 V. cond.
22	SA 103852	.002 mfd. 500 V. cond.
23	SA 105278	100,000 ohms 1/4 W. res.
24	SA 103659	.005 mfd. 350 V. cond.
25	SA 105279	.25 meg. 1/4 W. res.
26	CW 951	.1 mfd. 200 V. cond.
27	SA 105279	.25 meg. 1/4 W. res.
28	CW 952	.005 mfd. 500 V. cond.
29	TR 952	Output transformer
30	SA 102492	.05 mfd. 350 V. cond.
31	SA 101471	18,000 ohms 1/2 W. res.
32	RC 9527	Choke coil
33	SA 102496	.25 mfd. 350 V. cond.
34	SK 951	Speaker
35	DM 951	Diaphragm & voice coil assy.
36	FU 951	Fuse - 20 ampere
37	RC 9512	Filter choke
38	CM 953	.00005 mfd. mica cond.
39		Switch - part of VR 951
40	LP 951	Dial light
41	SA 105452	Filter choke
42	SA 105452	Filter choke
43	CW 958	.5 mfd. 200 V. cond.
44	CW 958	.5 mfd. 200 V. cond.
45	VI 951	Vibrator
46	TR 953	Power transformer
47	SA 106804	.008 mfd. 1600 V. cond.
48	TR 951	B choke
49	CE 951	6-10 mfd. electrolytic condenser
50	SA 103659	.005 mfd. 350 V. cond.

MAIN ASSEMBLIES

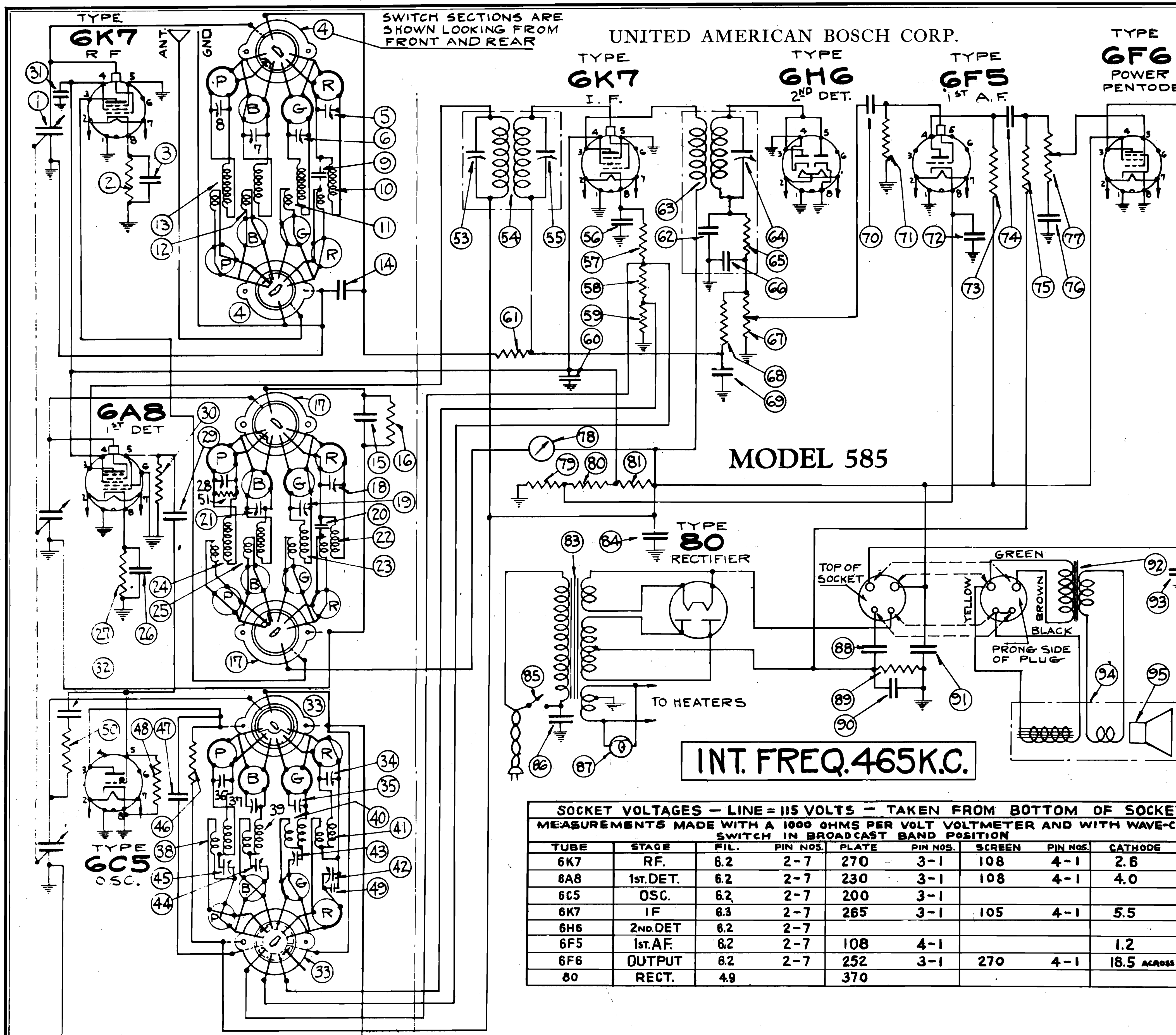
CH 954	Chassis assembly
CU 951	Control unit-less shafts
SK 951	Speaker assembly

CABLES & CABLE ASSEMBLIES

CB 951	Battery cable assembly
CB 958	Antenna cable assembly

MODEL 585
Preliminary
Schematic, Voltage
Resistor Data

UNITED AMERICAN BOSCH CORP.



FOR PARTS LIST SEE MODELS 585-Y, 585-Z
and the following differences

# 29	.000065 mfd. mica
# 32	.05 mfd. 200 volt
# 60	.05 mfd. 200 volt
# 72	.05 mfd. 200 volt
# 79	200 ohms 1/4 watt
# 80	20,000 ohms 1. watt
# 81	12,500 ohms 2. watt
# 86	.01 mfd. 600 volt
# 88	12. mfd. 475 volt
# 90	12. mfd. 25. volt

D.C. RESISTANCE
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION

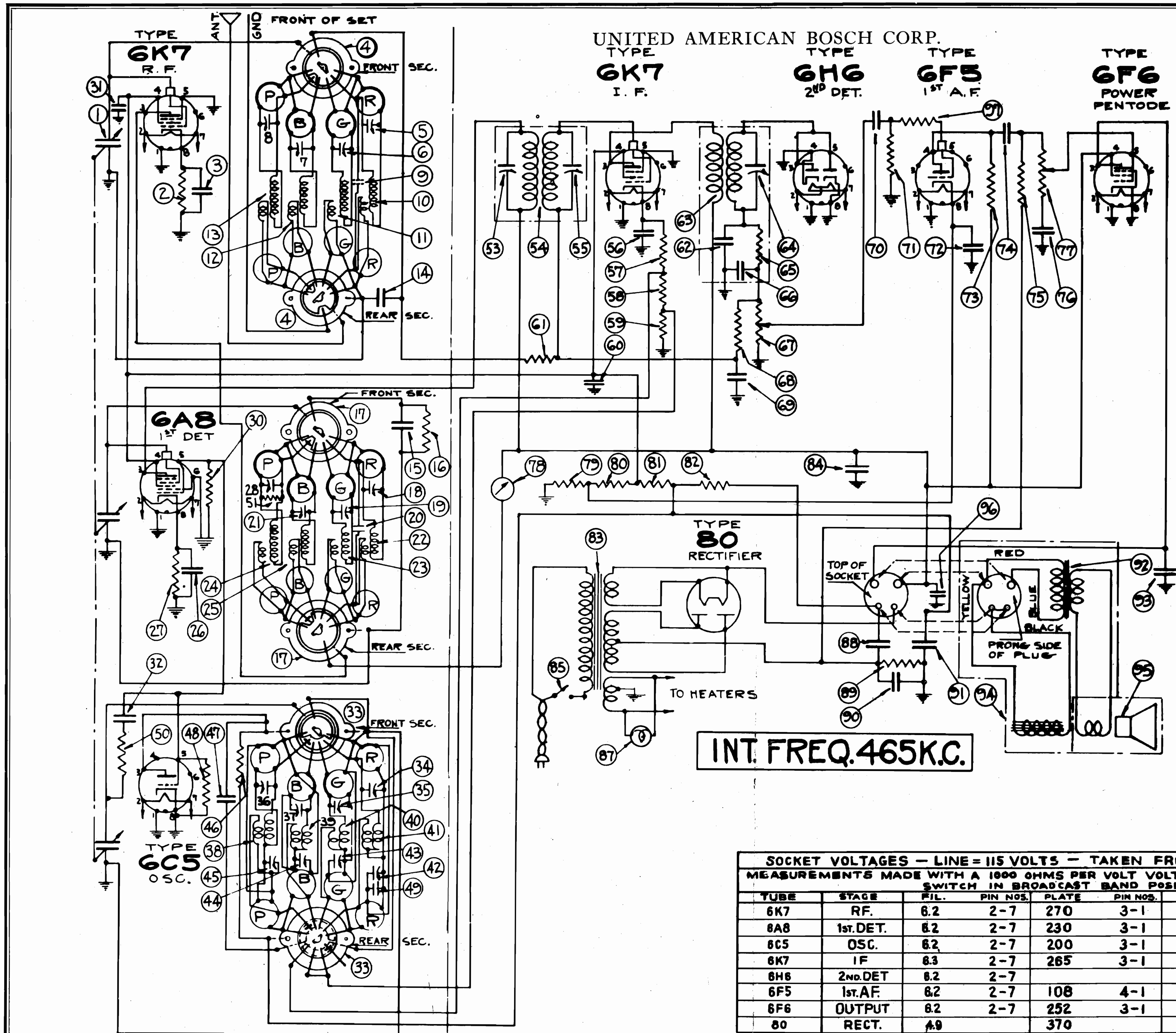
COIL	DIA.№	PRIM.	SEC.
P-ANT.	13	130 ohms	25 ohms
P-RF.	24	36 "	25 "
P-OSC.	38	8 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF.	25	.5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	3.2 "	1 "
G-RF	23	1.5 "	1 "
G-OSC.	40	.5 "	1 "
R-ANT.	10	1 "	.4 "
R-RF.	22	2 "	.4 "
R-OSC.	41	.5 "	.4 "
1st. I.F.	54	13 "	13 "
2nd. I.F.	63	11.5 "	11.5 "
OUTPUT TRANS.	92	450 "	.5 "
SPKR. FIELD		1900 "	
VOICE COIL	95	3 "	

SOCKET VOLTAGES — LINE = 115 VOLTS — TAKEN FROM BOTTOM OF SOCKETS
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION

TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	RF.	6.2	2-7	270	3-1	108	4-1	2.6	1-8
6A8	1st. DET.	6.2	2-7	230	3-1	108	4-1	4.0	1-8
6C5	OSC.	6.2	2-7	200	3-1				
6K7	IF	6.3	2-7	265	3-1	105	4-1	5.5	1-8
6H6	2nd. DET	6.2	2-7						
6F5	1st. AF.	6.2	2-7	108	4-1			1.2	1-8
6F6	OUTPUT	6.2	2-7	252	3-1	270	4-1	18.5 across # 89 res.	
80	RECT.	4.9		370					

MODELS 585Y,585Z
Schematic,Voltage
Resistor Data

UNITED AMERICAN BOSCH CORP.



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA.№	PRIM.	SEC.
P-ANT.	13	130 ohms	25 ohms
P-RF.	24	36 "	25 "
P-OSC.	38	8 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF.	25	.5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	3.2 "	1 "
G-RF	23	1.5 "	1 "
G-OSC.	40	.5 "	1 "
R-ANT.	10	1 "	.4 "
R-RF.	22	2 "	.4 "
R-OSC.	41	.5 "	.4 "
1st. I.F.	54	13 "	13 "
2nd. I.F.	63	11.5 "	11.5 "
OUTPUT TRANS.	92	450 "	.5 "
SPKR. FIELD		1900 "	
VOICE COIL	95	3 "	

MODELS
585 Y
585 Z

SOCKET VOLTAGES — LINE = 115 VOLTS — TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	RF.	6.2	2-7	270	3-1	108	4-1	2.6	1-8
6A8	1st. DET.	6.2	2-7	230	3-1	108	4-1	4.0	1-8
6C5	OSC.	6.2	2-7	200	3-1				
6K7	IF	6.3	2-7	265	3-1	105	4-1	5.5	1-8
6H6	2nd. DET	6.2	2-7						
6F5	1st. AF.	6.2	2-7	108	4-1			1.2	1-8
6F6	OUTPUT	6.2	2-7	252	3-1	270	4-1	18.5 across 89 res.	
80	RECT.	4.9		370					

MODELS 585Y, 585Z
Centr-O-Matic Data
Alignment, Trimmers

UNITED AMERICAN BOSCH CORP.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF CENTR-O-MATIC UNIT

If a component part located underneath the switch and coil assemblies of the "Centr-O-matic" unit has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which fasten the mounting plate of the wave-change switch shaft to the chassis frame. Pull switch shaft straight out.
3. Unsolder the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch sections are located on top of the "Centr-O-matic" unit and are indicated by X, Y, and Z in figure #3. Remove the corresponding screw.
5. Each individual section can then be pulled out straight.

Note: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed.

On the oscillator section, the plate lead will have to be unsoldered from the 6C5 socket.

6. After repairs have been made resolder the plate leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Centr-O-matic" unit. This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screw.
8. Resolder the stator and rotor leads on gang condenser.
9. Replace the switch shaft and the mounting fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch discs.
10. Before replacing the coil shields, it might be adviseable to bend the shields slightly to assure that positive contact is made. To do this hold the shield with your two hands using the thumbs and the first two fingers as shown in Figure #1. Pull out the ends of the shield slightly and at the same time apply a little pressure on the sides of the shield as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contacts, this will also prevent the shields from rattling.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #2, #3 and #4 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full and turn tone control to bass position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of 6K7 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust trimmer #64 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #53 and #55 for maximum output.

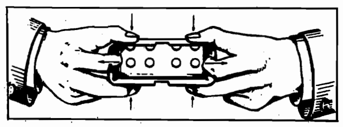


Figure No. 1

ADJUSTMENT OF RED BAND

1. Set wave-change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 K.C. and adjust #34, #18 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #42 for maximum output.
4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #5.

Note: The adjustment of the two short-wave oscillator lag condensers (#42 and #43) is best made by the max-max. method.

ADJUSTMENT OF PURPLE BAND

1. Set wave-change switch to Purple Band position.
2. Set test oscillator and dial indicator to 350 K.C.
3. Apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #36, #28 and #8 for maximum output.
4. Set test oscillator and dial indicator to 130 K.C. and adjust #45 for maximum output.
5. Return to 350 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #36, #28 and #8 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to the Black or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 for maximum output.
3. Set test oscillator and dial indicator to 570 K.C. and adjust #44 for maximum output.
4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

ADJUSTMENT OF GREEN BAND

Note: In adjusting the Green and Red Bands, a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change-switch to Green Band position.
2. Set test oscillator and dial indicator to 5500 K.C. and adjust #35, #19 and #6 for maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 for maximum output.
4. Return to 5500 K.C. setting and make readjustment of #35, #19 and #6.

This is done as follows:

Tune the receiver with the left hand by means of the tuning knob and adjust the lag condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading of the output meter. Change the lag condenser further in the same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of lag condenser. Continue this type of trial and error adjustment until no further improvement can be made when either the tuning control or the lag condenser is changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few minutes.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out thru the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

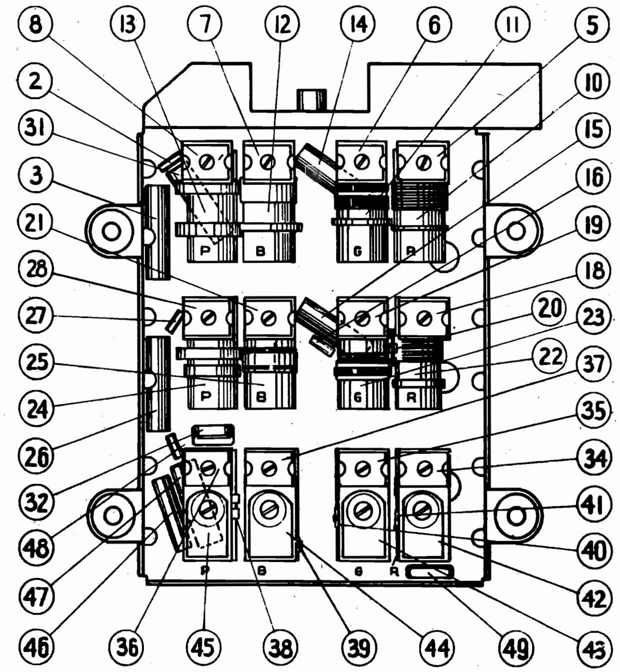


Figure No. 2

Type and Number of Tubes--2 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6F5, 1 #6F6, 1 #80-Total 8
Power Supply ---------- .105 to 125 volts, 50 to 60 cycles
Power Consumption ---------- 65 Watts
Maximum Undistorted Output ---------- 2.5 Watts
Maximum Output ---------- 3.3 Watts

Tuning Ranges ---------- (Purple Band 120 to 350 K.C. (Black Band 540 to 1800 K.C. (Green Band 1800 to 6000 K.C. (Red Band 6000 to 18500 K.C.

Line-up Frequencies -- I.F.465 K.C., 350 K.C., 130 K.C., 1600 K.C., 570 K.C., 5500 K.C., 1900 K.C., 17000 K.C., and 6000 K.C.

MODELS 585Y, 585Z
Socket, Trimmers
Parts List

UNITED AMERICAN BOSCH CORP.

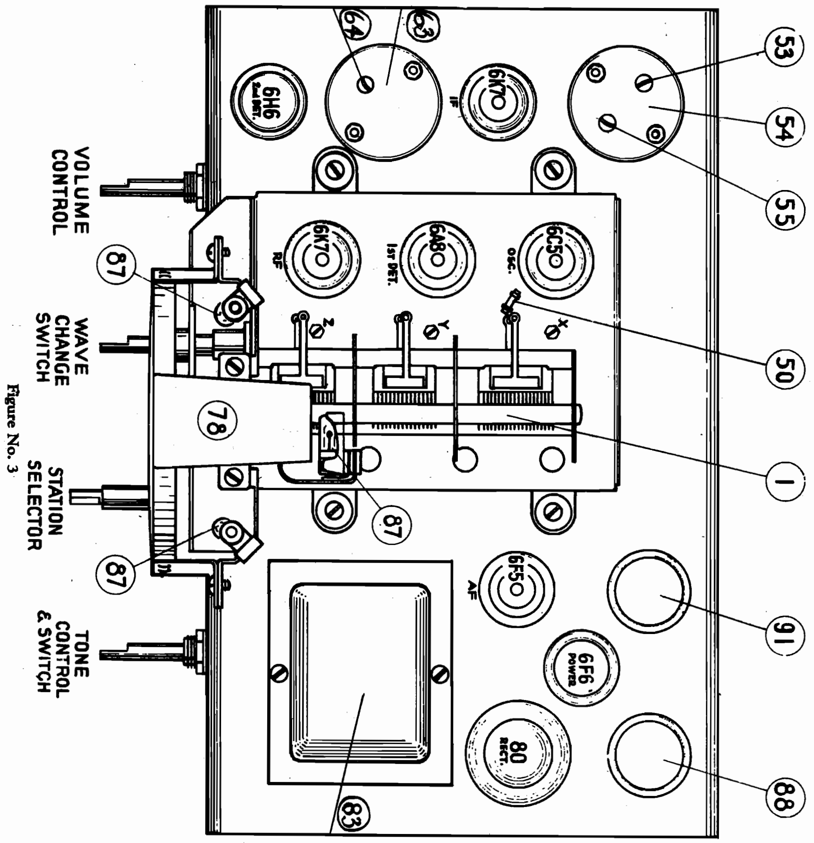


Figure No. 3

SERVICE PARTS LIST MODEL 585 Y

DIA. #	PART #	DESCRIPTION
1	CG 9527	Variable cond. assembly
2	RE 9529	300 ohm ¼ W. resistor
3	SA 106386	.05 mfd. 200 V. condenser
4	SW 9524	Antenna "Centr-O-matic" assembly complete with switch, coils and trimmers
5	CS 9511	4 to 25 mmf. antenna trim condenser (Red Band)
6	CS 9511	4 to 25 mmf. antenna trim condenser (Green Band)
7	CS 9511	4 to 25 mmf. antenna trim condenser (Black Band)
8	CS 9511	4 to 25 mmf. antenna trim condenser (Purple Band)
9		Twisted pair of wires-part of RC 9571
10	RC 9571	Antenna coil assembly (Red Band)
11	RC 9574	Antenna coil assembly (Green Band)
12	RC 9577	Antenna coil assembly (Black Band)
13	RC 9580	Antenna coil assembly (Purple Band)
14	CW 9513	.05 mfd. 200 V. condenser
15	CW 9513	.05 mfd. 200 V. condenser
16	RE 9527	5000 ohm ¼ W. resistor
17	SW 9525	R.F. "Centr-O-matic" assembly complete with switch, coils and trimmers
18	CS 9511	4 to 25 mmf. R.F. trim condenser (Red Band)
19	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Green Band)
20	CM 9512	6 mmf. mica condenser
21	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Black Band)
22	RC 9572	R.F. coil assembly (Red Band)
23	RC 9575	R.F. coil assembly (Green Band)
24	RC 9581	R.F. coil assembly (Purple Band)
25	RC 9578	R.F. coil assembly (Black Band)
26	SA 106386	.05 mfd. 200 V. condenser
27	RE 9529	300 ohm ¼ W. resistor
28	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Purple Band)
30	RE 9534	100,000 ohm ¼ W. resistor
31	SA 106386	.05 mfd. 200 V. condenser
32	CM 9511	.000065 mfd. mica cond.
33	SW 9526	Oscillator "Centr-O-matic" assembly complete with switch, coils and trimmers
34		1.5 to 10 mmf. trim condenser-part of CS 9519 (Red Band)
35		3. to 15 mmf. trim condenser-part of CS 9520 (Green Band)
36		10 to 35 mmf. trim condenser-part of CS 9518 (Purple Band)
37		5 to 25 mmf. trim condenser-part of CS 9517 (Black Band)
38	RC 9582	Oscillator coil assembly (Purple Band)
39	RC 9579	Oscillator coil assembly (Black Band)
40	RC 9576	Oscillator coil assembly (Green Band)
41	RC 9573	Oscillator coil assembly (Red Band)
42		800 to 1600 mmf. lag condenser-part of CS 9519 (Red Band)
43		800 to 1600 mmf. lag condenser-part of CS 9520 (Green Band)
44		300 to 600 mmf. lag condenser-part of CS 9517 (Black Band)
45		60 to 150 mmf. lag condenser-part of CS 9518 (Purple Band)
46	RE 9526	5000 ohm 1 W. resistor
47	CW 9513	.05 mfd. 200 V. condenser
48	RE 9524	50,000 ohm ¼ W. resistor
49	CM 959	.002 mfd. mica condenser
50	RE 9537	50 ohm ¼ W. resistor
51	RE 9534	100,000 ohm ¼ W. resistor
53		I.F. trimmer-part of IC 9527
54	IC 9527	1st I.F. transformer
55		I.F. trimmer-part of IC 9527
56	SA 102493	.05 mfd. 200 V. condenser
57	SA 105261	400 ohm ¼ W. resistor
58	SA 105267	1000 ohm ¼ W. resistor
59	SA 105249	5000 ohm ¼ W. resistor
60	SA 102497	.25 mfd. 200 V. condenser
61	SA 105278	100,000 ohm ¼ W. resistor
62		50 mmf. mica condenser-part of IC 9537
63	IC 9537	2nd I.F. transformer
64		I.F. trim condenser-part of IC 9537
65		50,000 ohm ¼ W. resistor-part of IC 9537
66		100 mmf. mica condenser-part of IC 9537
67	VR 959	Volume control-500,000 ohm
68	RE 9530	1 meg. ¼ W. resistor
69	SA 106386	.05 mfd. 200 V. condenser
70	CW 9512	.02 mfd. 400 V. condenser
71	RE 9530	1 meg. ¼ W. resistor
72	CE 9515	12 mfd. 25 V. electrolytic condenser
73	SA 105279	250,000 ohm ¼ W. resistor
74	CW 9512	.02 mfd. 400 V. condenser
75	RE 9531	250,000 ohm ¼ W. resistor
76	SA 106403	.001 mfd. 600 V.condenser
77	VR 9512	Tone control (500,000 ohm) and switch
78	SI 9538	Tuning meter assembly
79	SA 105260	300 ohm ¼ W. resistor
80	SA 104966	30,000 ohm ½ W. resistor
81	SA 105815	10,000 ohm 1 W. resistor
82	RE 9540	7000 ohm 2 W. resistor
83	TR 959	Power transformer
84	SA 102492	.05 mfd. 400 V. condenser
85		Line switch - part of VR 9512
87	SA 106809	Dial light (4 used)
88		8 mfd. 475 V.electrolytic condenser-part of CE 954
89	RE 9523	300 ohm muter resistor
90		20 mfd. 25 V.electrolytic condenser-part of CE 954
91	CE 9518	8 mfd. 300 V.electrolytic condenser
92	TR 9515	Speaker output transformer
93	SA 103659	.005 mfd. 400 V.condenser
94	SK 9511	Speaker - complete
95	SA 107282	Diaphragm and coil assy.
96		4 mfd. 450 V.electrolytic condenser-part of CE 954
97	RE 9534	100,000 ohm ¼ W. resistor

MODEL 585Z

Service parts list for Model 585Z same as for Model 585Y except for the following parts:

DIA. #	PART #	DESCRIPTION
94	SK 9512	Speaker complete
95	DM 956	Diaphragm and coil assy.

MAIN ASSEMBLIES

PART #	DESCRIPTION
KA 9524	Cabinet
SK 9512	Speaker assembly

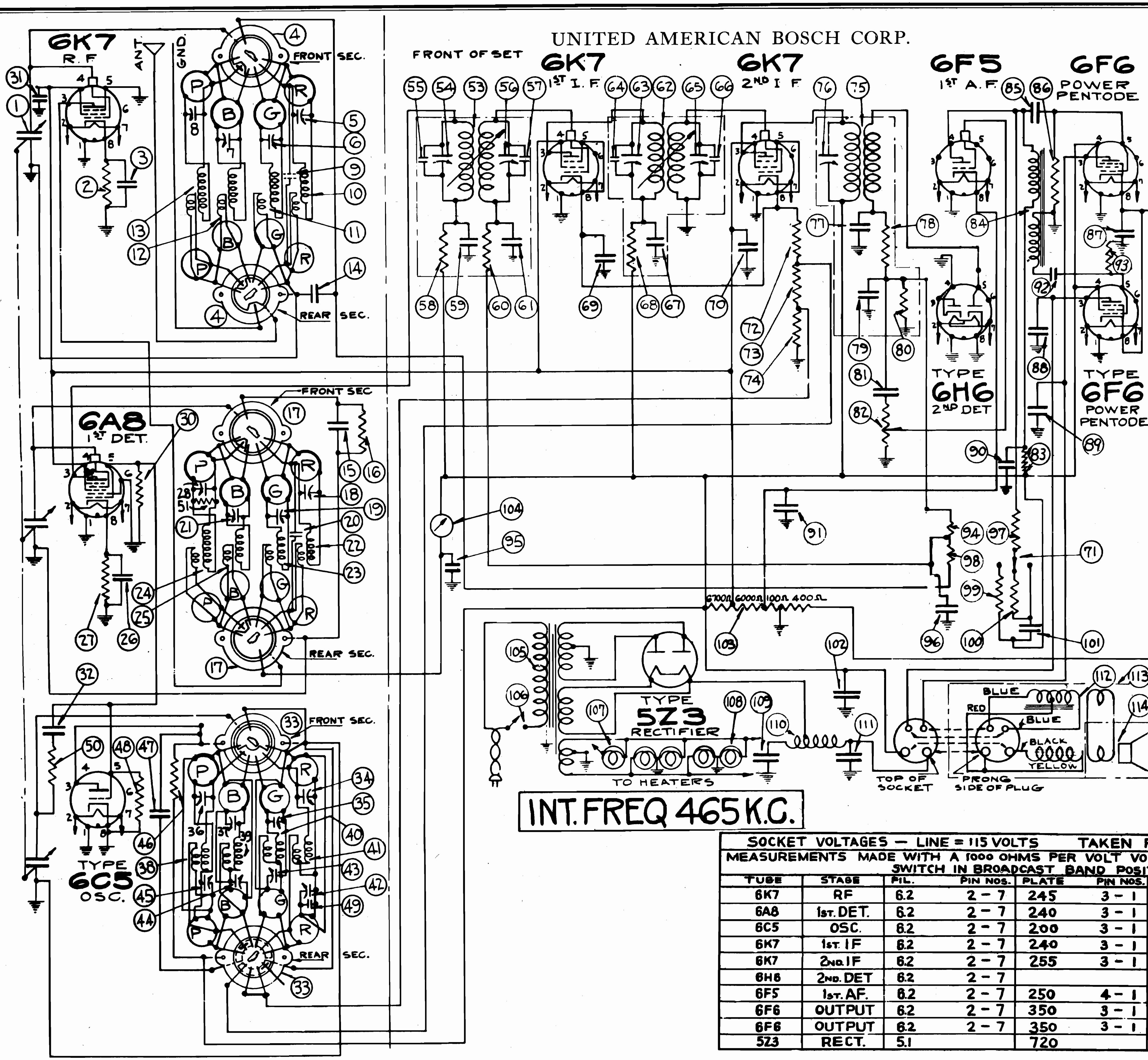
VR 9512	Tone control (500,000 ohm) and switch
SI 9538	Tuning meter assembly
SA 105260	300 ohm ¼ W. resistor
SA 104966	30,000 ohm ½ W. resistor
SA 105815	10,000 ohm 1 W. resistor
9540	7000 ohm 2 W. resistor
	Power transformer

SPEAKER PARTS

DM 956	Diaphragm and coil assembly
FP 101740	Copper ring
FP 102270	Steel plate
FP 101742	Paper washer
CL 9537	Speaker field coil
SA 101733	Core and frame assembly

MODELS 595M,595P
Schematic,Voltage
Resistor Data

UNITED AMERICAN BOSCH CORP.



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. Nº	PRIM.	SEC.
P-ANT.	13	130	25
P-RF.	24	38	25
P-OSC.	38	8.0	13.5
B-ANT.	12	22	4
B-RF.	25	.5	4.5
B-OSC.	39	1.5	3
G-ANT.	11	3.2	1
G-RF.	23	1.5	1
G-OSC.	40	.5	1
R-ANT.	10	1	.4
R-RF.	22	2	.4
R-OSC.	41	.5	.4
1ST. IF.	53	3.5	3.5
2ND. IF.	82	3.5	3.5
3RD. IF.	75	11.5	11.5
CHOKE	110	350	
1ST. AF. TRANS.	84	3200	3800
OUTPUT TRANS.	112	265 / 312	.03
SPKR. FIELD		1900	
VOICE COIL	114	2.6	

SOCKET VOLTAGES — LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	RF	6.2	2 – 7	245	3 – 1	100	4 – 1	2.5	1 – 8
6A8	1ST. DET.	6.2	2 – 7	240	3 – 1	100	4 – 1	2.2	1 – 8
6C5	OSC.	6.2	2 – 7	200	3 – 1				
6K7	1ST. IF	6.2	2 – 7	240	3 – 1	100	4 – 1	8.0	1 – 8
6K7	2ND. IF	6.2	2 – 7	255	3 – 1	100	4 – 1	8.0	1 – 8
6H6	2ND. DET	6.2	2 – 7						
6F5	1ST. AF.	6.2	2 – 7	250	4 – 1			1.75	1 – 8
6F6	OUTPUT	6.2	2 – 7	350	3 – 1	255	4 – 1	19.5	1 – 8
6F6	OUTPUT	6.2	2 – 7	350	3 – 1	255	4 – 1	19.5	1 – 8
5Z3	RECT.	5.1		720					

UNITED AMERICAN BOSCH CORP.

MODELS 595M, 595P
Centr-O-Matic Data
Socket, Trimmers
Alignment

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF THE CENTR-O-MATIC UNIT.

If a component part located underneath the switch and coil assemblies of the "Centr-O-matic" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which fasten the mounting plate of the wave-change switch shaft to the chassis frame. Pull switch shaft straight out.
3. Unsolder the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch and coil sections are located on top of the "Centr-O-matic" unit and are indicated by X, Y, and Z in figure #3. Remove the corresponding screw.
5. Each individual section can then be pulled out straight.
   NOTE: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed. On the oscillator section, the plate lead will have to be unsoldered from the 6C5 socket.
6. After repairs have been made resolder the plate leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Centr-O-matic" unit. This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screw.
8. Resolder the stator and rotor leads on gang condenser.
9. Replace the switch shaft and the mounting plate fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch disc.
10. Before replacing the coil shields, it is advisable to bend the shields slightly to assure that positive contact is made. To do this hold the shield with your two hands using the thumbs and first two fingers as shown in figure #1. Pull out the ends of the shield slightly and at the same time apply a little pressure on the sides as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contact, this will also prevent the shields from rattling.

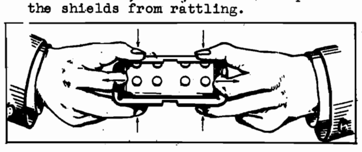


Figure No. 1

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in figures #2, #3, and #4, and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

CAUTION: DO NOT INTERFERE WITH THE I.F. ALIGNMENT OF THIS RECEIVER EXCEPT WHEN IT HAS BEEN ABSOLUTELY DETERMINED THAT THIS IS THE CAUSE OF THE TROUBLE AND ONLY WHEN HIGH GRADE TESTING EQUIPMENT IS AVAILABLE.

NOTE: Because of the variable selectivity incorporated in this receiver, it is important that the procedure outlined below be followed in order to obtain accurate alignment.

The travel brought about by the expander mechanism is limited by definite stops. To properly set the I.F. transformers, turn the fidelity control to the extreme right or clockwise position. Tighten the drive cords of the variable I.F. transformers until the pulleys on the bottom of the transformers are against the stops in counter-clockwise direction.

The I.F. trimmers are adjusted only when the variable selector coils are placed in a particular mechanical position. In order to align the circuits properly, it is necessary to have less coupling in the individual I.F. transformer than that provided by the maximum selectivity setting.

To obtain this lesser coupling, turn the fidelity control to the extreme left or counter-clockwise position and turn the stop-screw (indicated by "W" in figure #3), which acts as a stop to limit selectivity, out 1/4 inch. With the fidelity control in this position align the I.F. stages as follows:

1. Set volume control on full and connect output meter across voice coil of speaker.
2. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 2nd I.F. tube (6K7) thru a .5 mfd. blocking condenser.
3. Adjust trimmer #76 for maximum output, reducing output of test oscillator as required.
4. Apply test signal to grid of 1st I.F. tube (6K7) and adjust #63 and #65 for maximum output.
5. Apply test signal to grid of 1st detector (6A8) and adjust #54 and #56 for maximum output.
6. After the above I.F. adjustments have been made, turn the selectivity control (larger of the double lower right-hand knob) to the extreme right or clockwise direction and reset the stop-screw.

ADJUSTMENT OF PURPLE BAND

Note: During all of the subsequent adjustments, the selectivity control should be turned to the left or counter-clockwise direction.

1. Set wave-change switch to the Purple Band position.
2. Set test oscillator and dial indicator to 350 K.C. and apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #36, #28 and #8 for maximum output.
3. Set test oscillator and dial indicator to 130 K.C. and adjust #45 for maximum output.
4. Return to 350 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #36, #28 and #8 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 for maximum output.
3. Set test oscillator and dial indicator to 570 K.C. and adjust #44 for maximum output.
4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

ADJUSTMENT OF GREEN BAND

Note: In adjusting the Green and Red Bands, a .0002 mfd. condenser and a 400 ohms resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short wave antenna.

1. Set wave-change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5500 K.C. and adjust #35, #19 and #6 for maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 for maximum output.
4. Return to 5500 K.C. setting and make readjustment of #35, #19 and #6.

ADJUSTMENT OF RED BAND

1. Set wave-change switch to Red Band position.

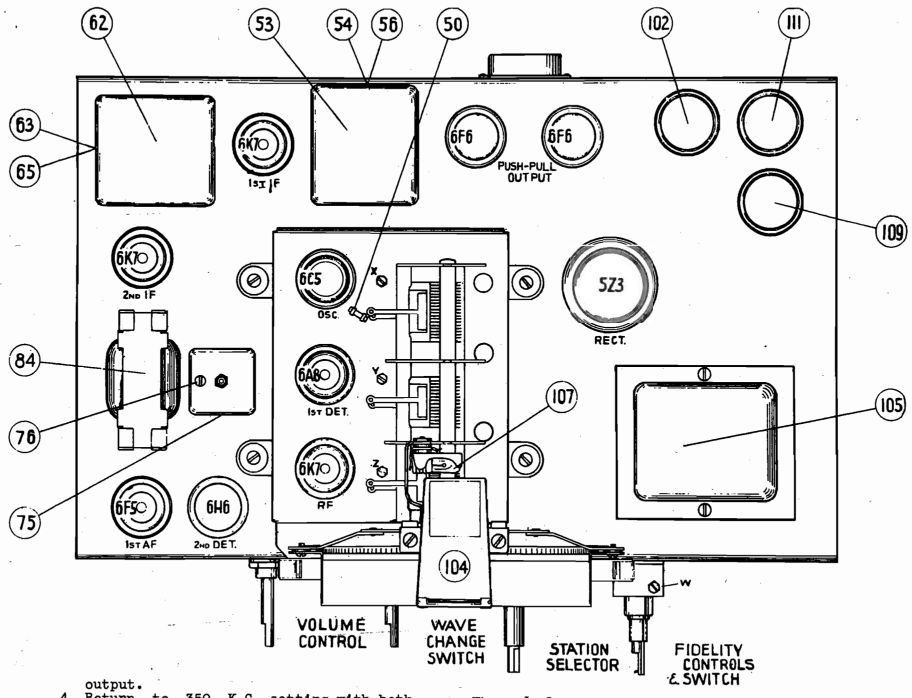


Figure No. 3

2. Set test oscillator and dial indicator to 17000 K.C. and adjust #34, #18 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #42 for maximum output.
4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #5.

Note: The adjustment of the two short-wave oscillator lag condensers (#42 and #43) is best made by the max-max. method. This is done as follows:

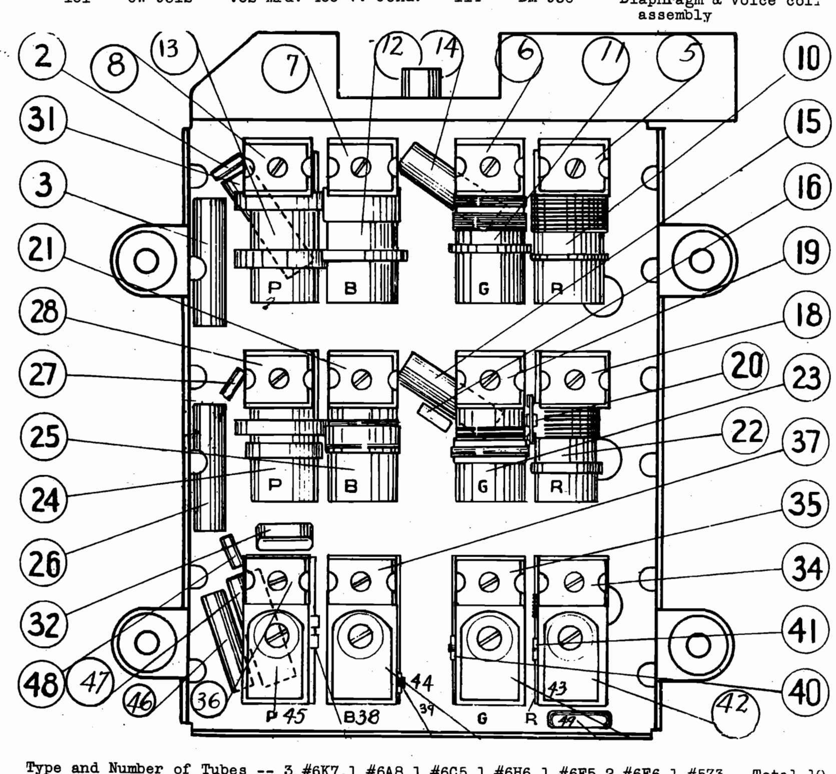
Tune the receiver with the left hand by means of the tuning knob and adjust the lag condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading of the output meter. Change the lag condenser further in the same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of lag condenser. Continue this type of trial and error adjustment until no further improvement can be made when either the tuning control or the lag condenser are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few minutes.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out thru the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

MODELS 595M, 595P
Trimmers, Parts

UNITED AMERICAN BOSCH CORP.

1	CG 9527	Variable cond. assy.
2	RE 9529	300 ohm ¼ W. resistor
3	SA 106386	.05 mfd. 200 V. cond.
4	SW 9524	Antenna section of "Centr-O-matic" assembly complete with switch, coils and trimmers
5	CS 9511	4 to 25 mmf. antenna trim cond. (Red Band)
6	CS 9511	4 to 25 mmf. antenna trim condenser (Green Band)
7	CS 9511	4 to 25 mmf. antenna trim condenser (White Band)
8	CS 9511	4 to 25 mmf. antenna trim condenser (Purple Band)
9		Twisted pair of wires - part of RC 9571
10	RC 9571	Antenna coil assembly (Red Band)
11	RC 9574	Antenna coil assembly (Green Band)
12	RC 9577	Antenna coil assembly (White Band)
13	RC 9580	Antenna coil assembly (Purple Band)
14	CW 9513	.05 mfd. 200 V. cond.
15	CW 9513	.05 mfd. 200 V. cond.
16	RE 9527	5000 ohm ¼ W. resistor
17	SW 9525	R.F. section of "Centr-O-matic" assy. complete with switch, coils and trimmers
18	CS 9511	4. to 25 mmf. R.F. trim condenser (Red Band)
19	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Green Band)
20	CM 9512	6. mmf. mica condenser
21	CS 9512	1.5 to 10 mmf. R.F. trim condenser (White Band)
22	RC 9572	R.F. coil assembly (Red Band)
23	RC 9575	R.F. coil assembly (Green Band)
24	RC 9581	R.F. coil assembly (Purple Band)
25	RC 9578	R.F. coil assembly (White Band)
26	SA 106386	.05 mfd. 200 V. cond.
27	RE 9529	300 ohm ¼ W. resistor
28	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Purple Band)
30	RE 9534	100,000 ohm ¼ W. res.
31	SA 106386	.05 mfd. 200 V. cond.
32	CM 9511	.000065 mfd. mica condenser
33	SW 9526	Oscillator section of "Centr-O-matic" assembly complete with switch, coils and trimmers
34		1.5 to 10 mmf. trim condenser - part of CS 9519 (Red Band)
35		3. to 15. mmf. trim condenser - part of CS 9520 (Green Band)
36		10 to 35 mmf. trim condenser - part of CS 9518 (Purple Band)
37		5 to 25 mmf. trim condenser - part of CS 9517 (White Band)
38	RC 9582	Oscillator coil assy. (Purple Band)
39	RC 9579	Oscillator coil assy. (White Band)
40	RC 9576	Oscillator coil assy. (Green Band)
41	RC 9573	Oscillator coil assy. (Red Band)
42		800 to 1600 mmf. lag condenser - part of CS 9519 (Red Band)
43		800 to 1600 mmf. lag condenser - part of CS 9520 (Green Band)
44		300 to 600 mmf. lag condenser - part of CS 9517 (White Band)
45		60 to 150 mmf. lag condenser - part of CS 9518 (Purple Band)
46	RE 9526	5000 ohm 1 W. resistor
47	CW 9513	.05 mfd. 200 V. cond.
48	RE 9524	50,000 ohm ¼ W. res.
49	CM 959	.002 mfd. mica cond.
50	RE 9537	50 ohm ¼ W. resistor
51	RE 9534	100,000 ohm ¼ W. res.
53	IC 9529	1st I.F. transformer assembly
54		250 to 350 mmf. I.F. trim condenser - part of IC 9529
55	SA 106417	.0001 mfd. mica cond.
56		250 to 350 mmf. I.F. trim condenser - part of IC 9529
57	SA 106417	.0001 mfd. mica cond.
58	RE 9527	5000 ohm ¼ W. resistor
59	SA 103659	.005 mfd. 400 V. cond.
60	RE 9534	100,000 ohm ¼ W. res.
61	SA 103659	.005 mfd. 400 V. cond.
62	IC 9530	2nd I.F. transformer assembly
63		250 to 350 mmf. I.F. trim condenser - part of IC 9530
64	SA 106417	.0001 mfd. mica cond.
65		250 to 350 mmf. I.F. trim condenser - part of IC 9530
66	SA 106417	.0001 mfd. mica cond.
67	SA 103659	.005 mfd. 400 V. cond.
68	RE 9527	5000 ohm ¼ W. resistor
69	SA 106386	.05 mfd. 200 V. cond.
70	SA 106386	.05 mfd. 200 V. cond.
71	VR 9511	Tone control switch
72	SA 105267	1000 ohm ¼ W. resistor
73	RE 9528	1000 ohm ¼ W. resistor
74	RE 9538	4000 ohm ¼ W. resistor
75	IC 9526	3rd I.F. transformer
76		25 to 100 mmf. I.F. trim condenser - part of IC 9526
77		.00005 mfd. mica cond. - part of IC 9526
78		100,000 ohm ¼ W. res. - part of IC 9526
79		.0001 mfd. mica cond. - part of IC 9526
80		250,000 ohm ¼ W. res. - part of IC 9526
81	SA 102504	.02 mfd. 200 V. cond.
82	VR 9510	Volume control (1 meg.)
83	SA 105249	5000 ohm ¼ W. resistor
84	TR 9516	Input transformer
85	CW 9512	.02 mfd. 400 V. cond.
86	SA 105246	½ meg. ¼ W. resistor
87		10 mfd. 25 V. electrolytic condenser - part of SA 107913
88	SA 103852	.002 mfd. 600 V. cond.
89	SA 103852	.002 mfd. 600 V. cond.
90	CW 9512	.02 mfd. 400 V. cond.
91		10 mfd. 25 V. electrolytic condenser - part of SA 107913
92	CW 9512	.02 mfd. 400 V. cond.
93	SA 105246	½ meg. ¼ W. resistor
94	SA 105281	1 meg. ¼ W. resistor
95	SA 102492	.05 mfd. 400 V. cond.
96	SA 106386	.05 mfd. 200 V. cond.
97	SA 105274	20,000 ohm ¼ W. res.
98	SA 105279	250,000 ohm ¼ W. res.
99	SA 105277	75,000 ohm ¼ W. res.
100	RE 9536	20,000 ohm ¼ W. res.
101	CW 9512	.02 mfd. 400 V. cond.
102	CE 9517	18. mfd. 300 V. electrolytic condenser
103	RE 9521	Voltage divider res.
104	SI 9532	Tuning meter assembly
105	TR 9517	Power transformer
106		Line switch - part of VR 9511
107	LP 952	Tuning meter light (3.2 V.)
108	LP 952	Dial lights (4 used) (3.2 V.)
109	CE 9516	8. mfd. 450 V. electrolytic condenser
110	SA 101696	Choke coil assembly
111	CE 9516	8. Mfd. 450 V. electrolytic condenser
112	TR 9513	Speaker output trans.
113	SK 959	Speaker
114	DM 956	Diaphragm & voice coil assembly



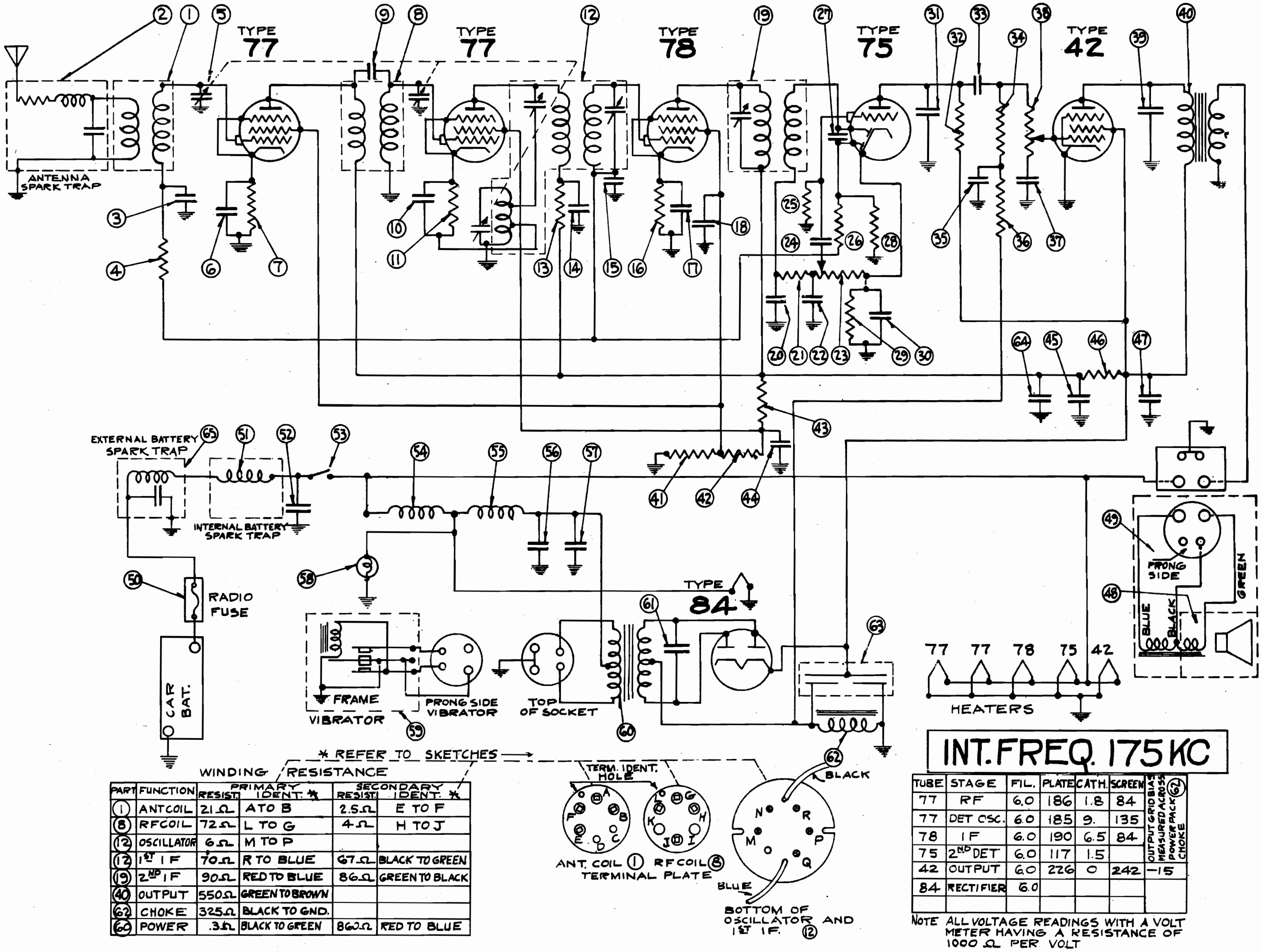
Type and Number of Tubes -- 3 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6F5, 2 #6F6, 1 #5Z3 - Total 10
Power Supply ---------- 105 to 125 volts, 50 to 60 cycle
Power Consumption ---------- 90 Watts
Maximum Undistorted Output ---------- 8 Watts
Maximum Output ---------- 10 Watts

Tuning Ranges			
	(Purple Band	120 K.C. to	350 K.C.
	(Broadcast Band	540 K.C. to	1800 K.C.
	(Green Band	1800 K.C. to	6000 K.C.
	(Red Band	6000 K.C. to	18,500 K.C.

Line-Up Frequencies -- I.F. 465K.C., 350K.C., 130K.C., 1600K.C., 570K.C., 5500K.C., 1900K.C., 17.000K.C. and 6000K.C.

UNITED AMERICAN BOSCH CORP

MODEL 634A
Schematic, Voltage Resistor Data



PART	FUNCTION	PRIMARY RESIST.	PRIMARY IDENT. *	SECONDARY RESIST.	SECONDARY IDENT. *
1	ANT COIL	21 Ω	A TO B	2.5 Ω	E TO F
8	RF COIL	72 Ω	L TO G	4 Ω	H TO J
12	OSCILLATOR	6 Ω	M TO P		
12	1ST I F	70 Ω	R TO BLUE	67 Ω	BLACK TO GREEN
19	2ND I F	90 Ω	RED TO BLUE	86 Ω	GREEN TO BLACK
40	OUTPUT	550 Ω	GREEN TO BROWN		
62	CHOKE	325 Ω	BLACK TO GND.		
60	POWER	.3 Ω	BLACK TO GREEN	86 Ω	RED TO BLUE

WINDING RESISTANCE

INT. FREQ. 175 KC

TUBE	STAGE	FIL.	PLATE	CATH.	SCREEN	OUTPUT GRID BIAS MEASURED ACROSS POWER PACK (62) CHOKE
77	RF	6.0	186	1.8	84	
77	DET OSC.	6.0	185	9.	135	
78	I F	6.0	190	6.5	84	
75	2ND DET	6.0	117	1.5		
42	OUTPUT	6.0	226	0	242	−15
84	RECTIFIER	6.0				

NOTE ALL VOLTAGE READINGS WITH A VOLT METER HAVING A RESISTANCE OF 1000 Ω PER VOLT

MODEL 634A
Socket, Trimmers
Alignment, Parts

UNITED AMERICAN BOSCH CORP.

LINE-UP CAPACITOR ADJUSTMENTS

All the adjustable capacitors, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or I.F. transformer is changed or the adjustments tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a high grade modulated test oscillator is available, then proceed as follows and refer to Fig. #2.

1. Set test oscillator to 175 K.C.
2. Set condenser gang to approximately 600 K.C. This will be at a point where the condenser plates are nearly all in mesh.
3. Connect output meter across voice coil of speaker. This may be done by connecting one lead of the output meter to the blue lead of the speaker terminal strip and the other lead to the frame of the chassis. The impedance of the voice coil is 3. ohms.
4. Apply test signal to grid of 78 I.F. tube thru a .5 mfd. blocking condenser and adjust trimmer "A" to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 77 first detector-oscillator and adjust trimmers "B" and "C" to maximum output.
6. Set test oscillator to 1500 K.C. and rotate condenser gang until the plates are wide open. Place a piece of paper (approx. .015 thk.) between the rotor and stator plates at the bottom of the gang and close the rotor down to this spacing. This is the exact setting of the condenser gang for the receiver oscillator at 1500 K.C. and should be carefully set as the resultant alignment of the receiver is directly dependant upon it.
7. Adjust trimmer "D" to maximum output and then remove the paper gauge.
8. Set test oscillator and condenser gang to 1400 K.C.
9. Apply test signal to grid of 77 R.F. tube and adjust trimmer "E" to maximum output.
10. Apply test signal to antenna lead thru a .0002 mfd. condenser and adjust trimmer "F" to maximum output.
11. Check sensitivity at several points.

The Model 634A Ed. 1 is designed with an internal tuned spark trap in the battery cable to assist in the suppression of ignition interference.

Dia. #	Part #	Description of Parts
1	RC 956	Antenna coil assembly
2	CM 952	.00001 mfd. mica cond.
3	SA 106386	.05 mfd. 200 V. cond.
4	SA 105278	100,000 ohms 1/4 W. res.
5	CG 954	Variable condenser assy.
6	SA 106386	.05 mfd. 200 V. cond.
7	SA 105264	500 ohms 1/4 W. res.
8	RC 957	R.F. coil assembly
9	CM 952	.00001 mfd. condenser
10	SA 103852	.002 mfd. 500 V. cond.
11	SA 105247	7500 ohms 1/4 W. res.
12	RC 958	Composite coil assy.
13	SA 105245	2000 ohms 1/4 W. res.
14	SA 102492	.05 mfd. 350 V. cond.
15	SA 106386	.05 mfd. 200 V. cond.
16	SA 105270	2,500 ohms 1/4 W. res.
17	SA 102497	.25 mfd. 200 V. cond.
18	CW 951	.1 mfd. 200 V. cond.
19	IC 951	I.F. coil assembly
20	SA 106417	.0001 mfd. mica cond.
21	SA 105276	50,000 ohms 1/4 W. res.
22	SA 106417	.0001 mfd. mica cond.
23	VR 951	Volume control-500,000 ohms
24	SA 103659	.005 mfd. 350 V. cond.
25	SA 105281	1 meg. 1/4 W. res.
26	SA 105246	1/2 meg. 1/4 W. res.
27	SA 106417	.0001 mfd. mica cond.
28	SA 105246	1/2 meg. 1/4 W. res.
29	SA 105249	5,000 ohms 1/4 W. res.
30	SA 102497	.25 mfd. 200 V. cond.
31	SA 103852	.002 mfd. 500 V. cond.
32	SA 105278	100,000 ohms 1/4 W.res.
33	SA 103659	.005 mfd. 350 V. cond.
34	SA 105279	1/4 meg. 1/4 W. res.
35	CW 951	.1 mfd. 200 V. cond.
36	SA 105279	1/4 meg. 1/4 W. res.
37	SA 106403	.001 mfd. 500 V. cond.
38	VR 952	Tone control-250,000 ohms
39	CW 952	.005 mfd. 500 V. cond.
40	TR 952	Output transformer
41	SA 105277	75,000 ohms 1/4 W. res.
42	SA 105274	20,000 ohms 1/4 W. res.
43	SA 105274	20,000 ohms 1/4 W. res.
44	SA 102492	.05 mfd. 350 V. cond.
45	SA 102496	.25 mfd. 350 V. cond.
46	SA 107572	5,000 ohms 1 W. res.
47	CM 951	.001 mfd. mica cond.
48	DM 951	Spkr.dphrgm.& voice coil
49	SK 955	Spkr.with cable & plug
50	FU 951	20 ampere fuse
51	RC 9512	Filter choke coil
52	CM 953	.00005 mfd. mica cond.
53		Switch - part of VR 951
54	SA 105452	Filter choke coil
55	SA 105452	Filter choke coil
56	CW 958	.5 mfd. 200 V. cond.
57	CW 958	.5 mfd. 200 V. cond.
58	SA 106809	Dial light-scr.type base
59	VI 951	Vibrator
60	TR 953	Power transformer
61	SA 106804	.008 mfd. 1600 V. cond.
62	TR 951	B choke
63	CE 951	6. and 10. mfd. elec. cond.
64	CM 951	.001 mfd. mica cond.

The Model 634A Ed. 2 is designed with an additional spark trap connected externally and in series with the battery cable. An antenna spark trap is also provided in the antenna circuit. These two spark traps make the use of spark plug suppressors unnecessary in most installations. The antenna spark trap is mounted inside of the chassis housing and a new R.F. transformer has been provided to match the impedance of this antenna spark trap.

Type and Number of Tubes ....2 #77, 1 #78, 1 #75, 1 #42, 1 #84 - Total 6
Battery Current (6.3 Volt Battery)........ 6.5 Amperes
Tuning Range .... 540 to 1500 K.C.
Maximum Undistorted Output .... 3. Watts
Maximum Output .... 4. Watts
Line-Up Frequencies .... I.F. 175 K.C., 1400 K.C., 1500 K.C.

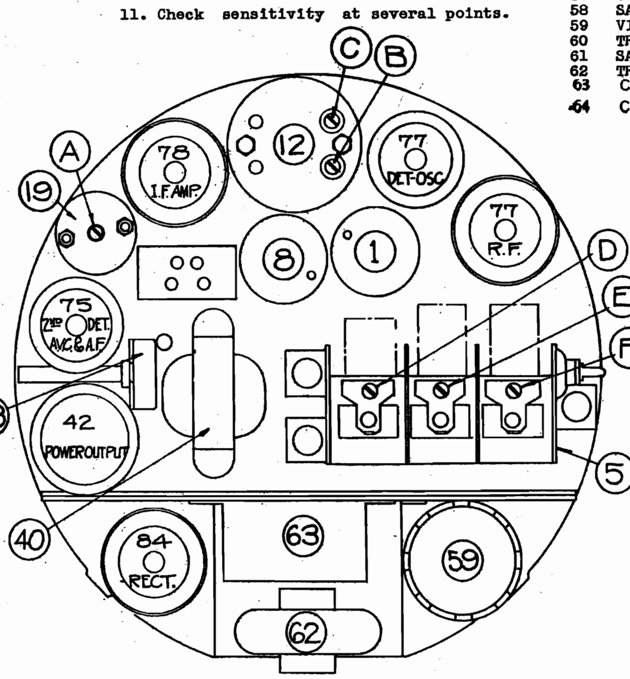


Figure No. 2

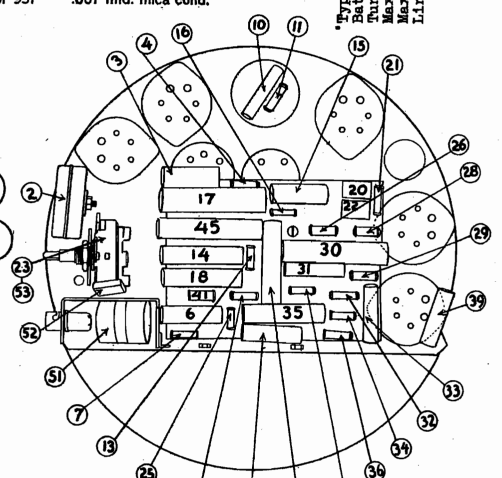


Figure No. 4

MODEL 626 Delco
Schematic
Voltage

UNITED MOTORS SERVICE

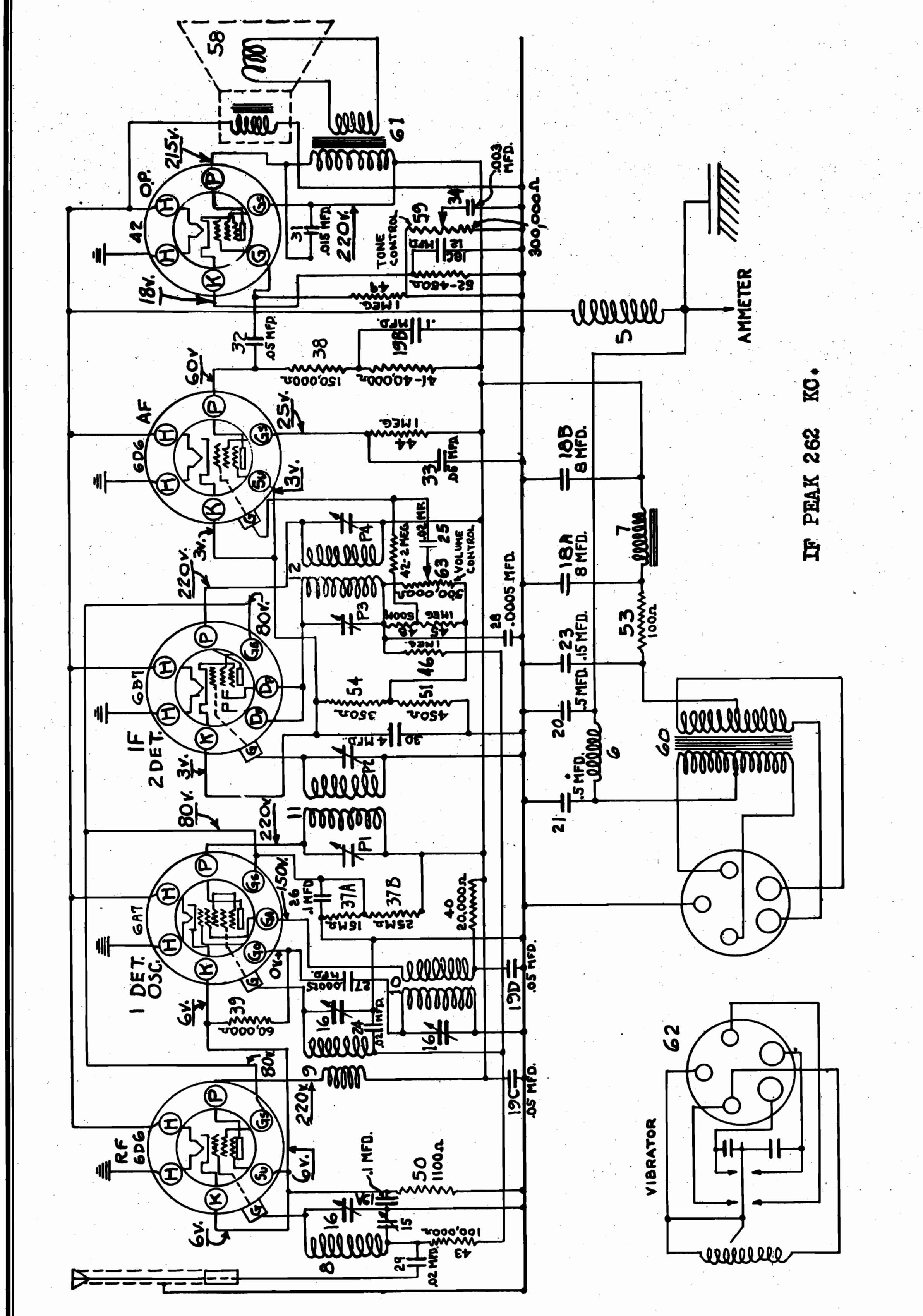


FIG. 1 DELCO MODEL 626 CIRCUIT DIAGRAM

MODEL 626 Delco
Alignment
Circuit Notes

UNITED MOTORS SERVICE

PEAKING PROCEDURE

The only way the circuits of this receiver can be peaked properly is with the use of a calibrated test oscillator and an output meter. The circuits are very carefully adjusted at the factory and do not need any further adjustment unless tampered with in the field or a defective coil has been replaced. It is, therefore, advisable not to attempt any adjustments unless it is definitely known that an adjustment is necessary. This is especially important in connection with the Syncro-Tuning circuit.

Connecting Output Meter

Connect one of the output meter leads to the plate prong of the type 42 output tube. (The plate prong is the first prong to the left of the filament when looking at the bottom of the tube with the filament prongs toward you.) Connect the other output meter lead to the receiver chassis, making sure that the meter is protected with a D.C. blocking condenser connected in series to prevent damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case. Also, the following procedure should be followed closely if the "Syncro-Tuning" circuit is to function properly.

1. Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. (The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.)

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the 2nd I.F. coil, Illustration #12 on Fig. 3.

(e) Then peak each of the trimmers on the 1st I.F. coil, Illustration #11 on Fig. 3.

NOTE: In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

2. Peaking Oscillator Section of Gang Condenser at 1540 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on exactly 1540 kilocycles.

(d) Adjust the parallel trimmer for the "OSC." section (middle section) CAREFULLY for maximum output. Then adjust the trimmers for the other two sections of the gang condenser, also for maximum output.

3. Peaking "ANT". and "R.F." Sections of Gang Condenser at 1400 K.C. and Compensating Condenser at 600 K.C.

(a) Set the test oscillator on 1400 kilocycles.

(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output

(c) Readjust the parallel trimmers for the "ANT." and "R.F." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the oscillator trimmer as this is adjusted at 1540 K.C. only and any adjustment at this point will affect both the tuning range of the receiver and the tracking of its circuits.

NOTE: In order to accurately set the "ANT." trimmer of the condenser gang at 1400 K.C. it will be necessary to make a preliminary adjustment of the "antenna compensating condenser" (Illustration #15 on Fig. 3) before installing the receiver on a car.

(d) Set the test oscillator on 600 kilocycles.

(e) Turn the condenser rotor plates until the 600 K.C. signal from the test oscillator is tuned in with maximum output.

(f) Peak the "antenna compensating condenser," (Illustration #15 on Fig. 3) for maximum output, rocking the rotor plates of the condenser gang back and forth and adjusting the "antenna compensating condenser" alternately until no further improvement in output can be obtained.

(g) Reset the test oscillator on 1400 kilocycles.

(h) Turn the condenser rotor plates until the 1400 K.C. signal is tuned in with maximum output.

(i) Adjust the trimmer for the "ANT." section of the gang condenser CAREFULLY for maximum output.

4. Adjusting Compensating Condenser to Car Antenna

After the "ANT." section of the gang condenser has been correctly adjusted according to preceding information it will be necessary to reset the "antenna capacity compensating condenser" to the car antenna when installing the receiver in a car in order to compensate for the wide range of antenna capacities being used. This is done in the following manner:

(a) Tune the receiver to a weak broadcast station between 570 to 640 K.C.

(b) Peak the "antenna capacity compensating condenser" for maximum output, rocking the receiver dial back and forth and adjusting the compensating condenser alternately until no further improvement in output can be obtained.

CAUTION: Do not touch the adjustment of the parallel trimmer for the "ANT." section of the gang condenser after the receiver is installed a car.

Delco Syncro-Tuning

The outstanding circuit feature of this receiver is the specially designed antenna circuit which provides more than four times the stage gain of conventional circuits, making it particularly suitable for under car antenna systems required on several 1935 Model cars. Syncro-Tuning differs from other circuits in that the antenna system is actually tuned to resonance at all frequencies instead of just one point in the broadcast band as is the case in other circuits. This results in a greatly increased efficiency and a lower noise level. Syncro-Tuning is accomplished through the use of specially shaped stator plates in the "ANT." section of the condenser gang in collaboration with a very carefully designed antenna circuit which in reality is very simple. The capacity of the antenna system with which the receiver is to be used is immaterial insofar as the tuning of the antenna circuit is concerned. This is because of the use of an "antenna capacity compensating condenser" that can be adjusted for any deficiency or excess of antenna capacity so that the sum total capacity the receiver works with is always the same. It is therefore important that this condenser be adjusted to the car antenna when installing the receiver in a car.

A spark noise filter is employed to prevent ignition interference from affecting the receiver circuits. The elimination of chassis pickup in this manner should make possible the installation of this receiver in the majority of cars without the use of spark plug suppressors.

The receiver may be connected for operation on a car battery with the positive side grounded by simply reversing the two wires connected to the terminal strip located on top of the power transformer.

The "B" power supply utilizes a full wave self-rectifying vibrator of the plug-in type.

A slight voltage delay is used on the detector circuit to assist materially in reducing background noise.

Circuit Operation

Referring to the circuit diagram Figure 1. The antenna is capacity coupled to the antenna coil, which is tuned by the "ANT." section of the gang condenser, and feeds the grid of the 6D6 R.F. amplifier tube. The plate circuit of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned by the "R.F." section of the gang condenser. (The 6A7 tube is used as the conventional detector oscillator or pentagrid converter.) The oscillator frequency which is produced due to the reaction between the oscillator grid, plate, and associated circuit constants is tuned by the "OSC." section of the gang condenser. The incoming station frequency and the oscillator frequency are mixed in the 6A7 tube and the resultant frequency which is 262 kilocycles is transformer coupled to the grid of the pentode section of the 6B7 tube and the output of this section of the tube is impressed on the diode plates of this tube for detection and developing A.V.C. voltage. The A.V.C. voltage controls the grid bias of the 6D6 R.F. tube, the control grid of the 6A7 tube and also a part of the developed voltage is used to control the 6D6 audio tube. The audio output of the detector circuit is coupled to the grid of the 6D6 audio amplifier tube and the grid voltage swing is controlled by the volume control. The output of this audio tube is resistance coupled to the grid of type 42 power output pentode.

MODEL 626 Delco
Socket,Trimmers
Chassis Layout

UNITED MOTORS SERVICE

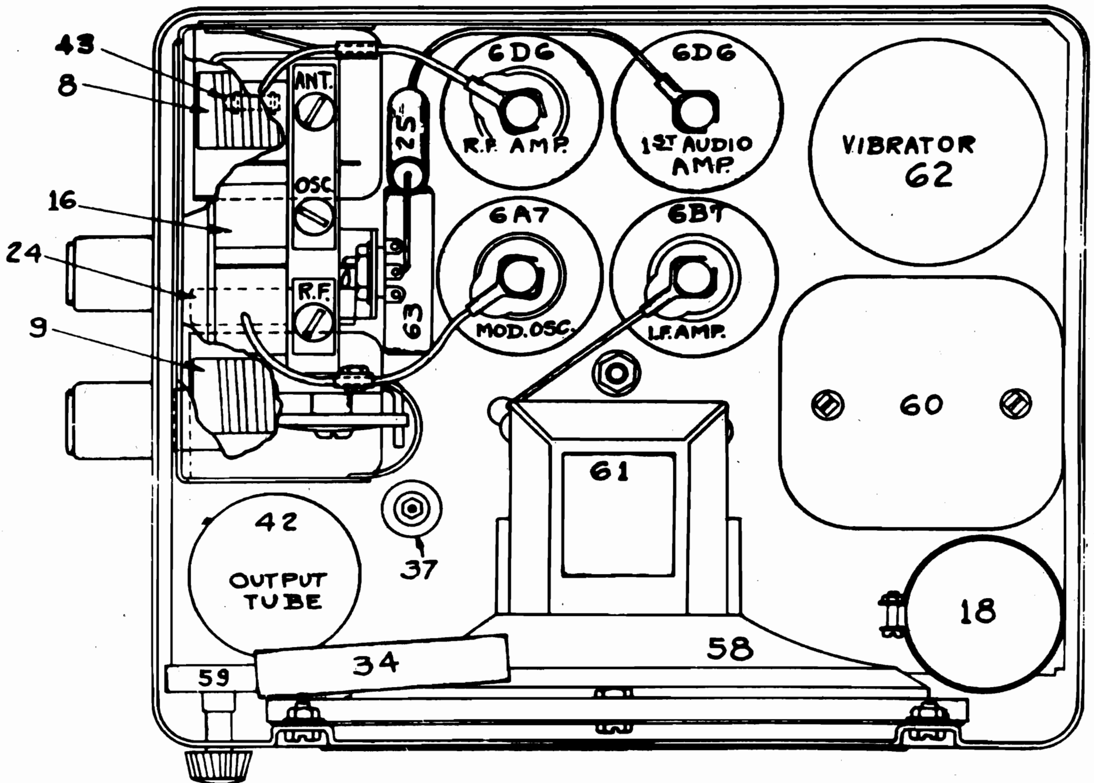


FIG. 2 PARTS LAYOUT--TOP VIEW

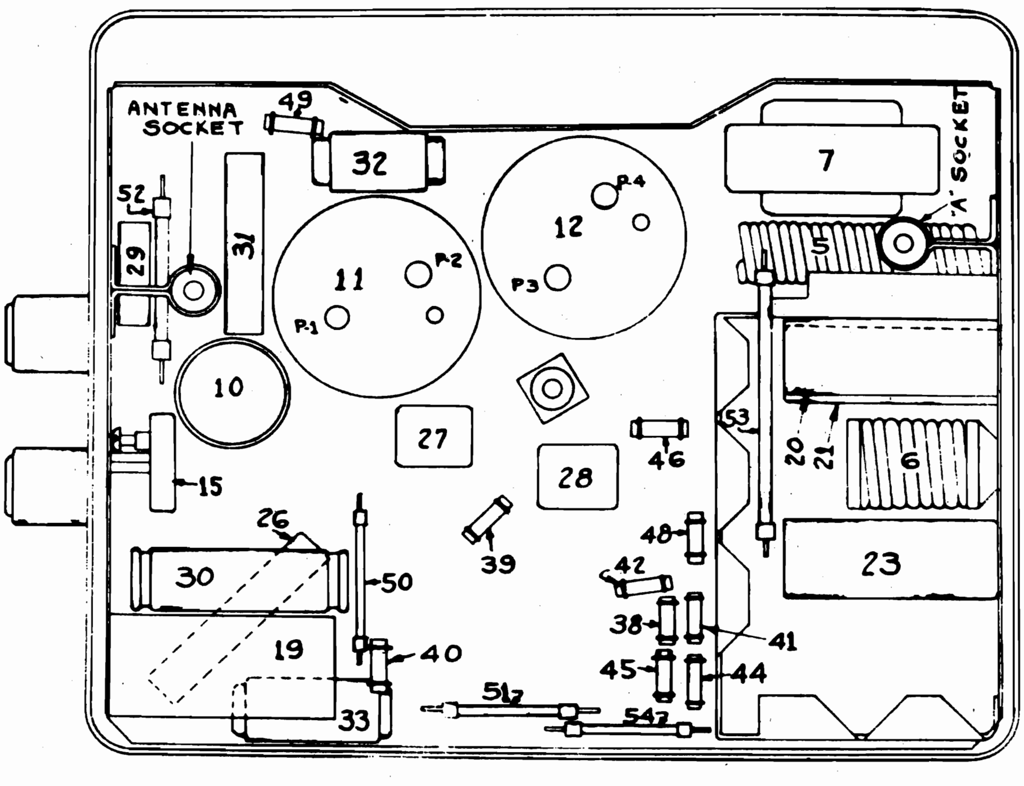


FIG. 3 PARTS LAYOUT--BOTTOM VIEW

MODEL 626 Delco
Parts List

UNITED MOTORS SERVICE

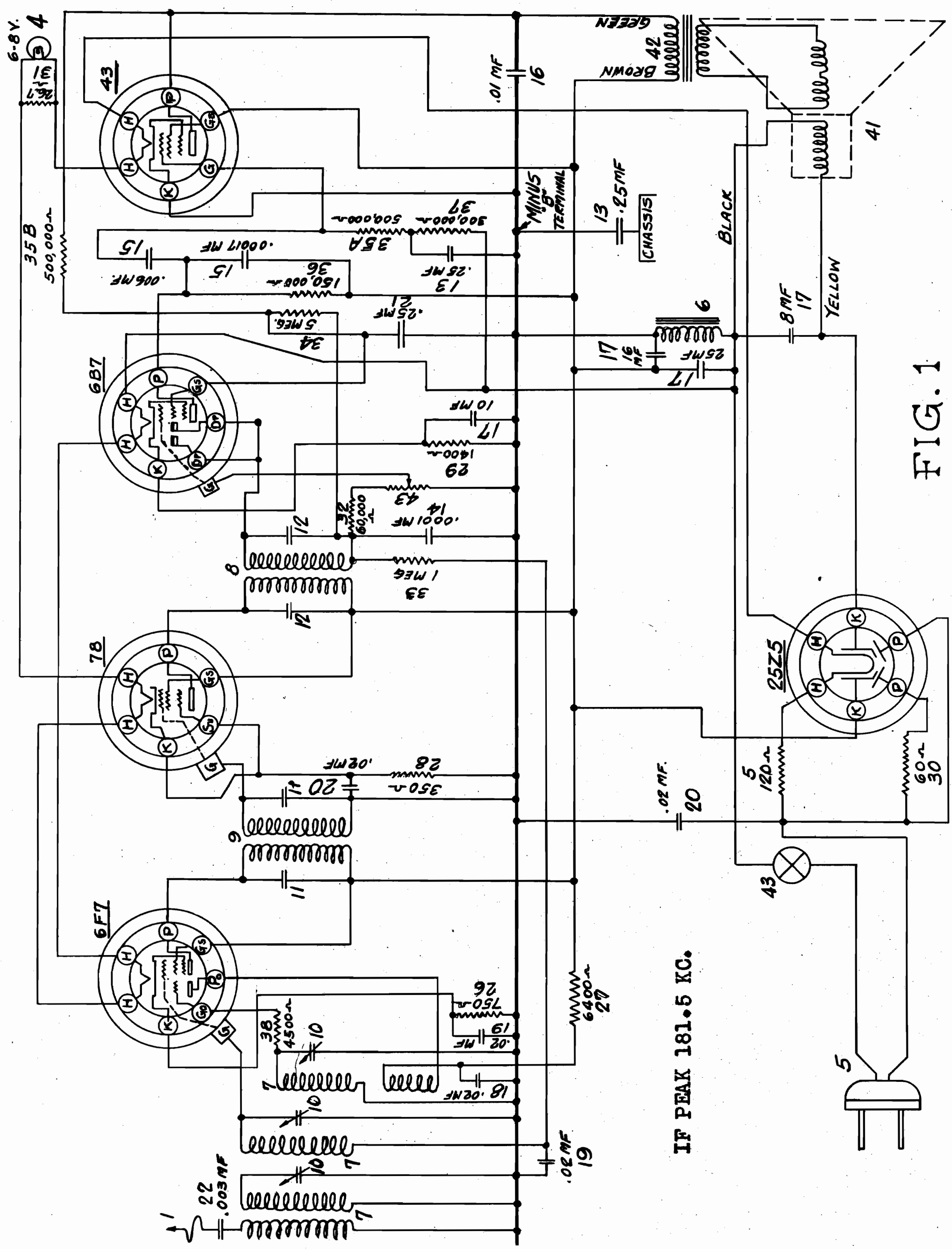
CHASSIS PARTS

Part No.	Part Name	Description	Illus. No.
1208767	Base	Tube shield grounding	
1209334	Bolt	Chassis cover retaining stud	
1209335	Bracket	Volume control mounting	
1209336	Case	Chassis (less covers)	
1209337	Case	Transformer	
1209340	Clamp	Vibrator grounding	
1209341	Clamp	Condenser mtg. (4 mfd.)	
1209342	Clamp	Elect. cond. mtg.	
1209636	Cloth	Speaker grille	
1209338	Coil	"A" supply filter choke	5
1209339	Coil	Vibrator "A" choke	6
1209291	Coil	"B" power filter choke	7
1209343	Coil	Antenna	8
1209344	Coil	R.F.	9
1209345	Coil	Oscillator	10
1209304	Coil assy.	1st I.F.	11
1209305	Coil assy.	2nd I.F.	12
1209633	Condenser	Antenna compensating	15
1209346	Condenser	3 gang tuning	16
	Sec. A	Antenna	
	Sec. B	R.F.	
	Sec. C	Oscillator	
1209285	Condenser	Electrolytic block	18
	Sec. A	8 mfd., 450 volt	
	Sec. B	8 mfd., 450 volt	
	Sec. C	12 mfd., 25 volt	
209321	Condenser	By-pass block	19
	Sec. A	.1 mfd., 200 volt	
	Sec. B	.1 mfd., 200 volt	
	Sec. C	.05 mfd. 400 volt	
	Sec. D	.05 mfd. 400 volt	
1209299	Condenser	Metal case .5 mfd. 160 volt	20
1209299	Condenser	Metal case .5 mfd. 160 volt	21
1209300	Condenser	Metal case .15 mfd .400 volt	23
1209307	Condenser	Tubular .02 mfd. 200 volt	24
1209307	Condenser	Tubular .02 mfd. 200 volt	25
1209306	Condenser	Tubular .1 mfd. 200 volt	26
1209220	Condenser	Molded .00025 mfd.	27
1209612	Condenser	Molded .0005 mfd.	28
1209310	Condenser	Tubular .02 mfd. 200 volt	29
1209324	Condenser	Metal case 4 mfd. 10 volt	30
1209325	Condenser	Tubular .015 mfd. 400 volt	31
1209313	Condenser	Tubular .05 mfd. 400 volt	32
1209308	Condenser	Tubular .05 mfd. 400 volt	33
1209627	Condenser	Tubular .003 mfd. 200 volt	34

Part No.	Part Name	Description	Illus. No.
1209726	Connector assy.	"A" power on chassis	
1836869	Cap	Ferrule holder	
1838476	Ferrule	Contact	
1209727	Connector assy.	Antenna on chassis	
1838476	Ferrule	Contact	
1836878	Spring	Tension	
1843713	Washer	Fiber	
1209347	Cord	Speaker	
1209348	Cover	Chassis bottom	
1209349	Cover	Chassis tube lid	
1209350	Cover	Transformer bottom	
1209351	Cover	Transformer top	
1209352	Cover	Vibrator filter shield	
1209639	Grille	Speaker front (nickel ed)	
1209354	Plug	Antenna trimmer cover	
1209355	Resistor	Voltage divider "ohmite"	37
	Sec. A	15,000 ohms, 2 watt	
	Sec. B	25,000 ohms, 2 watt	
1208292	Resistor	Carbon 150,000 ohms 1/3 watt	38
1208320	Resistor	Carbon 60,000 ohms 1/4 watt	39
1209405	Resistor	Carbon 20,000 ohms 1/3 watt	40
1208296	Resistor	Carbon 40,000 ohms 1/3 watt	41
1209356	Resistor	Carbon 2 megohms, 1/3 watt	42
1208854	Resistor	Carbon 100,000 ohms 1/3 watt	43
1208232	Resistor	Carbon 1 megohm 1/3 watt	44
1208232	Resistor	Carbon 1 megohm 1/3 watt	45
1208232	Resistor	Carbon 1 megohm 1/3 watt	46
1204138	Resistor	Carbon 500,000 ohms 1/3 watt	48
1208232	Resistor	Carbon 1 megohm 1/3 watt	49
1209357	Resistor	Flexible 1100 ohms 1/2 watt	50
1208110	Resistor	Flexible 450 ohms 1/2 watt	51
1209358	Resistor	Flexible 450 ohms 1½ watt	52
1209359	Resistor	Flexible 100 ohms 3 watt	53
1208802	Resistor	Flexible 350 ohms 1/2 watt	54
1209607	Speaker	Complete unit 6½"	58
1209614	Term. assy.	Polarity reversing	
1209217	Term. assy.	Single lug	
1209611	Term. assy.	Fire lug	
1209747	Term. assy.	Four lug-on speaker	
1209628	Tone control	Res. 300,000 ohms	59
1209282	Transformer	Vibrator power	60
1209613	Transformer	Output-speaker	61
5039661	Vibrator	Plug-in synchronous	62
1209330	Volume control	Res. 500,000 ohms	63

UNITED MOTORS SERVICE, INC.

MODEL 1101 Delco
Schematic



IF PEAK 181.5 KC.

FIG. 1

MODEL 1101 Delco Alignment, Data Socket, Trimmers Voltage, Parts

UNITED MOTORS SERVICE, INC.

The chassis employs a 5 tube AC-DC superheterodyne circuit, automatic volume control and an electro-dynamic speaker.

The frequency range is 535-1720 kilocycles, including the full broadcast range and also the first police channels. The intermediate frequency is 181.5 Kilocycles.

METHOD OF BIASING

Referring to the circuit diagram, it will be seen that the 6F7 tube obtains its bias from the cathode resistor Illus. #26, by-passed by condenser 19, .02 Mfd.

The 78 I.F. amplifier obtains its bias from the cathode resistor 28.

Bias for the 6B7 audio amplifier is obtained from cathode resistor 29. The effect of this circuit is that a slight bucking bias is applied to the diode setcion, but a very weak signal soon overcomes this bias and the diode then acts as though there were no bias resistor. The pentode audio amplifier section, however, makes use of this initial bias in resistor 29 and after signal is applied, depending on the strength of the signal, a varying amount of bias will be applied to accommodate the signal from the AVC circuit.

Bias for the type 43 output tube is obtained from the drop across the filter choke 6 and whatever hum component there is remaining is filtered through resistor 37 and bypass condenser 13.

AUTOMATIC VOLUME CONTROL CIRCUIT

Automatic volume control voltage is developed in the diode circuit across resistor 32 in series with volume control 43. This voltage is fed back through filter resistor 33 to the control grid return of the 6F7 modulator section. No automatic volume control is exerted on the intermediate frequency amplifier, type 78 tube.

Connecting Output Meter

Connect one terminal of the output meter to the plate prong of the type 43 output tube and the other terminal to the radio chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 181.5 KC

(a) Connect the antenna of the signal generator to the receiver antenna wire close to where it enters the chassis, through a series condenser, preferably an .02 mfd. The best way to make this connection is with a sharp, pointed prod so that the insulation on the antenna wire is not permanently damaged. The unused dead end of the antenna wire should be rolled up on its reel.

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the Signal Generator to exactly 181.5 KC.

(d) With the Signal Generator set to the lowest useable output level and the radio volume control on full, adjust the four I.F. coil trimmer condenser nuts for maximum signal output. These nuts are accessible through the front flange of the chassis. To make these adjustments a standard 1/4" (across flats) insulated hexagon socket wrench must be used. It may be necessary to move the tuning dial slightly for the best result. Normally the rotor plates should be in mesh with the stator plates. (Approx. 550 KC.) Always make these I.F. adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency.

Peaking Tuning Condenser at 1400 KC

(a) Connect the antenna terminal of the test oscillator to the receiver antenna through a series condenser--a .0001 mfd. condenser is preferable. Again this connection should be made close to where the antenna wire enters the chassis.

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the signal generator to exactly 1720 kilocycles and to the lowest useable volume level, with radio set volume on full.

(d) Turn the tuning condenser on the radio chassis to 1720--rotor plates entirely out of mesh with stator plates--and adjust oscillator trimmer (on rear of cond. gang) for max. signal.

(e) Set signal generator to 1400 KC.

(f) Turn tuning condenser until max. signal is obtained.

(g) Adjust the remaining two trimmers--antenna & R.F. sections--on the tuning condenser to resonant frequency.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from minus "B" terminal to the tube prong, excepting the heater terminals in which case the voltage drop across the two H prongs is measured. This chart was made while using 115 volt, 60 cycle line. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*

TYPE	FUNCTION	H	P	Gs	Su	G	K	P-osc.
6F7	Osc-Mod.	6.5	100	100	-	0	5	100
78	IF	6.5	100	100	3	0	3	- -
6B7	Diode--AF	6.5	15	15	-	0	1	- -
43	Output	27.	96	100	-	-20	0	- -
25Z5	Rectifier	27.	-	- -	-	-	100	- -

***TUBE BASE DIAGRAM SYMBOLS**

H - Heater   Su - Suppressor Grid   K - Cathode
P - Plate   G - Control Grid   P-Osc - Osc Plate
Gs - Screen Grid

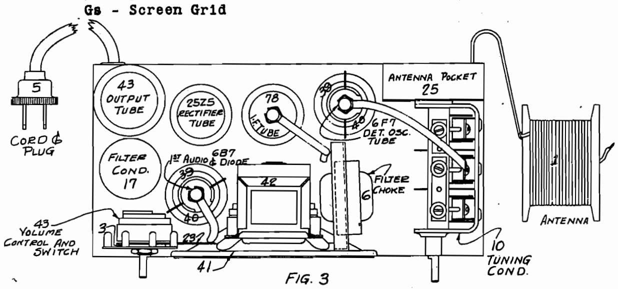
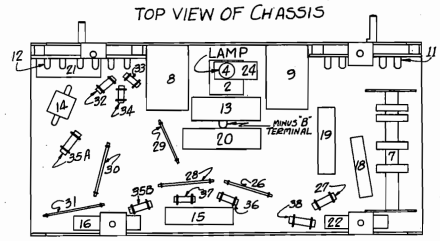


FIG. 3
TOP VIEW OF CHASSIS



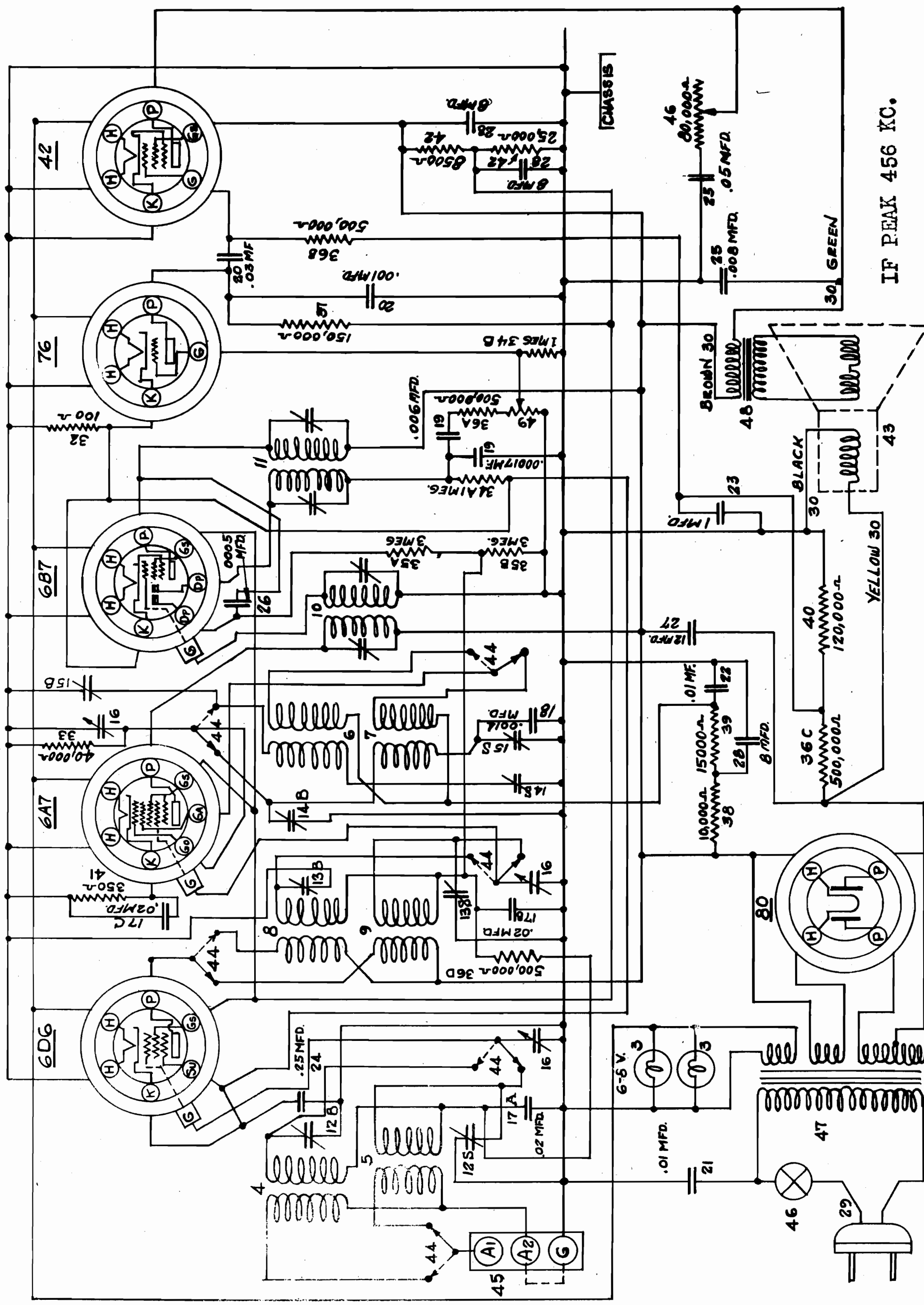
BOTTOM VIEW OF CHASSIS
FIG. 2

Part No.	Illus. No.	Part Name	Description
1208766	1	Antenna	15 ft. flexible--coiled
1208767		Base	Tube shield
1208346	2	Bracket	Dial light
1208768	3	Bracket	Volume control
1208769		Bracket	Speaker support
1209000	4	Bulb	Dial light--6-8 volt
1208351	5	Cord & plug	Includes resistor wire
1208775	6	Choke	Filter
1208776		Clamp	Filter condenser
1208777	7	Coil	Antenna
1208778	8	Coil	Diode feeding
1208779	9	Coil	1st I.F.
1208780	10	Condenser	Tuning
1208781	11	Condenser	1st I.F. padding
1208785	12	Condenser	2nd I.F. padding
1208782	13	Condenser	.25 - .25 Mfd. 200 volt
1208783	14	Condenser	.0001 " (Mica)
1208355	15	Condenser	.00017 - .006 Mfd. 200 volt
1208784	16	Condenser	.01 Mfd. 200 volt
1208786	17	Condenser	10. -8. - 25.- 16. " (filter.
1208787	18	Condenser	.02 Mfd. 200 volt
1208788	19	Condenser	.02 - .02 Mfd. 200 volt
1208789	20	Condenser	.02 - .02 Mfd. 400 volt
1208790	21	Condenser	.25 Mfd. 200 volt
1208352	22	Condenser	.003 Mfd. 200 volt
1208792		Grommet	Tuning condenser
1208793	23	Insulator	Volume control
1208794	24	Insulator	Dial light & bracket
1208799	25	Pocket	Antenna
1208800	26	Resistor	750 ohms (Flex.)
1209007	27	Resistor	6400 "
1208802	28	Resistor	350 "
1208803	29	Resistor	1400 "
1208804	30	Resistor	60 ohm (Flex.) 1/2 watt
1208360	31	Resistor	26.7 ohm (Flex.)
1208320	32	Resistor	60,000 ohm, 1/3 watt
1208144	33	Resistor	1,000,000 ohm, 1/3 watt
1208805	34	Resistor	5,000,000 ohm, 1/3 watt
1204138	35A,35B	Resistor	500,000 ohms
1207905	36	Resistor	150,000 "
1204139	37	Resistor	300,000 o"
1208906	38	Resistor	4500 ohms
1208810	41	Speaker	Assembly
1209002	42	Transformer	Output
1208812	43	Vol. Control	With switch

1103 Delco
Below Serial 805120
Schematic

UNITED MOTORS SERVICE, INC.

MODELS 1102 Delco
Below Serial 781400



IF PEAK 456 KC.

Frequency Ranges
535 - 1750 KC.
5.5 - 16.0 MC.

FIG. 1

MODELS 1102 Delco
Above Serial 781400

UNITED MOTORS SERVICE, INC.

1103 Delco
Above Serial 805120
Schematic

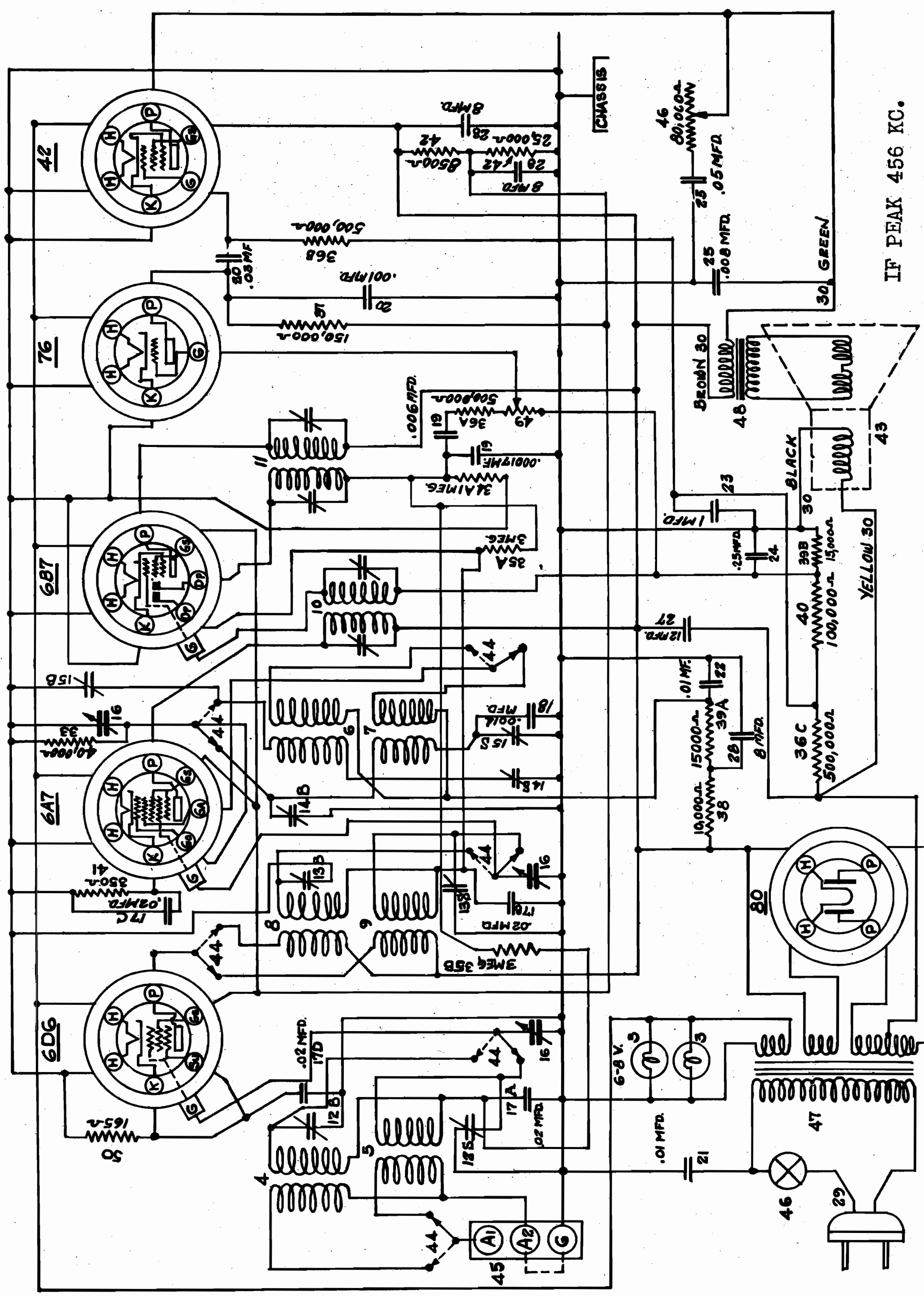
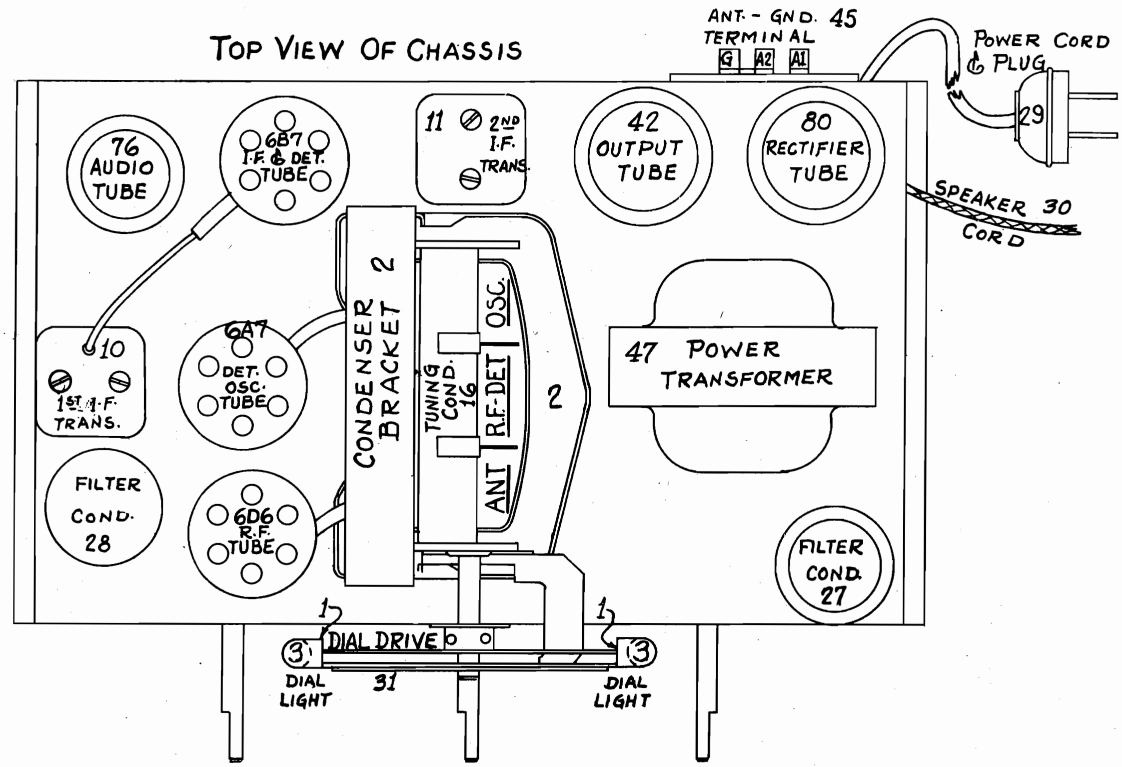
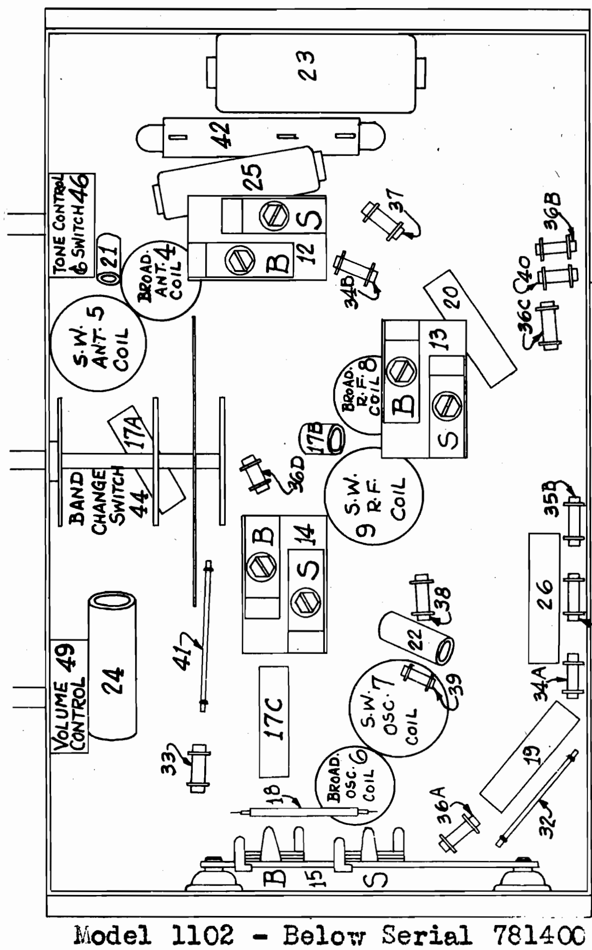


FIG. 1a

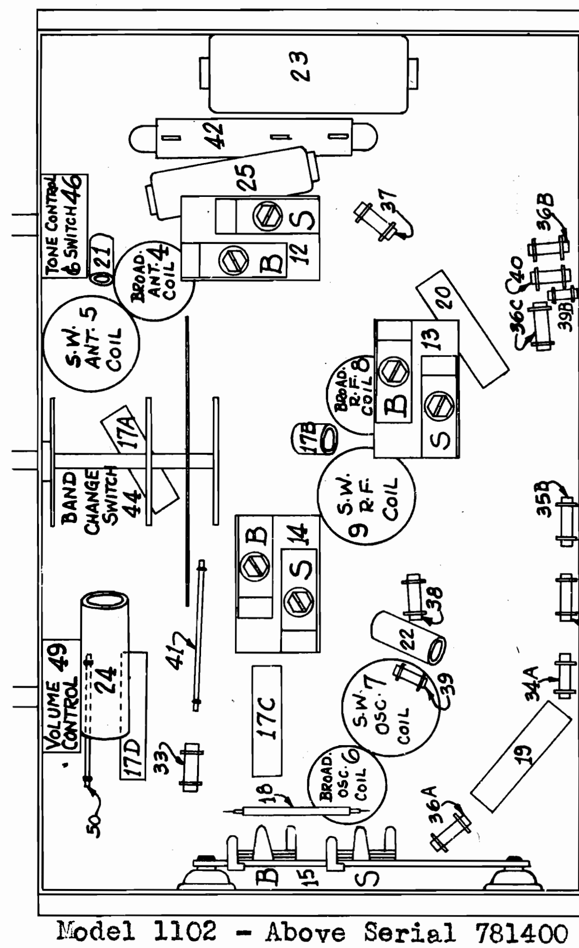
MODELS 1102,1103 Delco
Socket,Trimmers
Chassis Layout

TOP VIEW OF CHASSIS





Model 1102 - Below Serial 781400
Model 1103 - Below Serial 805120



Model 1102 - Above Serial 781400
Model 1103 - Above Serial 805120

MODELS 1102,1103 Delco Alignment,Voltage Tables Parts List

UNITED MOTORS SERVICE, INC.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate terminal of the type #42 output tube and the other terminal to the radio chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 456 Kilocycles

(a) Connect the antenna of the signal generator to the control grid connection on top of the 6A7 tube, (DO NOT REMOVE grid cap) through a series condenser (.02 mfd.).

b) Connect the ground terminal of the signal generator to the radio chassis frame.

c) Set the signal generator to exactly 456 kilocycles.

d) Set the receiver band change switch to the broadcast (right) position.

e) With the signal generator set to the lowest useable output level, and the receiver volume control on full, adjust the I.F. trimmer condensers for maximum output.

To make this adjustment a small insulated screw-driver is required. Always make the I.F. adjustments very carefully and go over them several times to insure that the final setting is at resonant frequency. Rotate selector dial to insure that the alignment has not been made on a broadcast frequency in which case the signal will disappear as the dial is turned.

PEAKING TUNING CONDENSER AT 1400 KILOCYCLES (Broadcast Band)

a) Close the receiver tuning condenser plates (535 KC) and set the pointer on the horizontal line.

(b) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series condenser (.0002 mfd.)

(c) Connect the ground terminal of the signal generator to the radio chassis frame.

d) Set the signal generator to exactly 1400 kilocycles and to the lowest useable volume level, with the radio set volume on full.

e) Turn band change switch to the right hand position (broadcast band).

f) Set the tuning control of the receiver to 140 on the dial.

(g) Adjust the oscillator broadcast shunt trimmer, Illus. #14-B to resonant frequency (greatest swing on output meter).

(h) Adjust the antenna trimmer, Illus. #12-B, to resonant frequency.

(i) Adjust the radio frequency trimmer, Illus. #13-B, to resonant frequency.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

j) Set the signal generator to 600 kilocycles.

(k) Tune the receiver to 60 on the dial and adjust the frequency setting of the signal generator until maximum response is obtained.

l) Adjust the series oscillator trimmer 15-B and vary selector dial slightly, not over an 1/8" simultaneously until maximum output is obtained.

m) Repeat the adjustments at 1400 KC.

PEAKING TUNING CONDENSER AT 15 MEGACYCLES (Short Wave Band)

(a) Connect the antenna terminal of the signal generator to a receiver antenna terminal through a series carbon resistor (approx. 750 ohms).

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the signal generator to exactly 1500 KC (15 megacycles.)

(d) Turn band change switch to the left hand position (short wave band).

e) Set the tuning control of the receiver at 15 on the dial.

f) Adjust the oscillator parallel trimmer 14-S, to resonant frequency.

g) Adjust the antenna trimmer 12-S, to resonant frequency.

h) Adjust the radio frequency trimmer 13-S, and vary selector dial slightly (not over 1/8") simultaneously until maximum output is obtained.

NOTE: It is necessary that these adjustments be gone over very carefully several times until no further improvement can be made. Greater accuracy is required for making short wave adjustments than for the broadcast band.

i) Now set the signal generator to 6000 KC.

j) Set the receiver dial to 6.

k) Adjust the oscillator series trimmer, 15-S, and vary the dial slightly (not over 1/8") simultaneously until maximum output is obtained.

(l) Repeat the adjustments at 15000 KC.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis to the tube prong. This chart was made while using 115 volt line. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*

TYPE	FUNCTION	H	P	Gs	Su	G	Ga	Go	K
6D6	RF Amp.	6.5	250	125	0	0	-	-	3
6A7	Osc-Mod.	6.5	250	125	-	0	140	15	4.2
6B7	IF & Diode	6.5	250	125	-	0	-	-	3
76	AF Amp.	6.5	35	-	-	0	-	-	3
42	Output	6.5	230	250	-	-18	-	-	0
80	Rectifier	5.1	-	-	-	-	-	-	-

VOLTAGE CHART

(Use only for 1102's above #781400 and 1103's above #805120.)

The tube voltages shown below are average readings taken from chassis to the tube prong. This chart was made while using a line voltage of 115 volts. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS *

TYPE	FUNCTION	H	P	Gs	Su	G	Ga	Go	K
6D6	R.F. Amp.	6.5	250	110	2	0	-	-	2
6A7	Osc.-Mod.	6.5	250	110	-	0	125	-5	4.0
6B7	IF & Diode	6.5	250	110	-	-3	-	to	0
76	A.F. Amp.	6.5	28	-	-	-3	-	-15	0
42	Output	6.5	230	250	-	18	-	-	0
80	Rectifier	5.1	-	-	-	-	-	-	-

1208828	4	Coil	Broadcast antenna
1208829	5	Coil	S.W. ant.
1209003	6	Coil	Broadcast oscillator
1208829	7	Coil	S. W. oscillator
1208830	8	Coil	Broadcast R.F.
1208831	9	Coil	S.W. R.F.
1208832	10	Coil	1st I.F.
1208834	11	Coil	2nd I.F.
1208835	12	Condenser	Ant. trimmer--broadcast & S.W.
1208835	13	Condenser	R.F. trimmer--broadcast & S.W.
1209017	14	Condenser	Osc. trimmer--broadcast & S.W.
1209018	15	Condenser	Series osc. trimmer--broadcast & S.W.
1208838	16	Condenser	Tuning
1208840	17A,17B,17C	Condenser	.02 Mfd., 200 volt
1208841	18	Condenser	.0014 Mfd., Mica
1208355	19	Condenser	.006-.00017 Mfd., 200 volt
1208288	20	Condenser	.001-.03 Mfd., 400 volt
1208843	21	Condenser	.01 Mfd. (line by-pass), 400 volt
1208844	22	Condenser	.01 Mfd. (osc. plate), 400 volt
1208845	23	Condenser	1. Mfd., 160 volt
1208790	24	Condenser	.25 Mfd., 200 volt
1208126	25	Condenser	.008-.05 Mfd., 400 volt
1208119	26	Condenser	.0005 mf.,400 volt
1208317	27	"	12 mf. 475 volt
1208316	28	"	.8 -8. -8. mf. 200-300-400 volt
1208846	29	Cord & Plug	Receiver
1208325	30	Cord	Speaker
1208847	31	Dial	Complete with drive assembly
1209015	32	Resistor	100 ohms, flexible
1208296	33	"	40,000 ohms
1208144	34	"	1,000,000 ohms
1208123	35A,35B	"	3,000,000 ohms
1204138	36A,36B	"	500,000 ohms
1207905	37	"	150,000 ohms
1208141	38	"	10,000 ohms
1208758	39	"	15,000 ohms
1209016	40	"	120,000 ohms
1208802	41	"	350 ohms,flexible
1208856	42	"	8500-25,000 ohms candohm
1208868	43	Speaker	6" (mantel set)
1208869	43	Speaker	8" (console set)
1208870	44	Switch	Band change
1208871	45	Terminal	Ant. & gnd.
1208872	46	Tone control	With line switch
1208873	47	Transformer	Power
1209004	48	Transformer	Output 6" speaker
1209005	48	Transformer	Output 8" speaker
1208928	49	Volume control	

PARTS LIST

The following parts are in Model 1102 - Above Serial 781400,and in Model 1103 - Above Serial 805120.

Part No.	Illus. No.	Part Name	Description
1208840	17D	Condenser	.02 mfd. 200 volt
1208758	39A, 39B	Resistor	15,000 ohm 1/3 watt
1208140	50	Resistor	165 ohm flexible

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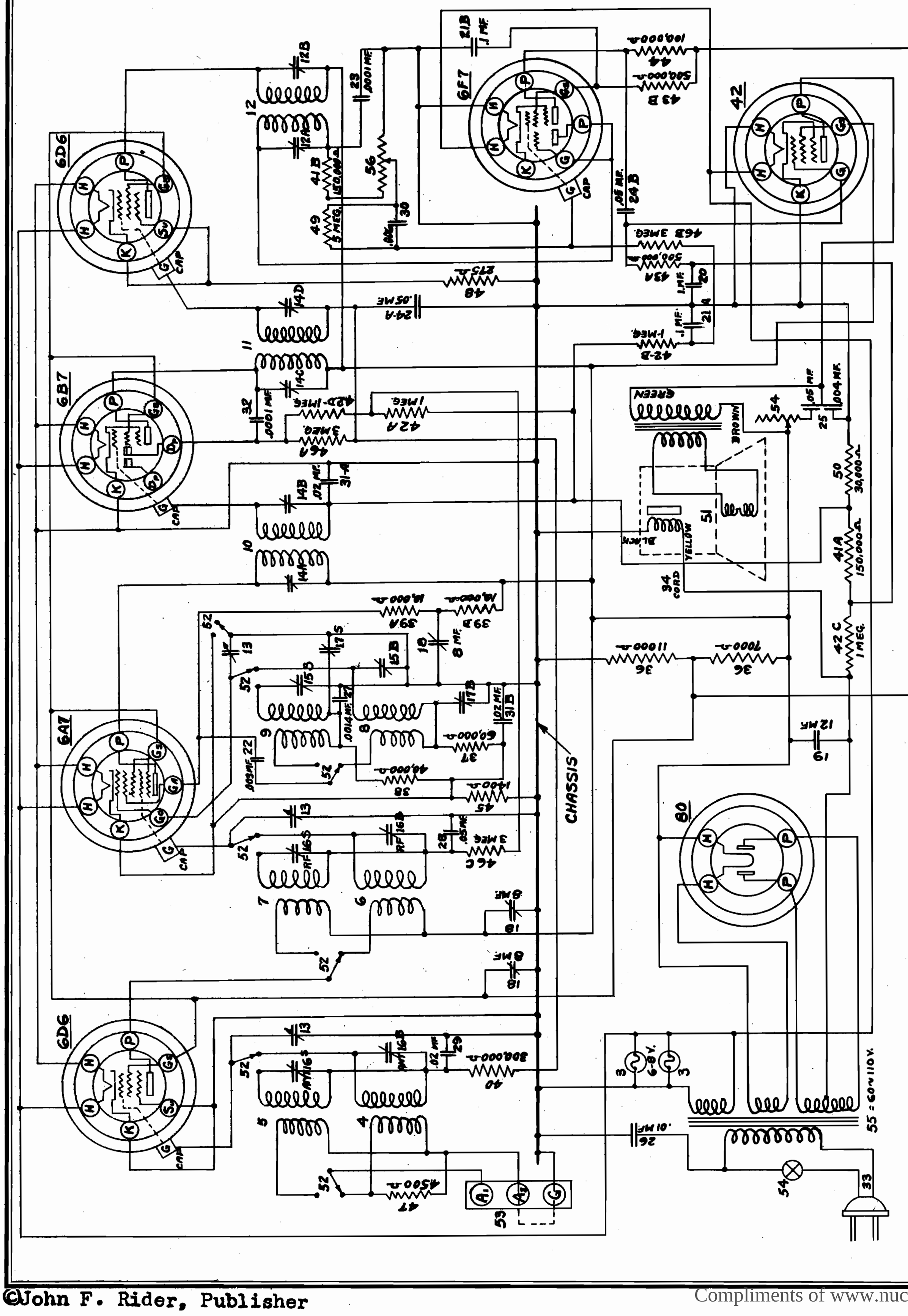
MODEL 1104 Delco
Schematic



The frequency ranges covered are 535 to 1735 kilocycles, for the broadcast band and 5.7 to 15.5 megacycles for the short wave band. The intermediate frequency is 456 Kilocycles.

MODEL 1104 Delco
Alignment, Voltage
Socket, Trimmers
Chassis, Parts

UNITED MOTORS SERVICE, INC.

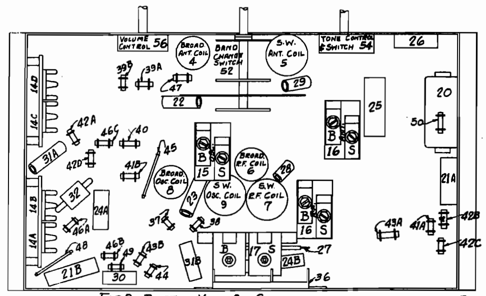


FIG 2 - BOTTOM VIEW OF CHASSIS

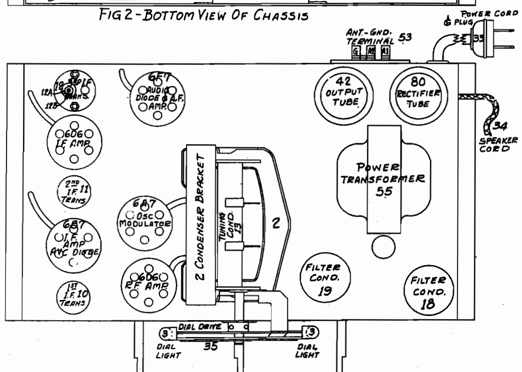


FIG 3 TOP VIEW OF CHASSIS

Connecting Output Meter

Connect the two terminals of the output meter to the plates of the two type 42 tubes. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the meter.

Peaking I.F. Stages at 456 KC

(a) Connect the antenna of the signal generator to the receiver control grid connection on top of the 6A7 tube, through a series condenser, (.02 mfd.), leaving the grid cap in place.

(b) Connect the ground terminal of the signal generator to the receiver chassis frame.

(c) Turn volume control to full on position.

(d) Set the Signal Generator to exactly 456 KC and to the lowest useable output with the receiver volume on full.

(e) Set the receiver band change switch to the right--(broadcast).

(f) Adjust I.F. trimmers 12A, 12B, 14D, 14C, 14B and 14A to maximum reading on output meter, in the sequence listed.

(g) Go over the Adjustments several times till no further improvements can be made.

Peaking Tuning Condenser at 1400 Kilocycles (Broadcast Band)

(a) Connect antennna of Signal Generator to the antenna terminal on chassis through a series condenser (.0002 mfd.).

(b) Turn volume control full on, wave change switch to the right (Broadcast).

(c) Set the signal generator to 1400KC.

(d) With receiver condenser blades fully engaged (535 KC) check pointer location. It should be exactly parallel with Horizontal line through dial. If it is not, loosen set screws in center of pointer and adjust pointer correctly.

(e) Set receiver dial pointer to 140.

(f) Adjust oscillator shunt trimmer #15-B for maximum reading on output meter.

(g) Now adjust trimmers #Ant. 16B, #RF 16B to maximum output.

(h) Set receiver pointer to 60.

(i) Set signal generator to 600 KC.

(j) Adjust series oscillator trimmer #17B for maximum reading on output meter.

(k) Repeat c, d, e and f at 1400 KC.

Peaking Tuning Condenser at 15 Megacycles (Short Wave Band)

(a) Connect signal generator antenna to the receiver antenna terminal through a series resistor (approx. 750 ohm midget-carbon).

(b) Connect ground terminal of signal generator to the receiver chassis frame.

(c) Set signal generator to 15000 KC with lowest useable output volume level.

(d) Set receiver dial to 15, and turn volume on full.

(e) Change band switch to left--short wave band.

(f) Adjust oscillator shunt trimmer #15S to Maximum output.

(g) Adjust trimmers "ant. 16S" and "RF16S" to maximum output. Repeat these adjustments until no further improvement can be made.

(h) Set signal generator to 6000 KC and the receiver pointer to 6.

(i) Adjust oscillator series trimmer 17S to maximum output.

(j) Repeat c, d, e, f and g.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis frame to the tube prong. The chart was made while using 115 volts. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*

TYPE	FUNCTION	H	P	Gs	Su	G	K		P-osc.
6D6	RF	6.5	225	100	-	-	0		- -
6A7	Osc-Mod.	6.5	225	100	-	-	0	Shortwave	150
							10	Broadcast	150
6B7	1st IF & AVC	6.5	225	100	-	0.3	0		- -
6D6	2nd IF	6.5	225	100	-	-	2		- -
6F7	Diode & AF	6.5	30	22	-	0.5	0		- -
42	Output	6.5	215	25	-	2.	0		- -
80	Rectifier	4.9	0	-	-	-	-		- -

120 Volts across speaker field

***TUBE BASE DIAGRAM SYMBOLS**

H - Heater; Su - Suppressor Grid; K - Cathode
P - Plate; G - Control Grid; P-Osc - Osc Plate
Gs - Screen Grid

1208828	4	Coil	Broadcast antenna
1208829	5	Coil	Short wave antenna
1208830	6	Coil	Broadcast R.F.
1208831	7	Coil	Short wave R.F.
1209003	8	Coil	Broadcast Oscillator
1208829	9	Coil	Short wave osc.
1208835	10	Coil	1st I.F. trans.
1208935	11	Coil	2nd I.F. trans.
1208936	12	Coil	3rd I.F.--Includes trimmers
1208838	13	Condenser	Tuning
1209006	14	Condenser	1st & 2nd I.F. trimmer
1208836	15	Condenser	Trimmer--osc., B.C. & S.W.
1208835	16	Condenser	Trimmer--R.F. & Ant., B.C. & S.W.
1208936	17	Condenser	B.C. & S.W. osc. series
1208316	18	Condenser	8.-8.-8. Mfd., 200,300,400 V.
1208317	19	Condenser	12. Mfd., 475 V.
1208845	20	Condenser	1. Mfd., 160 V.
1208131	21	Condenser	0.1 Mfd., 200 V.
1208942	22	Condenser	0.003 Mfd., 400 V.
1208313	23	Condenser	0.001 Mfd., 200 V.
1208944	24A,24B	Condenser	0.05 Mfd., 200 V.
1208315	25	Condenser	0.004-0.05 Mfd., 400 V.
1208843	26	Condenser	0.01 Mfd., 400 V.
1208841	27	Condenser	0.0014 Mfd., Mica
1208839	28	Condenser	0.05 Mfd., 200 Volt
1208840	29	Condenser	0.02 Mfd., 200 Volt
1208946	30	Condenser	0.006 Mfd., 200 Volt
1208787	31A,31B	Condenser	0.02 Mfd., 200 Volt
1208946	32	Condenser	.0001 Mfd., Mica
1208142	33	Cord & plug	A.C.
1208325	34	Cord	Speaker (4 wire)
1208847	35	Dial	Drive assembly
1208848		Dial	Hand or pointer
1208961		Diffuser	Light
1208952		Retainer	Light diffuser
1208849		Knob	Large center
1208850		Knob	Small center
1208861		Knob	Small lower
1208953	36	Resistor	7000-11000 ohm (Candohm)
1208320	37	Resistor	60,000 ohms
1208296	38	"	40,000 "
1208141	39A,39B	"	10,000 "
1204139	40	"	300,000 "
1207905	41A,41B	"	150,000 "
1208144	42A,42B, 42C,42D	"	1 megohm
1204138	43A,43B	"	500,000 ohms
1207903	44	"	100,000 "
1208803	45	"	1400 ohms
1208123	46A,46B	"	3 megohms
1208905	47	"	4500 ohms
1208125	48	"	275 "
1208805	49	"	5 megohms
1208959	50	"	30,000 ohms
1209012	51	Speaker	Assembly
1208973	52	Switch	Band change
1208871	53	Terminal	Antenna & grd.
1208872	54	Tone control	With line switch
1209013		Transformer	Output
1208974	55	Transformer	Power
1208811		Washer	Insulating (coils)
1208975		Washer	Insulating (12. Mfd. cond.)
1208928	56	Volume control	

UNITED MOTORS SERVICE, INC

MODELS 3201,3202 Delco
Below Serial 800,000
Schematic, Voltage

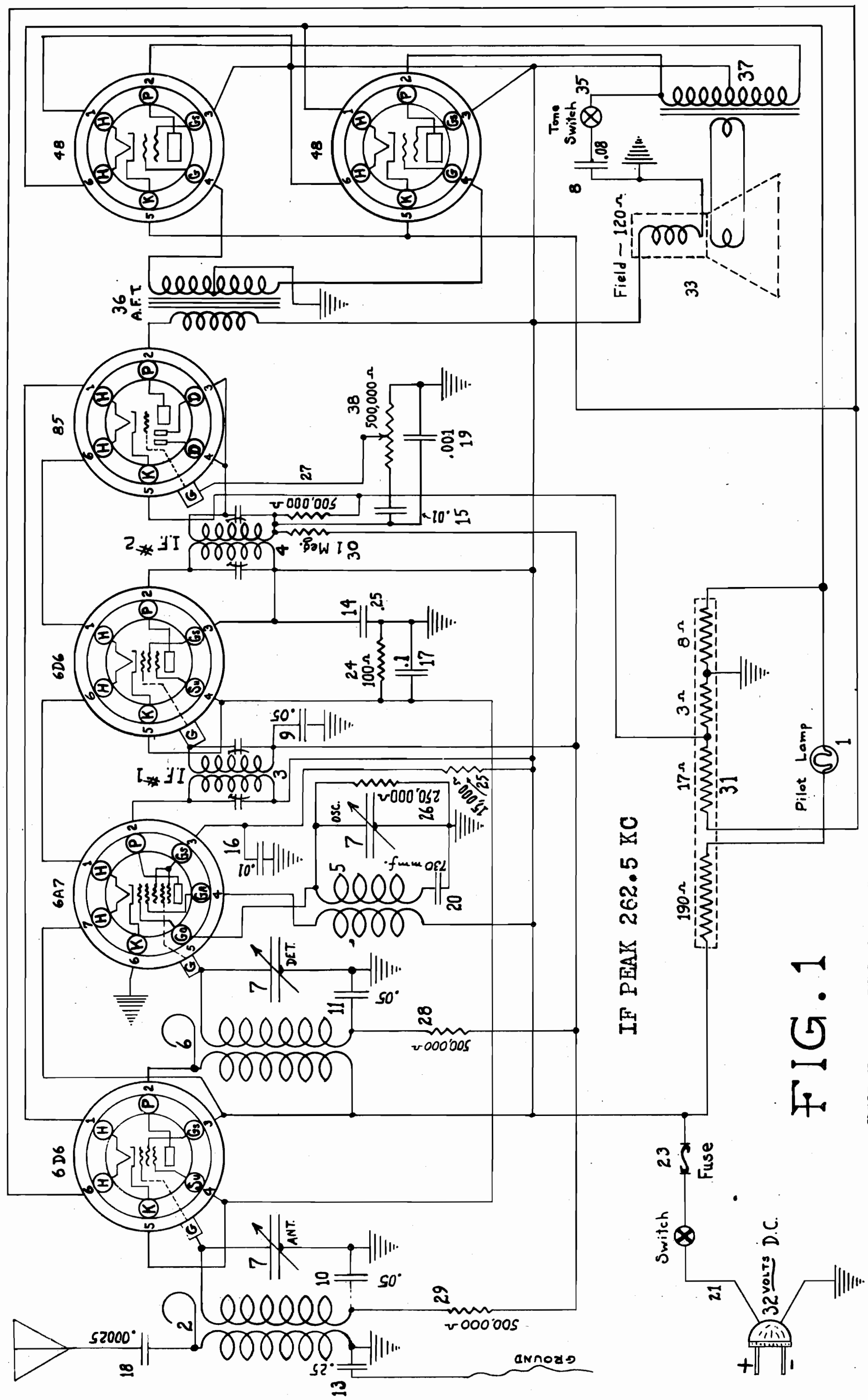


FIG. 1

TYPE	FUNCTION	H	P	Gs	Su	G	K	P-osc.
6D6	R.F. Amp.	6.3	32	32	.5	0	.5	-
6A7	1st Det.-osc.	6.3	32	20	-	0	0	32
6D6	I.F. Amp.	6.3	32	32	.5	0	.5	-
85	2nd Det.-AVC	6.3	30	-	-	0	1	-
48	Power Amp.	26.0	31.5	32	-	0	7	-
48	Power Amp.	26.0	31.5	32	-	0	7	-

Model 3201, table set with 6" speaker and
Model 3202, console with 8" speaker

NOTE: The types 6D6, 6A7 and 85 tubes have the heater elements connected in series. If any one of these tube heaters should burn out, the others will fail to light.

MODELS 3201,3202 Delco
Below Serial 800,000
Alignment, Socket
Trimmers, Parts

UNITED MOTORS SERVICE, INC.

Connecting Output Meter

Connect one terminal of the output meter to the plate prong of one of the 48 tubes and the other to the plate prong of the other 48 tube or to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 262½ KC

(a) Connect the output of the signal generator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis frame.

(b) Turn the tuning condenser until the plates are entirely out of mesh.

(c) Set the signal generator on 262½ KC and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer located on the top of the 1st I.F. Coil, Fig. 2. Then peak the trimmer located on the bottom of the same coil, Fig. 3. Due to the detuning effect the primary winding exerts over the secondary, it will then be necessary to reset the top trimmer for maximum output.

(e) Peak the I.F. trimmer located on the top of the 2nd I.F. coil, Fig. 2. Then peak the trimmer located on the bottom of the same coil, Fig. 3. Then reset trimmer on top of the 2nd I.F. coil making all adjustments for maximum output.

NOTE: In the event that the I.F. stages are badly out of alignment at 262½ KC the operation outlined in paragraphs (d) and (e) should be repeated.

PEAKING GANG CONDENSER AT 1400 KC

(a) With the condenser plates completely out of mesh, the 1600 KC indicator line should be exactly in the upper vertical position. If it is not, loosen the two set screws in the selector dial hub and make the necessary adjustment. Then rotate the dial until the 1400 KC indicator line is exactly in the upper vertical position.

(b) Coil up the antenna lead to within a foot of the chassis and set the oscillator at 1400 KC. Feed the signal generator output into the antenna wire. This may be done by connecting the shielding on the signal generator output lead to the chassis ground wire (green) and by simply wrapping a few turns of the portion of the antenna wire nearest the chassis around the signal generator output lead. This will ordinarily provide sufficient coupling between the signal generator and the antenna circuit of the set. A direct connection with the antenna wire can be made by inserting a pin into the wire close to the chassis. Care should be taken, however, not to permanently damage the insulation.

(c) Peak the osc. trimmer condenser, Fig. 2, until the oscillator output can be heard in the speaker, then the "Ant." and "Det." trimmers located on the gang tuning condenser, making all adjustments for maximum deflection on the output meter scale. Repeat the adjustment several times until no further improvement can be made.

NOTE: To avoid AVC action and to insure sharp peaking of all trimmers, reduce the signal generator output to the lowest level that will give a reasonable deflection on the output meter scale.

Part No.	Illus. No.	Part Name	Description
1208978		Bracket	Pilot light mounting
1203982	1	Bulb	Dial light 6-8 volt
1208979		Cabinet	Table model #3201
1208980		Cabinet	Console model #3202
1208981	2	Coil	Antenna
1208761	3	Coil	1st I.F.
1208982	4	Coil	2nd I.F.
1208983	5	Coil	Oscillator
1208984	6	Coil	Detector
1208985	7	Condenser	Tuning
1208986	8	Condenser	.08 Mfd., 200 volt
1208748	9,10,11	Condenser	.05 Mfd., 200 volt
1208987	13,14	Condenser	.25 Mfd., 200 volt
1208746	15,16	Condenser	.01 Mfd., 200 volt
1208988	17	Condenser	.1 Mfd., 25 volt
1207760	18	Condenser	.00025 Mfd.
1208744	19	Condenser	.001 Mfd., 400 volt
1208743	20	Condenser	.00073 Mfd.
1208142	21	Cord & plug	Power
1208990	22	Dial	Station selector
106652	23	Fuse	3 ampere
1208579		Knob	All
1208999		Plate	Escutcheon
1209009	24	Resistor	100 ohms, 1/3 watt
1208758	25	Resistor	15,000 ohms, 1/3 watt
1208756	26	Resistor	250,000 ohms, 1/3 watt
1204138	27,28,29	Resistor	500,000 ohms, 1/3 watt
1208144	30	Resistor	1,000,000 ohms, 1/3 watt
1208991	31	Resistor	Tapped candohm
1208994	33	Speaker	6" for Table Model 3201
1208995	36	"	8" for Console Model 3202
1208996	35	Tone Control	Switch
1208997	34	Terminal	Spk'r.Connection on chassis
1208764	36	Transformer	Audio
1208998	38	Vol. Control	Includes switch
1209010	37	Transformer	Output-Model 3201
1209011	37	Transformer	Output-Model 3202

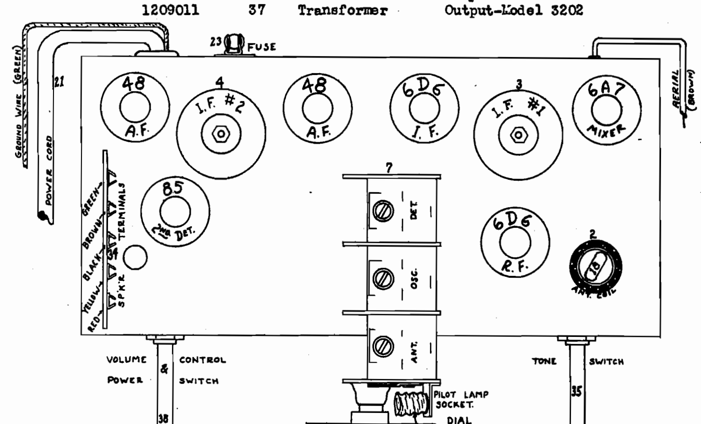


Fig. 2- Top View

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MODELS 3201,3202 Delco
Above Serial 800,000
Schematic,Voltage

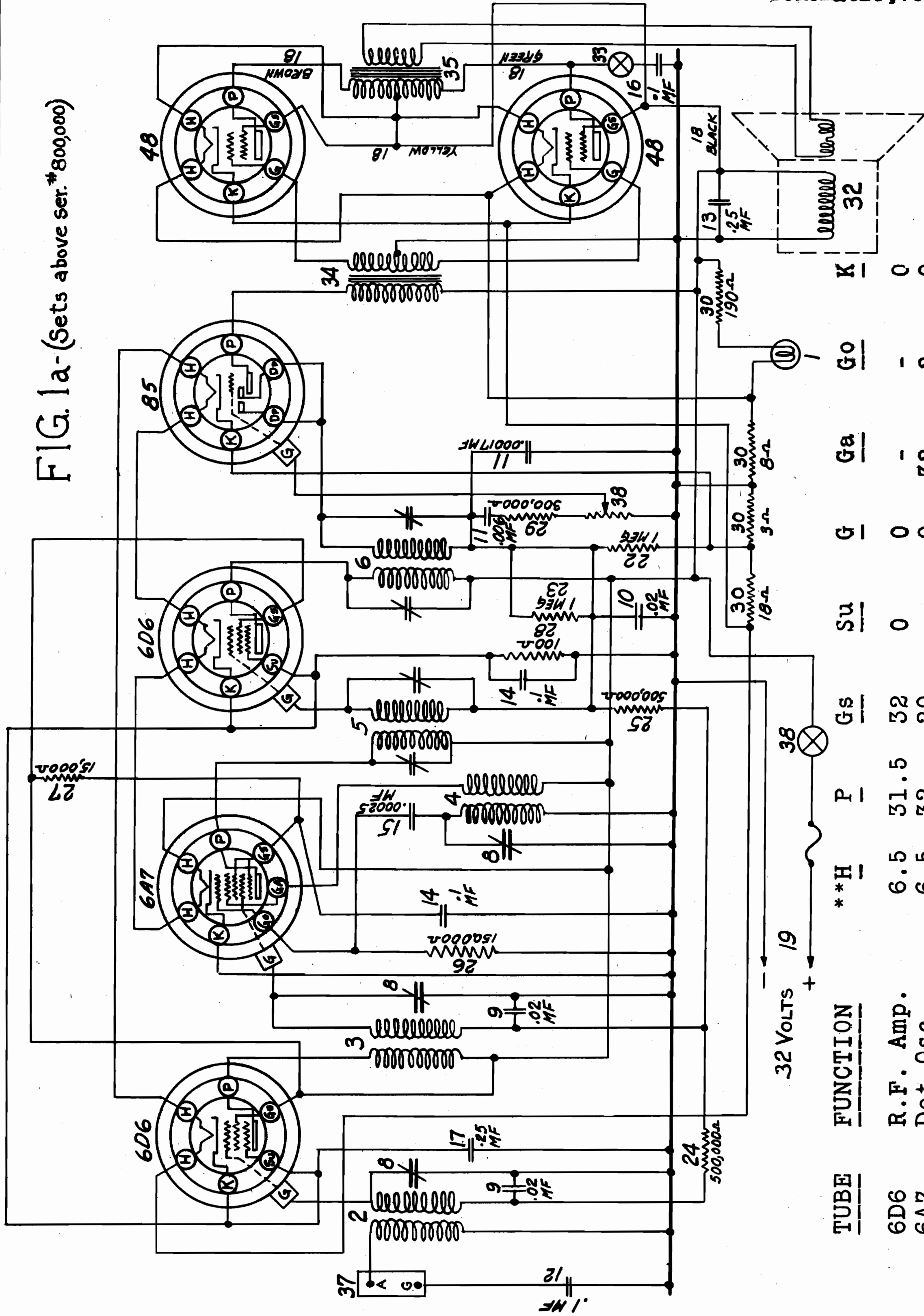


FIG. 1a-(Sets above ser. #800,000)

TUBE	FUNCTION	**H	P	Gs	Su	G	Ga	Go	K
6D6	R.F. Amp.	6.5	31.5	32	0	0	-	-	0
6A7	Det-Osc.	6.5	32	20	-	0	32	2	0
6D6	I.F. Amp.	6.5	32	32	.5	0	-	-	.5
85	A.F. Amp-Det.	6.5	31	-	-	0	-	-	1.2
48	Output	25.0	31.5	32	-	-	-	-	6.5
48	Output	25.0	31.5	32	-	-	-	-	6.5

** The filament voltages shown are measured across the filament prongs of each tube and not from filament to chassis frame.

MODELS 3201,3202 Delco
Above Serial 800,000 UNITED MOTORS SERVICE, INC.
Alignment, Data
Socket,Trimmers,Chassis

GENERAL DESCRIPTION

The Models 3801 and 3202 are both 32 volt 6 tube superheterodyne receivers with A.V.C. The only difference between the two receivers is that the Model 3201 has a table type cabinet and a 6" speaker, while the Model 3202 has a console cabinet and an 8" speaker. The frequency range of these sets is from 540 to 1700 kilocycles.

Power Supply System

The unique feature of these receivers is that the maximum plate or screen voltage used is 32 volts, as the positive lead of the power cord connects directly to the plates and screens of the tubes and the negative lead connects to the chassis.

The filaments of the two type 6D6 tubes, the type 6A7 and the type 85 are connected in series and are lighted by being connected directly across the 32 volt power supply in series with the 18 and 3 ohm sections of the resistor strip (Illus. #30, Fig. 1a). The filaments of the two type 48 output tubes are each connected in parallel across the 32 volt power supply in series with the 8 ohm section of the resistor strip (Illus. #30, Fig. 1a).

METHOD OF BIASING

The 6D6 R.F. and I.F. tubes obtain their residual bias from a common bias resistor of 100 ohms (Illus. #28) and the control grids of both of these tubes receive a negative voltage from the A.V.C. circuit depending on the strength of the signal tuned in. The 6A7 tube has its cathode connected directly to ground and its control grid also receives a negative voltage for grid bias from the A.V.C. circuit when a signal is tuned in. The bias on the 85 tube is obtained by connecting the cathode to a point that is positive with respect to ground and returning the grid circuit to ground through the volume control. The bias on the two type 48 output tubes is also obtained by connecting their cathodes to a positive point with respect to ground and returning the center tap on the input transformer to ground

CIRCUIT GROUND

DO NOT ground the chassis except through the use of the "GND" terminal of the terminal strip located on back of the chassis. This terminal connects to the chassis frame through a series condenser in order to prevent a short circuit when operating the receiver on a 32 volt system with the positive side grounded.

OSCILLATION

A few receivers below Serial No. 866175 may have a tendency to oscillate due to the lack of capacity by-passing the common bias resistor (Illus. #28, Fig. 2a) for the two 6D6 tubes. The majority of these sets were corrected in the field through the use of an additional condenser of a .25 mfd. capacity connected from the 6D6 R.F. tube cathode to the chassis. In cases where this condenser has not been included in the chassis and the receiver oscillates, it will be necessary to connect a part #1208130 condenser from the 6D6 R.F. tube cathode to the chassis. This condenser has been included in production on all sets above Serial #866175*(Illus. #17, Fig. 2a) and should eliminate all cases of oscillation from low capacity.

PEAKING PROCEDURE

All of the adjustable condensers, commonly called "trimmer" condensers, are very accurately adjusted at the factory and will not need any further adjustment unless they are tampered with in the field or a defective coil has been replaced. DO NOT attempt to change the setting of any trimmer condensers unless it is definitely known that the adjustment is necessary. If realignment is found necessary, the circuits can be properly adjusted only with the use of a test oscillator and an output meter.

Connecting Output Meter

Connect one terminal of the output meter to the plate prong of one of the 48 tubes and the other to the plate prong of the other 48 tube or to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 456 K.C.

(a) Connect the output of the test oscillator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis ground.

(b) Turn the tuning condenser rotor plates until they are completely out of mesh.

(c) Set the test oscillator on 456 kilocycles.

(d) Peak the I.F. trimmers located on the top of the 2nd I.F. coil (Illus. #6, Fig. 3a) for maximum output.

(e) Then peak the I.F. trimmers located on the top of the 1st I.F. coil (Illus. #5, Fig. 3a) for maximum output.

(f) In order to insure accurate setting of the I.F. trimmers the above adjustments should be repeated using the lowest test oscillator otuput that will give a reasonable deflection of the output meter pointer. Make all adjustments for maixmum output.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the test oscillator to the "ANT" and "GND" terminals of the receiver chassis with the ground connection of the oscillator connecting to the "GND" terminal of the receiver chassis.

(b) Set the receiver dial on 1400 K.C. This position can be determined with the chassis out of the cabinet by moving the dial so that the 1400 K.C. mark is in a vertical position.

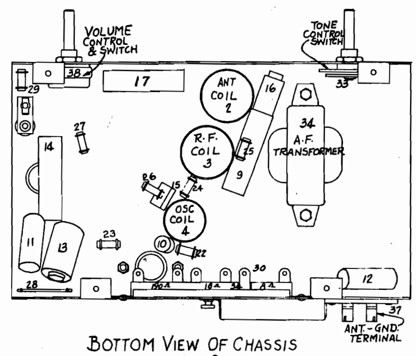
(c) Set the test oscillator on 1400 K.C.

(d) Adjust the parallel trimmer for the oscillator section (3rd section from receiver dial with the small rotor plates) of the condenser gang for maximum output.

(e) Then adjust the parallel trimmers for the other two sections of the gang condenser for maximum output.

(f) To insure accurate setting of the trimmer condensers the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable deflection of the output meter pointed. This is necessary in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

(g) Place a few drops of Duco Cement over the adjusting screws and trimmer blades to prevent the adjustments from shifting. Do not allow any cement to get on the mica insulators.



BOTTOM VIEW OF CHASSIS
FIG. 2a

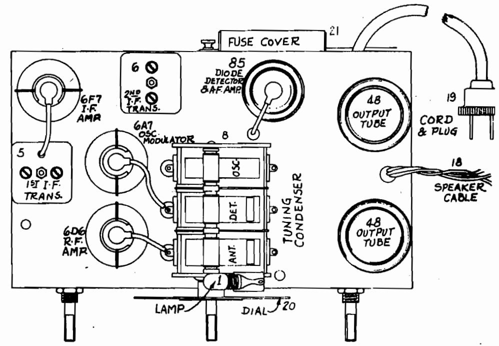


FIG 3a
TOP VIEW OF CHASSIS

MODELS 3203,3204 Delco
Schematic

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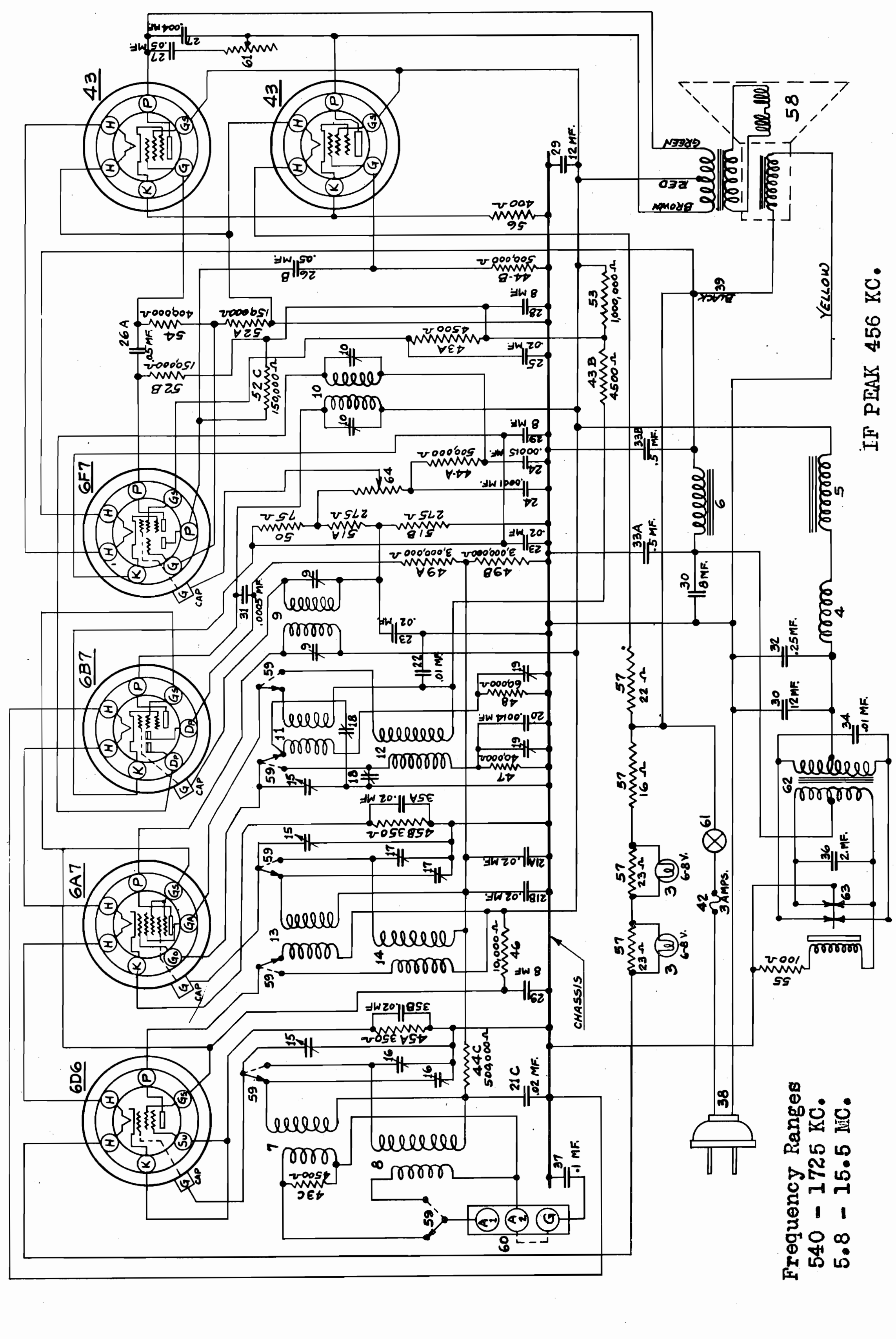

MODELS 3203,3204 Delco
Alignment,Voltage

UNITED MOTORS SERVICE, INC.

Connecting Output Meter

Connect one terminal of the output meter to the plate terminal of one type 43 output tube and the other to the plate of the other type 43 tube.

Peaking I.F. Stages at 456 KC

(a) Connect the antenna of the signal generator to the control grid connection on top of the 6A7 tube, (DO NOT remove grid clip) through a series condenser, .02 mfd.

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the signal generator to exactly 456 kilocycles.

(d) With the signal generator set to the lowest useable output level, and the receiver volume control on full, adjust the I.F. trimmer condensers for maximum signal output.

NOTE: The I.F. trimmers are located on top of the I.F. coils and may be adjusted with an insulated screw driver. Always make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency.

Peaking Tuning Condenser at 1400 Kilocycles (Broadcast

(a) Close the receiver tuning condenser plates (535 KC) and set the selector pointer on the horizontal line.

(b) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series condenser (.0002 mfd.).

(c) Connect the ground terminal of the signal generator to the radio chassis frame.

(d) Set the signal generator to exactly 1400 KC and to the lowest useable volume level, with the radio set volume on full.

(e) Turn the receiver band change switch to the right hand position (broadcast band).

(f) Set the receiver tuning control to 140.

(g) Adjust the oscillator braodcast shunt trimmer, Illus. 19-B to maximum output.

(h) Adjust the radio frequency trimmer, Illus. 17-B to maximum output.

(i) Adjust the antenna trimmer, Illus. 16-B to maximum output.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

(j) Set the signal generator to 600 kilocycles.

(k) Tune the receiver to 60 on the dial and adjust the signal generator until maximum response is obtained.

(l) Adjust the series oscillator trimmer #19-B for resonant frequency. Simultaneously rotate station selector (slightly-approx. 1/8 inch) until maximum signal is obtained.

(m) Repeat the adjustments at 1400 KC.

Peaking Tuning Condenser at 15 Megacycles (Short Wave Band)

(a) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series carbon resistor (750 ohms ± 20%).

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the signal generator to exactly 15000 KC (15 megacycles).

(d) Turn band change switch to the left hand position (short wave band).

(e) Set the tuning control of the receiver to 15 on the dial.

(f) Adjust the oscillator parallel trimmer, Illus. 18-S to maximum output.

(g) Adjust the antenna tirmmer, Illus. 16-S to maximum output.

(h) Adjust the radio frequency trimmer, Illus. 17-S to maximum output.

NOTE: It is necessary that these adjustments be gone over very carefully several times until no further improvement can be made. Greater accuracy is required for making short wave adjustments.

(i) Now set the signal generator to 6000 KC.

(j) Set the receiver dial to 6.

(k) Adjust the oscillator series trimmer, Illus. 19-S to maximum output, simultaneously rotate station selector (slightly-approx. 1/8 inch) until maximum signal is obtained.

(l) Repeat the adjustments at 15000 KC.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis to the tube prong. This chart was made while using 32 volt line. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS*

TYPE	FUNCTION	H	P	Gs	Su	G	Ga	K	P-osc.
6D6	RF AMP.	6.25	175	110	3	0.	-	3	- -
6A7	Osc-Mod.	6.25	175	110	-	0.	6 to 12	4	145
6B7	IF Det. AVC	6.25	175	110	-	0.	-	6	- -
6F7	AF Amp. & Inverter	6.25	45	15	-	0.	-	6	60
43	Output	25.75	168	175	-	0.	-	30	- -
43	Output	25.75	168	175	-	0.	-	30	- -

*TUBE BASE DIAGRAM SYMBOLS

H - Heater
P - Plate
Gs - Screen Grid
Su - Suppressor
G - Control Grid
Ga - Anode Grid
K - Cathode
P-Osc - Osc Plate

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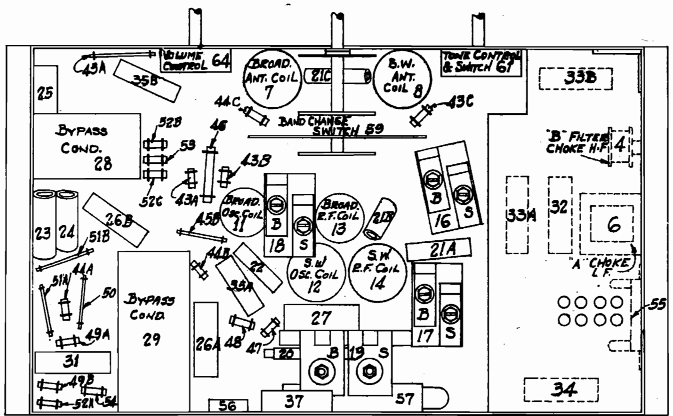
MODELS 3203,3204 Delco
Socket,Trimmers
Chassis,Parts



BOTTOM VIEW OF CHASSIS
FIG. 2

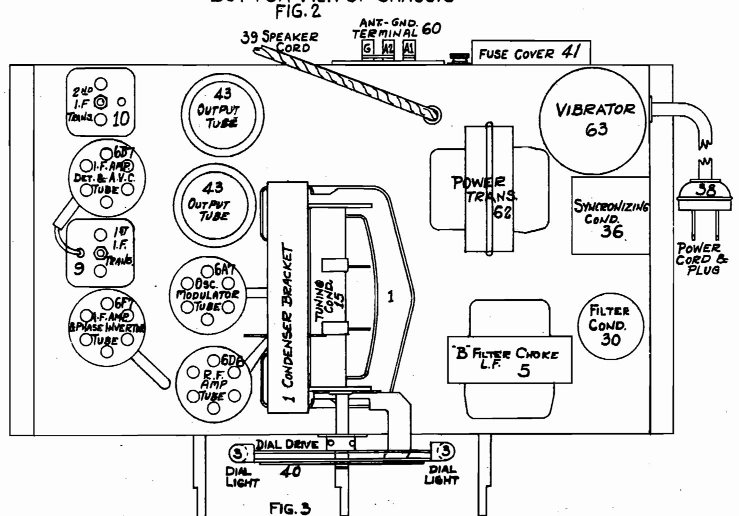


FIG. 3
TOP VIEW OF CHASSIS

1208349	4	Choke	High frequency "B" circuit
1208883	5	Choke	Low frequency "B" circuit
1208884	6	Choke	Low frequency "A" circuit
1208888	7	Coil	Antenna-broadcast
1208829	8	Coil	Antenna-short wave
1208832	9	Coil	1st I.F. assembly
1208834	10	Coil	2nd I.F. assembly
1209003	11	Coil	Oscillator--broadcast
1208828	12	Coil	Oscillator-short wave
1208830	13	Coil	R.F.--broadcast
1208831	14	Coil	R.F.--short wave

1208838	15	Condenser	Tuning--3 gang
1208836	16	Condenser	Ant. trimmer--broadcast & S.W.
1208835	17	Condenser	R.F. trimmer--broadcast & S.W.
1208836	18	Condenser	Osc. trimmer " "
1208837	19	Condenser	Series osc. trimmer " "
1208841	20	Condenser	.0014 mfd.--mica
1208840	21	Condenser	.02 mfd.--200 volt
1208844	22	Condenser	.01 mfd.--400 volt
1208120	23	Condenser	.02-.02 mfd.--200 volt
1208124	24	Condenser	.0001-.00015 mfd.--400 volt
1208136	25	Condenser	.02 mfd.--400 volt
1208135	26	Condenser	.05 mfd.--400 volt
1208315	27	Condenser	.05-.004 mfd.--400 volt
1208890	28	Condenser	8. mfd.--250 volt
1208891	29	Condenser	12.-8.-8. mfd.--250 V., 250 V., 25 V.
1208892	30	Condenser	12. -.8 mf. 250v.,35v.
1208119	31	"	.0005 mf. 400 v.
1208893	32	"	.25 mf. 300 v.
1208894	33	"	.5 mf. 160 v.
1208895	34	"	.01 mf. 2000 v.
1208787	35A,35B	"	.02 mf. 200 v.
1208896	36	"	2. mf. 300 v.
1208139	37	"	.1 mf. 400 v.
1208846	38	Cord & Plug	Receiver
1208897	39	Cord	Speaker
1208905	43A,43B	Resistor	4500 ohms
1204138	44A,44B,44C	"	500,000 ohms
1208802	45A,45B	"	350 ohms
1208322	46	"	10,000 ohms
1208296	47	"	40,000 ohms
1208320	48	"	60,000 ohms
1208123	49A,49B	"	3,000,000 ohms
1208359	50	"	75 ohms
1208125	51A,51B	"	275 ohms,Flexible
1207905	52A,52B,52C	"	150,000 ohms
1208144	53	"	1,000,000 ohms
1208906	54	"	400,000 ohms
1208907	55	"	100 ohms,candohm
1208908	56	"	400 ohms,candohm
1209909	57	"	23-23-16-22 ohms,candohm
1208917	58	Speaker	8"--(Mantel set)
1208918	58	Speaker	10"--(console set)
1208870	59	Switch	Band change
1208871	60	Terminal	Ant. & grd.
1208872	61	Tone control	With on-off switch
1209014		Transformer	Output
1208919	62	Transformer	Power
1208920	63	Vibrator	
1208921		Vibrator case	
1208922		Cap	Screw type--vib. case
1208923		Plug	Socket
1208924		Vibrator cover	
1208925		Vibrator cover base	
1208928	64	Volume control	

MODEL Chevrolet 364441
Alignment, Parts List

UNITED MOTORS SERVICE

Peaking I.F. Stages at 262 KC

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the type 89 output tubes.

(a) Connect the output of the oscillator to the grid cap of the type 36 Detector--Oscillator tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 KC and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. condenser (C-6 on Fig. 4) which is on the I.F. coil located on the bottom of the chassis. Then peak the two condensers (C-4 and C-5 on Fig. 3) located on front of the Oscillator I.F. coil, peaking the plate coil condenser C-4 first.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. It should be less than one third of the maximum output available.

(f) Make all trimmer condenser adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 KC

(a) Set the oscillator on 1400 KC and connect its output to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 KC can be properly determined a metal aligning strip (part #1206431) should be used. This strip is placed over the top edge of the condenser gang as shown in figure 1.

(c) The condenser plates should be turned until they stop against the aligning strip.

(d) Place the tube shield (part #1206419) in position around the detector-oscillator tube.

(e) Peak the parallel trimmers on the top of the condenser gang. The oscillator section (C-1-C figure 3) located next to the volume control should be peaked first.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale, in order to prevent the A.V.C. from leveling out the output.

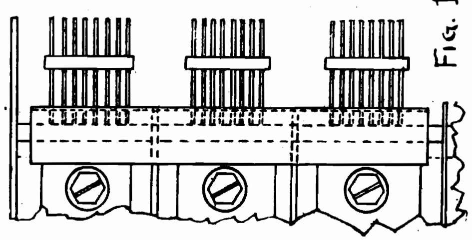


Fig. 1

1207686	Coil	Antenna	T-1
1207496	Coil	RF - 1st Det.	T-2
1207751	Coil	Oscillator--1st I.F.	T-3
1207752	Coil	2nd I.F.	T-4
1207755	Coil (choke)	R.F. choke	L-1
1207687	Coil (choke)	Power filter	L-2
1207688	Condenser	3 Gang tuning	C-1,A,B,C
1207625	Condenser	Molded .00005 Mfd.	C-2
1207626	Condenser	Molded .000735 Mfd.	C-3
1207799	Condenser	Tubular .02 Mfd.	C-7
1207636	Condenser	Molded .0005 Mfd.	C-8
1207628	Condenser	Tubular .01 Mfd.	C-9
1207690	Condenser	Paper .002 Mfd.	C-10
1207893	Condenser	Molded .003 Mfd.	C-11
1207617	Condenser	Molded .003 Mfd.	C-12
1207901	Condenser	By-pass block	C-13 A to G
	Sec. (A) .1 Mfd., (B) .4 Mfd. (C) .25 Mfd. (D) .15 Mfd. (E) .25 Mfd. (F) 4.0 Mfd. (G) 4.0 Mfd.		
*1207689	Condenser	Capacity values same as 1207901	
1207617	Condenser	Molded .003 Mfd.	C-14
1207617	Condenser	Molded .003 Mfd.	C-15
1207617	Condenser	Molded .003 Mfd.	C-16
1207617	Condenser	Molded .003 Mfd.	C-17
1207691	Condenser	Metal case .5 Mfd.	C-18
1207693	Condenser	Metal case .5 Mfd.	C-19

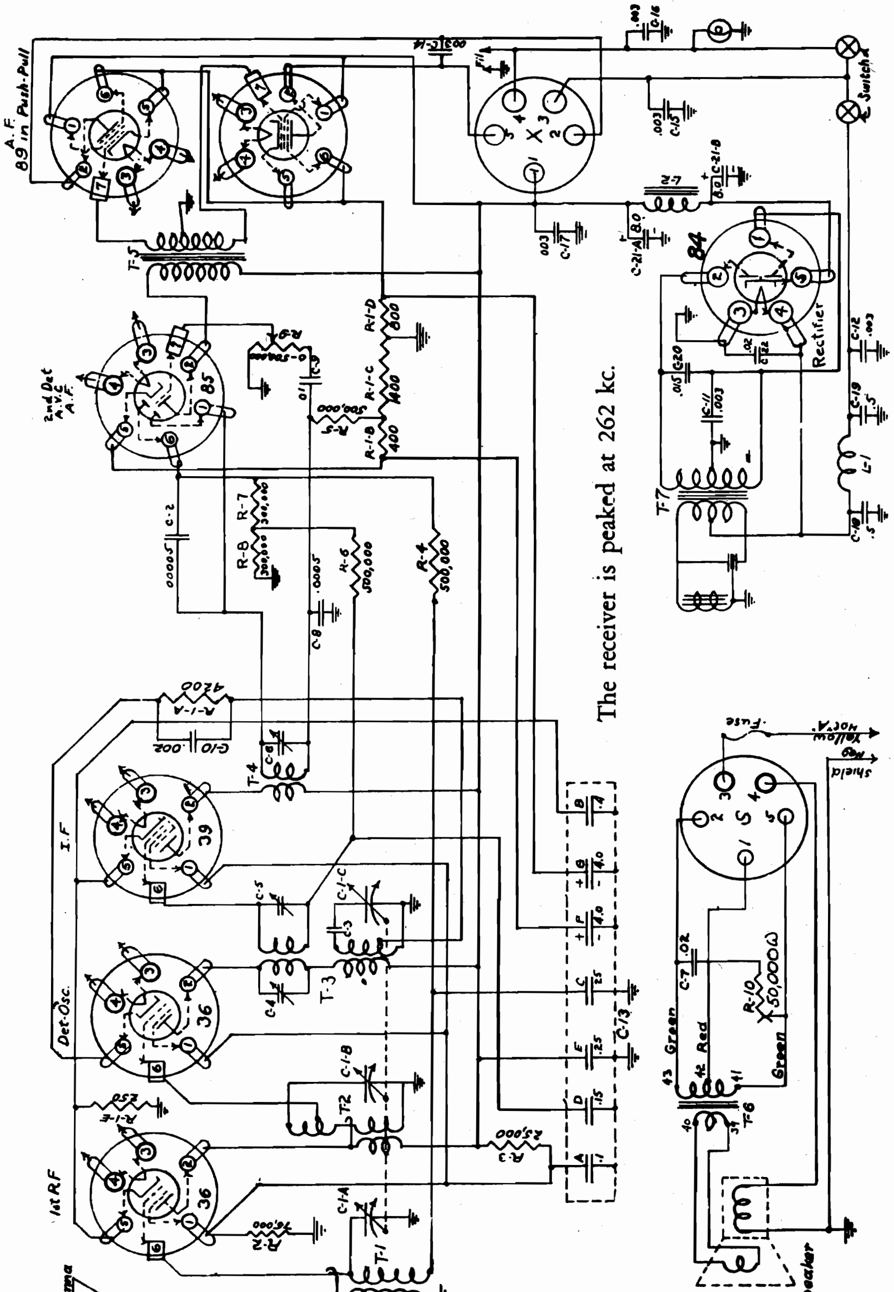
* See paragraph on "CIRCUIT and PART CHANGES"

1207694	Condenser	Metal Case	C-20
1207625	Condenser	Electrolytic block	C-21 A,B
	Sec. (A) 8.0 Mfd., (B) 8.0 Mfd.		
1207692	Condenser	Paper .02 Mfd.	C-22
1849014	Condenser	Generator .5 Mfd.	
1849161	Condenser	Ammeter .5 Mfd.	
1207720	Resistor	Candohm	R-1A,B,C,D,E
	(Sec. (A) 4200, (B) 400, (C) 1400, (D) 800, (E) 250 ohms.		
1208044	Resistor	Res. 75,000 ohms	R-2
1204135	Resistor	Res. 25,000 ohms	R-3
1204138	Resistor	Res. 500,000 ohms	R-4
1204138	Resistor	Res. 500,000 ohms	R-5
1204138	Resistor	Res. 500,000 ohms	R-6
1204139	Resistor	Res. 300,000 ohms	R-7
1204139	Resistor	Res. 300,000 ohms	R-8
1207821	Resistor	Spark plug 20 M ohms	
1201277	Resistor	Distributor 25 M ohms	
1207566	Coil	6 volt field	
1207799	Condenser	Tone control .02 Mfd	C-7
1207567	Cone assembly		
1207744	Cover	Case back	
1207745	Knob	Tone control	
1207682	Plug	Speaker cord	
1208257	Screw	Ornamental head	
1207798	Tone control	0-50,000 ohms	R-10
1207602	Transformer	Output	T-6

MODEL Chevrolet 364441
Schematic, Voltage
Service Notes

UNITED MOTORS SERVICE

OSCILLATOR CIRCUIT. If set fails to oscillate entirely or oscillates on one end of the dial only, a new 36 tube should be tried in the oscillator socket. If this does not remedy the trouble, check resistor R-1-A and condensers C-3, located below section C-1-C of the gang condenser, and C-10, located on the resistor strip. Due to the capacity values of C-3 and C-10 being rather critical, they should be tested by replacement. If the above does not remedy the trouble, it may be necessary to replace the oscillator coil.



The receiver is peaked at 262 kc.

Voltage Chart

The voltage readings given herewith are measured between the respective tube contacts upon the sockets and the chassis.

Tube	Screen #1	Plate #2	Heater #3	Heater #4	Cathode #5	Sup. Grid #6
RF	100	175	0	6	2.5	
Osc.	100	150	0	6	7.5	
I-F	100	175	0	6	2.5	
Det	2 Det	165	6	0	10.5	0-AVC
AF	175	175	0	6	19.5	19.5
AF	175	175	0	6	19.5	19.5
Rect.			0	6	190.0	

It is significant to note the following changes which have been made: In receivers below serial number 1,255,182, either the old or new C-13 condenser block may be used for service; in receivers above serial 1,255,182, condenser block number 1,207,901 MUST be used exclusively. When a new condenser block number 1,207,901 is used for replacement in a receiver below serial 1,255,182, the connecting wire from the cathode of the i-f. tube socket to the cathode of the r-f. tube socket should be removed. The new block has two white leads, both connected to the same section inside the condenser, and one of these leads should be connected to the i-f. cathode and the other to the r-f. cathode. Either lead may be connected to either cathode.

All receivers bearing serial numbers higher than 1,292,774 have a five-ampere fuse in the 6-volt side of the vibrator circuit, between the switch and the L-1 choke. The fuse block is mounted on the trans-vibrator assembly.

MODEL Chevrolet 364441
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE

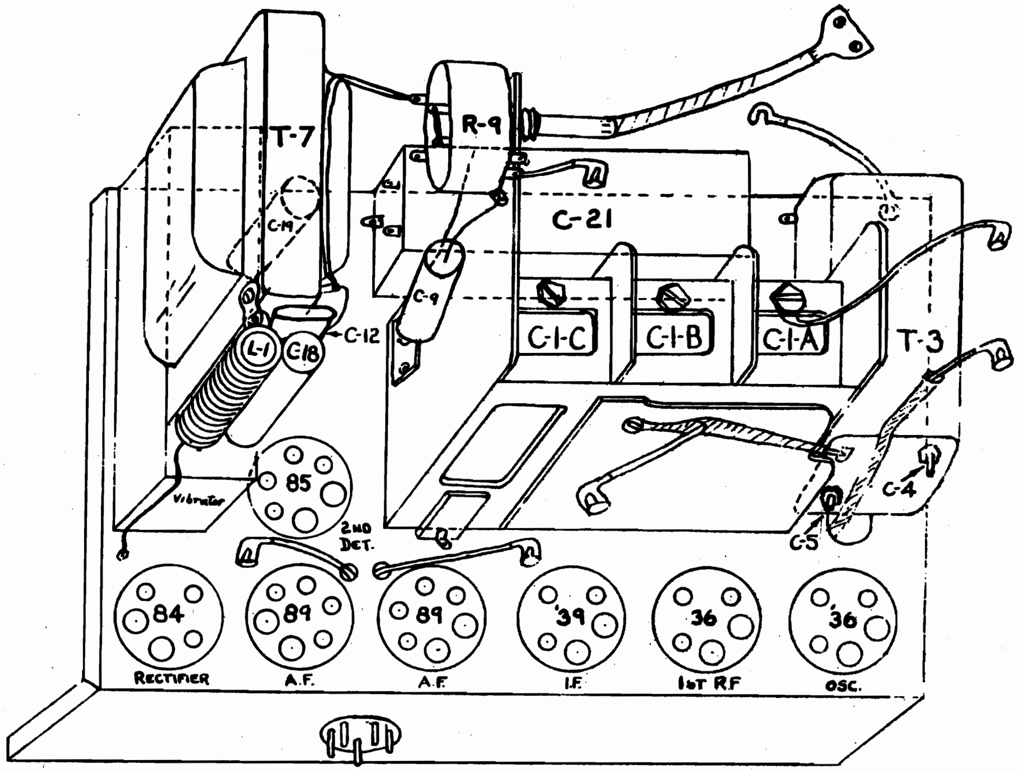


Fig.3 PARTS LOCATING DIAGRAM

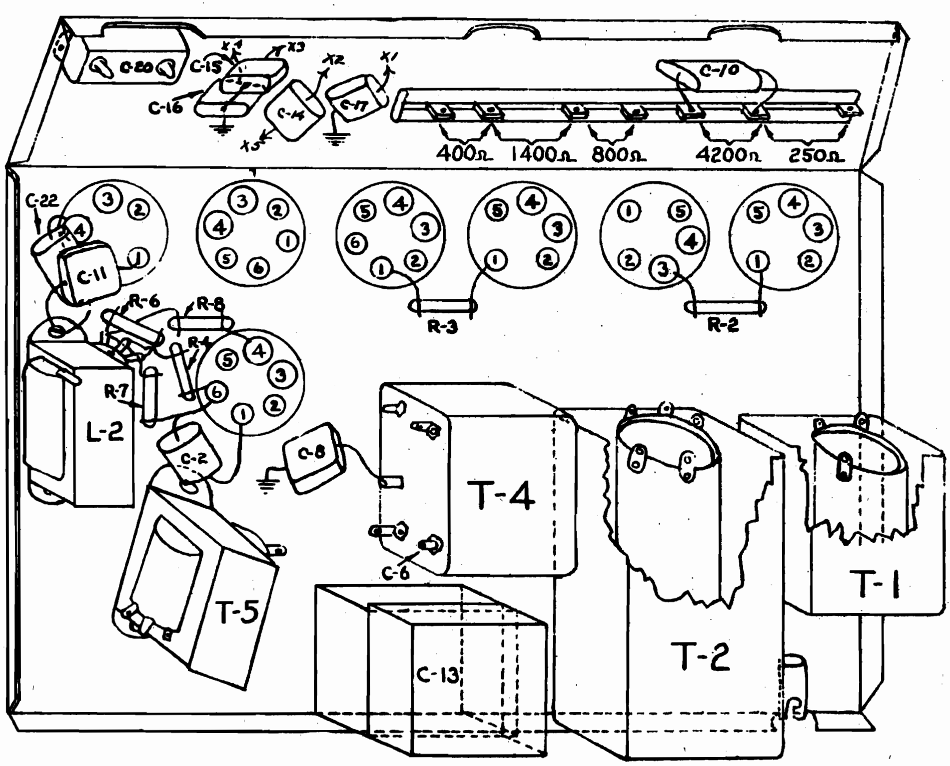
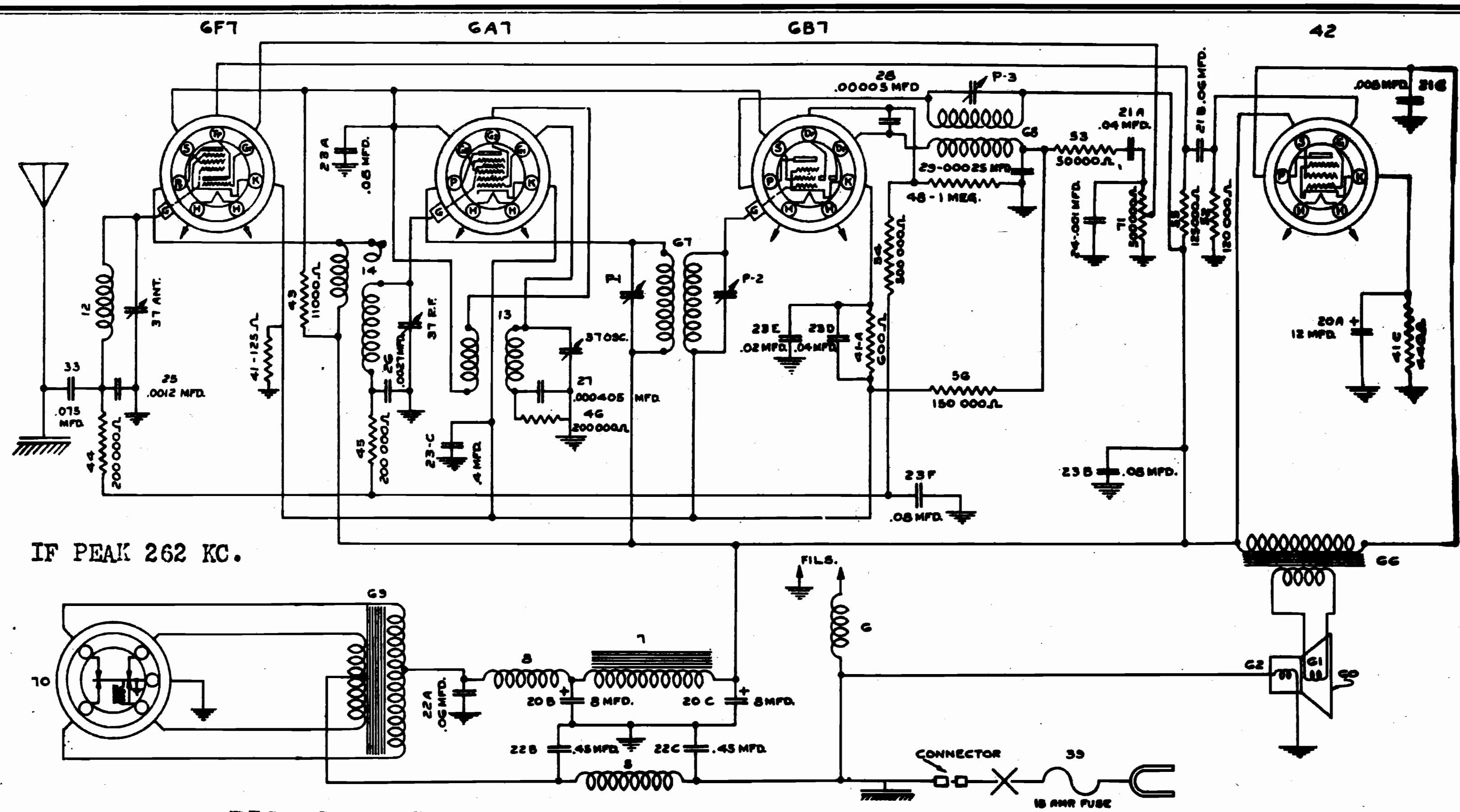


Fig.4 PARTS LOCATING DIAGRAM

UNITED MOTORS SERVICE

MODEL Buick-Pontiac 544245
Oldsmobile 393884
Below Serial 1748809
Schematic,Voltage



IF PEAK 262 KC.

FIG. 1 CIRCUIT DIAGRAM--Below Serial #1748809
(For Buick, Pontiac Model 544245 and Olds Model 393884)

TUBE BASE DIAGRAM SYMBOLS

TYPE	FUNCTION	H	Pp	S	Tp	Gt	G	G1	G2	G3,5	K
6F7	R.F.	6	250	135	80	0	0	-	-	-	6.2
6A7	Det-Osc.	6	250	-	-	-	0	0	120	135	6.2
6B7	2nd Det-AVC	6	250	135	-	-	**0	-	-	-	8.5
42	Output	6	240	250	-	-	0	-	-	-	16.0

** 6.2 Volts for sets below serial No. 1748809

MODEL Buick-Pontiac 544245
Oldsmobile 393884
Above Serial 1748809
Schematic,Changes

UNITED MOTORS SERVICE

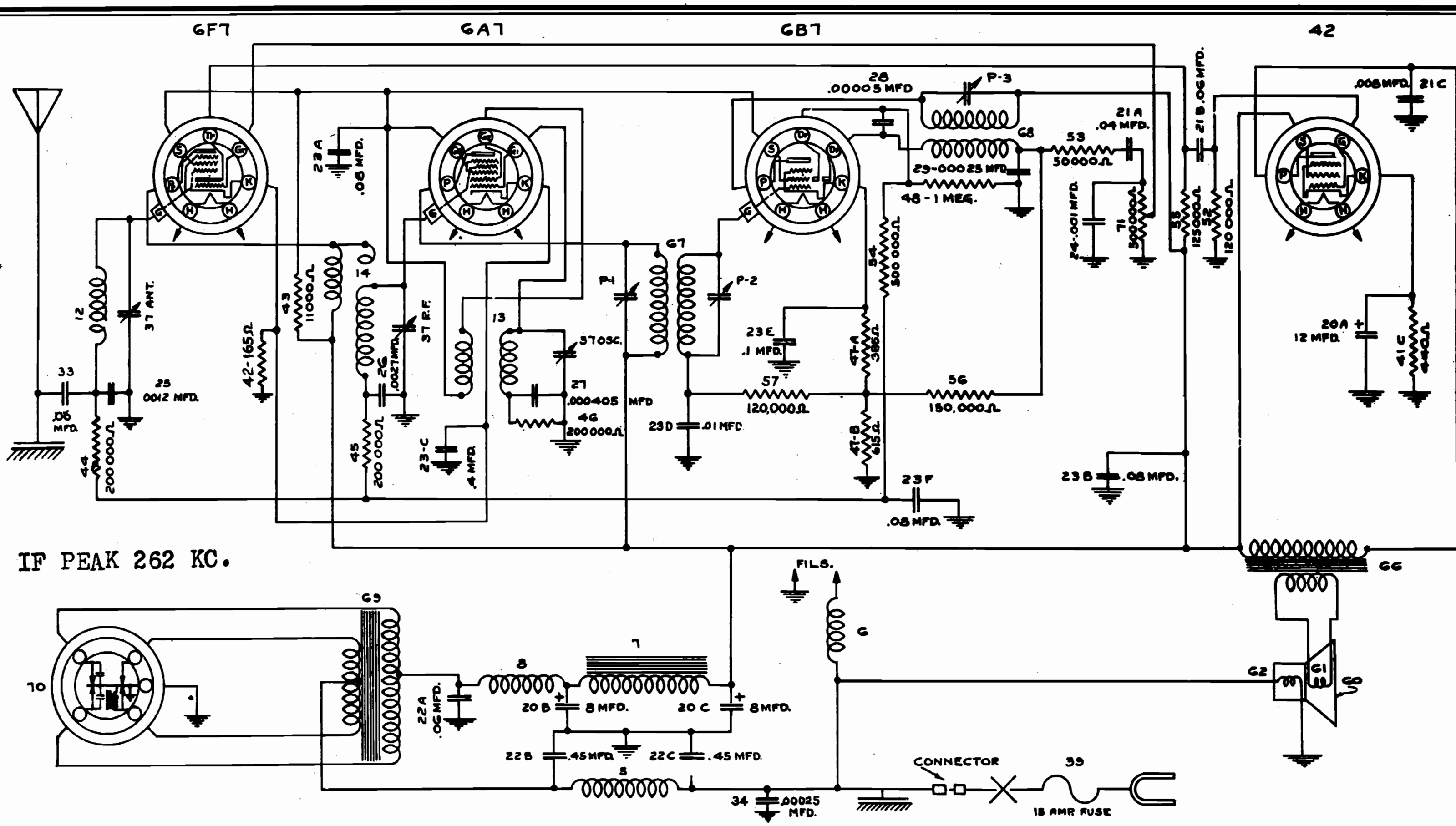


FIG. 1A CIRCUIT DIAGRAM--Above Serial #1748809
(For Buick, Pontiac Model 544245 and Olds Model 393884)

CIRCUIT CHANGES.-- The capacity of two sections of the part #1209050 condenser block (23A to F) were changed at serial #1748809 along with other changes. The "D" section, which was originally .04 mf., was changed to .01 mf. and the "E" section changed from .01 mf. to .1 mf. All the service replacement stock of the part #1209050 condenser blocks are of the new type, incorporating the above changes and should be used in the service replacement of all part #1209050 blocks used below serial #1748809.

MODEL Buick-Pontiac 544245
Oldsmobile 393884
Parts Layouts, Changes

UNITED MOTORS SERVICE

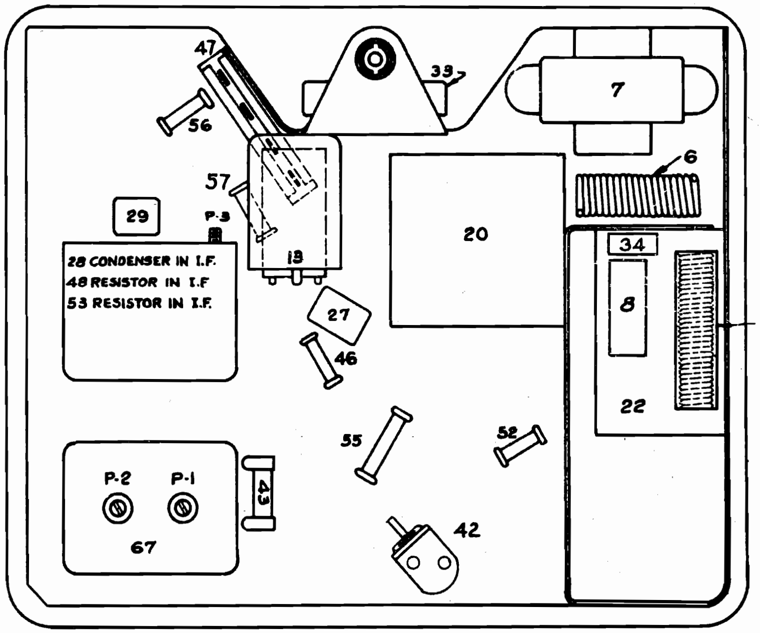


FIG.2 PARTS LAYOUT - Bottom View
For sets above serial #1748809

For sets below serial #1748809, the following changes should be noted:
Parts 34,42 and 57 are omitted;
Part 41 used instead of 47.

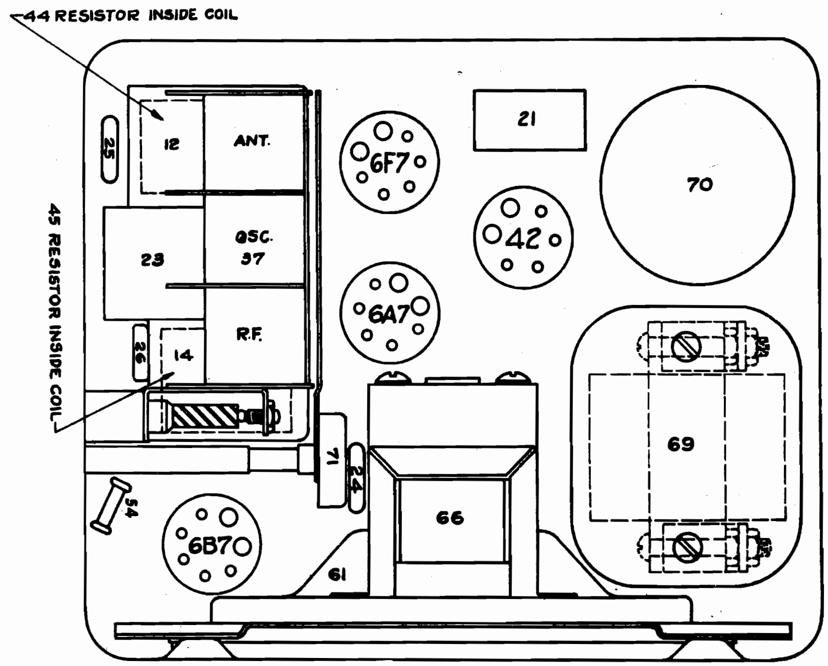


FIG.3 PARTS LAYOUT - Top View
This layout is the same for sets having serial numbers above and below #1748809.

CIRCUIT CHANGES.-- Several circuit changes were made starting at serial #1748809. See Figs.1,1A,2 and 3. It will be noted on some sets that the .008-mf. section (21C) of part #1209048 condenser block has its lead cut off close to the block and a .008-mf. tubular condenser connected from the plate of the 42 tube to ground in its place. This change was made because it was found necessary to change the voltage rating of the .008-mf. section of the condenser block after production started and the tubular condenser used until a new block could be manufactured. The tubular condenser used is part #1209212 and is located beside the filter choke. All the service replacement stock of #1209048 condenser blocks have a .008-mf. section of a higher voltage rating and in installing these blocks in a set where the tubular condenser was used, it will be necessary either to remove the tubular condenser or clip the lead off the .008-mf. section of the block.

MODEL Buick-Pontiac 544245
Oldsmobile 393884 UNITED MOTORS SERVICE
Alignment, Circuit Notes
Parts

Connecting Output Meter

Connect one of the terminals of the output meter to the plate prong of the type 42 output tube which can be determined by looking at the bottom of the tube with the filament prongs toward you. The plate prong is the first prong to the right of the filaments. Connect the other terminal of the output meter to receive chassis, making sure that the meter is protected with a series condenser.

Peaking I.F. Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I.F. trimmer P-3 for the 2nd I.F. coil shown on Figure 2.

(e) Then peak trimmers P-2 and P-1 of the first I.F. coil also shown on Figure 2.

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 and 1400 K.C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I.F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K.C. on this set.)

(g) Readjust the parallel trimmers for the "R.F." and "ANT" sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

Parts List

Part No.	Part Name	Description	Illus. No.
1207683	Cap	Grid connector	
1209080	Case	Chassis (Buick-Pontiac)	
1209081	Case	Chassis (Olds)	
1209045	Clamp	Vibrator holding	
1208077	Clip	Tube shield grinding	
1209039	Coil	R.F. "A" choke	5
1209040	Coil	Tube filament choke	6
1207999	Coil	Power filter choke	7
1209041	Coil	R.F. "B" choke	8
1209042	Coil assy.	Antenna	12
1209043	Coil	Oscillator	13
1209044	Coil assy.	R.F.-1st Det.	14
1209047	Condenser	Electrolytic block	20A,B,C
	Sec. (A) 12 mfd., (B) 8 mfd., (C) 8 mfd.,		
1209048	Condenser	By-pass block	21A,B,C
	Sec. (A) .04 mfd., (B) .06 mfd., (C) .008 mfd.		
1209049	Condenser	By-pass block	22A,B,C
	Sec. (A) .06 Mfd., (B) .45 Mfd. (C) .45 Mfd.		
†1209050	Condenser	By-pass block	23AtoF
	Sec. (A), (B), (F), .08 mfd., (C) .4 mfd., (D) .01 mfd., (E) .1 mfd.		
1207904	Condenser	Molded .001 mfd.	24
1209051	Condenser	Molded .00012 Mfd.	25
1209052	Condenser	Molded .0027 Mfd.	26
1209053	Condenser	Molded .000405 Mfd.	27
1209054	Condenser	Molded .00005 Mfd.	28
1209055	Condenser	Molded .00025 Mfd.	29
*1209056	Condenser	Tubular .075 Mfd.	33
‡1209213	Condenser	Tubular .06 Mfd.	33
1209055	Condenser	Molded .00025 Mfd	34
1209058	Condenser	3 Gang tuning	37
1209212	Condenser	Tubular .008 Mfd.	
1209059	Coupling	Condenser drive	
1209090	Cover	Chassis top (Buick-Pontiac)	
1209094	Cover	Chassis top (Olds)	
1209091	Cover	Tube lid (Buick-Pontiac)	
1209095	Cover	Tube lid (Olds)	
1209046	Cover	Vibrator trans.	

* Used below serial #1748809 † See "CIRCUIT CHANGES" ‡ Used above serial #1748809

The "A" supply to the receiver is filtered to prevent any spark interference from affecting the receiver circuits and also makes possible the installation of this receiver without the use of spark plug suppressors.

Delayed automatic volume control is used so that it will not have any effect on the volume of weak stations. A slight delay is also used on the detector circuit to assist materially in reducing background noise.

The vibrator circuit is permanently connected to operate on a car battery with the negative side grounded, as is the case on Buick, Olds and Pontiac automobiles.

The antenna of this receiver is capacity coupled to the grid winding of the antenna coil tuned by the first section of the gang condenser and feeding into the grid of the pentode section of the 6F7 tube, which in this case is used as an R.F. pentode and audio amplifier. The plate circuit of the pentode section of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned by the third section of the gang condenser. The 6A7 tube is used as the conventional detector-oscillator. The oscillator frequency which is produced due to the reaction between the oscillator grid and plate and associated circuit constants is tuned by the middle section of the gang condenser. The incoming frequency and the oscillator frequency are mixed in the 6A7 tube and the resultant frequency which is 262 kilocycles is transformer coupled to the grid of the R.F. pentode section of the 6B7 tube and the output of this section of tube is impressed on one of the diode plates of this tube for detection. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias of the R.F. section of the 6F7 and 6A7 tubes. The audio output of the detector circuit is coupled to the grid of the triode section of the 6F7 tube and the grid voltage swing is controlled by the volume control. The output of this section of the tube is resistance coupled to the grid of the type 42 power output pentode. The plate circuit of this tube is coupled through the output transformer to the speaker voice coil.

Part No.	Part Name	Description	Illus. No.
*1209062	Resistor	Candohm	41A,B,C
	Sec. (A) 600 ohm, (B) 125 ohms, (C) 440 ohms		
‡1209210	Resistor	Candohm 165 ohms	42
1209063	Resistor	"Ohmite" 11,000 ohms	43
1204136	Resistor	Carbon 200,000 ohms	44,45,46
‡1209211	Resistor	Candohm	47A,B,C
	Sec. (A) 585 ohms, (B) 615 ohms, (C) 440 ohms		
1208144	Resistor	Carbon 1 megohm	48
1209016	Resistor	Carbon 120,000 ohms	52
1204140	Resistor	Carbon 50,000 ohms	53
1204138	Resistor	Carbon 500,000 ohms	54
1209064	Resistor	Carbon 125,000 ohms	55
1207905	Resistor	Carbon 150,000 ohms	56
‡1209016	Resistor	Carbon 120,000 ohms	57
1209071	Speaker assy.	Complete 6 1/2" (G.H.U.)	60
1209072	Speaker assy.	Complete 6 1/2" (Rola)	60
1209073	Transformer	Output (G.H.U.)	66
1209202	Transformer	Output (Rola)	66
1209074	Transformer	1st I.F.	67
1209075	Transformer	2nd I.F.	68
1209076	Transformer	Vibrator	69
5037400	Vibrator	Plug-in type	70
1209078	Volume control	500,000 ohms	71
1209138	Washer	Rubber tuning cond.	
1208513	Washer	Osc. coil mtg.	
1207608	Washer	Rubber I.F. trans. mtg	

BUICK INSTALLATION PARTS (Special)

1209193	Bracket	Control unit (40 Series only)
1208568	Spring	Static collector
1207821	Suppressor	Distributor
1208557	Tube	Brass-ant. lead

PONTIAC INSTALLATION PARTS (Special)

1208562	Shield	Spark coil
1207821	Suppressor	Distributor

* Used below serial #1748809
‡ Used above serial #1748809

OLDS INSTALLATION PARTS (Special)

1208561	Clip	Replacement lead
1856907	Lead	Primary replacement
1208562	Shield	Spark coil
1208576	Spring	Static collector
1208559	Strip	Bonding
1208560	Strip	Bonding
1208544	Suppressor	Distributor
29353	Terminal	Replacement lead

INSTALLATION PARTS--COMMON ALL SETS

1853686	Adapter	Suppressor
1849161	Condenser	Ammeter by-pass
1849014	Condenser	Generator by-pass
1850429	Condenser	Domelight by-pass
120375	Nut	Chassis mtg.
1207790	Screw	Control unit
1208542	Shield assy.	Antenna lead
1208054	Stud	Chassis mtg.
1208565	Washer	Chassis stud
1208566	Washer	Speaker stud

MODEL Chevrolet 600566
Schematic, Voltage

UNITED MOTORS SERVICE. INC.

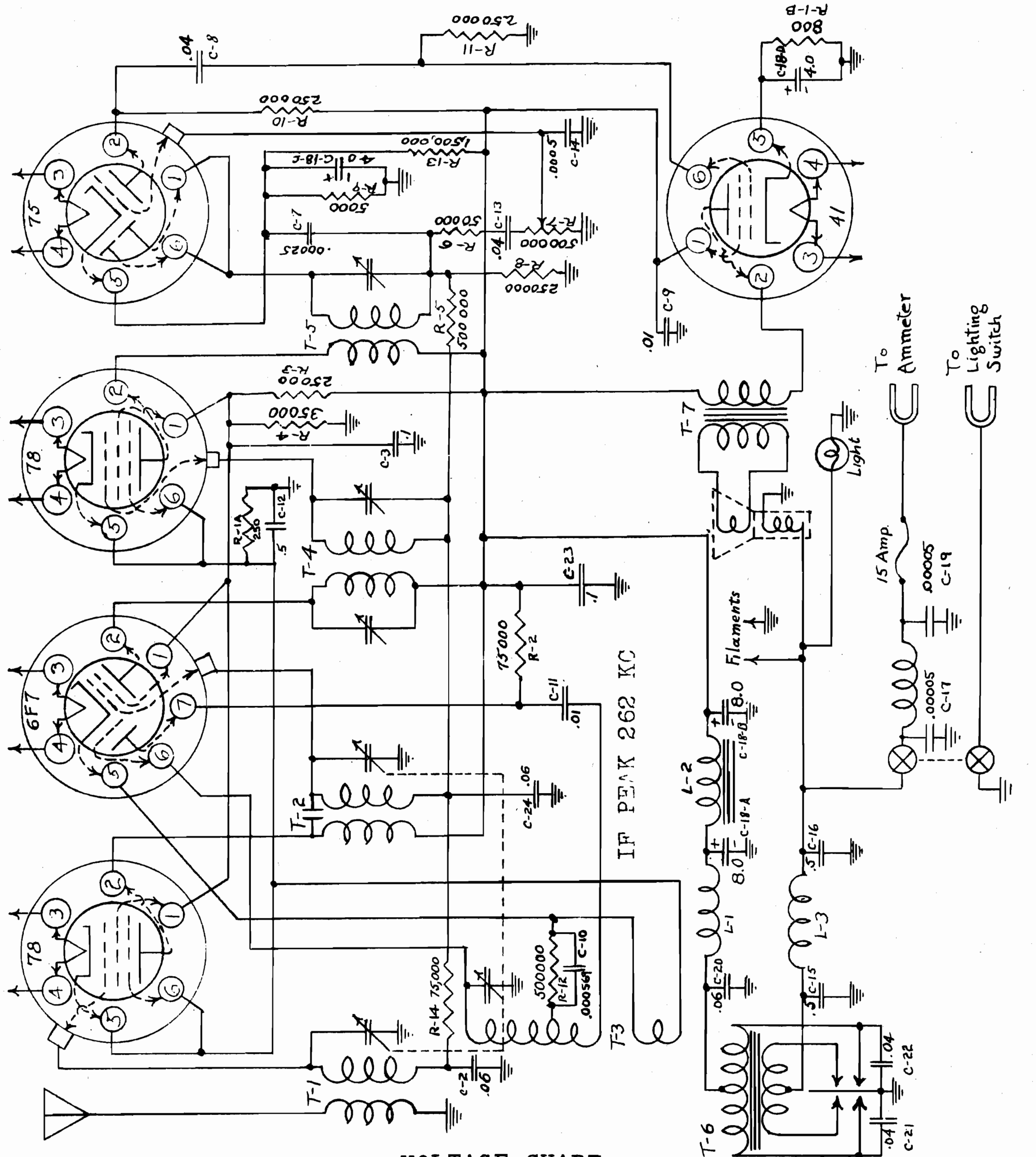


Fig. 2 CHEV. #600566 CIRCUIT DIAGRAM

VOLTAGE CHART

Note: ALL readings are taken from indicated tube prong to chassis frame. Volume control on full.

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Grid	#7 Triode Plate
78 R.F.	88	215	6	0	3.4	3.4	
6F7 (Det.							
(Osc.	88	215	0	6	3.4	-.8	88
78 I.F.	88	215	6	0	3.4	3.4	
75 (2nd Det.							
(AVC	0	90	0	6	1.5	0	
41 A.F.	215	180	6	0	16.3	0	

MODEL Chevrolet 600566
Alignment, Notes

UNITED MOTORS SERVICE, INC.

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the 41 output tube and to the chassis frame. Make sure that the output meter is protected with a series condenser internally: if not, connect a 1/10 mfd. condenser in series with the ground lead to the chassis. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

NOTE: Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

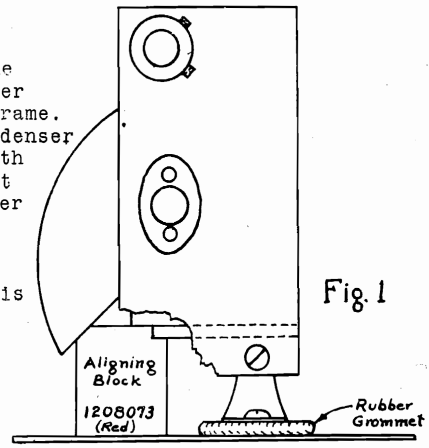


Fig. 1

(d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Fig. 1.

(e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

SERVICE HINTS

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

The paint should be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R.F. noise due to the vibrator will appear if good ground connections are not made at the dash.

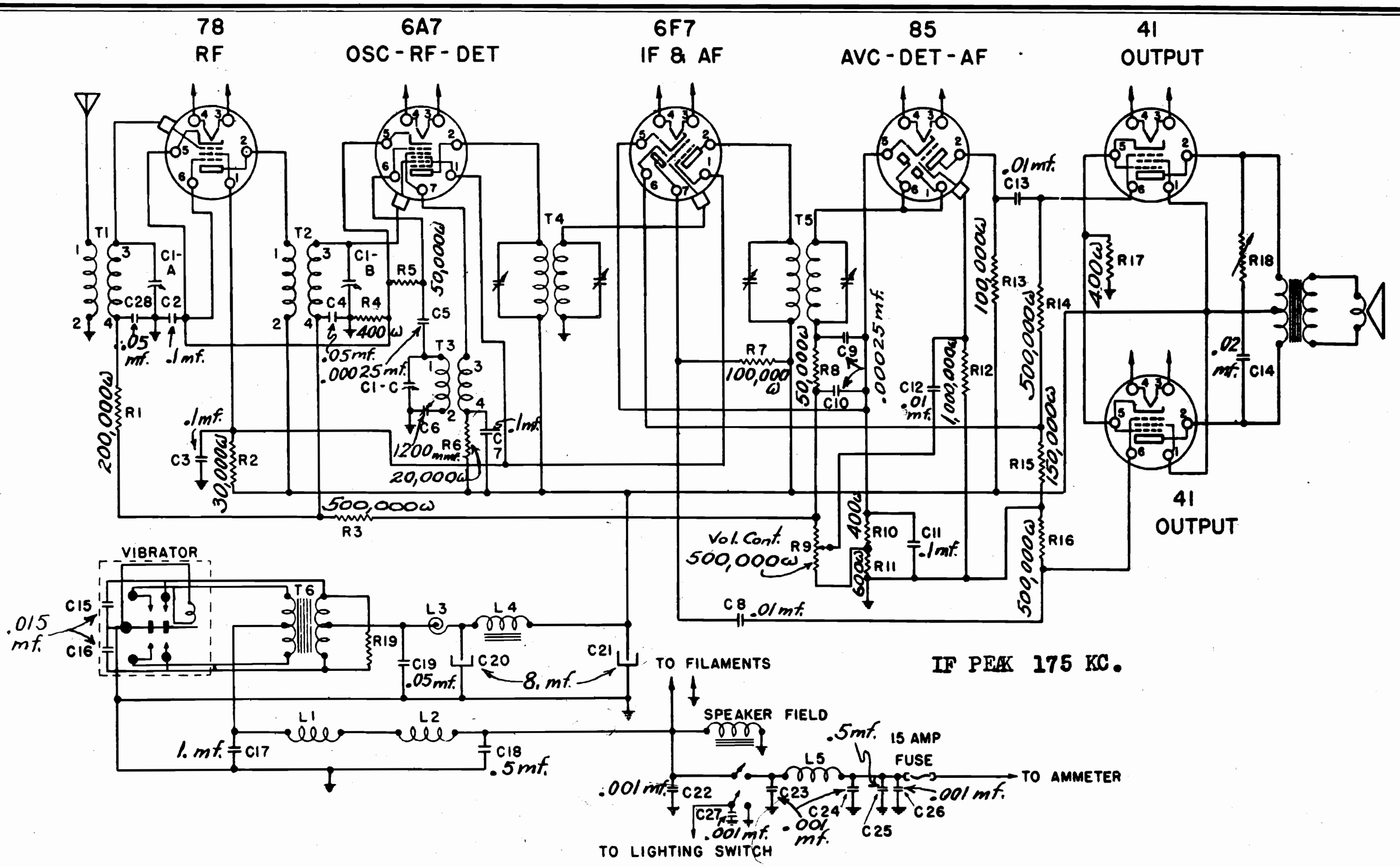
CAUTION: Care should be taken to see that the set is turned off before attempting to replace the dial light because, if the dial light assembly is removed from the bottom of the control unit while the current to the receiver is left turned on, there is the possibility that a short circuit will occur which will blow out the fuse. The dial light assembly is being changed on the later sets to prevent this.

MOTOR NOISE

In order to totally eliminate spark noise picked up by the antenna when this model is installed, it is necessary that a certain procedure be followed. The engine block and the metal bulkhead must be at the same ground potential. It is suggested that a heavy piece of copper braid approximately 1" wide and 1/16" thick and about 3" long be secured. Insert one end of this braid under the rear cylinder head hold down bolt on the left side of the engine block. Attach the other end of this piece of bonding braid to the metal bulkhead of the car by means of two self-threading screws. The paint should be removed from the metal bulkhead in order to secure a good ground connection. A slight amount of slack should be left in this lead to allow movement of the engine block with respect to the bulkhead.

MODEL Chevrolet 601038
Schematic, Voltage

UNITED MOTORS SERVICE



IF PEAK 175 KC.

All voltage readings taken from chassis to indicated tube prong. 6 volts at tube prongs, which usually requires 6.2 volts at ammeter lead clip.

TUBE	PRONG NUMBER #1	#2	#3	#4	#5	#6	#7
78	75	195	6	0	5	5	
6A7	75	195	6	0	5	-2	125
6F7	75	195	6	0	5	0	70
85	0	60	6	0	5	0	
41	195	190	6	0	16	0	

Important: The speaker cable plug plate must be connected to the chassis to complete the circuit.

MODEL Chevrolet 601038
Parts Locations, Data

UNITED MOTORS SERVICE

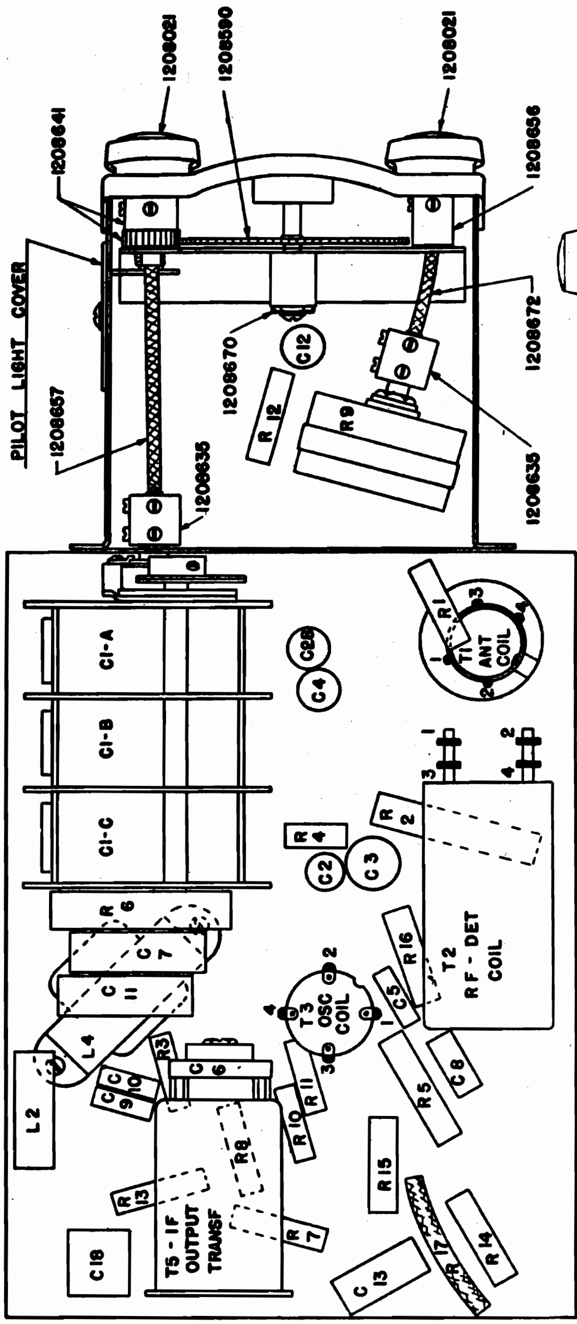
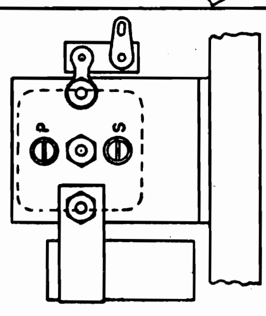


Fig. 7. Location of Parts Under Chassis.



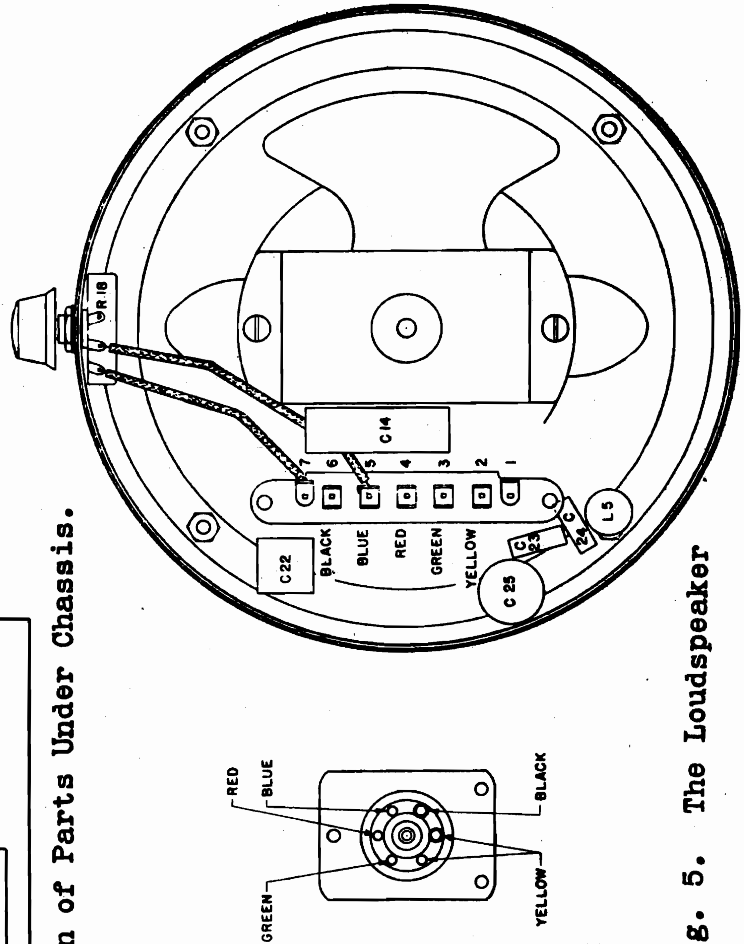


Fig. 5. The Loudspeaker

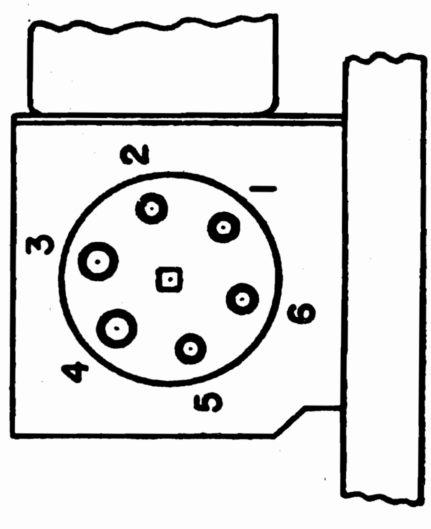


Fig. 4. Speaker Plug in Chassis.

MODEL Chevrolet 601038
Alignment, Test Data

UNITED MOTORS SERVICE

THE POWER SUPPLY UNIT.

The power supply unit is of the vibrating reed, synchronous mechanical rectifier type. The vibrator is of the plug-in type. It is sealed and no attempt should be made to repair it. Defective ones should be returned for replacement.

To gain access to the vibrator, remove the five Parker Kalon screws from around the power supply unit case top cover. The cover should then be pulled straight up. Do not attempt to pry up one end. Contacting fingers are riveted around the edges of the cover. These fingers must make tight contact with the power supply unit case in order to prevent radiation of interference from the power supply. The Parker Kalon screws in the top and the bottom covers of the case must be tightened securely to prevent noise radiation.

R19 is a special resistor whose value varies with the voltage applied to it. When the receiver is first turned on, the output voltage tends to become very high until the tubes heat sufficiently to draw their normal load. Under this condition, the value of R19 drops to a comparatively low value, loading the transformer sufficiently to prevent damage. As the tubes become heated, tending further to lower the voltage, the resistance of R19 increases greatly so that it no longer constitutes a load on the power supply.

The power supply unit may be removed from the chassis by taking out the four screws that hold it to the chassis plate and unsoldering the red and orange wires that pass through the fibre grommet near the left edge of the set.

The following chart will be helpful in making tests of the power supply unit. A continuity meter or ohmmeter may be used.

Power Supply Unit Test Chart

Note: Tests are to be made with the speaker plugged into the chassis, and the vibrator unit removed. Be sure the speaker plug plate makes contact with the chassis.

TEST (see Fig. 1)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
#4 to #5	400 ohms.	Defect in power transformer secondary or in R19.
#1 to #3	Very low resistance reading	Defect in power transformer primary
From #1 [redacted] prong of [redacted] 41 output tube to #4 or #5 prong of vibrator socket	Approximately 425 ohms.	Defective L3 or L4.
From # [redacted] prong of [redacted] 41 output to chassis	Open	Shorted C19, C20, or C21.
#2 to chassis	0 resistance	Open ground connection to prong
From #1 or #3 to ground, with speaker plug removed from chassis, tubes removed from sockets, and pilot light removed.	Open	Shorted C17 or C18.

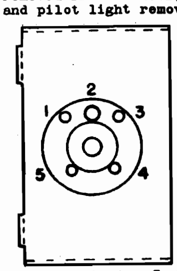


Fig. 1. Vibrator Socket

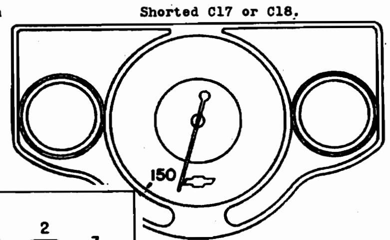


Fig. 3.

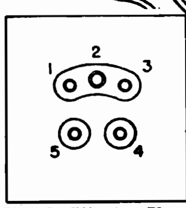


Fig. 2. Vibrator Plug

Vibrator Test Chart

TEST (see Fig. 2)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
#2 to #4	Open	Shorted C15. Defective vibrator
#2 to #5	Open	Shorted C16. Defective vibrator
#2 to #3	42 ohms	Defective vibrator
#1 to #2	Open	Defective vibrator
#2 to case	Closed	Defective vibrator

PILOT LIGHT REPLACEMENT

The pilot light can be made accessible for replacement by removing the two screws in the left side of the control unit housing. The small plate, with the pilot light socket attached, can then be removed. Be sure to turn the set off before attempting to remove the plate

ALIGNMENT

The IF Stages:

1. Connect a low voltage output meter across the transformer secondary in the speaker, or a high voltage meter between the plate prongs of the 41 tubes.

2. Set the test oscillator at 175 kc and connect its output between the control grid of the 6F7 tube and the chassis. Leave the tube shield in place and the grid connection attached to the cap. Adjust the two adjusting screws in T5 for maximum output meter deflection. The output of the test oscillator should be kept at as low a value as possible, in order to render the AVC action inoperative

3. Connect the test oscillator between the 6A7 control grid and the chassis. Adjust the two screws in T4 for maximum output meter deflection. As the meter reading is brought up due to peaking, reduce the test oscillator output so that it is kept at as low a value as possible.

The RF Stages:

(a) Adjusting the Calibration:

1. Loosen the four set screws in the variable condenser coupling (1208635 in Fig. 7).

2. Fully mesh the condenser plates.

3. Turn the Station Selector knob to its low frequency limit, keeping the condenser fully meshed.

4. Tighten the set screws in the coupling.

5. Turn the Station Selector knob to its high frequency limit. The dial pointer then should barely overlap the lower corner of the Chevrolet insignia on the dial, as shown in Fig. 3. If it does not, remove the knobs and the two bearing inserts that are screwed in the escutcheon. The escutcheon can then be removed, the dial pointer mounting screw loosened and the dial pointer set correctly. In its correct setting, the dial pointer position coincides with the stop on the large gear.

(b) Peaking the Trimmers:

1. Set the test oscillator to exactly 1500 kc and connect its output between the antenna socket contact and the chassis, in series with a .0002 mfd. mica condenser. No other value of condenser should be used.

2. With the Station Selector left at its high frequency limit, adjust the three trimmers on the variable condenser for maximum output meter deflection.

3. Readjust the test oscillator to 600 kc and tune in its signal.

4. Adjust the oscillator padder, C6, by slowly rotating the variable condenser back and forth a degree or two, adjusting the padder at the same time, until maximum output is obtained.

5. Since the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation.

CHASSIS UNIT TEST CHART

Note: Tests are to be made with the speaker plug removed from the chassis, the vibrator removed, the tubes removed, and the pilot light bulb removed.

TEST (see Fig. 4)	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Lighting switch lead to chassis	Open with set switch off; closed with set switch on.	Defect in connector or switch.
#3 to chassis	Open	Short in filament circuit.
#4 to chassis	Open	Short in filament circuit.
#3 to #4	Open with set-switch off; closed with set switch on.	Defect in switch or wiring.
#1 to #1 prong of 41 tubes	Reading	Open circuit
#1 to #2 prong of 6F7	100 ohms	Defective IF output Transformer, T5.
#1 to #2 prong of 6A7	100 ohms	Defective IF input Transformer, T4.
#1 to #2 prong of 78	7 ohms	Defective RF-Detector coil.
#1 to #2 prong of 85 tube	100 M ohms	Defective R13.
#1 to #7 prong of 6F7	100 M ohms	Defective R7.
#1 to #7 prong of 6A7	20 M ohms	Defective R6 or defective oscillator coil, T3.
#1 to #1 prong of 78, 6A7, 6F7	30 M ohms	Defective R2
Antenna socket contact to chassis	18 ohms	Defective antenna coil
Control grid of 78 to ground	Open	Shorted C28 or shorted tuning condenser (C1-A).

MODEL Chevrolet 601038
Socket, Test Data, Parts

UNITED MOTORS SERVICE

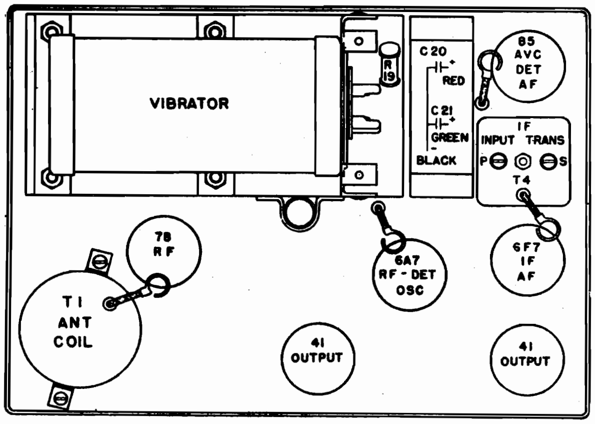


Fig. 8. Tube Positions and Functions.

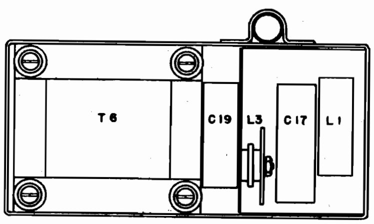


Fig. 9. Location of Parts in Base of Power Supply Unit.

SPEAKER TEST CHART

Note: These tests are to be made with the speaker plug removed from the chassis.

TEST (see Fig. 5).	PROPER EFFECT	TROUBLE IF IMPROPER EFFECT IS HAD
Case to #6	5 ohm reading	Defective field coil
#5 to #7	0-500 M ohms as Tone Control is turned	Defective Tone Control
"A" clip to #2	Reading	Open L5
"A" clip to shield	Open	Shorted C23, C24, C25, or C26.
#3 to #4	300 ohms	Defect in transformer secondary.
#4 to #5	275 ohms	Defect in transformer secondary.
#3 to #7 with Tone Control in "Brilliant" position	500 M ohms	Shorted C14.

1208684	Choke	RF	L-1
1208685	Choke	RF	L-2
1208630	Choke	RF	L-3
1208587	Choke	Audio	L-4
*1208686	Choke	RF	L-5

*Indicates part mounted in speaker.

1208624	Clamp	Instrument panel, removable part	
1208625	Clamp	Lead lighting switch	
1208626	Clamp	To make dual condenser units	
1208629	Clip	Grid connection	
1208585	Coil	Antenna	T-1
1208586	Coil	RF-Detector	T-2
1208631	Coil	Oscillator	T-3
1208583	CONDENSER	Variable tuning	C-1 (A-B-C)
1208675	" Bearing	Drive pinion	
1208678	" Bracket	Drive pinion bearing	
1208676	" Clamp	Drive pinion bearing retaining	
1208679	" Gear assembly	Rotor driving	
1208674	" Pinion and Shaft	Drive	
1208677	" Screws	Drive pinion bearing retaining clamp	
1208680	" Spring	Coil, rotor driving gear	
1208627	SHIELD	Antenna lead-in	
1838476	Ferrule	Antenna contact	
1208592	Shield	RF-Detector coil, includes speaker plug and bracket	
1208658	SHIELD	Tube, both halves	
1208660	Base mounting member	For 1208658	
1208659	Clamping ring	For 1208658	
1208623	SOCKET	Antenna (includes bracket)	
1838476	Ferrule		
1836876	Spring		
1843713	Washer		

PARTS LIST -- Cont'd.

Part No.	Part Name	Description	Code
1208599	Condenser	.1 mfd. 200 volts	C2
1208598	Condenser	.1 mfd. 30 volts	C3
1208673	Condenser	.05 mfd. 200 volts	C4
1208605	Condenser	.00025 mfd. mica	C5
1208597	Condenser	1200 mmf. oscillator padder.	C6
1208599	Condenser	.1 mfd. 200 volts	C7
1208600	Condenser	.01 mf. 600 volts	C8
1208605	Condenser	.00025 mfd. mica	C9
1208605	Condenser	.00025 mfd. mica	C10
1208599	Condenser	.1 mfd. 200 volts	C11
1208601	Condenser	.01 mfd. 200 volts	C12
1208600	Condenser	.01 mfd. 600 volts	C13
1208682	Condenser	.02 mfd. 800 volts	C14
	Condenser	.015 mfd. 1200 volts (enclosed in vibrator unit).	C15
	Condenser	.015 mfd. 1200 volts (enclosed in vibrator unit).	C16
1208604	Condenser	1 mfd. 25 volts	C17
1208603	Condenser	.5 mfd. 160 volts	C18
1208602	Condenser	.05 mfd. 600 volts	C19
1208584	Condenser	8 mfd. dual electrolytic	C20
1208584	Condenser	8 mfd. dual electrolytic	C21
*1208683	Condenser	.001 mfd. mica	C22
*1208683	Condenser	.001 mfd. mica	C23
*1208683	Condenser	.001 mfd. mica	C24
*1208669	Condenser	.5 mfd. 200 volts	C25
1208606	Condenser	.001 mfd. mica (built into ammeter lead).	C26
1208606	Condenser	.001 mfd. mica in metal case	C27
1208673	Condenser	.05 mfd. 200 volts	C28
*1208693	Control	Tone, 500 M ohms, with nut and washer	R18
1208589	Control	Volume	R9
1208635	Coupling	Flexible shaft to volume control and variable condenser	
1208636	Cover	Power supply bottom	
1208637	Cover	Power supply top	
1208632	Dial glass		
1208633	Dial	Station selector	
1208596	Escutcheon		
120151	Fuse	15 amp.	
1208642	Pointer	Dial	
1208634	Power Supply unit	Complete less vibrator	
1208645	Resistor	200 M ohm, 1/3 watt carbon	R1
1208652	Resistor	30 M ohm, 1 watt carbon	R2
1208644	Resistor	500 M ohm, 1/3 watt carbon	R3
1208650	Resistor	400 ohms, 1/3 watt carbon	R4
1208648	Resistor	50 M ohm, 1/3 watt carbon	R5
1208653	Resistor	20 M ohm, 1 watt carbon	R6
1208647	Resistor	100 M ohm, 1/3 watt carbon	R7
1208648	Resistor	50 M ohm, 1/3 watt carbon	R8
1208650	Resistor	400 ohms, 1/3 watt carbon	R10
1208649	Resistor	600 ohms, 1/3 watt carbon	R11
1208651	Resistor	1 megohm, 1/3 watt carbon	R12
1208647	Resistor	100 M ohms, 1/3 watt carbon	R13
1208644	Resistor	500 M ohms, 1/3 watt carbon	R14
1208646	Resistor	150 M ohms, 1/3 watt carbon	R15
1208644	Resistor	500 M ohms 1/3 watt carbon	R16
1208654	Resistor	400 ohms 2 watts, Flexible	R17
1208643	Resistor	Globar, 1 watt, voltage regulator	R19
1208549	Screen	Toe Board	
1208639	Screw	Case clamping	
1208656	Shaft	Volume control, knob end	
1208657	Shaft	Station selector	
1208672	Shaft	Flexible, volume control	
1208591	Shield	Antenna coil	
1208614	Socket and bracket	Vibrator	
1208615	Socket and bracket	Dial light	
1208661	Socket	7 prong	
1208662	Socket	6 prong	
1208663	Socket	Vibrator	
601105	SPEAKER	Complete with case and cable	
1208666	" Cable, plug and " plate		
1208689	" Case	Back cover	
1208690	" Case	Less cover	
1208668	" Plug		
1208691	" Screw	Mounting, ornamental head	
1208687	" Speaker only	Less transformer and case	
1208688	" Transformer	Includes mounting bracket	T-7
1208552	Static collector	Universal	
1207900	Suppressor	Distributor	
1208593	Transformer	IF INPUT	T-4
1208594	Transformer	IF output	T-5
1208588	Transformer	Power	T-6
1207424	Lamp	Pilot, 6 to 8 volts	
1208694	LEAD	Lighting switch, complete	
1836869	" Cap	For connector of 1208655	
1838476	" Ferrule	For connector of 1208628 and 1208655	
1208628	" Lead	Chassis end only	
1208655	" Lead	Lighting switch end only	
1208697	" Lead	With lug and rubber sleeve for 1208655	
1836876	" Spring	For connector of 1208628	
1843713	" Washer	For connector of 1208628	

UNITED MOTORS SERVICE

MODEL Chevrolet 601574
Schematic
Voltage

TUBE BASE DIAGRAM SYMBOLS

Type	Function	H	P	S	PT	GT	G1	G2	K
6F7	R.F.	6	245	100	70	-	-	-	2.5
6A7	Det-Osc.	6	245	100	-	-	-0	170	2.5
6B7	I.F.,--2nd Det-AVC	6	245	100	-	-	-	-	10.0
41	Output	6	230	245	-	-	-	-	16.0

NOTE: Ampere drain of set at 6 volts is 6.0 amperes
Milliampere drain from "B" supply is approximately 55 M.A.

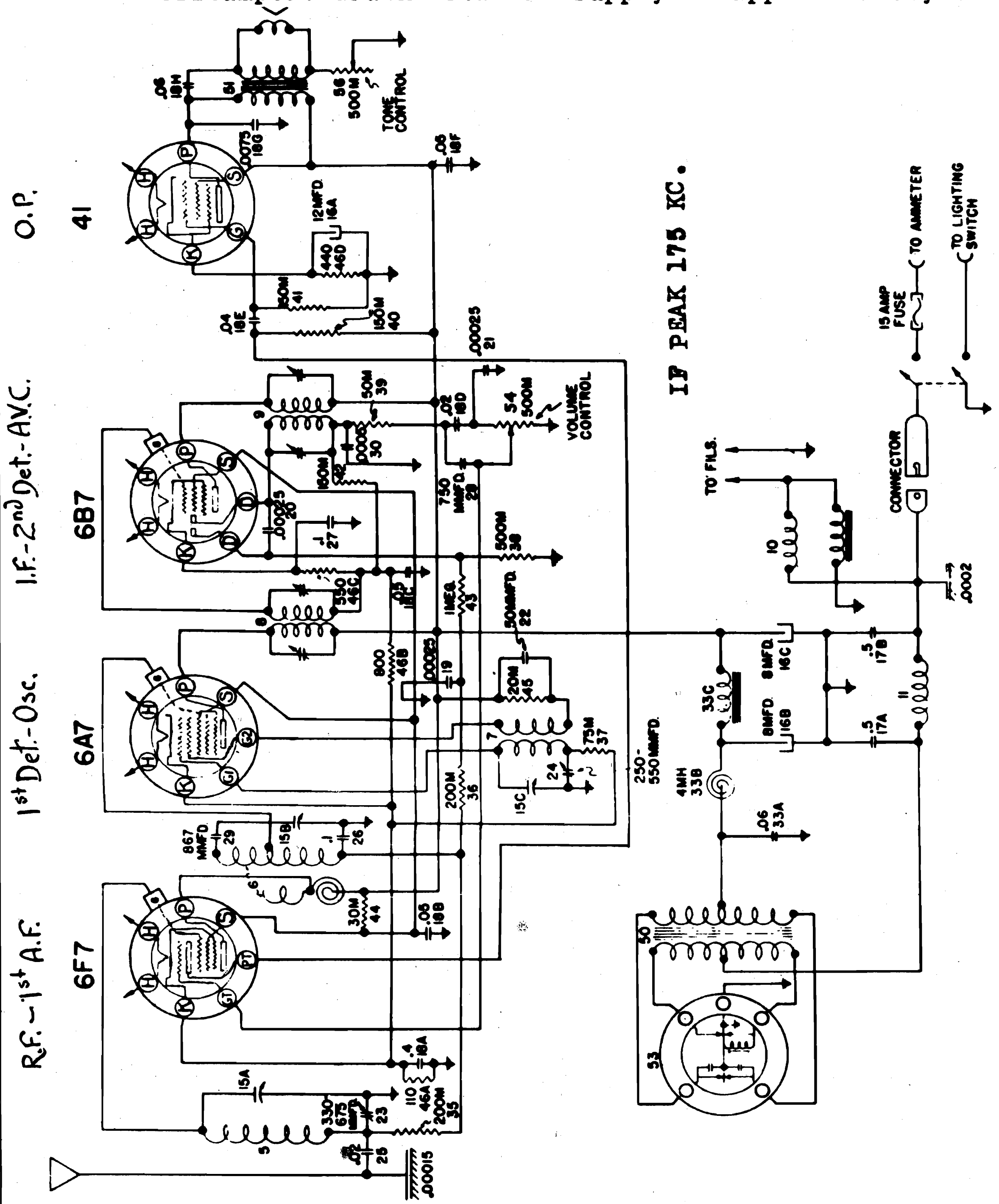


FIG. 1--CHEVROLET 601574 CIRCUIT DIAGRAM

MODEL Chevrolet 601574
Parts Layouts

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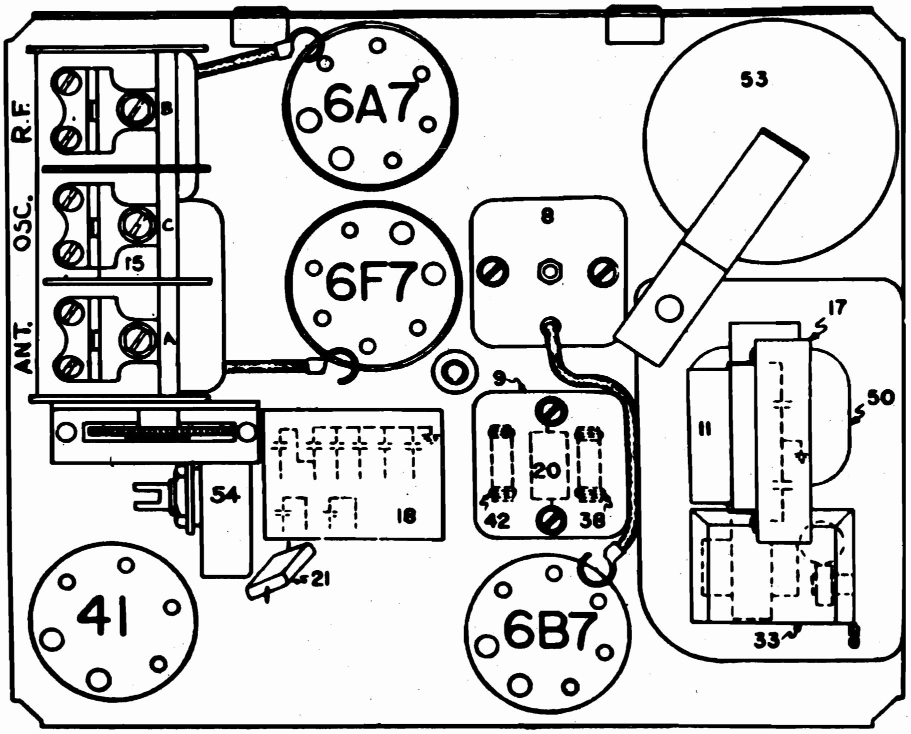


FIG.2--PARTS LAYOUT--Top View

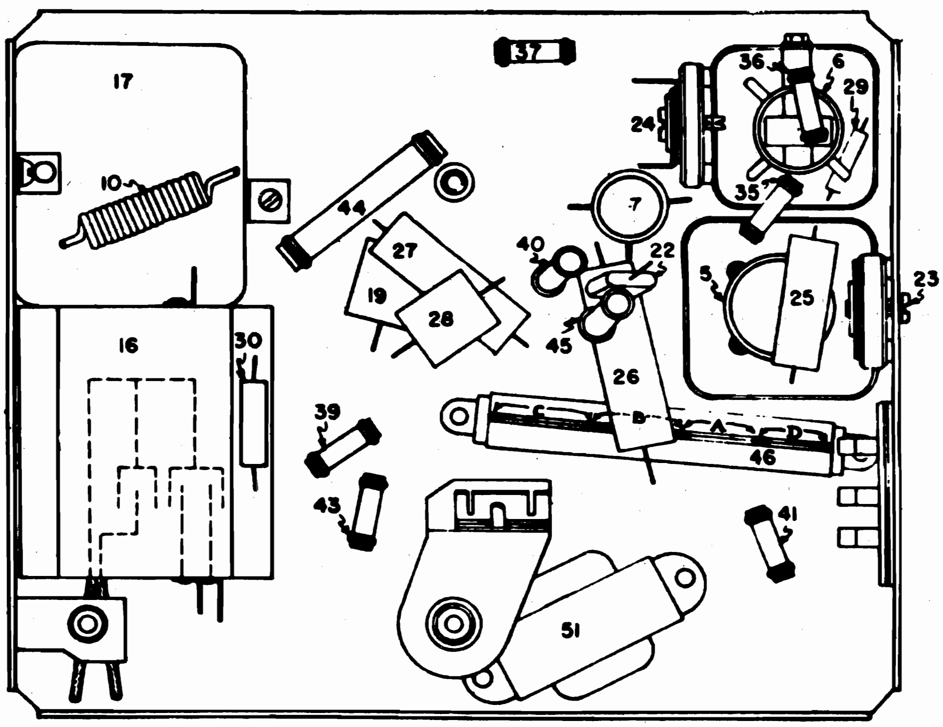


FIG. 3--PARTS LAYOUT--Bottom View

UNITED MOTORS SERVICE

The antenna circuit of this receiver is capacity coupled to the antenna system. This results in exceptionally high gain in the antenna stage and serves to make up for the relative inefficiency of the under-car antennas which are necessary on the all steel top cars. A separate adjustment is provided on the receiver to permit an accurate alignment to the car antenna.

The audio output of the detector circuit is coupled to the triode portion of the 6F7 tube for audio frequency amplification. The pentode section of the same tube is used as a radio frequency amplifier.

The "A" supply to the receiver is filtererd to prevent any spark interference from affecting the receiver circuits and makes possible the installation of this receiver without the use of spark plug suppressors.

A plug-in vibrator is used of the full wave self-rectifying type. Its circuit is permanently connected for operation on a car battery with the negative side grounded as is the case on Chevrolet automobiles.

Tone control action is obtained in a unique manner in that one of the voice coil leads present in the speaker cable is also used as a conductor for the tone control circuit. This is done to reduce the number of wires in the speaker cable and has no effect on the voice coil circuit because of the great differences in impedance between the voice coil circuit and the output tube plate circuit.

The output transformer of this receiver is an integral part of the chassis. This is necessary because of space limitations in a "header" speaker.

Circuit Operation

Referring to the Circuit Diagram Figure 1: The antenna system used with this receiver is capacity coupled to the antenna coil. The antenna capacity is accurately matched to the receiver antenna stage, greatest efficiency through the use of an adjustable padding condenser. The antenna coil is tuned by the "ANT" section of the condenser gang and feeds the pentode grid of the 6F7 tube. The output of the pentode portion of the 6F7 tube is capacity coupled to the grid coil tuned by the "R.F." section of the condenser gang feeding the control grid of the 6F7 detector-oscillator tube. The incoming station frequency is then mixed in this tube with the frequency produced by the receiver oscillator circuit which is tuned by the "OSC." section of the condenser gang. A resultant frequency is produced of 175 kilocycles and is inductively coupled to the pentode grid of the 6B7 tube. The output of the pentode section of the 6B7 tube is then impressed on one of the diode plates of this tube for detection purposes through the 2nd I.F. coil. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias on both the pentode section of the 6F7 tube and the control grid of the 6A7 tube. The audio output of the detector circuit is coupled to the grid of the triode portion of the 6F7 tube and the grid voltage swing is controlled by the volume control. The plate circuit of this section of the tube is resistance coupled to the grid of the 41 output tube. The output of the 41 tube is coupled to the speaker voice coil through the output transformer. Tone control action is obtained by feeding some of the higher frequencies to ground using the voice coil circuit as a conducting medium.

MODEL Chevrolet 601574
Alignment, Parts List

UNITED MOTORS SERVICE

Connecting Output Meter

Connect one of the output meter leads to the plate prong of the type 41 output tube. The plate prong is the first prong to the left of the filament when looking at the bottom of the tube with the filament prongs toward you. Connect the other output meter lead to the receiver chassis, making sure that the meter is protected with a D.C. blocking condenser connected in series to prevent damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case.

Peaking I.F. Stages at 175 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 175 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the 2nd I.F. coil, Illustration #9 on Fig. 2.

(e) Then pack each of the trimmers on the 1st I.F. coil, Illustration #8 on Fig. 2.

NOTE: In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 K.C.

(a) Connect the output of the receiver and to the chassis ground. (Do not use the .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Ajdust the trimmer for the oscillator section of the gang condenser (middle section CAREFULLY for maximum output. Then adjust the trimmers for the "R.F." and "ANT." sections of the gang condenser also for maximum output.

Tracking Oscillator at 540 K.C.

(a) Turn the condenser plates until they are COMPLETELY IN MESH.

(b) Set test oscillator at 540 kilocycles. (Leave test oscillator leads connected to antenna and ground of receiver.)

(c) Adjust the oscillator tracking condenser (Illus. #24 on Fig. 3) located on the bottom of the chassis until the 540 K.C. signal is tuned in with maximum output.

Peaking Gang Condenser at 1400 K.C.

(a) Set the test oscillator at 1400 kilocycles.

(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test osicllator is tuned in with maximum output.

(c) Readjust the parallel trimmers for the "R.F." and "ANT." sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT DISTURB the setting of the "OSC." section of the gang condenser as this is adjusted at 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

Adjusting Receiver to Car Antenna

NOTE: An antenna compensating condenser is provided in the antenna circuit of this receiver that must be adjusted to the particular car antenna the receiver is to be used on. The test oscillator cannot be used for this adjustment due to the fact that capacity of its output circuit will not match the wide range of antenna capacities being used. Therefore, it is necessary that the adjustment be made after the receiver is installed on the car and is done in the following manner:

(a) Tune the receiver to a weak broadcast station on the low frequency end of the dial 550 to 700 K.C.

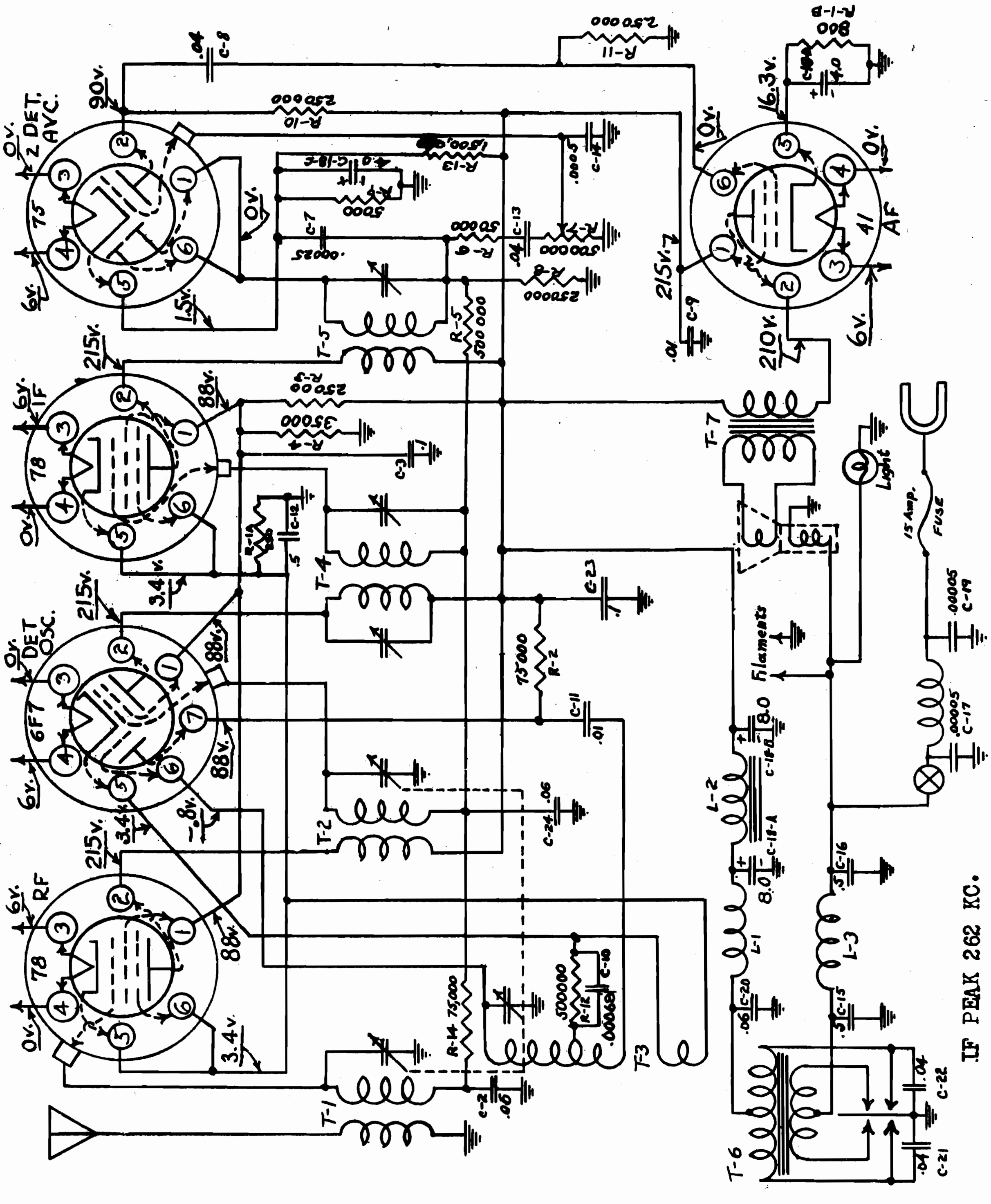
(b) Adjust the antenna compensating condenser for maximum response from the broadcast station. This condenser is shown as Illustration #23 on Fig. 3 and is located immediately to the rear of the speaker plug on the side of the receiver case.

CHASSIS PARTS

Part No.	Part Name	Description	Illus. No.
1209573	Case	Chassis	
1209574	Case	Power transformer	
1207683	Clip	Grid connector	
1209527	Coil	Antenna	5
1209528	Coil	R.F.	6
1209529	Coil	Oscillator	7
1209544	Coil assy.	1st I.F.	8
1209544	Coil assy.	2nd I.F.	9
1209571	Coil	Tube filament choke	10
1209572	Coil	Vibrator "A" choke	11
1209530	Condenser	3 gang tuning	15
	Sec. A	Antenna	
	Sec. B	R.F.	
	Sec. C	Oscillator	
1209531	Condenser	Electrolytic block	16
	Sec. A	16 mfd.	
	Sec. B	8 mfd.	
	Sec. C	8 mfd.	
1209532	Condenser	By-pass block	17
	Sec. A	.5 mfd., 160 volt	
	Sec. B	.5 mfd., 160 volt	
1209533	Condenser	By-pass block	18
	Sec. A	.4 mfd., 160 volt	
	Sec. B	.05 mfd., 200 volt	
	Sec. C	.05 mfd., 160 volt	
	Sec. D	.02 mfd., 160 volt	
	Sec. E	.04 mfd., 200 volt	
	Sec. F	.05 mfd., 400 volt	
	Sec. G	.0075 mfd., 800 volt	
	Sec. H	.06 mfd., 400 volt	
1209055	Condenser	Modled .00025 mfd.	19,20,21
1207625	Condenser	Molded .00005 mfd.	22
1209535	Condenser	Antenna compensating	23
1209536	Condenser	Oscillator tracking	24
1207799	Condenser	Tubular .02 mfd., 200 volt	25
1207908	Condenser	Tubular .1 mfd., 160 volt	26,27
1209537	Condenser	Molded .00075 mfd.	28
1209538	Condenser	Molded .000867 mfd.	29
1209556	Condenser	Molded .0005 mfd.	30
1209577	Connector assy.	"A" power on chassis	
1836869	Cap	Ferrule holder	
1838476	Ferrule	Contact	
1209576	Connector assy.	Antenna on chassis	
1838476	Ferrule	Contact	
1836876	Spring	Antenna connector	
1843713	Washer	Antenna connector	
1209557	Connector	Condenser gang shaft	
1209565	Cup	Cond. gang mounting	
120151	Fuse	15 ampere	
1209525	Filter assy.	"B" power	33
	Sec. A	.06 mfd. condenser	
	Sec. B	R.F. choke	
	Sec. C	Audio choke	
1209568	Grommet	Cond. gang mounting	
1209599	Nut	Hex. #4-36 nickle plated	
110922	Nut	Hex. #8-32 nickle plated	
	Nut	Hex. #6-32 nickle plated	
1209581	Pad	Vibrator clamp	
1204136	Resistor	Carbon 200,000 ohms 1/3 watt	35,36
1207943	Resistor	Carbon 75,000 ohms, 1/3 watt	37
1204138	Resistor	Carbon 500,000 ohms, 1/3 watt	38
1204138	Resistor	Carbon 500,000 ohms, 1/3 watt	39
1207905	Resistor	Carbon 150,000 ohms, 1/3 watt	40,41,42
1208232	Resistor	Carbon 1 megohm, 1/3 watt	43
1208959	Resistor	Carbon 30,000 ohms, 1 watt	44
1209405	Resistor	Carbon 20,000 ohms, 1/3 watt	45
1209542	Resistor	Candohm strip	46
	Sec. A	Res. 110 ohms	
	Sec. B	Res. 800 ohms	
	Sec. C	Res. 550 ohms	
	Sec. D	Res. 440 ohms	
1209570	Transformer	Vibrator power	50
1209546	Transformer	Speaker output	51
5039661	Vibrator	Plug-in synchronous	53
1209540	Volume control	Res. 500,000 ohms	54
1209543	Speaker unit	6" Dynamic	55
1209539	Tone control	Res. 500,000 ohms	56

UNITED MOTORS SERVICE

Fig. 2 MODEL 980455 CIRCUIT DIAGRAM
(BUICK, PONTIAC, OLDS.)



MODEL B-O-P 980455
Alignment, Service Notes UNITED MOTORS SERVICE
Parts

MOTOR NOISE

In sets of previous designs the use of suppressors was necessary in order to eliminate chassis pickup and had but little effect on the interference picked up by the antenna. The Buick, Pontiac and Olds models 980455 are equipped with special filters for the elimination of chassis pickup, (interference with the antenna disconnected from the set) which makes possible the installation of the set with out the usual spark plug suppressors. Care should be taken to keep the ammeter lead away from any high tension cables because of the intense interference field that exists around them. This lead must be by-passed with a ½ mfd. condenser at the point where it connects to the ammeter.

VIBRATORS

Sometimes a small amount of dirt will lodge between the contacts and result in such high contact resistance that the vibrator will not start. If such is apparently the case, remove the transformer-vibrator from the chassis. Disconnect ONLY the red B plus lead from the iron core choke. Turn the receiver "on" (there must be a connection between the vibrator case and the chassis) and start the vibrator by snapping the reed back and forth with a pencil. If the vibrator starts to function, allow it to run without stopping until the dirt has been burned out as indicated by the cessation of brilliant sparking. The vibrator should now start under its own power and should continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

Vibrator Noise

Examination of the mechanical construction of the transformer-vibrator assembly will show that the bottom plate of the vibrator case is riveted to the chassis. The transformer-vibrator assembly is fastened to the bottom plate with two Parker Kalon screws through each end of the lid. For complete elimination of vibrator noise it is necessary that the bottom plate of the vibrator assembly make good contact with the vibrator case at all points. Placing screws on all four sides of the bottom plate would make the servicing of the vibrator rather difficult, consequently screws were placed in the ends only. The press fit of the bottom plate must be depended upon to eliminate the vibrator noise.

Do not change a vibrator that is noisy electrically before checking the grounding of the vibrator assembly to its bottom plate. Use a pair of pliers to bend the longest sides of the bottom plate inward just enough to insure a pressure contact with the vibrator assembly at all points.

FAILURES IN TRANSFORMER-VIBRATOR ASSEMBLY

In addition to the actual failure of the vibrator, due to the shorting of the vibrator condensers, or burned or poorly adjusted contacts, there are severel other defects, which may occur in the transformer-vibrator assembly, which may seemingly point toward the vibrator as the seat of the trouble.

Defective Tubes. A tube, which has shorted internally, may draw an abnormal amount of "B" current. This high current drain on the "B" supply will make the vibrator operate irregularly, and may make it spark, eventually damaging the vibrator by burning the points.

Defective Condensers. The .06 mfd. (C-20) condenser, connected between the power transformer side of the "B" R.F. choke and ground, may become shorted and cause a high current drain which will, in time, ruin the vibrator points. High current drain causes irregular operation of the vibrator.

Defective R.F. "B" Choke. The R.F. "B" choke may become grounded to the transformer case causing high current drain. Such a short circuit will cause irregular operation of the vibrator.

Less Apparent Defects. Some defects occur which point toward the vibrator and which may be cleared by changing the vibrator although the vibrator is not defective. Vibrators which are replaced due to such defects may be turned down by the factory for warranty replacement as the points and vibrator may be in perfect condition. If the vibrator is irregular in operation, check the points for abnormal wear or burning. Check for shorts in the "B" circuit if the points do not show abnormal burning.

6 Volt Terminal Screws on the transformer terminal board occasionally short against the sliding cover.

Broken Strands in the vibrator leads sometimes occur and the frayed end may come in contact with ground or some other terminal causing irregular operation of the vibrator or blown fuses.

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prong of the 41 output tube and to the chassis frame. Make sure that the output meter is protected with a series condenser internally, if not, connect a 1/10 mfd. condenser in series with the ground lead to the chassis. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output availale.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

(d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Figure (1).

(e) Peak the parrallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

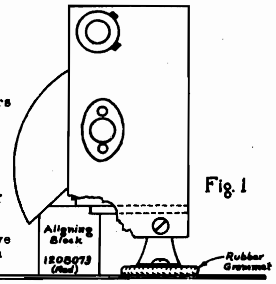


Fig. 1

NOTE--Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F. noise due to the vibrator will appear if good ground connections are not made at the dash.

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

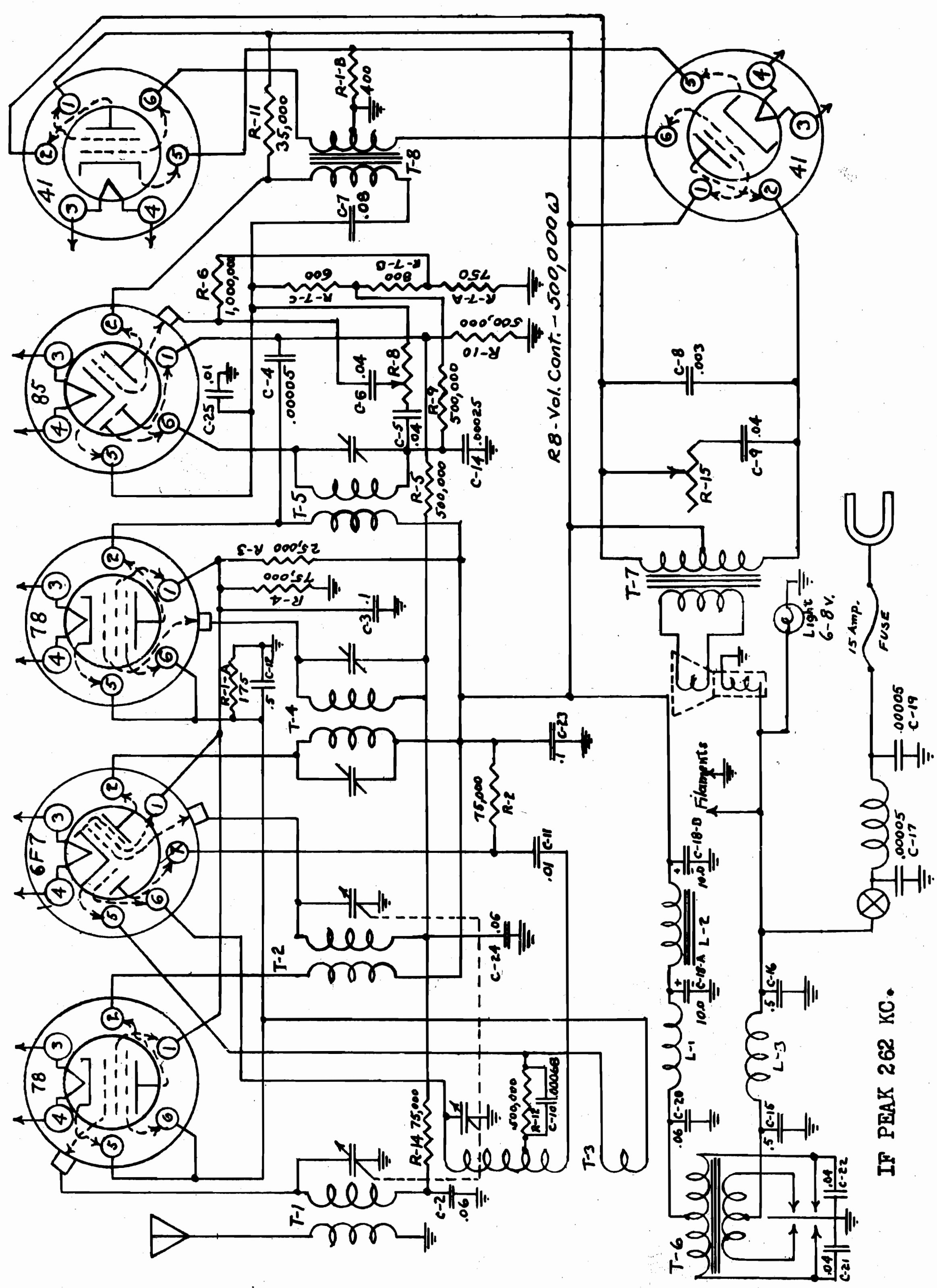
1207990	Antenna	T-1
*1208468	Antenna	T-1
1207989	R.F.--1st Det.	T-2
*1208469	R.F.--1st Det.	T-2
1208023	Oscillator	T-3
*1208470	Oscillator	T-3
1207998	1st I.F.	T-4
1207997	2nd I.F.	T-5
*1208547	2nd I.F.	T-5
1207999	Filter	L-2
1208156	3 Gang tuning	C-1A
1208028	Tubular .06 mfd.	C-2
1207908	Tubular .1 mfd.	C-3
1207760	Tubular .00025 mfd.	C-7
1207930	Molded .04 mfd.	C-8
1207628	Tubular .01 mfd.	C-9
1208026	Molded .00068 mfd.	C-10
*1208472	Molded .000569 mfd.	C-10
1207628	Tubular .01 mfd.	C-11
1208242	Tubular .5 mfd.	C-12
1207930	Tubular .04 mfd.	C-13
1207636	Molded .0005 mfd.	C-14
1853060	Metal case .5 mfd.	C-15
1853060	Metal case .5 mfd.	C-16
1207625	Molded .00005 mfd.	C-17
1207995	Elect. block (Sec. a,b 10 mfd., c,d 4 mfd.)	C-18A,B,C&D
**1207625	Molded .00005 mfd.	C-19
1208028	Tubular .06 mfd.	C-20
1207908	Tubular .1 mfd.	C-23
1208028	Tubular .06 mfd.	C-24
1208550	Molded .0007 mfd.	C-25
1849014	Generator by-pass	
1849161	Ammeter by-pass	
1850429	Dome light	

1207986	(a) 250 ohms (b) 800 ohms		R-1A&B
1208044	75,000 ohms		R-2
1208045	25,000 ohms		R-3
1208046	35,000 ohms		R-4
1204138	500,000 ohms		R-5
1204140	50,000 ohms		R-6
1208047	250,000 ohms		R-8
1208048	5,000 ohms		R-9
1208047	250,000 ohms		R-10
1208047	250,000 ohms		R-11
1204138	500,000 ohms		R-12
1208069	1,500,000 ohms		R-13
1204141	75,000 ohms		R-14
1208557	Tube (brass)	Ant. lead shield	
1208157	Volume control	Includes switch	
1208204	TRANSFORMER-VIBRATOR ASSEM.		
1208187	Bag (small)	Cellophane (to cover vib.)	
1208188	Bag (large)	Cellophane (to cover vib.)	
1208484	Case & brkt	Vibrator	
1208431	Coil (choke	R.F. "A"	L-3
1208058	Coil (choke	R.F. "B"	L-1
1853060	Condenser	Metal case .5 mfd.	C-15
1853060	Condenser	Metal case .5 mfd.	C-16
1208028	Condenser	Tubular .06 mfd.	C-20
1208563	Container	Vibrator (rubber)	
1208060	Insulator	Terminal	
1208064	Terminal	Transformer	
1208153	Transformer	Vibrator power	
5035120	Vib. (large)	Inc. C-21 & C-22	
1208063	Shield assem.	Transf (inc. C-15 & C-16,	
*1208522	LEAD ASSEMBLY	Ammeter (10 amp. fuse)	
1208151	LEAD ASSEMBLY	Ammeter (10 amp. fuse)	
1208441	DRIVE ASSEMBLY	Buick (complete)	
1208442	DRIVE ASSEMBLY	Pontiac "	
1208443	DRIVE ASSEMBLY.	Olds "	

* Used on sets above Serial No. 1557000
** Not required when No. 1208562 coil shield is used

MODEL B-O-P 980459
Schematic

UNITED MOTORS SERVICE



IF PEAK 262 KC.

Fig. 2 MODEL 980459 CIRCUIT DIAGRAM
(BUICK, PONTIAC, OLDS.)

MODEL B-O-P 980459
Alignment, Voltage
Parts

UNITED MOTORS SERVICE

Peaking I.F. Stages at 262 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the two 41 output tubes. Make sure that the output meter is protected with a series condenser internally, if not, connect a 1/10 mfd. condenser in series with one of the meter leads. The Dayrad #875 Universal Test Meter and Series #51 Volt-Ohmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassi ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connetcion of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the U.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

(d) Open the condenser plates until they stop solidly against the beveled edge of the block as shown in Fig. (1).

(e) Peak the parallel trimmers on top of the condenser gang, the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

PEAKING--Cont'd.

(f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

NOTE: Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to find the 1400 kc. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be reset.

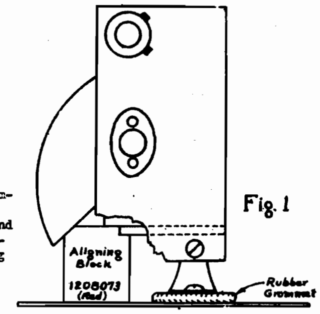


Fig. 1

VOLTAGE CHART

Note: ALL readings are taken from indicated tube prong to chassis frame. Volume control on full. Battery supply voltage at exactly 6 volts.

Tube	#1 Screen	#2 Plate	#3 Fil.	#4 Fil.	#5 Cathode	#6 Cond.	#7 Triode Plate
78	85	210	5.9	0	3.2	3.2	
6F7	85	210	0	5.9	3.2	0	90
78	85	210	5.9	0	3.2	3.2	
85	0	85	0	5.9	8.0	0	
41	210	205	5.9	0	16	0	
41	210	205	5.9	0	16	0	

SERVICE HINTS

The paint must be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R. F. noise due to the vibrator may result if a good ground of the receiver to the car chassis is not provided.

The 6F7 tube is a two unit Tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operates weakly or not at all at the 550 end of the dial, remove the grid cap of the 78 I.F. tube and make and break the grid contact several times; if very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

Part No.	Part Name	Description	Code
1207990	Coil	Antenna	T-1
*1208468	Coil	Antenna	T-1
1207989	Coil	R.F.--1st Det.	T-2
*1208469	Coil	R.F.--1st Det.	T-2
1208023	Coil	Oscillator	T-3
*1208470	Coil	Oscillator	T-3
1207998	Coil	1st I.F.	T-4
1207997	Coil	2nd I.F.	T-5
*1208553	Coil	2nd I.F.	T-5
1207999	Coil (choke)	Filter	L-2
1208156	Condenser	3 Gang tuning	C-1A,B,C
1208028	Condenser	Tubular .06 mfd.	C-2
1207908	Condenser	Tubular .1 mfd.	C-3
1207625	Condenser	Molded .00005 mfd.	C-4
1207930	Condenser	Tubular .04 mfd.	C-5
1207930	Condenser	Tubular .04 mfd.	C-6
1208261	Condenser	Tubular .08 mfd.	C-7
1207893	Condenser	Molded .003 mfd.	C-8
1207930	Condenser	Tubular .04 mfd.	C-9
1208026	Condenser	Molded .00068 mfd.	C-10
*1208472	Condenser	Molded .000569 mfd.	C-10
1207628	Condenser	Tubular .01 mfd.	C-11
1208242	Condenser	Tubular .5 mfd.	C-12
1208550	Condenser	Molded .0007 mfd.	C-13
1207760	Condenser	Molded .00025 mfd.	C-14
1853060	Condenser	Metal case .5 mfd.	C-15
1853060	Condenser	Metal case .5 mfd.	C-16
**1207625	Condenser	Molded .00005 mfd.	C-17
1208241	Condenser	Electrolytic (a) 10 mfd.	C-18 A
		(b) 10 mfd.	C-18 B
1207625	Condenser	Molded .00005 mfd.	C-19
1208028	Condenser	Tubular .06 mfd.	C-20
1207908	Condenser	Tubular .1 mfd.	C-23
1208028	Condenser	Tubular .06 mfd.	C-24
1207628	Condenser	Tubular .01 mfd.	C-25
1849014	Condenser	Generator by-pass	
1849161	Condenser	Ammeter by-pass	
1850429	Condenser	Dome light	

* Used on sets above Serial No. 1557025
** Not used on sets having No. 1208539 spark filter plate

Part No.	Part Name	Description	Code
1208448	SPEAKER ASSEMBLY (complete)		
1208251	Speaker unit	8" dynamic	
1208450	Cardboard ring & grille cloth assem.		
1207930	Condenser	Tone control .04 mfd.	C-9
1208244	Resistor (candohm)	(a) 175 ohms (b) 400 ohms	R-1 A, B
1208044	Resistor	75,000 ohms	R-2
1208045	Resistor	25,000 ohms	R-3
1208044	Resistor	75,000 ohms	R-4
1204138	Resistor	500,000 ohms	R-5
1208232	Resistor	1,000,000 ohms	R-6
1208426	Resistor (candohm)	(a) 750 ohms (b) 800 ohms (c) 600 ohms	R-7 A
1204138	Resistor	500,000 ohms	R-9 B,C
1204138	Resistor	500,000 ohms	R-10
1208046	Resistor	35,000 ohms	R-11
1204138	Resistor	500,000 ohms	R-12
1208044	Resistor	75,000 ohms	R-14
1207821	Resistor	Distributor (Buick, Pontiac)	
1208544	Resistor	Distributor (Olds)	
1208204	TRANSFORMER-VIBRATOR ASSEM.		
1208187	Bag (small)	Cellophane (to cover vib.)	
1208188	Bag (large)	Cellophane (to cover vib.)	
1208484	Case & brkt.	Vibrator	
1208431	Coil (choke)	R.F. "A"	L-3
1208058	Coil (choke)	R.F. "B"	L-1
1208153	Transformer	Vibrator power	T-6
5035120	Vib. (large)	Inc. C-21 & C-22	
1208557	Tube (brass)	Ant. shield (Buick)	
1208157	Volume control	500,000 ohms	R-8
1208441	DRIVE ASSEMBLY	Buick (complete)	
1208442	DRIVE ASSEMBLY	Pontiac "	
1208443	DRIVE ASSEMBLY	Olds "	
1208161	Drive cables, brkt. & shaft assembly--Buick & Olds		
1208447	Drive cables, brkt. & shaft assembly--Pontiac		
1208444	Escutcheon plate	Buick) NOTE: These plates can be	
1208445	Escutcheon plate	Pontiac) supplied only by	
1208446	Escutcheon plate	Olds) B-O-P dealers	
	Parts common to Buick, Pontiac & Olds drive assemblies		
1208434	Drive case	Includes bracket	
1208537	Dial chart		
1207424	Dial light	6-8 volt	
1208021	Knob	Black bakelite--Buick	
1208250	Knob	Brown bakelite--Olds	
1208546	Knob	Brown bakelite--Pontiac	
1208049	Shield	Ant. coil	
*1208564	Shield	Ant. coil	
1208049	Shield	R.F. coil	

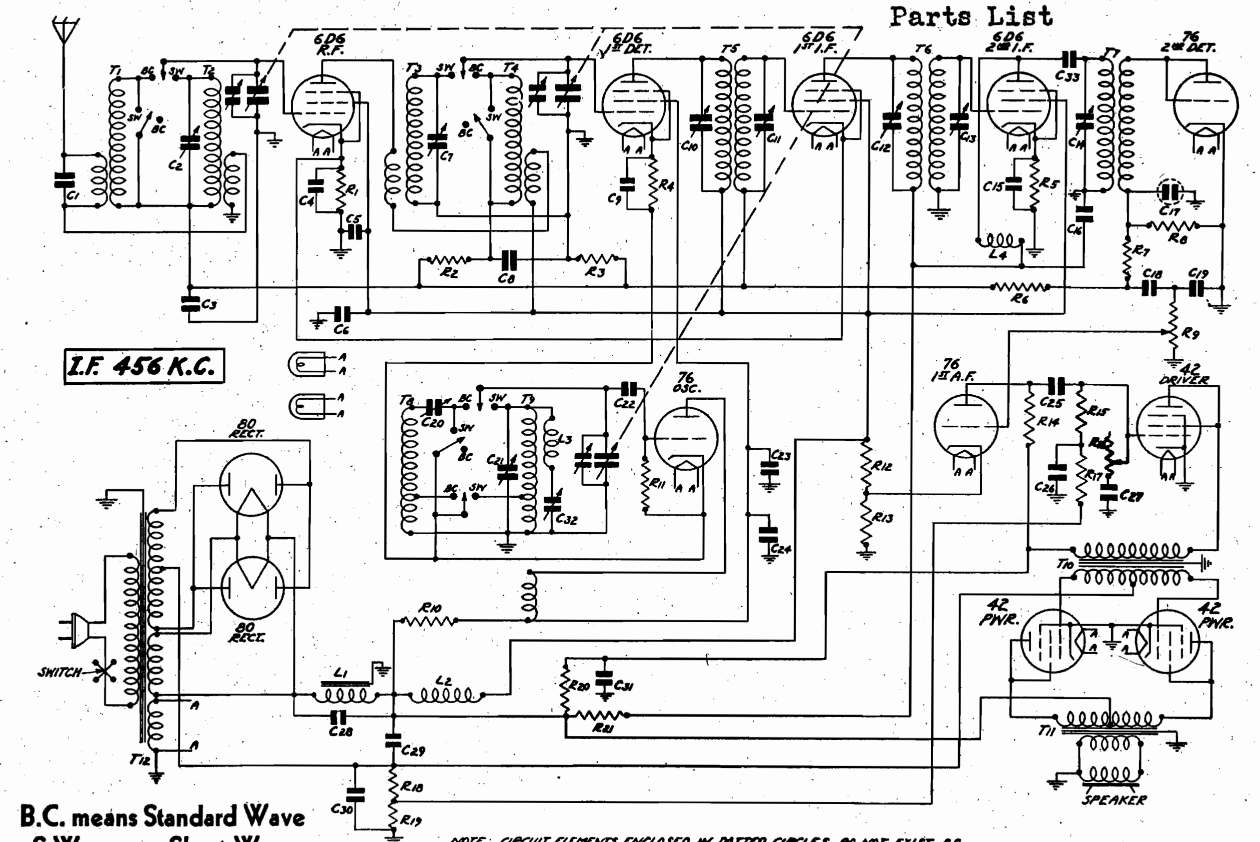
* Used on sets above Serial No. 1557000

Part No.	Part Name	Description	Code
1207918	Shield	Osc. coil	
1208227	Shield assembly	High tension (Pontiac)	
**1208535	Shield assembly	High tension (Olds)	
1208562	Shield assembly	Ignition coil (Olds)	
1208534	Shield assembly	Ignition coil (Pontiac)	

Not required when No. 1208562 coil shield is used

WELLS-GARDNER & CO.

MODEL 22B5
Chassis 2B
Schematic, Socket, Trimmers
Parts List



B.C. means Standard Wave
S.W. means Short Wave

NOTE: CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

Fig. 1—Schematic Circuit Diagram

Aug., 1934

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A93141ww	R1	140 Ohm		Wire Wound
P-A95204	R2	200,000 Ohm	0.2	Carbon
P-A95105	R3	1.0 Megohm	0.2	Carbon
P-A94252	R4	2,500 Ohm	0.2	Carbon
P-A93401ww	R5	400 Ohm	0.2	Wire Wound
P-A95205	R6	2.0 Megohm	0.2	Carbon
P-A95104	R7	100,000 Ohm	0.2	Carbon
P-A94304	R8	300,000 Ohm	0.2	Carbon
P- 96005	R9	2.0 Megohm		Volume Control and Switch
P-E94403	R10	40,000 Ohm	3.0	Carbon
P-A95104	R11	100,000 Ohm	0.2	Carbon
P- 98038	R12	4,000 Ohm	2.5	Armored Wire Wound
	R13	390 Ohm	0.5	
	R18	128 Ohm	2.5	
	R19	145 Ohm	3.0	
P-B95603	R14	60,000 Ohm	0.5	Carbon
P-A95603	R15	60,000 Ohm	0.2	Carbon
P- 97011	R16	150,000 Ohm		Tone Control
P-A95203	R17	20,000 Ohm	0.2	Carbon
P- 98037	R20	4,000 Ohm	4.0	Armored Wire Wound
	R21	6,000 Ohm	2.0	

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80919	C1	250 mmf	600V	Moulded
P-2102	C2	3—40 mmf		Short Wave Ant. Trimmer
P-81076	C3	0.05 mf	200V	Tubular
P-81111	C4	0.25 mf	200V	Tubular
P-81117	C5	0.25 mf	200V	Tubular
P-81056	C6	6.0 mf	150V	Dry Electrolytic
	C24	2.0 mf	350V	
P-2102	C7	3—40 mmf		Short Wave Inter. Trimmer
P-81076	C8	0.05 mf	200V	Tubular
P-81076	C9	0.05 mf	200V	Tubular
P-2103	C10	150—250 mmf		Double (Part of 1st I. F. Trans. Trimmer)
	C11	150—250 mmf		
P-2103	C12	150—250 mmf		Double (Part of 2nd I. F. Trans. Trimmer)
	C13	150—250 mmf		
P-1685	C14	40—100 mmf		3rd I. F. Trans. Pri. Trimmer
P-81076	C15	0.05 mf	200V	Tubular
P-81097	C16	0.10 mf	500V	Tubular
	C17			Integral Part of 3rd I. F. Assem.
P-81076	C18	0.05 mf	200V	Tubular
P-81081	C19	35 mmf		Wire Capacitor
P-2112	C20	300—500 mmf		Osc. Std. W. Padding Cond.
P-2102	C21	3—40 mmf		Osc. Sho. W. Trimmer
P-81081	C22	35 mmf		Wire Capacitor
P-81118	C23	0.10 mf	400V	Tubular
P-81096	C25	0.25 mf	400V	Tubular
P-81117	C26	25 mf	200V	Tubular
P-81076	C27	0.05 mf	200V	Tubular
P-81099	C28	0.15 mf	220V	AC Tubular
P-81058	C29	16 mf	450V	Wet Electrolytic
P-82000	C30	30 mf	50V	Dry Electrolytic
P-81039A	C31	16 mf	400V	Wet Electrolytic
P-1685	C32	40—100 mmf		Osc. Sho. W. Padding Cond.
P-80919	C33	250 mmf	600V	Moulded

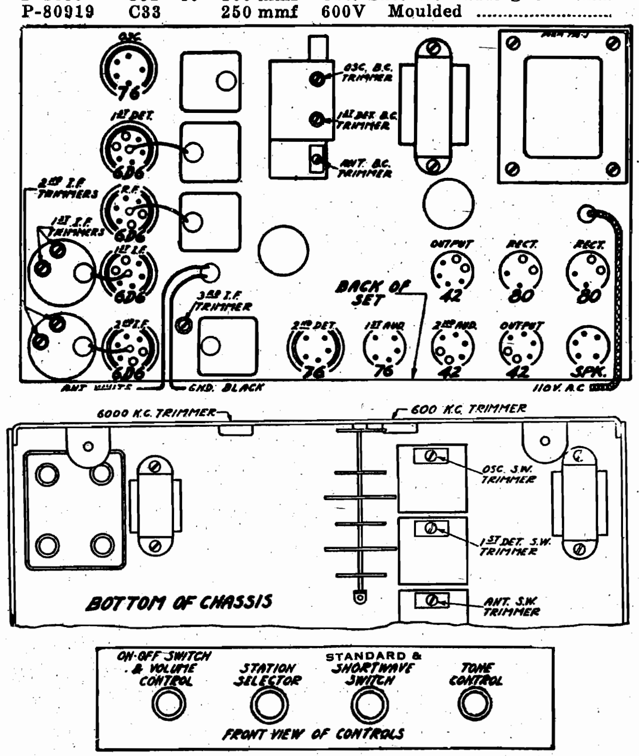


Fig. 2—Location of Tubes, Trimmers and Controls

MODEL 22B5
Chassis 2B
Alignment, Voltage
Resistance Data

WELLS-GARDNER & CO.

Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Reduce the signal so that A. V. C. action is not obtained.

Then adjust the five I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st and 2nd trimmer condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to these trimmer condensers are covered over by small cover plates which are held in position by screws. Loosen these screws until the cover plates can be swung around. **CAUTION - Use an insulated screwdriver for adjust ng trimmers to prevent short circuiting to ground.** In the 3rd I. F. coil, only the primary has a variable trimmer condenser. This condenser is mounted on the top panel of the chassis as shown in Fig. 2 and the adjustment screw is reached through a hole in the top panel.

Standard Wave Band Adjustment

The standard-short wave switch should be in the standard wave position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Reduce the signal so that A. V. C. action is not obtained. Adjust the oscillator standard wave trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the set screw in the pointer hub and set the pointer at the 1500 K. C. mark on the standard wave band scale. Retighten the hub set screw. Then adjust the antenna and 1st detector standard wave trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K. C. higher in frequency than the signal.

Turn the standard-short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be reduced to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 15,000 K. C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. This condenser is mounted on the front panel of the chassis as shown in Fig. 2 and is reached through a hole in the front panel. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained.

Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

Type of Tube	Function	Across Fila. or Heater	Plate to Cath.	Screen to Cathode	Grid to Cath.	Normal Plate M. A.
6D6	R. F.	6.3	105	105	2.8	8.8
6D6	1st Detector	6.3	95	105	10.0	3.3
76	Oscillator	6.3	115		0.0	5.8 (1) 7.7 (2)
6D6	1st I. F.	6.3	260	105	2.8	8.8
6D6	2nd I. F.	6.3	260	105	3.2	7.2
76	2nd Detector	6.3				
76	1st Audio	6.3	170		11.0	1.2
42	Driver Stage	6.3	235	235	18 (3)	26.5
42	Output	6.3	350	350	38.0	21.0
80	Rectifier	4.6	435			35.5 per plate

(1) Switch in Standard Wave position.
(2) Switch in Short Wave position (No Signal).
(3) Measured across resistor R19.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5176	B. C. Antenna Transformer Primary	T1	28.
	B. C. Antenna Transformer Secondary	T1	4.9
	S. W. Antenna Transformer Primary	T2	.3
	S. W. Antenna Transformer Secondary	T2	Small
P-5241	B. C. & S. W. Interstage R. F. Transformer Primaries in series	T4	2.9
	B. C. Interstage R. F. Trans. Sec.	T4	7.8
	S. W. Interstage R. F. Trans. Sec.	T3	Small
P-5243	1st I. F. Transformer Primary	T5	4.8
	1st I. F. Transformer Secondary	T5	4.8
P-5244	2nd I. F. Transformer Primary	T6	5.
	2nd I. F. Transformer Secondary	T6	5.
P-5245	3rd I. F. Transformer Primary	T7	12.0
	3rd I. F. Transformer Secondary	T7	30.0
P-5183	B. C. Oscillator Grid Coil	T8	3.3
	S. W. Oscillator Grid Coil	T9	Small
	S. W. Oscillator Plate Coil	T9	0.25
P-50653-2B	Audio Input Transformer Primary	T10	400.
	Audio Input Transformer Secondary (Center Top to Inside)	T10	200.
	Audio Input Transformer Secondary (Center Tap to Outside)	T10	280.
P-50642A-2B	Audio Output Transformer primary (Center Tap to Inside)	T11	300.
	Audio Output Transformer Primary (Center Tap to Outside)	T11	340.
	Audio Output Transformer Secondary	T11	.4
P-50620-2B	Power Trans. (115V 60 Cycles) prim.	T12	2.5
	Power Transformer (115V 60 Cycles) H. T. Sec. (Center Tap to Inside)	T12	150.
	H. T. Sec. (Center Tap to Outside)	T12	165.
	Power Transformer (115V 60 Cycles) Secondary (80 Filament)	T12	Small
	Power Transformer (115V 60 Cycles) Secondary A-A (Filament)	T12	Small
P-50650-2B	Power Choke	L1	140.
P-5190	H. F. Oscillator Tracking Coil	L3	1.2
P-5246	2nd I. F. Plate Reactor	L4	57.
P-1925	Speaker Voice Coil		1.6
	Speaker Field Coil	L2	5300.

Power Output

The maximum undistorted power output is 15 watts, measured with a 7000 ohm load resistor connected between the plates of the type 42 PWR tubes. The speaker voice coil must be disconnected for this measurement.

Sensitivity

Standard Wave Band
Over entire band—2 microvolts absolute
Short Wave Band
6.0 MC—5 microvolts absolute
15.0 MC—2 microvolts absolute

MODEL 22B5
Chassis 2B
Circuit Data, Parts

WELLS-GARDNER & CO.

Circuit

This model is a standard and short wave receiver with a coverage of 530 to 1740 K. C. on the standard wave band and 5.8 to 18.3 M.C. on the short wave band. Dual band coverage is accomplished by means of dual sets of R. F. and oscillator coils and a three section double throw switch. The various circuits made and broken as this switch is thrown, are indicated in the schematic circuit diagram Fig. 1.

Referring to the antenna transformer in Fig. 1, T1 is the standard wave transformer and T2 the short wave transformer. The two primaries are connected in series. With the switch in the short wave position, the short wave secondary is connected to the grid circuit of the 6D6 R. F. amplifier tube and the standard wave secondary is short circuited. When the switch is in the standard wave position, the short wave secondary circuit is opened up and the standard wave secondary is connected to the grid circuit of the tube. The secondary being used is tuned by the R. F. section of the three gang condenser. A separate variable trimmer condenser C2 is used for the short wave secondary.

The output of the R. F. 6D6 tube is fed through another R. F. transformer with tuned secondary into a second 6D6 tube which functions as the first detector. The first detector section of the three gang condenser is used for tuning this circuit. This interstage R. F. transformer consists of two portions shown as T3 and T4 on the diagram. T3 is the short wave transformer and T4 is the standard wave transformer. The connections to the two portions are made in the same manner as described above for the antenna R. F. transformer. A separate trimmer condenser C7 is used for the short wave secondary.

A type 76 tube is employed in a separate oscillator circuit. Referring to the diagram, T8 is the standard wave oscillator coil and T9 is the short wave oscillator coil. The coil being used is tuned by the oscillator section of the three gang condenser and these circuits are always resonant at 456 K. C. above the frequency to which the R. F. amplifier is tuned. When the switch is in the standard wave position, the connections are completed to the standard wave oscillator coil and the short wave oscillator coil is opened up. When the switch is in the short wave position, the connections are completed to the short wave coil and the standard wave coil is connected between ground and the short wave tap in order to render it ineffective. A separate trimmer condenser C21 is used for the short wave oscillator coil. A 600 K. C. padding condenser C20 is used in conjunction with the standard wave oscillator and a 6000 K. C. padder C32 is used for the short wave oscillator circuit.

The oscillator potential is fed into the cathode circuit of the 6D6 first detector tube. This results in the intermediate or beat frequency of 456 K. C. being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using two 6D6 tubes. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers located in the I. F. coil cans. The primary of the third I. F. transformer is tuned by a trimmer condenser located on the chassis top panel as shown in Fig. 2.

A 76 tube functions as the second detector and also as the automatic volume control tube. This tube operates as a diode or two element rectifier. When the standard and short wave switch is in the standard wave position, A V. C. voltage is applied to the R. F., 1st Detector and 1st I. F. tubes. In the short wave position A. V. C. voltage is not applied to the 1st detector tube.

A 76 type tube is used in the 1st Audio Stage. The output of this stage is fed through a resistance coupled unit into a Driver Stage which employs a 42 type tube. The output stage uses two 42 type tubes operating in a class A' amplifier circuit.

The power supply in this receiver makes use of two 80 type, full wave rectifying tubes operating in parallel.

It should be noted that with the exception of the 80's all tubes and dial lamps are of the 6 volt type.

REPAIR PARTS LIST FOR 12 TUBE SUPERHETERODYNE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

MISCELLANEOUS

Part No.	ITEM
P-5176	Sho. W. and Std. W. Antenna R. F. Transformer less can T1, T2
P-5241	Sho. W. and Std. W. Interstage R. F. Transformer less can T3, T4
P-5183	Oscillator Coil Assembly less can T8, T9
P-5245	3rd I. F. Transformer less can T7
P-40433	Cans for the above assemblies
P-5243	1st I. F. Trans. & Can Assem. T5
P-5244	2nd I. F. Trans. & Can Assem. T6
P-5190	H. F. Oscillator Tracking Coil L3
P-5246	2nd I. F. Plate Reactor L4
P-50650-2B	Power Choke L1
P-50653-2B	Input Transformer T10
P-50642A-2B	Output Transformer T11
P-50620-2B	Power Transformer 115V 60 Cycle T12
P-50652-2B	Power Transformer 115V 25 Cycle T12
P-50651-2B	Power Transformer 115–230V 40–60 Cycle T12
P-2025	No. 80 Tube Socket
P-1884	No. 42 Tube Socket
P-2022	No. 76 Tube Socket
P-1885	No. 6D6 Tube Socket
P-1637	Speaker Socket
P-40445	Tube Shield
P-40443	Tube Shield Base
P-1925	Speaker
P-10320	Glass Crystal
P-20875	Crystal Retainer Ring
P-2060	Knob, Small
P-2062	Knob, Large
P-10272	Rubber Chassis Cushion
P-20912	Large Double End Pointer
P-2101	Band Change Switch
P-2012	Pilot Light Bulb
P-20905	Condenser Shield
P-10369	8" Black Drive Cord (V. C. or T. C. Ind.)
P-10370	29" Black Drive Cord (Con. Drive)
P-2126	Pilot Light Socket and Clip Assem.
P-70702	Cord and Plug Assem.
P-30342	Grid Cap Only
P-1504	8 Lug Terminal Srip
P-1421	Single Lug Terminal Strip

Voltages

Check the voltages at the sockets to see if the power unit is delivering the correct voltages. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together.

All of the D.C. voltage readings as shown on the chart are read with a 1,000 ohm per volt meter. As high a range as possible should be used. In general, the higher the resistance of the meter, the more accurate the reading will be.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition, with the volume at a minimum.

These voltages are typical of the sets but will vary slightly with variations in individual receivers and variations in tube characteristics. All voltages in the chart are taken with a line voltage of 115. Differences in line voltage as well as difference in test equipment used will introduce other variations in the voltage readings.

MODEL 5D Series
Schematic, Voltage
Parts

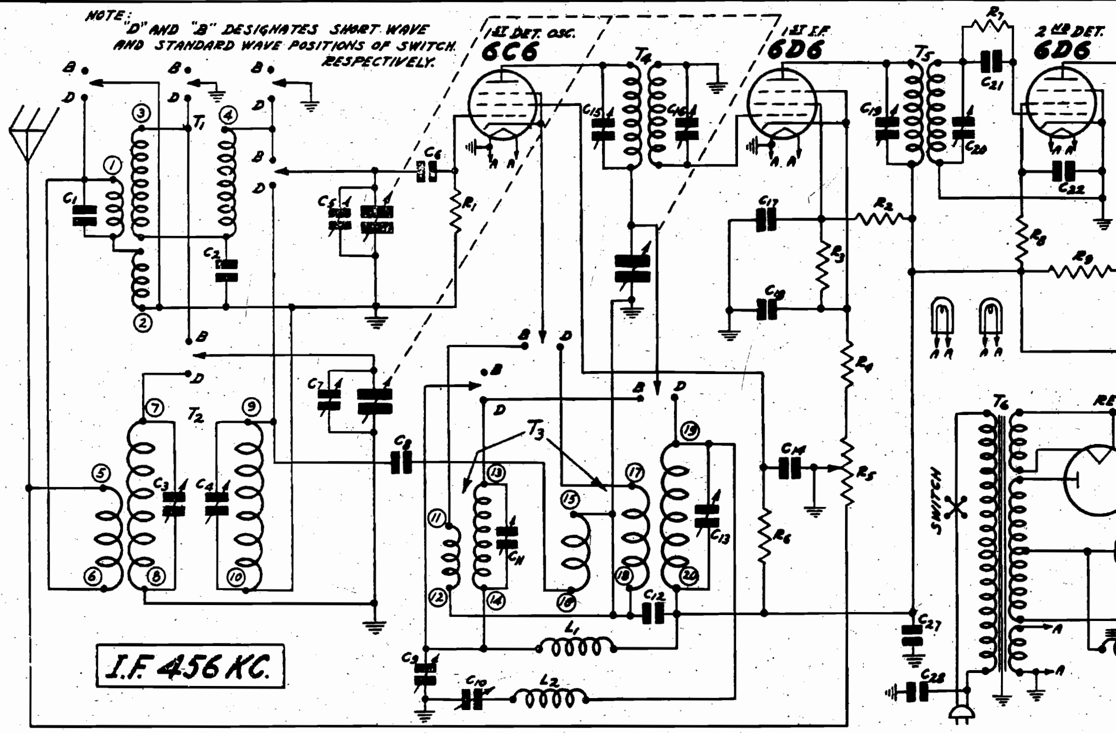
WELLS-GARDNER & CO.

VOLTAGES AT SOCKETS

Input - 115 Volts 60 Cycles Antenna Shorted to Ground

Type of Tube	Function	Across Filament or Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6C6	1st Det. & Osc.	6.3	250	175	4.0	8.8
6D6	I. F.	6.3	250	100	4.0	7.0
6D6	2nd Det.	6.3	35	26	0	1.1
42	Output	6.3	230	250	*20.0	28
80	Rectifier	5.0	—	—	—	32.0

Volume control in maximum position.
*Measured across R12.



NOTE: THE NUMBERS IN CIRCLES AT THE COILS ARE USED TO DESIGNATE THE COIL TERMINALS INDICATED IN THE D.C. RESISTANCE CHART

Jan., 1935

Sensitivity

Standard Wave Band
600 KC — 15 microvolts absolute
1500 KC — 10 microvolts absolute
Short Wave Band
6 MC — 20 microvolts absolute
15 MC — 5 microvolts absolute

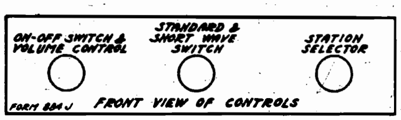


Fig 3—Arrangement of Controls

Part No.	Description	Code
P-5266	Std. Wave Ant. Coil Assem. Complete with Can	T1
P-5267	Short Wave Ant. Coil Assem. Less Can	T2
P-40450	Can for above Assembly	
P-5268	Oscillator Coil Assem. less Can	T3
P-40433	Can for above Assembly	
P-5265	Oscillator Plate Choke Coil	L1
P-5190	High Frequency Oscillator Tracking Coil	L2
P-5271	1st I. F. Coil Assembly. Complete with Can	T4
P-5272	2nd I. F. Coil Assembly. Complete with Can	T5
P-50667-5D	Output Transformer	T7
P-50661-5D	Power Transformer; 60 cycle, 115 volt	T6
P-50664	Power Transformer, 50 cycle, 230 volt	
P-50663	Power Transformer, 40-60 cycle, 115-230 volts	
P-50662	Power Transformer, 25 cycle, 115 volt	

Part No.	Code	Resistance	Wattage	Type
P-A94304	R1	300,000 ohm	.2W	Carbon
P-C94283	R2	28,000 ohm	1.0W	Carbon
P-B94303	R3	30,000 ohm	.5W	Carbon
P-B93261ww	R4	260 ohm	.5W	Flexible Wire Wound
P-96019	R5	16,000 ohm		Volume Control and Switch
P-B94603	R6	60,000 ohm	.5W	Carbon
P-A95205	R7	2. megohm	.2W	Carbon
P-A94504	R8	500,000 ohm	.2W	Carbon
P-B94104	R9	100,000 ohm	.5W	Carbon
P-A95504	R10	500,000 ohm	.2W	Carbon
P-A94104	R11	100,000 ohm	.5W	Carbon
P-98041	R12	400 ohm	2.5W	Flexible Wire Wound

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81817	C1	250 mmf.		Moulded
P-81076	C2	.05 mf.	200V	Tubular
P-2278	C3	2- 25 mmf.		Trimmer
P-2278	C4	2- 25 mmf.		Trimmer
	C5	Std. Wave Ant. Trimmer on Gang Cond. Assem.		
P-81822	C6	35 mmf.		Moulded
	C7	Sh. Wave Ant. Trimmer on Gang Cond. Assem.		
P-81824	C8	7 mmf.		Moulded
P-2263	C9	300-500 mmf		Double Trimmer Cond. Assem.
	C10	40-100 mmf		
P-2278	C11	Trimmer		(Std. Wave Oscillator Coil Sec.)
P-81129	C12	.05 mf.	400V	Tubular
P-2278	C13	Trimmer		(Sh. Wave Oscillator Coil Sec.)
P-81071	C14	.05 mf.	400V	Tubular
P-1386	C15	60-120 mmf.		Double Trimmer Cond. Assem. 1st I.F.
	C16	60-120 mmf.		
P-81134	C17	.25 mf.	200V	Tubular
P-81131	C18	.25 mf.	140V	Tubular
P-1386	C19	60-120 mmf.		Dbl. Trim. Cond. Assem. 2nd I. F.
	C20	60-120 mmf.		
P-81821	C21	35 mmf.		Moulded
P-81070	C22	.10 mf.	400V	Tubular
P-81072	C23	.002 mf.	600V	Tubular
P-81086	C24	.01 mf.	600V	Tubular
P-81086	C25	.01 mf.	600V	Tubular
P-81086	C26	.01 mf.	600V	Tubular
P-81135	C27	.10 mf.	400V	Tubular
P-81133	C28	.01 mf.	600V	Tubular
P-82004	C29	10.0 mf.	350V	Wet Electrolytic (Insltd. Mtg.)
P-82003	C30	8.0 mf.	300V	Wet Electrolytic (Grnded Mtg.)
P-82502		3 Section Gang Condenser		

WELLS-GARDNER & CO.

MODEL 5D Series
Alignment, Socket
Trimmers, Resistances
Drive Cord Data, Notes

Intermediate Frequency Adjustment

Set the signal generator for 456 KC. The antenna lead of the signal generator should be connected to the grid circuit of the 1st detector on the band switch side of the grid condenser, C6, thru a .05 mfd. condenser. There is a lead which connects the center stator of the tuning condenser and one of the terminals of the band switch. Connect the signal lead to this terminal on the band switch. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for the 1st I. F. trimmer condensers are reached thru the two holes at the righthand side of the rear panel of the chassis.

CAUTION—Use an insulated screwdriver for adjusting trimmers to prevent short circuiting to ground.

The adjusting screws for the 2nd I. F. trimmer condensers are reached from the top of the chassis and are in the round I. F. can—See Fig. 2. The openings to these trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen this screw until the cover plate can be swung around.

Standard Wave Band Adjustment

The standard-short wave switch should be in the standard wave position. Set the signal generator for 1740 K C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the oscillator standard wave trimmer until maximum output is obtained. This trimmer is on the underside of the chassis and its location is shown in Fig. 2.

Then set the signal generator for 1500 K C. Turn the rotor until maximum output is obtained. Loosen the set screws which secure the pointer extension shaft and set the pointer at the 1500 K C mark on the standard wave band scale. Retighten the shaft set screw. Then adjust the antenna and 1st detector standard wave trimmers until maximum output is obtained. These trimmer condensers are mounted on the tuning condenser. See Fig. 2.

Next set the signal generator for 600 K C and adjust the 600 KC padder, C9. The adjusting screw is reached through a hole in the right side panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K C padder screw until the highest output is obtained.

Short Wave Band Adjustment

CAUTION—After the standard wave band alignment as described above has been made, do not change the adjustment of any of the standard wave band trimmers.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K C apart. That is, if the receiver is tuned to 15,000 K C a signal will be heard when the signal generator is set at 15,000 K C and again at approximately 15,912 K C. This is due to image reception or the fact that a 456 K C beat is obtained when the signal is 456 K C lower than the receiver oscillator and also when the signal is 456 K C higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K C higher in frequency than the signal.

Turn the standard-short wave switch to the short wave position. Turn the rotor to the full open position. The volume control should be at the maximum position. Set the signal generator for 18,000 K C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2. If a maximum output peak cannot be reached, it may be due to the fact that the antenna and 1st detector short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

Next set the signal generator for 16,500 K C. Turn the rotor until maximum output is obtained. Then adjust the antenna and 1st detector short wave trimmers for maximum output.

Next set the signal generator for 6000 K C and adjust the 6000 KC padder C10. The adjusting screw is reached through a hole in the right side panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K C padder screw until the highest output is obtained.

Caution

The can of the wet electrolytic condenser C29 is not at ground potential. Therefore in any work on the chassis, care should be taken not to touch this can and any grounded point or to remove the cardboard shim separating the condenser and power transformer.

The oscillator stator section of the gang condenser is "HOT". It will be noted from the circuit diagram that the stator of the oscillator section of the gang condenser is in the plate circuit of the 6C6 1st detector-oscillator tube. Care should be taken, therefore, not to short this section to ground or to touch the section to any point of lower potential.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

A 115-230 Volt, 40-60 cycle Power Transformer is also available for this model.

Replacing Glass Crystal

The glass dial crystal is held in place by means of four metal tabs which form a part of the dial ring. To remove the cracked or broken crystal, bend the upper two tabs back just far enough to enable removing the broken crystal.

Place the new crystal in the dial ring frame, putting it behind the lower two metal tabs, which are still in the correct position, and holding it firmly against the dial cushion ring.

BEND THE TOP TWO TABS OVER THE EDGE OF THE GLASS CRYSTAL JUST FAR ENOUGH TO PREVENT THE CRYSTAL FROM FALLING OUT OF THE FRAME. A crystal is very easily cracked by forcing the tabs over the edge of the glass.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	Ohms D.C.
5266	Double Tuned Antenna Std. W. Coil	T1	
	(1-2) Primary Windings in Series	T1	20.0
	(3-4) Secondary Windings in Series	T1	10.0
5267	Double Tuned Antenna Sh. W. Coil	T2	
	(5-6) Primary Winding	T2	0.2
	(7-8) 1st Secondary Winding	T2	Small
	(9-10) 2nd Secondary Winding	T2	Small
5268	Oscillator Coil	T3	
	(11-12) Std. W. Cathode Winding	T3	1.5
	(13-14) Std. W. Plate Winding	T3	3.0
	(15-16) Sh. W. Neutralizing Winding	T3	.43
	(17-18) Sh. W. Cathode Winding	T3	.53
	(19-20) Sh. W. Plate Winding	T3	Small
5271	1st I. F. Coil Primary	T4	12.65
	1st I. F. Coil Secondary	T4	12.75
5272	2nd I. F. Coil Primary	T5	12.65
	*2nd I. F. Coil Secondary	T5	12.75
50661	Power Transformer Primary	T6	7.0
	H. V. Secondary (Center tap to outside)	T6	197.0
	H. V. Secondary (Center tap to inside)	T6	187.0
	Tube Filament Secondary (A-A)	T6	Small
	Rect. Tube Fil. Secondary	T6	Small
50667	Output Trans. Primary	T7	565.0
	Output Trans. Secondary	T7	0.75
2258	Speaker Voice Coil		3.25
	Speaker Field Coil	L3	1100.0
5265	Oscillator Plate Reactor	L1	70.0
5190	Tracking Coil	L2	Small

Remarks Volume Control moveable arm should be disconnected from ground when measuring Antenna Coil primaries.
Band switch position should be in Std. W. when making Std. W. Ant. and Osc. coil measurements.
Band switch position should be in Sh. W. when making Sh. W. Ant. and Osc. Coil measurements.
*If measured from grid clip to ground, will include 2.0 meg. resistance. To get resistance value shown, measure from trimmer condenser rivet, which is plainly visible through hole in top of 2nd I. F. can, to ground.

Replacing Drive Cord

Remove chassis from cabinet.
Remove the tension spring and the old drive cord.
Do not remove the glass crystal or dial assembly.

Using the old cord as a sample, measure off very nearly the exact length of cord for this drive before proceeding to put it on the assembly. This length should be approximately 30½ inches.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4. The condenser rotor plates should be in the completely open position.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clock wise direction (facing front of chassis) around the drive drum approximately one-fifth turn.

Then wrap the cord around back of the offset in the drive bracket as shown by the dotted lines in Fig. 4.

Bring this cord up from the drive bracket offset and wrap it around the drive drum approximately one-half turn in a clockwise direction until it is just past the eyelet in this drum as illustrated. Cross it over the other cord at this point, as shown in Fig. 4, and continue to wind it around the drive drum in a clockwise direction nearly one complete turn until it is again up to the eyelet in the drum as illustrated.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring.

Then tilt the chassis up on its back panel and pull the cord which was wrapped in back of the offset in the drive bracket down to the drive shaft. Wrap it two and one-third times around the drive shaft as shown in Fg. 4.

Now secure the other end of the tension spring over the spur on the drive drum with a pair of long nose pliers, grip the two ends of the cord just above the tension spring and pull down to take all slack out of the cord.

Replace the chassis in the cabinet.

REPAIR PARTS LIST

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No. and the large letter which is stamped at the left of the rear panel of the chassis base.

Part No.	Item
P-1637	Speaker Socket
P-1884	42 Tube Socket
P-1885	6D6 Tube Socket
P-1886	6C6 Tube Socket
P-2025	80 Tube Socket
P-40445	Tube Shields (Bottle Neck)
P-40443	Tube Shield Bases
P-70787	Line Cord and Plug Assembly
P-2258A	6" Dynamic Speaker
P-2060	Small Knob (Spring)
P-2133	Small Knob (Set Screw)
P-10272	Rubber Chassis Cushions
P-10157	Ferrules for mounting Trimmer Condenser
P-2266	2 Section Band Change Switch
P-2130	3 Lug Terminal Strip (2 Lugs Insltd)
P-2106	2 Lug Terminal Strip (1 Lug Insltd)
P-2170	2 Lug Terminal Strip (2 Lugs Insltd)
P-2286	2 Lug Terminal Strip (1 Lug Insltd - Gnd Lug Ext)
P-20923	Gang Condenser Shield
P-10318	Rubber Mounting Cushions for Gang Condenser
P-20983	Pilot Light Bracket
P-2261	Long Drive Shaft Bracket and Bushing Assembly
P-20981	Drive Shaft
P-20339	Drive Shaft Lock Spring
P-20986	Small Double End Pointer
P-10377	Dial Cushion Ring
P-2265	Dial Strip
P-30480	Pointer Shaft
P-10373	Glass Crystal
P-2262	Dial Ring and Bracket Assembly
P-20840	Dial Drum
P-20900	Drive Tension Spring
P-10X7	32" Black Drive Cord
P-2126	Pilot Light Socket and Spring Clip
P-2012	Pilot Light Bulb (6-8V)

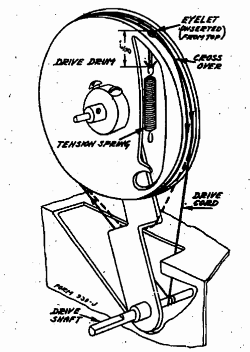


Fig. 4—Drive Cord Replacement

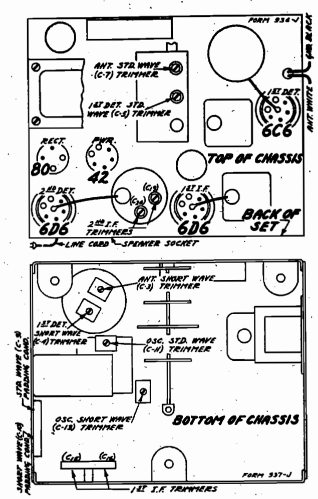
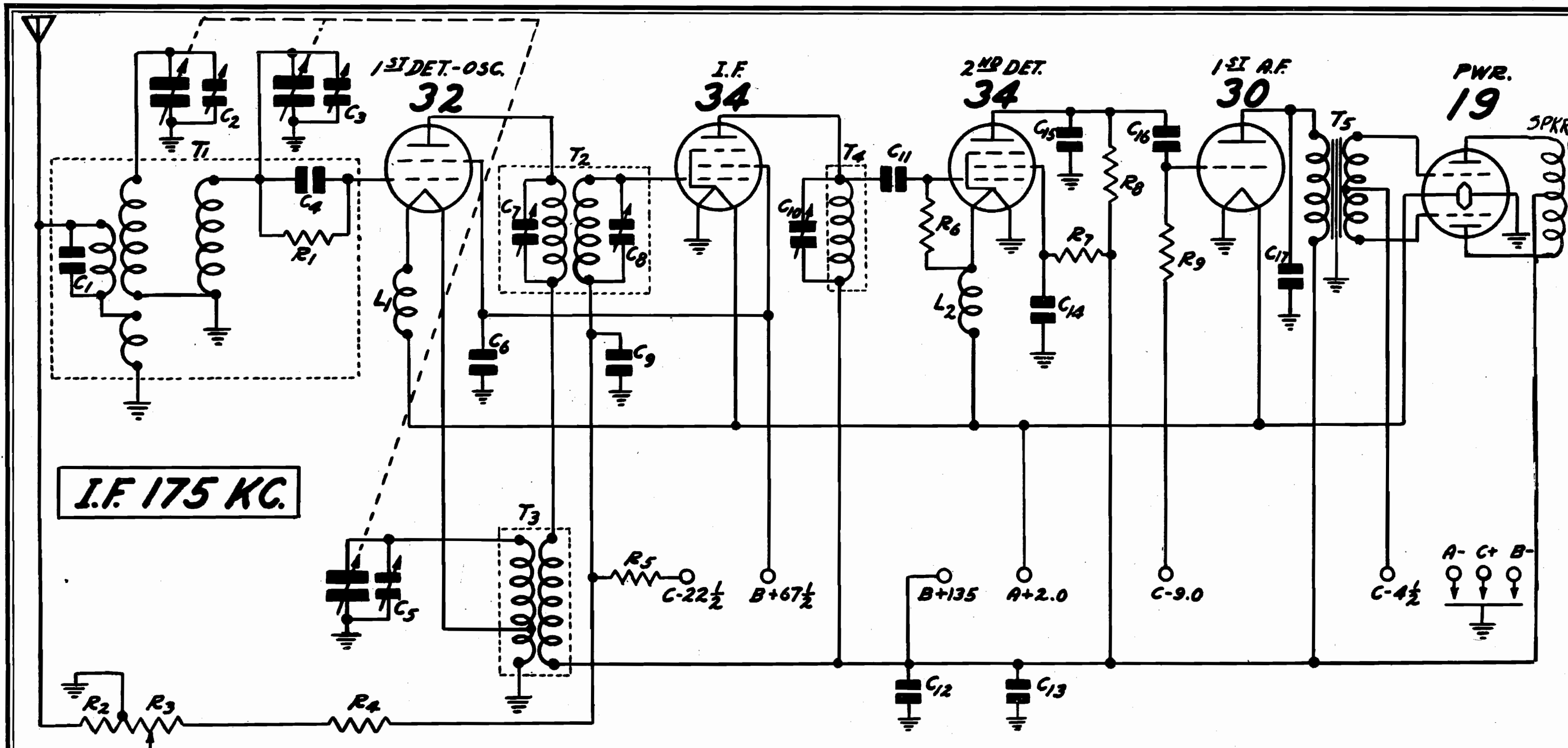


Fig. 2—Tube Arrangement and Location of Trimmers

MODELS 35G510,35G560
Chassis 5G
Schematic

WELLS - GARDNER & CO.



GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C_1	150 μμf MOULDED	
C_2	GANG TRIMMER	
C_3	GANG TRIMMER	
C_4	35 μμf MOULDED	
C_5	GANG TRIMMER	
C_6	.25 μf 180V.	
C_7	40-100 μμf	DUAL (P-17A37)
C_8	20-70 μμf	
C_9	.05 μf 180V.	
C_{10}	40-100 μμf (P-17A38)	
C_{11}	50 μμf MOULDED	
C_{12}	.10 μf 180V.	
C_{13}	4.0 μf 150V. ELECTROLYTIC (P-45X28)	
C_{14}	.10 μf 180V.	
C_{15}	.002 μf 300V.	
C_{16}	.006 μf 300V.	
C_{17}	.002 μf 300V.	

R_1	1.0 MEGOHM	.2 W.	
R_2	10 000 OHM		VOLUME CONTROL (P-36X201)
R_3	60 000 OHM		
R_4	900 OHM	.2 W.	
R_5	6 500 OHM	.2 W.	
R_6	2.0 MEGOHM	.2 W.	
R_7	100 000 OHM	.5 W.	
R_8	40 000 OHM	.5 W.	
R_9	1.0 MEGOHM	.2 W.	

L_1	SINGLE FILAMENT REACTOR (P-9A281)
L_2	SINGLE FILAMENT REACTOR (P-9A281)
T_1	DOUBLE TUNED ANTENNA COIL (P-9A381)
T_2	1ST I.F. COIL (P-9A383)
T_3	OSC. COIL (P-9A382)
T_4	2ND I.F. COIL (P-9A384)
T_5	AUDIO INPUT TRANS. (P-50XH)

WELLS - GARDNER & CO.

MODELS 35G510,35G560
Chassis 5G
Voltage,Alignment
Battery Data

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt **"A" Battery**—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

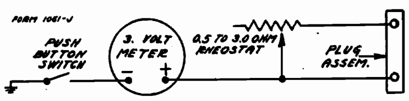


Fig. 5—Schematic Diagram of Voltage Regulator

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A+" line.

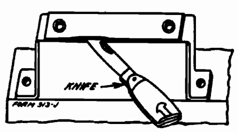


Fig. 6—Prying off Fiber Cover

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. **Caution the user never to operate the receiver with the adjustment beyond 2 volts.**

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery

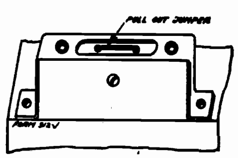


Fig. 7—Removing Jumper Wire

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pointer by removing the screw at the center of the dial.

Remove the dial by taking out the six rivets from the dial assembly.

Remove the on-off indicator dial by pulling it forward.

With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.

Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.

Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now slip the piece of fine tubing (about ¾" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the bend in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. *If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.*

Replace the on-off indicator dial, care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by ¼" long round head machine screws and nuts.

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

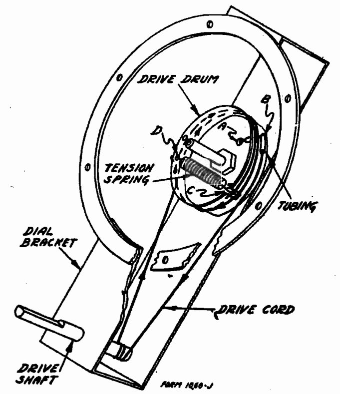


Fig. 9—Replacing Drive Cord

VOLTAGES AT SOCKETS
Volume Control at Maximum—Antenna Shorted to Ground. B+135 Volts
Voltages to Chassis

Type of Tube	Function	Across Filament	Plate to Gnd.	Screen to Gnd.	Grid to Gnd.	Normal Plate M. A.
32	1st Det. & Osc.	2.0	135	67.5	7.5 (1) (2)	2.5
34	I. F.	2.0	135	67.5	2.5 (3)	2.8
34	2nd Det.	2.0	50	40 (1)	0	1.8
30	1st Audio	2.0	135		9 (4)	3.0
19	Output	2.0	135		4.5	3.2 Total

(1) With 250,000 ohm meter.
(2) Subject to variation.
(3) With 25,000 ohm meter.
(4) Read at "C" battery.

Alignment Procedure and Dial Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator.

Keep the volume control at the maximum position.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

Dial Calibration

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

SPECIFICATIONS

Input Voltages
"A" Battery . . . . . 2 Volts (.5 Amperes)
"B" Batteries . . . . . . 67½ and 135 Volts
"C" Batteries . . . . . 4½, 9 and 22½ Volts
Power Output . . . . 1 Watt (Undistorted)

Sensitivity . . . . 15 Microvolts Absolute
Tuning Range . . . . . . 530 to 1750 KC
Intermediate Frequency . . . . . 175 KC
Speaker . . . . 6" Magnetic

MODELS 35G510,35G560
Chassis 5G
Socket,Trimmers,Parts
Resistance Data

WELLS - GARDNER & CO.

Replacement Parts List

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this large letter.

MISCELLANEOUS

Part No.	DESCRIPTION	Selling Price
P-3A64	Type 30 Tube Socket (4 Prong)	$ .06
P-3A65	Type 34 Tube Socket (4 Prong)	.06
P-3A133	Type 32 Tube Socket (4 Prong)	.06
P-3A110	Type 19 Tube Socket (6 Prong)	.06
P-13X212	Speaker Cable and Socket Assembly	.30
P-13X215	"B" and "C" Battery Cable	.40
P-13X66	"A" Battery Cable	.20
P-13X214	Antenna and Ground Lead Assembly	.14
P-12A217	5" Magnetic Speaker	2.84
P-12A218	8" Magnetic Speaker	3.16
P-17X7	Glass Crystal	.06
P-28X38	Crystal Retainer Ring	.04
P-10A32	Knobs	.10
P-2X38	Felt Washers (for use behind knobs)	.04
P-32X18	Tube Shield Base	.04
P-32X1	Tube Shields	.06
P-8X23	Rubber Chassis Mounting Cushions	.04
P-4A18	Lug Terminal Strip	.04
P-30X14	Grid Clip Only	.04

DIAL ASSEMBLY

Part No.	DESCRIPTION	Selling Price
P-15A36	Dial and Drive Assembly Complete	$1.30
P-5A28	Drive and Dial Bracket Assembly Only	.32
P-15X37	Indicator Disc and Hub Assembly Only	.12
P-26X203	Drive Shaft Only	.06
P-19X21	Horse Shoe Lockwasher for use on above shaft	.04
P-26X213	Pointer Shaft	.06
P-24X20	Drive Drum	.06
P-28X19	Tension Spring (used in drive drum)	.04
P-10X10	16" Black Drive Cord doz.	.12
P-10X11	10" Black Indicator Cord doz.	.08
P-29X20	Brass Collar and 6-32 x 3/16" Set Screw for securing above Indicator Cord to Shaft of Volume Control and On-Off Switch	.04
P-58X69	Dial Strip	.18
P-15X25	Double End Pointer	.04
P28X34	Indicator Spring	.04
P-19X43	Spring Washer	.04

Following are the D. C. resistances of the various windings in the chassis.

Part No.		Code	D. C. Resistance in Ohms
9A381	Double Tuned Ant. Trans. Pri. (in series)	T1	17.
	Double Tuned Ant. Trans. Sec. (Antenna)	T1	3.5
	Double Tuned Ant. Trans. Sec. (1st Det.)	T1	3.5
9A383	1st I.F. Trans. Primary	T2	80.
	1st I.F. Trans. Secondary	T2	105.
9A382	Oscillator Coil Cathode Winding	T3	2.
	Oscillator Coil Plate Winding	T3	7.
9A384	2nd I.F. Reactor Coil	T4	50.
9A281	Filament Reactor (In 1st Det. Ckt.)	L1	Small
9A281	Filament Reactor (In 2nd Det. Ckt.)	L2	Small
50X11	Audio Transformer Primary	T5	950.
	Audio Transformer Secondary (Center Tap to outside)	T5	600.
	Audio Transformer Secondary (Center Tap to inside)	T5	550.
12A217	Magnetic Speaker (Center Tap to outside)		290.
	Magnetic Speaker (Center Tap to inside)		250.

TRANSFORMERS AND COILS

Part No.	Code	DESCRIPTION	Selling Price
P-9A381	T1	Double Tuned Antenna Transformer Less Can	.80
P-42X23		Transformer Can for above Assembly	.08
P-9A383	T2	1st I.F. Transformer and Can Assembly	.96
P-9A382	T3	Oscillator Coil and Can Assembly	.48
P-9A384	T4	2nd I.F. Reactor Coil and Can Assembly	.84
P-50X11-5G	T5	Push Pull Audio Input Transformer	1.02
P-9A281	L1	Filament Reactor in 1st Det. Circuit	.12
P-9A281	L2	Filament Reactor in 2nd Det. Circuit	.12

RESISTORS

Part No.	Code	Resistance	Watts	Type	Selling Price
P-A95105	R1	1.0 Megohm	0.2	Carbon	.06
P-36X201	R2 / R3	10,000 Ohms / 60,000 Ohms		Dual Volume Control	.58
P-A94901	R4	900 Ohms	0.2	Carbon	.03
P-A94652	R5	6,500 Ohms	0.2	Carbon	.03
P-A95205	R6	2.0 Megohm	0.2	Carbon	.06
P-B94104	R7	100,000 Ohms	0.5	Carbon	.08
P-B94403	R8	40,000 Ohms	0.5	Carbon	.03
P-A95105	R9	1.0 Megohm	0.2	Carbon	.06

CONDENSERS

Part No.	Code	Capacity	Voltage	Type	Selling Price
P-47X55	C1	150 mmf.		Moulded	.08
	C2	Antenna Trimmer—Part of Gang Condenser			
	C3	1st Det. Trimmer—Part of Gang Condenser			
P-47X53	C4	35 mmf.		Moulded	.06
	C5	Oscillator Trimmer—Part of Gang Cond.			
P-46X97	C6	.250 mf.	180	Tubular	.14
P-17A37	C7 / C8	40-100 mmf. / 20- 70 mmf.		1st I.F. Trimmer Cond.	.16
P-46X80	C9	.050 mf.	180	Tubular	.08
P-17A38	C10	40-100 mmf.		2nd I.F. Trimmer Cond.	.12
P-47X56	C11	50 mmf.		Moulded	.06
P-46X98	C12	.100 mf.	180	Tubular	.10
P-45X28	C13	4.00 mf.	150	Electrolytic	.40
P-46X96	C14	.100 mf.	180	Tubular	.10
P-46X111	C15	.002 mf.	300	Tubular	.14
P-46X112	C16	.006 mf.	300	Tubular	.08
P-46X111	C17	.002 mf.	300	Tubular	.14
P-14A38		3 Section Gang Condenser			1.80

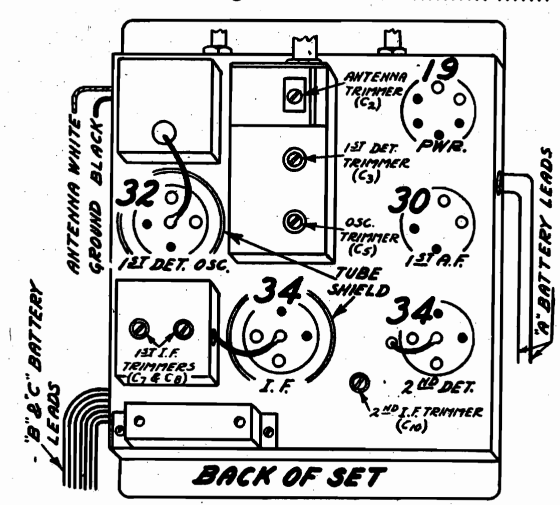


Fig. 8—Tube Arrangement

MODEL 25Y1
Chassis 5Y
Schematic, Voltage
Socket, Trimmers, Parts

WELLS-GARDNER & CO.

VOLTAGES AT SOCKETS

Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

Dec, 1934

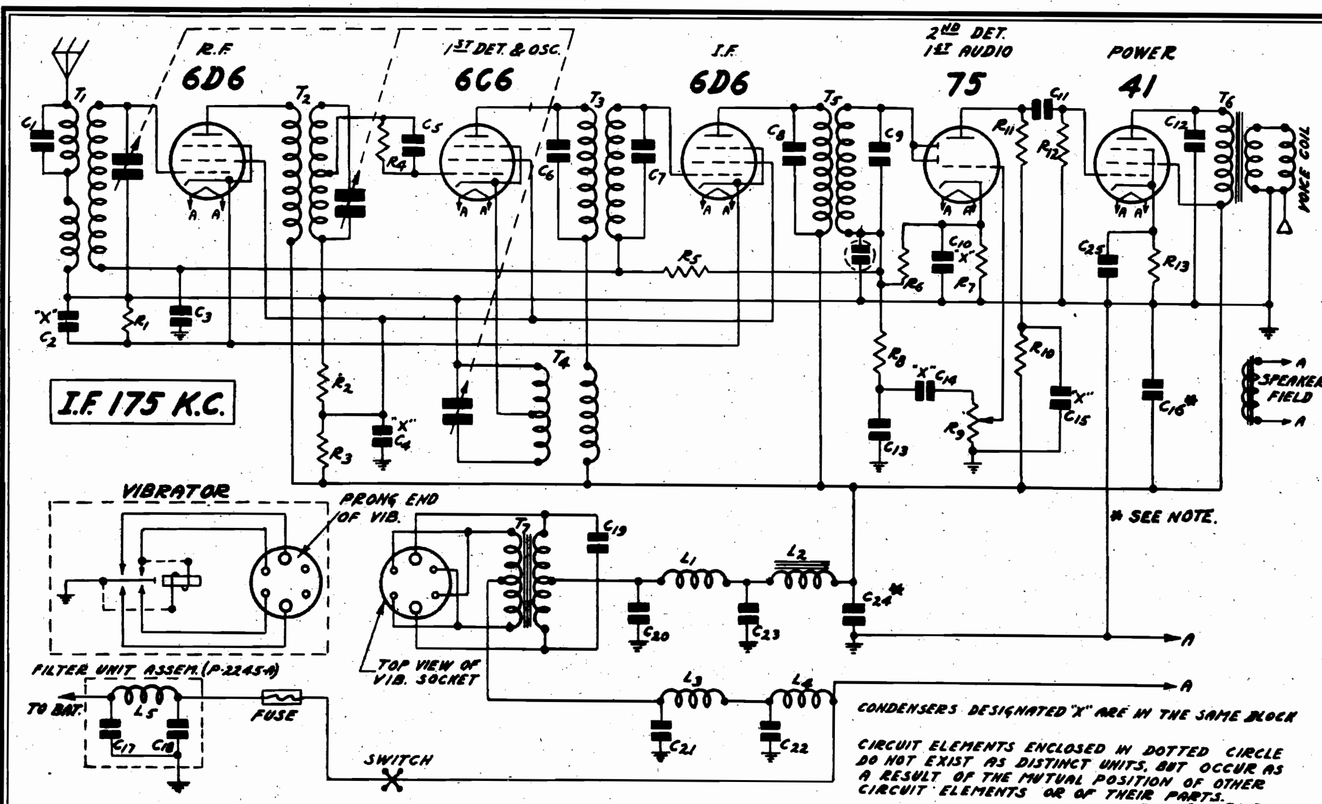


Fig. 1—*Schematic Circuit Diagram*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.		Part of Antenna Coil Assembly)
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.		Part of 2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500	Gang	Condenser		

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

In the first models of this receiver a bypass condenser block (P-82600) containing condensers: C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

On the Voltage Chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected at the bayonet connector.

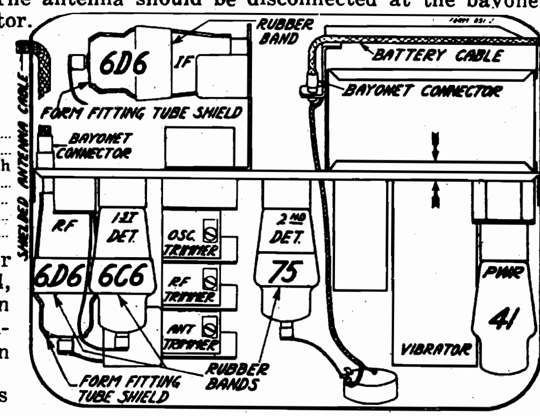


Fig. 2—*Location of Tubes and Vibrator*

MODEL 25Y1
Chassis 5Y
Alignment, Resistances
Drive Cord Data

WELLS-GARDNER & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attemped unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION—Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec.	T2	
	(Center Tap to Inside)		3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No.

Part No.	Item
P- 1885	6D6 Tube Socket
P- 1886	6C6 Tube Socket
P- 1775	75 Tube Socket
P- 1911	41 Tube Socket
P- 5247	Antenna Coil Assembly Less Can
P-40415B	Can for above assembly Part of Gang Condenser Assembly
P- 5248	R. F. Interstage Coil Assembly Less Can
P-40447C	Can for above assembly -Part of Chassis Assembly
P- 5249	1st I. F. and Oscillator Coils and Can Assembly
P- 5250	2nd I. F. Coil and Can Assembly
P- 2228	Dynamic Speaker
P-10359	Carboard Baffle for Speaker
P- 2229	Vibrator Unit
P- 3030	Vibrator Socket
P-50656	Power Transformer
P- 5251	R. F. "A" Choke Coil
P- 5174	R. F. "B" Choke Coil
P-50657	Power Choke Coil Assembly
P- 5253	Filament Choke Coil
P- 2220	2 Half Tube Shields with Clamping Ring
P- 2240	Grid Leak and Condenser Assembly
P- 2224	Knobs
P-20960	Thumb Screws
P-10356	Glass Crystal
P-10361	Gasket for Glass Crystal
P-30342A	Grid Clip only
P-10213	Wide Rubber Bands for Tubes
P-70774	Shielded Antenna Cable
P-70781	"A" Battery Cable
P- 1421	Single Lug Terminal Strip
P- 2082	Double Insulated Terminal Strip
P- 2232	Five Lug Terminal Strip
P- 1933	Cinch Terminal Lug
P-20701	Drive Tension Spring
P-20953	Horse-shoe Lock (Washer)
P- 2227	Dial Strip
P-20954	Dial Pointer

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

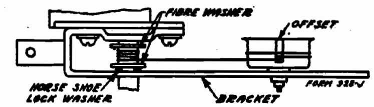


Fig. 3—Cord Drive—Top View

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse-shoe lock washer which holds the drive shaft in position. This may be done with a fine jawed, long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse-shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

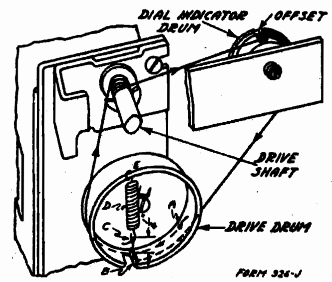


Fig. 4—Cord Drive Replacement

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

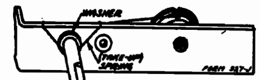


Fig. 5—Drive "Take-up" Spring

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between ⅛" and ⅜" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about ¼".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and clip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

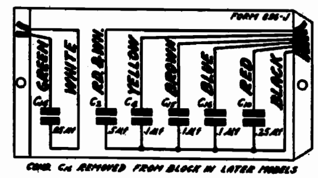


Fig. 6—Condenser Block Internal Wiring

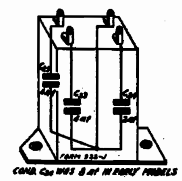


Fig. 7—Electrolytic Block Internal Wiring

WELLS-GARDNER & CO.

MODEL 25Y1
Chassis 5Y
Mounting Notes

Mounting the Receiver

The receiver is mounted by first securing the cover to the car body. The two slots in the chassis box proper are then slipped over the two hooks on the cover (see Figs. 2 and 3) and the chassis is then secured to the cover by means of the four screws provided.

The complete receiver should be held in position in the tentative locations to determine if there is space available. After a location is chosen, the cover may be removed and held in position to see if it can be attached to the car supports.

Top Mounting

The top mounting or securing of the receiver to the roof of the car is the method of attachment for which this receiver is primarily designed—see Fig. 1 (A). The receiver is very low in height and will mount in back of the car header without obscuring front or rear vision. Less difficulty will be experienced with ignition noise when the set is mounted in this position.

The best position for the receiver is at the center of the header as shown in the illustration, as the controls will then be accessible to the person in either front seat. If mounted at the left side of the header (facing forward) the controls will, of course, be more accessible to the driver. The best position on the header at which to mount the set will be determined in many cases by car devices, including sun visor, rear vision mirror mounting, windshield wiper control, etc

In Figs. 2 and 3 are shown the details of the roof mounting.

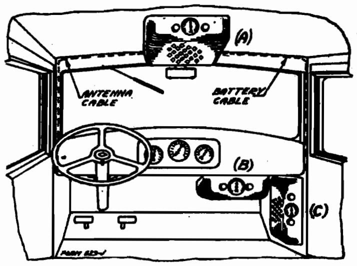


Fig. 1—General Mounting Positions

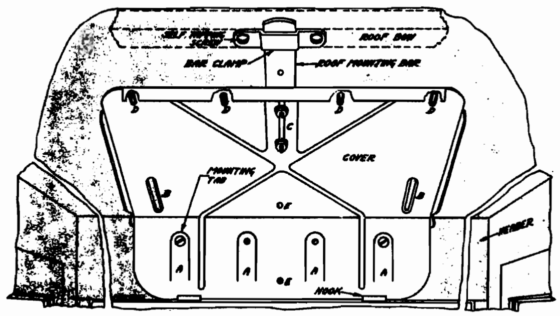


Fig. 2—Mounting Cover to Car Roof

First remove the cover from the box by taking out the four cover screws. The cover may then be removed from the chassis box.

In most cases the cover will be secured to the header of the car and one of the roof bows. The method of fastening it to the bow will depend on the location of the bow. In general it will be necessary to attach the roof mounting bar to the cover at slot C, as shown in Fig. 2. Two 8-32 screws, nuts and lockwashers are provided for this.

Use the holes in the bar which allow it to extend only to the roof bow As shown in the illustration, the bar is held in position at the bow by means of the bar clamp which is screwed to the bow. If the bar extends beyond the clamp, it may, in some cases, have to be cut off. Two No. 8 screws and lockwashers are provided with the bar clamp. These are self tapping and may be used in either wood or metal. Drill 7/64 inch holes (No. 35 drill) for these screws. Do not deviate more than .005 inch. *Care should be taken not to drill through the car roof.*

If there is a roof bow over slots C or D, it will not be necessary to use the roof mounting bar. Any two of the slots D may be used. If the roof bow is curved, do not tighten the screws through slots D enough to bend the cover. Should it be necessary to use slot C, only one screw is then used.

For attachment to the header, two or more of the mounting tabs A shown in Fig. 2 may be employed. If the angle of the header from the perpendicular is less than the angle of the back of the cover, the mounting tab may be bent as shown in Fig. 3 to fit tightly against the header No. 8 screws and lockwashers are provided. These are self tapping screws and may be used in either wood or metal. Drill 7/64 inch holes (No. 35 drill) for these screws.

In some cases it may be desirable to mount the set away from the header in order to clear car devices. This can be done if there is a roof bow near the header which coincides with slots B. Use the self tapping screws and lockwashers mentioned above. If the header is of cardboard construction it may be necessary to secure the set in this manner.

Before reassembling the receiver to the cover, refer to the articles, "Attaching the Cables" and "Trying Out the Set and Adjusting."

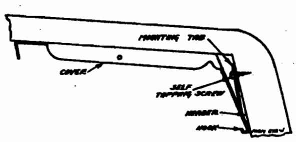


Fig. 3—Mounting Cover to Car Roof - Side View

Instrument Panel Mounting

If top mounting cannot be used the receiver may be mounted to the instrument panel as shown in Fig. 1 (B). In general it will be mounted at the right side (facing forward) in order to clear car controls.

Details of this method of mounting are shown in Fig. 4. First remove the cover as explained under "Top Mounting." Then attach the curved bracket to the cover as shown in Fig. 4. Holes E are used—see Fig. 2. Two 8-32 machine screws, nuts and lockwashers are provided. Reassemble the cover to the chassis box.

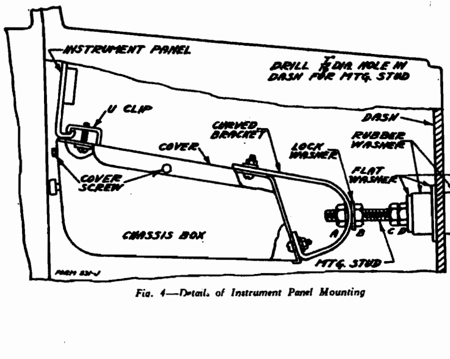


Fig. 4—Detail of Instrument Panel Mounting

Next hold the complete receiver in position under the instrument panel and determine the best mounting position. Consideration should be given to leg room and interference with car controls, including gear shift and hand brake levers, cowl ventilator, glove compartment hinges, etc. Consideration should also be given to whether a hole can be drilled in the dash for the mounting stud at the location chosen.

Another matter to consider is the angle of the front of the box. In general this angle will be less than the angle of the instrument panel—see Fig. 4. The angle of the front of the box should be such that the dial scale can be easily seen. On the other hand the box should not be down so far at the back that leg room will be materially reduced.

The next step is to locate the mounting stud hole. The vertical position of this hole can vary because of the curved bracket. The horizontal position, however, must be more accurately determined. Place a short pencil or pointed tool through the slot in the curved bracket and mark the dash at the point closest to the bracket. This point should line up with the center line of the chassis box.

Drill a 7/16 inch hole through the dash at this point, care being taken not to drill through any car apparatus, such as vacuum tanks, etc.

Then, again remove the cover. Next, assemble the mounting stud to the curved bracket and to the dash loosely, putting the parts on as shown in Fig. 4.

Most cars of the later models have a bead or upturned edge at the back of the flange on the bottom of the instrument panel, as illustrated. If this is the case the front end of the cover is secured to the flange by means of holes D (see Fig. 2) and two U clips, as shown. Two 1 inch 10-32 machine screws and lockwashers are provided. The U clips are tapped.

If the bottom of the instrument panel is straight, the two outer holes D may be used. If the bottom is curved or offset, use any two of the holes D which will not bend the cover. In some cases spacers may be necessary.

In some cars the flange of the instrument panel is flat. In a case of this kind it will be necessary to drill the flange. The front of the cover is then held in position by extending the two No. 10-32 machine screws through holes D and through the two holes drilled in the flange. The same conditions as mentioned above govern the choice of the two holes D. If the set is mounted at the extreme right, it may be necessary to tap the holes in the flange as it is difficult to hold a nut in position.

Next, tighten up the stud mounting. First raise the cover to the desired position. Turn down nut D (see Fig. 4) until it is snug. Then tighten nut C with a wrench. Next tighten down nuts E and F in the same manner. Make final adjustment of the cover position and tighten nuts A and B.

Before reassembling the receiver to the cover, refer to the articles, "Attaching the Cables" and "Trying Out the Set and Adjusting."

Side Mounting

In extreme cases it may be necessary to use side mounting as shown in Fig. 1 (C). In most cars the receiver will be mounted on the right side but can also be mounted on the left if it clears the clutch pedal or other car devices.

The cover is secured to the corner post by using two of the D holes (see Fig. 2). Two self tapping screws and lockwashers are provided. Drill two 7/64 inch holes (No. 35 drill). Longer wood screws may be used if the screws supplied with the receiver are not of sufficient length to get a secure hold in the wood.

The mounting stud is secured to the dash as explained in "Instrument Panel Mounting." In this method of mounting it will be necessary to turn the dial scale 90 degrees as explained in the article on adjustments.

Miscellaneous Mounting

Certain other positions may be used for this receiver, depending on the space available and the construction of the car body. Among these may be mentioned: back of the front seat, between the two front seats, and the shelf in back of the seat in a Coupe.

Attaching the Cables

Top Mounting

Five foot antenna and battery cables are supplied. These may be cut to length if they are too long.

Antenna Cable—This cable is connected at the chassis by means of a bayonet connector in the chassis box as shown in Fig. 5. If the car has a built-in antenna, the lead-in is usually brought to a point under the cowl and it will be most convenient to bring the antenna cable from the receiver down to this location to make the connection.

As illustrated in Fig. 1 (A), this cable is secured along the edge of the car roof, and then brought down the corner post. In many cars it can be concealed behind the header or under the trim and may be run down inside of the corner post, if the latter is hollow.

In Fig. 1 the antenna cable is shown on the left side as it is brought out of this side of the chassis and the antenna lead-in is usually on this side. However, if the latter is on the right side, the antenna cable can be crossed over the top of the chassis and brought down the right corner post.

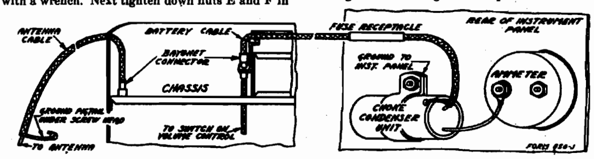


Fig. 5—External Wiring Connections

Connect the antenna wire to the lead-in wire from the antenna. *Ground the pigtail of the antenna cable shield at the antenna end to a nearby convenient ground.* Keep the antenna cable as high as possible and as far away from any car wiring as possible.

The unshielded portion of the antenna lead-in may be responsible for interference pick-up, and it may, therefore, in some instances, be necessary to extend the antenna shield as shown in Fig. 6. Any coiled up and excess length of the lead-in from the car antenna should be cut off, and after it is connected to the shielded lead from the receiver, should be tucked back into the corner post so that only the shielded portion will be exposed.

When it is necessary to install an antenna in the car roof, the antenna cable can be connected directly to the roof antenna without being brought down the corner post.

Battery Cable—The battery connection is made at the ammeter. The battery cable is secured to the edge of the car roof and brought down the front corner post in the same manner as described above for the antenna cable. In Fig. 1 this cable is shown on the right side. If the ammeter is on the left side, this cable may be crossed over the top of the chassis and brought down the left corner post.

The battery cable is made up of two portions which are joined together by the fuse receptacle. The long portion of the cable is connected by the bayonet connector at the chassis as shown in Fig. 5. The short portion of this cable has a choke condenser connected to it. This unit is mounted on the back of the instrument panel and is grounded by means of its mounting clamp under a convenient screw-head or nut. *Clean the contact surfaces before attaching the clamp as this must be a good ground.*

When the receiver is top mounted, the battery cable shield should also be grounded to the car body at a point as close to the chassis as possible. Use a small piece of braided shielding for this.

If the battery cable is not long enough, extend the unshielded lead between the choke condenser unit and the ammeter.

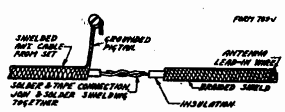


Fig. 6—Extension of Antenna Cable Shield

Instrument Panel Mounting

Antenna Cable—Connect the cable lead to the lead-in from the antenna in the same manner as described for top mounting. Keep this cable as high as possible and as far away from car wiring as possible. *Ground the pigtail of the antenna cable shield at the antenna end.*

In some cases the shielded antenna lead from the receiver is not long enough to reach to the column at which the antenna lead-in comes down. Ignition interference may be picked up by the unshielded portion and it may be necessary to extend the shielding of this lead. To do this, cover the lead from the antenna with braided shielding and push this shielding as far up in the corner post at which this lead comes down, as possible. The antenna lead wire should be covered with heavy insulation such as loom to properly separate the shielding from the wire. Connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire—see Fig. 6.

Battery Cable—This lead is connected in the same manner as described for top mounting.

MODELS 26B1, 26B5
Chassis 6B
Schematic, Socket
Parts. Data

WELLS-GARDNER & CO.

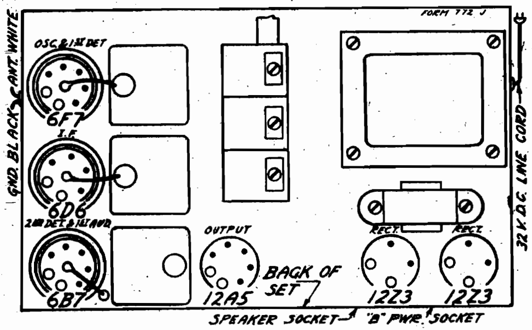


Fig. 2—Arrangement of Tubes

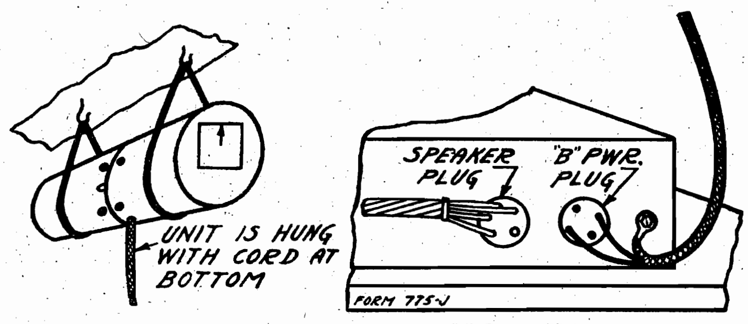
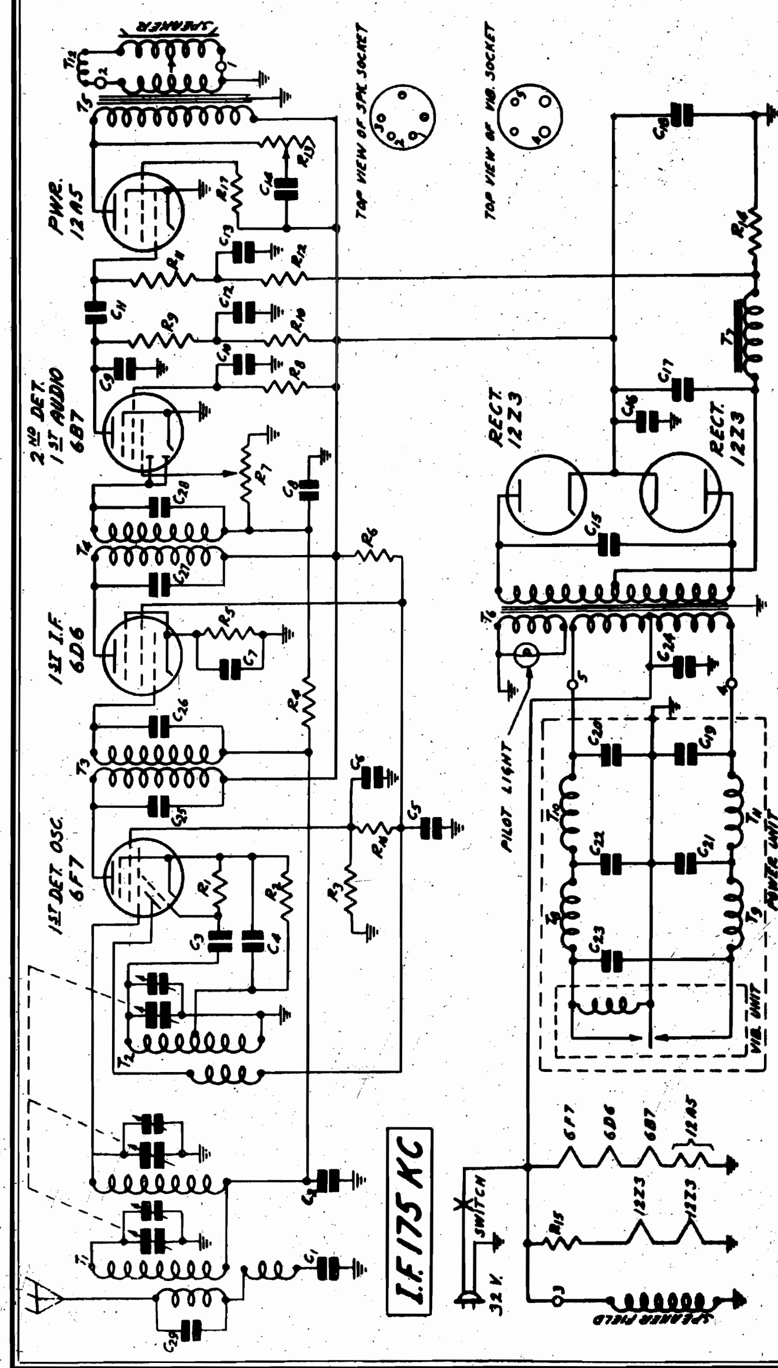


Fig. 3—Method of Installing "B" Power Unit



The numbers on the 2 sockets shown at the right above, correspond with the numbers as shown in the circuit.

Fig. 1—Schematic Circuit Diagram

Oct, 1934

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-80862	C1	.05 Mf.	200V	Tubular
P-80862	C2	.05 Mf.	200V	"
P-81801	C3	.35 Mmf.		Wire Capacitor Part of Osc. Assem
P-80862	C4	.05 Mf.	200V	Tubular
P-80888	C5	.25 Mf.	200V	"
P-81049	C6	.05 Mf.	200V	"
	C7	.05 Mf.	200V	"
P-81811	C8	100 Mmf.		Wire Capacitor
P-81051	C9	.002 Mf.	600V	Tubular
P-80888	C10	.25 Mf.	200V	"
P-80872	C11	.01 Mf.	600V	"
P-80888	C12	.25 Mf.	200V	"
P-81062	C13	.01 Mf.	140V	"
P-81055	C14	.05 Mf.	400V	"
P-81052	C15	.015 Mf.	1600V	"
P-80887	C16	.10 Mf.	400V	"
P-81016	C17	8.0 Mf.	300V	Electrolytic Block
	C18	8.0 Mf.	300V	
P-80993	C24	.5 Mf.	140V	Tubular
P-81806	C25	70 Mmf.		Wire Capac. Part of 1st I.F.Assem.
P-81804	C26	45 Mmf.		Wire Capac. Part of 1st I.F.Assem.
P-81808	C27	90 Mmf.		Wire Capac. Part of 2nd I.F.Assem.
P-81810	C28	100 Mmf.		Wire Capac. Part of 2nd I.F.Assem
P-81812	C29	200 Mmf.		Wire Capac. Part of Ant. Assem.
P-81015				Three Gang Condenser

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A95152	R2	1,500 Ohm	.2	Carbon
P-B94303	R3	30,000 Ohm	.5	Carbon
P-A98205	R4	2 Megohm	.2	Carbon
P- 98021	R5	400 Ohm	.2	Wire Wound
P-C93702	R6	7,000 Ohm	1.0	Carbon
P- 96014	R7	500,000 Ohm		Volume Control
P-B94204	R8	200,000 Ohm	.5	Carbon
P-B94603	R9	60,000 Ohm	.5	Carbon
P-A95203	R10	20,000 Ohm	.2	Carbon
P-A95504	R11	500,000 Ohm	.2	Carbon
P-A94104	R12	100,000 Ohm	.2	Carbon
P- 97011	R13	150,000 Ohm		Tone Control
P- 98035	R14	450 Ohm	2.0	Wire Wound
P- 98034	R15	25 Ohm	3.0	Wire Wound
P-B95602	R16	6,000 Ohm	.5	Carbon

MODELS 26B1,26B5
Chassis 6B
Voltage,Circuit Data
Resistances, Parts

WELLS-GARDNER & CO.,

Circuit

This receiver is designed to operate from a power supply source of 32 volts D. C. Six and twelve volt tubes are used. The heaters of these tubes are connected in series across the 32 volt line as shown in Fig. 1. As shown in this illustration, the heaters of the 6F7, 6D6, 6B7 and 12A5 tubes are in one series while the heaters of the two 12Z3 tubes and a 25 ohm resistor are in another series across the 32 volt line. A third connection across the line consists of the speaker field winding. A vibrator unit is used to provide the necessary high voltage which is rectified by the two 12Z3 tubes and then filtered for use in the plate and screen circuits.

A pre-selector stage incorporating two tuned circuits is used. These circuits provide pre-selection of the desired R. F. signal and have a high image rejection ratio. The signal from the pre-selector stage actuates the control grid of the pentode of the 6F7 tube. The latter is a pentode triode tube with the pentode being used as the 1st detector and the triode as an oscillator.

The oscillator circuit is tuned by the cut plate section (section closest to back of chassis) of the gang condenser, and is always resonant at 175 K. C. above the frequency to which the R. F. circuits are tuned. The oscillator potential is fed into the cathode circuit of the 6F7 tube. This results in the intermediate or beat frequency of 175 K. C. being present in the pentode plate circuit of this tube.

One stage of I. F. amplification is employed using a 6D6 tube. Fixed condensers tune the primaries and secondaries of the 1st and 2nd I. F. transformers.

A 6B7 tube is employed as the 2nd detector, A.V.C. tube, and one stage audio amplifier. A.V.C. voltage is applied to the grid circuits of the 1st detector and I. F. tubes. The audio voltage developed across volume control resistor R7 is applied thru the movable arm to the control grid of the pentode section of the 6B7 tube. Resistance coupling is used between the first audio and output stage which employs a 12A5 tube. A dynamic speaker is used.

The receiver uses 1.56 amps. at 32 volts input.

The maximum undistorted power output is 1.5 watts, measured with a load impedance of 4000 ohms.

Sensitivity

600 K. C.—25 microvolts absolute.
1500 K. C.—15 microvolts absolute.

D. C. RESISTANCE OF WINDINGS

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5200	Primaries of Antenna Trans. in Series	T1	Small
	1st Secondary of Antenna Transformer	T1	3.2
	2nd Secondary of Antenna Transformer	T1	2.4
P-5202	Oscillator Plate Coil	T2	2.0
	Oscillator Grid Coil	T2	3.5
P-5221	1st I. F. Transformer Primary	T3	67
	1st I. F. Transformer Secondary	T3	93
P-5203	2nd I. F. Transformer Primary	T4	63
	2nd I. F. Transformer Secondary	T4	63
P-50624	Output Transformer Primary	T5	243
	Output Transformer Secondary and Bucking Coil in Series	T5 & L12	Small
P-50637	"B" Filter Reactor	17	300
P-2147	Speaker Field		97
P-2173	Speaker Voice Coil		Small
P-50626	Power Transformer Primary	T6	
	Center Tap to Inside	T6	3.6
	Center Tap to Outside	T6	4.4
	Power Transformer H. V. Secondary	T6	
	Center Tap to Inside	T6	322
	Center Tap to Outside	T6	350
	Power Transformer Pilot Lamp Sec.	T6	.3
P-2153	Vibrator Unit Magnetizing Coil		1025
	Vibrator Unit Filter Chokes		3.0

VOLTAGES AT SOCKETS

Input 32 Volts—Antenna Shorted to Ground

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6F7	1st Det. & Osc.	6.3	167(1)	90	2.6	7.0(1)
			117(2)		0	2.8(2)
6D6	I. F.	6.3	172	120	3.2	8.2
6B7	2nd Det.	6.3	25	25	7.25	2.0
12A5	Output	12.6	180	180	25	32
12Z3	Rectifier	12.6	225			25

(1) Pentode Section of Tube
(2) Triode Section of Tube

REPAIR PARTS LIST FOR 6 TUBE, 32 VOLT D. C. RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

MISCELLANEOUS

Part No.	ITEM
P-5200	Antenna Transformer Assembly less Can
P-40433	Can for Above Assembly
P-5202	Oscillator Coil and Can Assembly
P-5221	1st I. F. Coil and Can Assembly
P-5203	2nd I. F. Coil and Can Assembly
P-50626	Power Transformer
P-50624A-6B	Output Transformer
P-50637	"B" Filter Reactor
P-1885	6D6 Tube Socket
P-1944	6B7 Tube Socket
P-1945	6F7 Tube Socket
P-1946	12A5 Tube Socket
P-2020	12Z3 Tube Socket
P-1637	Speaker Socket
P-2060	Knob, Small
P-2062	Knob, Large
P-10272	Rubber Chassis Cushions
P-40445	Tube Shield
P-40443	Tube Shield Base
P-10320	Glass Crystal
P-20875	Crystal Retainer Ring
P-1421	Single Lug Mtg.
P-2130	Double Insulated Mtg. Lug
P-20912	Large Double End Pointer
P-10337	Celluloid Indicator Disc
P-30342	Grid Cap Only
P-70702	115 Volt Line and Plug Assembly
P-70703	Antenna and Ground Wires
P-2012	Pilot Light Bulbs (6.8 volts)
P-2147	Speaker 6" Mantel
P-2173	Speaker 8" Console
P-10347	Rubber Grommet (Small Gang Con. Mtg.)
P-10296	Rubber Grommet (Large)

"B" POWER UNIT PARTS

P-70770	Shield Cable and Plug
P-40439	Vibrator Shield Can
P-2153	Vibrator Unit
P-5172	R. F. Choke Coils
P-2021	Vibrator Socket
P-10349	Rubber Band (For Mtg. Vib.)
P-20926	Screw Hook (For Mtg. Vib.)
P-81101	C19 .01 Mf. 400V Tubular Condenser
P-81101	C20 .01 Mf. 400V Tubular Condenser
P-80888	C21 .25 Mf. 200V Tubular Condenser
P-80888	C22 .25 Mf. 200V Tubular Condenser
P-81054	C23 .5 Mf. 140V Tubular Condenser

INTERFERENCE ELIMINATION PARTS

Part No.	
P-91011	Spark Plug Suppressor
P-80933	Dual .5 Mfd. Generator Condenser

WELLS-GARDNER & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

32 Volt Power Supply

This receiver is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant. The receiver may not be satisfactory on plants which do not use storage batteries.

Line Voltage Range

The receiver will operate satisfactorily within a line voltage range of 27 to 38 volts. If the line voltage runs higher, it will have to be cut down and one method of doing this is to use a series resistor.

Series Resistor

Let us say the line voltage is 40. The receiver uses 1.56 amps. at 32 volts. A resistance of 5.13 ohms, therefore, capable of dissipating 12.5 watts will be required in the receiver line to cut the voltage down to 32. If the line voltage varies a variable resistor may be required.

Starting Current

When first turned on the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

No Polarity

When inserting the line plug no attention need be paid to polarity.

Servicing Power Unit

Vibrator Unit

The vibrator is mounted inside the "B" power unit. Normally the vibrator will last upward of 1000 hours. However, in the same manner as a tube it may become defective in less time and require replacement.

If the tubes light and by touching the power unit case, no vibration is felt, then the vibrator unit is probably not operating. If the pilot lamp is not lighted this will be a further indication of the same fact.

To replace the vibrator unit in the power supply remove the end of the case on which the label is placed by taking out the four screws which hold the vibrator shield can to the framework. The old vibrator may then be withdrawn and a new unit inserted in the same manner as a tube.

One or more of the vibrator units should be kept on hand for replacement purposes. It is advisable when servicing the receiver, to try one out in the same manner as a new set of tubes would be tried.

Filter Unit

The other side of the power unit case contains the filter unit which is made up of several chokes and condensers as shown in Fig. 1. The purpose of this filter is to prevent high frequency currents from getting out of the power unit case.

Failure in the unit may affect the voltage supply to the power transformer or it may result in radio frequency noise. The chokes and condensers should be tested and replaced, if necessary. A resistance continuity test should be made of the wiring in the unit and to the chassis, using the circuit diagram as a guide.

Hum

If a hum is heard this may be caused by the power unit case touching the speaker frame.

Defective tubes are very often the cause of excessive hum. Try out a complete new set of tubes and note any difference. The hum may be due to external pick-up. Disconnect the antenna and ground and see if the hum disappears.

A faulty power transformer, shorted filter choke, open filter condensers, and defective grid circuits are some of the other causes of excessive hum.

If Microphonic hum or howl is encountered see if the mounting bolts have been loosened or taken out so that the chassis is resting on the rubber cushions. If this does not remedy the condition, try out a new set of tubes.

Eliminating Ignition and Generator Noise

After the receiver is in working order, the following procedure must be followed in practically all cases to eliminate ignition and generator noise caused by the charging plant. If the charging plant causes no noise, then of course, these steps do not have to be taken.

One spark plug suppressor must be placed on each spark plug of the engine. One spark plug suppressor for example would be required on a one-cylinder engine and four must be used on a four-cylinder engine. To connect the spark plug suppressor, remove the wire from the top of the plug, put the suppressor on and attach the wire to the other end of the suppressor.

The generator condenser consists of two .5 mfd. sections in one unit. The two sections have one side grounded to the metal case of the condenser. Mount the condenser on the frame of charging plant. This will ground it. Then connect the two leads to the charging switch, one on each side of the line.

In some large installations, where the charging unit is on only two or three times a week, the above steps do not have to be taken, as interference is only caused when the generating plant is in operation.

Noisy Operation

Noisy operation may be due to a faulty antenna system. The action of the automatic volume control, due to the low pickup, causes the set to operate at its maximum sensitivity, thereby increasing noisy reception due both to external pickup and internal conditions.

The receiver may be partially detuned, causing it to operate at maximum sensitivity. The signal should be very carefully tuned in until it is clearest and strongest.

If the reception is noisy only when the generating plant is in operation, then the noise is due to the latter and several things can be done. There may be loose parts in the generator plant rubbing together. Tighten up all parts and be sure that all parts of the engine are well grounded. Dirty spark plugs may cause noise. Clean and respace the plugs or try out a new set. In some instances it may be necessary to filter the power supply line to the receiver.

If any motor driven devices, such as pumps, are operated from the 32 volt line, the motor may cause noisy reception in the receiver. This can be corrected in most cases by connecting one of the dual .5 mfd. condensers mentioned above across the line at the motor. The common connection to the two condensers which is grounded to the can is grounded externally by mounting the unit on the motor or on a nearby point which is well grounded.

A faulty "B" power unit may cause noisy operation. See Article on "Servicing Power Unit".

MODEL 6C Series
Circuit Data, Voltage
Alignment

WELLS-GARDNER & CO.

WELLS-GARDNER SERIES 6C

6 Tube, 3 Band Receiver

SERVICE MANUAL AND PARTS LIST

Nov. 1934

FORM 885 J(A)

Circuit

Series 6C is a three band receiver with a coverage on each band as shown on page three. Triple band coverage is accomplished by means of three sets of R.F. and oscillator coils, and a four section, three position switch.

Referring to the schematic circuit diagram (Fig.1) T1 are the Antenna coils, T2 are the interstage coils and T3 are the oscillator coils. By means of the "Ant." and the "Ant. and PL" section of the band switch, connections for the band being used are completed to the grid circuit of the 6D6 R.F. amplifier tube.

The output of this tube is fed into an interstage R.F. transformer. Connections to this transformer are made by the "Int." section of the band switch.

A type 6A7 pentagrid converter tube functions as the oscillator and 1st detector. The three oscillator windings are shown to the right of this tube in the circuit diagram, and connections to these coils are completed by the "osc." sections of the band switch. The oscillating circuits are resonant at 456 K.C. above the frequency to which the R.F. amplifier is tuned. This frequency beating against the R.F. frequency results in the intermediate frequency of 456 K.C. being present in the plate circuit of this tube.

One stage of I.F. amplification is employed using a 6D6 tube. Three windings are used in the 1st I.F. transformer for added selectivity. These three windings and the two windings in the 2nd I.F. transformer are tuned by small adjustable condensers.

A 6B7 duo-diode pentode tube is employed as a diode 2nd detector, AVC tube and one stage audio amplifier. AVC voltage is applied to the grid circuits of the 6D6 R.F. and I.F. tubes. The audio voltage developed across volume control resistor R18 is applied thru the movable arm to the control grid of the pentode section of the 6B7 tube.

Resistance coupling is used between the 1st Audio and output stage which employs a type 42 power pentode tube. A dynamic speaker is used.

A type 80 full wave rectifier tube is employed in the power unit.

The silencer switch as shown in the circuit diagram affects the sensitivity of the receiver by changing the bias voltage on the R.F. and I.F. tubes. When this switch is closed, resistor R3 is short-circuited and the bias voltage is reduced, thus increasing the sensitivity.

Phonograph connections are made by inserting a double throw switch in the diode circuit as shown.

Power Output

The maximum undistorted output is 3.0 watts when dissipated across a load resistance of 6500 ohms from 42 plate to B+.

Sensitivity

Long Wave Band	2-4 microvolts
Standard Wave Band	2-4 "
Short Wave Band	4-10 "

Alignment and Calibration

Correct alignment is extremely important in connection with multi-band receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K.C. and accurately calibrated signals over the long wave, standard wave and short wave bands, 145 to 380 K.C. 505 to 1520 K.C. and 5.84 to 18.0 Megacycles, is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for adjustments.

Seventeen trimmer condensers are used in aligning the R.F. and I.F. circuits as follows: The location of these trimmers is shown in Figs. 2,3 and 4.

1st I.F. Primary Trimmer
1st I.F. Secondary "
1st I.F. Tertiary "
2nd I.F. Primary "
2nd I.F. Secondary "

Long Wave Padding Condensers
Oscillator Long Wave Trimmer
Antenna Long Wave Trimmer
Interstage Long Wave Trimmer
Standard Wave Padding Condenser
Oscillator Standard Wave Trimmer
Antenna Standard Wave Trimmer
Interstage Standard Wave Trimmer

Short Wave Padding Condenser
Oscillator Short Wave Trimmer
Antenna Short Wave Trimmer
Interstage Short Wave Trimmer

The procedure is as follows:

Intermediate Frequency Adjustment

Set the signal generator for 456 K.C. and connect the antenna lead of the signal generator to the grid of the 1st detector thru a .05 MFD condenser. Set the switch to the standard wave position and turn the gang condenser completely out.

Adjust the five I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Figs. 2 and 4.

Alignment and Calibration (cont.)

Setting The Pointer

With the condenser plates completely meshed, the pointer should coincide with the last heavy line at the low frequency end of the short wave band.

Long Wave Band Adjustment

The antenna lead from the signal generator is connected to the antenna lead of the receiver through a standard dummy antenna. Turn the band switch to the long wave position.

Set the signal generator for a signal of 165 K.C. and adjust the long wave padding condenser for maximum output. As this adjustment is made, turn the tuning condenser rotor back and forth until maximum output is obtained.

Set the signal generator to 380 K.C. and turn the tuning control until the condenser rotor is at the completely open position.

Adjust the oscillator long wave trimmer for maximum output.

Set the signal generator to 330 K.C. and tune in the signal very accurately by turning the tuning control.

Adjust the antenna long wave and interstage long wave trimmers for maximum output.

Check the 165 K.C. padding condenser adjustment. If this has to be readjusted, check and readjust again at 380 and 330 K.C. as before.

Standard Wave Band Adjustment

Turn the band switch to the standard wave position.

Set the signal generator for a signal of 550 K.C. and adjust the standard wave padding condenser for maximum output. As this adjustment is made, turn the tuning condenser rotor back and forth until maximum output is obtained.

Set the signal generator to 1520 K.C. and turn the tuning control until the condenser rotor is at the completely open position.

Adjust the oscillator standard wave trimmer for maximum output.

Set the signal generator to 1400 K.C. and tune in the signal very accurately by turning the tuning control.

Adjust the antenna standard wave and interstage standard wave trimmers for maximum output.

Check the 550 K.C. padding condenser adjustment. If this has to be readjusted, check and readjust again at 1520 and 1400 K.C. as before.

Short Wave Band Adjustment

Turn the band switch to the short wave position.

Adjust the short wave padding condenser at 6.0 megacycles for maximum output.

Set the signal generator to 18.0 megacycles and turn the tuning control until the condenser rotor is at the completely open position.

Adjust the oscillator short wave trimmer for maximum output.

Set the signal generator to 15 megacycles and tune in the signal very accurately by turning the tuning control.

Adjust the antenna and R.F. Short Wave trimmers for maximum output.

Check the 6.0 megacycle padding condenser adjustment. If this has to be readjusted, check and readjust again at 18 megacycles and 15 megacycles as before.

General

Be sure that the adjustments are made in the order given above and be careful not to disturb any of the preceding adjustments.

Power Supply

This receiver may be used on a power supply of 40 to 60 cycle, 110, 130 or 230 volts.

It is shipped from the factory connected for the voltage as specified on the tag on the power cord of the receiver.

The method of connecting the power transformer for the three voltages as specified is shown in Figure 7.

Band Coverage

This receiver covers three bands, the range of each being as follows:

LONG WAVE

145 to 380 Kilocycles
2069 to 789.5 Meters

STANDARD WAVE

505 to 1520 Kilocycles
594. to 197.4 Meters

SHORT WAVE

5.84 to 18.0 Megacycles
51.4 to 16.7 Meters

VOLTAGES AT SOCKETS

INPUT - 110 VOLTS - 60 CYCLE

ANTENNA SHORTED TO GROUND

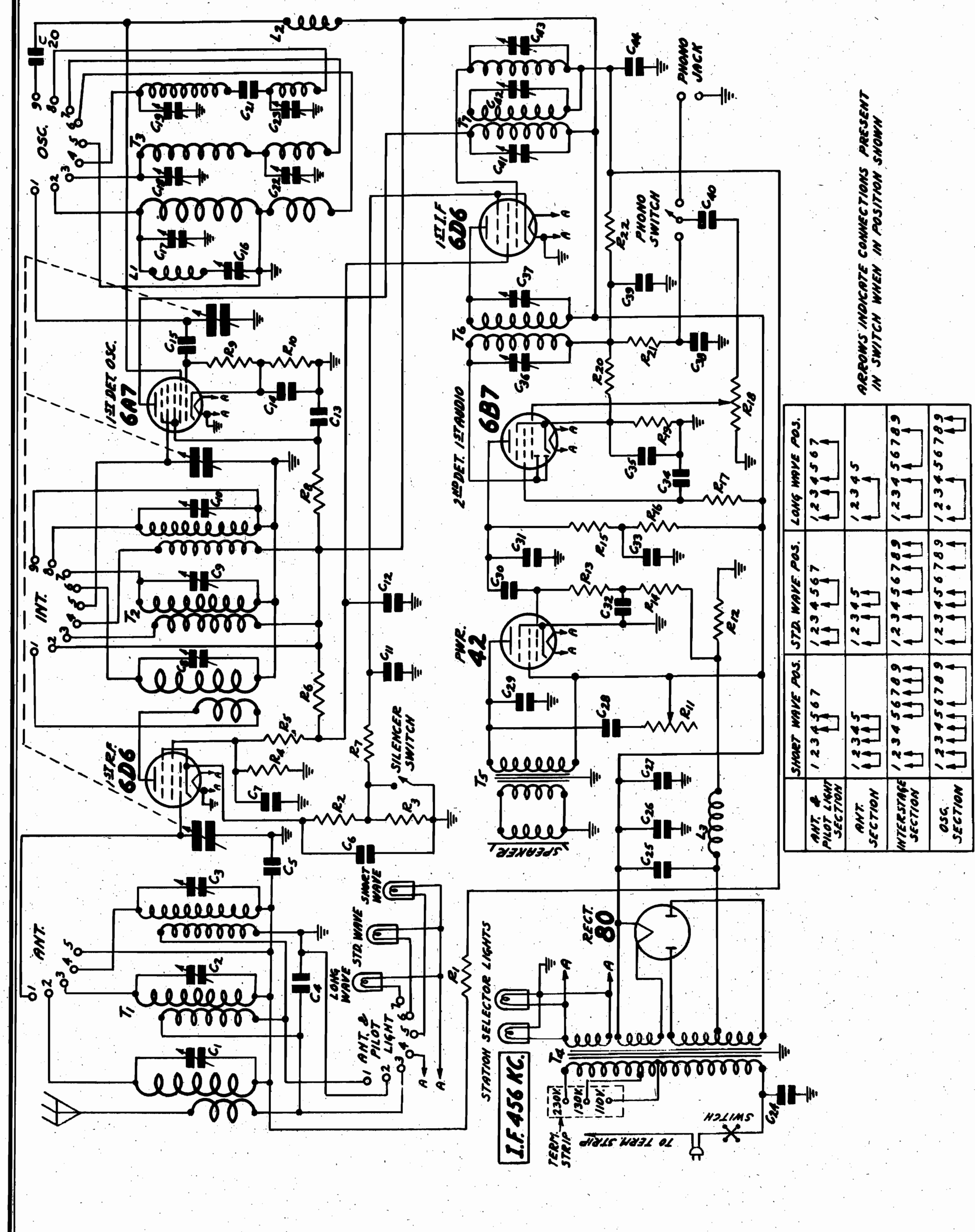
(Silencer Switch Down)

Type of Tube	Function	Heater Voltage	Plate to Cathode	Screen to Cathode	Gnd. to Cathode	Normal Plate M. A.
6D6	R. F.	6.3	250	100	6.0	8.0
6A7	1st Det. & Osc.	6.3	250(1) 250(2)	100	3.0	3.4(1) 3.6(2)
6D6	I. F.	6.3	250	125	6.5	9.5
6B7	2nd Det. & 1st A.F.	6.3	55	60	3.0	2.5
'42	Power Output	6.3	235	250	17(3)	33
'80	Rectifier	5.0	700V. A.C. pl.to pl.			40 Per Plate

(1) Plate
(2) Anode Grid
(3) Grid bias as measured across R 12

MODEL 6C Series
Schematic

WELLS-GARDNER & CO.,



WELLS-GARDNER & CO.,

MODEL 6C Series
Socket, Trimmers
Condenser Data, Parts

SERIES 6C
Replacement Parts List

MISCELLANEOUS

PART. NO.	ITEM	CODE	LIST
P 1885	6D6 Tube Socket		.10
P 1943	6A7 Tube Socket		.10
P 1944	6B7 Tube Socket		.10
P 1884	No. 42 Tube Socket		.10
P 2025	No. 80 Tube Socket		.15
P 1637	Speaker Socket		.10
P 5254	Antenna Coil Assembly Less Can	T1	2.75
P 5257	R. F. Interstage Coil Assembly Less Can	T2	2.35
P 5260	Oscillator Coil Assembly Less Can	T3	2.50
P 40451	Cans for the Above Assemblies		.10
P 5263	1st I.F.Coil Assembly Complete with Can	T7	2.15
P 5264	2nd I.F.Coil Assembly Complete with Can	T6	2.05
P 5265	Oscillator Plate Reactor	L2	.35
P 5190	High Frequency Oscillator Tracking Coil	L1	.35
P 2255	Gang Condenser and Dial Assembly		6.25
P 50659-6C	40-60 Cycle Power Transformer; 110-130-230V	T4	6.05
P 50660-6C	Output Transformer	T5	1.40
P 70785	110 Volt Line Cord & Plug Assembly		.70
P 2258	"6" Dynamic Speaker		4.50
P 10373	Glass Crystal		.10
P 2133	Small Knob (Set Screw)		.25
P 2060	Small Knob (Spring)		.20
P 10272	Rubber Chassis Cushion		.10
P 40445	Tube Shields		.15
P 2012	Pilot Light (6.8 volt)		.15
P 1165	Pilot Light Socket & Spring Clip		.10
P 2136	4 Lug Terminal Strip (3 insulated)		.10
P 2130	3 Lug Terminal Strip (2 insulated)		.10
P 1421	2 Lug Terminal Strip (1 insulated)		.10
P 2170	2 Lug Terminal Strip (2 insulated)		.10
P 30342	Grid Cap Only		.10

RESISTORS

PART NO.	CODE	RESISTANCE	TYPE	WATTAGE	LIST
P A95204	R1	200,000 Ohm	Carbon	0.2	.15
P A93401ww	R2	400 Ohm	Wire Wound	0.2	.15
P B95252	R3	2,500 Ohm	Carbon	0.5	.15
P B94303	R4	30,000 Ohm	Carbon	0.5	.15
P B95502	R5	5,000 Ohm	Carbon	0.5	.15
P C93153	R6	15,000 Ohm	Carbon	1.0	.15
P A93451ww	R7	450 Ohm	Wire Wound	0.2	.15
P B94703	R8	70,000 Ohm	Carbon	0.5	.15
P A94104	R9	100,000 Ohm	Carbon	0.2	.15
P A93351ww	R10	350 Ohm	Wire Wound	0.2	.15
P 97014	R11	150,000 Ohm	Tone Control		.75
P 98015	R12	235 Ohm	Wire Wound	2.0	.15
P A95504	R13	500,000 Ohm	Carbon	0.2	.15
P A95104	R14	100,000 Ohm	Carbon	0.2	.15
P B94603	R15	60,000 Ohm	Carbon	0.5	.15
P A95203	R16	20,000 Ohm	Carbon	0.2	.15
P A94254	R17	250,000 Ohm	Carbon	0.2	.15

RESISTORS- (CONT'D.)

PART NO.	CODE	RESISTANCE	TYPE	WATTAGE	LIST
P 96018	R18	2 Megohm	Volume Control		1.05
P A94801	R19	800 Ohm	Carbon	0.2	.15
P A94504	R20	500,000 Ohm	Carbon	0.2	.15
P A95503	R21	50,000 Ohm	Carbon	0.2	.15
P A95205	R22	2 Megohm	Carbon	0.2	.15

CONDENSERS

PART NO.	CODE	CAPACITY	VOLTAGE	TYPE	LIST
P 2260	C1	2-25 mmf		Sh.W.Antenna Trimmer	.20
P 2260	C2	2-25 mmf		Std.W. " "	.20
P 2260	C3	2-25 mmf		L.W. " "	.20
P 81817	C4	250 mmfd		Moulded	.15
P 81125	C5	.05 mfd	200 V	Tubular	.20
	(C6	.05 mf	140 V)		
	(C7	.05 mf	200 V)		
	(C11	.25 mf	140 V)		
	(C12	.10 mf	300 V)		
P 82603	(C27	.10 mf	400 V)	Condenser Block	2.40
	(C33	.25 mf	400 V)		
	(C34	.25 mf	400 V)		
	(C40	.05 mf	140 V)		
P 2260	C8	2-25 mmf		Sh.W.R.F.Interstage Trimmer	.20
P 2260	C9	2-25 mmf		Std.W.R.F. " "	.20
P 2260	C10	2-25 mmf		L.W.R.F. " "	.20
P 81127	C13	.10 mfd	300 V	Tubular	.20
P 81079	C14	.25 mfd	200 V	Tubular	.25
P 81819	C15	35 mmfd		Moulded	.15
P 2263	C16&C22	40-100 mfd &300-500 mmfd.		Double Trimmer	.65
P 2260	C17	2-25 mmf		Sh.W.Oscillator Trimmer	.20
P 2260	C18	2-25 mmf		Std.W. " "	.20
P 2260	C19	2-25 mmf		L.W.Oscillator Trimmer	.20
P 81071	C20	.05 mfd	400 V	Tubular	.20
P 81817	C21	250 mmfd		Moulded	.15
P 2103	C23&C41	200-50 mmfd. ea.		Double Trimmer	.60
P 81042	C25	14 mfd	400 V	Wet Elec.(Insltd Mtg.)	1.45
P 81043	C26	18 mfd	300 V	Wet Elec.(Gnd Mtg.)	1.30
	(C28	.05	600 V)		
	(C29	.002	600 V)		
P 82604	(C30	.01	400 V)	Condenser Block	1.20
	(C31	.002	600 V)		
P 81128	C32	.03 mfd	200 V	Tubular	.20
P 81003	C35	12 mfd	25 V	Dry Electrolytic	.75
P 2252	(C36	150-250 mmf)		2nd I.F.Trimmers	.65
	(C37	150-250 mmf)			
P 81818	C38	100 mmfd		Moulded	.15
P 81817	C39	250 mmfd		Moulded	.15
P 2252	(C42	150-250 mmf		1st I.F.Trimmers	.65
	(C43	150-250 mmf			
P 81076	(C44	.05 mfd	200 V	Tubular	.20
P 82501		3 Section Gang Condenser			2.85

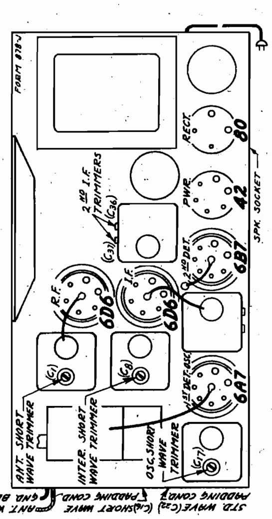


FIG. 2 TUBE ARRANGEMENT AND TRIMMERS AT TOP OF CHASSIS

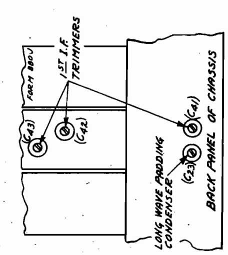


FIG. 4 TRIMMERS AT BACK OF CHASSIS

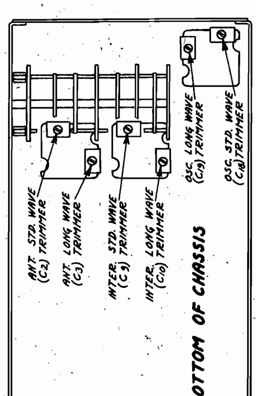


FIG. 3 TRIMMERS AT BOTTOM OF CHASSIS

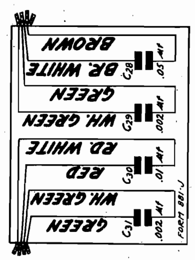
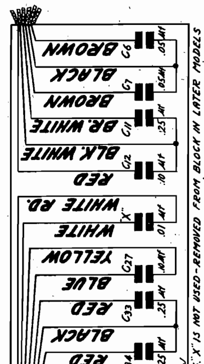


FIG. 6 SMALL BLOCK CONDENSER



COND. DESIG. "X" IS NOT USED-REMOVED FROM BLOCK IN LATER MODELS
FIG. 5 LARGE BLOCK CONDENSER

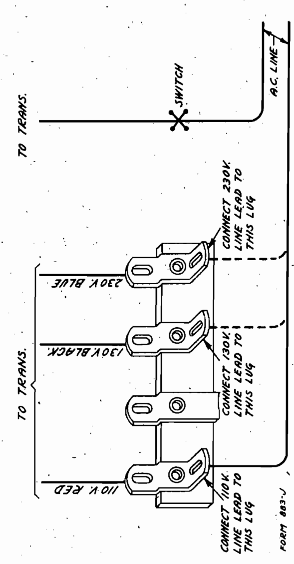


FIG. 7 POWER TRANSFORMER CONNECTIONS

MODELS 27C1,27C5
Chassis 7C
Schematic,Voltage
Socket,Trimmers

WELLS-GARDNER & CO.,

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A93803	R2	30,000 Ohm	.2	Carbon
P-A95104	R3	100,000 Ohm	2	Carbon
P-A93602	R4	6,000 Ohm	.2	Carbon
P-B93902	R5	9,000 Ohm	.5	Carbon
P-A95505	R6	5 Megohm	.2	Carbon
P- 96012	R7	1 Megohm		Volume Control.
P-A95505	R8	5 Megohm	.2	Carbon
P-A94603	R9	60,000 Ohm	.2	Carbon
P-A95104	R10	100,000 Ohm	.2	Carbon
P-A95104	R11	100,000 Ohm	.2	Carbon

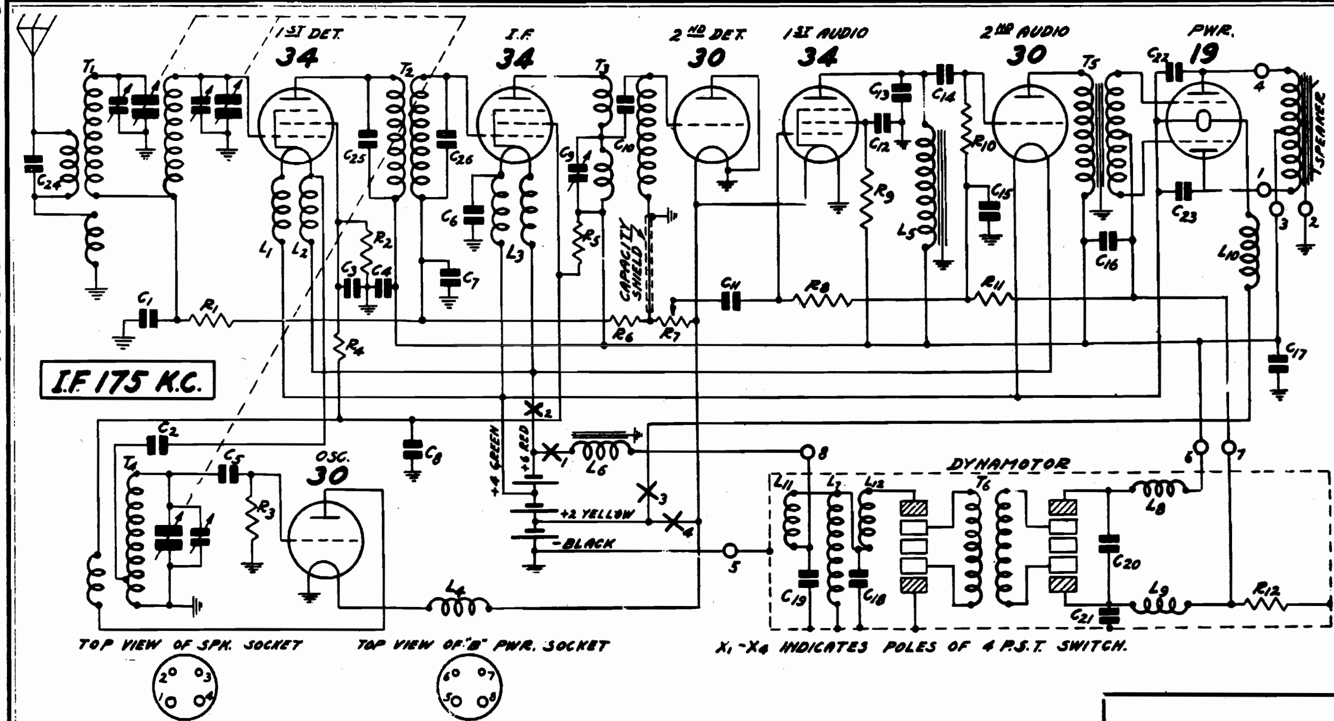


Fig. 1. Schematic Circuit Diagram

CONDENSERS

Part No.	Code	Capacity		Voltage	Type
P-80862	C1	0.050	Mf.	200V	Tubular
P-80862	C2	0.050	Mf.	200V	Tubular
P-80862	C3	0.050	Mf.	200V	Tubular
P-80864	C4	0.100	Mf.	200V	Tubular
P-81801	C5	35	Mmf.	Cap.	Part of Osc. Coil Assem.
P-80888	C6	0.250	Mf.	200V	Tubular
P-80862	C7	0.050	Mf.	200V	Tubular
P-80988	C8	1.500	Mf.	140V	Tubular
P-1965	C9	70-140	Mmf.		Trimmer
P-81800	C10	50	Mmf.	Cap.	Part of 2nd I.F. Coil As.
P-80981	C11	0.010	Mf.	400V	Tubular
P-80888	C12	0.250	Mf.	200V	Tubular
P-80945	C13	500	Mmf.		Moulded
P-80862	C14	0.050	Mf.		Tubular
P-80888	C15	0.250	Mf.	200V	Tubular
P-81014	{C16 / C17	16.00 / 16.00	Mf. / Mf.}		Electrolytic Block
P-80914	C22	0.002	Mf.	600V	Tubular
P-80914	C23	0.002	Mf.	600V	Tubular
P-81812	C24	200	Mmf.	Cap.	Part of Ant. Assem.
P-81807	C25	70	Mmf.	Cap.	Part of 1st I.F. Coil As.
P-81805	C26	45	Mmf.	Cap.	Part of 1st I.F. Coil As.
P-81015	Three Gang Condenser				

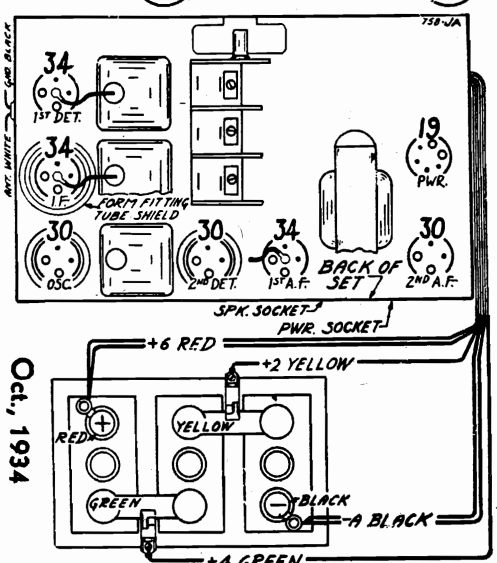


Fig. 2. Location of Tubes and Battery Connections

Voltages at Sockets

ANTENNA SHORTED TO GROUND

Type of Tube	Function	Fila-ment Volt.	Plate to Neg. Filament	Screen to Neg. Filament	Grid to Neg. Filament	Normal Plate M. A.
34	1st Detector	2.0	135	55	3.0 av.	1.90
30	Oscillator	2.0	75		0.0	3.70
34	I. F.	2.0	135	70	3.0 av.	3.00
30	2nd Detector	2.0	2			
34	1st A. F.	2.0	140	65	4.0	2.30
30	2nd A. F.	2.0	135		8.0	3.10
19	Output	2.0	137		6.0	1.00 per plate

Oct., 1934

WELLS-GARDNER & CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator to a frequency of 175 KC. Connect the antenna lead of the lead generator to the grid of the 1st detector thru a .05 mfd. condenser. The ground lead from the signal generator goes to the ground lead of the receiver. Adjust trimmer condenser C9 on the back panel of the chassis until maximum output is obtained. **A non-metallic screw driver should be used in making this adjustment as the I. F. trimmer is at B+ potential.**

Next set the signal generator for 1730 KC. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Then set the signal generator for 1400 KC and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 KC padder and no adjustment at this frequency, therefore, is required.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and Off-On switch collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 4.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 4. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 4.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 4. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

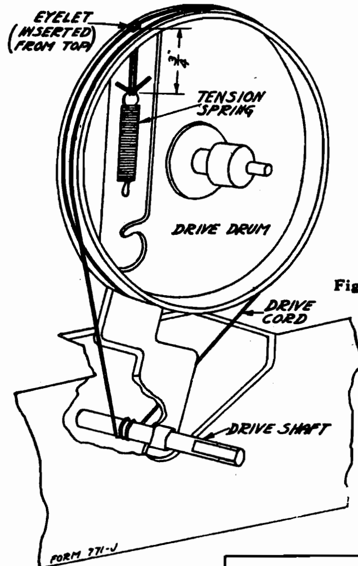


Fig. 4 Drive Cord Replacement.

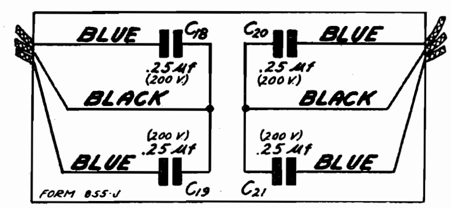


Fig. 3. Four Section Condenser in Power Unit Box

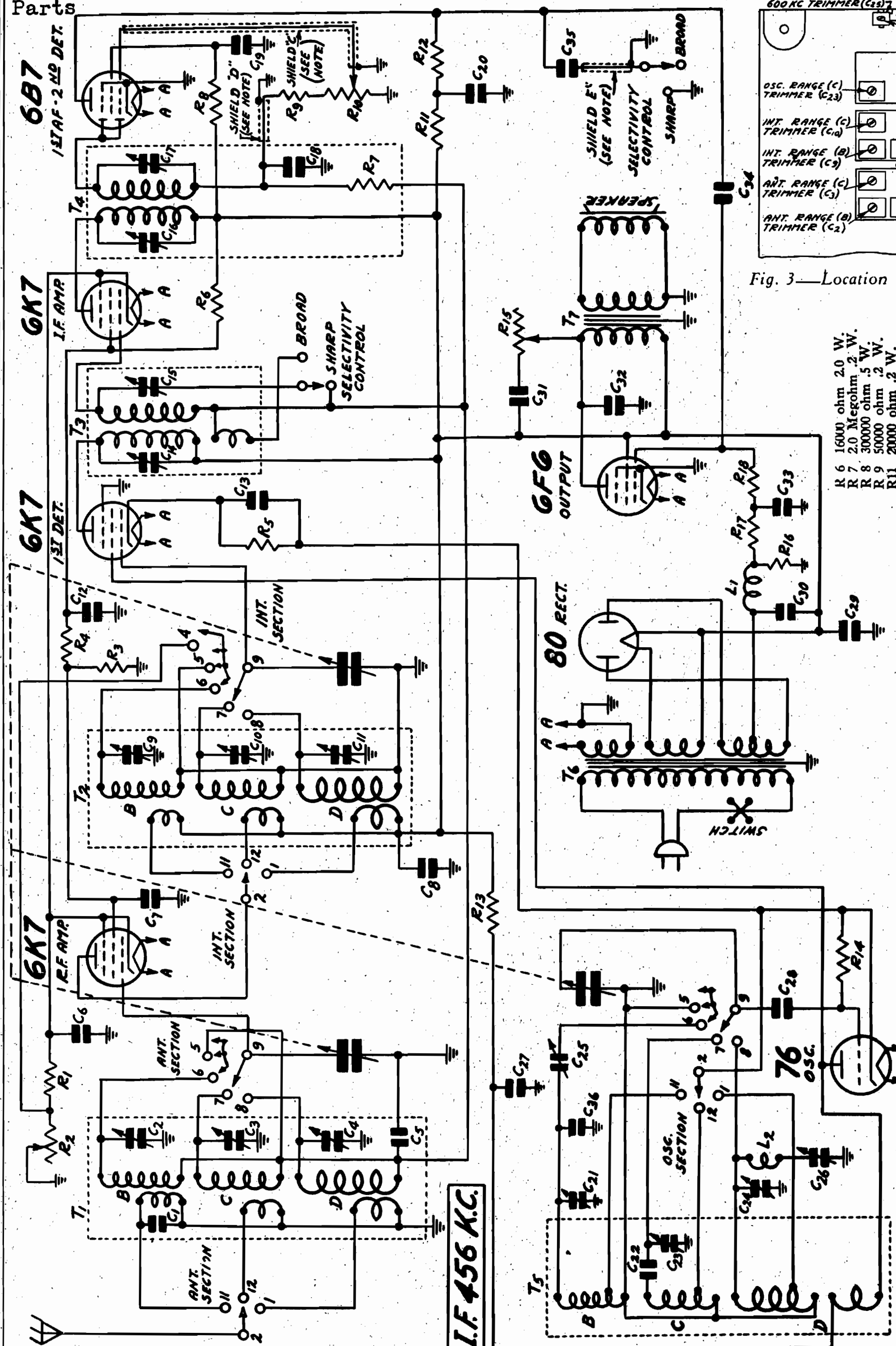
D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5200	Double Tuned Antenna Transformer, Primaries in series	T1	20.1
	Double Tuned Antenna Transformer Secondary Preselector	T1	3.3
	Double Tuned Antenna Transformer Secondary Detector	T1	3.1
P-5169	Oscillator Grid Coil	T4	3.6
	Oscillator Plate Coil	T4	1.6
P-5170	I. F. Coil Primary	T2	89.
	I. F. Coil Secondary	T2	126.
P-5171	I. F. Reactor Coil Plate Winding	T3	99.
	I. F. Reactor Coil Grid Winding	T3	429.
P-5172	Double Filament Reactor Assembly each section	L1, L2	Small
P-5173	Combined Filament Reactor Assembly each section	L3, L4	Small
P-50621	Audio Plate Reactor	L5	4940.
P-50622	Iron Core Isolating Reactor	L6	Small
P-5222	Filament Reactor	L10	Small
P-50625	Audio Transformer Primary	T5	1066.
	Audio Transformer Secondary (center tap to inside)	T5	614.
	Audio Transformer Secondary (center tap to outside)	T5	666.
P-2010	6" Magnetic Speaker (center tap to inside)		260.
	6" Magnetic Speaker (center tap to outside)		300.

MODELS 37G508,37G566
Chassis 7GM
Schematic,Trimmers
Parts

WELLS-GARDNER & CO.



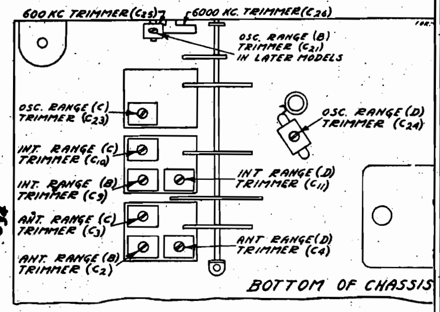


Fig. 3—Location of Trimmers (Latest Models)

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
THE CAPACITY OF SHIELD "C" "D" AND "E" IS 50 MMF EACH.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 180 V.
C 7 .05 mf. 240 V.
C 8 .10 mf. 360 V.
C 9 2-25 mmf.
C10 2-25 mmf.
C11 2-25 mmf.
C12 .25 mf. 240 V.
C13 .05 mf. 180 V.
C14 70-150 mmf. } ONE
C15 70 150 mmf. } UNIT
C16 70-150 mmf. } ONE
C17 150-250 mmf. } UNIT
C18 50 mmf.
C19 .25 mf. 360 V.
C20 .25 mf. 360 V.
C21 2 25 mmf.
C22 1400 mmf.
C23 2-25 mmf.
C24 2-25 mmf.
C25 300-600 mmf. } ONE
C26 40-100 mmf. } UNIT
C27 .10 mf. 360 V.
C28 35 mmf.
C29 18 mf. 300 V.
C30 14 mf. 400 V.
C31 .05 mf. 600 V.
C32 .002 mf. 600 V.
C33 .03 mf. 180 V.
C34 .01 mf. 480 V.
C35 .004 mf. 600 V.
R 1 150 ohm .2 W.
R 2 2500 ohm } Dual Vol.
R10 500000 ohm } Control
R 3 30000 ohm .5 W.
R 4 6000 ohm .5 W.
R 5 2500 ohm .2 W.
R 6 16000 ohm 2.0 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 50000 ohm .2 W.
R11 20000 ohm .2 W.
R12 60000 ohm .5 W.
R13 25000 ohm 1.0 W.
R14 80000 ohm .2 W.
R15 150000 Tone Cont.
R16 235 ohm 2.0 W.
R17 100000 ohm .2 W.
R18 500000 ohm .2 W.
T 1 Antenna R.F. Trans.
T 2 Interstage R.F. Trans
T 3 Ist. I.F. Trans.
T 4 2nd I.F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.
L 1 Speaker Field
L 2 Osc. Tracking Coil

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
ANT. & OSC. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2
INT. SECTION	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2

CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.

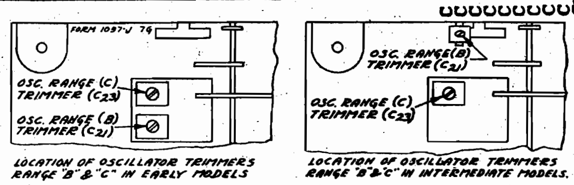


Fig. 4—Oscillator Trimmer Location

MODELS 37G508,37G566
Chassis 7GM
Voltage,Trimmers
Coil Data,Changes

WELLS-GARDNER & CO.

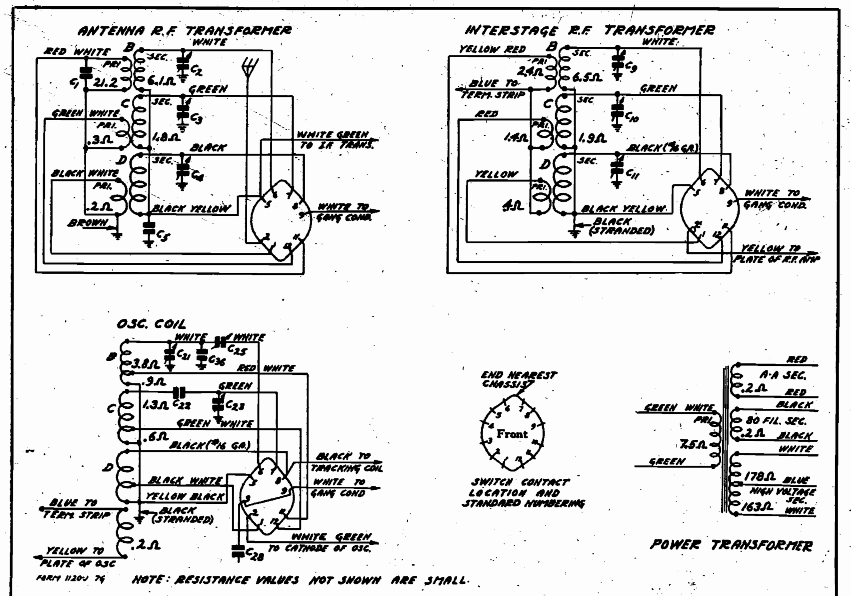


Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)

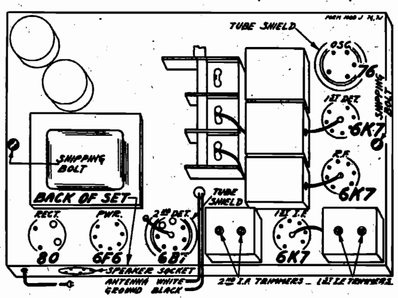


Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6D6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter
(2) As read across R16

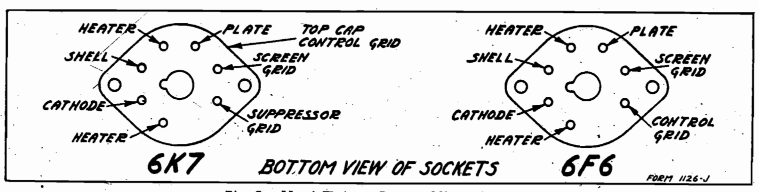


Fig. 7—Metal Tubes—Bottom View of Sockets

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

A standard arrangement for switch contact locatior numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

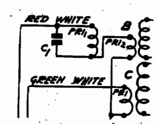


Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

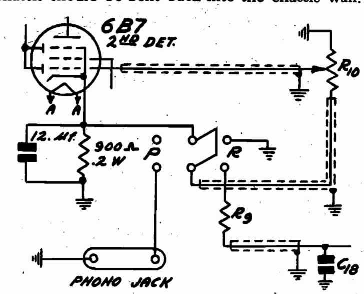


Fig. 9—Phonograph Connections

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

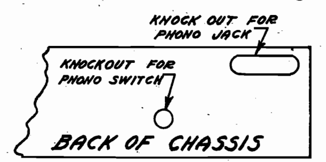


Fig. 10—Location of Phono Knockouts

MODELS 37G508,37G566
Chassis 7GM
Resistance Data
Parts List,Data

WELLS-GARDNER & CO.

Series 7GM–Replacement Parts

NOTICE—A change has been made in our parts numbering system. Old parts which are used in new receivers will have a new number assigned to them. For your convenience we are listing below the new part number and the corresponding old part number, should there be one. **Order by new part number only.**

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the series number and this large letter.

MISCELLANEOUS

New Part No.	Old Part No.	Description	List Price
3A129	2025	Type 80 Tube Socket (4 Prong), Glass Tube	$ .10
3A112	1884	Type 42 Tube Socket (6 Prong), Glass Tube	.10
3A210		Type 6F6 Tube Socket (Metal Tube)	.15
3A126	2022	Type 76 Tube Socket (5 Prong), Glass Tube	.10
3A120	1944	Type 6B7 Tube Socket (7 Prong), Glass Tube	.15
3A113	1885	Type 6D6 Tube Socket (6 Prong), Glass Tube	.10
3A211		Type 6K7 Tube Socket (Metal Tube)	.15
3A58	1637	5 Prong Speaker Socket	.10
12A211		8" Dynamic Speaker Complete with Output Transformer (T7)	5.95
12A221		10" Dynamic Speaker Complete with Output Transformer (T7)	6.45
12A222		6" Dynamic Speaker Complete with Output Transformer (T7)	4.15
17X1	10320	Glass Dial Crystal	.15
28X25	20875	Crystal Retainer Ring	.10
Specify Name of Knob & Model of Receiver		Small Push-on Type Knob	.15
		Large Set Screw Type Knob	.20
		Special Selectivity Control Knob (Set Screw Type)	.45
2X38	10387	Felt Washers (Used behind Knobs)	.10
8X23	10272	Rubber Chassis Mounting Cushions	.10
32X32	40434	Tube Shields	.15
32X30	40424	Tube Shield Bases	.10
4A38	2106	Single Lug Terminal Strip (Mounting foot to Left of lug)	.10
4A17	1421	Single Lug Terminal Strip (Mounting foot to Right of lug)	.10
4A49		Single Lug Terminal Strip (Mounting hole used)	.10
4A50		Two Lug Terminal Strip (Both lugs insulated—Mounting hole in center)	.10
13X80	70786	Line Cord and Plug	.50
13X214		Antenna and Ground Lead Assembly	.30
2A40		3 Section, 3 Position, Band Change Switch	1.70
2A42		Selectivity Switch	.45
30X14	30342	Grid Clip Only—for Glass Tubes	.10
30X44		Grid Clip Only—for Metal Tubes	.10

TRANSFORMERS AND COILS

New Part No.	Code	Description	List Price
9A376	T1	Antenna Trans. and Can Assembly	$2.80
9A377	T2	R. F. Interstage Trans. and Can Assembly	2.25
9A379	T3	1st I. F. Trans. and Can Assembly	1.70
9A380	T4	2nd I. F. Trans. and Can Assembly	2.10
9A378	T5	Oscillator Coil and Can Assembly	2.25
53X91	T6	115 volt 60 cycle Standard Power Transformer	3.60
53X92	T6	115 volt 25 cycle Special Power Transformer	5.95
53X93		115-230 volt 40-60 cycle Special Power Transformer	4.95
53X99	T6	230 volt. 50 cycle Special Power Transformer	4.10
9A391	L2	High Frequency Oscillator Tracking Coil	.25

CONDENSERS

New Part No.	Code	Capacity	Voltage	Type	List Price
47X59	C1	250 mmf.		Moulded	$ .15
17A36	C2	2-25 mmf.		Range B—Antenna Trimmer (1500 KC Adjustment)	.10
17A36	C3	2-25 mmf.		Range C—Antenna Trimmer (5000 KC Adjustment)	.10
17A36	C4	2-25 mmf.		Range D—Antenna Trimmer (15000 KC Adjustment)	.10
46X80	C5	.050 mf.	180	Tubular	.15
46X102	C6	.250 mf.	180	Tubular	.30
46X103	C7	.050 mf.	240	Tubular	.15
46X105	C8	.100 mf.	360	Tubular	.20
17A36	C9	2-25 mmf.		Range B—1st Detector Trimmer (1500 KC Adjustment)	.10
17A36	C10	2-25 mmf.		Range C—1st Detector Trimmer (5000 KC Adjustment)	.10
17A36	C11	2-25 mmf.		Range D—1st Detector Trimmer (15000 KC Adjustment)	.10
46X104	C12	.250 mf.	240	Tubular	.25
46X80	C13	.050 mf.	180	Tubular	.15
17A33	C14, C15	70-150 mmf., 70-150 mmf.		1st I. F. Trimmer Condensers	.40
17A34	C16, C17	70-150 mmf., 150-250 mmf.		2nd I.F. Trimmer Condensers	.40
47X36	C18	50 mmf.		Moulded	.10
46X116	C19	.250 mf.	360	Tubular	.35
46X107	C20	.250 mf.	360	Tubular	.30
17A36	C21	2-25 mmf.		Range B—Oscillator Trimmer (1730 KC Adjustment)	.10
47X60	C22	1400 mmf.		Moulded	.30
17A36	C23	2-25 mmf.		Range C—Oscillator Trimmer (5800 KC Adjustment)	.10
17A36	C24	2-25 mmf.		Range D—Oscillator Trimmer (18300 KC Adjustment)	.10
17A35	C25	300-600 mmf.		Oscillator Padding Condenser (600 KC Adjustment)	.45
	C26	40-100 mmf.		Oscillator Padding Condenser (6000 KC Adjustment)	
46X105	C27	.100 mf.	360	Tubular	.20
47X53	C28	35.0 mmf.		Moulded	.10
44X11	C29	18.0 mf.	300	Wet Electrolytic	1.10
44X10	C30	14.0 mf.	400	Wet Electrolytic	1.25
46X108	C31	.050 mf.	600	Tubular	.20
46X100	C32	.002 mf.	600	Tubular	.15
46X110	C33	.030 mf.	180	Tubular	.15
46X109	C34	.010 mf.	480	Tubular	.15
46X114	C35	.004 mf.	600	Tubular	.15
25A38				3 Gang Condenser Complete with Drive Assembly—less Dial Assembly	4.75

DIAL AND DRIVE ASSEMBLY

New Part No.	Old Part No.	Description	List Price
5A27		Gang Condenser Bracket & Bearing	$ .45
26X220		Drive Shaft	.15
24X207		Drive Pulley with Set Screw	.10
20X70		Main Shaft Pointer Stud	.10
24X205		Gear (Rotary)	.10
24X210		Gear (Stationary)	.10
28X35		Gear Spreader Spring	.10
26X205		Main Pointer Shaft Assembly	.45
26X209		Micrometer Pointer Shaft Assembly	.55
24X209		Compound Gear Assembly	.25
37X33		Tension Pulley Arm Assembly	.15
28X42		Tension Pulley Spring	.10
8X35		Drive Belt	.20
30X36		Dial Clamp to secure Dial Strip to Frame with 6-32 x 3/16" mounting screw)	.10
		Dial Strip Only (Specify Series No. and Name of Receiver)	.50
15X22		Double End Pointer	.10
15X26		Micrometer Pointer	.10
7A26	2012	Pilot Lamp Bulb (6-8V)	.15
7A27	2126	Pilot Lamp Sockets and Spring Clips	.10
15A38		Dial Bracket Assembly Complete	3.90
28X34		Pointer Slide, Take-up Spring Only	.10
10X9		4" Black Drive Cord Only ... Dozen	.10
29X42		Brass Collars and Set Screws Only for Securing above Drive Cord to Shaft	.10

NOTE: The Gang Condenser and Drive Assembly, less Dial Assembly, can be purchased complete—see Condenser List.

RESISTORS

New Part No.	Code	Resistance	Watts	Type	List Price
A94151	R1	151 ohm	0.2	Carbon	$ .15
36X204	R2, R10	2,500 ohm, 500,000 ohm		Dual Volume Control	1.75
B93303	R3	30,000 ohm	0.5	Carbon	.20
B94602	R4	6,000 ohm	0.5	Carbon	.15
A94252	R5	2,500 ohm	0.2	Carbon	.15
D93163	R6	16,000 ohm	2.0	Carbon	.45
A95205	R7	2.0 Megohm	0.2	Carbon	.10
B94304	R8	300,000 ohm	0.5	Carbon	.15
A95503	R9	50,000 ohm	0.2	Carbon	.10
A94203	R11	20,000 ohm	0.2	Carbon	.15
B94603	R12	60,000 ohm	0.5	Carbon	.15
C94253	R13	25,000 ohm	1.0	Carbon	.15
A94803	R14	80,000 ohm	0.2	Carbon	.15
40X203	R15	150,000 ohm		Tone Control	.75
43X42	R16	235 ohm	2.0	Armored Wire Wound	.25
A94104	R17	100,000 ohm	0.2	Carbon	.15
A95504	R18	500,000 ohm	0.2	Carbon	.10

PHONO ATTACHMENT PARTS

New Part No.	Description	List Price
2A31	Phono Switch (Double Pole Double Throw Switch)	$ .60
3A12	Phono Jack	.10
10A36	Switch Knob	.20
45X37	12.0 mf. - 25 Volt - Dry Electrolytic Condenser	.75
A94901	900 Ohm - 0.2 Watt Resistor	.15
	12 Inches of No. 722G Shielded Hookup Wire	.10
4A39	Terminal Strip	.10

General Service Data

D. C. Resistance of Windings
Refer to Fig. 5.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
9A376	Antenna Transformer	T1	
	Range B Primary Winding		21.2
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
9A377	R. F. Interstage Transformer	T2	
	Range B Primary Winding		2.4
	Range C Primary Winding		1.4
	Range D Primary Winding		0.4
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
9A378	Oscillator Coils	T5	
	Range B Grid Coil		
	Red White Tap to White		3.8
	Red White Tap to Ground		0.9
	Range C Grid Coil		
	Green White Tap to Green		1.3
	Green White Tap to Ground		0.6
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
9A379	1st I. F. Transformer	T3	
	Primary Winding		11.6
	Secondary Winding		
	Long Portion		11.4
	Short Portion		0.5
9A380	2nd I. F. Transformer	T4	
	Primary Winding		14.3
	Secondary Winding		4.4
*12A223	Dynamic Speaker (8")	L1	
	Output Transformer Primary Winding	T7	510.
	Output Transformer Sec. Winding	T7	1.0
	Speaker Field		1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
53X91	115 Volt 60 Cycle Power Transformer	T6	
	Primary Winding		7.5
	Tube Filament Winding (A-A)		0.2
	80 Filament Secondary		0.2
	High Voltage Secondary Winding		
	Center Tap to Inside		163.
	Center Tap to Outside		178.
9A391	High Frequency Oscillator Tracking Coil.	L2	1.1

*Speakers with other part numbers may have slightly different values of D. C. resistance.

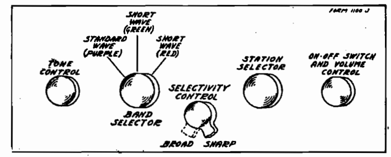


Fig. 1—Arrangement of Controls

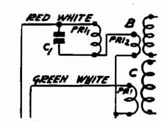


Fig. 8—Antenna Transformer in Early Models

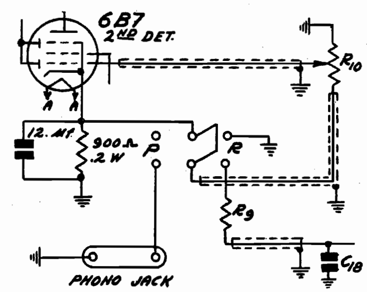


Fig. 9—Phonograph Connections

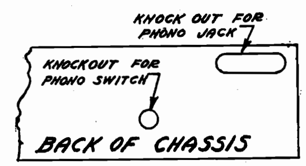


Fig. 10—Location of Phono Knockouts

MODELS 37G508,37G566
Chassis 7GM
Circuit Data,Alignment

WELLS-GARDNER & CO.

Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T5 is the oscillator coil assembly The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T5, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

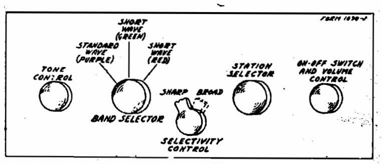


Fig. 1—Arrangement of Controls

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Tuning Frequency Range
- B Range - - - - - - - - - - 535 to 1730 KC.
- C Range - - - - - - - - - 1715 to 5800 KC.
- D Range - - - - - - - - - 5750 to 18300 KC.

Sensitivity
- B Range Average - - - - 0.5 Microvolts Absolute
- C Range Average - - - 1.0 Microvolts Absolute
- D Range Average - - - - 2.0 Microvolts Absolute

Power Consumption - 68 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 3 Watts Undistorted

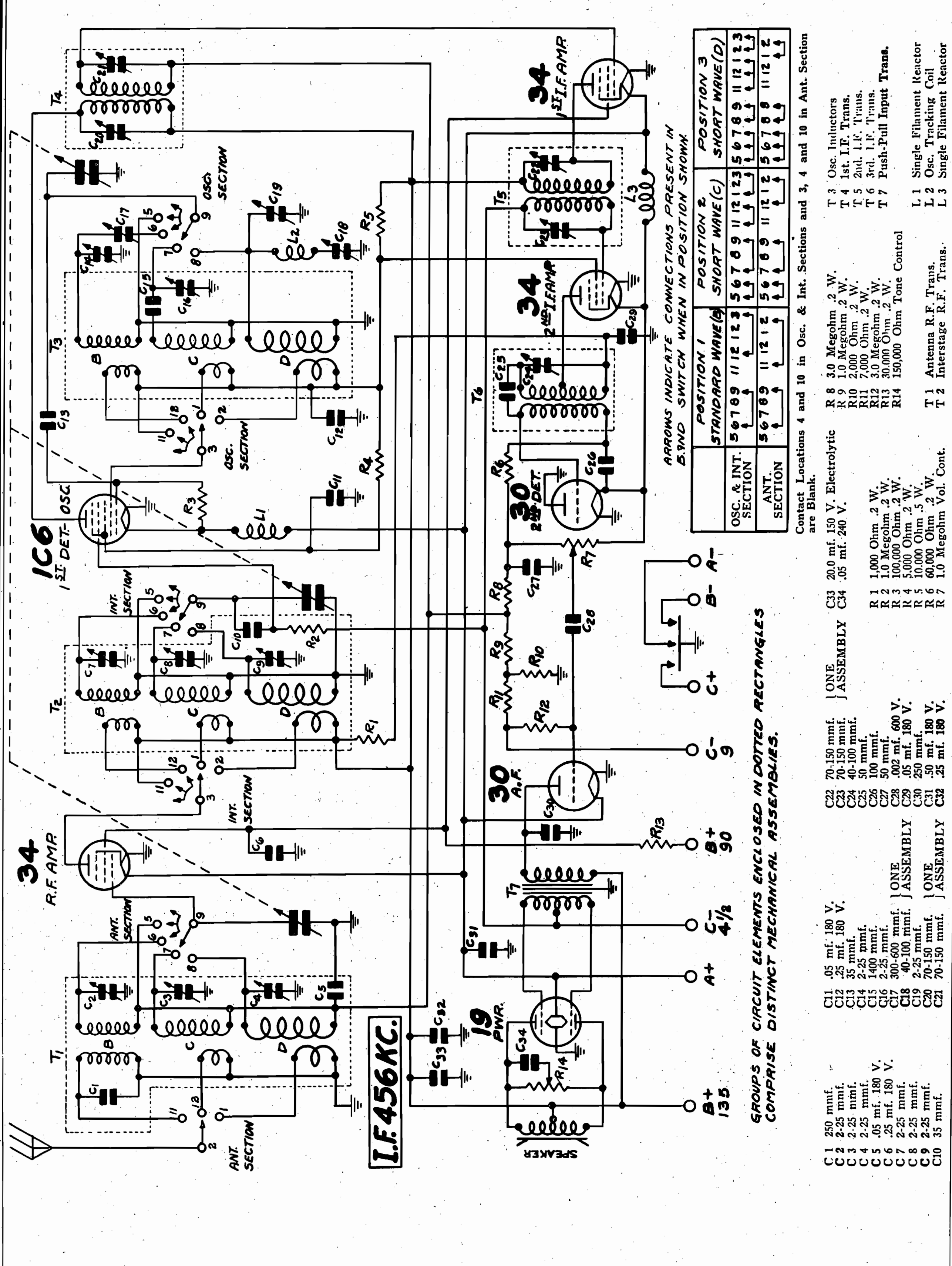
Selectivity - 28 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - 456 KC.

Speaker - - - - - - - - - 6" and 8" Dynamic

MODELS 37H508,37H566
Chassis 7H
Schematic

WELLS-GARDNER & CO.



MODELS 37H508,37H566
Chassis 7H
Voltage,Socket,
Trimmers,Coil Data

WELLS-GARDNER & CO.

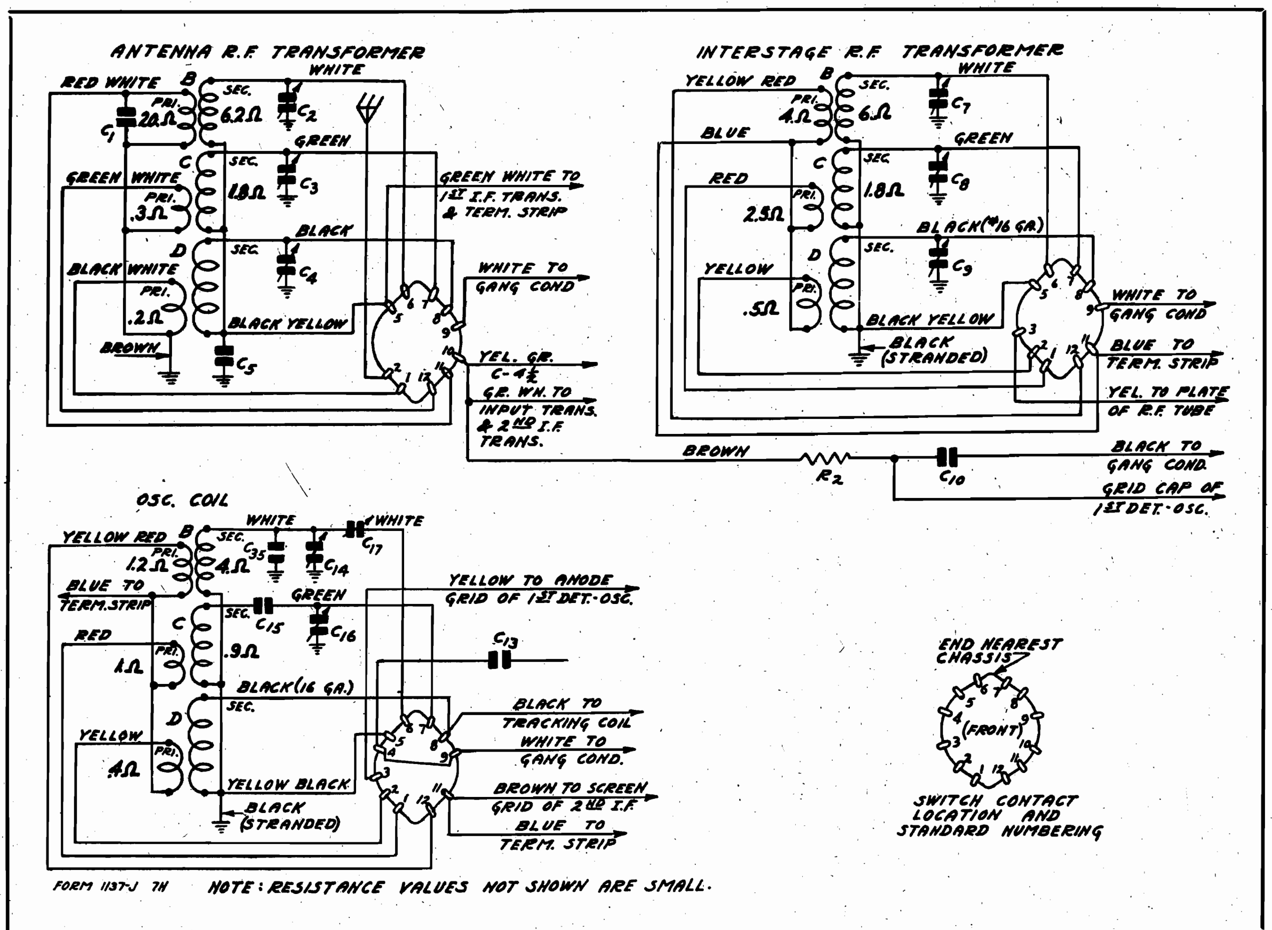


Fig. 11—Color Coding of Coil Wires and D. C. Resistance of Windings (Also See Complete D. C. Resistance List Below)

VOLTAGES AT SOCKETS

Batteries up to Rated Voltages Ant. Shorted to Ground Voltages Read from Negative Fil. Terminal Volume Control at Maximum

Type of Tube	Function	Across Filam't	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M. A.
34	R. F. Amp.	2.0	135	45		1.8
1C6	1st Detector Oscillator	2.0	135 75(1)	65		2.6 1.8(1)
34	1st I. F. Amp.	2.0	135	45		1.8
34	2nd I. F. Amp.	2.0	133	75	4.5	2.25
30	2nd Detector	2.0				
30	A. F. Amp.	2.0	135			3.0
19	Power Amp.	2.0	135		4.5	1.0 (Per Plate)

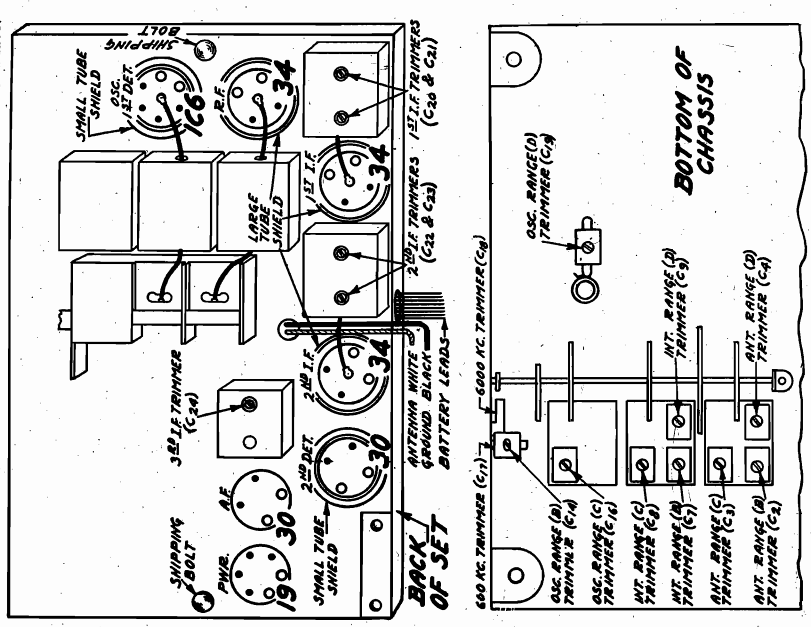


Fig. 9—Arrangement of Trimmers

MODELS 37H508,37H566
Chassis 7H
Drive Cord Data,
Resistances

WELLS-GARDNER & CO.

Replacing Drive Cord

Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector shaft.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket.

Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 12. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one half turns, progressing toward the front.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension

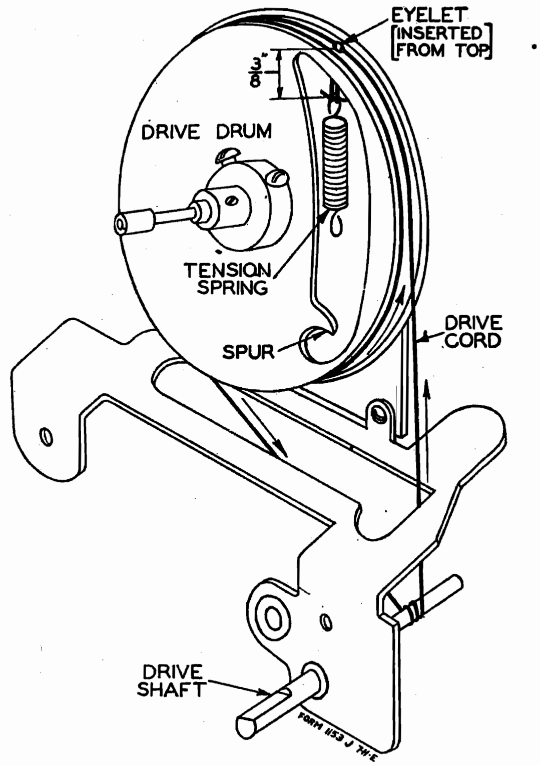


Fig. 12—Drive Cord Replacement

spring. The end of the spring when hanging free should be approximately 3/8" from the flange of the drum as shown in Fig. 12. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Turn the drive shaft back and forth several times.

Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

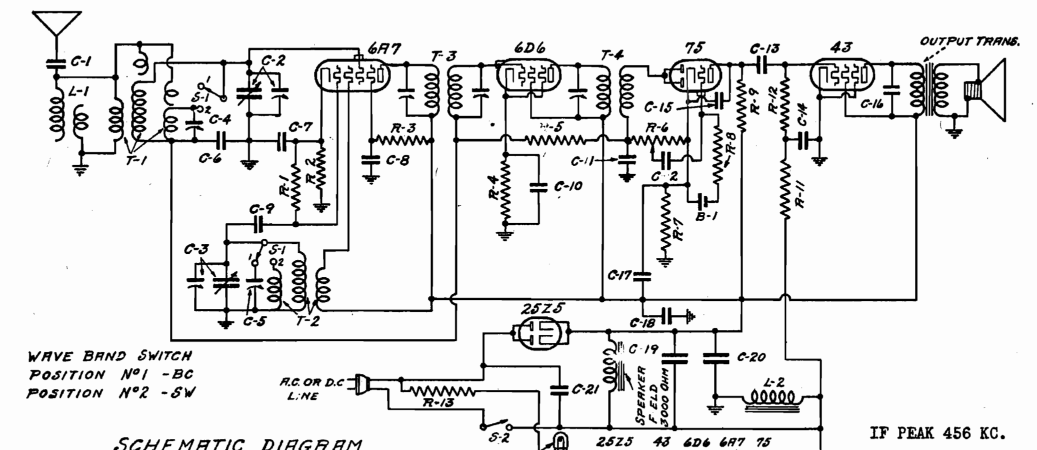
Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A416	Antenna R. F. Transformer	T1	
	Range B Primary Winding		20.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.2
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A392	Interstage R. F. Transformer	T2	
	Range B Primary Winding		4.0
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A393	Oscillator Coils	T3	
	Range B Plate Coil		1.2
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		4.0
	Range C Grid Coil		0.9
	Range D Grid Coil		Small

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A394	1st I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A395	2nd I. F. Transformer	T5	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A396	3rd I. F. Transformer	T6	
	Primary Winding		
	Tap to B+		8.0
	Tap to Variable Trimmer		8.2
	Secondary Winding		126.0
P-50X11	Audio Input Transformer	T7	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.0
	Center Tap to Outside		300.0
P-9A281	Single Filament Reactor	L1	1.2
P-9A391	High Frequency Oscillator Tracking Coil	L2	0.7
P-9A281	Single Filament Reactor	L3	1.2

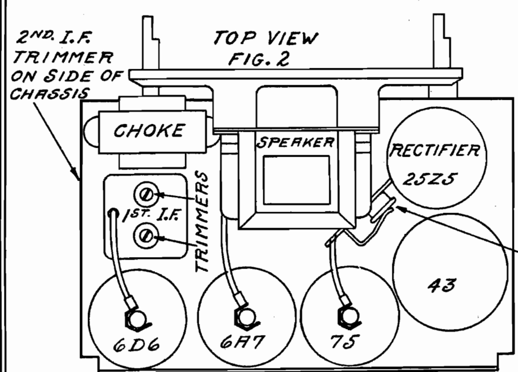
WESTINGHOUSE ELEC. & MFG. CO.

MODEL WR-100
Schematic, Socket Trimmers, Parts

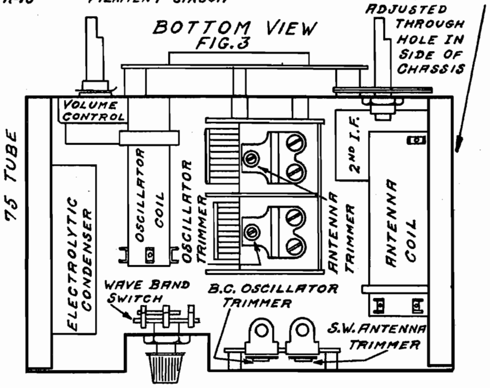


SCHEMATIC DIAGRAM
FIG. 1

IF PEAK 456 KC.



TOP VIEW
FIG. 2



BOTTOM VIEW
FIG. 3

REPLACEMENT PARTS

*Item	Part No.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L2	ZZT-196	Filter choke—500 ohms	$ .60
T1, L1	2DT-199	Two-band antenna coil with 456 kc wave trap	.75
T2	2DT-200	Two-band oscillator coil	.50
T3	2DT-201	456 first i-f transformer	.90
T4	2DT-202A	456 kc second i-f transformer	.90
R1	KR-53	50,000 ohm ¼ watt carbon resistor	.16
R2	CCR-140	350 ohm ½ watt wire-wound resistor	.16
R3	ZZR-196	30,000 ohm ¼ watt carbon resistor	.16
R4	AAR-119	300 ohm ½ watt wire-wound resistor	.16
R5, R8	KR-57	1 megohm ¼ watt carbon resistor	.16
R6, S2	2DR-169	Volume control with line switch—0.5 megohm	.80
R7	PR-79	1,000 ohm ¼ watt carbon resistor	.16
R9, R11, R12	KR-56	0.5 megohm ¼ watt carbon resistor	.16
R10	2DR-200	25 ohm wire-wound metal clad resistor	.16
R13	2DW-62	145 ohm, 15 watt resistor wire in line cord	.60
C1, C11	IC-47A	0.0005 mf mica condenser	.16
C2, C3	2DC-202	Two gang variable condenser	2.20
C4, C5	2DC-212	Dual trimmer on bakelite strip 3 to 30 mmf—each trimmer	.15
C6, C14, C21	AC-6	0.1 mf, 200 volt tubular condenser	.16
C7, C8, C10	BC-12	0.05 mf, 200 volt tubular condenser	.16
C9	EC-24A	0.0001 mf mica condenser	.16
C12, C13	CCC-127	0.01 mf, 200 volt tubular condenser	.16
C15	AC-7A	0.00025 mf mica condenser	.16
C16	HC-34	0.006 mf, 600 volt tubular condenser	.16
C17	EC-19	0.5 mf, 200 volt tubular condenser	.25
C18	BC-13	0.25 mf, 200 volt tubular condenser	.16
C19, C20	2DC-208	Multiple 8 and 16 mf electrolytic filter condenser C19—16 mf, 150 volts. C20—8 mf, 150 volts.	1.50
B1	XXZ-213	Bias cell, one volt	.15
S1	2DS-102A	Wave-band switch	.35
	KS-38B	5" dynamic speaker	3.50
	KL-6	Pilot light, 6-8 volt, .15 amp	.15
	2DW-62	Line cord with built-in resistor wire (R-13)	.60
		Dial Assembly consists of:	
	2DD-21A	Dial scale and bracket	.60
	2DD-21B	Pyralin drive disc	.20
	2DD-21C	Vernier friction drive	.35
	2DD-21D	Dial crystal	.10
	2DD-21E	Dial pointer	.05

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	105	55	1.6	105	6
6D6	105	105	3.0	—	6
75	45	—	0	—	6
43	100	105	0	—	24

Voltage across speaker field (25Z5 cathode to line switch)—125 volts.
Voltage across choke (chassis to line switch)—20 volts.

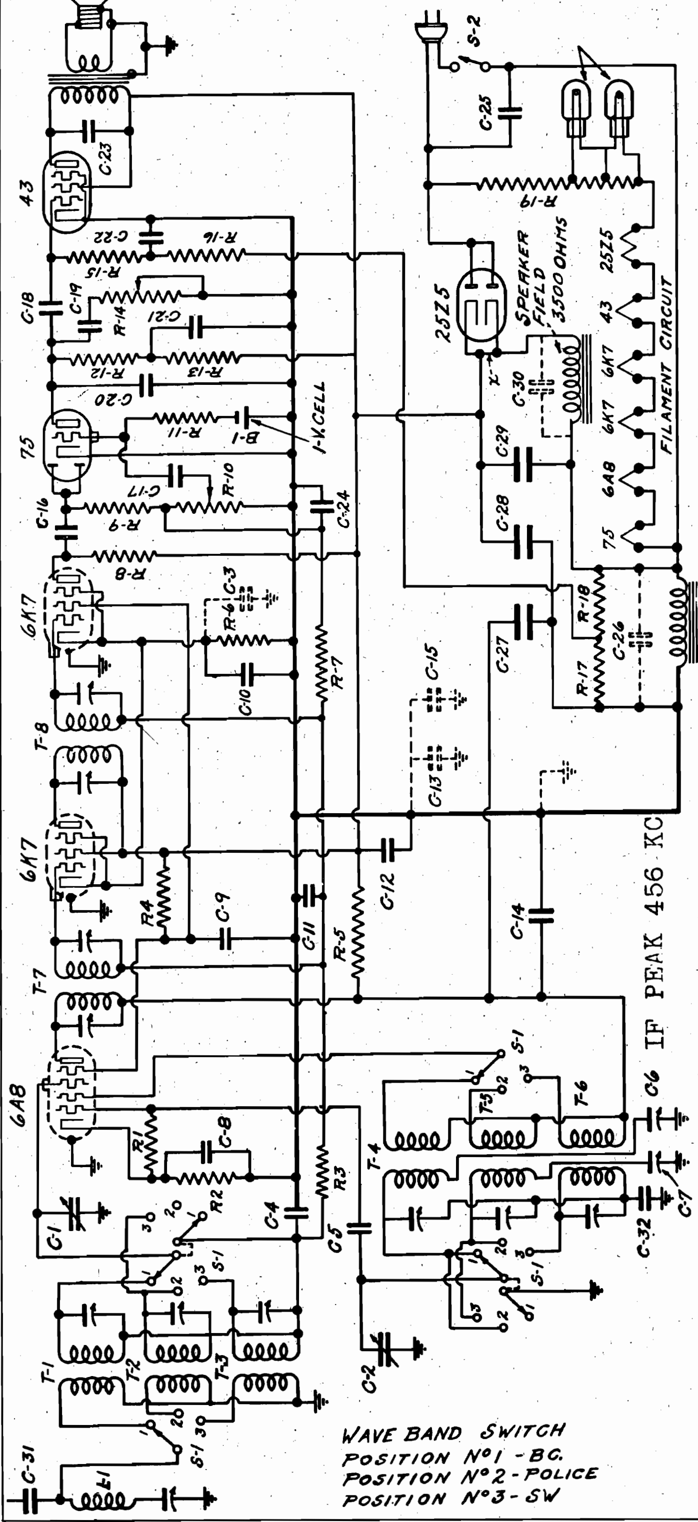
MODEL WR-101
Schematic, Changes
Parts

WESTINGHOUSE ELEC. SUPPLY CO.

Production Changes

In early production runs C3 was a 0.03 mf, 200 v. condenser. Later it was changed to a 0.1 mf, 200 v. condenser and subsequently removed entirely from the circuit.

In later production runs, the following changes were made:
C30 added and circuit broken at X; 25Z5 cathodes separated (see schematic). C26 removed.
B minus grounded to chassis. C15 and C13 removed. C22 placed in the condenser block.
R11 changed from 1 megohm carbon resistor to 0.5 megohm, ¼ watt carbon resistor, our part KR-56.
R16 changed from 0.5 megohm carbon resistor to 0.25 megohm, ¼ watt carbon resistor, our part KR-55.



L1	MMT-149	456 kc adjustable wave-trap
L2	ZZT-196	Filter choke—500 ohms
T1, T2, T3	ZZT-192A	Three-band antenna coil assembly
T4, T5, T6	ZZT-193	Three-band oscillator coil assembly
T7	ZZT-194	456 kc first i-f transformer
T8	ZZT-195	456 kc second i-f transformer
R1, R8	KR-53	50,000 ohm, ¼ watt carbon resistor
R2	FFR-126	500 ohm, ½ watt wire-wound resistor
R3, R7, R11	KR-57	1 megohm, ¼ watt carbon resistor
R4	ZZR-196	30,000 ohm, ¼ watt carbon resistor
R5, R17	LR-65	10,000 ohm, ¼ watt carbon resistor
R6	ZZR-197	850 ohm, ½ watt wire-wound resistor
R9, R13	KR-54	100,000 ohm, ¼ watt carbon resistor
R10, S2	ZZR-190A	Volume control with line switch—0.5
R12	LR-61	200,000 ohm, ¼ watt carbon resistor
R14	ZZR-191A	Tone control—0.25 megohms
R15, R16	KR-56	500,000 ohm, ¼ watt carbon resistor
R18	LR-64	5,000 ohm, ¼ watt carbon resistor
R19	ZZR-192A	Wire-wound ballast resistor—130 ohms
C1, C2	ZZC-184	Two-gang variable condenser
C3, C4, C21, C22, C25	AC-6	0.1 mf, 200 volt tubular condenser
C5	EC-24A	0.0001 mf mica condenser
C6, C7	JJC-144C	Dual adjustable padding condenser C6—250 to 550 mmf. C7—800 to 1400 mmf.
	ZZC-191B	Seven-section condenser block C8—0.1 mf, 200 v. C12—0.1 mf, 200 v. C9—0.1 mf, 200 v. C13—0.1 mf, 200 v. C10—0.2 mf, 200 v. C14—0.1 mf, 200 v. C11—0.05 mf, 200 v.
C15	ZZC-205	0.02 mf, 200 v. tubular condenser
C16, C20, C24	AC-7A	0.00025 mf mica condenser
C17, C18	CCC-127	0.01 mf, 200 v. tubular condenser
C19	ZZC-213	0.006 mf, 200 v. tubular condenser
C23, C31	AAC-114	0.001 mf mica condenser
C26	BC-13	0.25 mf, 200 v. tubular condenser
C27, C28, C29	ZZC-192A	4, 8 and 16 mf electrolytic filter condenser block C27—4 mf, 150 v. C29—16 mf, 150 v. C28—8 mf, 150 v.
C30	YC-98A	Tubular 4 mf, 150 v. electrolytic condenser
C32	ZZC-206	0.005 mf mica condenser
	ZZS-128A	5" dynamic speaker
S1	ZZS-129A	Wave-band switch
	KL-6	Pilot light, 6-8 volt, .15 amp.
	ZZD-26A	Airplane dial
B1	XXZ-213	Bias cell, one volt
	ZZZ-209	Escutcheon with crystal

WESTINGHOUSE ELEC. & MFG. CO.

MODEL WR-101
Alignment
Voltage

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1700, 4500 and 15,000 kc should be used. In addition, an output meter should be used across the voice coil or output transformer for observing maximum response.

I-f Alignment

The i-f transformers ZZT-194 and ZZT-195 are located on the top of the chassis. The four trimmers, two for each i-f transformer, are located at the tops of the cans. Set the wave-band switch to broadcast (extreme clockwise position) and rotate variable condenser to minimum. Feed 456 kc to grid of the 6A8 tube and adjust the four i-f trimmers for maximum response. Then feed 456 kc through the antenna and adjust the wave-trap trimmer for *minimum response.* The trimmer is on the wave-trap, which is located on top of the chassis behind the speaker.

Location of Coils

The antenna coils for the three bands are wound on one form and mounted on top of the chassis to the right of the speaker. The three trimmers for these coils are mounted on a bakelite strip above the tubing. The trimmer nearest the speaker is for the short-wave antenna coil. The center trimmer is for the police antenna coil and the trimmer furthest from speaker is for the broadcast antenna coil.

The oscillator coils for the three bands are wound on one form and mounted underneath the chassis deck on the right-hand wall with the trimmers facing out. The trimmer screws are available through three holes in the chassis wall. The trimmer closest to front is for the broadcast oscillator coil, the central trimmer is for the police oscillator coil and the trimmer furthest from front is for the short-wave oscillator coil.

The adjusting screws for the dual padder are also available at the right-hand chassis wall. The screw closer to the front is for the broadcast band and the other is for the police band. The short-wave band has no adjustable padder.

Broadcast Alignment

Set the wave-band switch to broadcast position (extreme clockwise) and dial pointer to 600. Feed 600 kc through antenna lead and adjust broadcast padder (lower row on right wall, closest to front) for maximum response. Set pointer to 1600, feed 1600 kc and adjust the broadcast oscillator trimmer (top row on right wall, closest to front) for maximum response, and then the broadcast antenna trimmer (on antenna coil, furthest from speaker). Return pointer to 600 and rock the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1600 and realign the antenna and oscillator trimmers.

Police Alignment

Set the wave-band switch to police (central position), pointer to 1700 and feed 1700 kc through antenna lead. Adjust police band padder (furthest from front on right wall, lower row) for maximum response. Set pointer to 4500 and feed 4500 kc. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are heard, select the one of minimum capacity (see General Instructions below), then adjust police band antenna trimmer (central one on top) for maximum response, selecting the peak of maximum capacity. Again feed 1700 kc, with pointer at 1700, rock variable condenser and adjust police band padder for maximum response. Realign at 4500 if necessary.

Short-Wave Alignment

Set wave-band switch to counter-clockwise (short-wave) position and pointer at 15 megacycles. Feed 15,000 kc through antenna. Adjust short-wave oscillator trimmer (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity.

Check all three bands for dead spots or incorrect image responses.

General Instructions

The set's oscillator is higher in frequency than the signal on all three bands. Images, therefore, should be observed on the low-frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this, always keep re-tuning the variable condenser.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (cathode of 43 tube). Line voltage for these readings was 117.5 volts, a.c., 60 cycles.

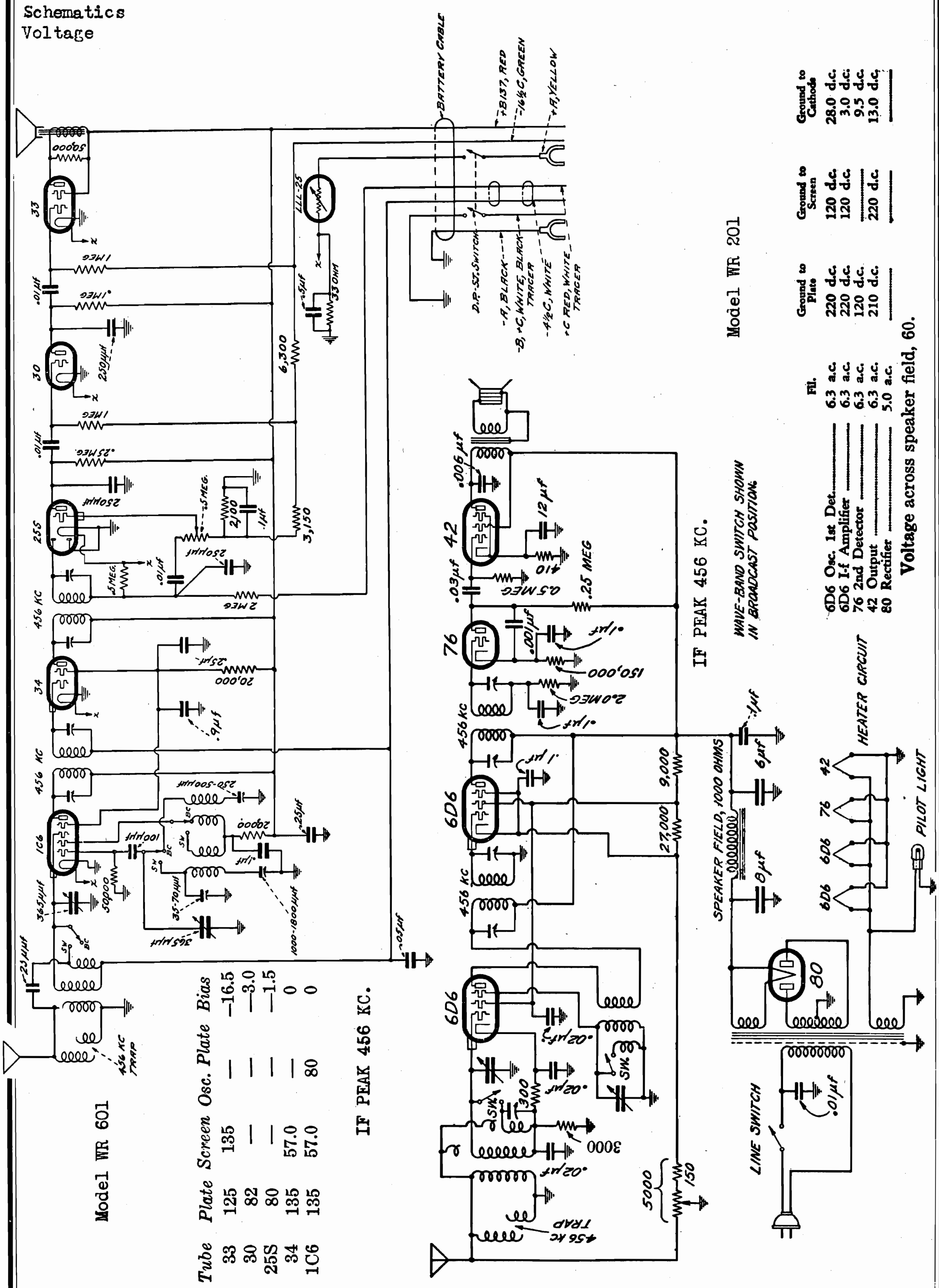
Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A8	82	50	2	82	6
6K7 1st i-f	107	107	5	—	6
6K7 2nd i-f	65	50	5	—	6
75	50	—	0	—	6
43	95	107	0	—	24

Voltage across speaker field (25Z5 cathode to line switch) — 107 volts.

Voltage across choke (43 cathode to line switch) — 22 volts.

MODEL WR-201
MODEL WR-601
Schematics
Voltage

WESTINGHOUSE ELEC. SUPPLY CO.



Model WR 601

Tube	Plate	Screen	Osc. Plate	Bias
33	125	135	—	−16.5
30	82	—	—	−3.0
25S	80	—	—	−1.5
34	135	57.0	—	0
1C6	135	57.0	80	0

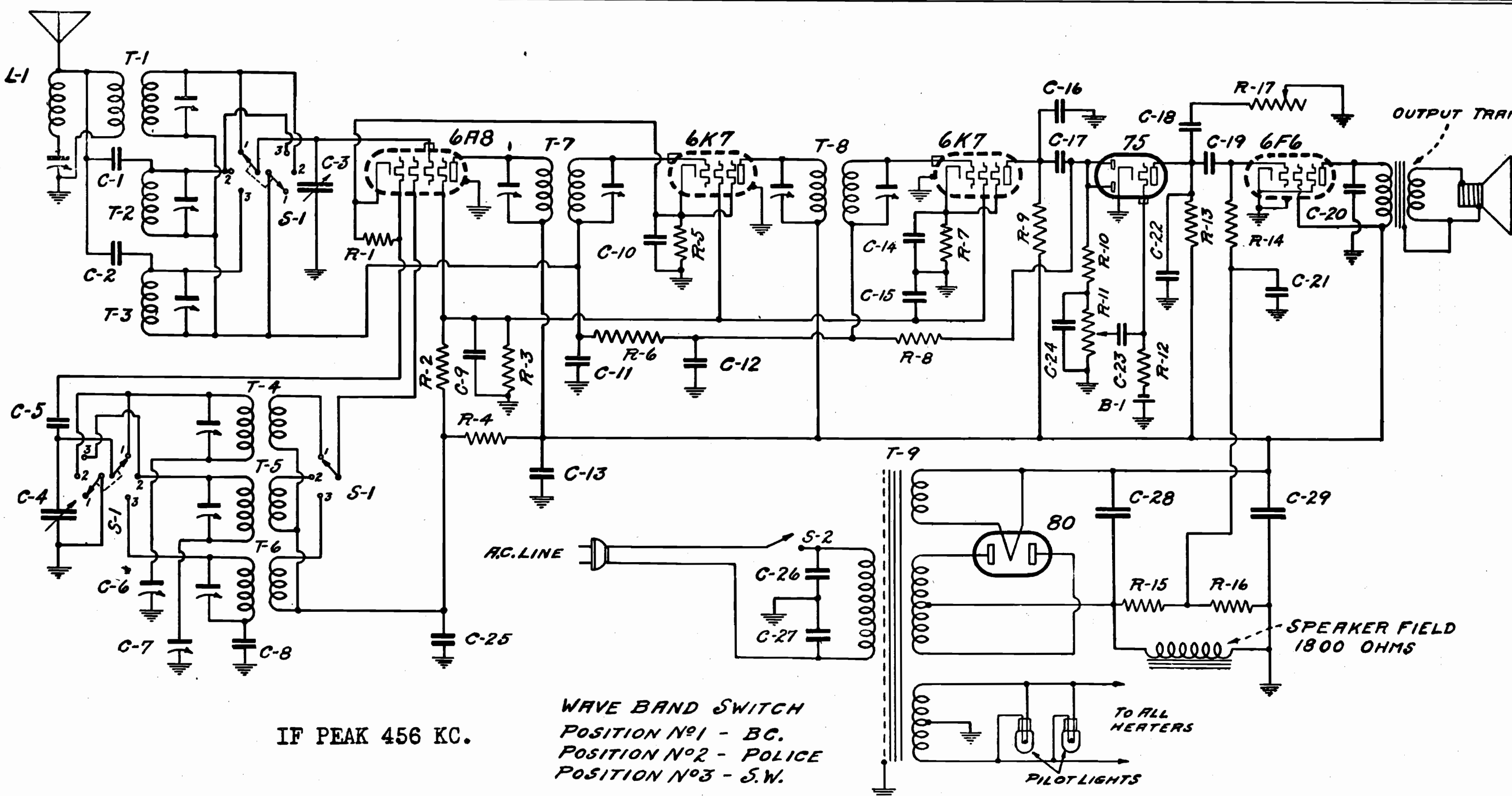
Model WR 201

	Fil.	Ground to Plate	Ground to Screen	Ground to Cathode
6D6 Osc. 1st Det.	6.3 a.c.	220 d.c.	120 d.c.	28.0 d.c.
6D6 I-f Amplifier	6.3 a.c.	220 d.c.	120 d.c.	3.0 d.c.
76 2nd Detector	6.3 a.c.	120 d.c.	—	9.5 d.c.
42 Output	6.3 a.c.	210 d.c.	220 d.c.	13.0 d.c.
80 Rectifier	5.0 a.c.	—	—	—

Voltage across speaker field, 60.

WESTINGHOUSE ELECTRIC & MFG. CO.

MODELS WR-203, WR-303
Schematic, Voltage



IF PEAK 456 KC.

WAVE BAND SWITCH
POSITION No1 - BC.
POSITION No2 - POLICE
POSITION No3 - S.W.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 v., a.c., 60 cycles.

Tube	*Plate*	*Screen*	*Osc. Plate*	*Cathode*	*Fil*
6A8	250	75	160	5	6.3 a-c
6K7 1st i-f	250	75	—	5	6.3 a-c
6K7 2nd i-f	145	75	—	5	6.3 a-c
75	100	—	—	0	6.3 a-c
6F6	225	250	—	0	6.3 a-c

B plus at 80 filament—355 volts.
Voltage across speaker field—105 volts.

MODELS WR-203, WR-303
Alignment, Data, Parts

WESTINGHOUSE ELEC. & MFG. CO.

ADJUSTMENTS

This receiver was carefully aligned and adjusted at the factory. *No one but a serviceman experienced with short-wave receivers should attempt to realign the receiver.*

An oscillator with frequencies of 456, 600, 1600, 1800, 4500 and 15,000 kc. should be used. In addition, an output meter should be used across the voice coil or output transformer for indicating maximum response.

Alignment Procedure:

1. Set variable condenser to minimum and turn wave-band switch to broadcast (clockwise). Introduce a 456 kc. signal on grid of the 6A8 tube. Adjust both trimmers of each of the two i-f transformers for maximum deflection on the output meter (maximum response). Repeat the process.
2. Remove 456 kc. signal from 6A8 grid and feed it through the antenna. Adjust the 456 kc. interference trap trimmer for *minimum response.* The trap trimmer is at the rear wall beneath the chassis deck.
3. With pointer at 600 feed 600 kc. through the antenna and adjust the broadcast series padder (headless set-screw, closest to front) for maximum response. Move pointer to 1600, feed 1600 kc., and align the broadcast oscillator (on left row, nearest front) and then the antenna (on right row, furthest from front). Return to 600 kc. and readjust padder, rocking the variable condenser for maximum response. Return to 1600 kc. again and check. (See General Instructions below).
4. Set switch at police-band (central position) and pointer at 1800. Feed 1800 kc. and align police-band series padder (headless set-screw, furthest from front). Move pointer to 4500, feed 4500 kc., and align oscillator (middle one at left) and antenna (middle one at right). Return to 1800 kc. and readjust series padder, rocking for maximum response. Return again to 4500 kc. and check.
5. Set switch at short-wave (counter-clockwise) and pointer at 15 megacycles (the thin line on the dial marking the edge of the 19 meter band). Feed 15,000 kc. and align the short-wave oscillator (furthest from front at left), choosing the minimum capacity peak, and then the antenna (nearest front at right) choosing the maximum capacity peak. The receiver is now completely aligned.

General Instructions

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

Replacements Should Be Made With Genuine Factory Parts For Best Results

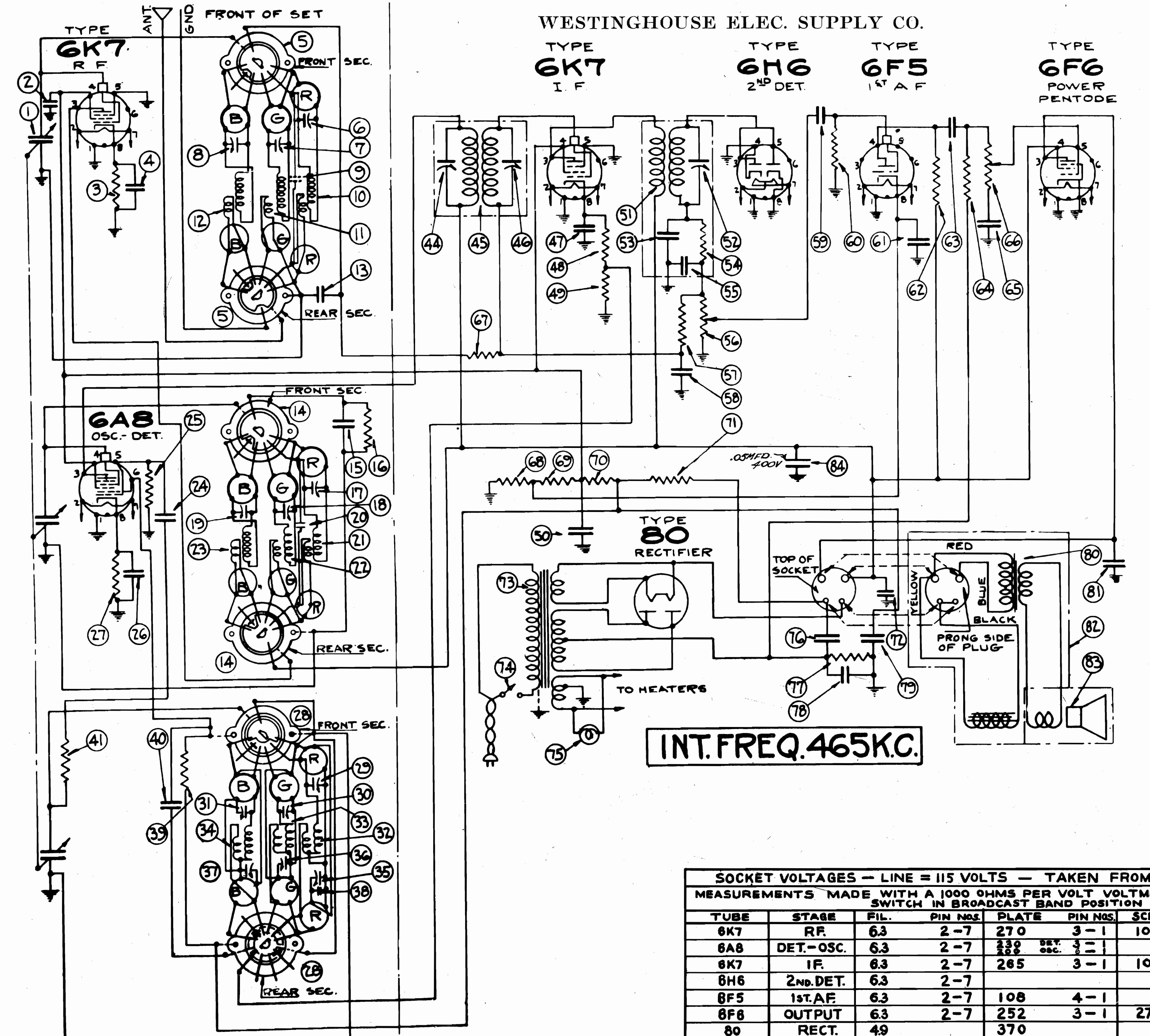
REPLACEMENT PARTS

* ITEM	PART NO.	DESCRIPTION	List Price Effective as of Sept. 1st, 1935 PRICE
L1	MMT-149	456 kc tunable wave trap	$ .35
T1, T2, T3	XXT-186	Three band antenna coil assembly	1.75
T4, T5, T6	XXT-187	Three band oscillator coil assembly	1.75
T7	XXT-188A	456 kc 1st i-f transformer	1.15
T8	XXT-189A	456 kc 2nd i-f transformer	1.15
T9	XXT-190	Power transformer	2.85
R11	XXR-185A	Volume control—.25 megohm	.60
R17, S2	XXR-186A	Tone control with switch—.25 megohm	.80
R7	KR-51	2,500 ohm—¼ watt carbon resistor	.16
R1, R9	KR-53	50,000 " " " " "	.16
R10, R14	KR-54	100,000 " " " " "	.16
R13	LR-61	200,000 " " " " "	.16
R16	XXR-202	210,000 " " " " "	.16
R6	KR-55	250,000 " " " " "	.16
R12	KR-56	500,000 " " " " "	.16
R8	KR-57	1 meg. " " " " "	.16
R15	XXR-203	1.1 " " " " " "	.16
R5	FFR-126	500 ohm wire-wound resistor—½ watt	.16
R2, R3, R4	XXR-194	30,000 ohm metal clad wire-wound tapped resistor R2=10,400 ohms—1 watt R3=13,000 ohms—1 watt R4= 6,600 ohms—1¼ watt	.40
C3, C4	XXC-187	Two-gang variable condenser	2.15
C28, C29	XXC-188	Dual 8 mf dry electrolytic condenser	1.65
C6, C7	JJC-144D	Dual padding condenser C6—250 to 600 mmf. C7—800 to 1600 mmf.	.60
C1, C2, C16	IIC-133A	.000025 mf mica condenser	.16
C5	EC-24A	.0001 mf mica condenser	.16
C17	AC-7A	.00025 mf mica condenser	.16
C22, C24	IC-47	.0005 mf mica condenser	.16
C8	XXC-197	.0038 mf mica condenser	.25
C18	XXC-207	.005 mf-400 v. tubular condenser	.16
C20	ZC-115	.006 mf-1000 v. tubular condenser	.16
C23	CCC-127	.01 mf-200 v. tubular condenser	.16
C19	KC-58	.01 mf-400 v. tubular condenser	.16
C11, C12	BC-12	.05 mf-200 v. tubular condenser	.16
C26, C27	XXC-220	Dual .01 mf, 250 volt condenser	.30
C9, C14 C10, C15	AC-6	.1 mf-200 v. tubular condenser	.16
C13, C25	EEC-132	.1 mf-400 v. tubular condenser	.16
C21	BC-13	.25 mf-200 v. tubular condenser	.16
	XXS-127	6" dynamic speaker	4.25
	2BS-130	10" dynamic speaker	6.25
S1	XXS-117A	Wave-band switch	1.10
	KL-6	Pilot light, 6-8 volt, .15 amp	.15
	XXD-25C	Airplane dial	2.10
	XXZ-195	Escutcheon with crystal	.50
B1	XXZ-213	Bias cell, one volt	.15

When Ordering Replacement Parts Specify Part Number

MODELS WR-204, WR-304
Schematic, Voltage
Resistance Data

WESTINGHOUSE ELEC. SUPPLY CO.



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA. No.	PRIM.	SEC.
B-ANT.	12	22 ohms	4 ohms
B-RF.	23	.5 "	4.5 "
B-OSC.	34	1.5 "	3 "
G-ANT.	11	3.2 "	1 "
G-RF.	22	1.5 "	1 "
G-OSC.	33	.5 "	1 "
R-ANT.	10	1 "	.04 "
R-RF.	21	2 "	.04 "
R-OSC.	32	.5 "	.04 "
1st. I.F.	45	13 "	13 "
2nd. IF	51	11.5 "	11.5 "
OUTPUT TRANS.	80	450 "	.5 "
SPKR. FIELD		1900 "	
VOICE COIL	83	3 "	

SOCKET VOLTAGES — LINE = 115 VOLTS — TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	R.F.	6.3	2-7	270	3-1	108	4-1	2.6	1-8
6A8	DET.-OSC.	6.3	2-7	230 DET. / 200 OSC.	3-1 / 6-1			4.0	1-8
6K7	I.F.	6.3	2-7	265	3-1	105	4-1	5.5	1-8
6H6	2nd. DET.	6.3	2-7						
6F5	1st. A.F.	6.3	2-7	108	4-1			1.2	1-8
6F6	OUTPUT	6.3	2-7	252	3-1	270	4-1	18.5 across #77 res.	
80	RECT.	4.9		370					

WESTINGHOUSE ELEC. SUPPLY

WESTINGHOUSE RADIO MODELS WR 204 AND WR 304

Seven-Tube, Superheterodyne Receiver

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes --------- 2 #6K7, 1 #6A8, 1 #6H6, 1 #6F5, 1 #6F6, 1 #80 Total 7
Power Supply ---------------------------------- 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption -- 60 Watts
Maximum Undistorted Output -- 2.5 Watts
Maximum Output -- 3.3 Watts
Tuning Ranges ------------------------------------ (Black Band 540 to 1800 K.C. (Green Band 1800 to 6000 K.C. (Red Band 6000 to 18500 K.C.
Line-up Frequencies-I.F.465K.C.,1600K.C.,570K.C.,5500K.C.,1900K.C.,17000K.C., & 6000K.C.

GENERAL DESCRIPTION

This model is a seven-tube, three-band superheterodyne receiver designed for world wide reception and employs the new all-metal tubes.

The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by a combined first detector-oscillator circuit employing a 6A8 tube. These tubes with their associated circuits, (coils, variable condensers, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillators) comprise a complete assembly in compact form separately cushioned from the main chassis. This assembly is known as the "Precision Tuner". From the high frequency assembly the energy passes thru an I.F. selective transformer and to an I.F. amplifier tube (type 6K7). From here further selection takes place and the energy is sent to the diode (type 6H6) where second detection takes place and voltages are provided for automatic volume control. A first audio amplifier tube (type 6F5) follows the diode and this is further followed by a pentode power amplifier tube (type 6F6). A type 80 rectifier supplies the direct current for energizing the tubes.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF PRECISION TUNER

If a component part located underneath the switch and coil assemblies of the "Precision Tuner" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which fastens the mounting plate of the wave - change switch shaft to the chassis.Pull switch shaft out straight.
3. Unsolder the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch sections are located on top of the "Precision Tuner" and are indicated by X, Y and Z in figure #3. Remove the corresponding screw.
5. Each individual section can then be pulled out straight.
Note: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the socket before the section can be removed. On the oscillator section, the blue lead from the 6A8 detector-oscillator socket will have to be unsoldered at the switch terminal.
6. After repairs have been made resolder the leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Precision Tuner". This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screw.
8. Resolder the stator and rotor leads on the gang condenser.
9. Replace the switch shaft and the mounting plate fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slots in each switch disc.
10. Before replacing the coil shields, it might be advisable to bend the shields slightly to assure that positive contact is made. To do this hold the shield with your two hands using the thumbs and the first two fingers as shown in figure #1. Pull out the ends of the shields slightly and at the same time apply a little pressure on the sides of the shield as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contacts, this will also prevent the shields from rattling.

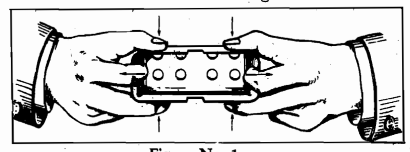


Figure No. 1

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal. Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in figures #2, #3 and #4 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full and turn tone control to the bass position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measureable reading on output meter when test signal is applied to the grid of the 6K7 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust trimmer #52 to maximum output, reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 detector-oscillator and adjust #44 and #46 to maximum output.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to the Black or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C.
3. Apply test signal to antenna terminal of chassis thru a .0002 mfd. series condenser and adjust #31, #19 and #8 to maximum output.
4. Set test oscillator and dial indicator to 570 K.C. and adjust #37 to maximum output.
5. Return to 1600 K.C. setting with both test oscillator and dial indicator and readjust #31, #19 and #8 for accuracy.

ADJUSTMENT OF GREEN BAND

Note: In adjusting the two short-wave Bands (Green and Red) a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short wave antenna.

1. Set wave-change switch to the Green Band position.
2. Set test oscillator and dial indicator to 5500 K.C. and adjust #30, #18 and #7 to maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #36 to maximum output.
4. Return to 5500 K.C. setting and make readjustment of #30, #18 and #7.

ADJUSTMENT OF RED BAND

1. Set wave change switch to the Red Band position.
2. Set test oscillator and dial indicator to 17000 K.C. and adjust #29, #17 and #6 to maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #35 to maximum output.
4. Return to 17000 K.C. setting and make readjustment of #29, #17 and #6.
Note: The adjustment of the two short-wave oscillator lag condensers (#35 and #36) is best made by the max-max. method. This is done as follows:

Tune the receiver with the left hand by means of the tuning knob and adjust the lag condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading on the output meter. Change the lag condenser further in the same direction retune receiver and note reading. If the output drops with the second adjustment, reverse direction of the adjust of lag condenser. Continue the type of trial and error adjustment until no further improvement can be made when either the tuning control or the lagging condenser are changed. While this procedure may appear to be difficult, facility can easily be acquired by practice and the operation requires only a few minutes.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out thru the air vents making the condenser appear to be defective. If the set is left in this position too long the condenser may be injured.

WESTINGHOUSE ELEC. SUPPLY CO.

DIA.#	PART#	DESCRIPTION
1	CG 9527	Variable gang condenser
2	SA 106386	.05 mfd. 200 V. condenser
3	RE 9529	300 ohm ½ W. resistor
4	SA 106386	.05 mfd.200 V. condenser
5	SW 9527	Ant. section of "Centr-O-matic" unit complete with coils,switch and trimmers
6	CS 9511	4 to 25 mmf. antenna trim condenser (Red Band)
7	CS 9511	4 to 25 mmf. antenna trim condenser (Green Band).
8	CS 9511	4 to 25 mmf. antenna trim condenser(Broadcast Band)
9		Twisted pair of wire-part of RC 9571
10	RC 9571	Antenna coil assembly (Red Band)
11	RC 9574	Antenna coil assembly (Green Band)
12	RC 9577	Antenna coil assembly (Broadcast Band)
13	CW 9513	.05 mfd. 200 V. condenser
14	SW 9588	R.F. unit complete with coils,switch and trimmers
15	CW 9513	.05 mfd. 200 V. condenser
16	RE 9527	5000 ohm ½ W. resistor
17	CS 9511	4 to 25 mmf. R.F. trim condenser (Red Band)
18	CS 9512	1.5 to 10. mmf. R.F. trim condenser (Green Band)
19	CS 9512	1.5 to 10. mmf. R.F. trim condenser (Broadcast Band)
20	CM 9512	6 mmf. mica condenser
21	RC 9572	R.F. coil assembly (Red Band)
22	RC 9575	R.F. coil assembly (Green Band)
23	RC 9578	R.F. coil assembly (Broad-cast Band)
24	SA 106417	.0001 mica condenser
25	RE 9524	50,000 ohm ½ W. resistor
26	SA 106386	.05 mfd. 200 V. condenser
27	RE 9529	300 ohm ½ W. resistor
28	SW 9589	Oscillator section of "Centr-O-matic" unit,complete with coils,switch, trim and lag condensers
29		3 to 15 mmf. oscillator trim condenser-part of CS 9520 (Red Band)
30		3 to 15 mmf. oscillator trim condenser-part of CS 9520 (Green Band)
31		5 to 25 mmf. oscillator trim condenser-part of CS 9517 (Broadcast Band)
32	RC 95109	Oscillator coil assembly (Red Band)
33	RC 9576	Oscillator coil assembly (Green Band)
34	RC 9579	Oscillator coil assembly (Broadcast Band)

DIA.#	PART#	DESCRIPTION
35		600 to 1600 mfd. osc. lag condenser-part of CS 9520 (Red Band)
36		800 to 1600 mfd. osc. lag condenser-part of CS 9520 (Green Band)
37		300 to 600 mfd. oscillator lag condenser-part of CS 9517 (Broadcast Band)
38	CM 959	.002 mfd. mica condenser
39	RE 9526	5000 ohm 1 W. resistor
40	CW 9513	.05 mfd, 200 V. condenser
41	RE 9537	50 ohm ½ W. resistor
44		30 to 100 mmf. trim condenser-part of IC 9527
45	IC 9527	1st I.F. transformer assembly
46		30 to 100 mmf. trim condenser-part of IC 9537.
47	SA 102493	.05 mfd. 200 V. condenser
48	SA 105261	400 ohm ½ W. resistor
49	SA 105267	1000 ohm ½ W. resistor
50	SA 102497	.25 mfd. 200 V. condenser
51	IC 9537	2nd I.F. transformer assembly
52		30 to 100 mmf. trim condenser-part of IC 9537
53		50 mmf. mica condenser - part of IC 9537
54		50,000 ohm ½ W. resistor-part of IC 9537
55		100 mmf. mica condenser-part of IC 9537
56	VR 959	Volume control (½ meg.)
57	RE 9530	1 meg. ½ W. resistor
58	SA 106386	.05 mfd. 200 V. condenser
59	CW 9512	.02 mfd. 400 V. condenser
60	RE 9530	1 meg. ½ W. resistor
61	CE 9515	12. mfd. 25 V. condenser
62	SA 105279	250,000 ohm ½ W. resistor
63	CW 9512	.02 mfd. 400 V. condenser
64	RE 9531	250,000 ohm ½ W. resistor
65	SA 106403	.001 mfd. 600 V. condenser
66	VR 9512	Tone control (½ meg.)
67	SA 105276	100,000 ohm ½ W. resistor
68	SA 105260	300 ohm ½ W. resistor
69	SA 104966	30,000 ohm ½ W. resistor
70	SA 101404	15,000 ohm 1 W. resistor
71	SA 103635	10,000 ohm 2 W. resistor
72		4. mfd. 450 V. elect. condenser-part of CE 954
73	TR 959	Power transformer
74		Line switch-part of VR9512
75	SA 106809	Dial lights 6 V. (3 used)
76		8. mfd. 475 V. elect. condenser-part of CE 954
77	RE 9523	300 ohm resistor
78		20. mfd. 25 V. elect. condenser-part of CE 954
79	CE 9511	8. mfd. 300 V. elect. condenser
80	TR 9515	Speaker output transformer
81	SA 103659	.005 mfd. 400 V. condenser
82	SK 9511	Speaker

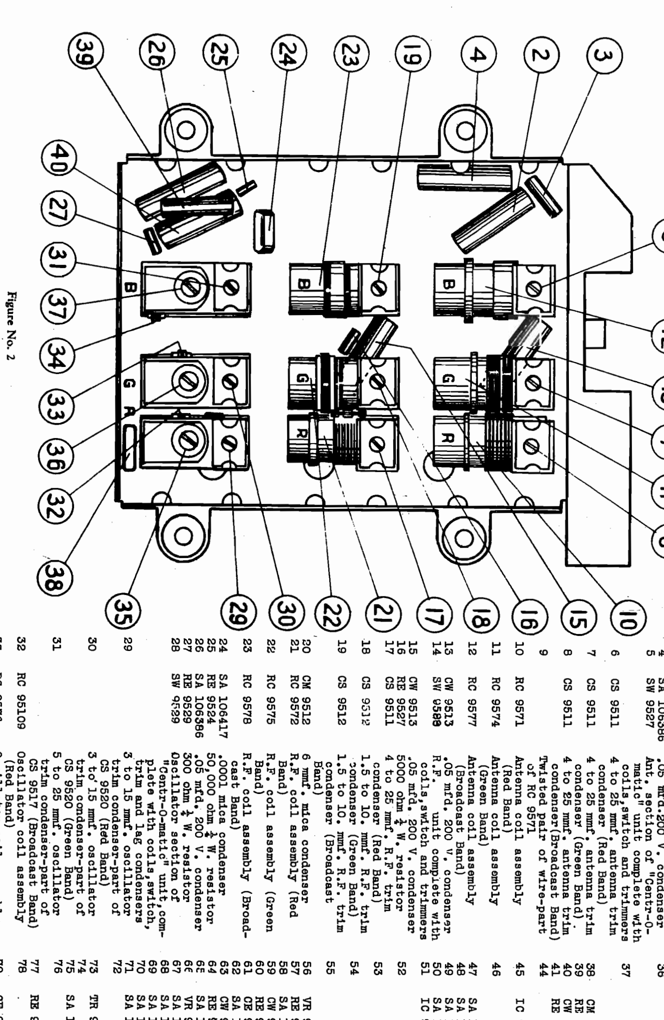


Figure No. 2

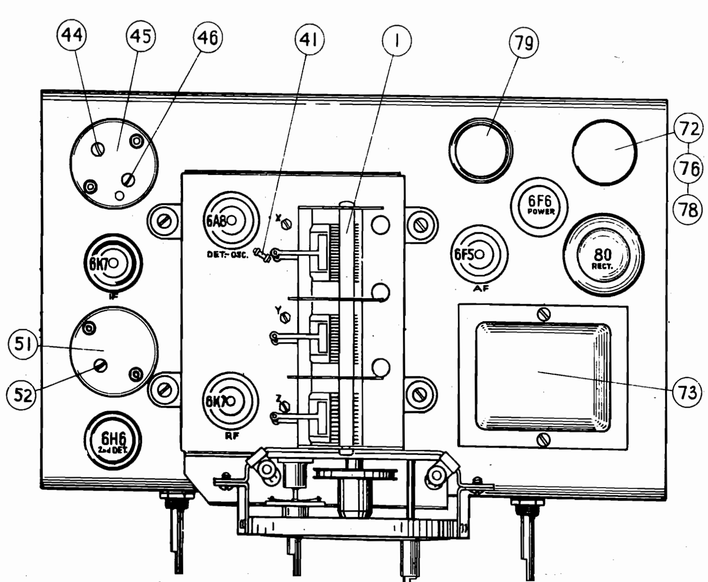


Figure No. 3

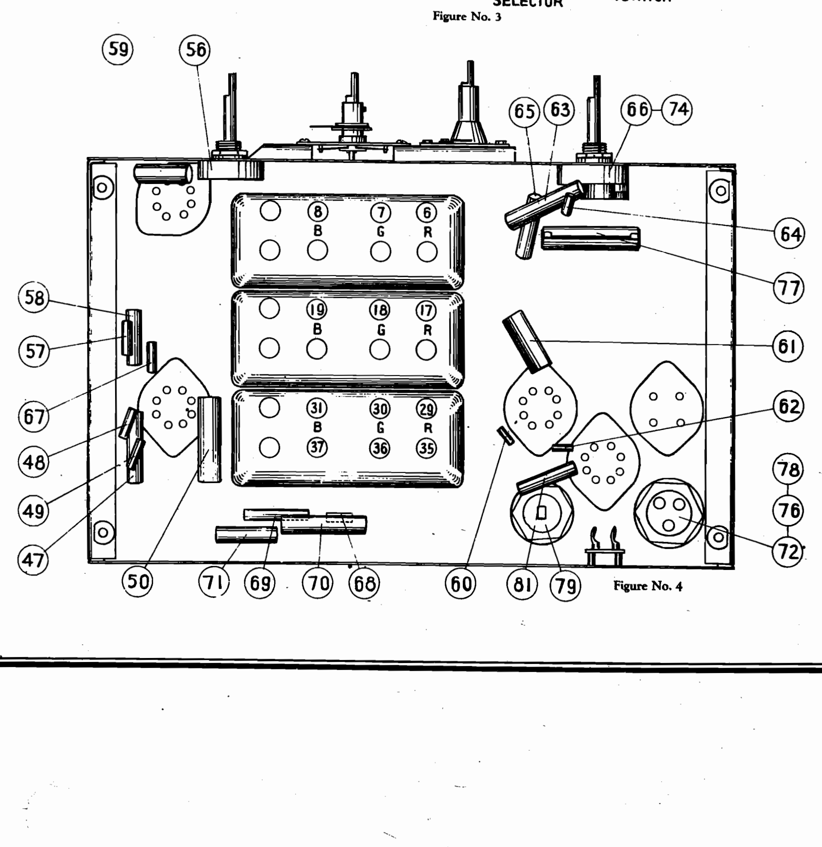
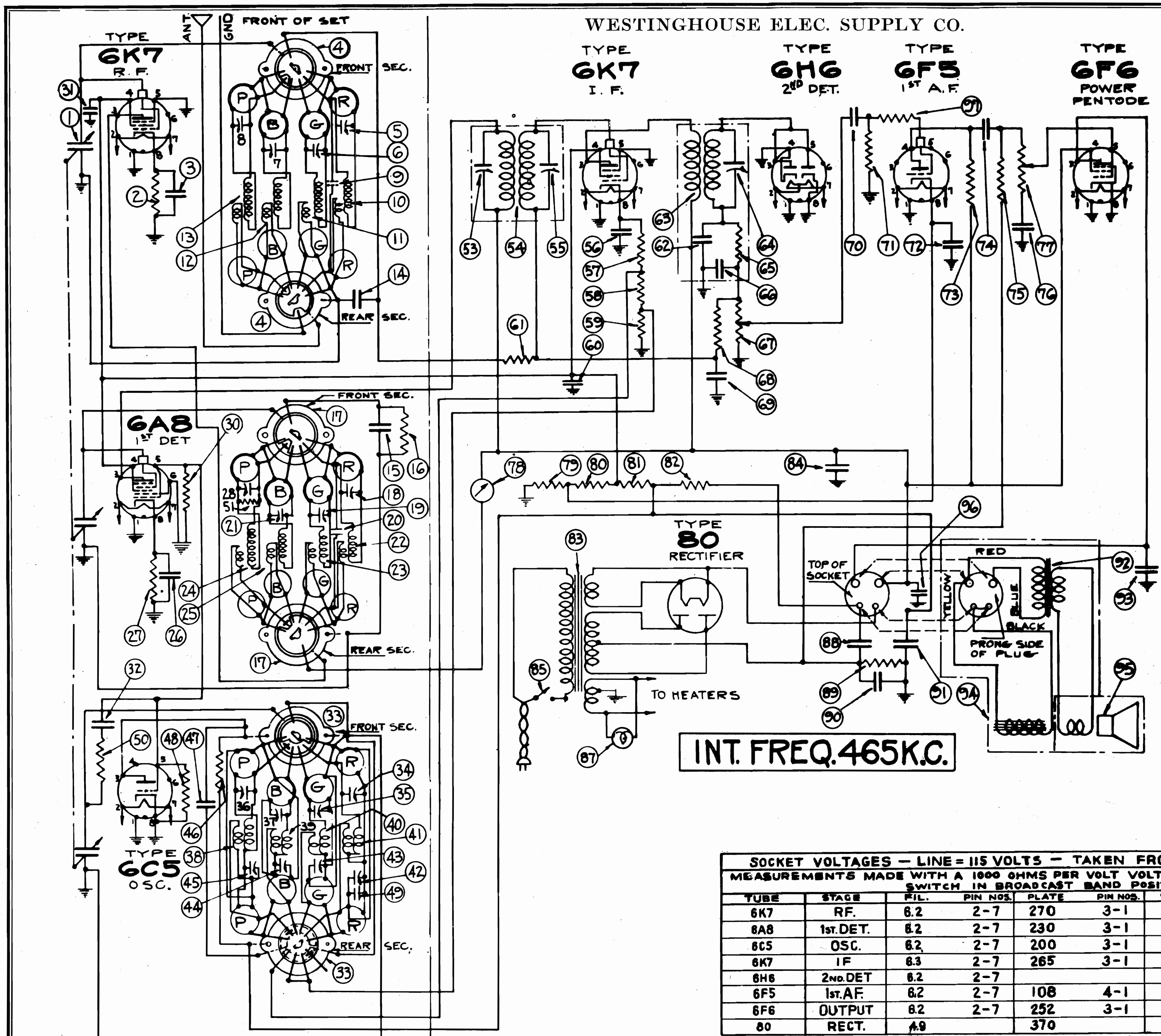


Figure No. 4

MODELS WR-205,WR-305
Schematic,Voltage
Resistance Data



D.C. RESISTANCE			
MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION			
COIL	DIA.No	PRIM.	SEC.
P-ANT.	13	130 ohms	25 ohms
P-RF.	24	36 "	25 "
P-OSC.	38	8 "	13.5 "
B-ANT.	12	22 "	4 "
B-RF.	25	.5 "	4.5 "
B-OSC.	39	1.5 "	3 "
G-ANT.	11	3.2 "	1 "
G-RF	23	1.5 "	1 "
G-OSC.	40	.5 "	1 "
R-ANT.	10	1 "	.4 "
R-RF.	22	2 "	.4 "
R-OSC.	41	.5 "	.4 "
1st. IF.	54	13 "	13 "
2nd. IF.	63	11.5 "	11.5 "
OUTPUT TRANS.	92	450 "	.5 "
SPKR. FIELD		1900 "	
VOICE COIL	95	3 "	

SOCKET VOLTAGES — LINE = 115 VOLTS — TAKEN FROM BOTTOM OF SOCKETS									
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION									
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.	CATHODE	PIN NOS.
6K7	RF.	6.2	2-7	270	3-1	108	4-1	2.6	1-8
6A8	1st. DET.	6.2	2-7	230	3-1	108	4-1	4.0	1-8
6C5	OSC.	6.2	2-7	200	3-1				
6K7	IF	6.3	2-7	265	3-1	105	4-1	5.5	1-8
6H6	2nd. DET	6.2	2-7						
6F5	1st. AF.	6.2	2-7	108	4-1			1.2	1-8
6F6	OUTPUT	6.2	2-7	252	3-1	270	4-1	18.5	across 89 res.
80	RECT.	4.9		370					

WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR-205,WR-305
Socket,Trimmers,Data

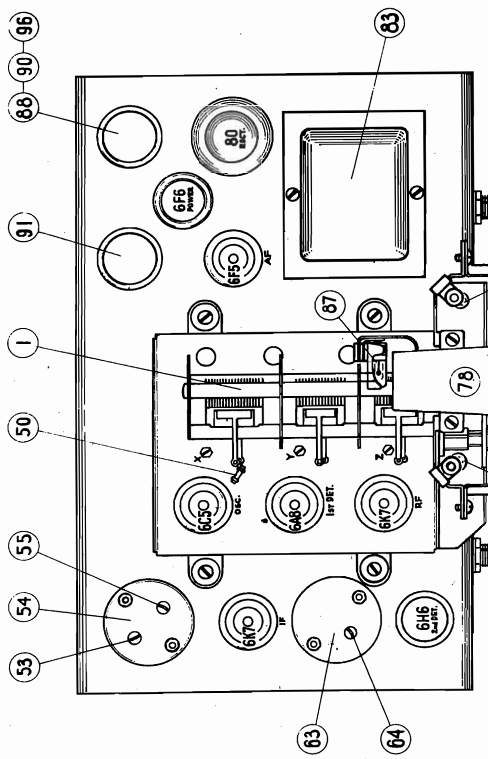


Figure No. 3

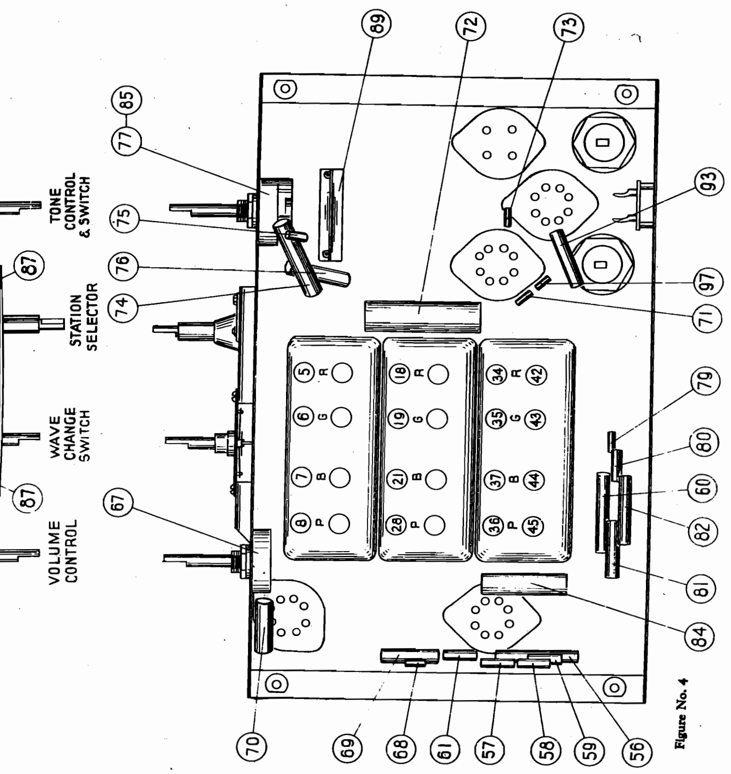


Figure No. 4

WESTINGHOUSE RADIO MODELS WR-205 AND WR-305

Tune the receiver with the left hand by means of the tuning knob and adjust the lag condenser in either direction and then without changing it, tune the receiver thru a maximum, noting reading of the output meter. Change the lag condenser further in the same direction, retune receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of lag condenser. Continue this type of trial and error adjustment until no further improvement can be made when either the tuning control or the lag condenser are changed. While this procedure may appear difficult, facility can be easily acquired by practice and the operation requires only a few minutes.

IMPORTANT: WHILE TESTING OR MAKING REPAIRS ON THIS RECEIVER, THE CHASSIS SHOULD NOT BE TURNED UPSIDE DOWN OR ON ITS SIDE FOR ANY LONG PERIOD OF TIME WHILE THE SET IS TURNED ON AS THE CHEMICALS IN THE ELECTROLYTIC FILTER CONDENSER WILL COME OUT THRU THE AIR VENTS MAKING THE CONDENSER APPEAR TO BE DEFECTIVE. IF LEFT IN THIS POSITION TOO LONG THE CONDENSER MAY BE INJURED.

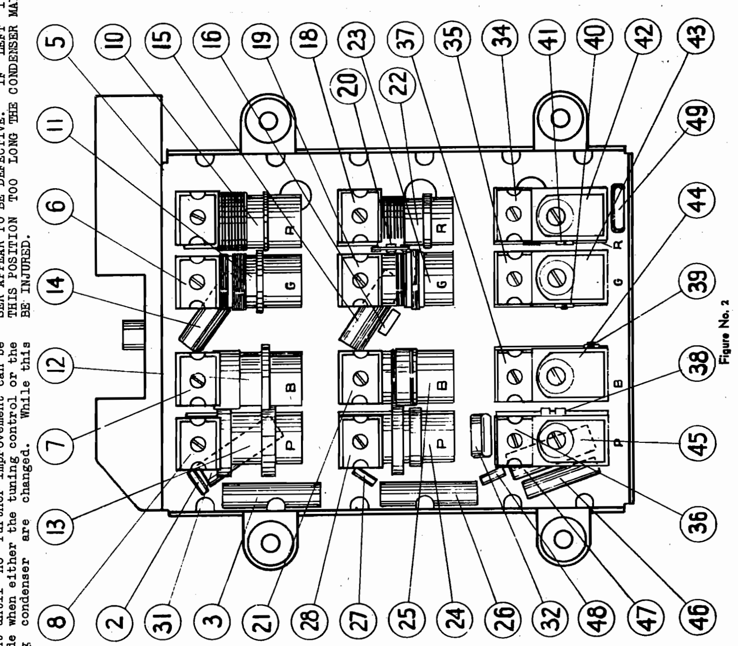


Figure No. 2

MODELS WR-205,WR-305
Alignment,
Service Notes
Parts List

WESTINGHOUSE ELEC. SUPPLY CO.

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes--2 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6F5, 1 #6F6, 1 #80-Total 8
Power Supply ------------------------- 105 to 125 volts, 50 to 60 cycles
Power Consumption ------------------------- 65 Watts
Maximum Undistorted Output ------------------------- 2.5 Watts
Maximum Output ------------------------- 3.3 Watts
Tuning Ranges -------------------------
(Purple Band 120 to 350 K.C.
(Black Band 540 to 1800 K.C.
(Green Band 1800 to 6000 K.C.
(Red Band 6000 to 18500 K.C.
Line-up Frequencies -- I.F.465 K.C.,350 K.C.,130 K.C.,1600 K.C.,570 K.C.,5500 K.C.,1900 K.C.,17000 K.C., and 6000 K.C.

GENERAL DESCRIPTION

This model is an eight-tube four-band superheterodyne receiver designed for world wide reception including the U.S. Weather Band and employs the new all-metal tubes. The circuit employs a high frequency amplifier using the new type 6K7 tube. This is followed by the first detector circuit employing a 6A8 tube and a separate oscillator (type 6C5). These tubes with their associated circuits, (coils, variable condensers, trim condensers for R.F. and detector stages, and trim and lag condensers for the oscillators) comprise a complete assembly in compact form separately cushioned from the main chassis. This assembly is known as the "Precision Tuner". From the high frequency assembly the energy passes thru an I.F. selective transformer and to an I.F. amplifier tube (type 6K7). From here further selection takes place and the energy is sent to the diode (type 6H6) where second detection takes place and voltages are provided for automatic volume control. A first audio amplifier tube (type 6F5) follows the diode and this is further followed by a pentode power amplifier tube (type 6F6). A type 80 rectifier supplies the direct current for energizing the tubes.

REMOVING INDIVIDUAL COIL AND SWITCH SECTIONS OF PRECISION TUNER

If a component part located underneath the switch and coil assemblies of the "Precision Tuner" has to be replaced or a section of the unit has to be removed for inspection, each section can easily be removed separately. To do this proceed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which fasten the mounting plate of the wave-change switch shaft to the chassis frame. Pull switch shaft straight out.
3. Unsolder the stator and rotor leads from the gang condenser.
4. The fastening screws for the switch sections are located on top of the "Precision Tuner" and are indicated by X, Y, and Z in figure #3. Remove the corresponding screw.
5. Each individual section can then be pulled out straight.

Note: On the R.F. section, the plate lead from the 6K7 socket will have to be unsoldered from the switch terminal before the section can be removed.

On the oscillator section, the plate lead will have to be unsoldered from the 6C5 socket.

6. After repairs have been made resolder the plate leads mentioned above and replace the section being careful to observe that the slotted holes in the switch bracket line up with the round guide pins on the base plate of the "Precision Tuner". This is IMPORTANT as the switch shaft cannot be inserted if the switch brackets do not line up.
7. Replace the section fastening screw.
8. Resolder the stator and rotor leads on gang condenser.
9. Replace the switch shaft and the mounting fastening screws. When inserting the switch shaft, be careful that all the switch discs are in the same position. Otherwise the switch shaft will not slide in. NEVER force the shaft into the switch discs. If shaft does not slide in freely, examine the position of the slot in each switch discs.
10. Before replacing the coil shields, it might be adviseable to bend the shields slightly to assure that positive contact is made. To do this hold the shield with your two hands using the thumbs and the first two fingers as shown in Figure #1. Pull out the ends of the shield slightly and at the same time apply a little pressure on the sides of the shield as indicated by the arrows in the drawing. Then replace the shields and observe that they fit tightly. In addition to assuring positive contacts, this will also prevent the shields from rattling.

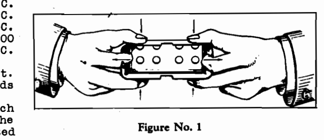


Figure No. 1

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment. A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures #2, #3 and #4 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full and turn tone control to bass position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of 6K7 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust trimmer #64 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #53 and #55 for maximum output.

ADJUSTMENT OF PURPLE BAND

1. Set wave-change switch to Purple Band position.
2. Set test oscillator and dial indicator to 350 K.C.
3. Apply test signal to antenna terminal of the chassis thru a .0002 mfd. series condenser and adjust #36,#28 and #8 for maximum output.
4. Set test oscillator and dial indicator to 130 K.C. and adjust #45 for maximum output.
5. Return to 350 K.C. setting with both test oscillator and dial indicator and repeat adjustment of #36, #28 and #8 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave-change switch to the Black or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 K.C. and adjust #37, #21 and #7 for maximum output.
3. Set test oscillator and dial indicator to 570 K.C. and adjust #44 for maximum output.
4. Return to 1600 K.C. setting and make readjustment of #37, #21 and #7.

ADJUSTMENT OF GREEN BAND

Note: In adjusting the Green and Red Bands, a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change-switch to Green Band position.
2. Set test oscillator and dial indicator to 5500 K.C. and adjust #35, #19 and #6 for maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #43 for maximum output.
4. Return to 5500 K.C. setting and make readjustment of #35, #19 and #6.

ADJUSTMENT OF RED BAND

1. Set wave-change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 K.C. and adjust #34, #18 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #42 for maximum output.
4. Return to 17000 K.C. setting and make readjustment of #34, #18 and #5.

Note: The adjustment of the two short-wave oscillator lag condensers (#42 and #43) is best made by the max-max. method.

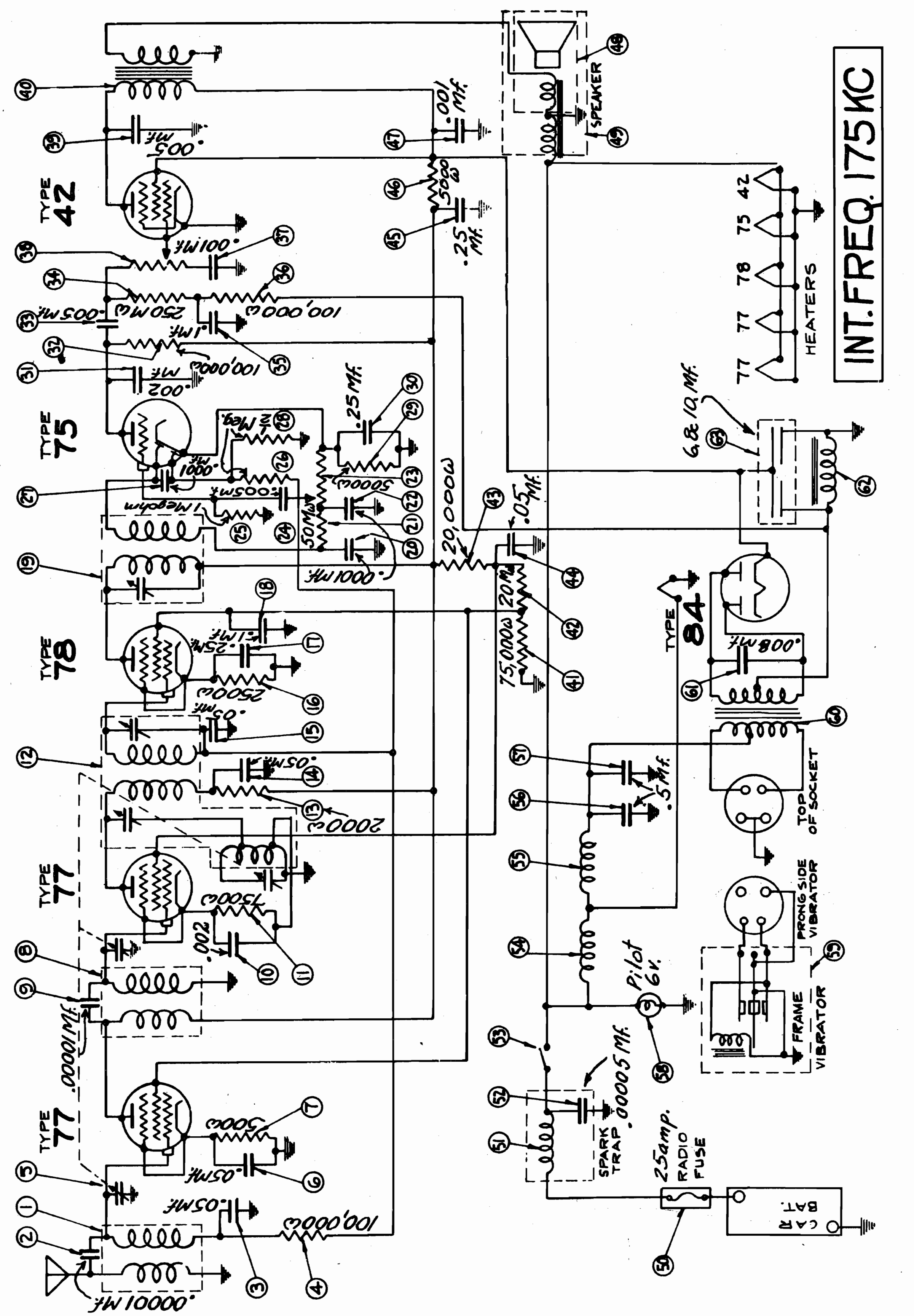
Dia. No.	Part No.	Description of Parts	List Price
1	CG 9527	Variable condenser assembly	$ 4.25
2	RE 9529	300 ohm 1/4 W. resistor	.10
3	SA 106386	.05 mfd. 200 V. condenser	.25
4	SW 9524	Antenna section "Precision Tuner" assembly complete with switch, coils and trimmers	5.75
5	CS 9511	4 to 25 mmf. antenna trim condenser (Red Band)	.20
6	CS 9511	4 to 25 mmf. antenna trim condenser (Green Band)	.20
7	CS 9511	4 to 25 mmf. antenna trim condenser (Black Band)	.20
8	CS 9511	4 to 25 mmf. antenna trim condenser (Purple Band)	.20
9		Twisted pair of wires - part of RC 9571	
10	RC 9571	Antenna coil assembly (Red Band)	.70
11	RC 9574	Antenna coil assembly (Green Band)	.65
12	RC 9577	Antenna coil assembly (Black Band)	1.10
13	RC 9580	Antenna coil assembly (Purple Band)	1.25
14	CW 9513	.05 mfd. 200 V. condenser	.25
15	CW 9513	.05 mfd. 200 V. condenser	.25
16	RE 9527	5000 ohms 1/4 W. resistor	.10
17	SW 9525	R.F. section "Precision Tuner" assembly complete with switch, coils and trimmers	6.00
18	CS 9511	4 to 25 mmf. R.F. trim condenser (Red Band)	.20
19	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Green Band)	.20
20	CM 9512	6. mmf. mica condenser	.15
21	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Black Band)	.20
22	RC 9572	R.F. coil assembly (Red Band)	.70
23	RC 9575	R.F. coil assembly (Green Band)	.95
24	RC 9581	R.F. coil assembly (Purple Band)	1.10
25	RC 9578	R.F. coil assembly (Black Band)	1.15
26	SA 106386	.05 mfd. 200 V. condenser	.25
27	RE 9529	300 ohm 1/4 W. resistor	.10
28	CS 9512	1.5 to 10 mmf. R.F. trim condenser (Purple Band)	.20
29	CM 9511	.000065 mfd. mica condenser	.15
30	RE 9534	100,000 ohm 1/4 W. resistor	.10
31	SA 106386	.05 mfd. 200 V. condenser	.25
32	CM 9511	.000065 mfd. mica condenser	.15
33	SW 9526	Oscillator section "Precision Tuner" assembly complete with switch, coils and trimmers	9.75
34		1.5 to 10 mmf. trim condenser part of CS 9519 (Red Band)	
35		3. to 15 mmf. trim condenser - part of CS 9520 (Green Band)	
36		10 to 35 mmf. trim condenser - part of CS 9518 (Purple Band)	
37		5 to 25 mmf. trim condenser - part of CS 9517 (Black Band)	
38	RC 9582	Oscillator coil assembly (Purple Band)	1.40
39	RC 9579	Oscillator coil assembly (Black Band)	1.50
40	RC 9576	Oscillator coil assembly (Green Band)	1.50
41	RC 9573	Oscillator coil assembly (Red Band)	1.25
42		800 to 1600 mmf. lag condenser - part of CS 9519 (Red Band)	
43		800 to 1600 mmf. lag condenser - part of CS 9520 (Green Band)	
44		300 to 600 mmf. lag condenser - part of CS 9517 (Black Band)	
45		60 to 150 mmf. lag condenser - part of CS 9518 (Purple Band)	
46	RE 9526	5000 ohm 1 W. resistor	.20
47	CW 9513	.05 mfd. 200 V. condenser	.25
48	RE 9524	50,000 ohm 1/4 W. resistor	.10
49	CM 959	.002 mfd. mica condenser	.25
50	RE 9537	50 ohm 1/4 W. resistor	.10
51	RE 9534	100,000 ohm 1/4 W. resistor	.10
53		I.F. trimmer - part of IC 9527	
54	IC 9527	1st I.F. transformer	1.75
55		I.F. trimmer - part of IC 9527	
56	SA 102493	.05 mfd. 200 V. condenser	.25

No.	Part No.	Description of Parts	List Price
57	SA 105261	400 ohm 1/4 W. resistor	$ .20
58	SA 105267	1000 ohm 1/4 W. resistor	.20
59	SA 105249	5000 ohm 1/4 W. resistor	.20
60	SA 102497	.25 mfd. 200 V. condenser	.35
61	SA 105278	100,000 ohm 1/4 W. resistor	.20
62		50 mmf. mica condenser - part of IC 9537	
63	IC 9537	2nd I.F. transformer	1.75
64		I.F. trim condenser - part of IC 9537	
65		50,000 ohm 1/4 W. resistor - part of IC 9537	
66		100 mmf. mica condenser - part of IC 9537	
67	VR 959	Volume control - 500,000 ohm	1.00
68	RE 9530	1 meg. 1/4 W. resistor	.10
69	SA 106386	.05 mfd. 200 V. condenser	.25
70	CW 9512	.02 mfd. 400 V. condenser	.20
71	RE 9530	1 meg. 1/4 W. resistor	.10
72	CE 9515	12 mfd. electrolytic condenser	.65
73	SA 105279	250,000 ohms 1/4 W. resistor	.20
74	CW 9512	.02 mfd. 400 V. condenser	.20
75	RE 9531	250,000 ohm 1/4 W. resistor	.10
76	SA 106403	300 ohm 1/4 W. resistor	.20
77	VR 9512	Tone control (500,000 ohm)	1.10
78	SI 9538	Tuning meter assembly	2.30
79	SA 105260	300 ohm 1/4 W. resistor	.20
80	SA 104966	30,000 ohm 1/2 W. resistor	.20
81	SA 105815	10,000 ohm 1 W. resistor	.25
82	RE 9540	7000 ohm 2 W. resistor	.30
83	TR 959	Power transformer	5.75
84	SA 102492	.05 mfd. 400 V. condenser	.25
85		Line switch - part of VR 9512	
86	CW 959	.01 mfd. 600 V. condenser	.40
87	SA 106809	Dial light (6.3 volt)	.15
88	CE 954	8 mfd. 475 V. section of electrolytic condenser	3.50
89	RE 9523	300 ohm muter resistor	.30
90		20 mfd. 25 V. electrolytic condenser - part of CE 954	
91	CE 9518	8 mfd. 300 V. electrolytic condenser	1.10
92	TR 9515	Speaker output transformer	1.85
93	SA 103659	.005 mfd. 400 V. condenser	.30
94	SK 9511	Speaker - complete	7.50
95	SA 107282	Diaphragm and coil assembly	1.15
96		4 mfd. electrolytic condenser - part of CE 954	
97	RE 9534	100,000 ohm 1/4 W. resistor	.10

Part No.	Description of Parts	List Price
	MAIN ASSEMBLIES	
CH 9555	Chassis assembly	
CH 9537	Chassis assembly "Precision Tuner"	
KA 9527	Cabinet	
SK 9511	Speaker	7.50
	CABLE AND CABLE ASSEMBLIES	
CB 9512	Line cable with plug	.50
PR 97160	Cable - dial drive	.05
FP 103164	Spring for dial cable	.05
	CONDENSERS	
CS 9517	Dual trim condenser (Black Band)	.55
CS 9518	Dual trim condenser (Purple Band)	$ .50
CS 9519	Dual trim condenser (Red Band)	.75
CS 9520	Dual trim condenser (Green Band)	.75

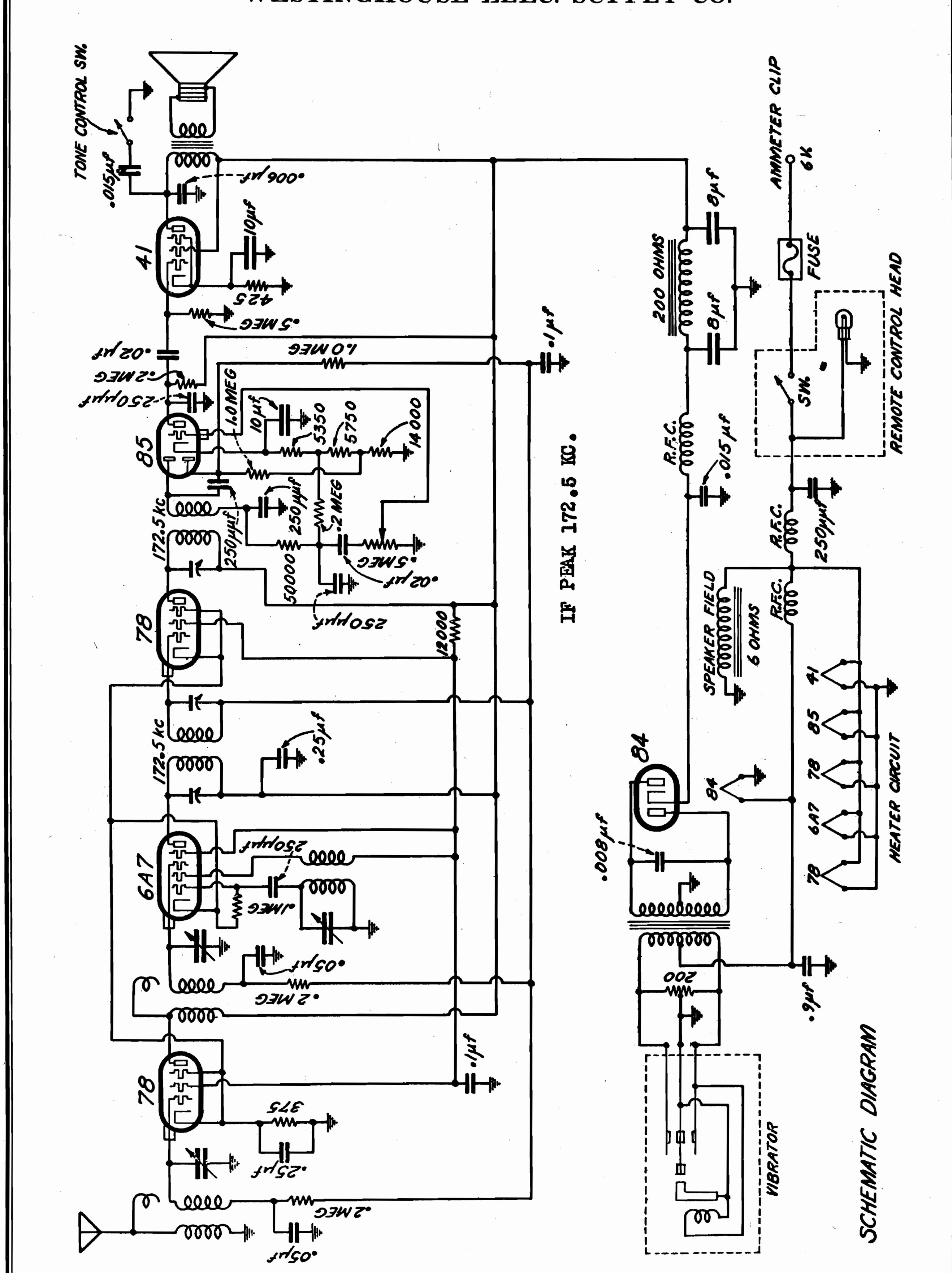
MODEL WR-500
Schematic

WESTINGHOUSE ELEC. SUPPLY CO.



MODEL WR-501
Schematic

WESTINGHOUSE ELEC. SUPPLY CO.



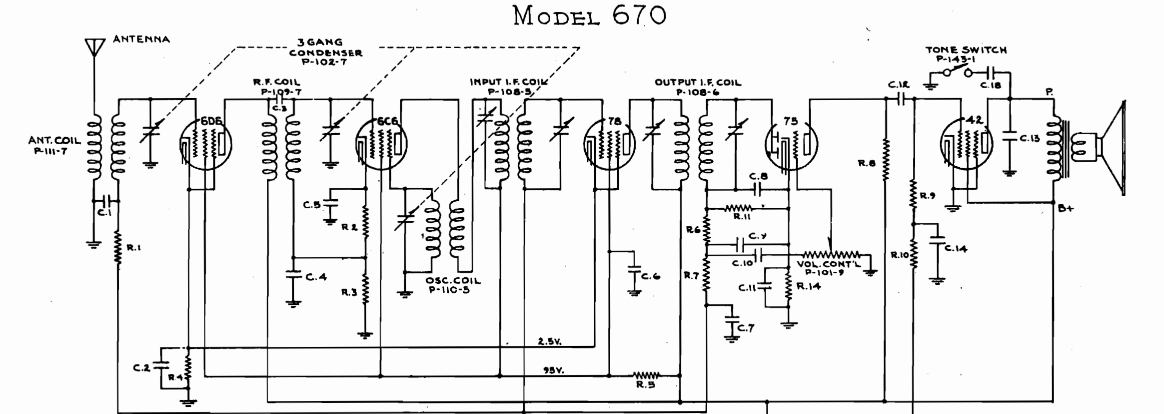
MODEL 670
Schematic
Socket, Trimmers

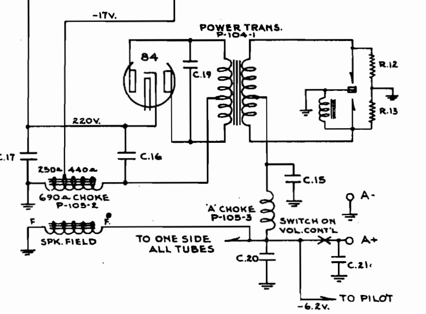
WESTERN AUTO SUPPLY CO.

Vibrators can be reconditioned at a cost of $3.00 each, if the old unit is returned.

All resistors are RMA color coded - specify value and/or resistor number (per schematic diagram) and model number.

Model 670





LEGEND

RESISTORS

Nº	VALUE
R.1:-	250M 1/3W.
R.2:-	450~
R.3:-	5M
R.4:-	150~
R.5:-	19M
R.6:-	50M 1/3W.
R.7:-	250M 1/3W.
R.8:-	250M 1/3W.
R.9:-	200M 1/3W.
R.10:-	300M 1/3W.
R.11:-	250M. 1/3W.
R.12:-	100~
R.13:-	100~
R.14:-	4M 1/3W
VAR. RESISTOR (VOL. CONT'L) :-	500M.

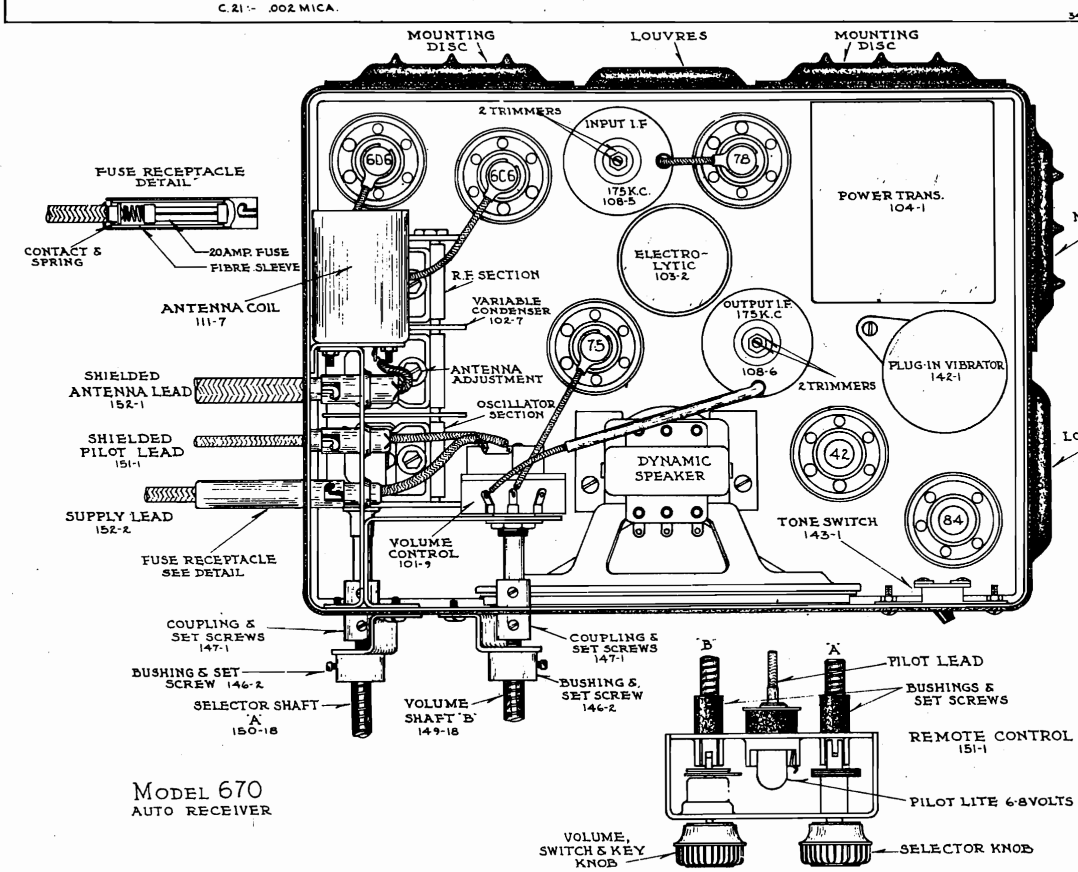
CONDENSERS

Nº	VALUE
C.1:-	.05 X 200V.
C.2:-	.1 X 200V.
C.3:-	11.5 mmf GIMMICK
C.4:-	.05 X 200V.
C.5:-	.05 X 200V.
C.6:-	.1 X 200V.
C.7:-	.1 X 200V.
C.8:-	.0005 MICA
C.9:-	.0005 MICA
C.10:-	.01 X 400V.
C.11:-	20 MFD. X 20V.
C.12:-	.01 X 400V.
C.13:-	.003 X 600V.
C.14:-	.1 X 200V.
C.15:-	1 MFD. X 120V.
C.16:-	8 MFD. X 350V.
C.17:-	8 MFD. X 350V.
C.18:-	.01 X 400V.
C.19:-	.02 X 1000V.
C.20:-	1 MFD. X 120V.
C.21:-	.002 MICA.

-: NOTE :-
NUMBERS PREFIXED BY LETTERS ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
THE PHRASE GIMMICK MEANS, A WIRE WOUND AROUND ANOTHER WIRE.
RESISTORS IN ONE UNIT, P-106-3, :- R. 2, 3, 4, 5.
CONDENSERS IN ONE UNIT, P-103-2 :- C. 16, 17.
CONDENSERS IN DUAL UNIT :- C. 2, 7.
CONDENSERS IN DUAL UNIT :- C. 5, 6.
RESISTORS AND CONDENSERS IN OUTPUT I.F. CAN, P-108-6, :- C. 8, 9, 10 AND R. 6, 7, 11.
CONDENSER, C.1, IN ANT. COIL CAN P-111-7.

IF PEAK 175 KC.

34133



Model 670
AUTO RECEIVER

MODEL 670
Alignment
Service Notes

WESTERN AUTO SUPPLY CO.

ELIMINATION OF MOTOR NOISE: (Cont'd)

In some few cases, such as Buicks, it is necessary to use screw type suppressors. Cut lead about two inches from distributor and screw one end of suppressor into the wire attached to distributor, screw wire from coil into other end of suppressor.

Generator capacitor, number 148-1, is connected to generator side of cutout. The ground side of capacitor can be fastened to the generator housing under the same screw that holds the relay housing to generator. In some cases, an additional capacitor, number 148-1, (obtainable from your dealer) must be installed between the battery side of ignition coil and the car frame.

If after connecting suppressors and condensers as outlined above there is still motor noise, make the following tests:

Shield high tension leads.

Bond flexible shaft leads, such as free wheeling, which run close to distributor, radiating ignition interference which is picked up by the antenna inside of car.

Cars using wooden floor boards, place a grounded copper screen under toe board.

Excessive gap between distributor rotor and high tension contacts, replace with a special radio rotor arm or build up end with solder and dress end with file so that its original shape is retained. The rotor should not brush or wipe the contacts, but should just clear them.

In some cases, such as V-8 Ford, it is necessary to pull battery and primary leads out of special tube which houses high tension leads, shield and ground these leads. Also on V-8 Fords it is necessary to install a capacitor at primary terminal of coil housing.

Additional suppressors can be obtained from your dealer.

The ignition system of car must be kept in good condition.

Fouled plugs or plugs with improperly adjusted gaps will affect the operation of receiver as well as of the automobile. Burned or poorly adjusted braker points will also impair the performance. It is advisable to advance the generator charging rate in order to compensate for the additional drain of the receiver on car storage battery.

It is sometimes necessary to connect a condenser (148-3) between the hot side of the dome light switch and ground.

BALANCING SET TO ANTENNA:

When this set has been installed and is ready for operation, it may be found necessary (depending on antenna) to balance set to this antenna. This is accomplished as follows:

With the receiver tuned to a very weak station, about 130 to 140 (1300 to 1400 kilocycles) on the dial, adjust the antenna trimmer with a screw driver until maximum volume is attained. To reach the antenna trimmer remove the plug button from the top of the case.

SERVICE NOTES

Should it ever be necessary or desirable to re-align this receiver, the proper method is as follows:

Adjustments can be made with the receiver mounted in the cabinet, being necessary only to remove the top cover.

I.F. ALIGNMENT:

1. With variable condenser at its maximum capacity position and with volume control full on, connect in series with a .1 mfd. condenser, an oscillator set at 175 kilocycles to the grid cap of the 6C6 tube.
2. Adjust trimming condensers of both input and output I.F. transformers, parts number 108-5 and 108-6 (see top view of chassis) to resonance with oscillator, as indicated on an output meter connected across the primary terminals of the speaker input transformer. Maximum deflection on the meter indicates resonance

Note: Each I.F. transformer trimmer has two adjustments, one nut and one screw, both of which are adjustable through the top of the can.

FREQUENCY ALIGNMENT:

1. Attach oscillator connected in series with a 200 mmfd. condenser to the antenna lead and with the variable condenser at its minimum capacity position (extreme right of its rotation) and with an oscillator set at 1550 kilocycles, adjust condenser trimmer of oscillator section (shaft end) to resonance.
2. Re-set oscillator to 1400 kilocycles, rotate variable condenser to pick up signal, adjust antenna and R.F. trimmers to resonance.
3. Check alignment at 1200-1000-800-600-530 kilocycles by setting oscillator to these frequencies and picking up signal by rotating condenser.
4. Bend slotted plates of antenna and R.F. sections only if necessary. UNDER NO CIRCUMSTANCES BEND PLATES OF OSCILLATOR SECTION.

NOTES:

Voltages from chassis to different points are indicated on schematic circuit diagram, and should be measured with a volt meter having a resistance of 1000 ohms per volt.

Failure to operate, noisy or weak reception, may be due to defective tubes or poor contact between cap on top of tube and grid clip.

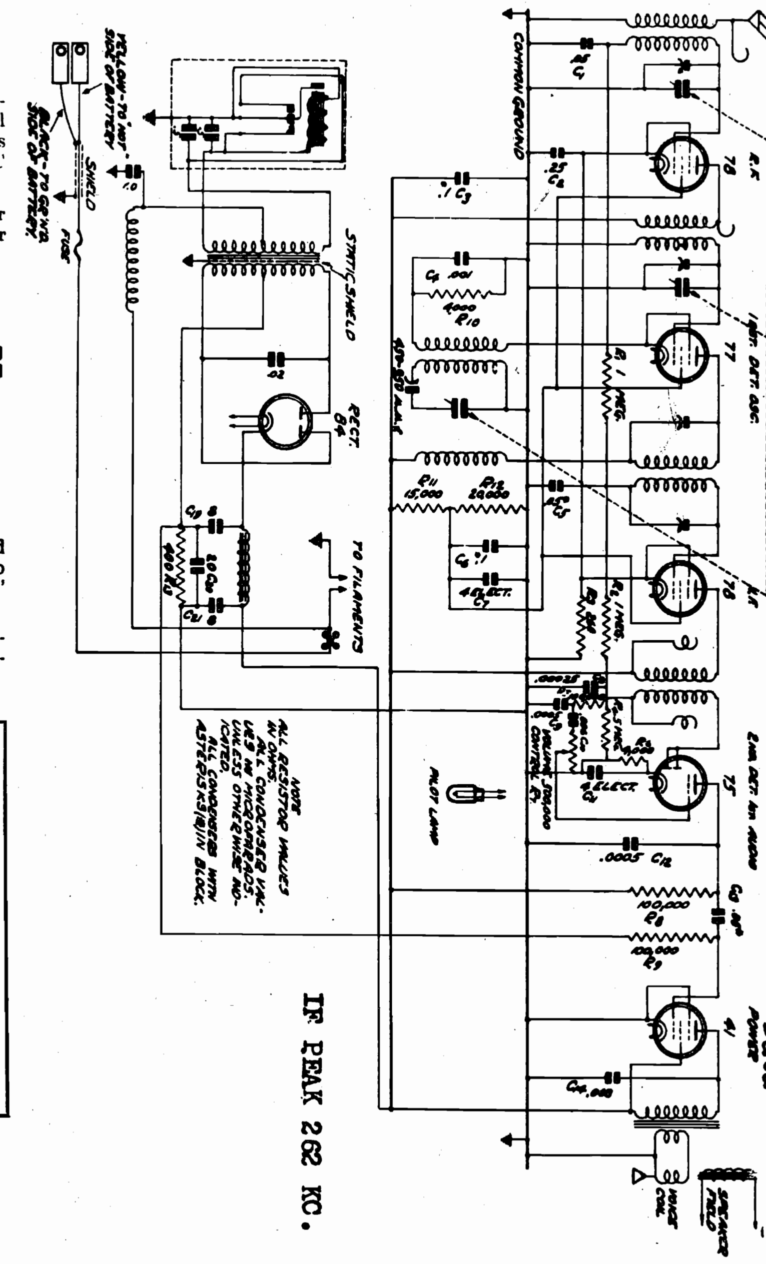
Tubes may be checked by replacing with another tube which is known to be good.

If fuse blows out frequently, and insulating sleeve has been properly placed over fuse, the trouble probably is in the vibrator and vibrator should be replaced.

NEVER ATTEMPT TO ADJUST VIBRATOR POINTS.

WESTERN AUTO SUPPLY CO.

MODEL S-732, S-733
Schematic, Voltage Data



IF PEAK 262 KC.

Circuit

The circuit consists of an antenna stage, a 78 R.F. stage, a 77 1st detector-oscillator stage, a 78 I.F. stage, a 75 dual diode-triode tube, which functions as a diode 2nd-detector and triode 1st audio stage, and a single 41 output stage. An 84 full wave rectifier is used in the power unit. The intermediate frequency is 262 K.C. The diode current establishes a drop across a resistor which is used as additional bias voltage for the R.F. and I.F. tubes giving automatic volume control action. Noise suppression between stations is obtained by the resistor in the cathode circuit of the 75 tube, the drop across which must be overcome before rectification in this tube begins. The manual volume control varies the audio voltage applied to the grid of the 75 tube.

A vibrator interrupts the current through the primary of the power transformer in the power unit. This, together with the turns ratio in this transformer, results in the high voltage AC being present in the secondary of the transformer. The full wave rectifier tube, filter choke, and filter condensers convert this high voltage AC into high voltage DC for the plate and screen circuits.

Current for the receiver is obtained from the car storage battery. In Fig. 11 is shown the condenser block internal wiring.

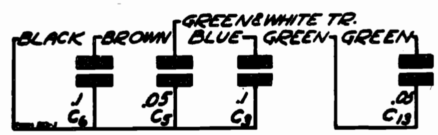


Fig. 11—Condenser Block—Internal Wiring

Voltages at Sockets

In the following chart are given the voltages at the sockets with all the tubes in, all units connected, and the set in operating condition, but with no signal being received. The antenna should be grounded.

A thousand ohm-per-volt meter of 0-250 volt range is required for the plate and screen voltages.

Lower ranges will be necessary for the grid and heater voltages. It is not absolutely necessary to have a high resistance meter for the heater or "A" battery reading.

These voltages will vary with variations in receivers, tubes, test equipment used, and "B" eliminator output voltage.

Type of Tube	*Function*	*Across Heater*	*Plate to Cathode*	*Screen to Cathode*	*Grid to Cathode*	*Normal Plate MA*
78	R. F.	6.1	182	80	3.[1]	7.0
77	1st Det. and Osc.	6.1	178	77	5.[2]	1.3[2]
78	I. F.	6.1	182	80	3.[1]	7.0
75	2nd Det. 1st Audio	6.1	70[3]		1.4[1]	.35
41	Output	6.1	172.5	176.5	12.5[4]	16.0
84	Rect.	6.1	205			17.5 per plate

(1) Cathode to Ground
(2) Subject to Variation
(3) Triode Plate to Cathode
(4) Read Across 400-Ohm Resistor, R13

MODEL S-732, S-733
Alignment, Parts

WESTERN AUTO SUPPLY CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself in broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and accurately calibrated signals at and around 262 K.C., the intermediate frequency and an output indicating meter are desirable.

First set the signal generator at approximately 262 K.C. Connect the antenna lead from the generator to the control grid of the I.F. 78 tube, through a .05 mfd. condenser. The ground lead of the generator goes to the ground of the receiver. Turn the rotor plates of the tuning condenser completely out and keep the signal weak enough to prevent A.V.C. action. Note from Fig. 10 that the second I.F. transformer is self tuned and cannot be adjusted. Adjust the frequency of the signal generator until the output meter shows maximum output. The intermediate frequency setting of the generator is then correct, although it may be a very small percentage higher or lower than 262 K.C.

Next connect the signal lead from the signal generator to the grid of the 1st detector tube through a .05 mfd. condenser. Then adjust the two intermediate frequency condensers for maximum output. One of the I.F. condenser screws is reached through the hole on the top of the 1st I.F. assembly can. The other I.F. condenser screw is reached from the bottom of the sub-panel through a hole at the bottom of this assembly.

Now set the signal generator for a signal of exactly 1400 K.C. The antenna lead from the generator is, in this instance, connected to the antenna lead of the receiver. Connect the flexible drive shaft to the chassis if it has been disconnected. As explained previously, the dial scale should be at the low frequency end stop when the rotor is completely in mesh. Then turn the station selector knob until the dial scale is at 1400 K.C.

Then adjust the three trimmer condensers on the gang tuning condenser for maximum output, adjusting the oscillator section first.

Next, set the signal generator for a signal of 600 K.C. and adjust the oscillator 600 K.C. trimmer. The adjusting screw for this condenser is reached through a hole in the back wall of the sub-panel.

A non-metallic screwdriver is necessary for this adjustment. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 600 K.C. trimmer screw until the highest output is obtained.

Then set the signal generator again for a signal of 1400 K.C. and check the adjustment of the tuning condenser trimmers at this frequency for maximum output.

Rattle

If rattle is experienced when a signal is being received, it is, in practically all cases, due to mechanical vibration at some point in the chassis. Inspect the chassis and look for a loose tube shield or a loose part at some point which can rattle against another part. When the vibrating part is found, secure it in place in some manner. This can generally be done with a wedge made of a piece of paper, cardboard or wood. Rattle may, in some instances, be due to a loose cover. If this is the case, remove the cover and bend the edge of the chassis box outward between the screw holes so that the cover will fit tightly when it is put on.

If the Receiver Fails to Operate

"A" Fuse—Check the "A" line fuse in the cable.

"A" Line Open—See if power is being supplied to the speaker, tube heaters, and "B" eliminator.

"B" Eliminator Not Working—See if the "B" eliminator is in proper working order by checking the high voltage points at the tube plate terminals (see Fig. 10).

Antenna and Lead—See if antenna is properly connected to lead-in wire and antenna lead from set. Be sure antenna system is not grounded at any point.

All Tubes Not Inserted—See if all tubes are inserted as per Fig. 8.

Defective Tubes—Try out a new set of tested tubes.

Grid Caps Not Connected—See if all grid caps are properly connected to top of top grid connection tubes.

Variable Condenser Plates Shorted—Check condenser sections in chassis carefully for foreign particles or rotor stator rubbing.

CHASSIS PARTS

Part No.	Description	List Price
P-1780	No. 75 Tube Socket	$0.10
P-1761	No. 77 Tube Socket	.10
P-1762	No. 78 Tube Socket	.10
P-1665	No. 41 Tube Socket	.10
P-1803	No. 84 Tube Socket	.10
P-1805	Single Pin Jack	.10
P-1799	Tube Shield Assembly	.25
P-20656	Chassis Box	4.00
P-20657	Chassis Box Cover	1.10
P-70740	Shielded Antenna Lead	.40
P-70744	Shielded "A" Battery Lead	1.15
P-1926	Interrupter with Condensers in Rubber Boot and Metal Case	6.35
P-10260	Cardboard Baffle	.20
P-1924	15 Amp. Fuse	.10
P-1774	Electrodynamic Speaker	3.75
P-20585	Cond. Drive Gear	.25
P-1801	Volume Control and Drive Bracket	.30
P-20635	Cond. Drive Pinion	.15
P-20677	Pinion Adjustment Plate	.10
P-20614	Lock Lever	.10
P-20658	Tension Spring	.10
P-30419	Entry Plate Assembly	.10
P-1830	Dial Gear and Strip Assembly	.40
P-1816	Celluloid Dial Strip only	.15
P-1810	Pilot Lamp Socket and Spring Clip	.10
P-1563	6-8 Volt Pilot Lamp	.25
P-10263	Rubber Tube Bumper—Square	.10
P-10210	Rubber Tube Bumper—Round	.10
P-10213	Rubber Band for Tube	.10
P-50569	Filter Choke Assembly	1.60
P-50595	Power Trans. Assembly	2.90
P-5099	Antenna R. F. Transformer—Less Can	1.20
P-5065	Interstage R. F. Transformer—Less Can	1.00
P-5105	Second I. F. Transformer and Can Assembly	.95
P-5096	First I. F. and Oscillator Transformer and Can Assembly	2.70
P-5097	Single Solenoid "A" Choke	.25
P-40431	Antenna R. F. Can	.15
P-1826	Interstage R. F. Can	.10

Resistors

Part No.	Code No.	Resistance	Type	List Price
P-A95105	R-1	1 Megohm	Carbon	$0.25
P-A95105	R-2	1 Megohm	Carbon	.25
P-B94261	R-3	260 ohm	Carbon	.35
P-A95504	R-4	.5 Megohm	Carbon	.25
P-A95104	R-5	100,000 ohm	Carbon	.25
P-A94402	R-6	4,000 ohm	Carbon	.20

Part No.	Code No.	Resistance	Type	List Price
P-91066	R-7	0-500,00 ohm	Volume Control and Switch	$1.15
P-A95104	R-8	100,000 ohm	Carbon	.25
P-A95104	R-9	100,000 ohm	Carbon	.25
P-A94402	R-10	4,000 ohm	Carbon	.20
P-B94153	R-11	15,000 ohm	Carbon	.25
P-B94203	R-12	20,000 ohm	Carbon	.25
P-C94401	R-13	400 ohm	Carbon	.20

Condensers

Part No.	Code No.	Capacity	Voltage	Type	List Price
P-80862	C-1	.05 mfd.	200 V.	Tubular	$0.30
P-80888	C-2	.25 mfd.	200 V.	Tubular	.35
P-80821-B	C-4	.001 mfd.	600 V.	Molded	.25
P-80937	C-7 C-11	4.0 mfd. 4.0 mfd.		Electrolytic Block in can	1.25
P-80919	C-8	.00025 mfd.	600 V.	Molded	.20
P-80945	C-9	.0005 mfd.	600 V.	Molded	.15
P-80898	C-10	.006 mfd.	600 V.	Tubular	15
P-80945	C-12	.0005 mfd.	600 V.	Molded	.15
P-80966	C-14	.008 mfd.	600 V.	Tubular	20
P-80962A	.02 mfd.	800 V.	Tubular Condenser		.25
P-80978A	1. mfd.	120 V.	Tubular Condenser		.45
P-80976A	Dual	.5 mfd.	120 V.	Tubular Condenser In Paper Box	.80
P-80956	C-19 C-20 C-21	8.0 mfd. 20.0 mfd. 8.0 mfd.	225 V. 25 V. 225 V.	Electrolytic Block in Can	2.25
P-80955	C-3 C-5 C-6 C-13	.1 mfd. .05 mfd. .1 mfd. .05 mfd.	300 V. 200 V. 200 V. 300 V.	Bypass Block in Can	1.35
P-1539	600 K. C. Trimmer Condenser				.45
P-80957	Three-Gang Variable Condenser				3.00

CONTROL UNIT PARTS

(When Separate Control Unit Is Used)

Part No.	Description	List Price
P-1816	Celluloid Dial Strip	$0.15
P-1825	Dial Gear and Strip Assembly	.40
P-20509B	Control Unit Swivel	.15
P-20510A	Steering Post Apron	.30
P-20511	Steering Post Clamp	.15
P-20693	Control Box Cover	.35
P-20635	Cond. Drive Pinion	.15
P-70746	Pilot Lamp Cable only	.40
P-1415A	Pilot Lamp Socket and Clip	.15
P-1563A	6-8 Volt Pilot Lamp	.25
P-30426	Ornamental Plug	.10
P-30414	Key	.15

WESTERN AUTO SUPPLY CO.

MODEL S-735
Drive Cord Notes

Replacing Drive Cord

The drive cord in this receiver may be replaced as follows:

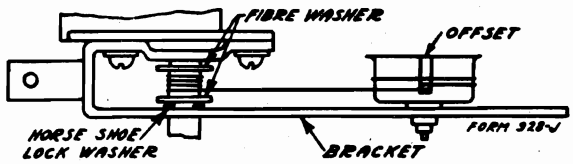


Fig. 3—*Cord Drive—Top View*

First remove the chassis from the case as explained on page 4.

Some of the first models did not have two fibre "end" washers on the drive shaft to protect the drive cord as shown in Fig. 3. If this is the case, these washers should be put on as follows:

Separate and take off the horse-shoe lock washer which holds the drive shaft in position. This may be done with a fine jawed, long nose plier.

Now pull the drive shaft out just far enough to permit the two fibre washers to be slipped over the end of the shaft.

Then slip the shaft back into place and replace the horse-shoe lock washer.

Knot one end of the new drive cord and with the condenser plates in a completely closed position, slip the drive cord through the small hole "A" in the drive drum — see Fig. 4. The knot will then be on the inside of the drum.

Now wrap the cord around the lower half of the drive drum as indicated and bring it up to the drive shaft. Proceed by wrapping it in a clockwise direction (from front) around the drive shaft three and one-quarter turns between the two fibre washers, progressing towards the front of the chassis. Be sure that the condenser plates are kept in a closed position and that the cord is held tight.

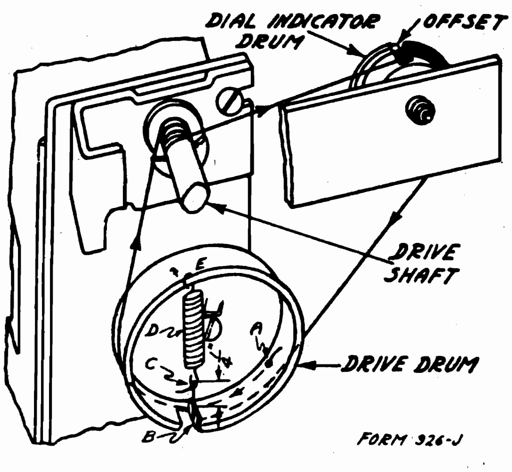


Fig. 4—*Cord Drive Replacement*

Set the dial indicator drum so that the offset is at the top or a little to the right of the center — see Fig. 4.

Wrap the cord from the drive shaft once around the offset in the dial indicator drum and then approximately one and one-half turns around the drum itself in a clockwise direction, progressing toward the back.

From the dial indicator drum draw the cord over the lower right hand quarter of drive drum as shown in Fig. 4.

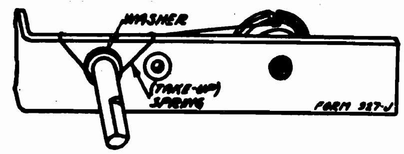


Fig. 5—*Drive "Take-up" Spring*

Then bring the cord inside of the drum by way of the turned-in portion of the flange at "B".

Tie the drive tension spring "D" to the loose end of the cord at the point "C" just above the top edge of the lip "B" as shown in the illustration. This should be done so that the lower hook of spring "D" at point "C" will be between 1/8" and 3/8" from top edge of the turned-in portion of the flange "B" in the flange of the drive drum. After the spring is hooked and the drive turned over several times the tension in the cord will cause this distance to become about 1/4".

Now, by applying a tension on the drive spring "D", hook the other end of the spring into the small hole "E" near the top of the drive drum. Hook spring from the inside out.

After the cord has been put on it may be necessary to calibrate the receiver as explained in the article on condenser alignment.

All of the earlier models did not have drive shaft "take-up" springs. This spring will prevent any tendency toward change of setting should the receiver be subjected to vibration. To insert these springs and fibre washers on the drive shaft proceed as follows:

Remove the station selector knob by pulling it off of the shaft.

Slip the small fibre washer over the shaft and clip the "take-up" spring to the drive bracket as shown in Fig. 5.

The chassis may now be replaced into the case in the reverse order of the manner in which it was removed.

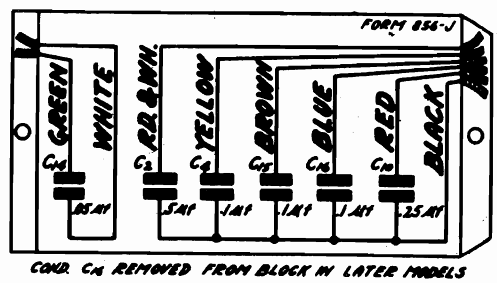


Fig. 6—*Condenser Block Internal Wiring*

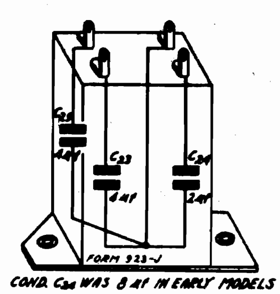


Fig. 7—*Electrolytic Block Internal Wiring*

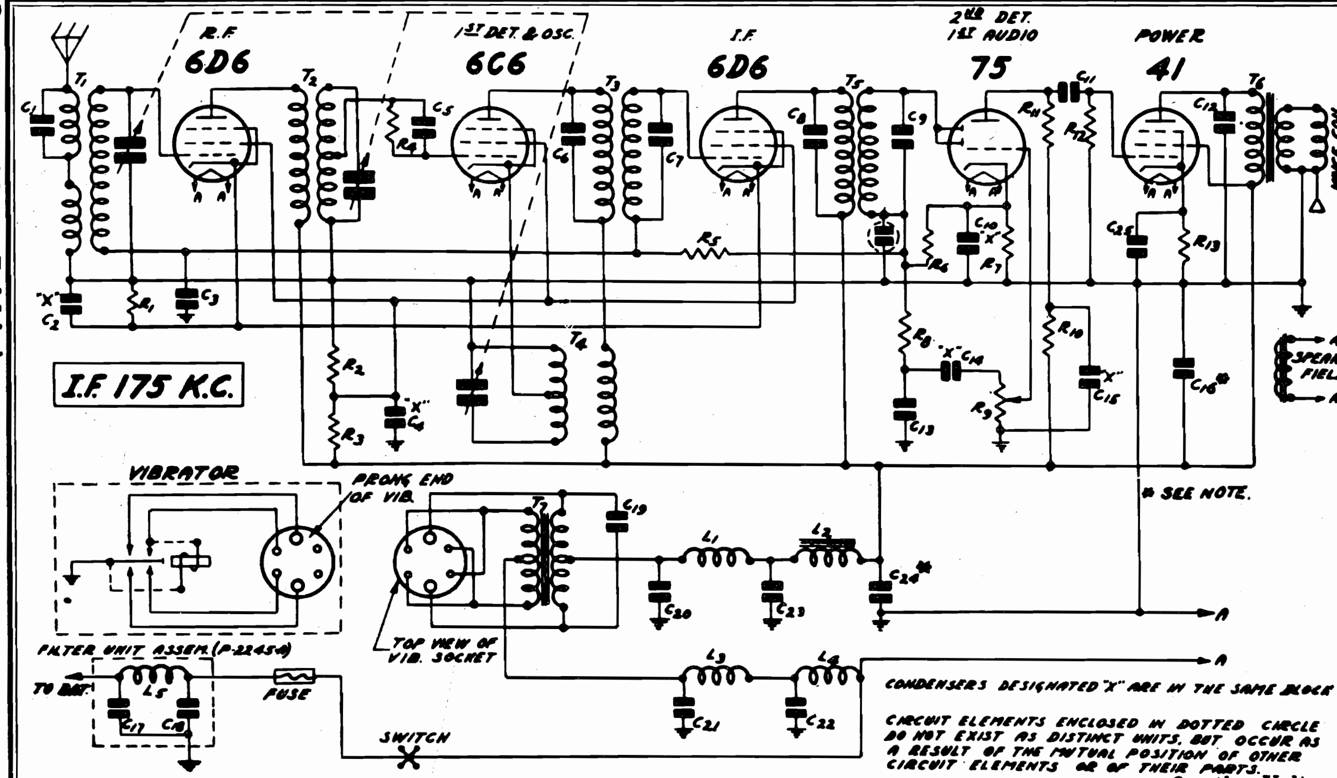
MODEL S-735
Schematic, Voltage
Socket, Trimmers, Parts

WESTERN AUTO SUPPLY CO.

VOLTAGES AT SOCKETS
Input 6.3 Volts—Antenna Disconnected at Connector

Type of Tube	Function	Volts at Heater	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6D6	R. F.	6.2	154	95	3.0	5.2
6C6	1st Det. & Osc.	6.2	160	97	0	3.0
6D6	I. F.	6.2	154	95	3.0	5.2
75	2nd Det. & 1st A. F.	6.2	110	—	1.	.25
41	Power	6.2	143	146	14.	13.0

Dec, 1934



CONDENSERS DESIGNATED "X" ARE IN THE SAME BLOCK

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLE DO NOT EXIST AS DISTINCT UNITS, BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR OF THEIR PARTS.

Fig. 1—*Schematic Circuit Diagram*

On the Voltage Chart are given the voltages at the sockets with all tubes in and the set in operating condition. The antenna should be disconnected at the bayonet connector.

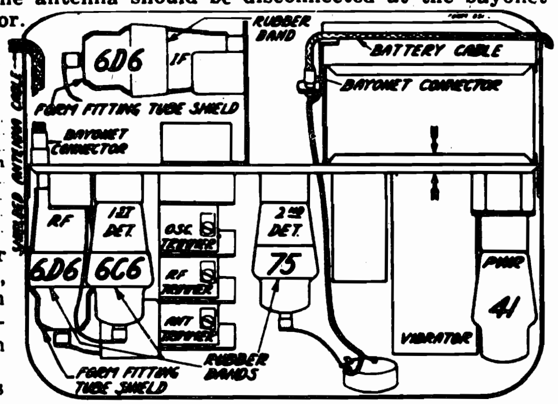


Fig. 2—*Location of Tubes and Vibrator*

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-81814	C1	250 mmf.		Part of Antenna Coil Assembly
P-82600D	C2	.50 mf.	200V.	Bypass Block
	C4	.10 mf.	140V.	
	C10	.25 mf.	140V.	
	C14	.05 mf.	300V.	
	C15	.10 mf.	200V.	
P-81116	C3	.05 mf.	200V.	Tubular
P-81815	C5	35 mmf.		Part of Grid Leak Assembly
P-81806	C6	70 mmf.		Part of 1st I. F. & Osc. Coil Assembly
	C7	70 mmf.		
P-81806	C8	70 mmf.		Part of 2nd I. F. Coil Assembly
	C9	70 mmf.		
P-81115	C11	.05 mf.	300V	Tubular
P-81114	C12	.006 mf.	600V.	Tubular
P-81814	C13	250 mmf.		Moulded
P-81132	C16	.10 mf.	300V.	Tubular
	C17	.01 mf.	120V.	In Choke Condenser Unit
	C18	.01 mf.	120V.	
P-81120	C19	.007 mf.	1600V.	Tubular
P-81122	C20	.10 mf.	300V.	Tubular
P-81121	C21	.50 mf.	140V.	Tubular
P-81816	C22	.002 mf.		Moulded
P-82002	C23	4.0 mf.	250V.	Dry Electrolytic Block
	C24	2.0 mf.	250V.	
	C25	4.0 mf.	25V.	
P-82500	Gang Condenser			

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-B94351ww	R1	350 Ohm	.5	Flexible Wire Wound
P-B95253	R2	25,000 Ohm	.5	Carbon
P-B95103	R3	10,000 Ohm	.5	Carbon
P-A95105	R4	1 Megohm	.2	Carbon
P-A95105	R5	1 Megohm	.2	Carbon
P-A95504	R6	500,000 Ohm	.2	Carbon
P-A94752	R7	7,500 Ohm	.2	Carbon
P-A95104	R8	100,000 Ohm	.2	Carbon
P- 96017	R9	2 Megohm		Volume Control and Switch
P-A95503	R10	50,000 Ohm	.2	Carbon
P-A95204	R11	200,000 Ohm	.2	Carbon
P-A95504	R12	500,000 Ohm	.2	Carbon
P-B94801ww	R13	800 Ohm	.5	Flexible Wire Wound

In the first models of this receiver a bypass condenser block (P-82600) containing condensers: C2, C4, C10, C14, C15 and C16 was used. Condenser C16 was removed in the later models and added as a separate tubular condenser (P-81132) while the other condensers remained in the block (P-82600-D).

A second condenser change from the earlier models was in the electrolytic filter block (P-82002). In this block section C24 was changed from an 8 mfd., 250 volt to a 2 mfd., 250 volt condenser.

MODEL S-735
Alignment, Notes
Test Data, Parts

WESTERN AUTO SUPPLY CO.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attemped unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the standard wave band and an output meter are required for indicating the effect of adjustments.

First remove the cover of the box. Leave the antenna and battery cables connected to the chassis.

Disconnect the car antenna and connect antenna cable lead to the lead from the signal generator.

Set the signal generator for 1650 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To calibrate the receiver, tune in a station of known frequency at about the center of the dial. Remove the escutcheon plate and glass. The pointer is held in position by friction. Grasp the pointer at the center and turn it until it points to the frequency of the station being received.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and, therefore, no adjustment at this frequency is required.

Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 K. C. with the volume control about three-fourths on. Drop the chassis from the cover. The location of the antenna trimmer is shown in Fig. 2. Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

Removing Chassis From Case

First unsolder the black, brown, yellow, and green speaker leads which connect to the terminal strip adjacent to the vibrator unit. Next, notice the small length of braided shielding which is soldered to the solder lug that is secured to the chassis case between the dial scale and the station selector control shaft. Unsolder this shielding at the lug.

Remove the 4 screws which hold the chassis in the case — 2 are in the side and 2 on the speaker panel of the chassis case. (Do not remove the four speaker mounting screws.)

Remove the two control knobs by pulling them off of the shaft.

Next remove the volume control. To do this first loosen the hexagonal nut on the inside of the case with a flat wrench. Then unscrew and remove the round knurled nut from the front.

The chassis may then be taken out.

Replacing Vibrator Unit

The vibrator unit is plugged in in the same manner as a tube. This unit may, in case of failure, be readily replaced. CAUTION—Polarity, as explained in the label on the unit and in the label on the metal box in the chassis, must be observed when plugging in vibrator unit.

In replacing the vibrator unit be sure to replace the corrugated cardboard pad, which prevents the unit from working its way out of the socket.

When servicing this receiver, a new vibrator unit should be tried out in the same manner as a new set of tubes would be tried out.

One or more vibrator units should be kept on hand for replacement purposes.

Replacing Volume Control

To remove the volume control and the switch, first pull the knob from the volume control shaft. Next loosen the hexagonal nut on the inside of the case with a flat end wrench. Then unscrew and remove the round knurled nut from the front.

The old volume control and switch connections may now be unsoldered and the new unit put in its place and the leads resoldered.

Fasten the volume control to the case in the reverse order in which it was removed.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-5247	Antenna Trans. Pri. in Series	T1	17.50
	Antenna Trans. Sec.	T1	5.25
P-5248	R. F. Interstage Trans. Pri.	T2	2.31
	R. F. Interstage Trans. Sec.	T2	
	(Center Tap to Inside)		3.23
	(Center Tap to Outside)		3.98
P-5249	1st I. F. Trans. Primary	T3	100.00
	1st I. F. Trans. Secondary	T3	100.00
	Oscillator Cathode Coil (Total)	T4	4.50
	Oscillator Plate Coil	T4	9.00
P-5250	2nd I. F. Trans. Pri.	T5	100.00
	2nd I. F. Trans. Sec.	T5	100.00
P-50656	Power Trans. Pri.	T7	0.36
	Power Trans. Sec.	T7	860.00
P-5174	"B" R. F. Choke	L1	1.65
P-50657	Power Choke	L2	390.00
P-5251	"A" Choke	L3	Small
P-5253	Line Choke	L4	Small
P-5252	Choke Coil	L5	Small
P-2228	Output Trans. Pri.	T6	690.00
	Output Trans. Sec. and Voice Coil in Par.		0.80
	Speaker Field		6.00

When ordering parts be sure and give the part number. Also give the complete serial number which includes the Series No.

Part No.	Item
P- 1885	6D6 Tube Socket
P- 1886	6C6 Tube Socket
P- 1775	75 Tube Socket
P- 1911	41 Tube Socket
P- 5247	Antenna Coil Assembly Less Can
P-40415B	Can for above assembly Part of Gang Condenser Assembly
P- 5248	R. F. Interstage Coil Assembly Less Can
P-40447C	Can for above assembly--Part of Chassis Assembly
P- 5249	1st I. F. and Oscillator Coils and Can Assembly
P- 5250	2nd I. F. Coil and Can Assembly
P- 2228	Dynamic Speaker
P-10359	Carboard Baffle for Speaker
P- 2229	Vibrator Unit
P- 2030	Vibrator Socket
P-50656	Power Transformer
P- 5251	R. F. "A" Choke Coil
P- 5174	R. F. "B" Choke Coil
P-50657	Power Choke Coil Assembly
P- 5253	Filament Choke Coil
P- 2220	2 Half Tube Shields with Clamping Ring
P- 2240	Grid Leak and Condenser Assembly
P- 2224	Knobs
P-20960	Thumb Screws
P-10356	Glass Crystal
P-10361	Gasket for Glass Crystal
P-30342A	Grid Clip only
P-10213	Wide Rubber Bands for Tubes
P-70774	Shielded Antenna Cable
P-70781	"A" Battery Cable
P- 1421	Single Lug Terminal Strip
P- 2082	Double Insulated Terminal Strip
P- 2232	Five Lug Terminal Strip
P- 1933	Cinch Terminal Lug
P-20701	Drive Tension Spring
P-20953	Horse-shoe Lock (Washer)
P- 2227	Dial Strip
P-20954	Dial Pointer

MODEL S-740
Schematic

WESTERN AUTO SUPPLY CO.

T1 ANTENNA COIL (P-5039)
T2 R.F. INTERSTAGE COIL (P-5065)
T3 } 1ST I.F. & OSCILLATOR
T4 } COIL (P 5063)
T5 2ND I.F. COIL (P-5022)
T6 OUTPUT TRANS. (P-50632)
T7 POWER TRANS. (P-50633)

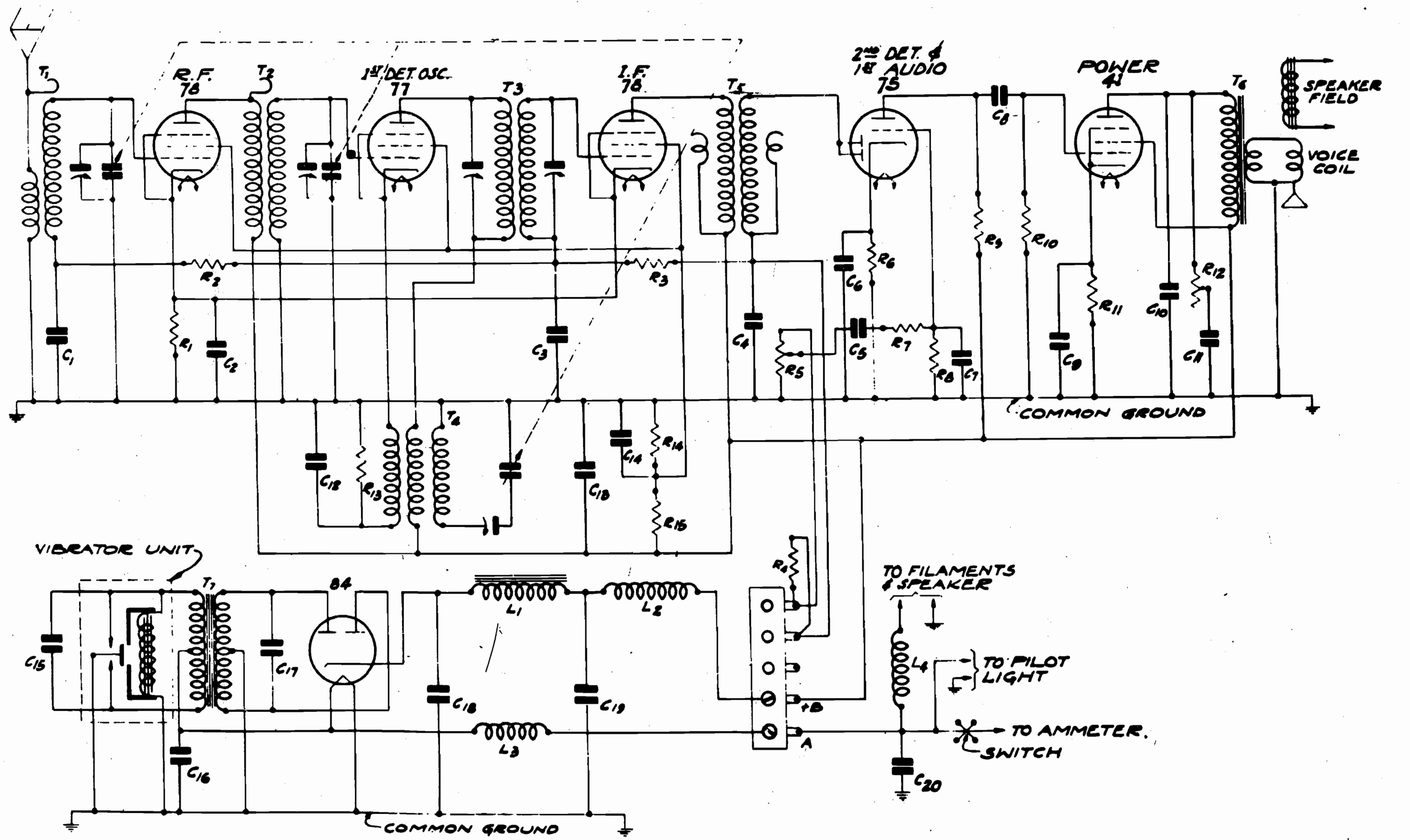
L1 FILTER CHOKE (P-50637)
L2 R.F. "B" CHOKE (P-5174)
L3 ELIMINATOR "A" CHOKE (P-5175)
L4 R.F. "A" CHOKE (P-5167)

C1 0.050 µf 200V. TUBULAR
C2 0.500 µf (BLOCK RED-WH.)
C3 0.050 µf (BLOCK GR.-WH.)
C4 0.00025 µf MICA
C5 0.050 µf 200V. TUBULAR
C6 12.000 µf ELECTROLYTIC IN BLOCK WITH C9
C7 0.00025 µf MICA
C8 0.050 µf (BLOCK GR.)
C9 12.000 µf ELECTROLYTIC IN BLOCK WITH C6
C10 0.003 µf (BLOCK YELLOW)
C11 0.020 µf 600V. TUBULAR
C12 0.001 µf MICA
C13 0.500 µf (BLOCK BLUE)
C14 0.100 µf (BLOCK BROWN)
C15 0.500 µf 120V. TUBULAR
C16 1.000 µf 120V. TUBULAR
C17 0.010 µf 1600V TUBULAR
C18 16.000 µf BLOCK WITH C19
C19 16.000 µf BLOCK WITH C18
C20 0.500 µf 120V. TUBULAR

COLOR CODE DESIGNATES CONDENSERS IN BY PASS BLOCK

R1 260 OHMS
R2 1.0 MEGOHM
R3 2.0 "
R4 200,000 OHM
R5 250,000 OHM VOL. CONTROL
R6 6,000 OHM
R7 100,000 OHM
R8 1.0 MEGOHM
R9 250,000 OHM
R10 250,000 OHM
R11 800 OHM
R12 150,000 OHM TONE CONTROL
R13 4,000 OHM
R14 20,000 OHM
R15 15,000 OHM

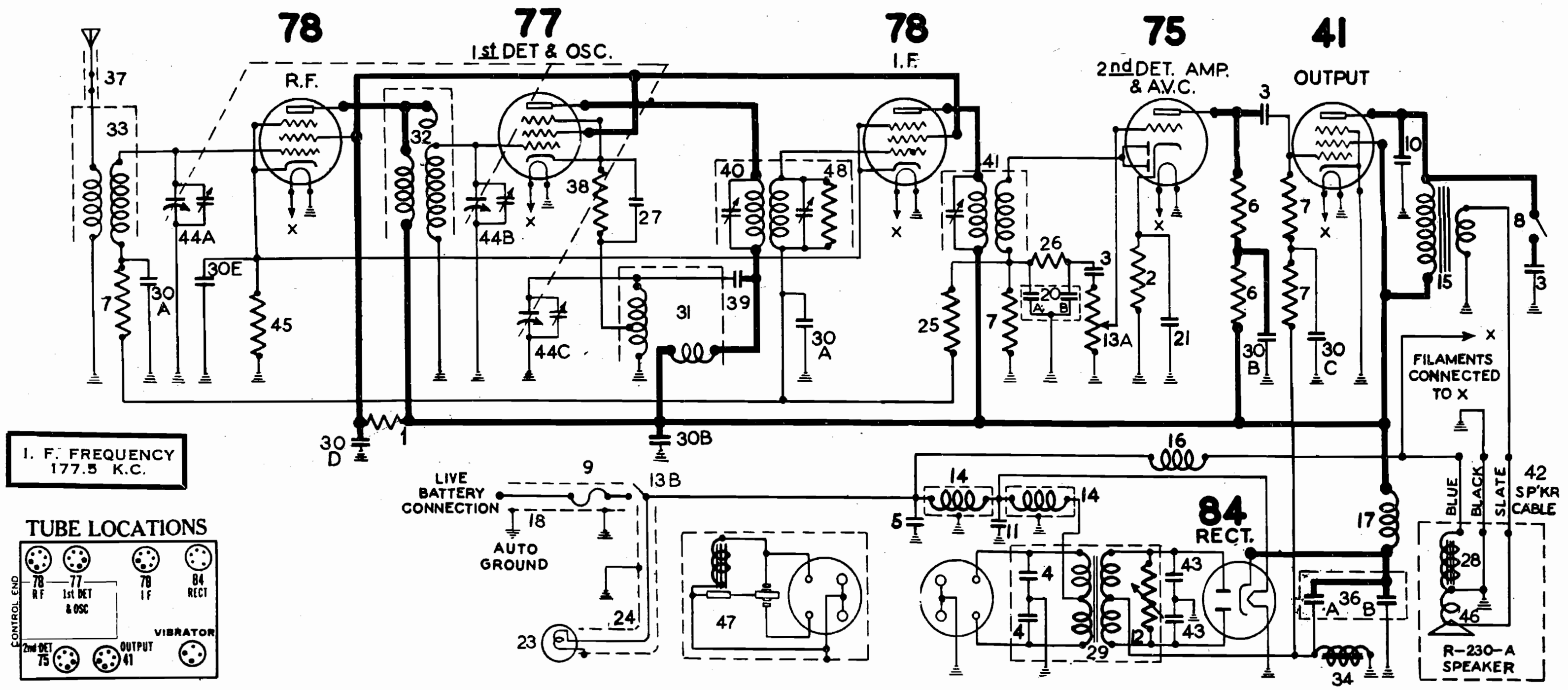
IF PEAK 262.5 KC.



WESTERN AUTO SUPPLY CO.

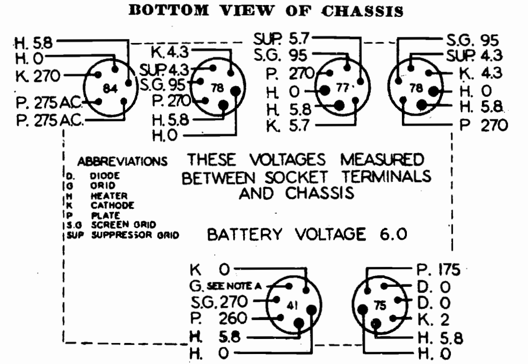
MODEL S-743,1312. Schematic,Voltage Socket,Parts List

TRUETONE MODEL 1312



SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS



IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

MODEL R-1312 PARTS LIST

Diag. No.	Part No.	Description	List Price
1	66023	60,000 ohm 1 watt carbon resistor	$0.25
2	67580	6,000 ohm ¼ watt carbon resistor	.25
3	83007	.02 mfd. 600 volt paper condenser	.35
4	83058	.25 mfd. 100 volt paper condenser	.35
5	83063	.5 mfd. 100 volt paper condenser	.45
6	83080	51,000 ohm ¼ watt carbon resistor	.20
7	83082	260,000 ohm ¼ watt carbon resistor	.20
8	83179	Tone control switch	.30
9	83207	15 ampere fuse	.05
10	83706	.006 mfd. 600 volt paper condenser	.35
11	83714	1.5 mfd. 100 volt shielded condenser	.80
12	83725	Special Globar resistor	.45
14	83730	Vibrator R.F. Choke	.25
15	83731	Output transformer	2.00
16	83742	Filament R.F. choke	.16
13A, 13B	83728	500,000 ohm volume control; Line Switch	1.20
17	83770	"B" supply R.F. choke	.40
18	83777	Battery lead and fuse housing	.50
20	83785	Dual .0005 mfd. molded mica condenser	.32
21	83803	12 mfd. 25 volt dry electrolytic condenser	.80
23	84058	6 - 8 volt dial light bulb	.15
24	84099	Dial light cable	.35
25	84235	1.1 megohm carbon resistor	.20
26	84238	11,000 ohm ¼ watt carbon resistor	.20
27	84282	.001 mfd. molded mica condenser	.25
28	84791	Field coil and housing (R-230A only) (Part 85118 for R-232A)	2.50
29	84798	Power transformer	3.50

Diag. No.	Part No.	Description	List Price
30A, 30B, 30C, 30D, 30E	84806	.05 mfd. 300 volt paper cond. (green-white); .1 mfd. 400 v. paper cond. (red or red-white); .25 mfd. 100 volt paper cond. (green lead); .25 mfd. 300 volt paper cond. (white lead); .5 mfd. 100 volt paper cond. (orange lead)	2.50
31	84814	Oscillator (O) coil and shield assembly	1.50
32	84822	R.F. (B) coil and shield assembly	1.50
33	84825	Antenna (A) coil and shield assembly	1.40
34	84827	"B" supply filter choke	1.25
36A, 36B	84829	4 mfd.—400 volt dry electrolytic condenser; 8 mfd.—400 volt dry electrolytic condenser	2.50
37	84831	Antenna lead and plug	.10
38	85051	8000 ohm ¼ watt carbon resistor	.20
39	84833	.00007 mfd. molded mica condenser	.20
40	84838	1st. I.F. transformer assembly	2.75
41	84842	2nd. I.F. transformer assembly	2.60
42	84845	Speaker cable	.50
43	84850	.03 mfd. 750 volt paper condenser	.25
44A, 44B, 44C	84866	Three gang variable condenser with mounting plate and shaft coupling	6.00
45	84888	300 ohm. ½ watt flexible wire resistor	.20
46	84891	Diaphragm, voice coil, and shell assembly (R-230A only) (Part 85119 for R-232A)	2.10
47	84905	Vibrator	5.00
48	83072	510,000 ohms ¼ watt resistor	.20
38	85051	8000 ohm ¼ watt carbon resistor	.20
28	85118	Field coil and housing (R-232A only)	2.50
46	85119	Diaphragm, and shell assembly (R-232A only)	2.10

(See reverse side for other parts.)

MODEL S-743,1312
Alignment,Parts
Circuit Data

WESTERN AUTO SUPPLY CO.

SERVICE DATA FOR TRUETONE MODEL 1312

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 177.5 KC. take place in the 77 combination first detector and oscillator tube.

The 177.5 KC. signal is amplified in the I.F. stage, using a 78 type tube, and then rectified in the diode section of the 75 second detector tube. The rectified current produces a modulated D.C. voltage across the diode load resistor No. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate is the terminal of the tone control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below.

The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to maximum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output.

Adjust the output of the oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

Part No.	Description	List Price
12606	Receiver mtg. nut (5/16—18 hex.)	$0.02
81346	4 lug terminal strip.	.04
83144	15,000 ohm spark plug suppressor	.35
83145	10,000 ohm distributor suppressor	.35
83242	No. 8 x 1/4" self tapping screws (dark finish for mtg. back cover and casing brackets)	.02
83319	Fuse insulating tube	.02
83624	No. 8 x 1/4" self tapping screw (Cad. plate. for mtg. power transformer)	.01
83711	8 lug terminal strip	.12
83719	Front cover mtg. spade bolt (8-32)	.01
83720	4 lug terminal strip	.08
83721	Battery lead plug rubber grommet	.02
83727	Back cover	.90
83737	Front cover knurled nuts	.06
83771	Receiver mounting stud	.08
83772	Receiver mounting dash support washer	.04
83806	Speaker grill cloth	.12
83892	Variable condenser shaft coupling	.10
83893	Volume control shaft guide bushing	.05
83904	Generator condenser	.70
84869	Case assembly, less covers	3.75
84893	Front cover and speaker grill cloth	1.00
84911	Aluminum vibrator shield assembly	.30

REMOTE CONTROL HEAD PARTS

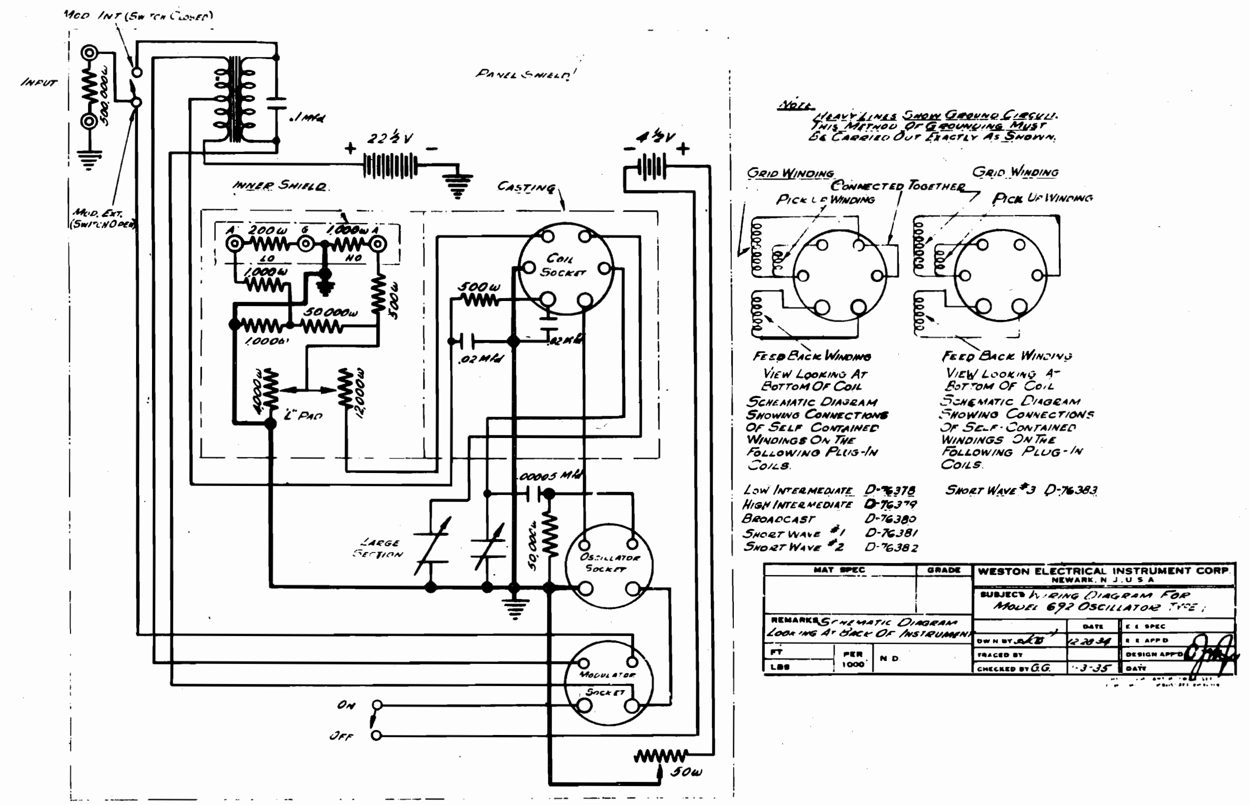
Part No.	Description	List Price
15244	Long mtg. strap screw (10/32 x 1 1/4" R.H.M.S.)	.01
84059	Case screw (4-40 x 3/16") Per hundred	.80
84060	Flexible casing set screw	.02
84067	Steering post mtg. bracket	.25
84068	Steering post mtg. strap	.15
84075	Bezel and glass	.50
84076	Dial light button and socket	.25
84106	Volume control knob	.25
84309	Instrument panel mounting accessories	.15
84854	Complete accessories for installation	5.00

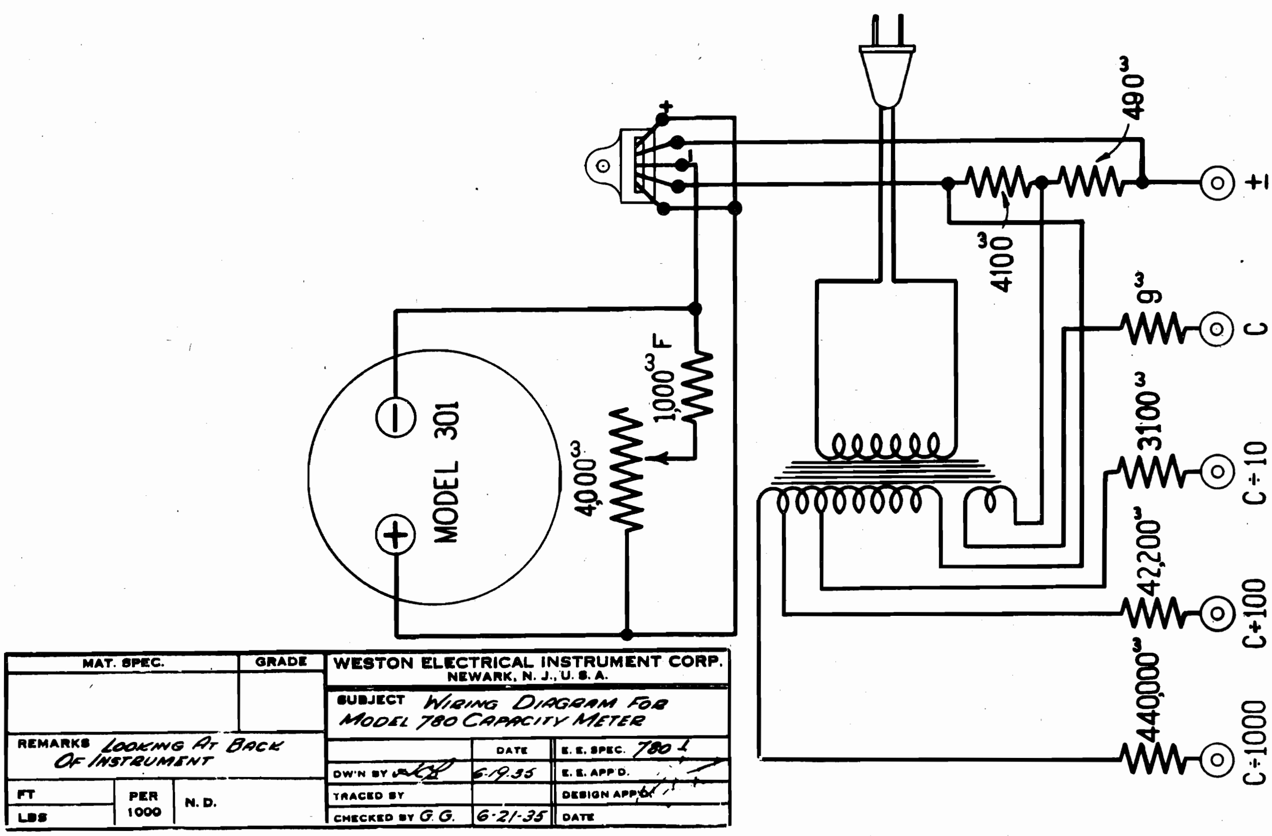
FLEXIBLE SHAFTS

Part No.	Description	List Price
84871	Tuning shaft, 24 inches long	1.50
84873	Volume control shaft, 24 inches long	1.50
84882	Tuning shaft, 36 inches long	2.00
84883	Volume control shaft, 36 inches long	2.00
84886	Tuning shaft, 30 inches long	2.00
84887	Volume control shaft, 30 inches long	2.00

MODEL 692, Type 1 Oscillator
MODEL 780 Capacity Meter
Schematics

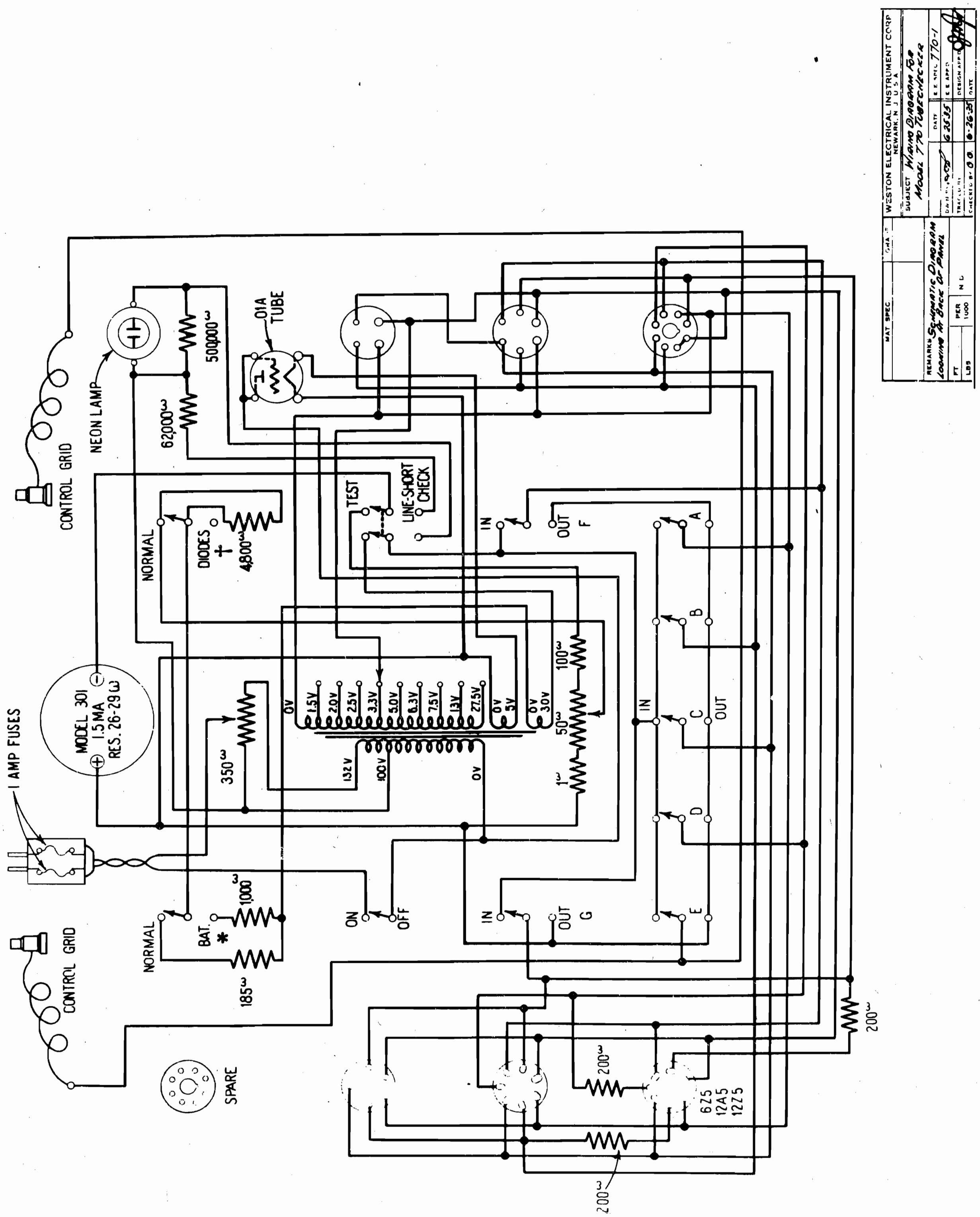
WESTON ELECTRICAL INSTRUM'T CORP.





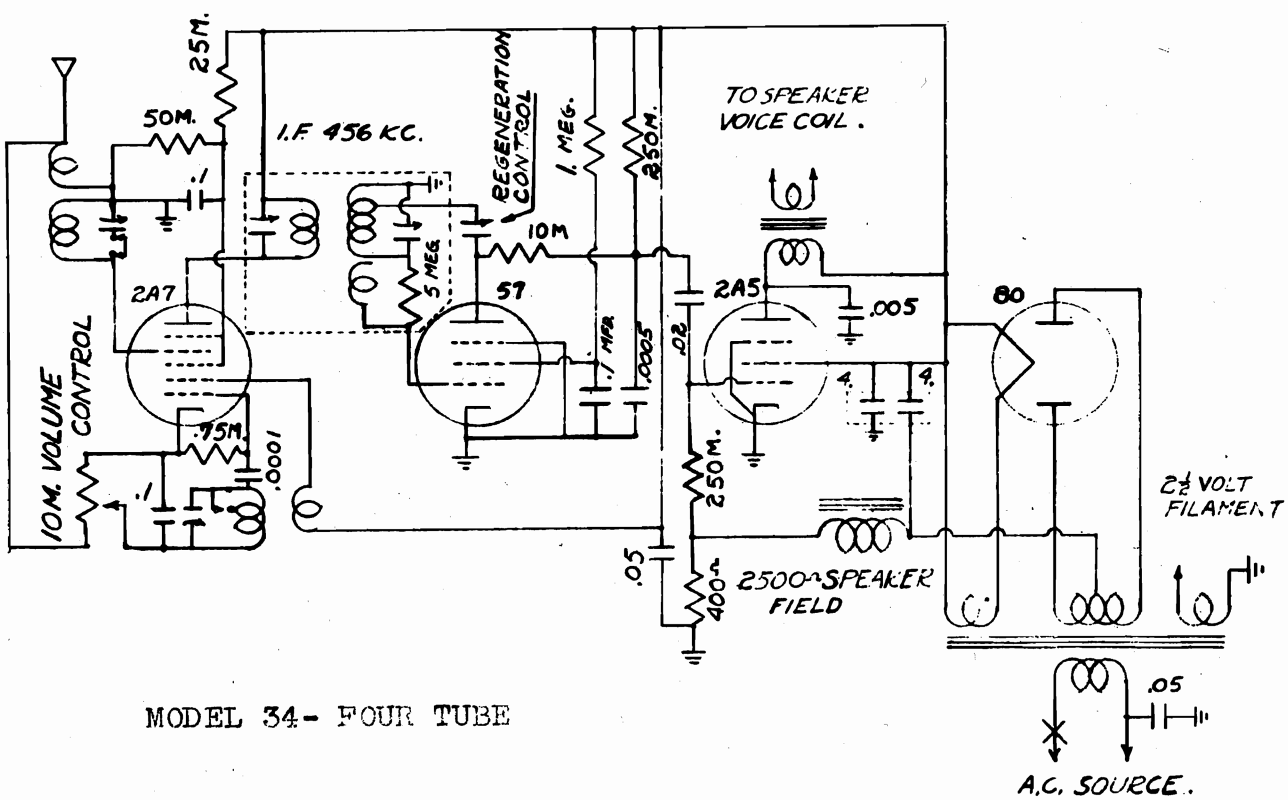
MODEL 770
Tube Checker
Schematic

WESTON ELECTRICAL INSTRUM'T CORP.

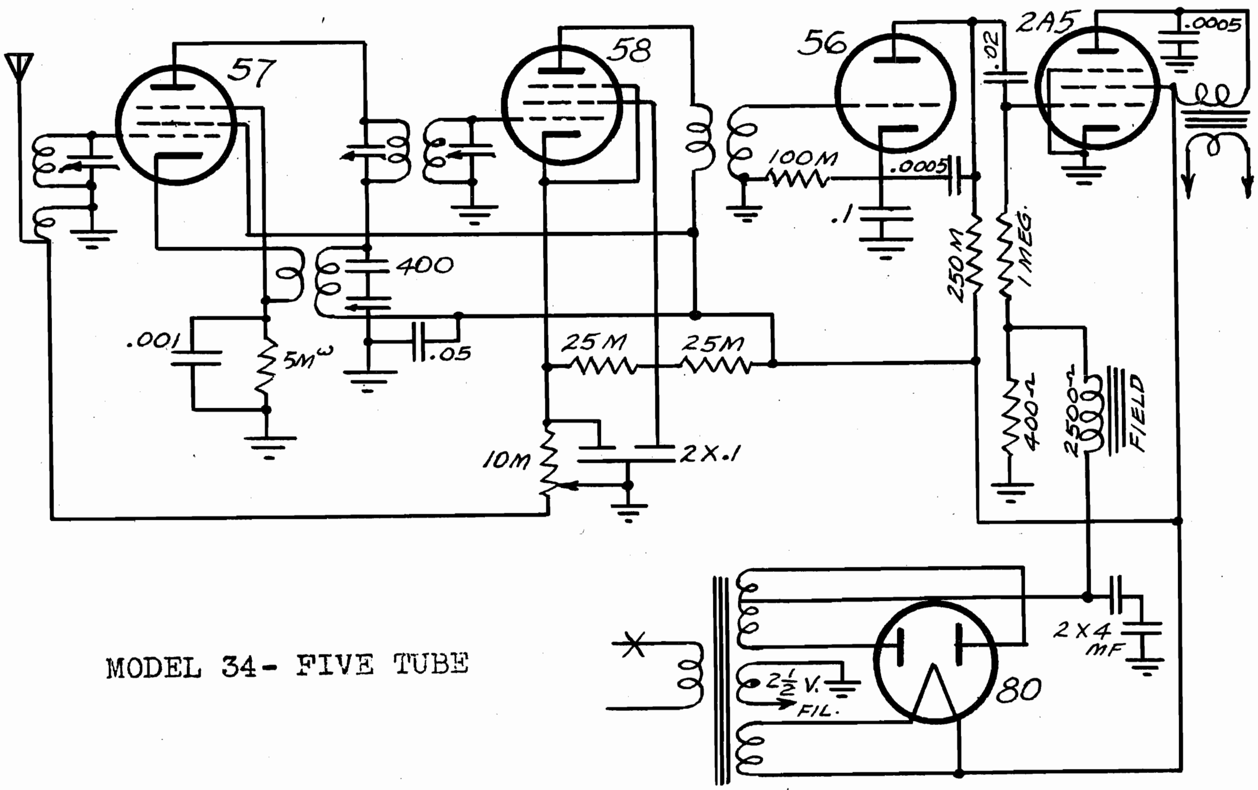


WESTONE RADIO CORP.

MODEL 34, 4-Tubes
MODEL 34, 5-Tubes
Schematics



MODEL 34- FOUR TUBE

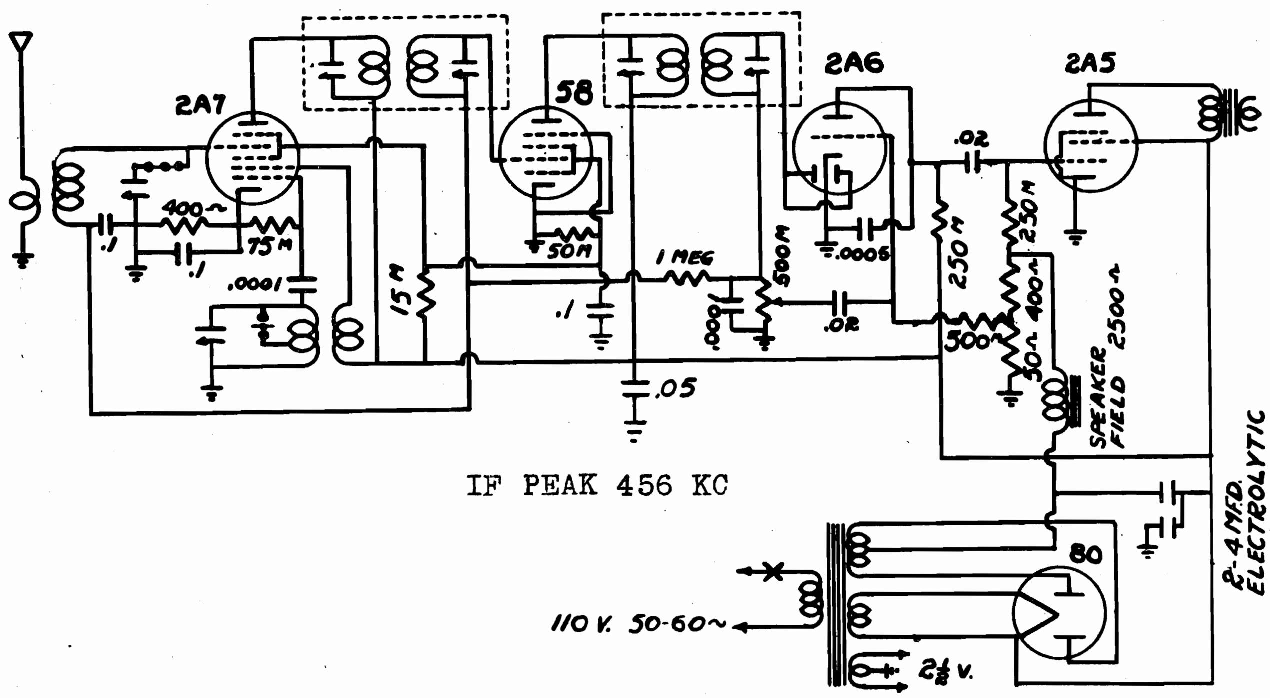


MODEL 34- FIVE TUBE

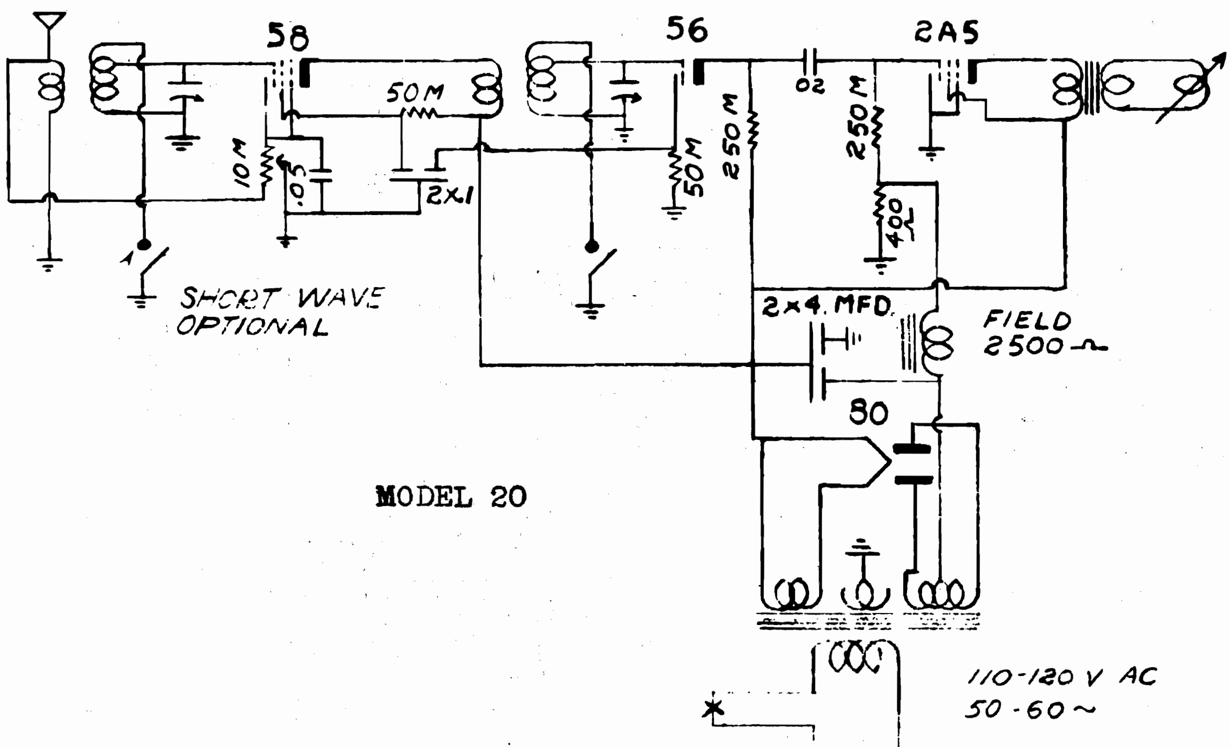
MODEL 20
MODEL 40
Schematics

WESTONE RADIO CORP.

MODEL 40



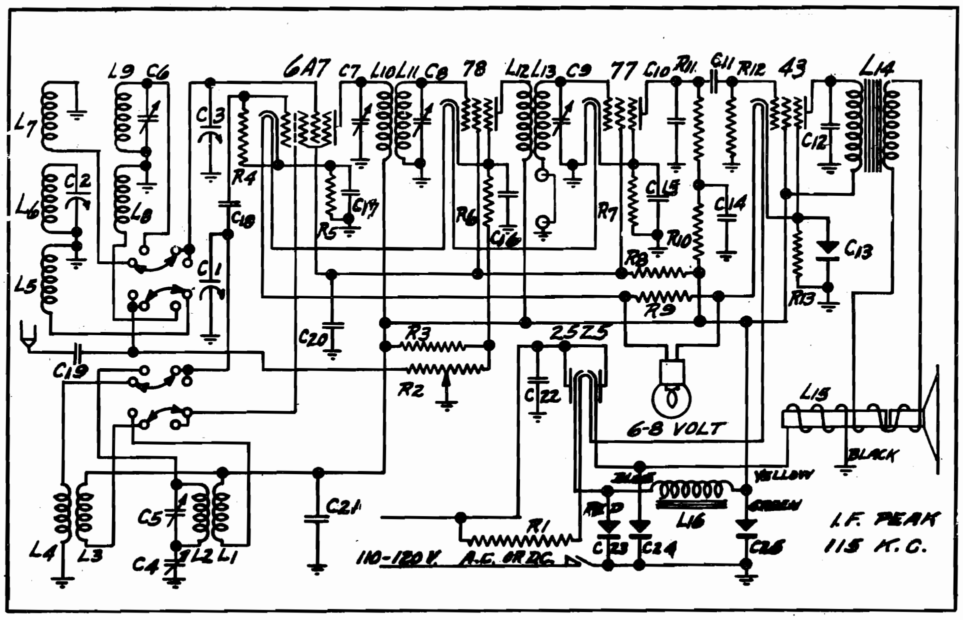
IF PEAK 456 KC



MODEL 20

WILCOX-GAY CORP.

MODELS 3JD5,3JG5
Schematic, Socket
Voltage, Parts



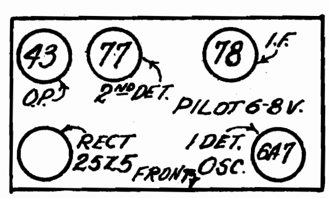
CODE	PART NO.	RESISTORS
R1	20-1125	130 Ohm Resistor in Power Cord
R2	19-1296	10,000 Ohm Volume Control & Switch
R3	53-922	75,000 Ohm Resistor I.F. Cathode Feed
R4	53-898	50,000 Ohm Resistor Oscillator Grid
R5	53-1062	250 Ohm Resistor 6A7 Cathode
R6	53-1063	500 Ohm Resistor I.F.Cathode
R7	53-941	20,000 Ohm Resistor Second Detector Cathode
R8	53-921	40,000 Ohm Resistor Screen Feed
R9	53-1308	20 Ohm Resistor Pilot Light Shunt
R10	53-923	100,000 Ohm 77 Plate Hum Resistor
R11	53-924	250,000 Ohm Resistor 77 Plate
R12	53-925	500,000 Ohm Resistor Output Grid
R13	53-1063	500 Ohm Resistor Output Cathode

CODE	PART NO.	CONDENSERS
C1	77-833	336 MMFD. Oscillator Section of 3 Gang
C2	77-833	371 MMFD. Preselector Section of 3 Gang
C3	77-833	371 MMFD. Preselector Section of 3 Gang
C4	78-2006	Long Wave Oscillator Series Trimmer
C5	78-1597	Long Wave Oscillator Parallel Trimmer
C6	78-1597	Long Wave Preselector Trimmer
C7	78-993	First I.F. Primary Trimmer
C8	78-994	First I.F. Secondary Trimmer
C9	78-788	Second I.F. Trimmer
C10	76-265	.001 Mfd. Mica 77 Plate By-Pass
C11	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C12	75-343A	.004 Mfd. Paper Output Plate By-Pass
C13	18-928	25 Mfd. 25 Volt Output Cathode
C14	75-272A	.1 Mfd. 200 Volt 77 Plate Hum Filter
C15	75-267A	5. Mfd. 200 Volt 77 Cathode By-Pass
C16	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
C17	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
C18	76-264	.00005 Mfd. Mica Oscillator Grid Condenser
C19	76-265	.001 Mfd. Mica Antenna Series Condenser
C20	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C21	75-267A	.5 Mfd. 200 Volt B Supply By-Pass
C22	75-272A	.1 Mfd. 200 Volt 110 Volt Line By-Pass
C23	18-1085	10 Mfd. 150 Volt Dry Electrolytic Cond.
C24	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.
C25	18-1085	4 Mfd. 150 Volt Dry Electrolytic Cond.

CODE	PART NO.	INDUCTANCES
L1	17-2013	Long Wave Oscillator Primary
L2	17-2013	Long Wave Oscillator Secondary
L3	17-2013	Broadcast Oscillator Primary
L4	17-2013	Broadcast Oscillator Secondary
L5	17-2015	Broadcast Preselector Primary
L6	17-2015	Broadcast Preselector First Secondary
L7	17-2015	Broadcast Preselector Second Secondary
L8	17-2015	Long Wave Preselector Primary
L9	17-2015	Long Wave Preselector Secondary
L10	17-999	First I.F. Trans. Primary
L11	17-999	First I.F. Trans. Secondary
L12	17-2032	Second I.F. Trans. Primary
L13	17-2032	Second I.F. Trans. Secondary
L14	64-1260	Single 43 Output Trans.
L15	64-1260	3000 Ohm Speaker Field
L16	14-940	20 Henry Filter Choke

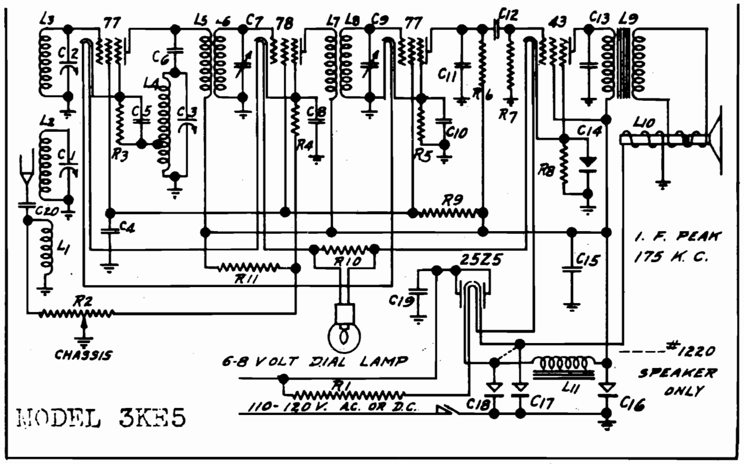
Tube	Plate	Screen	Cathode
6A7	106	40	1.
78	106	40	1.5
77	30	40	1.5
43	100	106	15.

Osc. Plate 106, Grid -2.
Field drop 112 v.



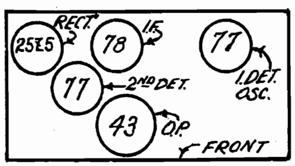
MODEL 3JF5
MODEL 3KE5
Schematics, Socket Voltage, Parts

WILCOX-GAY CORP.



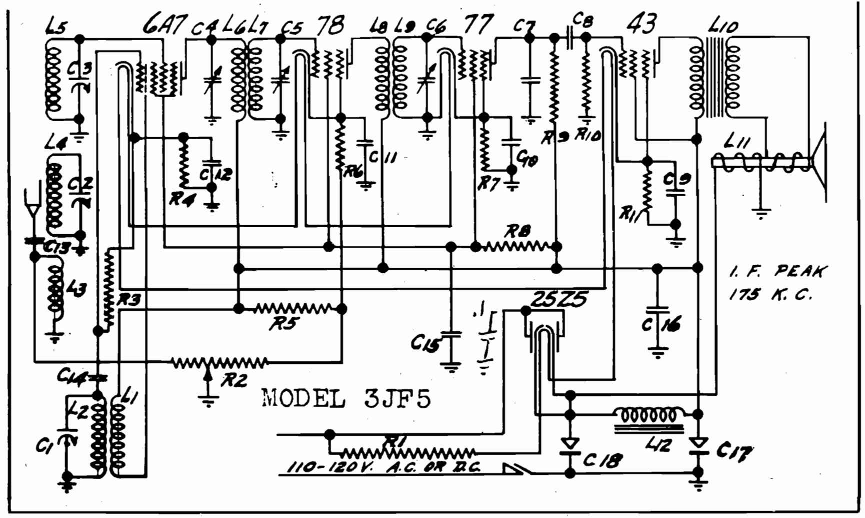
MODEL 3KE5

CODE	PART NO.	RESISTORS
R1	1125	130 Ohm Resistor in Power Cord
R2	1296	10,000 Ohm Volume Control & Switch
R3	919	5,000 Ohm Resistor First Detector & Osc. Cathode
R4	1063	500 Ohm Resistor I.F. Cathode
R5	941	20,000 Ohm Resistor Second Detector Cathode
R6	924	250,000 Ohm Resistor Second Detector Plate
R7	925	500,000 Ohm Resistor Output Grid Bias
R8	1063	500 Ohm Resistor Output Cathode
R9	921	40,000 Ohm Resistor Screen Feed
R10	308	20 Ohm Resistor Pilot light shunt
R11	922	75,000 Ohm Resistor I.F. Cathode Feed
		CONDENSERS
C1	833	371 MMFD. Preselector Section of 3 Gang Condenser
C2	833	371 MMFD. Preselector Section of 3 Gang Condenser
C3	833	336 MMFD. Oscillator Section of 3 Gang Condenser
C4	272A	.1 Mfd. 200 Volt Screen By-Pass Condenser
C5	265	.001 Mfd. Mica First Detector & Oscillator Cathode
C6	264	.00005 Mfd. Mica Oscillator Coupling Condenser
C7	938	75-150 MMFD. First I.F. Trimmer Condenser
C8	272A	.1 Mfd. 200 Volt I.F. Cathode By-Pass Condenser
C9	849	75-150 MMFD. Second I.F. Trimmer Condenser
C10	183A	.2 Mfd. 200 Volt Second Detector Cathode By-Pass Condenser
C11	265	.001 Mfd. Mica Second Detector Plate Filter Condenser
C12	269A	.01 Mfd. 400 Volt Audio Feed Condenser
C13	662	.002 Mfd. Mica Output Plate Filter Condenser
C14	928	25 Mfd. 25 Volt C Bias By-Pass Condenser
C15	267-A	.5 Mfd. 200 Volt B Supply By-Pass Condenser
C16	1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C17	1085	4 Mfd. 150 Volt Dry Electrolytic Condenser
C18	1085	11 Mfd. 150 Volt Dry Electrolytic Condenser
C19	272A	.1 Mfd. 200 Volt Line By-Pass Condenser
C20	265	.001 Mfd. Antenna Series Condenser
		INDUCTANCES
L1	844	Preselector Primary 178 turns #36 S.S.E.
L2	844	Preselector First Secondary 133 turns #36 S.S.E.
L3	844	Preselector Second Secondary 128 turns #36 S.S.E.
L4	935	Oscillator Coil 98 turns #36 S.S.E. tapped at 15 T.
L5	935	First I.F. Primary 650 turns #36 S.S.E.
L6	935	First I.F. Secondary 650 turns #36 S.S.E.
L7	1172	Second I.F. Primary 650 turns #38 S.S.E.
L8	1172	Second I.F. Secondary 650 turns #38 S.S.E.
L9	917	Single #43 Output Transformer
L10	917	3000 Ohm speaker Field
L11	940	20 Henry Choke



	Tube	Plate	Screen	Cathode
Mix-Osc	77	118	65	3.6
I-F	78	118	65	2.2
2 Det.	77	52	65	3.2
Output	43	111	118	17.

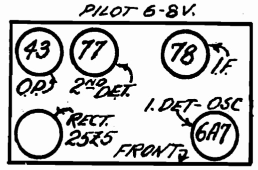
Field drop 135 v.



MODEL 3JF5

CODE	PART NO.	RESISTORS
R1	20-809	170 Ohm Resistor In Power Cord
R2	19-1296	10,000 Ohm Volume Control & Switch
R3	53-898	50,000 Ohm Resistor Oscillator Grid
R4	53-1062	250 Ohm Resistor Oscillator Cathode
R5	53-922	75,000 Ohm Resistor I.F. Cathode Feed
R6	53-1063	500 Ohm Resistor I.F. Cathode
R7	53-941	20,000 Ohm Resistor 77 Cathode
R8	53-919	5,000 Ohm Resistor Screen
R9	53-923	100,000 Ohm Resistor 77 Plate
R10	53-925	500,000 Ohm Resistor Output Grid
R11	53-1063	500 Ohm Resistor Output Cathode
		CONDENSERS
C1	77-833	336 Oscillator Section of 3 Gang
C2	77-833	371 Preselector Section of 3 Gang
C3	77-833	371 Preselector Section of 3 Gang
C4	78-2008	First I.F. Primary Trimmer
C5	78-2007	First I.F. Secondary Trimmer
C6	78-2009	Second I.F. Trimmer
C7	76-265	.001 Mfd. Mica 77 Plate Filter
C8	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C9	75-267A	.5 Mfd. 200 Volt 43 Cathode By-Pass
C10	75-272A	.1 Mfd. 200 Volt 77 Cathode By-Pass
C11	75-272A	.1 Mfd. 200 Volt 78 Cathode By-Pass
C12	75-272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass
C13	76-265	.001 Mfd. Mica Antenna Series Condenser
C14	76-264	.00005 Mfd. Mica Oscillator Grid Cond.
C15	75-272A	.1 Mfd. 200 Volt Screen By-Pass
C16	75-272A	.1 Mfd. 200 Volt B supply By-Pass
C17	18-2001	6 Mfd. 150 Volt Dry Electrolytic Condenser
C18	18-2001	6 Mfd. 150 Volt Dry Electrolytic Condenser
		INDUCTANCES
L1	17-2030	Oscillator Coil Primary
L2	17-2030	Oscillator Coil Secondary
L3	17-2019	Preselector Coil Primary
L4	17-2019	Preselector Coil First Secondary
L5	17-2019	Preselector Coil Second Secondary
L6	17-2024	First I.F. Transformer Primary
L7	17-2024	First I.F. Transformer Secondary
L8	17-2023	Second I.F. Transformer Primary
L9	17-2023	Second I.F. Transformer Secondary
L10	64-2006	Output Transformer for #43 Tube
L11	64-2006	3000 Ohm Speaker Field
L12	14-940	20 Henry Choke

PILOT 6-8V.



Tube	Plate	Screen	Cathode
6A7	80	60	2.
78	80	60	2.
77	25	60	3
43	70	80	15

Osc. Plate 80, Grid -2.
Field drop 90 v.

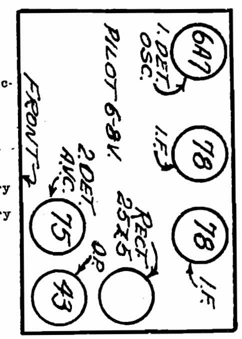
WILCOX-GAY CORP.

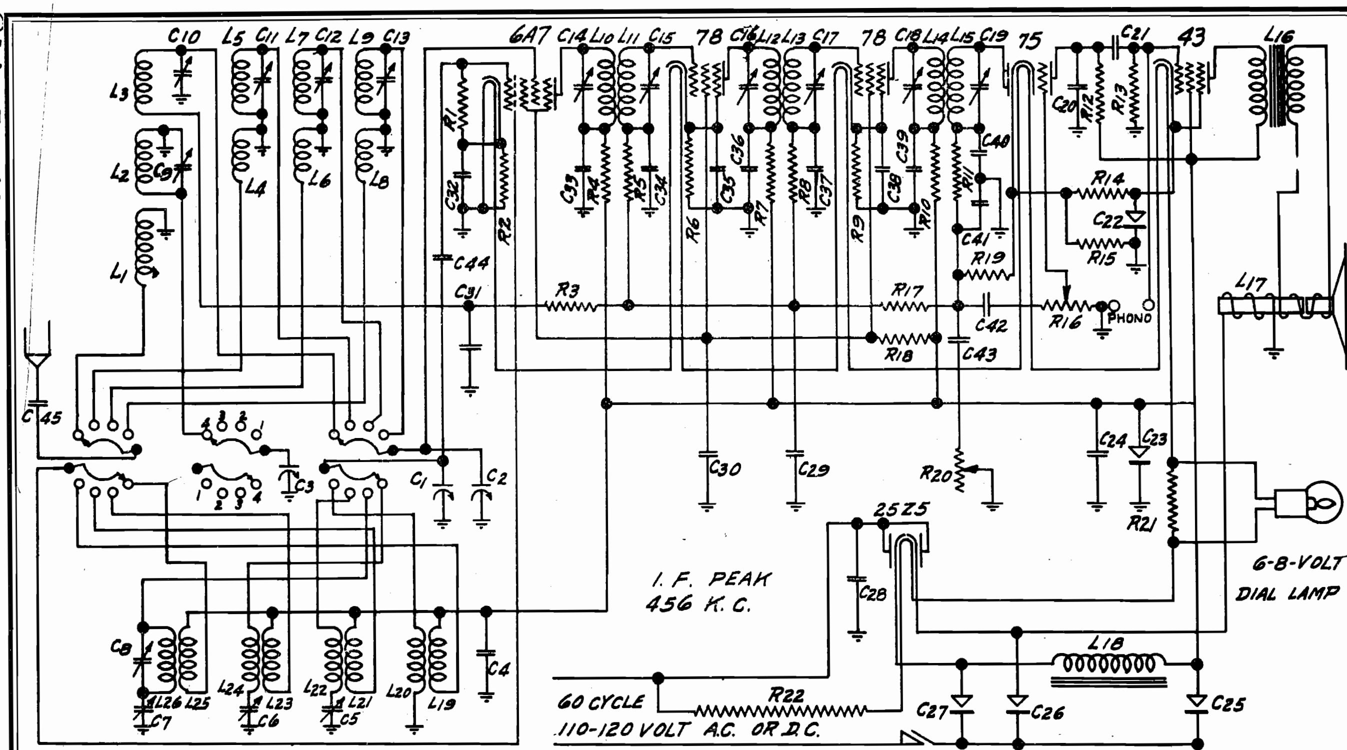
MODELS 4JA6, 4JB6 Schematic, Socket Voltage, Parts

6A7

Tube	Plate	Screen	Cathode
6A7	80*95**	70*	2*
78	72	70	3
78	72	70	3
75	55	--	1
43	80	95	12

* Mixer ** Oscillator





CODE	PART NO.	RESISTORS
R1	941	20,000 Ohm Oscillator Grid Resistor
R2	1062	250 Ohm Oscillator Cathode Resistor
R3	923	100,000 Ohm A.V.C. Network Resistor
R4	919	5,000 Ohm 6A7 Plate Isolation Resistor
R5	923	100,000 Ohm First I.F. Grid Isolation Resistor
R6	1063	500 Ohm First I.F. Cathode Resistor
R7	919	5,000 Ohm First I.F. Plate Isolation Resistor
R8	923	100,000 Ohm Second I.F. Grid Isolation Resistor
R9	1063	500 Ohm Second I.F. Cathode Resistor
R10	919	5,000 Ohm Second I.F. Plate Isolation Resistor
R11	898	50,000 Ohm Diode Plate Filter Resistor
R12	923	100,000 Ohm 75 Plate Load Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm 43 Cathode Resistor
R15	1122	40 Ohm 75 Cathode Resistor
R16	1291	500,000 Ohm Volume Control & Switch
R17	926	1 Megohm A.V.C. Network Resistor
R18	919	5,000 Ohm R.F. & I.F. Screen Feed Resistor
R19	925	500,000 Ohm A.V.C. Load Resistor
R20	1317	250,000 Ohm Tone Control
R21	1308	20 Ohm Pilot Light Shunt Resistor
R22	1125	130 Ohm Resistor in Power Cord

C1	1581	16-366 MMFD. First Section of 3 Gang Condenser
C2	1581	16-366 MMFD. Second Section of 3 Gang Condenser
C3	1581	16-366 MMFD. Third Section of 3 Gang Condenser
C4	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass Condenser
C5	1572	1600 MMFD. No. 2 Band Oscillator Reciprocal Trimmer
C6	1572	500 MMFD. No. 3 Band Oscillator Reciprocal Trimmer
C7	1569	450 MMFD. No. 4 Band Oscillator Reciprocal Trimmer
C8	1581	No. 4 Band Oscillator Parallet Trimmer on C1
C9	1581	No. 4 Band First Preselector Trimmer on C3
C10	1581	No. 4 Band Second Preselector Trimmer on C2
C11	1588	3-30 MMFD. No. 3 Band Preselector Trimmer
C12	1588	3-30 MMFD. No. 2 Band Preselector Trimmer
C13	1588	3-30 MMFD. No. 1 Band Preselector Trimmer
C14	1561	70-120 MMFD. First I.F. Primary Trimmer
C15	1561	70-120 MMFD. First I.F. Secondary Trimmer
C16	1561	70-120 MMFD. Second I.F. Primary Trimmer
C17	1561	70-120 MMFD. Second I.F. Secondary Trimmer
C18	1561	70-120 MMFD. Third I.F. Primary Trimmer
C19	1561	70-120 MMFD. Third I.F. Secondary Trimmer
C20	265	.001 Mfd. Mica 75 Plate Filter Condenser
C21	269A	.01 Mfd. 400 Volt Audio Feed Condenser
C22	928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C23	1379	4 Mfd. 375 Volt Dry Electrolytic Condenser
C24	266	1 Mfd. 400 Volt B Supply By-Pass Condenser
C25	1295	4 Mfd. 150 Volt Dry Electrolytic Condenser
C26	1295	4 Mfd. 150 Volt Dry Electrolytic Condenser
C27	1295	10 Mfd. 150 Volt Dry Electrolytic Condenser
C28	272A	.1 Mfd. 200 Volt Line By-Pass Condenser
C29	272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C30	267A	.5 Mfd. 200 Volt Screen By-Pass Condenser
C31	269A	.01 Mfd. 400 Volt A.V.C. Network By-Pass Condenser
C32	272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass Condenser
C33	269A	.01 Mfd. 400 Volt 6A7 Plate Isolation Condenser
C34	269A	.01 Mfd. 400 Volt First I.F. Grid Isolation Condenser
C35	272A	.1 Mfd. 200 Volt First I.F. Cathode By-Pass Condenser
C36	269A	.01 Mfd. 400 Volt First I.F. Plate Isolation Condenser
C37	269A	.01 Mfd. 400 Volt Second I.F. Grid Isolation Condenser
C38	272A	.1 Mfd. 200 Volt Second I.F. Cathode By-Pass Condenser
C39	269A	.01 Mfd. 400 Volt Second I.F. Plate Isolation Condenser
C40	339	.0001 Mfd. Mica Diode Filter Condenser
C41	339	.0001 Mfd. Mica Diode Filter Condenser
C42	269A	.01 Mfd. 400 Volt 75 Grid Feed Condenser
C43	269A	.01 Mfd. 400 Volt Tone Control Condenser
C44	268	.00025 Mfd. Mica Oscillator Coupling Condenser
C45	269	.00025 Mfd. Mica Antenna Series Condenser

INDUCTANCES

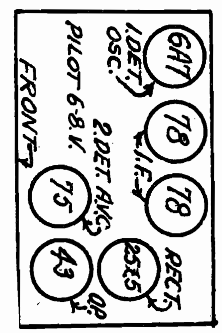
L1	1481	No. 4 Band Preselector Primary
L2	1481	No. 4 Band Preselector First Secondary
L3	1481	No. 4 Band Preselector Second Secondary
L4	1668	No. 3 Band Preselector Primary
L5	1668	No. 3 Band Preselector Secondary
L6	1668	No. 2 Band Preselector Primary
L7	1666	No. 2 Band Preselector Secondary
L8	1664	No. 1 Band Preselector Primary
L9	1664	No. 1 Band Preselector Secondary
L10	1663	First I.F. Primary
L11	1663	First I.F. Secondary
L12	1633	Second I.F. Primary
L13	1633	Second I.F. Secondary
L14	1633	Third I.F. Primary
L15	1633	Third I.F. Secondary
L16	1653	Single 43 Output Transformer
L17	1653	3000 Ohm Speaker Field
L18	940	20 Henry Filter Choke
L19	1663	No. 1 Band Oscillator Primary
L20	1663	No. 1 Band Oscillator Secondary
L21	1665	No. 2 Band Oscillator Primary
L22	1665	No. 2 Band Oscillator Secondary
L23	1667	No. 3 Band Oscillator Primary
L24	1667	No. 3 Band Oscillator Secondary
L25	1645	No. 4 Band Oscillator Primary
L26	1645	No. 4 Band Oscillator Secondary

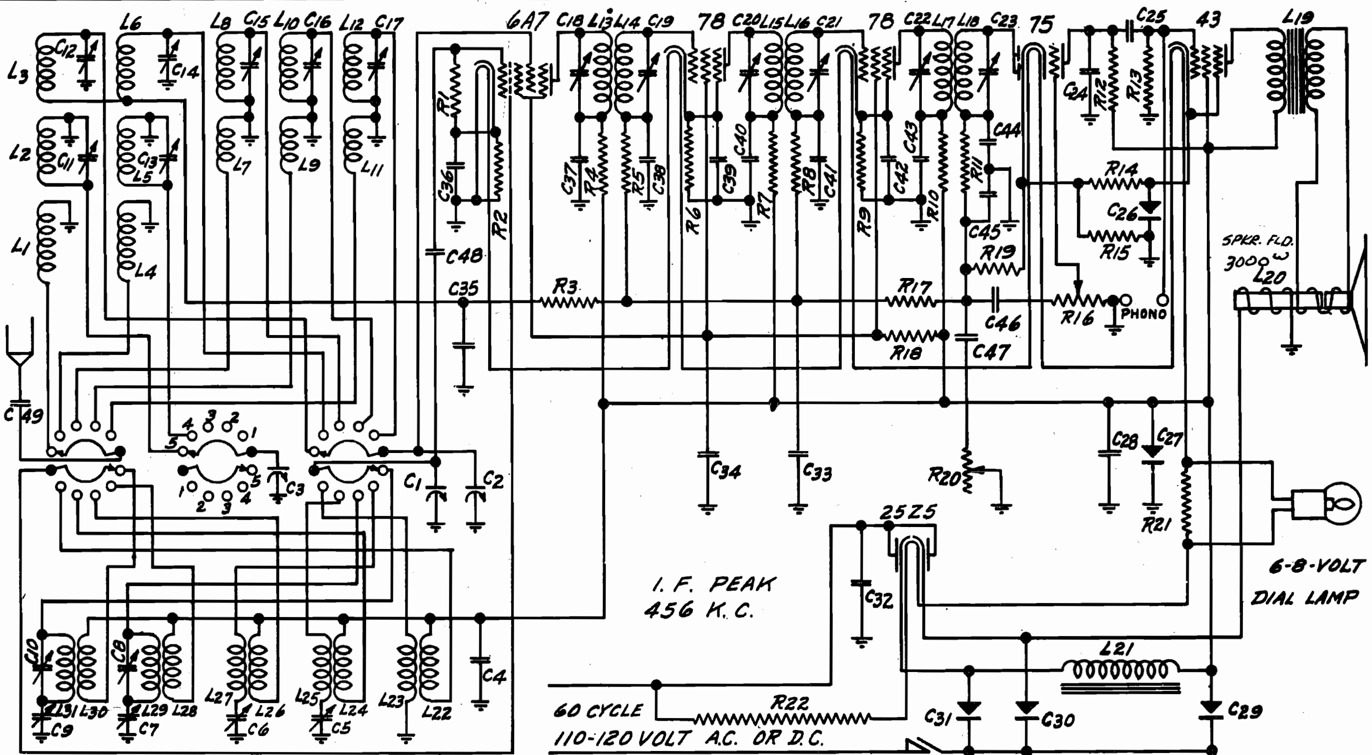
MODELS 4J6, 4JC6
Schematic, Socket
Voltage, Parts

WILCOX-GAY CORP.

Tube	Plate	Screen	Cathode
6A7	80	70	2
1 IF	72	70	3
2 IF	72	70	3
2 Det	55	--	1
Out	80	95	12

6A7 P to Grd 95. G to Grd -6





CODE	PART NO.	RESISTORS
R1	941	20,000 Ohm Oscillator Grid Resistor
R2	1062	250 Ohm Oscillator Cathode Resistor
R3	923	100,000 Ohm A.V.C. Network Resistor
R4	919	5,000 Ohm 6A7 Plate Isolation Resistor
R5	923	100,000 Ohm First I.F. Grid Isolation Resistor
R6	1063	500 Ohm First I.F. Cathode Resistor
R7	919	5,000 Ohm First I.F. Plate Isolation Resistor
R8	923	100,000 Ohm Second I.F. Grid Isolation Resistor
R9	1065	500 Ohm Second I.F. Cathode Resistor
R10	919	5,000 Ohm Second I.F. Plate Isolation Resistor
R11	898	50,000 Ohm Diode Plate Filter Resistor
R12	923	100,000 Ohm 75 Plate Load Resistor
R13	925	500,000 Ohm 43 Grid Resistor
R14	1063	500 Ohm 43 Cathode Resistor
R15	1122	40 Ohm 75 Cathode Resistor
R16	1291	500,000 Ohm Volume Control & Switch
R17	926	1 Megohm A.V.C. Network Resistor
R18	919	5,000 Ohm R.F. & I.F. Screen Feed Resistor
R19	925	500,000 Ohm A.V.C. Load Resistor
R20	1317	250,000 Ohm Tone Control
R21	1308	20 Ohm Pilot Light Shunt Resistor
R22	1125	130 Ohm Resistor in Power Cord

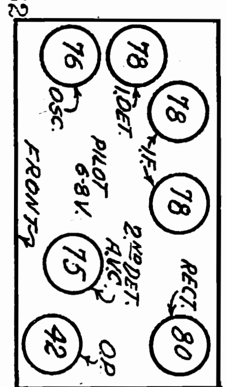
CODE	PART NO.	CONDENSERS
C1	1581	16-366 MMFD. First Section of 3 Gang Condenser
C2	1581	16-366 MMFD. Second Section of 3 Gang Condenser
C3	1581	16-366 MMFD. Third Section of 3 Gang Condenser
C4	272A	.1 MFD. 200 Volt Oscillator Feed By-Pass Condenser
C5	1572	1600 MMFD. No. 2 Band Oscillator Reciprocal Trimmer
C6	1572	600 MMFD. No. 3 Band Oscillator Reciprocal Trimmer
C7	1569	450 MMFD. No. 4 Band Oscillator Reciprocal Trimmer
C8	1581	No. 4 Band Oscillator Parallel Trimmer on C1
C9	1569	140 MMFD. No. 5 Band Oscillator Reciprocal Trimmer
C10	1588	3-30 MMFD. No. 5 Band Oscillator Parallel Trimmer
C11	1588	3-30 MMFD. No. 5 Band First Preselector Trimmer
C12	1588	3-30 MMFD. No. 5 Band Second Preselector Trimmer
C13	1581	No. 4 Band First Preselector Trimmer on C3
C14	1581	No. 4 Band Second Preselector Trimmer on C2
C15	1588	3-30 MMFD. No. 3 Band Preselector Trimmer
C16	1588	3-30 MMFD. No. 2 Band Preselector Trimmer
C17	1588	3-30 MMFD. No. 1 Band Preselector Trimmer
C18	1561	70-120 MMFD. First I.F. Primary Trimmer
C19	1561	70-120 MMFD. First I.F. Secondary Trimmer
C20	1561	70-120 MMFD. Second I.F. Primary Trimmer
C21	1561	70-120 MMFD. Second I.F. Secondary Trimmer
C22	1561	70-120 MMFD. Third I.F. Primary Trimmer
C23	1561	70-120 MMFD. Third I.F. Secondary Trimmer
C24	265	.001 Mfd. Mica 75 Plate Filter Condenser
C25	269A	.01 Mfd. 400 Volt Audio Feed Condenser
C26	928	25 Mfd. 25 Volt Dry Electrolytic Condenser
C27	1379	4 Mfd. 375 Volt Dry Electrolytic Condenser
C28	266	1 Mfd. 400 Volt B Supply By-Pass Condenser
C29	1295	4 Mfd. 150 Volt Dry Electrolytic Condenser
C30	1295	4 Mfd. 150 Volt Dry Electrolytic Condenser
C31	1295	10 Mfd. 150 Volt Dry Electrolytic Condenser
C32	272A	.1 Mfd. 200 Volt Line By-Pass Condenser
C33	272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C34	267A	.5 Mfd. 200 Volt Screen By-Pass Condenser
C35	269A	.01 Mfd. 400 Volt A.V.C. Network By-Pass Condenser
C36	272A	.1 Mfd. 200 Volt 6A7 Cathode By-Pass Condenser
C37	269A	.01 Mfd. 400 Volt 6A7 Plate Isolation Condenser
C38	269A	.01 Mfd. 400 Volt First I.F. Grid Isolation Condenser
C39	272A	.1 Mfd. 200 Volt First I.F. Cathode By-Pass Condenser
C40	269A	.01 Mfd. 400 Volt First I.F. Plate Isolation Condenser
C41	269A	.01 Mfd. 400 Volt Second I.F. Grid Isolation Condenser
C42	272A	.1 Mfd. 200 Volt Second I.F. Cathode By-Pass Condenser
C43	269A	.01 Mfd. 400 Volt Second I.F. Plate Isolation Condenser
C44	339	.0001 Mfd. Mica Diode Filter Condenser
C45	339	.0001 Mfd. Mica Diode Filter Condenser
C46	269A	.01 Mfd. 400 Volt 75 Grid Feed Condenser
C47	269A	.01 Mfd. 400 Volt Tone Control Condenser
C48	268	.00025 Mfd. Mica Oscillator Coupling Condenser
C49	268	.00025 Mfd. Mica Antenna Series Condenser

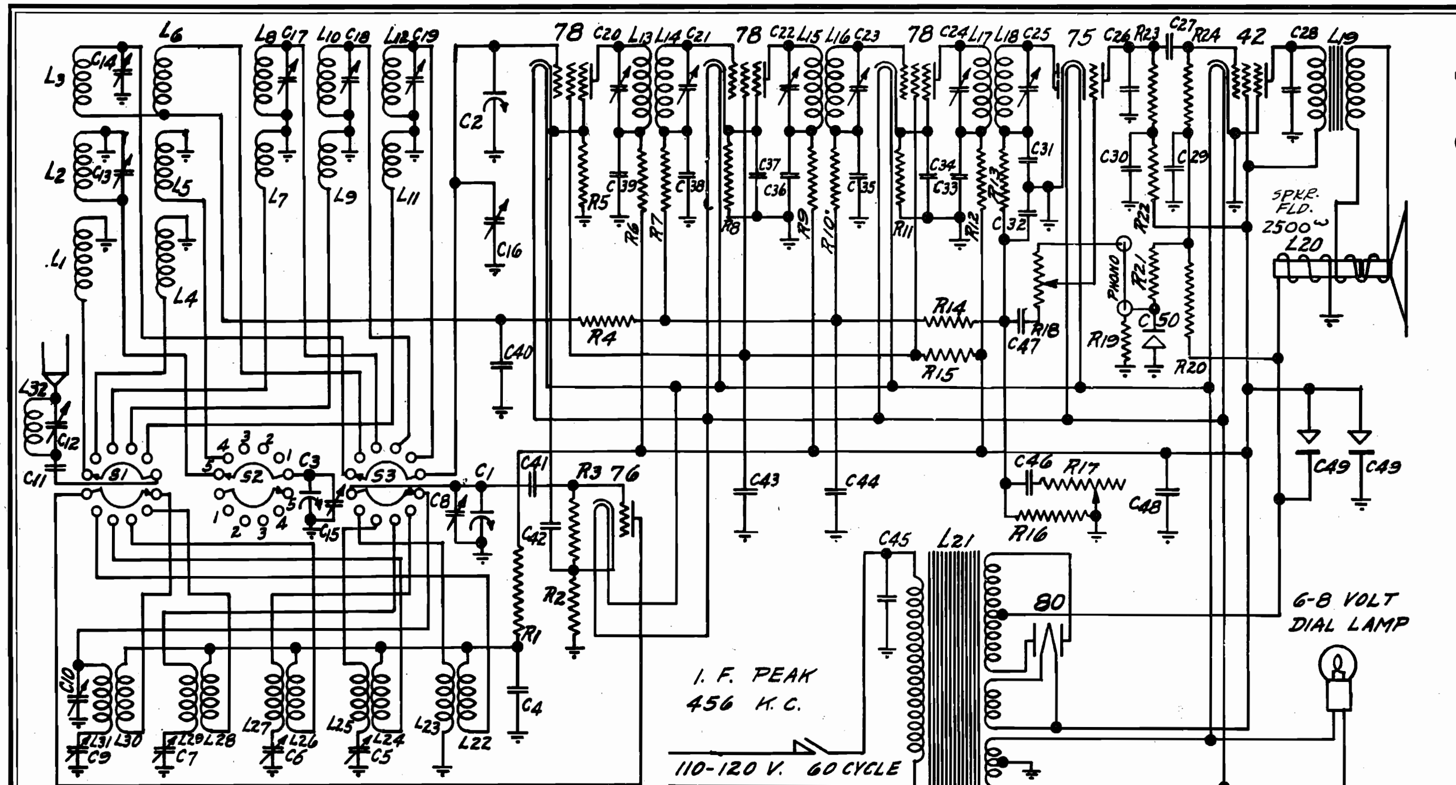
WILCOX-GAY CORP.

MODEL 4G7
Schematic, Socket Voltage, Parts

Tube	Plate	Screen	Cathode
1Det	192	82	6.
Osc.	110	--	2
1 IF	182	82.	3
2 IF	180	82	3
2 Det	60	--	--
Output	187	210	--

Output grid -16. Field 162





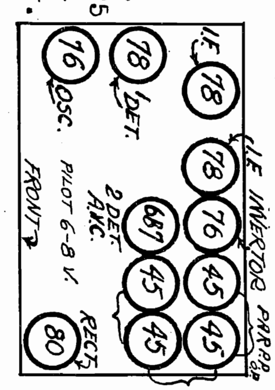
CODE NO.	PART NO.	RESISTORS
R1	53-277	10,000 Ohm Oscillator Feed Resistor - Type J
R2	53-1062	250 Ohm Oscillator Cathode Resistor
R3	53-941	20,000 Ohm Oscillator Grid Resistor
R4	53-923	100,000 Ohm A.V.C. Network Resistor
R5	53-1144	2,000 Ohm First Detector Cathode Resistor
R6	53-919	5,000 Ohm First Detector Plate Isolation
R7	53-923	100,000 Ohm First I.F. Grid Isolation
R8	53-1063	500 Ohm First I.F. Cathode Resistor
R9	53-919	5,000 Ohm First I.F. Plate Isolation
R10	53-923	100,000 Ohm Second I.F. Grid Isolation
R11	53-1063	500 Ohm Second I.F. Cathode Resistor
R12	53-919	5,000 Ohm Second I.F. Plate Isolation
R13	53-898	50,000 Ohm Diode Filter Resistor
R14	53-926	1 Meg Ohm A.V.C. Network Resistor
R15	53-921	40,000 Ohm R.F. & I.F. Screen Feed Resistor
R16	53-925	500,000 Ohm A.V.C. Load Resistor
R17	19-1317	250,000 Ohm Tone Control
R18	19-1291	500,000 Ohm Volume Control & Switch
R19	53-919	5,000 Ohm C Bias Network Resistor
R20	53-926	1 Meg Ohm C Bias Network Resistor
R21	53-922	75,000 Ohm C Bias Network Resistor
R22	53-923	100,000 Ohm 75 Plate Hum Resistor
R23	53-924	250,000 Ohm 75 Plate Resistor
R24	53-925	500,000 Ohm 42 Grid Resistor
		CONDENSERS
C1	77-1581	16-366 MMFD. First Section of 3 Gang Condenser
C2	77-1581	16-366 MMFD. Second Section of 3 Gang Condenser
C3	77-1581	16-366 MMFD. Third Section of 3 Gang Condenser
C4	75-272A	.1 Mfd. 200 Volt Oscillator Feed By-Pass Condenser
C5	78-1572	1600 MMFD. No. 2 Band Oscillator Reciprocal Trimmer
C6	78-1572	600 MMFD. No. 3 Band Oscillator Reciprocal Trimmer
C7	78-1569	450 MMFD. No. 4 Band Oscillator Reciprocal Trimmer
C8	77-1581	No. 4 Band Oscillator Parallel Trimmer on C-1
C9	78-1569	140 MMFD. No. 5 Band Oscillator Reciprocal Trimmer
C10	78-1588	3-30 MMFD. No. 5 Band Oscillator Parallel Trimmer
C11	75-269A	.01 Mfd. 400 Volt Antenna Series Condenser
C12		900 MMFD. Wave Trap Trimmer
C13	78-1588	3-30 MMFD. No. 5 Band First Preselector Trimmer
C14	78-1588	3-30 MMFD. No. 5 Band Second Preselector Trimmer
C15	77-1581	No. 4 Band First Preselector Trimmer on C-3
C16	77-1581	No. 4 Band Second Preselector Trimmer on C-2
C17	78-1588	3-30 MMFD. No. 3 Band Preselector Trimmer
C18	78-1588	3-30 MMFD. No. 4 Band Preselector Trimmer
C19	78-1588	3-30 MMFD. No. 5 Band Preselector Trimmer
C20	78-1561	70-120 MMFD. First I.F. Primary Trimmer
C21	78-1561	70-120 MMFD. First I.F. Secondary Trimmer
C22	78-1561	70-120 MMFD. Second I.F. Primary Trimmer
C23	78-1561	70-120 MMFD. Second I.F. Secondary Trimmer
C24	78-1561	70-120 MMFD. Third I.F. Primary Trimmer
C25	78-1561	70-120 MMFD. Third I.F. Secondary Trimmer
C26	76-265	.001 Mfd. Mica 75 Plate Filter Condenser
C27	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C28	75-1132	.002 Mfd. 600 Volt 42 Plate Filter Condenser
C29	75-183A	.2 Mfd. 200 Volt C Bias Network Condenser
C30	75-1326A	.1 Mfd. 400 Volt 75 Plate Hum Filter Condenser
C31	76-339	.0001 Mfd. Mica Diode Filter Condenser
C32	76-339	.0001 Mfd. Mica Diode Filter Condenser
C33	75-269A	.01 Mfd. 400 Volt Second I.F. Plate Isolation Condenser
C34	75-272A	.1 Mfd. 200 Volt Second I.F. Cathode By-Pass Condenser
C35	75-269A	.01 Mfd. 400 Volt Second I.F. Grid Isolation Condenser
C36	75-269A	.01 Mfd. 400 Volt First I.F. Plate Isolation Condenser
C37	75-272A	.1 Mfd. 200 Volt First I.F. Cathode By-Pass Condenser
C38	75-269A	.01 Mfd. 400 Volt First I.F. Grid Isolation Condenser
C39	75-269A	.01 Mfd. 400 Volt First Detector Plate Isolation Condenser
C40	75-272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C41	76-264	.00005 Mfd. Mica Oscillator Coupling Condenser
C42	75-269-A	.01 Mfd. 400 Volt Oscillator Feed Condenser
C43	75-267A	.5 Mfd. 200 Volt R.F. & I.F. Screen By-Pass Condenser
C44	75-272A	.1 Mfd. 200 Volt A.V.C. Network By-Pass Condenser
C45	75-269A	.01 Mfd. 400 Volt 110 Line By-Pass Condenser
C46	75-269A	.01 Mfd. 400 Volt Tone Control Condenser
C47	75-269A	.01 Mfd. 400 Volt Audio Feed Condenser
C48	75-266	1. Mfd. 400 Volt B Supply By-Pass Condenser
C49	18-1129	4-4 Mfd. 450 Volt Electrolytic Filter Condenser
C50	18-928	25 Mfd. 25 Volt Electrolytic Condenser

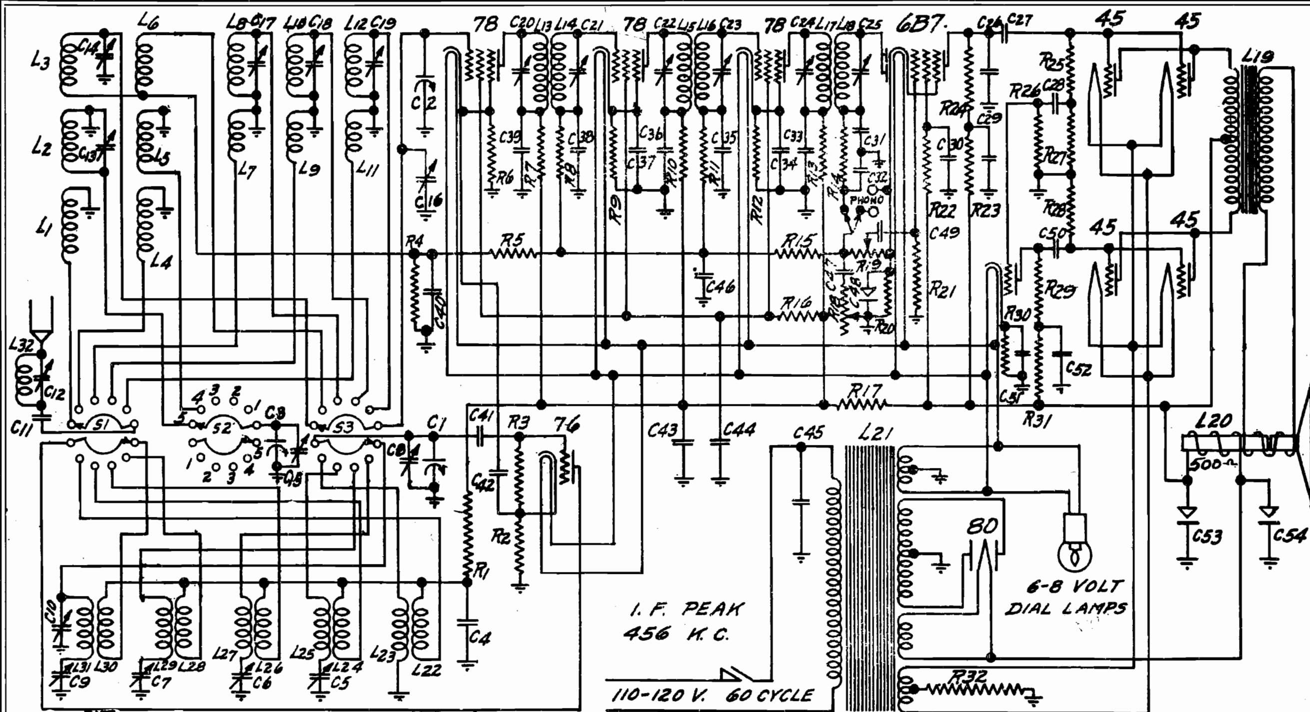
MODEL 4H11
Schematic, Socket
Voltage, Parts

WILCOX-GAY CORP.

Tube	Plate	Screen	Cathode
Mixer	245	95	8
Osc.	100	--	2
1 IF	235	95	4
2 IF	235	95	4
2 Det	70	--	1.5
Invert.	52	--	2.25
Output	330	--	---

Field 70 v. Output G-F 20 v.





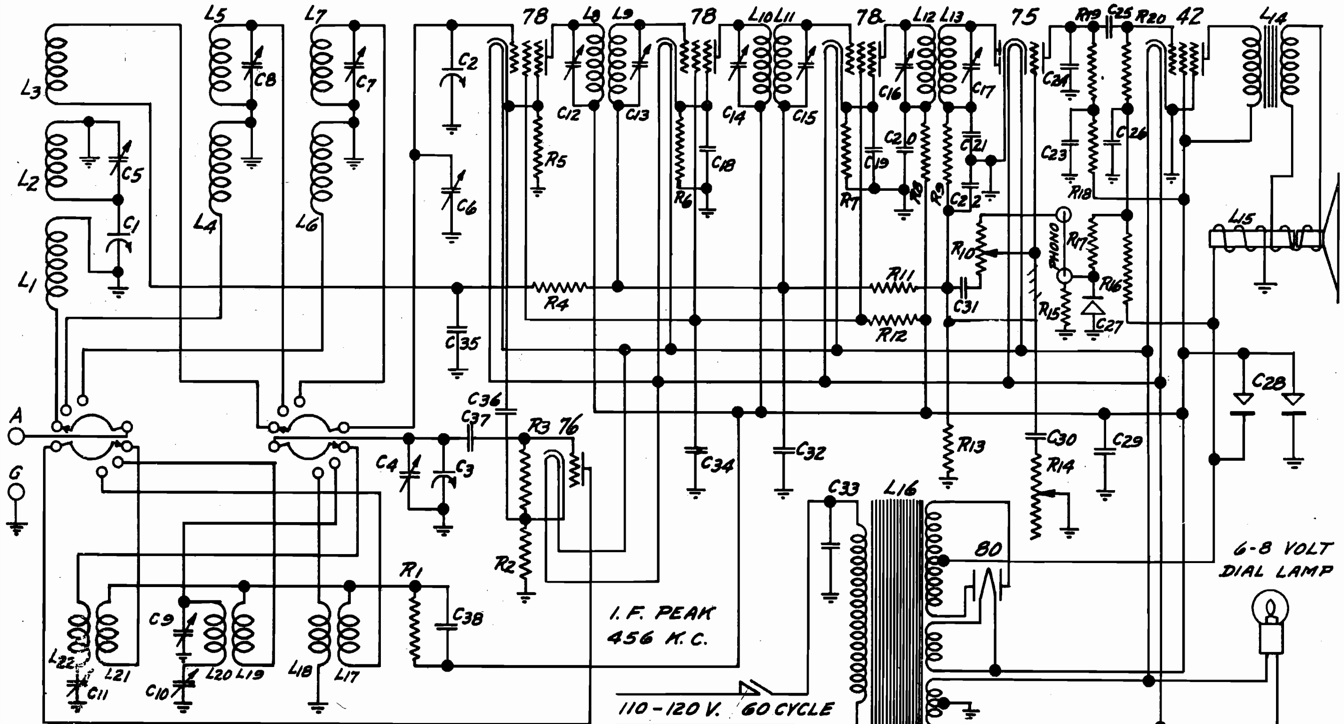
CODE	PART NO.	RESISTORS	
R1	53-278	20,000	Ohm Oscillator Feed Resistor Type J
R2	53-1062	250	Ohm Oscillator Cathode Resistor
R3	53-941	20,000	Ohm Oscillator Grid Resistor
R4	53-926	1 Meg	Ohm A.V.C. Network Resistor
R5	53-923	100,000	Ohm A.V.C. Network Resistor
R6	53-1144	2,000	Ohm First Detector Cathode Resistor
R7	53-919	5,000	Ohm First Detector Plate Isolation
R8	53-923	100,000	Ohm First I.F. Grid Isolation
R9	53-1063	500	Ohm First I.F. Cathode Resistor
R10	53-919	5,000	Ohm First I.F. Plate Isolation
R11	53-923	100,000	Ohm Second I.F. Grid Isolation
R12	53-1063	500	Ohm Second I.F. Cathode Resistor
R13	53-919	5,000	Ohm Second I.F. Plate Isolation
R14	53-898	50,000	Ohm Diode Filter Resistor
R15	53-926	1 Meg	Ohm A.V.C. Network Resistor
R16	53-898	50,000	Ohm Screen Feed Resistor
R17	53-1420	2,500	Ohm B Supply Series Resistor
R18	19-1317	250,000	Ohm Tone Control
R19	19-1291	500,000	Ohm Volume Control & Switch
R20	53-1065	1,000	Ohm 6B7 Cathode Resistor
R21	53-925	500,000	Ohm 6B7 Grid Resistor
R22	53-926	1 Meg	Ohm 6B7 Screen Resistor
R23	53-923	100,000	Ohm 6B7 Plate Hum Filter Resistor
R24	53-923	100,000	Ohm 6B7 Plate Resistor
R25	53-925	500,000	Ohm 45 Grid Resistor
R26	53-925	500,000	Ohm 76 Grid Resistor
R27	53-923	100,000	Ohm Push-Pull Network Resistor
R28	53-925	500,000	Ohm 45 Grid Resistor
R29	53-923	100,000	Ohm 76 Plate Resistor
R30	53-1144	2,000	Ohm 76 Cathode Resistor
R31	53-923	100,000	Ohm 76 Plate Hum Filter Resistor
R32	53-1419	650	Ohm 45 Cathode Bias Resistor
		CONDENSERS	
C1	77-1581	16-366 MMFD.	First Section of 3 Gang Condenser
C2	77-1581	16-366 MMFD.	Second Section of 3 Gang Condenser
C3	77-1581	16-366 MMFD.	Third Section of 3 Gang Condenser
C4	75-272A	.1 Mfd.	200 Volt Oscillator Feed By-Pass Condenser
C5	78-1572	1600 MMFD.	No. 2 Band Oscillator Reciprocal Trimmer
C6	78-1572	600 MMFD.	No. 3 Band Oscillator Reciprocal Trimmer
C7	78-1569	450 MMFD.	No. 4 Band Oscillator Reciprocal Trimmer
C8	77-1581		No. 4 Band Oscillator Parallel Trimmer on C1
C9	78-1569	140 MMFD.	No. 5 Band Oscillator Reciprocal Trimmer
C10	78-1588	3-30 MMFD.	No. 5 Band Oscillator Parallel Trimmer
C11	75-269A	.01 Mfd.	400 Volt Antenna Series Condenser
C12		900 MMFD.	Wave Trap Trimmer
C13	78-1588	3-30 MMFD.	No. 5 Band First Preselector Trimmer
C14	78-1588	3-30 MMFD.	No. 5 Band Second Preselector Trimmer
C15	77-1581		No. 4 Band First Preselector Trimmer on C3
C16	77-1581		No. 4 Band Second Preselector Trimmer on C2
C17	78-1588	3-30 MMFD.	No. 3 Band Preselector Trimmer
C18	78-1588	3-30 MMFD.	No. 4 Band Preselector Trimmer
C19	78-1588	3-30 MMFD.	No. 5 Band Preselector Trimmer
C20	78-1561	70-120 MMFD.	First I.F. Primary Trimmer
C21	78-1561	70-120 MMFD.	First I.F. Secondary Trimmer
C22	78-1561	70-120 MMFD.	Second I.F. Primary Trimmer
C23	78-1561	70-120 MMFD.	Second I.F. Secondary Trimmer
C24	78-1561	70-120 MMFD.	Third I.F. Primary Trimmer
C25	78-1561	70-120 MMFD.	Third I.F. Secondary Trimmer
C26	76-265	.001 Mfd.	Mica 6B7 Plate Filter Condenser
C27	75-269A	.01 Mfd.	400 Volt Audio Feed Condenser
C28	75-269A	.01 Mfd.	400 Volt Push-Pull Network Condenser
C29	75-1326A	.1 Mfd.	400 Volt 6B7 Hum Filter Condenser
C30	75-1326A	.1 Mfd.	400 Volt 6B7 Screen Condenser
C31	76-339	.0001 Mfd.	Mica Diode Filter Condenser
C32	76-339	.0001 Mfd.	Mica Diode Filter Condenser
C33	75-269A	.01 Mfd.	400 Volt Second I.F. Plate Isolation Condenser
C34	75-272A	.1 Mfd.	200 Volt Second I.F. Cathode By-Pass Condenser
C35	75-269A	.01 Mfd.	400 Volt Second I.F. Grid Isolation
C36	75-269A	.01 Mfd.	400 Volt First I.F. Plate Isolation
C37	75-272A	.1 Mfd.	200 Volt First I.F. Cathode By-Pass Condenser
C38	75-269A	.01 Mfd.	400 Volt First I.F. Grid Isolation
C39	75-269A	.01 Mfd.	400 Volt First Detector Plate Isolation
C40	75-272A	.1 Mfd.	200 Volt A.V.C. Network By-Pass Condenser
C41	76-264	.00005 Mfd.	Mica Oscillator Coupling Condenser
C42	75-269A	.01 Mfd.	400 Volt Oscillator Feed Condenser
C43	75-266	1. Mfd.	400 Volt B. Supply By-Pass Condenser
C44	75-267A	5. Mfd.	200 Volt R.F. & I.F. Screen By-Pass Condenser
C45	75-269A	.01 Mfd.	400 Volt Line By-Pass Condenser
C46	75-272A	.1 Mfd.	200 Volt A.V.C. Network By-Pass Condenser
C47	75-269A	.01 Mfd.	400 Volt One Control Condenser
C48	18-928	25 Mfd.	25 Volt 6B7 Cathode By-Pass Condenser
C49	75-269A	.01 Mfd.	400 Volt 6B7 Grid Feed Condenser
C50	75-269A	.01 Mfd.	400 Volt Audio Feed Condenser
C51	75-272A	.1 Mfd.	200 Volt 76 Cathode By-Pass Condenser
C52	75-1326A	.1 Mfd.	400 Volt 76 Plate Hum Filter Condenser
C53	18-721	.8 Mfd.	450 Volt Electrolytic Filter Condenser
C54	18-721	.8 Mfd.	450 Volt Electrolytic Filter Condenser

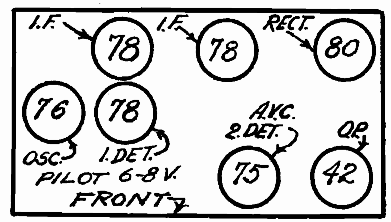
MODEL 5E7
Schematic, Socket Voltage, Parts

WILCOX-GAY CORP.

Tube	Plate	Screen	Cathode
Mixer	200	80	5
Osc	100	--	2
1 IF	190	80	3
2 IF	170	80	3
2 Det	45	--	-
Out	175	190	-

Output Grid to ground -18v
Field drop 135





R1	53-277	10,000	ohm Oscillator Plate Resistor
R2	53-1062	250	ohm Oscillator Cathode Resistor
R3	53-941	20,000	ohm Oscillator Grid Resistor
R4	53-923	100,000	ohm A.V.C. Network Resistor
R5	53-1144	2,000	ohm First Detector Cathode Resistor
R6	53-1063	500	ohm First I.F. Cathode Resistor
R7	53-1063	500	ohm Second I.F. Cathode Resistor
R8	53-919	5,000	ohm Second I.F. Plate Resistor
R9	53-898	50,000	ohm Diode I.F. Filter Resistor
R10	19-1291	500,000	ohm Volume Control & Switch
R11	53-926	1	Megohm A.V.C. Network Resistor
R12	53-921	40,000	ohm Screen Resistor
R13	53-925	500,000	ohm Diode Load Resistor
R14	19-1317	250,000	ohm Tone Control
R15	53-919	5,000	ohm C Bias Network Resistor
R16	53-926	1	Megohm C Bias Network Resistor
R17	53-923	100,000	ohm C Bias Network Resistor
R18	53-923	100,000	ohm Second Detector Hum Filter Resistor
R19	53-924	250,000	ohm Second Detector Plate Resistor
R20	53-925	500,000	ohm Output Grid Resistor

CONDENSERS

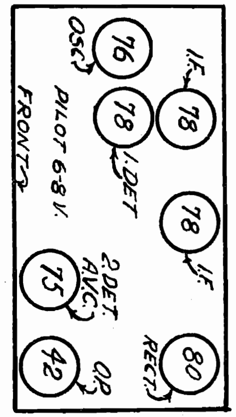
C1	77-1581	16-366	MMFD. First Section of 3 Gang Condenser
C2	77-1581	16-366	MMFD. Second Section of 3 Gang Condenser
C3	77-1581	16-366	MMFD. Third Section of 3 Gang Condenser
C4	77-1581		Broadcast Oscillator Parallel Trimmer on C3
C5	77-1581		Broadcast First Preselector Trimmer on C1
C6	77-1581		Broadcast Second Preselector Trimmer on C2
C7	78-1598	3-30	MMFD. Foreign Band Preselector Trimmer
C8	78-1598	3-30	MMFD. Police Band Preselector Trimmer
C9	78-1598	3-30	MMFD. Police Band Oscillator Parallel Trimmer
C10	78-1572	1600	MMFD. Police Band Oscillator Series Trimmer
C11	78-1572	600	MMFD. Broadcast Oscillator Series Trimmer
C12	78-1561	70-120	MMFD. First I.F. Primary Trimmer
C13	78-1561	70-120	MMFD. First I.F. Secondary Trimmer
C14	78-1561	70-120	MMFD. Second I.F. Primary Trimmer
C15	78-1561	70-120	MMFD. Second I.F. Secondary Trimmer
C16	78-1561	70-120	MMFD. Third I.F. Primary Trimmer
C17	78-1561	70-120	MMFD. Third I.F. Secondary Trimmer
C18	75-272A	.1	MFD. 200 Volt First I.F. Cathode By-Pass
C19	75-272A	.1	MFD. 200 Volt Second I.F. Cathode By-Pass
C20	75-269A	.01	MFD. 400 Volt Second I.F. Plate Isolation Condenser
C21	76-339	.0001	MFD. Mica Diode Filter Condenser
C22	76-339	.0001	MFD. Mica Diode Filter Condenser
C23	75-1326A	.1	MFD. 400 Volt Second Detector Plate Hum Filter
C24	76-265	.001	MFD. Mica Second Detector Plate By-Pass
C25	75-269A	.01	MFD. 400 Volt Audio Feed Condenser
C26	75-183A	.2	MFD. 200 Volt C Bias Network Condenser
C27	18-928	25	MFD. 25 Volt Electrolytic Condenser
C28	18-1274	4-4	MFD. 450 Volt Electrolytic Condenser
C29	75-266	1.	MFD. 400 Volt B Supply By-Pass Condenser
C30	75-269A	.01	MFD. Tone Control Condenser
C31	75-269A	.01	MFD. Audio Feed Condenser
C32	75-272A	.1	MFD. 200 Volt A.V.C. Network Condenser
C33	75-269A	.01	MFD. 400 Volt Line By-Pass Condenser
C34	75-272A	.1	MFD. 200 Volt Screen By-Pass Condenser
C35	75-272A	.1	MFD. 200 Volt A.V.C. Network By-Pass
C36	75-269A	.01	MFD. 400 Volt Oscillator Coupling Condenser
C37	76-264	.00005	MFD. Mica Oscillator Grid Condenser
C38	75-269A	.01	MFD. 400 Volt Oscillator Plate Condenser

INDUCTANCES

L1	17-2025	Broadcast Preselector Primary
L2	17-2025	Broadcast Preselector First Secondary
L3	17-2025	Broadcast Preselector Second Secondary
L4	17-1668	Police Band Preselector Primary
L5	17-1668	Police Band Preselector Secondary
L6	17-2017	Foreign Band Preselector Primary
L7	17-2017	Foreign Band Preselector Secondary
L8	17-2010	1200 Microhenry First I.F. Primary
L9	17-2010	1200 Microhenry First I.F. Secondary
L10	17-2010	1200 Microhenry Second I.F. Primary
L11	17-2010	1200 Microhenry Second I.F. Secondary
L12	17-2010	1200 Microhenry Third I.F. Primary
L13	17-2010	1200 Microhenry Third I.F. Secondary
L14	64-2003	Single 42 Output Transformer
L15	64-2003	2500 ohm Speaker Field
L16	80-1068	Power Transformer
L17	17-2018	Foreign Band Oscillator Primary
L18	17-2018	Foreign Band Oscillator Secondary
L19	17-1667	Police Band Oscillator Primary
L20	17-1667	Police Band Oscillator Secondary
L21	17-1646	Broadcast Oscillator Primary
L22	17-1646	Broadcast Oscillator Secondary
	68-2003	First I.F. Transformer Assembly
	68-2003	Second I.F. Transformer Assembly
	68-2004	Third I.F. Transformer Assembly

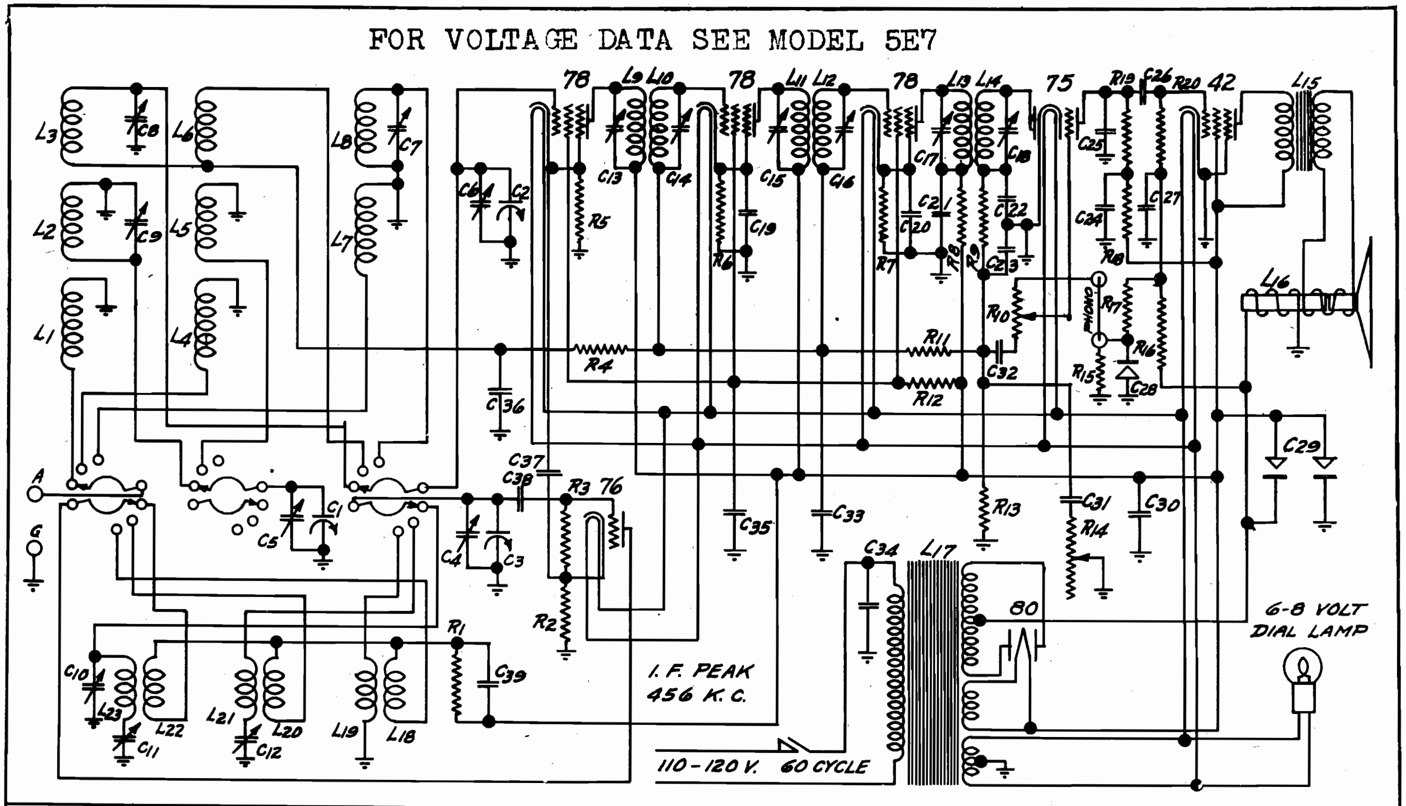
MODEL 5EA7
Schematic, Socket
Parts List

WILCOX-GAY CORP.



L13	17-2010	1200 Microhenry Third I.F.Primary
L14	17-2010	1200 Microhenry Third I.F.Secondary
L15	64-2003	Single 42 Output Transformer
L16	64-2003	2500 Ohm Speaker Field
L17	80-1068	Power Transformer
L18	17-2018	Foreign Band Oscillator Primary
L19	17-2018	Foreign Band Oscillator Secondary
L20	17-1646	Broadcast Band Oscillator Primary
L21	17-1646	Broadcast Band Oscillator Secondary
L22	17-1648	Long Wave Band Oscillator Primary
L23	17-1648	Long Wave Band Oscillator Secondary
	68-2003	First I.F. Transformer Assembly
	68-2003	Second I.F. Transformer Assembly
	68-2004	Third I.F. Transformer Assembly

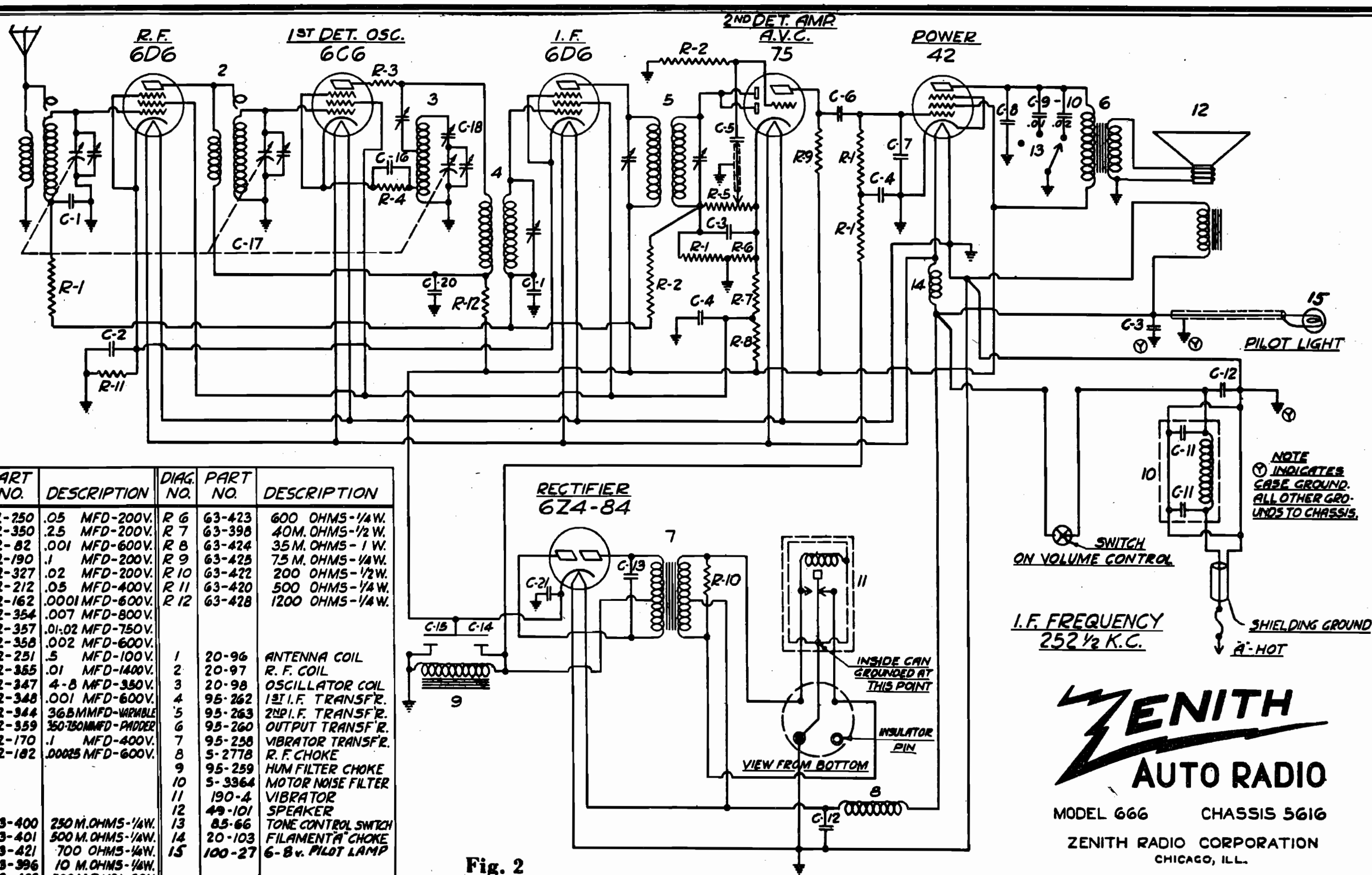
FOR VOLTAGE DATA SEE MODEL 5E7



CODE	NO.		RESISTORS
R1	53-277	10,000	ohm Oscillator Plate Resistor
R2	53-1062	250	ohm Oscillator Cathode Resistor
R3	53-941	20,000	ohm Oscillator Grid Resistor
R4	53-923	100,000	ohm A.V.C. Network Resistor
R5	53-1144	2,000	ohm First Detector Cathode Resistor
R6	53-1063	500	ohm First I.F. Cathode Resistor
R7	53-1063	500	ohm Second I.F. Cathode Resistor
R8	53-919	5,000	ohm Second I.F. Plate Resistor
R9	53-898	50,000	ohm Diode I.F. Filter Resistor
R10	19-1291	500,000	ohm Volume Control & Switch
R11	53-926	1	Megohm A.V.C. Network Resistor
R12	53-921	40,000	ohm Screen Resistor
R13	53-925	500,000	ohm Diode Load Resistor
R14	19-1317	250,000	ohm Tone Control
R15	53-919	5,000	ohm C Bias Network Resistor
R16	53-926	1	Megohm C Bias Network Resistor
R17	53-923	100,000	ohm C. Bias Network Resistor
R18	53-923	100,000	ohm Second Detector Hum Filter Resistor
R19	53-924	250,000	ohm Second Detector Plate Resistor
R20	53-925	500,000	ohm Output Grid Resistor
			CONDENSERS
C1	77-1581	16-366	MMFD. First Section of 3 Gang Condenser
C2	77-1581	16-366	MMFD. Second Section of 3 Gang Condenser
C3	77-1581	16-366	MMFD. Third Section of 3 Gang Condenser
C4	77-1581		Broadcast Oscillator Parallel Trimmer on C3
C5	77-1581		Broadcast First Preselector Trimmer on C1
C6	77-1581		Broadcast Second Preselector Trimmer on C2
C7	78-1588	3-30	MMFD. Foreign Band Preselector Trimmer
C8	78-1588	3-30	MMFD. Long Wave Second Preselector Trimmer
C9	78-1588	3-30	MMFD. Long Wave First Preselector Trimmer
C10	78-2010	3-30	MMFD. Long Wave Oscillator Parallel Trimmer
C11	78-1569	140	MMFD. Long Wave Oscillator Series Trimmer
C12	78-1569	450	MMFD. Broadcast Oscillator Series Trimmer
C13	78-1561	70-120	MMFD. First I.F. Primary Trimmer
C14	78-1561	70-120	MMFD. First I.F. Secondary Trimmer
C15	78-1561	70-120	MMFD. Second I.F. Primary Trimmer
C16	78-1561	70-120	MMFD. Second I.F. Secondary Trimmer
C17	78-1561	70-120	MMFD. Third I.F. Primary Trimmer
C18	78-1561	70-120	MMFD. Third I.F. Secondary Trimmer
C19	75-272A	.1	MFD. 200 Volt First I.F. Cathode By-Pass
C20	75-272A	.1	MFD. 200 Volt Second I.F. Cathode By-Pass
C21	75-269A	.01	MFD. 400 Volt Second I.F. Plate Isolation Condenser
C22	76-339	.0001	MFD. Mica Diode Filter Condenser
C23	76-339	.0001	MFD. Mica Diode Filter Condenser
C24	75-1326A	.1	MFD. 400 Volt Second Detector Plate Hum Filter
C25	76-265	.001	MFD. Mica Second Detector Plate By-Pass
C26	75-269A	.01	MFD. 400 Volt Audio Feed Condenser
C27	75-183A	.2	MFD. 200 Volt C Bias Network Condenser
C28	18-928	25	MFD. 25 Volt Electrolytic Condenser
C29	18-1274	4-4	MFD. 450 Volt Electrolytic Condenser
C30	75-266	1.	MFD. 400 Volt B Supply By-Pass Condenser
C31	75-269A	.01	MFD. Tone Control Condenser
C32	75-269A	.01	MFD. Audio Feed Condenser
C33	75-272A	.1	MFD. 200 Volt A.V.C. Network Condenser
C34	75-269A	.01	MFD. 400 Volt Line By-Pass Condenser
C35	75-272A	.1	MFD. 200 Volt Screen By-Pass Condenser
C36	75-272A	.1	MFD. 200 Volt A.V.C. Network By-Pass
C37	75-269A	.01	MFD. 400 Volt Oscillator Coupling Condenser
C38	76-264	.00005	MFD. Mica Oscillator Grid Condenser
C39	75-269A	.01	MFD. 400 Volt Oscillator Plate Condenser
			INDUCTANCES
L1	17-2038		Long Wave Band Preselector Primary
L2	17-2038		Long Wave Band First Preselector Secondary
L3	17-2038		Long Wave Band Second Preselector Secondary
L4	17-2025		Broadcast Preselector Primary
L5	17-2025		Broadcast First Preselector Secondary
L6	17-2025		Broadcast Second Preselector Secondary
L7	17-2017		Foreign Band Preselector Primary
L8	17-2017		Foreign Band Preselector Secondary
L9	17-2010		1200 Microhenry First I.F. Primary
L10	17-2010		1200 Microhenry First I.F.Secondary
L11	17-2010		1200 Microhenry Second I.F.Primary
L12	17-2010		1200 Microhenry Second I.F.Secondary

MODEL 666
Schematic
Alignment

ZENITH RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C 1	22-250	.05 MFD-200V.	R 6	63-423	600 OHMS-1/4W.
C 2	22-350	.25 MFD-200V.	R 7	63-398	40M. OHMS-1/2 W.
C 3	22-82	.001 MFD-600V.	R 8	63-424	35M. OHMS-1 W.
C 4	22-190	.1 MFD-200V.	R 9	63-425	75M. OHMS-1/4W.
C 5	22-327	.02 MFD-200V.	R 10	63-422	200 OHMS-1/2W.
C 6	22-212	.05 MFD-400V.	R 11	63-420	500 OHMS-1/4W.
C 7	22-162	.0001 MFD-600V.	R 12	63-428	1200 OHMS-1/4W.
C 8	22-354	.007 MFD-800V.			
C 9-10	22-357	.01-.02 MFD-750V.			
C 11	22-358	.002 MFD-600V.			
C 12	22-251	.5 MFD-100V.	1	20-96	ANTENNA COIL
C 13	22-355	.01 MFD-1400V.	2	20-97	R. F. COIL
C14-15	22-347	4-8 MFD-350V.	3	20-98	OSCILLATOR COIL
C 16	22-348	.001 MFD-600V.	4	95-262	1ST I.F. TRANSF'R.
C 17	22-344	368 MMFD-VARIABLE	5	95-263	2ND I.F. TRANSF'R.
C 18	22-359	350-750 MMFD-PADDER	6	95-260	OUTPUT TRANSF'R.
C 20	22-170	.1 MFD-400V.	7	95-258	VIBRATOR TRANSF'R.
C 21	22-182	.00025 MFD-600V.	8	S-2778	R. F. CHOKE
			9	95-259	HUM FILTER CHOKE
			10	S-3364	MOTOR NOISE FILTER
			11	190-4	VIBRATOR
			12	49-101	SPEAKER
R 1	63-400	250 M.OHMS-1/4W.	13	85-66	TONE CONTROL SWITCH
R 2	63-401	500 M.OHMS-1/4W.	14	20-103	FILAMENT "A" CHOKE
R 3	63-421	700 OHMS-1/4W.	15	100-27	6-8 v. PILOT LAMP
R 4	63-396	10 M.OHMS-1/4W.			
R 5	63-402	500 M.Ω VOL. CON.			

Fig. 2

I. F. Alignment:

To balance the I. F. Circuit, connect the 252½ K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd. condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:

1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately. Now set pointer on dial to 1400 K. C. by turning indicator screw in rear center of head.
6. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the padder condenser (see fig. 1) for greatest output.

If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.

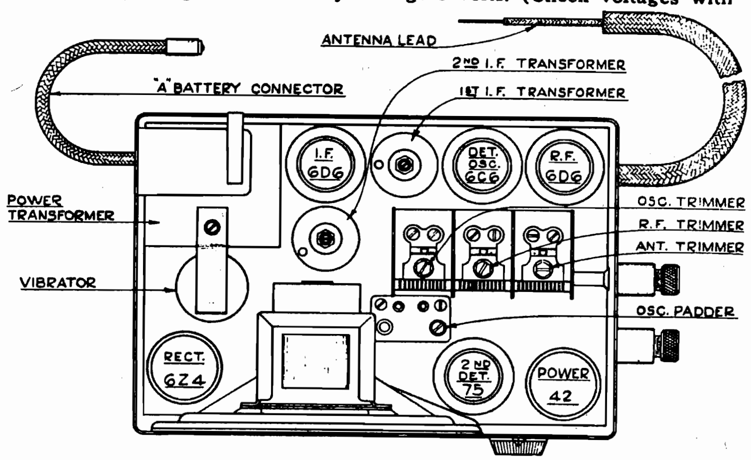
MODEL 666
Voltage, Socket
Trimmers, Parts

ZENITH RADIO CORP.

Tube Operating Voltages:

Position	Tube	EF	EK	EG1	EG2	EG3	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

f—Filament; k—Cathode; g^1—Control Grid; g^2—Suppressor Grid; g^3—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)



RESISTORS (CHASSIS ONLY)

Part Number	Description
63-396	10M Ohm ¼ Watt
63-398	40M Ohm ½ Watt
63-400	250M Ohm ¼ Watt
63-401	500M Ohm ¼ Watt
63-402	500M Ohm Vol. Control & Switch Ass'mbly
63-420	500 Ohm ¼ Watt
63-421	700 Ohm ¼ Watt
63-422	200 Ohm ½ Watt
63-423	600 Ohm ¼ Watt
63-424	35M Ohm 1 Watt
63-425	75M Ohm ¼ Watt
63-428	1200 Ohm ¼ Watt

CONDENSERS (CHASSIS ONLY)

Part Number	Description
22-82	.001 Mfd. 600 V.
22-162	.0001 Mfd. 600 V.
22-170	.1 Mfd. 400 V.
22-190	.1 Mfd. 200 V.
22-182	.00025 Mfd. 600 V.
22-212	.05 Mfd. 400 V.
22-250	.05 Mfd. 200 V.
22-251	.5 Mfd. 100 V.
22-327	.02 Mfd. 200 V.
22-344	Three-Gang Variable
22-347	4. x 8. Mfd. 350 V.
22-348	.001 Mfd. 600 V.
22-350	.25 Mfd. 120 V.
22-354	.007 Mfd. 750 V.
22-355	.01 Mfd. 1400 V.
22-357	.01 x .02 Mfd. 750 V.
22-358	.002 Mfd. 600 V.
22-359	Padder

MISCELLANEOUS CHASSIS PARTS
COILS AND CHOKES

Part Number	Description
20-96	Antenna Coil Assembly
20-97	R. F. Coil Assembly
20-98	Oscillator Coil Assembly
20-103	Filament "A" Choke
95-262	1st I. F. Transformer
95-263	2nd I. F. Transformer
S-2778	R. F. Choke
S-3364	Motor Noise Filter
46-101	Tone Control Knob (Knob Spring only, see 80-107)
52-44	"A" Battery Cable
52-59	Antenna Cable
54-76	¼ x 20 Knurled Coupling Shaft Nuts
78-100	Socket 6D6
78-101	Socket 75
78-102	Socket 42
78-113	Socket 6D6
78-114	Socket 6Z4
78-115	Socket Vibrator
80-107	Tone Control Knob Spring
85-66	Tone Control Switch

SPEAKER

Part Number	Description
*49-100	6" Dynamic Speaker (with output transformer
	Cone & Voice Coil Assemb.
	Field Coil

MISCELLANEOUS CHASSIS PARTS (Contd.)

Part Number	Description
93-125	No. 6 Lock Washers
93-220	Bakelite Washer for Chassis Mtg. Screws
94-185	Rubber Bushing for Chassis Mtg. Screws
95-258	Power Transformer
95-259	Hum Filter Choke
97-75	10/32 x ¼ Wing Screw for Box Cover
114-27	No. 8 x ¼ Chassis Box Screws
190-4	Vibrator
MS-350	Chassis Box Top Cover and Clip Assem.
24-88	Chassis Box Bottom
MS-256	Chassis Box Body Less Cover and Top

REMOTE CONTROL UNIT

Part Number	Description
170-12	Zenith Control Unit (with knobs and mounting brackets—less cable)
7-5	Control Unit Bezel
26-83	Zenith Dial Scale Assembly
46-117	Volume and Tuning Knobs
52-63	Pilot Lamp Cable and Socket Assemb.
76-156	24" Tuning Control Cables
26-157	24" Volume Control Cables
80-110	Knob Springs
100-27	6-8 V. Pilot Lamp
192-7	Unbreakable Dial Glass

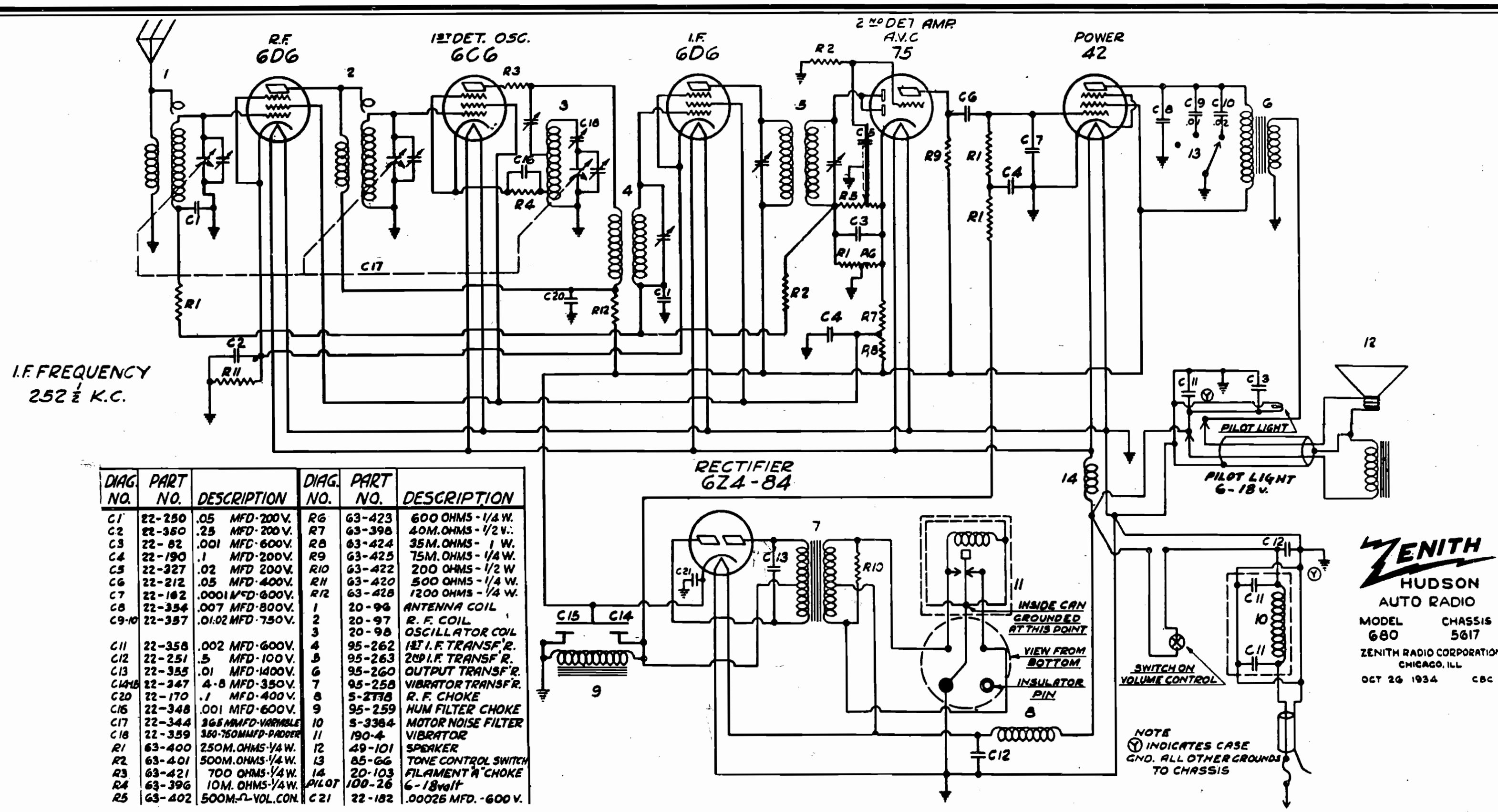
SUPPRESSOR AND MOUNTING PARTS

Part Number	Description
22-193	.5 Mfd. Ignition Coil Condenser
22-194	.5 Mfd. Generator Coil Condenser
52-44	"A" Battery Cable
57-478	Set Mounting Plate
63-336	15 M Ohm Dist. Suppressor
67-107	10/32 x ⅜ RHM Screws (8 used)
93-127	No. 10 Lock Washer (8 used)
93-222	7/16 Lock Washer
93-223	Mounting Bolt Washer
136-6	15 Ampere Fuse
144-14	Mounting Bolt and Nut
196-1	Mounting plate Gasket

*Speakers are numbered 49-100U, 49-100-R, 49-100-M designating three different types. Therefore, when ordering speaker or speaker parts refer to the number on speaker at all times and order by that part number accordingly.

MODEL 680 Hudson
Schematic
Alignment Data

ZENITH RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22-250	.05 MFD-200V.	R6	63-423	600 OHMS - 1/4 W.
C2	22-350	.25 MFD-200V.	R7	63-398	40M. OHMS - 1/2 W.
C3	22-82	.001 MFD-600V.	R8	63-424	35M. OHMS - 1 W.
C4	22-190	.1 MFD-200V.	R9	63-425	75M. OHMS - 1/4 W.
C5	22-327	.02 MFD 200V.	R10	63-422	200 OHMS - 1/2 W
C6	22-212	.05 MFD-400V.	R11	63-420	500 OHMS - 1/4 W.
C7	22-162	.0001 MFD-600V.	R12	63-428	1200 OHMS - 1/4 W.
C8	22-354	.007 MFD-800V.	1	20-96	ANTENNA COIL
C9-10	22-357	.01:.02 MFD-750V.	2	20-97	R. F. COIL
			3	20-98	OSCILLATOR COIL
C11	22-358	.002 MFD-600V.	4	95-262	1ST I. F. TRANSF'R.
C12	22-251	.5 MFD-100V.	5	95-263	2ND I. F. TRANSF'R.
C13	22-355	.01 MFD-1400V.	6	95-260	OUTPUT TRANSF'R.
C14-15	22-347	4-8 MFD-350V.	7	95-258	VIBRATOR TRANSF'R.
C20	22-170	.1 MFD-400V.	8	5-2778	R. F. CHOKE
C16	22-348	.001 MFD-600V.	9	95-259	HUM FILTER CHOKE
C17	22-344	365 MMFD-VARIABLE	10	S-3384	MOTOR NOISE FILTER
C18	22-359	350-750 MMFD-PADDER	11	190-4	VIBRATOR
R1	63-400	250M. OHMS-1/4 W.	12	49-101	SPEAKER
R2	63-401	500M. OHMS-1/4 W.	13	85-66	TONE CONTROL SWITCH
R3	63-421	700 OHMS-1/4 W.	14	20-103	FILAMENT "A" CHOKE
R4	63-396	10M. OHMS-1/4 W.	PILOT	100-26	6-18 volt
R5	63-402	500M.Ω-VOL.CON.	C21	22-182	.00026 MFD. -600 V.

Fig. 2

I. F. Alignment:

To balance the I. F. Circuit, connect the 252½ K. C. test oscillator signal to the grid of the 6C6 tube through a 0.5 mfd. condenser and to ground. Adjust the 1st I. F. primary trimmer to maximum output from either the speaker or an output meter. Follow in the same manner with the secondary, and the primary and secondary of the 2nd I. F. transformer. This completes the I. F. circuit adjustment.

R. F. Alignment:

1. Next attach the test oscillator thru a 150 mmf. condenser to the antenna and ground leads.
2. Turn condenser plates completely out of mesh.
3. Set test oscillator to 1600 K. C.
4. Adjust the oscillator condenser trimmer (see fig. 1) to approximate resonance at 1600. Disregard dial setting for this operation.
5. Set test oscillator to 1400 K. C. and turn gang condenser to resonance and peak the three trimmers accurately. Now set pointer on dial to 1400 K. C. by turning indicator screw from rear of head through pilot light socket hole.
6. Set test oscillator to 600 K. C. and tune set to pick up the signal. Rock the dial over this point while adjusting the padder condenser (see fig. 1) for greatest output.

If the dial is off calibration at the low frequency end after this is done the indicator may be moved slightly in either direction to give a uniform accuracy over the entire scale.

MODEL 680 Hudson
Voltage, Socket
Trimmers, Parts

ZENITH RADIO CORP.

Voltages:

Position	Tube	EF	EK	EG1	EG2	EG3	EP
R. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
1st Det.-Osc.	6C6	5.6	4.5	0	4.5	76	200
I. F. Amplifier	6D6	5.6	4.1	*	4.1	76	200
2nd Det. A. V. C.	75	5.6	1.3	0	0	—	165
Power Amp.	42	5.6	0	3	0	200	192
Rectifier	6Z4	5.6	200	—	—	—	—

f—Filament; k—Cathode; g^1—Control Grid; g^2—Suppressor Grid; g^3—Screen Grid; p—Plate; *—Depends on applied signal strength. All voltages measured from indicated points to ground. Battery voltage 6 volts. (Check voltages with condenser gang in full mesh.)

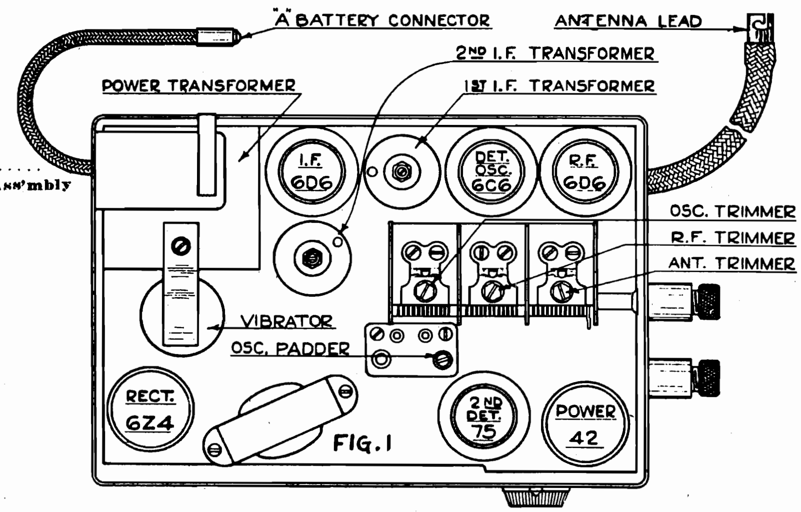


FIG. 1

RESISTORS (CHASSIS ONLY)

Zenith Number	Hudson Number	Description
63-396	48013	10M Ohm ¼ Watt
63-398	48015	40M Ohm ½ Watt
63-400	48017	250M Ohm ¼ Watt
63-401	48018	500M Ohm ¼ Watt
63-402	48019	500M Ohm Vol. Control & Switch Ass'mbly
63-420	48009	500 Ohm ¼ Watt
63-421	48010	700 Ohm ¼ Watt
63-422	48011	200 Ohm ½ Watt
63-423	48012	600 Ohm ¼ Watt
63-424	48014	35M Ohm 1 Watt
63-425	48016	75M Ohm ¼ Watt
63-428	48084	1200 Ohm ¼ Watt

CONDENSERS (CHASSIS ONLY)

22-82	46375	.001 Mfd. 600 V
22-162	46378	.0001 Mfd. 600 V
22-170	46370	.1 Mfd. 400 V
22-190	48021	.1 Mfd. 200 V
22-182	46953	.00025 Mfd. 600 V
22-212	48020	.05 Mfd. 400 V
22-250	46372	.05 Mfd. 200 V
22-251	46774	.5 Mfd. 100 V
22-327	48022	.02 Mfd. 200 V
22-344	48023	Three-Gang Variable
22-347	48024	4. x 8. Mfd. 350 V.
22-348	48025	.001 Mfd. 600 V
22-350	48026	.25 Mfd. 120 V
22-354	48027	.007 Mfd. 750 V
22-355	48028	.01 Mfd. 1400 V
22-357	48029	.01 x .02 Mfd. 750 V
22-358	48030	.002 Mfd. 600 V
22-359	48031	Padder

MISCELLANEOUS CHASSIS PARTS
COILS AND CHOKES

20-96	48032	Antenna Coil Assembly
20-97	48033	R. F. Coil Assembly
20-98	48034	Oscillator Coil Assembly
20-103	48035	Filament "A" Choke
95-262	48036	1st I. F. Transformer
95-263	48037	2nd I. F. Transformer
S-2778	46773	R. F. Choke
S-3364	46952	Motor Noise Filter
46-101	48038	Tone Control Knob (Knob Spring only, see 80-107)
52-54	48040	"A" Battery Cable
52-55	48041	Antenna Cable
54-76	48042	¼ x 20 Knurled Coupling Shaft Nuts
78-100	48043	Socket 6D6
78-101	48044	Socket 75
78-102	48045	Socket 42
78-113	48046	Socket 6D6
78-114	48047	Socket 6Z4
78-115	48048	Socket Vibrator
80-107	48049	Tone Control Knob Spring
85-66	48050	Tone Control Switch

SPEAKER

*49-101	48062	6" Dynamic Speaker (less output transformer
	48063	Cone & Voice Coil Assemb. (for 48062 Speaker)
	48064	Field Coil (for 48062 Speaker)
S-3328	48065	Speaker Box and Grill Cloth

Zenith Number	Hudson Number	Description
93-125	48051	No. 6 Lock Washers
93-220	48052	Bakelite Washer for Chassis Mtg. Screws
94-185	48053	Rubber Bushing for Chassis Mtg. Screws
95-258	48054	Power Transformer
95-259	48055	Hum Filter Choke
95-260	48056	Speaker Output Transformer
97-75	48057	10/32 x ¼ Wing Screw for Box Cover
114-27	48058	No. 8 x ¼ Chassis Box Screws
190-4	48075	Vibrator
MS-246	48059	Chassis Box Top Cover and Bushing Assem.
MS-247	48060	Chassis Box Bottom Cover and Bushing Assem.
MS-253	48061	Chassis Box Body Less Cover and Top

REMOTE CONTROL UNIT

170-11	48066	Hudson Remote Control (less cables)
7-3	45738	Control Unit Bezel & Glass Assembly
26-77	48067	Hudson Dial Scale and Pointer Bushing Assembly
46-72	45740	Volume Control Knob
46-73	45741	Tuning Control Knob (for Spring only, see 80-109)
52-62	48068	Pilot Lamp Cable & Socket Assembly
76-155	48069	Volume Control Coupling & Shaft Assem.
76-154	48070	Tuning Control Coupling & Shaft Assem.
80-109	46563	Tuning Knob Spring only
100-26	48071	6 V. - 18 V. Pilot Lamp

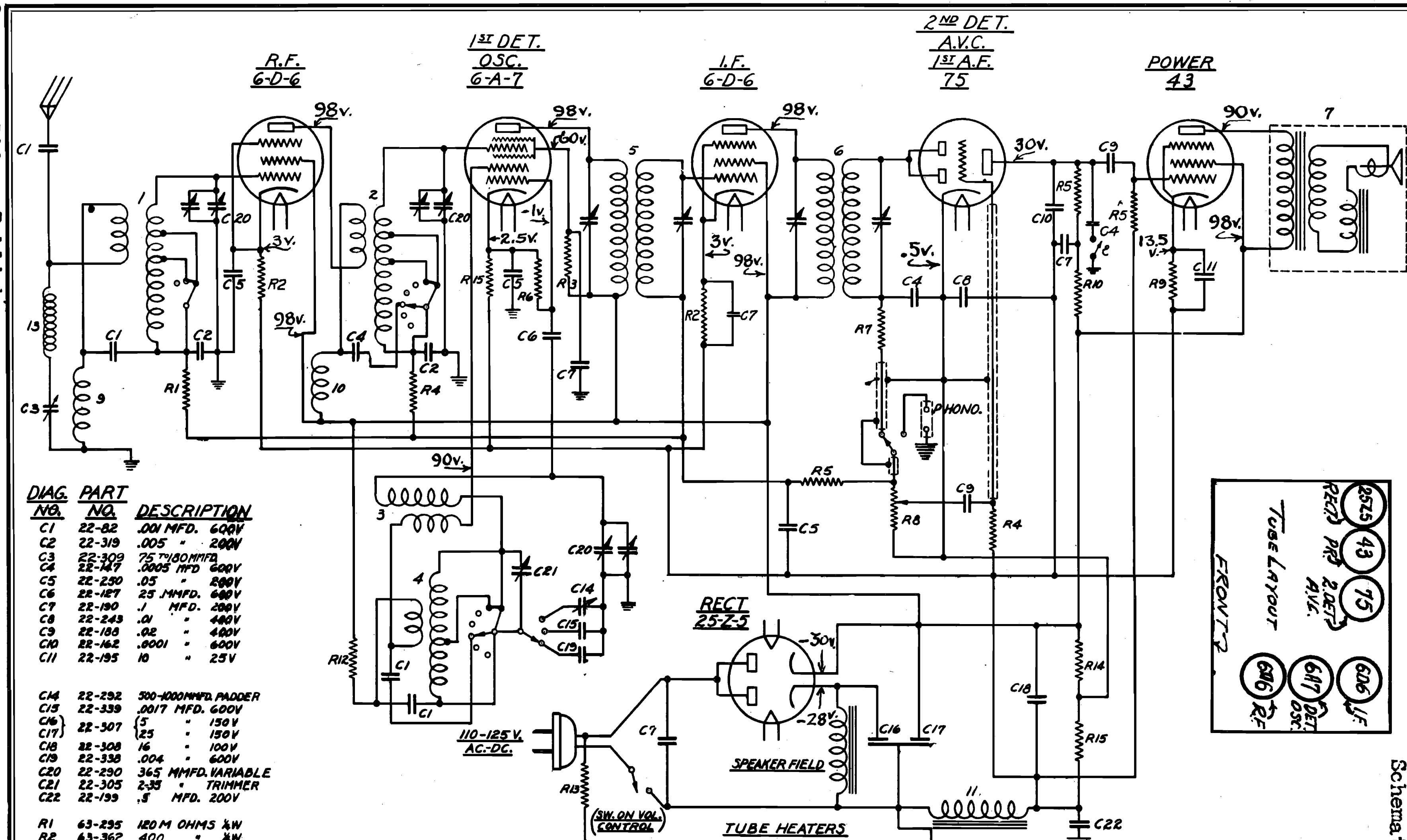
SUPPRESSOR AND SPEAKER MOUNTING PARTS

22-260	45923	.5 - 120 V. Coil Condenser
22-262	45990	.5 - 120 V. Generator Condenser
22-282	47974	.05 - 120 V. Condenser
54-77	48072	Hex Nut for Speaker Mtg. Bolt
63-403	47968	1500 Ohm Distributor Suppressor
97-73	48073	Speaker Mtg. Stud
147-21	48074	Wood Spacer Block for Speaker Mtg.

*Speakers are numbered 49-101-U, 49-101-R, 49-101-M designating three different types. Therefore, when ordering speaker or speaker parts refer to the number on speaker at all times and order by that part number accordingly.

ZENITH RADIO CORP.

MODELS 811,862,865,866,
1162
Chassis 5609 AC-DC
Schematic,Socket,Parts



DIAG. NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 600V
C2	22-319	.005 " 200V
C3	22-309	75 TO 180 MMFD.
C4	22-147	.0005 MFD 600V
C5	22-250	.05 " 200V
C6	22-127	25 MMFD. 600V
C7	22-190	.1 MFD. 200V
C8	22-243	.01 " 400V
C9	22-188	.02 " 400V
C10	22-162	.0001 " 600V
C11	22-195	10 " 25V
C14	22-292	500-1000 MMFD. PADDER
C15	22-339	.0017 MFD. 600V
C16	22-307	5 " 150V
C17	22-307	25 " 150V
C18	22-308	16 " 100V
C19	22-338	.004 " 600V
C20	22-290	365 MMFD. VARIABLE
C21	22-305	2-35 " TRIMMER
C22	22-199	.5 MFD. 200V
R1	63-295	120 M OHMS ¼W
R2	63-362	400 " ¼W
R3	63-375	24 M " ¼W
R4	63-293	990 M " ¼W
R5	63-258	490 M " ¼W
R6	63-260	100 M " ¼W
R7	63-280	49 M " ¼W
R8	63-366	200 M OHM VOL. CONT.
R9	63-287	700 OHMS ½W
R10	63-278	99 M " ¼W
R12	63-326	4 M " ¼W
R13	11-9	90 OHM RES. CORD
R14	63-372	50 M OHMS ¼W
R15	63-244	500 " ¼W
R16	63-374	50 " 2W

1	S-3122	ANT. COIL ASSEM.
2	S-3124	DET. " "
3	S-3121	H.F. OSC. COIL "
4	S-3123	B'DC'ST OSC. COIL ASSEM.
5	95-247	1ST. I.F. TRANSF.
6	95-248	2ND I.F. "
7	49-93	SPEAKER 3000 Ω FIELD
8	85-48	TONE CONTROL SWITCH
9	20-71	ANT. CHOKE
10	20-76	R.F. PLATE IMPEDANCE COIL
11	95-249	POWER FILTER CHOKE
12	85-57	BAND CHANGE SWITCH
13	20-75	WAVE TRAP

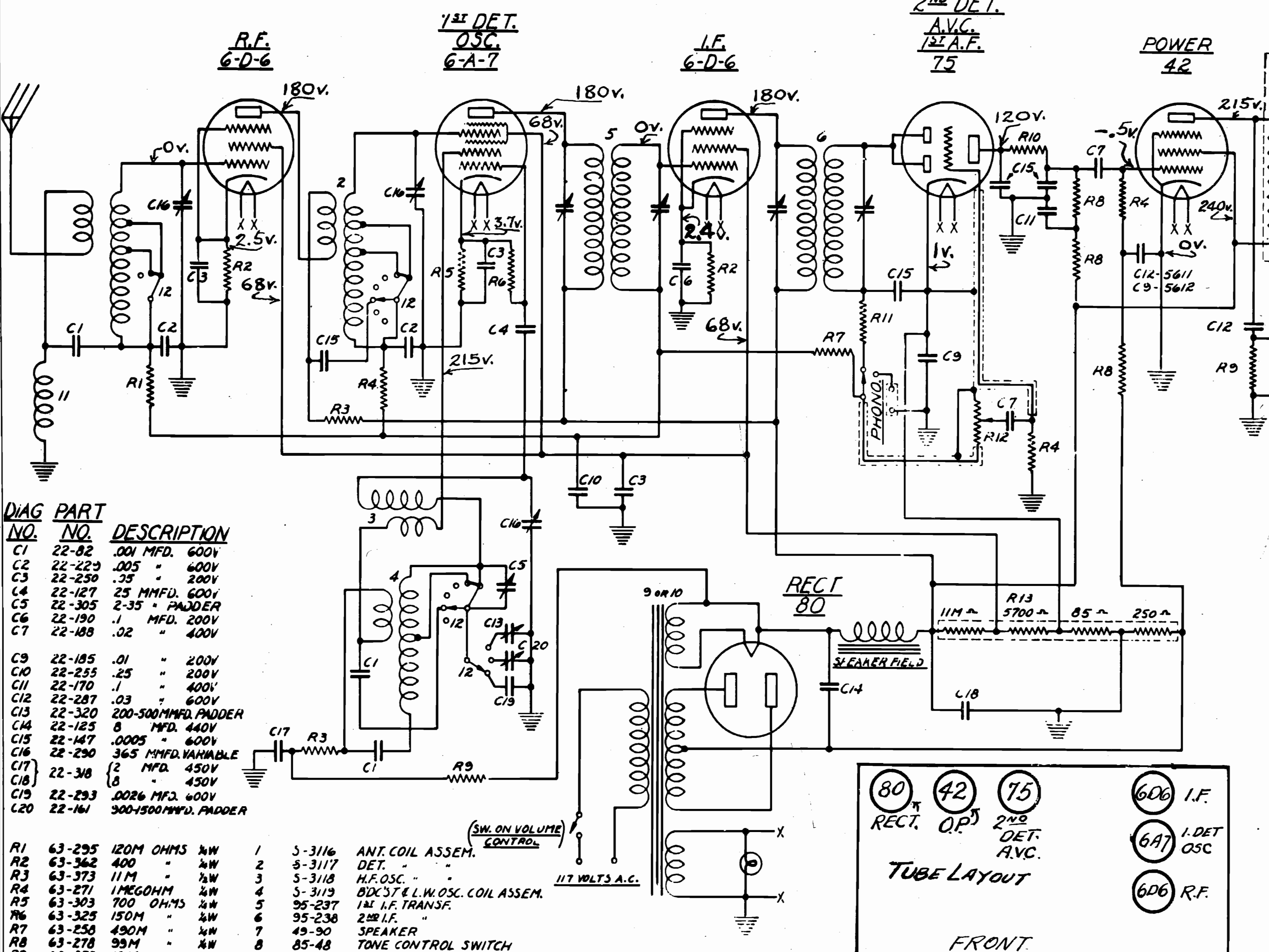
I.F. FREQUENCY 252.5 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS NO. 5609 A.C.-D.C.

MODELS 811-862-865-866-1162

MODELS 814,815,864,1161
Chassis 5611,5612
Schematic,Socket,Parts

ZENITH RADIO CORP.

I.F. FREQUENCY 125 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS NOS. 5611 AND 5612



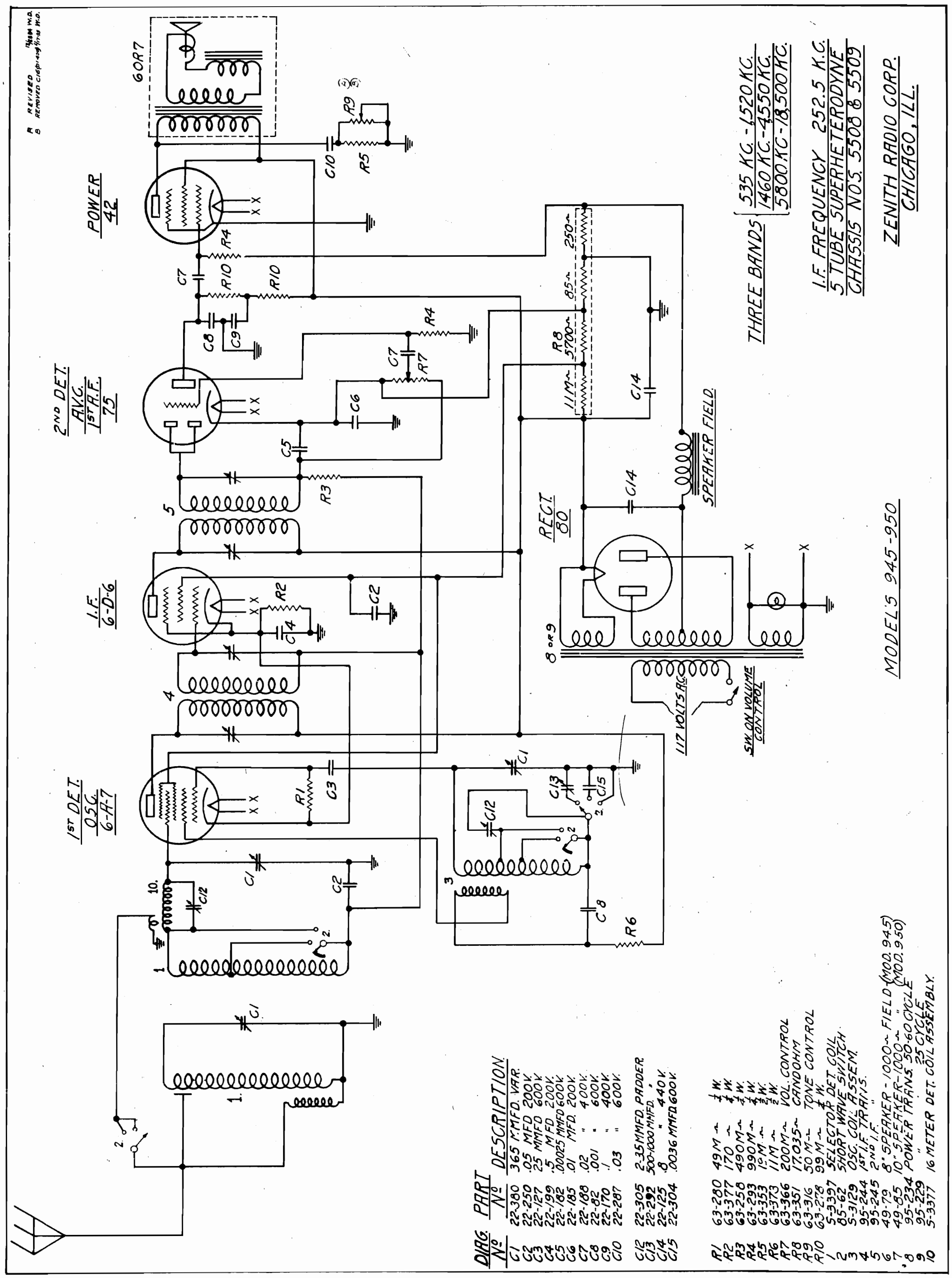
DIAG NO.	PART NO.	DESCRIPTION
C1	22-82	.001 MFD. 600V
C2	22-229	.005 " 600V
C3	22-250	.05 " 200V
C4	22-127	25 MMFD. 600V
C5	22-305	2-35 " PADDER
C6	22-190	.1 MFD. 200V
C7	22-188	.02 " 400V
C9	22-185	.01 " 200V
C10	22-255	.25 " 200V
C11	22-170	.1 " 400V
C12	22-287	.03 " 600V
C13	22-320	200-500 MMFD. PADDER
C14	22-125	8 MFD. 440V
C15	22-147	.0005 " 600V
C16	22-290	365 MMFD. VARIABLE
C17	22-318	2 MFD. 450V
C18	22-318	8 " 450V
C19	22-293	.0026 MFD. 600V
C20	22-161	900-1500 MMFD. PADDER
R1	63-295	120M OHMS ¼W
R2	63-362	400 " ¼W
R3	63-373	11M " ½W
R4	63-271	1 MEGOHM ¼W
R5	63-303	700 OHMS ¼W
R6	63-325	150M " ¼W
R7	63-258	490M " ¼W
R8	63-278	99M " ¼W
R9	63-353	19M " ½W
R10	63-261	9900 " ¼W
R11	63-355	51M " ¼W
R12	63-366	200M OHM VOL. CON.
R13	63-351	12035 " CANDOHM

DIAG NO.	PART NO.	DESCRIPTION
1	S-3116	ANT. COIL ASSEM.
2	S-3117	DET. " "
3	S-3118	H.F. OSC. " "
4	S-3119	B'DC'ST & L.W. OSC. COIL ASSEM.
5	95-237	1ST I.F. TRANSF.
6	95-238	2ND I.F. "
7	49-90	SPEAKER
8	85-48	TONE CONTROL SWITCH
9	95-234	POWER TRANSF. 50-60 CYCLE
10	95-229	" " 25 CYCLE
11	20-82	ANT. CHOKE
12	85-57	BAND CHANGE SWITCH

MODELS 814-815-864-1161

MODELS 945,950
Chassis 5508,5509
Schematic

ZENITH RADIO CORP.



MODELS 945,950
Chassis 5508,5509
Voltage,Alignment
Socket,Trimmers,Parts

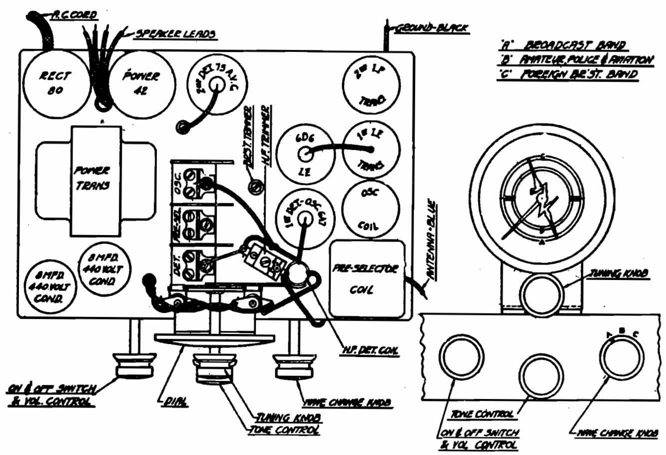
ZENITH RADIO CORP.

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6A7	1st Det.	5.8	4	0	80	-	260
	Osc.			.6	-	-	210
6D6	I.F.	5.8	5.2	0	80	5.2	260
75	2nd Det.	5.8	1.5	0	-	-	135
42	PWR.	5.8	0	-.7	260	-	245
80	RECT.	4.8	-	-	-	-	-

Line Voltage 112 Antenna and Ground Disconnected.
All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except filaments).
F- Filament; K - Cathode; G1 - Control Grid; G2 - Screen Grid; G3 - Suppressor Grid; P - Plate

Alignment

1. Balance I.F.transformers at 252.5 K.C. with test oscillator connected to control grid of 6A7 and ground.
2. Turn band switch to C band. Connect test oscillator to antenna and ground leads. Set test oscillator at 15 Megacycles. Adjust oscillator trimmer on gang condenser for correct dial reading.
3. Adjust detector trimmer (located on top of chassis between front section of gang condenser and coil) for maximum output.
4. Turn band switch to A band. Adjust oscillator trimmer (located on right side underneath chassis) for correct dial reading at 1400 K.C. also adjust preselector and detector trimmers on gang for maximum output.
5. Adjust oscillator padder (next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K.C. to the combination giving greatest output.
6. Recheck 1400 K.C.



PARTS AND PRICES
Chassis #5508 & #5509

MODELS 945, 950

	Dial Assembly	
S-3403	Complete Split Second Dial Assembly	$3.75
26-78	Dial Scale Only	.40
59-27	Special "Z" Pointer	.15
59-32	Split Second Pointer	.10
93-231	Dial Glass Cushion Washer	.05
192-6	Dial Glass	.20
	Miscellaneous	
49-79	8" Dynamic Speaker for Model 945	$8.00
	Cone and Voice Coil for Model 945	2.50
	Output Transformer for Model 945	2.00
	Field Coil for Model 945	2.00
49-85	10" Dynamic Speaker for Model 950	8.50
	Cone and Voice Coil for Model 950	3.00
	Output Transformer for Model 950	2.00
	Field Coils for Model 950	2.00
57-483	Dial Escutcheon Plate	.45
78-82	Type 80 Tube Socket	.10
78-100	" 6D6 " "	.10
78-101	" 75 " "	.10
78-102	" 42 " "	.10
78-106	" 6A7 " "	.10
85-62	Wave Change Switch	.80
95-229	Power Transformer 25 Cycle	6.50
95-234	Power Transformer 50/60 Cycle	3.75
100-23	6.3 Volt Pilot Lamp	.15
125-131	Goat Tube Shield	.10
	Coils, Etc.	
95-244	1st I.F. Transformer	1.50
95-245	2nd I.F. Transformer	1.50
S-3129	Oscillator Coil Assembly	1.00
S-3397	Selector Detector Coil Assembly	2.00
S-3377	16 Meter Detector Coil Assembly	.65
	Miscellaneous	
46-108	Band Selector Knob	.15
46-109	Tuning Control Knob	.10
46-110	Tone Control Knob	.10
46-111	Volume Control Knob	.10

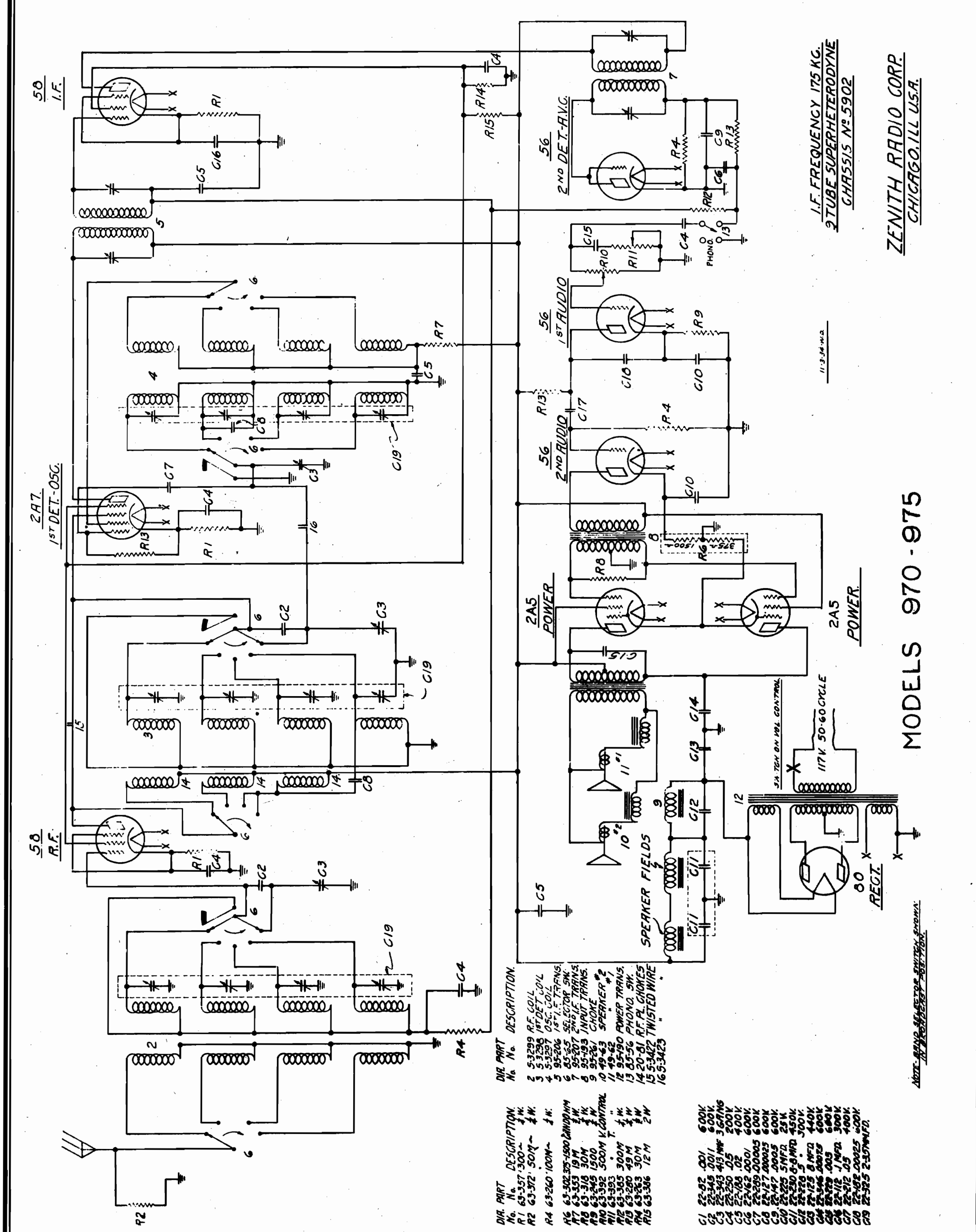
THESE PRICES SUPERSEDE ALL OTHER PREVIOUS QUOTATIONS AND ARE SUBJECT TO REGULAR DISCOUNT AND CHANGE WITHOUT NOTICE.

January 31, 1935

ZENITH RADIO CORPORATION

MODELS 970,975
Chassis 5902
Schematic

ZENITH RADIO CORP.



MODELS 970,975
Voltage,Alignment
Socket,Trimmers

ZENITH RADIO CORP.

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
58	R.F.	2.6	A 14 B 9.5 C 3 D 3	0	110	A 14 B 9.5 C 3 D 3	250
2A7	1st Det.	2.6	3	0	110	-	250
	Osc.			-1	-	-	180
58	I.F.	2.6	2.8	0	110	2.8	250
56	2nd Det.	2.6	0	0	-	-	0
56	1st Aud.	2.6	6	0	-	-	120
56	2nd Aud.	2.6	13.5	0	-	-	250
2A5	PWR.	2.6	18	0	250	-	250
2A5	PWR.	2.6	18	0	250	-	250
80	Rect.	4.6	-	- -	-	-	-

Line 116 V. Antenna and Ground Disconnected
F - filament; K - cathode; G1 - control grid; G2 - screen grid; G3 - suppressor grid; P - plate.

Alignment

The diagram on page 3 shows position of major components and aligning adjustments. It should be studied carefully before any attempt is made to adjust the various circuits. A suitable high frequency service oscillator capable of excellent atenuation is required and no adjustments should be made without one. Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

(I.F.) - Connect 175 K.C.service oscillator to grid of 6A7 and chassis ground. Adjust I.F.trimmers to point of maximum output.

(A) - Set service oscillater at 1400 K.C.and connect to antenna and ground leads. Place pointer at 1400 K.C. on dial and first adjust top trimmer on oscillator coil, then top trimmer on detector coil and top trimmer on R.F. coil to resonance. There is no 600 K.C. adjustment necessary.

(B) - Set service oscillator at 3 megacycle. Adjust second from top trimmer on oscillator coil to secure correct dial reading. Adjust second from top trimmers on detector and R.F. coils to resonance.

(C) - Set service oscillator at 6 megacycle. Adjust third from top trimmer on oscillator coil to secure correct dial reading. Adjust third from top trimmers on detector and R.F. coils to resonance.

(D) - Set service oscillator at 18 megacycle. Adjust bottom trimmer on oscillator coil to secure correct dial reading. Adjust bottom trimmers on detector and R.F.coils to resonance. Check for scale at 9 megacycle,if off, either twist or untwist blue wire loop on rear section of gang-switch and rebalance.

NOTE: It may be possible to obtain two settings on the oscillator and detector trimmers,particularly on bands C and D. If this occurs the oscillator should always be left on the loosest setting and the detector on the tightest one. Otherwise, reception over the band will be very erratic.

Mushy on full volume. Tendency to oscillate on edge of carrier. Check C9 .0005 micamold condenser for open.

Dead, or very distorted on strong signal only. Check for open R 4 100,000 ohm resistor on 56 tube - 2nd detector and A.V.C.

Weak and distorted - Check R 13 49,000 ohms for open.

Too much audio hiss and flutter on broadcast, .005 - C15 across 2A5 open. Weak audio if condenser is shorted or leaky.

Too much highs. Check C 14 .00075 from 2A5 to ground for open. Set dead if shorted.

Weak - Audio lacks bass. Poor quality. Check 1500 ohm resistor and 22-225 in 56 circuits for open or shorts.

Dead - 280 plates red - Check filter and plate circuits for shorts or grounds.

Carrier hum, on stations. Usually caused by static shield in power transformer not being grounded. Check tubes and by-passes first. If carrier hum still present, replace power transformer.

Weak and Distorted - A.V.C. seems to block. C5 near 2nd I.F. shorted.

Weak and Oscillates on B.C. - Open antenna coil or open .001 - C1 grounded. Also set will be weak on R.F.

Weak on D and dead at 3 Meg. Stops oscillating around 10-11. Check C8 micamold .000025 for open or high leakage. Check tubes and coils for opens.

Weak on all S.W. bands.Check C2 .0011 micamold for open or high leakage.

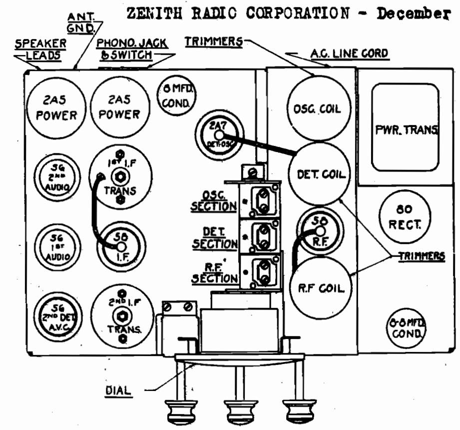
Microphonic - Try tubes, put cotton in oscillator coil to suppress grid wire vibrations. Check by-passes.

Dead on B.C. - Shorted coil trimmer condenser, usually oscillator coil.

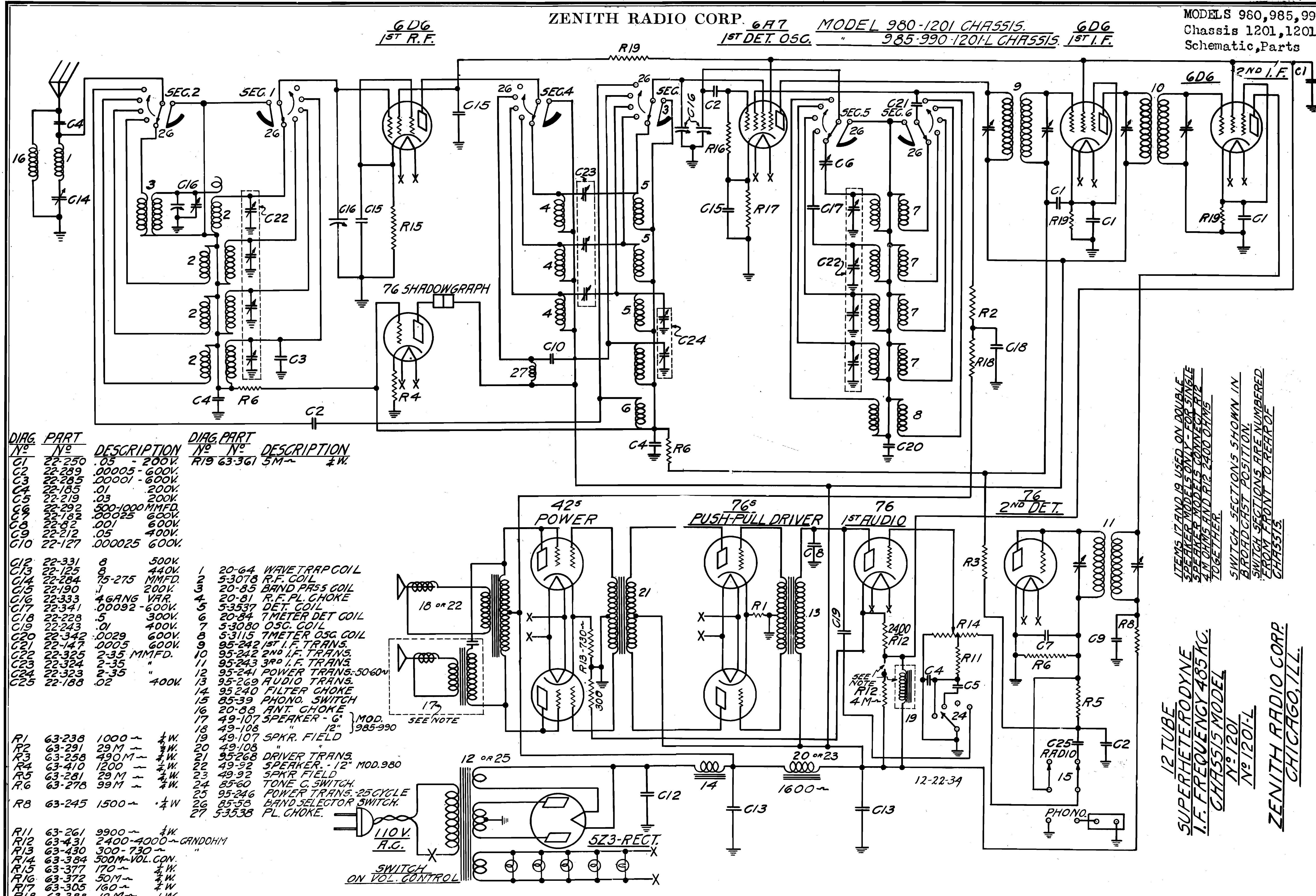
Balance proceedure must be done very carefully on this model, and tubes checked carefully in particular for satisfactory S.W. operation. In addition to above, an occasional open coil or shorted trimmer will cause either weak or no reception on one or more bands. Check for poor contacts on band switch, rosin or loose connections.

Oscillates on S.W. - Ground 56 detector cathode directly at socket prong. Remove black ground wire to #2 I.F. ground at C5 condenser

ZENITH RADIO CORPORATION - December 17, 1934.



MODELS 980,985,990
Chassis 1201,1201A
Schematic,Parts



DIAG. No	PART No	DESCRIPTION
C1	22-250	.05 - 200V.
C2	22-289	.00005 - 600V.
C3	22-285	.00001 - 600V.
C4	22-185	.01 200V.
C5	22-219	.03 200V.
C6	22-292	500-1000 MMFD.
C7	22-182	.00025 600V.
C8	22-82	.001 600V.
C9	22-212	.05 400V.
C10	22-127	.000025 600V.
C12	22-331	8 500V.
C13	22-125	8 440V.
C14	22-284	75-275 MMFD.
C15	22-190	.1 200V.
C16	22-333	4 GANG VAR.
C17	22-341	.00092 - 600V.
C18	22-228	.5 300V.
C19	22-243	.01 400V.
C20	22-342	.0029 600V.
C21	22-147	.0005 600V.
C22	22-325	2-35 MMFD.
C23	22-324	2-35 "
C24	22-323	2-35 "
C25	22-188	.02 400V.
R1	63-238	1000 ~ 1/4 W.
R2	63-291	29M ~ 1/4 W.
R3	63-258	490M ~ 1/4 W.
R4	63-410	1200 ~ 1/4 W.
R5	63-281	29M ~ 1/4 W.
R6	63-278	99M ~ 1/4 W.
R8	63-245	1500 ~ 1/4 W
R11	63-261	9900 ~ 1/4 W.
R12	63-431	2400-4000 ~ CANDOHM
R13	63-430	300-730 ~ "
R14	63-384	500M ~ VOL. CON.
R15	63-377	170 ~ 1/4 W.
R16	63-372	50M ~ 1/4 W.
R17	63-305	160 ~ 1/4 W
R18	63-388	19M ~ 1 W.

DIAG. No	PART No	DESCRIPTION
R19	63-361	5M ~ 1/4 W.

1	20-64	WAVE TRAP COIL
2	S-3078	R.F. COIL
3	20-85	BAND PASS COIL
4	20-81	R.F. PL. CHOKE
5	S-3537	DET. COIL
6	20-84	7 METER DET COIL
7	S-3080	OSC. COIL
8	S-3115	7 METER OSC. COIL
9	95-242	1ST I.F. TRANS.
10	95-242	2ND I.F. TRANS.
11	95-243	3RD I.F. TRANS.
12	95-241	POWER TRANS. - 50-60~
13	95-269	AUDIO TRANS.
14	95-240	FILTER CHOKE
15	85-39	PHONO. SWITCH
16	20-88	ANT. CHOKE
17	49-107	SPEAKER - 6" } MOD. 985-990
18	49-108	" 12" } MOD. 985-990
19	49-107	SPKR. FIELD
20	49-108	" "
21	95-268	DRIVER TRANS.
22	49-92	SPEAKER. - 12" MOD. 980
23	49-92	SPK'R FIELD
24	85-60	TONE C. SWITCH.
25	95-246	POWER TRANS. - 25 CYCLE
26	85-58	BAND SELECTOR SWITCH.
27	S-3538	PL. CHOKE.

ZENITH RADIO CORP.

MODELS 980,985,990
Chassis 1201,1201A
Voltage,Socket
Trimmers

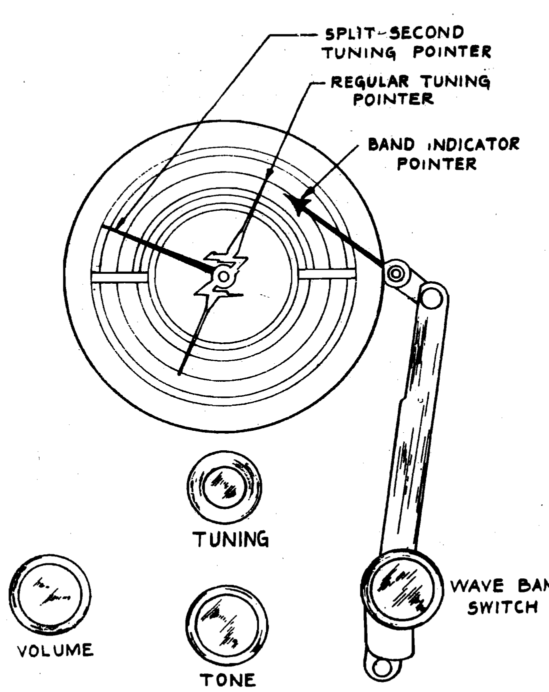
Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.8	1	0	78	1	220
6A7	1st Det.	5.8	1.5	0	86	-	220
	Osc.			-10	-	-	220
6D6	1st I.F.	5.8	7	0	86	7	220
6D6	2nd I.F.	5.8	7	0	86	7	220
76	2nd Det.	5.8	0	0	-	-	0
76	Shadow-meter AMP.	5.8	10	0	-	-	210
76	1st Aud.	5.8	11	0	-	-	210
76	P.P. Driver	5.8	11	0	-	-	220
76	P.P. Driver	5.8	11	0	-	-	220
42	PWR.	5.8	26	0	260	-	260
42	PWR.	5.8	26	0	260	-	260
5Z3	RECT.	4.8	-	-	-	-	-

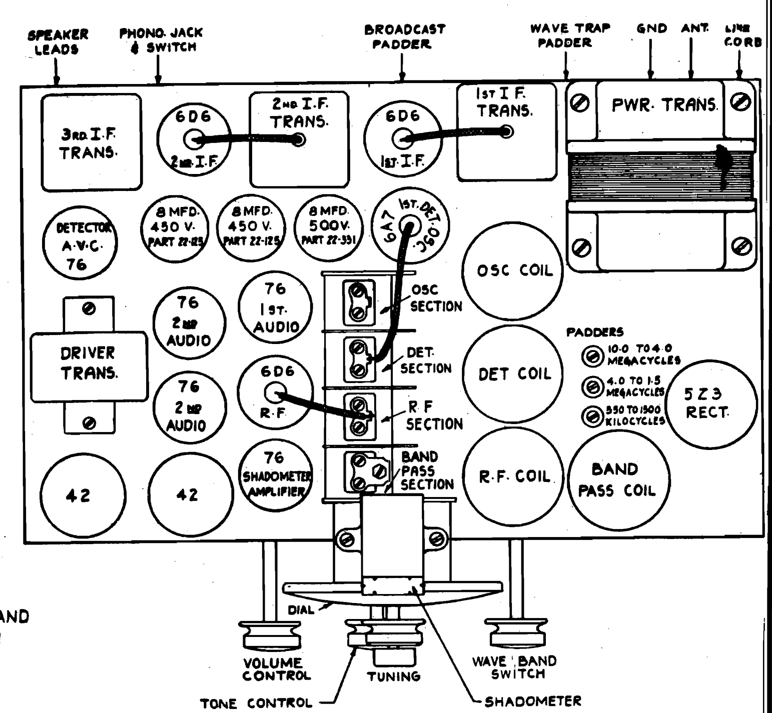
Line Voltage 110 Volts

Antenna and Ground Disconnected.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppresso grid; p - plate.



Control Panel



TUBE POSITION

MODELS 980,985,990
Chassis 1201,1201A
Alignment,Service Notes

ZENITH RADIO CORP.

Service Bulletin

MODELS 980-985-990

Chassis 1201 - 1201A

SERVICE NOTES

Dial Slips or Binds. Tighten lugs on planetary drive. See that both pointers are free. Make sure gang is squarely lined up with dial.
Off Calibration. Check for loose set screws on dial assembly to condenser shaft. Black pointer may be loose on shaft. Check alignment as outlined in Alignment Procedure.
Poor Tone. Defective tubes in audio. One side of push-pull circuit faulty. Check audio and output transformers. See A.V.C. blocking.
Insensitive. Out of alignment, weak tubes or defective by-pass condenser.
Shadowgraph Inoperative. Weak 76 tube, burnt out shadowgraph, open resistor in 76 plate circuit.
Distortion at Medium Volume. Defective 75 tube, defective volume control. Separate green volume control-lead and speaker-lead close to grid of 42 tube.
Insensitive on Any Short Wave Band. Check alignment, make sure R.F. circuit is not aligned to image frequency. Change 6A7 tube. Change position of fixed condensers adjacent to rear section of wave change switch. Location of these condensers in relation to each other and their distance from the chassis will affect dial calibration and sensitivity.
Stops Oscillating Around 9 M.C. Change 6A7 tube, leakage in 50 Mmfd. or .0029 Mfd. condenser.
A.V.C.Blocks. Shorted resistor on antenna choke. C-14 padder shorted. Grounded R.F. grid circuit.
Oscillates on Broadcast. Check alignment. Push brown wire away from 6A7 socket. Grounded cathode on 1st I.F. or grounded to 600 K.C. padder. Check for open by-pass condenser.
Noisy. Shorting plates in gang condenser. Poor contact in band switch. Loose shields or shield bases. Static shields may be touching leads under gang condenser.
Overheats. Check pilot light and heater circuits for partial short or ground.
Hum on D and E Bands. Antenna lead too close to AC line or 5Z3 socket short in 6D6 in R.F. socket.
Flutters. Rearrange leads adjacent to 6A7 socket. Open antenna coil. Push yellow band pass lead away from detector trimmer assembly and yellow choke leads. Replace 6D6 in R.F. socket.
Oscillates on Short Wave Bands. Make sure brown R.F. grid return lead is pushed away from 6A7 socket. Check for ground on any A.V.C. lead. Open by-pass condenser.
Tone Control Inoperative. Loose ground lug on 63-430 candohm. Defective condensers in tone control circuit.
Whistles. Rearrange leads in audio circuits. Speaker wires couple with 1st I.F.
Warning. The wiring to the switch is a part of the tuned circuit on the "E" band. Do not change the position of any leads.

Alignment

The diagram on page 2 shows position of major components and aligning adjustments. It should be studied carefully before any attempt is made to adjust the various circuits. The Clough-Brengle type is the only commercial service oscillator found practical for this work.

Separate coils are used for each band. Mounted on the coils are individual trimmers that align each band, independent of the other bands.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. trimmers on rear of I.F. transformers for strongest signal.

Connect 485 K.C. service oscillator to antenna and ground. Turn dial to 540 K.C. on broadcast band and adjust wave trap trimmer on right rear side of chassis for weakest signal.

Broadcast - "A" Band

Set service oscillator at 1400 K.C., remaining attached to antenna ground posts. Turn dial to same point and adjust #1 trimmer (top one on oscillator coil) to resonance. Adjust #1 R.F. trimmer (top one on R.F. coil); #1 detector trimmer (through hole in chassis base) and band pass trimmer (top front section of gang) all to resonance.

Set service oscillator at 600 K.C. Adjust padder (located in center rear of chassis) for correct dial reading.

Recheck 1400 K.C. alignment.

"B" Band

Set service oscillator at 4 M.C.(still attached to antenna and ground) and adjust trimmer #2 (2nd from top) on oscillator coil for correct dial reading. Adjust #2 R.F. trimmer (2nd from top on R.F. coil) and #2 detector trimmer (center hole through chassis) to resonance.

"C" Band

Loosen #3 detector trimmer (top one on detector coil). Set service oscillator at 10.5 M.C. Adjust #3 oscillator trimmer (third from top on oscillator coil) for correct dial reading. Adjust #3 R.F. trimmer (third from top of R.F.coil) and #3 detector trimmer (rear one through hole in top of chassis). Adjust #3 detector trimmer on coil to resonance.

"D" Band

Tighten #4 detector trimmer (bottom one on detector coil). Set service oscillator at 21 M.C. Adjust #4 oscillator trimmer (bottom one on oscillator coil) for correct dial reading. Adjust #4 R.F. trimmer (lower one on R.F. coil) and #4 detector trimmer (lower one on detector coil) to resonance.

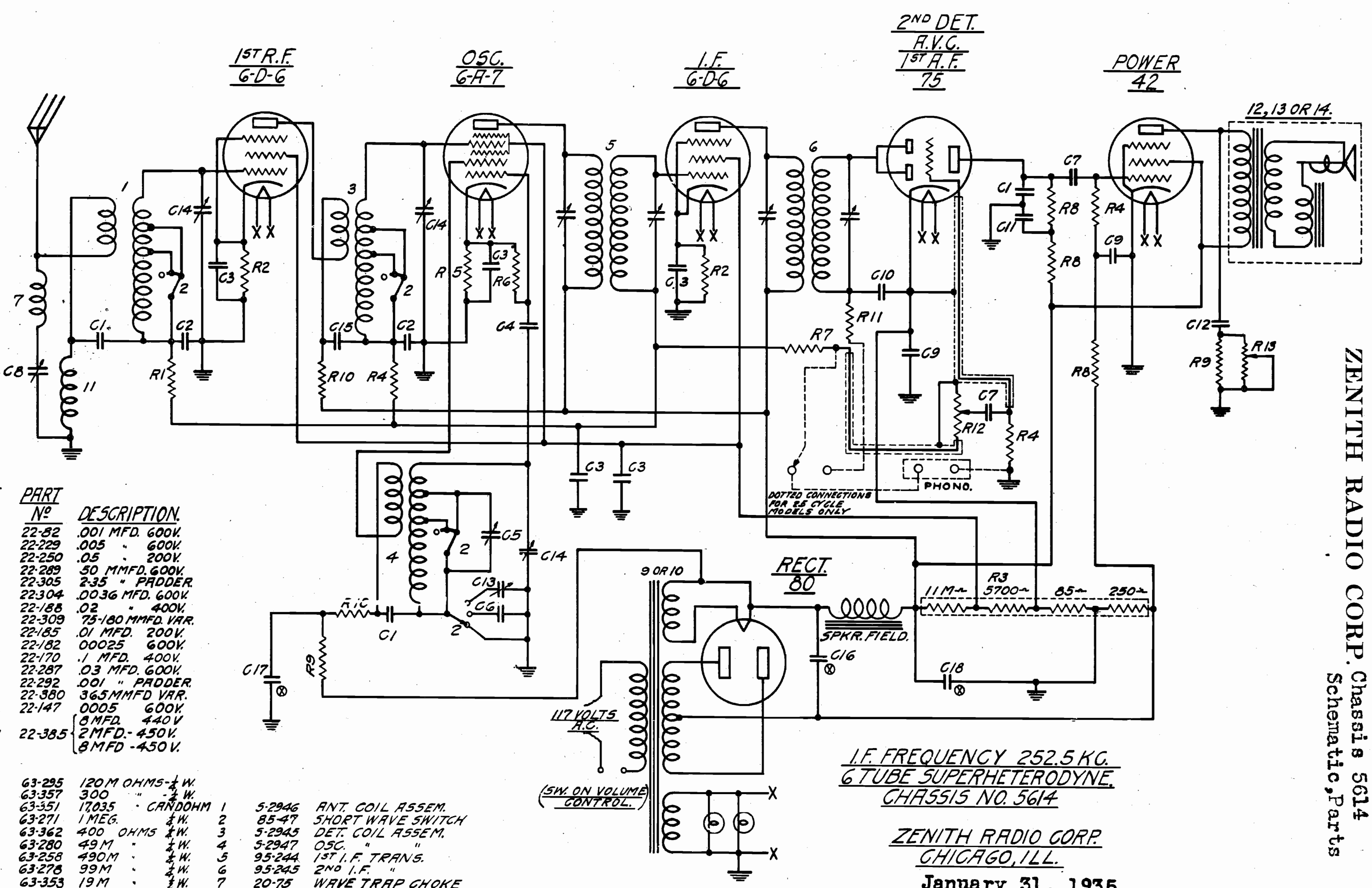
It is very easy to mistake the image frequency for the fundamental on this band. Rotate dial and if shadowmeter narrows at any point, especially at 15 M.C., the band should be rebalanced.

"E" Band

There are no adjustments to be made on this band.

ZENITH RADIO CORP.

MODELS 908,909,960,961,1117
Chassis 5614
Schematic,Parts



DIAG Nº	PART Nº	DESCRIPTION.
C1	22-82	.001 MFD. 600V.
C2	22-229	.005 " 600V.
C3	22-250	.05 " 200V.
C4	22-289	50 MMFD. 600V.
C5	22-305	2-35 " PADDER.
C6	22-304	.0036 MFD. 600V.
C7	22-188	.02 " 400V.
C8	22-309	75-180 MMFD. VAR.
C9	22-185	.01 MFD. 200V.
C10	22-182	00025 600V.
C11	22-170	.1 MFD. 400V.
C12	22-287	.03 MFD. 600V.
C13	22-292	.001 " PADDER.
C14	22-380	365 MMFD VAR.
C15	22-147	0005 600V.
C16	22-385	8 MFD. 440V
C17	22-385	2 MFD. - 450V.
C18	22-385	8 MFD - 450V.
R1	63-295	120M OHMS - 1/4 W.
R2	63-357	300 " - 1/4 W.
R3	63-351	17,035 " CANDOHM
R4	63-271	1 MEG. 1/4 W.
R5	63-362	400 OHMS 1/4 W.
R6	63-280	49M " 1/4 W.
R7	63-258	490M " 1/4 W.
R8	63-278	99M " 1/4 W.
R9	63-353	19M " 1/2 W.
R10	63-373	11M " 1/2 W.
R11	63-335	51M " 1/4 W.
R12	63-366	200M " V. CON.
R13	63-316	50M " T. " .

1	5-2946	ANT. COIL ASSEM.
2	85-47	SHORT WAVE SWITCH
3	5-2945	DET. COIL ASSEM.
4	5-2947	OSC. " "
5	95-244	1ST I.F. TRANS.
6	95-245	2ND I.F. "
7	20-75	WAVE TRAP CHOKE
8	85-48	TONE CONTROL SWITCH
9	95-234	POWER TRANS. - 50-60 CYCLE
10	95-229	" " 25 CYCLE
11	20-71	ANT. CHOKE
12	49-79	8" SPEAKER - FIELD 1000~ (908-909)
13	49-85	10" " " " (960)
14	49-97	12" " " " (961)

I.F. FREQUENCY 252.5 KC.
6 TUBE SUPERHETERODYNE.
CHASSIS NO. 5614

ZENITH RADIO CORP.
CHICAGO, ILL.
January 31, 1935

CONDENSERS MARKED THUS ⊗ ARE IN SINGLE CONTAINER.

MODELS - 908 - 909 - 960 - 961

MODELS 908,909,960,961,1117
Chassis 5614
Voltage, Socket, Trimmers, Parts

ZENITH RADIO CORP.

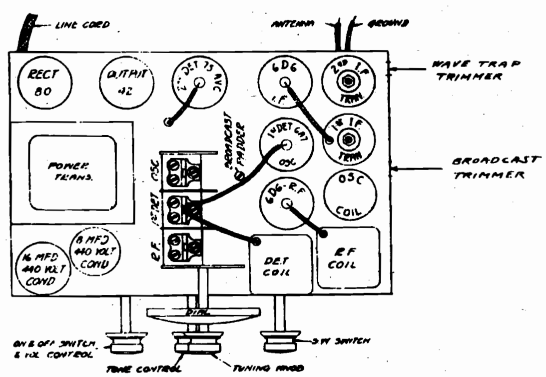
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1St. Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd.Det. 1st Audio	5.6	1.4	0	-	-	148
42	PWR.	5.6	0	-.6	250	-	250
80	RECT.	4.6	-	-	-	-	300

Line Voltage 112 — Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters).
F - Filament; K - Cathode; g1 - Control Grid; g2 - Screen Grid; g3 - Suppressor Grid; p - Plate.

Alignment

1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 15,000 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator padder (located next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K. C. for combination giving maximum output.
6. Recheck 1400 K.C.



TUBE-POSITION

ZENITH

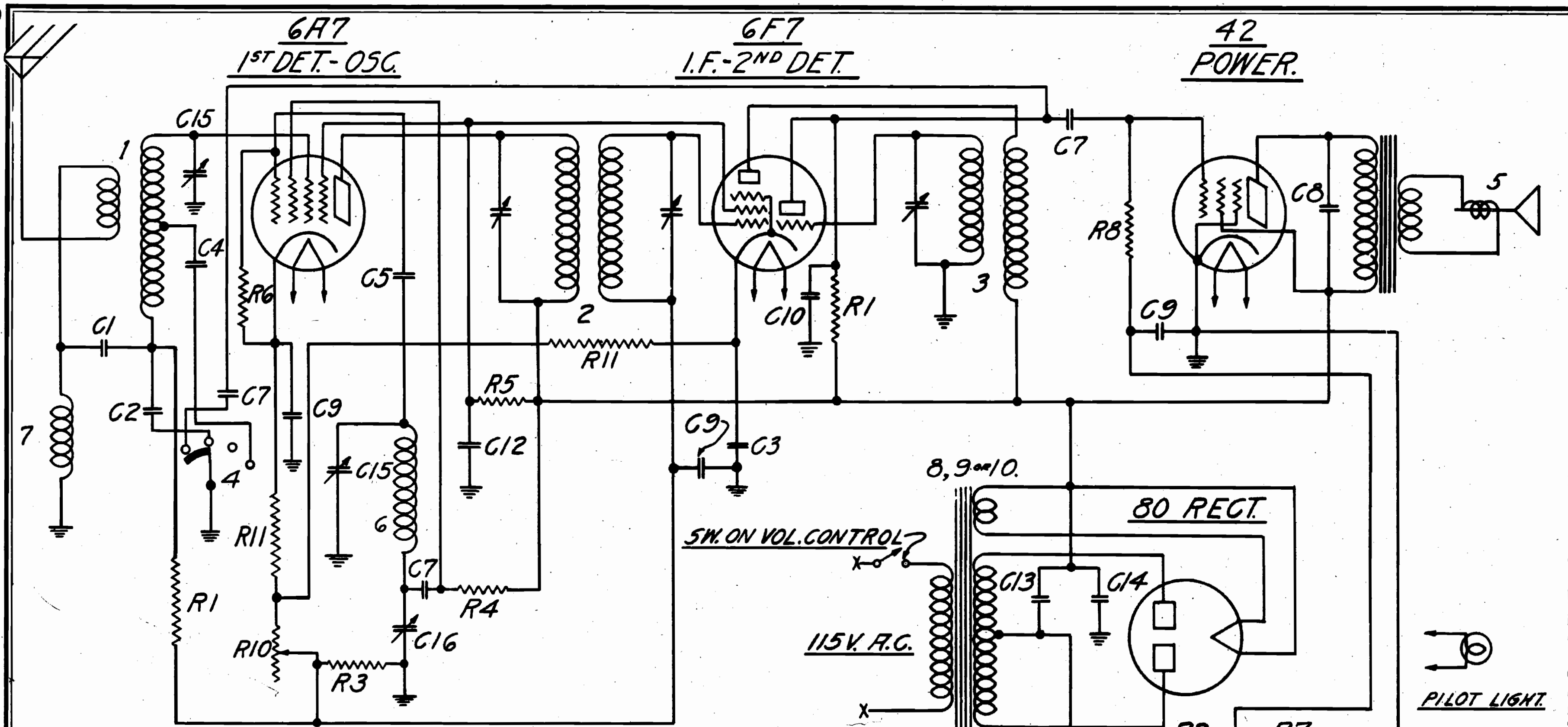
PARTS AND PRICES
Chassis #5614

MODELS 908, 960, 961, 1117

	Dial Assembly	
S-3421	Complete Split Second Dial Assembly	$3.75
26-79	Dial Scale Only	.40
59-32	Split Second Pointer	.10
59-33	Special "Z" Pointer	.20
93-231	Glass Cushion Washer	.05
192-6	Dial Glass	.20
	Coils and Chokes	
20-71	Antenna Choke	.20
20-75	Wave Trap Choke	.25
95-244	1st I.F. Transformer	1.50
95-245	2nd I.F. Transformer	1.50
S-2957	Detector Coil Assembly	1.60
S-2955	Antenna Coil Assembly	$1.25
S-2953	Oscillator Coil Assembly	1.00
	Miscellaneous	
46-108	Band Selector Switch Knob (960-961)	.15
46-109	Tuning Control Knob	.10
46-110	Tone Control Knob	.10
46-111	Volume Control Knob	.10
46-112	Band Selector Switch Knob (908)	.15
49-79	8" Dynamic Speaker for Model 908	8.00
	Cone and Voice Coil for 49-79	2.50
	Output Transformer for 49-79	2.00
	Field Coil for 49-79	2.00
49-85	10" Dynamic Speaker	8.50
	Cone and Voice Coil for 49-85	3.00
	Output Transformer for 49-85	2.00
	Field Coil for 49-85	2.00
57-483	Dial Escutcheon Plate	.45
78-82	Type 80 Tube Socket	.10
78-100	Type 6D6 " "	.10
78-101	Type 75 " "	.10
78-102	Type 42 " "	.10
78-103	Type 6A7 " "	.10
85-47	Wave Change Switch	1.10
85-56	Phono Switch (25 Cycle only)	.35
95-229	All Voltage 25 Cycle Power Transformer	6.50
95-234	117 Volt 50/60 Cycle Power Transformer	3.75
100-23	Pilot Lamp	.15
126-131	Goat Tube Shield	.10

ZENITH RADIO CORP.

MODELS 4P26,4T26,4P51,4T51
Chassis 5401
Schematic,Parts



C1	22-147	.0005	600V.
C2	22-319	.005	200V.
C3	22-190	.1	200V.
C4	22-345	.0011	600V.
C5	22-162	.0001	600V.
C7	22-243	.01	400V.
C8	22-229	.005	600V.
C9	22-250	.05	200V.
C10	22-358	.002	600V.
C12	22-407	2 MFD. ELECT.	450V.
C13	22-407	8 " "	"
C14	22-407	4 " "	"
C15	22-406	.00036 VARIABLE.	
C16	22-205	200-550 MMFD. PADDER.	
R1	63-290	260M OHMS	¼W.
R3	63-300	990	¼W.
R4	63-353	19M	½W.
R5	63-263	30M	½W.

R6	63-280	49M OHMS	¼W.
R7	63-376	190M "	¼W.
R8	63-293	990M "	¼W.
R9	63-258	490M "	¼W.
R10	63-455	3M " VOL. CONTROL.	
R11	63-265	220	¼W.

1	5-3673	ANT. COIL ASSEMBLY.
2	95-287	1ST I.F. TRANS.
3	95-284	2ND I.F. TRANS.
4	85-76	BAND SELECT. & T.C. SWITCH
5	49-115	SPEAKER-COMPLETE.
6	5-3674	OSC. COIL ASSEMBLY.
7	20-82	ANT. CHOKE.
8	95-297	115-V.-60 CYCLE TRANS.
9	95-288	115-V.-50 CYCLE VAR. VOLT. TRANS.
10	95-296	115V.-25 " " " "

4-10-35

2 BANDS { 550 KC. - 1600 KC. / 1550 KC. - 3650 KC.
I.F. FREQUENCY 456 K.C.
4 TUBE SUPERHETERODYNE
CHASSIS NO 5401

MODELS 4P26,4T26,4P51,4T51
Chassis 5401
Voltage,Scoket,Trimmers
Alignment,Parts List

ZENITH RADIO CORP.

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6A7	1st. Det.	6.1	27	0	111	-	231
	Osc.			12	-	-	150
6F7	I.F.	6.1	25	0	111	-	231
	2nd. Det.			0	-	-	195
42	PWR.	6.1	0	-15	231	-	219
80	RECT.	5	-	-	-	-	231

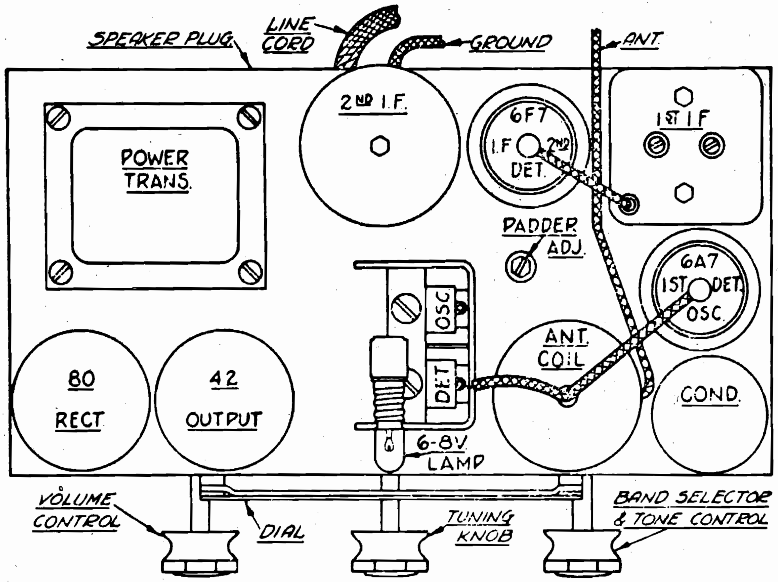
Line 115 V.

f - heaters; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

All measurements taken from point indicated to ground, using a 1,000 ohm per volt D.C. meter (except heater).

Alignment

(1) Balance I. F. transformer at 456 K.C.
(2) Place switch in left or broadcast position. Set dial pointer at 1500 K.C. and align trimmers on gang to resonance. Align broadcast padder at 540 K.C. slowly rocking pointer past 540 on dial to position giving strongest signal.
There are no adjustments for the short wave band.



Tube Position

78-103	Type 6F7 Socket (Wafer Type)	.10
78-106	" 6A7 " " "	.10
78-128	Speaker Plug Socket	.10
78-129	Voltage Indicator Socket (25 Cycle only)	.10
85-76	Band Selector and Tone Control Switch .	.35
95-297	115 V., 60 Cycle Power Transformer	2.50
95-296	All Voltage 25 Cycle Power Transformer	4.75
100-23	6.3 V. Pilot Lamp	.15
126-191	Tube Shield	.15

Resistors

63-258	490 M Ohm ½ Watt Resistor	$ .20
63-263	30M " ½ "	.20
63-265	220 " ½ "	.20
63-280	49M " ½ "	.20
63-290	260M " ½ "	.20
63-293	990M " 1 "	.20
63-300	990 " ½ "	.20
63-376	190M " ½ "	.20
63-455	Volume Control Assembly	1.00

Condensers

22-147	.0005 Mfd. 600 V.	.15
22-162	.0001 " 600 V.	.20
22-205	200-500M Mfd. Padder	.35
22-229	.005 Mfd. 600 V.	.15
22-243	.01 " 400 V.	.15
22-250	.05 " 200 V.	.20
22-319	.005 " 200 V.	.20
22-345	.0011 " 600 V.	.15
22-358	.002 " 600 V.	.20
22-406	2-Gang Variable	2.50
22-407	2 x 4 x 8 Mfd. 450 V.	1.75

Coils, Chokes,

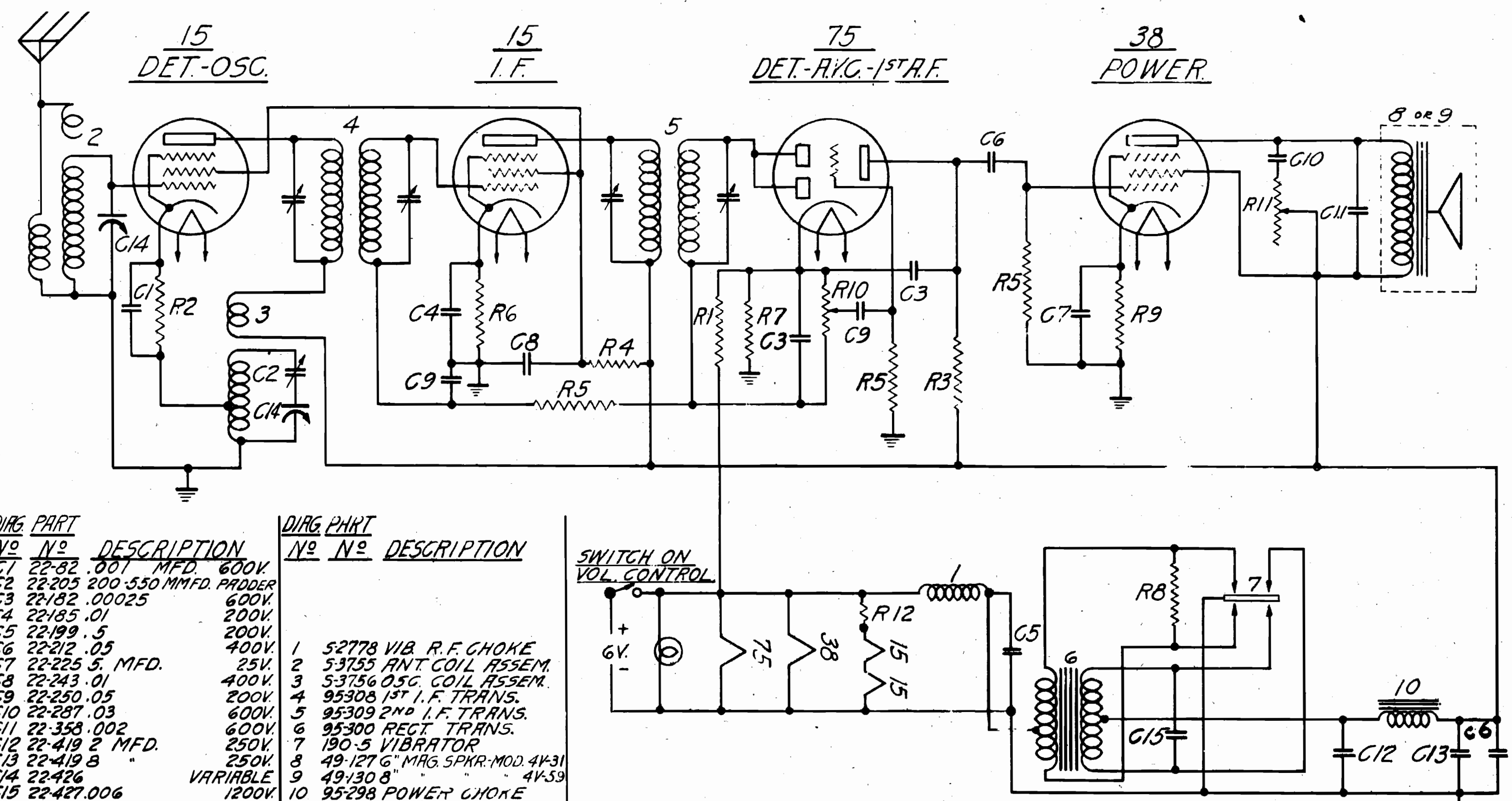
S-3673	Antenna Coil Assembly	1.00
S-3674	Oscillator Coil Assembly	.65
S-3720	1st I.F. Transformer Assembly	1.25
95-284	2nd I.F. Transformer Assembly	1.00
20-82	Antenna Choke	.25

Miscellaneous

S-3717	Dial Pointer and Bushing Assembly .	.25
S-3718	Dial Scale and Frame Assembly	.50
46-122	Tuning Knobs	.10
49-115	5" Dynamic Speaker (Model 26)	4.50
	Cone and Voice Coil for 49-115	2.00
	Output Transformer for 49-115	1.75
	Field Coil for 49-115	1.50
49-116	8" Dynamic Speaker for Model 51 ...	6.00
	Cone and Voice Coil for Model 51 ..	2.50
	Output Transformer for Model 51 ...	1.75
	Field Coil for Model 51	1.50

MODELS 4V31,4V59
Chassis 5405
Schematic,Parts

ZENITH RADIO CORP.



DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-82	.001 MFD.	600V.
C2	22-205	200-550 MMFD. PADDER	
C3	22-182	.00025	600V.
C4	22-185	.01	200V.
C5	22-199	.5	200V.
C6	22-212	.05	400V.
C7	22-225	5. MFD.	25V.
C8	22-243	.01	400V.
C9	22-250	.05	200V.
C10	22-287	.03	600V.
C11	22-358	.002	600V.
C12	22-419	2 MFD.	250V.
C13	22-419	8 "	250V.
C14	22-426		VARIABLE
C15	22-427	.006	1200V.

R1	63-238	1M OHMS	1/4W.
R2	63-247	8M "	1/4W.
R3	63-258	490M "	1/4W.
R4	63-281	29M "	1/4W.
R5	63-293	990M "	1/4W.
R6	63-303	700 "	1/4W.
R7	63-378	250 "	1/4W.
R8	63-394	200 "	1/2W.
R9	63-418	1500 "	1/2W.
R10	63-468	200M "	V. CONTROL
R11	63-469	50M "	T. "
R12	63-476	9.1 "	1/2W.

DIAG. Nº	PART Nº	DESCRIPTION
1	5-2778	VIB. R.F. CHOKE
2	5-3755	ANT. COIL ASSEM.
3	5-3756	OSC. COIL ASSEM.
4	95308	1ST I.F. TRANS.
5	95309	2ND I.F. TRANS.
6	95300	RECT. TRANS.
7	190-5	VIBRATOR
8	49-127	6" MAG. SPKR.-MOD. 4V-31
9	49-130	8" " " " 4V-59
10	95-298	POWER CHOKE

ZENITH
6-22-35

4 TUBE BATTERY SUPERHETERODYNE
I.F. FREQUENCY 456 KC.
CHASSIS Nº 5405.
MODELS 4V-31 -4V-59

TUNING RANGE 550-1700 K.C

MODELS 4V31,4V59
Chassis 5405
Voltage,Socket,Parts
Trimmers,Alignment

ZENITH RADIO CORP.

Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
15	1st Det. Osc.	2	8	0	115	-	155
15	I. F.	2	3.5	0	115	-	155
75	2nd Det. A.V.C.	6	1.5	0	-	-	30
38	PWR	6	14	0	155	-	148

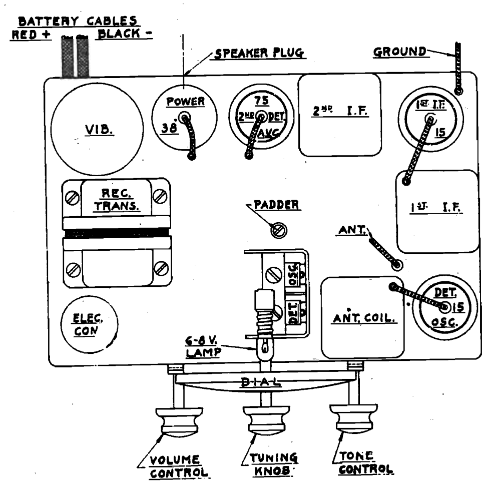
Battery - 6 volts   Antenna and ground disconnected.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

All measurements taken from point indicated to ground using a 1000 ohm per volt D. C. meter.

Alignment

(1) Balance intermediate transformers at 456 K.C. with service oscillator connected to grid of 15 first detector and ground.
(2) Connect service oscillator to antenna and ground.
(3) Adjust oscillator trimmer on gang condenser for correct dial reading at 1400 K.C.
(4) Adjust detector trimmer on gang condenser to resonance.
(5) Adjust oscillator padder (located in rear of gang) meanwhile rocking pointer past 600 K.C. to combination giving greatest output.
(6) Repeat operations 3 and 4.



PARTS AND PRICES
Chassis #5405

Models 4-V-31
4-V-59

	Dial Assembly	
7-7	Dial Glass and Scale Bezel and Mounting Bracket	.40
26-98	Dial Scale	.50
59-45	Dial Pointer and Busing Assembly	.15
61-38	Dial Pulley	.40
76-182	Dial Drive Shaft	.10
80-69	Dial Tension Spring	.02
94-200	Dial Shaft Bushing	.10
100-23	6.3 Volt Dial Lamp	.15
132-13	Dial Glass Retaining Ring	.05
188-2	Retaining Rings	.10
192-11	Dial Glass	.15
196-5	Dial Glass Gasket	.03
	Condensers	
22-82	.001 Mfd. 600 Volts	.25
22-182	.00025 " 600 "	.12
22-185	.01 " 200 "	.20
22-199	.5 " 200 "	.35
22-205	200-550 Mmfd. Padder	.35
22-212	.05 Mfd. 400 Volts	.20
22-225	5. " 25 "	.65
22-243	.01 " 400 "	.15
22-250	.05 " 200 "	.15
22-287	.03 " 600 "	.15
22-358	.002 " 600 "	.20
22-419	2 x 8 " 250 "	1.75
22-426	2-Gang Variable Condenser	2.00
22-427	.006 Mfd. 1200 Volts	.15
	Resistors	
63-236	1 M Ohm ½ Watt	.20
63-247	8 M " ½ "	.20
63-258	490 M " ½ "	.20
63-281	29 M " ½ "	.20
63-293	990 M " ½ "	.20
63-303	700 " ½ "	.20
63-378	250 " ½ "	.20
63-394	200 " ½ "	.20
63-418	1500 " ½ "	.20
63-468	200 M Volume Control and Switch Assembly	1.00
63-469	50 M Tone Control Assembly	.60
63-476	9.1 Ohm ½ Watt	.20
	Coils and Chokes	
95-308	1st I.F. Transformer Assembly	1.25
95-309	2nd I.F. Transformer Assembly	1.25
S-3755	Antenna Coil Assembly	1.25
S-3756	Oscillator Coil Assembly	1.50
S-2778	Vibrator R. F. Choke Assembly	.15

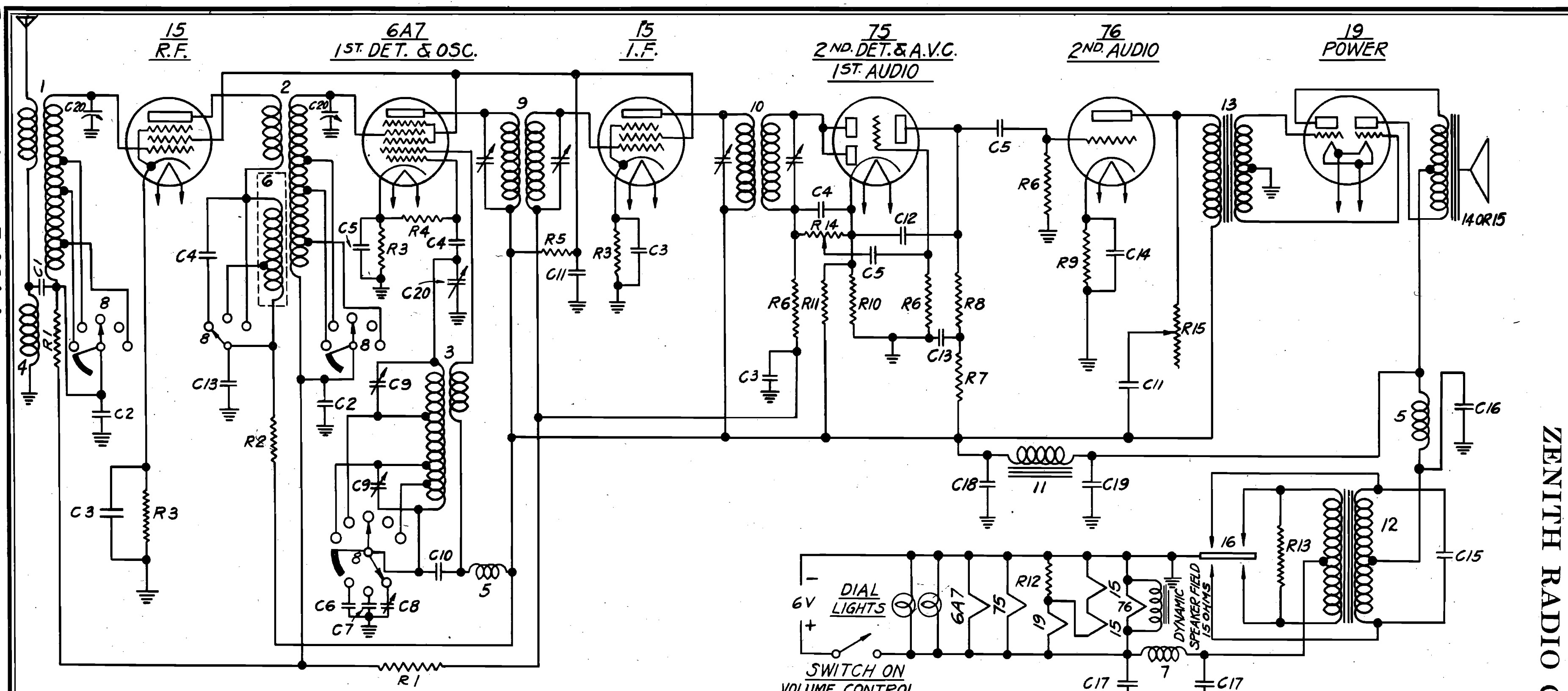
ZENITH RADIO CORP.

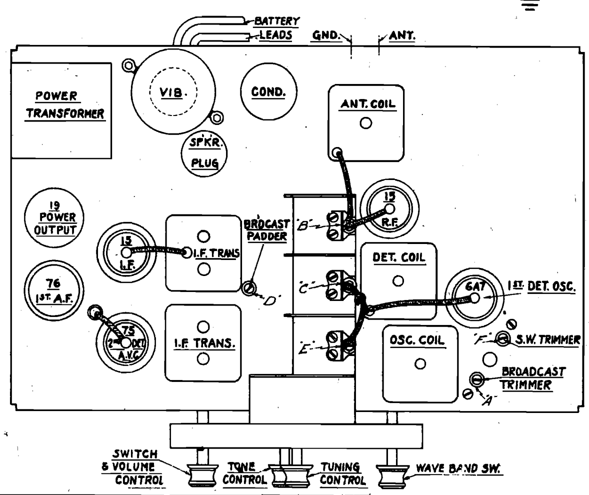
MODELS 6V27, 6V62
Chassis 5621
Schematic, Socket
Trimmers, Parts

3 BAND { 550 KC. - 1780 KC. / 2100 KC. - 6800 KC. / 7000 KC. - 23000 KC.

I.F. FREQUENCY 456 KC.
6 TUBE BATTERY SUPERHETERODYNE
CHASSIS № 5621

MODELS - 6V27, 6V62





DIAG. NO.	PART NUMBER	DESCRIPTION		
R1	63-278	99 M	OHMS	1/4 W.
R2	63-361	5 M	"	1/4 W.
R3	63-362	400	"	1/4 W.
R4	63-280	49 M	"	1/4 W.
R5	63-353	19 M	"	1/2 W.
R6	63-293	990 M	"	1/4 W.
R7	63-290	260 M	"	1/4 W.
R8	63-258	490 M	"	1/4 W.
R9	63-272	4 M	"	1/4 W.
R10	63-238	1 M	"	1/4 W.
R11	63-260	100 M	"	1/4 W.
R12	63-477	100	FLEXIBLE WIRE WOUND	1/4
R13	63-394	200	OHMS	1/2 W.
R14	63-456	200 M	VOL. CONTROL & SWITCH	
R15	63-458	50 M	TONE CONTROL	
C1	22-243	.01	MFD.	400 V.
C2	22-410	.003	"	600 V.
C3	22-250	.05	"	200 V.
C4	22-289	50	MMFD.	600 V.
C5	22-188	.02	MFD.	400 V.
C6	22-411	.0023	"	600 V.
C7	22-345	.0011	"	600 V.
C8	22-205	200-350	MMFD. PADDER	

DIAG. NO.	PART NUMBER	DESCRIPTION		
C9	22-408	2-35	MMFD. PADDER	
C10	22-82	.001	MFD.	600 V.
C11	22-212	.05	"	400 V.
C12	22-182	.00025	"	600 V.
C13	22-224	.1	"	300 V.
C14	22-225	5	"	25 V.
C15	22-437	.01	"	1400 V.
C16	22-228	.5	"	300 V.
C17	22-251	.5	"	200 V.
C18 }	22-432	8	"	{ 250 V
C19 }		2	"	
C20	22-409	456 MMF. VAR. COND.		
1	S-3697	ANT. COIL ASSEM.		
2	S-3698	DET. COIL ASSEM.		
3	S-3699	OSC. COIL ASSEM.		
4	20-82	ANT. CHOKE		
5	20-88	R.F. CHOKE		
6	20-119	R.F. PLATE CHOKE		
7	S-2778	R.F. CHOKE		
8	85-78	BAND SELECTOR SWITCH		
9	95-291	1ST. I.F. TRANS.		
10	95-292	2ND. I.F. TRANS.		
11	95-298	POWER CHOKE		
12	95-305	RECTIFIER TRANS.		
13	95-311	AUDIO TRANS.		
14	49-132	8" MAG. SPEAKER		MOD. 6V27
15	49-134	12" DYN. " "		MOD. 6V62

MODELS 6V27, 6V62
Chassis 5621
Voltage, Alignment
Parts List

ZENITH RADIO CORP.

SOCKET VOLTAGES

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
15	R. F.	2	1.5	0	70	-	125
6A7	Det.-Osc.	6	2	0	150	-	150
				-1	-	-	150
15	I. F.	2	2	0	70	-	150
75	2nd Det. A.V.C.	6	1.5	0	-	-	40
76	1st Audio	6	8	0	-	-	140
19	PWR.	2	-	0	-	-	160
				0			160

Battery Voltage 6 Volts   Antenna and Ground Disconnected

All voltages measured from socket contacts to ground with 1000 ohm per volt D. C. meter.

F - Filament; K - Cathode; g1 - Control grid; g2 - Screen grid; g3 - Suppressor grid; p - plate.

Alignment

1. Attach service oscillator to grid cap of 6A7 tube and adjust I.F. trimmers at 456 K.C.
2. Place band switch in "A" (Standard broadcast) position and attach 1400 K.C. service oscillator to antenna and ground posts. Set dial indicator to 1400 K.C. and adjust trimmers "A" (Osc.); "B" (R.F.); "C" (Det.) to maximum output.
3. Set service oscillator to 600 K.C. and rock indicator over 600 K.C. on dial of receiver while adjusting standard broadcast padder "D".
4. Repeat operations 2 and 3.
5. Place band switch in "B" or 1st short wave position (2100 - 6800 K.C.) and set white dial pointer on 6 megacycles. Set service oscillator to 6 megacycles and adjust trimmer "E" for maximum output while rocking dial pointer slowly over 6 megacycle division.
6. Place band switch on "C" position (7000- 23000 K.C.) and set service oscillator and white dial pointer to 18 megacycles. Adjust trimmer "F" to resonance while rocking dial indicator slowly over 18 megacycle division.
7. Set dial and service oscillator at 9 megacycles and twist or untwist tinned bare wire tuning "loop" (on front section of band switch under chassis) for maximum output.
8. Align standard broadcast band again at 1400 K.C. by adjusting trimmer "A" only. Repeat all eight operations for final accuracy.

Dial Assembly

7-6	Dial Glass Bezel....	-
26-104	Aeroplane Dial Scale.	1.00
32-7	Dial Drive Belt.......	.20
34-49	Condenser Shaft Gear..	.25
34-50	Pinion Gear..........	.05
34-51	Lower Pinion and Gear	.15
59-40	Special Z Pointer....	.15
59-41	Split Second Pointer	.10
61-34	Drive Pulley............	.10
61-35	Shaft Pulley and Sleeve	.25
61-36	Tension Pulley........	.05
76-178	Drive Shaft........	.10
76-180	Tension Pulley Shaft..........	.05
80-111	Dial Spring..................	.25
80-112	Tension Pulley Spring........	.10
83-407	Dial Light Diffusion Strip	.05
100-23	6.3 V. Pilot Lamp..............	.15
159-11	Snap Buttons...................	.02
188-2	Retaining Ring.................	.10
192-10	Dial Glass....................	-
196-4	Dial Glass Gasket.............	-
198-1	Dial Reflector.................	.40
S-3777	Tension Pulley and Spring Assembly	.30

Coils and Chokes

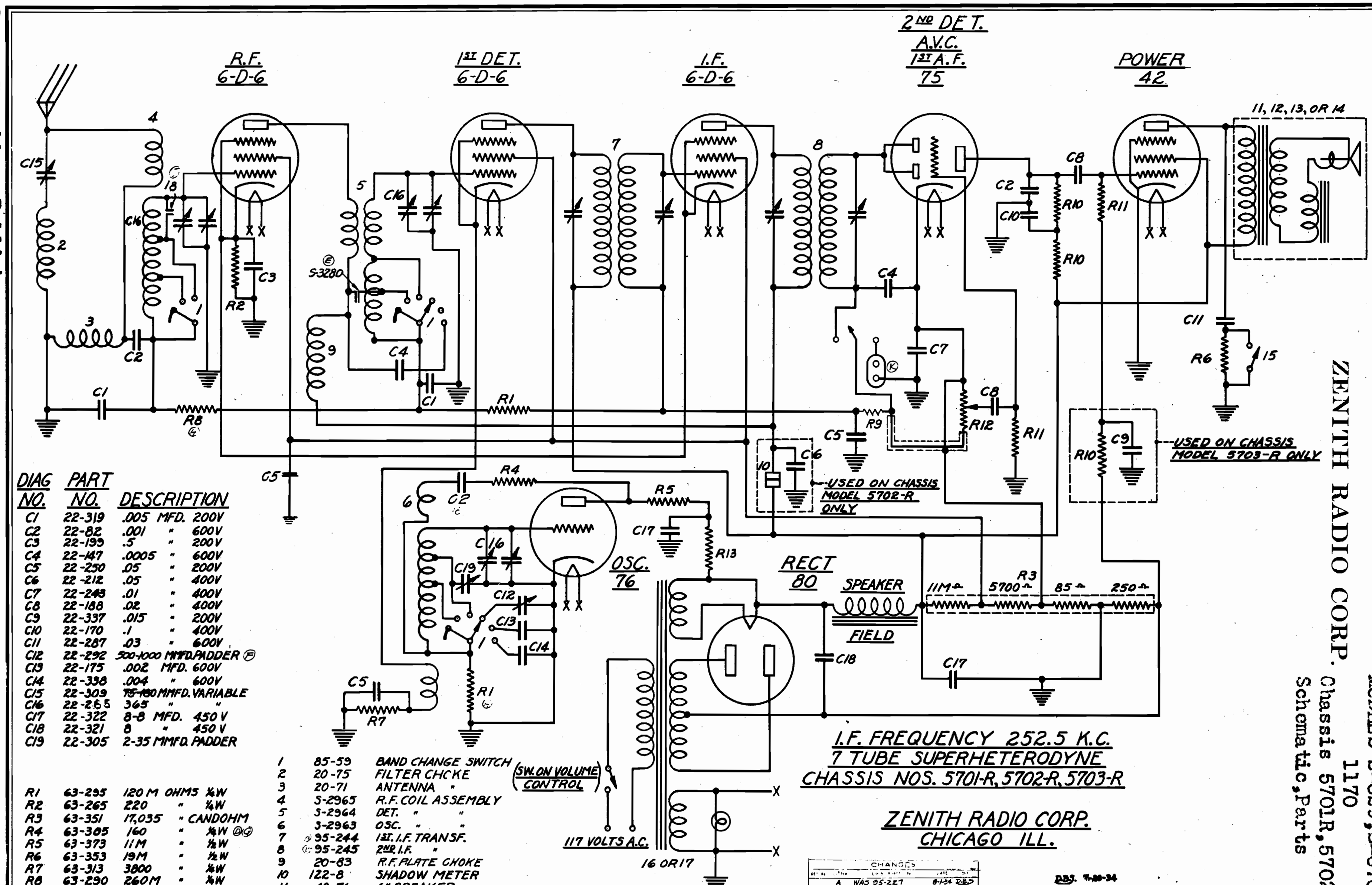
20-82	Antenna Choke..................................	.25
20-88	R. F. Choke	.25
20-119	R. F. Plate Choke Assembly..................	.50
95-291	1st I. F. Transformer Assembly...............	1.25
95-292	2nd I. F. " "	1.25
S-3697	Antenna Coil Assembly	1.00
S-3698	Detector " "	.85
S-3699	Oscillator " "	.85

Miscellaneous

19-59	Battery Lead Clip (Positive)................	.15
19-60	" " " (Negative)................	.15
46-124	Volume Control Knob.........................	.20
46-127	Tone and Tuning Knobs.......................	.20
46-132	Band Selector Switch Knob..................	.20
49-131	12" Magnetic Speaker Assembly (Model 62).....	8.00
	Cone Assembly for 49-131....................	1.00
	Felt Ring " " "	.15
	Coil for 49-131	1.25
	Motor Drive Assembly for 49-131.............	6.50
	Cord and Plug Assembly for 49-131...........	.75
49-132	8" Magnetic Speaker Assembly (Model 27).......	6.00
	Cone Assembly for 49-132....................	.60
	Paper Ring " " "	.10
	Coil for 49-132..............................	1.25
	Motor Drive Assembly for 49-132.............	4.75
	Terminal Strip Cord and Plug Assembly for 49-132	.60
57-511	Dial Glass and Escutcheon Plate Assembly.....	1.50
58-30	Four Prong Speaker Plug.....................	.25
78-101	Type 75 Wafer Tube Socket..................	.10
78-106	" 6A7 " " "	.10
78-109	" 76 " " "	.10
78-124	" 19 " " "	.10
78-128	Five Prong Speaker Plug Socket..............	.10
78-139	Type 15 Wafer Tube Socket	.10
78-141	Vibrator " " "	.10
83-334	Antenna and Ground Terminal Strip...........	.10
85-78	Band Selector Switch........................	1.50
95-298	Power Choke.................................	.75
95-305	Rectifier Transformer.......................	1.75
95-311	Audio Transformer...........................	1.25
126-127	Tube Shield.................................	.10
126-201	Vibrator Shield.............................	.15
190-5	Special Zenith Vibrator.....................	5.00

ZENITH RADIO CORP.

MODELS S-829, S-870, S-871
1170
Chassis 5701R, 5702R, 5703R
Schematic, Parts



DIAG NO.	PART NO.	DESCRIPTION
C1	22-319	.005 MFD. 200V
C2	22-82	.001 " 600V
C3	22-199	.5 " 200V
C4	22-147	.0005 " 600V
C5	22-250	.05 " 200V
C6	22-212	.05 " 400V
C7	22-248	.01 " 400V
C8	22-188	.02 " 400V
C9	22-337	.015 " 200V
C10	22-170	.1 " 400V
C11	22-287	.03 " 600V
C12	22-292	500-1000 MMFD. PADDER (F)
C13	22-175	.002 MFD. 600V
C14	22-338	.004 " 600V
C15	22-309	~~15-180~~ MMFD. VARIABLE
C16	22-265	365 " "
C17	22-322	8-8 MFD. 450 V
C18	22-321	8 " 450 V
C19	22-305	2-35 MMFD. PADDER
R1	63-295	120 M OHMS ¼W
R2	63-265	220 " ¼W
R3	63-351	17,035 " CANDOHM
R4	63-305	160 " ¼W (D)(G)
R5	63-373	11M " ½W
R6	63-353	19M " ½W
R7	63-313	3800 " ¼W
R8	63-290	260M " ¼W
R9	63-258	490M " ¼W
R10	63-278	99M " ¼W
R11	63-293	990M " ¼W
R12	63-338	200 M OHMS VOL. CON
R13	63-388	19M " 1W.

1	85-59	BAND CHANGE SWITCH (SW. ON VOLUME CONTROL)
2	20-75	FILTER CHCKE
3	20-71	ANTENNA "
4	S-2965	R.F. COIL ASSEMBLY
5	S-2964	DET. " "
6	S-2963	OSC. " "
7	(B) 95-244	1ST. I.F. TRANSF.
8	(C) 95-245	2ND. I.F. "
9	20-83	R.F. PLATE CHOKE
10	122-8	SHADOW METER
11	49-76	6" SPEAKER
12	49-86	8" "
13	49-97	12" "
14	49-98	12" AUDITORIUM SPEAKER
15	85-56	TONE CONTROL SWITCH
16	95-234	POWER TRANSF. 50-60 CYCLE
17	95-229	" " 25 CYCLE

18-S-3280 APPROX. 10 MMFD. COUP. COND.

I.F. FREQUENCY 252.5 K.C.
7 TUBE SUPERHETERODYNE
CHASSIS NOS. 5701-R, 5702-R, 5703-R

ZENITH RADIO CORP.
CHICAGO ILL.

CHANGES

	A	WAS 95-227	8-1-34	D.B.S.
	B	WAS 95-230	"	D.B.S.
	C	WAS .01-600V.	9/28-34	W.D.
	D	WAS 300 M	9/14-34	W.D.
	E	S-3280 ADDED	9/21/34	T.D.C.
	F	WAS 22-205	"	"
	G	WAS 63-385	"	"
	H	C8 & C-1 REVERSED	"	"
	J	ADDED COND.	9/26-34	W.D.
	K	ADDED PHONO. CONN.	"	"
	L	WAS R6 (19M-½W)	"	"

D.B.S. 7-30-34

MODELS S-829,S-870,S-871
1170
Chassis 5701R,5702R,5703R
Voltage,Socket,Trimmers
Alignment

ZENITH RADIO CORP.

5703R

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.4	3	0	76	3	250
6D6	1st.Det.	5.4	6.2	0	76	6.2	250
76	Osc.	5.4	0	0	-	-	165
6D6	I.F.	5.4	6.2	0	76	6.2	250
75	2nd.Det. A.V.C. 1st.Aud.	5.4	1	0	-	-	125
42	PWR	5.4	0	-.5	-	250	240
80	Rect.	4.6	-	-	-	-	-

Line voltage 112   Antenna and Ground Disconnected

F - heaters; K - cathode; G1 - control grid; G2 - screen grid; G3 suppressor grid; P - plate.

Alignment

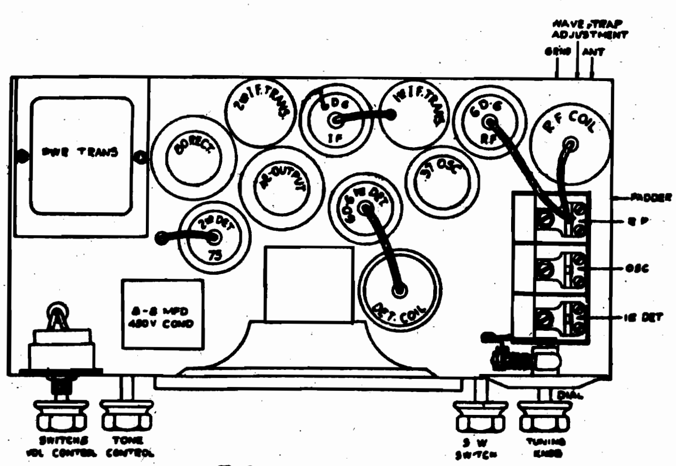
(1) Balance intermediate transformers at 252.5 K.C. with service oscillator connected to grid of first detector and ground.

(2) Adjust wave trap padder (located on rear of chassis at right side) at 252.5 K.C. for weakest signal with service oscillator connected to aerial and ground.

(3) Turn wave band switch clockwise to the highest frequency band. Set service oscillator at 15 megacycle (still connected to aerial and ground). Adjust trimmer on oscillator section of 3-gang condenser for correct dial reading at this frequency.

(4) Turn wave band switch counter-clockwise to standard broadcast. Adjust oscillator trimmer (located underneath chassis next to band switch) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on gang condenser for loudest signal at this frequency.

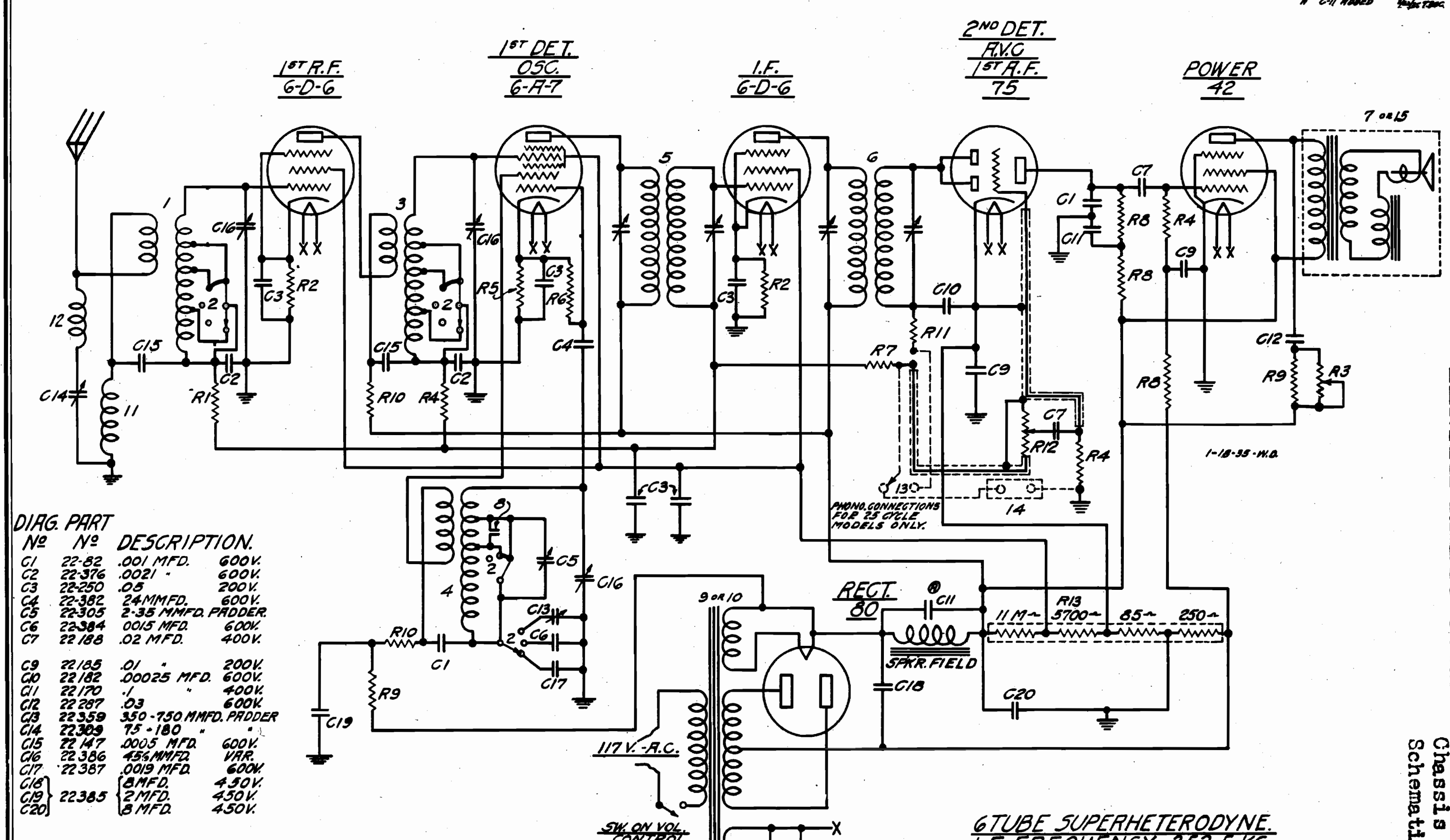
(5) Adjust broadcast oscillator padder (through hole in right side of chassis) at 600 K.C. meanwhile rocking dial pointer past this point on dial, to position giving loudest signal.



Tube Layout

MODELS S-908, S-909, S-961
1167
Chassis 5618
Schematic, Parts

ZENITH RADIO CORP.



6 TUBE SUPERHETERODYNE.
I.F. FREQUENCY 252.5 KC.
CHASSIS № 5618

ZENITH RADIO CORP.
CHICAGO, ILL.

MODELS 5908 - 5961

DIAG. №	PART №	DESCRIPTION.	
C1	22-82	.001 MFD.	600V.
C2	22-376	.0021 "	600V.
C3	22-250	.05	200V.
C4	22-382	24 MMFD.	600V.
C5	22-305	2-35 MMFD. PADDER.	
C6	22-384	.0015 MFD.	600V.
C7	22 188	.02 MFD.	400V.
C9	22 185	.01 "	200V.
C10	22 182	.00025 MFD.	600V.
C11	22 170	.1 "	400V.
C12	22 287	.03	600V.
C13	22 359	350-750 MMFD. PADDER	
C14	22 309	75-180 " "	
C15	22 147	.0005 MFD.	600V.
C16	22 386	45½ MMFD.	VAR.
C17	22 387	.0019 MFD.	600V.
C18	22385	8 MFD.	450V.
C19	22385	2 MFD.	450V.
C20	22385	8 MFD.	450V.

R1	63-295	120 M OHMS	1/4 W.
R2	63-357	300 "	1/4 W.
R3	63-316	50 M~ T. CONTROL	
R4	63-271	1 MEG.	1/4 W.
R5	63-362	400~	1/4 W.
R6	63-280	49 M~	1/4 W.
R7	63-258	490 M~	1/4 W.
R8	63-278	99 M~	1/4 W.
R9	63-353	19 M~	1/2 W.
R10	63-373	11 M~	1/2 W.
R11	63-355	51 M~	1/4 W.
R12	63-366	200 M~ VOL. CONTROL	
R13	63-351	17,035~ CANDOHM.	

1	5-3540	ANT. COIL ASSEMBLY
2	85-61	SHORT WAVE SWITCH
3	5-3542	DET. COIL ASSEMBLY
4	5-3536	OSC. " "
5	95-244	1ST I.F. TRANS.
6	95-245	2ND I.F. "
7	49-79	SPEAKER - 1000~ FIELD. (5908)
8	5-3565	TWISTED WIRE
9	95-234	POWER TRANS.
10	95-229	" " 25 CYCLE.
11	20-71	ANT. CHOKE
12	20-75	WAVE TRAP CHOKE.
13	85-56	PHONO.-RADIO SWITCH
14	44-7	PHONO. JACK
15	49-97	12" SPEAKER 1000~ FIELD (5961)

MODELS S-908, S-909, S-961 1167

Chassis 5618

Voltage, Socket, Trimmers Alignment, Parts List

ZENITH RADIO CORP.

Chassis 5618

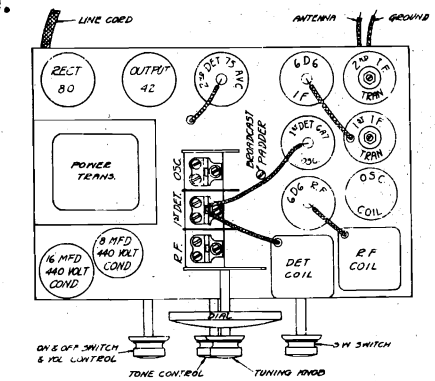
TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	R.F.	5.6	2.4	0	70	2.4	200
6A7	1st.Det.	5.6	3	0	70	-	250
	Osc.			3.6	-	-	230
6D6	I.F.	5.6	2.6	0	70	2.6	250
75	2nd.Det. 1st Audio	5.6	1.4	0	-	-	148
42	PWR.	5.6	0	-.6	250	-	250
80	RECT.	4.6	-	-	-	-	-

Line Voltage 112 Antenna and Ground Disconnected

All measurements taken from point indicated to ground, using a 1000 ohm per volt D.C. meter (except heaters). F - filament; K - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Alignment

1. Balance intermediate transformers at 252.5 K.C. with oscillator connected to grid of first detector and ground.
2. Adjust wave trap padder (located underneath chassis at rear right side) for weakest signal with 252.5 K.C. oscillator connected to aerial and ground.
3. Turn wave band switch clockwise to the highest frequency band. Connect 17,500 K.C. oscillator to aerial and ground. Balance oscillator trimmer on three-gang condenser for correct dial reading at this frequency.
4. Turn wave band switch counter-clockwise to standard broadcast position. Adjust broadcast oscillator trimmer (located underneath chassis at right center) for correct dial reading at 1400 K.C. and balance R.F. and 1st detector trimmers on three-gang condenser for loudest signal.
5. Adjust oscillator padder (located next to oscillator section of gang on top of chassis) while rocking pointer back and forth past 600 K.C. for combination giving maximum output.
6. Recheck 1400 K.C.



TUBE-POSITION

Tube Position

PARTS AND PRICES

Chassis 5618

Models S-908, 909, S-961, 1167

Dial Assembly

S-3552	Complete split second dial assembly	$3.75
26-84	Dial scale only	.40
59-32	Split second pointer	.10
59-33	Special Z pointer	.20
93-231	Glass cushion washer	.05
192-6	Dial glass	.20

Coils and Chokes

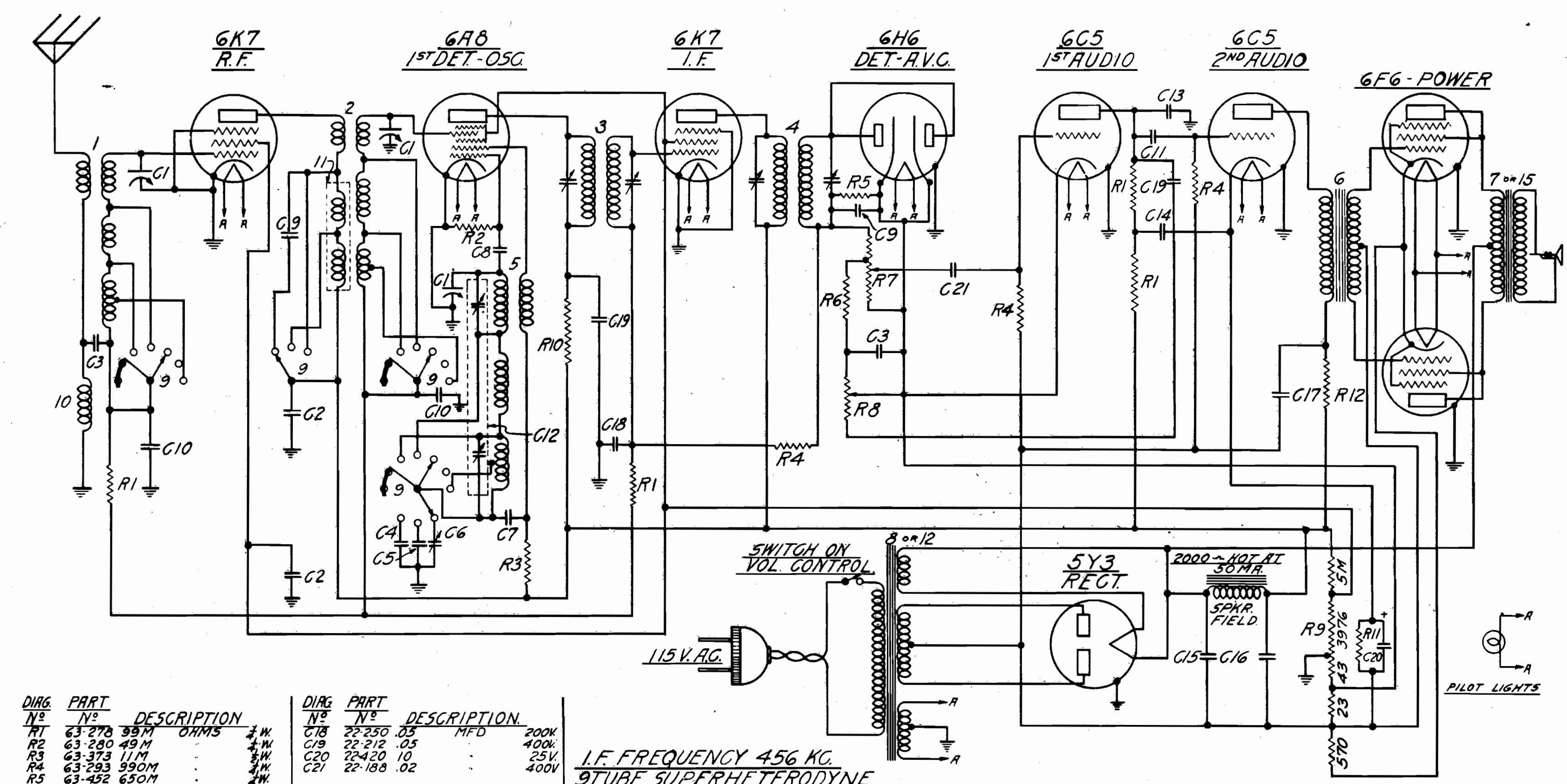
20-71	Antenna Choke	.20
20-75	Wave trap choke	.25
95-244	1st I.F. transformer	1.50
95-245	2nd I.F. transformer	1.50
S-3536	Oscillator coil assembly	1.25
S-3540	Antenna coil assembly	$1.75
S-3542	Detector " "	2.00

Miscellaneous

46-108	Band selector switch knob (Models 909, S-961, 1167)	.15
46-109	Tuning control knob	.10
46-110	Tone control knob	.10
46-111	Volume control knob	.10
46-112	Band selector switch knob (Model S-908)	.15
49-79	8" Dynamic speaker for S-908, 909	8.00
	Cone and voice coil for 49-79	2.50
	Output transformer for 49-79	2.00
	Field coil for 49-79	2.00
49-97	12" Dynamic speaker for S-961, 1167	10.00
	Cone and voice coil for 49-97	3.25
	Output transformer for 49-97	2.00
	Field coil for 49-97	2.00
57-483	Dial escutcheon plate	.45
78-82	Type 80 tube socket	.10
78-100	" 6D6 " "	.10
78-101	" 75 " "	.10
78-102	" 42 " "	.10
78-106	" 6A7 " "	.10
85-56	Phono switch (25 cycle)	.35
85-61	Band selector switch	1.10
95-229	All voltage, 25 cycle power transformer	6.50
100-23	Pilot lamp	.15
126-131	Goat tube shield	.10
S-3021	#95-234 power transformer and mounting plate, 117 V., 60 C.	4.00

ZENITH RADIO CORP.

MODELS 9-S-30, 9-S-54, 9-S-55
Schematic, Socket, Trimmers
Parts



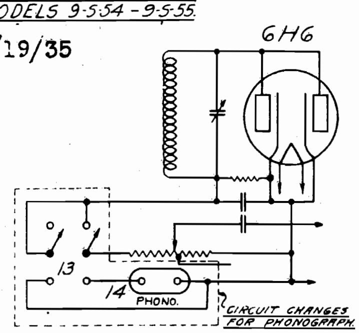
I.F. FREQUENCY 456 KC.
9 TUBE SUPERHETERODYNE
CHASSIS Nº 5903
MODELS 9-S-54 - 9-S-55

6/19/35

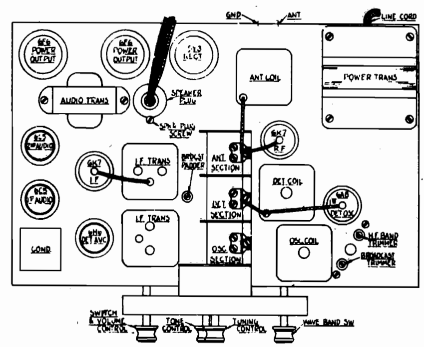
DIAG. Nº	PART Nº	DESCRIPTION	
R1	63-278	99M OHMS	¼W.
R2	63-280	49M "	¼W.
R3	63-373	11M "	½W.
R4	63-293	990M "	¼W.
R5	63-452	650M "	¼W.
R6	63-288	19M "	¼W.
R7	63-450	1 MEG VOL. CONTROL	
R8	63-451	1 " TONE "	
R9	63-449	CANDOHM	
R10	63-466	990 OHMS	½W.
R11	63-300	990 "	¼W.
R12	63-240	1900 "	¼W.
C1	22-409	VARIABLE	
C2	22-170	.1 MFD.	400V.
C3	22-243	.01 "	400V.
C4	22-411	.0023 "	600V.
C5	22-345	.0011 "	600V.
C6	22-205	200-550 MMFD. PADDER	
C7	22-82	.001 MFD.	600V.
C8	22-127	.000025 "	600V.
C9	22-289	.00005 "	600V.
C10	22-410	.003 "	600V.
C11	22-435	.02 "	600V.
C12	22-408	2-35 MMFD.	
C13	22-162	.0001 MFD.	600V.
C14	22-433	.5 "	400V.
C15	22-412	16 "	450V.
C16	22-412	4 "	450V.
C17	22-412	2 "	450V.

DIAG. Nº	PART Nº	DESCRIPTION	
C18	22-250	.05 MFD	200V.
C19	22-212	.05 "	400V.
C20	22-420	10 "	25V.
C21	22-188	.02 "	400V.
1	5-3697	ANT. COIL ASSEM.	
2	5-3698	DET. COIL ASSEM.	
3	95-291	1ST I.F. TRANS.	
4	95-292	2ND I.F. TRANS.	
5	5-3699	OSC. COIL ASSEM.	
6	95-294	INPUT TRANS.	
7	49-120	SPEAKER - MOD. 9-S-54	
8	95-293	POWER TRANS. - 50~	
9	85-78	BAND SELECT SWITCH	
10	20-82	ANT. CHOKE (1MH.)	
11	20-119	R.F. PLATE CHOKE ASSEM.	
12	95-295	POWER TRANS. - 25~	
13	85-39	PHONO. SWITCH	
14	44-7	PHONO. JACK.	
15	49-123	SPKR. - MODEL 9-S-55	

ZENITH RADIO CORP.
CHICAGO, ILL.



CIRCUIT CHANGES FOR PHONOGRAPH



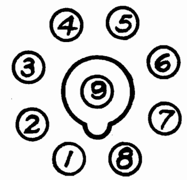
TUBE POSITION

MODELS 9-S-30, 9-S-54, 9-S-55
Voltage, Alignment, Parts

ZENITH RADIO CORP.

TUBE	POSITION	1	2	3	4	5	6	7	8	9
6K7	R.F.	0	3_{ac}	230	95	0	-	3_{ac}	0	-.1
6A8	1st.Det. Osc.	0	3_{ac}	230	95	0	140	3_{ac}	0	-.1
6K7	I.F.	0	3_{ac}	230	95	0	-	3_{ac}	0	-.1
6H6	2nd Det. A.V.C.	0	3_{ac}	-1	-1	0	-	3_{ac}	-1	-
6C5	1st.Aud.	0	3_{ac}	22	-	-2	-	3_{ac}	-2	-
6C5	2nd Aud.	0	3_{ac}	210	-	-2	-	3_{ac}	0	-
6F6	PWR.	0	3_{ac}	350	350	-3	-	3_{ac}	27	-
5Y3	Rect.	0	360	-	350_{AC}	-	350_{AC}	-	360	-

Line Voltage 115   Antenna and Ground Disconnected



BOTTOM VIEW OF SOCKET

Voltages measured from point indicated to ground, using a 1000 ohm per volt meter, except heaters. (2 - 7)

Alignment

The use of an accurately calibrated service oscillator is imperative in the alignment of modern superheterodynes. The alignment procedure is as follows:

(1) Connect service oscillator to grid of 6A8 and ground. Balance I. F. trimmers at 456 K.C.

(2) Connect service oscillator to antenna and ground binding posts and set at 6 megacycles. Adjust oscillator trimmer on gang for correct dial reading, (6 megacycles on Band B).

(3) Set service oscillator and pointer to 21 megacycles and adjust S.W. trimmer (through hole in top of chassis) for correct dial reading.

(4) Recheck 6 megacycle adjustment.

(5) Set service oscillator and pointer to 1700 K.C. (Band A) and adjust broadcast trimmer (through hole in top of chassis) for correct dial reading.

(6) Set service oscillator at 600 K.C. Adjust broadcast padder (through hole in top of chassis next to I.F. transformer), meanwhile rocking pointer to and fro past 600 K.C. on dial to combination giving greatest output.

(7) Readjust at 1700 K.C.

Note: These adjustments affect each other slightly and the entire procedure should be repeated to secure maximum results.

ZENITH LONG DISTANCE RADIO

PARTS AND PRICES

Models 9-S-30, 9-S-54 and 9-S-55
Chassis #5903 - Domestic
#5903 A - Export

Dial Assembly

7-6	Dial Glass Bezel (part of 57-511)	-
26-94	Aeroplane Dial Scale	$1.00
32-8	Drive Belt	.20
34-49	Condenser Shaft Gear	.25
34-50	Pinion Gear	.05
34-51	Lower Pinion and Gear	.15
56-44	Planetary Guide Pin (furnished with 76-181)	-
59-40	Special Z Pointer	.15
59-41	Split Second Pointer	.10
61-35	Shaft Pulley and Sleeve	.25
61-36	Tension Pulley	.05
61-37	Dial Pulley	.05
76-180	Tension Pulley Shaft	.05
76-181	Planetary Drive Assembly	1.00
80-111	Dial Spring	.25
80-112	Tension Pulley Spring	.10
83-407	Dial Light Diffusion Strip	.05
100-23	6.3 Volt Pilot Lamp	.15
118-10	Band Switch Indicator Link	.05
159-11	Snap Buttons	.02
188-2	Retainer Ring	.10
196-4	Dial Glass Gasket (part of 57-511)	-
S-3777	Tension Pulley and Spring Assembly	.30
S-3782	Band Indicator Lever Arm and Bushing Assembly	.30
S-3783	" " Scale and Arm Assembly	1.00
S-2918	Dial Lamp Socket and Clip Assembly	.15

Condensers

22-82	.001 Mfd. 600 Volt	.25
22-127	.000025 " 600 "	.20
22-162	.001 " 600 "	.20
22-170	.5 " 400 "	.25
22-188	.02 " 400 "	.15
22-205	200-500 Mmfd. Padder	.35
22-212	.05 Mfd. 400 Volt	.20
22-243	.01 " 400 "	.15
22-250	.05 " 200 "	.15
22-289	.00005 " 600 "	.12
22-345	.0011 " 600 "	.15
22-408	2-35 Mmfd. Padder	.25
22-409	3-Gang Variable Condenser	3.50
22-410	.003 Mfd. 600 Volt	.40
22-411	.0023 " 600 "	.25
22-412	16 x 4 x 2 Mfd. 450 Volt (domestic only)	3.00
22-420	10. Mfd. 25 Volt	.65
22-433	.5 " 400 "	.30
22-435	.02 " 600 "	.15
22-421	16 x 4 x 2 Mfd. 450 Volt (export only)	3.25

Resistors

63-240	1900 Ohm 1/4 Watt	.20
63-278	99 M Ohm 1/4 Watt	$ .20
63-280	49 M " 1/4 "	.20
63-288	19 M " 1/4 "	.20
63-293	990 M " 1/4 "	.20
63-300	990 " 1/4 "	.20
63-373	11 M " 1/2 "	.20
63-449	Candohm Resistor	1.00
63-450	Volume Control and Switch Assembly (domestic only)	1.00
63-451	Tone Control Assembly	.80
63-452	650 M Ohm 1/4 Watt	.20
63-466	990 " 1/2 "	.20
63-472	Volume Control and Switch Assembly (export only)	1.00

Coils and Chokes

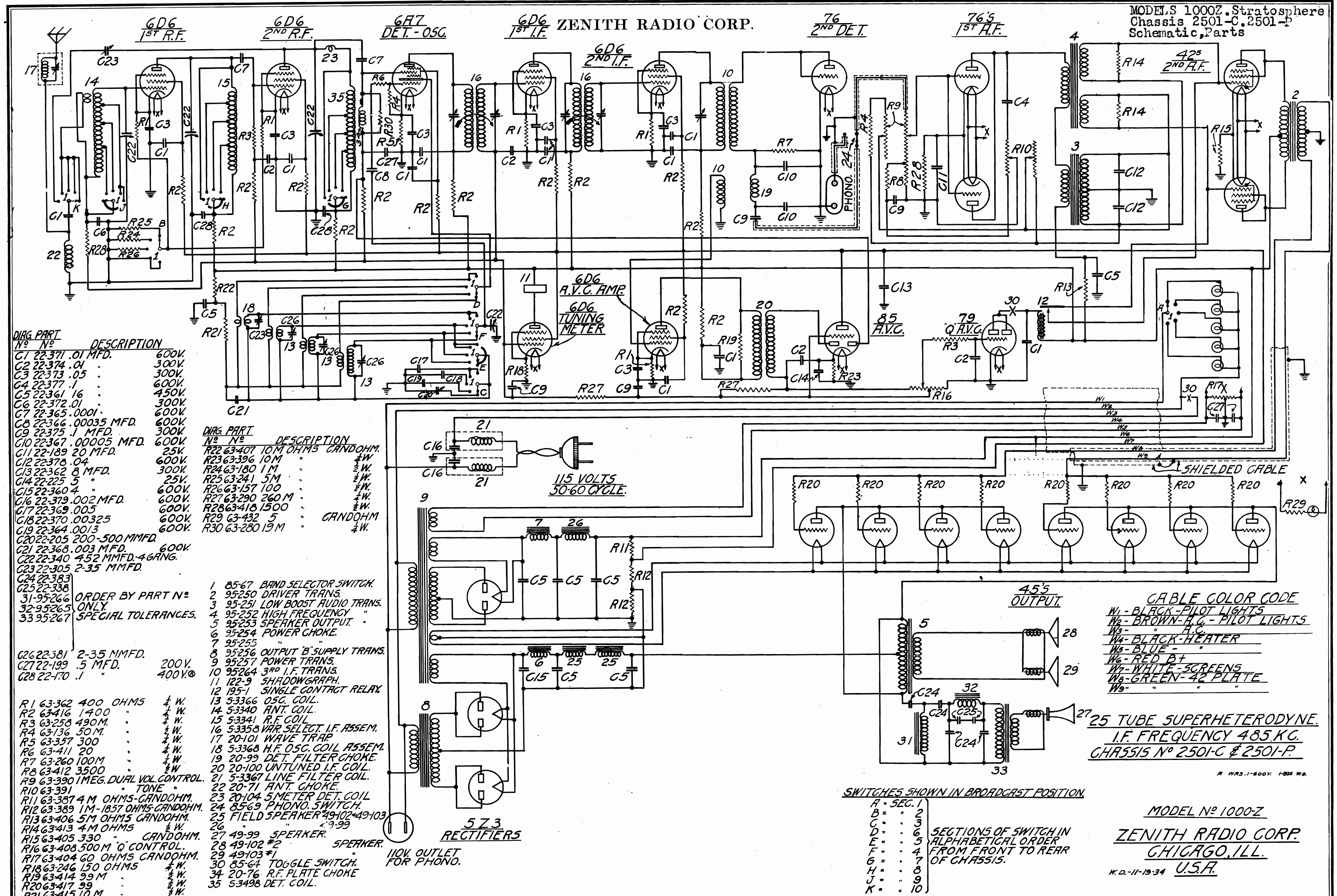
20-82	Antenna Choke	.25
20-119	R. F. Plate Choke Assembly	.50
95-291	1st I.F. Transformer Assembly	1.25
95-292	2nd " " " "	1.25
S-3697	Antenna Coil Assembly	1.00
S-3698	Detector Coil Assembly	.85
S-3699	Oscillator Coil Assembly	.85

Miscellaneous

44-7	Phonograph Jack (export only)	.15
46-123	Band Selector Switch Knob	.20
46-124	Volume and Tone Control Knobs	.20
46-125	Tuning Knob (small)	.15
46-126	" " (large)	.15
49-120	12" Dynamic Speaker (Models 54 and 55)	10.00
	Cone and Voice Coil for 49-120	3.25
	Field Coil for 49-120	2.00
	Output Transformer for 49-120	2.00
49-126	8" Dynamic Speaker (Model 30)	8.00
	Cone and Voice Coil for 49-126	2.50
	Field Coil for 49-126	2.00
	Output Transformer for 49-126	2.00

MODELS 1000Z.Stratosphere
Chassis 2501-C.2501-P
Schematic,Parts

ZENITH RADIO CORP.



DIAG. Nº	PART Nº	DESCRIPTION	
C1	22-371	.01 MFD.	600V.
C2	22-374	.01 "	300V.
C3	22-373	.05 "	300V.
C4	22-377	.1 "	600V.
C5	22-361	16 "	450V.
C6	22-372	.01 "	300V.
C7	22-365	.0001 "	600V.
C8	22-366	.00035 MFD.	600V.
C9	22-375	.1 MFD.	300V.
C10	22-367	.00005 MFD.	600V.
C11	22-189	20 MFD.	25V.
C12	22-378	.04	600V.
C13	22-362	8 MFD.	300V.
C14	22-225	5 "	25V.
C15	22-360	4 "	600V.
C16	22-379	.002 MFD.	600V.
C17	22-369	.005	600V.
C18	22-370	.00325	600V.
C19	22-364	.0013	600V.
C20	22-205	200-500 MMFD.	
C21	22-368	.003 MFD.	600V.
C22	22-340	452 MMFD.-4 GANG.	
C23	22-305	2-35 MMFD.	
C24	22-383	ORDER BY PART Nº ONLY. SPECIAL TOLERANCES.	
C25	22-338		
31-	95-266		
32-	95-265		
33	95-267		
C26	22-381	2-35 MMFD.	
C27	22-199	.5 MFD.	200V.
C28	22-170	.1 "	400V.®
R1	63-362	400 OHMS	1/4 W.
R2	63-416	1400 "	1/4 W.
R3	63-258	490M. "	1/4 W.
R4	63-136	50M. "	1/2 W.
R5	63-357	300 "	1/4 W.
R6	63-411	20 "	1/4 W.
R7	63-260	100M "	1/4 W
R8	63-412	3500 "	1/2 W
R9	63-390	1 MEG. DUAL VOL. CONTROL.	
R10	63-391	" TONE "	
R11	63-387	4 M OHMS-CANDOHM.	
R12	63-389	1M-1857 OHMS-CANDOHM.	
R13	63-406	5M OHMS CANDOHM.	
R14	63-413	4M OHMS	1/2 W.
R15	63-405	330 " CANDOHM.	
R16	63-408	500M "Q" CONTROL.	
R17	63-404	60 OHMS CANDOHM.	
R18	63-246	150 OHMS	1/4 W.
R19	63-414	99M "	1/2 W.
R20	63-417	99 "	1/2 W.
R21	63-415	10 M "	1/2 W.

DIAG. Nº	PART Nº	DESCRIPTION	
R22	63-407	10M OHMS	CANDOHM.
R23	63-396	10M "	1/4 W
R24	63-180	1 M "	1/2 W.
R25	63-241	5M "	1/2 W.
R26	63-157	100 "	1/2 W.
R27	63-290	260 M "	1/4 W.
R28	63-418	1500 "	1/2 W.
R29	63-432	5 "	CANDOHM
R30	63-280	19 M "	1/4 W.

1	85-67	BAND SELECTOR SWITCH.
2	95-250	DRIVER TRANS.
3	95-251	LOW BOOST AUDIO TRANS.
4	95-252	HIGH FREQUENCY "
5	95-253	SPEAKER OUTPUT "
6	95-254	POWER CHOKE.
7	95-255	" "
8	95-256	OUTPUT "B" SUPPLY TRANS.
9	95-257	POWER TRANS.
10	95-264	3RD I.F. TRANS.
11	122-9	SHADOWGRAPH.
12	195-1	SINGLE CONTACT RELAY.
13	S-3366	OSC. COIL.
14	S-3340	ANT. COIL.
15	S-3341	R.F. COIL
16	S-3358	VAR. SELECT. I.F. ASSEM.
17	20-101	WAVE TRAP
18	S-3368	H.F. OSC. COIL ASSEM.
19	20-99	DET. FILTER CHOKE.
20	20-100	UNTUNED I.F. COIL.
21	S-3367	LINE FILTER COIL.
22	20-71	ANT. CHOKE.
23	20-104	5 METER DET. COIL
24	85-69	PHONO. SWITCH.
25	FIELD	SPEAKER #49-102 #49-103
26	"	" 49-99
27	49-99	SPEAKER.
28	49-102	#2 SPEAKER.
29	49-103	#1 "
30	85-64	TOGGLE SWITCH.
34	20-76	R.F. PLATE CHOKE
35	S-3498	DET. COIL.

CABLE COLOR CODE

W1 - BLACK-PILOT LIGHTS
W2 - BROWN-A.C.-PILOT LIGHTS
W3 - " A.C.
W4 - BLACK-HEATER
W5 - BLUE - "
W6 - RED B+
W7 - WHITE-SCREENS
W8 - GREEN- 42 PLATE
W9 - " " "

25 TUBE SUPERHETERODYNE.
I.F. FREQUENCY 485 K.C.
CHASSIS Nº 2501-C & 2501-P.

® WAS .1-600V. 1-23-35 W.B.

SWITCHES SHOWN IN BROADCAST POSITION.

A = SEC. 1
B = " 2
C = " 3
D = " 6
E = " 5
F = " 4
G = " 7
H = " 8
J = " 9
K = " 10

SECTIONS OF SWITCH IN ALPHABETICAL ORDER FROM FRONT TO REAR OF CHASSIS.

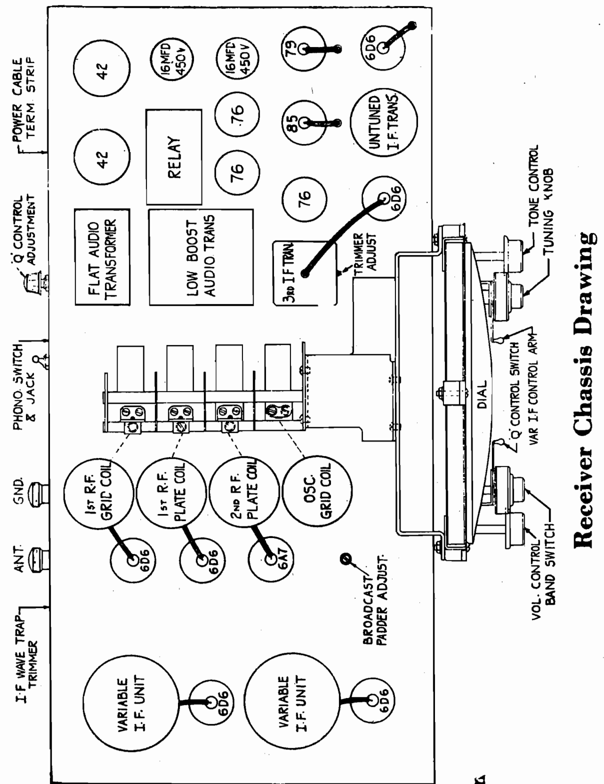
MODEL Nº 1000-Z

ZENITH RADIO CORP.
CHICAGO, ILL.
U.S.A.

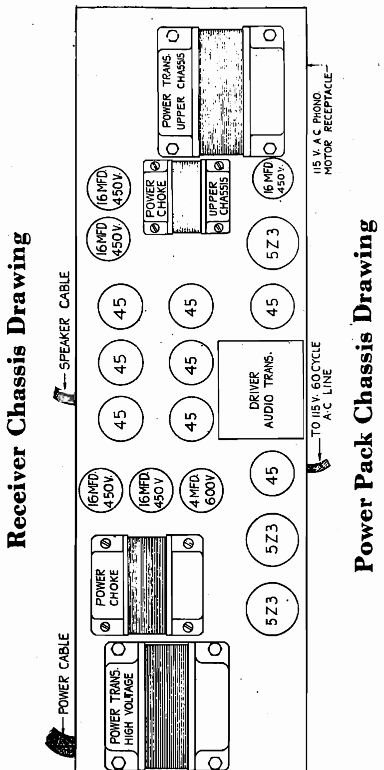
W.D.-11-19-34

ZENITH RADIO CORP.

MODELS 1000Z, Stratosphere
Chassis 2501-C, 2501-P
Service Data, Socket, Trimmers



Receiver Chassis Drawing



Power Pack Chassis Drawing

Antenna Coil - Check for continuity - Red wire through to Green wire - This will include all coils on this form.

These coil readings are given on coils only, disconnected from associating circuits.

Power pack readings taken with set disconnected and pack cold, tubes in sockets.

Both A. C. primary windings #95-256 and #95-257 less than ½ Ohm. 45 and 6 volt winding practically no D.C. resistance, - check for continuity only and check center tap of 45 winding.

5Z3 filament same as above.
5Z3 plate windings 100 Ohms.
Check center tap, approximately ½ of total winding or 50 Ohms.
Filter chokes - #95-255 - #95-254 - 70 Ohms.
Line filter #S-3367 - Check for continuity.
See voltage readings supplement.

SERVICE NOTES

Hums - Defective tubes and check filters - Voltages, etc.

Hums - Weak and Distorted. Check #95-250 transformer for open winding, weak audio if shorted.

Too Much High, Lacks Low Notes - #95-250 open center tap. #22-225 condenser open 50,000 ohm resistor grounded on tone control to bottom plate. ½ of low boost shorted secondary.

Motorboats On All Bands - #22-228 - .5 condenser to 85 socket open, I. F. shorted, graph won't narrow and set will distort on edge of carrier.

Weak And Distorted All Bands. 1500 Ohm resistor across #22-189 25-volt 2 Mfd. open.

Blocks Up - Tendency to Slow Motorboat. Check red wire from #63-407 to 10,000 ohm on 5-meter coil for ground. Set seems alive but no signal if this resistor is open.

Set Dead- Check tubes, filters, coils and transformers and I.F. for grounds or open.

Dead - No Radio - Open Phono Switch.

Weak Audio And High Notes - Hum level increases slightly if you pull one push-pull #42 tube. Open secondary on low boost #95-251. Disconnect high boost and tone control circuit before testing.

Tone Control No Effect On Highs. Set flutters as tone control is rotated to bass. Check .1-22 -3770 for open or short.

MODELS 1000Z, Stratosphere
Chassis 2501-C, 2501-P
Circuit Data, Voltage, Alignment

ZENITH RADIO CORP.

GENERAL INFORMATION

Tubes used are as follows:

	6D6	First Radio Frequency Amplifier
	6D6	Second Radio Frequency Amplifier
	6A7	First Detector and Oscillator
	6D6	First Intermediate Amplifier
	6D6	Second Intermediate Amplifier
	76	Second Detector
2 -	76	First Audio Amplifier
2 -	42	Push-Pull Second Audio Amplifier
8 -	45	Parallel Push-Pull Power Amplifier
	79	Electron Relay for Q Circuit
	6D6	Shadowgraph Amplifier
	85	Automatic Volume Control
	6D6	A.V. C. Amplifier
2 -	5Z3	Rectifier for Power Amplifier
	5Z3	Rectifier for remainder for receiver.

CIRCUIT

Radio Frequency Amplifier. This receiver employs two stages of radio frequency amplification using pentode tubes in conjunction with tuned plate circuits resulting in high R. F. gain at all frequencies. The bias voltage on both stages is varied through the band switch to secure stability and preserve maximum gain on all bands. Both stages are used on all bands except the fifth or ultra-high frequency band. Double shielding is employed on the entire R. F. section to prevent signal pick-up by the wiring.

First Detector and Oscillator. A 6A7 tube is used as first detector and oscillator. The input circuit of the first detector is an R.F.choke and a 50,000 ohm resistor in parallel. The input grid of a 6A7 type of tube has a tendency to become positive whenever a strong signal is impressed on it, if there is any appreciable resistance in the grid circuit. The grid return connection of the choke is connected to one diode plate of the 85 A.V.C. tube so that if at any time the input grid of the 6A7 should become positive, due to overload, the diode plate will provide a low D.C. path to ground preventing detector overload distortion.

Intermediate Amplifier. The circuit employed in the two stages of intermediate amplification is conventional. The unusual feature of this portion of the receiver is in the transformers which are so designed that the mechanical coupling and, in turn, the band width or selectivity may be varied continuously without changing the natural period of either primary or secondary coils. This variation of selectivity has no effect on the sensitivity of the receiver.

Delayed Automatic Volume Control. A pick-up winding is incorporated in the third I.F. transformer which feeds I.F. to the control grid of a 6D6 A.V.C. amplifier. The output of this stage is coupled through an untuned transformer to the diode plate of an 85 tube. The plate of the 85 is connected directly to B plus and the control grid to a tap in the diode load resistor. This tube is biased at approximately 10 volts which places a negative bias on the diode plate and no A.V.C. voltage is developed until a signal is tuned in of a strong enough value to swing the diode plate positive. At this point A.V.C. voltage is developed, which in turn makes the grid of the 85 negative and reduces the plate current which reduces the bias and allows still more A.V.C. voltage to be developed. This accumulative action allows excellent automatic control of the stronger signals and eliminates the detrimental effects of A.V.C. on weak signals.

Q.A.V.C. A portion of the resistance load of the 85 diode is incorporated in a potentiometer on the rear of the upper chassis. The arm of this potentiometer is connected to the grids of a 79 tube. The two plates of the 79 are connected in parallel and operate a magnetic relay which short-circuits the grids of the push-pull 42 audio driver stage. When a signal is tuned in the grids of the 79 tube become negative stopping the plate current and the relay opens, allowing the audio system of the receiver to operate. The signal level at which this occurs is determined by the setting of the potentiometer arm. A switch, operatod by a lever under the band switch knob on the front panel is in series with the 79 plate circuit and when opened makes the Q.A.V.C. circuit inoperative. The shadowmeter is connected in the plate circuit of a separate 6D6 whose control grid is controlled by the A.V.C. voltage. The amplifying action of this tube allows the shadowmeter to operate on very weak stations.

First Audio and Driver. In order to eliminate any possibility of overloading, two 76 tubes are used in parallel in the first audio stage. Two audio transformers of special design couple the first audio stage to a push-pull driver stage using two 42 tubes. The smaller transformer only handles frequencies above 400 cycles and has a rising high characteristic. The large transformer handles frequencies below 400 cycles and is resonated at 30 cycles. The voltage output of each of these transformers is controlled by the tone control.

The Power Output Stage. This consists of eight 45 tubes connected in parallel push-pull. A much better balance is preserved in this stage by using several medium size power tubes rather than a pair of high-power tubes. Also, the voltage requirements are greatly reduced. A 99 ohm resistor is incorporated in the grid circuit of each tube to prevent parasitic oscillation.

Power Supply. There are two rectifying and filtering systems incorporated in the lower power amplifier chassis. One uses a single 5Z3 full wave rectifier and supplies plate current for the upper chassis and bias voltage for the output stage. The second uses two 5Z3 tubes and supplies plate current for the output stage only. Special electrolytic condensers are used in both power supplies. These condensers will make a slight frying sound while the tubes are heating, unlike the more common type of electrolytic condensers. This is not an indication of deterioration.

Reproducers. There are three dynamic reproducers used. The small one in the center reproduces the higher register above 4000 cycles. A filtering system is used in conjunction with this speaker which prevents the lower frequencies from being reproduced. The two large concert dynamics handle all frequencies lower than 4000 cycles. Two are necessary to handle the 50 watts output of the power stage without distortion. The leads and connections on all three speakers are color coded so as to insure correct connections and proper phasing. These connections must not be reversed.

Tuning Ranges.

Color	Kilocycles	Megacycles	Meters
Green	535 - 1,550	.53 - 1.55	560 - 190
Orange	1,530 - 4,575	1.53 - 4.57	196 - 65.7
Yellow	3,725 -11,150	3.72 -11.15	80.5 - 27
Red	9,500 -31,600	9.5 - 31.6	31.5 - 9.4
Blue	19,500 -63,500	19.5 - 63.6	15.3 - 4.7

The high efficiency and unexcelled performance of this receiver has been achieved by the careful selection and high quality of all components. It is therefore most important that when service is required only genuine Zenith parts and tubes be used.

Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Ep
6D6	1st R. F.	6.3	10	0	100	10	270
6D6	2nd R. F.	6.3	3	0	100	3	270
6A7	1st Det.	6.3	3	0	100	-	270
	Osc.			0	-	-	165
6D6	1st I.F.	6.3	3	0	100	3	255
6D6	2nd I.F.	6.3	3	0	100	3	255
76	2nd Det.	6.3	0	0	-	-	0
76	Parallel 1st. Audio	6.3	12	0	-	-	192
42	P.P.Driver	6.3	19	0	-	-	258
45	Power Aud.	2.5	63	0	-	-	330
79	Q.A.V.C.	6.3	0	.5	-	-	240
6D6	Shadowmeter Amplifier	6.3	1.3	0	100	1.3	255
6D6	A.V.C. Amplifier	6.3	3	0	100	3	255
85	A.V.C.	6.3	7	0	-	-	100
5Z3	Rect.Power Amplifier	5	-	-	-	-	-
5Z3	Rect. for Upper Chassis.	5	-	-	-	-	-

Line voltage 112. Antenna and Ground shorted.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Balance Procedure: Caution - Test set thoroughly for defective tubes, antenna and ground, check line voltage and chassis voltages before any attempt is made to re-balance.

Set volume control in full position, fidelity control in selective position, tone control at high position. Output meter usually connected across plates of 45 tubes.

Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground, adjust I.F. transformers to maximum output with minimum signal input. Rotate selectivity control to broad position, I.F. output should remain constant six K.C. plus and minus of 485 K.C.

Set band switch on 550 to 1500 scale, rotate gang to 1400 K.C. Set test oscillator at 1400 and connect to aerial and ground.

Adjust oscillator trimmer screw, top padder screw on oscillator coil, to scale.

Rotate gang to 600 K.C., set test oscillator at 600. Adjust padder inside left front corner of shield can, near oscillator coil, for maximum output.

Rotate gang and padder together near 600 K.C. while making this adjustment. Set pointer to exactly 600 K.C. Re-adjust service oscillator to 1400, rotate gang back to 1400 and re-check for maximum output and scale. The two R. F. and detector gang condenser trimmers should be adjusted to maximum output at 1400 K.C

The short wave bands are adjusted at 3.5 and 9 and 28 Meg. Adjust for maximum signal or noise level. Under no circumstances should wires in oscillator and 5-meter circuits be disturbed. Adjust screws following in sequence below 1400 oscillator screw on oscillator coil.

Resistance Checks: The following D. C. resistances are given as help for continuity test, taken with the average type of ohmmeter.

Chassis - Power pack disconnected.
Driver transformer, Part #95-250 - #2853 -- Center tap of secondary to each side, numbers, 5 to 4, and 5 to 6 - 675 and 700 Ohms.
Primary - Center tap to each side 450 and 525 Ohm, numbers 2 to 1 and 2 to 3.
High Boost, #95-252, with low boost disconnected.
Primary (White wire
(White and black tracer - 200 Ohms
Secondary -(Blue - 200 Ohm
(Yellow
Secondary- (Red
(White and Red tracer - 200 Ohms.
Low Boost, #95-251, with high boost and tone control disconnected.
Primary - 650 Ohms.
Secondary center tap to each side 5000 Ohms.
Antenna choke - #20-71 - 15 Ohms.
Wave Trap - #20-101 - 5 Ohms.
Relay - #195-1 - 3000 Ohms.
Detector filter choke - #20-99 - 150 Ohms.
3rd I.F. -#20-100 -(Brown - 7 Ohms
(Green
(Red -
(Blue - 6.5 Ohms
(Black
(Green grid cap wire - 3 Ohms.
High fidelity I.F. - #S-3356 - 2 used.
(Green - Brown - 3.2 Ohms.
(Blue - Red - 3.2 Ohms.

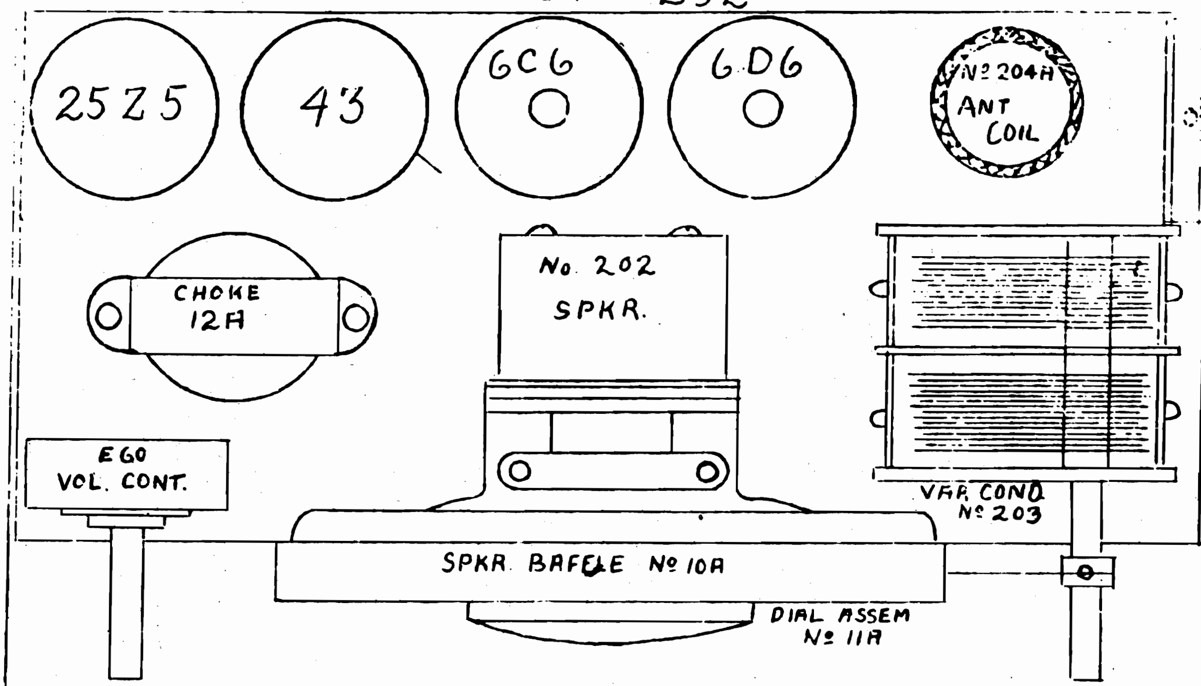
R.F. Coil - Check from Grid cap, green wire to brown wire coming out of bottom of coil 490,000 Ohms. This high resistance is due to series resistor mounted on coil form of 490,000 value. Black to White - Yellow to Blue - ½ ohms approximately.

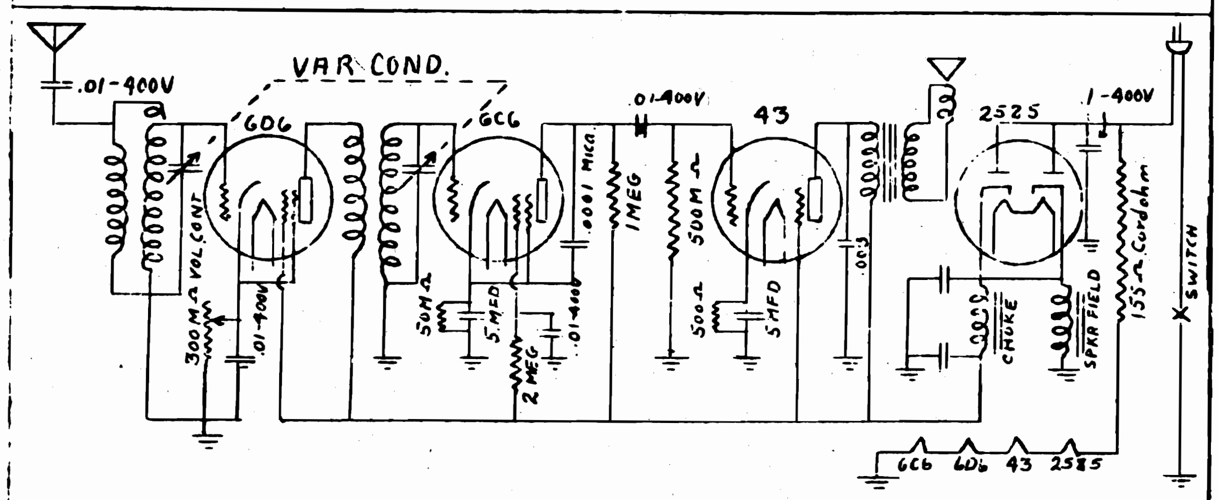
Oscillator Coil -
Brown to Slate - ½ Ohm.
Brown to Black - 3.9 Ohm.
Brown to White - 1.5 Ohm.
Red Green tracer to Blue - 4.8 Ohms.
Red Green tracer to Yellow - .8 Ohms.
Red Green tracer to Red - 1.5 Ohms.
Red to Blue - 3.2 Ohms.
Red to Yellow - 6.8 Ohms.

MODEL 252
Schematic
Socket,Voltage

AETNA

1935 SERIES - ÆTNA Model - 252





SOCKET VOLTAGES ~

TUBE	POSITION	E.F.	EK	EG2	EG3	EP
6D6	RF	6.3	2.1	110	2.1	108
6C6	DET.	6.3	1.4	14	1.4	18
43	PR. OUTPUT	25	16	110	—	100

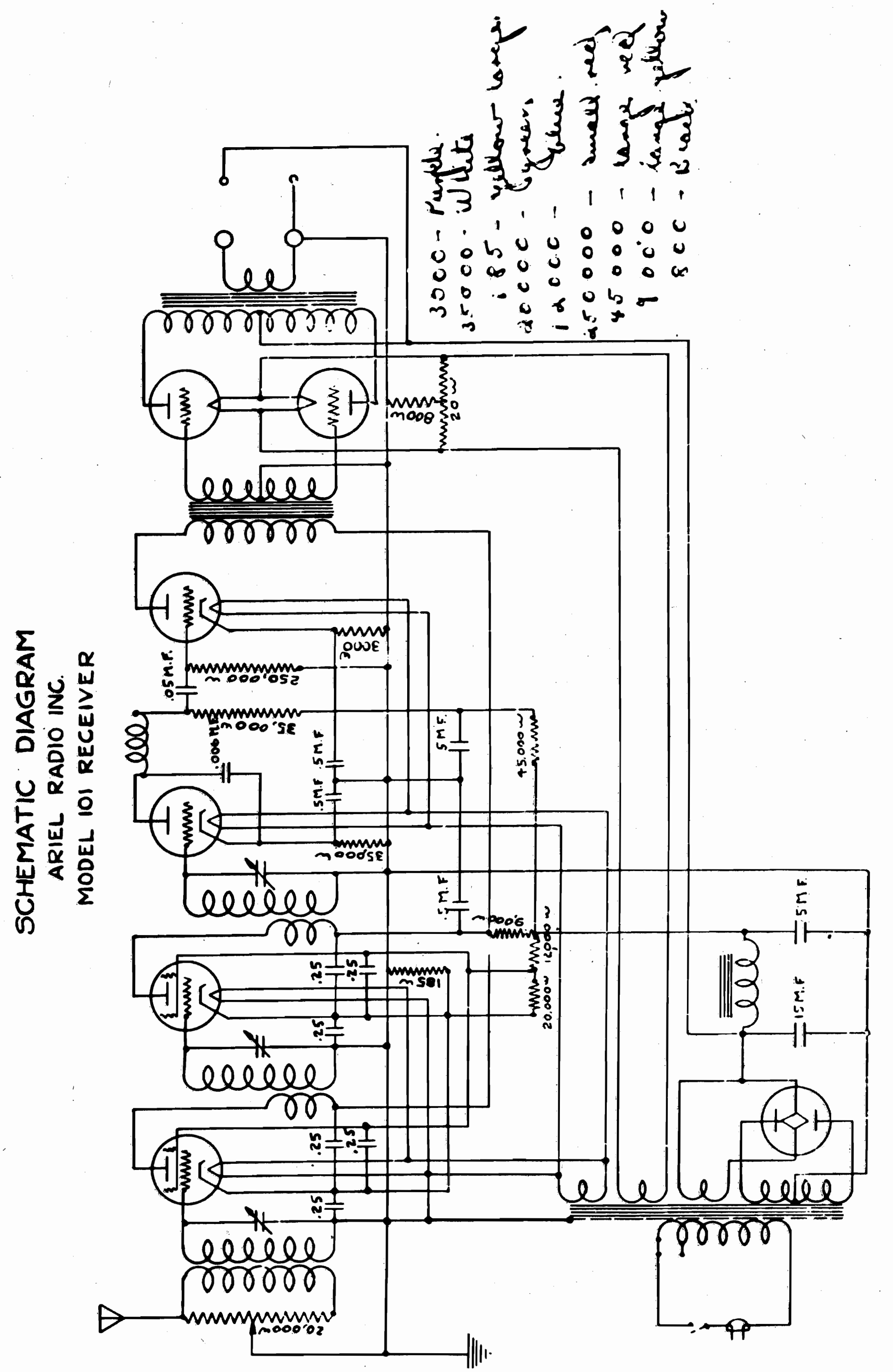
All voltages taken with 1000 ohms per volt D.C Meter except Heaters.
LINE VOLTAGE 115 VOLTS

F = Filaments K = Cathode G2 = Screen Grid
G3 = Suppressor Grid P = Plate

10-5-35 - W.L.

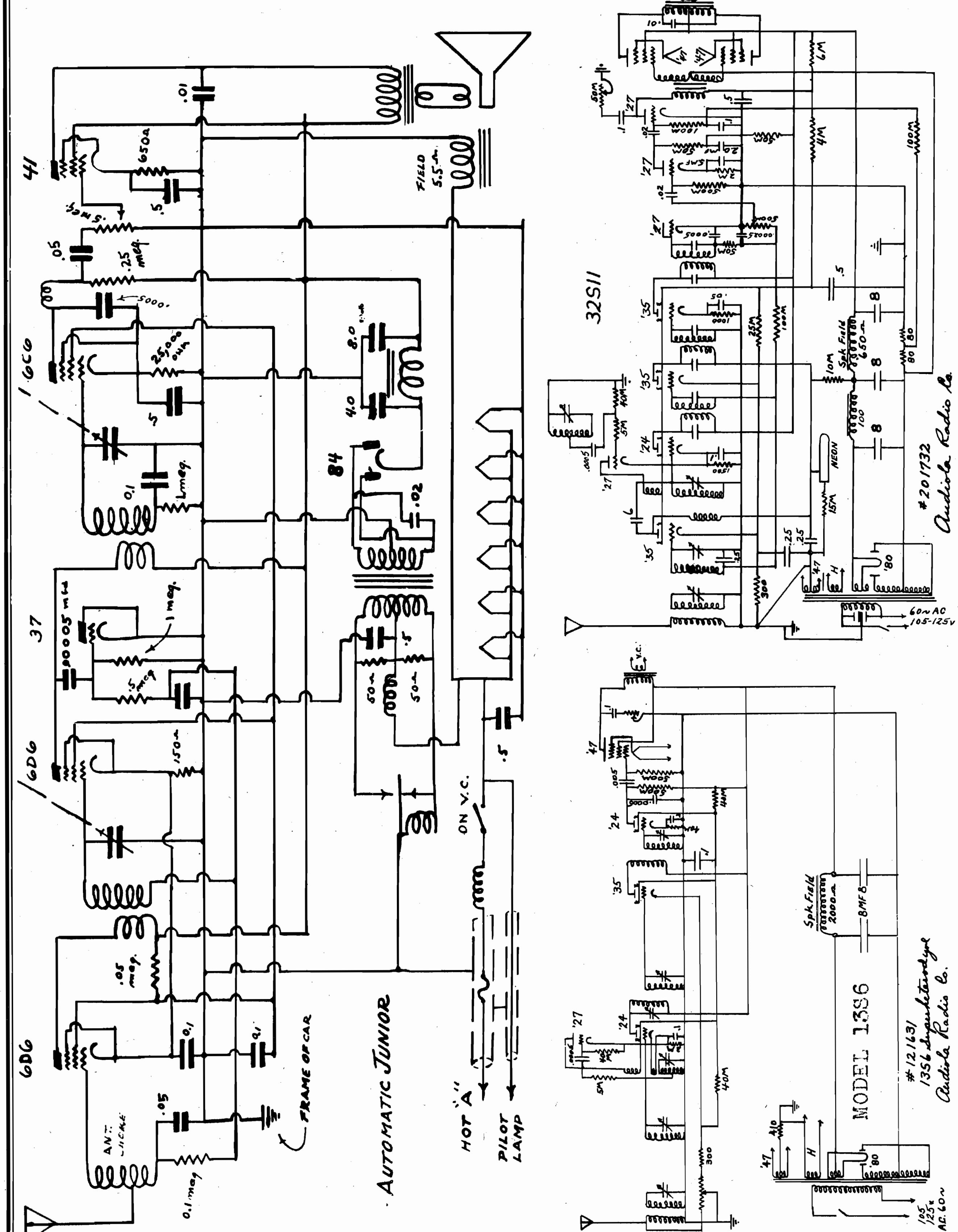
MODEL 101
Schematic

ARIEL RADIO INC.



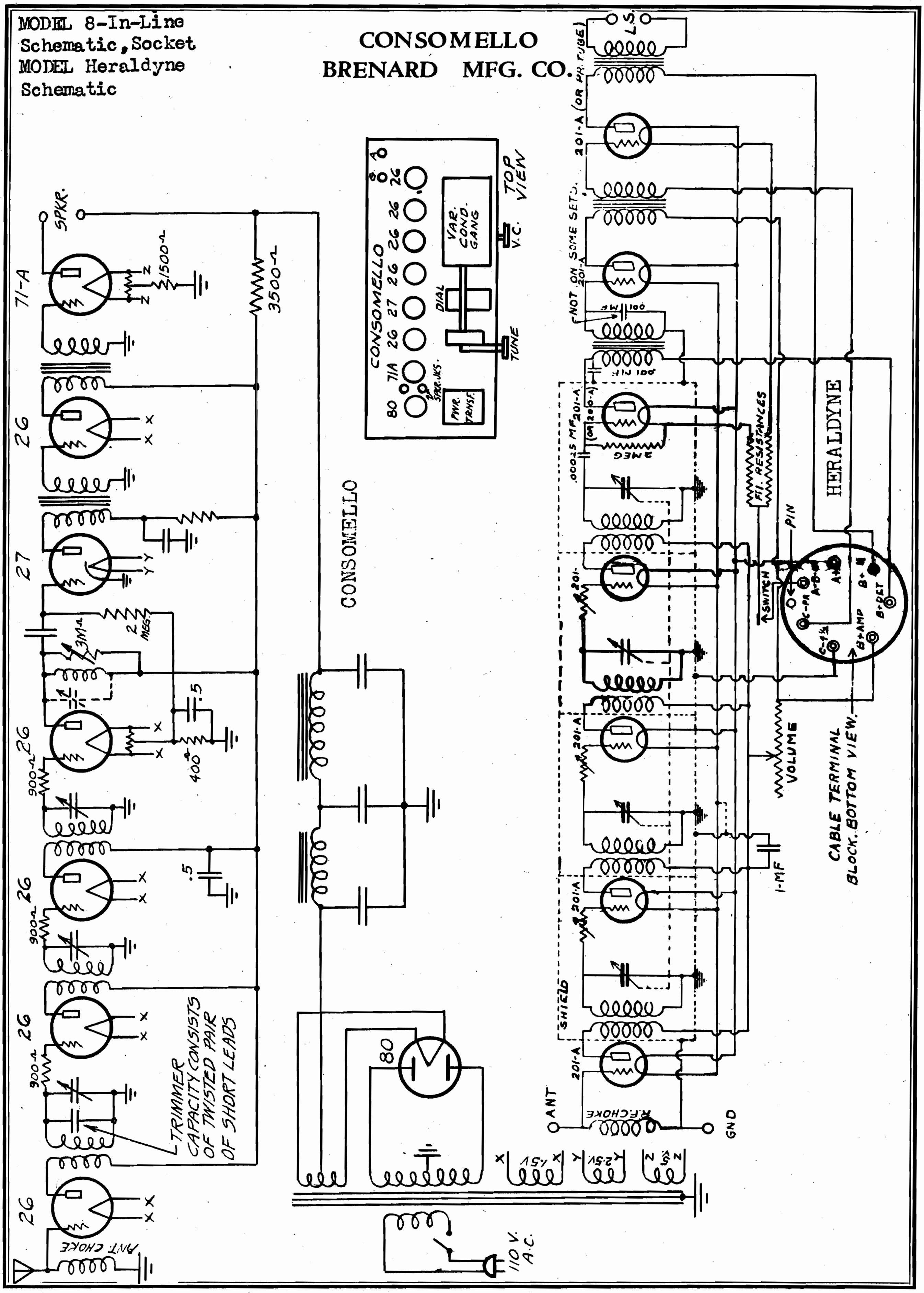
AUTOMATIC RADIO MFG. CO.
AUDIOLA RADIO CO.

MODEL Junior
MODEL 13S6
MODEL 32S11
Schematics



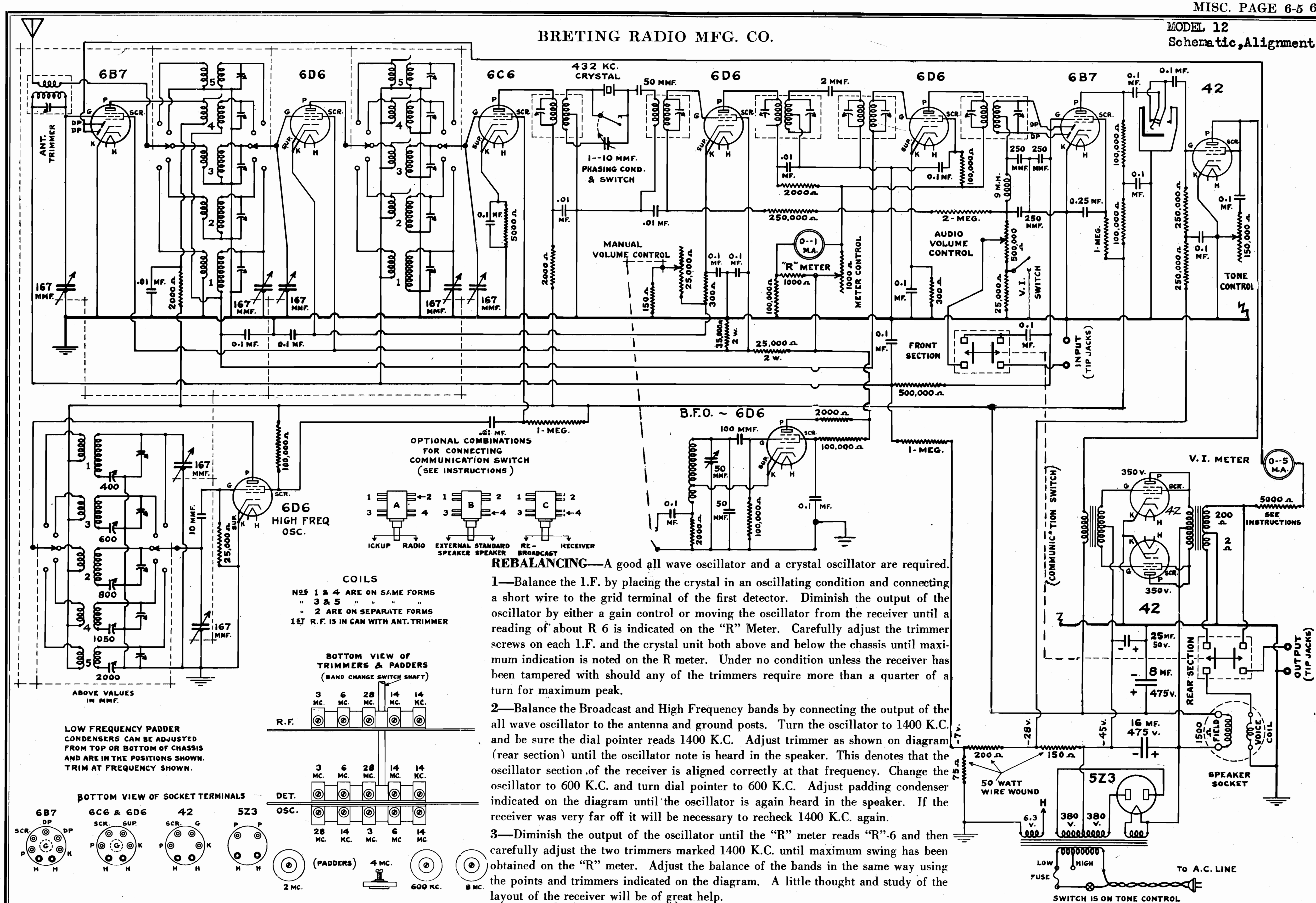
MODEL 8-In-Line
Schematic, Socket
MODEL Heraldyne
Schematic

CONSOMELLO
BRENARD MFG. CO.



MODEL 12
Schematic,Alignment

BRETING RADIO MFG. CO.



REBALANCING—A good all wave oscillator and a crystal oscillator are required.

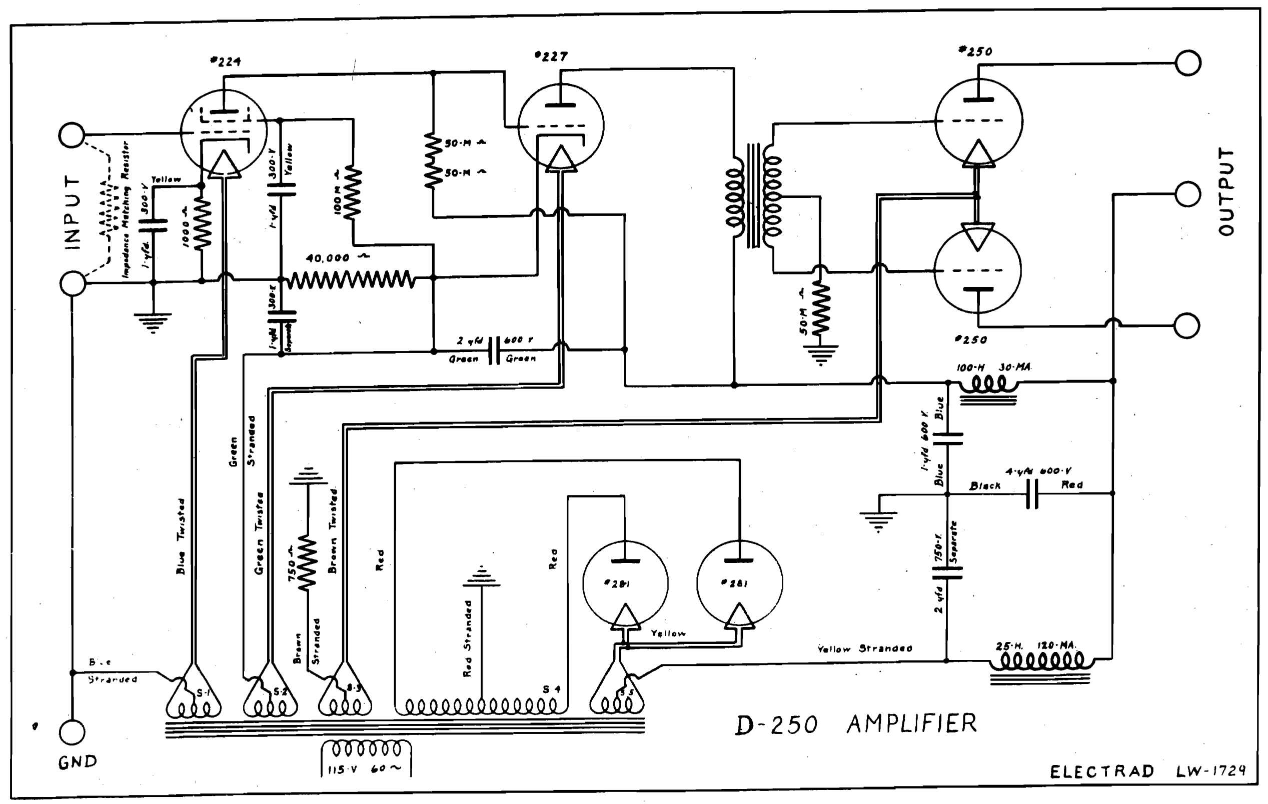
1—Balance the I.F. by placing the crystal in an oscillating condition and connecting a short wire to the grid terminal of the first detector. Diminish the output of the oscillator by either a gain control or moving the oscillator from the receiver until a reading of about R 6 is indicated on the "R" Meter. Carefully adjust the trimmer screws on each I.F. and the crystal unit both above and below the chassis until maximum indication is noted on the R meter. Under no condition unless the receiver has been tampered with should any of the trimmers require more than a quarter of a turn for maximum peak.

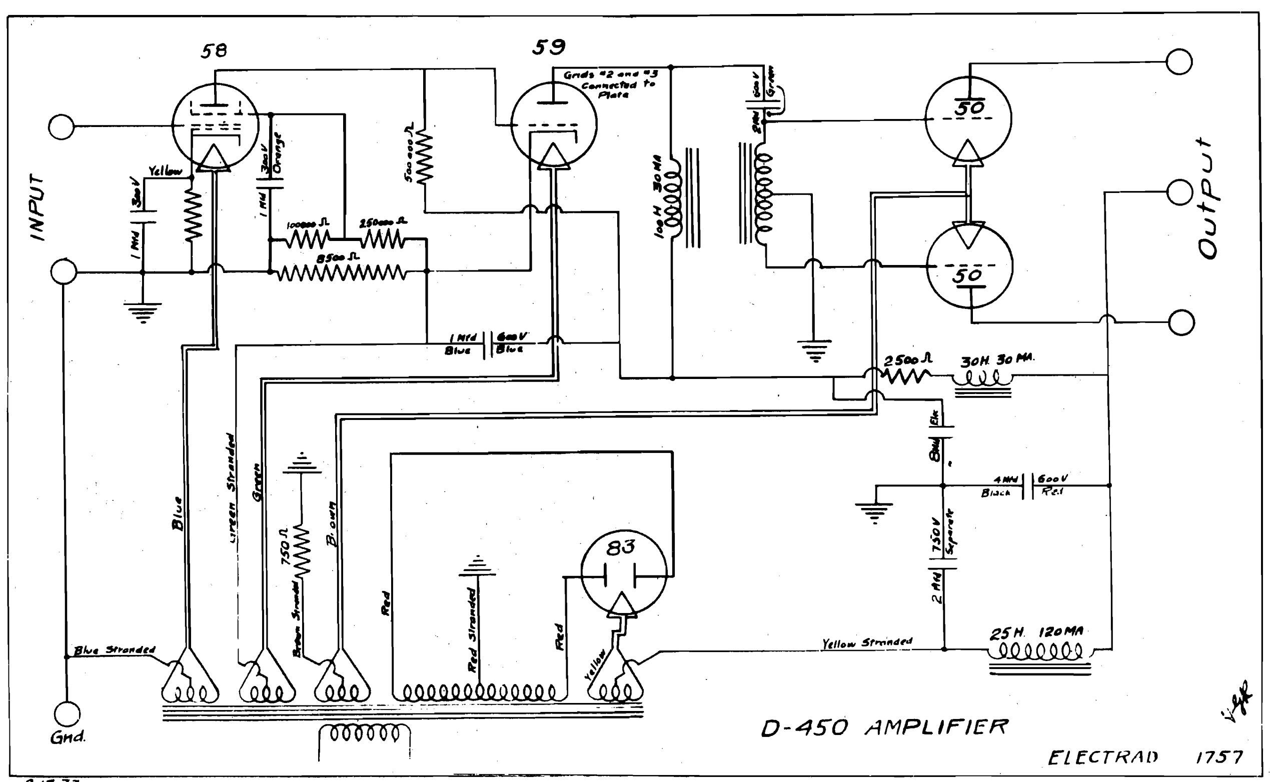
2—Balance the Broadcast and High Frequency bands by connecting the output of the all wave oscillator to the antenna and ground posts. Turn the oscillator to 1400 K.C. and be sure the dial pointer reads 1400 K.C. Adjust trimmer as shown on diagram (rear section) until the oscillator note is heard in the speaker. This denotes that the oscillator section of the receiver is aligned correctly at that frequency. Change the oscillator to 600 K.C. and turn dial pointer to 600 K.C. Adjust padding condenser indicated on the diagram until the oscillator is again heard in the speaker. If the receiver was very far off it will be necessary to recheck 1400 K.C. again.

3—Diminish the output of the oscillator until the "R" meter reads "R"-6 and then carefully adjust the two trimmers marked 1400 K.C. until maximum swing has been obtained on the "R" meter. Adjust the balance of the bands in the same way using the points and trimmers indicated on the diagram. A little thought and study of the layout of the receiver will be of great help.

MODEL D-250
MODEL D-450
Schematics

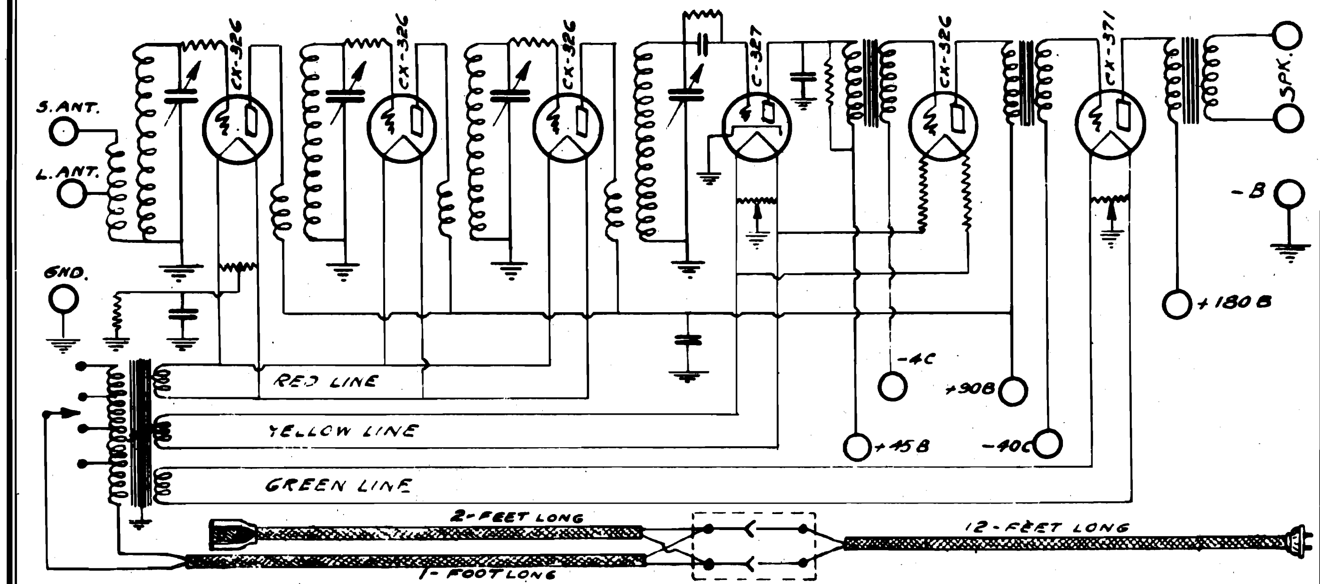
ELECTRAD, INC.

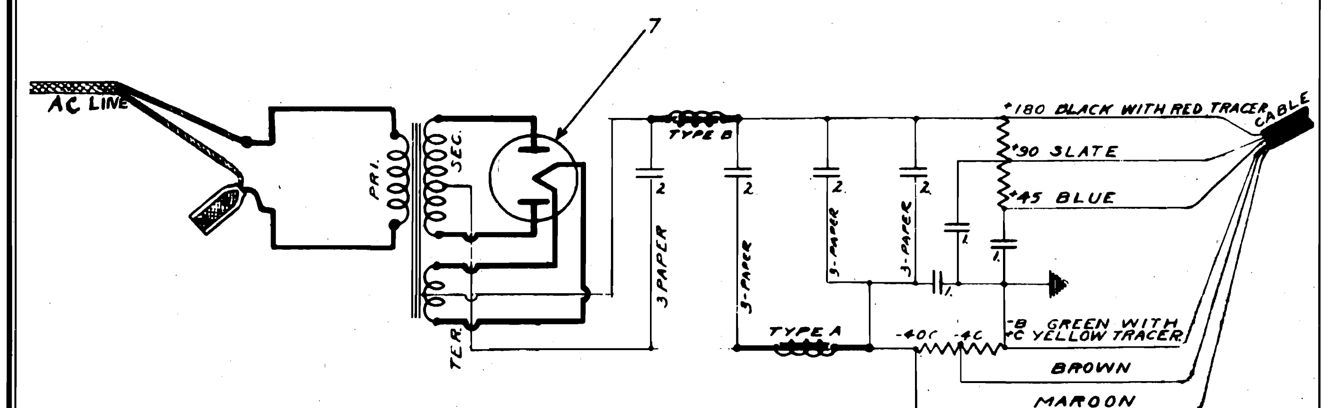


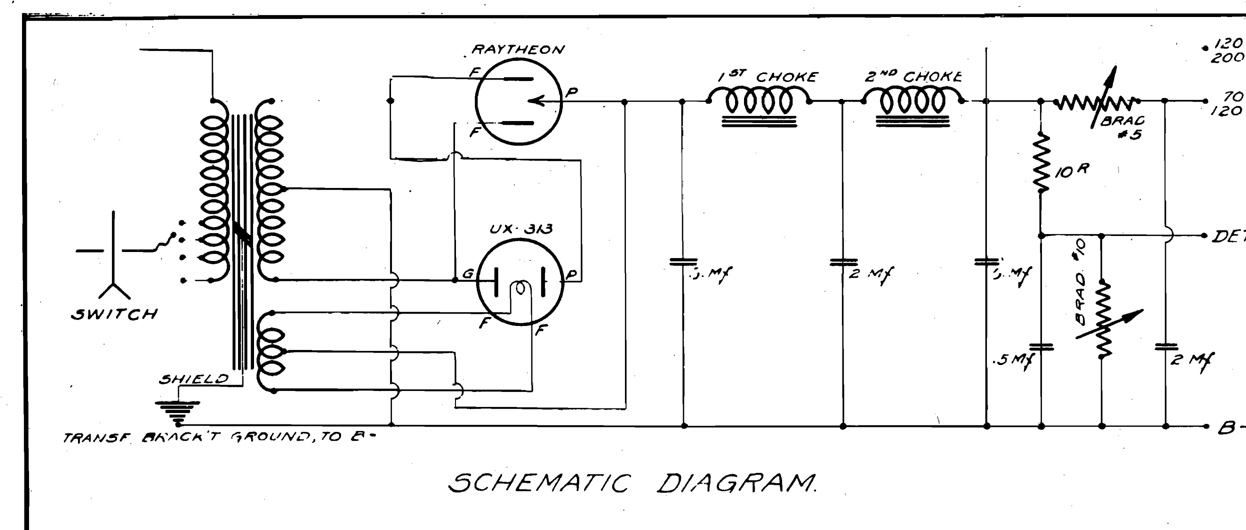


MODEL 7-Tube AC
MODEL B-Eliminator
Schematics

FARRAND MFG. COMPANY







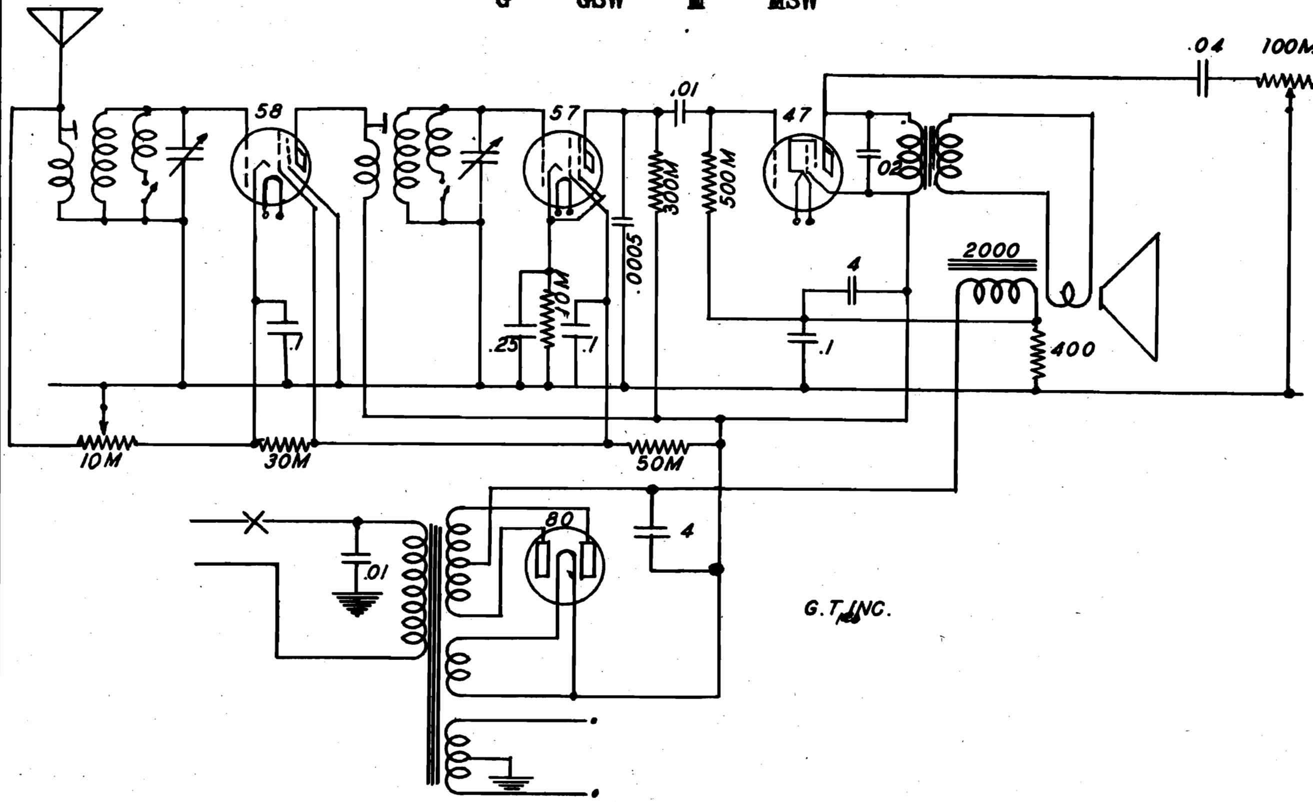
DIAGRAMS for FARRAND "B" ELIMINATOR	DWN BY	DESIGN 7.V.N.	APPVD BY
	DATE 11-1-26	DATE 11-1-26	DATE

GENERAL TELEVISION, INC.

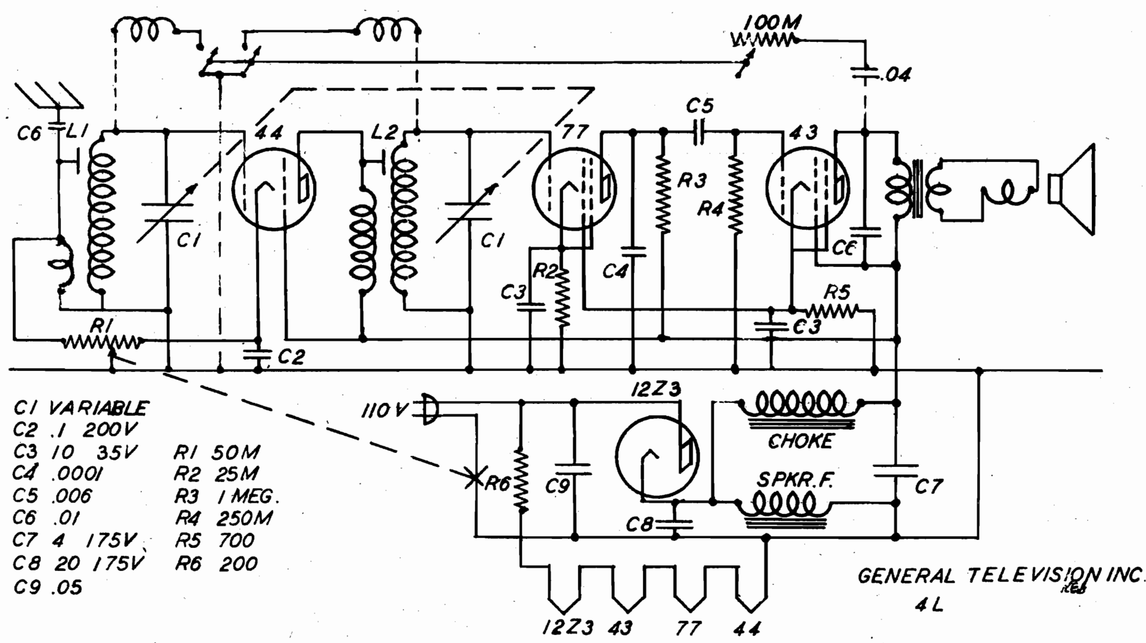
MODELS G,GSW,M,MSW
MODELS A,B,C,E
Regular & SW Models
Schematics

SCHEMATIC DIAGRAMS

AC MODELS
"G" "GSW" "M" "MSW"



AC-DC MODELS
"A" "B" "C" "E" REGULAR AND "SW" MODELS

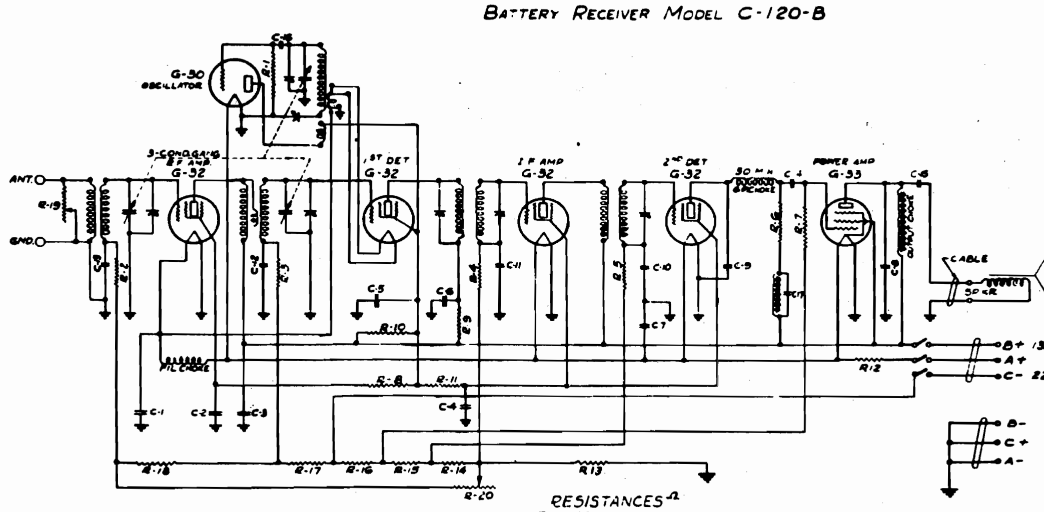


MODEL 123
Chassis 120-B
Schematic, Alignment
Voltage

GRIGSBY - GRUNOW CO.

SCHEMATIC DIAGRAM OF SCREEN GRID SUPERHETRODYNE
BATTERY RECEIVER MODEL C-120-B

FIG. 150
ISSUE #1 8-22-32



CAPACITIES M.F

C1 = .1
C2 = .1
C3 = .27
C4 = .1
C5 = .1 } CAN
C6 = .1
C7 = .1
C8 = .004
C9 = .00025
C10 = .01
C11 = .01
C12 = .01
C13 = .01
C14 = .067 ← TERM STRIP "A"
C15 = .4
C16 = .00005
C17 = .03 TERM STRIP "A"

RESISTANCES Ω

R1 = 330,000
R2 = 100,000
R3 = 100,000
R4 = 100,000
R5 = 100,000
R6 = 25,000
R7 = 600,000
R8 = 50,000
R9 = 250 } TERM. STRIP A
R10 = 20,000
R11 = 50,000
R12 = 0.45
R13 = 375
R14 = 830
R15 = 920
R16 = 1,500
R17 = 7,250
R18 = 2,530 } TERM STRIP B
R19 = 10,000
R20 = 10,000 } VOLUME CONTROL

Schematic Diagram Chassis 120-B

COLOR CODE

SPEAKER—Red and green or black (with small lugs)
"A" Plus—Red (with large lug)
"A" Minus—Black (with large lug)
"B" Plus—Red 135 volt
"B" Minus—Black
"C" Plus—Black 22½ volt
"C" Minus—Blue

ALIGNMENT

Align with the volume control in maximum position and the input reduced to keep the output below 1 watt.

An output meter should be used to insure the proper adjustment of all aligning condensers.

Supply a 175 K.C. signal to the grid of the first detector tube and align all intermediate frequency condensers for maximum output.

Supply a 1,500 K.C. signal to the input of the receiver and tune the receiver to this signal. Then adjust all radio frequency alignment condensers for maximum output.

Supply a 600 K.C. signal to the input of the receiver and tune the receiver to this signal. Then adjust the oscillator tracking condenser and tuning control simultaneously for maximum output. For each adjustment of the oscillator tracking condenser there will be a different dial setting which gives maximum output. The combination of tracing condenser adjustment and dial setting which give maximum output, disregarding the calibration point is the correct adjustment.

VOLUME CONTROL

The Model 120-B chassis is equipped with a double volume control unit. Each section of the unit has a value of 10.000 ohms. One section of the volume control governs the voltage input to the antenna whereas the other section adjusts the bias voltages obtainable of the voltage divider.

TABLE OF VOLTAGES

Tube Purpose	Type	Fil. Volts D.C.	Plate Volts D.C.	Plate Current M.A.-D.C.	Screen Volts D.C.	Screen Current M.A.-D.C.
R.F. Amp.	G-32	2.0	135	1.2	40	.3
Oscil.	G-30	2.0	55	3.0	. . .	. .
1st Det.	G-32	2.0	135	.2	55	.2
I F. Amp.	G-32	2.0	135	.3	22	.3
2nd Det.	G-32	2.0	20	*	22	.4
Pentode	G-33	2.0	130	12	135	2.6

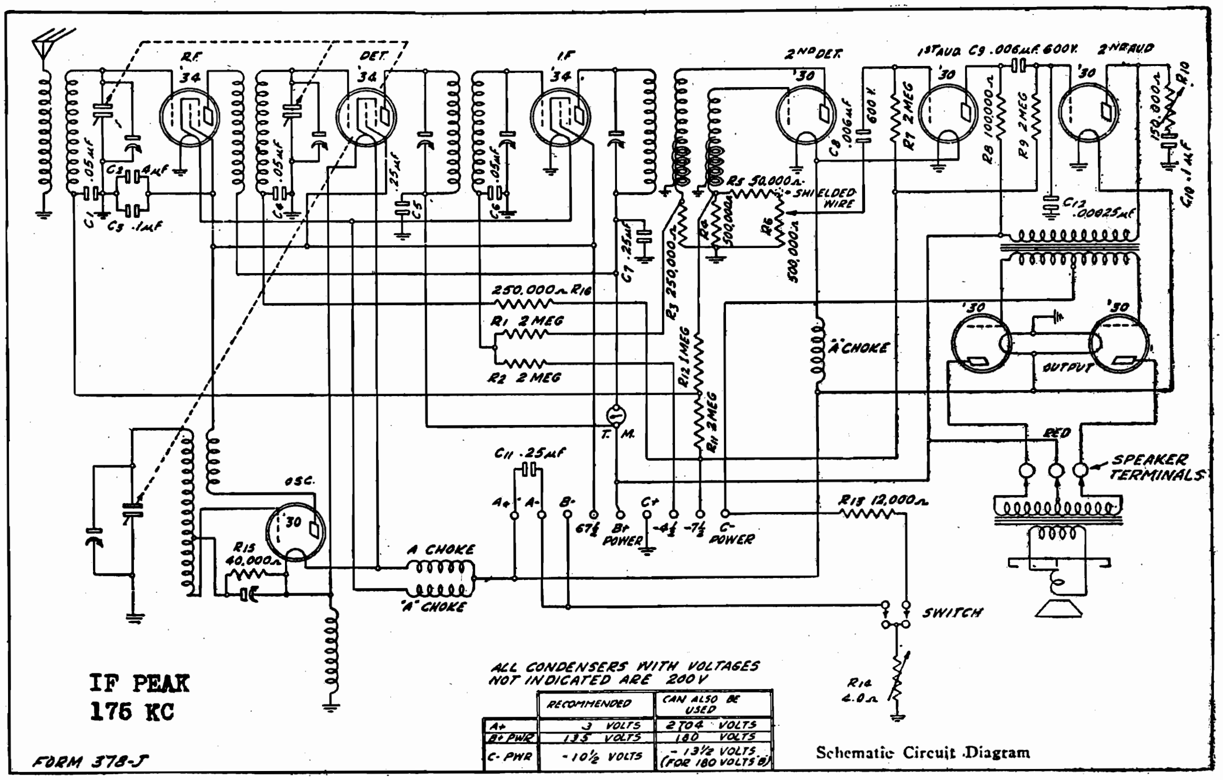
*Less than .1 M.A.

BIAS VOLTAGES

	Volume Control at Maximum	Volume Control at Minimum
R.F. Ampl.	—3 Volt	—11 Volt
Oscillator	0 Volt	0 Volt
1st Det.	—8 Volt	—14 Volt
I.F. Amp.	—3 Volt	—3 Volt
2nd Det.	—8 Volt	—8 Volt
Pentode	—13.5 Volt	—13.5 Volt

GULBRANSEN CO.

MODEL 392
Schematic, Voltage
Socket, Trimmers



Schematic Circuit Diagram

Voltages at Sockets

"B" AND "C" BATTERIES UP TO RATED VOLTAGE—FILAMENT CONTROL KNOB SET SO THAT FILAMENT VOLTAGE IS 2—ANTENNA LEAD SHORTENED TO GROUND—VOLTAGES READ FROM NEGATIVE FILAMENT LEG

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate MA
'34	R.F	2.0	125	65	2.88 (1)	2.3
'34	1st Det.	2.0	130	65	7.5 (1)	1.4
'30	Osc.	2.0	67		4-15 (2)	1.6-4 (2)
'34	I.F	2.0	120	65	2.38 (1)	2.4
'30	2nd Det.	2.0	0		0	0
'30	1st Audio	2.0	85		7.5 (1)	.5
'30	Driver	2.0	125		7.5 (1)	4.0
'30	Output	2.0	130		10.	1.1

(1) Computed figure—cannot be read with ordinary voltmeter because of high resistance in this circuit. See article "Voltages" for further information

(2) Subject to variation with dial setting.

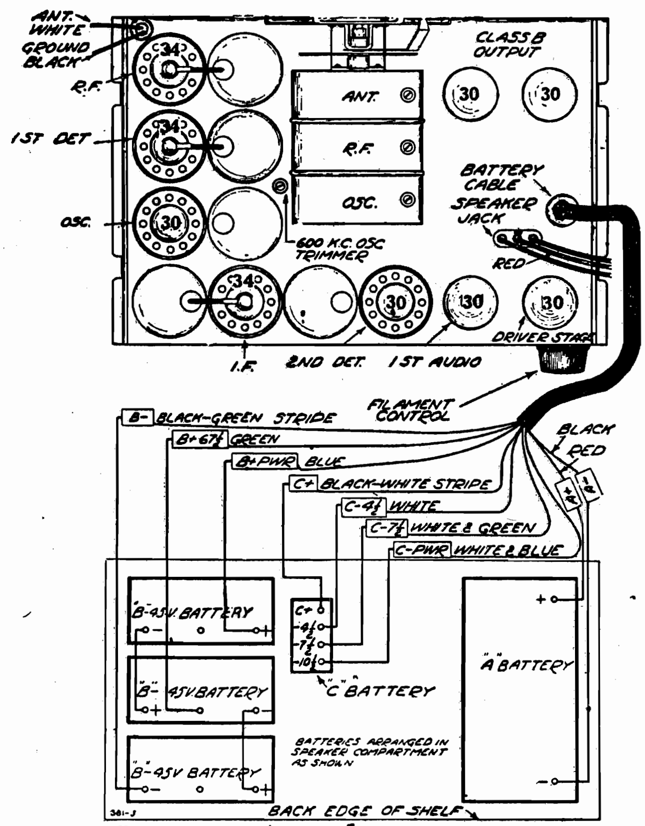
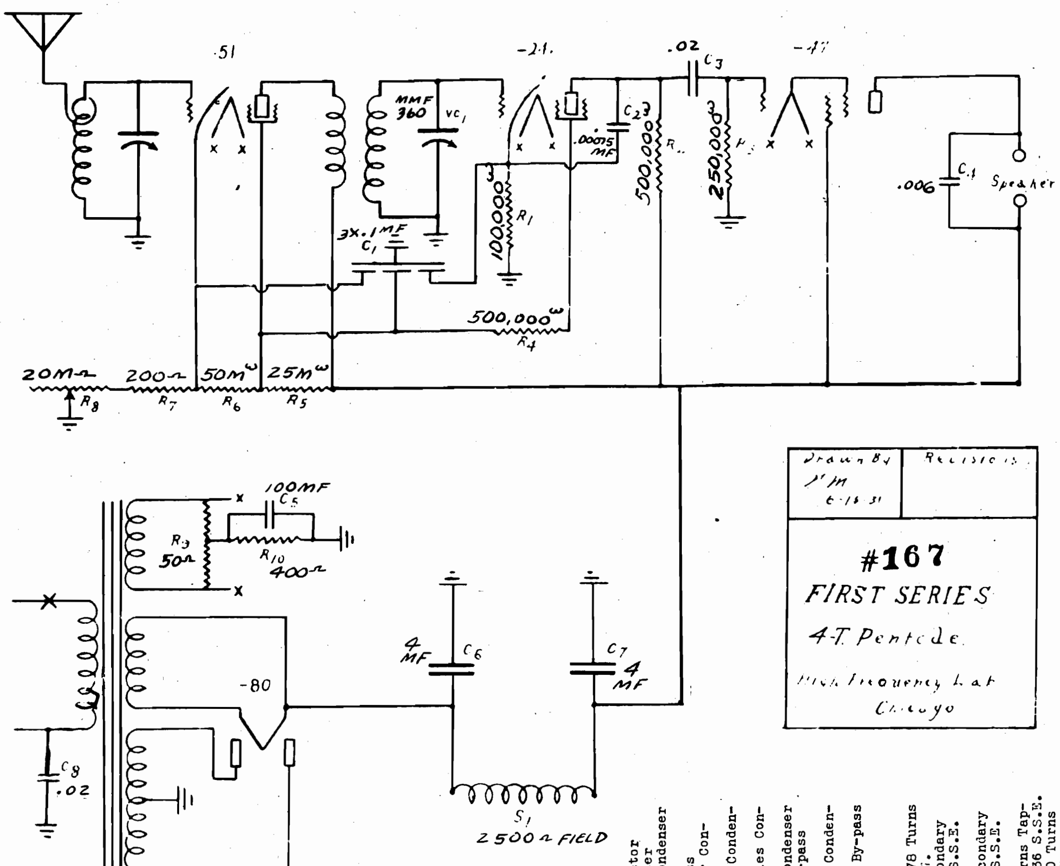


Fig. 2—Tube Arrangement and Battery Connections

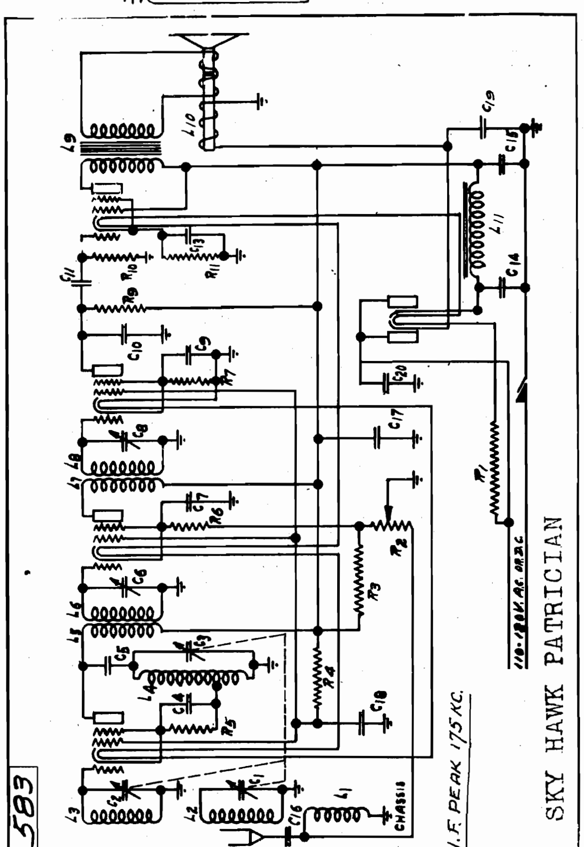
MODEL 4-Tube Pentode
Schematic
MODEL Sky Hawk Patrician
Schematic, Parts

HIGH FREQUENCY LABORATORIES

REPUBLIC INDUSTRIES



Drawn By
Revisions
#167
FIRST SERIES
4-T. Pentode
High Frequency Lab
Chicago

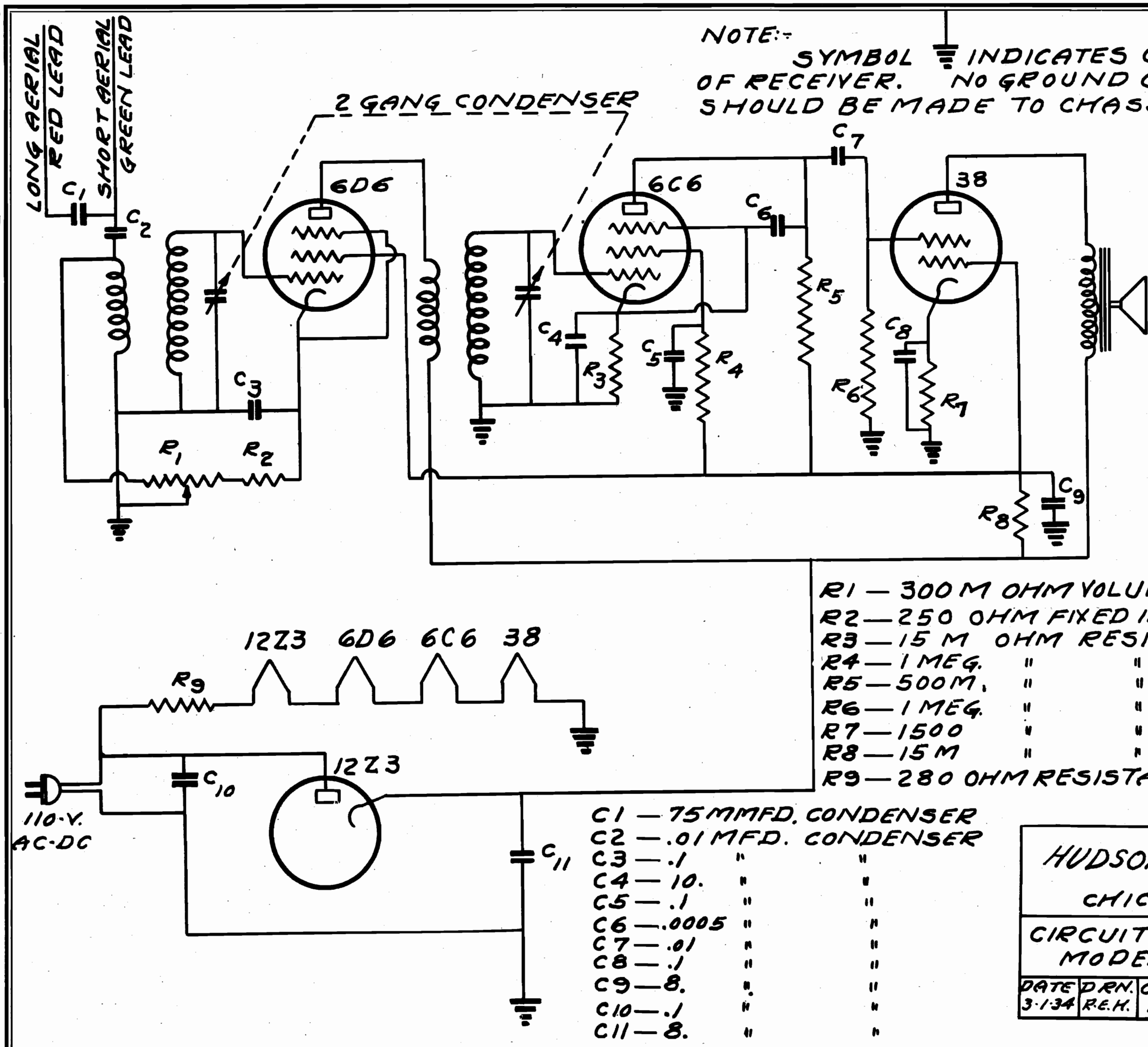


Code	Part No.	RESISTORS
R1	809	170 Ohm Filament Resistor In Power Cord
R2	853	10,000 Ohm Volume Control and Switch
R3	922	75,000 Ohm Resistor I.F. Cathode Feed
R4	921	40,000 Ohm Resistor Screen Feed
R5	919	5,000 Ohm Resistor First Detector & Oscillator Cathode
R6	1063	500 Ohm Resistor I.F. Cathode Feed
R7	941	20,000 Ohm Resistor Second Detector Cathode
R8		
R9	924	250,000 Ohm Resistor Second Detector Plate Load
R10	925	500,000 Ohm Resistor Output Grid Bias
R11	1063	500 Ohm Resistor 43 Bias
		CONDENSERS
C1	833	365 MMFD. Preselector Section of Variable Condenser
C2	833	365 MMFD. Preselector Section of Variable Condenser
C3	833	350 MMFD. Oscillator Section of Variable Condenser
C4	265	.001 MFD. First Detector & Oscillator Cathode Condenser
C5	264	.00005 MFD. Oscillator Coupling Condenser
C6	477	75-150 MMFD. First I.F. Trimmer Condenser
C7	272	.1 MFD. I.F. Cathode By-pass Condenser
C8	849	75-150 MMFD. Second I.F. Trimmer Condenser
C9	569	.2 MFD. Second Detector Cathode
C10	265	.001 MFD. Second Detector Plate R.F. Filter
C11	269	.01 MFD. Audio Feed Condenser
C12		
C13	928	25 MFD. C. Bias By-pass
C14	965	12 MFD. Voltage Filter Condenser
C15	965	4 MFD. Voltage Filter Condenser
C16	265	.001 MFD. Antenna Series Condenser
C17	267	.5 B Supply By-pass Condenser
C18	272	.1 200 Volt Screen By-pass Condenser
C19	965	4 MFD. Voltage Filter Condenser
C20	272	.1 MFD. 200 Volt Line By-pass Condenser
		INDUCTANCES
L1	847	Preselector Primary 178 Turns #36 S.S.E. U.W.
L2	847	Preselector First Secondary 128 Turns #36 S.S.E. U.W.
L3	847	Preselector Second Secondary 133 Turns #36 S.S.E. U.W.
L4	938	Oscillator Coil 98 Turns Tapped 15 Turns #36 S.S.E.
L5	938	First I.F. Primary 650 Turns #36 S.S.E. U.W.
L6	938	First I.F. Secondary 650 Turns #36 S.S.E. U.W.
L7	937	Second I.F. Primary 650 Turns #36 S.S.E. U.W.
L8	937	Second I.F. Secondary 650 Turns #36 S.S.E. U.W.
L9		Single #43 Output Transformer
L10	917	3,000 Ohm Speaker Field
L11	940	32 Henry Choke

HUDSON-ROSS, INC.

MODEL Legion
Schematic

NOTE:-
SYMBOL ⏚ INDICATES CHASSIS OF RECEIVER. NO GROUND CONNECTION SHOULD BE MADE TO CHASSIS.



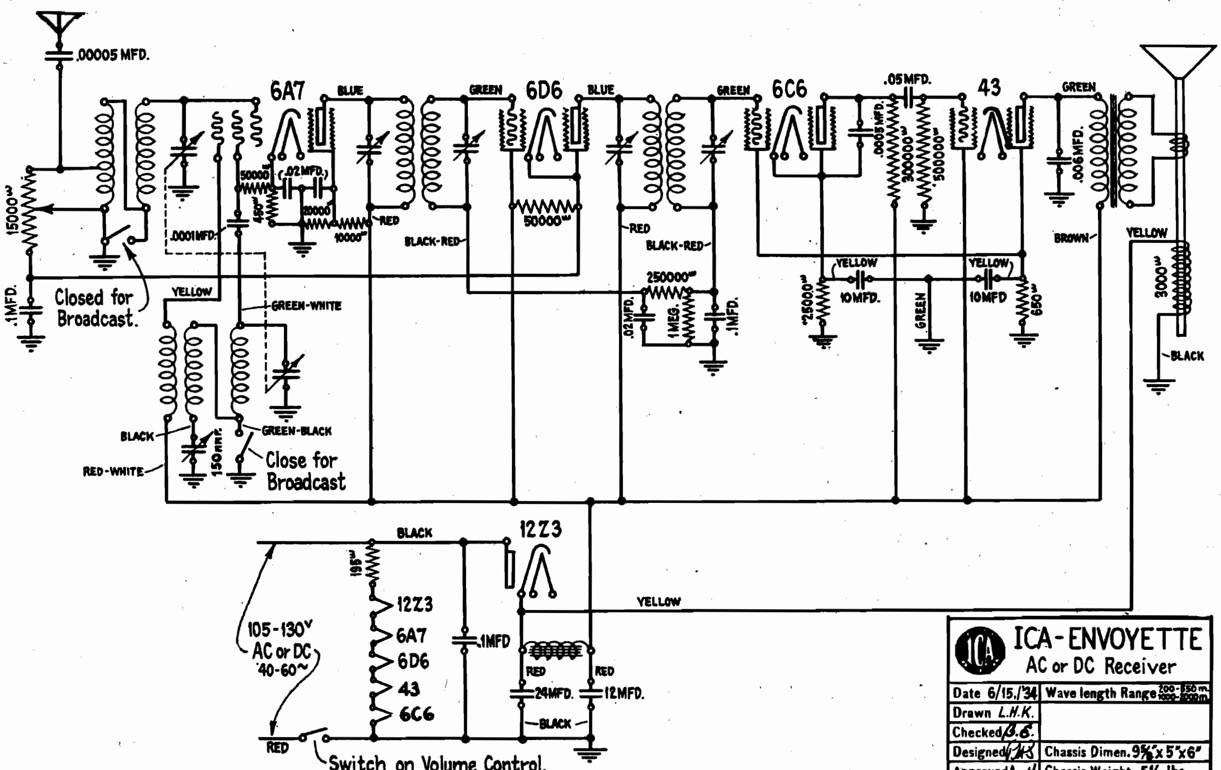
R1 — 300 M OHM VOLUME CONTROL
R2 — 250 OHM FIXED IN VOLUME CONTROL
R3 — 15 M OHM RESISTOR
R4 — 1 MEG. " "
R5 — 500 M. " "
R6 — 1 MEG. " "
R7 — 1500 " "
R8 — 15 M " "
R9 — 280 OHM RESISTANCE IN LINE CORD.

C1 — 75 MMFD. CONDENSER
C2 — .01 MFD. CONDENSER
C3 — .1 " "
C4 — 10. " "
C5 — .1 " "
C6 — .0005 " "
C7 — .01 " "
C8 — .1 " "
C9 — 8. " "
C10 — .1 " "
C11 — 8. " "

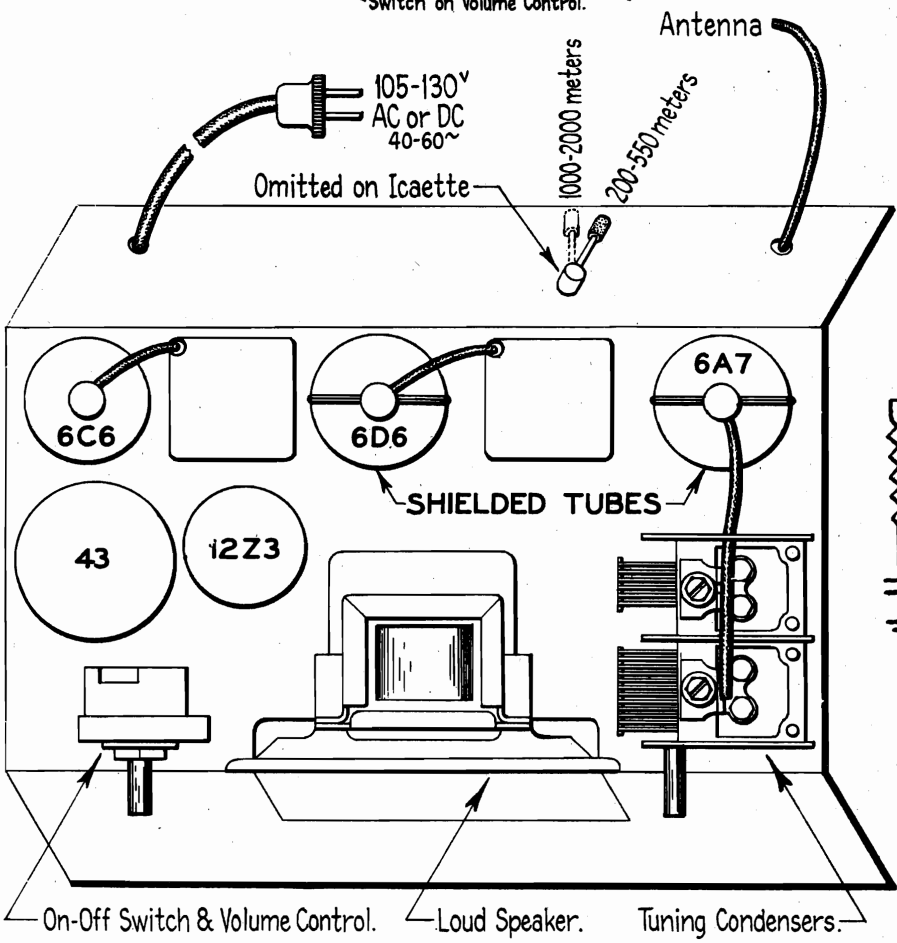
HUDSON-ROSS INC			
CHICAGO, ILL.			
CIRCUIT DIAGRAM MODEL "LEGION"			
DATE 3-1-34	DRN. R.E.H.	CHKD. M	DWG. No. 104

MODEL Envoyette
Schematic, Socket
MODEL ICA-ette
Schematic

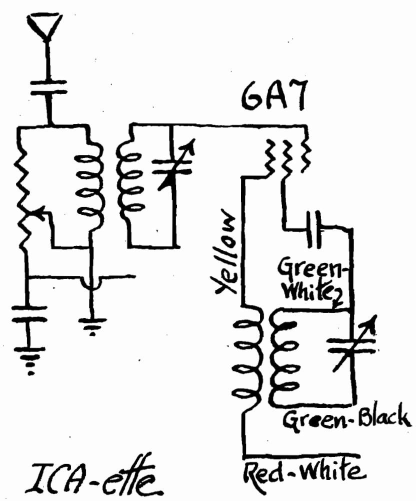
INSULINE CORP. OF AMERICA



ICA-ENVOYETTE AC or DC Receiver	
Date 6/15/'34	Wave length Range 200-550 m. 1000-2000 m.
Drawn L.H.K.	
Checked G.G.	
Designed L.H.K.	Chassis Dimen. 9⅝"x 5"x 6"
Approved A.H.	Chassis Weight 5½ lbs.
INSULINE CORP. OF AMERICA 23-25 Park Place, New York, N.Y., U.S.A.	

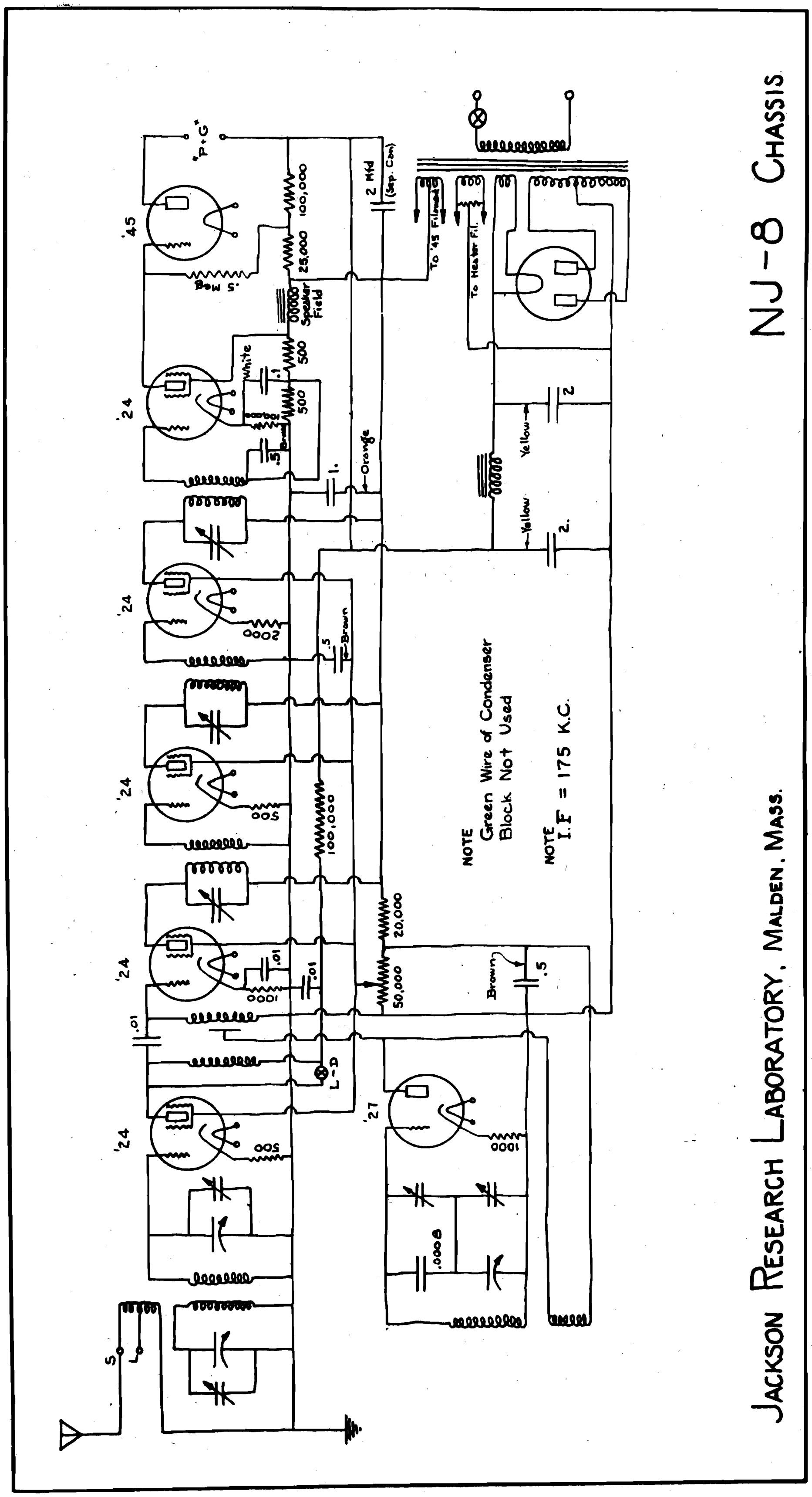


ICA-ette Broadcast Receiver same as above, with change shown below,



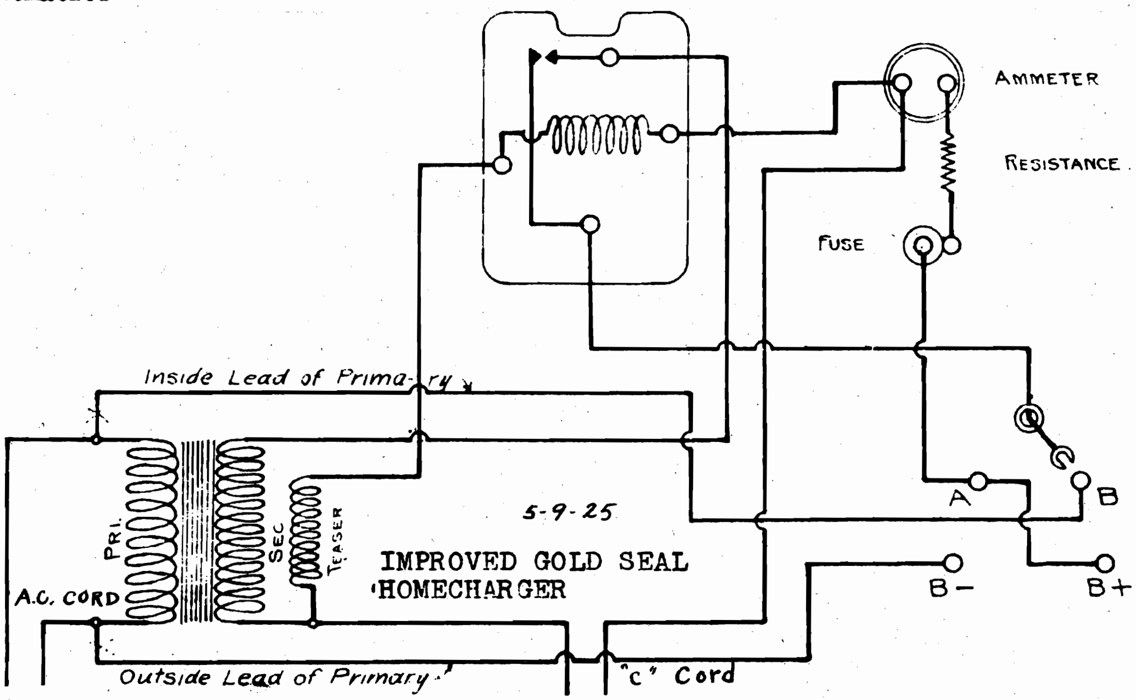
MODEL NJ-8
Schematic

JACKSON RESEARCH LAB.

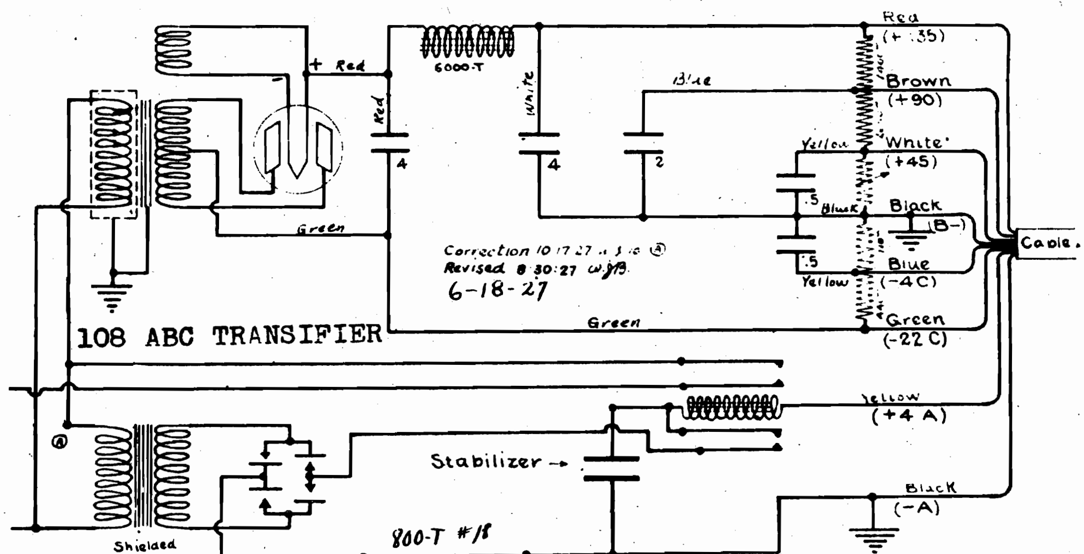


MODEL Improved Gold Seal
MODEL 108 ABC Transifier
MODEL 110B Transifier
Schematics

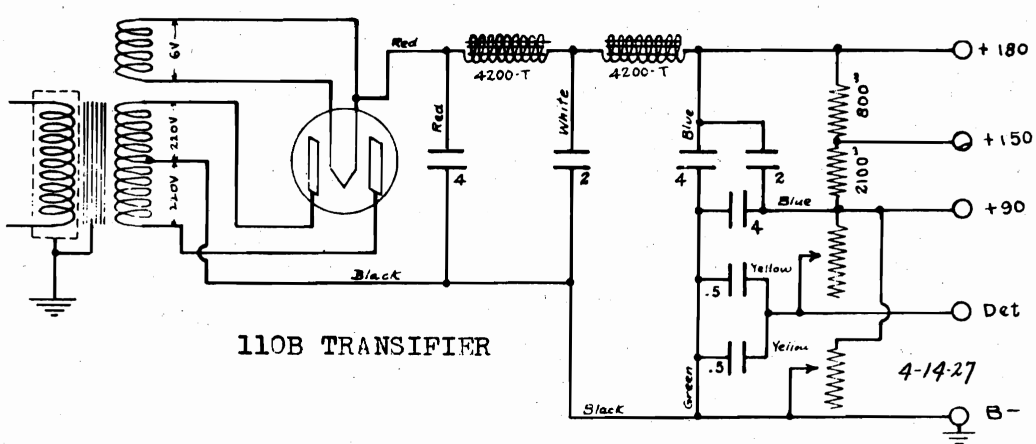
KODEL RADIO CORP.



IMPROVED GOLD SEAL
HOMECHARGER



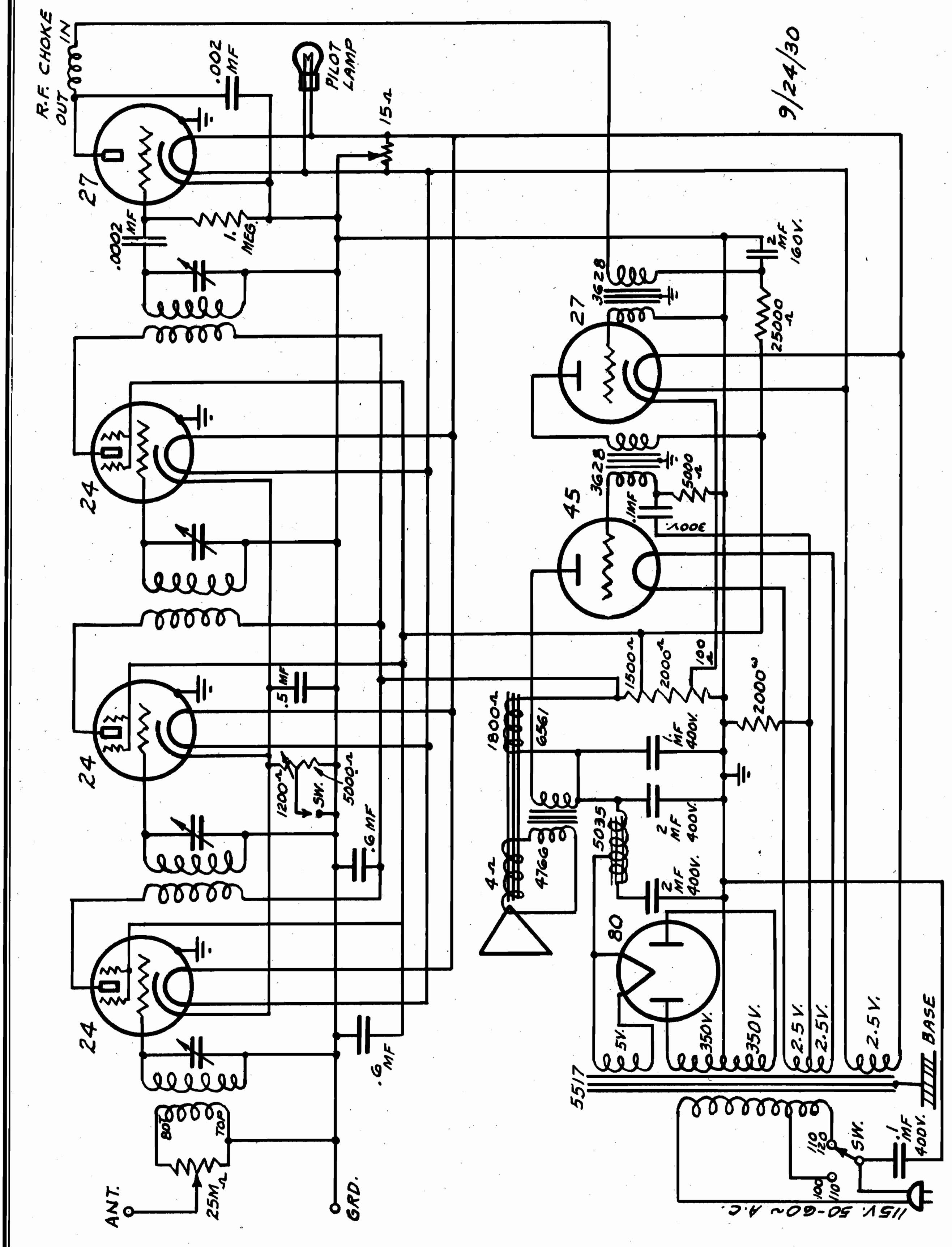
108 ABC TRANSIFIER



110B TRANSIFIER

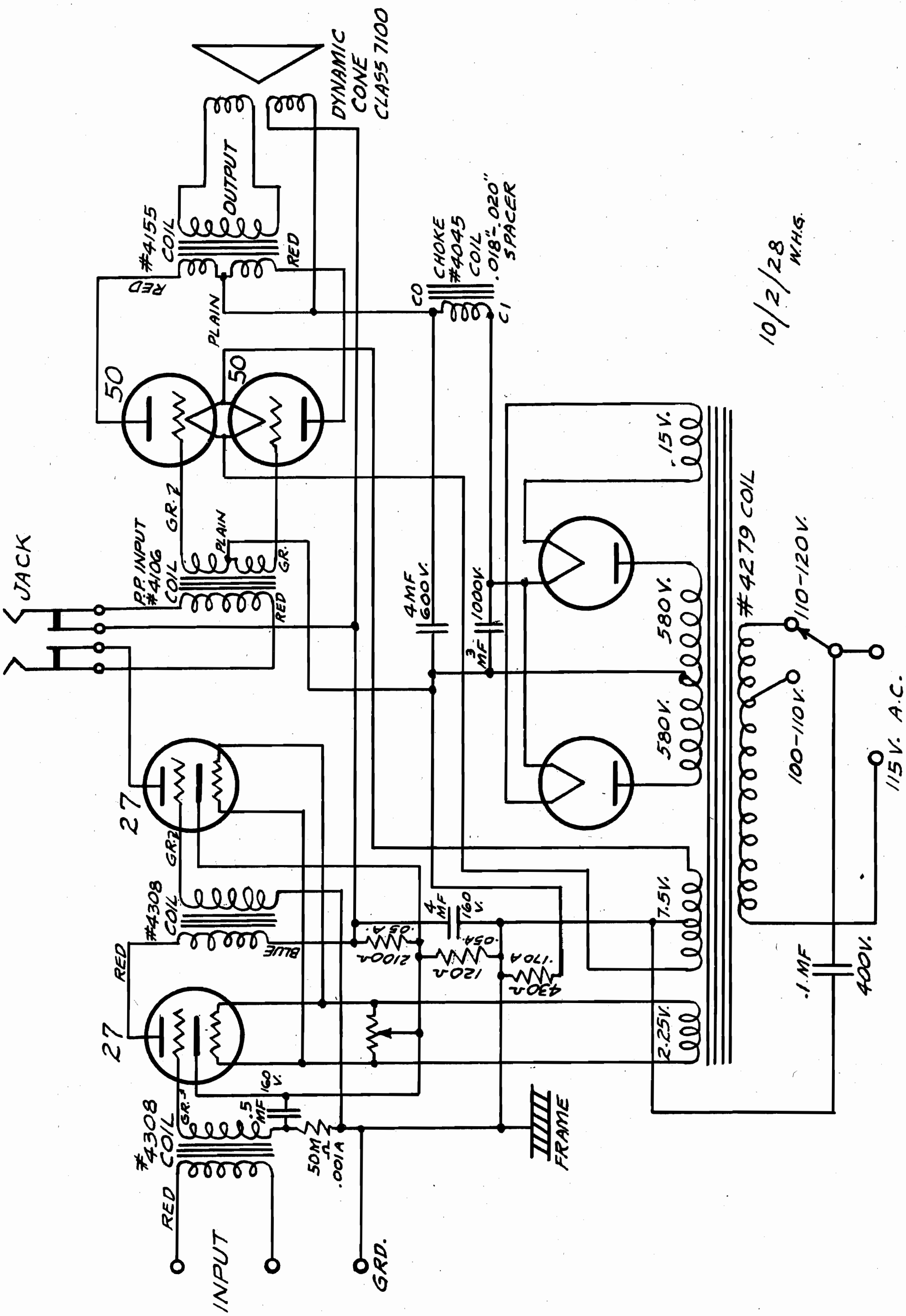
KOLSTER RADIO CORP.

MODEL K-48
Schematic



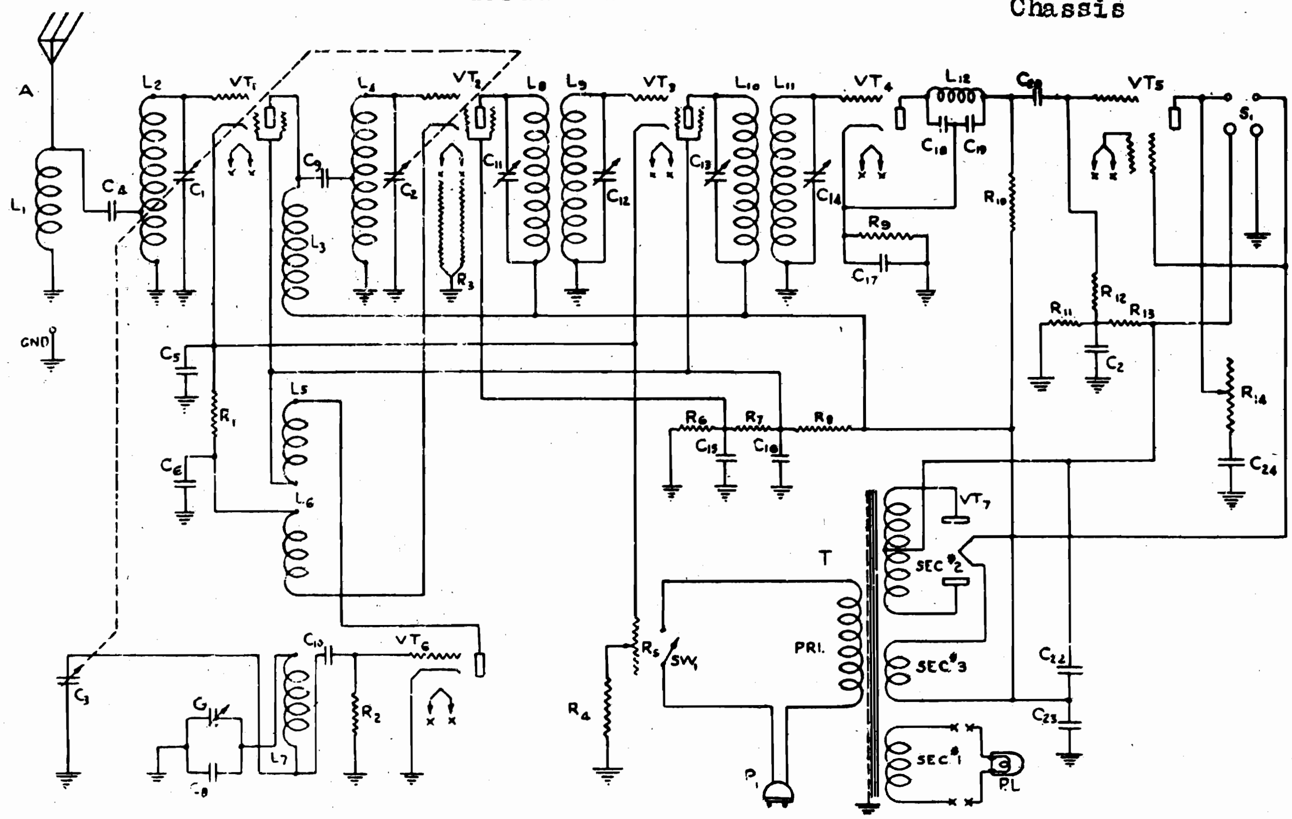
MODEL Power Amplifier
Schematic

KOLSTER RADIO CORP.

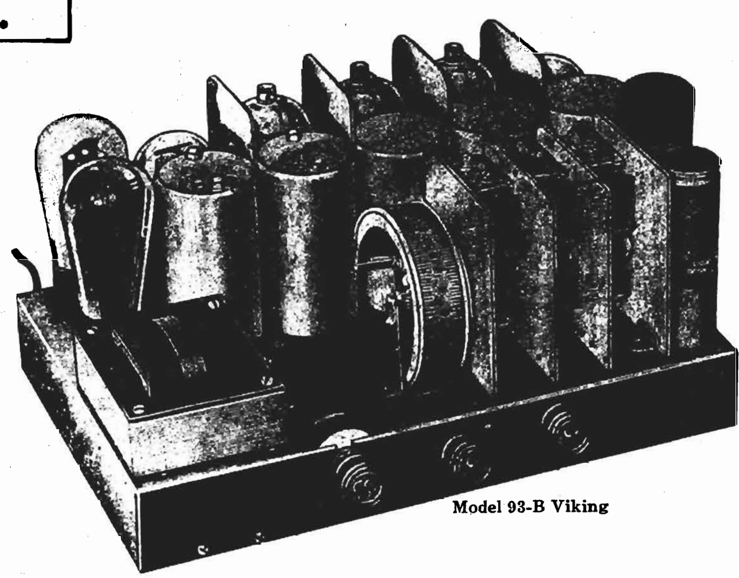


MODEL 93-B Viking
Schematic, Voltage
Chassis

KROHLER MFG. CO.



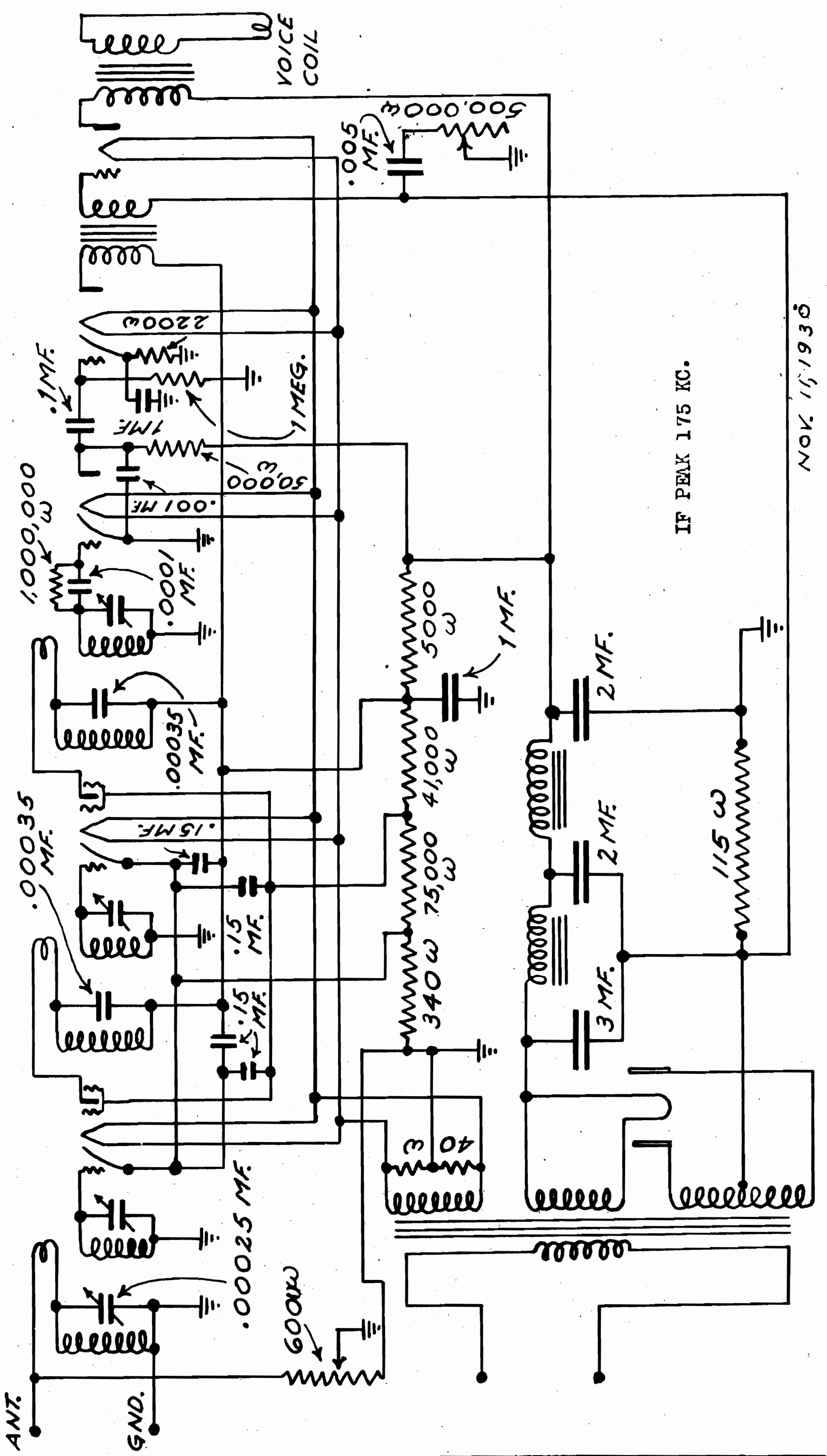
MODEL 93-B				
Tube	Type	Plate	S.Grid	Cath.
Osc.	'27	80	--	--
R.F.	'35	190	85	1.5
Det.	'35	190	45	2.
I.F.	'35	190	85	1.5
Det.	'27	125	--	12.
Pwr.	'47	175	190	
Rect.	'80			
Vol.-Max.		Volts To Ground.		



Model 93-B Viking

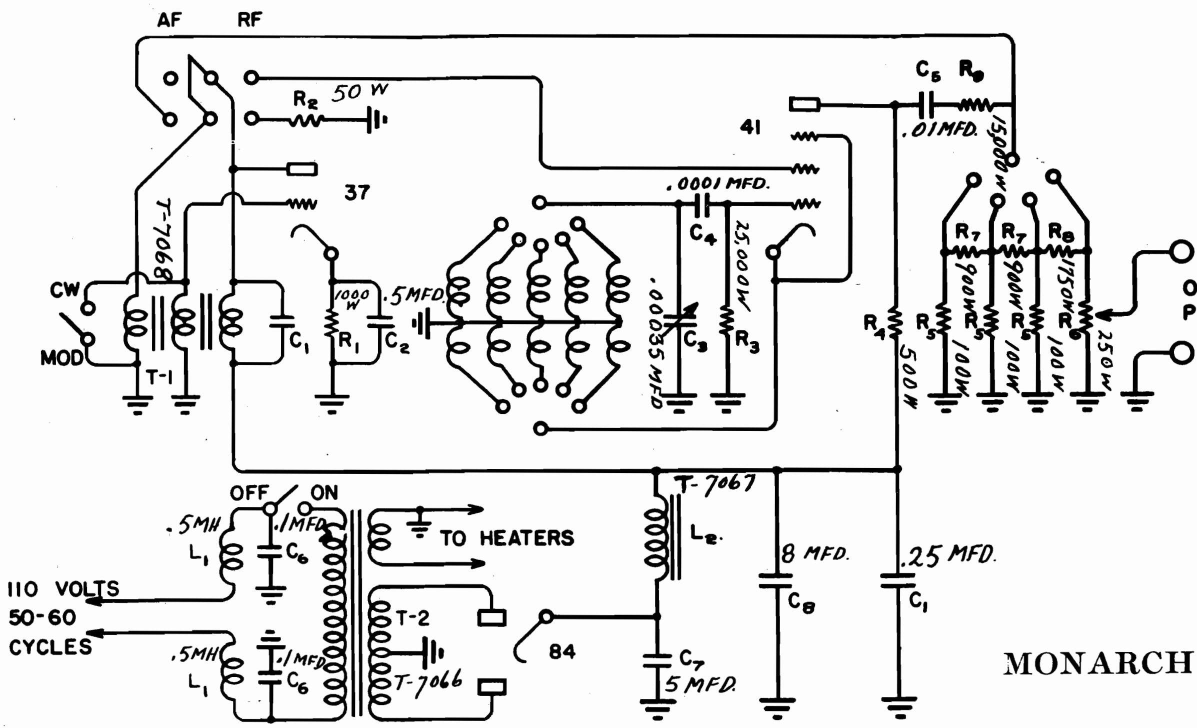
MODEL 84
Schematic

LARKIN CO., INC.



MONARCH MFG. CO. **MODEL A-W. Signal Generator**
ELECTRONIC LABS. **MODEL 10, 32-Volt Converter**
Schematics

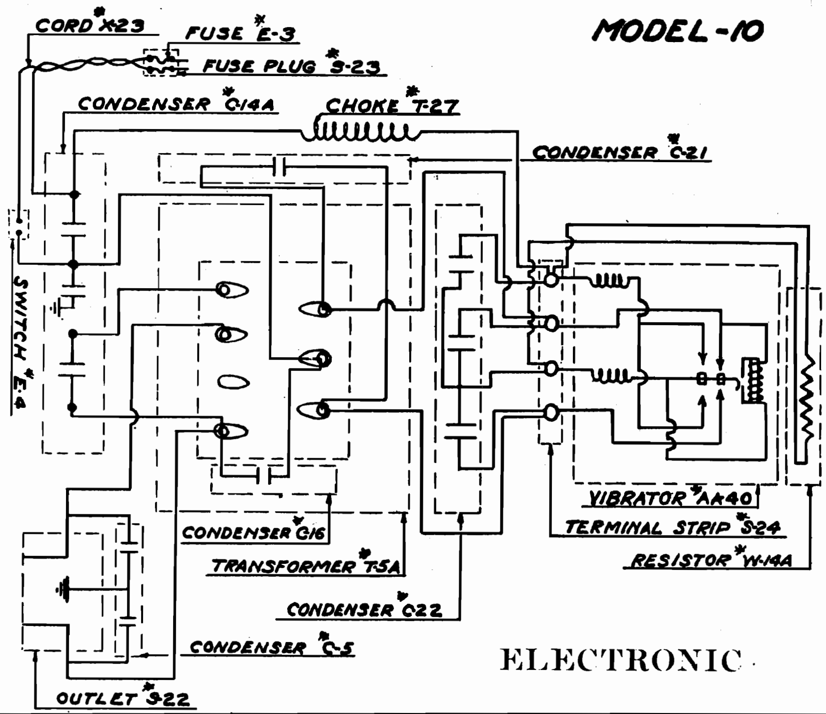
ALL-WAVE STANDARD SIGNAL GENERATOR



MONARCH

SCHEMATIC DIAGRAM

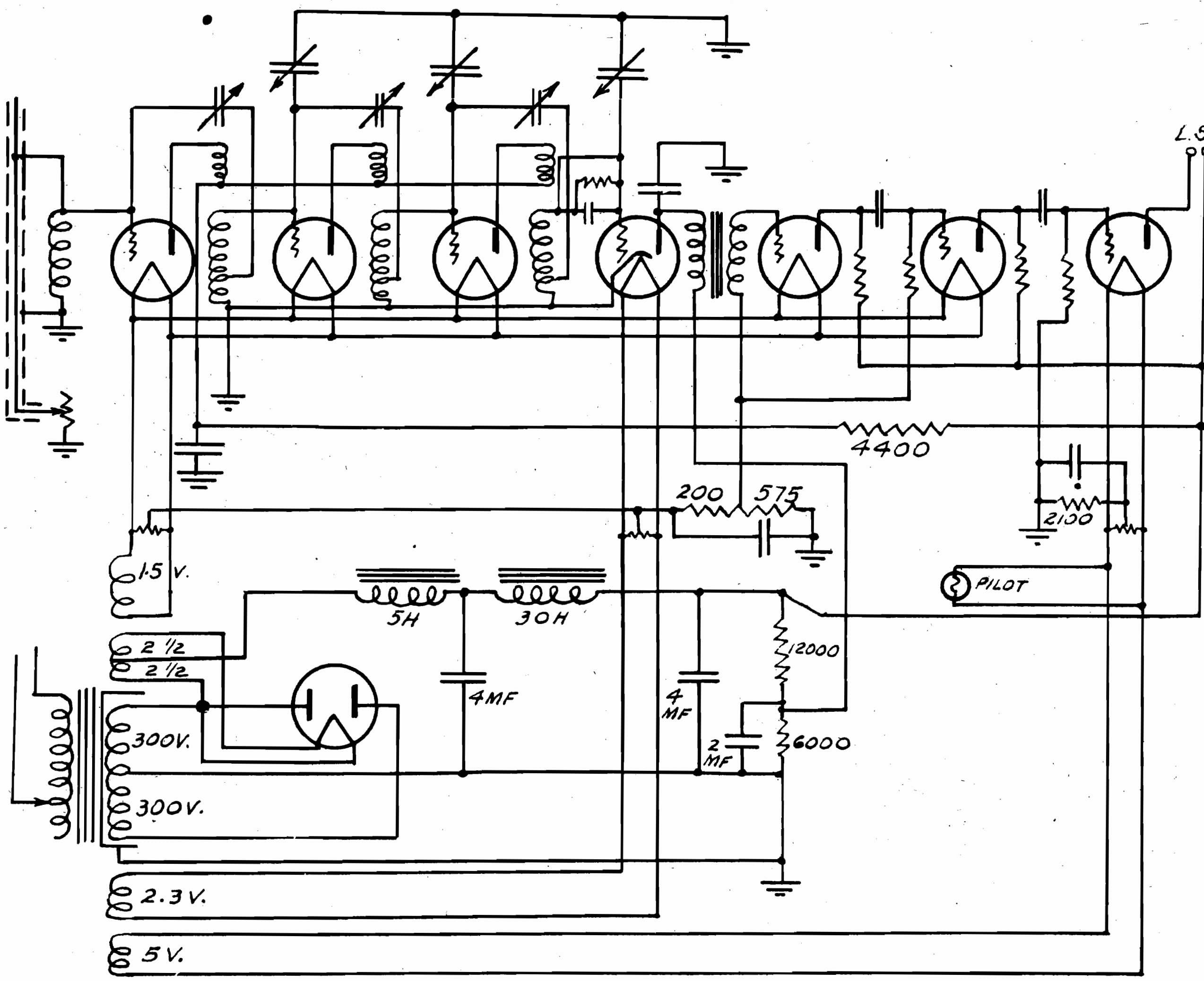
MODEL 10 32 VOLT CONVERTER

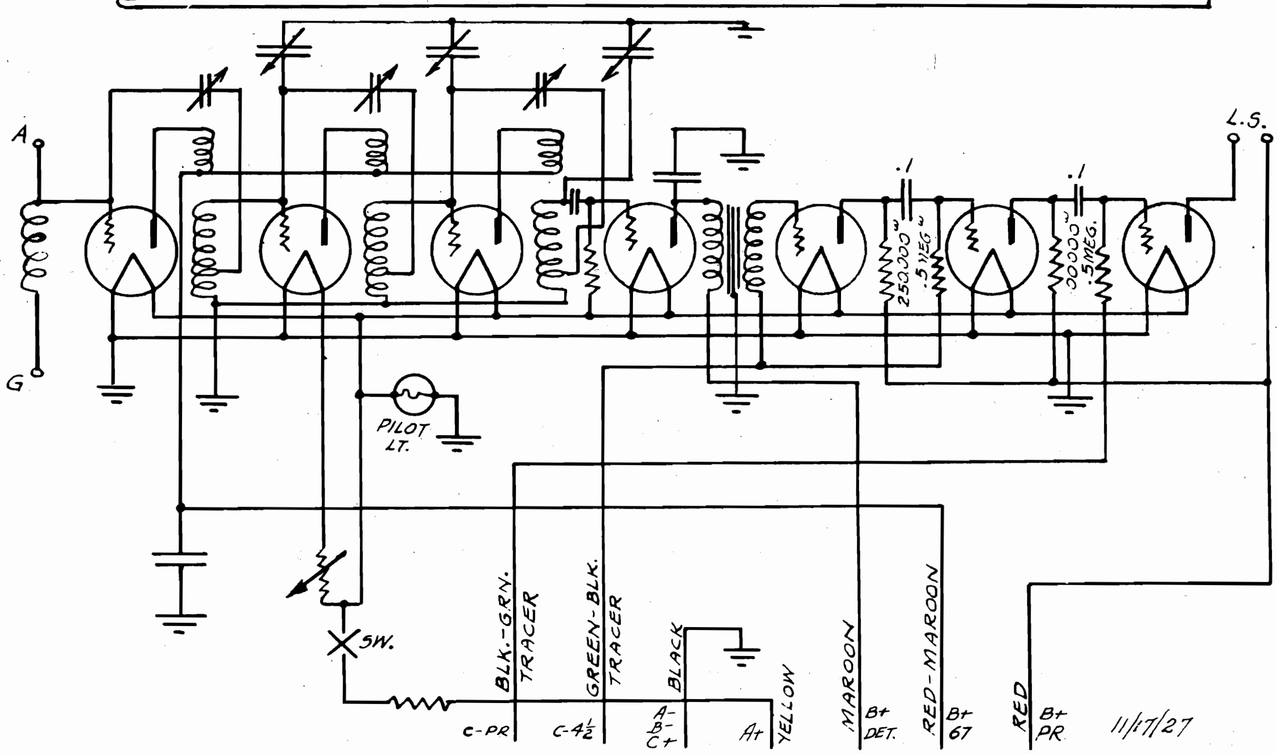


ELECTRONIC

MODEL 8-Tube AC
MODEL 7-Tube Battery
Schematics

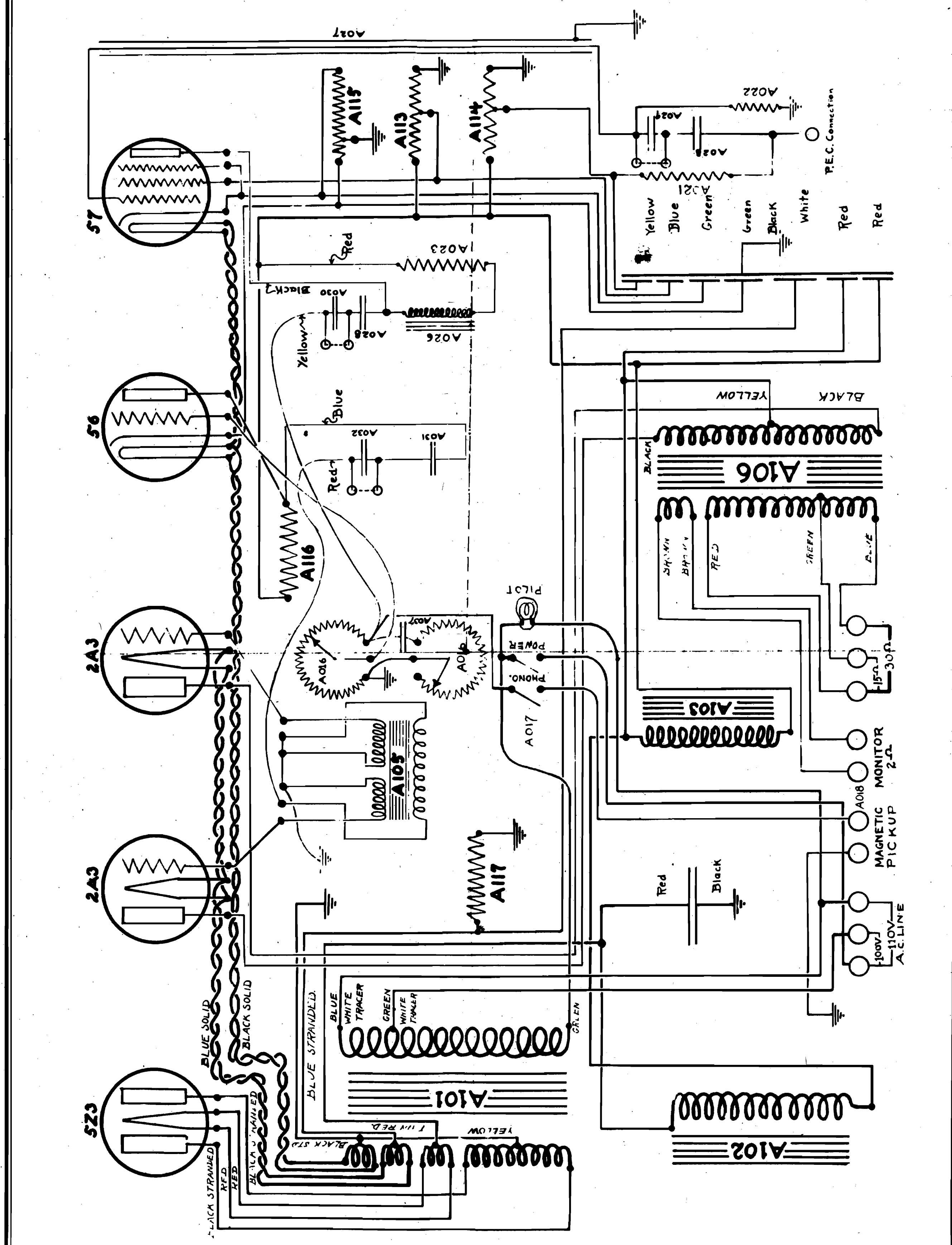
WILLIAM J. MURDOCK CO.





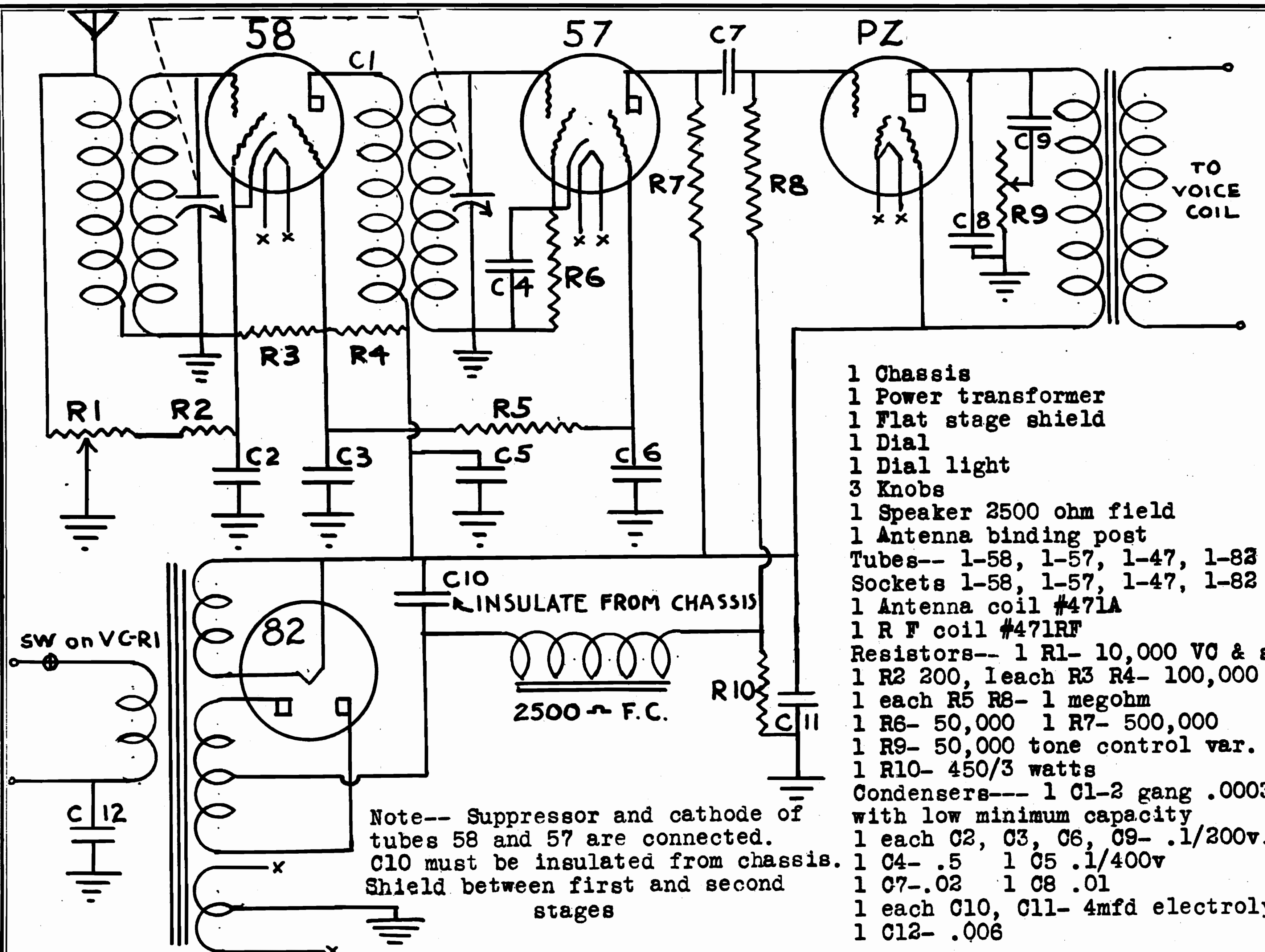
PACENT ELECTRIC CO., INC.

MODEL HFA 112 Amplifier Schematic



MODEL Spero Four
Schematic

PACIFIC RADIO EXCHANGE

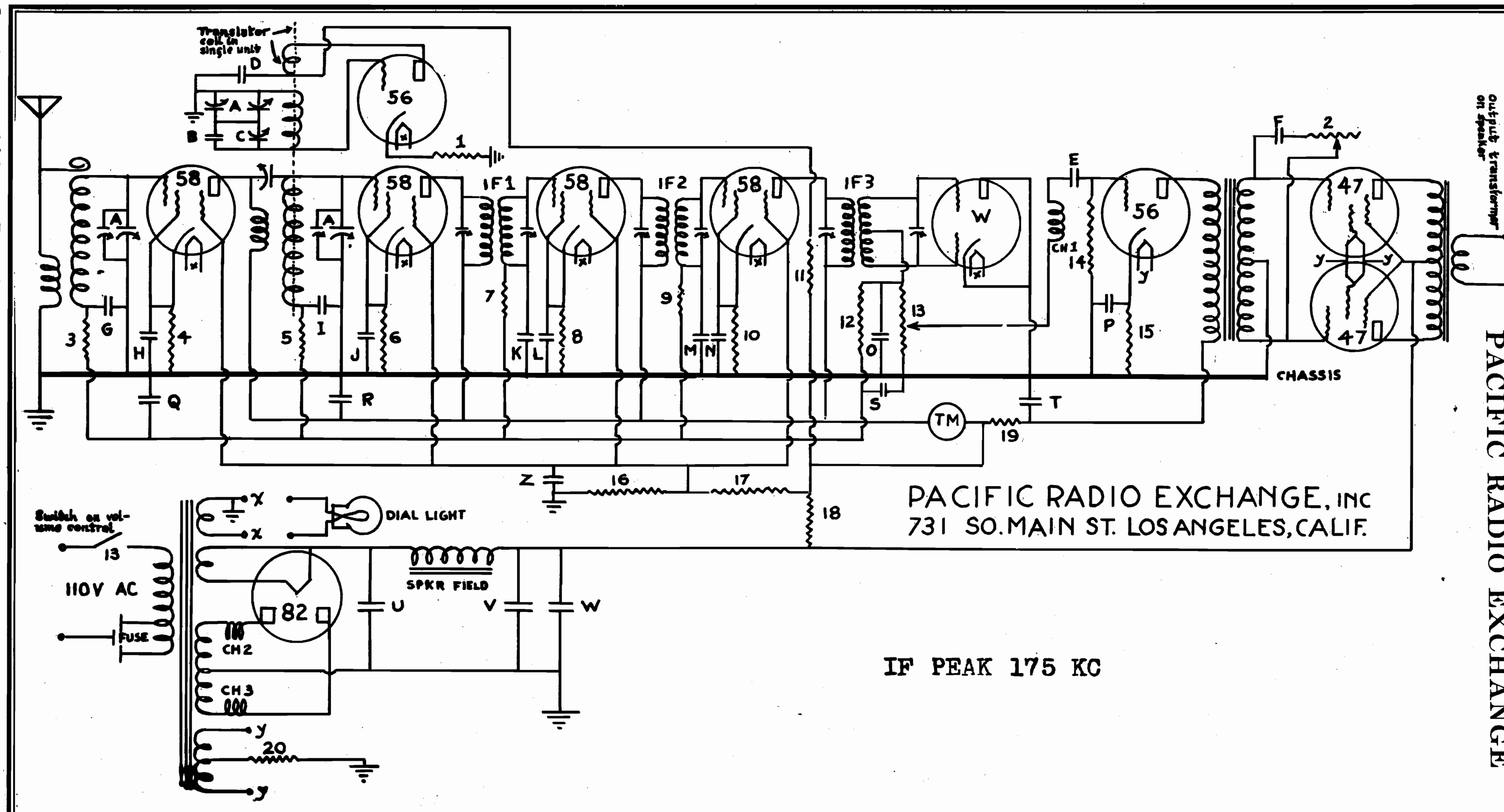


Note-- Suppressor and cathode of tubes 58 and 57 are connected. C10 must be insulated from chassis. Shield between first and second stages

1 Chassis
1 Power transformer
1 Flat stage shield
1 Dial
1 Dial light
3 Knobs
1 Speaker 2500 ohm field
1 Antenna binding post
Tubes-- 1-58, 1-57, 1-47, 1-82
Sockets 1-58, 1-57, 1-47, 1-82
1 Antenna coil #471A
1 R F coil #471RF
Resistors-- 1 R1- 10,000 VC & sw
1 R2 200, 1each R3 R4- 100,000
1 each R5 R8- 1 megohm
1 R6- 50,000 1 R7- 500,000
1 R9- 50,000 tone control var.
1 R10- 450/3 watts
Condensers--- 1 C1-2 gang .00035 with low minimum capacity
1 each C2, C3, C6, C9- .1/200v.
1 C4- .5 1 C5 .1/400v
1 C7-.02 1 C8 .01
1 each C10, C11- 4mfd electrolytic
1 C12- .006

MODEL Spero Super
Schematic

PACIFIC RADIO EXCHANGE



IF PEAK 175 KC

12 and 14--2 megohms
13--500,000 var. VC & SW
16--15,000, 18--500/3 watts
20--225/3 watts
RF Chokes 1, 2 and 3--1000

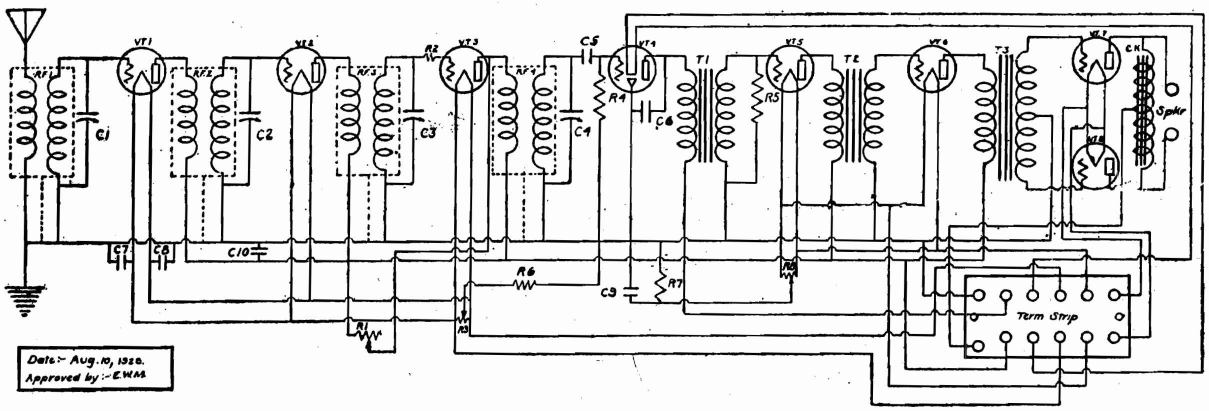
Condensers
A--3 gang, .00035 low min.
B--.001, C--.00014, D and E--.01
F--.006
G, H, I, J, K, L, M and N--.1
O--.001, P, Q, R and T--.5
S--.02, U and V--8 mfd. W--4 mfd.
Z--.25

1 Chassis
1 Power transformer
1 13 gang condenser .00035
1 Tuning dial with light
3 Knobs
1 Antenna and ground binding post
1 Fuse clip
1 T. M. (Tuning Meter)
1 Antenna coil
1 Translator coil
1 #212 input intermediate trans. #1
1 #212 Litz " " #2
1 #212 W center tapped " " #3
3 R. F. Choke coils
1 Audio transformer push-pull input

6 Tube Shields
4 #58 tubes
2 #56 tubes
2 #47 tubes
1 Wunderlich detector tube
1 #82 Mercury vapor rectifier
Sockets for same
1 Socket for speaker output cable
1 Plug for speaker output cable
1 Length of speaker cable
Resistors
1--1000, 2--200,000 variable TC
3, 5, 7, 9, 11 and 17--10,000 ohms
4--300, 6 and 19--5000 ohms
8 and 10--300 ohms, 15--2500 ohms

MODEL 8 AC
Schematic, Parts

PACKARD RADIO CO.

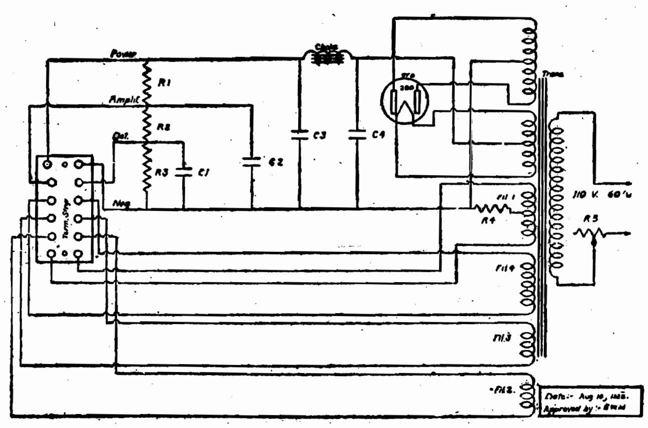


C1, C2, C3, C4	—Variable tuning condensers.
RF1, RF2, RF3, RF4	—Radio frequency shielded coils (dotted lines indicate shields).
VT1, VT2, VT3	—Radio frequency amp. tubes of '26 type.
VT4	—Detector tube of 5-prong '27 type.
VT5, VT6	—Audio frequency amp. tubes of '26 type.
VT7, VT8	—Power tubes of '71A type.
T1, T2	—Audio transformers.
T3	—Push-pull input transformer.
Ck	—Push-pull output choke.
C5	—Grid condenser.
C6	—R. F. by-pass condenser.
C7, C8	—By-pass condenser.

C9	—By-pass condenser.
C10	—By-pass condenser.
R1	—Volume control.
R2	—Grid suppressor.
R3	—Center tapped fixed resistor.
R4	—Grid leak.
R5	—Resistor.
R6	—Biasing resistor.
R7	—Biasing resistor.
R8	—Center tapped variable resistor.
Spkr.	—Jacks for speaker cord tips.
Term. Strip	—Terminal strip on cord attached to set by which Pack is connected.

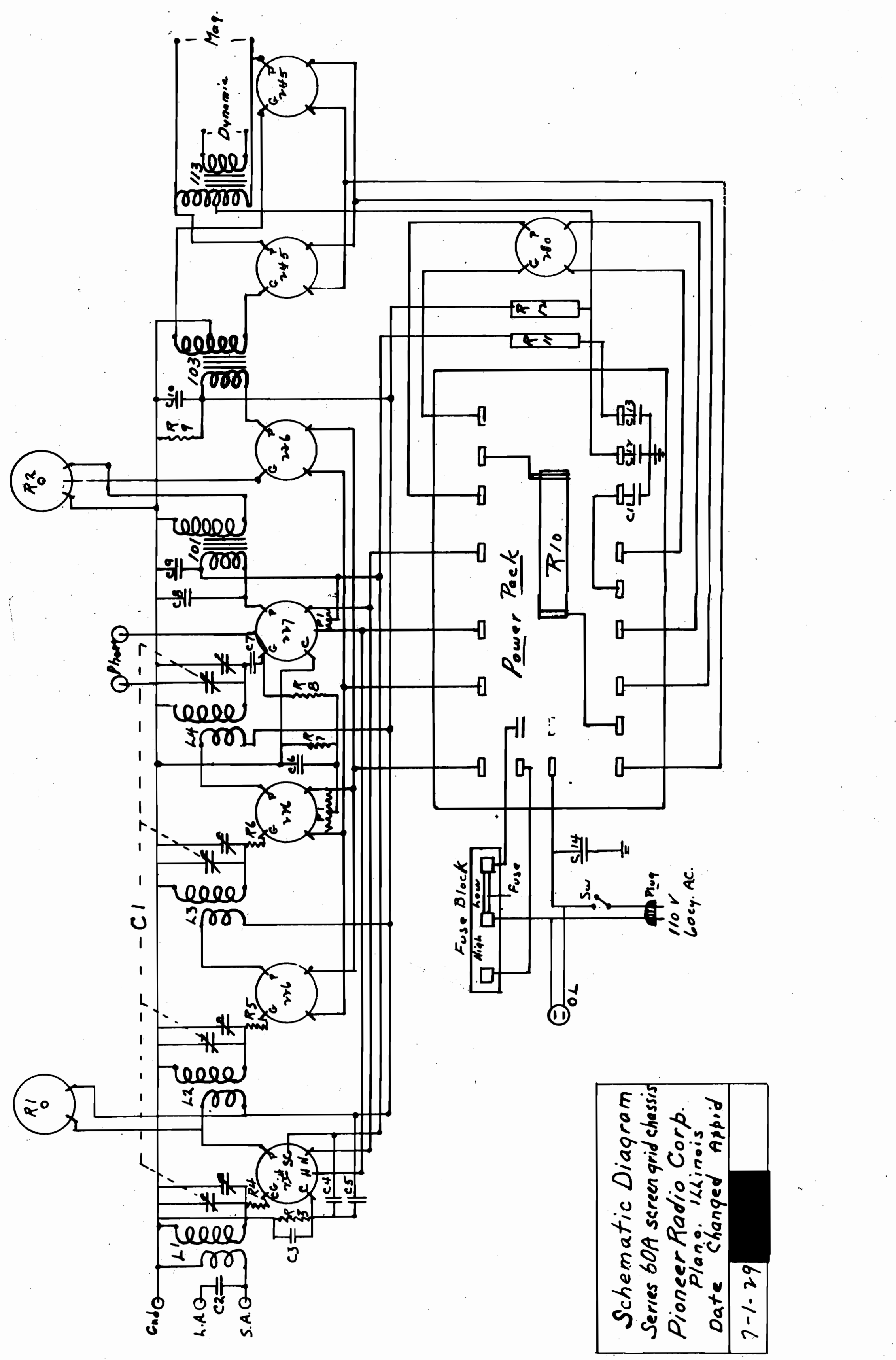
Circuit Diagram of Power Pack

Choke	—Filter choke.
Trans.	—Power transformer.
VT9	—Full-wave rectifier tube of '80 type.
C1, C2	—Filter condenser.
C3	—Filter condensers.
C4	—Filter condensers.
R1	—Resistor.
R2	—Resistor.
R3	—Resistor.
R4	—Biasing resistor.
R5	—Variable resistor for line volt. control.
Power	—Plate voltage for power tubes.
Amplif.	—Plate voltage for audio frequency and radio frequency amp. tubes.
Det.	—Plate voltage for detector tube.
Neg.	—Negative or ground potential terminal of Pack.
Term. Strip	—Terminal strip where Pack is connected to set.
Fil. 1	—Filament supply for '71 tubes.
Fil. 2	—Filament supply for audio amp. tubes.
Fil. 3	—Filament supply for radio amp. tubes.
Fil. 4	—Filament supply for detector tube.



MODEL 60-A Series
Schematic

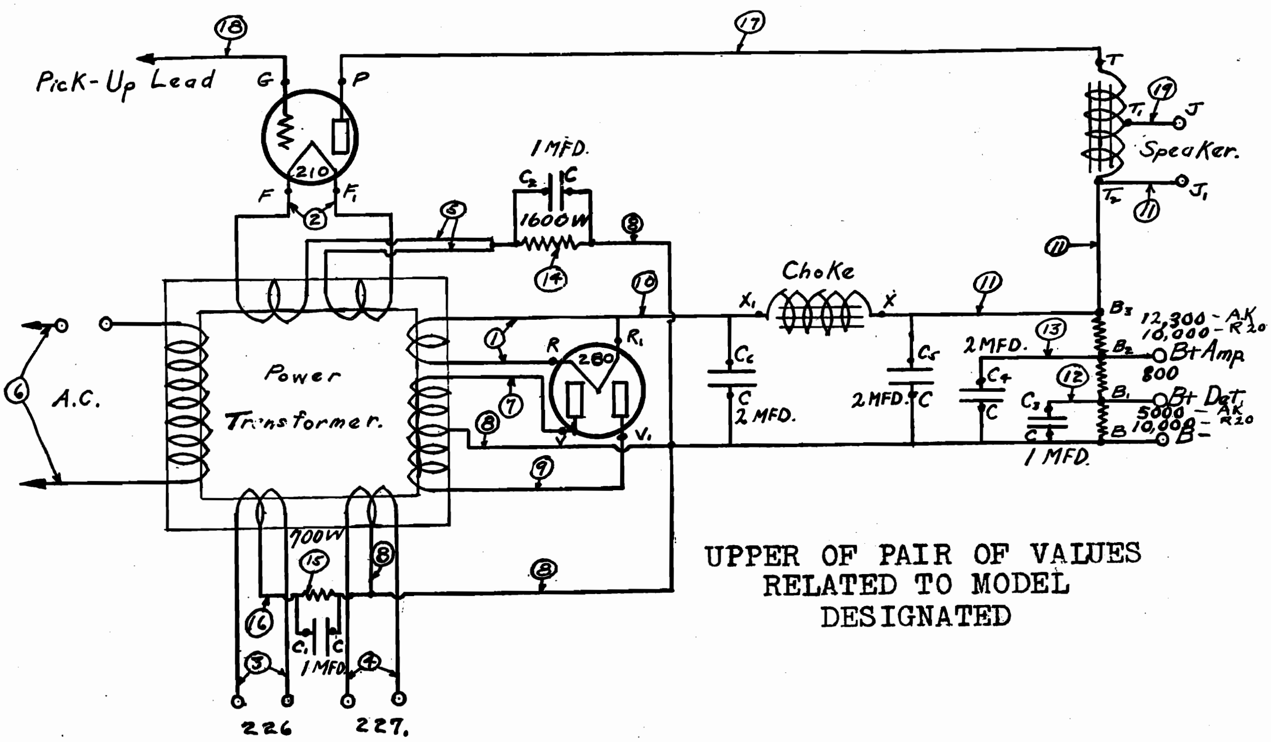
PIONEER RADIO CORPORATION



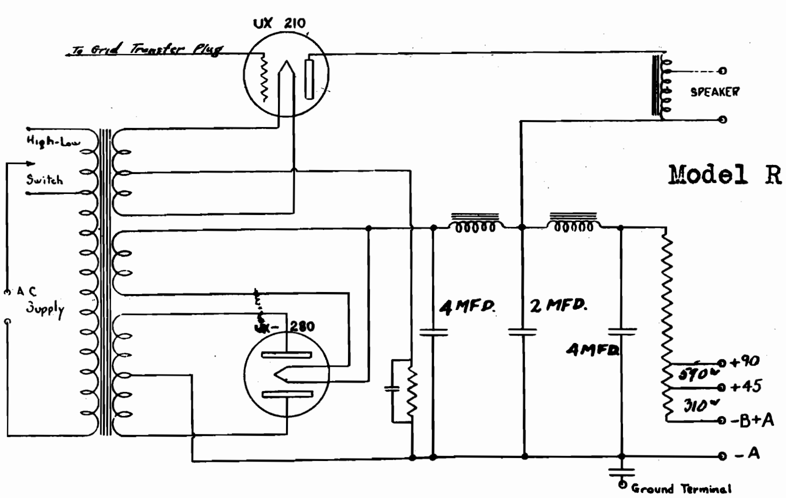
MODELS AK, R-20
MODELS R 25-28
Schematics

RADIO RECEPTOR CO.

SCHEMATIC DIAGRAM OF POWERIZER



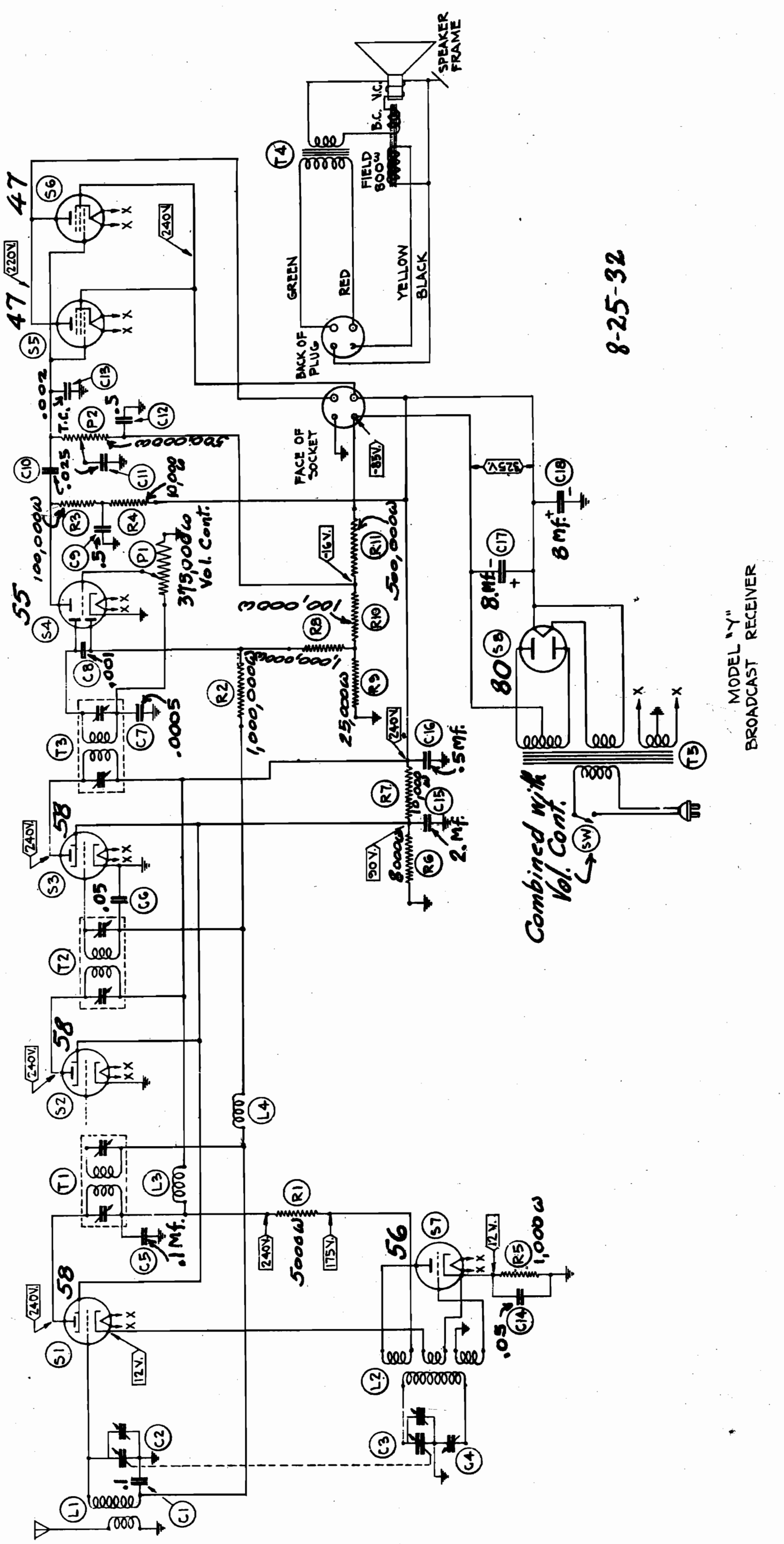
UPPER OF PAIR OF VALUES
RELATED TO MODEL
DESIGNATED



Model R 25-28

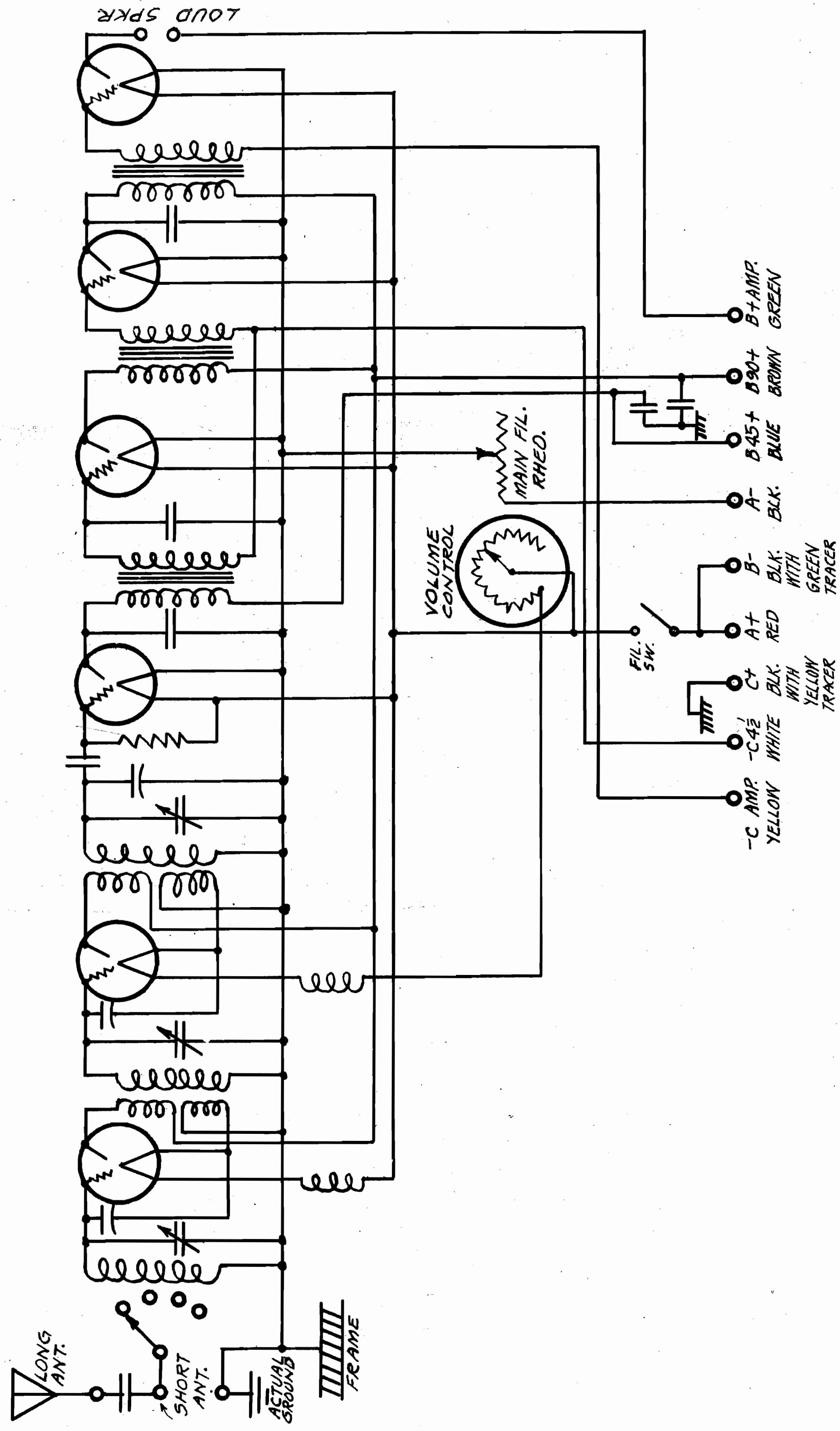
MODEL Y
Schematic

SILVER - MARSHALL, Inc.



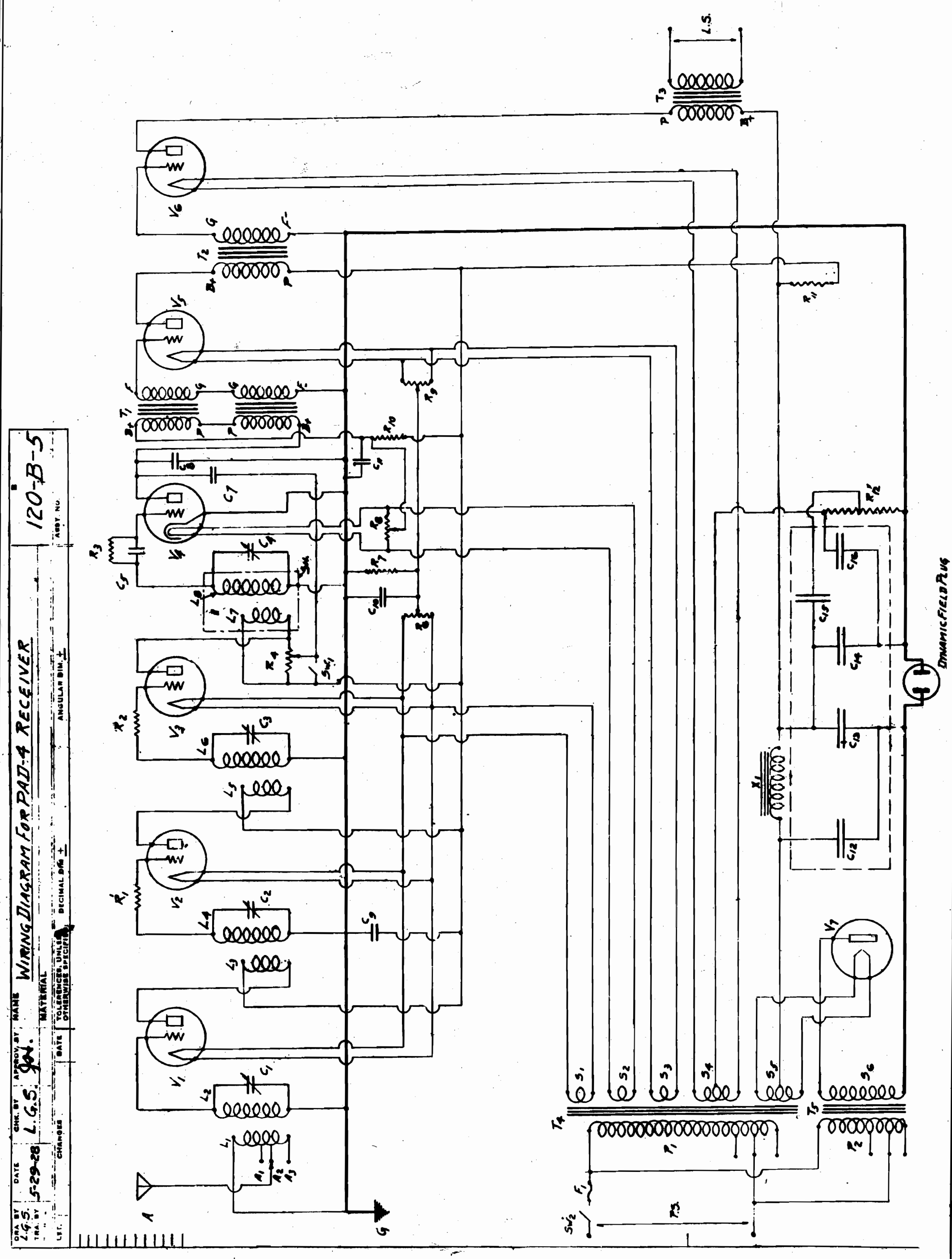
MODEL D
Schematic

SONORA PHONOGRAPH CO. Inc.



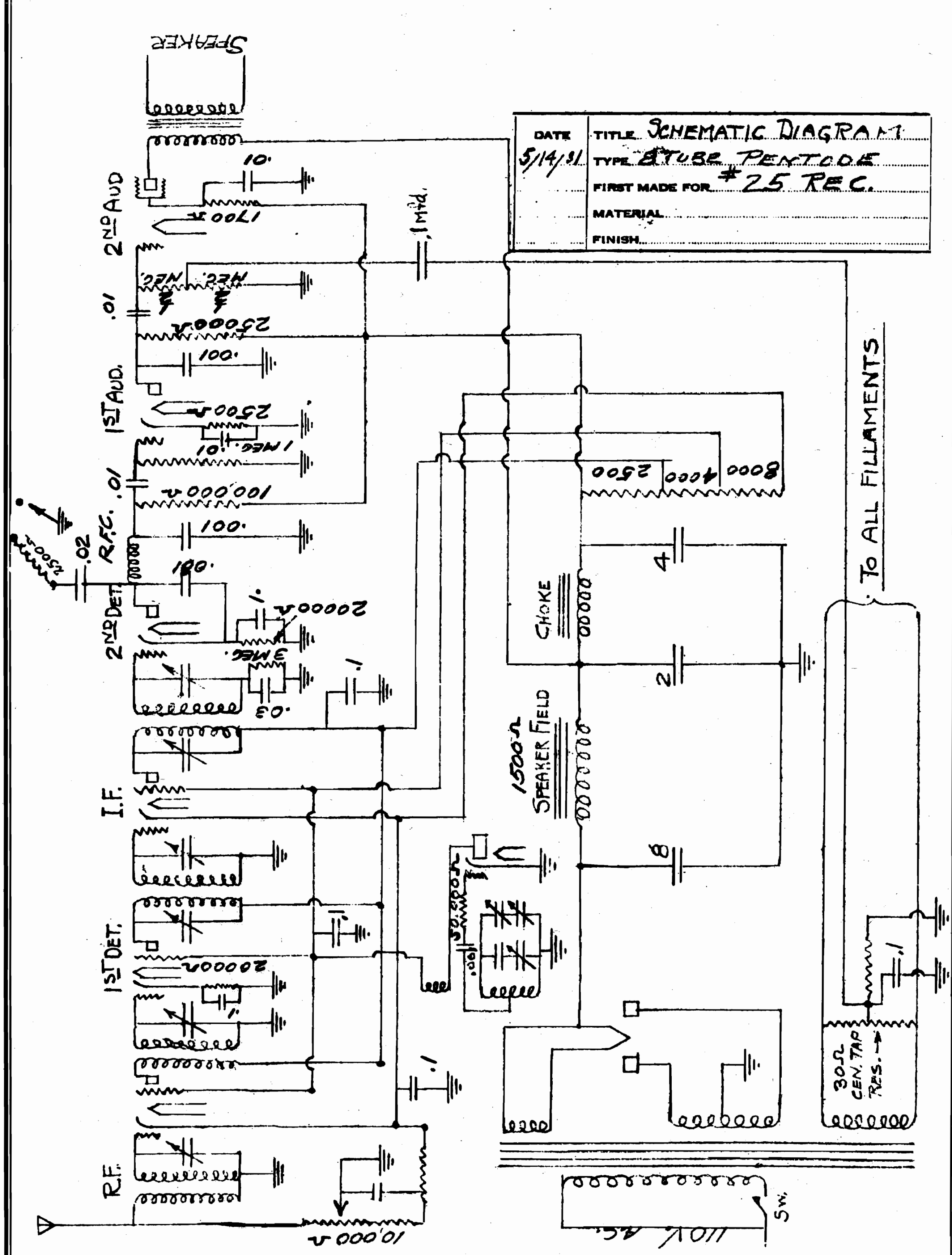
SPLITDORF RADIO CORP.

MODEL PAD-4
Schematic



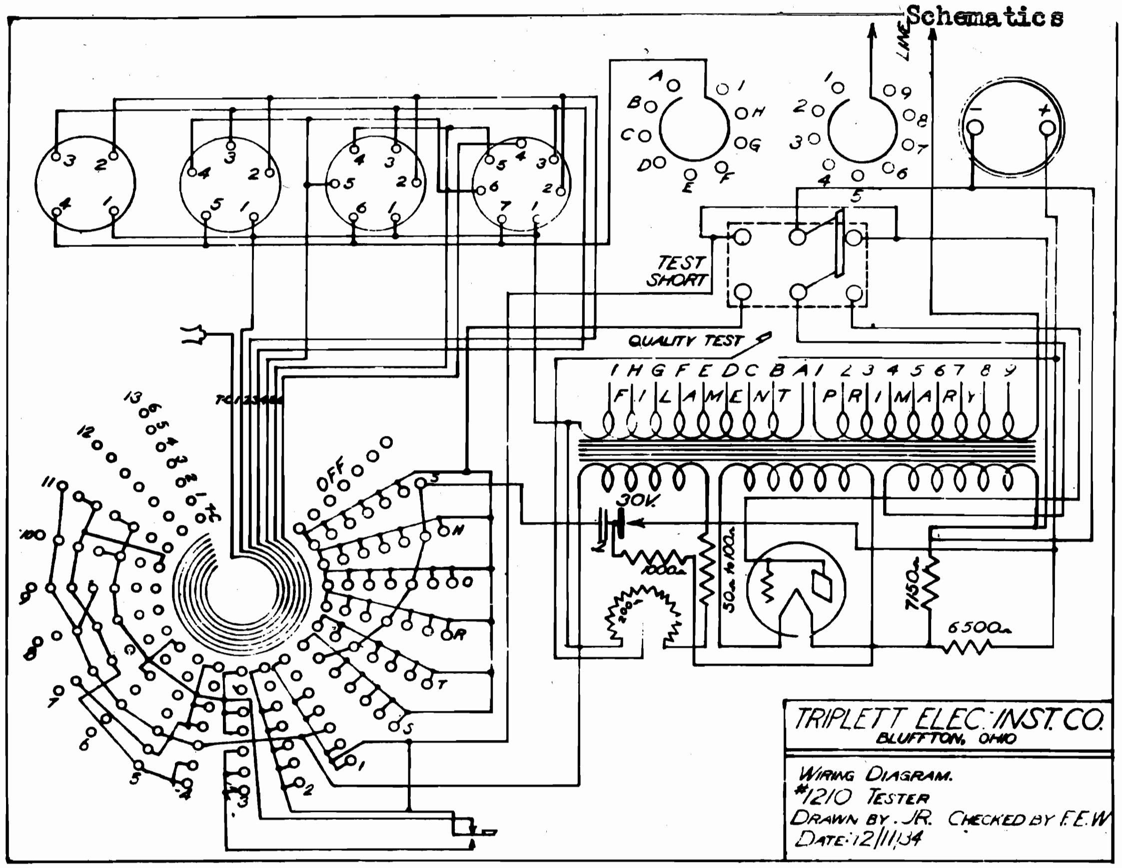
MODEL 8-Tube Pentode
Schematic

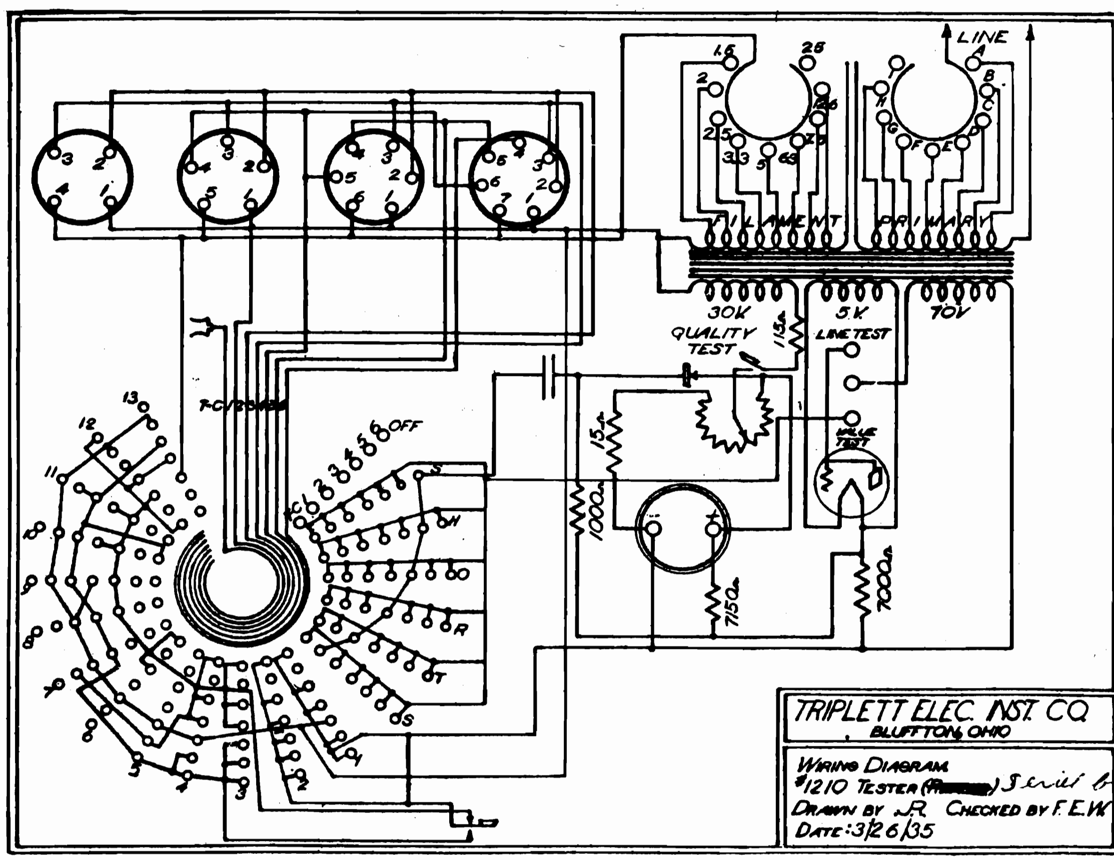
STEINITE RADIO CO.



TRIPLETT ELECTRICAL INSTRUMENT

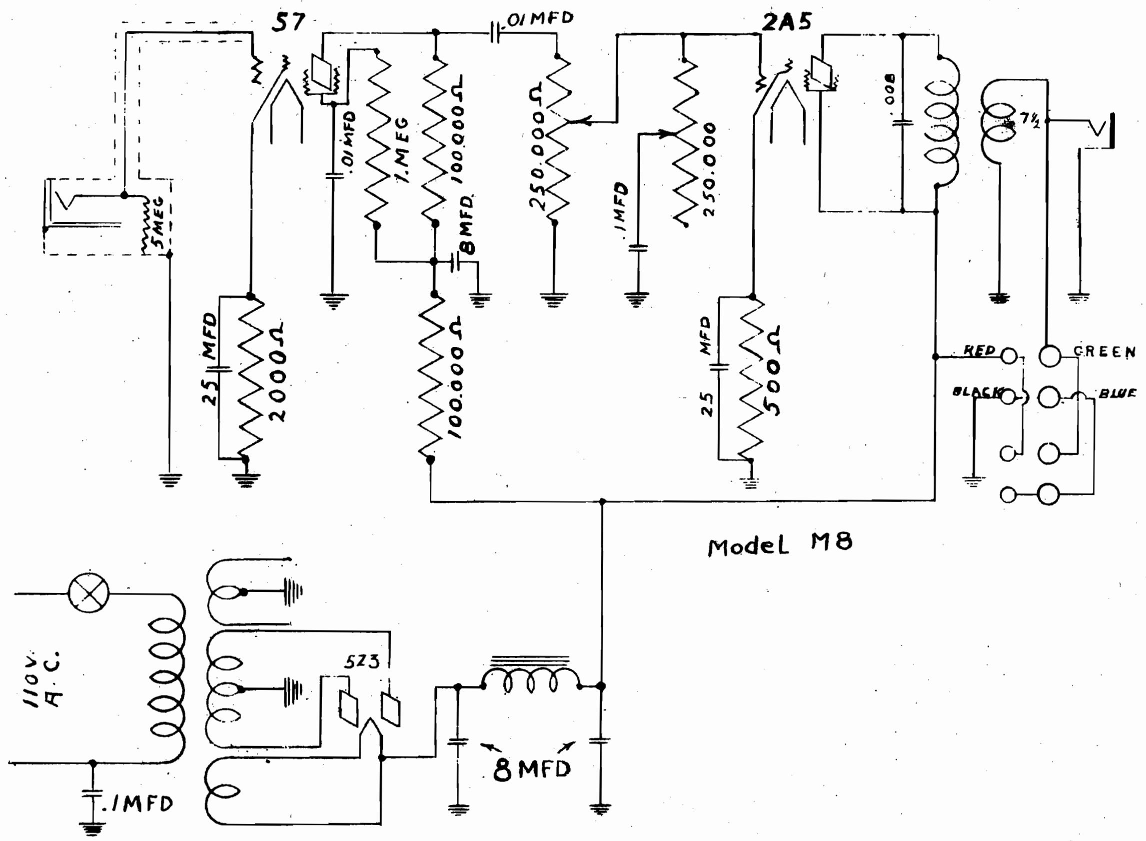
MODEL 1210 Tester
2 Types, Above and Below Serial 100,000
Schematics

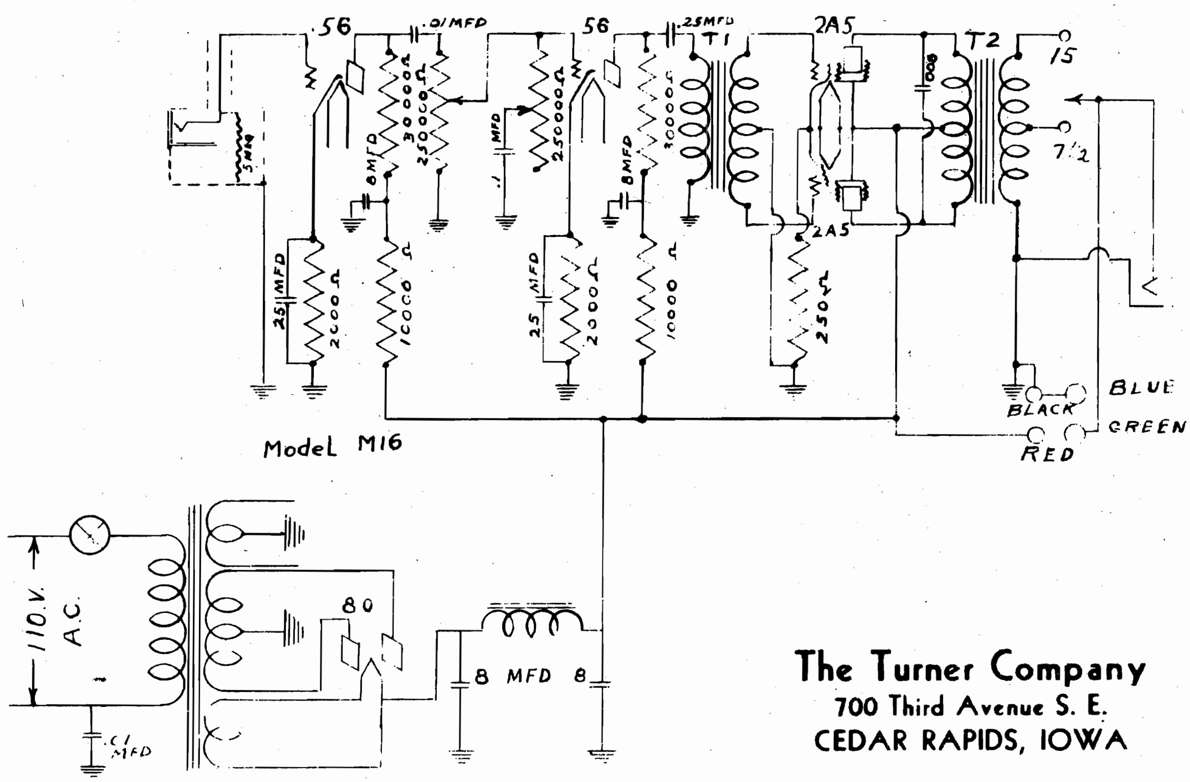




MODEL M-8
MODEL M-16
Schematics

THE TURNER CO.





The Turner Company
700 Third Avenue S. E.
CEDAR RAPIDS, IOWA

UNIVERSAL BATTERY CO.

MODEL 613V
MODELS 7232,7332
Schematics, Parts
Socket Layouts

PARTS

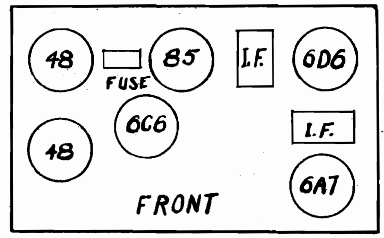
R1-250Ω RESISTOR
R2-50MΩ "
R3-15MΩ "
R4-25MΩ "
R5-50MΩ "
R6-500M VOL. CONTROL
R7-1 MEG. RESISTOR
R8-500MΩ "
R9-100MΩ "

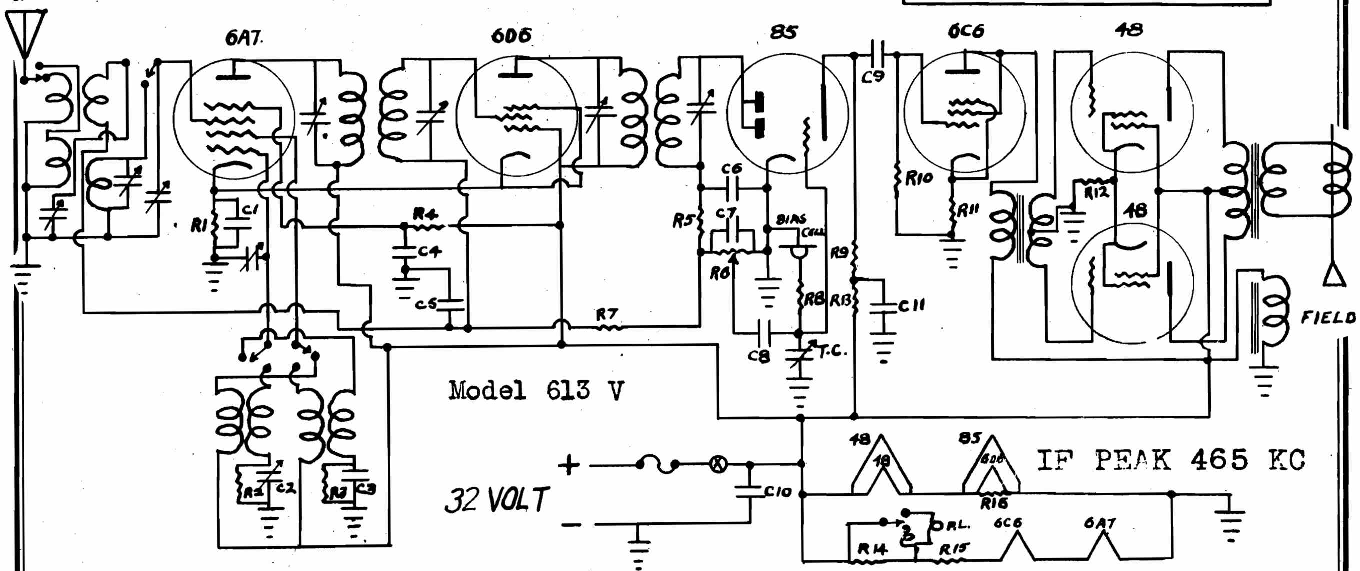
R10-500MΩ RESISTOR
R11-750Ω "
R12-350Ω "
R13-100MΩ "
R14-40Ω 2 WATT "
R15-40Ω 2 " "
R16-40Ω 2 " "
C1-.1-200 V. CONDENSER
C2-500MMF PAD. "
I.C.-TONE CONTROL

C3-.004 MICA CONDENSER
C4-.1-200V. "
C5-.01-200V. "
C6-.0001 MICA "
C7-.0001 " "
C8-.05-200V. "
C9-.05-200V. "
C10-.25-200V. "
C11-.1-200V. "

Model 613V

TUBE LOCATIONS





PARTS

R1-250Ω RESISTOR
R2-50MΩ "
R3-1MEG. "
R4-25MΩ "
R5-1MEG. "
R6-250Ω "
R7-50MΩ "
R8-500MΩ "
R9-500M VOL. CONTROL

R10-5MΩ RESISTOR
R11-100MΩ "
R12-100MΩ "
R13-250MΩ "
R14-1MΩ "
R15-10MΩ "
R16-30Ω 1½ WATT
R17-60Ω ½ WATT
R18-30Ω 5 WATT

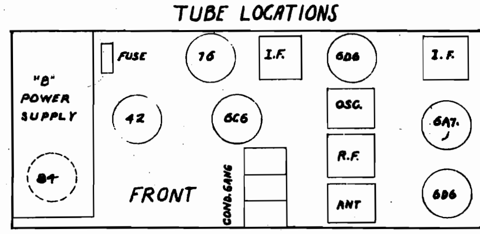
R19-15Ω 2½ WATT
C1-.1-200V. CONDENSER
C2-.0001 MICA "
C3-450MMF PAD.
C4-1000MMF PAD.
C5-.003 MICA COND.
C6-.01-200V. "
C7-.01-200 V. "
C8-.1-400V. "
C9-.1-200V. "

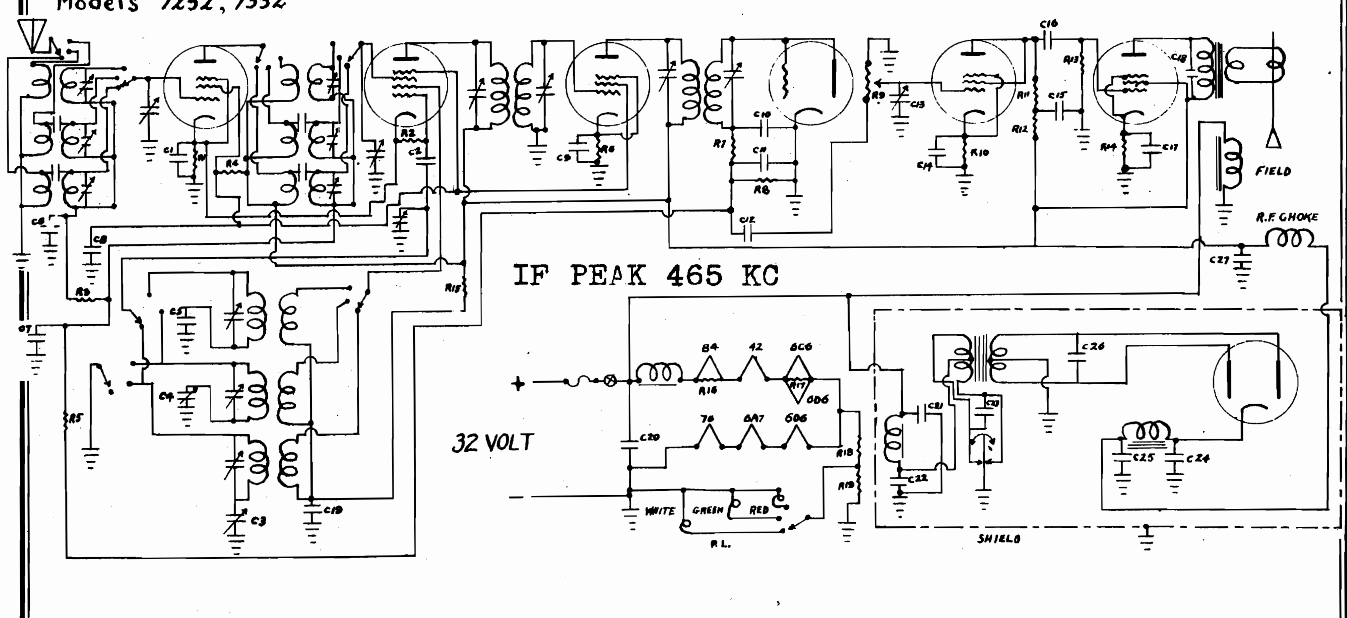
C10-.0001 MICA COND.
C11-.0001 MICA "
C12-.05-200V. "
C13-TONE CONTROL
C14-.25-200V. COND.
C15-.1-400 V. "
C16-.05-400V. "
C17-10MFD-35 V.
C18-.005-600V. COND.

C19-.1-400V. COND.
C20-.004 MICA "
C21-.25-200V. "
C22-.25-200V. "
C23-.5-200V. "
C24-12 MFD.-500 V.
C25-6 MFD.-500V.
C26-.02-800 V.
C27-.25-600V.

Models 7232, 7332

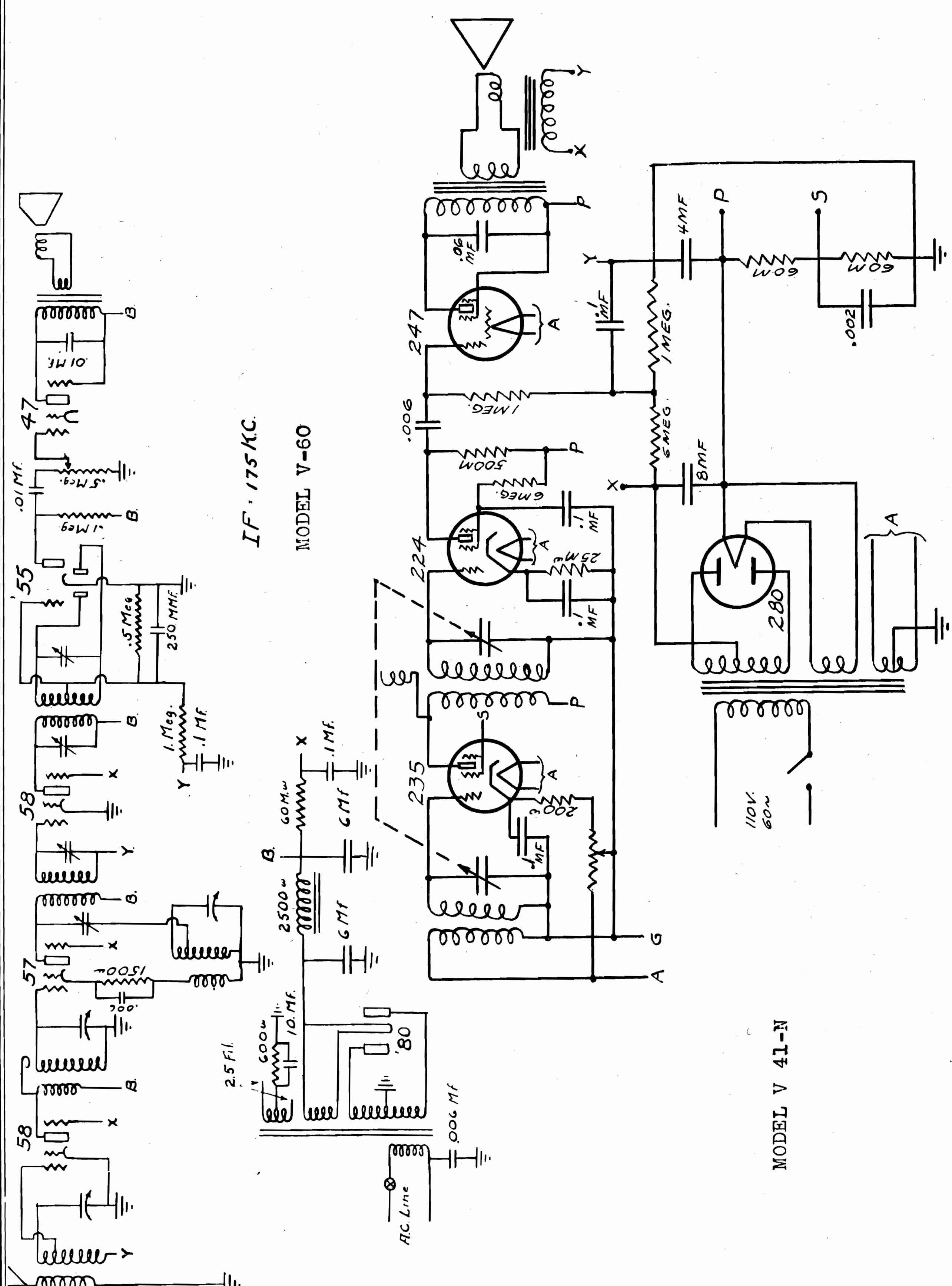
TUBE LOCATIONS





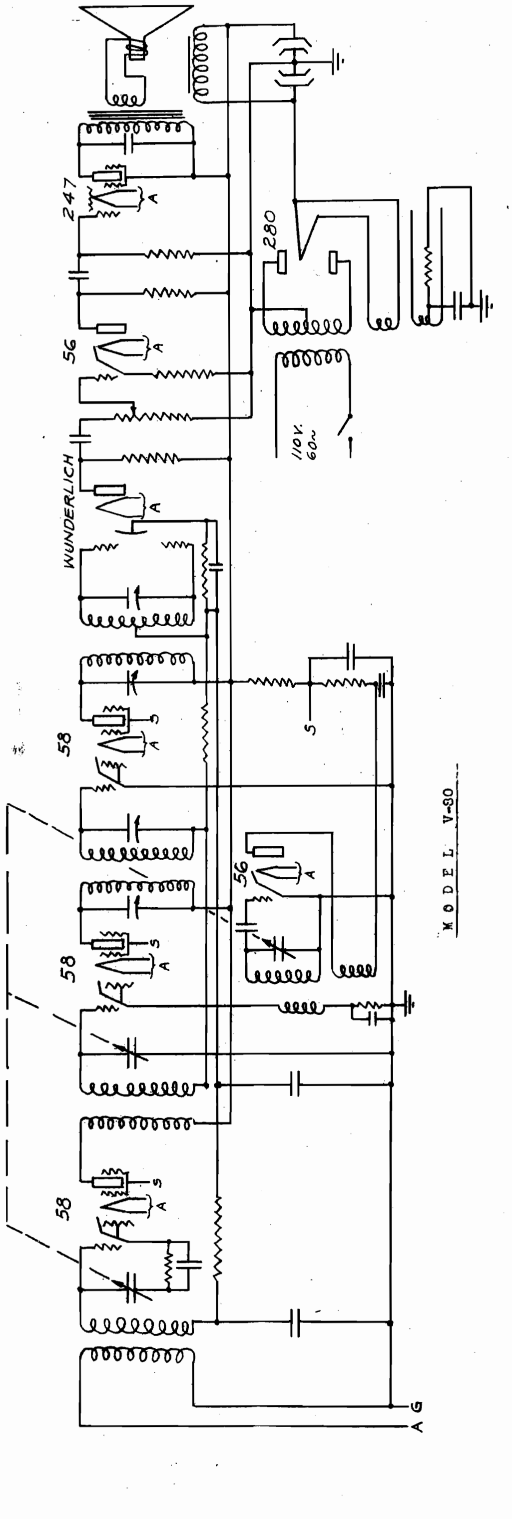
MODEL V-60
MODEL V-41-N
Schematics

VOCO RADIO MFG. CO., INC.

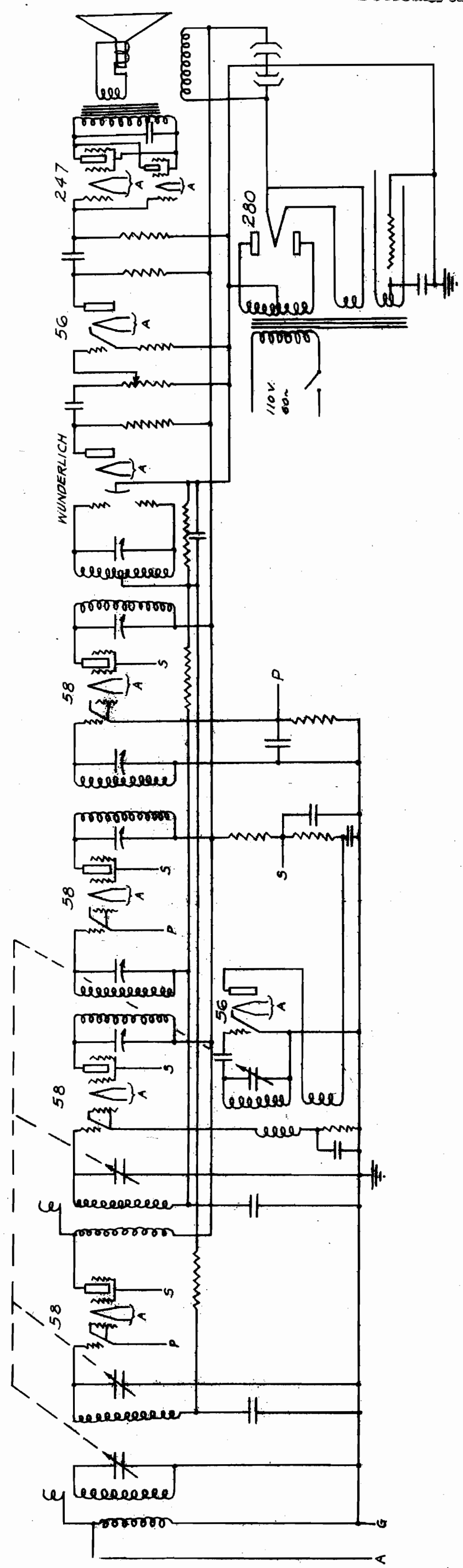


VOCO RADIO MFG. CO., INC.

MODEL V-80
MODEL V-100
Schematics



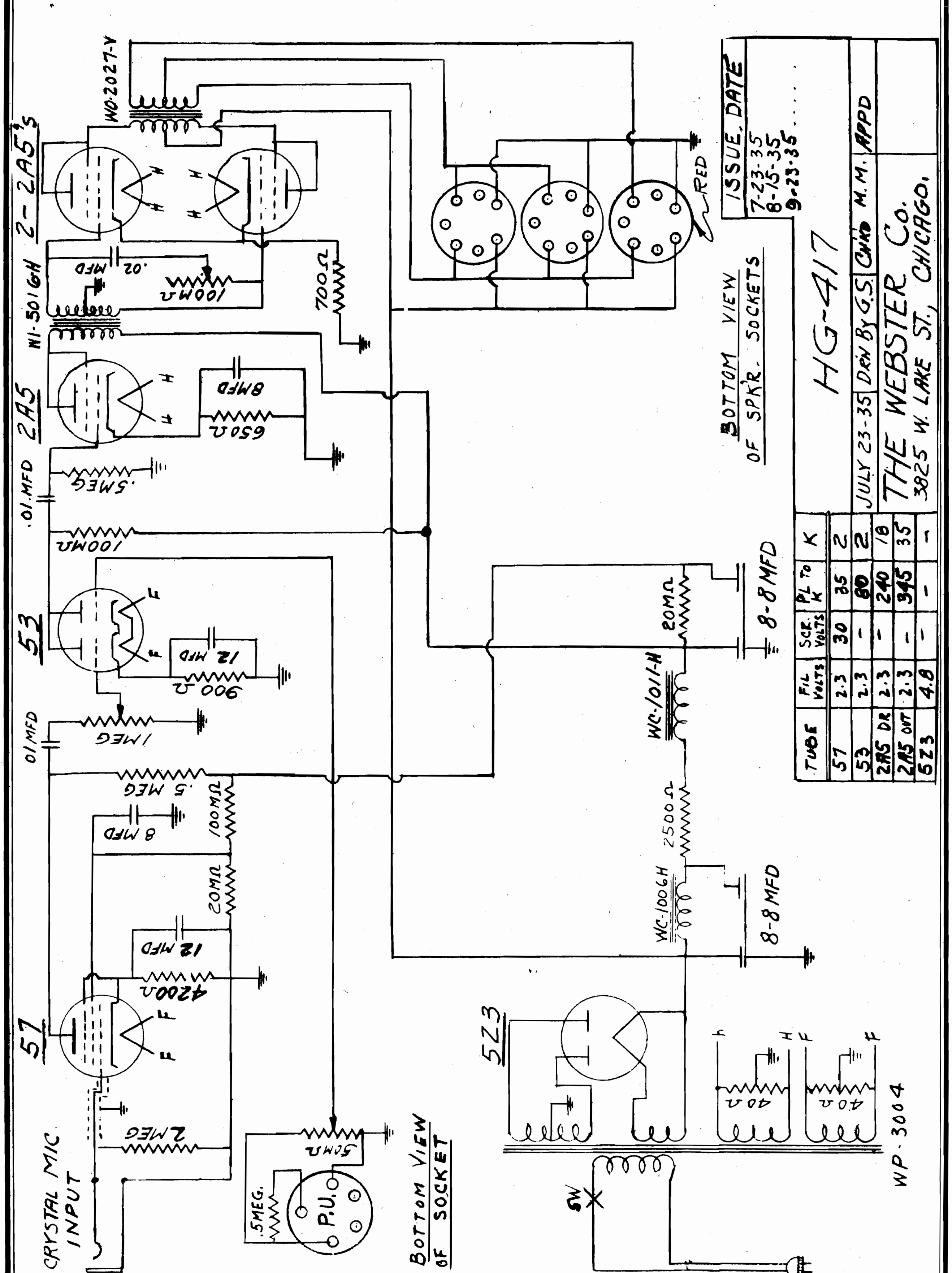
MODEL V-80



MODEL V-100

MODEL HG-417
Schematic

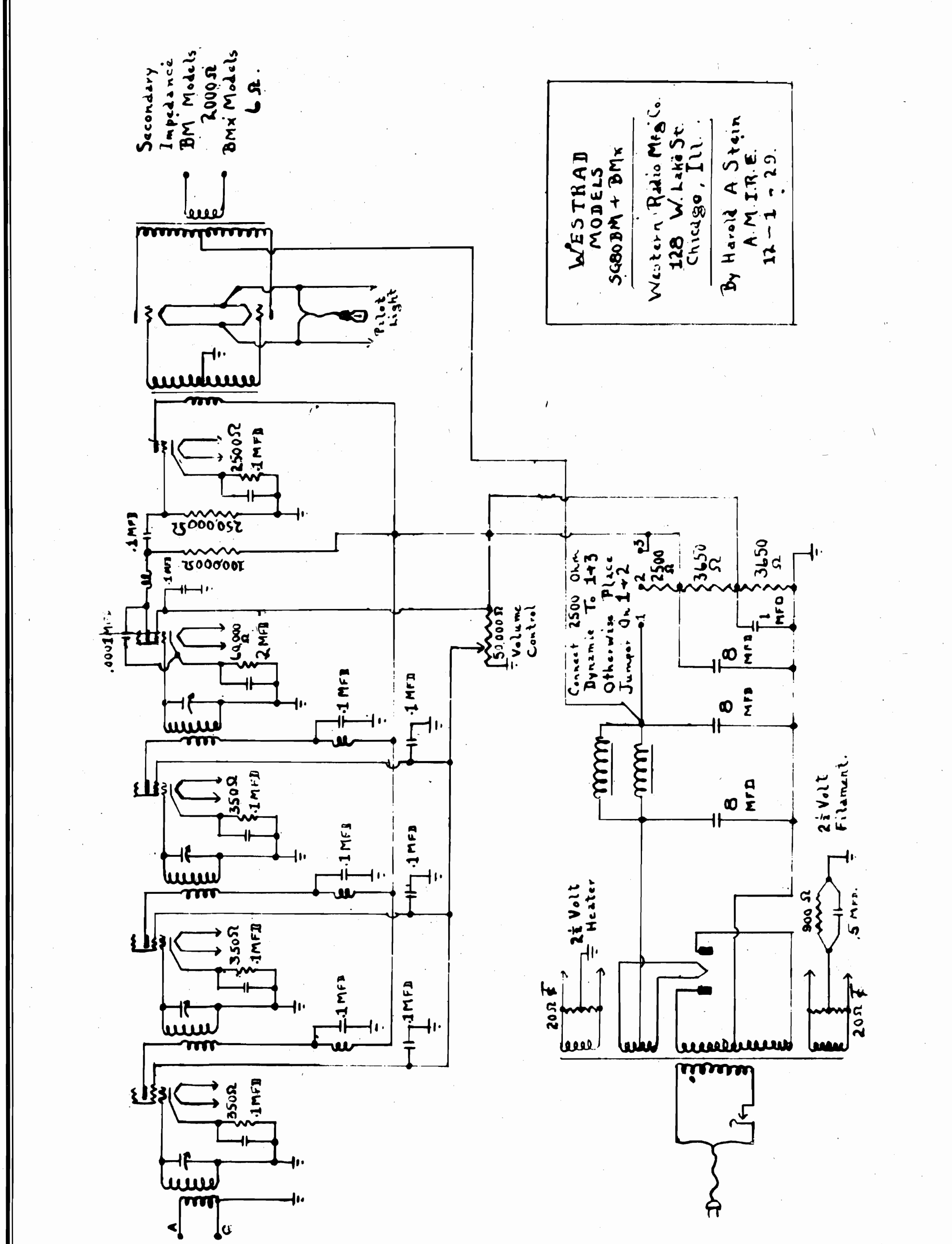
WEBSTER CO.



TUBE	FIL VOLTS	SCR. VOLTS	PL TO K	K
57	2.3	30	35	2
53	2.3	-	80	2
2A5 DR.	2.3	-	240	18
2A5 OUT	2.3	-	345	35
5Z3	4.8	-	-	-

MODEL SG 80 BM
Schematic

WESTERN RADIO MFG. CO.



MODEL 550
Schematic, Parts Data

THE RUDOLPH WURLITZER CO.

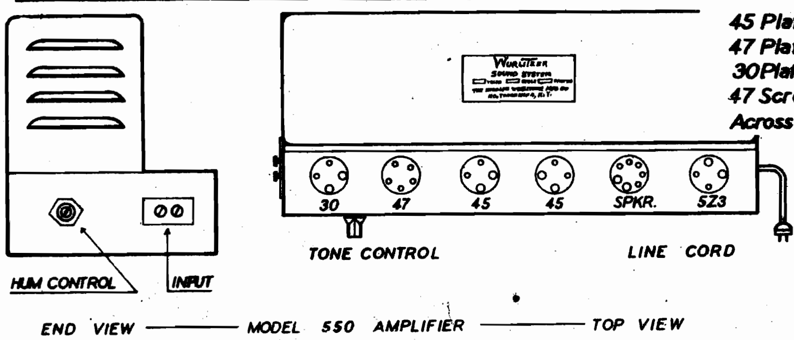
SIMPLEX POWER AMPLIFIER
MODEL 550
SERIAL NUMBER SERIES 5 500 001
DRAWING NUMBER 97

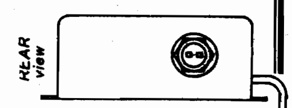
9-1-35

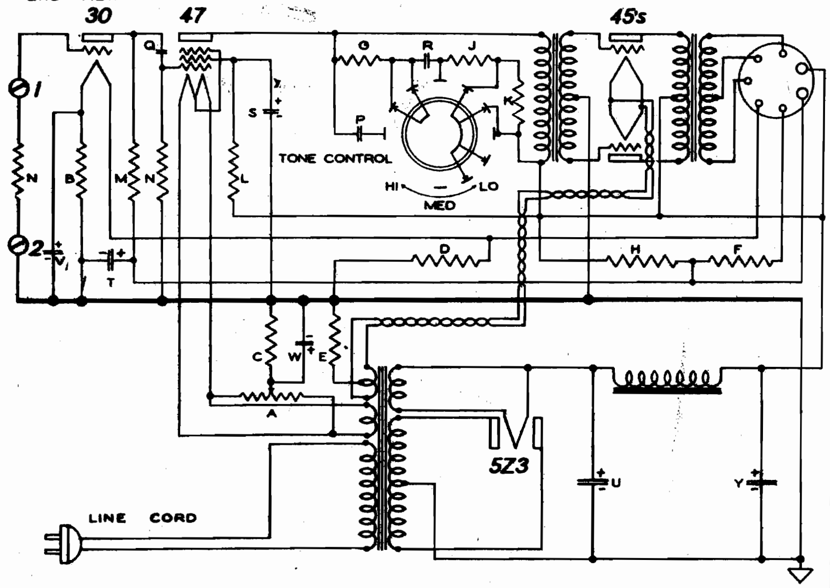
Measure all D.C. voltages from chassis with a 1000 ohm per volt meter with the line at 115 volts 60 cycles.

AVERAGE D.C. VOLTAGES

45 Plates	338v.	45 Bias	57.5v.
47 Plate	313v.	47 Bias	19v.
30 Plate	75v.	30 Bias	4.1v.
47 Screen	294v.	5Z3 Fil.	365v.
Across cond. Y	340v.	Across cond. T	170v.







LEGEND

+	Connection
⊥	NO Connection
▽	Ground
ω	Ohm
Mω	Kilohm
Ω	Megohm

PARTS LIST

amplifier unit			
A	20ω	Hum Control	
B	65ω	w.w.	res.
C	500ω	w.w.	res.
D	280ω	volt.	div.
E	775ω	volt.	div.
F	1850ω	volt.	div.
G	4500ω	carbon.	
H	7000ω	volt.	div.
J	1500ω	carbon w/2	
K	4 Mω	carbon w/2	
L	5 Mω	carbon w/1	
M	100Mω	carbon w/4	
N	0.5 Ω	carbon w/4	
P	.01mf.	600v.	paper
Q	.05mf.	400v.	paper
R	.3mf.	400v.	paper
S	2 mf.	450v.	dry
T	8 mf.	200v.	dry
U	8 mf.	475v.	wet
V	10 mf.	25v.	dry
W	25mf.	25v.	dry
Y	30mf.	400v.	wet
volume control unit			
a	15Mω	carbon	w/4
b	50Mω	carbon	w/4
c	50 Mω	dual	var.
d	150Mω	dual	var.
e	0.0015mf.		mica
f	0.004mf.		mica
g	.25mf.	200v.	paper