Perpetual Trouble Shooter's Manual Volume I
About 1000 pages. Price $7.50

Perpetual Trouble Shooter's Manual Volume II
About 800 pages. Price $7.50

Perpetual Trouble Shooter's Manual Volume III
About 1070 pages. Price $7.50

Perpetual Trouble Shooter's Manual Volume IV
About 1060 pages. Price $7.50

Perpetual Trouble Shooter's Manual Volume V
About 1200 pages. Price $7.50

Perpetual Trouble Shooter's Manual Volume VI
About 1240 pages. Price $7.50

Perpetual Trouble Shooter's Manual Volume VII
About 1600 pages. Price $10.00

Perpetual Trouble Shooter's Manual Volume VIII
About 1650 pages. Price $10.00

Perpetual Trouble Shooter's Manual Volume IX
About 1570 pages. Price $10.00

The Perpetual Trouble Shooter's Manuals listed above are the "standard" of the radio service industry.

Their absolute supremacy as sources of accurate—complete and detailed radio service data is established by their use by the world-famous tube manufacturing organizations, such as E. T. Cunningham, Inc., National Union Radio Corp., RCA Radiotron, Inc., Arcturus Radio Tube Co., Raytheon Production Corp., Hygrade Sylvania Corp.—the most famous service instrument manufacturers, like Weston, Hickok, Readrite and Supreme and their use and recommendation by the world's leading radio receiver manufacturers.

The servicing data appearing on Philco, RCA, and other pages carrying individual copyright notices, are copyrighted by the respective companies and are reproduced herein with their permission.

Entire contents copyrighted 1939 by John F. Rider.
New Developments
Manufacturers' Changes
Keep Your
Rider Manuals
Up-to-Date
With
Successful Servicing
Rider's FREE House-organ

Manufacturers are continually changing their various chassis....As far as possible, these important facts are published in our house-organ together with timely articles on servicing and new developments... These are vital to you... This FREE service is yours for the asking....

Please PRINT your Name and Address

Please mail me SUCCESSFUL SERVICING

Name

Street

City  State

Check the following:

Are you a - SERVICE MAN □ DEALER □
Do you own RIDER'S MANUALS? Yes □ No □
(If "Yes", check Volumes I, II, III, IV, V, VI, VII)
VIII, IX)

Mail This Coupon Today To
Today T Rider
John F. Rider Ave.
404 Fourth Ave.
New York City
MODEL 912 AUTOMATIC TUNING CONTROL

Decide on station you wish to receive.

Refer to the diagram underneath cabinet and see which station you wish to receive. The proper pair of adjustment screws are located on the rear of the cabinet. These screws are adjusted to give the proper frequency for the station desired.

Adjust volume control knob until desired station is heard. (In this case, the station is heard. If when turning volume control knob, the station is not heard, make sure the frequency of the station is correct.)

Adjust screw marked "A" for maximum volume. Then, with the volume control adjusted, the other buttons (four other buttons) and cut out canned disc, insert necessary adjustment for each station.
MODEL 257
Tuner Data
MODEL 3905
Schematic, Voltage
Alignment, Socket

AIR KING PRODUCTS CORP.

MODEL 3910
Schematic, Socket

LOCATION OF TUBES & BATTERIES
MODEL 3910

LOCATION OF TUBES & BATTERIES
MODEL 3905

MODEL 257

AUTOMATIC TUNING:
There are four push buttons on the front panel which can
be set so that by simply pushing the button marked with
a station’s call letters, any of four different stations may be received.

Allow the receiver to warm up for 20 minutes before making the station adjustments.

Decide on the station you wish to receive.

Tune to this station as accurately as possible with the selector knob.

Next, push in this button as far as possible, being careful not to disturb the station setting on the dial.

Turn this push button knob about one turn to the left, or until it starts to unscrew easily.

Holding the button at the "IN" position, screw the push button knob to the right until it is tight.

Cut out name of station from list supplied and insert in face of button.

Insert celluloid disk.

This completes the adjustments for one station. The three other buttons may be set in a similar manner.

©John F. Rider, Publisher
Compliments of www.nucow.com
Allied Radio Corp.

**Models A-9780, A-9781**
Chassis B-6
Schematic, Socket, Alignment
Trimmers

**If Alignment** - Adjust Generator to 175 KC, connect output to grid of GA7, the omission of series cond and resistor to block out AVC action. Generator grounded to chassis. Align trimmers of IF transformers (three).

**Oscillator** - Adjust Generator to 1400 KC, connect through 100 MF cond to the antenna of receiver. Adjust last section of gang condenser trimmer to max peak.

**RF Alignment** - Adjust the Antenna and RF trimmers on gang condenser to maximum peak at 1400 KC. Repeat all adjustments for maximum performance.

©John F. Rider, Publisher
INTERMEDIATE FREQUENCY - Connect the Signal Generator to Grid of 6A7 tube through a .05 MFD. condenser. Ground Generator to Ground of Chassis. Set Generator at 456 KC and adjust Trimmers on IF Transformers for maximum peak.

BROADCAST BAND - Connect the Generator to the Antenna of receiver through a .0001 MFD condenser. Ground Generator to Ground of Chassis. Range switch in Broadcast Position. Set Generator to 1400 KC and adjust Oscillator and RF Trimmers to Maximum peak. Dial of Receiver set on 1400 KC.

Pad the Broadcast Band at 500 KC, rocking the variable condenser during the adjustment.

SHORTWAVE BAND - Set Receiver and Generator to 6000 KC. Range switch in SW Position. Adjust SW Antenna Trimmer for maximum peak. No Oscillator adjustment is needed on this range.
Five Tube AC Superheterodyne

A1 Chassis

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.
6 Volt Battery Superheterodyne

M5 Chassis

©John F. Rider, Publisher
ALIGNMENT DATA

IF ALIGNMENT - Wave change switch on BG position. Generator connected to grid of 6A8 thru a .05 MFD condenser, and align six IF trimmers to peak.

BROADCAST - Connect Generator to ANT lead thru 1000 MFD condenser. Receiver, Generator set to 1400 KC, adjust Oscillator trimmer to peak, then RF trimmers. Pad the Oscillator circuit at 600 KC while rocking variable condenser.

POLICE - Replace 1000 MFD condenser with 400 ohm resistor in series with 100 MFD condenser and connect Generator to ANT lead. Generator and receiver set to 4000 KC, adjust Oscillator and ANT Police trimmers to maximum peak. Reset the Generator and receiver to 1800 KC, rock variable condenser while padding 250.

FOREIGN - Set Generator and Receiver to 14000 KC, adjust Oscillator trimmer and the Foreign ANT trimmer to peak. Readjust receiver to 13100 KC, generator still at 14000 KC and check for image response which should be weaker. Adjustments should be started with oscillator trimmer loose and ANT trimmer tight. Repeat all adjustments for maximum performance of the receiver.

WAVE TRAP - Used only in event of code interference, adjusted to 456 KC.
ALLIED RADIO CORP.

ALIGNMENT DATA

IF ALIGNMENT - Wave switch on B.C. position. Generator connected to grid of 6A7 tube through a .05 MF Cond. Align four trimmers.

BROADCAST - Connect generator to ANT. lead (blue) through a 200 MF cond. Gang condenser at minimum, generator set at 1730 KC, adj. OSC. trimmer to peak. Set generator to 1400 KC and adjust ANT. trimmer to peak. Generator and receiver set to 600 KC. Rock
8K and 8T are designed to operate over three tuning ranges with a pointer swing of 340°: the broadcast range which extends from 535 to 1730 Kilocycles (KC) (173 to 560 meters), Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) (53 to 176 Meters) and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.
ALIGNMENT DATA 8K.B.T.

ALLEE RADIO CORP.

MODELS A-10510 to A-10513
Chassis 8-K
INCL.

MODELS A-10515 to A-10518
Chassis 8-2
INCL.

ALIGNMENT DATA 8K.B.T.

BALLAST TUBES

This receiver is designed to operate from any 60 cycle AC (alternating current) or DC (direct current) power supply mains of 110 to 120 volts. However by the use of the proper tubes listed below any one of the following line voltages can be employed: 115, 120, 150, 220.

LINE VOLTAGE; TUBE VOLTAGE;
115 VOLT; 45; 60; 200 VOLT; 6; 120 VOLT; 100; 150 VOLT; 20; 220 VOLT; 30

EIGHT TUBE AC TELEPHONE DIAL

ALL WAVE SUPERHETERODYNE

This receiver is designed to operate from a power supply mains of 110-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

©John F. Rider, Publisher
The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 m., 200 mm.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency Setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. F.</td>
<td>465 Kc</td>
<td>.1 MYD</td>
<td>Grid of IN5G I. F. Tube</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD</td>
<td>Grid of IA5G</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST BAND</td>
<td>1275 Kc</td>
<td>200 mmf.</td>
<td>Antenna lead</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer—Top of rear section of gang (See Fig. 1)</td>
<td>Broadcast Oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1400 Kc</td>
<td>200 mmf.</td>
<td>Antenna lead</td>
<td>Set dial at 1400 Kc</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Antenna</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

**NOTE: A** — A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer, (C3). The loop antenna must be disconnected from the chassis.

**NOTE: B** — Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust trimmer (C2). (See note "C").

**PROCEDURE FOR SETTING THE AUTOMATIC LEVERS: MODEL 418 SERIES A.**

There are six levers on the front of the radio by means of which six stations may be selected. (See "B" Fig. 2). Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected on the station call letter tab above this lever. Above each automatic tuner lever an opening in the cabinet is provided for inserting the call letter tabs. (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the cabinet above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.
Broadcast Band 1 1/2-Volt Battery Operated
Superheterodyne Receiver

Frequency Range 530 - 1735 Kilocycles

**Circuit Reference No.**

**RESISTORS**

- R1 13021 200 ohm—5 w.
- R2 13029 100 ohm—5 w.
- R3 13030 150 ohm—5 w.
- R4 13031 2 megohm—5 w.
- R5 13034 2 megohm—5 w.
- R6 13038 2 megohm—5 w.
- R7 13015 1 megohm volume control
- R8 13019 1 megohm—5 w.
- R9 13028 350 ohm—5 w.
- R10 13019 1 megohm—5 w.
- R11 13027 550 ohm—5 w.

**CONDENSERS**

- C1 10007B 2 gang variable condenser
- C2 10029 .06 x 200 v.
- C3 10030 Antenna Trimmer
- C4 10036 Oscillator Trimmer
- C5 12012 .0005 mica
- C6 10064 .25 x 200 v
- C7 10065 .25 x 200 v
- C8 10061 .01 x 400 v
- C9 10062 .0001 mica
- C10 10031 .01 x 400 v
- C11 10052 25 mfd. x 25 w. v.
- C12 10038 .003 x 600 v.

©John F. Rider, Publisher

Compliments of www.nucow.com
**ALIGNMENT PROCEDURE**

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator. An all wave signal generator through 1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead. Non-metallic screwdriver.
- Connect output meter across primary of output transformer. Dummy antennas—1 Mfd
- Allow chassis and signal generator to “heat up” for several minutes.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>465 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 12A8GT</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>4 Trimmers on Top (See Fig. 1)</td>
<td>Output and Input I.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROAD-CAST BAND</td>
<td>1650 Kc.</td>
<td>.1 MFD. Grid of 12A8GT</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer bottom of rear section of gang. (See bottom of radio)</td>
<td>Broadcast Oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>1400 Kc.</td>
<td>See Note “A”</td>
<td></td>
<td></td>
<td>Trimmer bottom of front section of gang. (See bottom of radio)</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE “A”** Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator. Power Consumption: 40 Watts Power Output: 1.3 Watts Undistorted, 2.5 Watts Maximum Intermediate Frequency: .465 K.C.
PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the front of the radio by means of which six stations may be selected, (See “B” Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (See “A” Fig. 2).

Insert the call letter tabs in the rectangular openings in each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station you have assigned to this lever. Turn the tuning knob very slowly back and forth (while still holding lever is downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station assigned to this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw (“C”) in the center of the tuning knob. (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw “C” is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw “C” one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—your favorite station is selected.

MODEL 520 SERIES A.
ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B-1 of radio chassis, to ground post of signal generator through a Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted in Order Shown</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F.</td>
<td>465 Kc.</td>
<td>.1 MFD</td>
<td>Grid of 648</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers (See Fig. 3)</td>
<td>L.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST BAND</td>
<td>1270 Kc.</td>
<td>100 mfd</td>
<td>Antenna Lead</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer—Top of Rear section of gang (See Fig. 1)</td>
<td>Broadcast Oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1460 Kc.</td>
<td>100 mfd</td>
<td>Antenna Lead</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

The following equipment is required for aligning:
- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antenna—1 mfd, 100 mfd.

FREQUENCY RANGE 330 to 1720 K.C.

©John F. Rider, Publisher

Compliments of www.nucow.com
Broadcast Band A.C.-D.C. Superheterodyne Receiver

Frequency Range 530-1720 Kilocycles

For setting Automatic Levers see Model 418.

Compliments of www.nucow.com
CHASSIS MODEL 521
Series A
When ordering parts always mention complete factory model number, series and issue.

LIST OF REPAIR PARTS (Serial No. 386700 and up)
Use Only Genuine Factory Replacement Parts

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Circuit Diagram Reference</th>
<th>Description</th>
<th>No. Used Price in Set Each</th>
<th>No. List Circuit Diagram Reference</th>
<th>Description</th>
<th>Used Price in Set Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>11128</td>
<td>B1</td>
<td>Volume Control &amp; On-Off Switch (300 Ohms)</td>
<td>1.00</td>
<td>11243</td>
<td>Back for Cabinet (Specify Color)</td>
<td>.50</td>
</tr>
<tr>
<td>11318</td>
<td>C, C8</td>
<td>Two Gang Variable Condenser</td>
<td>1.50</td>
<td>11824</td>
<td>Brown Bakelite Cabinet Complete</td>
<td>2.50</td>
</tr>
<tr>
<td>11250</td>
<td></td>
<td>Line Cord and Plug</td>
<td>1.00</td>
<td>11825</td>
<td>Ivory Finish Bakelite Cabinet Complete</td>
<td>2.50</td>
</tr>
<tr>
<td>11526</td>
<td></td>
<td>Cover Shield for 101228 I.F. Collar</td>
<td>1.50</td>
<td>11826</td>
<td>Back for Cabinet (Specify Color)</td>
<td>1.10</td>
</tr>
<tr>
<td>11527</td>
<td></td>
<td>Brown Bakelite Cabinet Complete</td>
<td>3.00</td>
<td>11827</td>
<td>Brown Bakelite Knob (Volume)</td>
<td>1.10</td>
</tr>
<tr>
<td>11528</td>
<td></td>
<td>Back for Cabinet (Specify Color)</td>
<td>1.10</td>
<td>11828</td>
<td>Ivory Bakelite Knob (Volume)</td>
<td>1.10</td>
</tr>
<tr>
<td>11529</td>
<td></td>
<td>Brown Bakelite Knob (Volume)</td>
<td>1.10</td>
<td>11829</td>
<td>Ivory Bakelite Knob (Tuning)</td>
<td>1.20</td>
</tr>
<tr>
<td>11530</td>
<td></td>
<td>Brown Bakelite Knob (Tuning)</td>
<td>1.35</td>
<td>11830</td>
<td>Brown Buttons for Tuner Levers</td>
<td>1.10</td>
</tr>
<tr>
<td>11531</td>
<td></td>
<td>Brown Buttons for Tuner Levers</td>
<td>1.10</td>
<td>11831</td>
<td>Bakelite Resistor (In Tube, Shell and Base)</td>
<td>.75</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PARTS LIST</th>
<th>Description</th>
<th>No. Used Price in Set Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>11128</td>
<td>Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser)</td>
<td>1.00</td>
</tr>
<tr>
<td>11129</td>
<td>Support End Bracket for Automatic Tuning Mechanism</td>
<td>1.10</td>
</tr>
<tr>
<td>11130</td>
<td>Tuner Cam</td>
<td>6.00</td>
</tr>
<tr>
<td>11131</td>
<td>Key Washers (Used on Each Side of Tuner Cam)</td>
<td>1.10</td>
</tr>
<tr>
<td>11132</td>
<td>Lever Complete with 112309 Roller</td>
<td>1.10</td>
</tr>
<tr>
<td>11133</td>
<td>Shaft for Tuner Levers</td>
<td>1.10</td>
</tr>
<tr>
<td>11134</td>
<td>Spacer</td>
<td>1.10</td>
</tr>
<tr>
<td>11135</td>
<td>Spacer</td>
<td>1.10</td>
</tr>
<tr>
<td>11136</td>
<td>Locking Collar (for Right End of Cam Shaft)</td>
<td>1.10</td>
</tr>
<tr>
<td>11137</td>
<td>Locking Screw (Lock Tuner Cam Inserted Through Center of Tuning Knob)</td>
<td>1.10</td>
</tr>
<tr>
<td>11138</td>
<td>Compression Spring Washer (Used Between Locking Collar and First Tuner Cam)</td>
<td>1.10</td>
</tr>
<tr>
<td>11139</td>
<td>Right End of Cam Shaft</td>
<td>1.10</td>
</tr>
<tr>
<td>11140</td>
<td>Hair Pin Spring for Tuner Levers</td>
<td>6.00</td>
</tr>
<tr>
<td>11141</td>
<td>Brown Spring for Tuner Levers</td>
<td>6.00</td>
</tr>
<tr>
<td>11142</td>
<td>Ivory Spring for Tuner Levers</td>
<td>6.00</td>
</tr>
<tr>
<td>11143</td>
<td>Set of 2 Sheets of Station Call Letters</td>
<td>1.15</td>
</tr>
<tr>
<td>11144</td>
<td>Clear Pyralin Tube for Station Call Letter Tube</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

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.

Miscellaneous parts are coded with an additional dot indicating tolerance:

<table>
<thead>
<tr>
<th>Tolerance percentage</th>
<th>Color of Dot</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>White</td>
</tr>
<tr>
<td>15%</td>
<td>Orange</td>
</tr>
<tr>
<td>10%</td>
<td>Yellow</td>
</tr>
<tr>
<td>5%</td>
<td>Brown</td>
</tr>
<tr>
<td>2%</td>
<td>Red</td>
</tr>
<tr>
<td>More Than 20%</td>
<td>None</td>
</tr>
</tbody>
</table>

All prices quoted are list and are subject to the usual trade discounts.

Shipment are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKERS, CONES OR FIELDS SEPARATELY. WE WILL REPAIR OR REPLACE A DAMAGED SPEAKER FOR $5.00. IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

BRC—SHGO

Compliments of www.nucow.com
ALIGNMENT PROCEDURE

The procedure for setting the Automatic Tuning Levers in this receiver is the same as that for Model 135 with the exception that this receiver has six levers instead of five.

FIG. 3

FREQUENCY RANGE

45 Watts

Intermediate Frequency

465 K.C.

Power Output

465 K.C.

Reception

465 K.C.

Power Consumption

80 Milliwatts

120 Milliwatts

500 Milliwatts Maximum

FIG. 2

FRONT VIEW

The following adjustments are required for alignment:

- Connect B.M.F.D. condenser.
- Connect B.M.F.D. coupling to generator, and adjust for 1 M.F.D. grid of 6A8. (See Fig. 3.)
- Connect output meter in series with generator output lead. (See Fig. 3.)
- Connect output meter in series with output transformer.
- Connect output meter in series with output transformer. (See Fig. 3.)
- Connect output meter in series with output transformer. (See Fig. 3.)
- Allow chassis and signal generator to "heat up" for several minutes.

FIG. 1

TOP VIEW

Volume control. Maximum all adjustments.

- Maximum all adjustments.

Signal Generator

BAND

I.F.

465 K.C.

1 M.F.D.

Grid of 6A8

R.F. Output, 100 milliwatts

Intermittent operation of generator. (See Fig. 3.)

140 K.C.

100 milliwatts

120 Milliwatts

Maximum

500 Milliwatts

Maximum

©John F. Rider, Publisher
BELMONT RADIO CORP.

MODEL 527, Series A
Schematic

CHASSIS MODEL 527
Series A

When ordering parts always mention factory model number, series and issue.

LIST OF REPAIR PARTS (Serial No. 307600 and up)

Use Only Genuine Factory Replacement Parts

Circuit No.  Description

1001 CI 1 x 400 Volt Tubular Capacitor
1002 CI .05 x 400 Volt Tubular Condenser
1003 CI .05 x 400 Volt Tubular Condenser
1010 CI .05 x 400 Volt Tubular Condenser
1101 CI .05 x 400 Volt Tubular Condenser
1110 CI Dual .015 mfd x 50 W. V. Filter Condenser
1202 CI .0025 mfd Type Condenser-30%
1303 CI .0025 mfd Type Condenser-30%
1502 CI .0025 mfd Type Condenser-30%

RESISTOR

10035 R4, R5, R5 56 Ohm, 500 Watt Clad Resistors
1109 R10 2000 Ohm-10 Watt Resistors-20%
1110 R12 500 Ohm-10 Watt Resistors-20%
1111 R11 R13 200 Ohm-10 Watt Resistors-20%
11118 R18 100 Ohm-10 Watt Resistors-20%
11107 R7 3 Megohm-15 Watt Resistors-45%

COILS

10105F T4 Inductor L.F. Coil Assembly Complete with Can
10105G T3 Inductor L.F. Coil Assembly Complete with Can
11107 T2 Oscillator Coil Assembly Complete
11108 T1 Oscillator Coil Assembly Complete

SOCKETS

12183 Single Prong Octal Base Tube Sockets
12185 Single Prong Octal Base Tube Socket

TRANSFORMERS

10149 T6 50/60 Cycle Power Transformer 105-115 Volt Primary
114 T6 25/60 Cycle Power Transformer 105-115 Volt Primary
1015D T5 Output Transformer for Speaker
11143 T7 50 Cycle Dynamic Speaker (Field 200 Ohms)

SPAKER

10141 R8, S1 Volume Control and Switch (500 Ohms)
10130 C Two Gang Variable Condenser
10135D T5 Output Transformer for Speaker
12097 T9 Line Cord and Plug
12101R Brown Bakelite Cabinet (with Carton)
12101R Brown Bakelite Cabinet (with Carton)
12101W Ivory Bakelite Cabinet (with Carton)
12101R Brown Bakelite Knob (Tuning)
12101W Ivory Bakelite Knob (Tuning)
12101W Brown Bakelite Knob (Volume)
12102W Ivory Bakelite Knob (Volume)
12105 Back for Cabinet (Specify Color)

DIAL PARTS LIST

11054 F1 6.3 Volt Pilot Light Bulb Type 44
11020 F1 Socket and Bracket for Pilot Light
11125 F1 Support Bracket for Automatic Tuning Mechanism
11125 F1 Support End Bracket for Automatic Tuning Mechanism

Tubes are coded and guaranteed by the tube manufacturer.
Preliminary service can be rendered on adjustment if defective tubes are
replaced direct to the tube manufacturer rather than through our factory.
All resistors are RMA color coded—specify value and/or resistor number
(per schematic diagram) and model number.
When ordering condensers, specify type number, model number and/or
material (per schematic diagram) and model number.
Mica condensers are coded with an additional dot indicating tolerance:
Tolerance percent:  

Color of Dot

6%  Red
10% Yellow
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 CONES, OR FIELDS SEPARATELY.
WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.00.
IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.
Priced SUBJECT TO CHANGE WITHOUT NOTICE.

© John F. Rider, Publisher
For Instructions for setting Automatic
Tuning Levers, see Model 633

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mF, 100 mF.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc. 1 MFD.</td>
<td>Grid of 6A8G</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Four trimmers (See Fig. 1)</td>
<td>Input I. F. Adjust to maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BROADCAST BAND</td>
<td>1700 Kc. 100 mF.</td>
<td>Antenna Lead</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer—Top of rear section of gang (See Fig. 1)</td>
<td>Broadcast Oscillator Adjust to maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1400 Kc. 100 mF.</td>
<td>Antenna Lead</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Broadcast Antenna Adjust to maximum output</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FREQUENCY RANGE
935 to 1715 Kc.

Power Consumption 50 Watts
Power Output 1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency 465 Kc.
The power consumption of this receiver is 50 watts.

**LIST OF REPAIR PARTS** (Serial No. 542,699 and up)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>102-1C</td>
<td>1 x 400 volt Tubular Condenser</td>
</tr>
<tr>
<td>102-9C</td>
<td>2 x 200 volt Tubular Condenser</td>
</tr>
<tr>
<td>102-13C</td>
<td>2 x 300 volt Tubular Condenser</td>
</tr>
<tr>
<td>102-14C</td>
<td>2 x 400 volt Tubular Condenser</td>
</tr>
<tr>
<td>102-16C</td>
<td>2 x 600 volt Tubular Condenser</td>
</tr>
<tr>
<td>117-3C</td>
<td>1 x 5000 nF, 150 volt Tubular Condenser</td>
</tr>
<tr>
<td>127-2C</td>
<td>1 x 1000 nF, 150 volt Tubular Condenser</td>
</tr>
<tr>
<td>117-13C</td>
<td>1 x 10 microfarad Condenser, 150 volt</td>
</tr>
</tbody>
</table>

**CONDENSORS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>106-3R</td>
<td>R4, R5, R6</td>
</tr>
<tr>
<td>117-21R</td>
<td>RI, R2</td>
</tr>
<tr>
<td>117-22R</td>
<td>R1</td>
</tr>
<tr>
<td>117-23R</td>
<td>R3</td>
</tr>
<tr>
<td>117-24R</td>
<td>R4</td>
</tr>
<tr>
<td>117-25R</td>
<td>R5</td>
</tr>
<tr>
<td>117-26R</td>
<td>R6</td>
</tr>
</tbody>
</table>

**RESISTORS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>121-1R</td>
<td>T4</td>
</tr>
<tr>
<td>121-2R</td>
<td>T5</td>
</tr>
<tr>
<td>111-1R</td>
<td>T1</td>
</tr>
<tr>
<td>111-2R</td>
<td>T2</td>
</tr>
</tbody>
</table>

**SOCKETS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>121-5R</td>
<td>T6</td>
</tr>
<tr>
<td>121-5S</td>
<td>50/60 Cycle Transformer Universal Primary</td>
</tr>
</tbody>
</table>

**TRANSFORMER**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1512</td>
<td>T7</td>
</tr>
</tbody>
</table>

**SPEAKER**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>107-2R</td>
<td>I</td>
</tr>
<tr>
<td>107-7R</td>
<td>Q</td>
</tr>
<tr>
<td>107-9R</td>
<td>S</td>
</tr>
<tr>
<td>107-9W</td>
<td>T</td>
</tr>
<tr>
<td>117-2R</td>
<td>Line Cord and Plug</td>
</tr>
<tr>
<td>131-10R</td>
<td>R1</td>
</tr>
<tr>
<td>131-11R</td>
<td>R2</td>
</tr>
<tr>
<td>131-13R</td>
<td>R3</td>
</tr>
<tr>
<td>131-14R</td>
<td>R4</td>
</tr>
<tr>
<td>131-15R</td>
<td>R5</td>
</tr>
<tr>
<td>131-16R</td>
<td>R6</td>
</tr>
<tr>
<td>131-17R</td>
<td>R7</td>
</tr>
<tr>
<td>131-18R</td>
<td>R8</td>
</tr>
<tr>
<td>131-19R</td>
<td>R9</td>
</tr>
<tr>
<td>131-20R</td>
<td>R10</td>
</tr>
<tr>
<td>131-21R</td>
<td>R11</td>
</tr>
<tr>
<td>131-22R</td>
<td>R12</td>
</tr>
<tr>
<td>131-23R</td>
<td>R13</td>
</tr>
<tr>
<td>131-24R</td>
<td>R14</td>
</tr>
<tr>
<td>131-25R</td>
<td>R15</td>
</tr>
<tr>
<td>131-26R</td>
<td>R16</td>
</tr>
<tr>
<td>131-27R</td>
<td>R17</td>
</tr>
</tbody>
</table>

**CIRCUIT LIST**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>102-7R</td>
<td>R1</td>
</tr>
<tr>
<td>102-11R</td>
<td>R2</td>
</tr>
<tr>
<td>112-1R</td>
<td>R3</td>
</tr>
<tr>
<td>112-2R</td>
<td>R4</td>
</tr>
<tr>
<td>112-3R</td>
<td>R5</td>
</tr>
<tr>
<td>112-4R</td>
<td>R6</td>
</tr>
<tr>
<td>112-5R</td>
<td>R7</td>
</tr>
<tr>
<td>112-6R</td>
<td>R8</td>
</tr>
<tr>
<td>112-7R</td>
<td>R9</td>
</tr>
<tr>
<td>112-8R</td>
<td>R10</td>
</tr>
<tr>
<td>112-9R</td>
<td>R11</td>
</tr>
<tr>
<td>112-10R</td>
<td>R12</td>
</tr>
<tr>
<td>112-11R</td>
<td>R13</td>
</tr>
<tr>
<td>112-12R</td>
<td>R14</td>
</tr>
<tr>
<td>112-13R</td>
<td>R15</td>
</tr>
<tr>
<td>112-14R</td>
<td>R16</td>
</tr>
<tr>
<td>112-15R</td>
<td>R17</td>
</tr>
<tr>
<td>112-16R</td>
<td>R18</td>
</tr>
<tr>
<td>112-17R</td>
<td>R19</td>
</tr>
<tr>
<td>112-18R</td>
<td>R20</td>
</tr>
<tr>
<td>112-19R</td>
<td>R21</td>
</tr>
<tr>
<td>112-20R</td>
<td>R22</td>
</tr>
<tr>
<td>112-21R</td>
<td>R23</td>
</tr>
</tbody>
</table>

**KEY PARTS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>112-22R</td>
<td>R24</td>
</tr>
</tbody>
</table>

**DIAL PARTS LIST**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>112-23R</td>
<td>R25</td>
</tr>
</tbody>
</table>

**TUBE LOADING**

- 5E2: 6.8 volt filament light bulb type 5L
- 6J7: Pilot Light Bracket and Socket
- 6K7: Drive Drum for Indicator Film
- 6N7: Indicator Film
- 6N7: Center Wood Killer Pulse for Indicator Film
- 5U4: Dial Scale (Calibrated)
- 101B: Support Bracket for Automatic Tuning Mechanism
- 101B: Support Bracket for Automatic Tuning Mechanism (Right End of Mechanism)
- 101B: Lever Complete with 117-205, Bolt
- 101B: Dial Bracket Housing (For Dial Scale)
- 101B: Brass Spacer (Used on Cam Shaft Between Second and Third Tuner Cam) | 1.00 |
- 101B: Locking Screw for Tuning Knob | 1.00 |
- 101B: Tuning Cam | 1.00 |
- 101B: Locking Collar (For Right End of Cam Shaft) | 1.00 |
- 101B: Spacers (Used on Cam Shaft to Mount Dial Housing Assembly) | 1.00 |
- 101B: Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Left of Drive Drum) | 1.00 |
- 101B: Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Right of Drive Drum) | 1.00 |
- 101B: Hair Pin Springs for Tuner Lever | 1.00 |
- 101B: Turn-Up Spring for Indicator Film | 1.00 |
- 101B: Screwed Button Keys for Automatic Tuning Lever | 1.00 |
- 101B: Clutch Buttons (Used on Fasten Dial Scale to Dial Housing) | 1.00 |
- 101B: Compression Spring Washer (Used Between Locking Collar and First Tuner Cam) | 1.00 |
- 101B: Key Washers (Used on Each Side of Tuner Cam) | 1.00 |

**Cable colors and gauges are given in the tube manufacturer's catalog.**

**More than 20 parts are listed in this catalog.**

**Price subject to change without notice.**
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.

All voltages as indicated on diagram are measured with 115 volts on the primary of the power transformer.

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.

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.

Transformers are available and chassis are sometimes equipped with transformers for operation on 25, 40 and 60 cycles (see parts list).

ALIGNING INSTRUCTIONS:

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. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screwdriver.

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 6K6G 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.

ALIGNING L.F. TRANSFORMERS: (665 K.C.):

Part No. 108-95B Output L.F. Transformer
Part No. 108-96 Input L.F. Transformer

These L.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with 1 mfd. condenser, to the control grid cap of the type 6K7 tube, and adjust the output L.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input L.F. transformer (No. 108-96).
   (c) With oscillator still connected to 6A8G, readjust output L.F. transformer (108-95B) if necessary.

1. R.F. ALIGNMENT: (555-1720 K.C.)

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mfd. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected. (See "B" Fig. 2).
Broadcast Band 1½-Volt Battery Operated
Superheterodyne Receiver

DESCRIPTION:

TUBES:
The type and function of each tube is as follows:
1—Type 1A7G Mixer, First Detector-oscillator.
1—Type 1N5G Remote Cut-Off Fentode, 1st I. F. Amplifier (465 K. C.)
1—Type 1H5G Second Detector, A.V.C., 1st Audio.
2—Type 1A5G Push-Pull Output Amplifier.

SERVICE NOTES:

Voltage at 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 the voltage chart 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.

The approximate current consumption is as follows:

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.

ALIGNING INSTRUCTIONS:

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 battery voltage, 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. Remove the knobs and the 3 bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screwdriver.

ALIGNMENT PROCEDURE:
The following equipment is required for aligning:

• An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
• Output indicating meter.
• Non-metallic screwdriver.
• Dummy antennas—1mf., 200 mfn.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy antenna</th>
<th>Connection to radio</th>
<th>Variable condenser setting</th>
<th>Trimmer(s) adjusted</th>
<th>Trimmer function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 1N5G I.F. Tube</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>2 trimmers on top (See Fig. 1)</td>
<td>Output I. F.</td>
<td>Adj. to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 1A7G</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>2 trimmers on top (See Fig. 1)</td>
<td>Input I. F.</td>
<td>Adj. to maximum output</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>1725 Kc.</td>
<td>200 mfn.</td>
<td>Antenna lead</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer—Top of rear section of gang (See Fig. 1)</td>
<td>Broadcast Oscillator</td>
<td>Adj. to maximum output</td>
</tr>
<tr>
<td>BAND</td>
<td>160 Kc.</td>
<td>200 mfn.</td>
<td>Antenna lead</td>
<td>Set dial at 160 Kc.</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Antenna</td>
<td>Adj. to maximum output</td>
</tr>
<tr>
<td></td>
<td>600 Kc.</td>
<td>200 mfn.</td>
<td>Antenna lead</td>
<td>Set dial at 600 Kc.</td>
<td>B.C. Series Pad (See Fig. 1)</td>
<td>Broadcast oscillator series pad</td>
<td>Adj. to maximum rock dial (See note “A”)</td>
</tr>
</tbody>
</table>

NOTE “A”—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC after each band is completed, repeat the procedure as a final check.

FREQUENCY RANGE

535 to 1725 Kc.

*Power Output—120 Milliwatts Undistorted, 270 Milliwatts Maximum
Intermediate Frequency 465 Kc.
*Power Output Measured Across 3 Ohm. Voice Coil.

© John F. Rider, Publisher

Components of www.nucow.com
SERVICE NOTES:

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

All voltages are to be measured with 6.3 volts input to receiver.

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

To check for open by-pass capacitors, 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.

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

ALIGNING INSTRUCTIONS:

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 battery voltage, 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.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

TO REMOVE CHASSIS FROM THE CABINET:

Remove the four bolts which are used to fasten the chassis to the cabinet shelf; pull the knobs off their shafts and pull off the six button lever keys on front of dial.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected, (See "B", Fig. 2).

Press down any one of the six Automatic levers, holding it down, tune in by means of tuning knob No. 2 any one of your favorite stations. Turn the tuning knob very slowly back and forth until signal is clearest. The station will then be accurately tuned in.

Release this lever and press down any other Automatic lever. Hold this lever down and tune in by means of knob No. 2 another favorite station.

Follow this procedure until stations have been set on all the levers. Hold tuning knob securely with left hand to prevent it from turning with a coin or screw driver, tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

This screw will lock in place all stations you have selected on the Automatic levers. (Note: Locking Screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob securely and loosen locking screw ("C") one or two turns; select the new station as explained.

BE SURE TO RETIGHTEN THE LOCKING SCREW, otherwise the stations will not stay adjusted to the levers.

Above each Automatic lever an opening in the escutcheon is provided for inserting station call letters. (See "A", Fig. 2).

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the rectangular openings in the escutcheon above each of the levers. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

The Automatic Tuner dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

The following equipment is required for aligning.
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mfd.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 6K7 I. F. Tube</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Output</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>I. F.</td>
<td>465 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 6DBG</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Input</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROAD-CAST BAND</td>
<td>1750 Kc.</td>
<td>200 mfd.</td>
<td>Antenna Lead</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer—Top of rear section of tank (See Fig. 1)</td>
<td>Broadcast</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1600 Kc.</td>
<td>200 mfd.</td>
<td>Antenna Lead</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Broadcast</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

Adjust the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

<table>
<thead>
<tr>
<th>Power Consumption</th>
<th>40 Watts (at 115 Volts 50/60 Cycles) or 2.5 Aamperes at 6.3 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Output</td>
<td>.4 Watts Undistorted, 1 Watt Maximum</td>
</tr>
</tbody>
</table>
CONNECTIONS TO BATTERY

The battery cable, number 107-82, (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 100-82, 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 connecting to short battery cable from receiver.

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.

ADJUST ANTENNA TRIMMER

Tune in a weak signal at approximately 600 K.C. with volume control about three-fourths on. Adjust trimmer screw "X" until maximum output is obtained. (See Fig. 1, Adjustment "X" on right side of radio)
MODEL 577C
Above Serial 205070

BELMONT RADIO CORP.

SERVICE NOTES
Alignment, Socket, Trimmers
Tuner 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. These voltages are clearly indicated on the bottom view.

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 condensers, bypass 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 tube is probably in the vibrator; it should be replaced. Do not attempt to make any adjustments on the vibrators.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy"—A 5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 125 mmd 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 screen terminals of the type 6X6 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: (465 K.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 grid of 6SK7 I.F. tube.

2. Adjust trimmer condenser of output I.F. transformer No. 108121 to resonance with oscillator.

3. Move test oscillator connection to grid of 6SA7 tube and adjust trimmer condenser of input I.F. transformer No. 108129 to resonance with oscillator. 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. (See Fig. 3—top view, page 3.)

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.

2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is the rear section of the two-gang condenser—see top view, Fig. 3.)

3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust trimmer (front section of gang condenser) to resonance. (See top view, Fig. 3.)

4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. (Adjust series pad in the antenna cirt for maximum gain. This pad is mounted on the side of the antenna can, adjustment "X."...
**ALIGNMENT PROCEDURE**

- Volume control—Maximum all adjustments.
- Radios—All radio chassis to ground post of signal generator through .1 MFD condenser.
- Connect dummy antenna valve in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to “heat up” for several minutes.

### SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>BAND</th>
<th>Frequency Setting</th>
<th>Dummy Antenna Connection to Radio</th>
<th>Variables Connection</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>470 Kc.</td>
<td>.1 MFD.</td>
<td>Grid of 6ABG</td>
<td>4 trimmers</td>
<td>Output and Input L.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>Broadcast Band</td>
<td>1720 Kc.</td>
<td>100 mfd.</td>
<td>Antenna Lead</td>
<td>Trimmer—Top of rear section of gang (See Fig. 1)</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>1400 Kc.</td>
<td>100 mfd.</td>
<td>Antenna Lead</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

### FUNCTIONAL DATA

- **Power Consumption**: 1.2 Watts Undistorted, 2.1 Watts Max.
- **Intermediate Frequency**: 670 K.C.
- **Frequency Range**: 535 to 1720 K.C.
- **Speaker**: 5" Inch Dynamic Speaker (90 Ohm Field)
- **Transformer for Speaker**

### MISCELLANEOUS

- **Volume Control and Switch (1 Megohm)**
- **Two Gang Variable Condenser**
- **Output Transformer for Speaker**
- **Line Cord and Plug**
- **Brown Bakelite Cabinet Complete**
- **Ivory Finish Bakelite Cabinet Complete**
- **Brown Bakelite Volume Knob**
- **Ivory Bakelite Volume Knob**
- **Brown Bakelite Tuning Knob**
- **Ivory Bakelite Tuning Knob**
- **Back Set Cabinet (Specialty Color)**
- **Brown Built-in Tuner Levers**
- **Ivory Bakelite Buttons for Tuner Levers**
- **Ballast Resistor (In Tube Shell with Base)**

### DIAL PARTS LIST

- **6-8 Volt Pilot Light Type T-44**
- **Socket and Bracket for Pilot Light**
- **Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser)**
- **End Support Bracket for Automatic Tuning Mechanism**
- **Brass Pulley (String Drive for Pointer; Mounts on Cam Shaft at Variable Condenser End)**
- **Brass Pulley (String Drive for Pointer; Mounts on Right End of Cam Shaft with Spring Take-Up)**
- **Take-Up Spring for Drive Spring Pulley**
- **Tuner Cams (Five Used)**
- **Keywashers (Used on Each Side of Cams)**
- **Keywashers (Two Used; Have Holes to Attach Take-Up Spring)**
- **Lever Complete with 11737 Roller**
- **Lever Shaft**
- **Locking Collar (For Right End of Cam Shaft)**
- **Compensation Spring Washer (for Locking Collar)**
- **Locking Screw (Lock Tuner Cam; Inserted through Center of Tuning Knob)**
- **Harping Springs (for Tuner Levers)**
- **Brass Spacer (Three Used on Cams)**
- **Brass Spacer (One Used on Cam Shalt)**
- **Brass Pulleys and Bushing for Pointer Shaft**
- **Hedger Pulley and Stud for Pointer**
- **Pointer**
- **Diode Scale Calibrated**
- **Crystal (Cover for Dial Scale)**
- **Cinch Button (Fasten Dial Scale to Bracket)**
- **Set of Call Letter Sets**
- **Brown Bakelite Buttons for Tuner Levers**

### ALIGNING INSTRUCTIONS

**CAUTION**: No aligning adjustments should be attempted without first thoroughly checking over all possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, 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.

**HOW TO REMOVE CABINET**: Always disconnect the line cord from the house current before removing the chassis from the cabinet.

**To remove chassis from the cabinet unscrew the locking screws on the outer edges of the chassis, and lift out the chassis.**

**Remove the back of the cabinet and the two screws that hold the chassis to the cabinet.**

**Move the chassis toward back of cabinet so that control shafts and tuner assembly clear holes in cabinet, then chassis can be slipped out.**

© John F. Rider Publisher
Compliments of www.nucow.com

BELMONT RADIO CORP.  MODEL 634, Series A

BOTTOM VIEW OF CHASSIS

D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOMETERT BETWEEN SOCKET TERMINALS AND B- WITH LINE VOLTAGE OF 115 VOLTS A.C.

NOTE: TERMINALS MARKED 'O' ARE B- POINTS:
1. No reading connected to chassis.
2. 6.3 V.A.C. Read between terminals 2A of same socket.
3. Cannot be read with voltmeter.
4. Pilot light 5 V.A.C: Read between pins 7 & 8.
5. Ballast tube 50 V.A.C: Read between pins 22 & 23.
6. 250 V.A.C: Read between terminals 2A of same socket.
7. 74V LINE VOLTAGE.

ANTENNA GROUNDED REAR OF CHASSIS

FIG. 3

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

© John F. Rider, Publisher
### CHASSIS MODEL 634

Series A

When ordering parts always mention complete factory model number, series and issue.

#### LIST OF REPAIR PARTS (Serial No. 281300 and up)

Use Only Genuine Factory Replacement Parts

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Circuit Diagram Reference</th>
<th>Description</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001 C7</td>
<td>0.1 x 400 Volt Condenser</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1009 C7</td>
<td>0.5 x 200 Volt Condenser</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1011 C7, C12</td>
<td>0.1 x 200 Volt Condenser</td>
<td></td>
<td>0.20</td>
</tr>
<tr>
<td>1006 C7</td>
<td>0.25 x 400 Volt Condenser</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1007 C7</td>
<td>0.5 x 400 Volt Condenser</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1053C C11, C15 C16</td>
<td>25 MFD x 150 Volts Paper Condenser (for 60 Cycle)</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>1062C C11, C15, C16</td>
<td>60 MFD x 150 Volts Paper Condenser (for 25 Cycle)</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>1052 C1</td>
<td>0.003 Mica Type Condenser — 25% Tolerance</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1210 C5</td>
<td>0.003 Mica Type Condenser — 25% Tolerance</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1212 C5</td>
<td>0.003 Mica Type Condenser — 25% Tolerance</td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>1901 R3</td>
<td>200 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>1902 R4</td>
<td>5 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>1907 R1</td>
<td>10 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>12009 R8</td>
<td>100 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>12019 R9</td>
<td>150 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>1327 100</td>
<td>2 Megohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>1217 R1</td>
<td>5 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>12325 R7</td>
<td>15 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>12331 R10</td>
<td>75 Ohm — 15 Watt Resistor</td>
<td>25% tolerance</td>
<td>0.25</td>
</tr>
<tr>
<td>1082 T3</td>
<td>Input i.e., Coil Assembly Complete with Cap.</td>
<td></td>
<td>1.25</td>
</tr>
<tr>
<td>1092 F3</td>
<td>Output i.e., Coil Assembly Complete with Cap.</td>
<td></td>
<td>1.25</td>
</tr>
<tr>
<td>1107 T2</td>
<td>Oscillator Coil Assembly Complete.</td>
<td></td>
<td>1.25</td>
</tr>
<tr>
<td>11108 T1</td>
<td>Antenna Coil Assembly Complete.</td>
<td></td>
<td>1.25</td>
</tr>
<tr>
<td>1293</td>
<td>Eight Prong Octal Sockets.</td>
<td></td>
<td>1.25</td>
</tr>
<tr>
<td>114116T6</td>
<td>Five Inch Dynamic Speaker (40 Ohm Field)</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>10550 T3</td>
<td>Output Transformer for Speaker.</td>
<td></td>
<td>1.25</td>
</tr>
</tbody>
</table>

#### DIAL PARTS LIST

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Circuit Diagram Reference</th>
<th>Description</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>15794 F1</td>
<td>6-8 Volt Pilot Light Type T-46</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>11224</td>
<td>Socket and Bracket for Pilot Light</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>11524</td>
<td>Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser)</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>11576</td>
<td>End Support Bracket for Automatic Tuning Mechanism</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>11798</td>
<td>Brass Pulley (String Drive for Pointer; Mounts on Cam Shaft at Variable Condenser End)</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>11299</td>
<td>Brass Pulley (String Drive for Pointer; Mounts on Right End of Cam Shaft with Spring Take-Up)</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>11290</td>
<td>Take-Up Spring for Drive Spring Pulley</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>11293</td>
<td>Tuning Cam (Five Used)</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>11281</td>
<td>Keywashers (Used on Each Side of Tuner Cam)</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>113117B</td>
<td>Keywashers (Two Used; Have Holes to Attach Take-Up Screw)</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>11294</td>
<td>Lever Complete with 113730 Roller</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>11240</td>
<td>Lever Shaft</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>11763</td>
<td>Locking Collar (For Right End of Cam Shaft)</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>11241</td>
<td>Compression Spring</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>117290</td>
<td>Locking Screw (Lock Tuner Cam; Inserted Through Center of Tuning Knob)</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>11324</td>
<td>Hairpin Springs (For Tuner Levers)</td>
<td></td>
<td>0.03</td>
</tr>
<tr>
<td>112725</td>
<td>Brass Spacer (Three Used on Cam Shaft)</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>112740</td>
<td>Brass Spacer (One Used on Cam Shaft)</td>
<td></td>
<td>0.05</td>
</tr>
<tr>
<td>11239</td>
<td>Bracket for Dial Scale Complete, with Two Small Brass Pulleys and Bushing for Pointer Shaft</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>11248</td>
<td>Threaded Pulley and Stud for Pointer</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>11449</td>
<td>Pointer</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>11499</td>
<td>Dial Scale Calibrated</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>11498</td>
<td>Crystal (Cover for Dial Scale)</td>
<td></td>
<td>0.10</td>
</tr>
<tr>
<td>11477</td>
<td>Clock Buttons (Prestige Dial Scale to Bracket)</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td>123148</td>
<td>Brown Bakelite Buttons for Tuner Lef</td>
<td></td>
<td>0.15</td>
</tr>
</tbody>
</table>

**PRICES SUBJECT TO CHANGE WITHOUT NOTICE.**

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("B") in the center of the tuning knob. (See Fig. 1).

It is very important that this locking screw is turned until it is absolutely tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "B" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "B" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

### RADIO-PHONOGRAPH SWITCH:

The knob for the Radio—Phonograph Switch is located in the front right hand corner of the phonograph compartment. It is marked with a pin and under the knob an escutcheon plate is marked as follows: "Radio" — "Phono Off" — "Phono On"

Rotating the knob so that the pin marker on the knob is in line with the word "Radio" the switch is in radio playing position; when the pin is in line with the word "Phono Off" the switch disconnects the radio and connects the phonograph pick-up; when the pin is in line with the word "Phono On" the switch connects the phonograph motor and is in the phonograph playing position. The motor must be started by hand. Press down on the turntable with the fingers, spread and give the word and turntable a quick spin in a clockwise direction. The motor can be started rotating in either direction. For proper operation, however, it must rotate in a clockwise to the right direction.

To stop the phonograph motor turn the switch knob to "Phono-Off" position.

To disconnect phonograph entirely turn switch knob to extreme left to "Radio" position.

Volume control knob No. 1 on front of the radio controls the volume in either case; for radio, or for phonograph.
MODEL 677, Issue C
Alignment, Tuner Data

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 A.V.C. and affecting accuracy of voltage measurements, serial 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.

Fig. 2—Front View of Remote Tuner Unit

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy"—A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 125 muf. 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 screen terminals of the type 6V6 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: (465 K.C.)

IMPORTANT:

To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the tertiary coil of this unit.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point.

Proceed as follows:

2. Adjust trimmers "H" and "I" of output I.F. transformer for maximum gain, (See Fig. 3, top view).
3. Disconnect the 10M ohm resistor which has been shunted across the tertiary winding and adjust trimmer "J" for maximum gain.
   (a) This transformer is now correctly tuned. Under no circumstances re-adjust trimmers "H" and "I" after the 10M ohm resistor has been removed.
   (b) For alignment of the output I.F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used and the procedure is similar to the alignment of any two circuit I.F. transformer; merely tune for a symmetrical curve of maximum amplitude.
   (c) Output connections for the cathode ray oscillograph should be made to pin No. 8 on 6Q7 tube socket and to the end terminal on the terminal strip; at this point the diode lead resistors terminate.
4. Move test oscillator connection to grid of 6AS tube and adjust trimmer condensers "F" and "G" of input I.F. transformer for maximum gain.

NOTE: A red dot on top of output I.F. can designate location of trimmer "H".

BROADCAST ALIGNMENT:

1. With the dial on the Remote Tuner Unit set at 1500 K.C., connect test oscillator set at 1500 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer (adjustment "D") on back of Remote Tuner Unit to resonance. (See Fig. 4, back view).
3. Re-set test oscillator to 1400 K.C. and pick up signal by rotating dial on Remote Tuner Unit. Adjust K. P. Trimmer (adjustment "C"), on back of Remote Tuner Unit, to resonance. (See Fig. 4, back view).

CAUTION: In order to realize maximum gain out of the antenna adjustments, back out antenna shunt trimmer (adjustment "B") on back of remote tuner unit all the way out and then adjust antenna series trimmer (adjustment "A") on side of remote tuner unit to resonance.

4. Re-set test oscillator to 600 K.C. and rotate Remote Tuner Unit dial to 600 K.C.

Adjust shunt oscillator adjustment "F", rotating dial to and fro at the same time adjusting shunt oscillator for maximum gain. This adjustment is accessible from the top of the radio chassis, (See Fig. 3, top view).

5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.

© John F. Rider, Publisher
BELMONT RADIO CORP.

IMPORTANT—ADJUSTING ANTENNA TRIMMER:

Tune in any weak station between 600 and 800 kc. Make sure that the antenna shunt trimmer on the Bottom of the Remote Tuner is turned out (counter clockwise). (See adjustment “C1,” Fig. 4.)

Adjust antenna series trimmer on the side of the remote Tuner Unit. For maximum output. (See adjustment “C2,” Fig. 4.)

NOTE: If resonance (maximum output) cannot be obtained within the range of the antenna series trimmer “C2,” then the adjustment screw all the way out (counter clockwise) and then adjust the antenna shunt trimmer “C1” on the bottom of the remote tuner unit for a peak of maximum output.

The above arrangement will cover any antenna capacity that is now in use.

---

**MODEL 678, ISSUE A**

**ALIGNMENT PROCEDURE**

**ALIGNING INSTRUCTIONS:**

1. **Ensure proper settings:**
   - Set all trimmers to their mid-positions.
   - Ensure the antenna is connected.
   - Set the remote remote Tuner to the correct frequency.

2. **Tune in a strong station:**
   - Set the remote remote Tuner to the correct frequency.
   - Adjust the antenna series trimmer to obtain maximum output.

3. **Fine tune:**
   - Adjust the remote remote Tuner to obtain maximum output.
   - Adjust the antenna series trimmer to obtain maximum output.

4. **Repeat process:**
   - Repeat steps 2 and 3 until maximum output is achieved.

5. **Final adjustments:**
   - Make sure all trimmers are set to their mid-positions.

**SERVICE NOTES:**

- **Alignment:** Use a strong signal to align the receiver.
- **Troubleshooting:** Check for loose connections, dirty contacts, and proper alignment of components.

---

**TABLE:**

<table>
<thead>
<tr>
<th>** Trimmed Function**</th>
<th><strong>Remote Tuner Setting</strong></th>
<th><strong>Antenna Series Adjust</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td><strong>Adjustment</strong></td>
<td><strong>Output</strong></td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td><strong>Adjustment</strong></td>
<td><strong>Output</strong></td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td><strong>Adjustment</strong></td>
<td><strong>Output</strong></td>
</tr>
</tbody>
</table>

---

**DESCRIPTION:**

Model 578 is a tr白雪 superheterodyne receiver having a six-tube, three-stage superheterodyne circuit, with a 6V6 plate power supply. It has a 63 volt meter, having a useful indication of 0 to 100 ohms per volt.

The 6V6 has three separate circuits giving a superheterodyne performance. The output 6V6 is connected to the antenna circuit, with a resistance of approximately 1000 ohms per volt. The receiver is designed to operate in a push-pull amplifier circuit, which will provide for the maximum output of the receiver.

The receiver is designed to operate with a minimum of 0.5 volts input, and with a maximum output of approximately 0.5 volts. The receiver is designed to operate with a minimum of 0.5 volts input, and with a maximum output of approximately 0.5 volts.
NOW, PROCEED AS FOLLOWS:

1. Push the dial tuning knob in hard enough to make it latch in.
2. Rotate the dial tuning knob to the left (counter-clockwise), until the knob can not be turned any further without forcing.
3. You will now see that the knob is rotated and it will turn easily until the pointer reaches the end of the dial scale and then a slight amount of force will be required actually start unlocking the tuner mechanism. Beyond this point the knob will turn quite easily again until the tuner mechanism is completely unlocked. At this point do not force the knob any further. The tuner mechanism is now unlocked.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.

4. Push in all the way any one of the pushbuttons and at the same time hold in firmly the dial tuning knob. The dial tuning knob and the pushbutton should be pushed hard enough to make them stay latched in.
5. The reason for holding the dial tuning knob firmly when the pushbutton is pressed in is due to the latching mechanism in the Remote Tuner Unit which is set to automatically engage the pushbutton and the call letter tags in position when a pushbutton is pressed in.
6. When setting up stations for automatic tuning, however, it is necessary that both the dial tuning knob and the pushbutton be latched in together.

NOTE: Automatic tuner mechanism is locked tight when radio is shipped from the factory.
MODEL 751, Series A  
MODEL 867, Series A  
Tuner Data

BELMONT RADIO CORP.  
MODEL 787 Series A  
Tuner Data

**Model 751, Series A**

**Service Notes:**

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

**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 115 volts A.C. line or a fully charged 6 volt storage battery.

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

To check for open by-pass condensers, short 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, fluttering, 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.

**Setting the Automatic Tuner Levers:**

**Important:** Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small cellloid tabs supplied should be inserted into place over each of the station call letter tabs.

**Now. Proceed as follows:**

1. Pull the dial tuning knob all the way out (See Illus. "B," Fig. 3), and rotate the tuning knob to the left (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism.

   **Note:** Automatic tuner mechanism is locked tight when radio is shipped from the factory.

2. Press down all the way any one of the automatic tuner levers. Holding it down firmly, push in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be pressed in (See Illus. "E," Fig. 3). Turn the dial tuning knob very slowly back and forth (while still holding the automatic tuner lever in downward position), noting the width of the shadow on the screen of the cathode-ray tuning indicator. Minimum width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down another automatic tuner lever. Holding it down firmly, press in on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob all the way out (See Illus. "B," Fig. 3) and rotate the tuning knob to the right (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3). This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place. After you have locked the tuner mechanism, push the dial tuning knob in.

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way out and rotate the knob to the left (counterclockwise) and unlock the tuner mechanism. Select the new station as explained.

7. After you have selected the new station, pull the dial tuning knob all the way out and rotate the knob to the right (clockwise) to lock the tuner mechanism. Be sure the knob is turned until it will turn no further, then press the dial tuning knob in.

8. The automatic tuner levers are now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The important steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. To unlock the tuner mechanism pull the dial tuning knob all the way out. You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. To set a lever, press down all the way and hold in this position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to. (Note: you will notice that it will be necessary to keep pressing in on the dial tuning knob while turning in the station as a spring tends to push the knob out.) Set all the levers in the same manner before locking the mechanism.

3. To lock the tuner mechanism pull the dial tuning knob all the way out. Rotate the dial tuning knob to the right as far as it will turn making certain that it is tight, but it is not necessary to use force.

4. After locking or unlocking the tuner mechanism always return the dial tuning knob to its normal position (pushed in).

© John F. Rider, Publisher
ALIGNMENT PROCEDURE

The following equipment is required for alignment:

- An all wave signal generator with a short heavy feed.
- An all wave antenna with a short heavy feed.
- Connect dummy antenna across generator output terminals.
- Connect output to signal generator with a short heavy feed.
- Allow channels and signal generator to "heat up" for several minutes.

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

ATTENUATE SIGNAL FROM SIGNAL GENERATOR TO PREVENT THE LEVELING-OFF ACTION OF THE AVC.

After each band is completed, repeat the procedure as a final check.

ALIGNING INSTRUCTIONS:

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, 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 from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (Fig. 1, top view).

NOTE: On the side of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

1. For 6 volt storage battery operation:
   (a) Use cable No. 107126.
   (b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.
   (c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.

2. For 105-125 volts, 50/60 cycle operation:
   (a) Use special cable No. 107129.
   (b) Plug receptacle of cable into power socket on chassis.
Alignment Procedure

Model 767 Series A

Voltage

NOTE "A" - Turn the dial back and forth slightly (ock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" - 100 kc is the image frequency of 2330 kc. Adjust trimmer (C3) until a minimum output is obtained.

Compliments of www.nucow.com
Compliments of www.nucow.com

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Pushbutton Indicated Below Pushed “In”</th>
<th>Variable Capacitor Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc.  .1 MFD.</td>
<td>Grid of 6K7 L.F. Tube</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 2)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>465 Kc.  .1 MFD.</td>
<td>Grid of 6K8</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 2)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>BAND BROADCAST</td>
<td>160 Kc.  200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer (C17) (See Fig. 5)</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>160 Kc.  200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set dial at 1600 Kc.</td>
<td>Trimmer (C19) (See Fig. 5)</td>
<td>Broadcast antenna and R. F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>600 Kc.  300 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set dial at 600 Kc.</td>
<td>Trimmer (C23) (See Fig. 5)</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>SHORT WAVE BAND</td>
<td>17 Mc.  400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Set dial at 17 MC</td>
<td>Trimmer (C16) (See Fig. 5)</td>
<td>Short wave oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17 Mc.  400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Set dial at 17 MC</td>
<td>Trimmer (C22) (See Fig. 5)</td>
<td>Short wave antenna and R. F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>MEDIUM WAVE BAND</td>
<td>5 Mc.  400 ohms</td>
<td>Antenna lead</td>
<td>Med. Wave</td>
<td>Set dial at 5 MC</td>
<td>Trimmer (C15) (See Fig. 5)</td>
<td>Medium wave oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 Mc.  400 ohms</td>
<td>Antenna lead</td>
<td>Med. Wave</td>
<td>Dial set at 5 MC</td>
<td>Trimmer (C21) (See Fig. 5)</td>
<td>Medium wave antenna and R. F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

NOTE "A"-. Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

After each range is completed, repeat the procedure as a final check.

BAND FREQUENCY RANGE
- Broadcast - 535 to 1690 Kc.
- Medium Wave - 1.66 to 5.5 MC
- Short Wave - 2.5 to 18.0 MC

Power Consumption......100 Watts (At 115 volts 50-60 cycles)
Power Output.............5 Watts Undisorted, 7.3 Watts Maximum
Intermediate Frequency...465 KC

TOP VIEW

BOTTOM VIEW
ALIGNING INSTRUCTIONS:

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. No aligning adjustments should be attempted with the chassis in the cabinet.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 2, top view).

NOTE:—On the back of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self aligning thereby correcting dial calibration.

POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts A.C. only. If you are in doubt as to the voltage and frequency rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 50-60 cycles are so marked. The power consumption of this receiver is 100 watts.

PHONOGRAPH CONNECTIONS:

A phonograph connector and switch are provided on the rear of the chassis. To operate, insert plug on end of phonograph pick-up lead into connector on chassis and move phonograph switch to "Phono" position. Volume and tone may be controlled by using the controls on the front of the radio.
PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.

Only a single adjustment for each station is required in setting up your favorite stations for automatic pushbutton operation. These adjustments are located at the front of the chassis shown in Fig. 4 and are accessible through the station call letter holes. The only equipment needed is a small screwdriver to make the adjustments.

Make a list of your favorite local stations, those which you tune in regularly. Put down the frequency (kilocycle number) of these stations. There may be 2, 3, 5 or any number up to and including six in this list.

If you do not know the broadcasting frequencies, consult your local newspaper or a radio log book. They can also be obtained by pressing the button marked "Broadcast" on the left and tuning in the stations manually, noting the numbers on the dial at which they are received.

The automatic station pushbuttons are grouped to cover specific frequency ranges.

The range of the frequencies covered by each button are given below and are also shown in Fig. 4. Only stations within the frequency ranges given can be obtained on a particular button. Counting the station buttons from left to right, looking at the front of the set, the frequency ranges are as follows:

1. 1550 to 1000 Kilocycles.
2. 1500 to 1000 Kilocycles.
3. 1100 to 680 Kilocycles.
4. 1100 to 680 Kilocycles.
5. 830 to 520 Kilocycles.
6. 830 to 520 Kilocycles.

This means that any station which has a kilocycle number lying between 1550 and 2000 K.C. can be set up on either Button 1 or Button 2. Any station which has a kilocycle number lying between 1100 and 680 K.C. can be set on either Button 3 or Button 4. Any station which has a kilocycle number lying between 830 and 520 K.C. can be set on either Button 5 or Button 6.

After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 4). Adjust screw through station tab opening above button pressed until the same station is heard clearly and tuning indicator indicates that it is correctly tuned.

ANTENNA AND GROUND CONNECTIONS:

Antenna connections are made on the terminal board, with terminals marked "A" and "D" on the rear of the chassis. Do not use a conventional antenna to connect the lead-in to terminal "A". The ground lead should be connected at Terminal "D". When using a Doublet Antenna, connect one lead-in of the doublet to "A", and the other lead-in to "D". Connect a ground wire to Terminal "G". (See Fig. 1).

FIG. 1

Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.

Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

ANTENNA AND GROUND CONNECTIONS:

COILS FOR PUSHBUTTON TUNER ASSEMBLY

| 11029 | T7 | Low Frequency Coil | 1.25 |
| 11033 | T9 | Medium Frequency Coil (Two Used) | 1.25 |
| 11051 | T9 | High Frequency Coil | 1.25 |
| 11061 | T9 | High Frequency Coil | 1.25 |
| 11063 | T7 | Medium Frequency Coil | 1.25 |
| 11079 | T7 | Low Frequency Coil | 1.25 |

DIAL PARTS LIST

| 11245 | Screw, Bell Knob | .15 |
| 11247 | Tube Shield | .15 |
| 11248 | Rubber Grommet for Variable Condenser Mounting | .02 |
| 11251 | Rubber Chassis Mounting Cushions | .02 |

AUTOMATIC PUSHBUTTON ASSEMBLY PARTS

| 11245 | Pushbutton Tuner Assembly Complete with Coils and Switch Mechanism | .25 |
| 11252 | Switch Assembly for Pushbutton Tuner (Less Coils) | 1.00 |
| 11003 | T7 | Low Frequency Coil | 1.50 |
| 11003B | T7 | Low Frequency Coil | 1.50 |
| 11002 | T9 | Medium Frequency Coil | 1.25 |
| 11001B | T9 | Medium Frequency Coil (Two Used) | 1.25 |
| 11001 | T9 | High Frequency Coil | 1.25 |
| 11002B | T9 | High Frequency Coil | 1.25 |
| 11002 | T9 | Medium Frequency Coil | 1.25 |
| 11001B | T9 | Medium Frequency Coil | 1.25 |

CATHODE-RAY TUNING INDICATOR PARTS

| 11709 | Lamp, Light Bulb Type 4 | .10 |
| 11714 | Lamp, Light Bulb Type 5 | .10 |
| 11713 | Lamp, Light Bulb Type 6 | .10 |
| 11710 | Lamp, Light Bulb Type 7 | .10 |

© John F. Rider, Publisher
### Table: Voltage on Pin # to GND (No Signal Condition)

<table>
<thead>
<tr>
<th>Tube Description</th>
<th>Voltage on Pin # to GND (No Signal Condition)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>1051 Convertor</td>
<td>6.3 AC</td>
<td>290</td>
<td>180</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>1052 - 1st I.F.</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>180</td>
<td>0</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1053 - 2nd I.F.</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>180</td>
<td>0</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1054 - 3rd I.F.</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>180</td>
<td>0</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>605 Video</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>N.C.</td>
<td>0</td>
<td>N.C.</td>
<td>0</td>
<td>N.C.</td>
<td>0</td>
<td>N.C.</td>
</tr>
<tr>
<td>607 Fet Video</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>3-10</td>
<td>100</td>
<td>6.3 AC</td>
<td>180</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6082 2nd Video</td>
<td>6.3 AC</td>
<td>150</td>
<td>70-180</td>
<td>0</td>
<td>N.C.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>609 Cac.</td>
<td>0</td>
<td>95 v approx.</td>
<td>N.C.</td>
<td>0</td>
<td>N.C.</td>
<td>6.3 AC</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>607 Sound I.F.</td>
<td>6.3 AC</td>
<td>0</td>
<td>4.5 v.</td>
<td>0</td>
<td>4.5</td>
<td>100</td>
<td>6.3 AC</td>
<td>290</td>
<td></td>
<td></td>
</tr>
<tr>
<td>607 Sound Dec.</td>
<td>6.3 AC</td>
<td>0</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>70</td>
<td>0</td>
<td>6.3 AC</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>637 Video A/V Amp</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>110</td>
<td>0</td>
<td>290</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>606 Video Dec.</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>N.C.</td>
<td>N.C.</td>
<td>6.3 AC</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6077 Sync. Channel Amp</td>
<td>0</td>
<td>Pin 2-8</td>
<td>5 AC</td>
<td>280 AC</td>
<td>280 AC</td>
<td>N.C.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6075 Rectifier</td>
<td>0</td>
<td>Pin 2-8</td>
<td>5 AC</td>
<td>280 AC</td>
<td>280 AC</td>
<td>N.C.</td>
<td>N.C.</td>
<td>N.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6073 Synch. Channel Amp</td>
<td>0</td>
<td>Pin 2-7</td>
<td>6.3 AC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>110</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6076 Hor. Vert.</td>
<td>0</td>
<td>Pin 2-7</td>
<td>6.3 AC</td>
<td>195</td>
<td>0</td>
<td>0</td>
<td>205</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6077 Hor. Osc.</td>
<td>0</td>
<td>Pin 2-7</td>
<td>6.3 AC</td>
<td>105</td>
<td>72</td>
<td>72</td>
<td>200</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>606 Hor. Output</td>
<td>0</td>
<td>Pin 2-7</td>
<td>Cannot be</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>606 Hor. Dec.</td>
<td>0</td>
<td>Pin 2-7</td>
<td>5.0 AC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0-18 v.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>607 Vert. Dec.</td>
<td>0</td>
<td>Pin 2-7</td>
<td>6.3 AC</td>
<td>290</td>
<td>-50</td>
<td>-50</td>
<td>20</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6075 Vert. Output</td>
<td>0</td>
<td>Pin 2-7</td>
<td>6.3 AC</td>
<td>300</td>
<td>300</td>
<td>0</td>
<td>6</td>
<td>13 v approx.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Great caution should be exercised in checking high voltage circuits. It is best never to attempt to measure heater voltage on the 2V35. If the tube lights brightly, it is sufficient indication that the heater voltage is correct. To measure high voltage, disconnect power supply and insert 0-60 m.v., meter in ground end of bleeder chain. (With protection fuse) current should read about 1 m.a. when power supply is reconnected. If bleeder current is appreciably off, measure individual resistors in chain, to see if difficulty lies there. Thus by replacing rectifier tubes an appropriate check of transformer the high voltage circuits can be checked without the use of dangerous probes.*

- Electrostatic voltmeter
- Special high resistance voltmeter

© John F. Rider, Publisher
Tuning Range
CADDILLAC 1939 AUTOMATIC RADIO
530 to 1550 KC
540 to 970 KC
870 to 1250 KC
920 to 1560 KC

Manual Tuning
Buttons 1 & 2 (Left to right)
Button 3 (Center)
Buttons 4 & 5

Speaker
Selectivity at 1000 times signal
6" Electro Dynamic
35 KC

MODEL C8—PART NO. 1433970
L.F. 456 KC.

Power Output
6 Watts Undistorted
Consumption 8 Amperes at 6.3 Volts

TUBE COMPLEMENT

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Part No.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1213392</td>
<td>6SK7</td>
</tr>
<tr>
<td>1</td>
<td>1213393</td>
<td>6K8</td>
</tr>
<tr>
<td>1</td>
<td>1213395</td>
<td>6H6</td>
</tr>
<tr>
<td>1</td>
<td>1213394</td>
<td>6J5</td>
</tr>
<tr>
<td>1</td>
<td>1213396</td>
<td>6V6G</td>
</tr>
<tr>
<td>1</td>
<td>7233587</td>
<td>6N7G</td>
</tr>
</tbody>
</table>

Antenna Capacity Screw Settings
Low Capacity Setting - In tight (clockwise) — 59 mmf. — Total of antenna and shielded cable.
High Capacity Setting — Out (counter clockwise) — 193 mmf. — Total of under car antenna and shielded lead.

Antenna Trimmer Range
± 15 mmf. of above antenna capacities
The 1959 Cadillac Automatic Radio is an 8-tube automobile radio covering the standard wave band incorporating the very latest developments in automobile radio engineering. The outstanding features are:

1. Permeability tuning, providing a dual input circuit to the ler detector, one for manual tuning and one for automatic push button tuning, is used.
2. A new noise-limiting circuit in the audio system coupled by signal voltage developed by the 2nd detector and the AVC network, providing for the first time effective noise-limiting action without affecting sensitivity.
3. Two stages of Intermediate Frequency, increasing considerably Automatic Volume Control action.
4. A new Automatic Tuning circuit, providing the same sensitivity and on both manual and automatic tuning sections.
5. An OFF-switch incorporated in the push button operating mechanism to provide practically complete automatic operation, making it necessary to push only one button to select a station, tune and turn on the radio.

MANUAL TUNING CIRCUIT

When the manual tuning button is depressed, the manual antenna tuning coil is connected to the grid of the 6CB7 RF amplifier tube through a series motor noise filter. The plate of the R.F. tube is fed through a resistor and to capacity coupled to the detector grid of the 6X5 tube through the manual intermediate tuning coil. This grid is also controlled by the AVC system through the manual intermediate tuning coil. The manual oscillator tuning coil is capacity coupled to the oscillator grid of the 6X5 in parallel with the fixed oscillator coil 77 which also functions as the low frequency adjustment. All the automatic tuning coils are open circuited when the manual tuning button is depressed.

Manual tuning is accomplished by varying the inductance of the manual tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core of special design in and out of the coil by rotating the manual station selector drum.

The extreme position of the iron core within the coil has been precision adjusted at the factory and should not be disturbed.

AUTOMATIC TUNING CIRCUIT

Automatic tuning is accomplished by the use of a new and highly efficient three-circuit push button permeability tuner.

The tuning of the R.F., Intermediate and Oscillator semi-fixed tuned circuits, is accomplished by varying the inductance of the coils, by changing the permeability of the iron cores, tuning the circuits and by moving the iron core (rear) out of the coil. The iron cores within the coil are rigidly secured to a brass rod. This brass rod moves in and out of the coil as the adjustment screw is turned, changing the inductance of the coil, giving the same result as the variable tuning condenser across the coil except that this method is more precise and stable, and it is not affected by moisture or temperature changes as is the case with a normal tuning condenser.

ALIGNMENT

Alignment between the oscillator, antenna and intermediate automatic tuning coils is obtained by changing the antenna (center) and intermediate (rear) coil positions while the iron cores are held stationary on the shaft. To describe the connections for automatic tuning, let us assume that button No. 1 is depressed.

The automatic tuning antenna coil, No. 1, is connected to the grid of the R.F. tube. The plate circuit Automatic tuner is fed through a resistance and is capacity coupled to the automatic tuning Intermediate coil, No. 2, which is connected to the control grid of the 6X5 tube.

The manual Intermediate tuning coil is short-circuited.

The automatic tuning Oscillator coil, No. 3, is capacity coupled to the oscillator grid of the 6X5 tube.

Two stages of I.F. amplification are employed, using 68K7 tubes. The primary and secondary of each of the I.F. transformers are tuned by small trimmer condensers directly below the condenser or step filter. In this way, the trimmer condenser is also tuned by the trimmer condenser or step filter.

The signal voltage across the secondary of the 2nd I.F. transformer is used to drive the plate of the AVC section of the 6G6 tube. AVC voltage is applied to the control grid circuit of the 6G6 tube. The I.F. and 2nd I.F. tubes.

The rectified output of the 2nd detector section of the 6G6 tube is applied to the control grid of the 6X5 tube.

At no signal, the 6G6 tube is biased to cut off by virtue of the current flowing through resistor network R16 and 17. This gives a constant potential across R17, which keeps the tube biased to cut off when the signal is being received.

When a station is being received, a positive voltage is applied to the control grid by both sections of the 6G6 tube through resistor networks R15, R16 and 18, causing a rapid reduction in bias so that the noise gate or noise limiter does not affect the sensitivity of the receiver. This is a very outstanding development in automobile radio circuit design and provides unusually quiet operation.

The 6X5 is resistance coupled to the 6V6G driver tube. The 6V6G is transformer coupled to the 6700 output tube. This tube is a class A power amplifier and combines two triodes in one envelope. A 6 electro dynamic reproducer is employed.

Degeneration, or negative feedback, is used to improve the audio amplifier. The voltage developed across the separate small secondary of the output transformer is fed back into the cathode circuit of the driver tube. The voltage feedback is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

ALIGNMENT AND CALIBRATION PROCEDURE

The following equipment is required for proper alignment:

An all wave signal generator which will provide an accurately calibrated signal at the best frequencies as listed.

An output indicators meter with a non-magnetic screwdriver.

DUMMY Antennas -- 12", 16", and 20".

The Radio Chassis must be removed from the case, but the front cover must remain on the chassis with all screws in place. THIS IS ABSOLUTELY NECESSARY TO ALIGN THE VOLUME CONTROL.

The Volume Control must be at maximum for all adjustments.

The Normal Quiet Control must be in the Normal position for all adjustments.

The Antenna Capacity Switch (see Fig. 5) should be in the maximum clockwise position for the Low Capacity (Vacuum Type) Antenna. The total capacity of the low capacity antenna and the shielded lead is 0.02 mfd.

Connect Radio Chassis to ground post of signal generator with a short heavy lead.

Allow chasis and Signal Generator to "Heat Up" for several minutes.

Alternate the signal from the signal generator to prevent the leveling-off action of the AVC.

Refer to Alignment Chart.
## ALIGNMENT CHART NUMBER ONE

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Connection at Radio</th>
<th>Dummy Antenna</th>
<th>Inductive Tuner and Dial Setting</th>
<th>Adjust Trimmers to Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F. ADJUSTMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>456 EC</td>
<td>Control Grid (prox No. 4) 6SH7 End I.F. Tube</td>
<td>1 mH</td>
<td>Manual</td>
<td>1550 KD</td>
</tr>
<tr>
<td>456 EC</td>
<td>Control Grid (prox No. 4) 6SK7 1st I.F. Tube</td>
<td>1 mH</td>
<td>Manual</td>
<td>1550 KD</td>
</tr>
<tr>
<td>456 EC</td>
<td>Control Grid (top cap) 6SK7 1st Det. Tube</td>
<td>1 mH</td>
<td>Manual</td>
<td>1550 KD</td>
</tr>
</tbody>
</table>

| OSCILLATOR ADJUSTMENT             |                     |               |                               |                           |
| 1400 EC                           | Control Grid (top cap) 6SK7 1st Det. Tube | 1 mH | Manual | 1550 KD | Osc. (C10) |

| 1400 EC                           | Antenna Cable - See Note B | 35 mH | Manual | Tune to Maximum Output with station selector drum. | Int. 1400 KD (C0) See Fig. 2 |
| 600 EC                            | Antenna Cable             | 35 mH | Manual | Tune to Maximum Output with station selector drum. | 600 KD (C7) See Fig. 2 Rocking Adjustment - Note C |
| 1400 EC                           | Antenna Cable             | 35 mH | Manual | Tune to Maximum Output with station selector drum. | Osc. (C10) See Fig. 2 Rocking Adjustment - Note C |

**NOTE A** - Insert antenna cable at chassis and short circuit open end of cable to cable shield for all I.F. and oscillator adjustments.

**NOTE B** - Remove antenna cable short circuit and insert 35 mH condenser between open end of antenna cable and signal generator.

**NOTE C** - Rotate station selector drum back and forth and turn the adjusting screw until the peak of greatest intensity is obtained.

## ALIGNMENT CHART NUMBER TWO

**CAUTION** - DO NOT CHANGE SETTING OF ANY TRIMMERS THAT HAVE BEEN ADJUSTED UP TO THIS POINT.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Connection at Radio</th>
<th>Dummy Antenna</th>
<th>Automatic Tuner Setting</th>
<th>Adjust Coil Positions to Maximum Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTOMATIC TUNER ADJUSTMENTS AND ALIGNMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>700 KC</td>
<td>Antenna Lead</td>
<td>35 mH</td>
<td>No. 1</td>
<td>Adjusting Screw No. 1</td>
</tr>
<tr>
<td>700 KC</td>
<td>Antenna Lead</td>
<td>35 mH</td>
<td>No. 2</td>
<td>Adjusting Screw No. 2</td>
</tr>
<tr>
<td>850 KC</td>
<td>Antenna Lead</td>
<td>35 mH</td>
<td>No. 3</td>
<td>Adjusting Screw No. 3</td>
</tr>
<tr>
<td>1100 KC</td>
<td>Antenna Lead</td>
<td>35 mH</td>
<td>No. 4</td>
<td>Adjusting Screw No. 4</td>
</tr>
<tr>
<td>1300 KC</td>
<td>Antenna Lead</td>
<td>35 mH</td>
<td>No. 5</td>
<td>Adjusting Screw No. 5</td>
</tr>
</tbody>
</table>

**NOTE D** - At the top of the automatic tuning unit can be seen ten round openings - See Fig. 3. Through these openings can be seen the ten "A" openings on the other side of the unit. Insert a thin blade screwdriver through the round openings and in the "A" opening of the proper button and adjust the position of the coil by twisting the screw driver until maximum output is obtained.

### ADJUSTING ANTENNA 1400 KC TRIMMER

After the radio is installed and the car antenna is connected, it is necessary to readjust the antenna 1400 KC trimmer.

There are two small holes in the chassis case near the antenna connection through which the antenna capacity and antenna trimmer adjustments are to be made. See Fig. 2. With the Cadillac Vacuum Antenna, the screw marked "Capacity" should be set to the extreme counter clockwise or high capacity position.

To adjust trimmer, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on, turn the adjusting screw (marked trim) in or out until maximum output is obtained. On Vacuum Antenna this adjustment should be made with antenna fully extended.

©John F. Rider, Publisher
Align the i-f stages at 465 kc after removing the 6C5 oscillator and with the test oscillator connected to the grid of the 6L7 first detector.

R-F Alignment: Replace the 6C5 and connect the test oscillator to the antenna post of the receiver. Start with the oscillator trimmer with the dial set on the high-frequency end of the band at the frequencies listed below:

- Broadcast Band = 1400 kc
- 1st H-F Band = 5.0 mc
- 2nd H-F Band = 17 mc

After the oscillator trimmer has been adjusted, align the r-f trimmer of each band. Then set the oscillator padding condensers of the various bands at the following frequencies:

- Broadcast Band = 550 kc
- 1st H-F Band = 2.0 mc
- 2nd H-F Band = 6.0 mc
ALIGNMENT INSTRUCTIONS

When aligning the i-f stages, short the oscillator section of the tuning condenser to ground. Set test oscillator to 440 kc and connect to the grid of the 6D6 first detector. Set the i-f trimmers for maximum reading of the output meter connected across the voice coil.

When aligning the r-f amplifier, connect the test oscillator to the antenna post, after removing ground from the tuning condenser mentioned above. Regardless of which band is being aligned, start with the oscillator coil trimmer with the dial set on the high-frequency end of the band at the following frequencies:

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast</td>
<td>1400 kc</td>
</tr>
<tr>
<td>1st I-F band</td>
<td>5,4 mc</td>
</tr>
<tr>
<td>2nd I-F band</td>
<td>17 mc</td>
</tr>
</tbody>
</table>

After the oscillator coil trimmer has been set, align the r-f trimmers. Next set the oscillator tuning condenser of the various bands at the following frequencies:

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast</td>
<td>550 kc</td>
</tr>
<tr>
<td>1st I-F band</td>
<td>2,0 mc</td>
</tr>
<tr>
<td>2nd I-F band</td>
<td>6.0 mc</td>
</tr>
</tbody>
</table>
ALIGNMENT PROCEDURE

When aligning the i-f stages at 465 kc, make certain the Selectivity Control is in the extreme counter-clockwise position, i.e. set to "sharp tuning". Remove the 6CS oscillator tube and connect the output of the test oscillator to the grid of the 618 first detector. The bias of this tube is fixed, therefore it will be necessary to leave the grid cap on the tube and couple the oscillator through a .001 or .002-mf condenser. Adjust the trimmers on the three i-f transformers for maximum readings.

R-F Alignment: Replace the 6CS oscillator tube. Connect the test oscillator to the antenna post with the dial set on the high-frequency end of the band at the following frequencies:

Long-Wave Band ... 400 kc
Broadcast Band ... 1600 kc

First Band 460 kc
Second " 170 kc

First adjust the oscillator trimmers and then the r-f trimmers. After the adjustments of these trimmers, set the oscillator padding condensers of the various bands at the following frequencies:

Long-Wave Band ... 200 kc
Broadcast Band ... 550 kc

First H-F Band ... 2.0 mc
Second " 6.0 mc

©John J. Rider, Publisher
CAPEHART CORPORATION

CAPEHART REMOTE CONTROL INSTALLATION

AVAILABLE ON MODELS OF THE SERIES 400G AND SERIES 500G INSTRUMENTS

© John F. Rider, Publisher
Alignment: I-F
The I-F stages are peaked at 465 kc. Remove the 6J5 oscillator tube. Set the test oscillator at 465 kc and connect the output to the grid of the 6L7 first detector. Adjust the trimmers for maximum reading of the output meter.

AFC:
The AFC circuit is aligned when aligning the I-F amplifier at 465 kc. The primary of the discriminator transformer, marked DIODE transformer in the layout, is aligned at 465 kc. The secondary is aligned with the AFC switch closed on a broadcast or oscillator signal, using either the electric eye or output meter for checking resonance. The AFC switch should then be opened and the secondary re-aligned. If alignment has been made correctly, turning the AFC switch off and on should make no difference in the cathode-ray tuning tube.

R-F:
Replace the oscillator tube. Connect oscillator to antenna post. No matter what band is being aligned, start with the oscillator trimmer with the dial set to the high-frequency end of the band at the following frequencies:

- Broadcast Band ... 1400 kc
- First H-F Band ... 5.0 mc
- Second " " ... 17.0 mc

After the oscillator trimmer has been set for resonance, align the r-f trimmers. After these have been adjusted properly and checked, set the oscillator padding condensers of the bands at the following frequencies:

- Broadcast Band ... 550 kc
- First H-F Band ... 2.0 mc
- Second " " ... 6.0 mc

© John F. Rider, Publisher
TO ADJUST THE TUNING METER

To adjust the tuning meter at each station box, set the set by hand to 660 kilocycles, then turn the knob to the zero adjusting screw on the face of the meter. Then tune the set by hand to 1600 kilocycles, and adjust the mercury until the meter indicates this frequency. Again check the zero frequency setting, making the necessary adjustments by the adjusting screws in each box.

IN ORDER THAT THE CALIBRATION OF THE TUNING METER IN THE REMOTE CONTROL STATIONS MAY BE MADE TO AGREE WITH THE TUNING DIAL, A MERIDIAN IS PROVIDED. THIS MERIDIAN IS MOUNTED ON THE RADIO CHASSIS DIRECTLY ABOVE THE ANTENNA GROUND TERMINAL STRIP. THIS MERIDIAN IS USED TO COMPENSATE FOR THE VARIOUS LENGTHS OF CABLE REQUIRED IN THE DIFFERENT INSTALLATIONS, AND TO COMPENSATE IN THE DROP IN BATTERY VOLTAGE.
THE $A$ TRANSFORMERS, $B$ TRANSFORMERS, $C$ CYCLES, ARE FOR THE PURPOSE OF ENERGIZING THE VARIOUS RELAYS NECESSARY TO PERFORM THE NECESSARY SWITCHING OPERATIONS WHEN CUTTING IN OR CUTTING OUT A GROUP OF SPEAKERS, CHANGING FROM RADIO TO PHONOGRAPH, ETC. ONE OF THESE TRANSFORMERS IS ALWAYS ON THE LINE, EXCEPT WHEN THE PLAY CONTROL IS AT 0, TO PROVIDE VOLTAGE FOR THE OFF-ON RELAY.

TRANSFORMER $D$, $E$ TRANSFORMERS, $F$ CYCLES, IS EMPLOYED FOR THE PILOT LIGHT IN THE REMOTE CONTROL STATIONS. IF TRANSFORMERS $G$ OR $H$ FAILS TO WORK, THE RESULTS WILL BE NO PILOT LIGHT IN THE REMOTE STATIONS, THE OUTPUT VOLTAGE OF THESE TRANSFORMERS IS 6.3 VOLS.

THE D.C. CELL, $I$, IS TO SUPPLY A STEADY SOURCE OF DIRECT CURRENT TO OPERATE THE TUNING OR KILOCYCLE METERS IN THE REMOTE STATIONS. IF IT BECOMES IMPOSSIBLE TO READ THE METERS IN THE REMOTE STATIONS INTO SYNCHRONISM WITH THE TUNING DIAL, BY ADJUSTING THE METER OR THE RADIO CHASSIS, A NEW BATTERY IS INDICATED.

IF THE OFF-ON BUTTON DOES NOT TURN THE INSTRUMENT ON AND OFF, IT MAY BE THAT THE COIL IN RELAY $J$, $K$ CYCLES, IS OPEN. HOWEVER, IF THE COIL IS NOT OPEN, THE CONTACTS MAY NEED CLEANING, OR THE SPRINGS ADJUSTED.
MIXING PANEL - Q-SERIES

If any speaker button does not switch its associated speaker group on or off, the #61241 relay, #61256 if 25 cycle, #61242 60 cycle or #61256, 25 cycle if a Model 500 instrument, may be open, or the contacts in need of adjustment or cleaning. Low voltage from one set of speakers is probably due to lack of field current, due to defective field supply rectifier tube, or the 110-volt relay not making proper contact.

The 200-Ohm resistors, in series with the 0.1 Mfd. condensers, across the points of some of the relays as thumb filters to reduce the radio interference when the relays open or close.

If either the tuning or volume control knob are ineffectual, the trouble may be located in the #61243, #61244 if 25 cycle relay. In the "Q" model remote control, the relays operate from 16-volts, instead of 110-volts, with a large reduction in radio interference.

The covers, for the unused 15-wire sockets of the face of the mixing panel, used to connect the remote cables to the instrument, should be left in place. These covers hold the jumpers in the sockets, which complete the tuning meter circuit. If any cover is removed, see that the tuning meter circuit is completed, as these meters operate in series and if a jumper is removed, all meters will fail to function.

When installing a remote control system, all control stations are wired in parallel, except the tuning meters, these meters are in series. The leads for the meters are coded red for one lead, and green for the other. In the event that one, or more station tuning meters read backward, the remedy is, of course, to reverse the polarity of the leads going to the meter.

If extra outlets are provided, it is necessary that some method be provided to close the meter circuit in the unused outlets, otherwise the meters will not function.

TO REPLACE KILOCYCLE METER OR GLASS

Remove the station box rear cover, by removing the six screws from the back, thus exposing the bakelite meter cover. This cover has three solder lugs at the bottom edge, all leads to these lugs should be unsoldered. Extreme care should be used in removing the leads going into the meter case. After the leads are free, remove the three screws holding the meter cover in the box, lift the meter cover and the pilot light out. Check the position of the Zero adjuster in the face of the box. This is a bakelite part and its pin, which adjusts the meter hand, should be turned to the large opening, in the slot of the Zero correcting arm. Now remove the three screws holding the meter mounting bracket to the case. Care should be exercised when handling the meter, not to bend the hand or get any foreign bodies, especially steel particles, in its moving parts. The glue used to hold the glass in place, is water soluble, and any broken pieces of glass, remaining in the case, may be removed by soaking.

Lincoln cement may be used to hold the new glass in place. This cement requires a minimum of 24 hours to dry, due to the impervious nature of the box and glass. After the cement has hardened, clean the glass carefully, on the inside before remounting the meter. Also check the Zero adjuster before setting the meter into the box, to see that the pin will enter its slot without striking and bending the correcting arm.

When replacing the pointer, #6062, turn the shaft to the position where the switch is open, then turn the shaft one notch or step toward one hundred, at this point, set the indicator on Zero and set up the set screw, checking to see that the pointer does not ride on the dial at any point.

TO CPT STATION STOPS ON EXTENDED TUNING CHASSIS

Starting at the high frequency (shortest wave length) end of the broadcast band, with the AFC off, pick the desired station, nearest the end of the dial. Slide station stop #1 on the commutator, meanwhile holding button #2 down, until the station desired comes in best, then lock the station stop by the thumb screw. The odd numbered stops are in the outer row and the even numbered stops in the inner row, (by having two rows of stops, stations on adjacent channels may be tuned in). Next, adjust stop #2 for the next low frequency station, using button #2 and so on, until all eight stops are adjusted. Always have the AFC switch in circuit when using extended tuning, except during the time the stops are being set. Proper call letter stripes should be inserted in the buttons with the celluloid covers over them. These call letter slips and covers are packed in a manila envelope with each extended control instrument.

On the chassis is a relay #61256, #61246 if 25 cycles, which is used to shift the clutch so that the meter may drive either the gang condenser or the volume control, a set of contacts is mounted on this relay to mute the speakers when the meter is tuned from station to station. If a station button is depressed, this relay should close, muting the speakers and shifting the clutch so as to engage with the condenser drive pulley, in the event of failure of the instrument to tune when a station button is depressed, failure may be traced to an open coil in this relay, if the meter operates properly.

Underneath the chassis is the program relay, #61246, #61256 if 25 cycle. Failure to change from radio to phonograph, or from phonograph to radio, may be due to an open coil or improper contact adjustment here.

In the bottom of the cabinet is the OFF-ON relay, #61246, #61256 if 25 cycle. Failure of the instrument to start or shut off when the corresponding buttons are pushed, may be due to failure of the relay coil or improper adjustment of the contacts.

In case a control button fails to operate from the control box, but the corresponding button on the instrument works, the trouble may be located in the cable.
**Extended Control Box Wiring Diagram**

- **Model 400-G, 500-G Series**
- **CAPEHART CORPORATION**

### Wiring Diagram

**110-Volt**
- 60 Cycle Cabinet 61828 Cabinet 1 1 1 1
- 25 Cycle Cabinet 61829 Cabinet 1 1 1 1

**120-Volt**
- 60 Cycle Off-On 61846 Cabinet 1 1 1 1
- 60 Cycle Program 61840 Chassis 1 1 1 1
- 25 Cycle Program 61850 Chassis 1 1 1 1
- 25 Cycle Motor 61855 Chassis 1 1 1 1
- 60 Cycle Speaker 61841 Mixing Panel 1 1 1 1
- 60 Cycle Speaker 61843 Mixing Panel 1 1 1 1
- 25 Cycle Speaker 61853 Mixing Panel 1 1 1 1
- 60 Cycle Remote 61844 Mixing Panel 1 1 1 1
- 60 Cycle Off-On 61824 Speaker Cabinet 1 1 1 1

*One speaker relay is required for each speaker installation, including the speakers in the instrument, in the case of the 400 and 500 Series.*

©John F. Rider, Publisher

Compliments of www.nucow.com
The motor when operates the tuning and volume control mechanism has a thermostat on it. This thermostat will allow the motor to operate continuously for ten minutes before shutting off the motor.

If the motor fails to operate when the proper controls are used, the thermostat has undoubtedly shut off the motor. Allowing the tuning and volume control to remain unused for three or four minutes, will close the thermostat and the instrument can be used in the regular manner.

This thermostat is placed on this motor as a safety device and if the above occurs, it is a normal function of this motor.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2290</td>
<td>Master Volume Control</td>
</tr>
<tr>
<td>3954</td>
<td>Mixing Switch Contact Assembly</td>
</tr>
<tr>
<td>3295</td>
<td></td>
</tr>
<tr>
<td>5999</td>
<td>Volume Control Gear</td>
</tr>
<tr>
<td>5962</td>
<td>Clutch (Driver)</td>
</tr>
<tr>
<td>3603</td>
<td>Drive Pulley for Remote Control only</td>
</tr>
<tr>
<td>3607</td>
<td>Extended</td>
</tr>
<tr>
<td>4451</td>
<td>Collar</td>
</tr>
<tr>
<td>4432</td>
<td></td>
</tr>
<tr>
<td>21146</td>
<td>Motor, 60 cycles</td>
</tr>
<tr>
<td>21148</td>
<td>25</td>
</tr>
<tr>
<td>59217</td>
<td>Spring Washer, Volume Control</td>
</tr>
<tr>
<td>50174</td>
<td>Grommet</td>
</tr>
<tr>
<td>59108</td>
<td>Friction Disc, Volume Control</td>
</tr>
<tr>
<td>61235</td>
<td>Relay, 60 cycles</td>
</tr>
<tr>
<td>61245</td>
<td>26</td>
</tr>
<tr>
<td>66311</td>
<td>Relay Spring Assembly</td>
</tr>
<tr>
<td>99-28-7</td>
<td>1/2-32 x 3/16&quot; set screw</td>
</tr>
<tr>
<td>99-28-30</td>
<td>6-32 x 1/4&quot;</td>
</tr>
<tr>
<td>99-37-7</td>
<td>6-32 x 3/8&quot; Spade bolt</td>
</tr>
<tr>
<td>99-33-8</td>
<td></td>
</tr>
</tbody>
</table>

VOLUME CONTROL NO. 228 (CONSTANT IMPEDANCE)

This diagram and volume control are to be used when it is necessary to have volume control for each individual remote speaker. One volume control is needed for each speaker to be controlled, that is, two for each remote speaker installation, and three for each 500-6 remote speaker installation. This volume control No. 228, my only be used in low impedance circuits, from 6 to 10 cents. It is not suitable for use with high impedance speakers of the magnetic type, or electrodynamic speakers, having high impedance transformers.

The output transformers of the Caphart amplifiers must match to 8 cents, at 400 cycles.
THE CAPEHART PLAY CONTROL

The play control allows the operator to set the phonograph to play a predetermined number of selections and have the instrument automatically stop when that number of selections have been played.

When the play control is set at zero, all remote control and extended control stations are rendered ineffective. An off position is provided on the play control, so an indefinite number of selections may be played without the control operating.

In disconnecting the play control from the record changer, the two set screws on the cable and the cable housing should be loosened and the cable and cable housing carefully removed. When the cable is removed from the plunger, see that the wire is not broken, and the kink, due to the set screw, should be straightened out before reinstalling the cable.

TO ADJUST THE PLAY CONTROL

When setting up a play control, the counter should be reset at zero just as the needle touches the record. That is, the play control can, on the record changer main shaft, should be from 1/4" to 1/2" beyond the plunger after the main clutch has disengaged. The control cable is put in the hole in the plunger and the set screw tightened, then the cable housing should be held in place by the set screw - do not set the screw tight. Turn the pointer back and forth over the play control dial, if the pointer catches or binds, slip the cable housing away from the bracket slightly, until the pointer runs free, then run the changer through a cycle to see that the play control resets properly, then tighten the screw.

When adjusting the play control, which is in the record compartment, after removing the wood screws which mount the control to the shelf, remove the clips holding the 110 volt leads to the switch. Then remove the pointer and the two round head machine screws from the back. The stop spring of the stop spring and ball assembly, #66324, should be tangent to the gear and the ball should be in the space between the last and the next to the last tooth, before the blank space in the gear tooth. With the ball in this position, the set screw in the collar at the rear of the unit should be firmly against the stop pin. To make this adjustment, loosen the set screw, while holding the gear, move the collar, then tighten the set screw. In this position, the switch pin, #6802, should hold the switch open and permit the switch to close when the gear is advanced one tooth. The stop bracket #4450, for the resetting dog, should allow the dog to advance only one tooth at a time, if it picks up more than one tooth, move the step toward the dog until it advances only one tooth at a time.

The resetting dog #689, should not ride on the gear tooth, as this will prevent turning the pointer toward one hundred. Shift the stud, #4354, until the dog clears the tooth, then check the alignment of the plunger tube and the cable housing stud, for if the cable is bent here, the play control may fail to function.
REMOTE CONTROL CABLE BULLETIN
SERIES-0

TO SPEAKERS --

Speaker cable of size according to the charts below, must be run from the instrument to each individual speaker.

The 110-volt AC lead for the speaker field may be run from any 110-volt AC line nearest, or most convenient to each individual speaker. The above is all the wiring necessary for remote speakers.

TO REMOTE STATIONS --

Remote station cable of size according to the chart below, may be run from the instrument to each individual remote station, or extended from one remote station to another in parallel. This one cable is all the wiring required for remote stations.

CABLE SIZES ON #600-GR (REMOTE CONTROL)

<table>
<thead>
<tr>
<th>No. of Remote Control Stations and Speakers</th>
<th>Speaker Cable Sizes</th>
<th>Remote Control Cable Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or less</td>
<td>8-Wire</td>
<td>16-Wire To All Stations</td>
</tr>
<tr>
<td>5 to 13</td>
<td>8-Wire</td>
<td>24-Wire To All Stations</td>
</tr>
</tbody>
</table>

CABLE SIZES FOR #400-GR and #1600-GR (REMOTE CONTROL)

<table>
<thead>
<tr>
<th>No. of Remote Control Stations and Speakers</th>
<th>Speaker Cable Sizes</th>
<th>Remote Control Cable Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 or less</td>
<td>8-Wire</td>
<td>16-Wire To All Stations</td>
</tr>
<tr>
<td>5 to 13</td>
<td>8-Wire</td>
<td>24-Wire To All Stations</td>
</tr>
</tbody>
</table>

Note the Model-1600GR does not include any speakers. All speakers used with this model must be of the AC type, Models 23 or 24. All remote speakers on the #400-GR Series are AC speakers, Models 23 and 24. All remote speakers on the #500-GR Series are 23.

Note the Model 1600-GR does not include any speakers; while the Series #400-GR and #500-GR models include one set of DC speakers in the instrument cabinet. No DC speakers are required with the Model-1600GR and all speakers for this model and all remote speakers for the Series #400-GR and #500-GR are of the AC type.

Instruments equipped for four speakers or less (including the speaker in the instrument) contain one set of amplifiers. For five and including eight speakers, two sets of amplifiers are used, and for nine and including twelve speakers, three sets of amplifiers are used. These additional sets of amplifiers are not installed in the instrument cabinet and may be located in a closet or other convenient place, apart from the instrument.

In all models where additional sets of amplifiers are used, all speakers operating from these amplifiers are of the AC type. When ordering equipment calling for additional sets of amplifiers, specify length of cable necessary to connect additional amplifiers to the instrument.

REMOTE CONTROL EQUIPMENT INCLUDES:

- Instrument equipped for remote control operation.
- One remote control station with 20-ft. flat cable.
- Provision for attaching number of additional remote control stations as ordered.
- Provision for attaching number of auxiliary speakers as ordered.

Speaker push buttons will be engraved with any lettering desired as specified, maximum limit two lines of six letters each. unless otherwise specified, speaker push buttons will be engraved "spkr 1", "spkr 2", etc.

Plug #6106 and outlet box cover #66132, are used where the 24-wire remote control station cable enters and leaves the wall.

Plug #6194 and outlet box cover #66132, are used where the 16-wire remote control station enters and leaves the wall.

24-wire flat cable is used between each remote control station and the instrument, or between remote station and wall receptacle on instrument, or between remote station and wall receptacle on instruments having more than four remote stations and speakers.

16-wire flat cable is used between each remote control station and the instrument, or between remote station and wall receptacle on instruments having four or less remote stations and speakers.

Round cable is used whenever the cable is concealed.

Standard Con "P" Outlet Box is used with #66107, #65264, #66132, #6531, #66104 and #66132 outlet box covers and is obtainable at any local electrical dealer.

Use standard house wire, approved by the Underwriters' Laboratories for connecting AC speaker fields.
MECHANICAL INSTRUCTIONS

No. 16-E De Luxe Record Changer

1. TO LOCATE AND ADJUST THE RECORD TRAY (6687) (Fig. 6).

In assembling the record tray to the record changer, the first tooth of the driver quadrant (3551) (Fig. 5) should mesh with the second tooth of the driven quadrant of the tray as shown.

2. THE ADJUSTMENTS OF THE RECORD MAGAZINE.

Before attempting to adjust the magazine, be sure that the center of the magazine pivot pins (34323) (Fig. 1) is 5/16" above the base plate. This height is very important and we recommend checking the height of the right hand pin, when looking at the magazine, before any adjustments are made.

The magazine is positioned by moving it sideways on its bearing or pivot pins. The two set screws underneath the pivot pins lock the magazine in position. Loosen these set screws, then set the left left hand side of the record reverse assembly lock (part of 622B, Fig. 6) is between 1/2" and 3/4" inside the left hand side of the Reverse crank, when looking at the magazine. This is the left hand edge of the record reverse fork is about 3/8" or 1/2" to the right of the left hand edge of the crank. After moving, the magazine, lightly retighten the set screws. Then with the selection arm in the “Repeat” position swing the record reverse arm around in front of the magazine, to see whether the guide guide strikes either of the record support pins (34348) (Fig. 6). If the guide guide strikes either of the support pins it will be necessary to bend the pin away from the guide so that they can be inserted. If it is necessary to bend either pin, set the control lever in the “Repeat” position, then raise the record tray by hand, with a 10" record on it, observing the way the guide strikes the support pins, the record should hit both pins about 3/4" from the end of the pin; if it does not it will again be necessary to adjust the pin until the record hits both pins an equal distance from the ends. It is necessary to bend the pins, check the clearance between the guide guide arms and the pins and between the arm carrying the record guide and the right hand pin. Also if the magazine has been shifted it is necessary to see that the two points, which extend downward from the magazine, have ample clearance in the channels, in the record tray, which are provided for their passage. If there is possibility of the points striking it probably means that magazine has been shifted too much.

If the magazine has been adjusted, it is also necessary to see that the record separator hook (6226) (Fig. 1) does not bind in the slot in the end of the record separator arm (6445) (Fig. 6). If it does the action covering these parts give the adjustment.

MAGAZINE STOP SCREW.

The magazine stop screw No. 2, Fig. 5, should be adjusted so that the crank pin (part of 620, Fig. 1) is approximately 3/8" from the right of the reverse reverse fork (part of 622B, Fig. 6) which is farthest from the magazine, when the record reverse guide is in front of the magazine, that is, in the reversing position.

RECORD REVERSE GUIDE (6444) (Fig. 6).

With a 12" record in the magazine the record reverse guide assembly (6444) (Fig. 6) should be parallel with the record when in the reversing position, in front of the magazine. If the reverse assembly is parallel with a 12" record as shown, it should turn around and lay against the reverse guide pin tubing (34344) (Fig. 6), if the eccentric cam (3525) (Fig. 8) is properly adjusted. This cam can be adjusted, by loosening the screw through the cam and turning it so that the record reverse assembly returns to the reverse guide pin tubing. Care should be taken when making this adjustment so that the crank pin (part of 620, Fig. 1) does not hold the reverse guide away from the pin tubing. This cam should be turned so that the reverse guide assembly just touches the pin tubing, if the cam is turned too far it will allow the reverse guide assembly to hit the pin tubing, but in the reversing position the assembly will not be able to assume a position parallel with a 12" record.

REVERSE ASSEMBLY LINK ROD.

Loosen lock nut No. 9, Fig. 5, while the record changer is in the reversing position, that is, when the reversing assembly (6444) (Fig. 5) is in front of the magazine. Remove the screw (3543) (Fig. 8) holding the reverse segment link (3441) (Fig. 8) to the reverse segment (3550) (Fig. 8) and lengthen or shorten the link, by the link thread until the reversing crank (6230) (Fig. 1) stands with the crank pin just barely touching, but not binding, against the front side of the fork (6228) (Fig. 6). After the adjustment has been made, lock the link in place with the lock nut No. 9, Fig. 8.

RECORD SEPARATOR ADJUSTMENT.

The separator stop No. 5, Fig. 1, should be adjusted so that a small 10" record will positively clear the knife portion of the separator lever as shown in the following illustration. A standard to use to make certain that there is approximately 3/16" clearance between the edge of the small record and the point of the separator lever, as shown at "A" in illustration below. However, it may be necessary to vary one way or the other from this measurement, depending on whether or not the slotted end of the record separator lever goes over the hook (6228) (Fig. 1) without binding.

RECORD SEPARATOR HOOK ADJUSTMENT.

After adjusting the record separator it will be necessary to check the record separator hook (6226) (Fig. 1) to be sure that it enters the slot in the record separator without binding. This hook is thinned and by loosening...
ing the locknut the hook can be turned in either direction, to raise or lower it. After the correct adjustment is obtained, tighten the locknut.

It should never be necessary to change these adjustments on record changers unless they have been tampered with by an untrained person.

9. SEPARATOR HOOK AND ARM (6226) (Fig. 12).

Be sure set screw No. 10 in Fig. 8 is screwed all the way in.

10. RECORD MAGAZINE BUSHING (4029) (Fig. 1).

If a ringing noise is heard while the instrument is changing records, i.e., such a noise that might be made by a spring, it will be found that the Durax bushing (4020) (Fig. 1) is too tight, in which case it will be necessary to loosen the lock out of the holding bolt, and back the bolt out, from a quarter to a half turn, then tighten the lock out.

11. TO ADJUST THE TONE ARM HEIGHT.

To adjust the tone arm height, first place a "1" record on the turntable and adjust the tone arm stop lever (64197) (Fig. 1) so that the record hits the rubber roller (5044) (Fig. 1) in the center. Start the record changer through a cycle and stop it when the tone arm lever hook (5658) (Fig. 1) just touches the stop lever assembly. In this position adjust the tone arm height so that the top of the stop lever is the same height as the center of the hook. This adjustment is made by loosening the two Allen set screws at the rear of the tone arm. These Allen set screws are accessible by raising the tone arm by hand. After making the height adjustment it is necessary to make certain that there is a clearance of approximately .5" between the pickup head and the record tray. This distance may be checked between the bottom of the record tray and the bottom of the pickup when the record tray is approximately parallel with the pickup.

12. TO ADJUST THE PICKUP ELEVATION.

When the tone arm swings in towards the record, the pickup arm lever hook (5658) (Fig. 1) comes into rest against the pickup arm stop lever (64197) (Fig. 1) and when the tone arm lowers the pickup toward the record it passes momentarily before the pickup arm lever hook goes through the stop lever. If the record changer is stopped during this pause, it will be found that the ball in the end of the pickup arm lift shaft (4675) (Fig. 1) is at the point marked 'L' in Fig. 9 on the lift cam (6449). (Fig. 1) Now if the pickup arm, with a needle in the proper position, is moved beyond the edge of the record, the point of the needle will extend below the tip surface of the record a distance equal to half the radius of the record. The correct elevation of the pickup is made by the screw in the underside of the tone arm fork against which the pickup cover rests. Loosen the locknut, adjust the screw to bring the needle to the position mentioned above, then lock the locknut.

15. PICKUP FEED IN ADJUSTMENT.

The collar of the pickup arm swing lever and roller assembly (6232) (Fig. 9) should ride on the feather facing of the friction cam (6691) (Fig. 10) until the pickup arm lever hook (5658) (Fig. 1) has engaged the stop lever (64197) (Fig. 1). Then a slight amount of friction should be maintained between the ball at the end of the pick off arm lift shaft (4675) (Fig. 1) and the roller cam (6449) (Fig. 1). This friction should be maintained until the needle has touched the record, otherwise the pickup arm may move away from the stop lever and the needle miss the record. If the friction is maintained too long the needle may be forced beyond the first playing groove. To adjust this, the pin locking the friction cam to the main shaft should be driven out and the Allen set screw loosened to a sliding tension. The cam is rotated forward, in the direction of rotation of the main cam shaft, to maintain the friction a longer time and backward to maintain it for a shorter time.

14. TO ADJUST THE PICKUP.

After replacing the pickup cover, it should be noted whether the stylus (5610) (Fig. 10) is centrally located with respect to the pole pieces (566) (Fig. 10). To center the stylus, loosen the locknut (99-11) (Fig. 10), then loosen the two headless set screws (99-28-3) (Fig. 10). These set screws hold the spool assembly (6041) (Fig. 10). The stylus assembly should be shifted until the stylus is centered with the pole piece, then tighten the set screws carefully, so as not to crack the spool, then tighten the lock nuts.

If for any reason it is necessary to shift the pole pieces, which are held to the back by two screws, the two set screws holding the spool should be loosened before attempting to move the pole pieces. If any adjustment of pole pieces, is made carefully check the centering of the stylus before replacing the cover by means of its three screws.

15. TO ADJUST THE STOP LEVER HOOK (5658) (Fig. 1).

Always adjust the tone arm position on a 12" record before adjusting for a 10" record. Adjust the tone arm stop lever hook (5658) (Fig. 1) by moving it in or out. This hook is locked in place by a set screw in the stud whose nut is shown in Fig. 1 as No. 43159. This set screw is at the bottom of the stud. Adjust the hook so that it will pass through the notch in the pickup arm lever (64197) (Fig. 1) without binding against the top of the stop lever. With the top of the stop lever (64197) against the edge of the record and the stop lever hook (5658) against the blade of the stop lever (64197) the operator should stop on the record exactly 1/8" from the edge of the record.

With the record changer in exactly the same position as described above, and with a 10" record on the turntable and the hook (5658) (Fig. 1) against the blade, the stop lever should allow the needle to stop on the record exactly 1/8" from the edge of the record. A 6-32 screw shown in Fig. 9 is provided for making this adjustment, simply by screwing it in or out. A check should be made for clearance between the roller and the tray, this roller should never bind on the record tray. This can be taken care of by slightly bending the tone arm stop lever hook (64197) (Fig. 1) up or down. If it is necessary to bend the stop lever it will be necessary to readjust for 12" records.

16. TO ADJUST THE CLUTCH THROWOUT LEVER AND CAM.

The clutch throwout lever cam is shown at 15 in Fig. 2 and is adjusted by loosening the shoulder screw (5317) (Fig. 1) to a sliding tension after the record changer has been stopped in the playing position. The clutch throwout lever cam should just clear the point of the record throwout cam (6448) (Fig. 10) with the clutch disengaged. Unless clearance between the record throwout cam and clutch throwout lever cam is maintained the record changer will jam. If too much clearance is allowed the throwout cam will not disengage the clutch and the record changer will continue to change records without playing them.

17. TO ADJUST SOLENOID WEDGE SPRING.

This phosphor bronze spring is one of the three spacers used to mount the solenoid plate bracket to the solenoid bracket. It is used to prevent clutch chatter or bounce when the clutch engages. The only adjustment is to bend the spring to a snug fit with a long screw driver so as to increase or decrease its pressure on the solenoid to clutch lever (6455) (Fig. 11).

18. TO ADJUST THE REVERSE CAM SHIFT LEVER (5326) (Fig. 5).

This lever is moved by the record control shaft (5724) (Fig. 12) and is held in position by an Allen set screw. It should be positioned on its shaft so that the record reverse cam (5629) (Fig. 4) is firmly engaged with its pin (44-64) (Fig. 8) in the "Both Sides" position. In the "One Side" and "Repeat" positions it should have good clearance with the pin. If any adjustment of this lever is made to be sure to check the setting of the Reverse Cam Arm and Roller Assembly (6490) (Fig. 8) as instructed in Section 7 of the instructions on replacing a reverse cam.

19. TO ADJUST THE RECORD REPEAT LOCK LEVER (5354) (Fig. 12).

The purpose of this lever is to prevent accidental shifting of the Selector Arm while the instrument is not in the playing position. The "Repeat" position this lever is on the side of the Solenoid to Clutch Lever (6457) (Fig. 11) away from the main cam. In the "One Side" and "Both Sides" positions it is on the main cam side of the solenoid to clutch lever. With the tone arm in the playing position (Main Clutch Disengaged) this lock lever should lock the solenoid to clutch lever by approximately 1/8" when moved under it.

20. TO ADJUST THE RECORD REVERSE LOCK VER (5339) (Fig. 12).

This lever should be on the main cam side of the solenoid to clutch lever when in the "Both Sides" position. And on the opposite side when in the "One Side" and "Repeat" positions. With the main clutch disengaged the lock lever should clear the solenoid to clutch lever by approximately 1/8" when moving under it.

21. TO ADJUST REVERSE CAM ARM AND ROLLER ASSEMBLY (6450) (Fig. 4).

See Section 7 under Instructions For Replacing a Reverse Cam.

22. TO ADJUST RECORD REPEAT THROWOUT LEVER (6665) (Fig. 12).

No adjustment of this part is necessary.

23. TO ADJUST RECORD REPEAT CLUTCH LEVER (5352) (Fig. 12).

The adjustment of this lever is made by loosening the Allen set screw to a sliding tension then moving the part along the shaft. The sliding clutch should engage in the "One Side" and "Both Sides" positions, but should be disengaged in the "Repeat" position. The fork of this lever should not bind the sliding clutch in either the "Repeat" or "Both Sides" position.

24. LATERAL LOCATION OF THE MAIN CAM SHAFT.

Both end bearings of the main cam shaft are movable, and are used to locate the cam shaft in its proper lateral position, as well as adjust the amount of end play. The main cam shaft is located laterally so that the
ball in the end of the tone arm lift rod (6457) (Fig. 9) travels in the exact center of the tone arm lift cam (6640) (Fig. 9). As shown at N in Fig. 9.

25. TO ADJUST THE TRIP SWITCH (2792) (Fig. 7).

This switch is accessible by removing the turntable, which will expose the switch cover. To remove the switch cover it is necessary to remove the trip arm, which goes through the switch cover and the two flat head screws which hold the cover in place. The clearance between the contact points on the fixed and movable arm of the switch should be 0.05. After replacing the trip arm (6510) (Fig. 7) in the switch, after the switch cover has been replaced, set the tone arm on the spindle, push up trip arm (4524) (Fig. 7) about 2° toward the magazine and then turn the tonearm through one complete revolution. This will insure the fiber cam, on the tonearm, resetting the top switch, the clearance between the trip arm and the movable arm of the switch should be 0.05. The distance between the trip arm and the switch trip guard finger should also be 0.05.

To adjust the clearance between the trip arm hook (6510) (Fig. 7) and the movable arm switch, loosen the screw in the bakelite switch base, at the end near the tone arm. Move the switch until 0.05" clearance is secured between the trip arm hook and the movable arm of the switch, then tighten the screw holding the switch. In making this adjustment be sure that the stationary arm of the switch is not bent when tightening this screw.

On some models a headless set screw, near the end of the coil spring, is used to lock the switch in position; loosen this screw, adjust the switch, then tighten the set screw.

26. TO ADJUST THE SOLENOID MOTOR SWITCH (2764) (Fig. 5).

After the switch cover has been removed the switch is exposed. The upper switch points should make good electrical contact, while the main clutch is disengaged, in this position the clearance between the bottom points should be approximately 0.05. While the clutch moves from the disengaged to the engaged position the upper switch points remain closed until the lower set of points are closed. When the clutch is fully engaged the lower set of points should make good contact and the clearance between the upper points should be approximately 0.015.

To adjust the switch loosen the screw through the bakelite switch base at the rear of the switch assembly. After the position is found where proper clearance is secured with the clutch engaged and disengaged, the switch should be locked in position with the screw.

On some models a headless set screw used to lock the switch in position. This screw is near the point of the tapped bakelite insulating block. Loosen this screw and adjust switch to get proper clearance then lock in position by the set screw.

The two upper contacts are in series with the auto trip switch and the two lower contacts are shunted across the motor switch. When the clutch is engaged the auto trip switch is out of circuit and the motor switch is shunted by the lower contacts thus insuring the complete operation of the switch even though the instrument is switched to radio or turned off.

27. TO ADJUST THE FRICTION JOINT OF AUTOMATIC TRIP Switch.

The amount of friction necessary in the friction joint between the auto trip stop lever—long (6502) (Fig. 7) and the auto stop trip lever—short (4525) (Fig. 7) should be just sufficient to close the automatic stop trip switch (2792) (Fig. 7). The friction is regulated by adjusting the screw which tightens the flat spring (3908) (Fig. 7). If the tension is too great the instrument may trip before finishing a record, if too great tension is had the instrument will not change records when the needle hits the automatic change groove.

28. RECORD SIZE LIMIT.

The 15/20 Series record changer will play any 10" or 12" record of standard size. The minimum size for 12" records is 115. The minimum size for 10" records is 90. Records smaller than these limits are very apt to miss centering and the turntable and in most cases are broken.

These record changers will automatically trip on any record having a automatic stop change groove, either circular, oval or, where the blank space in the center of the record is not more than 60mm in diameter.

29. RECORDS.

Always inspect the records to see that no rough edges are present. Occasionally you will find a record which has a rough edge. This rough edge will greatly interfere with the satisfactory performance of the record changer. A small piece of #00 sandpaper will assist you greatly in removing this rough edge.

30. TO ADJUST THE VERTICAL BUMPER GUIDE (6093) (Fig. 6).

This guide is located back of the magazine cross bar (6083) (Fig. 6). After the records are separated from the magazine they are guided in dropping off the separator so they hit the center of the record changers (5081) (Fig. 6). This vertical bumper guide also guides the records when the elevating hook, on the rear of the record tray lifts the record. The vertical bumper should be at lock just far enough to allow a 12" record to drop out of the record changers freely. The lower part of the vertical bumper should be set in such a manner that the record well, should extend toward the center of the well rubber bumpers far enough to make sure that the upper edges of the records fall behind the points of the upper record support (5517) (Fig. 6). This adjustment is not critical. In many cases it will be found that the lower end of the vertical bumper will just clear the elevating hook on the rear of the tray. In cases where it is found that 10" records are chipping about the edges, of any position against the points of the upper record support (5517) (Fig. 6) it will be necessary to bend the vertical bumper (6093) (Fig. 6) back at the top to a point where it just clears the elevating hook at the rear of the tray. It should never be bent back far enough to raise the front of the tray.

31. CLUTCH CLEARANCE.

The clearance between the drive (6356) (Fig. 10) and driving (6360) (Fig. 10) members of the clutch should be approximately 0.005" (Twenty thousandths), and is adjusted by loosening screw No. 16 Fixed to the sliding tension and adjusting the clutch fork (5353) (Fig. 2) and the solenoid to clutch lever and pin assembly until the proper clearance is obtained. After adjustment is made lock the screw No. 16, Fig. 3.

32. MOTOR CONNECTIONS (21531).

The 21531 motor is a synchronous motor and will run equally well in either direction when properly connected. For this reason, all motors shipped from the factory are equipped with a terminal strip and cable. However, if it should ever be necessary to disconnect the leads from the terminal strip the leads should be replaced in the following order: With the cable extending to the right of the terminal strip and the mounting lugs pointing downward, and the solenoid lugs towards you, the leads go on from left to right in the following order—small black, black with yellow tracer, blue and large black. In the order they are ground, one side of 110 volt line, one side of the resistor, and the remaining 110 volt condenser leads. The motor terminal strip should be mounted to the cabinet terminal strip so that the cable extends to the right, with the solenoid lugs towards you.

33. OPERATING INSTRUCTIONS.

Due to its careful design and precision workmanship, the Caphart 16E record changer requires a minimum of oiling.

About once each year a light coat of vaseline or petroleum jelly should be applied to all moving surfaces which were coated with graphite at the factory.

A very light coat of vaseline should be applied to the surfaces of the magazine, indicated at "A" in Figure 6. It is best to apply this coating every six months. The vaseline should be applied by the fingers, on the magazine faces. DO NOT USE EXCESSIVE AMOUNTS OF LUBRICANT ANYWHERE ON THE RECORD CHANGER, YOU WILL CAUSE INJURY TO YOUR EYES.

A good grade of machine oil, not too light, should be used on the sliding clothes, reverse cam shaft and all eccentric and shoulder screws.

NEVER OIL THE "DUREX" BUSHINGS, AS THIS WILL CAUSE THEM TO DISINTEGRATE.

Once every year the motor oil cups should be oiled with a good grade of motor oil. At the same time the gear box should be inspected, and the grease replaced if it has become hard. A good mixture to use here is 75% vaseline and 25% SAE 40 motor oil.

34. INSTRUCTIONS FOR REPLACING THE RECORD REVERSE CAM AND ITS ADJUSTMENTS.

1. Set record changer in the playing position. Carefully mark the drive gear (1361) (Fig. 10) on the main shaft, and the driven gear shown as part of 6225, Fig. 10, by prick punch marker or scribe, so that the same marks will be on the one after new insuring proper fitting.

2. Remove the two bolts, one (3238) (Fig. 4) securing the magazine slide and roller assembly to the magazine slide arm lever, and one (3235) (Fig. 1) securing the record slide arm and stud assembly to the record tray elevating shift.

3. Locking in rear of the instrument, remove the Durex bushing from the end of the main cam shaft, nearest the motor drive shaft. This is accomplished by loosening the bolt to the right of the main shaft. Care should be taken when replacing this bushing so as to not tighten the bolt enough to crush the bushing, a snug fit only is required.

4. Remove lower half of bearing and Durex bushing from the other end of the main cam shaft and the cam shaft out of the record changer. The same precautions against crushing this bushing should be taken with this one as with the one in the preceding section.

5. Remove taper pin from gear and loosen set screw in the collar, both shown as 6235 in Fig. 8, of the reverse cam shaft assembly, as well as the pin (3444) (Fig. 10) over which the reverse cam forks, when in
the reversing position. After removing the collar and sliding the gear to one side, file all burrs from the edges of the holes in the reverse cam shaft. Slide the shaft through its bronze bushing toward the rear of the instrument far enough to allow the removal and replacement of the reverse cam (6525) (Fig. 10).

6. Reassemble the reverse cam shaft assembly, making certain that the taper pin holes in the shaft and gear are correctly aligned to permit the taper pin being properly inserted. The set screw in the collar at the end of the shaft shall be properly tightened.

7. Remove the reverse cam arm and roller assembly (6450) (Fig. 2) and make sure that the roller pin and arm are not bent, if either of these items are found bent suggest you that you replace the reverse arm and roller assembly.

8. In reassembling the reverse cam arm and roller assembly (6450) (Fig. 2) in its proper position for alignment with the reverse cam, be sure the roller is about \(\frac{1}{8}\)" inside the ridge on the reverse cam, when the cam is in the reversing position.

9. Remove the taper pin from the gear (5516) (Fig. 10) on the main shaft, which drives the gear on the reverse cam shaft assembly (6233) (Fig. 10) and remount the main shaft to the record changer chassis, pushing the above gear, from which the pin was removed, to one side so that it will not mesh with its driven gear.

10. Locate the main shaft so that the lower end of the pickup arm lift shaft travels in the center of the pickup arm lift cam, as shown at "B" (Fig. 9). With the main shaft in this position, adjust the main shaft Durex bushings so that there is no end play in the main shaft assembly.

11. Set the reverse cam arm from its lowest position, with the control lever in the "Both Sides" position, so that the fork of the reverse cam is meshed with the driving pin.

12. Mesh the reverse cam assembly driven gear (5516) (Fig. 10) with the reverse cam assembly driven gear so that the identifying punch marks correspond to the original position. The taper pin for the driving gear should be inserted next. If the assembly has been properly made there should be approximately \(\frac{1}{32}\)" clearance between the roller or reverse cam arm and the reverse cam. See "A", Fig. 9.

13. Throw the control lever to the "One Side" position and rotate the reverse cam with the fingers until it is in the reversing position. Again throw the control lever to the "Both Sides" position. Now there should be approximately \(\frac{1}{32}\)" clearance between the reverse cam and the roller. See "B", Fig. 9. If the clearance is not approximately \(\frac{1}{32}\)" for both positions of the reverse cam it indicates either the gears are not properly meshed or the reverse segment link rod may be bent. A careful check of the latter while the main shaft is out will save time and trouble later.

35. INSTRUCTIONS FOR REMOVING THE 16-E RECORD CHANGER.

There is a great possibility, when removing the chassis from the cabinet, to mar or scratch the cabinet If you will place a piece of cardboard around the record changer it will eliminate, to a great extent, the possibility of marring the finish. A rubber auto mat, with a hole for the record changer, the same size as the one in the cabinet, makes an excellent pad. This pad can be split and easily put in position and removed.

Remove the back from the record changer, radio and amplifier compartments.

Remove the screws from the partition between the radio and record changer compartments, so it can be moved back out of the way.

Remove the wood screw, under the turntable, also the three bolts which hold the record changer down.

Remove the two wood screws that mount the play control.

Remove the female chassis plug, from the male chassis plug (6178) (Fig. 1), the pickup lead, which runs from the radio chassis to the terminal block, then disassemble the terminal block by removing the wood screws in its center, the straps holding the shielded lead, which runs from the shorting switch, and the 110 volt leads to the Play Control.

Release the play control cable and cable housing from the bracket on the record changer chassis, by loosening the two set screws. Care must be taken to prevent breaking the control cable when removing it. The end which has been inked by the set screw should be straightened before attempting to reinstall it.

Loosen the two Allen head screws in the flexible coupling and allow it to slide down the motor shaft, so as to clear the record changer shaft.

Move the play control as far into the radio compartment as possible.

Remove the screw marked "B" in the illustration on page 8. This is the middle one of the screws holding the upper record support.

Remove the magazine link shoulder screw (3239) (Fig. 6). This will allow the magazine to be swung out of the way. As seen in the record reverse arm and fork assembly (6230) (Fig. 1) it should be swung over the magazine and locked with the record reverse arm lock (6409) (Fig. 6), to keep it out of the way.

Lift the record changer up, until the tone arm just touches the top of the cabinet, carry it forward through the doors, tilting it to keep the main cam clear of the shelf.

All parts of the cabinet liable to damage must be protected by soft cloths while removing or installing the record changer.

It is not necessary that the above operations be carried out in the above sequence.

36. ALIGNMENT OF TRUE-TANGENT PICKUP.

When adjusting the TRUE-TANGENT pickup, the pickup head and tone arm should form a straight line, when the needle is exactly one and one half inches from the front of the tone table drive shaft cap (45.05) (Fig. 6). To adjust the pickup angle, loosen the nut at the rear of the steering arm assembly (6525) (Fig. 1), turn the steering arm either right or left until the correct position for the pickup is found, then set the lock nut up tight. Then see that there is in \(\frac{1}{32}\)" clearance between the pickup and the record top per Section 11.
CASE ELECTRIC CORP.

VOLTAGE CHART
115 VOLT LINE

Measurements taken from elements to chassis—1000 Ohms per volt meter.

\*Across Condenser (R-81)

Total 8" current drain 72 mA.--speaker field drop—90 volts.

<table>
<thead>
<tr>
<th>POSITION</th>
<th>TYPE</th>
<th>E_R</th>
<th>E_G Screen</th>
<th>E_G Suppressor</th>
<th>E_R Speaker</th>
<th>E_P Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Amplifier</td>
<td>6.0</td>
<td>6.0</td>
<td>100.0</td>
<td>8.0</td>
<td>280.0</td>
<td></td>
</tr>
<tr>
<td>Mixer</td>
<td>6.0</td>
<td>0.0</td>
<td>125.0</td>
<td>0.0</td>
<td>280.0</td>
<td></td>
</tr>
<tr>
<td>IF Amplifier</td>
<td>6.0</td>
<td>5.0</td>
<td>150.0</td>
<td>5.0</td>
<td>280.0</td>
<td></td>
</tr>
<tr>
<td>AVC Detector</td>
<td>6.0</td>
<td>6.0</td>
<td>75.0</td>
<td>75.0</td>
<td>18.0</td>
<td></td>
</tr>
<tr>
<td>Oscillator</td>
<td>6.0</td>
<td>0.0</td>
<td>20.0</td>
<td>20.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Audio Output</td>
<td>6.0</td>
<td>0.0</td>
<td>20.0</td>
<td>20.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Rectifier</td>
<td>6.0</td>
<td>0.0</td>
<td>20.0</td>
<td>20.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

PARTS CHASSIS 17, PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

©John F. Rider, Publisher

Compliments of www.nucow.com
The voltages shown below are average readings taken from the tube socket contacts to the chassis frame, and will vary 10% when the set is tested on a 6 volt battery due to differences in characteristics of vibrators and tubes.

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>1st R. F. Amplifier</td>
<td>85</td>
<td>2nd Detector—A. V. C.—2nd Audio</td>
</tr>
<tr>
<td>6A7</td>
<td>1st Detector—Oscillator</td>
<td>41</td>
<td>Power Output (Class &quot;A Prime&quot;)</td>
</tr>
<tr>
<td>6F7</td>
<td>I. F.—1st Audio Amplifier</td>
<td>41</td>
<td>Power Output (Class &quot;A Prime&quot;)</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
GENERAL: This auto radio is a six tube, two unit (dash speaker) superheterodyne receiver. It is equipped with a remote control and a plug-in vibrator of the full wave self-rectifying type.

Circuit Changes

A number of the early receivers have \( \frac{1}{4} \) mfd. tubular condenser mounted above the cation resistor, illustration #42 of Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R. F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.

It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the cation resistor, Illus. #42, Figure 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

Peaking Instructions

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 trimmer condenser for 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 oscillator is turned 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 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.
A number of .05 mfd. tubular condensers were used at the factory in place of the .06 mfd. condenser part #1209213 condenser shown on Fig. 2 as Illus. #33. For Service Replacement purposes of any defective .05 mfd. condensers—use part #1209213 condenser.

©John F. Rider, Publisher
Page 10-4 Chevrolet

Model 601586
Socket, Trimmers
Chassis, Alignment

Parts

General: This auto radio is a four tube, single unit superheterodyne radio. It was designed for the 1955 model Chevrolet. A tuning control of the type that adjusts the top dial is the instrument used.

Peaking Instructions

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 over this lead to the grid cap of the 6A7 tube, leaving the tube's e.g. clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I. F. adjustment.

(b) Set the oscillator on 250 kilocycles.

(c) Connect the condenser on 250 kilocycles.

(d) Peak the I. F. trimmer P-3 for the 2nd I. F. coil shown on Fig. 3.

(e) Then peak trimmers P-2 and P-1 at the first I. F. coil also shown on Fig. 3.

(f) In order to secure 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 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 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) 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 1600 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. 3) 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.

(h) The capacity of the output circuit of the test oscillator may be slightly different than that of the under-car antenna the receiver to be used on. Therefore, it is advisable to readjust the "ANT" trimmer to the car antenna when reinstalling the receiver. This may be done by tuning the receiver to a broadcast station around 1400 K.C. and adjusting for maximum volume.

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. C. from leveling out the output as the adjustments are made.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Description</th>
<th>Illus. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1209079</td>
<td>Case</td>
<td>Chassis</td>
<td></td>
</tr>
<tr>
<td>1209683</td>
<td>Clip</td>
<td>Tube grid connector</td>
<td>5</td>
</tr>
<tr>
<td>1209039</td>
<td>Coils</td>
<td>&quot;A&quot; choke</td>
<td></td>
</tr>
<tr>
<td>1209299</td>
<td>Condenser</td>
<td>By-pass block</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Sec. A</td>
<td>.08 Mfd., 400 v.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sec. B</td>
<td>.08 Mfd., 400 v.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sec. C</td>
<td>.4 Mfd., 100 v.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sec. D</td>
<td>.01 Mfd., 100 v.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sec. E</td>
<td>.1 Mfd., 100 v.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sec. F</td>
<td>.08 Mfd., 106 v.</td>
<td></td>
</tr>
<tr>
<td>1209551</td>
<td>Condenser</td>
<td>Molded .0012 Mfd.</td>
<td>25</td>
</tr>
<tr>
<td>1209502</td>
<td>Condenser</td>
<td>Molded .00027 Mfd.</td>
<td>26</td>
</tr>
<tr>
<td>1209533</td>
<td>Condenser</td>
<td>Molded .000045 Mfd.</td>
<td>27</td>
</tr>
<tr>
<td>1209578</td>
<td>Condenser</td>
<td>Molded .00005 Mfd.</td>
<td>18</td>
</tr>
<tr>
<td>1209555</td>
<td>Condenser</td>
<td>Molded .00025 Mfd.</td>
<td>29</td>
</tr>
<tr>
<td>1209534</td>
<td>Condenser</td>
<td>Tubular .006 Mfd., 200 v.</td>
<td>33</td>
</tr>
<tr>
<td>1209550</td>
<td>Condenser</td>
<td>3 gang tuning—incl. coupling</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td><strong>Connector Assembly</strong></td>
<td>&quot;A&quot; power on chassis</td>
<td></td>
</tr>
<tr>
<td>1830849</td>
<td>Cap</td>
<td>Fender holder</td>
<td>109079</td>
</tr>
<tr>
<td>1834876</td>
<td>Fender</td>
<td>Contact</td>
<td>1209576</td>
</tr>
<tr>
<td></td>
<td><strong>Connector Assembly</strong></td>
<td>Antenna on chassis</td>
<td></td>
</tr>
<tr>
<td>1835878</td>
<td>Body</td>
<td>Antenna connector</td>
<td>1090961</td>
</tr>
<tr>
<td>1834876</td>
<td>Fender</td>
<td>Contact</td>
<td>1209053</td>
</tr>
<tr>
<td>1834876</td>
<td>Socket</td>
<td>Fender terminal</td>
<td>1209130</td>
</tr>
<tr>
<td>1843733</td>
<td>Washer</td>
<td>Antenna connector</td>
<td>1209197</td>
</tr>
<tr>
<td>1209097</td>
<td>Coupling</td>
<td>Condenser drive</td>
<td>1209999</td>
</tr>
<tr>
<td>1209392</td>
<td>Cover</td>
<td>Chassis top</td>
<td>1209391</td>
</tr>
<tr>
<td>1209084</td>
<td>Cover</td>
<td>Tube lead</td>
<td>351655</td>
</tr>
<tr>
<td>1209219</td>
<td>Resistor</td>
<td>165 ohms</td>
<td>42</td>
</tr>
<tr>
<td>1209533</td>
<td>Resistor</td>
<td>11,000 ohms</td>
<td>1209910</td>
</tr>
<tr>
<td>1209119</td>
<td>Resistor</td>
<td>Insulated 200,000 ohms</td>
<td>1209204</td>
</tr>
<tr>
<td></td>
<td>Sec. A</td>
<td>385 ohms</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Sec. B</td>
<td>615 ohms</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Sec. C</td>
<td>440 ohms</td>
<td>47</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher
The circuit used is of the conventional superheterodyne type and does not employ regeneration which might affect its stability. A high gain antenna circuit especially designed for use with an under car antenna is used. An antenna compensating condenser is provided in this circuit which can be adjusted so as to bring the antenna circuit of the receiver into resonance with the car antenna.

**Compliments of www.nucow.com**

---

**CHEVROLET DIV.-GEN. MOTORS**

**MODEL 985200**

**Schematic, Voltage**

**Circuit Description**

**Symbol Code**

- H—Heater
- G1—Oscillator grid
- G2—Oscillator plate
- K—Cathode
- P—Plate
- S—Screen grid
- Cs—Suppressor grid

**Tube Socket Voltages**

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>Gs</th>
<th>G1</th>
<th>G2</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R. F. Amplifier</td>
<td>6</td>
<td>240</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6A7</td>
<td>1st Det.-Osc.</td>
<td>6</td>
<td>140</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6B7</td>
<td>IF Amp.-2nd Det.</td>
<td>6</td>
<td>130</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>1st A. F.</td>
<td>0</td>
<td>130</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Output</td>
<td>6</td>
<td>220</td>
<td>240</td>
<td></td>
<td></td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td>84</td>
<td>Rectifier</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>240</td>
</tr>
</tbody>
</table>

*A. C.

**Note:** Above readings taken from tube socket contacts to ground with a D. C. voltmeter having a resistance of 1000 ohms per volt.
Chevrolet Div.—Gen. Motors

MODEL 36200
Socket, Trimmers, Alignment, Chassis, Parts

Peaking Procedure

1. Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 output tube. Be sure the plate and screen are connected to the plate and screen of the 42 output tube.

2. Connect the tuning dial to the chassis in place. Connect a resonant-tuning circuit (a 1 MHz or lower-tuning circuit) to the plate and screen of the 42 output tube, leaving out the tubes.

3. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

4. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

5. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

6. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

7. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

8. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

9. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

10. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

11. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

12. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

13. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

14. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

15. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

16. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

17. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

18. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

19. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

20. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

21. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

22. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

23. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

24. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

25. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

26. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

27. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

28. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

29. Adjust the tuning dial until the output meter reads zero. Then, connect the tuning dial to the chassis in place.

30. Repeat the tuning procedure until the plate and screen of the 42 output tube are completely in phase.

© John F. Rider, Publisher
ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some Chevrolet Models. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end as with the capacity coupled sets.

POWER SUPPLY: The power supply in this receiver differs from previous Chevrolet Models in that a rectifier tube (type 6X5G) is used in conjunction with a full wave, plug-in vibrator. The vibrator circuit is permanently connected for operation on negative battery ground as is the case on all Chevrolets.
Compliments of www.nucow.com

**CIRCUIT ALIGNMENT**

1. **Align at 1100 Kilocycles**
   - Leave the test oscillator tuned to 1000 Kc.
   - Connect the second grid of the test oscillator to the grid of the grid dip in plate point A of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
   - Connect the second grid of the test oscillator to the ground point of the receiver.
   - Connect the second grid of the test oscillator to the plate of the receiver.
SUBJECT: Service Hints On Tuning Unit For 985283 Radio

1. Motor does not run
   (a) Press button down and check motor terminals for voltage. The voltage on the motor must be measured across the terminals because a voltage reading will show at all times from any one of the four motor terminals to ground or chassis. The voltage across the motor terminal should read 5.5 volts with 6 volts on the radio set, and will only show a reading when a button is pressed down and the relay is operating.
   (b) If no voltage reading is obtained at the motor terminals to ground, check high "A" wiring from spark plate to motor terminals for open circuit. This check is made with no buttons down.
   (c) When there is a voltage reading on some of the motor terminals to ground with no buttons down and not on other terminals, check motor fields and armature for open circuit. This is done with the regular continuity test.
   (d) Check all motor terminals for ground with high "A" disconnected from the motor.
   (e) Check the brushes on motor to make sure that they are seating properly on the commutator.
   (f) Polish commutator with very fine emery paper, then wipe with a clean rag. Be sure that no abrasive is left on the commutator.

2. Motor stalls or does not pull condenser gang, but still motor checks ok even under No. 1
   (a) Rotate armature of motor with finger to see if motor bearings are not frozen up. If the armature has a slight drag, it may be caused by the following:
      1. Tight motor bearings.
      2. Improper adjustment of motor worm with respect to the motor worm gear.
   (b) Rotate condenser gang coupling if chassis is out of case and make sure that all moving parts rotate freely. Check remote control and be sure that all moving parts rotate freely.
   (c) Hold clutch armature from engaging clutch and run motor by pressing button. Motor should run at very high speed with no load on it. This will check the motor and motor worm gear for freeness.
   (d) Check remote control for binding either in the control head or in drive cables. Make sure that there are no sharp bends in control cables when installed in the car.
   (e) Check motor armature for proper end play.
   (f) If any bearings or gears appear to be running tight, oil only with 3 in 1 oil or its equivalent. This is very important, and only a very light grade of oil should be used, otherwise motor unit will not operate properly under low temperature conditions.

3. If motor unit runs slow in both directions
   (a) The same checks as outlined in Nos. 1 and 2 will apply to a slow running motor.

4. Motor unit runs slow in one direction
   (a) Check motor brushes for proper fit to commutator.
   (b) Check motor worm for proper adjustment. Motor worm should be exactly on a center with motor worm gear, with about 0.002 inch of backlash to worm gear when motor armature is held rigid.
   (c) Check remote control and gang condenser assembly for binding in one direction or both.

SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont’d

5. Noisy motor unit mechanically
   (a) Check remote control for grinding or squeaking by spinning remote control knob.
   (b) Check all gear adjustments for proper backlash and alignment.
   (c) Check gears for proper lubrication. Use a light grade of thin vasoline on gears.
   (d) Check gears and bearings for worn parts or poor bearing fits and lack of lubrication. Refer to No. 2 for oiling.
   (e) Check motor brushes for noise.

6. Set noisy when jarred. This deals only with troubles in the motor unit that may cause the above trouble
   (a) Relay armature bouncing on relay contacts. To remedy this condition adjust relay spring if weak and relay spring contacts for a wider gap.
   (b) Push button cable plug not pushed in pocket far enough.
   (c) Weak push button springs in push button box. This will be noticeable only when the button box itself is jarred.

7. Motor runs but condenser gang and dial pointer do not move
   (a) Check the set screw in rear of gang condenser worm gear that locks the drive shaft to the gang condenser worm. The drive shaft may be turning free and not driving the gang. The drive shaft is adjustable endwise for the clutch armature adjustment only, and not for the motor worm gear. If this set screw has come loose the drive shaft will be out of adjustment and the clutch and motor worm will have to be adjusted in the order named.
   (b) Check clutch armature not operating. Check voltage across the clutch coil and also check the clutch coil for continuity.
   (c) If the clutch armature is operating, the clutch arm on the drive shaft may not be engaging the pin and roller on the motor worm gear. Adjustment can be made by moving the drive shaft endwise, but be sure to adjust motor after moving the drive shaft.

8. Motor unit operates and gang condenser oscillates but remote control does not operate
   (a) This condition will be caused by the bakelite gang condenser coupling slipping in the gang condenser worm. This coupling is a friction drive and is pushed inside the gang condenser worm with spring pressure exerted outwards on the worm. Do not oil this friction drive. To tighten this friction drive, pull coupling out and spread the split shaft with a small screwdriver. A very small spread is all that is required. Be sure to clean off all grease on split shaft and inside of hole in gang condenser worm gear, then replace the coupling.
   (b) Check remote control for any faults.

9. Push buttons do not release when one button is pressed at a time
   (a) Buttons may be binding on control panel plate. Loosen the nuts holding push button box and adjust box so that buttons are free to move in and out.
   (b) Buttons may be binding on top plate of button box. Adjust box plate so that buttons are free.
   (c) Rubber bands around buttons may be causing the buttons to bind.
   (d) Push button box may be defective. Try a new box. Do not repair push button box internally. Caution: Remember, the push buttons will not release until the proper station is tuned in and the motor unit has ceased to run.
10. Push buttons do not release when two or more buttons are pressed at the same time. This is a fault that should seldom be complained about because it is not the correct way to operate the tuning unit, but provision has been made in the design to eliminate continuous oscillation of the tuning unit when two or more buttons are pressed at the same time. Three or four oscillations are permissible before buttons release. If the buttons do not release, proceed as follows:
   (a) Try a new push button box.
   (b) Check adjustment of relay spring contacts for proper gap.
   (c) Check relay control arm for free operation and also for proper spring tension. Make sure that relay control arm is returning to normal position after relay operates.
   (d) Check instrument panel plate and button box as outlined in No. 9.

11. Dial pointer slides past the proper station or setting and then returns to station when the corresponding button is pressed the second time
   (a) This is a fault of the clutch which is not releasing fast enough or is not releasing at all. If the clutch does not release, the momentum of the locating motor will carry the gang condenser past the required setting. Check the clutch armature for free operation.
   (b) Check the clutch arm or drive shaft for free operation.
   (c) Check the clutch arm spring or drive shaft for proper tension.
   (d) Check the small roller on motor worm gear for free operation on its retaining pin.
   (e) Check the motor worm gear for free rotation on drive shaft when clutch arm is disengaged from the clutch pin.
   (f) Check the clutch magnet gap clip for proper tension.
   (g) Check the clutch arm spring for proper tension.
   (h) Check the clutch arm for proper alignment with control shaft.

12. Stations do not log properly when dial pointer comes towards the station from the high frequency end—in other words, rotating in a counter clockwise direction
   (a) Bakelite control disc for that particular station has not been set accurately. Adjust as per instructions.
   (b) This condition may also be caused by fault No. 11. Check as per instructions in No. 11.

13. Stations do not log properly when dial pointer comes towards station from the low frequency end of dial—in other words, rotating in a clockwise direction. Under this fault, it is assumed that fault No. 12 has been checked
   (a) The contact spring on control switch corresponding to the particular button under question may not be adjusted properly. If dial is over-riding on station it means that the contact spring is too close to the contact arm. To correct this condition it is necessary to loosen the screw on the discriminator switch to give contact spring a wider gap. If dial is under-riding the station, that is, not dialing entirely to the station, it means that the contact spring is too far from the contact arm. To correct this condition, it is necessary to tighten the adjusting screw on the discriminator switch. Be sure that none of the other adjusting screws are disturbed.

14. Set very noisy when motor unit is running. This would be electrical noise from the speaker
   (a) Improper adjustment of the silencing contact on the relay. This silencing contact is the back contact, or the one nearest the condenser gang. The lead running from this contact is connected to the tab of the push-pull input choke and hence when the relay is operated to either side, the input choke tab is then grounded, silencing the audio of the set. Check wiring, soldered joints and contact resistance of silencing contact on relay. Polish relay contacts with very fine emery paper to remove dirt and grease. This will assure a good contact.

15. Set noisy immediately after motor unit has ceased to operate dial pointer
   (a) This noise will only last for one or two seconds after the unit has stopped running and is caused by a voltage being generated in the motor and hence the “A” circuit by the rotation of the armature in a small residual field of the pole pieces. Check motor brushes and commutator for high resistance. Polish commutator as previously outlined.
   (b) Check the .51 mfd. condenser across motor terminals for open.

16. Push buttons do not hold down when pressed
   (a) Check the voltage between the black and yellow leads on push button cable socket.
   (b) Make sure that push button cable plug is making good contact to the socket.
   (c) Try a new push button box.

17. Calibrating light inside of case lights when calibrating switch is closed and push button is pressed. Motor will not run when this happens
   (a) This condition is due to a faulty calibrating switch. Bend the switch arm down slightly so that a good contact is assured. This light is in series with relay coils and when light is not shorted out with calibrating switch the relay will not operate.

18. Calibrating light inside of case does not light when calibrating switch is open and push button is pressed
   (a) Be sure calibrating light is not burned out.
   (b) Check the voltage on relay coils.
   (c) Check the relay coils for continuity.
   (d) Check the calibrating switch contact for grounded connection.

19. Shift in station logging
   (a) Check bakelite control discs for being loose on shaft. discs are not supposed to slip when unit operates. This is a friction fit on the control shaft and should never be oiled.
   (b) Check the oscillator circuit for shift.
CHEVROLET DIV.—GEN. MOTORS

Tube Complement

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>R. F. Amplifier</td>
<td>8R7</td>
<td>2nd Det.—A. V. C.—1st A. F. Amplifier</td>
</tr>
<tr>
<td>6A8</td>
<td>Oscillator-Modulator</td>
<td>6V6G</td>
<td>Output</td>
</tr>
<tr>
<td>6K7</td>
<td>I. F. Amplifier</td>
<td>0Z4</td>
<td>Rectifier</td>
</tr>
</tbody>
</table>

985424 PARTS LOCATING DIAGRAM
1. Aligning I. F. Stages at 362.5 Kilocycles

The I. F. amplifier may best be aligned by first using a modulated signal generator and an output meter in the conventional manner, and then making the final adjustment with a radio frequency modulator signal generator and oscillograph. The accuracy of the push-button tuning system partially depends upon the symmetry of the I. F. waveform. In most cases the symmetry is only approximate without the aid of the oscillograph equipment.

(a) Connect one terminal of the output meter to the plate of one of the 6Y6G output tubes and connect the other terminal through a .01 mfd. condenser (not electrolytic) to the plate of the other 6Y6G output tube.

(b) Connect the output of the signal generator through a .02 mfd. condenser to the grid of the 6K7 I. F. amplifier tube leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the frame of the receiver chassis.

(c) Turn the volume control on full. Adjust the station selector so that the rotor plates of the condenser gang are completely in mesh and turn the audio fidelity control to the treble position. The microphone control should be in the "music" position.

(d) Adjust the signal generator to 362.5 Kilocycles.

(e) Adjust both transformers located on the 2nd I. F. transformer to maximum reading on the output meter.

Note: Always use the lowest signal generator output that will give a reasonable reading on the output meter.

(f) Connect the output of the signal generator to the grid of the 6AS8 tube leaving the tube's grid clip in place.

(g) Turn the middle trimmer on the 1st I. F. transformer two or three turns of the adjustment screw. Care should be taken that the trimmer screw does not become dislodged from the nut.

(h) Adjust the other two trimmers on the 1st I. F. transformer for maximum reading on the output meter.

(i) Adjust the middle trimmer on the I. F. transformers for maximum reading on the output meter.

Note: Do not adjust the trimmers on the 2nd I. F. transformer.

2. Oscillograph Alignment

For a more accurate adjustment of the I. F. amplifier a cathode ray oscillograph may be obtained for obtaining a visual alignment. It will allow adjusting for a more symmetrical waveform. 

(a) Disconnect the conventional signal generator from the receiver.

(b) Connect the vertical plates of the oscillograph to the receiver connecting the (H) terminal through a .02 mfd. condenser to the grid cap of the 6K7 tube leaving the tube's grid clip in place. (Condenser is built into most oscillographas.) Connect the ground terminal to the frame of the receiver chassis.

(c) Connect the output of the R. F. modulated signal generator also through a .02 mfd. condenser to the grid cap of the 6AS8 tube leaving the tube's grid clip in place. Connect the ground lead to the frame of the receiver chassis.

(d) Adjust the signal generator to 362.5 Kilocycles.

(e) With the modulator switch of the signal generator turned off, a horizontal line will appear on the oscillograph by means of the amplitude control on the oscillograph. Adjust the length of this line so that it is equal to the width of the celluloid scale supplied with the oscillograph.

(f) Turn the frequency modulator switch of the signal generator on.

(g) Adjust the vertical control of the oscillograph so that the image is just within the top and bottom lines of the oscillograph scale.

Note: Use the lowest signal generator output that will give a stable image on the oscillograph screen. If no signal input is used; the humps desired on the waveform will not be visible even at perfect alignment.

(b) Readjust the middle trimmer on the 1st I. F. transformer for maximum symmetry above the vertical resonance line in the center of the celluloid scale. The bump or shoulder appearing on each side of the waveform will be equal distance from the nose of the curve when maximum symmetry is reached.

3. Aligning the R. F. Amplifier

(a) Connect the output of the signal generator through a .00016 mfd. condenser and a shielded antenna lead-in to the antenna connection of the receiver. Connect the ground lead to the frame of the receiver chassis.

(b) Adjust the signal generator to 1400 Kilocycles.

(c) Adjust the station selector to 140 on the dial logging the dial from the low frequency end.

(d) Adjust the trimmer on the oscillator section of the condenser gang for maximum reading on the output meter.

(e) Adjust the trimmer on the R. F. trimmer gang for maximum reading on the output meter.

(f) Adjust the trimmer on the antenna section for maximum reading on the output meter.

(g) Readjust the antenna trimmer for maximum volume on the output meter.

Note: Do not readjust the oscillator trimmer.

(h) Repeat operations (a) and (g) for more accurate adjustments.

4. Adjusting Antenna Compensating Condenser

(a) Adjust the signal generator to 600 Kilocycles.

(b) Tune in the 600 Kilocycle signal with the station selector for maximum reading on the output meter.

(c) Adjust the antenna compensating condenser for maximum reading on the output meter.

(d) Repeat operations (a) and (c) alternately until no further improvement in output can be obtained.

(e) Readjust the signal generator to 1400 Kilocycles.

(f) Tune in the 1400 Kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the antenna section of the condenser gang for maximum reading on the output meter.

5. Adjusting the Antenna Compensating Condenser When Set Is Installed on Car

(a) After installation is complete, tune-in a weak station between 55 and 65 on the dial that is just audible with volume control on full.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

6. Setting the Push-Buttons

The order in which the stations are set up on the push-buttons will in no way affect the operation of the tuning unit. To set the push-buttons no tools are required, but an understanding of the operation of the push-button switch is essential. There are some definite pressures and movements required to actuate the switch. First, a slight touch and a movement of less than one-eighth of an inch is all that is required to tune the receiver with a push-button after the button has been adjusted. Second, a heavier pressure and a movement of about one-quarter of an inch is required when the push-button is to be set to the station selected. To adjust the button, push the button all the way down (a slight snap will be felt when going past first stop position), and hold it in that position while you tune-in as accurately as possible with the manual tuning knob, the station selected. Release button, the station is set. Follow the same procedure in setting the remaining buttons.

Note: The accuracy of the push-buttons depends upon how accurate you tune-in the station while setting them.
A highly efficient superheterodyne circuit is used. Bias for the 6AS6 and 6K7 tubes is obtained across the 600 ohm resistor, item No. 39. Bias for the 6K6G tube is obtained across the 160 ohm resistor, item No. 28.

**Tube Complement**

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8G</td>
<td>Oscillator-Modulator</td>
</tr>
<tr>
<td>6K7</td>
<td>I. F. Amplifier</td>
</tr>
<tr>
<td>6Q7G</td>
<td>2nd Det. A. V. C.</td>
</tr>
<tr>
<td></td>
<td>- 1st A. F. Amplifier</td>
</tr>
<tr>
<td>6K6G</td>
<td>Power Output</td>
</tr>
<tr>
<td>6X5G</td>
<td>Rectifier</td>
</tr>
</tbody>
</table>

**Adjusting Antenna Compensating Condenser After Radio Is Installed**

(a) After installation, tune-in a weak station between 55 and 65 on the dial that is just audible with the volume control on full.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

**ANTENNA SYSTEM:** There are three antenna systems available for use with this receiver:

- The under-car
- The turret top
- The telescopic cowl antenna

Any one of these antennas will operate very efficiently with this receiver.
Circuit Alignment

1. Aligning the I. F. Stage at 455 Kilocycles
   (a) Connect the output meter to the plate and screen of the 6K6G output tube. Be sure the meter is protected from D. C. by connecting a .001 microfarad condenser (not electrolytic) in series with one of the leads.
   (b) Connect the output of the signal generator through a .002 mfd. condenser to the grid of the 6K7 I. F. tube leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame.
   Note: Keep the generator leads as far as possible from the grid leads of the other screen grid tubes.
   (c) Adjust the station selector so that the rotor plates of the tuning condensers are completely disengaged and turn the volume control to the maximum position.
   (d) Adjust the signal generator to 455 kilocycles.
   (e) Adjust both the I. F. trimmer condensers for maximum output.
   (f) Transfer generator lead to the grid of the 6AG tube leaving the tube's grid clip in place.
   (g) Adjust both trimmers located on the 1st I. F. transformer for maximum output.
   (h) Repeat operations (i) and (i) for more accurate adjustments.
   Note: To prevent A. V. C. action always use the lowest signal generator output that will give a reasonable output meter reading.

2. Aligning the R. F. Amplifier
   To obtain the greatest gain from the antenna system, the capacity of the dummy antenna should be accurate to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mmf. to 250 mmf., depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna having a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity or vice versa.
   (a) If the receiver is to be used with a turreted-top antenna or a telescopic coaxial antenna, the output lead from the signal generator should be connected through a .0005 mfd. condenser, and shielded lead, to the antenna connection of the receiver. If a large antenna such as the running board type is used, a .00018 mfd. condenser should be used and a long shielded lead in place of the .00005 mfd. condenser and short shielded lead.
   (b) Adjust the signal generator to 1400 kilocycles.
   (c) Adjust the station selector to 1400 on the dial.
   (d) Adjust the trimmer on the oscillator section of the tuning condenser for maximum output.
   (e) Adjust the trimmer on the antenna section of the tuning condenser for maximum output.
   (f) Readjust the station selector for maximum output.
   Note: Do not readjust the oscillator trimmer.
   (g) Repeat operation (c) for more accurate adjustment.

Adjusting Antenna Compensating Condenser
   (a) Set the signal generator to 600 kilocycles.
   (b) Tune-in the 600 kilocycle signal with the station selector for maximum output.
   (c) Adjust the antenna compensating condenser for maximum output.
   (d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.
   (e) Set the signal generator to 1400 kilocycles.
   (f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.
   (g) Readjust the trimmer on the antenna section of the tuning condenser for maximum output.

The push-button can be quickly and accurately set from the front of the receiver. The buttons are for the purposes to be used for the antenna. Determine the five broadcasting stations to be used by means of the manual tuning band. Tune the set to the station to be used as accurately as possible, then to the station desired. Push the button on which this tuning is to be set up on and hold in that position, then accurately adjust the remaining buttons in the same manner.
Circuit Alignment

When adjustments are being made, the chassis must be in its case to provide proper shielding, and the volume control should be turned full on to the maximum position. The signal generator output should be adjusted to give a reasonable scale deflection on the output meter.

Part No. 985426
Date 11-1-38

©John F. Rider, Publisher
Peaking I-F Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect the output of the test oscillator through an .02 mfd. condenser to the grid cap of the 6A7 tube (1st detector-oscillator) leaving the tube's grid clip in place. Keep the leads of the test oscillator as far as possible from the grid wires of the other screen grid tubes.

(b) Set the test oscillator to 262 kilocycles.

(c) Adjust the station selector so that the plates of the tuning condenser are completely in mesh.

(d) Turn the volume control on full and turn the tone control to the treble position.

(e) Adjust both trimmer condensers located on top of the second I. F. coil. Illustration No. 10—Fig. 1, for maximum output.

(f) Adjust both trimmer condensers located on top of the first I. F. coil. Illustration No. 9—Fig. 1, for maximum output.

(g) Repeat operations (c) and (f) for more accurate adjustments.

Always use the lowest signal generator output that will give a reasonable output meter reading.

Peaking R. F. Stages

(a) Remove the .02 mfd. condenser from the output lead of the test oscillator and connect a .00025 mfd. condenser in its place. Then, connect this lead to the antenna connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the “Osc” section of the tuning condenser for maximum output. (Fig. 1.)

(e) Adjust the trimmer on the “R-F” section of the tuning condenser for maximum output. (Fig. 1.)

(f) Adjust the trimmer on the “ant” section of the tuning condenser for maximum output. (Fig. 1.)

(g) Readjust the station selector for maximum output. Do not readjust the “Osc” trimmer.

(h) Repeat operations (c) and (f) for more accurate adjustments.

Adjusting Antenna Compensating Condenser

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector, for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 11, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement in output can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

(f) Tune in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the “ant” section of the tuning condenser, for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune in a weak station between 55 and 65 on the dial.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.
CONTINENTAL RADIO & TELEV. CO.
MODELS 4A, 4B, Early, Late, 4C
MODEL 5J
Schematics

MODELS 4A, 4B (Early), 4A, 4B (Late) and 4C. ON MODEL 4C ONLY

CAPACITORS

RESISTORS

FOR ALIGNMENT AND LAYOUT SEE INDEX

FINES:
LATE MODELS 4A AND 4B DIFFER FROM THE ABOVE DIAGRAM AS FOLLOWS;
1Q56 REPLACES 1C5G OUTPUT TUBE; CAPACITOR C1 IS .00005 MICA,
INSTEAD OF .00025 MICA AND RESISTOR R8 IS 440 OHMS 1/4 WATT
INSTEAD OF THE 600 OHM 1/4 WATT IN EARLY MODELS.

105-115, VOLTAGE (600V), A.C.-D.C.
LINE CORD RESISTOR, 165 OHMS

©John F. Rider, Publisher

Compliments of www.nucow.com
Models 4A, 4B Early, Late
Continental Radio & Telev. Co.

Model 4C
Model 4D, Early, Late, 4D-HH
Model 4H
Models 5D, 5DL
Model 5EA

Model 5J
Models 5L, 5LL
Alignment, Socket Trimmers

Compliments of www.nucow.com

© John F. Rider, Publisher
CONTINENTAL RADIO & TELEV CO.

MODEL 4H
Schematics

FOR SOCKET LAYOUT, SEE INDEX.

RANGE 535 - 1730 KC

© John F. Rider, Publisher
PROCEDURE FOR
SETTING UP

PUSH BUTTONS

MODEL 5B

There are four push buttons by means of which four stations may be selected (see Fig. 1). Make a list of four stations tuned in regularly. Loosen any of the push buttons by turning the push bottom properly, counter clockwise a few turns. Holding it in, tune in any one of your favorite stations by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now tighten the push button knob by turning clockwise.

Release the push button and loosen another push button. Holding it in, tune in another favorite station using the station selector. Turn the selector wheel very slowly back and forth until the signal is clearest. Now tighten the push button by turning it clockwise.

Repeat this operation for the remaining two buttons, tightening each button securely as it is set. If it is desired to change a station, simply loosen the push button and re-set.

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the windows above the push buttons.

The dial is now set up for quick tuning.

PHONOGRAPH
CONNECTIONS

MODEL 5B This receiver is provided with a phonograph (see chassis layout) and connection may be made from the phonograph to this jack by means of phone tips. It is necessary that the phonograph be equipped with a volume control and a switch to break connection between the phonograph and the set as the radioc will not operate properly if a permanent connection is made. When the phonograph is in use the volume control of the set will act to some extent as a tone control. Best results will be obtained with the volume control of the set near maximum and no station tuned in.

MODEL 5B VOLTAGE READINGS—LINE VOLTAGE 115

Volume control minimum, antenna shorted to ground and band switch in broadcast position. Meter 1,000 ohms per volt.

Filament of 80 tube to ground.................................................. 253 Volts
Screen of 41 tube to ground..................................................... 196 Volts
Screen of 6A7 and 6D6 tubes to ground................................. 87 Volts
Cathode of 41 tube to ground.................................................. 13 Volts
Cathode of 6A7 tube to ground................................................. 2.75 Volts
This receiver is designed to operate from a power supply main of 110-120 volt, 60 cycle alternating current AC. Never plug into a DC outlet.

GROUND
Where ever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the "Black" lead.

IF PEAK 456 KC
BAND SWITCH IN BROADCAST POSITION
V.C. = VOLUME CONTROL
T.C. = TONE CONTROL

SCHEMATIC DIAGRAM
MODEL 6B

Model 6B 535 to 1730 Kilocycles
Speaker Socket
5650 to 18,100 Kilocycles

©John F. Rider, Publisher
6. Using the same procedure, set up the remaining five stations, in each case using the station of the next highest frequency and the thumb screw having the same number as the corresponding button. Never skip buttons, always set up in numerical order from button 1 to 6 from left to right.

7. After all the stations have been set up, insert the proper station call tabs (found with the instructions) into the recesses of their respective buttons.

8. To receive any of the six stations set up as described above turn receiver “ON” by rotating the left hand knob to the right until the switch clicks. Allow the tubes to heat up, press the buttons designated by the call letter of the station desired, and hold the button in until the pointer stops moving and the station comes in. Adjust tone and volume.

**IMPORTANT:** Be sure the band switch is in the position for Standard Broadcast Reception.

**AUTOMATIC PUSH BUTTONS**

**MODELS 6C and 6G**

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these push buttons. Fig. 1 also shows the tuning range or frequencies covered by each button.

The remaining two (2) push buttons located at the extreme right hand end of the push button plate are for short wave and manual tuning. See Fig. 1. Short wave tuning is accomplished by pressing “short wave” button and tuning with the selector knob. By pressing “manual tuning” button, the automatic disconnects and the selector knob becomes active for the broadcast band.

1. Choose a station having a frequency within the range of button No. 1 (540 to 880 kc).

2. Press “Manual Tuning” button and tune this station conventionally by using the selector knob.

3. Now press button No. 1 and turn adjusting screw in either direction until the previously selected station is heard. Adjust the screw until the station is received with maximum volume.

4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw.

5. Repeat the above procedure for the remaining five (5) stations.
Six Tube Combination 6 Volt Battery, and 110-120 Volt AC

60 Cycle Dual Wave Superheterodyne

For tuner data see index

545 to 1720 kc
5800 to 18,100 kc

©John F. Rider, Publisher
This receiver is designed to operate over two tuning ranges: the broadcast range which extends from 545 to 1720 kc (174.4 to 550.4 meters) and the international short wave band which extends from 5800 to 13,100 kc (18.5 to 51.7 meters). This latter range is the one which includes the five internationally assigned bands—the 16, 19, 25, 31 and 49 meter bands.

IF PEAK 456 KC

FOR TUNER DATA
SEE INDEX

535 to 1730 kilocycles
5650 to 18100 Kilocycles

©John F. Rider, Publisher
POWER SUPPLY
This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycles alternating current (AC). Never plug into a DC outlet.

ALIGNMENT DATA AND SERVICING

GENERAL DATA
The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5800, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. It is possible all alignments 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.

CORRECT ALIGNMENT PROCEDURE
The intermediate frequency (IF) stage should be aligned properly as the first step. After the IF transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure, after which, either or both of the Short Wave Bands may be aligned.

IF ALIGNMENT
With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6L7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground if the test oscillator is not grounded to one side of the power line. In case one side is connected to ground, connect a large condenser from ground on the test oscillator to ground of the chassis. Align all four IF trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT
Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and adjust the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmers to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. Note: approximate the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved bypadding the circuit. This is done by slowly increasing or decreasing 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 may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the RF section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

POLICE BAND ALIGNMENT
The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5500 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust the "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

SHORT WAVE BAND ALIGNMENT
The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 18,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and the oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

Compliments of www.nucow.com
Eight Tube AC Automatic Tuning

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 535 to 1730 K.C. (173 to 560 meters), police and aviation band which extends from 1700 to 5600 K.C. (53 to 176 meters) and the international short wave band which extends from 5600 to 18,100 K.C. (16.5 to 55 meters). This latter range is the one which includes the five internationally assigned bands — the 16, 13, 25, 31, and 49 meter bands.

PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

A glance at Fig. 1 will show that there are only two push buttons, each of which can be automatically turned on to the frequency of the station desired.

Fig. 1 shows the tuning range or frequencies covered by each push button.

1. Choose a station, having a frequency within the range of button No. 1 (530 K.C. to 930 K.C.)

2. With the middle switch in the "Broadcast" position, turn the tuning condenser until the station is found. Turn the tuning condenser in either direction until the reception is best. Then turn the tuning condenser to the position shown in Fig. 1, where the station can be received at maximum volume and sensitivity.

3. Now turn the middle switch to the "Automatic" position and press button No. 1 and turn the tuning condenser to the position shown in Fig. 1. The station now automatically is tuned in and its frequency is set at the push button in position.

4. Repeat the above procedure for the remaining five (5) stations.

NOTE: It is advisable to listen to each station before setting the control in position.

5. Repeat the above procedure for the remaining five (5) stations.
This receiver is designed to operate over four tuning ranges; **long wave** 150 to 350 K.C. (2000 to 857 meters); **broadcast** 535 to 1730 K.C. (173 to 561 meters); **medium short wave band** 2350 to 7100 K.C. (127.6 to 42 meters); **international short wave** 7000 to 22,000 K.C. (13.6 to 42.8 meters), which includes five—5 internationally assigned bands—16, 19, 25, 31 and 49 meter bands.

**PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS**  
See Model 8A.

**ALIGNMENT**

Align I F and Broadcast Bands using the procedure for Model 8A. Using this procedure align Med. S.W. and S.W. Band likewise, using the following frequencies; Med. S.W., 7000 KC Osc. Trimmer, 6000Kc Ant. Trimmer, 2500 Kc "pad". S.W., 22000 KC S.W. Osc. Trimmer, 18000 KC S.W. Ant. Trimmer, 8000 KC "pad".

Align L.W. Band as below;

**LONG WAVE BAND ALIGNMENT**

The long wave band is adjusted by connecting the output of the signal generator through a .0002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 360 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of the long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.

---

©John F. Rider, Publisher

---

**PARTS LIST**

MODEL 8AU

**TRANSFORMERS AND COILS**

- P2727 8" Dynamic Speaker (Mantel)
- P2683 Universal Transformer

**MISCELLANEOUS**

- P2681 Band Switch
- P2689 Dial Scale
- G5775 Medium Short Wave and Short Wave Antenna Coil
- G5774 Oscillator Coil, Trimmer and Shield Assembly
- G5777 Long Wave Antenna Coil Assembly

**RESISTORS—CARBON**

- P1114 2,000,000 Ohm ¼ Watt
- P2759 5,000,000 Ohm ¼ Watt

**MICA CONDENSERS**

- 2701 .005 5%
- 2702 .0018 3%
This receiver is designed to operate over three tuning ranges:
535 to 1730 Kilocycles, 1.7 to 5.6 and 5.6 to 18.1 Megacycles.

ALIGNMENT
SEE MODEL 8A.
Note: In aligning IF, align all six trimmers.

© John F. Rider, Publisher
INSTRUCTIONS FOR ADJUSTMENT AND OPERATION
OF THE ELECTRIC TUNER

SETTING UP STATIONS

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the dial tuning button: tune in the station of the lowest frequency, using the station selector knob. Now hold the dial tuning button in and press in button number one (1), (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidentally happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by releasing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (See Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, insert the word “OFF” found in the call letter sheet.

NOTE:

In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. Note: Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver.

R25

Base Control——

1,000,000 Ohms

R26—P2127 0.0000 Ohms

R27—P217 0.0000 Ohms

R28—P2185 0.0000 Ohms

R29

Speaker Field——600 Ohms

C33—P2132 0.0000 Mfd. 600 V.

C34—P2122 0.0000 Mfd. 600 V.

C35—P276 0.0000 Mfd. 600 V.

C36—P276 0.0000 Mfd. 400 V.

C38—P214 0.0000 Mfd. 200 V.

MICA CAPACITORS

C3—P2180 0.0000 Mfd. 600 V.

C7—P280 0.0000 Mfd. 400 V.

C11—P280 0.0000 Mfd. 400 V.

C12—P280 0.0000 Mfd. 400 V.

C17—P280 0.0000 Mfd. 400 V.

C18—P280 0.0000 Mfd. 400 V.

ELECTROLYTIC CAPACITORS

C10—P280 0.0000 Mfd. 600 V.

C17—P280 0.0000 Mfd. 400 V.

C18—P280 0.0000 Mfd. 400 V.

ADJUSTABLE CAPACITORS

P1925A Variable Capacitor

P2743 Gong Trimmer Strip

P1852 Oscillator Padder Condensers

P2895 Push Button Switch

P1503 Pilot Light Socket

P1504 Pilot Light Bulb

P350 Electrical Motor

P3899 Rubber Drive Belt

P3899 Dial Scale

P3894 Dial Points

G5462 Lower Segment Adjustment Bracket and Contact

G5463 Upper Segment Adjustment Bracket and Contact

© John F. Rider, Publisher

Compliments of www.nucow.com
Compliments of www.nucow.com

CONTINENTAL RADIO & TELEV. CO. MODEL AW11 Wireless Record Player

RESISTORS
P1952 50,000 Ohm ¼ Watt Ins.
P2344 250,000 Ohm ¼ Watt Ins.
P1381 1,000 Ohm ¼ Watt Ins.
P673 10,000 Ohm ¼ Watt Ins.
P1304 5,000 Ohm ¼ Watt Ins.
P2833 Condenser Resistor

CONDENSERS
P276 .10 Mfd. 400 V. Paper
P148 .05 Mfd. 200 V. Paper
P2821 Electrolytic Condenser
P480 .0001 Moulded Micr
P1382 .00005 Moulded Micr
P336 .0055 Moulded Micr
P2826 Trimmer Condenser

MISCELLANEOUS
P506 6A7 Tube Socket
P559 2525 Tube Socket
P2827 Oscillator Coil
P2788 Motor and Turntable
P2828 Pickup Arm
P2880 Automatic Stop Switch
P2815 Needle Cup
P879 Phono Jack
P2829 Slide Switch
P2835 Power Switch
P2831 Power Switch Knob
P2115 Line Cord
P1923 Pilot Light Socket
P1504 Pilot Light Bulb
P2844 Pickup Rest


©John F. Rider, Publisher

Compliments of www.nucow.com
This receiver is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (Kc) (73 to 560 Meters). Police and Aviation bands which extends from 17 to 55 Megacycles (Mc) (53 to 176 Meters) and the International Short Wave Band which extends from 5.5 to 18.1 Megacycles (Mc) (15.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 55, 31 and 49 meter bands.

This receiver is designed to operate from a power supply mean of 100-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

FLOATING CHASSIS (IMPORTANT) Loosen the four (4) mounting screws and remove the (2) wooden strips that are fastened to the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not weight the mounting screws. NOTE. Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the instrument, cabinet or tubes.

GROUND Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (Black).

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent rod can be prepared by driving a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a moist condition throughout the year.

REPLACEMENT PARTS LIST 165

| C 2504 | .05 Mfd. 400 V. | C 2505 | .05 Mfd. 400 V. | C 2506 | .05 Mfd. 400 V. | C 2507 | .05 Mfd. 400 V. |
| C 2508 | .05 Mfd. 400 V. | C 2509 | .05 Mfd. 400 V. | C 2510 | .05 Mfd. 400 V. | C 2511 | .05 Mfd. 400 V. |

This receiver is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (Kc) (73 to 560 Meters). Police and Aviation bands which extends from 17 to 55 Megacycles (Mc) (53 to 176 Meters) and the International Short Wave Band which extends from 5.5 to 18.1 Megacycles (Mc) (15.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 55, 31 and 49 meter bands.

This receiver is designed to operate from a power supply mean of 100-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

FLOATING CHASSIS (IMPORTANT) Loosen the four (4) mounting screws and remove the (2) wooden strips that are fastened to the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not weight the mounting screws. NOTE. Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the instrument, cabinet or tubes.

GROUND Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (Black).

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent rod can be prepared by driving a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a moist condition throughout the year.

REPLACEMENT PARTS LIST 165

| C 2504 | .05 Mfd. 400 V. | C 2505 | .05 Mfd. 400 V. | C 2506 | .05 Mfd. 400 V. | C 2507 | .05 Mfd. 400 V. |
| C 2508 | .05 Mfd. 400 V. | C 2509 | .05 Mfd. 400 V. | C 2510 | .05 Mfd. 400 V. | C 2511 | .05 Mfd. 400 V. |

This receiver is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (Kc) (73 to 560 Meters). Police and Aviation bands which extends from 17 to 55 Megacycles (Mc) (53 to 176 Meters) and the International Short Wave Band which extends from 5.5 to 18.1 Megacycles (Mc) (15.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 55, 31 and 49 meter bands.

This receiver is designed to operate from a power supply mean of 100-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

FLOATING CHASSIS (IMPORTANT) Loosen the four (4) mounting screws and remove the (2) wooden strips that are fastened to the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not weight the mounting screws. NOTE. Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the instrument, cabinet or tubes.

GROUND Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (Black).

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent rod can be prepared by driving a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a moist condition throughout the year.

REPLACEMENT PARTS LIST 165

| C 2504 | .05 Mfd. 400 V. | C 2505 | .05 Mfd. 400 V. | C 2506 | .05 Mfd. 400 V. | C 2507 | .05 Mfd. 400 V. |
| C 2508 | .05 Mfd. 400 V. | C 2509 | .05 Mfd. 400 V. | C 2510 | .05 Mfd. 400 V. | C 2511 | .05 Mfd. 400 V. |
SPECIFICATIONS

This model combination consists of a four-tube T. R. F. radio receiver and Record Player in a console cabinet, designed for operation on electric circuits as specified on the Model and License Notices Label.

Incorporated in the receiver design is a mechanical Push Button tuning system, an iron cored antenna coil with antenna to match, A.V.C., beam power output and dynamic speaker.

The frequency range of the receiver is from 1725 to 5400 kilocycles. The tubes used and their function are as follows: one 6GQ as R.F. amplifier, one 6G5O as detector, A.V.C. and low audio amplifier, one 6G5 as beam power and one 545A as rectifier.

The bias for the 6GQ is obtained from the voltage drop across a 60 ohm resistor (item 21) and is measured from the cathode to the grid of the 6GQ. The bias for the 6G5T is obtained from the voltage drop across a 12 ohm resistor (item 23) and is measured from the cathode of the 6G5T to the junction of items 23, 32 (32 ohm), 22, 24, 26 and 140 (140 ohm). The 6G5T bias is obtained from the total drop across items 22, 32 (32 ohm), 22, 24, 26 and 140 (140 ohm) resistors which are in series with the speaker field that is in the negative leg of the power supply. The bias is measured from the junction of items 22, 24 and speaker field.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 6G5T output tube. 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.

ALIGNMENT PROCEDURE

The signal generator high side should be connected to the antenna through a 6000 ohm condenser, after the antenna has been completely shielded. The low side of the signal generator is connected to chassis.

(1) Set the signal generator to 1500 kilocycles. Check to see that the pointer makes a complete trip both ways. (2) Set the signal generator to 1500 kilocycles, and then adjust the condenser (1 mfd.) until the meter reads zero. (3) Adjust the condenser (1 mfd.) until the meter reads zero. (4) Set the signal generator to 1500 kilocycles, and then adjust the condenser (1 mfd.) until the meter reads zero.

SETTING THE PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. Insert a small screwdriver in the hole in the front of each push button to be set and loosen (DO NOT REMOVE) the screw set at the bottom of the holes.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the station selector knob, tune IN AS ACCURATELY AS POSSIBLE the station having the highest frequency (kilocycles), that is, the one nearest the 150 marking on the knob. Completely depress and hold the right hand push button in that position, while you SECURELY TIGHTEN THE SET SCREW.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles).

Cut the call letters of the stations selected from the list supplied with your receiver and press them into the openings in the front of the push buttons. Four pieces of clear celluloid are supplied in a small envelope and should be snapped into place over the call letters to protect and hold them in place.

REPLACING DRIVE CORD

1. Remove the chassis from the cabinet.
2. Remove the driven drive cord, first from the pointer then from the pulleys. Remove the cord tension spring.
3. Remove the dial (glass and mask) and the manual tuning shaft bracket.
4. Cut a piece of drive cord 44 inches in length (624-4150).
5. Tie the cord tension spring approximately 1 1/2 inches from the end of the cord. Open gang condenser, this should place the eyepoint in the pulley apparatus of the cord through eyepoint, from the inside of the pulley. Hook end of the tension spring on the catch in pulley, opposite the eyepoint.
6. Bring the cord forward and down, then around lower idler pulley, run gang bracket: on the underside, continue over to the left hand idler pulley. Bring around and over in a clockwise direction. Continue on over to top of right hand idler pulley, then straight down to and around pulley on drive shaft. Make two complete turns around drive shaft pulley in a clockwise direction. Then bring cord up and over top idler pulley on gang bracket, making 1 1/2 turns in a counter clockwise direction. Continue cord straight down then back and around large pulley on the gang, in a counter clockwise direction to eyepoint. Insert end of cord through eyepoint (top down). Pull cord until tension spring is stretched to about 3 inches in length. Loop cord in tension spring and tie in knot. Clamp cords together with cord clamp (W-40629) approximately 3/8 inch from inside rim of large pulley.

PHONO

The motor is in a manner that it will swing up and to the right of the 20000 to 20000 position. The reason for this is, that when the turntable is in operating position the weight of the motor is applied to the friction drive and against the inside surface of the turntable rim. The amount of friction obtained is just right for proper operation. When placing the turntable in position, first back the rim over the friction disk on the motor shaft then carefully place the motor in the turntable in the turntable guide. (spindle). During this operation you should be very careful to see that the friction drive is completely under the rim and that the turntable is all in the way down on the turntable guide (spindle).

The Radio-Phono Switch (Fig. 4) when turned to the left is for radio broadcast reception and when turned to the right cuts off the radio signals and starts the phonograph motor. The Volume Control and Line Switch of the receiver must be turned on before the motor will operate. Thd volume control also controls the output level of the phonograph motor.

©John F. Rider, Publisher
MODEL 448 Combination Socket, Trimmers, Voltage Alignment, Phone Data, Tuner

CROSLEY CORP.

SPECIFICATIONS

The receiver is a four-tube Tuned Radio Frequency receiver designed for operation on A.C. circuits as specified or Model 448A. Each power output, Dynamic Speaker, is a column of the AM, FM, and FM. The castings incorporated in this receiver are a few of the features incorporated in this receiver. The frequency range is from 1750 to 540 Kc. The tubes used and their functions are as follows: one 6BN6 as RF Amplifier, one 6CS6 as mixer, detector, one 12SL6 as beam power output and one 2526K as rectifier. The volume control varies the bias on the 6CS6 and at the same time the amount of signal fed to the antenna coil primary. The bias for the 12SL6 is obtained from the voltage drop across item 19 (2500 ohm resistor) and for the 2526K from the drop across item 23 (110 ohm resistor).

This receiver incorporates a certain amount of fixed regeneration to improve selectivity and sensitivity. With a normal antenna the receiver is stable and the performance approaches that of a three gang T. B. F. receiver in spite of the fact that only two gang condensers are used. However with no antenna or a very small antenna the receiver will oscillate but this oscillation can readily be controlled by the volume control.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filament) with filament voltage full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

NOTE: The RED and BLACK terminals on the phone terminal board supply the current for the phone motor, therefore HAVE 110 VOLTS ACROSS THEM WHEN THE RECEIVER IS IN OPERATING POSITION. BE CAREFUL NOT TO TOUCH OR SHORT CIRCUIT THEM WHILE WORKING ON THE CHASSIS.

CONNECTING OUTPUT METER

Connect the one terminal of the output meter to the plate and the other terminal to the socket of the 25SL6 Output tube. Be sure the output meter is protected from D.C. by connecting a condenser (1 mfd. or larger, not electrolytic) in series with one of the leads.

RECORD PLAYER ASSEMBLY

A three lead cable is used for connecting the Phone Unit to the Radiotelephone. The green lead is the high side of the magnetic pickup and is connected to the 6CS6 cathode through a 25 MF, 160 V. condenser. The red lead is the high side of the 250 volt circuit for the motor. Connect this to the receiver chassis and is the low side of the pickup and motor.

To turn in position by hooking the rim over the rubber friction drive on the motor shaft, then carefully placing center hole over record guide spindle. Be sure that the table is all the way down on the spindle and that the friction drive is riding full on the outside surface of the rim.

©John F. Rider, Publisher

Compliments of www.nucow.com
CROSLEY CORP.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>G</th>
<th>Ga</th>
<th>Go</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A7-G</td>
<td>Oscillator-Modulator</td>
<td>1.5</td>
<td>82</td>
<td>43</td>
<td>0</td>
<td>82</td>
<td>-6</td>
</tr>
<tr>
<td>1N5-G</td>
<td>AF Amplifier</td>
<td>1.5</td>
<td>82</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1H5-G</td>
<td>Detector &amp; 1st A-F Amp.</td>
<td>1.5</td>
<td>17</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1C5-G</td>
<td>Output</td>
<td>1.5</td>
<td>78</td>
<td>82</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Power Output approximately .5 Watt.
"A" Battery Drain approximately .25 Ampere at 1.5 Volts.
"B" Battery Drain approximately 9 Milliamperes at 90 Volts.
*Measured at No. 9 Socket Lead and Chassis.
MODEL 458 (Battery Vanity)

SPECIFICATIONS

The Crosley Model 458 radio is a four-tube superhet
erodyne receiver designed for operation from batteries.
The method of connecting the battery cable to the bat
teries is shown on the Wiring Diagram. The batteries
required are: one 1.5 volt "A" (EVEREADY NO. 740 or
equivalent) or 3 or 4 No. 6 DRY CELLS in parallel,
and two plug-in type 45 volt "B" batteries.

TUBES AND VOLTAGE LIMITS

The table gives the function of the tubes used,
together with the voltage readings between the
tube socket contacts and the negative side of the "A"
battery circuit. Voltage readings should be taken with a
1000 ohm per volt, 250 volt voltmeter (except fila
tments) with receiver in operating condition and the
voltage control full on and no signal input. The fila
ment voltages should be measured with an accurate low
range DC voltmeter (approximately 0 to 10 volts).
Voltage limits may vary plus or minus 10% of values
given.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately
adjusted at the factory and normally should need no
further adjustment. However, if it is definitely known
that an adjustment is necessary, the circuits can best be
properly aligned with the use of a modulated signal
generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S"
terminals of the 1SG output tube. Be certain that the
meter is protected from DC by connecting a condenser
(0.1 md, or larger—not electrolytic) in series with one of
the leads.

1. Tuning 1-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator
through a 0.2 md. condenser to the top cap of the 1AG7
tube, leaving the tube's grid clip in place. Connect the
ground lead from the signal generator to the "GND"
terminal of the receiver. KEEP THE GENERATOR
LEADS AS FAR AS POSSIBLE FROM THE GRID
LEADS OF THE OTHER SCREEN GRID TUBES.


When aligning the R-F amplifier the output lead from
the signal generator should be connected through a
0.0002 md. condenser to the "ANT" terminal of the
receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser on gang
for maximum output.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune the receiver to the generator signal for
maximum output (approximately 140 on the dial).

(f) Adjust the "ANT" trimmer condenser on gang
for maximum output. DO NOT REJUST THE
"OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until
no further improvement in output can be obtained.

If any of the circuits have been re-adjusted it may be
necessary to reset the push buttons.

SETTING THE PUSH BUTTONS

With a small screw driver or pen knife remove cellu
loid cover and the call letters. Insert screw driver
in the hole in the front of the button and loosen the
set screw a turn or two. With the manual tuning knob
tune-in as ACCURATELY AS POSSIBLE the station
for which the button is to be set. Then push the but
ton all the way down and while you hold it in that po
sition SECURELY TIGHTEN the set screw. Replace the
call letter and call letter cover. Use same procedure
in resetting or adjusting the rest of the push buttons.
CROSLEY CORP.

SPECIFICATIONS

This model Crosley radio chassis is especially designed for installation in Crosley Shelvador electric refrigerators. It should be operated only from an ALTERNATING CURRENT power supply as specified on the rear of the receiver.

The tuning range of the receiver is from 540 to 1725 kilocycles or 555 to 173 metres.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Voltage limits may vary plus or minus 10% of values given.

Compliments of www.nucow.com
CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>K</th>
<th>Su</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7/GT</td>
<td>R-F Amplifier</td>
<td>6.3</td>
<td>97</td>
<td>98</td>
<td>2.5-25</td>
<td></td>
<td>2.5-25</td>
</tr>
<tr>
<td>6F7/GT</td>
<td>Detector</td>
<td>6.3</td>
<td>20</td>
<td>10</td>
<td>7</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>25L6/GT</td>
<td>Output</td>
<td>25</td>
<td>85</td>
<td>98</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25Z6/GT</td>
<td>Rectifier</td>
<td>25</td>
<td></td>
<td></td>
<td>126</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W-48416</td>
<td>Ballast</td>
<td></td>
<td></td>
<td></td>
<td>25 Volts A.C.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Power output approximately 2 watts.

Power consumption at 117.5 volts line 45 watts (A.C.).

All readings except filaments will be approximately 10% lower on 117.5 D.C.

Drop across field 28 volts.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt volt meter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

© John F. Rider, Publisher
CROSLEY CORP.

CONNECTING OUTPUT METER

Connect the one terminal of the output meter to the plate and the other terminal to the screen of the 2SL6-G Output tube. Be sure the output meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—NOT electrolytic) in series with one of the leads.

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power line, therefore when using an A. C. operated signal generator for alignment the following precaution should be taken.

(a) Connect the output lead of the signal generator through a .001 Mf. condenser to the antenna lead on the receiver. The ground lead of the generator should be connected through a .001 Mf. condenser to the chassis.

(b) Open the gang condenser all the way.

(c) Set the generator to 1725 Kilocycles.

(d) Adjust the trimmer condensers on the gang until the 1725 Kc. signal is heard. The gang does not have to tune through this signal.

(e) Set the generator to 1400 Kc.

(f) Tune the set to the 1400 Kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.

NOTE: Always use the lowest signal generator output that will give a reasonable indication on the output meter.

Keep the two grid leads as far as possible from each other.

PARTS LIST — MODEL 568

Figures in first column refer to parts in Diagrams.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G182—32000</td>
<td>Antenna Coil</td>
<td></td>
<td>19</td>
<td>284-BL-4&quot;B&quot;</td>
</tr>
<tr>
<td>2</td>
<td>G102—32001</td>
<td>B-F. Coil</td>
<td></td>
<td></td>
<td>284-BL-4&quot;H&quot;</td>
</tr>
<tr>
<td>3</td>
<td>G3—34002</td>
<td>Condenser, .005 Mf. Moided</td>
<td></td>
<td></td>
<td>284-BL-4&quot;H&quot;</td>
</tr>
<tr>
<td>4</td>
<td>W—45708B</td>
<td>Condenser, .02 Mf. 160 V.</td>
<td></td>
<td>20 to 24</td>
<td>G178—36400</td>
</tr>
<tr>
<td>5</td>
<td>G60—33001</td>
<td>2 Section Gang Condenser</td>
<td></td>
<td>25</td>
<td>W—46477</td>
</tr>
<tr>
<td></td>
<td>D—46418</td>
<td>Dial Face</td>
<td>26Z</td>
<td></td>
<td>G25—26035</td>
</tr>
<tr>
<td></td>
<td>W—46425</td>
<td>Pointer</td>
<td>26Y</td>
<td></td>
<td>W—46411</td>
</tr>
<tr>
<td></td>
<td>W—45859</td>
<td>Pointer Mtg. Screw</td>
<td></td>
<td></td>
<td>W—46416</td>
</tr>
<tr>
<td></td>
<td>W—44809C</td>
<td>Drive Shaft</td>
<td></td>
<td></td>
<td>B—46886</td>
</tr>
<tr>
<td></td>
<td>W—44809B</td>
<td>Bracket—Shaft Mtg.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>W—45589</td>
<td>&quot;C&quot; Washer—Shaft Mtg.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G1—41582</td>
<td>Drive Cord—8&quot;x Inches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>W—44864A</td>
<td>Dial Support Brkt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G3—50640</td>
<td>Twisted Lead—Cap. Coupling Assy.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>W—45782B</td>
<td>Condenser, .05 Mf. 120 V.</td>
<td></td>
<td></td>
<td>8FD</td>
</tr>
<tr>
<td>8</td>
<td>W—45782B</td>
<td>Condenser, .02 Mf. 160 V.</td>
<td>11Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>W—50105</td>
<td>Condenser, .1 Mf. 160 V.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>W—45708B</td>
<td>Condenser, .02 Mf. 160 V.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11Z</td>
<td>W—46398</td>
<td>Condenser, 16 Mf. 125 V.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>11B</td>
<td>W—46398</td>
<td>Condenser, 16 Mf. 125 V.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>12</td>
<td>W—45780B</td>
<td>Condenser, .02 Mf. 160 V.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>13</td>
<td>B—45784</td>
<td>Power Cord and Plug</td>
<td>8</td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>14</td>
<td>24990</td>
<td>Resistor, 25,000 Ohm ¾W.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>15</td>
<td>37583</td>
<td>Resistor, 2.5 Megohm ¾W.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>16</td>
<td>25785</td>
<td>Resistor, 30,000 Ohm ¾W.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>17</td>
<td>29785</td>
<td>Resistor, 30,000 Ohm ¾W.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
<tr>
<td>18</td>
<td>45965</td>
<td>Resistor, 110 Ohm ½W.</td>
<td></td>
<td></td>
<td>4324</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT PROCEDURE

All the circuits in this receiver were very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits may be properly aligned 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 6K6G output tube. Be certain that the meter is protected from D.C. by connecting a condenser (1 ufd. or larger—not electrolytic) in series with one of the leads.

Tuning The I.F. Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mf. condenser to the top cap of the 6AEC tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the ground terminal of the receiver. (KEEP THE SIGNAL GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.)

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the trimmer condensers located on the 2nd I.F. transformer, item 4—fig. 2, for maximum reading on the output meter.

(e) Adjust the trimmer condensers located on the 1st I.F. transformer, item 3—fig. 2, for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R.F. Amplifier.

(a) Connect the output of the signal generator through a .00005 mf. condenser to the antenna terminal of the receiver.

(b) Set the signal generator to 1725 kilocycles.

(c) With the condenser gang rotated to the minimum capacity position, adjust the "OSC SHUNT TRIMMER" so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune in the 1400 kilocycle signal, in the region of 140 on the dial, for maximum output.

(f) Adjust the "ANT" SHUNT TRIMMER for maximum output. NOTE: Do not adjust the "OSC" SHUNT TRIMMER.

(g) Repeat operations (e) and (f) for more accurate adjustments.

SPECIFICATIONS

These model Crosley radios are designed for operation on 110-volt, 60-cycle A.C. power lines or on a six-volt storage battery. No "B" or "C" batteries are required. The tuning range is from 555 to 1725 kilocycles (560 to 173 Meters). Model 5587 is identical with Model 557 except that it has a larger dial assembly, an 8" speaker, larger electrolytic condenser, and is mounted in a console cabinet.

CIRCUIT DESCRIPTION

Five octal base glass tubes are employed in a superheterodyne circuit which consists of an oscillator-modulator tube, 455-kilocycle I.F. amplifier, composite detector—A.V.C. and A.F. amplifier tube, modulator and power supply. The oscillator tube is used as the top of the chassis, and must be connected to the power supply; the receiver is to be used on. The 6Q7F tube supplies A.V.C. voltage to the grids of the 6AEC and 6U7G tubes through items 22 and 25A. The initial bias for the 6AEC and 6U7G tubes is developed across a 75 ohm resistor, item 27. The bias for the 6Q7F tube is developed across a 40 ohm resistor, item 26. The bias for the output tube is obtained by the combined voltage drop across items 6 ("B" filter choke), 26 (40 ohms), 27 (75 ohms) and 28 (100 ohms). The speaker is a permanent magnet type dynamic.
CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>Su</th>
<th>K</th>
<th>Go</th>
<th>Ga</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8-GT</td>
<td>Oscillator-Modulator</td>
<td>6.3</td>
<td>105</td>
<td>65</td>
<td>-</td>
<td>-</td>
<td>-10</td>
<td>105</td>
</tr>
<tr>
<td>6K7-GT</td>
<td>I-F Amplifier</td>
<td>6.3</td>
<td>105</td>
<td>65</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6D7-GT</td>
<td>Det, A/V, A-F Amplifier</td>
<td>6.3</td>
<td>42</td>
<td>106</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2526-GT</td>
<td>Output</td>
<td>25.1</td>
<td>117.5 A.C.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>25Z8-GT</td>
<td>Rectifier</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Power output approximately 2 watts. Power consumption approximately 47 watts. Voltage drop across speaker field 27 volts. All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

This model Crosley radio is designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 540 to 1725 kilocycles (555.4 to 173 metres).
**CROSLEY CORP.**

**TUBE SOCKET VOLTAGE READINGS**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>K</th>
<th>Su</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7-GT</td>
<td>R-F Amplifier</td>
<td>6.3</td>
<td>110</td>
<td>110</td>
<td>2.5-25</td>
<td>2.5-25</td>
<td>—</td>
</tr>
<tr>
<td>6L7-GT</td>
<td>Detector</td>
<td>6.3</td>
<td>20</td>
<td>7</td>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>25L6-GT</td>
<td>Output</td>
<td>25.1</td>
<td>98</td>
<td>110</td>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>25Z6-GT</td>
<td>Rectifier</td>
<td>25.1</td>
<td>117 A.C.</td>
<td>—</td>
<td>135</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>W-46416</td>
<td>Ballast</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Approx. 54.7 Drop A.C.

Power output approximately 2 watts.
Power consumption at 117.5 volts line 47 watts (A.C.).
All readings except filaments will be approximately 15% lower on 117.5 D. C.

Drop across field 25 volts.

**FIG. 1—WIRING DIAGRAM**

**MODEL 598 VANITY**

**JANUARY, 1939**

**TUBES AND VOLTAGE LIMITS**

The table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.
SPECIFICATIONS

These model Crosley radios are designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is 535 to 1725 kilocycles (550 to 1733 meters). Model 597 is identical with Model 5597 except that it has an illuminated dial and a different cabinet.

CIRCUIT DESCRIPTION

Five metal tubes are employed in a superheterodyne circuit which consists of a combination oscillator-modulator tube, 455 kilocycle I.F. amplifier, pentode output and power supply. The 6Q7 tube serves as the detector and 6A8 and 6F1 tubes in the detector and 6Q7. The bias for the 6Q7 and 25A6 tubes is obtained across the speaker field. A resistance type power supply is used to provide the proper heater voltage to the tubes. The filament of the tubes are wired in series. A .05 mfd. condenser (item 11) is connected across the power supply leads to reduce electrical interference from that source.

TUBES AND VOLTAGE LIMITS

The following table gives the voltages on each of the tubes, with the voltages between the grid and cathode of each tube indicated in the notes column. All voltages except filaments are approximately 10% lower if measured on 117.5 volts AC power supply.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>F</th>
<th>S</th>
<th>Su</th>
<th>K</th>
<th>Go</th>
<th>Ge</th>
</tr>
</thead>
<tbody>
<tr>
<td>6Q7</td>
<td>Oscillator-Modulator</td>
<td>6.6</td>
<td>80</td>
<td>60</td>
<td>0</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>6F1</td>
<td>I.F. Amplifier</td>
<td>6.6</td>
<td>80</td>
<td>60</td>
<td>0</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>6A8</td>
<td>Detector, F-P Amplifier</td>
<td>6.6</td>
<td>80</td>
<td>60</td>
<td>0</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>25A6</td>
<td>Output</td>
<td>10</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>25A5</td>
<td>Rectifier</td>
<td>12.3</td>
<td>117.5</td>
<td>117.5</td>
<td>117.5</td>
<td>117.5</td>
<td>117.5</td>
<td></td>
</tr>
</tbody>
</table>

Power output approximately 1 watt.
Voltage drop across speaker field 15 volts.
Power consumption approximately 50 watts.

ALIGNMENT PROCEDURE

The chassis of this receiver is designed to be used with a power supply. The alignment procedure should be thoroughly described in order that the power supply will not become short circuited or damaged while aligning the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 output tube. If the meter is protected from DC by connecting a condenser (.01 mfd. or larger, and electrolytic) in series with the output line, the meter will be protected from reverse current.

Tuning the I.F. Amplifier to 455 Kilocycles.

(a) Disconnect the antenna from the receiver and connect the output of the signal generator through a 50 ohm, condenser to the antenna connector on the receiver. Do not use a ground return from the signal generator unless it is available and it is not essential.
(b) If it is found to be necessary, a small condenser (approx. .0001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. Keep the amplifier leads as far as possible from the grid and oscillator leads of the other screen grid tubes.
(c) Set the station selector so that the plate of the condenser gang is completely out of tone and turn the volume control to the right (GN).
(d) Set the signal generator to 455 kilocycles.
(e) Adjust the 25A6 I.F. condenser, item 4, located beneath the edge of the receiver field, for maximum reading on the output meter.
(f) Repeat operations (e) and (f) for more accurate adjustments.

WAVE TRAP

Some chassies of this model are equipped with a wave trap for the purpose of eliminating interference from other stations which operate on frequencies of approximately 455 kilocycles. This assembly is located on the underside side of the chassis and consists of a coil and a trimmer as illustrated by dotted lines in the Wiring Diagram.
CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>Su</th>
<th>K</th>
<th>Gs</th>
<th>Ga</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8G</td>
<td>Oscillator-Modulator</td>
<td>6.3</td>
<td>105</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td>-10</td>
</tr>
<tr>
<td>6L7C</td>
<td>F-A Amplifier</td>
<td>6.3</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>697C</td>
<td>Det, AVC, A-F Amplifier</td>
<td>6.3</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2839G</td>
<td>Output</td>
<td>25.1</td>
<td>105</td>
<td>105</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2526G</td>
<td>Rectifier</td>
<td>25.1</td>
<td>105</td>
<td>117.5 A.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W-46773</td>
<td>Ballast Tube</td>
<td>Approx. 48.4 A.C. Drops</td>
<td></td>
<td>132</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Power output approximately 2 watts.
Power consumption approximately 48 watts.
Voltage drop across speaker field 27 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

MODEL 648, Super Saxette

Schematic, Voltage Data

CIRCUIT DESCRIPTION

The following table gives the functions of the tubes used in the Super Saxette. Voltage readings should be taken at the indicated points in the circuit, and measured with a voltmeter. The indicated voltage readings should be measured on a 12-volt AC line voltage meter. When measured by a voltmeter, the voltage readings may vary from the indicated values.

Tubes and Voltage Limits

455 K.C. I.F.

Ballast tube is used to provide the proper heater voltage to the tubes. It is a neutralizing unit. F-A amplifiers are wired across the power supply leads to reduce electrical interferences from the power source.

SPECIFICATIONS

This model Crosley radio is designed for operation on 120 to 125 volt AC or DC. The tuning range is from 540 to 175 kilocycles (S.S.S. 935 to 173 meters).

CROSSLEY PAGE 10-15

Compliments of www.nucow.com

© John E. Rider, Publisher
Compliments of www.nucow.com

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short-circuited while aligning the receiver.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25L6 output tube. Be certain that the meter is protected from NC by connecting a condenser (1 mfd or larger—not electrolytic) in series with one of the leads.

CONNECTING SIGNAL GENERATOR

(a) Connect the output of the signal generator through a .02 mfd condenser to the grid cap of 6A8-G, the writing grid cap in place. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd) should be connected in series with the ground terminal of the signal generator and the receiver.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I.F. trimmer condensers (Fig. 2), located between Push Button Assembly and speaker field, for maximum reading on the output meter.

(e) Adjust the 1st I.F. trimmer condensers for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

ALIGNING THE R.F. AMPLIFIER

Connect output of signal generator through a .001 mfd condenser to the antenna lead of receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(c) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(d) Adjust the trimmer condenser located on the "ANT" section of the gang for maximum output.

(NOTE: Do not adjust the above trimmer condenser.)

(f) Repeat operations (d) and (e) for more accurate adjustments.

WAVE TRAP

Some chassis of this model are equipped with a wave trap and for the purpose of eliminating interference from other stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the undershelf side of the chassis and consists of a coil and a fixed condenser as illustrated on dotted lines in the Wiring Diagram. If any of the circuits have been re-arranged, check push buttons to see if they need resetting.

SETTING THE PUSH BUTTONS

The push buttons are easily and accurately set from the top of the receiver. It is not necessary that all of the buttons be set at the same time. Remove the push buttons from the button box by grasping the button between the finger and thumb and pulling straight up. Lower the set screws on the keys but do not remove them.

The push button tuning system is now correctly set for the 1st station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles). Detach the call letters of the favorite stations from the list supplied with your receiver and press them into the openings in the front of the push buttons. Piece of clear celluloid is supplied in a small envelope and should be snapped in place over the call letters to protect and hold them in place. Figures in front of call refer to pages in manual.

PARTS LIST - MODEL 648

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W-46565</td>
<td>5/6-Palnut</td>
</tr>
<tr>
<td>2</td>
<td>G108</td>
<td>12-Gang Tube (No Marking)</td>
</tr>
<tr>
<td>3</td>
<td>G4777</td>
<td>Ballast Tube</td>
</tr>
<tr>
<td>4</td>
<td>G6511</td>
<td>Tabulator</td>
</tr>
<tr>
<td>5</td>
<td>G108</td>
<td>Wave Trap</td>
</tr>
<tr>
<td>6</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>7</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>8</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>9</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>10</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>11</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>12</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>13</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>14</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>15</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>16</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>17</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>18</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>19</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>20</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>21</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>22</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>23</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>24</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>25</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>26</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>27</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>28</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
<tr>
<td>29</td>
<td>G2050</td>
<td>Condenser</td>
</tr>
</tbody>
</table>

PAGE 115

CROSLEY CORP.

Compliments of www.nucow.com
50 CYCLE POWER TRANSFORMER ADJUSTMENT

 Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the underside of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer. The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 121 volts and of the "high" tap is from 112 to 130 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumpers" which are attached to the terminal at which the line voltage is either to be used or to be avoided. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.
SPECIFICATIONS
This model Crosley is a compact seven-tube superheterodyne receiver designed for operation on ALTERNATING CURRENT as specified on the Model and License sticker.

540-1725 Kilocycles or 555-1712 Meters (American and some Police) 5.7-18.3 Megacycles or 52.5-16.4 Meters (Foreign)

The tubes used and their functions are as follows: one 6J8G as Oscillator-Modulator, one 6U7G as I-F amplifier, one 6PSG as Detector, A. V. C. diode, one 6F5G as first Audio amplifier, one 6V6G as Beam Power output, one 5Y3G as Rectifier and one 6U5 as eye Tuning Indicator. The initial bias for the 6J8G and 6U7G (drop across item 34 is 60 ohm resistor) is measured from chassis to the low end of the volume control. For the 6PSG, (drop across item 35 is 32 ohm resistor) is measured from the low end of the 10 megohm resistor to the cathode of the 6PSG. The bias for the 6V6G is obtained from the drop across items 34, 35, 32, 60 ohms, 32 ohms, 100 ohms respectively, measured from the junction of item 32 and speaker field to chassis. The speaker field is in the negative leg of the power supply. Item 51Y is a 1 megohm resistor assembled in the socket of the 6US.

TUBES AND VOLTAGE LIMITS
The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1,000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>G</th>
<th>Ga</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>6J8G</td>
<td>Oscillator-Modulator</td>
<td>6.3</td>
<td>172</td>
<td>88</td>
<td>-3</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>6U7G</td>
<td>I-F Amplifier</td>
<td>6.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6PSG</td>
<td>Detector A.V.C. Diode</td>
<td>6.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6F5G</td>
<td>1st A.F. Amplifier</td>
<td>6.3</td>
<td>100</td>
<td>0</td>
<td>-2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6V6G</td>
<td>Output</td>
<td>6.3</td>
<td>100</td>
<td>172</td>
<td>-10</td>
<td>0</td>
<td>217</td>
</tr>
<tr>
<td>5Y3G</td>
<td>Rectifier</td>
<td>3.9</td>
<td>A.C.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6US</td>
<td>Tuning Indicator</td>
<td>6.3</td>
<td>170</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Maximum power output approximately 5 watts. Voltage across speaker field 37 volts. Power consumption approximately 52 watts at 117.5 line.
ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

SETTING THE PUSH BUTTONS

Should it become necessary to realign the various circuits of this receiver, it may be necessary to reset the Push Button Tuning Knob.

The buttons are set by means of a set screw that is accessible through the front of the push button. Loosen the screw, tune in with the manual tuning knob the station whose call letters are to be placed in that button.

PUSH THAT BUTTON ALL THE WAY DOWN, AND WHILE YOU HOLD IT IN THAT POSITION, SECURELY TIGHTEN THE SET SCREW.

The first button is now set, follow the same procedure with the rest of the push buttons.

The accuracy of the buttons depends on how accurately the station is tuned-in while setting them.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6V6G Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (1 mil. or larger—not electrolyte) in series with one of the leads.

1. Tuning I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 microcondenser to the top cap of the 6J8G tube, leaving the tube's grid clip in place. Connect the grid from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control to the right (ON).

(c) Turn the band selector switch to the left (American Broadcast Band).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F amplifier the output of the modulated signal generator should be fed through a dummy antenna and connected to the "ANT" terminal of the receiver.

For the "Foreign" band use a 250 ohm carbon resistor for dummy and for the "American" band use a .0002 M. condenser.

Align the "Foreign" band first.

(a) Set Band selector to "Foreign" band, right.

(b) Set signal generator to 18.3 Megacycles.

(c) Open gang all the way. Minimum capacity.

(d) Tune-in with H-F Osc. shunt trimmer 18.3 kilocycles. This signal will be heard at two settings of this trimmer always choose the setting furthest open.

(e) Set signal generator to 19.0 Megacycles. DO NOT ADJUST OSC. TRIMMER AT THIS FREQUENCY.

(f) Tune-in 19.0 M. signal with signal station selector, then align the H-F ANT. trimmer condenser for maximum output. DO NOT ADJUST OSC. TRIMMER AT THIS FREQUENCY.

(g) Repeat operations (d), (e) and (f) until no further improvement in output can be obtained.

(h) Tune receiver for maximum general signal (approx. 140 on the dial).

(i) Adjust B-C ANT. trimmer for maximum output. DO NOT ADJUST OSC. TRIMMER AT 1400 Kc.

(j) Repeat operations (m) and (n) alternately until no further improvement in output can be obtained.

NOTE: At any time the H-F coils in this receiver are replaced, it may be necessary to vary the inductance of the coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance at the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both with the generator frequency as indicated on the station selector dial and at approximately 910 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 dial setting.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 Kc. This assembly is located on the underneather side of the chassis and consists of a coil and a trimmer condenser as indicated by item 48 in the wiring diagram.

The wave trap should not be adjusted until all other adjustments have been made. To adjust, feed a 455 Kc signal through a .0002 M. condenser to the antenna terminals of the receiver. With the band selector turned to the broadcast band and the condenser gang closed and the volume control on full, adjust the trimmer condenser on the wave-trap for MINIMUM SIGNAL.

Should the interfering station be operating on a frequency of slightly more or less than 455 Kc, the exact frequency should be determined with the aid of a signal general by the beat note method. Then instead of feeding a 455 Kc signal through, the exact frequency of the interfering station should be used. If it is not possible to determine the exact frequency of the interfering signal, the antenna may be attached to the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave-trap for minimum interference.

REPLACING DIAL DRIVE CORD

To replace a broken drive cord proceed as follows:

1. Remove broken cord from dial pointer and the cord tension spring from the large pulley on the condenser gang.

2. Remove complete dial assembly, fastened with two P. K. screws to top of chassis.

3. Remove screw and washer that fastens felt key mask to chassis and fold felt to one side.

4. Remove manual drive shaft bracket, fastened with two P. K. screws.

5. Place the ends of replacement drive cord (G3-A18B2) together and tie a knot about 1½ inches from the end. Slip tension spring through knot. Fasten the other end of spring on hook in large pulley on gang.

6. Close the gang then thread loop through the eyelet in pulley rim.

7. Bring one side of drive cord loop forward over pulley and around (½ turn) horizontal idler pulley, then under and over the right hand idler pulley (counter-clockwise).

8. Loop the other side of drive cord over large pulley on gang in a clockwise direction, continue around and up over the small idler pulley.

9. Then remove drive shaft from chassis, wrap two complete turns around pulley on the shaft, taking the cord coming over the small idler pulley and wrapping in a clockwise direction while holding shaft in right hand.

10. Replace drive shaft in position, taking care that the drive cord coming down to the pulley goes between the 4th and 5th keys and the cord going up from the pulley goes between the 1st and 2nd keys.

11. Hook drive cord over left hand idler pulley. Mount drive shaft bracket in position. Check to see that cord is running on all pulleys, and tension spring is stretched to approx. one inch in length.

12. Place drive cord clamp (W-6462B0) on drive cord approx. ⅛ inch from inside edge of large pulley on gang.

13. Replace key felt, rubber bands and dial assembly.

14. Close gang, set the pointer at 540 Kc, place cord in pointer, check pointer travel from end to end before going cord to pointer.
CROSLEY CORP.

TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>P</th>
<th>S</th>
<th>G</th>
<th>K</th>
<th>Go</th>
<th>Ga</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8G</td>
<td>Modulator</td>
<td>6.3</td>
<td>240</td>
<td>85</td>
<td>Neg</td>
<td>0</td>
<td>Neg</td>
<td>85</td>
</tr>
<tr>
<td>6K6G</td>
<td>Oscillator</td>
<td>6.3</td>
<td>145</td>
<td>145</td>
<td>Neg</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6U7G</td>
<td>1st I-F Amp</td>
<td>6.3</td>
<td>240</td>
<td>85</td>
<td>Neg</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6Q7G</td>
<td>Det, AVC &amp; 1st A-F Amp</td>
<td>6.3</td>
<td>210</td>
<td>85</td>
<td>Neg</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6K6G</td>
<td>Output</td>
<td>6.3</td>
<td>235</td>
<td>230</td>
<td>0</td>
<td>18.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6K6G</td>
<td>Output</td>
<td>6.3</td>
<td>235</td>
<td>230</td>
<td>0</td>
<td>18.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5Y3G</td>
<td>Rectifier</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>240</td>
</tr>
</tbody>
</table>

Power output approximately 5.5 watts.

Power consumption approximately 70 watts at 117.5 volts.
Voltage drop across speaker field 80 volts.

Fig. 2. Top View Model 818

Fig. 3. Bottom View Model 818

© John F. Rider, Publisher
Compliments of www.nucow.com


Compliments of www.nucow.com


Circuit Description

The circuit consists of separate oscillator and modulator tubes, two stages of IF amplification—the second of which is resistance coupled, separate AVC and detector diodes, two stages of audio amplification and power supply. The speaker field is located in the negative leg of the power supply. The bias for all tubes except the output is developed across a 2.8 ohm resistor, item 46, located between the speaker field and ground. Phase inversion is obtained in the output circuit by combining a 3500 ohm resistor, item 274, located in the screen circuit of one of the output tubes, item 42B.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with 1000 ohm per volt 500 volt D. C. voltmeter (except filament) with the receiving set in operating condition and no signal input. The volume control should be turned full on, the tone control should be turned to the TREBLE position (counter-clockwise) and the tuning condenser should be turned to the minimum capacity position. The filament voltages should be 6.3 volts for all sockets and a 6.3 volt resistor plate in series with the filament. The plate voltage should be measured with an accurate low range A.C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>N</th>
<th>F</th>
<th>G</th>
<th>K</th>
<th>Ca</th>
<th>Cc</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L6G</td>
<td>Oscillator</td>
<td>6.3</td>
<td>147</td>
<td>147</td>
<td>—</td>
<td>36</td>
<td>—</td>
</tr>
<tr>
<td>6A6G</td>
<td>Modulator</td>
<td>6.3</td>
<td>234</td>
<td>110</td>
<td>110</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6F6G</td>
<td>R.F. Amplifier</td>
<td>6.3</td>
<td>231</td>
<td>110</td>
<td>110</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6F7G</td>
<td>Oscillator</td>
<td>6.3</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6D6G</td>
<td>Oscillator</td>
<td>6.3</td>
<td>190</td>
<td>190</td>
<td>190</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6L6G</td>
<td>Output</td>
<td>6.3</td>
<td>210</td>
<td>0</td>
<td>0</td>
<td>210</td>
<td>0</td>
</tr>
<tr>
<td>5U4G</td>
<td>Rectifier</td>
<td>6.0</td>
<td>300</td>
<td>0</td>
<td>0</td>
<td>300</td>
<td>0</td>
</tr>
</tbody>
</table>

Power consumption approximately 85 watts at 117.5 volts. Power output approximately 10 watts. Voltage drop across speaker field 60 volts.

50 CYCLE POWER TRANSFORMER ADJUSTMENT

 Receivers equipped with a 50 cycle power transformer should be adjusted for maximum output on the low, medium and high range. The receiver should have the line cord plugged in and the set turned on. The power transformer is located under the chassis at the rear. The original receiver should be adjusted with the power transformer removed. The step up of 50 cycle transformer is 5.6:1.

Fundamental power transformer adjustment is at the transformer primary. The secondaries of the transformers are used to drive the audio amplifiers. The primary of the power transformer is tapped from the secondary of the transformer. The transformers are rated at 5000 watts and are located under the receiver cabinet. The transformer primary is connected to the transformer secondary with the transformer secondary connected to the receiver. The transformer secondary is tapped from the transformer primary. The transformer secondary is connected to the receiver with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary. The transformer secondary is connected to the transformer primary with the transformer primary connected to the transformer secondary.
CROSLEY CORP.

SPECIFICATIONS

This model Crosley is a ten-tube superheterodyne receiver featuring B.C. oscillator, (to prevent station drift) compensated B.C. output and many of the latest improvements in circuit design. It is designed for operation on A.C., and is divided into three bands as follows:

- 535 to 20,000 kilocycles (American Broadcast Band)
- 1000 to 4000 kilocycles (Police & Amateur Band)
- 62.5 to 20,000 Megacycles (Foreign Band)

© John F. Rider, Publisher

Compliments of www.nucow.com
SPECIFICATIONS

This model Crosley radio is an 11-tube AC receiver and parallel pentode output. The tuning range is from 540-1890 Kilocycles or 555-162 Metres designed for American and Foreign broadcast reception. 540 kilocycles to 22 megacycles and is divided into 1.9-6.6 Megacycles or 158-45.5 Metres 6.4-22 Megacycles or 47-13.5 Metres

It incorporates such features as push-button electric tuning, three bands as follows:

NOVEMBER, 1938
## Parts List — Model 1118

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G97-33001</td>
<td>Pre-Selector Coil, B.C.</td>
</tr>
<tr>
<td>2</td>
<td>G139-33000</td>
<td>Antenna Coil, B.C.</td>
</tr>
<tr>
<td>3</td>
<td>G151-33001</td>
<td>Antenna Coils, Police</td>
</tr>
<tr>
<td>4</td>
<td>G150-33000</td>
<td>Antenna Coil, H.F.</td>
</tr>
<tr>
<td>6</td>
<td>G154-33002</td>
<td>Oscillator Coil, B.C.</td>
</tr>
<tr>
<td>7</td>
<td>G153-33002</td>
<td>Oscillator Coil, H.F.</td>
</tr>
<tr>
<td>8</td>
<td>G161-33004</td>
<td>1st F, 455 Kc. Assy.</td>
</tr>
<tr>
<td>9</td>
<td>G152-33004</td>
<td>2nd F, 455 Kc. Assy.</td>
</tr>
<tr>
<td>10</td>
<td>W 44054</td>
<td>Condenser, 30 Mf. 50 V.</td>
</tr>
<tr>
<td>11</td>
<td>W 36947B</td>
<td>Condenser, 40 Mf. 300 V.</td>
</tr>
<tr>
<td>12</td>
<td>G1</td>
<td>Condenser, Bimetal Temp. Control</td>
</tr>
<tr>
<td>13A</td>
<td>G2-34002</td>
<td>Condenser, 0.001 Mf. Molded</td>
</tr>
<tr>
<td>13B</td>
<td>G2-34002</td>
<td>Condenser, 0.001 Mf. Molded</td>
</tr>
<tr>
<td>13C</td>
<td>G2-34002</td>
<td>Condenser, 0.001 Mf. Molded</td>
</tr>
<tr>
<td>14</td>
<td>W 35936</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>15A</td>
<td>W 35821</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>15B</td>
<td>W 35821</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>15C</td>
<td>W 35821</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>15D</td>
<td>W 35821</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>16</td>
<td>W 35821</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>17</td>
<td>W 35821</td>
<td>Condenser, 0.05 Mf. 200 V.</td>
</tr>
<tr>
<td>18A</td>
<td>W 32888</td>
<td>Condenser, 1.0 Mf. 400 V.</td>
</tr>
<tr>
<td>18B</td>
<td>W 32888</td>
<td>Condenser, 1.0 Mf. 400 V.</td>
</tr>
<tr>
<td>18C</td>
<td>W 32888</td>
<td>Condenser, 1.0 Mf. 400 V.</td>
</tr>
<tr>
<td>19</td>
<td>W 33815</td>
<td>Condenser, 0.05 Mf. 400 V.</td>
</tr>
<tr>
<td>20</td>
<td>W 33835</td>
<td>Condenser, 0.01 Mf. 400 V.</td>
</tr>
<tr>
<td>21A</td>
<td>W 33139</td>
<td>Condenser, 0.004 Mf. 400 V.</td>
</tr>
<tr>
<td>21B</td>
<td>W 33139</td>
<td>Condenser, 0.004 Mf. 400 V.</td>
</tr>
<tr>
<td>22</td>
<td>W 50786</td>
<td>Condenser, B.C. Osc. Soms Trimmer</td>
</tr>
<tr>
<td>23</td>
<td>G23-34000</td>
<td>Condenser, 0.005 Mf. Pol. Osc. Fixed Trimmer</td>
</tr>
<tr>
<td>24</td>
<td>G20-34000</td>
<td>Motor Assembly (112)</td>
</tr>
<tr>
<td>25</td>
<td>G35-5951A</td>
<td>Section Shunt Trimmer Assy.</td>
</tr>
<tr>
<td>26</td>
<td>G3-30000</td>
<td>Section Var, Tuning Cond. (112)</td>
</tr>
<tr>
<td>27</td>
<td>G33-30002</td>
<td>Section Var, Tuning Cond. (112)</td>
</tr>
<tr>
<td>28</td>
<td>W 4481B</td>
<td>Dial Face (Glass) (112)</td>
</tr>
<tr>
<td>29</td>
<td>W 35587A</td>
<td>Mask (Metalized Color) (112)</td>
</tr>
<tr>
<td>30</td>
<td>C 44217</td>
<td>Support Bracket (Dial Glass) (112)</td>
</tr>
<tr>
<td>31</td>
<td>W 44262</td>
<td>Ring (Glass Support) (112)</td>
</tr>
<tr>
<td>32</td>
<td>W 44263</td>
<td>Arc (Glass Support) (112)</td>
</tr>
<tr>
<td>33</td>
<td>G 41217</td>
<td>Pointer (112)</td>
</tr>
<tr>
<td>34</td>
<td>W 40486</td>
<td>Screw—Pointer Mtg. (112)</td>
</tr>
<tr>
<td>35</td>
<td>G5</td>
<td>Phono and Hub Assy. (112)</td>
</tr>
<tr>
<td>36</td>
<td>W 44518</td>
<td>Drive Cord (112)</td>
</tr>
<tr>
<td>37</td>
<td>W 45448</td>
<td>Drive Belt (112)</td>
</tr>
<tr>
<td>38</td>
<td>W 44907A</td>
<td>Idler Pulley (112), Mtg. Stud (112)</td>
</tr>
<tr>
<td>39</td>
<td>H 44689</td>
<td>0.001 Mf. Condenser (112)</td>
</tr>
<tr>
<td>40</td>
<td>W 46239</td>
<td>Dial Glass (Glass) (112)</td>
</tr>
<tr>
<td>41</td>
<td>W 46094</td>
<td>Dial Glass Support (112)</td>
</tr>
<tr>
<td>42</td>
<td>W 46099</td>
<td>Dial Glass Clip (2) (112)</td>
</tr>
<tr>
<td>43</td>
<td>W 46096</td>
<td>Dial Glass Clip, R.H. (112)</td>
</tr>
<tr>
<td>44</td>
<td>W 46095</td>
<td>Dial Glass Clip, L.H. (112)</td>
</tr>
<tr>
<td>45</td>
<td>W 46097</td>
<td>Dial Pointer Guide (112)</td>
</tr>
<tr>
<td>46</td>
<td>W 41592</td>
<td>Drive Cord, 50-Inch (112)</td>
</tr>
<tr>
<td>47</td>
<td>G 41592</td>
<td>Drive Cord, 50-Inch (112)</td>
</tr>
<tr>
<td>48</td>
<td>W 43564</td>
<td>Pulley and Hub Assy. (112)</td>
</tr>
<tr>
<td>49</td>
<td>MG4-44879</td>
<td>Idler Pulley B.Rkt. Assy. (112)</td>
</tr>
<tr>
<td>50</td>
<td>W 44869</td>
<td>Cord Tension Spring (112)</td>
</tr>
<tr>
<td>51</td>
<td>W 46477</td>
<td>Tensioning—Drive Shaft (112)</td>
</tr>
<tr>
<td>52</td>
<td>W 45448</td>
<td>Drive Belt (112)</td>
</tr>
<tr>
<td>53</td>
<td>W 44807B</td>
<td>Idler Pulley (Dial)</td>
</tr>
<tr>
<td>54</td>
<td>W 44908</td>
<td>Idler Stud (112)</td>
</tr>
<tr>
<td>55</td>
<td>D 44949</td>
<td>Dial Glass (Foreign Only) (112)</td>
</tr>
<tr>
<td>56</td>
<td>W 46250</td>
<td>Drive Cord Clasp (112)</td>
</tr>
<tr>
<td>57</td>
<td>W 41598</td>
<td>Condenser, 20 Mf. 25 V.</td>
</tr>
<tr>
<td>58</td>
<td>G 4316</td>
<td>Condenser, Pre-Select Shunt</td>
</tr>
<tr>
<td>59</td>
<td>MG10S-44879</td>
<td>Motor Assembly (50-60 Cycle)</td>
</tr>
<tr>
<td>60</td>
<td>W 45168</td>
<td>Motor Foot</td>
</tr>
<tr>
<td>61</td>
<td>W 45168</td>
<td>Motor Mounting Bracket</td>
</tr>
<tr>
<td>62</td>
<td>W 30800</td>
<td>Shakers Washer</td>
</tr>
<tr>
<td>63</td>
<td>W 6075</td>
<td>W. H. Machine Screw, A-Long</td>
</tr>
<tr>
<td>64</td>
<td>W 6075</td>
<td>W. H. Machine Screw, A-Long</td>
</tr>
<tr>
<td>67</td>
<td>W 3200A</td>
<td>Resistor, 90 Ohm (1/4 W. Ins.</td>
</tr>
<tr>
<td>68</td>
<td>W 21296</td>
<td>Resistor, 20,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>69</td>
<td>W 21287A</td>
<td>Resistor, 60,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>70</td>
<td>W 41875</td>
<td>Resistor, 100,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>71</td>
<td>W 41875</td>
<td>Resistor, 100,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>72</td>
<td>W 41875</td>
<td>Resistor, 100,000 Ohm 1/4 W. Carb.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>73</td>
<td>W 41875</td>
<td>Resistor, 100,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>74</td>
<td>W 35600</td>
<td>Resistor, 10,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>75</td>
<td>W 36020</td>
<td>Resistor, 10,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>76</td>
<td>W 34018</td>
<td>Resistor, 200,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>77</td>
<td>W 34020</td>
<td>Resistor, 250,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>78</td>
<td>G 390A</td>
<td>Resistor, 500,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>79</td>
<td>W 34987B</td>
<td>Resistor, 500,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>80</td>
<td>W 33785</td>
<td>Resistor, 250,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>81</td>
<td>W 32940</td>
<td>Resistor, 1,000,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>82</td>
<td>W 32577</td>
<td>Resistor, 3 Megohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>83</td>
<td>W 44165</td>
<td>Resistor, 5,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>84</td>
<td>G 4291C</td>
<td>Resistor, 10,000 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>85</td>
<td>G 44006</td>
<td>Resistor, 10,000 Ohm 2W. Carb.</td>
</tr>
<tr>
<td>86</td>
<td>W 37651</td>
<td>Resistor, 2 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>87</td>
<td>W 34531</td>
<td>Resistor, 200 Ohm 1/4 W. Carb.</td>
</tr>
<tr>
<td>88</td>
<td>W 42893</td>
<td>Resistor, 20,000 Ohm 1/4 W. Carb.</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
CROSELY CORP.

MODEL 1118 AND 1128

CIRCUIT DESCRIPTION

Eleven tubes are used in a superhetodyne circuit comprising the receiving amplifier and modulator, two 455 kilocycle IF amplifiers—one stage of which is in resistance coupled, separate AVC and detector grids, two stages of audio amplification and power supply. The 1st IF transformer is a triplate tuned unit, which is out of the accessory section where switch control, selectivity of the receiver. Inter-section noise suppression is accomplished while tuning by means of the padder tubes due to the action of the 6SC5 "squash" tubes. When a push button is depressed, this tube supplies sufficient voltage to the cathodes of the output tubes to bias them beyond "cut-off." It also supplies voltage to the AVC circuit through a 250,000 ohm resistor, item 36. The speaker field is located in the negative of the grid of tube. The bias for all tubes except the three types 6SC5, is 11/2 volts for the 455 kilocycle IF transformers. The "bias" voltage tap (BLACK) and the "low" voltage tap (ORANGE) are connected to terminals near the transformer.

The voltage range of the "low" tap of the 90-130 volt transformer is from 95 to 112/4 volts and of the "high" tap is from 112/4 to 130 volts. The range of the "low" tap of the 190-250 volt transformer is from 130 to 225 volts and of the "high" tap is from 225 to 360 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of the jumper wire should be connected to the ORANGE or BLACK lead of the transformer powering the chassis which is connected to the line voltage receiver is to be used on.

AGALEMENT PROCEDURE

All the controls are very accurately adjusted at the factory and normally should need no further attention. However, if it is definitely known that an adjustment is necessary, the circuits may be properly aligned with the use of a modulated signal generator. CARRY THE SIGNAL GENERATOR LED pilots, ON THE PANEL, TO THE UNIT, OR TO THE UNIT IN THE CAR, ALONG WITH THE PANEL-Leads, TO THE UNIT, OR TO THE UNIT IN THE CAR, ALONG WITH THE PANEL-Leads.

Connecting Output Meter

Connect the output meter to the plate and screen of one of the 456C output tubes. Be certain that the meter is protected by D.C. by a condenser (3 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning The 1F Amplifier To 455 Kilocycles

(1) Connect the output of the signal generator through a 0.02 mfd. condenser to the top cap of the 4576 1st IF Amptube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the terminal for the ground terminal of the amplifier. Killer padder (See Fig. 2) as far as possible from the GRID LEADS OF THE OTHER SCREW (GND) TUBE.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control to the right and turn the tone control knob to the left (TREBLE).

(c) Set the band switch to the Broadcast Band.

(d) Turn the Remote-Control Switch to the "Distance" position. Then the key to the remote-control switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through hole No. 1 of the identification bracket. If it does not drop into the slot in the zinc, push it in with the fingers.

(2) Turn the Local-Control Switch to the "Distance" position. By means of the station selector knob, tune in the station whose call letters have been placed in No. 1 push button.

Then remove the key.

NOTE ON MODEL 1128: The push button on the extreme right (signal generator) and serve as a release for all other push buttons and should be depressed before operating the others. "ONE" positions.

NOTE ON MODEL 1118: The push button which will ordinarily be used for Police calls does not lock in the "OFF" position. It will all other buttons and should be depressed before operating the manual control.

By means of the manual tuning knob, turn the dial indicator to the other position. Then check the setting by pressing the button which has been set. If the pointer stops to go far too far, a second setting will be made.

To make the second setting, observe how far the pointer stops from the correct position for that station. Replace the key in the dial and tune far enough to one side of the correct position to make allowance for the dial setting.

The electric tuning system is now correctly set for the 1st station. Follow through with the procedure for the proper alignment of the "Distance" switch should be turned to the "Local" position. Should the selector switch become operative in the field, it should not be disassembled for repairs, but should be returned to the factory via an authorized Crosley Distributor.

REPLACING DRIVE CORD ON THE 1128

To replace the dial drive cord, the following procedure should be carefully followed:

1. Remove the knobs, plunger, and dial buttons from the chassis. Replace the key in the dial and tune far enough to one side of the correct position to make allowance for the dial setting.

2. - Remove the drive cord from the pointer, dial light socket, and from the complete dial assembly.

3. - Replace the slide cord and spring tension.

4. - Cut a piece of drive cord exactly 50 inches in length. Fold double then tie the tension spring approximately one inch from the end, this gives you a loop 24 inches long.

5. - Close the condenser, this should place the eyepoint in the pulley on the pulley.

6. - Insert the cord through the eyelet in the large pulley and tie it to the small pulley. Hoist the loose end of tension spring on catch in pulley.

7. - Take one side of drive cord and make half turn in a counter-clockwise direction. Use pulley from front of chassis.

8. - Take one side of drive cord and make half turn in a counter-clockwise direction around large pulley.

9. - Hold brass pulley in left hand and make two complete turns in a clockwise direction around small end. While keeping tension on pulley pulley to chassis. Then, continue cord up and over the right hand idler pulley in a clockwise direction (1/4 turn). Continue across to left hand idler pulley and around and down to bottom of large pulley, Stretch tension spring and wrap cord over pulley rim.

Place cord clamp (W-62500) on drive cord approximately 3/4 inch from inside edge of pulley rim.

10. - Replace drive belt, dial assembly and dial lights.

Fig. 4 Photopickup Shape


SOCKET VOLTAGES

The tube socket voltages are measured from the tube chassis ground to the chassis at 50 volts or 2, 500 volt D. C. voltmeter (except Filaments) with the receiver in operating condition and no signal input. The voltage on the filament should be turned to the "TREBLE" position (650 volts), the Local-Distance switch should be turned to the "Distance" position and the condenser knob should be rotated to the maximum capacitance position. The 1118 is measured with an accurate low range A. C. voltmeter (approx. 400). Readings may vary plus or minus 10% of values given.

©John F. Rider, Publisher
PUSH BUTTON TUNING SYSTEM

The push button electric tuning system employed in this recorder incorporates eight push buttons, a selector switch and an electric motor. The discriminator switch, item 65 — also Fig. 5, incorporates eight metallic discs, each of which operates in conjunction with a different push button to tune-in a favorite station. That is, the 1st push button on the left goes from the front of the cabinet with No. 1 disc, and the 2nd push button works with No. 2 disc, etc.

SETTING PUSH BUTTONS

To set the electric tuning system, turn the receiver "ON" and depress No. 1 push button. When the dial pointer stops rotating, the key in No. 1 disc on the selector switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through No. 1 hole in the disc identification bracket. If it does not drop into the slot in the disc, push it in with the fingers.

Turn the Local-Distance switch to the "Distance" position. By means of the distance selector knob, tune-in AS ACCURATELY AS POSSIBLE, the station whose call letters have been placed in No. 1 push button. Then remove the key.

NOTE: The push button which will ordinarily be used for POLICE calls does not lock in the depressed position. It serves as a release for all other push buttons and should be depressed before operating the manual tuning control. (The first set of this model were built with non-lock type push buttons.)

By means of the manual tuning knob, turn the dial pointer to some other position. Then check the setting by pressing the button which has been set. If the pointer stops too soon or goes too far, a second setting will be necessary.

To make the second setting, observe how far the pointer stops from the second position for that station. Reposition the key in the disc and turn far enough to one side of the correct position to make allowance for the difference noted in the first setting.

The electric tuning system is now correctly set for the 1st station. Follow through with this same procedure until the proper adjustments have been made for all eight of the favorite stations. When tuning the receiver by means of the push buttons, the Local-Distance switch should be turned to the "Local" position.

Tuning Motor

Should the clutch on the tuning motor fail to operate satisfactorily, either by not engaging or not releasing when it should, the two tension springs located on the back of the motor should be checked.

With the receiver in its normal operating position, bend both tension springs until the clutch will not engage. Slowly decrease the tension on both springs until the clutch engages and releases satisfactorily. Check the operation of the motor several times to be certain that the tension is correct.

Selector Switch

Should the selector switch become inoperative in the field, it should not be disassembled for repair, but should be returned to the factory via an authorized Crosley distributor.
CROSLEY CORP.

MODELS 1217, 1227
Socket, trimmers, chassis
Drive Data, phonograph

Fig. 2. Top View Models 1217 and 1227

Fig. 3. Bottom View Models 1217 and 1227

Fig. 4. Phonograph Pickup

© John F. Rider, Publisher
These model Croxley radios are 12-tube AC receivers designed for Standard Broadcast and Short Wave reception. They incorporate such features as push button 538-1725 Kilocycles or 565-1725 Meters 241 - 45 Megacycles or 6.6 - 22 Megacycles or 65.5 - 135.5 Megacycles.

CIRCUIT DESCRIPTION

Twelve tubes are employed in a superhetronyde circuit which consists of an R. F. Amplifier, separate oscillator and modulator tube, a type 282 or kilowatt I. F. Amplifier, a composite detector, AVC and quiet or "speech" tube, two stage audio amplifier—the output of which feeds four pentode tubes in push pull parallel and power supply.

The 1st I. F. transformer is a triple-tuned unit, which in conjunction with the Local-Distance switch, controls the selectivity of the receiver. Quiet tuning is accomplished while tuning by means of the push buttons due to the action of the 60-74 tube, item 55, on the audio amplifier. When any push button is depressed, A.C. voltage is impressed upon the control grid of this tube through one or the other of the condensers 208 or 200. A portion of this voltage is rectified and passed on to the control grid of the 607G A. F. tube through resistors 420 and 400, the effect being to bias the tube beyond cutoff.

The diode plates of the 607G A. F. tube have no effect upon the circuit and the socket terminals for these two elements are only used for junction blocks. The 480 ohm field of the speaker is located in the negative leg of the power supply. The bias voltage for the 607G I. F. amplifier tube is obtained across a 250 ohm resistor, item 61, located between the speaker field and ground.

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 Elements) with the receiver in operating condition and no signal input. The volume control should be turned full "ON", the tone control should be turned to the "TREBLE" position (counter-clockwise), the Local-Distance switch should be turned to the "Distance" position and the condenser gaps should be rotated to the minimum capacitance position. The Element voltages should be measured with an accurate low range A. C. voltmeter (approximately 0.10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>H</th>
<th>F</th>
<th>S</th>
<th>Se</th>
<th>K</th>
<th>Gc</th>
<th>Ga</th>
</tr>
</thead>
<tbody>
<tr>
<td>607G</td>
<td>B. F. Amplifier</td>
<td>6.5</td>
<td>250</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6647R</td>
<td>Modulator</td>
<td>6.5</td>
<td>255</td>
<td>95</td>
<td>5</td>
<td>0</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6647L</td>
<td>I. F. Amplifier</td>
<td>6.5</td>
<td>255</td>
<td>95</td>
<td>5</td>
<td>3</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6GQ2</td>
<td>AVC &amp; Speech</td>
<td>6.5</td>
<td>256</td>
<td>96</td>
<td>5</td>
<td>3</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6GQ1</td>
<td>1st A. F. Amplifier</td>
<td>6.5</td>
<td>175</td>
<td>30</td>
<td>5</td>
<td>3</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6647</td>
<td>2nd A. F. Amplifier</td>
<td>255</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6647</td>
<td>3rd A. F. Amplifier</td>
<td>255</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>6GQ2</td>
<td>4th A. F. Amplifier</td>
<td>255</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

Power output approximate 120 watts at 117.5 volts. Power output approximately 12 watts. Voltage drop across speaker field 75 volts.

SPECIAL POWER TRANSFORMERS

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 1175 volts and of the "high" tap is from 1175 to 1900 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 360 volts.

The accompanying illustration shows the connections for changing from high to low or low to high voltage lead. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

N.B. Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

Connecting Output Meter.

Connect the output meter to the plates of the two 6K0G output tubes. Be certain that the meter is protected from D. C. by a condenser 1.1 milfd or larger—necessary to prevent current flow in the grid circuit of the output tubes.

Tuning the I.F. Amplifier 455 Kilocycles.
(a) Connect the output of the signal generator through a .02 milfd condenser to the top cap of the 607G I.F. Amp tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS PRACTICAL FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.
(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (O.K.) and turn the tone control knob to the left (TREBLE).
(c) Set the band selector switch on the Broadcast Band.
(d) Turn the Local-Distance switch to the "Distance" position (clockwise).
(e) Set the signal generator to 455 kilocycles.
(f) Adjust both trimmer condensers located on top of the 2nd I.F. transformer for maximum output.
(g) Transfer the signal generator lead to the top cap of the 6AG1 tube, leaving the tube's grid clip in place.
(h) Close the middle trimmer of the 1st I.F. transformer. (Do not force adjustment screw).
(i) Adjust the trimmer condensers located on the 1st I.F. transformer for maximum output.

DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I.F. TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6AG1 TUBE. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a 200 ohm condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in place of the condenser. Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). 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, f(D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "O.C.S." (quieting trimmer) until the minimum CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).
(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "R-F" and "ANT" trimmers for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "R-F" and "ANT" trimmers. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. Check on this, increase the output of the signal generator ten times, or more, and then adjust both the generator frequency as indicated on the station selector dial and at approximately the same point as 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 frequency.
(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the Station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 3540 kilocycles in the Police Band and 7000 kilocycles in the High Frequency Band may be compensated for by slight readjustment of the grid lead of the antenna coil in the Band affected.

(D) SIGNAL INPUT FREQUENCIES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Megacycles</td>
<td>1975 Kilocycles</td>
<td>110 Megacycles</td>
<td></td>
</tr>
<tr>
<td>22 Megacycles</td>
<td>16 Megacycles</td>
<td>110 Megacycles</td>
<td>18 Megacycles</td>
</tr>
</tbody>
</table>
FIGURE 6

RED – TO 4 PIN ON RECTIFIER SOCKET.
BLUE – TO TRANSFORMER.
GREEN – TO .025MF 8.05MF CONDENSER.
BLACK – TO 8 PIN ON RECTIFIER.

FIG. 1A

0.1 MF, 600 VOLT.

SWITCH.

OPEN 1/2 LEAD HERE

OUTPUT TRANSFORMER

RECEIVER CHASSIS GROUND.

FIG. 2A

OUTPUT TRANSFORMER.

RECEIVER GROUND.

FIG. 2B

MATCHING

BLACK & YELLOW — APPROX 5,000 OHMS.
GREEN & YELLOW — APPROX 5,000 OHMS.
BLACK & GREEN — APPROX 10,000 OHMS.
BLACK, YELLOW, GREEN — APPROX 10,000 OHMS, PUSH-PULL.
COMPLIMENTS OF www.nucow.com

CROSLEY PAGE 10-48

MODELS 118, 119 Read-Printers and Service Data

1. At least 5 watts output (clean audio).
2. A very good A.V.O. circuit.
3. Good sensitivity and selectivity.
4. A well filtered power supply (50 Hertz).

Figures 1-A and B and 1-A and B show how to connect 119 Printer to Receiver. The switching arrangement is up to the individual, whether the connection may be made at Figure 1-A or 1-B, open the connection that gives the best results.

CROSLEY OWNERS OPERATING INSTRUCTIONS THROUGHOUT USE RECOMMENDED THE CROSLEY MODEL 750 READER AS AN EXCEPTIONAL RADIO RECEPTOR, IS THAT THE CIRCUIT INTEGRATES MANY NEW DEVELOPMENTS THAT ARE ESSENTIAL FOR PROVIDING THE EXCELLENT JOB OF PRINTING OF WHICH THIS RAD A READER IS CAPABLE.

OPERATION

If the preceding instructions have been carefully followed, the operation of the RAD A is practically automatic with the exception of turning ON and OFF

TUNING IN THE RAD AUTOMATIC

THE IMPORTANCE OF ACCURATE tuning of the radio system to the station broadcasting Factuals signal cannot be emphasized too strongly. Good copy cannot be received unless the station is tuned to right on the scale, as the form of printing depends almost entirely on the RAD A being synchronized with the transmitting equipment.

The procedure for accurate tuning is as follows: Locate desired station on the dial, then tune to each side, then bring printer back to the center of that portion of the dial that the station covers. It will be found much easier to tune-in accurately (Factuals signals) by setting the station to be broadcast from a non-A.C. signal, while the system is broadcasting a regular radio program.

ADJUSTING THE QUALITY OF PRINTING (Blackness)

First, the receiver must have sufficient output (5 watts or more). The blackness of the printing is regulated by increasing or decreasing the setting of the volume or level control.

MAINTENANCE

1. Keep the Stylus.

The stylus may tend to bind in the needle block after considerable service due to small particles of carbon collecting on it. If this occurs, loosen collet and remove stylus and clean. Replace and adjust as stated in paragraph "Stylus".

2. Clean the PLATE TRAMP.

The plate tramp is a strip of spring steel that is held in the plate tray and separates the paper. Due to the usual printing trade practice, it is necessary to maintain the tramp in good condition to prevent possible damage to the stylus point when removing paper. If this plate tramp should become stiff, it will tend to break the stylus tip and will also cause a decrease in the efficiency of the printing operation.

The plate tramp should be cleaned at least once a week. Use a clean cloth moistened in alcohol.

STYLUS POINT

It is essential that the plate tramp be thoroughly lubricated at all times, check at least once a week. Use a high grade of machine oil for this purpose.

STYLUS VARIATION

Variations in density or blueness of printing may be due to:
(a) Receiver may not have the A.V.O. circuit capable of keeping the output constant over wide variations of incoming signal strength.
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS VARIATION

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.

STYLUS PRINTING

(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in needle block.
(d) Stylus may be worn.
(e) Plate tramp may have small deposits of carbon on it.
ALINEMENT PROCEDURE MODELS 255, 251, 256.

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using i mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and align transformer No. 2. Connect generator to grid of 6A7 tube and align transformer No. 1.

RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to left hand position and the tuning condenser to about 600 kc. Feed a 456 kc. signal to the antenna and adjust wave trap trimmer for minimum response. With the tuning condenser at minimum capacity feed 1600 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1450 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 540 kc. and adjust oscillator trimmer for top frequency. Set generator to 5000 kc. tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 16,500 kc. screw trimmer down tight, then unscrew to second peak. Set generator to 15,000 kc. tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to first peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. Above procedure for alignment at 15,000 kc. must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc. will result if antenna and oscillator circuits are not set in proper relation to each other.

Adjustment of Mechanical Automatic Tuning System

Any of your favorite stations may be set up on any button, but it is recommended that they be set up in the same sequence as they are received on the dial. Loosen one of the buttons by turning it to the LEFT. A slot is provided in the button into which a coin may be inserted to facilitate turning. After turning the button a few turns to the LEFT, press it as far as it will go. While holding the button in this position, tune the station desired very carefully in the usual manner with the manual tuning knob. While still holding the button if, fix the adjustment by turning the button to the RIGHT until tight. Thereafter the station set up on this button will be received whenever this button is pressed in AS FAR AS IT WILL GO.
**DETROLA CORP.**

**MODEL 260**
- 150 to 400 KC
- 540 to 1380 KC

This receiver is designed to operate on 220 volts, direct or alternating current.

**MODEL 266**
- 2 - 6D6 R. F. Amplifiers
- 1 - 76 Detector
- 1 - 25L6G Power Output
- 1 - 2525 Rectifier
- 1 - BK49BG Ballast

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

**MODEL 268**
- 1 - type 76 Detector
- 1 - type 76 1st Audio
- 2 - type 6D6 R. F. Amplifiers
- 1 - type 25L6 Output
- 1 - type 2525 Rectifier

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

**MODEL 272**
- 1 - 2526 Rectifier
- 1 - 252A Output

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.
Tubes required are:

Model **259**
- 1-76 Oscillator
- 1-6278 Audio Amplifier
- 1-76 Phase Inverter, driver
- 2-6V6 Power Output
- 1-80 Rectifier

Model **258**
- 1-6K5G Audio Amplifier
- 1-6V6G Power Output
- 1-80 Rectifier

*Only on those sets equipped with tuning eye.*

No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

---

**IF PEAK 456 KC**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Part No.</th>
<th>Description</th>
<th>Symbol</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>1611</td>
<td>5-35 mfd Trimmer</td>
<td>R-15</td>
<td>3353</td>
<td>250 ohm 2W</td>
</tr>
<tr>
<td>C-2, 7, 10</td>
<td>580</td>
<td>0.05-200V</td>
<td>R-16</td>
<td>5511</td>
<td>100M T.C.</td>
</tr>
<tr>
<td>C-3</td>
<td>5654</td>
<td>Tuning Condenser</td>
<td>R-17</td>
<td>2887</td>
<td>400M 10% ½W</td>
</tr>
<tr>
<td>C-4</td>
<td>2597</td>
<td>1-10 mfd Trimmer</td>
<td>R-18</td>
<td>2889</td>
<td>400M 15% ½W</td>
</tr>
<tr>
<td>C-5</td>
<td>2741</td>
<td>1330 mfd Mica + 5%</td>
<td>R-19</td>
<td>2882</td>
<td>5M 10% ½W</td>
</tr>
<tr>
<td>C-6</td>
<td>2560</td>
<td>50-500 mfd paddler</td>
<td>R-20</td>
<td>5802</td>
<td>Power Transformer</td>
</tr>
<tr>
<td>C-8</td>
<td>2780</td>
<td>50 mfd mica</td>
<td>R-21</td>
<td>5656</td>
<td>Dial Chart</td>
</tr>
<tr>
<td>C-9</td>
<td>2792</td>
<td>.2-200V</td>
<td>R-22</td>
<td>5447</td>
<td>Pointer</td>
</tr>
<tr>
<td>C-11</td>
<td>1285</td>
<td>100 mfd mica</td>
<td>R-23</td>
<td>5657</td>
<td>1st I.F. Transformer</td>
</tr>
<tr>
<td>C-12</td>
<td>576</td>
<td>0.02-400V</td>
<td>R-24</td>
<td>5658</td>
<td>2nd I.F. Transformer</td>
</tr>
<tr>
<td>C-13</td>
<td>4810</td>
<td>0.0005-400V</td>
<td>R-25</td>
<td>5659</td>
<td>Antenna Coil</td>
</tr>
<tr>
<td>C-14</td>
<td>565</td>
<td>0.01-200V</td>
<td>R-26</td>
<td>5660</td>
<td>Oscillator Coil</td>
</tr>
<tr>
<td>C-15</td>
<td>1285</td>
<td>100 mfd mica</td>
<td>R-27</td>
<td>5789</td>
<td>Band Switch</td>
</tr>
<tr>
<td>C-16, 17</td>
<td>576</td>
<td>0.02-400V</td>
<td>R-28</td>
<td>5790</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>C-18</td>
<td>563</td>
<td>.05-400V</td>
<td>R-29</td>
<td>5791</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>C-19</td>
<td>3375</td>
<td>36MF 400V</td>
<td>R-30</td>
<td>5792</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>C-20</td>
<td>3113</td>
<td>16MF Reg.</td>
<td>R-31</td>
<td>5793</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-1, 5, 20</td>
<td>631</td>
<td>50M ½W</td>
<td>R-32</td>
<td>5794</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-2, 3</td>
<td>617</td>
<td>20M ½W</td>
<td>R-33</td>
<td>5795</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-4, 12</td>
<td>624</td>
<td>1 Meg ½W</td>
<td>R-34</td>
<td>5796</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-6</td>
<td>5100</td>
<td>5 meg V.C.</td>
<td>R-35</td>
<td>5797</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-7</td>
<td>2100</td>
<td>5 meg W</td>
<td>R-36</td>
<td>5798</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-8</td>
<td>615</td>
<td>5 Meg ½W</td>
<td>R-37</td>
<td>5799</td>
<td>Automatic Tuning Unit</td>
</tr>
<tr>
<td>R-9, 11</td>
<td>2689</td>
<td>100 ohm 10% ½W</td>
<td>R-38</td>
<td>5800</td>
<td>Tuning Eye Escutcheon</td>
</tr>
<tr>
<td>R-10</td>
<td>600</td>
<td>10M ½W</td>
<td>R-39</td>
<td>5801</td>
<td>Call Letter Sheets</td>
</tr>
<tr>
<td>R-13</td>
<td>594</td>
<td>200M ½W</td>
<td>R-40</td>
<td>5912</td>
<td>Speaker</td>
</tr>
</tbody>
</table>

**IF PEAK 456 KC**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>1611</td>
<td>5-35 mfd Trimmer</td>
</tr>
<tr>
<td>C-2, 7, 10</td>
<td>580</td>
<td>0.05-200V</td>
</tr>
<tr>
<td>C-3</td>
<td>5654</td>
<td>Tuning Condenser</td>
</tr>
<tr>
<td>C-4</td>
<td>2597</td>
<td>1-10 mfd Trimmer</td>
</tr>
<tr>
<td>C-5</td>
<td>2741</td>
<td>1330 mfd Mica + 5%</td>
</tr>
<tr>
<td>C-6</td>
<td>2560</td>
<td>50-500 mfd paddler</td>
</tr>
<tr>
<td>C-8</td>
<td>2780</td>
<td>50 mfd mica</td>
</tr>
<tr>
<td>C-9</td>
<td>2792</td>
<td>.2-200V</td>
</tr>
<tr>
<td>C-11</td>
<td>1285</td>
<td>100 mfd mica</td>
</tr>
<tr>
<td>C-13</td>
<td>4810</td>
<td>0.0005-400V</td>
</tr>
<tr>
<td>C-14</td>
<td>565</td>
<td>0.01-200V</td>
</tr>
<tr>
<td>C-15</td>
<td>1285</td>
<td>100 mfd mica</td>
</tr>
<tr>
<td>C-16, 17</td>
<td>576</td>
<td>0.02-400V</td>
</tr>
<tr>
<td>C-18</td>
<td>563</td>
<td>.05-400V</td>
</tr>
<tr>
<td>C-19</td>
<td>3375</td>
<td>36MF 400V</td>
</tr>
<tr>
<td>C-20</td>
<td>3113</td>
<td>16MF Reg.</td>
</tr>
<tr>
<td>R-1, 5, 20</td>
<td>631</td>
<td>50M ½W</td>
</tr>
<tr>
<td>R-2, 3</td>
<td>617</td>
<td>20M ½W</td>
</tr>
<tr>
<td>R-4, 12</td>
<td>624</td>
<td>1 Meg ½W</td>
</tr>
<tr>
<td>R-6</td>
<td>5100</td>
<td>5 meg V.C.</td>
</tr>
<tr>
<td>R-7</td>
<td>2100</td>
<td>5 meg W</td>
</tr>
<tr>
<td>R-8</td>
<td>615</td>
<td>5 Meg ½W</td>
</tr>
<tr>
<td>R-9, 11</td>
<td>2689</td>
<td>100 ohm 10% ½W</td>
</tr>
<tr>
<td>R-10</td>
<td>600</td>
<td>10M ½W</td>
</tr>
<tr>
<td>R-13</td>
<td>594</td>
<td>200M ½W</td>
</tr>
<tr>
<td>R-15</td>
<td>5912</td>
<td>Speaker</td>
</tr>
</tbody>
</table>

---

Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% ½W on sets not equipped with phonograph.
**ALIGNMENT PROCEDURE**

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator. Strong signals tend to cause improper adjustments.

**I.F.:** Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D0 I.F. amplifiers tube, and a line transformer No. 2. Connect generator to grid of 6A7 tube and a line transformer No. 1.

**RF:** (See above diagram for location of trimmers.) Using a 200 MMF condenser in series with the high side of the generator, turn band selector switch to center (B) position and the tuning condenser at minimum capacity feed 1720 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padding. The tuning condenser should be rocked back and forth through the signal while varying the padding in order to assure perfect alignment.

Using 400 ohm resistor in series with generator, set band selector in right hand (F) position, set generator to 6300 kc. and adjust oscillator trimmer for top frequency. Set generator to 5000 kc., tune receiver to signal and adjust antenna trimmer.

**Setting Up the Push Button Station Selector**

First select six favorite local or strong nearby stations, listing them according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left hand end of the dial (nearest 1600 kc.) the No. 1 station and number the other five stations consecutively as they are tuned in on the dial, tuning from left to right. For example assume your selected stations operate on frequencies of 1500 kc., 1300 kc., 1100 kc., 900 kc., 700 kc., and 600 kc. The 1500 kc. station should be listed as No. 1, the 1300 kc. stations would be No. 2, and so on through the list with the 600 kc. station becoming No. 6. In setting up the buttons, the 1500 kc. station should be set up on No. 1 button, or the first button from the left, the 1300 kc. station on the second button from the left, and so on until the 600 kc. station is finally set up on the button farthest to the right.

With the band selector set at "A" or the second position from the left, tune in station No. 1. Observe the program in progress, then turn the band selector knob to the extreme left position (A). Push the No. 1 button in as far as it will go: when the proper operating position is reached the button will lock in. Then insert the screwdriver through the opening directly above the No. 1 button and turn the larger headed screw until the same program is heard. Do not force this screw. It should turn very easily and if the station is not heard when the screw is turned all the way in one direction, reverse the direction of rotation until the station is found. When the station is located, turn the screw back and forth through the station slowly and observe whether the station is accurately tuned in, indicated by a minimum of noise or interference, by watching the tuning eye on the models so equipped. Inserted in one side of the larger screw head is a smaller screw.

This screw is for fine adjustment, and should be turned in and out until position of least bias is found, or until the tuning eye, on models so equipped, shows the least shadow. It will not be necessary to turn this small screw more than one full turn from the factory adjusted position. As a definite check that the desired station has been tuned in, listen for the station announcement. Set up the remaining buttons in the same manner, and after all stations have been set up, locate the call letters of the stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets and insert them in the escutcheon according to the directions on the envelope.

**On Sets Equipped with Phonograph**

Phono Radio Switch: The Left Hand Position is for Radio Only. The Right Hand Position connects the pick-up and turns on the power for the phonograph motor.
5-TUBE STORAGE BATTERY POWERED SUPERHETERODYNE

WARNING! DO NOT CONNECT A CHARGER TO THE BATTERY WHILE THE SET IS IN USE. DO NOT GROUND EITHER SIDE OF THE BATTERY.

ALIGNMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using 200 mfd condenser in series with generator, feed 1725 kc signal to antenna lead and adjust oscillator top frequency. Set generator at 1400 kc. tune receiver to signal and adjust broadcast antenna trimmer. Set generator to 600 kc. tune receiver and adjust pad. The tuning condenser should be rocked back and forth through the signal while the pad is being adjusted in order to obtain perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in short wave (right) position, feed 15,600 kc signal to antenna and adjust oscillator trimmer—screw trimmer down tight and unscrew to SECOND peak. Set generator to 15,000 kc. tune receiver and adjust antenna trimmer—screw trimmer down tight and unscrew to FIRST peak, rocking the condenser back and forth through the signal while the adjustment is being made. Above procedure for alignment at 15,000 kc must be followed exactly to insure proper tracking. A 'dead spot' at about 12,400 kc will result if antenna and oscillator are not set in proper relation to each other.

©John F. Rider, Publisher
This receiver is designed to operate on 105 to 125 volts, 60 cycle, alternating or direct current. Do not connect to any other source.

For phonograph operation turn the Radio Phono switch to the Phono position. THE A.C.-D.C. SWITCH MUST BE IN THE PROPER POSITION. (This switch is on the phonograph panel.) The radio volume control also serves as the phonograph volume control.
DeWald Radio Mfg. Corp.

This is a battery operated superhetodrome receiver with full automatic volume control. It is designed to function with an AC supply of 1.5 volts and a DC supply of 90 volts. The broadcast range coverage is 540-1500 kilocycles.

Model 408R

12K7GT

12F5GT

50L66T

45Z56T

When used as LW model see "A-B"
MODEL A Phonowtron
MODEL 411 Phonoscope

DEWALD RADIO MFG. CORP.

Schematics, Data

The "PHONESCOPE" is a combination audio and wireless playback. Disc recordings may be played directly through this unit, or may be reproduced through a remote radio receiver. A microphone may also be used instead of disc recordings. The unit has been designed to operate on 105-125 volts 60 cycles A.C. unless otherwise specified.

PHONOGRAPH The phonograph motor and unit is turned "on" by rotating the knob on the right in a clockwise direction. Further rotation in this direction increases the volume. Turn the knob on the left side to the clockwise position. Allow about a minute for the tubes to become sufficiently heated. Disc recordings may now be played through the speaker in the PHONESCOPE.

MICROPHONE A high impedance magnetic or crystal microphone may be used in place of phonograph recordings. The two pin tips should be inserted in the microphone jack in the rear of the cabinet. The microphone may be used as a means of speaking or entertaining through the unit.

NOTE: ON DIRECT CURRENT IT MAY BE NECESSARY TO START THE MOTOR BY GIVING IT A SPIN.
Adjust the signal generator at 456 K.C. and peak the I.F. trimmers for maximum signal. Connect the "hot" lead from the signal generator to antenna of receiver and ground to ground of receiver. Adjust the generator and receiver to 1500 K.C. and peak the trimmers for maximum signal. Adjust generator and receiver to 600 K.C. and peak the padder for maximum signal. The model 655 should have the back attached to the cabinet when peaking 1500 K.C. and 600 K.C. The trimmers and padder on these models are shown in a sketch on the wiring diagram.
GENERAL FEATURES

These receivers are classed as "Electrostatic and Direct Vision." Electrostatic indicates that the entire deflection system is electrostatic and since the picture is viewed directly without the use of a mirror, lens or other device, it is referred to as Direct Vision. The latter ensures clarity, brilliance and the least amount of distortion. Stedy, clear cut, black and white pictures that are large enough to enjoy at one time are secured by the use of a fourteen inch cathode-ray tube which furnishes a picture eight by ten inches. A separate high fidelity section brings superb reproduction of the sound channel which is associated with the picture. A single control tunes both the sight and the sound channels so the receiver is not so difficult to operate than an ordinary broadcast receiver. To the above features add its compact size, minimum number of controls and simple straightforward layout and you will have an idea of the first commercial receiver which we believe you will find easy to install and service in spite of the apparent complexity of the subject Television.

CIRCUIT ARRANGEMENT

A simple straight line layout is used in these receivers that should prove extremely helpful to the serviceman. Viewed from the front the video receiver is on the left side of the chassis and the sound receiver is on the right. Fig. No. 3 shows the front controls and the sound receiver while Fig. No. 2 shows the rear adjustments and the video receiver. The top portion of the chassis contains both sweep circuits along with the modulating circuits of the cathode-ray tube. To prevent confusion each side is considered separately, half appearing in Fig. No. 1 and the remainder in Fig. No. 2. The seven auxiliary controls shown in Fig. No. 2 are provided for the use of the installer and serviceman. These controls are necessary to make the final alignment of picture size and positioning when the receiver is installed under the operating conditions imposed by the earth's magnetic field and the power supply line voltages. Once properly set these controls do not need adjustment since they were not provided for the owner's use we suggest that the dealer or serviceman seal the back of the cabinet as it is not possible to tamper with the controls when the back is in place. The use of the parts and tubes shown in Fig. No. 1 and Fig. No. 2 can be checked by comparing the "V" numbers, etc., with the schematic drawings.

Operating Controls of the Receiver (Front)

First, become familiar with the controls on the front of the receiver. Since the receiver has been tested before shipment, probably only a few minor adjustments will be necessary. Therefore be careful not to change the adjustments in the rear to operate the set according to the instruction sheet supplied the purchaser and make only the adjustments required. These instructions are repeated here to cover the point. A brief loss of this sheet. Figure No. 1 shows the front of the receiver with the controls numbered and the use and the purpose of these controls as follows.

1. Marked CONTRAST, ON and OFF
   This is a power switch for starting and stopping a set. It also is the volume control of the picture signal. It should be adjusted in conjunction with the intensity control (No. 4) to give a picture of pleasing contrast to the user. If the location is such that the signal is very small, it may be necessary to use the full gain of this control, while in a good location it may have to be retarded considerably. If the picture is not satisfactory the rear controls must be adjusted as covered in a following section.

2. Marked SELECTOR
   This control is a four position switch provided for covering four television channels.

3. Marked TUNING
   Only one control is necessary to properly tune both the sight and sound channels. Simply adjust this control until the best reception of the sound is secured and at this point the picture signal will be correctly tuned.

4. Marked INTENSITY
   The intensity or brightness of the picture is controlled by this knob. It should be adjusted in conjunction with Control No. 1 to get the best picture. Note: It is a good policy to retard (turn to the left) this control when starting the set. If about 15 seconds is allowed to elapse before advancing this control it will prevent a small bright spot from appearing on the screen which might eventually darken the screen.

5. Marked FOCUS
   This control is used to sharpen the individual lines of the pattern and once set seldom requires further adjustment.

6. Marked VOLUME
   This volume control adjusts the audio volume and has no effect whatever upon the picture.

Rear Controls of the Receiver

As previously stated, the adjustment of these controls is necessary for the final alignment of picture size and positioning, as the earth's magnetic field and power supply line voltages vary with locations. The location of these controls is shown in Figure No. 2 and their use will be covered in numerical order.

Proceed as follows: remove the wood screws holding in the back of the cabinet and pull out the back. The safety switch will open, turning the set off and since it is necessary to have the set in operation while making these adjustments the switch can be made temporarily inoperative. (A large battery clip is convenient for this purpose.) Do not reach into the set with the voltages on. (See Cautions and Warnings.) There is one adjustment that cannot be made by these controls, that of rotating the Cathode-ray tube to cause the picture to properly line up with the viewing area. To remedy this, turn the set off, remove the elastic band that grips the rear support and rotate the tube by hand in the correct direction. The function of the seven rear controls are as follows:

1. Vertical Frequency Control
   This controls the frequency of the vertical sweep. If the picture is not steady and slips past at intervals, vertically, this control should be adjusted until a steady picture is secured.

2. Vertical Size Control
   If the picture is too narrow and out of proportion vertically this control will remedy the trouble.

3. Vertical Positioning Control
   As its name indicates, this control will move the pattern vertically, allowing the picture to be placed directly in the center of the opening.

4. Astigmatism Positioning Control
   This is adjusted in conjunction with Control No. 5 to give the best possible focus on the corners of the picture.

5. Horizontal Positioning Control
   This control positions the picture horizontally.

6. Horizontal Size Control
   This width of the picture is adjusted by this control.

7. Horizontal Frequency Control
   If no picture can be secured but modulation (dark and light spaces) can be seen on the screen, the setting of the horizontal frequency control is probably incorrect. Adjust this control until the picture forms.

With the adjustment of these controls the installation should be satisfactory. However, if the signal is weak or if ghosts or noise is present, return to the dipole antenna and the control previously suggested until the best position for it is secured.

LOCATION OF TROUBLE

FAULT

No picture.

1. Power supply trouble in any or all three sources.

2. Too much bias on modulator electrode.

3. Defective cathode-ray tube.

No scanning.

1. Trouble in 1500 volt power source.

2. Poor connections to deflection plates.

3. Defective scanning circuits.

4. Defective cathode-ray tube cell.

No modulation.

1. Defective or shorted antenna.

2. Defect in video receiver.

3. Too much bias on modulator electrode.


Poor focus.

1. Improper voltages supplied cathode-ray tube.

2. Defective video receiver.

3. Poor adjustments.


Uneven brilliance.

1. Hum from power source.

2. Defective scanning circuits.

3. Scanning picked up by modulator circuits.

4. Screen burnt or discolored.

Distorted picture.

1. Poor synchronizing (circuit or adjustment).

2. Overloading (contrast control advanced too far).

3. Defective video receiver.

4. A.C. hum.

5. External interference.

Unsteady picture or flickers.

1. Poor synchronizing action.

2. Leakage.

3. Varying voltages to cathode-ray tube or receiver.

4. Unsteady receiver.

5. Antenna loose or shorting.

Double image.

1. Scanning circuits incorrectly adjusted.

2. Ghost images due to reflection of signals.

Cathode-ray tube controls effect the function of the tube and scanning.

Superimposed pattern on the picture.

1. Oscillation probably in the receiver.

2. Usually local interference such as ignition or diathermy.
TUBE COMPLEMENT

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
<th>STEP</th>
<th>STATION</th>
<th>SIDE BAND</th>
<th>AUDIO CARRIER</th>
<th>VIDEO CARRIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1658</td>
<td>R.F. Amplifier</td>
<td>A</td>
<td>NBC</td>
<td>Single</td>
<td>49.75</td>
<td>45.25</td>
</tr>
<tr>
<td>658M</td>
<td>R.F. Oscillator</td>
<td>B</td>
<td>CBS</td>
<td>Single</td>
<td>55.75</td>
<td>51.25</td>
</tr>
<tr>
<td>1858</td>
<td>1st Video I.F. Amplifier</td>
<td>C</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>1858</td>
<td>2nd Video I.F. Amplifier</td>
<td>D</td>
<td>NBC</td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>696M</td>
<td>2nd Video Detector and Amplifier</td>
<td>E</td>
<td></td>
<td>Single</td>
<td>49.75</td>
<td>45.25</td>
</tr>
<tr>
<td>675G</td>
<td>1st Sound I.F. Amplifier</td>
<td>F</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>675G</td>
<td>2nd Sound I.F. Amplifier</td>
<td>G</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>675G</td>
<td>Sound Power Amplifier</td>
<td>H</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>675G</td>
<td>Horizontal Sync Separator</td>
<td>I</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>675G</td>
<td>Vertical Sync Separator</td>
<td>J</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>675G</td>
<td>Vertical Sweep Oscillator</td>
<td>K</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>675G</td>
<td>Vertical Sweep Amplifier</td>
<td>L</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>2Y3</td>
<td>4100 Volt Rectifier</td>
<td>M</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>5X3</td>
<td>1600 Volt Rectifier</td>
<td>N</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>523</td>
<td>350 Volt Rectifier</td>
<td>O</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
<tr>
<td>1149-T</td>
<td>Cathode-ray Tube (14&quot;)</td>
<td>P</td>
<td></td>
<td>Double</td>
<td>49.75</td>
<td>46.5</td>
</tr>
</tbody>
</table>
It is better to shut the set completely off between adjustments than to suffer a painful or even a dangerous burn. The set is equipped with a safety switch which automatically opens upon the removal of the hack of the cabinet. This protects the operator from dangerous high voltages which would otherwise be exposed.

Figure 5 — Schematic Diagram, Separator and Sweep Circuits

The high voltages that are necessary in this type of equipment are very dangerous and should not be approached in a careless manner.

The serviceman that is engaged in installing or servicing television receivers is urged to take all precautions and run no unnecessary risks.

Figure 6 — Schematic Diagram.
Voltage Divider and Socket Connections
CAUTION AND WARNING

Large cathode-ray tubes operate at high voltages and hence are evacuated to a very high degree of vacuum. Therefore the atmospheric pressure on the glass can run into tons depending on the size of the tube. A collapse therefore is as bad as an explosion and all cathode-ray tubes should be handled with care. The Du Mont Laboratories have gone to great expense to provide a cathode-ray tube that is safe for the home and the structural design results in its ability to stand tests nearly twice as severe as usually employed. The serviceman, however, should observe the following rules as he will probably be the only one to handle the average tube.

1. Be careful in handling the tube.
2. Watch the use of tools near the tube.
3. Don't scratch the surface of the glass.
4. Don't stand the tube on a metal surface or in any other way cause certain parts to be quickly heated or cooled.

TERMINAL VOLTAGES

Using Weston Model 772 20,000 Ohms per Voltmeter
(with Televerter)

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Grid (Control)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>V9</td>
<td>240</td>
<td>-</td>
<td>-</td>
<td>4.3</td>
</tr>
<tr>
<td>V10</td>
<td>240</td>
<td>-</td>
<td>-</td>
<td>4.3</td>
</tr>
<tr>
<td>V11</td>
<td>190</td>
<td>-</td>
<td>-</td>
<td>2.2</td>
</tr>
<tr>
<td>V12</td>
<td>275</td>
<td>-</td>
<td>-11.5</td>
<td>Cathode to ground.</td>
</tr>
<tr>
<td>V8</td>
<td>115</td>
<td>-</td>
<td>-</td>
<td>Contrast on full.</td>
</tr>
<tr>
<td>V1</td>
<td>140</td>
<td>-190</td>
<td>-</td>
<td>3.5</td>
</tr>
<tr>
<td>V2</td>
<td>190</td>
<td>-</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>V3</td>
<td>180</td>
<td>-</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td>V4</td>
<td>170</td>
<td>-</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td>V6</td>
<td>170</td>
<td>-185</td>
<td>2.0</td>
<td>Cannot be measured at the grid of V6. Should read 4 volts at center tap of 6Z8 high voltage winding to ground.</td>
</tr>
<tr>
<td>V7</td>
<td>140</td>
<td>225</td>
<td>-</td>
<td>7.5</td>
</tr>
<tr>
<td>V17</td>
<td>528</td>
<td>-</td>
<td>310 volts</td>
<td></td>
</tr>
<tr>
<td>V18</td>
<td>5X8</td>
<td>-</td>
<td>1600 volts</td>
<td></td>
</tr>
<tr>
<td>V14</td>
<td>2Y2 output = 3950 to 4200 (ground is positive) (output after R43 = 3950 to 4100 volts)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The above measurements were taken with respect to ground, the following are point to point.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V21</td>
<td>From cathode to grid —60 to —160</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>From cathode to first anode +500 to +1600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>From cathode to second anode +5000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 7 — Schematic Diagram, Power Supplies
### RESISTOR VALUES

<table>
<thead>
<tr>
<th>R</th>
<th>Ohms</th>
<th>Watt Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>10,000</td>
<td>½ R</td>
</tr>
<tr>
<td>50</td>
<td>10,000</td>
<td>½ R</td>
</tr>
<tr>
<td>51</td>
<td>6,000</td>
<td>W</td>
</tr>
<tr>
<td>52</td>
<td>1 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>53</td>
<td>200,000</td>
<td>½ R</td>
</tr>
<tr>
<td>54</td>
<td>20,000</td>
<td>½ R</td>
</tr>
<tr>
<td>55</td>
<td>100,000</td>
<td>½ R</td>
</tr>
<tr>
<td>56</td>
<td>500,000</td>
<td>½ R</td>
</tr>
<tr>
<td>58</td>
<td>15,000</td>
<td>½ R</td>
</tr>
<tr>
<td>59</td>
<td>8,000</td>
<td>W</td>
</tr>
<tr>
<td>60</td>
<td>50,000</td>
<td>½ R</td>
</tr>
<tr>
<td>61</td>
<td>25 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>62</td>
<td>1 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>63</td>
<td>250,000</td>
<td>½ R</td>
</tr>
<tr>
<td>64</td>
<td>20,000</td>
<td>½ R</td>
</tr>
<tr>
<td>65</td>
<td>5 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>66</td>
<td>5 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>67</td>
<td>8 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>68</td>
<td>8 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>69</td>
<td>2 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>70</td>
<td>2 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>71</td>
<td>300,000</td>
<td>½ R</td>
</tr>
<tr>
<td>72</td>
<td>200,000</td>
<td>½ R</td>
</tr>
<tr>
<td>73</td>
<td>750,000</td>
<td>½ R</td>
</tr>
<tr>
<td>74</td>
<td>15,000</td>
<td>½ R</td>
</tr>
<tr>
<td>77</td>
<td>1 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>78</td>
<td>8 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>79</td>
<td>500,000</td>
<td>½ R</td>
</tr>
<tr>
<td>80</td>
<td>100,000</td>
<td>½ R</td>
</tr>
<tr>
<td>81</td>
<td>1 meg</td>
<td>½ R</td>
</tr>
<tr>
<td>82</td>
<td>35,000</td>
<td>½ R</td>
</tr>
<tr>
<td>83</td>
<td>100,000</td>
<td>½ R</td>
</tr>
<tr>
<td>84</td>
<td>100,000</td>
<td>½ R</td>
</tr>
<tr>
<td>87</td>
<td>50,000</td>
<td>½ R</td>
</tr>
<tr>
<td>88</td>
<td>50,000</td>
<td>½ R</td>
</tr>
<tr>
<td>90</td>
<td>30,000</td>
<td>½ R</td>
</tr>
<tr>
<td>94</td>
<td>250,000</td>
<td>½ R</td>
</tr>
<tr>
<td>95</td>
<td>60,000</td>
<td>½ R</td>
</tr>
<tr>
<td>96</td>
<td>60,000</td>
<td>½ R</td>
</tr>
<tr>
<td>99</td>
<td>3,000</td>
<td>½ R</td>
</tr>
<tr>
<td>100</td>
<td>200,000</td>
<td>½ R</td>
</tr>
</tbody>
</table>

### EARLY PRODUCTION CONDENSER VALUES

<table>
<thead>
<tr>
<th>C, Mfd.</th>
<th>Yeils</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>.1</td>
</tr>
<tr>
<td>70</td>
<td>.01</td>
</tr>
<tr>
<td>71</td>
<td>.0025</td>
</tr>
<tr>
<td>72</td>
<td>.025</td>
</tr>
<tr>
<td>73</td>
<td>.05</td>
</tr>
<tr>
<td>74</td>
<td>.1</td>
</tr>
<tr>
<td>75</td>
<td>.25</td>
</tr>
<tr>
<td>76</td>
<td>.5</td>
</tr>
<tr>
<td>77</td>
<td>2.5</td>
</tr>
<tr>
<td>78</td>
<td>10</td>
</tr>
<tr>
<td>79</td>
<td>50</td>
</tr>
<tr>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>81</td>
<td>200</td>
</tr>
<tr>
<td>82</td>
<td>300</td>
</tr>
<tr>
<td>83</td>
<td>400</td>
</tr>
<tr>
<td>84</td>
<td>500</td>
</tr>
<tr>
<td>85</td>
<td>600</td>
</tr>
<tr>
<td>96</td>
<td>250</td>
</tr>
<tr>
<td>97</td>
<td>250</td>
</tr>
<tr>
<td>98</td>
<td>500</td>
</tr>
<tr>
<td>99</td>
<td>1000</td>
</tr>
</tbody>
</table>

### CONDENSER VALUES

<table>
<thead>
<tr>
<th>C, Mfd.</th>
<th>Yeils</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>51</td>
<td>6000</td>
</tr>
<tr>
<td>52</td>
<td>300</td>
</tr>
<tr>
<td>53</td>
<td>2000</td>
</tr>
<tr>
<td>54</td>
<td>2000</td>
</tr>
<tr>
<td>55</td>
<td>3000</td>
</tr>
<tr>
<td>56</td>
<td>3000</td>
</tr>
<tr>
<td>57</td>
<td>3000</td>
</tr>
<tr>
<td>58</td>
<td>1500</td>
</tr>
<tr>
<td>59</td>
<td>5000</td>
</tr>
<tr>
<td>60</td>
<td>3000</td>
</tr>
<tr>
<td>61</td>
<td>5000</td>
</tr>
<tr>
<td>62</td>
<td>5000</td>
</tr>
<tr>
<td>63</td>
<td>5000</td>
</tr>
<tr>
<td>64</td>
<td>5000</td>
</tr>
<tr>
<td>65</td>
<td>5000</td>
</tr>
<tr>
<td>66</td>
<td>5000</td>
</tr>
<tr>
<td>67</td>
<td>5000</td>
</tr>
<tr>
<td>68</td>
<td>5000</td>
</tr>
<tr>
<td>69</td>
<td>5000</td>
</tr>
<tr>
<td>70</td>
<td>5000</td>
</tr>
<tr>
<td>71</td>
<td>5000</td>
</tr>
<tr>
<td>72</td>
<td>5000</td>
</tr>
<tr>
<td>73</td>
<td>5000</td>
</tr>
<tr>
<td>74</td>
<td>5000</td>
</tr>
<tr>
<td>75</td>
<td>5000</td>
</tr>
<tr>
<td>76</td>
<td>5000</td>
</tr>
<tr>
<td>77</td>
<td>5000</td>
</tr>
<tr>
<td>78</td>
<td>5000</td>
</tr>
<tr>
<td>79</td>
<td>5000</td>
</tr>
<tr>
<td>80</td>
<td>5000</td>
</tr>
<tr>
<td>81</td>
<td>5000</td>
</tr>
<tr>
<td>82</td>
<td>5000</td>
</tr>
<tr>
<td>83</td>
<td>5000</td>
</tr>
<tr>
<td>84</td>
<td>5000</td>
</tr>
<tr>
<td>85</td>
<td>5000</td>
</tr>
<tr>
<td>86</td>
<td>5000</td>
</tr>
<tr>
<td>87</td>
<td>5000</td>
</tr>
<tr>
<td>88</td>
<td>5000</td>
</tr>
<tr>
<td>89</td>
<td>5000</td>
</tr>
<tr>
<td>90</td>
<td>5000</td>
</tr>
<tr>
<td>91</td>
<td>5000</td>
</tr>
<tr>
<td>92</td>
<td>5000</td>
</tr>
<tr>
<td>93</td>
<td>5000</td>
</tr>
<tr>
<td>94</td>
<td>5000</td>
</tr>
<tr>
<td>95</td>
<td>5000</td>
</tr>
<tr>
<td>96</td>
<td>5000</td>
</tr>
<tr>
<td>97</td>
<td>5000</td>
</tr>
<tr>
<td>98</td>
<td>5000</td>
</tr>
<tr>
<td>99</td>
<td>5000</td>
</tr>
<tr>
<td>100</td>
<td>5000</td>
</tr>
</tbody>
</table>

---

© John F. Rider, Publisher

Compliments of www.nucow.com
Antenna Installation

In the installation of television receivers, the proper antenna is necessary. Successful installations will result from attention to detail, while slipshod and careless work will bring only poor customer satisfaction and repeat calls. There is nothing difficult about the installation of television aerials; a little patience and experience is all that is required. Regular broadcast aerials in the majority of cases will be found useless. Impress upon the owner and make a satisfactory installation regardless of what other equipment he already has. Satisfactory picture reception is what both of you require for the completion of the installation.

The Dipole Antenna

The Dipole Antenna consists of two metal rods, each approximately five feet long and placed on a line with each other. Extreme accuracy in the length of these rods is usually not necessary and if the receiver is located very close to the transmitting station it may be found advisable to cut down the length of each rod. The dipole dipole aerial is shown in Fig. No. 5.

The Lead-in

The most popular lead-in from the dipole to the television receiver will be a twisted pair as it is inexpensive and generally satisfactory in locations where the signal is strong. The length of this lead is usually not of extreme importance. It is better to get the location of the Dipole located in the clear and as far from electrical interference as possible than to limit its location by using a theoretical, exact length feeder. The twisted pair should be secured to the house, a good connection is essential and necessary since several changes in the position of the antenna may be required for best results.

Another form of lead-in is the coaxial type such as the Amphenol No. 72. This form of feeder should be used in installations where the length of the lead is too long for satisfactory work with the twisted pair and again where the installation is at an extreme distance and every bit of energy picked up must be delivered to the receiver.

Polarization

If the dipole is mounted horizontally it is said to be horizontally polarized and, if vertical, it is vertically polarized. Since the physical location materially affects the signal to a specific form can be advised and we can merely suggest that you start by using horizontal polarization and change if necessary to produce the best results.

Location of the Antenna

Whenever possible the Dipole should be erected so that it is in line of sight with the transmitter. This does not mean that no signals can be secured where a direct view of the transmitter is not obtained. Surprising results are often secured on these high frequencies, and no concise rules can be assigned to this work. If the location is on a street where heavy traffic may be considerable noise level due to automobile ignition systems, in this case, place the Dipole to the rear of the building and away from the source of the noise as far as possible. In the case of electrical machinery which you have no control, the same method can be employed with the utilization of the directional effects of the aerial which will be covered later.

Room Illumination

Wherever possible the receiver should be placed in the room that is a direct glare from either natural or artificial light does not fall upon the face of the cathode-ray tube. The received pictures may be viewed under a variety of conditions where it is not always convenient to darken the room completely. Adjustments made to meet these conditions will not cause damage to the receiver. Viewing the pictures in a dark room as possible is always an advantage as it permits the setting of the intensity and contrast controls in a manner that will give picture tone values more correctly relating to those actually used in the studio from which the picture is transmitted.

Installation Process

It is a good plan to proceed as follows with the installation:

1. Erect the Dipole antenna in the clear. Start by using horizontal polarization (mount the rods horizontally) and turn them until their plane is at right angles with the location of the transmitter.
2. Adjust the receiver to produce a picture.
3. Return to the antenna and make final adjustments for best signal strength and removal of ghosts, etc.

Ghost Effects

Where the picture appears to be duplicated and slightly displaced, the additional picture is referred to as a ghost. This effect is usually due to the reflection of the signal and is not cured by the slanting of the dipole or the use of a reflector or reflectors. If, after all possible positions have been tried, the ghost still exists, it will be necessary to change the location of the antenna and try again.

Directional Effects

In the simple Dipole, directional effects are not very pronounced, but it does have a rather sharp no-signal radius and it is possible in some instances to materially reduce interference by placing the offending source in this area. If the installation of the receiver is being made at quite a distance from the transmitter or if the signal level is very low due to local conditions, it is well to consider the use of a reflector. This is done by placing a rod, about ten feet long, parallel with the Dipole and about one foot in front of it. The directional effect of the Dipole remains the same, namely at right angles to the plane. Signals coming from the front will be greatly attenuated. In using reflectors it is well to bear in mind, however, that any signal approaching from the rear (where the reflector is located) will be greatly attenuated.
When ordering replacement parts specify part number

*Item number locates the article on the schematic diagram.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No.</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>2TT-409</td>
<td>Two-band antenna coil</td>
<td>.65</td>
</tr>
<tr>
<td>T2</td>
<td>2TT-410</td>
<td>Two-band detector coil</td>
<td>.65</td>
</tr>
<tr>
<td>R2</td>
<td>2YR-218E</td>
<td>Volume control, 75,000 ohms, with line switch</td>
<td>.36</td>
</tr>
<tr>
<td>R2</td>
<td>3CB-294</td>
<td>240 ohm, 1/2 watt wire-wound resistor</td>
<td>.16</td>
</tr>
<tr>
<td>L6</td>
<td>L6-RC</td>
<td>Plug-in ballast tube</td>
<td>.55</td>
</tr>
<tr>
<td>R4</td>
<td>KR-66U</td>
<td>15,000 ohm, 1/2 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R5</td>
<td>HR-42U</td>
<td>2 megohm, 1/2 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R6, R7</td>
<td>KR-66U</td>
<td>500,000 ohm, 1/2 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R8</td>
<td>3QR-247</td>
<td>110 ohm, 1/2 watt wire-wound resistor</td>
<td>.16</td>
</tr>
<tr>
<td>C1</td>
<td>KC-68</td>
<td>0.01 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C2, C3</td>
<td>5MC-399</td>
<td>Two-gang variable condenser</td>
<td>8.55</td>
</tr>
<tr>
<td>C4, C5</td>
<td></td>
<td>Trimmers, part of variable condenser, not supplied separately.</td>
<td></td>
</tr>
<tr>
<td>C6, C9</td>
<td>AC-6</td>
<td>0.1 mf, 200 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C7</td>
<td>5AC-384</td>
<td>0.0002 mf, 600 volt tubular or mica condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C8</td>
<td>5AC-388</td>
<td>0.25 mf, 100 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C10</td>
<td>LC-65</td>
<td>0.02 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C11</td>
<td>3AC-276</td>
<td>Trimmer for long-wave interstage coil</td>
<td>.15</td>
</tr>
<tr>
<td>C12</td>
<td>LC-54</td>
<td>0.05 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C13, C14</td>
<td>4DC-345A</td>
<td>Dual 16 mf, 150 volt dry electrolytic condenser</td>
<td>1.20</td>
</tr>
<tr>
<td>C15</td>
<td>EEC-132</td>
<td>0.1 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C16</td>
<td>NC-70A</td>
<td>0.0002 mf mica condenser</td>
<td>.20</td>
</tr>
<tr>
<td>R9</td>
<td>HS-333</td>
<td>5&quot; dynamic speaker</td>
<td>8.90</td>
</tr>
<tr>
<td>R10</td>
<td>2TS-252A</td>
<td>Wave-band switch</td>
<td>1.15</td>
</tr>
<tr>
<td>R11</td>
<td>4BL-94</td>
<td>Pilot light, 6.3 volt, 25 amp., Mazda No. 44</td>
<td></td>
</tr>
<tr>
<td>R12</td>
<td>4XM-367</td>
<td>Drive pulley</td>
<td>.10</td>
</tr>
<tr>
<td>5MQ-209</td>
<td></td>
<td>Dial crystal</td>
<td>.10</td>
</tr>
<tr>
<td>5MZ-830</td>
<td></td>
<td>Drive shaft and pulley</td>
<td>.10</td>
</tr>
<tr>
<td>4MZ-585B</td>
<td></td>
<td>Dial pointer</td>
<td>.20</td>
</tr>
<tr>
<td>4V-777</td>
<td></td>
<td>Drive cord</td>
<td>.05</td>
</tr>
<tr>
<td>6H-824</td>
<td></td>
<td>Drive cord spring</td>
<td></td>
</tr>
<tr>
<td>6DD-63</td>
<td></td>
<td>Dial face</td>
<td>.15</td>
</tr>
</tbody>
</table>

**VOLTAGE ANALYSIS**

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned off and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>FIL.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>100</td>
<td>100</td>
<td>2.3</td>
<td>6.3</td>
</tr>
<tr>
<td>6C6</td>
<td>20</td>
<td>15</td>
<td>2.1</td>
<td>6.3</td>
</tr>
<tr>
<td>2SL6G</td>
<td>95</td>
<td>100</td>
<td>6</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Voltage across speaker field—26 volts.

2525 cathode to ground—126 volts.

**ALIGNMENT PROCEDURE**

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 550. Rotate band-switch clockwise to broadcast (medium-wave) position. Then rotate the variable condenser until the pointer at 200 and feed 1500 kc to the antenna through a 0.001 mf mica condenser and adjust both trimmer condensers or the variable condenser for maximum response.

Turn wave-band switch counter-clockwise to long-wave position. Rotate variable condenser until pointer is at 350 and feed 350 kc to antenna. Adjust the long-wave interstage coil trimmer for maximum output. Return to broadcast, and repeat entire procedure. The long-wave trimmer is located beneath the chassis and is reached from the right end of the chassis.

**Tube Data**

The tube complement is as follows:

- 1—6D6, r-f amplifier.
- 1—6C6, biased detector.
- 1—2SL6G, beam power output.
- 1—3B26, dual half-wave rectifier.
- 1—586BG, ballast tube.

Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.
TUBE DATA

The tube complement is as follows:

1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6G, beam power output.
1—25Z6, dual half-wave rectifier.
1—L65BG, ballast tube.

Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>100</td>
<td>100</td>
<td>2.3</td>
<td>6.3</td>
</tr>
<tr>
<td>6C6</td>
<td>20</td>
<td>16</td>
<td>2.1</td>
<td>6.3</td>
</tr>
<tr>
<td>25L6G</td>
<td>98</td>
<td>100</td>
<td>6.0</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Voltage across speaker field—26 volts.
25Z6 cathode to ground—126 volts.
Voltage across ballast tube (pins 2, 7)—55 volts.
Voltage across pilot light section (pins 8, 7)—4 volts.

The ballast resistor (L65BG on schematic) is in a special tube at the rear of the chassis. In normal operation this tube will become quite hot. For voltage drop specifications, see "Voltage Analysis" above.

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.
Schematic, Voltage Alignment Notes EMERSON RADIO & PHONOGRAPH CORP. MODELS CA-208, CA-209 and CA-234 CHASSIS MODEL CA

A.C.-D.C., Superheterodyne Receiver, with Miracle Instromatic Tuning
Six Tubes, Including Ballast Tube

All tubes are replaceable with other metal or equivalent metal base glass tubes.

SCHEMATIC DIAGRAM

MODELS CA-208, CA-209 and CA-234

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.

2. 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.

3. In operating the receiver on d-c, it may be necessary to remove the line plug for correct polarity.

4. The color coding of the i-f transformer leads is as follows:
   - Green—blue
   - Black—red
   - Gold return—naked

5. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-63. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

6. Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.

7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraph station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response. Always use as weak a test signal as possible when aligning the receiver.

Location of Cells and Trimmer Adjustments

The two i-f transformers are in oblong oil case located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the top of the case.

The trimmers for the antenna and oscillator cells are located on the variable condenser. The trimmer on the front section is for the antenna cell.

The 455 kc wave-trap is mounted on the same font, as the antenna cell on the top of the chassis beside the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the grid and is adjustable from the side of the chassis.

The oscillator cell is located underneath the chassis, beneath the first i-f transformer.

1-F and Wave-Trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid cap of the 6A7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .001 mf condenser to the antenna lead and adjust the wave-trap for maximum response. (See General Notes, paragraph No. 6.)

R-F Alignment

Set the dial pointer at 140. Feed 1600 kc through a .001 mf condenser to the antenna lead and adjust the oscillator trimmer (on rear section of variable condenser) for maximum response.
## REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1, T1</td>
<td>5YT-444</td>
<td>Antenna coil with adjustable 455 kc wave-trap</td>
<td>.90</td>
</tr>
<tr>
<td>T2</td>
<td>4XT-438</td>
<td>Oscillator coil</td>
<td>.35</td>
</tr>
<tr>
<td>T3</td>
<td>3TR-320C</td>
<td>Double-tuned 455 kc first i-f transformer</td>
<td>1.10</td>
</tr>
<tr>
<td>T4</td>
<td>3RT-321C</td>
<td>Double-tuned 455 kc second i-f transformer</td>
<td>1.10</td>
</tr>
<tr>
<td>R1</td>
<td>ZZR-196</td>
<td>30,000 ohm 1/4 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R2</td>
<td>KR-58</td>
<td>50,000 ohm 1/4 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R3</td>
<td>3FR-293</td>
<td>140 ohm 1/4 watt wire-wound resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R4</td>
<td>KR-57</td>
<td>1 megohm 1/4 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R5</td>
<td>2NR-214F</td>
<td>Volume control .25 megohm with line switch</td>
<td>.90</td>
</tr>
<tr>
<td>R6</td>
<td>4XR-327</td>
<td>15 megohm 1/4 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R7</td>
<td>KR-55</td>
<td>250,000 ohm 1/4 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>R8</td>
<td>KR-50</td>
<td>500,000 ohm 1/4 watt carbon resistor</td>
<td>.16</td>
</tr>
<tr>
<td>C1, C2</td>
<td>6AC-407</td>
<td>Two-gang variable condenser</td>
<td>2.35</td>
</tr>
<tr>
<td>C3</td>
<td>NNC-199</td>
<td>0.001 mf, 650 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C4</td>
<td></td>
<td>Trimmer, part of wave-trap assembly.</td>
<td></td>
</tr>
<tr>
<td>C5, C11</td>
<td></td>
<td>Trimmers, part of variable condenser.</td>
<td></td>
</tr>
<tr>
<td>C6, C7, C8, C9</td>
<td></td>
<td>Trimmers, part of i-f transformers.</td>
<td></td>
</tr>
<tr>
<td>C10</td>
<td>BC-12</td>
<td>0.05 mf, 200 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C12</td>
<td>4XC-393A</td>
<td>0.00006 mf mica condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C13</td>
<td>AC-6</td>
<td>0.1 mf, 200 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C14</td>
<td>EEC-132</td>
<td>0.1 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C15, C18</td>
<td>5AC-334</td>
<td>0.0002 mf, 600 volt tubular or mica condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C16</td>
<td>3HC-274</td>
<td>0.002 mf, 600 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C17</td>
<td>LC-65</td>
<td>0.02 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C19</td>
<td>3RC-386</td>
<td>0.025 mf, 400 volt tubular condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C20, C21</td>
<td>4HC-348A</td>
<td>Dual 20 mf, 150 volt dry electrolytic condenser</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>5SB-333</td>
<td>5&quot; dynamic speaker</td>
<td>3.90</td>
</tr>
</tbody>
</table>

*Item number locates the article on the schematic diagram.

†These condensers cannot be supplied separately.

## PREADJUSTMENT OF STATION BUTTONS

Select one of the following stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below.

1. Loosen the push-button to be adjusted by rotating it counter-clockwise from 1/4 to 1/2 turn. See Fig. 2.

2. Push the button in as far as it will go and, holding it in firmly, tune in the desired station by means of the selector knob. See Fig. 3.

3. Hold button in with finger of one hand and tighten securely with the other hand. Release the button and tighten it further if possible. See Fig. 4.

4. Remove the tab bearing the station call letters from one of the cards supplied in a separate envelope with the receiver. Insert the tab in the button, pressing it in firmly. Four celluloid caps are supplied in a separate envelope with the receiver. Snap one of these caps into the button over the station tab.

Check the adjustment of the button by detuning the station by means of the selector knob and then pressing the push-button in as far as it will go. The station should come back in clearly and with maximum volume.

© John F. Rider, Publisher

Compliments of www.nucow.com
Five-Tube, A.C.-D.C., Superheterodyne Receiver

The tube complement is as follows:
1—12A8 or 12A8GT, pentagrid oscillator modulator.
1—12K7 or 12K7GT, first i-f amplifier
1—12Q7 or 12Q7GT, diode detector, a-f amplifier a.c.
1—3L56 or 3S16GT, beam power output.
1—3S24 or 3S24GT, half-wave rectifier.

The color coding of the i-f transformer leads is as follows:
Grid—green Plate—blue
Grid return—black B plus—red.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil. The trimmer for the 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>O.e. Plate</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12A8</td>
<td>94</td>
<td>60</td>
<td>0</td>
<td>94</td>
<td>12</td>
</tr>
<tr>
<td>12K7</td>
<td>94</td>
<td>94</td>
<td>0</td>
<td>94</td>
<td>12</td>
</tr>
<tr>
<td>12Q7</td>
<td>94</td>
<td>40</td>
<td>—</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>3S24</td>
<td>94</td>
<td>94</td>
<td>6.2</td>
<td>—</td>
<td>35</td>
</tr>
</tbody>
</table>

Voltage at 3S24 cathode—121 volts.
Voltage across speaker field—27 volts.

© John F. Rider, Publisher
Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.

The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

The color coding of the i-f transformer leads is as follows:

- Grid—green
- Grid return—black
- Plate—blue
- B plus—red

I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc through a 3.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (0.0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response. (See General Note No. 7.)

R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1450 kc through a standard dummy antenna (0.0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

NOTE: The Model BJ-200 should be aligned with the chassis bottom plate in place.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from points indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale.

<table>
<thead>
<tr>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Oct. Plate</th>
<th>Heaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>46</td>
<td>2.0</td>
<td>84</td>
<td>6.3</td>
</tr>
<tr>
<td>84</td>
<td>84</td>
<td>2.8</td>
<td>—</td>
<td>6.3</td>
</tr>
<tr>
<td>35</td>
<td>—</td>
<td>1.0</td>
<td>—</td>
<td>6.3</td>
</tr>
<tr>
<td>116</td>
<td>84</td>
<td>5.5</td>
<td>—</td>
<td>25</td>
</tr>
</tbody>
</table>

Voltage at 25Z5 cathode—130 volts.
Voltage across speaker field (Models BJ-200, 210 and 214)—28 volts.
Voltage drop across ballast tube L49BG (pins nos. 3, 7)—49 volts.
Voltage drop across pilot light section (pins nos. 7, 8)—4 volts.
Compliments of www.nucow.com
Chassis AX

EMERSON RADIO & PHONOGRAPH CORP.

Schematics, Voltage, Changes

IF PEAK 455KC

MODELS AX-221 AC, AX221 AC-DC and AX-222

CHASSIS MODEL AX

MODELS AX-232 AC and AC-232 AC-DC

FOR RECORD CHANGER DATA SEE INDEX

CHASSIS MODEL AX

Models AX-221 AC, AX-221 AC-DC and AX-222

CHASSIS MODEL AX

VOLTAGE ANALYSIS

Readings should be taken with a 2000 ohms-per-volt meter. Voltages listed below are from points indicated to ground or chassis. Voltages above 5 volts are indicated by the number of volts, 0.01.

Table Data

The tube complement is as follows:
- 1-6AS or 6ASGT, pentagrid oscillator modulator.
- 1-6K7 or 6K7GT, first i-f amplifier.
- 1-6Q7 or 6Q7GT, diode detector, a-f amplifier, a-c.
- 1-25L6 or 25L6GT, beam power output.
- 1-28Z6 or 28Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes.

PRODUCTION CHANGES

AX-221 and AX-222 chasses bearing serial numbers below 1,890,976 do not have R16, 100,000 ohm resistor, connected in series with the yellow lead to phono-radio switch.

AX-221 and AX-222 chasses bearing serial numbers below 1,914,451 do not contain resistor R17.

On model AX-222 a 0.01 mf, 400 volt condenser is connected from B plus to the speaker frame. Another 0.01 mf condenser is connected from the motor mounting plate to ground.

AX-221 and AX-222 chasses below serial number 1,927,165 have a 210 ohm, ½ watt wire-wound resistor at R15.
COMPLIMENTS OF www.nucow.com
PRODUCTION CHANGE

The colors of leads in the cable to the phone radio switch on chassis bearing serial numbers below 1876210 are as follows:
- blue to diode; red to high side of volume control; green to arm of volume control; black to battery. These changes are easily distinguishable by the presence of a blue lead in the cable.
- The color coding of the 14 transformers is as follows:
  - Grid return: black
  - Plate: red
- The color coding of the wave trap transformer is as follows:
  - Primary: red lead
  - High-voltage secondary: two red leads
  - High-voltage secondary center tap: red and yellow lead
  - Grid return: red and black lead
- Secondary: two green leads
- Transformer core: two yellow leads.

The adjustable plate condenser for the broadcast band is mounted underneath the chassis (in the side near the wave-hand switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed center, C10, in its schematic. When replacing this fixed center, be careful to use a condenser which has a capacity within 2% of the specified value. Otherwise, the short-wave coils may not track.

The phonograph motor has been adjusted at the factory to turn at a speed of 78 rpm. The speed may be checked by counting the number of revolutions per minute or by using a strobe scope and a steady light. To readjust, the speed removes the turntable and turn the fixed adjusting screw located near the top of the shaft. A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

VOLTAGE ANALYSIS

Readings should be taken with a 1000-ohm micro-ohm meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on 6 and no signal. Line voltage for these readings was 115 volts, 60 cycles, a.c. All readings except B-29 are rectified, calibrated, and outside voltages are taken on 0 to 50 volt scale.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>One Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5Y5G</td>
<td>219</td>
<td>100</td>
<td>0</td>
<td>76</td>
</tr>
<tr>
<td>5Y3G</td>
<td>219</td>
<td>100</td>
<td>0</td>
<td>76</td>
</tr>
<tr>
<td>2A3G</td>
<td>235</td>
<td>133</td>
<td>0</td>
<td>111</td>
</tr>
<tr>
<td>2A3G</td>
<td>215</td>
<td>100</td>
<td>0</td>
<td>111</td>
</tr>
</tbody>
</table>

Voltage at 30 Element is 6 volts (center tap high voltage winding on power transformer)-800 volts.

Voltage across secondary-70 volts.

The voltage across R-7 and R-10 should be 12 volts.

Location of Coils and Trimmer Adjustments

The two 14 transformers are located on top of the chassis deck. The second 14 is the one directly behind the variable condenser. The remote trimmers, +22 for each transformer, are accessible through holes in the top of the chassis. The trimmers for the broadcast band are mounted at the rear of the chassis. The trimmer for the variable condenser is located underneath the chassis (in front of the 76 tube), with the screw adjustment accessible through a hole in the top of the chassis.

The broadcast band and short-wave bands are wound on one form and mounted underneath the chassis near the 76 tube socket. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest to the rear of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 456 kc wave trap.

The coil series for the broadcast and short-wave bands are wound on one form and are mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through holes in the rear of the chassis. The trimmer farthest from the end of the chassis is for short-wave and trimmer closest to the end of the chassis is for broadcast.

14 and Wave-Trap Alignment

Rotate the wave-hand switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 450 kc through a 0.05 mfd paper condenser to the grid cap of the 646 tube (do not remove the grid strip from the tube). Adjust the 14 trimmers for maximum response. Feed 450 kc to the antenna through a standard dummy antenna (a 0.0009 mfd condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on right side of the chassis) for maximum response. (See General Note No. 7.)

Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment)

Since the dial indicator is fastened to the cabinet, a place of stiff wire should be fastened to the dial assembly plate and bent over to form a dial pointer when the chassis is removed from the cabinet. Set pointer at extreme low-frequency end of dial with condenser closed.

Use a 450 kc dummy antenna (450 kc non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coil. Rotate the wave-hand switch to the short-wave (counter-clockwise) position, and set the volume control to 6. Adjust the short-wave condenser (at corner near 76 tube) in stages for maximum response. Move the dial to 140 and feed 1400 kc. Adjust the broadcast morse oscillator (closest to the right side of the chassis) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at right side of chassis) with the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

Broadcast Alignment

By adding a clipper to each figure on the broadcast band calibration, this scale may be read directly in kilocycles.

Add a standard dummy antenna in the broadcast coils. (A .0002 condenser may be substituted). Rotate the wave-hand switch to the broadcast (clockwise) position. Set the dial to 60 and feed 600 kc. Adjust the broadcast series inductor (in corner near 76 tube) for maximum response. Move the dial to 140 and feed 1400 kc. Adjust the broadcast morse oscillator trimmer (closest to the right side of the chassis) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at right side of chassis). Return dial to 60, feed 600 kc and readjust the broadcast series inductor, seeking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.

THE TUBE COMPLEMENT IS AS FOLLOWS:

1. 6AS7, triode high plate oscillator.
2. 6T9G, 14 amplifier.
3. 6Q7G, tube detector, audio amplifier and a.c.
4. 6V6, audio amplifier.
5. 6CG7, power output.
6. 6H6, Colby rectifier.

FOR PRE-ADJUSTMENT OF STATION, PUSH BUTTONS SIDE MODEL BR 224.
VOLTAGE ANALYSIS

CHASSIS BR

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Grid Plate</th>
<th>Cathode</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>27T1</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>510</td>
<td>6.3 a.c.</td>
</tr>
<tr>
<td>6K6</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>6.3 a.c.</td>
</tr>
<tr>
<td>6K9C</td>
<td>150</td>
<td>150</td>
<td>100</td>
<td>100</td>
<td>125 a.c.</td>
</tr>
<tr>
<td>6A8</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>125 a.c.</td>
</tr>
<tr>
<td>6SK7</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>170</td>
<td>125 a.c.</td>
</tr>
<tr>
<td>6SL7</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>280</td>
<td>125 a.c.</td>
</tr>
<tr>
<td>6BQ5</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>125 a.c.</td>
</tr>
<tr>
<td>6N82</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>375</td>
<td>125 a.c.</td>
</tr>
</tbody>
</table>

Voltage Measurements:

- Voltage at plate at 1000 volts - 800 volts
- Voltage at screen at 1000 volts - 800 volts
- Voltage at grid at 1000 volts - 800 volts
- Voltage at cathode at 1000 volts - 800 volts

MIRACLE INSTOMATIC TUNING

Preadjustment of Station Push-buttons

For CHASSIS BR

The six push-buttons provide a choice of six favorite broadcast stations for Miracle Instomatic TUNING. Adjustments for any particular station must be made by means of the short-circuited button immediately below the chosen push-button. The following procedure must be carefully observed in making these adjustments.

1. Insert the line plug in the electrical outlet. Turn the voltmeter to cover the tone control knob clockwise until the switch was heard on click and then rotate this until the static is extreme clockwise position. Wait about 10 minutes for the tubes to warm up. Turn the wave-band switch to the broadcast position, clockwise. Turn the volume control clockwise to about half of its full revolution.

2. Select six nearby stations desired for automatic tuning. Leave one of these stations and any button to be adjusted for it. Find the station call letters on one of the four cards supplied in an envelope with the receiver. Put the cross-electric tube from the station call letters from the card and press it in the side of the live face of the push-button. Insert one of the coil tuned plates, which are supplied in a separate envelope, over the station call letters in the push-button. Press this disc in firmly. See Fig. 4.

3. Push in the mutual selector knob (second from right). When pushing in the selector knob out of the push-button, results are obtained by using a firm rapid action.

4. With the selector knob depressed turn the knob on the receiver, in one direction, correspondingly to the frequency of the station desired. Select the knob on the station that appears at the block indicator line to the extreme broadcast section and turn until the desired broadcast frequency is reached. Identify the station and note the approximate position of the dial face.

5. Push in the button to be adjusted for this station. See Fig. 1.

6. Insert a small thin coin in one of the slots of the adjustment push-buttons. Turn the button clockwise until the coin becomes visible, corresponding approximately to the frequency of the station desired. Identify the station call letters from the card and press it in the side of the live face of the push-button. Insert the coil tuned plate, which is supplied in a separate envelope, over the station call letters in the push-button. Press this disc in firmly. See Fig. 2.

7. Check the results by moving the dial, using the selector knob, to a different position. Then turning the push-buttons and check the dial face of the push-buttons. The station should be received clearly and with maximum volume.

8. Check the results by moving the dial, using the selector knob, to a different position. Then turning the push-buttons and check the dial face of the push-buttons. The station should be received clearly and with maximum volume.

9. Adjust the remaining buttons, one at a time, following the procedure outlined above.
EMERSON RADIO & PHONOGRAPH CORP.

MODELS BR224
BR224A
Chassis BR
Schematic Notes

GENERAL NOTES

1. In replacing chasis do not tighten mounting screws so much that chassis will not sest firmly 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 microphone.

6-30 sec.; two heavy green leads

6-30 sec.; two heavy yellow leads

The color coding of the turntable governor leads is as follows:

High voltage sec.; one red lead

High voltage sec.; one red lead

Secondary center tap—red and yellow lead

The speed may be checked by removing the turntable governor cap and remove the turntable. A clockwise rotation of the screw decreases the speed. If the speed is too high, remove the turntable with the speed adjusting screw and turn the speed adjusting screw to the left until the speed is correct. Be sure to remove the turntable governor cap from the governor when replacing and turn the speed adjusting screw to the right. A counterclockwise rotation of the speed adjusting screw increases the speed. The speed adjusting screw is not accessible to the speed adjusting screw through a hole in the turntable. Adjust in same manner at BR-224.

2. Voltage rating: 105-125 volts, 60 cycles a.c.
Power consumption: 135 watts at 117.5 volts.

3. Frequency range: 540 to 1500 kc, 1890 to 6250 kc and 5.8 to 22.0 megacycles.

4. TUBE DATA

<table>
<thead>
<tr>
<th>Tube</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6K7</td>
<td>R-f amplifier (behind right-hand section of variable condenser).</td>
</tr>
<tr>
<td>1-6K8</td>
<td>Triode-hexode, oscillator-modulator (behind left-hand section of variable condenser).</td>
</tr>
<tr>
<td>1-6K7</td>
<td>I-f amplifier (between the two i-f transformers).</td>
</tr>
<tr>
<td>1-607</td>
<td>Diode detector, audio amplifier, a.v.c. (left rear corner of chassis).</td>
</tr>
<tr>
<td>1-655</td>
<td>Phase inverter (left side of chassis, third from rear).</td>
</tr>
<tr>
<td>1-655</td>
<td>Second audio amplifiers (left side of chassis, second from rear, and right side of chassis beside electrolytic condensers).</td>
</tr>
<tr>
<td>1-6AC6G</td>
<td>Dynamic coupled, power output (two are in front of power transformer; other two are alongside power transformer near variable condenser).</td>
</tr>
<tr>
<td>2-80</td>
<td>Rectifiers (beside power transformer, at rear of chassis).</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
AUTOMATIC OPERATION

1. Turn the receiver "on" in the usual way.
2. Rotiate the phono-radio switch knob counter-clockwise to the phonoaph position. Wait about a half-minute for the tubes in the receiver to warm up.
3. See that the pick-up is over the needle gauge plate with needle properly in place. If not, complete a cycle as follows: Throw the turntable switch "on." The turntable will start to revolve and the cycle of motion on the pick-up arm will follow through. When the pick-up arm comes down (and it can be moved by hand) the cycle is completed. Turn off the turntable switch.
4. The Index and Record Reject Lever are located near the right front corner of the motor board. With this lever at "Manual" position place the records on the record holder shelves. The records should be arranged in the desired order with the desired selection face up and the last selection on top. The first record to be played will rest directly on the shelves. The turntable should be empty.
5. Throw the turntable switch to the "on" position. The turntable should start to revolve.
6. While the turntable is revolving, push the Index and Record Reject Lever to the "Reject" position and let go. When the lever is released, after it has been pushed to "Reject," it will return automatically to the "10" position. If all the records to be played are 12 inch, return the lever to the "12" position. The changer will then begin to go through its cycle and the first record will drop on the turntable. The entire series of records will then be played automatically in sequence.
7. Adjust to the desired volume by means of the regular receiver volume control.
8. Close the cabinet lid to eliminate normal mechanical noises due to needle vibration.

The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pick-up, swing the arm to the right beyond the edge of the record and lower it onto the pick-up rest with pick-up over needle gauge plate. The record player is then ready for reloading, or for manual operation.

MANUAL OPERATION

1. Proceed as in steps 1, 2 and 3 under Automatic Operation.
2. Place record on turntable with desired selection upwards.
3. Set Index and Record Reject Lever to "Manual" position. The lever should be kept in this position when not actually playing records automatically.
4. Throw the turntable switch on and when turntable has attained speed, lift pick-up and gently lower onto the record, so that the needle point enters the outside groove.
5. Proceed as in steps 7 and 8 under Automatic Operation.

SPECIAL PRECAUTIONS

1. This instrument is not recommended for playing 10 inch and 12 inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pick-up will come down in position for a 10 inch record and repeat the playing of the record on a 10 inch diameter unless the turntable switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.
2. Do not handle or move manually the pick-up or any part of the mechanism while it is going through the record-changing operation.
3. Do not use force in handling the mechanism at any time.
4. Warped or thick records should not be used for automatic operation.
5. Do not leave records on record holder posts except when needed for immediate operation, as they will warp and sag if left in this manner for a long period of time. Records can be straightened, however, by placing them on a flat surface and resting heavy flat articles, such as books, over them.
6. During automatic operation, the needle is fed automatically into the starting groove of the next record. If the needle fails to enter the starting groove, this is an indication that the cabinet is not level. Raise the right hand side of the cabinet, by inserting several thin spacers beneath it on that side. If the needle slides over a few grooves, raise the left hand side of the cabinet in a similar manner.
7. Never leave pick-up with needle resting on a record or on the turntable. When finished playing, be sure that the turntable has stopped and the pick-up is in the rest position over needle gauge plate.

Replacements should be made with genuine Emerson parts for best results.

© John F. Riær, Publisher

Compliments of www.nucow.com
A bind or jam in the mechanism can usually be relieved by rotating the tone arm in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving in standard pin wrench.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, trapping, record separation, etc. One adjustment is provided for the main lever. Route the turntable until the changer is out-of-cycl; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "17" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "17" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, trippling will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever by the main "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cam" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknut "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper main adjustment.

To adjust for needle landing, place 1 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup landing lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "14" on lever "17." is in contact with "Step 1" on lever "17." The correct point of landing is 411/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/3 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D." Run mechanism through several cycles as a check, then tighten cone pointed screw "D.

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 511/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14." to give correct needle landing. The trip pawl end must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Snap (Knife).—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "H" to give 052. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072-.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be made so that the record shelf is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edge of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten tone pointed screw "H.

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch in motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin upward or downward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definition clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil when the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual minor adjustments will enable ready adjustment in most cases:

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."

2. Needle does not land properly on both 10 and 12 inch records.—Make complete adjustments "D" and "E."

3. Needle does not land properly on 12 inch record but correct on 10 inch.—Adjustment "B" is incorrect.

4. Failure to trip at end of record.—Increase clutch "V" friction by means of screw "B." Also, see that levers "Y" and "Z" are free to move without touching each other.

5. Pickup strikes lower record of stack or drags across top and rides on turntable.—Adjust lift cable per adjustment "C."

6. Needle does not track after landing.—Friction clutch "V" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "Y" and "Z" fouled; or pickup output cable twisted.

7. Cycle constants before record is complete.—Record is defective, or adjustment "B" of friction clutch "V" is too tight.

8. Wow in record reproduction.—Record is defective; flare, or the tone arm mechanism is not correctly assembled; or instrument is not being operated at normal room temperature (65°F)

9. Record knives strike or break all record edges are rough; or knife adjustments "F" and "G" are incorrect.

10. Record not released properly.—Adjust record shelf assembly in respect to shaft by means of adjustment "H."

11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed.—Increase tension of pickup locating lever spring "30."

©John F. Rider, Publisher

Compliments of www.nucow.com
Five-Tube, A.C.-D.C., Superheterodyne Receiver

Voltage rating ........................................ 105-125 volts
Power consumption .................................. 45 watts
Frequency range ..................................... 540 to 1750 kc.

Voltage Analysis

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken or 250 volt scale. Measurements made with 117.5 volts a.c. will be lower than those given below.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Oec. Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8</td>
<td>100</td>
<td>55</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>6K7</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>6Q7</td>
<td>43</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>25L6</td>
<td>22</td>
<td>100</td>
<td>5.5</td>
<td>100</td>
</tr>
</tbody>
</table>

Voltage at 2526 cathode—125 volts.
Voltage across speaker field—25 volts.

The color coding of the i-f transformer leads is as follows:
Grid—green
Grid return—black
Plate—blue
II plus—red

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes, paragraph No. 7.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

© John F. Rider, Publisher

Compliments of www.nucow.com
MODELS CH-243, CH-246 and CH-256
CHASSIS MODEL CH

Voltage rating ........................................ 105-125 volts, a.c. or d.c.
Power consumption .................................. 45 watts
Frequency range ...................................... 540 to 1780 kc.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Osc. Plate</th>
<th>Fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8</td>
<td>100</td>
<td>65</td>
<td>0</td>
<td>100</td>
<td>0.2</td>
</tr>
<tr>
<td>6K7</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>0.2</td>
</tr>
<tr>
<td>6Q7T</td>
<td>48</td>
<td>48</td>
<td>0</td>
<td>100</td>
<td>0.2</td>
</tr>
<tr>
<td>25L6</td>
<td>92</td>
<td>100</td>
<td>5.5</td>
<td>100</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Voltage at 25L6 cathode—125 volts.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

i-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mfd condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mfd condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes, paragraph No. 7.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mfd condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.
**GENERAL NOTES**

1. The receiver should never be turned on with either the speaker plug or the 6AJ5 tube out of their respective sockets, since the rapid rise in rectifier voltage will damage the electrolytic condenser.

2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonics will result.

3. The color coding of the 1st transformers is as follows:
   - Grid—green
   - Grid return—black
   - Plate—blue.

4. The color coding of the power transformer is as follows:
   - Primary—two black leads
   - High-voltage secondary—two red leads
   - High-voltage secondary center tap—red and yellow leads
   - 6.3 volt secondary—two green leads
   - 5 volt secondary—two yellow leads.

5. The adjustable padding condensers for the broadcast and police bands are mounted on the rear chassis wall with the screw adjustment accessible through holes in the rear of the chassis. The short-wave band has a fixed pad, CA9 on schematic. When replacing this fixed pad, be careful to use a condenser which has a capacity within 5% of the specified value, although the short-wave coils may not track.

6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Antenna High-Fidelity Antenna, Model W-75, and the Emerson All-Antenna Antenna System, Model W-49, are recommended. Instructions for the installation of these antennas are supplied with each kit.

In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

**VOLTAGE ANALYSIS**

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned full on and no signal. Line voltage for these readings was 110 volts, 60 cycles, a.c. All readings except P1, P2 at rectifier heaters, and cathode voltages were taken on 250 volt scale.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>O.e. Plate</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AK7 (t-1)</td>
<td>170</td>
<td>65</td>
<td>0</td>
<td>6.3 a.c.</td>
<td></td>
</tr>
<tr>
<td>6AK7 (t-4)</td>
<td>206</td>
<td>65</td>
<td>0</td>
<td>77</td>
<td>6.3 a.c.</td>
</tr>
<tr>
<td>6AK7 (t-4)</td>
<td>206</td>
<td>65</td>
<td>0</td>
<td>6.3 a.c.</td>
<td></td>
</tr>
<tr>
<td>6AK7 (t-4)</td>
<td>100</td>
<td>100</td>
<td>15.3</td>
<td>6.3 a.c.</td>
<td></td>
</tr>
<tr>
<td>6AK7 (t-4)</td>
<td>206</td>
<td>15.3</td>
<td>6.3 a.c.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Voltage at 80 filament to B minus (center tap on high voltage winding)—300 volts.

The grid bias for all tubes is developed across resistors R17 and R18. This voltage should measure 10.5 volts.

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL CB243
Alignment, Socket
EMERSON RADIO & PHONOGRAPH CORP.
Trimmers, Parts

<table>
<thead>
<tr>
<th>Item</th>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>4BT-184</td>
<td>Three-band antenna coil</td>
<td>$2.05</td>
</tr>
<tr>
<td>T2</td>
<td>4BT-187</td>
<td>Three-band interstage coil</td>
<td>$1.80</td>
</tr>
<tr>
<td>T3</td>
<td>4BT-188</td>
<td>Three-band oscillator coil</td>
<td>$1.75</td>
</tr>
<tr>
<td>T4</td>
<td>4ZT-425A</td>
<td>450 ohm 1/8 watt carbon resistor</td>
<td>$1.50</td>
</tr>
<tr>
<td>T5</td>
<td>4BT-461</td>
<td>Power transformer, 117.5 V, 50-60 cycle (see note below)</td>
<td>$4.50</td>
</tr>
<tr>
<td>R1</td>
<td>LR-44</td>
<td>50,000 ohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R2</td>
<td>LR-59</td>
<td>20,000 ohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R3</td>
<td>RR-183</td>
<td>1 megohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R4</td>
<td>RR-187</td>
<td>10,000 ohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R5</td>
<td>HB-34</td>
<td>2 megohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R6</td>
<td>MM-55</td>
<td>250,000 ohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R7</td>
<td>GS-18</td>
<td>25,000 ohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R8</td>
<td>ZR-320</td>
<td>1 megohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R9</td>
<td>ZR-344</td>
<td>1 megohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
<tr>
<td>R10</td>
<td>XN-371</td>
<td>5 megohm 1/8 watt carbon resistor</td>
<td>$0.16</td>
</tr>
</tbody>
</table>

Location of Trimmers

- Shortwave broadcast at 660 kHz.
- Police broadcast at 900 kHz.
- Broadcast at 1600 kHz.

VIEW LOOKING AT TOP OF CHASSIS

VIEW LOOKING AT BACK OF CHASSIS

Adjustments

An accurate meter should be selected for the various modes of the receiver and the antenna and resistance trimmers adjusted to give the best response. The variable condensers are adjusted to give the best response. The variable condensers are adjusted to give the best response.

REPLACEMENT PARTS LIST

MODEL CB-243
CHASSIS MODEL CB

Replacements should be made with genuine Emerson parts for best results.

Compliments of www.nucow.com
Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for minimum response. (See General Notes, paragraph No. 5.)

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heater and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Osc. Plate</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12A8</td>
<td>94</td>
<td>60</td>
<td>0</td>
<td>94</td>
<td>12</td>
</tr>
<tr>
<td>12K7</td>
<td>94</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>35L6</td>
<td>87</td>
<td>94</td>
<td>0</td>
<td>8.2</td>
<td>35</td>
</tr>
</tbody>
</table>

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R3 and R10)—13.5.
When ordering replacement parts specify part numbers.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12B8GT</td>
<td>95 (pin no. 3)</td>
<td>95 (pin no. 4)</td>
<td>2.1 (pin no. 1)</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>40 (pin no. 5)</td>
<td>0.0 (pin no. 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32L7GT</td>
<td>125 (pin no. 5)</td>
<td>95 (pin no. 4)</td>
<td>4.5 (pin no. 5)</td>
<td>32</td>
</tr>
</tbody>
</table>

Voltage at rectifier cathode—189 (pin no. 1)

The socket connections of the tubes used in the CF chassis are as follows, the numbering following standard designation R.M.A.

12B8GT: pin 1—r-f amplifier cathode
pin 2—heater
pin 3—r-f amplifier plate
pin 4—r-f amplifier screen grid
pin 5—detector plate
pin 6—detector cathode
pin 7—heater
pin 8—detector grid

32L7GT: pin 1—rectifier cathode
pin 2—heater
pin 3—output plate
pin 4—output screen grid
pin 5—output grid
pin 6—rectifier plate
pin 7—heater
pin 8—output cathode

ALIGNMENT PROCEDURE

An oscillator with a frequency of 1600 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Examine the condenser drive assembly bracket and locate five dots embossed along the front. Rotate the variable condenser to maximum capacity and set the pointer just below the bottom dot. Then rotate the condenser until the pointer is just below the second dot from the top. Feed 1600 kc to the antenna through a .0001 mf condenser and adjust both trimming condensers for maximum response.
GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. When checking the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:
   - Grid return—black
   - Grid return—yellow
   - B plate—red
   - B plate—blue
4. Models CM-260 and 267 have self-contained antennas and do not require additional antennas. Connections for permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional external antenna should be used.
5. The cathode is not connected to the chassis as in the cabinet for antenna connection. It is necessary to remove the chassis to the cabinet to make this connection. The screw is easily reached through a hole in the bottom of the cabinet.
6. The self-contained l-c antenna operates at maximum efficiency when its position is at right angles to the broadcast station. No effort is necessary to vary the position from 90 degrees, since the gain from this position is only about one-quarter of a circle (90 degrees), leaving it at the position where the receiver is without maximum volume.
7. On some models the bottom of the chassis is covered with a metal plate. To reach the internal chassis parts, this plate must be unsoldered and removed.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis and to the right of the speaker. The trimmers are accessible through holes in the top of the cabinet. The second i-f transformer is mounted on top of the chassis behind the speaker. The trimmers are accessible through holes in the top of the cabinet.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil, the trimmer located underneath the chassis, beneath the speaker. The loop antenna acts as the antenna coil.

I-f Wave-Trap Alignment

Switch the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12A6 tube through a .001 mf condenser and adjust the four i-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .001 mf condenser to the antenna connection and adjust the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

VOLTAGE ANALYSIS

Many readings are taken with a 1000 ohm-per-volt meter. Voltages listed below are from point indicated to B minus (switch) with the volume control turned on full and no signal. Line voltage for these readings was 115.8 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 300 volt scale. Measurements made with 1170 volts a.c. will be lower than those given below.

For serial numbers below 2,690,200:

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AT7</td>
<td>26</td>
<td>50</td>
<td>94</td>
<td>12</td>
</tr>
<tr>
<td>12AY8</td>
<td>94</td>
<td>80</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>12AD8</td>
<td>94</td>
<td>40</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>12AD9</td>
<td>94</td>
<td>94</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>12AT7</td>
<td>12AT7</td>
<td>12AT7</td>
<td>12AT7</td>
<td>12AT7</td>
</tr>
<tr>
<td>12AK7</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>12AK7</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>12AK7</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

All tubes are replaceable with other tubes or similar types. The letters "GT" at the end of the tube number indicate that the tube has a high testation glass envelope. All other respects it is the same as the tube listed with the number "GT."
VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.8 volts, "B" 90 volts.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Oec. Plate</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A7G</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>1.5</td>
</tr>
<tr>
<td>1N5G 1st i-f</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>1.5</td>
</tr>
<tr>
<td>1N5G 2nd i-f</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>1.5</td>
</tr>
<tr>
<td>1N5G</td>
<td></td>
<td></td>
<td>82</td>
<td>1.5</td>
</tr>
<tr>
<td>1C5G</td>
<td>77</td>
<td></td>
<td>82</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Bias for the 1C5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.8 volts.

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,219,650 use:
   (a) Double-tuned 455 kc first i-f transformer, part no. 4XT-434A.
   (b) Double tuned 455 kc diode i-f transformer, part no. 4XT-435B.
   (c) Oscillator coil, Part No. 4XT-433.
   (d) The low side of the volume control (R12) is connected to A plus instead of A minus (chassis) as shown in the schematic.
   (e) Condenser C19 is connected from plate to B plus instead of from plate to ground as shown in the schematic.

2. Chassis bearing serial numbers below 2,408,049 use the dial face, part no. 4XD-5.

3. On Model CE-260 the antenna trimming condenser (C4) is mounted on the loop antenna frame instead of on the variable condenser.

4. In chassis bearing serial numbers above 2,219,650 the condenser C15 is connected from the high side of the volume control to ground instead of to A plus as shown in the schematic.
MODELS CE259, CE260
Chassis CE
Socket, Trimmers
Alignment, Parts

MODELS CE259 AND CE260

GENERAL NOTES

1. Batteries: The Models CE259 and CE260 are designed to house the complete set of batteries within the cabinet.

   The battery compartment should be as follows:

   FOR MODEL CE259 (Portable)
   Type Battery No. Equ.
   39 V (2) 7340 A
   49 V (2) 7340 B

   FOR MODEL CE260
   Type Battery No. Equ.
   27 V (2) 7340 A
   52 V (plug-in type) 7340 B

2. The color coding of the 14 transformer leads is as follows:

   Grid - green
   Plate - blue
   B plus - red

3. The color coding of the battery cable is as follows:

   Red - B plus, 90 volts
   Blue - a minor

4. If replacements are made in the r-f section of the circuit, the receiver should be carefully realigned.

5. Models CE259 and CE260 have self-contained antennas and do not require additional external antennas or ground connections.

   Models CE259 and CE260, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal strip is provided in the cabinet for antenna and grounding connections. (See diagram on next page.)

6. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadening plane. If it is desired to improve the antenna further a horizontal antenna (not included) can be used. The receiver is equipped with a switch which provides the antenna with maximum volume. This switch is not necessary for receivers with outside antennas.

ADJUSTMENTS

An oscillator with frequencies of 455 and 1460 kc is required.

The trimmer should be used across the valve coil or output transformer for obtaining maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

The loop antenna sets across the antenna coil. The trimmer fits into the loop, when provided, is on the front section of the variable condenser.

1-f Alignment

Model CE259 (below serial number 2,318-660). Swing variable condenser to maximum capacity position.

Model CE259 (above serial number 2,318-660) and CE260. Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A70 tube through a 600 microfarad condenser and adjust the 4-f trimmers for maximum response.

R-f Alignment

Set the dial pointer at 140. Feed 1460 kc through the rf coil and trimmer to the antenna connection, and adjust the trimmer on the back section of the variable condenser, then the antenna trimmer on the front section of the variable condenser, for maximum response.

BATTERY INSTALLATION FOR MODEL CE259

(See diagram on inside page)

To install and connect the batteries is the portable cabinet observe the following procedure:

1. Open the metal end of the cabinet (side with speaker grille) by removing the two wood screws in the top corners of the panel. The panel is hinged at the bottom. Open the panel by pulling the small latch tab at the top edge.

2. A small wood clasp is fastened to the bottom of the cabinet directly above the two large wood rails. Remove this clasp by taking out the small wood screws.

3. The three-prong plug on the battery cable from the receiver should be plugged into the two "B" batteries.

4. Plug the "B" batteries, one at a time, into the holder in the cabinet next to the two wood rails in the cabinet, as indicated in the diagram.

5. Replace the wood clasp in front of the second battery and fasten it securely with the wood screws.

6. The small two-prong plug in the battery holder should be plugged into the "A" battery. Place the "A" battery in the front center of the cabinet, as shown in the diagram.

7. Be sure that all of the cable wires are free and clear of the receiver. Care should be taken to keep the wires from jamming between the wood rails and the batteries.

8. Close the end panel and replace the wood screws, fastening them securely.

BATTERY INSTALLATION FOR MODEL CE260

The cabinet for this model is designed to house completely the combined "A" and "B" pack. Place the battery pack in the cabinet at the top, and insert the front cover into the battery case into the socket on the top of the battery.

When ordering replacement parts specify part numbers.

©John F. Rider, Publisher
MODELS CR-261, CR-262 and CR-274

CHASSIS MODEL CR

ALIGNMENT AND LOCATION OF TRIMMERS

IF. 455kc through .01 mf. cond. to grid of 12A8G
1st IF, top of chassis right of speaker) 2nd IF
under chassis beneath variable, holes provided in
top of chassis—Variable max. depth. Adjust trimmers
to max. response.

Wave Trap (see GENERAL NOTES) Feed 455kc through
.0001 mf. cond. to ant. lead. Adjust for minimum
response.

RF. Dial at 140. Feed 1400kc through .0001 mf. cond.
to ant. lead. Adjust osc. trimmer (rear section of
variable) then ant. trimmer (front section of vari-
able) for maximum response.

GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully
re-aligned.

2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.

3. The color coding of the i-f transformer leads is as follows:

<table>
<thead>
<tr>
<th>Grid return</th>
<th>B plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>black</td>
<td>red</td>
</tr>
</tbody>
</table>

4. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent in-
terference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response
from the interfering station is at a minimum.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus
switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles,
a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will
be lower than those given below.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Osc. Plate</th>
<th>FIl</th>
</tr>
</thead>
<tbody>
<tr>
<td>12A8GT</td>
<td>88</td>
<td>45</td>
<td>0</td>
<td>88</td>
<td>12</td>
</tr>
<tr>
<td>12K7GT</td>
<td>88</td>
<td></td>
<td>0</td>
<td>88</td>
<td>12</td>
</tr>
<tr>
<td>12SQ7GT</td>
<td>40</td>
<td></td>
<td>0</td>
<td>88</td>
<td>12</td>
</tr>
<tr>
<td>50L6GT</td>
<td>82</td>
<td>88</td>
<td>57</td>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>


© John F. Rider, Publisher
EMERSON RADIO & PHONOGRAPH CORP.

Current drain .... “A” battery—0.5 amps.
“B” battery—0.250 amps. with no signal
Frequency range ... 500 to 1500 kc

MODEL CT-275
Chassis CT
Schematic, Voltage
Alignment

TERMINALS FOR OUTSIDE ANTENNA

1A7G, oscillator-modulator.
1N8G, 1st i-f amplifier.
1N8G, 2nd i-f amplifier.
1H8G, 2nd detector, a.v.c., a-f amplifier
1Q5G, beam power output.

Compliments of www.nucow.com

Batteries: The Model CT-275 is designed to house the complete set of batteries within the cabinet.
The battery complement should be as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 volt “A”</td>
<td>1</td>
<td>741</td>
<td>741</td>
<td>(plug-in type)</td>
</tr>
<tr>
<td>45 volt “B”</td>
<td>2</td>
<td></td>
<td></td>
<td>(plug-in type)</td>
</tr>
</tbody>
</table>

The color coding of the i-f transformer leads is as follows:
- Grid—green
- Grid return—black
- Plate—blue
- B plus—red

The color coding of the battery cable is as follows:
- Red—B plus, 90 volts
- Yellow—A plus, 1.5 volts
- Black—A minus

The i-f transformers are located in cans mounted at top of the chassis. The first i-f transformer is the one between the speaker and the variable condenser. The diode i-f transformer is the one behind the speaker. The trimming condensers for both transformers can be reached through holes in the top of the cans.

Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

I-f Alignment

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .001 mf condenser to the antenna connection and adjust the oscillator trimmer (on rear section of variable condenser) for maximum response. No alignment necessary on antenna circuit.

© John F. Rider, Publisher
FOR OTHER DATA SEE INDEX


Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked. Proceed as follows: Remove chassis from case and connect output meter across voice coil of speaker. Set dials pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6AF7 tube in series with a 1 condenser. Adjust trimmers 2 & 3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a 0.0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

MODEL 460 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

<table>
<thead>
<tr>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Anode</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AF7</td>
<td>110</td>
<td>50</td>
<td>2.5</td>
</tr>
<tr>
<td>6G7L</td>
<td>110</td>
<td>15</td>
<td>2.5</td>
</tr>
<tr>
<td>6G7Q</td>
<td>46</td>
<td>-</td>
<td>1.1</td>
</tr>
<tr>
<td>25L5G</td>
<td>110</td>
<td>110</td>
<td>7.0</td>
</tr>
<tr>
<td>25L6</td>
<td>120 AC</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

MODEL 460 alignment layout

MODEL 460 alignment layout

T-5 (15kΩ) T-2 (1450kΩ) T-3 (20kΩ)

T-1 (45kΩ) T-4 (45kΩ) T-6 (80kΩ)

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked. Proceed as follows: Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6AF7 tube in series with a 1 condenser and adjust trimmers 2 & 3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a 0.0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust pad 13 for maximum output. Check alignment at 1500 K.C. Shift oscillator to 606 K.C. and set trimmer on wave trap for maximum signal. Check sensitivity at 1000 K.C. using magicwand. Turn band switch to Short wave position. Set dial at 15 M.C. Use a 400 ohm resistor for dummy antenna. With a 15 M.C. signal adjust pad 13 for maximum output. Check range at 14 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

MODEL 461 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

<table>
<thead>
<tr>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Anode</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AF7</td>
<td>104</td>
<td>36</td>
<td>111</td>
</tr>
<tr>
<td>6G7Q</td>
<td>104</td>
<td>104</td>
<td>3.0</td>
</tr>
<tr>
<td>6G7L</td>
<td>46</td>
<td>-</td>
<td>1.1</td>
</tr>
<tr>
<td>25L6</td>
<td>98</td>
<td>104</td>
<td>6.7</td>
</tr>
<tr>
<td>25L5</td>
<td>120 A.C</td>
<td>135</td>
<td>-</td>
</tr>
</tbody>
</table>
FADA FLASH-O-MATIC SIX

INTRODUCTION: FADA Flash-o-Matic Six is an electrical type automatic tuning system that, once adjusted, will automatically "tune in" any one of six local broadcast stations operating between 540 and 1500 kilocycles (K.C.). While the Flash-o-Matic is not confined to local reception, it should be adjusted for stations affording the best reception and most frequently "tuned in."

ALIGNING PROCEDURE: It is advisable that the receiver remain in operation for fifteen minutes or more before attempting any adjustments. Now that the receiver has reached constant temperature the following adjustments are to be made to the trimmer condenser set screws located on the Flash-o-Matic tuning panel at the rear of the receiver.

(a) Select six local broadcast stations whose programs are preferred; then, detach the station call letters from the station call letter tab sheets, which are supplied with each receiver.

(b) The six Flash-o-Matic positions are numbered and arranged according to frequency limits.

There are number tabs (1 to 6) in the Flash-o-Matic escutcheon as shipped from the factory. These tabs show the relation between the Flash-o-Matic escutcheon and the Flash-o-Matic tuning panel positions and are to be removed; one at a time (with the aid of a pin) when inserting the station call letters.

The six call letter tabs corresponding to the six broadcast stations which have been chosen, must be arranged in the Flash-o-Matic escutcheon so that the frequency in kilocycles of each station will fall within the frequency limits of the proper group. If one of the chosen stations has an operating frequency of 550 K.C., it should be placed in the No. 1 (530 to 710 K.C.) group, a station of 600 K.C. should be placed in the No. 2 group, etc.

Each group has considerable overlap to allow for the selection of six stations which may have frequency assignments comparatively close together.

Having inserted the call letter tabs, cover each tab with a celluloid disc furnished with your receiver.

(c) Two trimmer condenser set screws are provided for each one of the six station positions and are accessible at the rear of the receiver. All trimmer condenser set screw adjustments are marked as to their group number and frequency range coverage.

(d) Tune in the station in the usual manner, using manual tuning, and determine the program.

(e) Turn the wave band switch completely to the right (clockwise).

(f) Turn the Flash-o-Matic selector switch to the position that corresponds to the group in which the desired station falls. This can be readily determined, for as the Flash-o-Matic selector switch is turned the various call letters will light up.

(g) The toggle switch (SEE ILLUSTRATION) near the center of the Flash-o-Matic tuning panel should be thrown to the "UP" position during the following adjustments.

(h) With the aid of a screwdriver adjust (by turning clockwise or counter-clockwise) the OSC. trimmer condenser set screw (SEE ILLUSTRATION) corresponding to the proper station, until the same station that was tuned in manually is heard. Turn the volume control down so that any variation in sound output can be noted and readjust set screw for maximum sound output. TAKE PARTICULAR CARE WHILE MAKING THIS ADJUSTMENT THAT THE SAME STATION IS HEARD AND NOT A NETWORK PROGRAM BROADCASTING THE SAME PROGRAM.

(i) Now adjust the ANT. trimmer condenser set screw (SEE ILLUSTRATION) having the same position number, for maximum sound output.

(j) Repeat the same procedure as outlined above for each of the remaining five stations.

(k) To insure accurate adjustment, it may be found advisable to repeat the operations outlined in paragraphs (h) thru (j).

(l) Having completed the adjustments for the desired stations throw the toggle switch (SEE ILLUSTRATION) to "DOWN" position. The receiver is now ready for Flash-o-Matic operation and any one of the six stations to which the Flash-o-Matic has been adjusted, may be instantly "tuned in" by merely rotating the Flash-o-Matic selector knob to the desired station position.

(m) In order to reset one or more positions of the Flash-o-Matic tuning to other stations, it is merely necessary to follow the instructions outlined above; additional celluloid discs are supplied for this purpose.

OPERATING PROCEDURE: For Flash-o-Matic tuning turn the wave band switch completely to the right (clockwise); this will reduce the illumination of the station selector dial. Then, turn the Flash-o-Matic selector switch until the call letters of the desired station are illuminated. To return to standard or manual tuning simply turn the wave band selector switch toward the left (counter-clockwise) to the desired wave band.

ALIGNMENT MODEL 6480

Tuning ranges 530-1750 K.C., 1,715-5,7 W.C. and 5,67 and 16,1 M.C. Tubes 3-6F7G-6AS6-6BY6-6L06-A0.

Remove chassis and connect output meter across volvo coil of speaker. Set dial pointer at 1000 K.C. Turn volume control to maximum. Tone switch to high end. Band switch to broadcast. Connect modulated oscillator to grid of 6AS6 in series with a .1 condenser and adjust trimmers 1-2-3-4-5-6 for maximum output at 455 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a 0.002 condenser as dummy antenna. With a 1500 signal adjust trimmers 7-8-9 for maximum output, reducing input signal as required. Turn pointer to 600 K.C. Shift oscillator to 600 K.C. and adjust pad 16 for maximum while rocking gang condenser. Check alignment at 1000 K.C. Turn band switch to position 2 - turn pointer to 5 M.C. Use a 400 ohm carbon resistor for dummy antenna. Adjust trimmers 10-11-12 for maximum output. Check output at .8 and 2.4, take sure 6 M.C. was aligned on fundamental and not image. Turn band switch to position 3 - turn pointer to 6 M.C. Adjust trimmers 12-14-15 for maximum. Check image at 14.5. Check sensitivity at 6 M.C.
FADA RADIO MODEL 450 - 115 VOLT AC-DC - Tuning Range 545-1720 K.C. - 5 Tube Superhetency. Use 547-606-676-676-80. Alignment instructions: Do not attempt to align receiver until all other causes of trouble are checked. One method involves checking and adjusting output at 1000 K.C. and turning volume control to maximum position. Tune control to highest and lowest frequencies. With a 0.0001 microfarad condenser as dummy antenna, turn dial pointer at 1000 K.C., and turn volume control to maximum position. These adjustments are made at 1000 K.C., and with a 0.0001 microfarad condenser as dummy antenna. The following adjustments are made: 1. With 1000 K.C., turn dial pointer at 1000 K.C., and turn volume control to maximum position. 2. With 2500 K.C., turn dial pointer at 1000 K.C., and turn volume control to maximum position. 3. With 5000 K.C., turn dial pointer at 1000 K.C., and turn volume control to maximum position.

MODEL 456

Plate Screen Anode
066 108 104 1.6
666 18 18 1.6
25LG 96 104 6.6
2566 120 A.C. - 130.

MODEL 454, 454A, 454B. READINGS TAKEN WITH LINE VOLTAGE 120 VAC.

Plate Screen Anode
606 13 10 1.3
676 112 62 2.7 1.1
676 112 62 2.7
676 112 112 11.6
80 414 60 Plate to Plate

FADA RADIO MODEL 451 - 115 VOLT AC-DC - Tuning Range 545-1720 K.C. - 5 Tube Superhetency. Use 547-606-676-676-80. Alignment instructions: Do not attempt to align receiver until all other causes of trouble are checked. One method involves checking and adjusting output at 1000 K.C. and turning volume control to maximum position. Tune control to highest and lowest frequencies. With a 0.0001 microfarad condenser as dummy antenna, turn dial pointer at 1000 K.C., and turn volume control to maximum position. These adjustments are made at 1000 K.C., and with a 0.0001 microfarad condenser as dummy antenna. The following adjustments are made: 1. With 1000 K.C., turn dial pointer at 1000 K.C., and turn volume control to maximum position. 2. With 2500 K.C., turn dial pointer at 1000 K.C., and turn volume control to maximum position. 3. With 5000 K.C., turn dial pointer at 1000 K.C., and turn volume control to maximum position.

MODEL 456

Plate Screen Anode
066 108 104 1.6
666 18 18 1.6
25LG 96 104 6.6
2566 120 A.C. - 130.

MODEL 454, 454A, 454B. READINGS TAKEN WITH LINE VOLTAGE 120 VAC.

Plate Screen Anode
606 13 10 1.3
676 112 62 2.7 1.1
676 112 62 2.7
676 112 112 11.6
80 414 60 Plate to Plate

NOTE: MODEL 202 DIFFERS FROM MODEL 20A IN THAT IT HAS A DARLINGTON TRANSISTOR IN PLACE OF THE 6V6 TUBE. MODEL 202 DIFFERS FROM MODEL 20A IN THAT IT HAS A 76 TUBE IN PLACE OF THE 6V6 TUBE TO ACCOMMODATE THE ADJUSTABLE VOLUME CONTROL.
MODEL 846
Schematic, Voltage
Alignment, Trimmers
Socket, Coils

---

FADA RADIO & ELECTRIC CO

---


Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked and proceed as follows: Remove chassis from case and connect output motor across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6AQ7 tube in series with all condensers. Adjust trimmers 1-2-3-4 for maximum reading at 646 K.C., reducing input signal of oscillator as required. Check pointer with condenser fully seated. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .002 condenser as dummy condenser. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

*** USE ONLY GENUINE FACTORY REPLACEMENT PARTS ***

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>List</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>75.307</td>
<td>Dial Assembly</td>
<td>1.75</td>
<td>20.79</td>
</tr>
<tr>
<td>100.45</td>
<td>Volume Control</td>
<td>.80</td>
<td>105.125</td>
</tr>
<tr>
<td>25.3</td>
<td>Antenna Coil</td>
<td>6.00</td>
<td>130.47</td>
</tr>
<tr>
<td>35.114</td>
<td>Oscillator Coil</td>
<td>.45</td>
<td>140.37</td>
</tr>
<tr>
<td>35.72</td>
<td>Input I.F.</td>
<td>1.00</td>
<td>190.57</td>
</tr>
<tr>
<td>35.115</td>
<td>Output I.F.</td>
<td>.90</td>
<td>70.245</td>
</tr>
<tr>
<td>25.522</td>
<td>Variable Condenser</td>
<td>2.15</td>
<td>110.68</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
Compliments of www.nucow.com

Model P 49 differs from Models B49, T49, and C49 as shown in schematic section above.

IF = 456 KC.
1. **VOLUME CONTROL** ................. MAXIMUM.
2. **ATTENUATE SIGNAL TO CONTROL SIGNAL OUTPUT.**
3. **CONNECT PROPER DUMMY ANTENNA, FOR EACH ADJUSTMENT, IN SERIES**
   **WITH HIGH POTENTIAL SIDE OF SIGNAL GENERATOR.** FOR .001 MFD.
   **CONDENSER, USE PAPER TUBULAR TYPE (400V); FOR 200 MFD., MICA;**
   **400 and 50,000 ohm resistors, CARBON 1/5 WATT.**
4. **GROUND LOW POTENTIAL SIDE OF SIGNAL GENERATOR.**
5. **FOR ADJUSTING THE I.F. TRIMMER CAPACITORS, THE CONTROL GRID**
   **SHOULD BE REMOVED AND A 50,000 OHM RESISTOR INSERTED IN SERIES**
   **WITH SAME. THEN CONNECT THE HIGH POTENTIAL LEAD OF THE SIGNAL**
   **GENERATOR THROUGH THE .001 MFD. CONDENSER DIRECTLY TO THE**
   **CONTROL GRID CAP OF THE TUBE.**
6. **REPEAT ALL ADJUSTMENTS.**
7. **TO DETERMINE THAT THE SHORT WAVE BAND SHORT TRIMMER HAS NOT**
   **BEEN ADJUSTED TO THE MAXIMUM FREQUENCY, TURN THE DIAL TO THE**
   **FREQUENCY LISTED UNDER IMAGE FREQUENCY WHERE A SIGNAL BREAKER**
   **THAT THE FUNDAMENTAL SHOULD BE NOTED. HOWEVER, IF NO SIGNAL CAN**
   **BE HEARD AT THIS SETTING EVEN WITH GREATER SIGNAL GENERATOR**
   **OUTPUT, THE TRIMMER HAS BEEN IMPROPERLY ADJUSTED AND IT WILL**
   **BE NECESSARY TO READJUST TO THE PROPER PEAK.**

### ALIGNMENT

**ALIGNMENT LAYOUT**

**CONTINUITY AND VOLTAGE READINGS ON**

**MODEL 365 & 365 SERIES**

**SEE INDEX**

**FOR MODEL 365**

**SCHEMATIC**

**Line voltage 115 A.C. - Input watts - 58**

**No signal input**

<table>
<thead>
<tr>
<th>TUBE</th>
<th>VOLTAGE CURRENT</th>
<th>VOLTS</th>
<th>VOLTS</th>
<th>GRID VOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AG3</td>
<td>1st Detector 235</td>
<td>1.9</td>
<td>1.8</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Oscillator 56</td>
<td>2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6D6</td>
<td>Int. Freq. 235</td>
<td>9.4</td>
<td>3.0</td>
<td>105</td>
</tr>
<tr>
<td>7B</td>
<td>2nd Detector 127</td>
<td>7.1</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>647G</td>
<td>1st Audio 67</td>
<td>1.1</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>676G</td>
<td>Pwr. Pentode 230</td>
<td>41.9</td>
<td>10.5</td>
<td>229</td>
</tr>
<tr>
<td>80</td>
<td>Rectifier</td>
<td>66.0 TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

Above readings taken with a 105.89 speaker in circuit.

**SPEAKER B.C. RESISTANCE VALUES**

**PART NO. FIELD COIL AUDIO TRANS. PRI. AUDIO TRANS. SEC. V.C.**

| 105.89 | 1,100* | 210* | .6** | 3.0 |
| 105.91A| 1,100* | 220* | .6** | 3.0 |

* These are cold D.C. resistance values.

**This reading includes resistance of hum bucking coil.**
FADA RADIO & ELECTRIC CO

MODEL 470
Schematic, Voltage Alignment, Trimmers
Socket

 THESE READINGS TAKEN WITH LINE VOLTAGE 120 V.C.

<table>
<thead>
<tr>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Anode</th>
</tr>
</thead>
<tbody>
<tr>
<td>648G</td>
<td>92</td>
<td>54</td>
<td>4</td>
</tr>
<tr>
<td>606</td>
<td>107</td>
<td>56</td>
<td>2.4</td>
</tr>
<tr>
<td>76</td>
<td>101</td>
<td></td>
<td>2.4</td>
</tr>
<tr>
<td>222</td>
<td></td>
<td></td>
<td>1.2</td>
</tr>
<tr>
<td>221.6G</td>
<td>105</td>
<td>109</td>
<td>8.4</td>
</tr>
<tr>
<td>2225</td>
<td>120 A.C.</td>
<td>120 D.C.</td>
<td></td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 7A
Alignment, Voltage Tuner, Phono

The model 7A chassis is an AC operated superheterodyne with automatic volume control, audio inverese feedback, sensitivity push button tuning and tuning eyes. It incorporates three wave bands, broadcast, police-amar and short wave. It is also equipped with a phone connection which permits the use of an external phonograph pickup.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of a spring loaded toggle switch which is accurately mounted at the factory so that it is not necessary to adjust external trimmer condensers in order to get a station. Tuning is accomplished by the carefully spaced of the iron core on their common shaft so that the position of the adjusting screw the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 40 on the schematic diagram and has a value of 150 micro-plates. The maximum capacitance in the oscillator circuit consists of two condensers, number 30 and number 44. Condenser number 30 must be adjusted when the initial alignment is made, but does not have to be touched at the time the buttons are set for their individual stations. Its use is covered in the alignment instructions. Instructions for setting-up the push button are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the 100 variable feedback circuit consisting of resistors number 56 and number 67 and condenser number 50. By means of this network a certain amount of the voltage present at the plate of the 6X6B tube is fed back to the grid circuit of that tube. This voltage, of course, out of phase with the input voltage, and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the frequency varies with the audio frequency present in the plate circuit of the output tube. This condition is more pronounced in amplifiers using an output tube of the high and medium plate type such as are in most audio amplifiers. Distortion effectively reduces the plate impedance of the tube and helps to smooth out these variations; thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

VOLTAGE AND RESISTANCE DATA

ALIGNMENT PROCEDURE CHART

© John F. Rider, Publisher
The model 50 chassis is an op. operated superheterodyne with automatic volume control. Push-pull output with inverse feedback, variable push button tuning, and tuning eye. It is made to accommodate three wave bands, broadcast, police, and marine bands. It is equipped with a phone connection which permits the use of an external phonograph pickup.

THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of variable tuned coils which have been accurately tracked at the factory so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This capacitor (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 69 on the schematic diagram and has a value of 140 micro-micro-strodes. It is connected in the antenna RF circuits as usual and is number 16 for the antenna and number 18 for the sideband RF. Condenser 17 and 18 must be adjusted when the initial alignment is made, but do not have to be touched at the time the buttons are set for their individual stations. Their use is covered in the instructions for setting up the push buttons. The instructions for setting up the push buttons are covered in detail in the instruction book which accompanies each receiver.

THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 80 and 81, and condensers 79 and 80. By means of a variable network a certain amount of the voltage present at the plate of each 6GW0 tube is fed back to the grid circuit of the next tube. This voltage, of course, out of phase with the input voltage, and is degenerative is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the frequency changes in the plate circuit of the output tube or tubes. This condition is more pronounced in amplifiers using output tubes of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree. The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the engineer a brief explanation of the feedback circuit.

PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success was obtained by the use of a unit of fairly low impedance. It is recommended that any difficulty be encountered with the ' 6T6' in the set, and a push button is covered, it is being due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phone lead is a shield) should remedy complaints of this kind.

ALIGNMENT PROCEDURE

The alignment procedure is given in diagrammatic and chart form. Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at minimum during the alignment and the sideband from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AFC will work in an unstable condition, and no result will be obtained.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The leads will fall below the fundamental signal on the dial, but at 60 megacycles the image should be heard at 60 megacycles minus 900 megacycles or at 910 megacycles approximately.

After setting the oscillators for the proper frequency and the required gain, you have the right peak. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order to hear the image when you have found the right peak.

Repeat this operation for the antenna trimmer.
### Alignment Procedure Chart

<table>
<thead>
<tr>
<th>Current Mode</th>
<th>Signal Mode</th>
<th>Change Access</th>
<th>Range Setting</th>
<th>Sense</th>
<th>Adapting Device</th>
<th>Pull-up Voltage</th>
<th>Pull-down Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>2</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>3</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>4</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>5</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>6</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>7</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>8</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>9</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>10</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>11</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>12</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>13</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>14</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>15</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>16</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>17</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>18</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>19</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>20</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
<tr>
<td>21</td>
<td>600 OC</td>
<td>Broadcast</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
<td>600 OC</td>
</tr>
</tbody>
</table>

### Alignment Procedure

1. **Compliance of www.nucow.com**
2. **Morse & Co.**
3. **Adjustment Chart**
4. **Pull-up Voltage**
5. **Pull-down Voltage**
6. **Component Values**
7. **Current Mode**
8. **Signal Mode**
9. **Change Access**
10. **Range Setting**
11. **Sense**
12. **Adapting Device**
13. **Pull-up Voltage**
14. **Pull-down Voltage**

**Alignment Procedure**: After setting the oscillator trimmer, increase the signal from the output of the signal generator and make sure that the signal is within the proper range. Then, you may use the oscilloscope to look at the frequency in which your generator is set, and tune until the signal generator is within the proper range. The signal generator should be set at the proper frequency, and the oscilloscope should be set at the proper range. The adjustable trimmer is then adjusted to match the signal generator output to the oscilloscope input. The signal generator output should be set at the proper frequency, and the oscilloscope output should be set at the proper range. The adjustable trimmer is then adjusted to match the signal generator output to the oscilloscope input.

©John F. Rider, Publisher
ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some previous Firestone receivers. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end as with the capacity coupled sets. There are two taps provided on the antenna coil. One for use with whip or low capacity type antenna, and the other for running board or high capacity type antenna. The antenna coil is set at the low capacity tap at the factory and must be changed (by means of the small tip jack located in the receiver at the antenna coil) if a high capacity antenna is used. This is done by merely removing the small tip jack from its present tap on the antenna coil and inserting the jack in the other tap respectively provided.

LOCATIONS OF PARTS UNDER POWER SUPPLY

©John F. Rider, Publisher

Compliments of www.nucow.com
Remove the plate that covers the Monomatic tuning adjustments on the receiver case.

Operate the Monomatic button (marked "Push") until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune in your #1 station, using the Station Selector knob.

Operate the Monomatic button until the #1 station indicator (furthest left of the five indicators) becomes illuminated.

Turn the #1 station screw marked "OSC" (see Fig. 3) until your #1 station is tuned in. Other stations may be heard during this operation. If in doubt whether you have your desired #1 station, compare it with the original station by operating the Monomatic button until the Dial Tuning position is reached.

After carefully adjusting the "OSC" screw as carefully as possible, adjust the "ANT" screw for maximum volume and best reproduction. After having done so, it is advisable to re-check the adjustment of the "OSC" screw and then the "ANT" one again to insure greatest accuracy.

Tune in your #2 station and operate the Monomatic button until the #2 indicator becomes illuminated. Then proceed to adjust the two screws for this station in the same manner as was just done for the #1 station. Always adjust the "OSC" screw before adjusting the "ANT" one, and then repeat the adjustments for greater accuracy.

Proceed in the same manner for the remaining stations on your list. Then replace the cover in the receiver case. Insert the proper call letters, cut from the sheets supplied, in the indicator button slots.
Alignment

POWER SUPPLY. This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles, or on any direct current supply (D.C.) ranging from 110 to 120 volts.

4 Tube AC Tuned Radio Frequency Receiver With Electric Clock

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)

POWER SUPPLY. This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.
CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (IF) stages should be aligned properly as the first step. After the IF transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1A7G) through a .05 or .1 mfd condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four IF trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna terminal to the generator through a 200 MFD dummy and the ground terminal to the generator ground. Set the dial and generator at 1720 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output. Check the sensitivity at 600 to determine if the gang or the coils have been damaged.
BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.
BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERY-PACK IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.
b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

©John F. Rider, Publisher
BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.

Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 900 and 1400 KC. and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments 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.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should be aligned.

I.F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (6DJ8) through a .05 or .1 mf.d. condenser. 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.

BROADCAST BAND ALIGNMENT. Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and tune in the signal to check sensitivity at this point to determine if coils or gang condenser have not been damaged.
GALVIN MFG. CORP.

MODEL 9-49
MODEL 9-69
MODEL 15-F
MODELS 20P, 21L, 24X

AUTOMATIC SERVICE PROCEDURE—Continued

3. Hold any latch bar tip down on EHS side of rotor (notch on lower side). While holding the lower side of the latch bar (at 90 degree angle) and down, rotate the latch bar to the left until it reaches the notch point "F". (Check adjustment by pressing down on latch bar at point "F". This should cause the depressed latch bar not to lift the contact even slightly.)

4. With latch bar at rest position adjust screw (A) up to latch tip outside the diameter of the bakelite ring separators.

5. Remove comb shaped latch tension spring.

6. Remove the hex-head machine screw which extends through the small angle bracket on the brass latch bar bearing shaft underneath the TUNER MOTOR. (This is in place under latch bar assembly.)

7. Pull out latch bar and shaft assembly. (F)

NOTE: To reassemble, reverse the above procedure, and take particular care that:

1. Latch bar center on latch rings. They should not rub bakelite ring separators. (Spacers are armature that latch ring side of small bracket under tuner.)

2. When reassembling, turn it all the way latch tip points on small side of rings, then back screw up one-half turn (See reversing switch adjustment on page.)

TO REMOVE LATCH BAR ASSEMBLY

1. Back up on front switch adjustment screw (A) until latch bar reaches the diameter of the bakelite ring separators.

2. Remove comb shaped latch tension spring.

3. Remove the hex-head machine screw which extends through the small angle bracket on the brass latch bar bearing shaft underneath the TUNER MOTOR. (This is in place under latch bar assembly.)

4. Pull out latch bar and shaft assembly. (F)

NOTE: To reassemble, reverse the above procedure, and take particular care that:

1. Latch bar center on latch rings. They should not rub bakelite ring separators. (Spacers are armature that latch ring side of small bracket under tuner.)

2. When reassembling, turn it all the way latch tip points on small side of rings, then back screw up one-half turn (See reversing switch adjustment on page.)

TO REMOVE LATCH RING ASSEMBLY

1. Back up on switch adjustment screw (A) until latch bar reaches the diameter of the bakelite ring separators.

2. Remove locking screw. (G)

3. Remove the three locking levers. (H)

4. Lift the locking nut off the end of the rotor shaft.

5. Carefully loosen the three screws (J) which hold the ring assembly to the rotor hub, and remove all rings and separators as a unit, being careful to keep the three screws in position through the assembly.

6. To reassemble, reverse the above procedure. Work carefully, do not let the rings and separators get out of order.

TO REPLACE DEFECTIVE LATCH RING

1. Remove the entire latch ring assembly from the rotor hub. (See instructions above.)

2. Lay assembly on flat surface with screws heads down.

3. Remove rings, separators and brass spring collars, one at a time, until the defective ring is exposed.

NOTE: Assemble parts one at a time, being careful that rings, separators, and spacers are in the correct position.

4. Turn ring to replace ring in original position. Turning the ring over will reverse the direction of the notch and will result in faulty tuning.

TO REMOVE DEFECTIVE LATCH BAR AND BAR ASSEMBLY

1. Remove the entire latch bar assembly from the rotor hub. (See instructions above.)

2. Loosen the four hex head screws in the lower side of the latch bar assembly.

3. Loosen the one hex head screw in the bottom side of the latch bar assembly.

4. Pull the rotor hub from the generator shaft. The new screw in turn coupling will require to be removed. When the rotor bar is removed, the rotor bar will also need to be removed.

NOTE: When installing a new bar, turn the bar to full width and the hub gear against the stop before tightening set screws.

©John F. Rider, Publisher

Compliments of www.nucow.com
The only difference between these two is the tube complement. Model 9-24 uses Lobl tubes, whereas Model 9-24A uses Octal Base Bantam tubes. See the circuit diagrams for correct tube complement.
ALIGNMENT PROCEDURES

4. Set the trimmer to 0.000 volts and read the output. Adjust the trimmer for maximum output.

5. Measure the voltage at each of the trimmers and adjust the trimmers for maximum output.

6. Repeat the process for each trimmer until maximum output is achieved.

R. P. ALIGNMENT

1. Set the trimmer at 0.000 volts and read the output. Adjust the trimmer for maximum output.

2. Set the trimmer at 1000 volts and read the output. Adjust the trimmer for maximum output.

3. Set the trimmer at 5000 volts and read the output. Adjust the trimmer for maximum output.

4. Set the trimmer at 10000 volts and read the output. Adjust the trimmer for maximum output.

5. Set the trimmer at 50000 volts and read the output. Adjust the trimmer for maximum output.

SENSITIVITY AND GAIN MEASUREMENTS

These measurements are intended for use with a signal generator that is accurately calibrated in microvolts.

1. Measure the voltage at each trimmer and adjust the trimmers for maximum output.

2. Measure the voltage at each trimmer and adjust the trimmers for maximum output.

3. Measure the voltage at each trimmer and adjust the trimmers for maximum output.

4. Measure the voltage at each trimmer and adjust the trimmers for maximum output.

5. Measure the voltage at each trimmer and adjust the trimmers for maximum output.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.

When measuring over-all sensitivity at the antenna terminals, use 0.000 volts at the output terminals, 0.000 volts at the input terminals, and 0.000 volts at the output terminals.
ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the oscillator coil can that is covered with Scotch tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 2 below, shows all trimmer locations.)

I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7) through a 1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 1.)

2. Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

3. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter.

4. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

5. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

Figure 2. 9-29 TRIMMERS

SETTING THE RANGE

Model 9-29

R.F. AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MF condenser and to chassis ground. Set the signal generator at 500 K.C. and turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna coil can for the maximum output reading.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna section of the condenser gang for maximum output reading.

3. Adjust the trimmer on the R.F. section of the condenser gang for maximum output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

4. Recheck steps 1, 2, and 3, for accuracy.
AUTOMOBILE RECEIVER

Model 9-49

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Gen.-Mod., I.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 40 MF condenser connected as a lead resistance between the grid of the tube and the grid lead which has been removed.

When measuring overall-sensitivity at the antenna terminal, use a 40 MF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowances must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Microvolt Input</th>
<th>Generator Feed at Connected to</th>
<th>Dummy Antenna Capacity</th>
<th>Leak Resistance</th>
<th>Output Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>.25 Volts</td>
<td>400 cycles</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>25,000</td>
<td>262 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>200</td>
<td>262 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>800</td>
<td>600 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>45</td>
<td>600 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>2</td>
<td>600 K.C.</td>
<td>Ant. Lead 40 MF</td>
<td>None</td>
<td>1.74 Volts</td>
</tr>
</tbody>
</table>

* For one watt output.
** Meter connected across voice coil.
V.C. Impedance - 5 ohms at 400 cycles.
1.74 volts equals 1 watt output.

ALIGNMENT:
For alignment, follow procedure as for Model 9-44.

AUTOMOBILE RECEIVER

Model 9-29

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Gen.-Mod., I.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the top grid terminal of the tube through a .1 MF condenser, with a 40 MF condenser connected as a lead resistance between the grid of the tube and the grid lead which has been removed. (See Fig. 1 on Page 1.)

When measuring overall-sensitivity at the antenna terminal, use a 40 MF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowances must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Microvolt Input</th>
<th>Generator Feed at Connected to</th>
<th>Dummy Antenna Capacity</th>
<th>Leak Resistance</th>
<th>Output Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>.25 Volts</td>
<td>400 cycles</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>2.2 Volts</td>
</tr>
<tr>
<td>25,000</td>
<td>362 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>2.2 Volts</td>
</tr>
<tr>
<td>200</td>
<td>362 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>2.2 Volts</td>
</tr>
<tr>
<td>800</td>
<td>600 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>2.2 Volts</td>
</tr>
<tr>
<td>45</td>
<td>600 K.C.</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>2.2 Volts</td>
</tr>
<tr>
<td>2</td>
<td>600 K.C.</td>
<td>Ant. Lead 40 MF</td>
<td>None</td>
<td>2.2 Volts</td>
</tr>
</tbody>
</table>

* For one watt output.
** Meter connected across voice coil.
V.C. Impedance - 5 ohms at 400 cycles.
2.2 Volts equals 1 watt output.
GALVIN MFG. CORP.

MODEL 9-44
Socket, Trimmers, Drive
Alignment

MODEL 9-49
Alignment

SENSITIVITY AND GAIN MEASUREMENTS

A table outlining the sensitivity and gain measurements of the model 9-44 is provided. The table includes columns for the generator type, set at a specific frequency, and the resulting output voltage. The table is as follows:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Generator Type</th>
<th>Gain</th>
<th>Output Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 kHz</td>
<td>220 Kc.</td>
<td>.25</td>
<td>2.5 Vols.</td>
</tr>
<tr>
<td>40 kHz</td>
<td>220 Kc.</td>
<td>.5</td>
<td>5.0 Vols.</td>
</tr>
<tr>
<td>50 kHz</td>
<td>220 Kc.</td>
<td>.75</td>
<td>7.5 Vols.</td>
</tr>
</tbody>
</table>

A caution is also included: if you use a screwdriver to pry out the coil leads, be careful not to crack the glass bead around the tube pins.

©John F. Rider, Publisher
MODEL 15F
Sensitivity, Gain, Voltage Alignment, Socket, Trimmers

GALVIN MFG. CORP.

ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

R. F. ALIGNMENT

1. Change to 40 MF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna pad and until a combination is found which gives highest output reading.

Figure 1 - Trimmers

<table>
<thead>
<tr>
<th>TUBE LAYOUT MODEL-15F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
INTERMEDIATE FREQUENCY 455KC
TUNING RANGE 535 TO 1550 KC

Figure 1 - Trimmers

Model 16-C
CUSTOM BUILT FOR 1939 CHEVROLET

CAUTION
When removing Loctal tubes from their sockets, do not pry them out with a
screw driver unless you take extreme care not to break the glass seal around
the pin terminals. To do so will render the tube worthless.
ALIGNMENT PROCEDURE

1. Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

2. Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

3. Connect the signal generator to the antenna lead through a 3-pF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

4. Set the signal generator at 450 Kc, and carefully adjust the single trimmer in the 450-ke. coil to point showing the highest output reading.

5. Set the signal generator at 1400 Kc, and turn the condenser gang to the point showing the highest output reading.

6. Set the signal generator at 600 Kc, and then turn it to the 600-ke. position on the dial scale, while adjusting the antenna pads until a combination is found which gives highest output reading.

7. Take cord (b) and bring it over to idler pulley No. 2, as shown in Fig. 6.

8. Continue cord (b) around the drive pulley and then thread the end of the cord through the hole in the drive pulley.

9. Remove the paper clip holding cord (a) and continue winding around idler pulley No. 2, and then thread the end of the cord through the hole in the drive pulley.

10. Assemble the lead rings on both ends of both cords tightly together inside the holes in the pulleys. Then thread the other end through the hole and out through the pulley.

11. Assemble the lead rings on both ends of both cords tightly together inside the holes in the pulleys. Then thread the other end through the hole and out through the pulley.

12. Set the pointer to correct frequency, in a station of known frequency and adjust position of pointer on string.

13. Secure paper clip with a drop of shelfer. Add auxiliary tension spring between cord (a) and (b).

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in millivolts.

Starting with the second detector - first audio stage, and working back step by step to i-f., o-m, and finally to the antenna terminal, the circuit in which the trouble exists will be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 mf condenser, with a .005-ohm resistor connected as a lead resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 400 ke. condenser in place of the .1 mf condenser. It must be remembered that the figures in the table are only guides and must be made for varying conditions and angles of the circuit, due to difference of tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Microvolt Input</th>
<th>Generator 1 2 3 4 5</th>
<th>Set at</th>
<th>Generator</th>
<th>Feedor</th>
<th>Dress</th>
<th>Antenna</th>
<th>Lead</th>
<th>Output Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>50,000</td>
<td>450 Kc.</td>
<td>IF Grid</td>
<td>.1 mf</td>
<td>.5 mg</td>
<td>1.74 Volts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>600 Kc.</td>
<td>Mod. Grid</td>
<td>.1 mf</td>
<td>.5 mg</td>
<td>1.74 Volts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>600 Kc.</td>
<td>Mod. Grid</td>
<td>.1 mf</td>
<td>.5 mg</td>
<td>1.74 Volts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>600 Kc.</td>
<td>IF Grid</td>
<td>.1 mf</td>
<td>.5 mg</td>
<td>1.74 Volts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>600 Kc.</td>
<td>Ant. Lead</td>
<td>10 mf</td>
<td>None</td>
<td>1.74 Volts</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For 1 volt output.

** Output meter connected across voice coil.

1.74 Volts equals 1 volt output.

V.C. resistance = 3 ohms.

VOLTAGE CHART - MODEL 14-C

<table>
<thead>
<tr>
<th>TUBE</th>
<th>POSITION</th>
<th>PLATE</th>
<th>SCREEN</th>
<th>CATHODE</th>
<th>GCL. PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>747</td>
<td>RF</td>
<td>250</td>
<td>55</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>756</td>
<td>Osc. Mod.</td>
<td>200</td>
<td>55</td>
<td>0</td>
<td>55</td>
</tr>
<tr>
<td>756</td>
<td>IF</td>
<td>210</td>
<td>60</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>756</td>
<td>Set. Mod.</td>
<td>100</td>
<td>60</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>756</td>
<td>Output</td>
<td>200</td>
<td>55</td>
<td>0</td>
<td>55</td>
</tr>
<tr>
<td>620</td>
<td>Rect.</td>
<td>-</td>
<td>0</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

All measurements from chassis ground to socket terminal using 1000 ohms per voltmeter.

Battery voltage 6.3 V. Current Consumption 6.8 Amps. Maximum Power Output 2 watts.

DIAL CORD INSTRUCTIONS

NOTE: If exact Motorola assembly is not available, use original spring and .03 ohm fish toroid to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.

2. Loop short end of cord around set screw (a) in condenser gear.

3. Make one complete turn clockwise around condenser gear hub.

4. Stretch spring and make one complete turn around the tuning gear hub with the long end of the backlash cord.

5. Loop the end of cord around drive pin "a".

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

Figures 3, 4 and 5

PAGE 10:14 MOTOROLA

COMPLIMENTS OF W. W. SHERMAN
ALIGNMENT PROCEDURE

1. Remove the chassis from the housing and place it on the service bench. Connect the speaker and battery.

2. Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

3. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser knob completely out of mesh. Connect an output meter across the speaker voice coil.

4. Set the signal generator at 485 Kc and carefully adjust the single trimmer in the diode cell can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

5. Adjust the two trimmers in the I.F. cell can to the point showing the highest output reading.

NOTE: The antenna pad is reached through a hole in the side of the chassis base, directly under the antenna cell can.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize troubles quickly, since they are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to i-f., o-c., and finally to the antenna terminal, the circuit in which the trouble exists will generally be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 0.01 ohm resistor connected as a load resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowances must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Microvolt Input</th>
<th>Generator Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,000</td>
<td>485 Kc</td>
</tr>
<tr>
<td>250</td>
<td>485 MΩ</td>
</tr>
<tr>
<td>250</td>
<td>485 MΩ</td>
</tr>
<tr>
<td>75</td>
<td>485 Kc</td>
</tr>
<tr>
<td>75</td>
<td>485 MΩ</td>
</tr>
</tbody>
</table>

NOTE: The antenna pad is reached through a hole in the side of the chassis base, directly under the antenna cell can.

Figure 1 - Trimmers

DIAG. DRIVE CORD ASSEMBLY - PART NO. 2114744

1. Remove all screws, nuts, and washers from the chassis.

2. If necessary, the additional adapter is not available, use a piece of 30 lb. silk fish cord 46 inches long. Connect the ends of the adapter as shown in Fig. 2.

3. Will the loop through the hole in the chassis.

4. Continue cord 'A' around idler pulley No. 3 and down to the drive pulley, making one-half turn around the pulley to the slot, then continue cord 'B' around the drive pulley and one-half turn around the pulley to the slot.

5. Continue cord 'B' around idler pulley No. 2 and one-half turn around the pulley to the slot, then continue cord 'A' around idler pulley No. 2 and one-half turn around the pulley to the slot, then continue cord 'B' around idler pulley No. 2 and one-half turn around the pulley to the slot.

6. Continue cord 'B' around idler pulley No. 2 and down to the drive pulley, making one-half turn around the pulley to the slot, then continue cord 'A' around idler pulley No. 2 and one-half turn around the pulley to the slot.

7. Continue cord 'A' around idler pulley No. 2 and down to the drive pulley, making one-half turn around the pulley to the slot, then continue cord 'B' around idler pulley No. 2 and one-half turn around the pulley to the slot.

8. Continue cord 'B' around idler pulley No. 2 and down to the drive pulley, making one-half turn around the pulley to the slot, then continue cord 'A' around idler pulley No. 2 and one-half turn around the pulley to the slot.

9. Continue cord 'A' around idler pulley No. 2 and down to the drive pulley, making one-half turn around the pulley to the slot, then continue cord 'B' around idler pulley No. 2 and one-half turn around the pulley to the slot.

10. Continue cord 'B' around idler pulley No. 2 and down to the drive pulley, making one-half turn around the pulley to the slot, then continue cord 'A' around idler pulley No. 2 and one-half turn around the pulley to the slot.

11. Stretch spring and make one complete turn counter-clockwise around pulley 'G' and hook the loop at the end of the cord around tube 'C' of condenser gear.

NOTE: Spring tension must be sufficient to take up backlash in gear train. Adjust tension through selection of gear tooth in Step 6 above.

Model 17-D

CUSTOM BUILT FOR 1939

CHRYSLER

DE SOTO

DODGE

PLYMOUTH
GALVIN MFG. CORP.

MODEL 18-O
Schematic, Socket
Trimmers

Figure 1 - Trimmers

CUSTOM BUILT FOR 1939 OLDSMOBILE

CAUTION
When removing, indicator tubes from their sockets, do not pry them out with a screwdriver. Always use the same care in reinserting them as you used in removing them. To do so will render the tube worthless.

©John F. Rider, Publisher

Compliments of www.nucow.com
**ALIGNMENT PROCEDURE**

Remove the chassis from its housing and place it on a service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, using the signal generator output if necessary.

**R. P. ALIGNMENT**

1. Connect the signal generator to the antenna lead through a .1 uf capacitor and to chassis ground. Turn the condenser gain completely out of mesh. Enable the signal generator output and adjust the trimmer to the point showing the highest output reading.

2. Set the signal generator to 1400 K.C. and turn the condenser gain completely out of mesh. Enable the signal generator output and adjust the trimmer to the point showing the highest output reading.

3. Set the signal generator to 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna trimmer, until a combination is found which gives the highest output reading.

4. Repeat the R. P. and Diode adjustment seven times for maximum accuracy.

**DIODE DRIVE CORD ASSEMBLY - PART NO. 111474**

1. While not essential, it will find it easier to work if you remove the front plate from the chassis. This requires removal of the dial light bracket, the bottom coil bracket, the volume control, and the wood cover or back connection of the variable condenser.

2. If the exact Motorola assembly is not available, cut a piece of 30 lb. wide silk fish cord about 2 inches long, ending from the rear of the chassis as in Fig. 2.

3. Loop cord "A" over lead's pulley No. 1 and across the chassis to lead pulley No. 2 and hold the end of the cord tight. Turn the pulley 90° to the right (clockwise), thereby winding all turns of cord "A" on the pulley.

4. Use a paper clip to slip the loose end of cord "A" to the front plate so you can work on cord "B," which is the same as cord "A" except a little longer.

5. Loop cord "B" over lead pulley No. 3, and across the chassis to lead pulley No. 4.

**DIODE CORD INSTRUCTIONS**

**BACKLASH CORE AND SARRY ASSEMBLY - PART NO. 111474**

1. If the exact Motorola assembly is not available, use original spring and 50 lb. wide silk fish cord to make up assembly as shown at the top of Fig. 2.

2. Turn gang to fully raised position.

3. Loop long end of cord around set screw (A) in upper gear.

4. Make sure complete turn around inner gear tab.

5. Stretch spring and loop other end around set screw (B) in inner gear.

**NOTE:** Spring tension must be sufficient to take up all backlash in gear teeth.

---

**VOLTAGE CHART - MODEL 18-0**

<table>
<thead>
<tr>
<th>TUBE</th>
<th>INPUT</th>
<th>PLATE</th>
<th>HEISEN</th>
<th>GATEWAY</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>747 or 745</td>
<td>R.F.</td>
<td>185</td>
<td>100</td>
<td>7.7</td>
<td>-</td>
</tr>
<tr>
<td>755 or 754</td>
<td>Dyn.</td>
<td>185</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>756 or 756</td>
<td>I.F.</td>
<td>185</td>
<td>100</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>755</td>
<td>Det.-AGC</td>
<td>75</td>
<td>-</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>705</td>
<td>Output</td>
<td>125</td>
<td>100</td>
<td>-</td>
<td>200</td>
</tr>
<tr>
<td>024 or 025</td>
<td>Rect.</td>
<td>AC</td>
<td>-</td>
<td>200</td>
<td>-</td>
</tr>
</tbody>
</table>


All measurements from socket terminal to chassis ground, using 1000 ohm per volt meter.

Battery Voltage = 6.3 V.

Current Consumption = 6.5 Amps.

Maximum Power Output = 7.5 watts.

**SENSITIVITY AND TUBE GAIN MEASUREMENTS**

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in micro-volts.

Starting with the second detector - first audio stage, and working back stage by stage to I.F., Det.-AGC, and finally to the antenna terminal. The circuit in which the trouble exists will usually be identifiable by evidence of low gain. When signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a 1.1 M. resistor, with a 100 ohm resistor connected as a load resistance between the grid of the tube and the grid lead which has been removed.

When measuring overall gain at the antenna terminal, use a 40 K. resistor in place of the 1.1 M. It must be remembered that the figures in the table are average and allowance must be made for variation between two sets of the same general type, due to difference of tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Microvolt</th>
<th>Generator</th>
<th>Generator</th>
<th>Average Capacitance</th>
<th>Leak</th>
<th>Output</th>
<th>M.S. or watt output.</th>
<th>V.C. impedance</th>
<th>M.S. or watt output.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
<td>405 K.C.</td>
<td>747</td>
<td>160</td>
<td>100</td>
<td>-</td>
<td>.7 M.</td>
<td>1.74 Volts</td>
<td>.7 M. 1.74 Volts</td>
</tr>
<tr>
<td>500</td>
<td>600 K.C.</td>
<td>747</td>
<td>160</td>
<td>100</td>
<td>-</td>
<td>.7 M.</td>
<td>1.74 Volts</td>
<td>.7 M. 1.74 Volts</td>
</tr>
<tr>
<td>4</td>
<td>600 K.C.</td>
<td>Ant. Lead</td>
<td>40 M.</td>
<td>None</td>
<td>1.74 Volts</td>
<td>1.74 Volts</td>
<td>None 1.74 Volts</td>
<td></td>
</tr>
</tbody>
</table>

*For one watt output.*

**For one watt output.**

---

**Page 10-18, Motorola, Model 20, Service Manual, 1950.**

Compliments of www.nucow.com
Sensitivity and Gain Measurements

These stage-gain measurements will be properly used, enable you to real-time trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., O.C., etc. MOD. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by a low output signal, when signal generator attenuation readings are compared to the normal values as shown in the tables.

All stage-gain measurements must be made with the volume control set for full volume. The chocked lead from the signal generator is connected to the grid terminal of the type through a .1 MF condenser, with a 100 K ohm resistor inserted as a load between the grid of the tube and the grid lead which has been removed.

When measuring overall sensitivity at the antenna terminal, use a 40 MF condenser in place of the .1 MF condenser.

It must be remembered that the figures in the table are average and must be made for variations between two sets of same general type, due to differences in tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Microvolts</th>
<th>Generator Input</th>
<th>Generator</th>
<th>Dummy Antenna</th>
<th>Leak Resistance</th>
<th>Output Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td>455 K.C.</td>
<td>787 Grid</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>100</td>
<td>455 K.C.</td>
<td>786 Grid</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>180</td>
<td>600 K.C.</td>
<td>787 Grid</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>18</td>
<td>600 K.C.</td>
<td>787 Grid</td>
<td>.1 MF</td>
<td>.5 Meg</td>
<td>1.74 Volts</td>
</tr>
<tr>
<td>1</td>
<td>600 K.C.</td>
<td>Ant. Lead</td>
<td>40 MF</td>
<td>None</td>
<td>1.74 Volts</td>
</tr>
</tbody>
</table>

* For 1 watt output.

** Output meter connected across voice coil.

V.C. resistance - 5 ohms.

VOLTAGE CHART - MODEL 19-B

<table>
<thead>
<tr>
<th>TUBE</th>
<th>POSITION</th>
<th>PLATE</th>
<th>SCREEN</th>
<th>CATHODE</th>
<th>G.C.</th>
<th>PIPER</th>
</tr>
</thead>
<tbody>
<tr>
<td>787</td>
<td>FP</td>
<td>250</td>
<td>75</td>
<td>7.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>786</td>
<td>C.C. - Mod.</td>
<td>250</td>
<td>75</td>
<td>5.5</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>787</td>
<td>IF</td>
<td>250</td>
<td>75</td>
<td>5.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>784</td>
<td>Det. - Mod.</td>
<td>250</td>
<td>-</td>
<td>-</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>702</td>
<td>Output</td>
<td>250</td>
<td>220</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>705</td>
<td>Output</td>
<td>250</td>
<td>220</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>034</td>
<td>B.C.</td>
<td>AC</td>
<td>500</td>
<td>500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All voltages measured from socket terminal to chassis ground using 1000 ohms per volt meter.

Current - 7.0 Amps at 6.5 Volts.

Maximum power output - 12 Watts.

ALIGNED COMPONENT ASSEMBLY - PART NO. ZI 41730

NOTE: If exact Motorola assembly is not available, use original wiring and 30 lb. silk from cord to make up assembly as shown as at the top of Fig. 5.

1. Turn gong to fully seated position.
2. Loop long end of cord around set screw (a) in tuning unit.
3. Make one complete turn around gear hub.
4. Stretch string and loop other end around set screw (b) in condenser gear.

NOTE: Spring tension must be sufficient to take up all slackness in gear train.

Figure 2
SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc. - Mod. A.F., and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table. All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which was been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to differences in tube characteristics, etc.

<table>
<thead>
<tr>
<th>Average Generator</th>
<th>Generator Feeder Connected to</th>
<th>Dummy Antenna Capacity</th>
<th>Leak Resistance</th>
<th>Output Meter Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microvolt Input *</td>
<td>Set at</td>
<td>Connected to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,000</td>
<td>455 K.C.</td>
<td>IF Grid</td>
<td>.1 MF</td>
<td>.5 Mag</td>
</tr>
<tr>
<td>400</td>
<td>455 K.C.</td>
<td>Mod. Grid</td>
<td>.1 MF</td>
<td>.5 Mag</td>
</tr>
<tr>
<td>450</td>
<td>600 K.C.</td>
<td>Mod. Grid</td>
<td>.1 MF</td>
<td>.5 Mag</td>
</tr>
<tr>
<td>25</td>
<td>600 K.C.</td>
<td>RF Grid</td>
<td>.1 MF</td>
<td>.5 Mag</td>
</tr>
<tr>
<td>2</td>
<td>600 K.C.</td>
<td>Ant. Lead</td>
<td>40 MF</td>
<td>None</td>
</tr>
</tbody>
</table>

* For one watt output. ** Meter connected across voice coil.

VOLTAGE CHART - MODELS 20-P, 21-L, AND 24-K

<table>
<thead>
<tr>
<th>TUBE</th>
<th>POSITION</th>
<th>PLATE</th>
<th>SCREEN</th>
<th>CATHODE</th>
<th>OSC. PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7B+</td>
<td>RF</td>
<td>180</td>
<td>80</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>7A+</td>
<td>Osc.-Mod.</td>
<td>180</td>
<td>80</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>78</td>
<td>IF</td>
<td>180</td>
<td>80</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>6LQ7</td>
<td>Det.-Ave.</td>
<td>180</td>
<td>-</td>
<td>-2.6</td>
<td>-</td>
</tr>
<tr>
<td>4L</td>
<td>Output</td>
<td>180</td>
<td>180</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>4L</td>
<td>Output</td>
<td>180</td>
<td>180</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>024</td>
<td>Rect.</td>
<td>180</td>
<td>180</td>
<td>15</td>
<td>-</td>
</tr>
</tbody>
</table>

* SSB -5.6 V. from B stick ** SSB -5.6 V. from B stick

Current - 6.5 Amps. at 6.5 Volts
Maximum power output 4.5 Watts
All readings from chassis ground with 1000 ohms per volt meter.
6 Tube - 32 Volt D. C.
Superheterodyne Receiver

Nov., 1935

Compliments of www.nucow.com
**Model 6D Alignment, Voltage Trimmers, Voltage**

**Gamble Skogmo, Inc. Specifications**

- **Power Consumption**: 1.2 Amperes at 32 Volts DC
- **Power Output**: .25 Watts Undistorted
- **Selectivity**: 29 KC Broad at 1000 Times Signal
- **Sensitivity**: 10 Microvolts Absolute

---

![Antenna R.F. Trans.](image1)

**ANTENNA R.F. TRANS.**

![Interstage R.F. Trans.](image2)

**INTERSTAGE R.F. TRANS.**

![Osc. Coil](image3)

**OSC. COIL**

---

**Fig. 3—R.F. and Oscillator Coil Base Termination Arrangement and D. C. Resistance of Windings**

---

**D. C. Resistance of Windings**

Refer to Fig. 3

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Winding Code</th>
<th>D. C. Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-9A452</td>
<td>Antenna R.F. Transformer</td>
<td>T1 11.5</td>
</tr>
<tr>
<td></td>
<td>Primary No. 1</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>Primary No. 2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Windings in Series</td>
<td>2.8</td>
</tr>
<tr>
<td>P-9A453</td>
<td>Interstage R.F. Transformer</td>
<td>T2 4.4</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td>5.7</td>
</tr>
<tr>
<td>P-9A454</td>
<td>Oscillator Coil</td>
<td>T1 3.6</td>
</tr>
<tr>
<td></td>
<td>Grid Coil</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Plate Coil</td>
<td>1.5</td>
</tr>
<tr>
<td>P-9A455</td>
<td>1st I.F. Transformer</td>
<td>T3 102.0</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td>99.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td>99.0</td>
</tr>
<tr>
<td>P-9A466</td>
<td>2nd I.F. Transformer</td>
<td>T5 100.0</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td>100.0</td>
</tr>
<tr>
<td>P-50X22</td>
<td>Audio Input Transformer</td>
<td>T6 380.0</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td>380.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td>380.0</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Inside</td>
<td>85.0</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Outside</td>
<td>95.0</td>
</tr>
<tr>
<td>P-12A219</td>
<td>Dynamic Speaker</td>
<td>L2 90.0</td>
</tr>
<tr>
<td></td>
<td>Speaker Field</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>Speaker Voice Coil</td>
<td>90.0</td>
</tr>
<tr>
<td>P-50X33</td>
<td>Audio Output Transformer (5X22)</td>
<td>T7 1.1</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Inside</td>
<td>152.0</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Outside</td>
<td>176.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Filter Choke</td>
<td>L1 50.0</td>
</tr>
</tbody>
</table>

---

**I. F. Adjustment 175 KC**

Connect the output lead of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

**1750 KC Adjustment**

Connect the antenna lead of the signal generator to the antenna lead of the receiver through a 200 mmf. condenser. Adjust the trimmer of the oscillator section.

**1500 KC Adjustment**

Loosen the pointer screw and set the pointer at the 1500 KC mark on the dial scale. Retighten the pointer screw.

Adjust the 1st detector and antenna trimmers for maximum output.

---

©John F. Rider, Publisher

---

**VOLTAGES AT SOCKETS**

Volume Control at Maximum —
Antenna Connected to Ground LEAD

<table>
<thead>
<tr>
<th>Type of Tube</th>
<th>Function</th>
<th>Across Heater</th>
<th>Plate to Ground</th>
<th>Screen to Ground</th>
<th>Cathode to Ground</th>
<th>Normal Plate MA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R.F.</td>
<td>6.4</td>
<td>81</td>
<td>31</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>6A7</td>
<td>1st Det. &amp; Osc.</td>
<td>6.4</td>
<td>31</td>
<td>18</td>
<td>2</td>
<td>.25</td>
</tr>
<tr>
<td>6D6</td>
<td>I.F.</td>
<td>6.4</td>
<td>31</td>
<td>31</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>85</td>
<td>2nd Det.</td>
<td>6.4</td>
<td>12.5</td>
<td>18</td>
<td>1.8</td>
<td>.20</td>
</tr>
<tr>
<td>43</td>
<td>1st Audio</td>
<td>25.6</td>
<td>28</td>
<td>31</td>
<td>3.5</td>
<td>7</td>
</tr>
<tr>
<td>6A6</td>
<td>Output</td>
<td>6.4</td>
<td>31</td>
<td>0</td>
<td>11 (per plate)</td>
<td></td>
</tr>
</tbody>
</table>

---

(1) Anode Grid

---

**Fig. 4—Tube Arrangement**

---

Compliments of www.nucow.com
Fig. 1—Schematic Circuit Diagram

15 C 6
APRIL, 1938

Tuning Frequency Range 528 to 1550 KC
Intermediate Frequency 456 KC
Speaker 6" Dynamic

Power Consumption 5.5 Amperes at 6.3 Volts
Power Output .8 Watt Undistorted
Sensitivity 10 Microvolts at .5 Watt Output
Selectivity 42.5 KC Broad at 1000 Times Signal
Alignment Procedure

Remove the bottom and front chassis covers. Directions for removing the bottom cover are in the instruction book. To remove the front cover, first pull the knobs and buttons off the shell. Remove the 2 screws at the top and the 2 screws at the sides of the front cover. Press in the sides of the chassis case to release the lugs at the sides of the front cover. Pull outward on the bottom of the front cover and then push the cover up until the lugs at the top are released.

Do not remove the back of the chassis case. This can be taken off of the No. 2, and later units set. The signal generator for 486 KC and connect the output of the signal generator through a coaxial connector to the control grid of the 1st Detector. Connect the ground lead of the generator to the chassis. Set the volume control at maximum. Attempt the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. These trimmers can be reached through the 4 holes in the back wall of the chassis case. It will be necessary to pull out the fiber insulating sleeve a slight amount. Insert the antenna cable plug in the antenna socket on the chassis.

Rotating Pointer Models—If the antenna is connected to the TC terminal and the entire 60-inch shielded cable (70 mmf) is used, connect the antenna wire to the other end through a 25 mmf condenser to the antenna post of the signal generator.

If the antenna is connected to the LC terminal, the antenna cable has been cut as explained in the instructions. If cut in at half (50-inch length), the capacity of the cable antenna is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf condenser to the antenna post of the signal generator.

Sliding Pointer Models—If the antenna is connected at the TC terminal and the 60-inch shielded cable (70 mmf) is being used, connect the antenna wire on the other end through a 250 mmf condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal and the short shielded cable (18 mmf) is being used, connect the antenna wire, in this case, through 30 mmf condenser to the antenna post of the signal generator. If the antenna cable has been cut to length and is being used, the total capacity of the cable and the series condenser should be 38 to 40 mmf.

Gain Equalizations—Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gain condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the trimmer of the antenna section of the gain condenser for maximum output.

Calibration—Rotating Pointer Models—To obtain dial scale calibration, tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

Calibration—Sliding Pointer Models—The pointer assembly is clamped to the drive cord and it is seldom necessary to reset it to obtain proper dial calibration. Re-calibration is required, loosen the clamps with a screw driver, bringing the pointer assembly first down to one end of the dial scale and then down to the other end. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the scale and tighten the clamps with long nose pliers.

Drive Cord Replacement—Rotating Pointer Models

Tie a knot with a small loop at one end of the new drive cord. The free end of the drive cord is tied to the tension spring. The distance between knots should be 231 inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—see Fig. 3. Bring the cord up through the slot in the drum shaft. Pass cord around pulley B as shown. Wind one turn clockwise from front of chassis around point on the pulley C. Loop cord through the notches on the outside rim of the pointer disc as shown. Wind 3½ turns clockwise, progressing from a point midway between the two bracket arms toward the chassis. Bring cord under pulley D and around pulleys E and F as shown. See that the fabric tubing is now between pulleys E and F. Bring the drive cord to the rear around drive drum A and through the slot in the drum rim as shown.

Turn the gang condenser to full open position and place the free end of the tension spring over the hook on drive drum A.

Tighten the dial scale adjustment—Mount the dial scale on the dial bracket. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the dial scale and tighten the clamps with long nose pliers.

Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The correct method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the ➞ mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (−) terminal of the car battery is cunded, line up the ➞ mark on the top of the vibrator with the arrow on the chassis base.

Antenna Capacity

Rotating Pointer Models—The antenna coil is designed for car antennas with a capacity of 190 mmf for the HC connection and 60 mmf for the LC connection. This capacity is the total capacity of the antenna and the shielded leads.

Complete information regarding car antenna installation, will be found in the instruction book packed with the radio.

Sedding Pointer Models—The information for this type of radio is the same as above except that the HC capacity is 800 mmf and the LC capacity is 38 mmf.

Two Models

One model has a rectangular dial scale with a sliding pointer. The other model has a circular dial scale with a rotating pointer disc.

The 2 models also differ in the capacities of the antennas which may be used. The values are shown in article “Antenna Capacity.”

Issue No. 1

Mechanical Assembly—The 2 front mounting studs are attached to the top of the chassis case.

The I.F. coil cans have a spring clip by means of which they are secured to the chassis.

The back of the chassis case is not removable.

Electrical Assembly—See electrical changes under “Issue No. 2.”

Issue No. 2

Mechanical Changes—The chassis case is supplied with a front mounting bracket and this bracket is secured to the instrument panel of the car by means of 2 separate bolts.

The I.F. case uses a threaded speaker lug which extends through the chassis base and is secured in place with nuts and lock washers.

The back of the chassis case can be removed.

Electrical Changes—The following changes are all illustrated in the schematic—Fig. 1.

The 650 tube plate No. 1, which was connected originally to ground is removed from ground and connected as shown in the schematic.

Condenser C20 is removed.

The position of condenser C22 is changed as shown.

Resistor R15 (200 ohms) is removed and replaced by choke L4.
SERVICE NOTES:

Voltage taken from different points of circuit to chassis are measured with voltmeter 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 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 where on schematic is circuit diagram.

To check for open by-pass condensers, short each condenser with a small plugs (do not use metal pliers) and volume which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in high, is usually caused by a shorted by-pass condenser, open by-pass condensers frequently cause oscillating and distorted tone.

ALIGNING INSTRUCTIONS:

CALL COMPANY: No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective or poor installation of open ground antenna system, defective condensers and resistors. To properly align this chassis, an oscillator (pentode) is necessary.

All adjustments should be made with a non-metallic screwdriver.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the output transformer, or by means of an adapter between the plug and screen terminals of the type 6AV6 output tube. Max reading deflection of meter indicates resonance. Use only enough signal to get a readable output. A low range output meter or the low side of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1 (E.F.T.): 600 ohm resistor connected in series with the external oscillator.

Dummy 2: 5000 kilohm resistor in the medium wave position, across the output of, and with external oscillator set at 3675 kilohertz and connected to "Dummy 2", 1500 ohm resistor in series with the external oscillator.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: 600 ohm resistor connected in series with the external oscillator.

Dummy 2: 5000 kilohm resistor in the medium wave position, across the output of, and with external oscillator set at 3675 kilohertz and connected to "Dummy 2", 1500 ohm resistor in series with the external oscillator.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: 600 ohm resistor connected in series with the external oscillator.

Dummy 2: 5000 kilohm resistor in the medium wave position, across the output of, and with external oscillator set at 3675 kilohertz and connected to "Dummy 2", 1500 ohm resistor in series with the external oscillator.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: 600 ohm resistor connected in series with the external oscillator.

Dummy 2: 5000 kilohm resistor in the medium wave position, across the output of, and with external oscillator set at 3675 kilohertz and connected to "Dummy 2", 1500 ohm resistor in series with the external oscillator.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: 600 ohm resistor connected in series with the external oscillator.

Dummy 2: 5000 kilohm resistor in the medium wave position, across the output of, and with external oscillator set at 3675 kilohertz and connected to "Dummy 2", 1500 ohm resistor in series with the external oscillator.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: 600 ohm resistor connected in series with the external oscillator.

Dummy 2: 5000 kilohm resistor in the medium wave position, across the output of, and with external oscillator set at 3675 kilohertz and connected to "Dummy 2", 1500 ohm resistor in series with the external oscillator.
GAMBLE SKOGMO, INC.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME V111

Frequency Range — 535-1720 Kilocycles

REPAIR PARTS (Serial No. 7J852900 and up)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Resistance</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1, R2</td>
<td>1 MΩ, 2 MΩ</td>
<td>2 MΩ, 5 MΩ</td>
<td>5 MΩ</td>
<td>in same unit</td>
</tr>
<tr>
<td>R3, R4</td>
<td>1 MΩ, 2 MΩ</td>
<td>2 MΩ, 5 MΩ</td>
<td>5 MΩ</td>
<td>in same unit</td>
</tr>
<tr>
<td>R5, R6</td>
<td>10 kΩ, 20 kΩ</td>
<td>20 kΩ, 50 kΩ</td>
<td>50 kΩ</td>
<td>in same unit</td>
</tr>
<tr>
<td>R7, R8</td>
<td>100 kΩ, 200 kΩ</td>
<td>200 kΩ, 500 kΩ</td>
<td>500 kΩ</td>
<td>in same unit</td>
</tr>
<tr>
<td>C1, C2</td>
<td>0.001 µF, 0.002 µF</td>
<td>0.002 µF, 0.003 µF</td>
<td>0.003 µF</td>
<td>in same unit</td>
</tr>
</tbody>
</table>

BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative (-) to the negative (-) post of the storage battery.

(c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.

©John F. Rider, Publisher
ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No.108-95B Output I.F. Transformer
Part No. 108-96 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its resistance), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd, condenser, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 108-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-95B) if necessary.

1. R.F. ALIGNMENT: (535-1720 K.C.)

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mfd, condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

SERVICE NOTES:

Voltagas 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 115 volts on the primary of the power transformer.

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.

Excessive hum, studdering, 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 PROCEDURE

The following equipment is required for aligning:
- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mfd, 100 mmf.

BAND | SIGNAL GENERATOR FREQUENCY | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment
---|---|---|---|---|---|---|---
I.F. | 46 Kc. | 1 MFD. | Grid of 6AG | Rotor full open (Plates out of mesh) | Four trimmers (See Fig. 1) | Input I.F. and Adjust to maximum output
BROADCAST | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Output | Adjust to maximum output
BAND | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Broadcast Antennas | Adjust to maximum output

FREQUENCY RANGE | 535 to 1720 Kc.
Power Consumption | 50 Watts
Power Output | 1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency | 46 Kc.
MODEL 587 - Series A
DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.) - Consists of a 1.3 mfd condenser connected in series with the external oscillator.

Dummy 2: (Broadcast) - Consists of a 200 mfd 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 .01 mfd condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

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

Part No. 108-78A Output I.F. Transformer
Part No. 108-78A Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator at 465 kilocycles in series with "Dummy 1." In the control grid cap of the type 6SK7 tube, and adjust the output I.F. transformer (No. 108-78A) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6SK7 to grid cap of 6A8 and adjust input I.F. transformer (No. 108-78A) to resonance.
   (c) With oscillator still connected to 6A8, readjust output I.F. transformer (108-78A) if necessary.

BROADCAST AND SHORT WAVE BAND ALIGNMENT

Broadcast Band - 535 to 1700 Kilocycles
Short Wave Band - 2200 to 6000 Kilocycles.

Important: These adjustments must be made in the following order:

SHORT WAVE OSCILLATOR ADJUSTMENT:

1. With band switch in the short wave band position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with the external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:
   (a) Set external oscillator to 6.6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is marked "S.W. Osc." (see top view of chassis, Fig. 1, for location of this adjustment).

NOTE: Make certain that the fundamental 6.6 megacycles signal has been turned in and not the image frequency, noting that the image appears when the tuning knob is moved to approximately 5.7 megacycles.

BROADCAST BAND OSCILLATOR ADJUSTMENT:

1. With band switch in the broadcast position, extreme left of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. This adjustment is marked "B.C. Ant." (see top view of chassis, Fig. 1, for location of this adjustment).
   (b) With external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until, by adjusting series pad, maximum output is attained. This adjustment is located on the top of the chassis directly in front of the antenna coil. (See top view of chassis, Fig. 1.)
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

SHORT WAVE BAND ANTENNA ADJUSTMENT:

1. With the band switch in the short wave position, and with external oscillator connected in series with "Dummy 1," to the antenna lead and black ground lead, make the following adjustment:
   (a) Set external oscillator to 6 megacycles and adjust trimmer short wave antenna trimmer to resonance. This adjustment is the trimmer mounted on the rear section of the variable gang condenser.

MODEL 527C

FIG. 1—TOP VIEW

PROCEDURE FOR SETTING THE AUTOMATIC LEVELS:

There are five levers on the dial by means of which five stations may be selected. (See Fig.)

Make a list of local stations you tune in regularly; any number to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner button an opening is provided for inserting call letter tabs. (See A, Fig. 2.)

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small collodion tabs supplied should be snapped into place over each of the station call letter tabs.

Press down ALL THE WAY any one of the automatic tuner lever buttons. Holding it down firmly, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab on this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be exactly tuned in. Release the lever.

Press down another automatic tuner lever button. Holding it down firmly, carefully tune in the station indicated on the call letter tab in this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob. (See Fig. 2.)

It is VERY IMPORTANT that this locking screw be turned until it is absolutely tight. This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory.)

If you should desire to change any station you have selected to another, hold the tuning knob No. 2 securely, and with a coin loosen the locking screw "C" one or two turns; select the new station as explained, press to reposition the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—your favorite station is selected.
**MODEL 587—SERIES A**

**PARTS** (Serial No. 6G310775 and up)

**RESISTORS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>130-111</td>
<td>100M Ohms 1/16W—25%—50W Carbon</td>
</tr>
<tr>
<td>R2</td>
<td>130-12</td>
<td>50M Ohms 1/2W—25%—50W Carbon</td>
</tr>
<tr>
<td>R3</td>
<td>130-112</td>
<td>100M Ohms 1/16W—25%—50W Carbon</td>
</tr>
<tr>
<td>R4</td>
<td>130-22</td>
<td>3M Ohms 1/2W—25%—50W Carbon</td>
</tr>
<tr>
<td>R5</td>
<td>130-77</td>
<td>10M Ohms 1/2W—25%—50W Carbon</td>
</tr>
<tr>
<td>R6</td>
<td>130-110</td>
<td>1 meg Ohm 1/2W—25%—50W Carbon</td>
</tr>
<tr>
<td>R7</td>
<td>100-49</td>
<td>1 meg Ohm Volume Control</td>
</tr>
<tr>
<td>R8</td>
<td>130-113</td>
<td>2 meg Ohm 1/4W—25%—50W Carbon</td>
</tr>
<tr>
<td>R9</td>
<td>130-20</td>
<td>100M Ohms 1/16W—25%—50W Carbon</td>
</tr>
<tr>
<td>R10</td>
<td>130-50</td>
<td>50M Ohms 1/16W—25%—50W Carbon</td>
</tr>
<tr>
<td>R11</td>
<td>106-36</td>
<td>220 Ohms</td>
</tr>
<tr>
<td>R12</td>
<td>106-26</td>
<td>33 Ohms</td>
</tr>
<tr>
<td>R13</td>
<td>106-36</td>
<td>52 Ohms</td>
</tr>
</tbody>
</table>

**CONDENSERS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>107-63</td>
</tr>
<tr>
<td>C2</td>
<td>100-26</td>
</tr>
<tr>
<td>C3</td>
<td>129-02</td>
</tr>
<tr>
<td>C4</td>
<td>129-45</td>
</tr>
<tr>
<td>C5</td>
<td>100-9</td>
</tr>
<tr>
<td>C6</td>
<td>100-6</td>
</tr>
<tr>
<td>C7</td>
<td>100-12</td>
</tr>
<tr>
<td>C8</td>
<td>129-12</td>
</tr>
<tr>
<td>C9</td>
<td>129-12</td>
</tr>
<tr>
<td>C10</td>
<td>106-11</td>
</tr>
<tr>
<td>C11</td>
<td>106-19</td>
</tr>
<tr>
<td>C12</td>
<td>106-6</td>
</tr>
<tr>
<td>C13</td>
<td>106-36</td>
</tr>
<tr>
<td>C14</td>
<td>106-37</td>
</tr>
<tr>
<td>C15</td>
<td>124-29</td>
</tr>
<tr>
<td>C16</td>
<td>124-30</td>
</tr>
</tbody>
</table>

**TUNING RANGE—**

- **Standard Broadcast Band**
- **Short Wave Band**
- **2200-6000 Kilocycles**

**MICROELECTRONIC PARTS**

- T1 | 111-64A | Antenna Coil |
- T2 | 110-44 | Oscillator Coil |
- T4 | 106-76A | Output I.F. 465 Kc. |
- T5 | 104-55 | Power Transformer—60 Cycle |
- S | 125-19 | 35-Watt Switch |
- C | 102-31 | One Section of Two Gang Condenser |

**DESCRIPTION:**

**TUBES:**

The tube complement of this chassis consists of the following tubes:

1. **Type 6A8** Pentagrid Mixer, First Detector-oscillator
2. **Type 6K7** Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
3. **Type 6Q7-G** Duplex Diode Triode Second Detector, A.V.C. and First Audio.
4. **Type 6P6-G** Pentode Output Amplifier.
5. **Type 5Y3** High Vacuum Rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 105, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universally.
MODEL 552

IF ALIGNMENT 456 K.C. Connect signal generator to grid of 1C7G tube through a .01 MFD condenser, leave grid cap in place and open tuning condenser (turn dial to high frequency end). Peak IF trimmers — use an output meter — use only enough signal to give a readable output, and go over trimmers several times.

OSCILLATOR & ANTENNA ALIGNMENT: With pointer set to end of scale calibration when tuning condenser is closed, trim oscillator (rear section of tuning condenser) for maximum response at 1400 K.C. dial reading with a 1400 K.C. signal into the antenna lead. Next adjust padding condenser at 540 K.C. and recheck at 1400, then resonate antenna trimmer at 1400 K.C.

MODEL 541A

NOTCH, RED DOT OR HOLE

MODEL 541A but connect signal generator thru a .00025 condenser.
MODEL 602
Schematic, Voltage, Socket Trimmers, Alignment

PARTS (Serial No. 7D600, 100 and up)

<table>
<thead>
<tr>
<th>No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>120-17</td>
<td>10M ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R2</td>
<td>130-12</td>
<td>50M ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R3</td>
<td>130-149</td>
<td>13M ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R4</td>
<td>130-4</td>
<td>2 meg ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R5</td>
<td>101-27</td>
<td>Voltage Control (1 Meg)</td>
</tr>
<tr>
<td>R6</td>
<td>130-12</td>
<td>2M ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R7</td>
<td>130-30</td>
<td>100M ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R8</td>
<td>130-19</td>
<td>1 meg ohm - 1/2 w, 25%</td>
</tr>
<tr>
<td>R9</td>
<td>106-38</td>
<td>30 ohm</td>
</tr>
<tr>
<td>R10</td>
<td>106-38</td>
<td>40 ohm</td>
</tr>
<tr>
<td>R11</td>
<td>106-38</td>
<td>55 ohm</td>
</tr>
<tr>
<td>C2</td>
<td>R5, R10, and R11 in one unit</td>
<td></td>
</tr>
</tbody>
</table>

FIG. 1—TOP VIEW

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with voltmeter control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 2000 ohms per volt.

All voltages as indicated on diagram are measured with 110 volt A.C. or D.C. line.

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.

Excessively high, low voltage 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.

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 5L6G 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 - 465 KC - Model 602
I.F. ALIGNMENT - 447 KC - Models 602 B & C

Part No. 108-83B Output I.F. Transformer
Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

Models 602, 602B & 602C

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1200 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.
**DESCRIPTION:**

Model No. 666 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give minimum drift and variation of gain due to climatic changes.

The receiver is so designed that it may be used as either a single or two unit installation. Taps are provided on the output transformer to a pin jack terminal board, a red dot distinguishing dual speaker tap and green dot for single speaker operation.

For complete details see illustration and Header speaker data chart. Dash kits for the remote control head are available for 1936 cars drilled for dash plates.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

---

**CONCLUDES**

C 120-3
C1 120-30 .00005 Mica - "O" - 20%
C2 120-40 .00005 Mica - "O" - 5%
C3 116-18 .05 x 300 Volt
C4 116-18 .25 x 300 Volt
C5 116-17 .05 x 300 Volt
C6 116-17 .0002 Mica - MT - "O" - 20%
C7 116-17 .1 x 400 Volt
C8 116-17 .1 x 400 Volt
C9 116-17 .1 x 200 Volt
C10 116-17 .1 x 200 Volt
C11 116-17 .1 x 200 Volt
C12 116-16 .05 x 200 Volt
C13 116-8 .0001 Mica - MT - "O" - 20%
C14 120-5 .0006 Mica - MT - "O" - 20%
C15 116-8 .02 x 200 Volt
C16 120-5 .0001 Mica - MT - "O" - 20%
C17 116-16 .05 x 400 Volt
C18 110-5 .005 x 600 Volt - 10%
C19 116-16 .01 x 400 Volt
C20 100-35 .5 x 200 Volt - 50% - 10%
C21 100-35 .5 x 200 Volt - 50% - 10%
C22 100-35 .5 x 200 Volt - 50% - 10%
C23 100-35 .01 x 1400 Volt - 10%
C24 119-21 5.0 mfd. Lyric Cond. 350
C25 119-21 4.0 mfd. Lyric Cond. 350
C26 .5 mfd. Glimnick

R1 130-20 100M Ohm - 5/8 Watt 20% - 60 Volt - Carbon
R2 130-30 300 Ohm - 5/8 Watt - 20% - 10 Volt - Carbon
R3 130-30 500 Ohm - 5/8 Watt - 10% - 10 Volt - Carbon
R4 130-30 1000 Ohm - 5/8 Watt - 20% - 25 Volt - Carbon
R5 130-30 1000 Ohm - 5/8 Watt - 20% - 20 Volt - Carbon
R6 130-30 500 Ohm - 5/8 Watt - 10% - 10 Volt - Carbon
R7 130-30 12M Ohm - 1/2 Watt - 10% - 100 Volt - Carbon
R8 130-30 200 Ohm - 1/2 Watt - 10% - 10 Volt - Carbon
R9 130-30 500M Ohm - 5/8 Watt 20% - 100 Volt - Carbon
R10 130-30 40M Ohm - 5/8 Watt - 10% - 100 Volt - Carbon
R11 130-30 800 Ohm - 5/8 Watt - 10% - 10 Volt - Carbon
R12 101-42 50M Ohm - Volume Control and Switch
R13 130-22 5M Ohm - 5/8 Watt - 20% - 10 Volt - Carbon
R14 130-68 1 Meg Ohm - 5/8 Watt - 10% - 25 Volt - Carbon
R15 130-9 200M Ohm - 5/8 Watt - 20% - 25 Volt - Carbon
R17 130-3 500M Ohm - 5/8 Watt - 20% - 100 Volt - Carbon
R18 130-4 1 Meg Ohm - Tone Control

**PARTS**

- **Antenna Filter Coil Assembly**
  - T1 111-47 Antenna Coil Assembly
  - T2 111-47 Antenna Coil Assembly
  - T3 100-27 High Inductance
  - T4 100-27 R.F. Coil Assembly
  - T5 110-37 Oscillator Coil Assembly
- **Input F.M. Coil**
  - T6 110-69 Input F.M. Coil - 100K Ohm - 0.1 Ohm - 200K Ohm
- **Input F.M. Coil**
  - T7 106-69 Input F.M. Coil - 0.1 Ohm - 0.1 Ohm - 0.1 Ohm

**GAMBLE, SKOGIO, INC.**

**MODEL 666 Schematic Diagram**
SINGLE HEADER SPEAKER CONNECTIONS

Consult Fig. No. 1. On this application, all that is required is to remove speaker from receiver case and place in header board of car. Install the special seven foot shielded speaker cable and header filter plate assembly and insert the three leads, (which formerly connected the radio to the speaker) to the pin jacks on the header filter plate assembly. Remove the three short pigtail leads from the header filter plate assembly, namely, black, green and blue. These leads are only used when dual (two) speakers are to be used, one in the header and the other in the receiver case.

DUAL SPEAKER CONNECTIONS

Consult Fig. No. 1. On this application, leave speaker in receiver case, install a complete header speaker in the header board of the automobile and assemble header filter plate assembly and seven foot shielded cable to front cover of receiver case.

The speaker leads from the radio are removed from the terminal board of the set speaker and plugged into the pin jacks of the header filter plate assembly, making certain to match the colors of the leads with the dots on the pin jacks. The three short pigtail leads from the header filter plate assembly are then connected to the set speaker. Shift the green lead which runs to the output transformer (No. 106-27) to the pin jack with red dot for dual speaker operation.

For further explanation, consult Fig. No. 2 Single Header Speaker schematic diagram, and Fig. No. 3, Dual Speaker schematic diagram.

A more technical explanation of the manner of interconnecting the set speaker with the header speaker and header filter plate is that for dual speaker operation the two speakers are connected in parallel, and for single header speaker operation, three pigtail leads from the header filter plate terminal assembly are cut off. All leads are color-coded and correspond to color dots on the pin jacks mounted on the speakers and the terminal board of the header filter plate assembly. A tapped output transformer is provided for impedance matching.

The dummy antennas referred to in the following instructions are:

“IF Dummy” — A 1 mfd. condenser connected in series with the test oscillator output lead.

“Broadcast Dummy” — A 175 mfd. condenser connected in series with the output lead of the test oscillator.

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 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.

2. Adjust trimmer condensers of output I.F. transformer No. 106-72 to resonance with oscillator.

3. Move test oscillator connection to grid of 6AS tube and adjust trimmer condensers of input I.F. transformer No. 106-79 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. in series with broadcast dummy antenna to the antenna lead of receiver.

2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle 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. and antenna trimmers to resonance (see top view).

4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view).

5. Go back and check 1600 K.C. If adjustment is made here, check 600 K.C. again.

6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.
**GAMBLE-SKOOGMO, INC.**

---

**MODELS 676A, 685B**

**MODEL 807B**

**Schematics, Alignment**

---

**IF ALIGNMENT**

Adj. AT 456 KC thru .01 cond.

**BROADCAST ALIGNMENT**

Adj. Osc. Trimmer AT 1400 KC

Thru .00025 Cond.

Pad AT 540 KC.

Conventional Alignment

See special section Vol. VII

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 677A
MODEL 677B
Alignment, Socket, Trimmers
Automatic Tuner Procedure

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected. (See “B” Fig. 2.)

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the left (counter clockwise) as far as it will turn, and tighten the special reset lock screw ("C") located on left side of remote tuner unit. (See Fig. 2.)

The automatic dial is now set up for quick tuning. Press down on the lever and Presto—your favorite station is selected.

Fig. 2—Front View of Remote Tuner Unit

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Reset lock screw "C" is loose when radio is shipped from factory.)

If you desire to change any station you selected to another, loosen the locking screw "C" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

L.F. ALIGNMENT: (465 K.C.)

IMPORTANT:

To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the tertiary coil of this unit.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point.

Proceed as follows:


2. Adjust trimmers "G" and "H" of output I.F. transformer for maximum gain. (See Fig. 3, top view.)

3. Disconnect the 10M ohm resistor which has been shunted across the tertiary winding and adjust trimmer "I" for maximum gain.

(a) This transformer is now correctly tuned. Under no circumstances re-adjust trimmers "G" and "H" after the 10M ohm resistor has been removed.

(b) For alignment of the output I.F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used and the procedure is similar to the alignment of any two circuit I.F. transformer; merely tune for a symmetrical curve of maximum amplitude.

(c) Output connections for the cathode ray oscillograph should be made to pin No. 8 on 6Q7 tube socket and to the end terminal on the terminal strip; at this point the diode load resistors terminate.

4. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers "E" and "F" of input I.F. transformer for maximum gain.

NOTE: A red dot on top of output I.F. can designates location of trimmer "G"

BROADCAST ALIGNMENT:

1. With the dial on the Remote Tuner Unit set at 1560 K.C, connect test oscillator set at 1560 K.C. in series with broadcast dummy to the antenna lead of receiver. (1 MF Cond.)

2. Adjust oscillator trimmer (adjustment "C", on back of Remote Tuner Unit) to resonance. (See Fig. 4, back view.)

3. Re-set test oscillator to 1400 K.C and pick up signal by roasting dial on Remote Tuner Unit. Adjust R.F. trimmer (adjustment "B", on back of Remote Tuner Unit), and Antenna Trimmer (adjustment "A", on side of Remote Tuner Unit), to resonance.

4. Re-set test oscillator to 600 K.C and rotate Remote Tuner Unit dial to 600 K.C. Adjust shunt oscillator adjustment "D", rotating dial to and fro at the same time adjusting shunt oscillator for maximum gain. This adjustment is accessible from the top of the radio chassis, (See Fig. 3, top view.)

5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.

© John F. Rider, Publisher
TUBE FUNCTIONS: "6AG7" First detector oscillator, "6K70" Intermediate amplifier, "6Q70" Second detector and first audio, two "6K6D" as parallel power tubes, "5Y3G" rectifier.

IF ALIGNMENT: Connect signal generator to grid of 6AG7 tube, through a .01 condenser, leave grid cap in place and tune tuning condenser open - peak IF transformers at 456 KC.

BROADCAST ALIGNMENT: Check pointer setting should reach end of scale with condenser closed - may be changed slightly by loosening set screw on lower pulley and slipping pulley around on tuning shaft. Connect signal generator to antenna terminal through .00025 condenser. Trim oscillator at 1400 KC -- this trimmer is reached through hole in top of chassis to the right of antenna coil. Pad at 540 KC, recheck at 1400, and trim preselector trimmer on coil on top of chassis, and antenna trimmer on gang condenser at 1400 KC. Use as low output from generator as possible for final adjustments and it is best to use an output meter connected across speaker to indicate "peak".
IF ALIGNMENT: Connect signal generator to grid of 6AG3 tube, through a .01 condenser, leave grid cap in place and turn tuning condenser open – peak IF transformers at 456 KC.

BROADCAST ALIGNMENT: Connect signal generator to antenna terminal through a .00025 condenser. Trim oscillator at 1400 KC (see picture of coil on circuit diagram for location of trimmer). Adjust paddler condenser at 540 KC, recheck at 1400 KC, then peak antenna and preselector trimer at 1400 KC. (See picture on diagram for location of antenna trimmer, preselector trimmer is on gang condenser.)

SHORT WAVE ALIGNMENT: Connect signal generator to antenna terminal through a 300 or 400 ohm resistor. Be sure wave switch is to the "left." Trim SW oscillator at 6 MC., also SW antenna coil at same frequency. The SW pad condenser is fixed for proper range.
GAMBLE-SKOGMO, INC.

BAND DIAL SCALE FREQUENCY RANGE

Broadcast Lower Scale 540 to 1750 K.C. (Kilocycles)
Middle Wave Upper Scale 1730 to 5800 K.C. (Kilocycles)
Short Wave Center Scale 5.5 to 18.1 M.C. (Megacycles)

MODEL 761A
Schematic, Voltage Socket, Trimmers

PARTS (Serial No. 8A973750 and up)

<table>
<thead>
<tr>
<th>Code</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>130-103</td>
<td>100M ohm - 1/3 w. 10%</td>
</tr>
<tr>
<td>R2</td>
<td>130-12</td>
<td>50M ohm - 1/3 w. 20%</td>
</tr>
<tr>
<td>R3</td>
<td>130-123</td>
<td>15M ohm - 1/2 w. 10%</td>
</tr>
<tr>
<td>R4</td>
<td>130-196</td>
<td>30M ohm - 1 w. 10%</td>
</tr>
<tr>
<td>R5</td>
<td>130-4</td>
<td>3 megohm - 1/3 w. 20%</td>
</tr>
<tr>
<td>R6</td>
<td>101-104</td>
<td>1 megohm volume control</td>
</tr>
<tr>
<td>R7</td>
<td>130-198</td>
<td>40 ohm - 1/2 w. 10%</td>
</tr>
<tr>
<td>R8</td>
<td>130-197</td>
<td>20 ohm - 1/3 w. 10%</td>
</tr>
<tr>
<td>R9</td>
<td>130-4</td>
<td>3 megohm - 1/3 w. 20%</td>
</tr>
<tr>
<td>R10</td>
<td>130-103</td>
<td>100M ohm - 1/3 w. 10%</td>
</tr>
<tr>
<td>R11</td>
<td>101-105</td>
<td>300M ohm - tone control</td>
</tr>
<tr>
<td>R12</td>
<td>130-163</td>
<td>400M ohm - 1/3 w. 10%</td>
</tr>
<tr>
<td>R13</td>
<td>130-22</td>
<td>5M ohm - 1/3 w. 20%</td>
</tr>
<tr>
<td>R14</td>
<td>130-103</td>
<td>100M ohm - 1/3 w. 10%</td>
</tr>
<tr>
<td>R15</td>
<td>130-12</td>
<td>50M ohm - 1/3 w. 20%</td>
</tr>
<tr>
<td>R16</td>
<td>130-102</td>
<td>500M ohm - 1/3 w. 10%</td>
</tr>
<tr>
<td>R17</td>
<td>130-195</td>
<td>250 ohm - 1.2 w. 10%</td>
</tr>
</tbody>
</table>

CONDENSERS

<table>
<thead>
<tr>
<th>Code</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>102-62</td>
<td>3 gang variable</td>
</tr>
<tr>
<td>C1</td>
<td>100-32</td>
<td>.05 x 200 v. 25%</td>
</tr>
<tr>
<td>C2</td>
<td>129-67</td>
<td>.00004 Mica 10%</td>
</tr>
<tr>
<td>C3</td>
<td>100-25</td>
<td>.002 x 600 v. 25%</td>
</tr>
<tr>
<td>C4</td>
<td>129-33</td>
<td>.0027 Mica 2-1/2%</td>
</tr>
<tr>
<td>C5</td>
<td>129-84</td>
<td>.003 Mica 2-1/2%</td>
</tr>
<tr>
<td>C6</td>
<td>129-88</td>
<td>.0006 Mica 5%</td>
</tr>
</tbody>
</table>

MODEL 761 A
FOR ALIGNMENT AND TUNER DATA SEE INDEX

FIG. 1—TOP VIEW

© John F. Rider, Publisher

Compliments of www.nucow.com
NO. S. 3 & 7 - PHANTOM LIGHT DIAL

Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.
No. 11 Dial—Same as No. 9 Dial except push buttons are brown.
No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in a square magnet ring. Equipped with visi-tone and volume indicators.
No. 3 Dial—Glass dial—Moving beam of light indicators. Tone and volume indicated by series of circles.
No. 7 Dial—Glass dial—Moving beam of light indicators. Tone and volume indicated by stanchions.

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-selecting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position. The mechanism is excited on the assembly mounted at the front of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in a silent tuning at stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1, it will be noted that the contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring, and pulley ring spring. Since the pulley ring is at ground potential, the ground the voltage and no signal will be heard until the button is released to break the contact.

It should also be noted that the contact ring is part of the pulley ring assembly, but is isolated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on “Silencer Circuit” in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

Telephone Dial Replacements

Replacing Complete Dial and Condenser Assembly

To replace the complete dial and condenser assembly:

1. Remove the four screws holding the dial and condenser assembly on the face of the chassis. Take care not to loosen the connections to the terminal block when removing the screws.

2. Pull the dial and condenser assembly out of the chassis and replace with a new one.

3. Secure the new assembly with the four screws.

Replacing Pulley Ring and Button Assembly Only

To replace the pulley ring and button assembly:

1. Remove the four screws holding the assembly to the chassis.

2. Pull the assembly out of the chassis and replace with a new one.

3. Secure the new assembly with the four screws.

Replacing Drive Cord

If the telephone dial drive cord is broken, the pulley ring must be replaced. The old cord should be removed and a new one inserted.

Replacing Gates

After a certain period of time, some light oil on the pulley ring shaft and on the teeth of the pulley ring may be necessary. Care being taken not to get any oil on the drive cord.
Phantom Light Dial - Replacing Drive Cord

Remove the dial assembly as follows: Take out the screw which secures the dial frame brace to the back of the gang condenser. Take out the two screws which secure the brackets on the bottom of the dial frame to the chassis. Lay the dial assembly face down on the front of the chassis—it is not necessary to remove the volume control and tone control indicator cords.

Remove the phantom light assembly from the drive drum by taking out the screw.

Take off the old cord and tension spring. Tie a knot with a small loop in it on one end of the new cord. Then tie the other end of the cord to the hook on the tension spring. The distance from the loop on one end to the tension spring is 2 7/8 inches.

From the front of the chassis, place the looped end of the cord through the drum hole located near the cord track opening, and hook it over the hook provided for it at the back of the drum.

Bring the cord up and around the right side of the drum, keeping the cord in the grooved track of the drum.

Then bring the cord up and around the left side of the drive shaft and wind it three and one-third times around this shaft progressing toward the back.

Put the hairpin spring on a push button shaft, and hook the tension spring on the hook of the drive drum.

Replace the phantom light and the dial assembly.
Gamble-Skogmo, Inc.

Telephone Dial Replacement Parts

Replacing Drive Cord

Remove the old drive cord and tension spring. Rotate telephone dial clockwise (from back of chassis) as far as it will go.

Viewing the pulley ring drum from above and to the back, place the knotted end of the drive cord in the slot provided for it, catching the knot in back of the rib as shown in Fig. 3.

Bring the cord down and around the right side (from back) of the drum at front part of groove in pulley ring drum and under the drive shaft pulley making one half turn on this pulley. Then, bring the cord around the right side (from back) of the adjustable tension pulley and up to the upper left side of the pulley ring drum in front of the cord already on.

Hold the cord in the left hand and rotate the dial counter-clockwise with the right hand. Feed the cord on the drum in such a way that after passing the two openings at the top of the pulley ring drum, it passes to the back of the groove in the drum.

After the pulley ring drum makes one complete revolution, place the cord through the left drum opening into the slot and secure the tension spring hook over the pin provided for it—See Fig. 3.

No. 9 DIAL PARTS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>PRICE</th>
<th>PART NO.</th>
<th>PRICE</th>
<th>PART NO.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>11A143</td>
<td>$23.20</td>
<td>11A121</td>
<td>$23.40</td>
<td>11A113</td>
<td>$25.50</td>
</tr>
<tr>
<td>25X348</td>
<td>1.40</td>
<td>25X348</td>
<td>1.40</td>
<td>25X348</td>
<td>1.40</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
</tbody>
</table>

No. 11 DIAL PARTS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>PRICE</th>
<th>PART NO.</th>
<th>PRICE</th>
<th>PART NO.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>25X348</td>
<td>1.40</td>
<td>25X348</td>
<td>1.40</td>
<td>25X348</td>
<td>1.40</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
</tbody>
</table>

No. 10 DIAL PARTS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>PRICE</th>
<th>PART NO.</th>
<th>PRICE</th>
<th>PART NO.</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>25X348</td>
<td>1.40</td>
<td>25X348</td>
<td>1.40</td>
<td>25X348</td>
<td>1.40</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
<tr>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
<td>25X371</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Prices Subject to Change Without Notice.

© John F. Rider, Publisher

Compliments of www.nucow.com
**ALIGNMENT PROCEDURE**

The following equipment is required for aligning:

- An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Dummy Antennas — 1 mlf., 200 mml., and 400 ohms.

**TRIMMERS ADJUSTED**

- See Illustration
- Initial Steps
- Adjustment

<table>
<thead>
<tr>
<th>BAND SWITCH SETTING</th>
<th>DUMMY ANTENNA</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>CONNECTION AT RADIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd L.F. Range B</td>
<td>J. mlf.</td>
<td>456 KC</td>
<td>Grid of 2nd L.F. Tube</td>
</tr>
<tr>
<td>2nd L.F. Range B</td>
<td>J. mlf.</td>
<td>456 KC</td>
<td>Grid of 1st L.F. Tube</td>
</tr>
<tr>
<td>1st L.F. Range B</td>
<td>J. mlf.</td>
<td>456 KC</td>
<td>Grid of 1st Det.</td>
</tr>
</tbody>
</table>

**PROCEDURE**

1. Turn Rotator to Full Open
2. Turn Rotator to Full Open
3. Adjust by Maximum Output

**RANGE C**

- 600 KC Range B 200 mlf. 600 KC Antenna Lead 600 KC (C16) Turn Rotator to Full Output
- Adjust to Maximum Output

**RANGE D**

- 22,000 KC Range D 400 Ohm 22,000 KC Antenna Lead Oscillator Range D (C11) Turn Rotator to Full Output
- Adjust to Maximum Output

**NOTICE**

- It is necessary for glass tubes to replace that in metal, and vice versa.

---

**VOLTAGES AT SOCKETS**

**Line Voltage: 117—Volume Control Maximum**

**Local-Distance Switch in Distance Position**

Readings taken with 1000 Ohm-per-volt meter

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>85T-517G</td>
<td>R.F.</td>
</tr>
<tr>
<td>66J-677G</td>
<td>1st Det.</td>
</tr>
<tr>
<td>68J-69G</td>
<td>2nd L.F.</td>
</tr>
<tr>
<td>65H-69G</td>
<td>2nd Det.</td>
</tr>
<tr>
<td>66G-69G</td>
<td>3rd L.F.</td>
</tr>
<tr>
<td>65C-69G</td>
<td>A.V.C.</td>
</tr>
<tr>
<td>65G-69G</td>
<td>3rd L.F.</td>
</tr>
<tr>
<td>87G-66G</td>
<td>R.F.</td>
</tr>
<tr>
<td>65S-66G</td>
<td>Tuning Indicator</td>
</tr>
</tbody>
</table>

**Antenna Shunted to Ground**

Position of Band Switch: Standard Wave

**VOLTAGE BETWEEN SOCKET TERMINALS (See chart for readings indicated)**

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with a 1000 Ohm-per-volt meter (500-ohm scale).

**SIGNATURE**

©John F. Rider, Publisher
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—1 mfd, 200 mmm, and 400 ohms.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>FREQUENCY SETTING</th>
<th>CONNECTION AT RADIO</th>
<th>DUMMY ANTENNA</th>
<th>BAND SWITCH</th>
<th>CONDENSER SETTING</th>
<th>ADJUST TRIMMERS TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F.</td>
<td>456 KC</td>
<td>Grid of 1st Det.</td>
<td>.1 mfd</td>
<td>B Range</td>
<td>Turn Rotor to Full Open</td>
<td>1st L.F. (C17) &amp; (C18)</td>
</tr>
<tr>
<td></td>
<td>456 KC</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>Push Button Position</td>
<td>Wave Trap (C5)</td>
<td>2nd L.F. (C20) &amp; (C21)</td>
</tr>
<tr>
<td>RANGE B</td>
<td>1730 KC</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>B Range</td>
<td>Turn Rotor to Full Open</td>
<td>3rd L.F. (C26)</td>
</tr>
<tr>
<td></td>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>B Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator B &amp; (C12)</td>
</tr>
<tr>
<td></td>
<td>600 KC</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>B Range</td>
<td>Turn Rotor to Full Output</td>
<td>1st Ant. Range B (C2)</td>
</tr>
<tr>
<td>RANGE D</td>
<td>18,300 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>D Range</td>
<td>Turn Rotor to Full Open</td>
<td>2nd Ant. Range B (C3)</td>
</tr>
<tr>
<td></td>
<td>15,000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>D Range</td>
<td>Turn Rotor to Full Output</td>
<td>Rock Rotor—See Note B</td>
</tr>
<tr>
<td></td>
<td>10,000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>D Range</td>
<td>Turn Rotor to Full Output</td>
<td>Oscillator Range D (C13)</td>
</tr>
</tbody>
</table>

PERMEABILITY TUNING UNIT

<table>
<thead>
<tr>
<th>Kit No.</th>
<th>Antenna Lead</th>
<th>200 mmm.</th>
<th>Band Switch</th>
<th>Setting Screw</th>
<th>Adjust Coil Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>No. 1</td>
<td>Setting Screw No. 1</td>
<td>Antenna Coil No. 1</td>
</tr>
<tr>
<td>1100</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>No. 2</td>
<td>Setting Screw No. 2</td>
<td>Antenna Coil No. 2</td>
</tr>
<tr>
<td>850</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>No. 3</td>
<td>Setting Screw No. 3</td>
<td>Antenna Coil No. 3</td>
</tr>
<tr>
<td>950</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>No. 4</td>
<td>Setting Screw No. 4</td>
<td>Antenna Coil No. 4</td>
</tr>
<tr>
<td>700</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>No. 5</td>
<td>Setting Screw No. 5</td>
<td>Antenna Coil No. 5</td>
</tr>
<tr>
<td>700</td>
<td>Antenna Lead</td>
<td>200 mmm.</td>
<td>No. 6</td>
<td>Setting Screw No. 6</td>
<td>Antenna Coil No. 6</td>
</tr>
</tbody>
</table>

ATTENUATE THE SIGNAL FROM THE SIGNAL GENERATOR TO PREVENT THE LEVELING-OFF ACTION OF THE AVC.

AFTER EACH RANGE IS COMPLETED, REPEAT THE PROCEDURE AS A FINAL CHECK.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit, can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper position and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 or the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

© John F. Rider, Publisher
**ALIGNMENT PROCEDURE**

- Volume control—Maximum, all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "warm up" for several minutes.

### SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I, F</td>
<td>465 Kc. 1 MFD.</td>
<td>Grid of 6X7.</td>
<td>Grid of 6X7.</td>
<td>Broadcast (Ext. left rotation)</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Output I, F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>465 Kc.</td>
<td>Grid of 6X8G.</td>
<td>Grid of 6X8G.</td>
<td>Grid of 6X8G.</td>
<td>Broadcast (Ext. right rotation)</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Input I, F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>1.150 Kc.</td>
<td>200 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast (Ext. left rotation)</td>
<td>Zotor full open (Plates out of mesh)</td>
<td>Set Dial at 150 Kc.</td>
<td>Trimmer (C9) (See Fig. 3)</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>600 Kc.</td>
<td>200 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast (Ext. left rotation)</td>
<td>Set Dial at 600 Kc.</td>
<td>Trimmer (C8) (See Fig. 4)</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>465 Kc.</td>
<td>200 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast (Ext. right rotation)</td>
<td>Set Dial at 600 Kc.</td>
<td>Trimmer (C7) (See Fig. 4)</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

### IMAGE REJECTION ADJUSTMENTS

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 Kc.</td>
<td>300 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast (Ext. left rotation)</td>
<td>Pick up signal at 140 Kc. on dial</td>
<td>Trimmer (C3) (See Fig. 4)</td>
<td>Image rejection</td>
<td>Adjust for minimum output (See note “B”)</td>
<td></td>
</tr>
<tr>
<td>17 Me.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave (Ext. right rotation)</td>
<td>Set Dial at 17 Me.</td>
<td>Trimmer (C8) (See Fig. 4)</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>17 Me.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave (Ext. right rotation)</td>
<td>Set Dial at 17 Me.</td>
<td>Trimmer (C7) (See Fig. 4)</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>6 Me.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave (Ext. right rotation)</td>
<td>Set Dial at 6 Me.</td>
<td>Trimmer (C6) (See Fig. 4)</td>
<td>Short Wave oscillator</td>
<td>Adjust to maximum rock dial (See note “A”)</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE “A”** Turn the dial back and forth slightly (rock) and adjust trimmer until the peak ofarest intensity is obtained.

**NOTE “B”** 1450 KC is the image frequency of 2350 KC. Adjust Trimmer (C3) until a minimum output is obtained.

Adjust the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

### BAND SWITCH

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXTREME LEFT ROTATION</td>
<td>56 to 18 MC.</td>
</tr>
<tr>
<td>EXTREME RIGHT ROTATION</td>
<td>540 to 1730 KC.</td>
</tr>
</tbody>
</table>

**Power Consumption**: 80 Watts (At 115 volts 60-60 cycles)

**Power Output**: 3 Watts Undistorted, 7 Watts Maximum

### DIAL SCALE

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>BROADCAST</td>
<td>Upper: 540 to 1730 KC. (Kilocycles)</td>
</tr>
<tr>
<td>SHORT WAVE</td>
<td>Lower: 5.6 to 18.0 MC. (Megacycles)</td>
</tr>
</tbody>
</table>

**Intermediate Frequency**: 650 Kc.

---

**ANTENNA COIL**

- C1 - WAVE TRAP TRIMMER 465 Kc.
- C3 - IMAGE REJECTION TRIMMER
- C6 - B.C. ANT. TRIMMER
- C7 - S.W. ANT. TRIMMER
- C8 - S.W. OSC. TRIMMER
- C9 - B.C. OSC. TRIMMER
- C12 - B.C. OSC. PAD
- C13 - S.W. OSC. PAD

**FIG. 4**
PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

IMPORTANT—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the smallVelkoToids supplied should be inserted into place over each of the station call letter tabs.

NOW, PROCEED AS FOLLOWS:

1. Pull the dial tuning knob all the way out (See Illus. "B," Fig. 3), and rotate the tuning knob to the left (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)

2. Press down all the way any one of the automatic tuner levers. Holding it down firmly, press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be pressed in (See Illus. "E," Fig. 3). Turn the dial tuning knob very slowly back and forth (while still holding the automatic tuner lever in down position), noting the width of the shadow on the screen of the cathode-ray tuning indicator. Minimum width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned.

3. Press down another automatic tuner lever. Holding it down firmly, press in on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob all the way out (See Illus. "B," Fig. 3) and rotate the tuning knob to the right (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3). This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place. After you have locked the tuner mechanism, push the dial tuning knob in.

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way out and rotate the knob to the left (counterclockwise) and unlock the tuner mechanism. Select the new station as explained. (NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the tuner mechanism not being unlocked all the way. Pull full dial tuning knob all the way out and rotate the knob to the left (counterclockwise) until it will turn no further. The dial mechanism should work freely with the tuner lever pressed down.)

7. After you have selected the new station, pull the dial tuning knob all the way out and rotate the knob to the right (clockwise) to lock the tuner mechanism. Be sure the knob is turned until it will turn no further, then press the dial tuning knob in.

8. The automatic tuner levers are now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The important steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. To unlock the tuner mechanism pull the dial tuning knob all the way out. You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. To set a lever, press down all the way and hold in this position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to (NOTE:—you will notice that it will be necessary to keep pressing in on the dial tuning knob while tuning in the station as a spring tends to push the knob out.) Set all the levers in the same manner before locking the mechanism.
All voltages are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter.
The CRT must be in operation and the wave band switch in broadcast position with battery fully charged and new "D" batteries.
Filament voltages are taken from filament prong to filament prong at tube socket.
I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (106). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

1.6 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 16 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 16 mc signal is tuned in exactly at the 16 mc calibration point, with the volume control on full and the signal generator adjusted for maximum output. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on band no. 1.

1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3, and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the upper opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 600 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

3 M.C. ADJUSTMENT - The band selector switch is set in position for operation on the No. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the Police Band Coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 M.C. padder is located as indicated.
MODEL 100
Chassis View
Socket, Controls

GAROD RADIO CORP.

Fig. 2

L.V.RECT.
H.V.RECT.

HIGH-FREQ. (HORIZ.) SWEEP

573
878

C.R.BIAS* (BRIGHTNESS)
FOCUS CONTROL

HORIZ.
VERT.
SYNC. SEPARATOR

CENTERING CONTROLS
SWEEP FREQUENCY

(T.O.GAIN CONTROL)

6K8 CONVERTER
1852 R-F

BRAID FROM 3 ROTOR TERMINALS SOLDERED TO CHASSIS

POWER SWITCH
TRANSF. 8K93

(LOW-FREQ. VERTICAL SWEEP)
6F8G
6L7G

6H6 SYNC.SEP.
6V6 2nd. VIDEO
1852 1st. VIDEO
6H6 DIODE DET.
1852 3rd. I-F
1852 2nd. I-F
1852 1st. I-F

©John F. Rider, Publisher
GAROD RADIO CORP.

MODEL 100
Circuit Data
Assembly Wiring Notes

GAROD PAGE 10-9
Compliments of www.nucow.com

©John F. Rider, Publisher

Compliments of www.nucow.com
**Compliments of www.nucow.com**

**MODEL 100**  
S.P.U., Chassis Wiring  
Voltage

---

**GAROD RADIO CORP.**

---

**Fig. 5**

---

**VOLTAGE TABLE**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>Sup.</td>
<td>0</td>
<td>GR</td>
</tr>
<tr>
<td>6X6</td>
<td>Conv.</td>
<td>Contr.</td>
<td>GR.</td>
<td>0</td>
<td>SH</td>
<td>0</td>
<td>H</td>
</tr>
<tr>
<td>1852</td>
<td>1st I.F. Amp.</td>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>Sup.</td>
</tr>
<tr>
<td>1852</td>
<td>2nd I.F. Amp.</td>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>Sup.</td>
</tr>
<tr>
<td>1852</td>
<td>3rd I.F. Amp.</td>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>Sup.</td>
</tr>
<tr>
<td>6X6</td>
<td>DIODE DET.</td>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>Sup.</td>
</tr>
<tr>
<td>2A6</td>
<td>2nd Video</td>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>6X6</td>
<td>SYNC. SUP.</td>
<td>SH</td>
<td>0</td>
<td>H</td>
<td>6 A</td>
<td>C</td>
<td>P</td>
</tr>
<tr>
<td>6L70</td>
<td>Hi-Freq. Sweep</td>
<td>Contr.</td>
<td>GR.</td>
<td>2</td>
<td>X</td>
<td>0</td>
<td>H</td>
</tr>
<tr>
<td>6L70</td>
<td>Low Freq. Sweep</td>
<td>Contr.</td>
<td>GR.</td>
<td>2</td>
<td>X</td>
<td>0</td>
<td>H</td>
</tr>
<tr>
<td>523</td>
<td>LOW VOLTAGE RECT.</td>
<td>F</td>
<td>5AC</td>
<td>470</td>
<td>P</td>
<td>F</td>
<td>5AC</td>
</tr>
<tr>
<td>879</td>
<td>HIGH VOLTAGE RECT.</td>
<td>-1300</td>
<td>F</td>
<td>2.3AC</td>
<td>P</td>
<td>F</td>
<td>2.3AC</td>
</tr>
</tbody>
</table>

---

ALL VOLTAGES MEASURED WITH A HIGH-RESISTANCE D.C. VOLT METER (EXCEPT HEATERS), ALL CONTROLS TURNED ALL WAY TO THE RIGHT (CLOCKWISE)

SH = Shell  
SC = Screen  
Inj. Gr. = Injector Grid  
Sup. = Suppressor Grid  
D.P. = Diode Plate  
Def. Pl. = Deflecting Plate  
K = Cathode  
Front  
A = Anode

©John F. Rider, Publisher
ALIGNMENT AND OPERATION

Set the Picture Tube bias control (#1) all the way to the right. Set the Horizontal and Vertical Sweep controls (#2 and #7) to the approximately half-way position.

Now turn the Spot locating control (#3) all the way to the left and rotate the other spot control (#4) thru its entire range. If neither spot nor a raster (the scanning pattern) appears, move the first spot locating control (#3) slightly to the right and rotate the other locating control thru its entire range again. Continue this procedure step by step until something appears upon the viewing screen of the Cathode Ray Tube.

Now adjust the Vertical and Horizontal Sweep controls until a complete raster appears. This should be approximately 4" square (the actual picture will be somewhat smaller due to the presence of the blanking and sync pulses in the raster carriage).

By means of the Spot Location controls (#3 and #4) this pattern may now be centered on the tube face. The Cathode Ray Tube socket can be rotated to level the raster.

The size of the picture is determined by two factors, namely; the sweep circuit voltage and the voltage applied to the second anode. The picture increases with increase in sweep voltage and decreases inversely as the square of the second or high voltage anode potential. The sawtooth voltage developed by the multi-vibrators is a function of the 250V voltage applied to the plates. Since we are operating near the voltage limit of the 525 rectifier tube, it is impractical to obtain any improvement in this direction. Amplifiers could be used to increase the sweep voltages, but this would complicate matters greatly. The other alternative is to reduce the 2nd Anode voltage. Referring to the circuit diagram, a 100,000 ohm (R66) dropping resistor is indicated in series with the low voltage filter system. This results in a larger picture, at only a slight sacrifice in brilliance. The use of this resistor is optional, depending upon which characteristic is the more desirable.

The Image Ratio should be 4:3. If the picture does not conform to this ratio, a rear-swept picture is noted in the sweep plate and screen circuits will correct this. Potential meters could be inserted to control the voltages applied to the deflection plates, but these additional controls are hardly necessary, since once this adjustment is made, it need not be changed, for a given set of tubes.

After this has been satisfactorily checked, we may proceed to the I.F. amplifier adjustments. An output meter or preferably an Oscilloscope is connected across the output of the Video Amplifier (6V6 plate). A signal from a Signal Generator or equivalent source is now introduced at the converter grid (6SN7). The intermediate frequency is 15Mc. The I.F. transformers are now adjusted for maximum output in the conventional way.

Now introduce a signal, whose frequency is approximately that of the principal station to be received, into the antenna circuit. Tune this signal by rotating the dial, then align the antenna and R.F. circuits for maximum output by means of the trimmers on the variable condenser.

After this has been done, the receiver is ready for a test on the air. It is best to make adjustments on the fixed pattern transmitted by television stations during test periods or during the regular scheduled programs. The I.F. system should now be readjusted by staggering the peaks to accept a wide band of frequencies (2 Megacycles). This will result in considerable improvement in picture detail, with relatively slight loss in gain.

The I.F. transformers are heavily loaded (with 1500 ohms across each secondary). It is possible to miss these, with an increase in gain if they are carefully realigned so as to stagger the peaks, with a resultant "square top" resonance curve over the desired band.

The R.F. circuits should now be realigned for best tracking. It may be necessary to adjust the R.F. coil inductances slightly to obtain the proper range and tracking. If necessary the end plates of the variable condensers may be bent to accomplish this.

About 20 Volts at the Control Grid of the Cathode Ray Tube is necessary in order to obtain a good picture. If everything is functioning properly, this should be easily obtained from stations within range. This can be checked with a vacuum tube voltmeter or calibrated oscilloscope.

A little experience will enable the user to tune in a station quickly and clearly. Proper manipulation of the controls is important, and the function of each should be studied carefully and thoroughly understood. A cathode bias control in the first I.F. stage sets the over-all gain. Other controls locate the pattern, vertically and horizontally; set the Vertical and Horizontal Sweep Frequencies; adjust Focus of the Picture Tube, fix the Average Brightness (Contrast); and adjust the Sinc separator and Selector. See illustration.

RECEIVING ANTENNA

The installation of an antenna for television reception is extremely important. In residential locations, the antenna should be elevated as high as possible and located in such a way as to be furthest from sources of interference. Automotive Ignition systems cause considerable interference, as do electrical devices having sparking or intermittent contacts. Reflections from buildings, bridges and steel or other metal structures may result in multiple transmission, thereby producing 2 or more images superimposed upon each other, due to the slight time difference in the arrival of the reflected waves.

This effect may become extremely critical in large cities where a great number of these high structures are present. If possible a "line of sight" transmission path from the transmitter antenna should be selected. Again, care must be taken to obtain the maximum freedom from electrical interference, since this will result in spotting and blooming of the picture.

It is noticed that less of this "noise" interference, from automobile ignition systems particularly, is picked up when using a horizontally polarized antenna than with a vertical antenna. So, from all other considerations, it is equally as effective. It is therefore desirable to use such an antenna for our Television receiver, when the field strength is sufficient to give us the necessary signal for satisfactory operation.

A simple dipole with twisted-pair lead-in (or a transposed lead-in) will usually give satisfactory results. These dipoles are available with arms of adjustable length and so arranged that they can be rotated. For a given station, maximum pickup will be obtained at right angles to the signal path from the transmitter. Where several stations are to be received, or the field strength is inadequate, more complicated forms of antennas may be required, or in the case of a directive antenna, a compass may have to be used to include all the desired stations within range. The length of the dipole is adjusted for maximum pickup from desired stations. An overall length of 120 inches is suggested for a start. In some cases, it may be desirable to use separate antennas facing in different directions for different stations.

It is extremely important that the antenna be securely fastened so as to prevent swinging of either the antenna itself, or the transmission line, since this may result in intermittent blurring or loss of the picture. (To avoid complications, no A.V.C. system has been incorporated in this receiver.)

It is strongly recommended that the builder study all literature available on Television and Ultra Short Waves before attempting to go ahead with the construction so as to enable him to proceed intelligently. A knowledge of the exact function of each component will help greatly towards the successful accomplishment of the desired results.

References: QST - Dec, Jan, Feb, Mar, Apr, May 1937
ELECTRONICS - 1937-38
TELEVISION - Vol I and II - RCA Technical Press.
ALIGNMENT - MODELS 269, 269, 629, 729, 739, 739, and 369.

1. F. A. ADJUSTMENT: The signal generator is set at 455 KC and is connected to the grid of the converter tube (6XK) through a .5 MFD condenser. Be sure to connect a resistor of approximately 65,000 ohms between the converter grid and ground so that the grid circuit is at ground potential for C.

The Band switch should be set on Broadcast and the pointer set at 550 KC. The input I.F. transformer trimmer is located on the rear chassis apron, between the variable condenser and the 245 I.F. tube. Both screws are adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker output transformer.

The output I.F. transformer trimmer is located on the rear chassis apron, under the power transformer. Adjust the trimmer for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

BROADCAST BAND

The dummy antenna for this band consists of only a 250 MFD condenser. Set the band Switch in the Broadcast position and condenser plates completely out of mesh.

The signal generator at 1720 KC and adjust the broadcast oscillator trimmer located on top of the chassis (it is the trimmer under the rear of the chassis) until a response is indicated on the output meter. The pointer should now be set at 1600 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1600 KC mark on the dial. Adjust the 1600 KC ANTENNA TRIMMER (located on top of the chassis) for maximum output.

MODEL 629 739

Set the signal generator at 1720 KC and adjust the broadcast oscillator trimmer on top of the chassis, under the chassis, behind the tone control. The oscillator trimmer is the one nearest the band switch) until a response is indicated on the output meter. The pointer should now be set at 1600 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1600 KC mark on the dial. Adjust the 1600 KC ANTENNA TRIMMER (located adjacent to the oscillator trimmer, under the chassis) for maximum output.

Set the generator at 600 KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padding condenser (located directly behind the variable condenser) for maximum response while rocking the gau condenser. The high frequency adjustments should be rechecked.

SHORT-WAVE BAND 1 ADJUSTMENT.

Set the band switch to the extreme (left band position) which is short wave band 1. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band 1. The generator is set at 6.22 MC and the Band 1 oscillator trimmer is opened until a response is indicated at the lower capacity setting of the trimmer. (located on top of the chassis, behind the dial bracket. The one is the front trimmer). Set the generator at 600 KC and turn the variable condenser until a response is indicated. The pointer should now co-incide with the 600 MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from left to right. The antenna trimmer is located on top of the chassis, in line with and directly behind the oscillator trimmer. Set the generator at 6.4 MC and turn the variable condenser knob until a response is indicated. The pointer should co-incide with the 600 MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from left to right.

SHORT-WAVE BAND 2 MODEL 369 ONLY

Set the band switch to the middle position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band 1. The generator is set at 6.22 MC and the Band 2 oscillator trimmer is opened until a response is indicated at the lower capacity setting of the trimmer. (located on top of the chassis, behind the dial bracket. The one is the front trimmer). Set the generator at 600 KC and turn the variable condenser until a response is indicated. The pointer should now co-incide with the 600 MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from left to right. The antenna trimmer is located on top of the chassis, in line with and directly behind the oscillator trimmer. Set the generator at 6.4 MC and turn the variable condenser knob until a response is indicated. The pointer should co-incide with the 600 MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from left to right.

LOW-WAVE BAND MODEL 739 ONLY

The dummy antenna for this band is the same one used in aligning the broadcast band.

Set the generator at 300 MC. Set the dial pointer so as to co-incide with the 300 MC mark on the dial. The oscillator trimmer (located on top of chassis, right hand side, behind the right hand dial bracket. The oscillator is the rear trimmer) is now adjusted until a response is indicated. The long wave antenna trimmer (located adjacent to the oscillator trimmer) is now adjusted for maximum output.

Set the generator at 160 MC and tune for a response. Adjust the Long-Wave padding condenser (located on chassis to the right and forward of the oscillator antenna trimmer) for maximum output while "rocking" the gau condenser. The high frequency adjustments should be rechecked.

NOW, set the signal generator to about 1200 KC and place THE BAND SWITCH ON THE LOW WAVE POSITION. Adjust the generator output voltage until a response is heard. The 1200 KC wave trap on top right of the chassis is now adjusted for MAXIMUM response.
PROCEDURE FOR SETTING STATION BUTTONS

Select the six favorite broadcast stations which you wish to set up for automatic tuning. The stations chosen should be from among those received most clearly when using dial tuning. It is not advisable to use this system of tuning for short wave or distant broadcast stations.

Although each button will cover the entire dial range it may be most advisable, from the standpoint of convenience, to arrange the stations chosen in order of frequency.

SETTING THE STATION BUTTONS: The proper procedure is as follows—grasp the first button to be set with the finger tips and loosen it by unscrewing it about one-half turn to the left or in a counter-clockwise direction. Now tune in the station which you desire to set on this button, using the regular tuning knob. After the station is perfectly tuned, hold the knob firmly with one hand and depress the button just loosened as far as it will go. Then tighten it gently by turning it to the right, or in a clockwise direction. The button should be kept depressed in the meantime, and the dial knob should be held firmly so that the station does not become detuned.

Now release the push button and turn it again in a clockwise direction to make sure it is firmly tightened. Then tune the dial off the station and try depressing the push button as far as it will go. The station should then be perfectly tuned. If it is not tuned properly that is, if you are able to retune it better with the dial, it will be necessary to repeat the above procedure.

The other five buttons may now be set up in the same manner as described above, tuning each to one of the favorite stations which you have selected.

The tabs bearing the station call letters may now be removed from the sheet provided, and placed in the slots below the pushbuttons.

When tuning with the pushbuttons, it must be remembered that this is a mechanically driven device, depending upon pressure for proper operation. For this reason the pushbuttons must be depressed firmly, otherwise the dial may not come to the correct setting before the button is released.

If at any time it is desired to change one of the stations which is set up for automatic tuning, this may be done without disturbing the settings of the other stations. Merely set up the new station on the button which was used for the station no longer desired.
Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wavebands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at 456 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6DJ). With the band switch set at 600 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on the left side of the I.F. transformer shield cans.

Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 200 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser is opened to minimum capacity and the signal generator then set to 28 megacycles. The oscillator trimmer is then adjusted to minimum capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 27.5 mc and the variable condenser turned until a response is obtained. The pointer should coincide with the 27.5 mc mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.5 mc and the signal turned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator tuning condenser is rocked slightly to the right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on the medium wave band #2. The variable condenser is opened so that the plates are completely unwound and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.5 mc and the oscillator trimmer condenser is opened to minimum capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity) be used. Set the signal generator at 7.5 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7.5 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 6.5 mc and the variable gang condenser turned until a response is observed. Adjust the padder condenser for this band for maximum gain while rocking the tuning condenser slightly to the left and right. The high frequency adjustment should then be rechecked.

Broadcast band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1720 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1720kc). Set the signal generator at 1500 kc and tune the receiver until a response is heard. The dial pointer should coincide with the 1500 kc mark on the dial. Then adjust the antennas and detector trimmers in the order indicated, for maximum output. The signal generator is then moved to 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning condenser is rocked slightly to the left and right. The 600 kc adjustment should then be rechecked.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are then tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named, for maximum output. The signal generator is then set at 150 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response while the tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.
With a small screwdriver slowly turn the setting screw below button 1, until the desired station, the one previously heard, is tuned in. Be sure not to tune in some other station which is broadcasting the same program. Use the tuning range as a guide for tuning in the station accurately. During this process you will be able to check your work by pressing the dial button and listening to the original station. The dial button will be the same as with the dial except that the screw driver is used instead of the tuning knob.

The remaining buttons may be set up in the same manner. Once the adjustments have been made, no further changes will be necessary. The station markers may now be removed from the sheet provided and inserted in the circular depressions below the corresponding buttons. Blank tabs may be used below buttons on which stations are not set.

ALIGNMENT FOR MODEL 4119

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been eliminated. An accurately calibrated signal generator which will cover the necessary wavebands and an output meter for indicating the effect of adjustments are required.

1. F. Adjustment: The signal generator is set at 466 kc and is connected through a 2 mfd condenser to the grid of the first detector (66R). With the band switch set on "Broadcast", the pointer set at 500 kc and the receiver volume control set at maximum position, the IF trimmers are adjusted for maximum output. These trimmers may be found on top of the F. transformer shields.

2. Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be adjusted to minimum capacity and the signal generator adjusted to 466 kc. The oscillator trimmer is then increased in capacity until the maximum output is obtained. Two response points are possible and it is important that the high frequency response (2000 kc) be checked. The signal generator should be turned until a response is obtained. The pointer should coincide with the 2000 kc mark on the scale. The preceding condenser and first detector trimmers are then adjusted in the order named for maximum output. The variable condenser should be rocked slightly during this last adjustment.

The signal generator is now set at 74 kc and the signal tuned in on the dial. The pad condenser for this band is adjusted for maximum output of the reading obtained on the output meter. The oscillator tuning condenser is rocked slightly to the right and left. The high frequency adjustment should then be readjusted.

3. Band #2 Adjustment: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely meshed and the oscillator trimmer is opened to infinite capacity. The signal generator is set at 74 kc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two response points are possible and it is important that the higher frequency response (4000 kc) be checked. Set the signal generator at 700 kc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 700 kc mark on the dial. The antenna post-selector and first detector trimmers are then adjusted for maximum output. After this adjustment has been made the signal generator is set at 2.6 kc and turn the variable condenser until a response is obtained. Now rock the tuning condenser slightly to the right and left. The high frequency adjustment should then be redjusted.

Broadcast Band: The dummy antenna for this band should consist of a 250 mfd condenser only. The signal generator is set at 1720 kc, the band switch set at broadcast position. The variable condenser is then adjusted to infinite capacity. The signal generator is set at 1720 kc, the band switch set at broadcast position. The signal generator is then increased in capacity until a response is heard. The pointer should coincide with the 1720 kc mark on the dial. The antenna post-selector and first detector trimmers are then adjusted for maximum output. After this adjustment has been made the signal generator is set at 2.6 kc and turn the variable condenser until a response is obtained. Now rock the tuning condenser slightly to the right and left. The 1500 kc adjustment should then be readjusted.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The variable condenser for this band are both turned 6000 kc and the oscillator trimmer is adjusted for maximum output. The antenna and first detector trimmers are then adjusted for maximum output. The signal generator is then set at 150 kc and the signal is tuned in. The long wave pad condenser is adjusted for maximum output while the tuning condenser is rocked slightly to the right and right. The 6000 kc adjustment should then be redjusted.
GENERAL ELECTRIC CO.

SERVICE DATA

<table>
<thead>
<tr>
<th>Physical Specifications</th>
<th>Impedance (pickup)</th>
<th>80,000 ohms at 1,000 cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model..................</td>
<td>GM-11</td>
<td></td>
</tr>
<tr>
<td>Height..................</td>
<td>8 inches</td>
<td></td>
</tr>
<tr>
<td>Width...................</td>
<td>15¼ inches</td>
<td></td>
</tr>
<tr>
<td>Depth...................</td>
<td>13¼ inches</td>
<td></td>
</tr>
</tbody>
</table>

Electrical Specifications

115–125 volts .......... 60 cycles* .......... 25 watts

* Is also furnished in 50 and 25 cycle models. The operating frequency is shown on the label.

Record Player Oscillator

Frequency

(Adjustable) .............. 1400–1600 K.C.

Oscillator tube .......... Type 12A7

Phonograph Mechanism

Motor ................. Self-starting, induction

Pickup .......... Crystal

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>160–375 mfd., mica capacitor</td>
</tr>
<tr>
<td>C2</td>
<td>47 mfd., mica capacitor</td>
</tr>
<tr>
<td>C3</td>
<td>0.003 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C4</td>
<td>0.01 mfd., molded capacitor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>470,000 ohm, carbon resistor</td>
</tr>
<tr>
<td>R2</td>
<td>15,000 ohm carbon resistor</td>
</tr>
<tr>
<td>R3</td>
<td>2.3 megohm carbon resistor</td>
</tr>
<tr>
<td>R4</td>
<td>0.05 ohm resistor</td>
</tr>
<tr>
<td>R5</td>
<td>33,000 ohm carbon resistor</td>
</tr>
<tr>
<td>R6</td>
<td>220,000 ohm carbon resistor</td>
</tr>
<tr>
<td>L1</td>
<td>Oscillator coil</td>
</tr>
<tr>
<td>M1, 2, 3</td>
<td>Phonograph motor</td>
</tr>
<tr>
<td>P1</td>
<td>Crystal pickup</td>
</tr>
</tbody>
</table>

Tuning Trimmer

This adjustment changes the frequency of the Wireless Record Player Signal. It is adjusted at the factory for approximately 1600 kilocycles and has a range of 1400–1600 kilocycles.

If the record player signal interferes with some local station (characterized by a whistle or low frequency buzz note) or the receiver does not tune quite high enough to receive the record player signal, it will be necessary to adjust the tuning trimmer described in a previous paragraph. Proceed by tuning the radio to a quiet point above 1400 K.C. on the dial, then, using a small screwdriver, turn the tuning trimmer until the record player is tuned to the dial setting of the receiver. Clockwise rotation of the trimmer lowers the frequency; while counterclockwise rotation raises the frequency.

Microphone Connections

A suitable microphone (G-E No. GM-1) may be connected into the circuit of the record player by merely inserting the plug in the microphone jack (location shown in Fig. 1).

A carbon microphone may be used provided a suitable step-up transformer is used. A suggested circuit is shown in Fig. 2.

Operating Notes

1. If a hum is noted when the pickup case is touched by the hand, merely reverse the power plug in the A.C. outlet.

2. If you are unable to receive the signal from the record player on the radio, it is possible that the oscillator tube in

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Carbon Microphone</td>
</tr>
<tr>
<td>B</td>
<td>2-volt battery</td>
</tr>
<tr>
<td>T</td>
<td>Step-up transformer</td>
</tr>
<tr>
<td>P</td>
<td>Telephone Plug</td>
</tr>
</tbody>
</table>

Compliments of www.nucow.com
Compliments of www.nucow.com

**GENERAL ELECTRIC CO.**

**Schematics, Voltage Alignment**

![Diagram of an electronic circuit](image)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>.001 mfd paper capacitors</td>
<td>R-1</td>
<td>25,000 ohm volume control</td>
</tr>
<tr>
<td>C-2, 3, 4, 5</td>
<td>.02 mfd paper capacitors</td>
<td>R-2</td>
<td>35,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C-7, 8</td>
<td>.01 mfd paper capacitors</td>
<td>R-3</td>
<td>3.0 megohm carbon resistor</td>
</tr>
<tr>
<td>C-9</td>
<td>.01 mfd paper capacitor</td>
<td>R-4, 5</td>
<td>100 ohm carbon resistor</td>
</tr>
<tr>
<td>C-10</td>
<td>.01 mfd paper capacitor</td>
<td>R-6</td>
<td>150,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C-11</td>
<td>.01 mfd paper capacitor</td>
<td>R-7</td>
<td>500,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C-12</td>
<td>.05 mfd paper capacitor</td>
<td>R-8</td>
<td>100,000 ohm volume control</td>
</tr>
<tr>
<td>C-14</td>
<td>.01 mfd paper capacitor</td>
<td>R-9</td>
<td>50,000 ohm shunt resistor</td>
</tr>
<tr>
<td>C-15</td>
<td>100 mfd, mica capacitor</td>
<td>R-10</td>
<td>Power switch</td>
</tr>
<tr>
<td>C-16</td>
<td>6 mfd. dry electrolytic</td>
<td>T-1</td>
<td>Motor switch</td>
</tr>
<tr>
<td>C-17</td>
<td>16 mfd. dry electrolytic</td>
<td>T-2</td>
<td>Antenna transformer</td>
</tr>
<tr>
<td>C-18</td>
<td>10 mfd. dry electrolytic</td>
<td>T-3</td>
<td>RF transformer</td>
</tr>
<tr>
<td>C-19</td>
<td>.01 mfd paper capacitor</td>
<td>T-4</td>
<td>Output transformer</td>
</tr>
</tbody>
</table>

**Tuning Frequency**
Band "B"................. 540-1800 kc.
Alignment Frequency........ 1506 kc.

**Electrical Power Output**
Undistorted............... 1.0 watt
Maximum.................. 2.0 watts

**Load-speaker—Electrodynamic**
Outside Cone Diameter... 5 inches
Voice Coil Impedance... 3.5 ohms at 400 cycles
Field Coil Resistance... 420 ohms (cold)

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Rating Label</th>
<th>Power Supply (Volts)</th>
<th>Frequency (Cycles)</th>
<th>Power Consumption (Volts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GD-44A</td>
<td>105-125</td>
<td>60</td>
<td>48</td>
</tr>
<tr>
<td>GD-44B</td>
<td>105-125</td>
<td>50</td>
<td>48</td>
</tr>
</tbody>
</table>

Models GD-44A and GD-44B are compact four tube AC-DC tuned radio frequency receivers that operate in the broadcast band of frequencies. In addition they have facilities for the reproduction of phonograph recordings. Condensers are used to isolate the power supply voltage from the chassis frame.

**Phonograph Mechanism**
The record reproducing facilities consist of a high impedance crystal pick-up with its associated balanced tone arm connected across the grid resistor (R-7) of the 6C6 tube. When using the phonograph, the volume control (R-1) should be set at a minimum and control (R-9) used for the desired volume level.

**ALIGNMENT**
Connect the high side of the signal generator through a 250 mmf. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the dial pointer should coincide with the horizontal dial line.
2. Tune receiver to the 1500 kc. point on the dial; then align trimmers (C-3 and C-5) on the gang condenser at 1500 kc. for a maximum output meter reading.

**SOCKET VOLTAGES**

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>Plate to B Volts D.C.</th>
<th>Screen to B Volts D.C.</th>
<th>Cathode to B Volts D.C.</th>
<th>Cathode Current M.A. D.C.</th>
<th>Heater Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>113</td>
<td>90</td>
<td>90</td>
<td>9.0</td>
<td>0.7</td>
</tr>
<tr>
<td>6C6</td>
<td>20*</td>
<td>16.4*</td>
<td>45, 37</td>
<td>3.1, 2.5</td>
<td>0.1, 0.08</td>
</tr>
<tr>
<td>24L6G</td>
<td>108</td>
<td>88</td>
<td>113, 90</td>
<td>7.6, 6.2</td>
<td>40.5, 33.1</td>
</tr>
<tr>
<td>25Z5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43.0, 35.0</td>
</tr>
</tbody>
</table>

* Line voltage 115 AC or DC—No signal input—1000 ohms per voltmeter.
* Dial pointer at 540 kc. Volume control at minimum.
* Measured on 250 volt scale.
* The B - is not chassis ground.

©John F. Rider, Publisher
GENERAL INFORMATION

GD-60/GD-55 is a compact, five-tube AC-DC superheterodyne receiver, employing five General Electric Pre-tested Tunes as described above, in a superheterodyne circuit. It incorporates a simplified trimmer tuned “Touch-Tuning” system, allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic volume control and an improved dustproof speaker.

I.F. Alignment

Connect an output meter across the voice coil. Set the volume control for maximum. Set test oscillator to 455 and apply signal to the control grid of the 6AG8 tube through a .06 mfd. capacitor. Do not remove the grid lead from the 6AG8 and keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

Wave Trap Alignment

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mfd. capacitor in series with 300 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment

Use the same dummy antenna (250 mfd. and 200 ohms) with 1600 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

Precaution—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.
GENERAL ELECTRIC CO.

MODEL GD52A
Schematic, Voltage
Socket, Trimmers
Alignment

![Schematic Diagram]

**Tuning Frequency Range** 540-1750 K.C.

**Intermediate Frequency** 455 K.C.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>Wave Trap Trimmer, 48-145 Mmfd.</td>
<td>C-21</td>
<td>Trimmer Capacitor, 50-135 Mmfd.</td>
<td>C-7</td>
<td>R-7</td>
</tr>
<tr>
<td>C-2</td>
<td>Selector Trimmer, 75-410 Mmfd.</td>
<td>C-22</td>
<td>Trimmer Capacitor, 50-135 Mmfd.</td>
<td>C-8</td>
<td>R-8</td>
</tr>
<tr>
<td>C-3</td>
<td>Selector Trimmer, 75-410 Mmfd.</td>
<td>C-23</td>
<td>Mica Capacitor, 470 Mmfd.</td>
<td>C-9</td>
<td>R-10</td>
</tr>
<tr>
<td>C-4</td>
<td>Selector Trimmer, 50-300 Mmfd.</td>
<td>C-24</td>
<td>Paper Capacitor, .002 Mfd.</td>
<td>C-10</td>
<td>R-11</td>
</tr>
<tr>
<td>C-5</td>
<td>Selector Trimmer, 50-300 Mmfd.</td>
<td>C-25</td>
<td>Paper Capacitor, .002 Mfd.</td>
<td>C-11</td>
<td>R-12</td>
</tr>
<tr>
<td>C-6</td>
<td>Selector Trimmer, 50-300 Mmfd.</td>
<td>C-26</td>
<td>Mica Capacitor, 330 Mmfd.</td>
<td>C-12</td>
<td>R-13</td>
</tr>
<tr>
<td>C-7</td>
<td>Selector Trimmer, 20-200 Mmfd.</td>
<td>C-27</td>
<td>Paper Capacitor, .005 Mfd.</td>
<td>C-13</td>
<td>S-1</td>
</tr>
<tr>
<td>C-9</td>
<td>Selector Trimmer, 20-200 Mmfd.</td>
<td>C-29</td>
<td>Paper Capacitor, .001 Mfd.</td>
<td>C-15</td>
<td>S-3</td>
</tr>
<tr>
<td>C-10</td>
<td>Selector Trimmer, 20-200 Mmfd.</td>
<td>C-30</td>
<td>Paper Capacitor, .001 Mfd.</td>
<td>C-16</td>
<td>T-1</td>
</tr>
<tr>
<td>C-11</td>
<td>Selector Trimmer, 20-100 Mmfd.</td>
<td>C-31</td>
<td>Paper Capacitor, .003 Mfd.</td>
<td>C-17</td>
<td>T-2</td>
</tr>
<tr>
<td>C-12</td>
<td>Tune Condenser Ant.</td>
<td>C-32</td>
<td>Paper Capacitor, .002 Mfd.</td>
<td>C-18</td>
<td>T-3</td>
</tr>
<tr>
<td>C-13</td>
<td>Tune Condenser Ant.</td>
<td>R-1</td>
<td>Dry Electrolytic Cap., 12 Mfd.</td>
<td>C-19</td>
<td>T-4</td>
</tr>
<tr>
<td>C-14</td>
<td>Mica Capacitor, 47 Mmfd.</td>
<td>R-2</td>
<td>Dry Electrolytic Cap., 20 Mfd.</td>
<td>C-20</td>
<td>T-5</td>
</tr>
<tr>
<td>C-15</td>
<td>Paper Capacitor, 25 Mfd.</td>
<td>R-3</td>
<td>Dry Electrolyric Cap.</td>
<td>C-21</td>
<td>T-6</td>
</tr>
<tr>
<td>C-16</td>
<td>Trimmer Capacitor, 50-135 Mmfd.</td>
<td>R-4</td>
<td>Carbon Resistor, 47,000 Ohms</td>
<td>C-22</td>
<td>T-7</td>
</tr>
<tr>
<td>C-17</td>
<td>Trimmer Capacitor, 50-135 Mmfd.</td>
<td>R-5</td>
<td>Carbon Resistor, 10,000 Ohms</td>
<td>C-23</td>
<td>T-8</td>
</tr>
<tr>
<td>C-19</td>
<td>Paper Capacitor, 0.8 Mfd.</td>
<td>R-7</td>
<td>Carbon Resistor, 2,2 Megohms</td>
<td>C-25</td>
<td>T-10</td>
</tr>
</tbody>
</table>

**Note:** In some receivers a 150,000 to 390,000 ohm resistor is connected across C-18.

**VOLTAGE CHART**

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>Plate to -B volts</th>
<th>Screen to -B volts</th>
<th>Cathode to -B volts</th>
<th>Cathode Current MA</th>
<th>Filament Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AG</td>
<td>115</td>
<td>75</td>
<td>0</td>
<td>6.6</td>
<td>6.0</td>
</tr>
<tr>
<td>6K7</td>
<td>115</td>
<td>75</td>
<td>0</td>
<td>6.6</td>
<td>6.0</td>
</tr>
<tr>
<td>6Q7G</td>
<td>55*</td>
<td>75</td>
<td>0</td>
<td>6.6</td>
<td>6.1</td>
</tr>
<tr>
<td>25L6G</td>
<td>110</td>
<td>115</td>
<td>0</td>
<td>6.6</td>
<td>6.1</td>
</tr>
<tr>
<td>25Z5</td>
<td>115</td>
<td>115</td>
<td>0</td>
<td>6.6</td>
<td>6.1</td>
</tr>
</tbody>
</table>

*Measured on 250-volt scale.

**Wave Trap Alignment**

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mfd. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

**R.F. Alignment**

Use the same dummy antenna (250 mfd. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

**Precaution:** One side of the power supply is connected to the chassis through a 25 mfd. capacitor. If signal generator is AC operated connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

**Alignment Frequencies**

I.F. - 455 K.C.  Broadcast - 1500

The location of all trimmers is shown in Fig. 1.

**I.F. Alignment**

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6AG tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6AG and keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

©John F. Rider, Publisher

Compliments of www.nucow.com
GENERAL ELECTRIC CO.

AUTOMATIC RECORD CHANGER (G-69)

General Information
Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A slight adjustment of the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through changes of 180° by rotating the index lever to “Reject” and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the changer is not perfectly level, normal operation is likely to be affected.

Adjustments

A. Main Lever—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl “22” by the trip lever “17” through a friction clutch “8.” If the motion of the pick-up is abruptly accelerated or becomes irregular due to swerving in the eccentric groove, the trip finger “7” moves the trip pawl “22” into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch “5” occurs when movement of the tone arm causes positive movement of the trip pawl “22” without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw “B.” If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pick-up Lift Cable Screw.—During the record change cycle, lever “16” is actuated by the main lever “15” so as to raise the tone arm clear of the record by means of the pick-up lift cable. To adjust the pick-up for proper elevation, stop the changer “in-cycle” at the point where pick-up is raised to the maximum height above turntable plate, and has not moved out of the record. To stop the change cycle, adjust locknuts “C” to 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relationship between the tone arm vertical shaft and lever “10” determines the landing position of the needle on a 10-inch position. Position of eccentric “E” governs the landing of the needle on a 12-inch position. This, however, is dependent on the proper 10-inch adjustment.

To adjust for needle landing, place 10-inch record on turntable; push index lever to reject position and return to 10-inch position; see that pick-up locating lever “17” is tilted fully toward turntable; rotate mechanism through cycle until needle lands on the record; then see that pin “V” on lever “14” is in contact with “Step T” on lever “17.” The correct point of landing is 4-11/16 inches from the nearest edge of the turntable pinion; loosen the two screws “D” and adjust horizontal position of tone arm proper dimension, being careful not to disturb levers “14” and “17.” Leave approximately 1/32 inch end play between hub of lever “20” and pick-up base bearing, and tighten the blunt nose screw “D”; run mechanism through several cycles as a check, then tighten one-pointed screw “D.”

After adjusting for needle landing on a 10-inch record, place 12-inch record on turntable; push index lever to reject and return to 12-inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud “E” until the eccentric end adjusts lever “14” to give correct needle landing. The eccentric end of the stud must always be toward the right end of the motor board, otherwise incorrect landing may occur with 10-inch records.

F. & G. Record Separating Knife.—The upper plate (knife) “20” on each of the record posts serves to separate the lower record from the stack to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record “27” be accurately maintained. The spacing for the 10-inch record is nominally .080 inch, and for the 12-inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut “F” to give .003 to .008 inch separation. Screw “G” must not be depressed during this adjustment. After setting screw “F,” adjust screw “G” so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072 to .078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are supported by a gear and rack coupled to the main lever “15,” and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12-inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable, lift record upward until it is in contact with both separating knives, then loosen screws “H” and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw “H’,” run mechanism through cycle several times to check action, then tighten one-pointed screw “H’.”

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pick-up head should be 3/16 inch above surface of motor board. This may be adjusted by levering the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin “K” in relation to the main lever “15” governs the point at which the roller enters the cam. By bending the pin support either upward or downward, the roller bearing can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petroleum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

Miscellaneous Service Hints

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases:

1. For any irregularity of operation, the adjustment of the main lever “15” should be checked first as in “A.”

2. Needle does not land properly on 10- and 12-inch records—Make compulsory adjustments: “D” and “E.”

3. Needle does not land properly on 12-inch record but correct on 10-inch—Effect adjustment “E.”

4. Failure to trip at end of record—Increase clutch “5” friction by means of screw “B.” Also, see that levers “7” and “12” are free to move without touching each other.

5. Pick-up strokers record of stack or records across top record on turntable—Adjust lift cable per adjustment “C.”

6. Needle does not track after landing—Friction clutch “5” adjustment “B” may be too tight; hind in tone arm vertical bearing “D’” and “12” fouled, or pick-up output cable twisted.

7. Cycle commences before record is complete—Record is defective or adjustment “B” of friction clutch “5” is too tight.

8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65°F).

9. Record is ruined—struck edge of one of record edges is rough; record edges are rough; or knife adjustments “F” and “G” are incorrect.

10. Record not released properly—Adjust record shelf assemblies in response to shaft by means of adjustment “H.”

11. Needle lands in 10-inch position on 12-inch record—Increase tension of pick-up lever landing lever spring “30.”

©John F. Rider, Publisher

Compliments of www.nucow.com
Motor Adjustments

The speed of the turntable is controlled by a governor which allows correct adjustment of the turntable rotation to 78 revolutions per minute. The speed may be checked by placing a piece of paper under a record and counting the number of revolutions in a minute while the record is being played. If adjustment is necessary, lift up the turntable and the speed regulator setscrew will be found adjacent to the turntable hub of the motor. Clockwise rotation of this setscrew reduces speed.

The motor bearings and gears are properly lubricated for long operation under normal weather conditions. If the motor chatters or runs unevenly, place a few drops of light machine oil on the governor felt.

Trip Mechanism

The trip mechanism is of simple design and consists of a latch bar connected to the motor switch and a trip lever. The latch is held closed by means of a spring between the latch bar and the trip lever. The motor switch is mechanically connected to the latch bar so that when the trip mechanism is released the motor switch is in the "off" position. Be sure this latch bar mechanism works freely without binding.

The trip is actuated by an adjustable arm on the trip lever. When the eccentric groove in the record swings the tone arm back and forth, it pushes the latch out of engagement. 

Phonograph Connections (G-61 and G-66)

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-61 or G-66 circuit for the reproduction of phonograph recordings. This method uses a two circuit jack and is connected into the receiver by opening the circuit at C-D at the output of the 2nd IF transformer; and connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert this plug into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be well shielded.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

Note.—A suitable load consisting of a 900,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

Fig. 7. Top View of Automatic Record Changer

Details of Record Shelf Posts, and Locating Lever Assemblies

Motor Drive and Coupling

NOTE: Numbers refer to parts—letters refer to adjustments.
GENERAL ELECTRIC CO.

MODEL GD-51
Schematic, Socket, Trimmers, Voltage Alignment

Power Supply (Volts)  Frequency (Cycles on AC)  Power Consumption (Watts)
100–125 Volts AC or DC  40–60  45

Tuning Frequency Range ............... 540–1750 K.C.
Intermediate Frequency ................. 455 K.C.

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6A8G</th>
<th>6C6</th>
<th>25L6G</th>
<th>25Z6G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to -B Volts</td>
<td>102</td>
<td>30*</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Screen to -B Volts</td>
<td>65</td>
<td>20*</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Cathode to -B Volts</td>
<td>0–30</td>
<td>0</td>
<td>0</td>
<td>127</td>
</tr>
<tr>
<td>Filament Volts</td>
<td>6.2</td>
<td>6.2</td>
<td>24.5</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Line voltage—120 VAC. No Signal Input.
* Measured on 280-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

Model GD-51 is a compact, five-tube AC-DC superheterodyne receiver employing four General Electric tubes plus a ballast tube, as described above in a superheterodyne circuit. It incorporates a simplified mechanically tuned "Touch Tuning" system allowing a set of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic overload control and an efficient electrodynamic speaker.

Alignment Frequencies:
I.F.—455 K.C.  Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

L.F. Alignment
Connect an output meter across the voice coil. Set the volume control for maximum.
Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mmf capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust the two I.F. trimmers (C9 and C10) for maximum output.

Wave Trap Alignment
Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-21) for minimum output.

R.F. Alignment
Use the same dummy antenna (250 mnf and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-5) and antenna trimmer (C-4) for a maximum output.

Precaution—One side of the power supply is connected directly to the chassis. If the signal generator is AC operated, connect a .05 mmf capacitor in the ground side before connecting it to the receiver chassis.

© John F. Rider, Publisher

Compliments of www.nucow.com
GENERAL INFORMATION

Model GA-62 is a compact, six-tube superheterodyne receiver, employing six General Electric Pre-tested Tubes as described previously. The power supply consists of a non-synchronous type vibrator and full-wave high-vacuum rectifier, operating in a conventional rectifier circuit. The receiver incorporates a simplified mechanically adjusted "Touch-Tuning" system, allowing a setup of five stations for automatic tuning. The use of an antenna-matching trimmer results in the maximum transfer of energy from the antenna to the control grid of the 6K7 R.F. tube, providing a high signal-to-noise ratio.

ALIGNMENT

IF ALIGNMENT - Adj. 4 trimmers at 465 Kc thru .1 mF cond.
RF ALIGNMENT - Adj. osc. and Ant. trimmers C-3 and C-2 at 1400 Kc thru 100 mF cond.
PEAK C-8 at 600 Kc.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. V111.

© John F. Rider, Publisher
GENERAL ELECTRIC CO.

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6A7</th>
<th>6D6</th>
<th>75</th>
<th>25L6G</th>
<th>25Z6G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to -B Volts</td>
<td>115</td>
<td>115</td>
<td>50*</td>
<td>105</td>
<td>120 V. A.C.</td>
</tr>
<tr>
<td>Screen to -B Volts</td>
<td>70</td>
<td>115</td>
<td></td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>Cathode to -B Volts</td>
<td>3.0</td>
<td>3.0</td>
<td>0.5</td>
<td>8.5</td>
<td>115</td>
</tr>
<tr>
<td>Filament Volts</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
<td>23.0</td>
<td>24.0</td>
</tr>
</tbody>
</table>

*Measured on 250-volt scale.
Line Voltage—120 A.C. No signal input.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

**Touch-Tuning Mechanism**

The dial mechanism is a very simple arrangement and should not require service. The frequency range of each of the automatic tuning buttons is as follows:

<table>
<thead>
<tr>
<th>Button No.</th>
<th>Frequency Range (Kilocycles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>540-590</td>
</tr>
<tr>
<td>2</td>
<td>570-670</td>
</tr>
<tr>
<td>3</td>
<td>630-780</td>
</tr>
<tr>
<td>4</td>
<td>710-940</td>
</tr>
</tbody>
</table>

**Tuning Frequency Range** 540-1800 K.C.

**Intermediate Frequency** 465 K.C.

**IF ALIGNMENT** - Adj. 4 trimmers at 465 KC thru .05 mf condenser.

**WAVE TRAP** - Adj. C10 cond. at 465 KC thru 250 mmf and 200 ohms series.

**RF ALIGNMENT** - Thru a 250 mmf and 200 ohms series :- Adj. C4 cond. o.e.o. trimmer at 1830 KC— Adj. C3 Ant. trimmer at 1600 KC.

Pwr. Supply connection to chassis is thru .25 mf cond. If Sig. gen. is AC, connect .05 mf cond. in grid side before chassis connection.

FOR CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME VIII.

©John F. Rider, Publisher
GENERAL INFORMATION

Model GD-63 is a compact, six-tube AC-DC superhetrodyne receiver, employing six General Electric Pre-tested Tubes as described above, in a superhetrodyne circuit. It incorporates a simplified trimmer tuned "Touch-Tuning" system, allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic volume control and an improved dustproof speaker.

Electrical Specifications

<table>
<thead>
<tr>
<th>Power Supply (Volts)</th>
<th>Frequency (Cycles on AC)</th>
<th>Power Consumption (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-125 Volts AC or DC</td>
<td>40-100</td>
<td>50</td>
</tr>
</tbody>
</table>

Electrical Power Output (120—line volts)

<table>
<thead>
<tr>
<th>Load-speaker—Permanent Magnet</th>
<th>AC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undistorted</td>
<td>1.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>2.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Voice Coil Impedance: 4.0 ohms at 400 cycles

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6A8G</th>
<th>6K7</th>
<th>6Q7G</th>
<th>25L6G</th>
<th>25Z5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to -B volts</td>
<td>112</td>
<td>112</td>
<td>55*</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Screen to -B volts</td>
<td>75</td>
<td>75</td>
<td>.</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>Cathode to -B volts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7.5</td>
<td>130</td>
</tr>
<tr>
<td>Cathode Current MA</td>
<td>6.6</td>
<td>1.4</td>
<td>0.5</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Filament Volts</td>
<td>6.0</td>
<td>6.0</td>
<td>6.1</td>
<td>24.5</td>
<td>24.0</td>
</tr>
</tbody>
</table>

Line Voltage—120 AC. No signal input
* Measured on 250 volt scale.

On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC reverse the power plug in the receptacle.
**SERVICES DATA**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, 2, 3, 4</td>
<td>Tuning condenser</td>
</tr>
<tr>
<td>C5, 6</td>
<td>Trimmer capacitor</td>
</tr>
<tr>
<td>C7</td>
<td>Wave trap trimmer</td>
</tr>
<tr>
<td>C8</td>
<td>Oscillator padter</td>
</tr>
<tr>
<td>C17</td>
<td>470 mmf., mica capacitor</td>
</tr>
<tr>
<td>C18</td>
<td>350 mmf., mica capacitor</td>
</tr>
<tr>
<td>C19</td>
<td>2500 mmf., mica capacitor</td>
</tr>
<tr>
<td>C20</td>
<td>47 mmf., mica capacitor</td>
</tr>
<tr>
<td>C21</td>
<td>370 mmf., mica capacitor</td>
</tr>
<tr>
<td>C34, 29</td>
<td>Antenna, trimmer strip</td>
</tr>
<tr>
<td>C39, 35</td>
<td>Oscillator trimmer strip</td>
</tr>
<tr>
<td>C40</td>
<td>.001 mfd., paper capacitor</td>
</tr>
<tr>
<td>C41</td>
<td>.05 mfd., paper capacitor</td>
</tr>
<tr>
<td>C42</td>
<td>.05 mfd., paper capacitor</td>
</tr>
<tr>
<td>C43, 44</td>
<td>.05 mfd., paper capacitor</td>
</tr>
<tr>
<td>C45</td>
<td>.01 mfd., paper capacitor</td>
</tr>
<tr>
<td>C46</td>
<td>.01 mfd., paper capacitor</td>
</tr>
<tr>
<td>C47, 48</td>
<td>.005 mfd., paper capacitor</td>
</tr>
<tr>
<td>C49</td>
<td>.012 mfd., paper capacitor</td>
</tr>
<tr>
<td>C50</td>
<td>.01 mfd., molded paper</td>
</tr>
<tr>
<td>C51</td>
<td>8 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C52</td>
<td>8 mfd., dry electrolytic</td>
</tr>
<tr>
<td>R1</td>
<td>47,000 ohm, carbon resistor</td>
</tr>
<tr>
<td>R2</td>
<td>4,700 ohm, carbon resistor</td>
</tr>
<tr>
<td>R3</td>
<td>18,000 ohm, carbon resistor</td>
</tr>
<tr>
<td>R4</td>
<td>10.5 megohm, carbon resistor</td>
</tr>
<tr>
<td>R5</td>
<td>1.5 megohm, carbon resistor</td>
</tr>
<tr>
<td>R6</td>
<td>470,000 ohm, carbon resistor</td>
</tr>
<tr>
<td>R10</td>
<td>2.2 megohm, carbon resistor</td>
</tr>
<tr>
<td>R11, 12</td>
<td>330,000 ohm, carbon resistor</td>
</tr>
<tr>
<td>R13</td>
<td>33,000 ohm, carbon resistor</td>
</tr>
<tr>
<td>R15</td>
<td>3900 ohm, carbon resistor</td>
</tr>
<tr>
<td>R16</td>
<td>22 ohm, carbon resistor</td>
</tr>
<tr>
<td>R17</td>
<td>330 ohm, carbon resistor</td>
</tr>
<tr>
<td>T1</td>
<td>2.0 megohm, volume control</td>
</tr>
<tr>
<td>T1</td>
<td>Power transformer</td>
</tr>
<tr>
<td>T2</td>
<td>Output transformer</td>
</tr>
<tr>
<td>T3</td>
<td>Antenna transformer</td>
</tr>
<tr>
<td>T4</td>
<td>Oscillator transformer</td>
</tr>
</tbody>
</table>

**Physical Specifications**

- **Model**: G-64, G-655
- **Height**: 11 inches, 34 inches
- **Width**: 14½ inches, 31 inches
- **Depth**: 7½ inches, 11½ inches

**Tuning Control Drive Ratio**: 10 to 1

**Electrical Power Output**

- Undistorted: 2.0 watts
- Maximum: 4.0 watts

**Tone Control**: 2 Point—Bass and Normal

**Loud-speaker—Electrodynamic**

- **Model**: G-655, G-64
- **Cone Diameter**: 12 inches, 6.5 inches
- **Voice Coil Impedance**: 3.5 ohms, 3.5 ohms

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT PROCEDURE

**I.F. ALIGNMENT WITH OSCILLOSCOPE**

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Band “B”</td>
<td>485 K C. Sweep</td>
<td>P.E. Grid</td>
<td>65 Mfd. or Larger</td>
<td>2nd J.P. Sec</td>
<td>2nd J.P. Pri (2-11)</td>
</tr>
<tr>
<td>3. Band “B”</td>
<td>485 K C. Sweep</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Wave Trap</td>
<td>Trimmer (C-7)</td>
</tr>
</tbody>
</table>

**I.F. ALIGNMENT WITH OUTPUT METER**

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Band “B”</td>
<td>485 K C. Sweep</td>
<td>P.E. Grid</td>
<td>65 Mfd. or Larger</td>
<td>2nd J.P. Sec</td>
<td>2nd J.P. Pri (2-11)</td>
</tr>
<tr>
<td>3. Band “B”</td>
<td>485 K C. Sweep</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Wave Trap</td>
<td>Trimmer (C-7)</td>
</tr>
</tbody>
</table>

**R.F. ALIGNMENT**

1. Band “B”

Close gap condenser—open plates. Adjust position to first line at left end of tuning scale.

2. Band “B”

2300 K C. Sweep

Antenna Post

250 Mfd. or Larger

Osc. (C-4)

Int. J.P. Sec (2-11)

Adjust plates for a maximum output power indication in vicinity of 600 kHz. While rocking the gagg condenser, adjust the trimmer for maximum output.

3. Band “B”

500 K C. Sweep

Antenna Post

250 Mfd. or Larger

Ant. (C-4)

Adjust plate for a maximum output power indication in vicinity of 160 kHz. While rocking the gagg condenser, adjust trimmer for maximum output.

4. Band “D”

50 M C. Sweep

Antenna Post

250 Mfd. or Larger

Ant. (C-4)

Adjust plate for a maximum output power indication in vicinity of 40 kHz. While rocking the gagg condenser, adjust trimmer for maximum output.

Use a dummy antenna and make all alignments. The grid lead should not be removed from the tube when the input signal is applied when aligning the i.f. amplifier.

**GENERAL INFORMATION**

Cf System

The “B” and “D” band antenna posts are wound on a single core (C-3) as shown in Fig. 2. C-3 is the oscillator transformer for both the “B” and “D” bands. All coil terminals are supported by the main leads of 220 kHz, 400 kHz, and 600 kHz. By showing points on the schematic diagram, Fig. 2, and the pinout diagram, Fig. 2, the circuit diagram.

Photograph Connections

Fig. 2 shows a simple sketch for connecting a crystal or high impedance pickup tube into the receiver circuit for the reproduction of phonograph recordings. 3.1 is either a crystal or toggle triode tube-right tube-swing from. A suitable capacitive circuit consisting of a resistor or capacitor and capacitor can be added if the pickup leads when using a crystal type unit. It is very important that the pickup lead have a high capacitance to reduce interference. This lead should be connected to the chassis ground.

The circuit should be opened at the top end of the volume control (R-26) and C-47, and photograph connectors made as shown. This procedure requires removal of the microphone from the socket. The volume control is then adjusted to the required position. The volume control is then adjusted to the required position.
Fig. 2. Schematic Diagram

Loud-speaker—Electrodynamic

Cone Diameter............ 12 inches
Voice Coil Impedance
(400 cycles)............. 3.5 ohms

Fig. 3. Chassis Parts Layout
### General Electric Co.

**Socket Voltages**

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6A8G</th>
<th>6SK7</th>
<th>6SF5</th>
<th>76</th>
<th>6AC5G</th>
<th>5Y3G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to Gnd. Volts</td>
<td>Conv.-210</td>
<td>215</td>
<td>*100</td>
<td>245</td>
<td>225</td>
<td>310/310 RMS</td>
</tr>
<tr>
<td>Osc.-165</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screen to Gnd. Volts</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cathode to Gnd. Volts</td>
<td>0</td>
<td>0</td>
<td>3.0</td>
<td>8.0</td>
<td>4.7</td>
<td>315</td>
</tr>
<tr>
<td>Cathode Current MA</td>
<td>12.0</td>
<td>9.0</td>
<td>0.3</td>
<td>6.0</td>
<td>33.5</td>
<td>71</td>
</tr>
<tr>
<td>Filament Volts</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
<td>5.2</td>
</tr>
</tbody>
</table>

A-c line voltage 125—no signal input. Dial pointer set at 550 kc. on "B" band. *Measured on 500-volt scale.

### Model G-78

#### Electrical Power Output
- Undistorted: 3.0 watts
- Maximum: 5.0 watts

#### Tone Control
- 4-position

#### Loud-speaker—Electrodynamic
- Outside Cone Diameter: 12 inches
- Voice Coil Impedance (400 Cycles): 3.5 ohms
- Field Coil Resistance: 880 ohms (cold)

#### Symbol | Description
---|---
C1 | Tuning condenser
C2 | Antenna trimmers
C3 | Wave trap trimmer
C4 | .1 mfd, paper capacitor
C5 | Oscillator trimmer
C6 | 50 mfd, mica capacitor
C7 | .005 mfd, paper capacitor
C8 | 300-650 mfd, paper
C9 | 4300 mfd, mica capacitor
C10 | .1 mfd, paper capacitor
C11 | 47 mfd, mica capacitor
C12 | .003 mfd, paper capacitor
C13 | 1500 mfd, mica capacitor
C14 | .0015 mfd, paper capacitor
C15 | .005 mfd, paper capacitor
C16 | .005 mfd, paper capacitor
C17 | .015 mfd, paper capacitor
C18 | 8 mfd, dry electrolytic
C19 | 8 mfd, dry electrolytic
C20 | 12 mfd, dry electrolytic
C21 | .02 mfd, line capacitor
C22 | 20 mfd, compenstatizing capacitor
C23 | Antenna trimmer strip
C24 | Oscillator trimmer strip
C25 | .05 mfd, paper capacitor
C26 | .1 mfd, paper capacitor
C27 | 47,000 ohm carbon resistor
C28 | 6800 ohm carbon resistor
C29 | 15,000 ohm carbon resistor
C30 | 47,000 ohm carbon resistor
C31 | 220,000 ohm carbon resistor
C32 | 180,000 ohm carbon resistor
C33 | 2.0 megohm volume control
C34 | 220 ohm carbon resistor
C35 | 220,000 ohm carbon resistor
C36 | 1.0 megohm carbon resistor
C37 | 2.2 megohm carbon resistor
C38 | 150 ohm carbon resistor
C39 | 3.3 megohm carbon resistor
C40 | 3300 ohm carbon resistor
C41 | 33,000 ohm carbon resistor
C42 | 100 ohm carbon resistor
C43 | 22 ohm carbon resistor
C44 | 6800 ohm carbon resistor
C45 | 22,000 ohm carbon resistor
C46 | 47,000 ohm carbon resistor
C47 | Power transformer
C48 | Output transformer
C49 | Wave trap coil
C50 | Antenna coil
C51 | Oscillator coil

---

© John F. Rider, Publisher

Compliments of www.nucow.com
SERVICE DATA

Physical Specifications:
- Model: G-78
- Height: 9.5 inches
- Width: 15.5 inches
- Depth: 5 inches
- Tuning Control Drive Ratio: 13 to 1

Electrical Specifications:

<table>
<thead>
<tr>
<th>Rating Label</th>
<th>Power Supply (Volts)</th>
<th>Frequency (Cycles)</th>
<th>Power Consumption (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>110-125</td>
<td>50-60</td>
<td>70</td>
</tr>
<tr>
<td>C</td>
<td>110-125</td>
<td>25-60</td>
<td>75</td>
</tr>
</tbody>
</table>

GENERAL INFORMATION

Coil System
T-6 and T-8 are the antenna and oscillator transformers respectively for the "B", "C", and "D" bands. All band switch terminals are numbered in Fig. 2 and 3 to facilitate circuit tracing by showing common points on the schematic diagram, Fig. 2 and pictorial wiring diagram, Fig. 3. The following table shows the coils in use for various positions of the band change switch.

<table>
<thead>
<tr>
<th>Band Switch Position</th>
<th>Antenna Primary</th>
<th>Antenna Secondary</th>
<th>Oscillator Grid</th>
<th>Oscillator Plate</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band &quot;B&quot; Part L-2</td>
<td>L-1 + L-3</td>
<td>L-6 Part L-3</td>
<td>L-8</td>
<td>L-6</td>
<td>Shorted</td>
</tr>
<tr>
<td>Band &quot;C&quot; Part L-2</td>
<td>L-1 + L-3</td>
<td>L-6 Part L-3</td>
<td>L-8</td>
<td>L-6</td>
<td>Shorted</td>
</tr>
<tr>
<td>Band &quot;D&quot; L-2</td>
<td>L-1</td>
<td>L-8</td>
<td>L-9</td>
<td>L-10</td>
<td>Shorted</td>
</tr>
</tbody>
</table>

Automatic Tuning L-4  L-1 + L-3  L-10  L-12  C-1 removed. Tuned by hand trimmer.

Load-speaker—To center the voice coil, remove dust cover by softening with acetone. Loosen two clamping screws and place three 1 in. by 3 in. by 0.10 in. paper or celluloid strips equally spaced around pole pieces for clearance—then tighten clamping screws. Remove strips and cement the dust cap back in place with Glyptal cement.

Phonograph Connections
Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pickup into the G-78 circuit for the reproduction of phonograph recordings. Sp is a rotary triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pickup leads when using a crystal type unit. It is very important that the pickup leads have a shield such as copper braid to prevent hum interference. This lead should be connected to chassis ground. The ACRYLIC cathode circuit should be opened between A-B on the schematic. Also open the circuit between C-D in the diode circuit and make connections of chassis ground as indicated in Fig. 1.

When the pickup is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction. The following are suggested parts:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Stock No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sp</td>
<td>Triple-pole, double-throw switch...</td>
<td>RS-3013</td>
</tr>
<tr>
<td>Rp</td>
<td>330,000 ohm carbon resistor...</td>
<td>HQ-1319</td>
</tr>
</tbody>
</table>

MODEL G-78

ALIGNMENT PROCEDURE

I. F. ALIGNMENT WITH OSCILLOSCOPE

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Band &quot;B&quot;</td>
<td>455 K.C.</td>
<td>I.F. Grid</td>
<td>200 Mfd. or Larger</td>
<td>2nd I.F. Sec. (C-13)</td>
<td>Gang condenser plates closed—&quot;manual&quot; key depressed—connect audio input of oscilloscope to ground and to the junction of C-10 and R-20 of the 2nd I.F. transformer. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplification. The resultant curve is shown in Fig. 5.</td>
</tr>
<tr>
<td>2. Band &quot;B&quot;</td>
<td>455 K.C.</td>
<td>Converter Grid</td>
<td>200 Mfd. or Larger</td>
<td>1st I.F. Sec. (C-10)</td>
<td></td>
</tr>
<tr>
<td>3. Band &quot;B&quot;</td>
<td>455 K.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Wave Trimmer (C-4)</td>
<td>Adjust trimmer for minimum amplitude.</td>
</tr>
</tbody>
</table>

I. F. ALIGNMENT WITH OUTPUT METER

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Band &quot;B&quot;</td>
<td>455 K.C.</td>
<td>I.F. Grid</td>
<td>200 Mfd. or Larger</td>
<td>2nd I.F. Sec. (C-13)</td>
<td>Gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output.</td>
</tr>
<tr>
<td>2. Band &quot;B&quot;</td>
<td>455 K.C.</td>
<td>Converter Grid</td>
<td>200 Mfd. or Larger</td>
<td>1st I.F. Sec. (C-10)</td>
<td></td>
</tr>
<tr>
<td>3. Band &quot;B&quot;</td>
<td>455 K.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Wave Trimmer (C-4)</td>
<td>Adjust trimmer for minimum output.</td>
</tr>
</tbody>
</table>

R. F. ALIGNMENT

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input</th>
<th>Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Band &quot;B&quot;</td>
<td>38 M.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Osc. (C-6)</td>
<td>Close gang plate—adjust pointer to first line at left end of tuning scale.</td>
</tr>
<tr>
<td>2. Band &quot;B&quot;</td>
<td>38 M.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Ant. (C-7)</td>
<td>Connect output meter across voice coil—tone control on &quot;Base&quot; position. The image of any &quot;D&quot; band signal should be heard 500 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.00 M.C. Peak (C-2) while rocking the gang condenser.</td>
</tr>
<tr>
<td>3. Band &quot;C&quot;</td>
<td>No adjustments necessary.</td>
<td></td>
<td></td>
<td></td>
<td>Peak trimmers for maximum output with a low input signal.</td>
</tr>
<tr>
<td>4. Band &quot;B&quot;</td>
<td>560 K.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Osc. (C-7)</td>
<td>Adjust pad for maximum output in vicinity of 560 K.C. while rocking the gang condenser.</td>
</tr>
<tr>
<td>5. Band &quot;B&quot;</td>
<td>560 K.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Pad. (C-10)</td>
<td></td>
</tr>
<tr>
<td>6. Band &quot;B&quot;</td>
<td>560 K.C.</td>
<td>Antenna Post</td>
<td>250 Mfd. or Larger</td>
<td>Osc. (C-7)</td>
<td>Retrim for maximum output with a low input signal.</td>
</tr>
</tbody>
</table>
Align the I.F. at 455 K.C. by visual or output meter method.

Align wave trap trimmer C-4 at 455 K.C. by peaking for a minimum output.

Band change switch on "D" band, align C-6 at 18 M.C. Rock the gang condenser when peaking C-2 for maximum output. The image of any signal on the "D" band should be heard 910 K.C. below input signal. Example: 18 M.C. image at 17.09 M.C.

On Broadcast band, align trimmers C-7 and C-3 at 1500 K.C. Align C-10 at 680 K.C. while rocking the gang condenser.
The "B," "C" and "D" band antenna coils are wound on a single coil form, T-1 as shown in Fig. 2. T-2 is the oscillator transformer for all three bands. All switch points are numbered in Fig. 2 to facilitate in locating these switch points on the pictorial wiring diagram Fig. 4.

The following table gives the coils in use for the various positions of the wave change switch.

<table>
<thead>
<tr>
<th>Rating Label</th>
<th>Power Supply (Volts)</th>
<th>Frequency (Cycles)</th>
<th>Power Consumption (Volts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>115-125</td>
<td>50-60</td>
<td>70</td>
</tr>
<tr>
<td>C</td>
<td>115-125</td>
<td>50</td>
<td>75</td>
</tr>
</tbody>
</table>

Compliments of www.nucow.com
© John F. Rider, Publisher
MODEL G-86
Alignment, chassis wiring GENERAL ELECTRIC CO.
"Beam-A-Scope" data, dial phonograph data.

ALIGNMENT PROCEDURE
MODEL G-86

I.P. Alignment with Oscilloscope

<table>
<thead>
<tr>
<th>Band Switch Setting</th>
<th>Input Freq.</th>
<th>Point of Input Dummy Antenna</th>
<th>Trimmer</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Band B'</td>
<td>450 K.C. + Modulation</td>
<td>J.F. Grid 05 Mfd. or Larger</td>
<td>2nd I.P. Sec. (C-10) 2nd I.P. Pri. (C-14)</td>
<td>Gang condenser plates closed—&quot;manual&quot; key depressed—connect audio input of oscilloscope to ground and to input terminals of A1 and B4 of the 6AC7 I.P. transformer. The oscilloscope grid plate potential is adjusted for the best indication of the characteristic curve of maximum amplitude. The resultant curve is shown in Fig. 3. When a station key is depressed, this I.P. curve should expand considerably.</td>
</tr>
<tr>
<td>2 Band B'</td>
<td>450 K.C. + Modulation</td>
<td>Converter Grid 05 Mfd. or Larger</td>
<td>1st I.P. Sec. 1st I.P. Pri. (C-13)</td>
<td>Gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control as far as possible. Adjust all trimmers for maximum output.</td>
</tr>
</tbody>
</table>

R.F. Alignment

<table>
<thead>
<tr>
<th>Band B'</th>
<th>15 M.C. with Modulation</th>
<th>Antenna Post 250 Mfd. or 500 ohms</th>
<th>Ooc. (C-9) Ant. (C-9)</th>
<th>Calibrate grid plate—adjust pointer to first line at left end of tuning scale.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Band C'</td>
<td>No adjustments necessary</td>
<td>Antenna Post 250 Mfd. or 500 ohms</td>
<td>Ooc. (C-7)</td>
<td>Connect output meter across voice coil—tone control on &quot;base&quot; position. The image of any &quot;D&quot; band signal should be heard 110 K.C. below signal input when (C-3) is on proper peak. Example: 104 M.C. image—114 M.C. Peak (C-3) while rocking the gang condenser.</td>
</tr>
<tr>
<td>4 Band B'</td>
<td>1500 K.C. with Modulation</td>
<td>Antenna Post 250 Mfd. or 500 ohms</td>
<td>Ooc. (C-7)</td>
<td>Peak oscillator trimmer C7 for maximum output in vicinity of 1500 K.C. while rocking the gang condenser.</td>
</tr>
<tr>
<td>5 Band B'</td>
<td>1500 K.C. with Modulation</td>
<td>Antenna Post 250 Mfd. or 500 ohms</td>
<td>Ooc. (C-7)</td>
<td>Adjust shaper for maximum output in vicinity of 580 K.C. while rocking the gang condenser.</td>
</tr>
<tr>
<td>6 Band B'</td>
<td>1500 K.C. with Modulation</td>
<td>Antenna Post 250 Mfd. or 500 ohms</td>
<td>Ooc. (C-7)</td>
<td>Refine for maximum output as described in step No. 4.</td>
</tr>
</tbody>
</table>

SERVICE DATA

**Physical Specifications**
Model
Height
Width
Depth
Tuning Control Drive Ratio

**General Information**

The Model G-86 is a three-band A-C operated receiver, employing eight General Electric Pre-tuned tubes in a super-heterodyne circuit as described above. It incorporates a simplified trimmer tuned "Touch Tuning" system, and the new and exclusive self-contained antenna system, "Beam-A-Scope." Other features include: easy-to-read dial, full-wave diode rectifier circuitry, automatic (with adapter) or AM broadcast, and when using Touch Tuning, de-generative audio feedback, and a high degree of selectivity. The receiver is designed for the home market and is equipped with a 12-inch dial drive mechanism. The sensitivity is high, and the signal-to-noise ratio is excellent. The receiver is fully transistorized for maximum efficiency and reliability. The receiver is housed in a compact cabinet, and is easy to use.

**Beam-A-Scope**

The "Beam-A-Scope" is essentially a tuned coil antenna wound on an impregnated frame and shielded by a Faraday screen against sounding disturbances. This construction discriminates in favor of the desired signal against a local man-made noise source in three ways. First, since any noise source is composed of two components—electrostatic and magnetic fields—the "Beam-A-Scope" may be tuned so that a null point is found where no voltage is produced by these two components in the two directions where noise originates. Due to the fact that this null point is very sharp, it is extremely unlikely that any desired station will be in a direct line of sight from the noise source. Second, the "Beam-A-Scope" eliminates the external return path to ground present in the case of an unshielded antenna. This reduces or eliminates local man-made noise sources in which the same way as a shielded antenna leads-in does in an ordinary antenna installation. In the third place, the "Beam-A-Scope" discriminates against the electromagnetic component of an incoming wave by comparison with the magnetic component of a local noise source; a great deal larger error is made by the Faraday screen. In most cases, the noise caused by the Faraday screen brings about an enormous increase in signals-to-noise ratio. The above operation is only available on the broadcast band and in this position the beam-a-scope is the first tuned grid circuit. On the "C" and "D" bands, the beam-a-scope is connected to operate as a capacity type antenna. When an outside antenna is connected to the receiver, it is tapped in on the grid circuit (Beam-A-Scope) L-2 when operating on the "B" band or on the "C" band, in the 2-Watt position. For the "D" band a separate antenna is required. The beam-a-scope is also used with the "C" and "D" beam primaries of the antenna coil. Load-speaker

To connect voice coil, remove the dust cover by softening with acetone. Leave the two spider clamping screws and cement the top in place. This should be spaced accurately at the voice coil. The voice coil is insulated from the cabinet by a piece of cloth between the speaker and speaker plate. The voice coil is insulated from the cabinet by a piece of cloth between the speaker and speaker plate.

**Circuit System**

The "C" and "D" band antenna coils are wound on a single coil form as shown in Figs. 2 and 3. The T-2 coil is the pickup inductor for all three bands. All switch positions are numbered in Fig. 2 and Fig. 4 in order of use. The component points on the schematic diagram, Fig. 2, and the pictorial wiring diagram, Fig. 4.

**Phonograph Connections**

The G.R.A. circuit is shown as a phonograph pickup, with the pickup in the middle of the receiver. It is very important that the pickup be clamped with copper braid to prevent hum interference. This loud should be connected to the phonograph jack. The G.R.A. circuit should be opened between A-B (as shown in the schematic). Also open the circuit between C-D in the loud lead and make connections to phonograph switch as shown in Fig. 1. When the pickup is connected as suggested, the regular radio volume and tone controls work both radio and phonograph reproduction. The following are suggested parts:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Stock No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>Triple-pole, double-throw switch</td>
<td>R5-2412</td>
</tr>
<tr>
<td>EP</td>
<td>500,000-ohm carbon resistor</td>
<td>R1-1319</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
### ALIGNMENT PROCEDURE

#### 1.7. Alignment with Oscilloscope

<table>
<thead>
<tr>
<th>Band</th>
<th>Switch</th>
<th>Frequency</th>
<th>Point of Input</th>
<th>Dynamic</th>
<th>Trimmer</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>2</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>3</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>4</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>5</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
</tbody>
</table>

#### RF Alignment with Output Meter

<table>
<thead>
<tr>
<th>Band</th>
<th>Switch</th>
<th>Frequency</th>
<th>Point of Input</th>
<th>Dynamic</th>
<th>Trimmer</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>2</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>3</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>4</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>5</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
</tbody>
</table>

#### R.F. Alignment

<table>
<thead>
<tr>
<th>Band</th>
<th>Switch</th>
<th>Frequency</th>
<th>Point of Input</th>
<th>Dynamic</th>
<th>Trimmer</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>2</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>3</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>4</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
<tr>
<td>5</td>
<td>Band B</td>
<td>455 K.C.</td>
<td>Ground terminal</td>
<td>.05 Mfd</td>
<td>.05 Mfd</td>
<td>Manual key depressed—pang condenser plate closed—connect vertical input of oscilloscope to ground and the 6300 and 6L4 output of 6300 (see page 3). Adjust trimmers for a single symmetrical curve of maximum amplitude. The condenser curve with input at converter (C-12) turned off is key is depressed. If F.P. curve should expand considerably.</td>
</tr>
</tbody>
</table>

#### REPLACEMENT PARTS LIST

**MODEL G-99**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>R2-017</td>
<td>BOARD—Terminal board (1 bag)</td>
<td>$0.10</td>
</tr>
<tr>
<td>R2-027</td>
<td>BOARD—Active terminal board</td>
<td>$0.10</td>
</tr>
<tr>
<td>R2-028</td>
<td>BOARD—Active terminal board (10)</td>
<td>$0.10</td>
</tr>
<tr>
<td>R2-011</td>
<td>CAPACITOR—.0022 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-012</td>
<td>CAPACITOR—.0047 mfd, 500 V, paper</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-013</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-014</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-015</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-016</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-017</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-018</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-019</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-020</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-021</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-022</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
<tr>
<td>R2-023</td>
<td>CAPACITOR—.00047 mfd, 500 V, paper (10)</td>
<td>$0.075</td>
</tr>
</tbody>
</table>

**G-E. Page 10-18**
Antenna and Ground

Since this receiver operates at a relatively high radio frequency, it is very essential to construct a good antenna and ground system in order to obtain maximum results.

For distances up to within thirty miles from the transmitter, a simple horizontal di-pole as shown in Fig. 1 should give excellent results. It should be located free from all obstructions and placed as high from the earth as possible. Make sure it is run approximately at right angles to the direction of the transmitter; i.e., if the transmitter is located due west, run the horizontal di-pole in a north and south direction. The horizontal flat-top has an effective antenna length of 10-feet, 8-inches and consists of #12 or #14 bare copper wire (preferably stranded), cut in the middle and the two halves insulated by glass insulators. A twisted lead-in wire is then soldered to each side of the di-pole as shown, and the other two ends of the transmission line are connected to the #1 and #2 terminals on the receiver chassis. The lead-in transmission line may be of any length up to 100 feet and should consist of low loss antenna lead-in wire. A good ground connection to a water pipe is connected to the terminal marked "G".

Somewhat better results may be obtained by constructing the antenna shown in Fig. 2. This is somewhat similar to the di-pole antenna and is more efficient due to the fact that the transmission line has very little loss.

The antenna proper consists of a 10-foot, 8-inch length of 1-inch diameter copper pipe supported at the middle by a pole located as high above ground as possible. The transmission line is made up of two #12 or #14 copper wires, spaced about 2-inches apart and transposed every two or three feet. The antenna end of the transmission line is soldered 13-1/2 inches each side of the center of the copper pipe and should form a triangle, 27 inches on all sides. As in the previous installation, the horizontal flat-top should run approximately at right angles to the direction of the transmitter.

For greater distances, somewhat better results may be obtained by using a reflector in conjunction with the antenna described and shown in Fig. 2. A suggested system is to use a 1-inch diameter copper pipe similar to the antenna, running parallel to the regular antenna and located farthest from the direction of the received signal. Fig. 3 shows a diagram looking for top and dimensions should be followed very carefully. By experimenting, however, with the distance between reflector and antenna, improvement in the individual installation may be noted.

Note - The reflector is a floating copper bar and there are no external connections. Connect and install the regular antenna as shown in Fig. 2.

Tuning Control Drive Ratio ............... 1:1

Electrical Specifications

Volts ................................ 115-125
Frequency ......................... 30-60 cycles
Watts Consumption ............... 100

Tuning Frequency Range ............... 37-44 M.C.
Intermediate Frequency ................. 3.0 M.C.
Band Width ........................... 500 K.C.

Electrical Power Output

Undistorted .................. 12.0 Watts
Maximum .................. 15.0 Watts

Loudspeaker - Electrodynamic

Cone - Outside Diameter ............... 10 inches
Voice Coil Impedence (400 cycles) .... 3.5 Ohms
Field Resistance ................ 450 Ohms (cold)
CIRCUIT ALIGNMENT

IF Amplifier

Due to the good stability of components and the wide band characteristics of this amplifier, alignment should be unnecessary under normal operating conditions. Should it become imperative that an IF alignment is desirable, it will be necessary to use a cathode-ray oscilloscope in conjunction with a 3.0 megacycle signal generator with a superimposed 200 K.C. sweep frequency. This generator may by built up by constructing an oscillator with the tank condenser semi-fixed and variable, the variable portion being designed to be rotated by a motor and of proper capacity to give a 200 K.C. variation of the 3.0 megacycle mid-frequency. Connect the vertical plates of the oscilloscope across the resistor R-15 of the 4th IF stage and align transformers T-7, T-6, T-5 and T-4 in a progressive step by step method.

Frequency Demodulator

With the above signal and sweep signal as used above, connect the vertical oscilloscope plates across the resistors R-16 and R-15, then align the transformer T-8 for a cross-over curve as shown in Fig. 4. Proper alignment of trimmer C-51 is indicated when the curve crosses about mid-way in a vertical plane. Proper alignment of C-50 is indicated when the sides of the curve near cross-over are nearest to a straight line.

Note - Keep signal input high enough so that noise limiter is functioning. This point is indicated when an increase in signal input no longer changes the size of the curve.

RF Alignment

Fig. 4

Make sure the last division on the low frequency end of the drum dial coincides with the cut-off mark when the gang condenser is completely closed; then, proceed as follows:


2. Apply a 52.8 megacycle unmodulated signal to the antenna terminal board.

3. Set dial scale so it is tuned to 52.8 megacycle and peak oscillator trimmer C-4 for maximum voltage reading on the meter.

4. Peak the antenna (0-2) and RF (0-3) trimmers for maximum voltage output on meter.

Note - The proper location of the trimmers is shown on a following page.
MODEL GB-400
BATTERY-OPERATED

SERVICE DATA

Physical Specifications
Model.................................................. GB-400
Height.................................................. 9¾ inches
Width.................................................. 13 inches
Depth.................................................. 8¾ inches

Tuning Control Drive-Ratio.......................... 1:1

Batteries Required
1—1½-volt "A" battery (Eveready No. 741 or equivalent).
2—45-volt "B" batteries (Eveready No. 762 or equivalent).

Tuning Frequency Range............................. 540–1600 kc.

Alignment Frequency
IF.................................................. 455 kc.
RF.................................................. 600 and 1500 kc.

Loud-speaker—Permanent Magnet
Over-all diameter.................................. 5 inch
Cone Coil Impedance (400 cycles).................. 3.0 ohms

Tubes
Converter and Oscillator................................ GE-1A7G
IF Amplifier........................................... GE-1N5G
Detector and 1st Audio................................ GE-1H5G
Power Amplifier...................................... GE-1C5G

GENERAL INFORMATION

The Model GB-400 is a compact and portable battery-operated receiver that employs four tubes in a superheterodyne circuit. Features of design include self-contained "A" and "B" battery supply, an efficient loop antenna built inside of the cabinet, and an efficient P.M. speaker.

©John F. Rider, Publisher

Compliments of www.nucow.com
**MODEL GD-500**

**Schematic, Socket, Trimmers**

**GENERAL ELECTRIC CO.**

Symbol | Description
--- | ---
C-1 | Tuning Capacitor .05 mfd., Paper Capacitor
C-2 | .001 mfd., Paper Capacitor
C-3 | .005 mfd., Paper Capacitor
C-4 | .005 mfd., Paper Capacitor
C-7 | 15 mfd., Dry Electrolytic
C-8 | 8 mfd., Dry Electrolytic
C-9 | .002 mfd., Paper Capacitor
C-10 | 30,000 ohm, Volume Control
R-1 | 150 ohm, Carbon Resistor
R-2 | 270 ohm, Carbon Resistor
R-3 | 470 ohm, Carbon Resistor
R-4 | 470 ohm, Carbon Resistor
R-5 | 470 ohm, Carbon Resistor
R-6 | 470 ohm, Carbon Resistor
R-7 | 470 ohm, Carbon Resistor
R-8 | 150 ohm, Carbon Resistor
R-9 | 150 ohm, Carbon Resistor
R-10 | 150 ohm, Power Cord Resistor
L-1 | R.F. Coil
L-2 | R.F. Coil
T-1 | Output Transformer

**Tubes**

R.F. Amplifier......GE-6K7GT
Detector.............GE-6P5GT
1st Audio...........GE-6J5GT
Power Output........GE-2S6GT
Rectifier...........GE-2S6GT

**MODEL GD-500**

**TRF RECEIVER**

**VOLTAGE CHART**

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6K7GT</th>
<th>6J5GT</th>
<th>6P5GT</th>
<th>2S6GT</th>
<th>2S6GT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to -B Volts</td>
<td>88</td>
<td>30</td>
<td>35</td>
<td>132</td>
<td>120 AC</td>
</tr>
<tr>
<td>Screen to -B Volts</td>
<td>13</td>
<td>30</td>
<td>35</td>
<td>132</td>
<td>120 AC</td>
</tr>
<tr>
<td>Cathode to -B Volts</td>
<td>13</td>
<td>30</td>
<td>35</td>
<td>132</td>
<td>120 AC</td>
</tr>
<tr>
<td>FilamentVolts</td>
<td>6.4</td>
<td>6.3</td>
<td>6.2</td>
<td>25.0</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Voltage measured when volume control is set to maximum.
Line Voltage—120 AC. No signal input.
* Measured on 500-volt scale.
On DC, voltages should read approximately 10% lower.

**GENERAL INFORMATION**

Model GD-500 is a compact five-tube AC-DC tuned radio frequency receiver that tunes the broadcast band of frequencies. One side of the power line is connected directly to the chassis ground, therefore, caution should be exercised in servicing.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If any hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

**ALIGNMENT**

Connect the high side of the signal generator through a 250 mfd. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the tuning mark should be over the last mark on the dial.
2. Tune receiver to the 1500 KC point on the dial; then align trimmers on the gang condenser at 1500 KC for a maximum output meter reading.

Precaution—One side of the power supply is connected to the chassis. Do not connect chassis to any external ground.

©John F. Rider, Publisher

Compliments of www.nucow.com
GENERAL ELECTRIC CO.

Tuning Frequency Range
Band "B" 535 to 1730 kc

Electrical Power Output
Undistorted 1.1 watts
Maximum 2.0 watts

MODELS GD-520 AND GD-521
GENERAL INFORMATION

Models GD-520 and GD-521 are compact five-tube AC-DC
superheterodyne receivers, employing five General Electric
Pre-tested Tubes. One side of the power line is connected
directly to the chassis ground in either receiver; therefore,
cautions should be exercised in servicing.
When operating from a D-c source of power, it is necessary
to insert the power plug with proper polarity; otherwise,
the receiver will fail to function. If any hum is noticed when the
receiver is used on AC, reverse the power plug in the recep-
tacle.

Alignment Frequencies
I.F. 456 kc. Broadcast 1500 kc
The location of all trimmers is shown in Fig. 1.

I.F. Alignment
Connect an output meter across the voice coil. Set the
volume control for maximum.
Set test oscillator to 456 kc and apply signals to the
time grid of the 6AS8GT tube through a .05 mfd. capacitor.
Do not remove the grid lead from the 6AS8GT. Keep the test
oscillator output as low as possible to give a readable output.
Adjust all three I.F. trimmers for maximum output.

R.F. Alignment
Set test oscillator to 1500 kc and connect one output
lead to the receiver chassis and the other through a 250 mfd.
capacitor in series with 200 ohms to the receiver antenna lead.
Adjust the oscillator trimmer (C-13) and the antenna trimmer
(C-14) for a maximum output.

Precaution. One side of the power supply is connected to the
chassis. Do not connect chassis to any external ground.
If signal generator is A-c operated, connect a .05 mfd. ca-
pacitor in the ground side before connecting it to the receiver
chassis.

© John F. Rider, Publisher
MODELS GD-610 AND GD-620

SERVICE DATA

Specifications
- Model: GD-610
- Model: GD-620
- Height: 8 1/4 inches
- Width: 12 3/4 inches
- Depth: 8 3/4 inches

Tuning Control Drive Ratio...1:1

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6AS8</th>
<th>6SK7</th>
<th>6SQ7</th>
<th>25L6G</th>
<th>25Z0G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to B volts</td>
<td>112</td>
<td>112</td>
<td>50*</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>Screen to B volts</td>
<td>75</td>
<td>75</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cathode to B volts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>Filament Volts</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
<td>24.5</td>
<td>24.5</td>
</tr>
</tbody>
</table>

Compliments of www.nucow.com

and antenna trimmer (C-30) for a maximum output.

Precaution—On the Model GD-610 one side of the power supply is connected to the chassis. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

Power Supply (Volts) | Frequency (Cycles on AC) | Power Consumption (Watts)
--- | --- | ---
100-125 Volts AC or DC | 40-60 | 50

Tuning Frequency Range ..........540-1750 K.C.
Intermediate Frequency ..........455 K.C.
Electrical Power Output (120-line Volts) A-C D-C
Undistorted ..........1.0 0.9
Maximum ..........1.8 1.5

Load-speaker—Electrodynamic
Outside Core Diameter ..........5 inches
Voice Coil Impedance (400 cycles) ..........4.0 ohms
Field Coil Resistance ..........420 ohms

**ALIGNMENT PROCEDURE**

Alignment Frequencies
- I.F.—455 K.C.
- Broadcast—1500 K.C.

The location of all trimmers is shown in Fig. 1.

I.F. Alignment
Connect an output meter across the voice coil. Set the volume control for maximum.
Set test oscillator to 455 K.C. and apply signal to the control grid of the 6AS8 tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6AS8. Keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

Wave Trap Alignment
Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mfd. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment
Use the same dummy antenna (250 mfd. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-37) for a maximum output.

© John F. Rider, Publisher

Compliments of www.nucow.com
## Fig. 2. Schematic diagram, Model GD-600

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Wave trap trimmer</td>
<td>C34b</td>
<td>30 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C12, 13</td>
<td>Tuning condenser</td>
<td>C34c</td>
<td>15 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C14</td>
<td>47 mfd., mica capacitor</td>
<td>C34</td>
<td>dry electrolytic (for 25 v sets only)</td>
</tr>
<tr>
<td>C15</td>
<td>0.2 mfd., paper capacitor</td>
<td>C15</td>
<td>0.05 mfd., paper capacitor</td>
</tr>
<tr>
<td>C19</td>
<td>0.05 mfd., paper capacitor</td>
<td>C35</td>
<td>300 mfd., mica capacitor</td>
</tr>
<tr>
<td>C24</td>
<td>0.05 mfd., paper capacitor</td>
<td>R1</td>
<td>47,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C25</td>
<td>0.05 mfd., paper capacitor</td>
<td>R2</td>
<td>10,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C26</td>
<td>0.05 mfd., paper capacitor</td>
<td>R3</td>
<td>Ballast resistor</td>
</tr>
<tr>
<td>C27</td>
<td>0.05 mfd., paper capacitor</td>
<td>R4</td>
<td>330 ohm carbon resistor</td>
</tr>
<tr>
<td>C28</td>
<td>0.05 mfd., paper capacitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C29</td>
<td>0.05 mfd., paper capacitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C30</td>
<td>0.05 mfd., paper capacitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>10,000 ohm volume control</td>
<td>R2</td>
<td>15 meghohm carbon resistor</td>
</tr>
<tr>
<td>R6</td>
<td>470,000 ohm carbon resistor</td>
<td>R11</td>
<td>270,000 ohm carbon resistor</td>
</tr>
<tr>
<td>R12</td>
<td>850,000 ohm carbon resistor</td>
<td>T1</td>
<td>1st I.F. transformer</td>
</tr>
<tr>
<td>T3</td>
<td>Output transformer</td>
<td>T4</td>
<td>Oscillator transformer</td>
</tr>
<tr>
<td>T5</td>
<td>Antenna Transformer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Fig. 3. Schematic diagram, Model GD-630

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Wave trap trimmer</td>
<td>C26</td>
<td>47 mfd., paper capacitor</td>
</tr>
<tr>
<td>C12, 13</td>
<td>Tuning condenser</td>
<td>C29</td>
<td>0.01 mfd., paper capacitor</td>
</tr>
<tr>
<td>C14</td>
<td>47 mfd., mica capacitor</td>
<td>C30</td>
<td>10 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C15</td>
<td>0.2 mfd., paper capacitor</td>
<td>C30b</td>
<td>30 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C19</td>
<td>0.05 mfd., paper capacitor</td>
<td>C32</td>
<td>0.2 mfd., line capacitor</td>
</tr>
<tr>
<td>C22</td>
<td>0.05 mfd., paper capacitor</td>
<td>C34</td>
<td>35 mfd., dry electrolytic</td>
</tr>
<tr>
<td>C23</td>
<td>0.2 mfd., paper capacitor</td>
<td>C35</td>
<td>150 mfd., mica capacitor</td>
</tr>
<tr>
<td>C24</td>
<td>0.05 mfd., paper capacitor</td>
<td>R1</td>
<td>47,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C25</td>
<td>0.05 mfd., paper capacitor</td>
<td>R2</td>
<td>10,000 ohm carbon resistor</td>
</tr>
<tr>
<td>C26</td>
<td>0.15 mfd., paper capacitor</td>
<td>R3</td>
<td>Ballast resistor</td>
</tr>
<tr>
<td>C27</td>
<td>0.05 mfd., paper capacitor</td>
<td>R4</td>
<td>330 ohm carbon resistor</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
GENERAL ELECTRIC CO.

MODELS GD-600 AND GD-630

SERVICE DATA

Specifications
Model: GD-600 GD-630
Height: 8 ¼ inches 8 ¼ inches
Width: 12 ¾ inches 12 ¾ inches
Depth: 6 ¼ inches 6 ¼ inches

Tuning Control Drive Ratio .... 1:1

Electrical Specifications

<table>
<thead>
<tr>
<th>Power Supply (Volts)</th>
<th>Frequency (Cycles on AC)</th>
<th>Power Consumption (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-125 Volts AC or DC</td>
<td>40-60</td>
<td>50</td>
</tr>
</tbody>
</table>

Tuning Frequency Range ....... 540–1750 kc.
Intermediate Frequency ....... 455 kc.

Electrical Power Output (120-line Volts)

<table>
<thead>
<tr>
<th></th>
<th>AC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undistorted</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Maximum</td>
<td>1.8</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Load-speaker—Electrodynamic

Outside Cone Diameter ....... 5 inches
Voice Coil Impedance (400 cycles) .... 4.0 ohms
Field Coil Resistance ....... 420 ohms

Tubes

Converter and Oscillator: GE-6A8G
I.F. Amplifier: GE-6SK7
Detector: GE-6SK5
Power Output: GE-25L6G
Rectifier: GE-25Z6G
Pilot Lamp: Mazda No. 44
Ballast: BL49-B

Production Change
On a number of receivers, substitute electrolytic RC-5113 is used for C30b with both sections tied in parallel and RC-5114 is used for C30a.

GENERAL INFORMATION

The models GD-600 and GD-630 are compact six-tube AC-DC superheterodyne receivers employing five General Electric tubes plus a ballast tube, as described above in a superheterodyne circuit. Features of design include I.F. wave trap, automatic overload control and an efficient electrodynamic speaker. Model GD-630 is fully approved by Underwriters’ Laboratories.

Precaution—On the Model GD-600, one side of the power supply is connected to the chassis. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

©John F. Rider, Publisher

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>6A8G</th>
<th>6SK7</th>
<th>6SF5</th>
<th>25L6G</th>
<th>25Z6G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate to -B volts</td>
<td>112</td>
<td>112</td>
<td>35*</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>Screen to -B volts</td>
<td>75</td>
<td>75</td>
<td></td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>Cathode to -B volts</td>
<td>3.4</td>
<td>3.4</td>
<td>0</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>Filament volts</td>
<td>6.4</td>
<td>6.4</td>
<td>6.4</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

Line Voltage—120 V. AC. No signal input—Vol. control at max.
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

ALIGNMENT PROCEDURE

Alignment Frequencies
I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

I.F. Alignment
Connect an output meter across the voice coil. Set the volume control for maximum.
Set test oscillator to 455 K.C. and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all I.F. trimmers for maximum output.

Wave Trap Alignment
Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

R.F. Alignment
Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-37) and antenna trimmer (C-36) for a maximum output.

Compliments of www.nucow.com
### ALIGNMENT FOR MODELS

**H-500, H-500W, H-510, H-611**

1-F Alignment:
Apply a 455-ko signal to the grid of the 12SK7 and align the 2nd 1-f transformer by visual or output meter method. Repeat the procedure, applying the 455-ko signal to the grid of the 12AT6 and aligning the 1st 1-f transformer.

R-F Alignment:
On Models H-500W, H-510 and H-611 (W and X models incl.), apply a 1500-ko signal through a 100 nmf mica condenser to the antenna terminal, Align C-2b. Peak C-2a for maximum output.

On Models H-520 and H-521 (W and X models incl.), apply a 1500-ko signal either through a standard B.F. jack, or to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500-ko signal is fed and which magnetically couples to the receiver Beam-ecoscope. Align C-2b. Peak C-2a for maximum output.

©John F. Rider, Publisher

### Alignment, Socket, Parts

**Specifications**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-006</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-008</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-010</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-011</td>
<td>Young</td>
<td>12.00</td>
</tr>
</tbody>
</table>

**Price List**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-006</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-008</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-010</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-011</td>
<td>Young</td>
<td>12.00</td>
</tr>
</tbody>
</table>

**Components**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-001</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-002</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-003</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-004</td>
<td>Young</td>
<td>12.00</td>
</tr>
</tbody>
</table>

**Parts List**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-006</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-008</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-010</td>
<td>Young</td>
<td>12.00</td>
</tr>
<tr>
<td>10-011</td>
<td>Young</td>
<td>12.00</td>
</tr>
</tbody>
</table>

**Alignment**

**Diagram**

- [Alignment Diagram](attachment:alignment_diagram.png)

**Notes**

- Use on previous receivers

- Prices subject to change without notice
GILFILLAN BROS., INC.

MODEL 56S
MODEL 66S
Schematics
Socket, Voltage

Compliments of www.nucow.com

Power consumption:
40 watts at 115 volts
60 cycles on primary,
All voltages to ground
with a 1000 ohm per
volt meter.

©John F. Rider, Publisher

Compliments of www.nucow.com
SETTING PUSH BUTTONS MODELS 56-S, 66-S.

To set push button station selector proceed as follows:

1. Release mechanism by turning screw "B" in center of manual control knob "A" approximately three turns to the left.

2. Manually tune the radio set by means of turning knob "A" until the pointer is at the bottom end of the dial scale (so that it is pointed at 170). Starting from this point tune the desired station you want to hear (on No. 1 button).

3. Press button marked 1 all the way in, then release. Tune the next station desired manually, then press button No. 2 all the way in, then proceed progressively until all six buttons have been tuned.

4. Turn screw "B" in center of manual control "A" to right until tight, locking the selector mechanism. Any of the stations selected can now be received by depressing its corresponding push button. BE SURE SELECTOR BUTTON IS PUSHER ALL THE WAY IN, both when setting selector to a station and when using push button tuning to receive that station.
GOODYEAR TIRE & RUBBER CO., INC.
MODEL 404
Schematic, Voltage

**IF ALIGNMENT** - Adj. trimmers at 465 KC thru .1 mf cond. -

**BC ALIGNMENT** - Thru 200 mmf cond.; Adj. Osc. trimmer at 1720 KC. - Adj. Ant. trimmer at 1400 KC - Adj. Dial and Padder at 600 KC.

---

**IF PEAK 465 KC**

Serial No.: 5D1L5200A and up

---

© John F. Rider, Publisher

Compliments of www.nucow.com
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 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

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.

Aligning I.F. Transformers: (485 K.C.):


Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   a. Connect external oscillator set at 485 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 657G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   b. Move oscillator output clip from grid of 657G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.

   c. With oscillator still connected to 6D8G, readjust output I.F. transformer (108-85) if necessary.

R.F. Alignment: (335-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mfd. condenser to top 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. Reset external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   c. Check sensitivity at 600 and 1000 kilocycles.
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 muf. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Voltage taken from different points of circuit to chassis are measured with voltmeter and twisted, with battery connected to 200 ohm per volt. These voltages are directly added to 100 volts on the primary of the power transformer.

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) Connect external oscillator which has been adjusted to 646 kilocycles in series with 1.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 108-83.

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

Beginning with 5K173250A, Antenna Coils No. 111-A4 replaced No. 111-33, and capacities C1—00385 muf. and C14—00011 muf. were eliminated. Note: On early models C14 was a capacity winding on the primary of the No. 111-33 Antenna Coil.

See revised diagram.

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, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments: (two adjustments at the top of parts number 108-33 and 108-47)

(a) Connect external oscillator which has been adjusted to 645 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 108-83.

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

TUBES

The tube complement of this chassis is as follows:

1. Type 6A7—pentagrid electron coupled oscillator and first detector.
2. Type 6D6—remote cut-off pentode as I.F. amplifier.
3. Type 6B7—duplex diode pentode as diode detector, A.V.C.
4. Type 62—pentaode output tube.
5. Type 6D—high vacuum receiver.

© John F. Rider, Publisher

Compliments of www.nucow.com
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 595
Schematic, Voltage Socket, Trimmers Alignment

MISCELLANEOUS

T1. 105-10 Antenna Choke Coil
T2. 111-27 Antenna Coil
T3. 110-22 Oscillator Coil
T4. 108-38A Input I.F. Transformer
T5. 108-40 Output I.F. Transformer
C  102-12 Two Gang Variable Cond.
S  123-4 Wave Change Switch
LI. 104-14A Power Transformer 50/60 Cycle
LI. 104-18 Power Transformer 25 Cycle
LI. 114-11 Speaker—Field Resistance 1550 Ohms
LI. 104-17 Power Trans. Universal 50/60 Cycle

©John F. Rider, Publisher
ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83 Output I.F. Transformer
Part No. 108-82 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-81) to resonance.

   (b) Move oscillator output clip from grid of 78 grid cap of 6A7 and adjust input I.F. transformer (No. 108-82) to resonance.

   (c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-83) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mfd. condenser to the antenna terminal on the antenna coil and chassis ground 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 1550 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.
MODEL 502, Serial 1, 2
Schematic, Voltage
GOODYEAR TIRE & RUBBER CO., INC.

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

ALIGNING I.F. TRANSFORMERS: (470 K.C.):
Part No. 108-83B Output I.F. Transformer
Part No. 108-82B Input I.F. Transformer
These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 470 kilocycles, in series with a 1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)
1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mfd. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:

Voltage 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.

Compliments of www.nucow.com
NOTE: IN RUN 2 CERTAIN PARTS HAVE BEEN SUBSTITUTED WHICH DIFFER FROM THOSE OF THE FIRST RUN. THESE CHANGES ARE INDICATED BY THE BOXED NUMBERS ON THE SCHEMATIC AND IN THE PARTS LIST BELOW.
NO SPARK PLUG SUPPRESSORS ARE REQUIRED

DESCRIPTION:
Model No. 666 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C. operates from a 6.0 volt storage battery and uses the automotive type 6.5 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 165 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give minimum drift and variation of gain due to climatic changes.

The receiver is so designed that it may be used as either a single or two unit installation. Tags are provided on the output transformer to a pin jack terminal board; red dot distinguishing dual speaker tap and green dot for single speaker operation.

For complete details see illustration and Header section data chart.

Dash kits for the remote control head are available for 1936 cars drilled for dash plates. This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimout buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

TUBE COMPLEMENT
1—Type No. 6K7—Remote Cut-off Pentode as R.F. Amplifier
2—Type No. 6AS—Pentagrid Converter (composite first detector and oscillator)
3—Type No. 6K7—Remote Cut-off Pentode as I.F. Amplifier (465 K.C.)
4—Type No. 6L7—Duplex Diode Triode Second Detector, A.V.C. and First Audio
5—Type No. 6N6—Twin Triode Output Amplifier
6—Type No. 6X5—High Vacuum Rectifier

The tube complement consists of the latest "Metal-Glass" tubes which are interchangeable with metal tubes.

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

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 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-49 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. 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 middle section of the three-gang condenser—see top view). Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad rocking gang condenser and find at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view).
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking. Make certain that the instrument panel has a ground connection to the frame of the car.

NOTE—Where ignition coils are mounted in motor compartments a .5 mfd cond (148-1 or 148-3) connected between primary coil terminal and receiver mounting bolt will often reduce motor noise.
GOODYEAR TIRE & RUBBER CO. INC.

MODEL 691
Schematic, Voltage Socket, Trimmers

BAND SWITCH
3 POSITIONS ROTATING COUNTERCLOCKWISE ARE:
R1 BROADCAST
R2 SHORT WAVE
R3 LONG WAVE

535 to 1720 K.C.
1695 to 5500 K.C.
5.2 to 18.1 M.C.

(Serial No. J7850200 and up)

INTERMEDIATE FREQUENCY 465 K.C.

WIRING SIDE OF OCTAL SOCKET SHOWING LOCATION OF PINES

C1 and C15 in same unit

PARTS
Preselector Coil
B. C. Antenna Coil Complete
S.W. M.W. Antenna Coil complete
S.W. M.W. Oscillator Coil complete
B.C. Oscillator Coil complete
Input I.F. Coil complete 465 kc.
Output I.F. Coil complete 465 kc.
6° dynamic Speaker
Power Transformer
Speaker field 1200 ohm
Wave band switch

Off-On Switch on Volume Control

Mica condensers are coded with an additional dot indicating tolerance:
Tolerance percent Color of Dot
2% White
5% Green
10% Blue
15% Yellow
Red

The power consumption of this receiver is 75 watts.
MODEL 91
(Serial No. J7S0200 and up)

Voltages taken from different points of circuit to chassis are measured with 10 mm tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohm per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent Signal from Acting upon AVC channel affecting accuracy of voltage measurements, Aerial and ground leads should be short circuitted while making measurements.

All voltages are to be measured with 115 volts on the primary of the power transformer.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning 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 mfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a 1 mfd. condenser and a 450 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (466 K.C.):

Part No. 108-110 Output I.F. Transformer
Part No. 108-110 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, the extreme left of its rotation, and with dummy 2 in its maximum capacity position, plates cut off, out of circuit, and with external oscillator connected, in series with dummy 2, adjust output I.F. transformer (No. 108-110) to resonance.

2. With dummy 2 still connected, make following adjustments:

(a) Move dial pointer to 4500 kilocycles and adjust short wave oscillator (Alignment number 3) to resonance.

(b) Re-set the external oscillator to 4000 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

(c) Re-set external oscillator and check set at 45 megacycles and 1.2 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be turned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 161 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

Part No. 108-110 Output I.F. Transformer
Part No. 108-110 Input I.F. Transformer

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and dummy 2 in its maximum capacity position, plates cut off, out of circuit, and with external oscillator connected, in series with dummy 2, adjust output I.F. transformer (No. 108-110) to resonance.

2. With dummy 2 "still connected, make following adjustments:

(a) Move dial pointer to 6500 kilocycles and adjust middle wave oscillator (Alignment number 2) and middle wave antenna (Alignment number 5) to resonance.

(b) Re-set the external oscillator to 1000 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

(c) Re-set external oscillator and check set at 2000 kilocycles and 1000 kilocycles for band coverage.

(b) Recheck broadcast band alignment.

MODEL 787

Voltages taken from different points of circuit to chassis are measured while the volume control is full on, both antennes connected in series with their sockets and speaker connected, with a volt meter having a resistance of 1200 ohms per volt. All voltages are indicated on a diagram which is measured with 115 volts on the primary of the power transformer.

The following dummy antennas are used in aligning 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 each other and in series with the external oscillator.

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

Dummy 3: (Middle and Short Wave)—Consists of a 1 mfd. condenser and a 450 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (466 K.C.):

Part No. 108-110 Output I.F. Transformer
Part No. 108-110 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, extreme left of its rotation, and with dummy 2 in its maximum capacity position, plates cut off, out of circuit, and with external oscillator connected in series with dummy 2, adjust output I.F. transformer (No. 108-110) to resonance.

2. With dummy 2 "still connected, make following adjustments:

(a) Move dial pointer to 4500 kilocycles and adjust short wave oscillator (Alignment number 3) and short wave antenna (Alignment number 5) to resonance.

(b) Re-set the external oscillator to 4000 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

(c) Re-set external oscillator and check set at 45 megacycles and 1.2 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be turned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 161 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

Part No. 108-110 Output I.F. Transformer
Part No. 108-110 Input I.F. Transformer

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and dummy 2 in its maximum capacity position, plates cut off, out of circuit, and with external oscillator connected, in series with dummy 2, adjust output I.F. transformer (No. 108-110) to resonance.

2. With dummy 2 "still connected, make following adjustments:

(a) Move dial pointer to 6500 kilocycles and adjust middle wave oscillator (Alignment number 2) and middle wave antenna (Alignment number 5) to resonance.

(b) Re-set the external oscillator to 1000 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

(c) Re-set external oscillator and check set at 2000 kilocycles and 1000 kilocycles for band coverage.

(b) Recheck broadcast band alignment.

SHORT WAVE BAND ALIGNMENT:

Part No. 108-110 Output I.F. Transformer
Part No. 108-110 Input I.F. Transformer

1. With band changing switch in the short wave position, extreme left of its rotation, and with external oscillator set at 5000 kilocycles and dummy 2 in its maximum capacity position, plates cut off, out of circuit, and with external oscillator connected, in series with dummy 2, adjust output I.F. transformer (No. 108-110) to resonance.

2. With dummy 2 "still connected, make following adjustments:

(a) Move dial pointer to 1000 kilocycles and adjust short wave oscillator (Alignment number 3) and short wave antenna (Alignment number 5) to resonance.

(b) Re-set the external oscillator to 2000 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

(c) Re-set external oscillator and check set at 35 megacycles and 1.8 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be turned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 13.8 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

Part No. 108-110 Output I.F. Transformer
Part No. 108-110 Input I.F. Transformer

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and dummy 2 in its maximum capacity position, plates cut off, out of circuit, and with external oscillator connected, in series with dummy 2, adjust output I.F. transformer (No. 108-110) to resonance.

2. With dummy 2 "still connected, make following adjustments:

(a) Move dial pointer to 1000 kilocycles and adjust short wave oscillator (Alignment number 3) and short wave antenna (Alignment number 5) to resonance.

(b) Re-set the external oscillator to 2000 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

(c) Re-set external oscillator and check set at 35 megacycles and 1.8 megacycles for band coverage.

(d) Re-set external oscillator and check set at 50 megacycles and 2.0 megacycles for band coverage.
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 1070—RUN 1

MODEL 1070—RUN 2

I.F. FREQUENCY
465 K.C.

TUNING RANGE—
Standard Broadcast Band
535-1750 Kilocycles.
Intermediate Band
1750-6500 Kilocycles
Short Wave Band
5.5-19.1 Megacycles.

© John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 1070 - RUN 1

DESCRIPTION
The tube complement of this chassis is as follows:
- 1 x 6AJ5 Pentode detector
- 1 x 6BQ5 Plate oscillator
- 1 x 6BQ5 Tube oscillator
- 1 x 6BQ5 Pentode driver
- 1 x 6BQ5 Rectifier oscillator
- 1 x 6BQ5 Audio oscillator
- 1 x 6BQ5 First audio amplifier
- 1 x 6BQ5 Second audio amplifier
- 1 x 6BQ5 Third audio amplifier
- 1 x 6BQ5 Fourth audio amplifier
- 1 x 6BQ5 Phase detector

SERVICE NOTES
- Voltages taken from different points of circuit to chassis are measured with voltmeter 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 marked on the chassis.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, EXTERNAL AND GROUND LEADS SHOULD BE SHORT-CIRCULATED WHILE MAKING MEASUREMENTS.

REPAIR PARTS LIST - MODEL 1070 - RUN 1

1. Anode of the grid condenser is usually caused by a short-circuit condition in the broadcast oscillator, resulting in an increase of the anode current and a decrease of the grid voltage.
2. A resistance value of 100,000 ohms is inserted between the anode and screen of the tetrode oscillator to increase the screen current and decrease the grid current.
3. A resistance value of 10,000 ohms is inserted between the grid and control grid of the tetrode oscillator to increase the control grid current and decrease the plate current.

ALIGNMENT PROCEDURE
1. Connect contact oscillator to 500 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.
2. Connect contact oscillator to 1000 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.
3. Connect contact oscillator to 10,000 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.
4. Connect contact oscillator to 100,000 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.

ALIGNMENT ADJUSTMENTS
- A variable condenser is preset to the limits specified.
- A variable condenser is preset to the limits specified.
- A variable condenser is preset to the limits specified.
- A variable condenser is preset to the limits specified.

BROADCAST BAND ALIGNMENT
1. With wave length switch in the broadcast position, extreme left of the rotation, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
2. With wave length switch in the broadcast position, extreme right of the rotation, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
3. With wave length switch in the broadcast position, intermediate position, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
4. With wave length switch in the broadcast position, extreme left of the rotation, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.

CATHODE-RAY TUNING INDICATOR PARTS
- Part No. 1: 4 x 400 V cathode-ray tube
- Part No. 2: 4 x 400 V cathode-ray tube
- Part No. 3: 4 x 400 V cathode-ray tube
- Part No. 4: 4 x 400 V cathode-ray tube
- Part No. 5: 4 x 400 V cathode-ray tube
- Part No. 6: 4 x 400 V cathode-ray tube
- Part No. 7: 4 x 400 V cathode-ray tube
- Part No. 8: 4 x 400 V cathode-ray tube
- Part No. 9: 4 x 400 V cathode-ray tube
- Part No. 10: 4 x 400 V cathode-ray tube

REPAIR PARTS LIST - MODEL 1070 - RUN 2

1. Anode of the grid condenser is usually caused by a short-circuit condition in the broadcast oscillator, resulting in an increase of the anode current and a decrease of the grid voltage.
2. A resistance value of 100,000 ohms is inserted between the anode and screen of the tetrode oscillator to increase the screen current and decrease the grid current.
3. A resistance value of 10,000 ohms is inserted between the grid and control grid of the tetrode oscillator to increase the control grid current and decrease the plate current.

ALIGNMENT PROCEDURE
1. Connect contact oscillator to 500 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.
2. Connect contact oscillator to 1000 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.
3. Connect contact oscillator to 10,000 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.
4. Connect contact oscillator to 100,000 ohms in series with "Dummy 1" and test oscilloscope to check if the oscillator frequency is within the limits specified.

ALIGNMENT ADJUSTMENTS
- A variable condenser is preset to the limits specified.
- A variable condenser is preset to the limits specified.
- A variable condenser is preset to the limits specified.
- A variable condenser is preset to the limits specified.

BROADCAST BAND ALIGNMENT
1. With wave length switch in the broadcast position, extreme left of the rotation, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
2. With wave length switch in the broadcast position, extreme right of the rotation, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
3. With wave length switch in the broadcast position, intermediate position, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
4. With wave length switch in the broadcast position, extreme left of the rotation, and with external oscillator set at 1000 K.C., test oscilloscope to check if the variable condenser is within the limits specified.
PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

IMPORTANT—READ CAREFULLY BEFORE SETTING THE AUTOMATIC LEVERS:

A mute feature has been incorporated in the automatic tuning mechanism of the Model 1175. The function of this feature is to permit SILENT TUNING from one station to another by means of the automatic tuning levers. When any one of the levers is pressed down, the speaker is automatically disconnected from the radio and NO SIGNAL is heard until the lever is RELEASED.

To facilitate an accurate adjustment of the levers it is desirable to hear the station being tuned in while the lever is being adjusted; therefore a MUTE SWITCH is provided to manually connect or disconnect the silent tuning feature.

Referring to the top view of the radio (Fig. 1 in this manual), THE POSITION OF THE SWITCH (located on the top of the radio chassis alongside the power transformer), IS IMPORTANT.

Set the switch as follows:

WHILE SETTING THE AUTOMATIC LEVERS:
Switch should be snapped to the right (white dot not visible).

AFTER AUTOMATIC LEVERS HAVE BEEN SET:
Switch should be mapped to the left (white dot showing).

There are eight levers on the dial by means of which eight stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 8.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A", Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand four automatic levers be used for high frequency stations (1700 to 1000 K.C.) and the right hand four automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic levers. If you are holding it down FIRMLY, tune in by means of the tuning knob No. 4 the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position), noting the width of the shadow indicated on the screen of the cathode-ray tuning eye. Minimum width on the eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob No. 4 to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screwdriver inserted through the hole, tighten the locking adjustment screw "C". IT IS VERY IMPORTANT that this locking screw be turned until it is ABSOLUTELY TIGHT. If a screwdriver is not available, the locking screw can be tightened by rechecking in from the back of the cabinet, and, by means of the pin "D" (see Fig. 1), the locking screw shaft to the right (clockwise) until thoroughly tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is locked when radio is shipped from factory.)

If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN THE LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

Snap mute switch to silent tuning position (white dot showing).
GOODYEAR PG. 10-39

MODEL 1175
Alignment
MOD 01029
Tuner Alignment

MODEL 1175
DUMMY ANTENNAS:
The following dummy antennas are used in aligning 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 mfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle 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.

ALIGNING I.F. TRANSFORMERS (465 K.C.)
Part No. 106-1134 Output I.F. Transformer
Part No. 106-113 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are visible from the top chassis (see top view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi", and the sharpness control at zero, adjust trimmed input I.F. transformer to approximately 1400 kilocycles.

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap. of the type 6K7 I.F. tube and adjust the output I.F. transformer to 1080-1040 Hz resonance.

(b) Move "Dummy 1" still connected move oscillator output up to grid of 6K7 to grid 617 and adjust input I.F. transformer (106-113) to resonance.

(c) With oscillator still connected to 617, re-adjust output I.F. transformer if necessary.

BROADCAST BAND ALIGNMENT:

MODEL 01029 CHASSIS 860
(Serial No. 718460 and up)

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

There are four levers on the dial by means of which eight stations may be selected. (See "B", Fig. 2).

Make a list of stations you wish to regularly; any number up to 16.

Pick out from the set of station call letters those which will include the call letters of the stations you want selected. One of the smallest call letter cards supplied should be inserted in place over each of the call letter index tabs.

Press DOWN ALL THE WAY any one of the automatic tuning levers . Holding down PUSHED, turn the tuning knob (No. 4) in the direction indicated by the desired tuning lever. Release the lever in the position indicated by the tuning knob. (For ease of operation, the tuning knobs can be locked in the upright position with a screwdriver through the hole in the back of the cabinet, and, by means of the po-D on the tuning knobs.) See Instruction Book for right (clockwise) and left (counterclockwise).

Rotate the tuning knob (No. 4) to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the pusher button, and, with a screwdriver, turn the knob through the hole, tightening the swing adjustment screw "C". It is important that you push the tuning lever until it is absolutely tight. If a screw driver is not available, the knob can be tightened by reaching into the back of the cabinet, and, by means of the po-D on the tuning knobs.) See Instruction Book.

If you should desire to change any station you selected, remove one of your call letters and insert another. (see "B", Fig. 2). If you should desire to change any station you selected, remove one of your call letters and insert another. (see "B", Fig. 2). Place the station call letter card supplied in place over each of the call letter index tabs. The station selector will then be set to the desired station.

MODEL 01029 CHASSIS 860

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).

If, after all other steps, you are not satisfied with the tuning, follow the instructions given in the Instruction Book. (See Instruction Book for right (clockwise) and left (counterclockwise).
Model 749
GOODYEAR TIRE & RUBBER CO., INC.

Sockett, Trimmers
Tuner

Tube sockets are viewed from under side of chassis. Voltage readings at indicated socket prongs are to zero voltage point on circuit which is on 25L6G tube. Voltages must be measured with no signal. Alignment is to be made at the frequencies shown on the trimmer condensers.

Wave trap adjustment at 456 KC. Input is made to provide maximum reduction of signal. Where no voltage reading is shown at socket prongs, it indicates zero voltage or very low reading.

If peak 456 KC

Setting Push-Buttons

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

©John F. Rider, Publisher

Compliments of www.nucow.com
FIG. 1—TOP VIEW

Mica condensers are coded with an additional dot indicating tolerance.

Mica Tolerance percent
White 25%
Green 10%
Blue 10%
Yellow 15%
Red 25%
None More than 20%

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

Part No. 106-95B Output I.F. Transformer
Part No. 106-96 Input I. F. Transformer
These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 106-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 106-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (106-95B) if necessary.

2. R.F. ALIGNMENT: (553-1720 K.C.)

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mfd. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release the lever.

Follow this procedure until you have selected all of your favorite stations.

Now hold tuning knob securely with left hand to prevent it from turning, or Rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob. (See Fig. 1.)

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory)

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.
**Goodyear Tire & Rubber Co., Inc.**

**Model 01012, Runs 1,2**

**Schematics, Voltages, Socket, Trimmers, Alignment**

**Serial No. 82006 and up**

**IF Peak 465 KC.**

**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 mmdf. condenser connected in series with the output lead of the test oscillator.

**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 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 (100-50) and output (100-50) 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.
4. 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.

©John F. Rider, Publisher

Compliments of www.nucow.com
GOODYEAR TIRE & RUBBER CO., INC.

Model 01029
Chassis 860
Schematic, Voltage

Code No. Part No. Description
R1 130-103 100M ohm - 1/3 w. 10%  
R2 130-12 50M ohm - 1/3 w. 20%  
R3 130-123 15M ohm - 1/2 w. 10%  
R4 130-196 50M ohm - 1 w. 10%  
R5 130-110 1 megohm - 1/10 w. 20%  
R6 130-4 3 megohm - 1/3 w. 20%  
R7 101-97 1 megohm volume control  
R8 130-198 40 ohm - 1/2 w. 10%  
R9 130-4 3 megohms - 1/3 w. 20%  
R10 130-197 20 ohm - 1/10 w. 10%  
R11 130-153 100M ohm - 1/3 w. 10%  
R12 101-96 30 ohm - tone control  
R13 130-15 120M ohm - 1/3 w. 10%  
R14 130-18 5M ohm - 1/2 w. 20%  
R15 130-133 100M ohm - 1/3 w. 10%  
R16 130-11 100M ohm - 1/3 w. 10%  
R17 130-162 50M ohm - 1/3 w. 15%  
R18 130-195 280 ohm - 1.2 w. 10%  
C1 135-67 3 gang variable  
C2 135-72 .05 x 200 v. - 25%  
C3 135-71 .0200 Mica 16%  
C4 135-73 .002 x 600 v.  20%  
C5 135-72 .0027 Mica 2-1/2%  

For conventional types of antennas connect the yellow wire to the antenna lead and the yellow with black tracer and the black wire together to the ground lead.

When a doule antenna is used connect the yellow wire and the yellow with black tracer wire to the doule antenna and the solid black wire to the ground lead. (See Fig. 1-Top View)

3-Band All-Wave A.C. Superheterodyne Receiver

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 106-83B Output I.F. Transformer
Part No. 106-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 106-83B) to resonance.

(b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 106-82B) to resonance.

(c) With oscillator still connected to 6A8G, readjust output I.F. transformer (106-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mnf condenser to the antenna lead and chassis ground and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

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.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

RESISTORS

<table>
<thead>
<tr>
<th>No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>130-17</td>
<td>10M ohm - 1/2 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R2</td>
<td>130-12</td>
<td>50M ohm - 1/2 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R3</td>
<td>130-149</td>
<td>15M ohm - 1/2 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R4</td>
<td>130-4</td>
<td>1 meg ohm - 1/2 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R5</td>
<td>101-77</td>
<td>Volume Control (1 Meg)</td>
<td></td>
</tr>
<tr>
<td>R6</td>
<td>130-12</td>
<td>50M ohm - 1/8 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R7</td>
<td>130-20</td>
<td>100M ohm - 1/8 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R8</td>
<td>130-19</td>
<td>1 megohm - 1/8 w.</td>
<td>20%</td>
</tr>
<tr>
<td>R9</td>
<td>106-38</td>
<td>30 ohm</td>
<td></td>
</tr>
<tr>
<td>R10</td>
<td>106-38</td>
<td>40 ohm</td>
<td></td>
</tr>
<tr>
<td>R11</td>
<td>106-38</td>
<td>55 ohm</td>
<td></td>
</tr>
<tr>
<td>R5, R10, and R11 in one unit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONDENSERS

<table>
<thead>
<tr>
<th>No.</th>
<th>Part No.</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>102-48</td>
<td>2 gang variable</td>
</tr>
<tr>
<td>C1</td>
<td>100-25</td>
<td>.002 x 600</td>
</tr>
<tr>
<td>C2</td>
<td>100-9</td>
<td>.05 x 200</td>
</tr>
<tr>
<td>C3</td>
<td>129-12</td>
<td>.00225 Mica</td>
</tr>
<tr>
<td>C4</td>
<td>100-22</td>
<td>.05 x 200</td>
</tr>
<tr>
<td>C5</td>
<td>129-3</td>
<td>.0001 Mica</td>
</tr>
<tr>
<td>C6</td>
<td>100-11</td>
<td>.01 x 400</td>
</tr>
<tr>
<td>C7</td>
<td>129-2</td>
<td>.005 Mica</td>
</tr>
<tr>
<td>C8</td>
<td>100-22</td>
<td>.05 x 200</td>
</tr>
<tr>
<td>C9</td>
<td>119-39</td>
<td>.25 mfd, lyric - 100 w.v.</td>
</tr>
<tr>
<td>C10</td>
<td>119-39</td>
<td>.15 mfd, lyric - 100 w.v.</td>
</tr>
<tr>
<td>C11</td>
<td>100-30</td>
<td>.1 x 200</td>
</tr>
<tr>
<td>C12</td>
<td>100-11</td>
<td>.05 x 400</td>
</tr>
<tr>
<td>C13</td>
<td>100-39</td>
<td>.1 x 400</td>
</tr>
<tr>
<td>C14</td>
<td>100-53</td>
<td>.25 x 400</td>
</tr>
</tbody>
</table>

PARTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Antenna Coll Complete</td>
</tr>
<tr>
<td>T2</td>
<td>111-58B</td>
</tr>
<tr>
<td>T3</td>
<td>110-46</td>
</tr>
<tr>
<td>T4</td>
<td>108-82B</td>
</tr>
<tr>
<td>T5</td>
<td>108-83B</td>
</tr>
<tr>
<td>T6</td>
<td>114-71</td>
</tr>
<tr>
<td>T7</td>
<td>Dynamic Speaker</td>
</tr>
<tr>
<td>T8</td>
<td>400 ohm speaker field</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
**GOODYEAR TIRE & RUBBER CO., INC.**

**MODEL 010219, Run 1**

**Chassis 415-A**

**Schematic, Voltage**

**IF FREQUENCY**

455 K.C.

<table>
<thead>
<tr>
<th>No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>700-10</td>
<td>.05 x 200 Volts</td>
</tr>
<tr>
<td>C2</td>
<td>712-12</td>
<td>.00025 Mica</td>
</tr>
<tr>
<td>C3</td>
<td>100-12</td>
<td>.1 x 200 Volts</td>
</tr>
<tr>
<td>C4</td>
<td>100-33</td>
<td>.1 x 200 Volts</td>
</tr>
<tr>
<td>C5</td>
<td>100-33</td>
<td>.1 x 200 Volts</td>
</tr>
<tr>
<td>C6</td>
<td>100-33</td>
<td>.1 x 200 Volts</td>
</tr>
<tr>
<td>C7</td>
<td>100-25</td>
<td>.002 x 600 Volts</td>
</tr>
<tr>
<td>C8</td>
<td>100-9</td>
<td>.05 x 200 Volts</td>
</tr>
<tr>
<td>C9</td>
<td>100-7</td>
<td>.05 x 400 Volts</td>
</tr>
<tr>
<td>C10</td>
<td>119-28</td>
<td>.5 mfd. x 200 Working Voltage</td>
</tr>
<tr>
<td>C11</td>
<td>119-28</td>
<td>.5 mfd. x 200 Working Voltage</td>
</tr>
<tr>
<td>C12</td>
<td>100-34</td>
<td>.005 x 1000 Volts</td>
</tr>
<tr>
<td>C13</td>
<td>100-40</td>
<td>.5 mfd. x 200 Working Voltage</td>
</tr>
</tbody>
</table>

**TUBES:**

The tube complement of this chassis consists of the following tubes:

1. Type 1A6 Pentagrid Mixer, First Detector-oscillator.
2. Type 1A4 Super Control R. F. Tetrode I. F. Amplifier (465 K.C.)
3. Type 1FS Duplex Diode Pentode, Second Detector, A.V.C. and First Audio.
4. Type 1F4 Pentode Output Amplifier.

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

- Part No. 108-84 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1450 kilocycles, make the following adjustments:
   - (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 1A4 tube, and adjust the output I.F. transformer (No. 108-85) to resonance.
   - (b) Move oscillator output clip from grid of 1A4 to grid cap of 1A6 and adjust input I.F. transformer (No. 108-84) to resonance.
   - (c) With oscillator still connected to 1A6, readjust output I.F. transformer (108-85) if necessary.

**R.F. ALIGNMENT: (535-1720 K.C.)**

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to 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 1440 kilocycles, rotate condenser, and pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).
   - (c) Check sensitivity at 500 and 1000 kilocycles.

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNING I.F. TRANSFORMERS: (465 K. C.):
Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view page 2).

1. With volume control full on (at the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 450 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 657G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

(b) Move oscillator output clip front grid of 657G to grid cap of 6DG6 and adjust input I.F. transformer (No. 108-84) to resonance.

(c) With oscillator still connected to 6DG6 readjust output I.F. transformer (108-85) if necessary.

R. F. ALIGNMENT: (555-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmaf. condenser 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) Check sensitivity at 600 and 1000 kilocycles.

The type and function of each tube is as follows:

1.—Type 6DG6 Pentagrid Mixer, First Detector-oscillator.
1.—Type 657G Remote Cut-off Pentode I. F. Amplifier (465 K.C.)
1.—Type 6T7G Duplex Diode Triode, Second Detector, A.V.C. and First Audio.
1.—Type 1F5G Pentode Output Amplifier.

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 1F5G 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.
ALIGNING I.F. TRANSFORMERS: (455 K.C.):

Part No. 108-1058 Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:

(a) Connect external oscillator set on 455 kilocycles, in series with “Dummy 1”, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.

(b) With “Dummy 1” still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8C and adjust input I.F. transformer (No. 108-105B) to resonance.

SHORT WAVE BAND ALIGNMENT:

55 to 101 Megacycles

1. With band 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 antenna and ground leads, make the following adjustments:

(a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.

This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).

(b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:

535 to 1729 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plate entirely out of mesh, and with external oscillator connected in series with “Dummy 2” to antenna and ground leads make following adjustments:

(a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).

(b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.

(c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

(d) Repeat adjustments “a” and “b” until sensitivity is at its maximum.

(e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. Under no circumstances bend plate of variable condenser sections to correct tracking.

©John F. Rider, Publisher
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 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.

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 plate terminals of the type 19 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.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (L.F.)—Consists of a 0.1 mfd. condenser connected in series with the external oscillator.

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

Dummy 3: (Middle and Short Wave)—Consists of a 0.1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

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

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the 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 657G tube, and adjust the output I.F. transformer (No. 108-92) to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 657G to grid cap to 6D8G and adjust input I.F. transformer (No. 108-93) to resonance.

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 18 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:

(a) Move dial pointer to 18 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.

(b) Re-set external oscillator to 17 megacycles and pick up signal by rotating variable condenser and adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.

(c) Reset external oscillator and check set at 18.1 megacycles and 0 megacycles for band coverage and sensitivity.

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 on the receiver dial. As an example of this a fundamental 18.5 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5.5 megacycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:

(a) Move dial pointer to 5.5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.

(b) Re-set external oscillator to 5 megacycles and pick up signal by rotating variable condenser and adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.

(c) Re-set external oscillator and check sensitivity at 1700 kilocycles.

BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band 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 "Dummy 2" to antenna and ground posts, make the following adjustments:

(a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 4)

(b) Re-set external oscillator to 1600 K.C. rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7) to resonance.

(c) Re-set external oscillator to 600 K.C. and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

(e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. Under no circumstances bend plates of variable condenser section to correct tracking.

FIG. 3—BOTTOM VIEW SHOWING TRIMMERS
GOODYEAR TIRE & RUBBER CO., INC.

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 IA6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, 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 IG5G 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.

BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mfd. 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 124-14 (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 1400, 1000, 600 K.C. DO NOT BEND PLATES.

FOR BEST OPERATION THIS RECEIVER MUST HAVE AN OUTSIDE AERIAL NOT OVER FIFTY FEET LONG INCLUDING THE LEAD IN.

©John F. Rider, Publisher

Compliments of www.nucow.com
VOLTAGES IN CIRCLES ARE FOR SERIES A.B.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

Fig. 1—Top view
FOR TUNER DATA, SEE INDEX

SERIES “A” (Serial No. 71654500 and up)

MODEL 582
535 TO 1720 K.C.
2000 TO 7000 K.C.

Voltagess 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 to be measured with 115 volts on the primary of the power transformer.
POWER SUPPLY

The receiver is designed for operation from 105-130 volt Alternating Current (A.C.) supply or a 105-130 volt Direct Current (D.C.) supply. Never connect the receiver to any supply having a higher voltage than that specified on the sticker. If you are not sure of the power supply voltage at your home, your Power Company will furnish the information.

When using a D.C. supply allow sufficient time for tubes to warm up (approximately 1½ minutes), and if at that time the receiver does not operate, remove the line cord plug from the socket and reverse. Replace plug in the reverse position and allow tubes to warm up, at which time the receiver will operate.
GOODYEAR PAGE 10-37

SCHEMATIC MODEL 015060

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

LOCATION OF PARTS ON TOP OF CHASSIS

PUSH BUTTON TUNING FOR MODELS 015040, 015050, 015100, 015110

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, your selected station which is tuned in nearest number 160 on the Station Selector Knob.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of highest frequency and the Call Letter Tab for this station should be in the Push-Button nearest the rear of the receiver.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second highest in frequency and the third station set up will be third highest in frequency. Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button, it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted. No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.

PUSH BUTTON TUNING FOR MODELS 015040, 015120, 015130

SETTING UP:

Unscrew (turn counter-clockwise) the push button, two or three turns. (Use a token or screwdriver in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it firmly and at the same time tune in your desired station. With your station tuned in, look the adjustment by securely tightening (turn clockwise) the push button knob, using token or screwdriver. Hold the button in while tightening it. Unless the button is tightened securely, the adjustments may slip. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

© John F. Rider, Publisher

Compliments of www.nucow.com
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015070
MODEL 015080
MODEL 015120
MODEL 015130
Alignment

ATTENTION!

The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 550 kHz is too low, the generator should be adjusted to the frequency of that station instead of 550 kHz.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the arc visible on the receiver indicator.

PUSH BUTTON TUNING

FOR SETTING OF PUSH BUTTONS
SEE GOODYEAR MODEL 015050

GOODYEAR MODEL 015120
ALGINMENT PROCEDURE

OUTPUT CONNECTOR

Output meter connection.............. Across lead speaker voice coil
Output meter reading to indicate 50 milliwatts.............. 0.05 volts
Generator ground lead connection.............. 1.0 volts
Dummy antenna value to be in series with generator output.............. See chart below
Connection of generator output lead.............. See chart below
Generator modulation.............. 500 ohms, 400 cycles
Position of Volume Control.............. Fully clockwise
Position of Dial Pointer with variable fully closed.............. Horizontal

RATING DATA

Position of Variable Generator Meter Generator Permit Generator Permit Generator Permit

'14' Closed 450 ohms .1 microhertz 1700 ohms TT, TT
'14' 800 ohms 450 ohms .1 microhertz 1700 ohms TT, TT
'14' 1400 ohms 1400 ohms .1 microhertz 1700 ohms TT, TT
'14' 800 ohms (reg) 800 ohms .1 microhertz 450 ohms TT, TT
'14' 1400 ohms (reg) 1400 ohms .1 microhertz 450 ohms TT, TT

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 550 kHz is too low, the generator should be adjusted to the frequency of that station instead of 550 kHz.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the arc visible on the receiver indicator.

©John F. Rider, Publisher

Compliments of www.nucow.com
PUSH BUTTON TUNING

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is helpful to arrange the stations in the order of their frequency (kilohertz). Normally, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations that can be tuned in on a BAND SSW scale can be set up for push button tuning. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate, through which the push buttons protrude, and remove the plate. (This plate is called the "outsource.")

3. Push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. Engage the small screwdriver, supplied, with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it (turn counter-clockwise) about four turns. Then remove the screwdriver.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned to exactly, as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button before turning the tuning knob again. If properly done, the tuning eye indication will not change when you let go of the push button.

5. Push in your #2 button. Hold it in firmly and turn your #2 station accurately. Then let go of the push button. The tuning knob. Proceed in the same manner for the other stations on your list.

CAUTION: Use the small screwdriver supplied for performing the next operation. Use of a larger screwdriver than the one supplied will result in the push button being applied to the mechanism, and the mechanism will be impossible to operate properly. The mechanism is not designed to be disassembled.

6. After the last station has been set up, lock the mechanism by pushing the slotted shaft in and securely tightening it (turn clockwise), using the small screwdriver supplied. (Pushing the slotted shaft in will release the last push button. The dial pointer will move to the right end of the dial. Then remove the screwdriver.)

7. After locking the mechanism, test the setting of each button by pushing it in. Then see if the dial pointer can be tuned accurately by using the tuning knob. If not, reposition the stations that have not been correctly set up, unless the mechanism, as described in Step 3, is adjusted. Then recheck the setting. Be sure to lock the mechanism again before tuning any stations.

8. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the recesses in the front of the push buttons. Over the call letters write the clear celluloid tabs supplied. Replace the mechanism as described in Step 3 and recheck the mechanism as described in Step 5. The call letters of the new station should be inserted in the proper push button.

OPERATION:

Push the button, indicated for your desired station, all the way in. Your station will be tuned in. If you have selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating what station is tuned in, until you push another button or until you push the tuning knob.

COMPLIMENTS OF www.nucow.com
GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT GOODYEAR MODEL 015090

Output meter connection .................. Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts .................. 1.06 volts
Generator ground lead connection .................. Receiver chassis
Dummy antenna value to be in series with generator output. See chart below
Connection of generator output lead .................. See chart below
Generator modulation .................. 50%, 400 cycles
Position of volume control .................. Fully clockwise
Position of tone control .................. HI
Position of dial pointer (variable closed) .... Center of block to left of
550 kc calibration mark.

<table>
<thead>
<tr>
<th>WAVE BAND</th>
<th>POSITION</th>
<th>GENERATOR FREQUENCY</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR CONNECTION</th>
<th>TRIMMERS ADJUSTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;AM&quot;</td>
<td>Closed</td>
<td>455 kc</td>
<td>.1 mfd.</td>
<td>6A80 Grid</td>
<td>T5, T2, T1</td>
</tr>
<tr>
<td>&quot;SW&quot;</td>
<td>18 mc</td>
<td>18 mc</td>
<td>400 ohms</td>
<td>Ant. Term.</td>
<td>C39*</td>
</tr>
<tr>
<td>&quot;SW&quot;</td>
<td>15 mc (rock)</td>
<td>15 mc</td>
<td>400 ohms</td>
<td>Ant. Term.</td>
<td>C11, C4</td>
</tr>
<tr>
<td>&quot;9&quot;</td>
<td>9.55 mc</td>
<td>9.55 mc</td>
<td>400 ohms</td>
<td>Ant. Term.</td>
<td>C2*</td>
</tr>
<tr>
<td>&quot;11&quot;</td>
<td>11.7 mc</td>
<td>11.7 mc</td>
<td>400 ohms</td>
<td>Ant. Term.</td>
<td>C27*</td>
</tr>
<tr>
<td>&quot;15&quot;</td>
<td>14.9 mc</td>
<td>14.9 mc</td>
<td>400 ohms</td>
<td>Ant. Term.</td>
<td>C14</td>
</tr>
<tr>
<td>&quot;AM&quot;</td>
<td>1400 kc</td>
<td>1400 kc</td>
<td>.0003 mfd.</td>
<td>Ant. Term.</td>
<td>C30</td>
</tr>
<tr>
<td>&quot;AM&quot;</td>
<td>800 kc (rock)</td>
<td>800 kc</td>
<td>.0003 mfd.</td>
<td>Ant. Term.</td>
<td>C31</td>
</tr>
</tbody>
</table>

TRIMMERS FUNCTION
- IF Output, IF Interstage, IF Input
- Oscillator
- Translator, RF
- Oscillator
- Oscillator, RF
- Oscillator
- Oscillator, RF
- Oscillator
- Oscillator, RF
- Padder

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVG action of the receiver ineffective.

©John F. Rider, Publisher

Compliments of www.nucow.com
GOODYEAR TIRE & RUBBER CO., INC.  
MODEL 100502  
Double Eagle  
Above Serial 42,000  
Schematic Changes, Tuner

SETTLING THE AUTOMATIC TUNER LEVERS TO STATIONS:

When setting up stations for the tuner levers it is important that the lever is pressed all the way down and held firmly in this position until the station is carefully selected by means of the manual tuning control.

This same procedure is followed until all the levers have been set up for stations, then the locking screw should be turned until it is absolutely tight. This is extremely important inasmuch as if the locking screw is not tight the cone on the cone shaft will slip and the stations will not stay adjusted to the tuner lever settings.

To reset one or more tuner levers to other stations it is only necessary to loosen the locking screw sufficiently to permit the mechanism to turn freely when the lever is pressed down as explained above and select the new station for the particular lever, however, make sure to re-tighten the locking screw again to lock the cone back in place.

DIAGRAM FOR GOODYEAR CHASSIS 100502

©John F. Rider, Publisher
**EYING DRAWM FOR GOODYEAR WINGS 100502**

**Serial No. 30,000 to 40,500**

**Model 100502**
**Double Eagle**
**GOODYEAR TIRE & RUBBER CO., INC. Alignment, Socket, Trimmers**

**Early Schematic of Coils**

**Alignment Procedure**

**Preliminary:**
- Output meter readings to indicate 1 watt output...
- 1/80 volts
- Average sensitivity in microvolts for 1 watt output...
- 3 micro volts
- Dummy antenna value to be in series with generator output. See chart below.
- Connection of generator output lead...
- 70,000 volts
- Generator modulation...
- 300, 400 cycles
- Position of volume control...
- Fully clockwise
- Position of tone control...
- Snapped to "Hi"
- Position of local-distance switch...

**Dial setting of remote tuner unit**

<table>
<thead>
<tr>
<th>Generator Frequency</th>
<th>Generator Connection</th>
<th>Dummy Antenna</th>
<th>Trimmers Adjusted (in order shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
<th>Approximate Microvolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1400 K.C. 465 K.C.</td>
<td>Grid of 6K7 I.F. Tube</td>
<td>.5 mfd.</td>
<td>I See &quot;B&quot; below</td>
<td>Output I.F.</td>
<td>Adjust to maximum output</td>
<td>20,000</td>
</tr>
<tr>
<td>1400 K.C. 465 K.C.</td>
<td>Grid of 6AS Converter Tube</td>
<td>.5 mfd.</td>
<td>E, F</td>
<td>Input I.F.</td>
<td>Adjust to maximum output</td>
<td>512</td>
</tr>
<tr>
<td>1560 K.C. 1860 K.C.</td>
<td>Antenna Lead</td>
<td>.000175 mfd.</td>
<td>C See Fig. 11</td>
<td>Oscillator</td>
<td>Adjust to resonance</td>
<td>512</td>
</tr>
<tr>
<td>1400 K.C. 1400 K.C.</td>
<td>Antenna Lead</td>
<td>.000175 mfd.</td>
<td>A, B See Fig. 11</td>
<td>Antenna and R.F.</td>
<td>Adjust to maximum output</td>
<td>3</td>
</tr>
<tr>
<td>600 K.C. 600 K.C.</td>
<td>Antenna Lead</td>
<td>.000175 mfd.</td>
<td>D See Fig. 10</td>
<td>Shunt oscillator Series adjustment</td>
<td>Adjust to maximum output</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**IMPORTANT ALIGNMENT NOTES**

A - To align the output I.F. transformer without using a cathode ray oscillograph, a 10M ohm resistor must be shunted across one winding of the output I.F. coil assembly while adjustment to trimmers G and H are being made.

   Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

   Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

   The white lead with green tracer which is connected to diode plate terminal No. 6 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point.

B - Disconnect the 10M ohm resistor before adjusting trimmer "I." If a cathode ray oscillograph is used it will not be necessary to connect a 10M ohm resistor across a portion of the I.F. coil as explained.

C - When adjusting the shunt oscillator trimmer "D," which is mounted on the base of the radio receiver unit (See Fig. 11), the dial on the remote tuner unit should be rotated slightly to and fro at the same time adjusting trimmer "D" for maximum gain.

   It is advisable to repeat the entire alignment procedure to insure greater accuracy.

   Always keep the output from the test generator (oscillator) at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT & SERVICING INSTRUCTIONS
FOR SKYRIDER DIVERSITY RECEIVER
MODEL: DD1

SWITCHING ARRANGEMENT
For speed, ease and accuracy in aligning the DD1 Diversity Receiver, it is recommended that the output of the signal generator be terminated in a switching box in which you have installed a double throw single pole switch. From this switching box connect a shielded cable which will serve as ground, run two leads one of which is connected appropriately to section "A" and the other to section "B." Operation of the switch will readily allow you to switch the signal generator to either receiver section being aligned for a quick comparative check.

INTERMEDIATE FREQUENCY ALIGNMENT

Have controls set as follows:
- Set receiver to 9 kHz marking.
- Receiver switch to "U" side.

IN ALIGNING "A" SECTION:
Connect signal generator to the grid of the "A" section 6L7 converter (see diagram for location.) Adjust the signal generator for 455 Kc output. Adjust I.F. transformer in the "A" receiver until they are peaked for maximum gain. The receiver switch will necessarily be switched to the "U" side.

REJECTOR ADJUSTMENT
Before aligning the I.F. Rejector Circuit, the variable rejector condensers found below the chassis and driven by the long flexible copper cable, should be set as follows: With the rejector pointer set at +3 Kc, check the first rejector condenser (closest to front panel in each I.F. section). It should have its rotor plates about 45° mesh. The second rejector condenser (farthest from front panel) should have its plates about 30° mesh. The same relationship should also exist between the condensers in the other I.F. section. When varying the rejector control from 0 to +3 Kc a slight feel of the rejector condenser should unmesh at the same time the plates on the second rejector condenser are meshing.

To properly correct the rejector circuit it is necessary to have two signals available which are accurately removed from the 455 Kc fundamental by 3 Kc on each side. The most satisfactory way to accomplish this is to use two crystals, one for 462 Kc output and the other for 458 Kc output. In the event, however, that crystals of those frequencies are not available, a satisfactory substitute can be used which consists of the following procedure: Put the BFO switch in the heterodyne position. Feed 455 Kc from the signal generator into either 6L7 converter. Remove modulation from the signal being delivered by the generator. Obtain zero beat on the B.F.O. by operating the pitch control knob. Tune the generator rejector away from the 465 Kc setting until a beat note of 3000 cycles (or - of 455 Kc) is heard. Remember the pitch of that note. It will be necessary in adjusting the signal generator to a frequency equivalent on the other side of 455 Kc. A little practice will enable you to reset to each side of 455 Kc by the 3 Kc difference quite accurately and when signals of 462 and 458 Kc are then available by this method, these signals should be used to properly peak the rejector circuit. This method is recommended only when a closely calibrated signal generator or a crystal controlled signal generator are not available.

Begin with receiver B. Set signal generator to 456 Kc output. Adjust the 2nd Rejector Control (shown in the top chassis view) for minimum response. There should be two points of minimum output. If there is only one minimum point, rotate the adjusting nut on this control approximately 1/4 turn from the minimum, and very carefully adjust the 1st rejector control until a minimum occurs. After this has been accomplished, adjust the 2nd rejector control for minimum response. Repeat with "A" side without changing setting of the signal generator, connecting the signal generator to the "A" side 6L7, and switching the receiver to the "A" side. Readjust signal generator to 456 Kc. Make similar adjustments on Rejector Controls 3 and 4 and the re-jector control until a minimum occurs, then rotate the adjusting nut on this control approximately 1/4 turn from the minimum, and very carefully adjust the 1st rejector control until a minimum occurs. After this has been accomplished, adjust the 2nd rejector control for minimum response. Repeat with "A" side without changing setting of the signal generator, connecting the signal generator to the "A" side 6L7, and switching the receiver to the "A" side. Readjust signal generator to 456 Kc. Make similar adjustments on Rejector Controls 3 and 4 and the re-jector control until a minimum occurs, then rotate the adjusting nut on this control approximately 1/4 turn from the minimum, and very carefully adjust the 1st rejector control until a minimum occurs. After this has been accomplished, adjust the 2nd rejector control for minimum response.

NOTE: The gain of each receiver should be approximately the same, variation between receiver sections should not exceed 25% as shown on output meter readings. Gain-balances is far off, interchanging the 6L7 I.F. amplifier tubes sometimes improves it.

R. F. ALIGNMENT

Adjust receiver to Band 1, set "A." Have all gain controls at maximum, balance control in center position.

New connect signal generator to antenna port of "A" receiver section through a 400 ohm resistor. Be sure shorting strap from 4A to 6 remains connected. During all adjustments the grounded side of the generator should be connected to the ground post on the receiver.

Set band spread dial to "U" and leave it there during entire alignment. Adjust receiver to 12450 Kc. Set dial on receiver to that frequency. Adjust oscillator, 2nd B. F. and antenna trimmers in the order named for maximum gain. Switch over to Receiver "U" and repeat the above operations with the exception of the oscillator section which does not require readjustment this time. Set generator and receiver to 600 Kc. Adjust oscillator paders for maximum response. Retune the band spread dial to 12450 Kc. Repeat the above procedure on the remaining bands, except that on Bands 3-4-5-6 (the R. F. paders should also be adjusted for maximum response at the low frequency ends of each band.)

Care should be exercised in avoiding alignment on the image frequency. In every case, the image will be heard approximately 1 megacycle lower in frequency when adjusting the main tuning dial.

The greatest caution should be taken when adjusting the No. 6 band oscillator paders because only a slight change causes a large variation in frequency and may throw the oscillator frequency completely out of band. The relative sensitivities of the various bands should not vary more than 75%. A little change in phase of the signals from the receivers will cause the image to occur in place of the wanted signal.

THE HALLICRAFTERS INC.
S. P. U. Schmalz

POWER PACK
DC-P

525

50 V A.C.

10
BEAT FREQUENCY OSCILLATOR ADJUSTMENTS

Place the B.F.O. Key in the Heterodyne position.

With 455 KC signal from generator feeding into the "A" 6L7 converter and receiver "A" functioning, and the chassis standing on its left end (looking at set from the front) adjust the padding condenser inside the B.F.O. Shield can until zero beat is reached. The B.F.O. shield can is located directly behind the pitch control. Prior to making this adjustment assure yourself that the PITCH CONTROL condenser is at 50% capacity pointer on control positioned vertically). When properly adjusted, rotation of the pitch control condenser will show two beat note signals 180 degrees apart.

8 METER ADJUSTMENT

Push in No. 8 Band Button. With gain controls at maximum, adjust the zero reset control on all meters for zero.

NOTES:

If overload occurs on the broadcast band it might be advisable to shorten the length of the receiving antennas. If this recommendation is of little help check for a short to ground in the A.V.C. circuit.

Should the occasion of examining the coil units arise, exercise extreme care in moving the heavy leads attached to the switch terminals. Excessive movement of one of these leads may cause the contacting portion of the switch to be thrown out of alignment and provide improper contact.

If it becomes difficult to properly heterodyne a strong signal when listening to C.W. reception, reduce the overall gain with the master gain control 'till a satisfactory note is obtained.
This control rotates the large calibrated dial so that the desired frequency can be easily located. The accuracy of calibration is held to close tolerances. This calibration will be correct, however, only if the "bandspread" dial is set at "0" or minimum capacity.
The tube lineup of the S19-R Sky Buddy is as follows:

- 6X6G 1st Detector - mixer
- 6X7G IF Amplifier
- 6Q7G 2nd Detector - 1st stage of audio
- 41 2nd Audio Amplifier
- 76 BFO
- 60 Rectifier

The Sky Buddy, model S19-R draws 50 watts at 117 volts, 60 cycles A.C.

**S19R CONDENSER PARTS LIST**

<table>
<thead>
<tr>
<th>NO.</th>
<th>CAPACITY</th>
<th>TYPE</th>
<th>VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>000375 mfd.</td>
<td>Maintaining</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>&quot;</td>
<td>&quot;</td>
<td>400</td>
</tr>
<tr>
<td>3</td>
<td>.05</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>.05</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>.05</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>6</td>
<td>.05</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>7</td>
<td>.10</td>
<td>&quot;</td>
<td>300</td>
</tr>
<tr>
<td>8</td>
<td>.05</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>9</td>
<td>.0004</td>
<td>Mica</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>.0004</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>.02</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>12</td>
<td>.1</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>13</td>
<td>.02</td>
<td>&quot;</td>
<td>200</td>
</tr>
<tr>
<td>14</td>
<td>.10</td>
<td>&quot;</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>.01</td>
<td>&quot;</td>
<td>600</td>
</tr>
<tr>
<td>16</td>
<td>.1</td>
<td>&quot;</td>
<td>400</td>
</tr>
<tr>
<td>17</td>
<td>.01</td>
<td>&quot;</td>
<td>400</td>
</tr>
<tr>
<td>18</td>
<td>.0004</td>
<td>Mica</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>.0004</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>.01</td>
<td>&quot;</td>
<td>300</td>
</tr>
<tr>
<td>21</td>
<td>.10</td>
<td>&quot;</td>
<td>350</td>
</tr>
<tr>
<td>22</td>
<td>.01</td>
<td>&quot;</td>
<td>600</td>
</tr>
<tr>
<td>23</td>
<td>.0001</td>
<td>Ceramic</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>.000375</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>.001</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>.0043</td>
<td>&quot;</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>.0004</td>
<td>Mica</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>.01</td>
<td>&quot;</td>
<td>600</td>
</tr>
</tbody>
</table>

**S19R RESISTOR PARTS LIST**

<table>
<thead>
<tr>
<th>NO.</th>
<th>OHMS</th>
<th>WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>300</td>
<td>1/3</td>
</tr>
<tr>
<td>2</td>
<td>50000</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>10000</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>5000</td>
<td>1/3</td>
</tr>
<tr>
<td>5</td>
<td>3500</td>
<td>&quot;</td>
</tr>
<tr>
<td>6</td>
<td>25000</td>
<td>&quot;</td>
</tr>
<tr>
<td>7</td>
<td>50000</td>
<td>1/3</td>
</tr>
<tr>
<td>8</td>
<td>300</td>
<td>&quot;</td>
</tr>
<tr>
<td>9</td>
<td>100000</td>
<td>Variable</td>
</tr>
<tr>
<td>10</td>
<td>50000</td>
<td>1/3</td>
</tr>
<tr>
<td>11</td>
<td>15000</td>
<td>&quot;</td>
</tr>
<tr>
<td>12</td>
<td>100000</td>
<td>&quot;</td>
</tr>
<tr>
<td>13</td>
<td>600</td>
<td>1/2</td>
</tr>
<tr>
<td>14</td>
<td>50000</td>
<td>1/3</td>
</tr>
<tr>
<td>15</td>
<td>50000</td>
<td>&quot;</td>
</tr>
<tr>
<td>16</td>
<td>3000</td>
<td>1/2</td>
</tr>
<tr>
<td>17</td>
<td>10000</td>
<td>1/2</td>
</tr>
</tbody>
</table>

**SWITCHES**

A.V.C. on - off
Send - Receive
BFO on - off
**ANTENNA**

For successful operation of the receiver throughout its tuning range very satisfactory results can be obtained with an inverted "L" type antenna 75 feet long overall. When this type of antenna is used the jumper should remain connected between A1 and G.

If the operator should wish to obtain the maximum in performance from the receiver on any one frequency, it is suggested that a half wave doublet antenna out for that frequency be installed.

For calculating the overall length of this antenna:

\[
\text{Length in feet} = \frac{465}{\text{Frequency in megacycles}}
\]

The antenna is cut in the center and connected to a twisted pair transmission line having a characteristic impedance of 75 ohms. The other end of this line is connected to the A1 and A2 antenna posts.

This antenna will not perform well at harmonic frequencies but should be better than the inverted "L" on the frequency for which it has been designed. Performance on the 40 meter band, even with a suitable antenna, is subject to varying conditions of the time of day and year.

A ground is usually not necessary for satisfactory performance of the model S10-R Sky Buddy receiver. If a ground does prove helpful it is connected to the "A" post of the antenna terminal strip.

**BANDSPREAD**

In no other similar receiver but the S10-R Sky Buddy can be found such extremely smooth and satisfactory electrical bandspread action. The antenna plates are an integral part of the main condenser and the separate rotor sections are driven by a gearless mechanism through the separate bandspread knob.

The controls along the bottom edge of the receiver are:

- SEND-RECEIVE SWITCH which, when in the "send" position, removes plate voltage from the tube.
- THE BAND SWITCH allows selection of any one of the four ranges covered by the receiver. The newly incorporated 10 meter band will prove to be most interesting when conditions are favorable for reception on that range.
- The R.F.O. "ON-OFF" SWITCH allows optional use of the best frequency oscillator and is used when the operator is copying code signals. It will be of additional help in locating weak code signals by first locating their carrier. Once located, the R.F.O. may then be turned off to eliminate the whistle.
- The PITCH-CONTROL knob allows the operator to vary the pitch of the beat note—when the BFO switch is in the "on" position. Selection of the pitch of the beat note most pleasing to the operator will be of help in copying through interference. The A.V.C. "OFF" and "ON" Switch is for optional use of automatic volume control. Should the strength of the telephone signal be so strong as to block the receiver the A.V.C. switch should be "on". For maximum sensitivity leave the A.V.C. switch "off" and manually adjust the gain of the receiver with the audio gain control.
- The receiver is turned on and off with this control and additionally provides variation of the volume delivered by the receiver to suit the requirements of the listener.

A Headphone Jack is mounted on the panel to the right of the Pitch Control knob. When headphones are used, inserting the phone plug in the jack automatically disconnects the speaker.

**ALIGNMENT PROCEDURE FOR SKY BUDDY MODEL S10-R**

**I.F. ALIGNMENT**

Set the controls as follows:
- Audio gain control at maximum
- A.V.C. switch "on"
- Range switch on Band #4
- Set main dial to minimum capacity 5.9 MHz position
- Remove 6NA grid cap and connect signal generator to this tube
- Set signal generator for 465 EC output

Adjust trims on transformers T1, T2 for maximum output.

For adjustment of the R.F.O., place the BFO switch in the "on" position. Remove the knob from the pitch control shaft. You will see a small adjustment screw in the center of this shaft. On the under-chassis side of this shaft you will see a set screw which should be loosened in order to allow adjustment of the shaft in the center of the pitch control shaft. Adjust to zero beat. Tighten the set screw and replace the knob. Should the BFO still fail to operate check the .0005 condenser in the BFO circuit, or the BFO tube.

**R.F. ALIGNMENT**

Connect the generator to the A1 terminal on the antenna terminal strip found on the rear edge of the chassis through a 400 ohm resistor. Leave the jumper connected between A2 and G. The trim and pad points for the bands are indicated below:

- Connect the signal generator to the required frequencies for each band, adjust the main tuning dial to those frequencies with the bandspread condenser at minimum capacity and then adjust the indicated trimmers and padders to resonance.
- Set the signal generator to the required frequencies for each band, adjust the main tuning dial to those frequencies with the bandspread condenser at minimum capacity and then adjust the indicated trimmers and padders to resonance.

On the two high frequency bands where no padding adjustments are found, the checking frequencies should fall within 1 division of the dial calibration with no further adjustments.

During the R.F. alignment process it is advisable to "tweak" the main tuning condenser across the frequency on which you are making adjustments to the receiver. Once the exact point of maximum output is obtained further adjustment is unnecessary.
The SKYRIIDER-22 has an antenna input circuit which will allow the use of either a doublet or Marconi (inverted "L") antenna. The approximate antenna input impedance of the SKYRIIDER 22 is 150 ohms.

A very serviceable antenna will be the inverted "L" or Marconi type. This antenna should be approximately 75 feet long overall, including the lead-in, and satisfactory operation of the SKYRIIDER 22 is obtained throughout its tuning range with this type of antenna and because of its construction it is highly recommended. Should a doublet antenna be used it is suggested that a transmission line of 400 ohms value of impedance be constructed so that a most efficient transfer of energy is obtained. The commercially available all-wave doublet antennas are usually provided with a coupling transformer which matches the transmission line to the receiver. This transformer connects to the A and A' terminals on the antenna strip. The half-wave length doublet antenna out for a particular frequency can be computed by the following formula:

\[ \text{Length in feet} = \frac{120}{f} \times 2 \]  

where \( f \) is the frequency in megacycles.

This type of antenna is broken in the center with an insulator and has the transmission line connected to each resulting quarter wave section at that point. This antenna is a very good performer, in a direct bore sight to its length, only on the relative group of frequencies for which it was cut. It does not function well on harmonic frequencies.

When using either type of doublet antenna the transmission line should be connected to the A and A' binding posts. The wire connecting the A and G ground or 0 can be left connected if the performance of the receiver is improved.

**Controls and Operation**

Each of the controls is identified by appropriate marking on the panel. The "Fine control" turns the receiver "on" and "off" and also allows the operator to make adjustments for the type of reproduction most pleasing to him. TUNING is for the far left position, just after the set is turned on, while the bass is at the extreme right. Intermediate positions allow for easy adjustment of the sound. The "Fine Control" is used when the receiver is in operation.

The "Pitch Control" is used when code or CW signals are being received. In its counter-clockwise position the best frequency selector is "off," rotating the control clockwise turns the B.P.O. in addition to varying the pitch of the note to the operator's taste.

Directly below the two controls mentioned will be found the "Phone Jack." Any type of high impedance headphones may be used because no direct current flows in the microphone. The strength of the signal in the headphones will be found to be at the proper level for most comfortable headphone reception. When headphones are used the speaker is automatically disconnected.

The "AF Gain" knob controls the volume of the receiver by varying the output of the audio amplifier. VOLUME is controlled in both the headphones and loud speaker circuits and the setting of this control is optimal with the user of the receiver for an amount of volume desired. "AF Gain" positions, an extremely strong signal will cause the receiver to block. Because of the unusually low noise level, it is possible to pull all controls without any chance of interfering with each other.

The "Stab-Sync" or "Send-Receive" switch which when in the "Send" position removes plate voltage from the tubes. This allows the receiver to be made temporarily inoperative should it be used in conjunction with a transmitter. The hand-wheel marked "Tuning," is for adjusting the main dial to the frequency desired. The mechanism is quiet in operation and free from backlash. The conveniently located control will give the greatest tuning ease after continued hours of operation.

The "AF" or Automatic Noise Limiter controls turn the noise limiter "on" or "off." The normal position for operation is without an effective noise limiter. With the A.F.L. switch in the "on" position the noise limiter will prove to be of great assistance and frequently means the difference between hearing a signal which otherwise would be inaudible on the higher frequencies where ignition and other pulsating types of interference are most aggravating.

The "RF Gain" control adjusts the sensitivity of the receiver by varying the cathode bias of the first stage. When the RF gain controls are operated clockwise as far as they go, when this is done a switch will be operated, the function of which will be described under 5 meters.

When using the receiver under varying local conditions of noise, it will be advisable to change the RF gain controls until the best possible signal to noise ratio is found. Until such a time as you have become thoroughly familiar with the function of all controls it is suggested that the B.F. gain be advanced until the white dot on the knob is pointing approximately at the "AF" or RF gain. Later experiment to find the best position for a given signal bearing in mind that with the selectivity switch in any of the "AF" positions.

There are three controls which must be properly adjusted for most satisfactory crystal filter operation. Their operation shall be treated in the order in which they are called upon to perform their functions in the receiver.

**Selectivity Switch**

There are three positions of selectivity with the Automatic Volume Control circuit operating. For high fidelity broadcast reception the selectivity switch should be rotated to the "AF" position.

The "Phone Crystal" position affords maximum selectivity with automatic volume control. The receiver will have to be accurately resonated on each desired signal because this step of selectivity greatly attenuates the side-bands of a modulated carrier. You will notice the apparent drop in volume which the signal falls, only in the least center of which will this tell-tell sign of a good order be maintained. The "Phone Crystal" position is recommended under conditions of extreme interference where adjacent channel stations are causing objectionable heterodynes.

Rotating the switch in a counter-clockwise position still further allows the receiver to be used on CW signals. The selectivity positions with the B.F.C. circuit disconnected. When the selectivity switch is so adjusted it is then manually adjusted the "RF Gain" control to keep the signal under control.

The "AF Gain" position the maximum selectivity of the set is obtained. The drop in volume is independent. In the background noises is immediately apparent. This position is recommended only for the reception of CW or code signals because the selectivity is so great that place signals are practically worthless. The following two controls should be adjusted as described. First tune in an extremely weak signal.

The "Pitch Control" should be tuned until a best note is audible. Then adjust the main tuning control and go across the signal. Two distinct signals will be heard either side of zero beat, or the null position in the center tuning through which no signal is audible. Now turn the low or the high frequency side to that signal which appears either side of zero beat (as referred to the markings on the dial at which this signal was first tuned in) as reduced in volume. Again carefully adjust the "Pitch Control" and compare the strength of the audio image when this image has been phased out, or rejected. When you have demonstrated that the phasing or rejection is better on either the low or high frequency audio image the phasing control is left in that position and you then have the SKYRIIDER 22 adjusted for the extremely selective crystal section for which it is noted.

The "Pich and Phasing Controls" should be called upon for only to demonstrate how, through proper adjustment, extreme conditions of interference can be coped with. Frequently the pitch control will place a desired signal on the highest frequency channel with the two signals differ in frequency by only a few hundred cycles. Minute adjustment of the phasing control will frequently obliterate an interfering signal by dropping it in the crystal pilot.
Close to the license tag on the rear of the receiver will be found a knurled shaft which is to be used in adjusting the "S" meter. Prior to adjusting this control the R. F. gain control must be in the maximum gain position, or rotated clockwise until a switch which is mounted on this control, is heard to operate. Additionally, the Selectivity Switch must be in any one of the three "A.V.C. On" selectivity positions. When the above two conditions are filled the meter is in the circuit and should be adjusted as follows: Disconnect the antenna from the receiver, being sure no strong local signal is being picked up by the receiver with the antenna removed. Now adjust the S meter shaft until the meter rests at zero. Reconnecting the antenna will then show the meter indicating relative carrier strength in both S units as well as DB's or decibels. Should most accurate S meter indication be desired, it is recommended that the meter be adjusted with the Selectivity Switch in the step of selectivity most frequently used.

The S meter does not function with the Selectivity Switch in the "A.V.C. Off" position because the meter is connected in the A.V.C. circuit which preferably is used for telephone reception.
Unless otherwise specified, the SKYRIDER 23 operates on 110-125 volts 60 cycle alternating current. A universal transformer model is available which will operate on 25-60 cycle current. This transformer is provided with taps to cover in 5 steps a voltage range from 110 to 250 volts. Actual operation is identical with either the 25 or 60 cycle transformer.
BAND SPREAD

Realizing that reset accuracy is a very desirable feature, the SETHREE 35 was designed so that only the 10 meter bands from 10 to 50 meters could be bandspread. The oscillator and antenna frequency bands are unique and eliminate the necessity of accurately resetting the main tuning dial whenever it is desired to band spread the amateur frequencies.

The four "band spread" positions on the SETHREE 35 cover the frequencies indicated below:

<table>
<thead>
<tr>
<th>Band Spread</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 10 MH</td>
<td>0 - 14 MH</td>
</tr>
<tr>
<td>0 - 20 MH</td>
<td>0 - 28 MH</td>
</tr>
<tr>
<td>0 - 30 MH</td>
<td>0 - 42 MH</td>
</tr>
<tr>
<td>0 - 40 MH</td>
<td>0 - 54 MH</td>
</tr>
</tbody>
</table>

When operating in the band spread position it will be noticed that more than just the frequency of each amateur band are covered. This has been done to enable easier operation of the receiver. The band spread positions are indicated by the illuminated indicator directly to the right of the main dial.

ALIGNMENT PROCEDURE

The alignment of the 35 is straightforward and requires no equipment other than the usual signal generator, or other signal source, and an output meter.

1. F. ALIGNMENT

No. 1 - Remove the "Top Hat" from the cabinet and then turn square "RF Coil Kit" handle so that the RF coil assembly is accessible.

No. 2 - Move the control grid wire from the SETHREE tube base to the point at which it is to connect to switch section No. 6. Signal is applied to this grid for alignment of I.F. and RF circuits. An output meter is connected across 2000 ohm speaker terminals.

No. 3 - Connect the signal generator to the control grid of the SETHREE tube through a 0.1 ohm and 100,000 ohm, 1/2 watt, resistor. Now connect a 100,000 ohm, 1/2 watt, resistor from the grid of the SETHREE tube to the RF output of the RF coil assembly. (See note 4A, page 14).

No. 4 - Place the selectivity switch in the "F.C. Select" position, the wave band switch in the 10, 11, 12, 14, 16, 18, 20 and 24 MHz positions. Turn the RF coil control until the best note is obtained.

No. 5 - Adjust the RF coil control so that the dot on the knob is pointing to the top of the cabinet and then adjust A1 until the best note is obtained.

2. B.G. ADJUSTMENT

Following the same procedure as No. 1, align first at 5000 MHz, then adjust the balance trimmers with the RF coil control. Then adjust the output meter and observe the output level. Now adjust the selectivity switch to the "F.C. Select" position and observe the output level. Now adjust the RF coil control so that the dot on the knob is pointing to the top of the cabinet and then adjust A1 until the best note is obtained.

CRYSTAL ALIGNMENT

No. 6 - For alignment of crystal, place selectivity switch in CW crystal position, remove modulation from signal source, adjust RF coil control until a peak of approximately 1000 cycles is observed. When the signal from 440 Hz and then adjust the crystal frequency control to a point where the noise level from the speaker is reduced to a minimum. Now vary the frequency of the signal source from about 420 to 480 Hz. At some frequency between these points a sharp increase in speaker output will be noted. This is the resonance frequency of the crystal. The signal generator should be adjusted to this point of crystal resonance for maximum output. If the frequency is not within 50 cycles of the specified value, adjust the crystal frequency control to obtain the specified value. The output meter is now set at 2000 Ohm and the frequency is adjusted to obtain the specified output level.

No. 7 - To adjust the RF coil control to "off" position, the selectivity switch to "F.C. Select" position. Adjust the frequency of the modulated signal source to the resonant frequency of the I.F. unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

No. 8 - Remove the grid wire of the SETHREE to the control section and replace the RF coil shield button.

3. F. ALIGNMENT

The holes in the RF coil shield should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. The holes in the RF coil are resonant and operating properly.

The holes in the RF coil are resonant and operating properly when the RF coil is resonant and operating properly. When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

The holes in the RF coil are resonant and operating properly when the RF coil is resonant and operating properly. When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.

When the RF coil is resonant and operating properly, the holes in the RF coil should be marked with the signal generator meter to the resonant frequency of the RF coil unit with the signal strength sufficient to set up about 600 milliwatts on output meter. Now adjust A1 until the output is reduced to a minimum. This is the point where the RF coil is resonant and operating properly.
### Resistors

<table>
<thead>
<tr>
<th>No.</th>
<th>OHMS</th>
<th>WATTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>1/3</td>
</tr>
<tr>
<td>2</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>10,000</td>
<td>R.F. Gain Control</td>
</tr>
<tr>
<td>5</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>400</td>
<td>1/3</td>
</tr>
<tr>
<td>7</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2,000,000</td>
<td>R.F. Gain Control</td>
</tr>
<tr>
<td>12</td>
<td>500,000</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>500,000</td>
<td>1/3</td>
</tr>
<tr>
<td>14</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>300</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>1,000</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>1,000,000</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1,000,000</td>
<td>1/3</td>
</tr>
</tbody>
</table>

### Capacitors

<table>
<thead>
<tr>
<th>No.</th>
<th>CAPACITY</th>
<th>VOLTAGE</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>440 nfd</td>
<td>Per Section</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>40 nfd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>250 nfd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>350 nfd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>300 nfd</td>
<td>Ceramic</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>100,000 nfd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>0.02 µfd</td>
<td>Mica</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.05 µfd</td>
<td>Ceramic</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0.06 µfd</td>
<td>Electrolytic</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0.1 µfd</td>
<td>Electrolytic</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>0.2 µfd</td>
<td>Electrolytic</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>500 µfd</td>
<td>Crystal Phasing Air</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>300 µfd</td>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>500 µfd</td>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>500 µfd</td>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>500 µfd</td>
<td>Paper</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>500 µfd</td>
<td>Paper</td>
<td></td>
</tr>
</tbody>
</table>

### Alignment Procedure

1. **R.F.** Switch the "ON" position.
2. Set band switch to "G" band.
3. Connect grid cap and grid loss of your 465 EE generator to the grid of the receiver. Connect the grid terminal of the signal generator to the chassis of the receiver. Now feed a 465 EE signal into the receiver and set the pitch control to give a beat note of approximately 500 cycles. Adjust the R.F. transformer trimmers for maximum gain with the exception of the secondary trimmer on transformer T1. Adjust this trimmer so that the output reaches a maximum peak at a dip and then back to maximum again. Rebalance the IF frequency and align to the dip between the two maximum points. A distinct change in the crystal note sounding like an apparent broadening of the crystal note will be noted when the correct adjustment has been reached. Now repeat carefully the other trimmers for maximum gain.

**R.F. Alignment**

- Reconnect the grid cap to the 465 tube. Connect the grid side of the generator to the A4 antenna terminal on the rear of the chassis. Be sure that the grid terminal of your 465 EE generator is connected to A4 and G. Leave signal generator ground connected to the chassis of the receiver.

- Connect the following trimmers and paddles for the low-frequency end of each band while the trimmers are for the high-frequency end.

- In order to avoid the NF trimmers, the note switch can be removed by placing a knife under the slab maccuccs holding it in place. So that most satisfactory adjustment of the trimmers and paddles can be made, it is advisable not to touch the high or low condenser knob the condition being delivered by the generator until that particular circuit has been accurately peaked.

**G Meter**

When the R.F. gain control is advanced until a switch is turned to operate, a light will appear behind the transient scale of the meter itself. Only when this light is on will the meter indicate a transient in the scale views. When the R.F. gain control is turned on from the maximum, the meter is held in the scale but will not indicate the carrier level accurately. When so, adjust the meter by the R.F. gain control. Set the meter to the R.F. gain control, then turn the knob to the maximum, and adjust the meter to the "ON" level. When the meter is turned on, the meter scale will show a relative carrier intensity.

The 500 and 6000 ohm terminals are for connections to a loud speaker or other load of those impedances. The matching X435 speakers should be connected to the 5000 ohm strip. When headphones are plugged into the phone jack, the 5000 ohm speaker connection is automatically disconnected.
12-tube superheterodyne covers a continuous range of from 31 to 54 mc. (97 to 555 meters) in 6 steps, thus taking in all important communication, amateur and broadcast bands.

ANTENNA REQUIREMENTS
The input of the "HQ-120" is arranged so that various types of antennas may be employed. The average input impedance is 400 to 600 ohms. The most common type of antenna used generally by the amateur and short wave listener is the Marconi, consisting of a single wire and ground connection.

©John F. Rider, Publisher
HAMMARDUN MFG. CO.

Model H-2-120X, Crystal Operating Notes, Parts

120-X

Operation

After unpacking the receiver the chassis carefully so as to determine that all tubes have been properly fitted into their respective sockets. Also, be certain that all caps are in place on the tops of the tubes. It is possible that the grid clips may be missing and the manufacturer is supposed to furnish these. The receiver, itself, is a special model, operating on 245 to 125 volts AC at 50 to 60 cycles. If you are uncertain as to the type of power available for operating the service, your dealer will be glad to make the necessary tests. An attempt is made to supply the tubes in sets of the various types of power is to be made in the set of the receiver and to the receiver itself. It may be necessary to replace the permanent magnetic dynode system connected to the base of the crystal, so that the vacuum of the condenser and 6200 ohm resistor is held at 200 V. It is also possible to operate the vacuum of the condenser at 200 V when the condenser is not in use. The vacuum must be kept at 200 V when the receiver is not in use.

Compliments of www.nucow.com

John F. Rider, Publisher
HOWARD RADIO CO.

MODEL 4B
Battery Receiver

This model must not be confused with the Model 4BT. Electrically they are
much the same but the Model 4B is built into an upright table cabinet with an oval
dial, whereas the 4BT is a flat type cabinet with straight line dial.
The function of the tubes is as follows: 1A7G - Modulator, 1N56 - IF Amplifier,
1H56 - Diode Det. AVC, 1C56 - Output.
The trimmers for the antenna and oscillator coils are mounted directly on each coil.
The output is rated at .180 to .360 milliwatts.
"A" Battery Drain at 1 12 volts - .25 amps.
"B" Battery Drain at 90 volts - .012 mills, or .7 mills when using the "Economizer".

VOLUME

BATTERY

CONTROL LAYOUT

TUNING

ECONOMIZER

MAXIMUM
BATTERY LIFE

MAXIMUM
POWER OUTPUT

IF 463 K.C.

© John F. Rider, Publisher
MODEL 4BT
Schematic, Voltage
Notes

HOWARD RADIO CO.

MODEL 4BT - BATTERY RECEIVER

This receiver is designed on the 220 style chassis.
"A" Battery Drain at 1/2 volts - .25 amps.
"B" Battery Drain at 90 volts - .012 amp, or 7 miles. when using the "Economizer".
Output - .180 to .360 milliwatts, maximum.

The set is equipped with plugs that are inserted directly into the "A" and "B"
batteries of the socket type construction since most all batteries are made that way at
this time.

CONTROL LAYOUT

VOLUME

ECONOMIZER

MAXIMUM BATTERY LIFE

MAXIMUM POWER OUTPUT

TUNING

On

Off

SEE INDEX FOR OTHER
SERVICING DATA

IF 465 KC

REPLACEMENT PARTS LIST - MODEL 4BT

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-270</td>
<td>Condenser - 2 Gang for Model 4BT</td>
<td>17-829</td>
<td>Drive Cord Spring</td>
</tr>
<tr>
<td>36-266</td>
<td>Condenser - &quot;B&quot; Filter -</td>
<td>34-720X</td>
<td>Drive Shaft with Wood Hub</td>
</tr>
<tr>
<td></td>
<td>Dual 10 Mfd. 200 V.</td>
<td>4-429</td>
<td>Drive Shaft Grommet</td>
</tr>
<tr>
<td>49-262</td>
<td>Condenser - Padding</td>
<td>12-752</td>
<td>Drive Shaft &amp; Wood Hub</td>
</tr>
<tr>
<td>39-261</td>
<td>Control - Volume, with Switch</td>
<td>22-356</td>
<td>I.F. Assembly</td>
</tr>
<tr>
<td>56-198</td>
<td>Cabinet</td>
<td>23-938</td>
<td>I.F. Assembly</td>
</tr>
<tr>
<td>2A30</td>
<td>Coil - Antenna</td>
<td>18-490</td>
<td>Knob - 1&quot; Diameter - Brown Bakelite</td>
</tr>
<tr>
<td>202</td>
<td>Coil - Oscillator</td>
<td>1-609X</td>
<td>Pulley with 4-425 Gear Assembly</td>
</tr>
<tr>
<td>0C3</td>
<td>Choke - Oscillator</td>
<td>3-609</td>
<td>Pulleys for Drive Cord</td>
</tr>
<tr>
<td>62-310</td>
<td>Dial Glass - 1 Band</td>
<td>12-805</td>
<td>Speaker - D' with Transformer - PM</td>
</tr>
<tr>
<td>20-448</td>
<td>Dial Hand finished with Eyelet</td>
<td>17-917</td>
<td>Switch, Rotary Shaft</td>
</tr>
<tr>
<td>1-288</td>
<td>Drive Cord - 36&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher
Alignment

HOWARD RADIO CO.

SEI INDEX FOR OTHER SERVICING DATA

MODEL HA-6 Serial 1
3-21-37
DWE-225-7/5

MODEL HA-9 Serial 1
3-25-37
DWE-225-7/5

SET TO AERIAL ADJ. - Tune a 600 KC sig. on dial. Adj. Ant. trimmer screw for maximum volume.

SET TO AERIAL ADJ. - Tune a 600 KC sig. on dial. Adj. Ant. trimmer screw for maximum volume.

©John F. Rider, Publisher

Compliments of www.nucow.com
Cathode circuit of the 6A7 or 6AS tubes where no other cathodes are common - MERELY REMOVE RESISTOR FROM GROUND AND ATTACH GREEN WIRE TO THE RESISTOR.

Note - Should cathode be already direct to ground - remove ground and connect green wire direct to cathode terminal.

Circuits in which I.F. cathodes are connected common to mixer cathode - SUBSTITUTE RESISTORS R8 AND R5 FOR R4 OF SUCH VALUES TO OBTAIN ORIGINAL CATHODE VOLTAGE AND 0.05 MF at 600 V. BETWEEN CATHODES AS SHOWN, ANY CONTACT GREEN WIRE TO END OF R5 RESISTOR.

The above arrangement is used when oscillator cathode and the mixer, cathodes are commonly coupled by resistor - MERELY REMOVE GROUND AND ATTACH GREEN WIRE AS SHOWN.

With circuits as shown above where 6L7 cathode uses bias resistor and cathode is grounded, the cathodes together so that green wire controls the ground return for both.

Parts List for Model 210 Adapter

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8A12</td>
<td>.40</td>
</tr>
<tr>
<td>1</td>
<td>2011</td>
<td>.40</td>
</tr>
<tr>
<td>1</td>
<td>20-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>10-666</td>
<td>1.10</td>
</tr>
<tr>
<td>1</td>
<td>15-666</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Prices subject to change without notice.

See installation instructions for the operation of this adapter.
MODEL 210
MODEL 211
Instructions

HOWARD RADIO CO.

MODELS 220, 221, 270, 271, 48, 4BT
Alignment Chart

<table>
<thead>
<tr>
<th>MODELS</th>
<th>CHECK ON SWITCH</th>
<th>GENERATOR FREQUENCY</th>
<th>GENERATOR CONNECTION</th>
<th>TUNING</th>
<th>FUNCTION</th>
<th>APPROXIMATE MICROVOLTS FOR 50-MA AMP UIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>Maximum Capacity</td>
<td>460 KHz</td>
<td>Grid of 645</td>
<td>IF</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>221</td>
<td></td>
<td>600 KHz</td>
<td></td>
<td>IF</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>270</td>
<td></td>
<td>600 KHz</td>
<td></td>
<td>IF</td>
<td>50-75</td>
<td>20</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>1.7 KHz</td>
<td></td>
<td>IF</td>
<td>50-75</td>
<td>20</td>
</tr>
</tbody>
</table>

**NOTE 1:** When aligning the I.F. channel, a condenser of .06 MFD may be used in series with the generator lead.

**NOTE 2:** When aligning the broadcast band, a 250 MFD condenser may be used in series with the signal generator.

**NOTE 3:** When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

**NOTE 4:** Check for an image signal about .9 mc lower in frequency. For example, if a peak has been made at 6 mc, an image should be heard at about 5.1 mc. Otherwise, the original setting was not correct.

©John F. Rider, Publisher
HOW TO SET AUTOMATIC TUNING BUTTONS

1. From the rear of the tuning mechanism within the cabinet extends a slotted screw; loosen this screw by turning it to the left.
2. Tune set in the regular way and decide upon which four stations are used the most in your locality.
3. With a station exactly in tune press one button ALL THE WAY DOWN which will set the adjustment, then the button will spring back in its original position.
4. Repeat this procedure for each of the remaining three buttons, being careful not to touch any other buttons while pressing down one.
5. Now tighten the rear screw, using a coin in the slot when tightening, if necessary, to make it will not loosen. Insert station letters into top of buttons.

THE GEAR ADJUSTMENT between the gear on the selector unit and the gear on the variable condenser is located on the top of the variable condenser in the form of a screw. The selector unit always tends to press against this screw head due to the mounting at point "A". See Fig. 2.

To lower or raise the selector unit to change the gear spacing, loosen the hex nut that locks the adjustment screw and adjust as required.

SHOULD THE SPOOL DRIVE CODE EVER NEED REPLACEMENT ON THE MODELS 220, 270, 321, 371 or 441, FOLLOW THIS DIAGRAM SHOWING THE CORRECT POSITION AND NOTATION OF THE DRIVE CODE.

In case the drive cord slips on the rubber grommet on the drive shaft, check:
1. To see that the tuning hand is sliding freely.
2. Be sure the spring on the large pulley is maintaining enough tension on the drive cord. A few models were not provided with an eyelet as shown causing the string to catch on the sharp edge of the hole in the pulley and the spring would not keep tension.
3. Check the rubber grommet on the drive shaft for defects.
The schematic diagram below covers both models 220 and 270, the main difference being the use of the short wave band for Model 270. The circuit is conventional with 6A7 mixer, 6D6, IF amplifier, 75 Diode Det. AVC, 41 Output, 80 Rectifier. The cathode circuit of the filter system is not grounded direct, the bias voltages are obtained by resistors from C.T. of high voltage to ground.

The output to be obtained will be from 1-1/2 to 2/25 watts, maximum.

For the models having four push buttons, a mechanical type tuner, the proper set-up is given on the following page.

REPLACEMENT PARTS LIST - MODELS 220 - 270

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-914</td>
<td>Band Switch for Model 270</td>
<td>34-720X</td>
<td>Drive Shaft with Wood Hub</td>
</tr>
<tr>
<td>39-270</td>
<td>Condenser - 2 Gage for Model 270</td>
<td>4-429</td>
<td>Drive Shaft Grommet</td>
</tr>
<tr>
<td>3E-270</td>
<td>Condenser - 2 Gage for Model 220</td>
<td>12-768</td>
<td>Drive Shaft &amp; Wood Hub</td>
</tr>
<tr>
<td>31-277</td>
<td>&quot;F&quot; Filter</td>
<td>5-425X</td>
<td>Gear with Hub for Selector Unit</td>
</tr>
<tr>
<td></td>
<td>- Dual 10 Mfd. 350 V.</td>
<td>16-490</td>
<td>Knob - 1&quot; Diameter - Brown Bakelite</td>
</tr>
<tr>
<td>50-262</td>
<td>Condenser - Single Trimmer 3-30 Mfd.</td>
<td>36-200</td>
<td>Push Buttons</td>
</tr>
<tr>
<td>49-262</td>
<td>Padder</td>
<td>2-276</td>
<td>Push Button Selector Unit</td>
</tr>
<tr>
<td>56-281</td>
<td>Control - Volume, with Switch</td>
<td>1-609X</td>
<td>Pulley with 4-425 Gear Assembly</td>
</tr>
<tr>
<td>53-168</td>
<td>Cabinet - Model 270</td>
<td>3-609</td>
<td>Pulleys for Drive Cord</td>
</tr>
<tr>
<td>54-168</td>
<td>Cabinet - Model 220</td>
<td>11-768</td>
<td>Pilot Light Sockets</td>
</tr>
<tr>
<td>62-310</td>
<td>Dial Glass Model 220 - 1 Band</td>
<td>2-498</td>
<td>Pilot Light - 6 V. Bayonet Type</td>
</tr>
<tr>
<td>61-310</td>
<td>Dial Glass Model 270 - 2 Band</td>
<td>73-805</td>
<td>Speaker - 5-1/2&quot; with Transformer</td>
</tr>
<tr>
<td>20-448</td>
<td>Dial Hand finished with Eyelet</td>
<td>1300 Ohm Field</td>
<td></td>
</tr>
<tr>
<td>1-288</td>
<td>Drive Cord - 36&quot;</td>
<td>27-438</td>
<td>Transformer - Power 115 V. 60 Cycle</td>
</tr>
<tr>
<td>17-829</td>
<td>Drive Cord Spring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.
Howard Radio Co.

General Description - Models 221 and 271

For use on either direct or alternating current

The schematic diagram below covers both 221 and 271 AC-DC Models, the main difference being that the 271 has a short wave band. Mechanical specifications are similar to the 220 - 270 series.

The maximum power output to be obtained is 2.7 watts, 1.7 watts undistorted.

Replacement Parts List - Models 221 - 271

Refer to schematic diagram for replacement parts not shown in above list.

© John F. Rider, Publisher
Each of the three bands has a separate antenna and oscillator coil.

The intermediate frequency stages are tuned to 465 KC and have a sensitivity of about 27 microvolts. (for 50 milliwatt output)

The maximum output is rated at about 5 watts, and 3.5 watts undistorted.

©John F. Rider, Publisher
No change should be made with the I.F. or R.F. adjustments unless it is certain that such adjustments are necessary.

The following instructions are given with the assumption that the service station has the proper proven means of measuring the output and proper input connections. The following circuit is recommended for the input from the signal generator.

See that the dial hand is straight across when the condenser is at full capacity.

After aligning the four trimmers of the IF system to 660 Kc, refer to Fig. 3, showing the position of the R.F. trimmer and the frequency to which they are to be adjusted. Although the dial is calibrated in meters, there will be found on the dial extra points representing the frequency in kilocycles corresponding to the trimmer adjustments as shown in Fig. 3.

**NOTE:**
Always peak the oscillator circuit first and recheck after the antenna circuit is adjusted.

Be certain the alignment is not made at an image frequency.

Seal trimmers after final adjustment.

The normal voltages are shown on the schematic circuit taken from the various points to ground.

**THE ADAPTION OF THE SET FOR USE WITH PHONOGRAPHS**

Out of the back of the chassis there extends three lugs labeled "Phono" 1-4-3. For phonograph use, the jumper is removed and the pick-up leads from the pick-up are connected to No. 1 and 2 terminals, with the overall wire shield grounded to No. 3 terminal. A single pole double throw switch may be used to change from radio to "Phono". See Fig. 2.

With certain models, the chassis is floated on cushion rubber. In shipment the chassis is tightened on corner wood strips. To release, loosen the four bottom screws, remove strips and let chassis float free.

**REPLACEMENT PARTS LIST MODEL X275**

<table>
<thead>
<tr>
<th>PART</th>
<th>DESCRIPTION</th>
<th>PART</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-914</td>
<td>Band Switch - 4 pole, 5 position</td>
<td>285</td>
</tr>
<tr>
<td>18-915</td>
<td>Choke - 240 Ohm</td>
<td>Dial Glass - Specify name on glass</td>
</tr>
<tr>
<td>22-916</td>
<td>Coll Assembly</td>
<td>2-468</td>
</tr>
<tr>
<td>22-917</td>
<td>Coll - R.C. Antenna</td>
<td>Dial Lamp - 6 V. Bayonet Type</td>
</tr>
<tr>
<td>22-918</td>
<td>Coll - 40 μF</td>
<td>10-700</td>
</tr>
<tr>
<td>22-919</td>
<td>Coll - R.C. Oscillator</td>
<td>Dial Lamp Socket Assembly</td>
</tr>
<tr>
<td>22-920</td>
<td>Coll - G.R. Antenna</td>
<td>9-210</td>
</tr>
<tr>
<td>22-921</td>
<td>Coll - 40 μF</td>
<td>Drive Disc - 2-1/4&quot; dia. with hub &amp; friction assembly</td>
</tr>
<tr>
<td>22-922</td>
<td>Coll - G.R. Oscillator</td>
<td>11-525</td>
</tr>
<tr>
<td>22-923</td>
<td>Coll - 0.1 μF</td>
<td>Drive Disc for mounting on V. Cond. Shaft</td>
</tr>
<tr>
<td>22-924</td>
<td>Coll - R.C. Antenna</td>
<td>Drive Shaft with friction discs</td>
</tr>
<tr>
<td>22-925</td>
<td>Condenser - Single Trim, 300 μF</td>
<td>10-490</td>
</tr>
<tr>
<td>22-926</td>
<td>Condenser - Single Trim, 50 μF</td>
<td>Knob for Controls</td>
</tr>
<tr>
<td>22-927</td>
<td>Condenser - Paddling, 5 Plate</td>
<td>2-465</td>
</tr>
<tr>
<td>22-928</td>
<td>Condenser - Paddling, 5 Plate</td>
<td>Resistor - Carbons 50 Ohms</td>
</tr>
<tr>
<td>22-929</td>
<td>Control - Volume</td>
<td>2-101</td>
</tr>
<tr>
<td>22-930</td>
<td>Control - Tone &amp; Switch</td>
<td>Resistance Line Cord, 250 Ohms</td>
</tr>
</tbody>
</table>

**REPLACEMENT PARTS LIST MODEL X285**

<table>
<thead>
<tr>
<th>PART</th>
<th>DESCRIPTION</th>
<th>PART</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-914</td>
<td>Band Switch - 4 pole, 5 position</td>
<td>285</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - let I.F. Complete</td>
<td>Dial Glass - Specify name on glass</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - 20 μH</td>
<td>2-468</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - 40 μH</td>
<td>Dial Lamp - 6 V. Bayonet Type</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - 80 μH</td>
<td>10-700</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - R.C. Antenna</td>
<td>Dial Lamp Socket Assembly</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - R.C. Oscillator</td>
<td>9-210</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - G.R. Antenna</td>
<td>Drive Disc - 2-1/4&quot; dia. with hub &amp; friction assembly</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - G.R. Oscillator</td>
<td>Drive Shaft for mounting on V. Cond. Shaft</td>
</tr>
<tr>
<td>22-920A</td>
<td>Coll - R.C. Antenna</td>
<td>Drive Shaft with friction discs</td>
</tr>
<tr>
<td>22-920A</td>
<td>Condenser - Single Trim, 300 μF</td>
<td>10-490</td>
</tr>
<tr>
<td>22-920A</td>
<td>Condenser - Single Trim, 50 μF</td>
<td>Knob for Controls</td>
</tr>
<tr>
<td>22-920A</td>
<td>Condenser - Paddling, 5 Plate</td>
<td>2-465</td>
</tr>
<tr>
<td>22-920A</td>
<td>Condenser - Paddling, 5 Plate</td>
<td>Resistor - Carbons 50 Ohms</td>
</tr>
<tr>
<td>22-920A</td>
<td>Control - Volume</td>
<td>2-101</td>
</tr>
<tr>
<td>22-920A</td>
<td>Control - Tone &amp; Switch</td>
<td>Resistance Line Cord, 250 Ohms</td>
</tr>
</tbody>
</table>

**PART**

- 18-914: Band Switch - 4 pole, 5 position
- 22-920A: Coll - let I.F. Complete
- 22-920A: Coll - 20 μH
- 22-920A: Coll - 40 μH
- 22-920A: Coll - 80 μH
- 22-920A: Coll - R.C. Antenna
- 22-920A: Coll - R.C. Oscillator
- 22-920A: Coll - G.R. Antenna
- 22-920A: Coll - G.R. Oscillator
- 22-920A: Coll - R.C. Antenna
- 22-920A: Condenser - Single Trim, 300 μF
- 22-920A: Condenser - Single Trim, 50 μF
- 22-920A: Condenser - Paddling, 5 Plate
HOWARD RADIO CO.

THIS RECEIVER CAN BE USED ON EITHER ALTERNATING OR DIRECT CURRENT AND IS ADAPTABLE TO THREE DIFFERENT LINE VOLTAGES BY CHANGING THE TERMINAL ARRANGEMENT ON THE BACK OF THE CHASSIS.

BEFORE CONNECTING RADIO, VERIFY THE VOLTAGE WITH WHICH THE RADIO IS TO BE USED, AND FOLLOW DIRECTIONS AS GIVEN ON CHASSIS, OR AS FOLLOWS:

FOR A LINE VOLTAGE BETWEEN 100 and 125 VOLTS, CONNECT ALL THREE TERMINALS TOGETHER.

FOR A LINE VOLTAGE FROM 125 to 150 VOLTS, OMIT JUMPER BETWEEN EXTREME LEFT TERMINAL AND CENTER TERMINAL.

FOR A LINE VOLTAGE BETWEEN 200 and 240 VOLTS, REMOVE ALL CONNECTIONS.
BE CAREFUL NOT TO LET LOOSE ENDS OF THE WIRES TOUCH THE CHASSIS.
The Model 377 is designed as a single band for broadcast reception. Three gang condenser is used to tune the antenna, R.F. and oscillator circuits. The intermediate frequency is 262 KC. The bias voltages are obtained by series resistors from the high voltage center tap to ground. The negative side of the filter is not grounded.

The maximum output obtainable is 25 watts.

The variable condenser section for the oscillator circuit is the cut-plate type. See circuit diagram for other specifications.
SET-UP INSTRUCTIONS FOR HOWARD
PERMA-MATIC AUTOMATIC TUNER NO 1
NOTE: DO NOT ATTEMPT ANY ADJUSTMENTS UNTIL THE SET
HAS BEEN TURNED ON AT LEAST 20 MINUTES.

(1) Remove the push-button escutcheon plate by prying forward from ends, taking care not to scratch cabinet.

(2) Depress any one of the selector buttons, tune the desired station in by turning slotted screw with small screw-driver (this screw is number 1 in illustration and is always the screw adjacent to and right of depressed button.) This moves the iron core in oscillator circuits.

(3) Adjust the screw with slotted head for maximum eye deflection. This adjustment is numbered 2 in illustration and always the one directly above the station selector adjustment mentioned in above paragraph. If eye deflection of tuning coil appears for a station and yet no station is present, THIS IS A NORMAL CONDITION and just means that the two adjustments are not close enough in relation to each other and can be corrected by varying the two adjustment screws.

THERE IS NO FREQUENCY DISCRIMINATION BETWEEN BUTTONS. ANY ONE OF SELECTORS WILL TUNE THE WHOLE BROADCAST BAND (1600-640 KC).

NOTICE: DO NOT FORCE ANY ADJUSTMENTS if they tighten up in the course of adjustment, either the maximum or minimum has been reached and the adjustment should be made in opposite rotation.

It will be found easier to adjust if the low frequency stations are started on right side and progress toward high frequency stations to left. IN SAME ORDER AS MAIN DIAL.

However, the above procedure is not absolutely necessary if there should be some preference for arranging stations otherwise.

AFTER ALL ADJUSTMENTS HAVE BEEN MADE — GO OVER EACH ADJUSTMENT THE SECOND TIME TO MAKE CERTAIN THEY ARE CORRECT AND TO COMPENSATE FOR SUBSEQUENT ADJUSTMENTS.

It is a big help to tune the desired station in on dial while making adjustments, in order that the station can be quickly recognized by switching from manual back to button being adjusted.

It is not necessary to look any of the adjustments as they are automatically looked.

Place station call letter tabs in escutcheon and replace escutcheon by pressing in place on cabinet.

NOTICE: Turning station selector screw clock-wise lowers the frequency. Best results will be had when band switch is in broadcast position when using automatic tuning.

MECHANICAL ACTION OF THE HOWARD TUNER

Fig. 1 shows one of the buttons depressed for a station. The trimmer panel assembly (for the antenna circuit) is designed with spring fingers "G" that make contact with cross bar "F" completing the ground circuit of the R.F. trimmer.

When making the original set-up, the adjusting screw may indicate two positions for resonance. This is due to the possibility of the small amount of play in the screw thread and is of no concern as long as it is set to the exact resonance point.

The jumper contact "Z" connects C1 contact to G2 contact with the button "FM". This completes the oscillator circuit for that particular button.

Fig. 2 shows the jumper position with the button "OFF".

Fig. 3 shows the manual OFF-ON button in the "OFF" position.

The "L" shaped sliding contact is the common cathode return circuit and alternates the bias on the 855 for manual tuning or on the 6A7 for push button tuning.

Fig. 4 shows the iron core movement within the oscillator coil. Its position is held stationary by the small spring wire across the coil form. The position of this spring must be such that no spring action is apparent from the end of the adjustment stud due to pressure with a screwdriver. Otherwise, when the screwdriver is removed, the core will shift out of position.

The button is held down by action of the latch bar and is released when another key raises the latch bar on its way down.

If it is necessary to replace a coil, mount it in line with the other coils and cement it in place.

WHEN ORDERING ANY PARTS, SPECIFY PART NUMBER AND IDENTIFY WHETHER THE PART IS FOR TUNER NO. 1 OR NO. 2. TUNER NO. 1 WAS CONNECTED WITH THE SLOTTED BRASS SCREW FOR CORE ADJUSTMENT, WHEREAS TUNER NO. 2 CONSISTED OF THREE BLACK THREAD AS SHOWN IN Fig. 4.
REPLACE HOWARD PERM-A-MATIC TUNERS #7-966 or #8-966
WITH PERM-A-MATIC TUNER #9-966 WHICH REQUIRES THE
CHANGE OF THE ANTENNA COIL ON THE CHASSIS AS EX-
PLAINED AT THE BOTTOM OF THIS PAGE.

There are six leads between the tuner and the receiver circuits to be un-
soldered. UNSOLDER THE CONNECTIONS FROM THE RECEIVER TERMINALS AND NOT FROM THE
TUNING UNIT AS THE NEW TUNER WILL HAVE THE NECESSARY LEADS.

Mechanically, it is only necessary to remove two screws from the front plate
to release the tuner.

Due to the fact that the two ceramic condensers (green in color), one each in
the grid and plate circuits of the oscillator, are now a part of the new Tuner,
they must be removed from within the receiver and returned with the tuner being
replaced.

Since the colors of the leads are different in the two type tuners, it is
advisable to follow the schematic diagram together with the following chart.

<table>
<thead>
<tr>
<th>TUNER NO. 1 (7-966)</th>
<th>TUNER NO. 2 (8-966)</th>
<th>TUNER NO. 3 (9-966)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEAD COLOR</td>
<td>CIRCUIT</td>
<td>LEAD COLOR</td>
</tr>
<tr>
<td>Unsolder from ANTENNA COIL 2A17</td>
<td>GRID 6A7</td>
<td>SAME</td>
</tr>
<tr>
<td>WHITE WITH BLUE TRACER</td>
<td>CATHODE BIAS SWITCH</td>
<td>SAME</td>
</tr>
<tr>
<td>GREEN</td>
<td>OSCILLATOR GRID 6A7</td>
<td>SAME</td>
</tr>
<tr>
<td>Unsolder from .0065 Condenser</td>
<td>OSCILLATOR PLATE 6A7</td>
<td>BLUE</td>
</tr>
<tr>
<td>GREEN</td>
<td>CATHODE RETURN FOR 6K3</td>
<td>BROWN WITH WHITE TRACER</td>
</tr>
<tr>
<td>Unsolder from 6K3 Cathode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLUE</td>
<td>CATHODE RETURN FOR 6A7</td>
<td>GREEN WITH WHITE TRACER</td>
</tr>
</tbody>
</table>

DUE TO THE FACT THAT THIS NEW UNIT, #9-966, HAS A DIFFERENT TRIMMER CAPACITY
RANGE, THE ASSOCIATED ANTENNA COIL, 2A17, IN THIS CIRCUIT MUST BE CHANGED TO
2A23. THIS IS THE COIL ON THE LEFT SIDE WHEN FACING FRONT OF SET. FOLLOW
DIAGRAM FOR TERMINAL ARRANGEMENT.

©John F. Rider, Publisher
FOUR MODELS ADAPTABLE TO PHONOGRAPH CONNECTION

OUT OF THE BACK OF THE CHASSIS THERE EXTENDS THREE LUGS AS SHOWN IN FIG. 1. FOR PHONOGRAPH USE, THE LUMBER IS CONNECTED TO A SINGLE POLE, SINGLE THROW SWITCH CONNECTED TO NO. 1 AND 2 TERMINALS, WITH THE OVERALL SHIELD GROUNDED TO NO. 3 TERMINAL.

FIG. 1

FIG. 2

FIG. 3

FIG. 4

BROADCAST BAND
PAD, COND.

ADJUST FROM TOP OF CHASSIS

CHECK BAND SWITCH
POSITION & SET DIAL TO

GENERATOR FREQUENCY

GENERATOR CONNECTION

TRIMMER LOCATION

TRIMMER FUNCTION

APPROXIMATE MICROVOLTS
FOR 50 MILLIWATT OUTPUT

| 540 KC | 645 KC | Grid of #259 | C7, C9, C10, C11, C12 | I.F. | 10 to 20 |
| 21 MC | 21 MC | Antenna Lead | T2, T4 | OSC, & ANT. | 1 |
| 6 MC | 6 MC | Antenna Lead | T5, T6 | OSC, & ANT. | 5 |
| 1400 KC | 1400 KC | Antenna Lead | T6, T7 | OSC, R.F. & ANT. | 1 |
| 500 KC | 600 KC | Antenna Lead | T4 | OSC, P.A. | 1 |

© John F. Rider, Publisher

Compliments of www.nucow.com
degrees of the lower frequency bands. The lower scale from 0 to 100 is for logging purposes. The left band pointer indicates the band in operation, for correct tuning calibration, the Band Spread pointer must be at 100. The power output for the Model 430 is about 1 3/4 watts, undistorted.
**NOTE 1:** When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

**NOTE 2:** When aligning the broadcast band, a 250 MFD condenser may be used in series with the signal generator.

**NOTE 3:** When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

**NOTE 4:** After the chassis has been removed from the cabinet, be sure when it is again assembled that the speaker plug is in place in the socket on top of the chassis and that the speaker cable wires do not lay back near the RF circuit, thus causing howling.

**NOTE 5:** Check for an image signal about .5 mc. lower in frequency. For example: If a peak has been made at 6 mc, an image should be heard at about 5.5 mc. Otherwise the original setting was not correct.

**FIG. 7**

**SHOULD THE DIAL DRIVE CORD EVER NEED REPLACEMENT ON THE MODELS 430 or 438, FOLLOW THIS DIAGRAM SHOWING THE CORRECT POSITION AND ROTATION OF THE DRIVE CORD.**

©John F. Rider, Publisher
The frequency coverage from .55 to 42 megacycles is divided into four bands. The left-hand pointer indicates the band in operation. For correct tuning calibration, the band spread pointer must be set at 100. The lower scale 0 to 100 is for logging purposes.

**THE POWER OUTPUT will be about 2½ watts, undistorted.**

For each band there is a Radio Frequency stage with individual coils for the RF oscillator and Mixer stages for each band. Ceramic coil forms are used on the high frequency band. Ceramic trimmers are used throughout. The unused coil secondaries of the lower frequency bands are shorted as the band switch is shifted to the higher bands.

The Intermediate Frequency is 465 KC. The Crystal input, Crystal output, and the 2nd IF consist of windings wound on iron cores.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-132</td>
<td>Ball Bearing - 1/8&quot; dia.</td>
<td>3-485</td>
<td>Headphone Jack</td>
</tr>
<tr>
<td>7601</td>
<td>Bias Cell - 1/2 V.</td>
<td>28-448</td>
<td>Indicator Pointer Hands</td>
</tr>
<tr>
<td>57-188</td>
<td>Cabinet - Complete</td>
<td>20-490</td>
<td>Knob - 1-1/8&quot;</td>
</tr>
<tr>
<td>17-829</td>
<td>Coil Spring for Drive Cord</td>
<td>21-490</td>
<td>Knob - 1-9/16&quot;</td>
</tr>
<tr>
<td>50-862</td>
<td>Condenser - Single Trimmer</td>
<td>2-498</td>
<td>Pilot Light - 6 V. Bayonet</td>
</tr>
<tr>
<td>68-862</td>
<td>Condenser - Variable Trimmer (Xtal Phase)</td>
<td>14-768</td>
<td>Pilot Light Socket - Bayonet</td>
</tr>
<tr>
<td>49-862</td>
<td>Condenser - Padding, BC Band</td>
<td>19-427</td>
<td>Pyralin Window</td>
</tr>
<tr>
<td></td>
<td>Condenser - .0015 Mfd. - Mica</td>
<td>19-917</td>
<td>Rotary Switch</td>
</tr>
<tr>
<td></td>
<td>Condenser - .0009 Mfd. - Mica</td>
<td>7-167</td>
<td>Rubber Mtg. Feet</td>
</tr>
<tr>
<td></td>
<td>Condenser - .004 Mfd. - Mica</td>
<td>J4-806</td>
<td>Speaker - 64&quot;, Cord and Plug</td>
</tr>
<tr>
<td>1-303</td>
<td>Crystal - 465 KC</td>
<td>15-829</td>
<td>Spring Clamp for Ball Bearing on Shaft</td>
</tr>
<tr>
<td>1-828</td>
<td>Drive Cord</td>
<td>14-917</td>
<td>Toggle Switches - S.P.S.T.</td>
</tr>
<tr>
<td>35-868</td>
<td>Filter Condenser - 5,5,20 Mfd.</td>
<td>27-448</td>
<td>Tuning Hand</td>
</tr>
<tr>
<td>30-866</td>
<td>Filter Condenser - 10,10 Mfd.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>450,450 Volt</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

Compliments of www.nucow.com
NOTE: When using a Crystal set Phasing Control to almost minimum capacity, see special alignment instructions below for Crystal.

ALIGNMENT CHART

<table>
<thead>
<tr>
<th>BAND</th>
<th>GENERATOR FREQUENCY</th>
<th>GENERATOR CONNECTION</th>
<th>TRIMMER LOCATION</th>
<th>TRIMMER ADJUSTMENTS</th>
<th>TRIMMER FUNCTION</th>
<th>APPROX. MICROVOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF</td>
<td>465 KC</td>
<td>Grid of G890</td>
<td>See Fig. 6</td>
<td>Cl, C2, C5, C4, C5, C6, C7</td>
<td>IF</td>
<td>16</td>
</tr>
<tr>
<td>42-16</td>
<td>32 MC</td>
<td>A and DG</td>
<td>See Fig. 5</td>
<td>T1, T2, T3</td>
<td>OSC. RF. ANT.</td>
<td>8</td>
</tr>
<tr>
<td>16-5.5</td>
<td>17 MC</td>
<td>A and DG</td>
<td>See Fig. 5</td>
<td>T4, T6, T6</td>
<td>OSC. RF. ANT.</td>
<td>3</td>
</tr>
<tr>
<td>5.5-1.7</td>
<td>5 MC</td>
<td>A and DG</td>
<td>See Fig. 6</td>
<td>T7, 76, T9</td>
<td>OSC. RF. ANT.</td>
<td>1</td>
</tr>
<tr>
<td>1.6-5.5</td>
<td>1400 KC</td>
<td>A and DG</td>
<td>See Fig. 6</td>
<td>T10, T11, T12</td>
<td>OSC. RF. ANT.</td>
<td>1</td>
</tr>
<tr>
<td>1.6-5.5</td>
<td>600 KC</td>
<td>A and DG</td>
<td>See Fig. 6</td>
<td>P13</td>
<td>OSC. PAD.</td>
<td>1</td>
</tr>
</tbody>
</table>

ALIGNMENT INSTRUCTIONS - FOR RECEIVERS EQUIPPED WITH CRYSTALS

1. REMOVE CRYSTAL, set crystal phasing condenser to almost minimum capacity and throw "XTAL" switch to "IN" position.
2. With the 465 KC signal, re-adjust the I.F. Trimmer C-6 by turning the screw counterclockwise. The signal now may be slightly weaker than before and sound "off-side". This, however, is a normal condition.
3. REPLACE THE CRYSTAL - A very noticeable drop in signal strength may be noted due to the filtering action of the crystal and the frequency control of the signal generator must be "rocked" slowly back and forth until the increase in signal strength indicates the exact frequency of the crystal being used. Now re-align the entire I.F. system to this frequency.
4. Adjust "XTAL" phasing condenser for lowest pitched note possible and re-adjust signal generator frequency. Repeat and continue to repeat this alignment procedure until no further improvement in the alignment can be accomplished.

NOTE: If the "XTAL" switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, so it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.
ALIGNMENT PROCEDURE

PRELIMINARY:
Output meter connection - 4000 ohm or more copper oxide meter across 5 ohm terminals.
Output meter reading to indicate .5 watt
1.675 V.
Shunt with speaker.
Average sensitivity in microvolts for .5 watt output. See chart below
Generator ground lead connection
A.V.C. Switch
Band spread dial set at 100
Min. Capacity
Generator modulation
30%, 400 cycles
Position of volume control A.F. gain Position of volume control R.F. gain. Full On

NOTE 1:
When aligning the I.F. channel, a condenser of .05 MF may be used in series with the generator lead.

NOTE 2:
When aligning the broadcast band, a 250 MF condenser may be used in series with the signal generator.

NOTE 3:
When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

NOTE 4:
When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions for Crystal MODEL 438.
CHASSIS FEATURES:
SEND-RECEIVE terminals in rear of chassis
for break-in connection.
RF Stages
VARIOUS CONDENSERS
Three Gang
ANTENNA
TWO REQUIRED
TYPE
SEE PAGE 3
HEADPHONE JACK
ON FRONT PANEL
Crystal Phaser.
Beat Frequency Oscillator, Pitch Control.
B.F.O. OFF-ON Switch with Injection Control
Two range B.F.O. switch

OPERATING FEATURES:
A.V.C. with ON-OFF Switch
Three Gang Electrolite Band Spread
A.F. Gain or Audio Level
R.F. Gain or Sensitivity
Tone Control
"R" Meter Showing Signal Strength
"R" Meter Zero Adjustment
Four-position IF Setting: 1560 KC
Iron Core Broad 465 KC
Iron Core Sharp 465 KC
Crystal Filter-In Position

INTERMEDIATE FREQUENCY = BAND A, B, C, & D - 465 KC

POWER TRANS.: 36961
POWER OUTPUT: Push Pull Output
8 Watts

©John F. Rider, Publisher
# Alignment Procedure

**Output meter connection:** 4,000 ohms or more copper oxide meter across 5 ohm terminals, shunt with speaker 1.06 V.

**Average sensitivity in microvolts for .5 watt output:** See chart below.

**Generator ground lead connection:** Direct to chassis.

**Dummy antenna value in series with generator output:** See Note 1 below.

**Connection of generator output lead:** See Chart Below.

**Generator modulation:** 30%, 60 cycles.

**Position of volume control A.F. gain:** Full on.

**Position of volume control R.F. gain:** Full on.

**A.V.C. Switch:**

**Band spread dial set at 100:** Min. Capacity.

**NOTE 1:** When aligning the two I.F. channels a condenser of .06 mfd. may be used in series with the generator lead. For the other bands the following circuit is shown with the values that make a universal dummy antenna system for all bands.

**POSITION OF VARIABLE AND BAND ST.**

<table>
<thead>
<tr>
<th>GENERATOR FREQ.</th>
<th>GENERATOR CONN.</th>
<th>POSITION OF I.F. BAND SWITCH</th>
<th>TRIMMER ADJUSTMENTS IN ORDER</th>
<th>TRIMMER FUNCTION</th>
<th>APPROX. MICROVOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed &quot;A&quot; Band</td>
<td>465 KC</td>
<td>&quot;XXA Alzheimer&quot;</td>
<td></td>
<td>I.F.</td>
<td>15</td>
</tr>
<tr>
<td>Closed &quot;A&quot; Band</td>
<td>1560 KC</td>
<td>617 Grid</td>
<td></td>
<td>I.F.</td>
<td>15</td>
</tr>
<tr>
<td>60 MC &quot;Y&quot;</td>
<td>60 MC</td>
<td>A-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C16</td>
<td>Osc.</td>
</tr>
<tr>
<td>40 MC &quot;Y&quot;</td>
<td>40 MC</td>
<td>A-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C21</td>
<td>Padder</td>
</tr>
<tr>
<td>16 MC &quot;Y&quot;</td>
<td>16 MC</td>
<td>A-D-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C21</td>
<td>Padder</td>
</tr>
<tr>
<td>7 MC &quot;Y&quot;</td>
<td>7 MC</td>
<td>A-D-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C20</td>
<td>Padder</td>
</tr>
<tr>
<td>3 MC &quot;C&quot;</td>
<td>3 MC</td>
<td>A-D-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C19</td>
<td>Padder</td>
</tr>
<tr>
<td>2,6 MHz &quot;Y&quot;</td>
<td>2.6</td>
<td>A-D-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C12,12,5</td>
<td>Osc. Trans. Ant.</td>
</tr>
<tr>
<td>1.3 MHz &quot;Y&quot;</td>
<td>1.3</td>
<td>A-D-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C12</td>
<td>Padder</td>
</tr>
<tr>
<td>6 MHz &quot;A&quot;</td>
<td>600 KC</td>
<td>A-D-G Ant. Term.</td>
<td>&quot;Y&quot; &amp; &quot;Y&quot;</td>
<td>C17</td>
<td>Padder</td>
</tr>
</tbody>
</table>

**NOTE 2:** When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions below for crystal. Align set in "sharp" position if set is without crystal.

**Alignment Instructions - For Receivers Equipped With Crystals**

(A) **Remove Crystal**, set crystal phasing condenser to almost minimum capacity and throw IF switch to "XTAL" position.

(B) **With the 465 KC signal**, re-adjust the I.F. Trimur 0-40 - the one nearest the front panel of the receiver - by turning the screw counter-clockwise. The signal now may be slightly weaker than before and sound "off-side." This, however, is a normal condition.

(C) **Replace the Crystal** - A very noticeable drop in signal strength may be noted, due to the filtering action of the crystal. The frequency control of the signal generator must be "rocked" slowly back and forth, until the increase in signal strength indicates the exact frequency of the crystal being used. Now re-align the entire I.F. system to this frequency.

(D) **Adjust "XTAL" phasing condenser** for the lowest pitched note possible and re-adjust signal generator frequency. Repeat and continue to repeat this alignment procedure until no further improvement in the alignment can be accomplished.

**NOTE:** If the IF switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, but it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.

**NOTE 3:** **The Beat Frequency Oscillator** is adjusted for the A, B, C, D Bands with Trimur C31. With models having an "A" & "C" Band S.P.O. - adjust C33 with dial at 1500 or Band B to 1560 KC. Recheck C31. Set pitch control to hair capacity.

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT PROCEDURE

In readjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator will be required as the source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to show accurately when the correct point of adjustment is reached. Two indication methods are applicable. One requires use of cathode-ray oscillograph equipment, and the other requires a voltmeter or output indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave image which represents the resonance characteristics of the circuits being tuned.

Adjust the control box by turning the tuning knob clockwise until a definite stop is reached at the high-frequency end of the dial scale. Then turn the tuning knob counter-clockwise until a definite stop is reached at the low-frequency end of the dial scale.

Figures 2235 and 2236 give the locations of the tubes and trimmer screws for adjustable capacitors and magnetite cores for models SA-38 and DB-38 respectively.

Place the receiver in operation with its two covers removed. Attach the output indicator across the loudspeaker voice coil circuit and advance the receiver volume control to full volume position. (If cathode-ray oscillograph is used for output indication, the vertical input terminals should be connected between the i-f transformer side of R15 (Figure 2240) and the receiver chassis for the DB-38 model, and between the high side of the volume control R7 (in control unit) (Figure 2238) and the receiver chassis for model SA-38. The cathode-ray oscillograph method of i-f alignment requires the conventional cathode-ray oscillograph, frequency modulator and signal generator set-up.)

For each adjusting operation, regulate the test oscillator output control so that the signal level is as low as possible and still observable on the indicating device. Use of such small signal will obviate broadness of tuning which would otherwise result from a.v.c. action on a stronger one.

I-F ADJUSTMENTS

1. Connect the "high" output of the test oscillator to the control grid cap of the i-f tube (6K7-G) through a 0.25 mfd. capacitor and connect the ground of the test oscillator to the receiver chassis. Adjust the frequency of the test oscillator to 260 kc. Tune the receiver to a point where no interference is received from the heterodyne oscillator or local stations.

2. Adjust the two screws L8 and L9 (attached to magnetite cores) of the second i-f transformer, one on top and one on bottom, until maximum output is produced on the indicating device.

3. Remove the test oscillator from the i-f tube input and connect it between the control grid cap of the first detector tube (6AS8-G) and chassis ground, using the 0.25 mfd. capacitor as previously. Allow its tuning to remain at 260 kc. Tune the receiver to avoid interference as in 1.

4. Adjust the two screws L4 and L5 of the first i-f transformer for maximum (peak) receiver output.

5. Repeat procedures 1, 2, 3 and 4 as a check.

R-F ADJUSTMENTS

6. Connect the "high" output of the test oscillator to the antenna plug of the receiver through a 100 mmdf. capacitor, leaving the test oscillator ground connected to the receiver chassis. If the antenna lead-in is used, the value of this capacitor should be 50 mmdf. Tune the test oscillator to 1400 kc. Allow the output indicator to remain attached to the receiver as for i-f alignment.

7. Tune the receiver so that the dial reading is approximately halfway between 1300 and 1500 kc., which gives a 1400 kc. setting. Then adjust the oscillator, detector and antenna coil trimmers, C10, C5, and C3 respectively, adjusting each to the point producing maximum indicated receiver output.

8. 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 received. The oscillator series trimmer C11 should then be adjusted, simultaneously rocking the receiver tuning control backward and forward through the signal until maximum (peak) receiver output results from these combined operations.

9. The adjustment of C10, C5 and C3 should then be repeated as in operation 7 to correct for any change in their alignment due to the adjustment of C11.

NOTE: The antenna coil L1 has a magnetite core which is adjusted at the factory for the correct inductance. This adjustment should not be disturbed.

DB-38

Speaker: Electrodynamic 8"
Type: Impedance (v.c.) 3 ohms. at 400 cycles
Vibrator: Synchronous
Power Output: Undistorted, 6 watts; maximum, 9 watts
Power Rating: Supply voltage 6.3 volts (storage battery)
Current drain 8.25 amperes at 6.3 volts
Fuse protection 15 amperes
R-F Alignment Frequencies:
Antenna coil 1400 kc.
Oscillator coil 600 kc. and 1400 kc.
Detector coil 1400 kc.

SA-38

Speaker: Six Inch Dynamic
Type: Impedance (v.c.) 3 ohms. at 400 cycles
Vibrator: Non-synchronous
Power Output: Undistorted, 2.6 watts; maximum, 4 watts
Power Rating: Supply voltage 6.3 volts (storage battery)
Current drain 6.0 amperes at 6.3 volts
Fuse protection 15 amperes
R-F Alignment Frequencies:
Antenna coil 1400 kc.
Oscillator coil 600 and 1400 kc.
Detector coil 1400 kc.
NOTE: SOCKET VOLTAGE TAKEN FROM SOCKET PHONES TO CIRCUIT GROUND WITH 1000 OHMS PER VOLT METER, VOLUME CONTROL FULL ON, LINE 115 VOLTS.
**MODEL KR-20, Autune**

**Schematic, Voltage**

**INTERNATIONAL INDUSTRIES, INC.**

**MODEL KRC-2**

**Alignment**

---

**NOTE:** SOCKET VOLTAGES TAKEN WITH 1000 OHM PER VOLT METER FROM TUBE VAXS TO CIRCUIT GROUND. LINE 116 VOLTS. VOLUME CONTROL FULL ON 10% VARIATION ALLOWABLE.

---

**CONNECTIONS:**

1. -300 Vdc - TO RECTIFIER CATHODE
2. - B+ 800 V dc. - TO B+
3. - NEGATIVE - TO GROUND.

---

**NOTE:** THESE PARTS ARE INTERCHANGEABLE ON MODEL KR-20, BUT MUST BE CONNECTED AS SHOWN.

---

**ALIGNMENT MODEL KRC-2**

**I.F. TRIMMER:** Feed 1570 Kc. modulated signal from signal generator directly to antenna of Tunemaster. Adjust both i.f. trimmers to maximum reading on output meter. Then adjust output coil trimmer to maximum.

**R.F. TRIMMER:** Set Tunemaster dial at 1500 Kc. and feed 1600 Kc. signal from signal generator to antenna of Tunemaster. Set antenna trimmer approximately 1/4 turn from tight. Peak oscillator trimmer at 1800 Kc. Set dial at 600 Kc. and peak series oscillator trimmer. Move dial and series trimmer simultaneously by small amounts as to get maximum output at 400 Kc. Tune back to 1600 Kc. and peak oscillator trimmer. Repeat previous peaking of series trimmer at 600 Kc. Return to 1500 Kc. and peak oscillator trimmer. Set dial at approximately 1400 Kc. Tune signal generator to resonance with Tunemaster. Then peak antenna trimmer.

---

**ALIGNMENT MODEL KR-20**

**I.F. TRIMMER:** To align the i.f. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. 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.

**R.F. TRIMMER:** Turn the dial to 1500 Kc. and feed a very weak 1600 Kc. modulated signal from your signal generator to the antenna. Adjust the oscillator trimmer for maximum reading. Then peak the antenna trimmer to this setting. Aligning of broadcast band should be done on 1500, 1000 and 600 kilocycles. There is no adjustable padater condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

---

©John F. Rider, Publisher

---

Compliments of www.nucow.com
**INTEROCEAN RADIO CORP.**

**MODEL 202**

**Schematic, Voltage**

**Socket, Trimmers**

**Alignment**

**GREEN** (Broadcast band) 550 - 1550 Kilocycles

**RED** (Short wave band) 1550 - 14,000 Kilocycles

---

**Alignment**

Connect oscillator at 456 KC to grid of 2A7 tube and ground wire. Variable condenser at minimum capacity, adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance.

Broadcast band, wave changing switch to Green, variable condenser at minimum capacity. Disconnect antenna wire, connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

Short wave band, set wave changing switch to RED and with input oscillator connected as above and set at 1720 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

©John F. Rider, Publisher
1. I.F. Alignment -
   To peak I.F. transformers, apply an oscillator note of 456 KC to the grid of the 6A7 tube and adjust screws seen in tops of I.F. transformers until maximum peak is obtained.

2. Broadcast -
   Connect an oscillator adjusted to 1720 KC, to the antenna of set, then adjust trimmer of oscillator section first with variable condenser way open to peak output, next adjust antenna section trimmer on variable condenser to peak output.

3. Low Frequency Padder -
   Next apply a 600 KC note from oscillator and while rocking variable condenser back and forth across signal, adjust padder to maximum output.

4. Check alignment again at 1400 KC; 1000 KC and 800 KC. It will not be necessary to bend plates to align this receiver.

© John F. Rider, Publisher
Compliments of www.nucow.com

Models 508, 522, 525, 525A

InterOcean Radio Corp.

Models 511, 524, 527, 527A

Chassis 508

Chassis 511

Schematics, Voltage

Trimmers

Trimmer Location (Both Models)

Chassis 508: Band 1, tops of respective cans, Bands 2 and 3, bottom of cans. (Ant., R.F., Osc.)

Chassis 511: Trimmers will be found in bottom of cans, except Band 4 Osc. (his no trimmer).

Note: The voltages shown on both schematics are taken with line 115 volts, aerial and ground disconnected, using 1000 ohms per volt meter; taken from points indicated to ground.
ALIGMENT CHASSIS 508 AND 511.

IF PeAK 456 KC

BAND 1: ADJUST TRIMMERS AT 1500 KC AND IF PADDER AT 600 KC (BOTH AT RIGHT OF CHASSIS).
BAND 2: (CHASSIS 508 ONLY) ADJUST AT 9000 KC (NO L.F. PADDER ON THIS BAND).
BAND 3: (CHASSIS 511 ONLY) ADJUST AT 3700 KC, L.F. PADDER AT 1700 KC.
BAND 4: (CHASSIS 511 ONLY) ADJUST AT 1,000 KC.

WHEN BALANCING SET BE SURE BAND SPREAD POINT IS SET AT ZERO POSITION.

CHASSIS 508 AND 511.

NOTE: TUBES AND PARTS INDICATED 1 ARE FOR CHASSIS 508; 2 INDICATES SAME FOR CHASSIS 511.
3 BAND BATTERY SUPERHET

6 VOLT STORAGE BATTERY OPERATION

IC 6

34

30

32

33

OSCILLATOR COIL

PLATE BIAS CIRCUIT

YELLOW

RED 1

RED 2

4 VOLT STORAGE BATTERY

SHIELDED CABLE

NOTE: TRANSFORMER HAS STATIC SHIELD
SPRING SUSPENDED - PLUG-IN 3" POWER UNIT.

©John F. Rider, Publisher

Compliments of www.nucow.com
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, 1750, 1900, 600, 3800, 1000, 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 tunned in with the selectivity control in the broad position and this control is then turned sharp station, the position 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.

1. F. Adjustment

Set the signal generator for a signal of 456 KC. Connect the input of the signal generator to the grid of the 1st detector through a 0.1 MF condenser. 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. 1.

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 antennas lead of the receiver through a 200 maf. 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 (C46) until maximum output is obtained. The location of this trimmer is shown in Fig. 1.

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 1st and 2nd interstage Range C trimmers (C9 and C11) and attenuate the signal from the signal generator to prevent A.V.C. action.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18300 KC Adjustment

Set the signal generator for 18300 KC. Keep the antennas lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

15000 KC Adjustment

Set the signal generator for 15000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Loosen the potentiometer screw and set the large pointer at the 15000 KC mark on the standard wave scale. Retighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C13) and antenna Range B trimmer (C2) to maximum. Do not change the setting of the oscillator Range B 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 and forth and 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. Be sure to use a non-metallic screwdriver for this adjustment.

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. Keep 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 (C40) 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 1st and 2nd interstage Range C trimmers (C9 and C11) and attenuate the signal from the signal generator to prevent A.V.C. action.

Do not change the setting of the oscillator Range C trimmer.

D C Resistance of Windings

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Windings</th>
<th>Code in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-4444</td>
<td>Antenna X F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna Y F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna Z F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna W F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna V F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna U F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna T F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna S F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna R F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna Q F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna P F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna O F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna N F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna M F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna L F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna K F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna J F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna I F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna H F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna G F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna F F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna E F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna D F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna C F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna B F</td>
<td>-</td>
</tr>
<tr>
<td>P-4444</td>
<td>Antenna A F</td>
<td>-</td>
</tr>
</tbody>
</table>

25-freke 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.
MODELS B30, B32
Voltage, Socket, Coils
Trimmers, Phone, Data

LAFAYETTE RADIO MFG. CO.

Fig. 4.—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)

Fig. 5.—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage 115 - Antenna Shorted to Ground
Volume Control at Maximum

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Across Heaters</th>
<th>Plate to Ground</th>
<th>Screen to Ground</th>
<th>Cath. to Ground</th>
<th>Cath. M.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>R. F.</td>
<td>6.2</td>
<td>245</td>
<td>80</td>
<td>2.8</td>
<td>7.6</td>
</tr>
<tr>
<td>6K7</td>
<td>1st Det.</td>
<td>6.2</td>
<td>245</td>
<td>90</td>
<td>6.5</td>
<td>2.6</td>
</tr>
<tr>
<td>76</td>
<td>Osc.</td>
<td>6.2</td>
<td>90</td>
<td></td>
<td></td>
<td>5.3</td>
</tr>
<tr>
<td>6K7</td>
<td>1st I. F.</td>
<td>6.2</td>
<td>245</td>
<td>80</td>
<td>2.8</td>
<td>7.6</td>
</tr>
<tr>
<td>6K7</td>
<td>2nd I. F.</td>
<td>6.2</td>
<td>245</td>
<td>74</td>
<td>3.9</td>
<td>7.0</td>
</tr>
<tr>
<td>76</td>
<td>2nd Det.</td>
<td>6.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>1st A. F.</td>
<td>6.2</td>
<td>110</td>
<td>5.6</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>6F6</td>
<td>Driver</td>
<td>6.2</td>
<td>235</td>
<td>230</td>
<td>20.0(2)</td>
<td>27.0</td>
</tr>
<tr>
<td>6F6</td>
<td>Power</td>
<td>6.2</td>
<td>345</td>
<td>345</td>
<td>38.0(1)</td>
<td>22.5</td>
</tr>
<tr>
<td>80</td>
<td>Rectifier</td>
<td>5.1</td>
<td>500(3)</td>
<td></td>
<td>140(4)</td>
<td></td>
</tr>
</tbody>
</table>

(1) As read across R19
(2) Grid to Ground
(3) Plate to Center Tap
(4) Two tubes in parallel

Fig. 6—Location of Trimmers

©John F. Rider, Publisher
Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

<table>
<thead>
<tr>
<th>Type of Tube</th>
<th>Function</th>
<th>Heater or Filament (^{(1)})</th>
<th>Plate to Ground</th>
<th>Screen to Ground</th>
<th>Cathode to Ground</th>
<th>Cadode M. A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8K7 (6BD)</td>
<td>R. F.</td>
<td>6.1</td>
<td>265</td>
<td>120</td>
<td>3.7</td>
<td>9.0</td>
</tr>
<tr>
<td>8K7 (6BD)</td>
<td>1st Det.</td>
<td>6.1</td>
<td>265</td>
<td>110</td>
<td>9.5</td>
<td>3.8</td>
</tr>
<tr>
<td>76</td>
<td>Osc.</td>
<td>6.1</td>
<td>110</td>
<td></td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>8K7 (6BD)</td>
<td>1st. I. F.</td>
<td>6.1</td>
<td>265</td>
<td>120</td>
<td>3.7</td>
<td>9.0</td>
</tr>
<tr>
<td>6K7 (6BD)</td>
<td>2nd I. F.</td>
<td>6.1</td>
<td>265</td>
<td>120</td>
<td>3.7</td>
<td>9.0</td>
</tr>
<tr>
<td>76</td>
<td>2nd Det.</td>
<td>6.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>1st A. F.</td>
<td>6.1</td>
<td>265</td>
<td></td>
<td>14.0</td>
<td>5.0</td>
</tr>
<tr>
<td>45 Power</td>
<td>Power</td>
<td>2.5</td>
<td>265</td>
<td></td>
<td>50 (1)</td>
<td>22.0</td>
</tr>
<tr>
<td>80 Rectifier</td>
<td>Rectifier</td>
<td>4.9</td>
<td></td>
<td></td>
<td></td>
<td>50 (total)</td>
</tr>
</tbody>
</table>

(1) As read with 500 Volt Scale. Grid to Ground.

©John F. Rider, Publisher
Alignment and Calibration

Correct alignment is extremely important in connection with all the receivers. The receivers are properly aligned at the factory with precision instruments and adjustments should not be attempted.

A signal generator that will provide an accurately calibrated signal at 455, 1710, 1500, 600, 3000, 5000, 18250, 15,000 and 6000 KC and an output indicating meter is 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 411 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 clipping of the I.F. action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. Adjust the screws for these trimmers from the top of the chassis, and the location is shown in Fig. 5.

Range B Adjustment

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. 5.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

2000 KC Adjustment

Set the signal generator for 2000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Then go back and repeat the procedure as given for the 18,3000 KC signal 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 up until maximum output is obtained. Then 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.

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.

Then adjust 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 d'ial 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 Trim of the oscillator Range C trimmer.

Range D Alignment

18,3000 KC Adjustment

Set the signal generator for 18,3000 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 d'ial 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 Trim of the oscillator Range D trimmer (C29) 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.

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.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-2584</td>
<td>Antenna R. P. Transformer</td>
<td>25</td>
</tr>
<tr>
<td>P-2585</td>
<td>R. P. Transformer</td>
<td>26</td>
</tr>
<tr>
<td>P-2586</td>
<td>Secondary</td>
<td>27</td>
</tr>
<tr>
<td>P-2587</td>
<td>Third</td>
<td>28</td>
</tr>
<tr>
<td>P-2588</td>
<td>Fourth</td>
<td>29</td>
</tr>
<tr>
<td>P-2589</td>
<td>Fifth</td>
<td>30</td>
</tr>
<tr>
<td>P-2591</td>
<td>Primary</td>
<td>31</td>
</tr>
<tr>
<td>P-2592</td>
<td>High Tension Transformer</td>
<td>32</td>
</tr>
<tr>
<td>P-2601</td>
<td>High Tension transformer</td>
<td>33</td>
</tr>
<tr>
<td>P-2602</td>
<td>Secondary</td>
<td>34</td>
</tr>
<tr>
<td>P-2603</td>
<td>Third</td>
<td>35</td>
</tr>
<tr>
<td>P-2604</td>
<td>Fourth</td>
<td>36</td>
</tr>
<tr>
<td>P-2605</td>
<td>fifth</td>
<td>37</td>
</tr>
<tr>
<td>P-2606</td>
<td>Primary</td>
<td>38</td>
</tr>
<tr>
<td>P-2607</td>
<td>High Tension Transformer</td>
<td>39</td>
</tr>
</tbody>
</table>

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.

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 115-210 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 C13 between the grids of the 41 tubes in the audio output stage. In the later models it is employed as a potentialmeter in the manner shown in Fig. 9.

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 C15 was added to the oscillator circuit standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.
D. C. Resistance of Windings

Part No. | Windings | Code | D. C. Resistance in Ohms
---|---|---|---
P-9A48 | Antenna R.F. Transformer | T1 | 22.8
P-9A49 | Range C Primary Windings | T1 | 0.35
P-9A50 | Range B Primary Windings | T1 | 0.5
P-9A51 | Range B Secondary Windings | T1 | 0.6
P-9A52 | Range C Secondary Windings | T1 | Small
P-9A45 | "E" Range Antenna R.P. Coil | T2 | Small
P-9A49 | 1st Intermediate R.F. Transformer | T3 | Small
Range B Primary Windings | T3 | 3.7
Range B Primary Windings | T3 | 0.5
Range B Primary Windings | T3 | 0.5
Range B Primary Windings | T3 | 0.5
Range C Secondary Windings | T3 | 1.8
P-9A46 | "E" Range Antenna R.P. Coil | T4 | Small
P-9A47 | 2nd Intermediate R.F. Transformer | T4 | Small
P-9A46 | Tap to either side | T4 | Small
P-5JX5 | "B" Power Transformer (150 Volts 60 Cycles) | T12 | 1.9
Primary Windings | T12 | 48.0
Secondary Windings | T12 | 12.0
P-5JX5 | Audio Input Transformer | T13 | 51.1
Primary Windings | T13 | 6000
Tap to Tone Control and Plate of 4050 | 4600
Secondary Windings | T13 | 2500
Center Tap to Outside | 2500
Center Tap to Outside | 2350
P-5JX3 | Audio Output Transformer | T14 | 2.6
Primary Windings | T14 | 19.7
Secondary Windings | T14 | 22.6
P-12A206 | 12" Dynamic Speaker | T17 | 0.3
Speaker Voice Coil | T17 | L7 | 4000
P-12A211 | 12" Dynamic Speaker | T17 | 0.3
Speaker Voice Coil | T17 | L7 | 4000
P-9A391 | "E" Range Intermediate Plate Resistor | L1 | 1.0
P-9A450 | 2nd L.F. Plate Isolating Resistor | L2 | 23.0
P-9A451 | High Frequency Oscillator Tracking Coil | L3 | 1.0
P-5JX5 | Filter Reactor | L4 | L5.6
P-5JX6 | Filter Reactor | L5 | L11.2
P-4X301 | Block Condenser & 10 K Reactor Assembly | L5 | 0.6
10 K Reactor Ass'y | L5 | 0.6
P-9A40 | 2nd Intermediate R.F. Coils | T5 | 1.3
Range B Section | T5 | 0.5
Short Portion | T5 | 0.3
Curl Portion | T5 | 0.3
Long Portion | T5 | 0.3
Range D Section | T5 | Small
P-9A42 | 1st L.F. Transformer | T6 | 4.4
Primary Windings | T6 | 4.4
Secondary Windings | T6 | 6.3
P-9A43 | 2nd L.F. Transformer | T7 | 4.4
Primary Windings | T7 | 4.4
Secondary Windings | T7 | 6.3
P-9A44 | 3rd L.F. Transformer | T7 | 4.4
Primary Windings | T7 | 4.4
Secondary Windings | T7 | 6.3
P-9A45 | Oscillator Coils | T9 | 7.6
Range B Grid Coil | T9 | 7.6
Red-white tape to White | 0.5
Red-white tape to Black | 0.5
Green-white tape to Green | 0.5
Green-white tape to Black | 0.5
Black-white tape to Black | 0.5
Black-white tape to Green | 0.5
Oscillator Range D Plate Coil | 0.2
P-9A47 | "E" Range Oscillator Coils | T10 | 4.4
Range B Coil | T10 | 4.4
Range E Coil | T10 | 4.4
P-5JX5 | Filament Transformer (150 Volts 60 Cycles) | T11 | 4.4
Primary Windings | 4.4
Filament Transformer Secondaries, below | 11.5
Red to Black | 22.8
Black to Yellow | 22.8
Green to Green | 22.8
Black to White | 22.8
Red to Red | 22.8
Photograph in Separate Cabinet
For this assembly, a 1 conductor cable and a small panel piece assembly are supplied. The assembly has the radio-phone switch, tap, plug for pickup leads and terminal plate for phone cable.

The phone plug is inserted at the cone connector in the subscriber's home and, in this manner, the radio-phone switch is connected to the line. The terminal plate has holes corresponding to the switches for phone connections. See Fig. 14.

When the switch is closed to the radio side, the phone pickup loop is intern connected to the subscriber's phone. When opened to the "off" position, the pickup loop is intern connected to the subscriber's phone. When opened to the "off" position, the pickup loop is intern connected to the subscriber's phone. When opened to the "off" position, the pickup loop is intern connected to the subscriber's phone.

Alignment and Calibration
Correct alignment is extremely important in connection with all-wave receivers. The maximum for all points is generally set at the factory when the receiver is assembled. The maximum for all points is generally set at the factory when the receiver is assembled. The maximum for all points is generally set at the factory when the receiver is assembled. The maximum for all points is generally set at the factory when the receiver is assembled.

The set may be adjusted in accordance with the procedures followed for the 5.000 K.C. receiver. The receiver is completely disassembled and checked before the receiver is returned to the customer.

Alignment of the receiver is rechecked.

Alignment of the receiver is rechecked.

Alignment of the receiver is rechecked.

Range A Alignment
5800 K.C. Adjustment
Set the signal generator for 5800 K.C. Turn the receiver to the line circuit of the output of the signal generator.

Setting the center of the receiver to the full open position.

Range A position (by 1000 K.C., 1500 K.C., and 2000 K.1.C.) and aligns Range A trimmer (C1 and C2) and adjusts Range A trimmer (C1 and C2).

Do not change the setting of the oscillator Range C trimmer (C1 and C2) until maximum output is obtained. See Fig. 5 location of this trimmer.

5000 K.C. Adjustment
Set the signal generator for 5000 K.C. Turn the receiver to the line circuit of the output of the signal generator.

The setting of the range-selector switch must be adjusted to the full open position.

Range D Alignment
30.00 K.C. Adjustment
Set the signal generator for 3000 K.C. Turn the receiver to the line circuit of the output of the signal generator.

The setting of the range-selector switch must be adjusted to the full open position.

Range D position (by 1000 K.C., 1500 K.C., and 2000 K.C.) and aligns Range D trimmer (C1 and C2) and adjusts Range D trimmer (C1 and C2).

Do not change the setting of the oscillator Range C trimmer (C1 and C2) until maximum output is obtained. See Fig. 5 location of this trimmer.

15,000 K.C. Adjustment
Set the signal generator for 15,000 K.C. Turn the receiver to the line circuit of the output of the signal generator.

The setting of the range-selector switch must be adjusted to the full open position.

Range D position (by 1000 K.C., 1500 K.C., and 2000 K.C.) and aligns Range D trimmer (C1 and C2) and adjusts Range D trimmer (C1 and C2).

Do not change the setting of the oscillator Range C trimmer (C1 and C2) until maximum output is obtained. See Fig. 5 location of this trimmer.

6000 K.C. Adjustment
Set the signal generator for 6000 K.C. Turn the range-selector switch until maximum output is obtained.

Turn the range-selector switch to 1500 K.C. and turn the range-selector switch until maximum output is obtained.

The range-selector switch must be adjusted to the full open position.

Range B position (by 1000 K.C., 1500 K.C., and 2000 K.C.) and aligns Range B trimmer (C1 and C2) and adjusts Range B trimmer (C1 and C2).

Do not change the setting of the oscillator Range C trimmer (C1 and C2) until maximum output is obtained. See Fig. 5 location of this trimmer.

4000 K.C. Adjustment
Set the signal generator for 4000 K.C. Turn the range-selector switch until maximum output is obtained.

Turn the range-selector switch to 1500 K.C. and turn the range-selector switch until maximum output is obtained.

Range B position (by 1000 K.C., 1500 K.C., and 2000 K.C.) and aligns Range B trimmer (C1 and C2) and adjusts Range B trimmer (C1 and C2).

Do not change the setting of the oscillator Range C trimmer (C1 and C2) until maximum output is obtained. See Fig. 5 location of this trimmer.
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.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Winding</th>
<th>Code</th>
<th>D. C. Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-9A443</td>
<td>Antenna Transformer</td>
<td>T1</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>P-9A459</td>
<td>Interstage Transformer</td>
<td>T2</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>P-9A441</td>
<td>1st I. F. Transformer</td>
<td>T3</td>
<td>93.5</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>97.6</td>
</tr>
<tr>
<td>P-9A442</td>
<td>2nd I. F. Transformer</td>
<td>T4</td>
<td>44.1</td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>49.6</td>
</tr>
</tbody>
</table>

Part No. | Winding | Code     | D. C. Resistance in Ohms |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P-12A227</td>
<td>Dynamic Speaker</td>
<td>T1</td>
<td>416.6</td>
</tr>
<tr>
<td></td>
<td>Output Transformer Primary</td>
<td>T5</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Output Transformer Secondary</td>
<td>T3</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Speaker Field</td>
<td>L1</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>Speaker Voice Coil</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td>P-9A440</td>
<td>Oscillator Coils</td>
<td>T6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grid Coil</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Long Portion</td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td>Short Portion</td>
<td></td>
<td>5.8</td>
</tr>
<tr>
<td>P-51X108</td>
<td>Power Transformer</td>
<td>T7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary Winding</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Inside</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Outside</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Inside</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Outside</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td>P-9A444</td>
<td>Motor Noise Reactor</td>
<td>L1</td>
<td>Small</td>
</tr>
<tr>
<td>P-9A445</td>
<td>Pilot Light Line Reactor</td>
<td>L2</td>
<td>Small</td>
</tr>
<tr>
<td>P-9A446</td>
<td>Filament Reactor</td>
<td>L4</td>
<td>Small</td>
</tr>
<tr>
<td>P-9A452</td>
<td>Filter Choke</td>
<td>L5</td>
<td>312.5</td>
</tr>
<tr>
<td>P-9A447</td>
<td>R. F. &quot;B&quot; Plate Reactor</td>
<td>T6</td>
<td>4.1</td>
</tr>
<tr>
<td>P-9A448</td>
<td>Vibrator Filter Reactor</td>
<td>L7</td>
<td>Small</td>
</tr>
</tbody>
</table>

(1) With 250,000 Ohm Meter
(2) As read across filter choke.
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.

<table>
<thead>
<tr>
<th>Code</th>
<th>Antenna Transformer</th>
<th>Primary Winding</th>
<th>Secondary Winding</th>
<th>D. C. Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td></td>
<td>5.1</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>Integrate Transformer</td>
<td>41.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>1st I. F. Transformer</td>
<td>88.0</td>
<td>87.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>2nd I. F. Transformer</td>
<td>43.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VOLTAGES AT SOCKETS

Antenna Disconnected Battery 6 Volts Under Load

<table>
<thead>
<tr>
<th>Type of Tube</th>
<th>Function</th>
<th>Across Plate to Ground</th>
<th>Screen to Ground</th>
<th>Cathode to Ground</th>
<th>Cathode to M. A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R. F. Amp.</td>
<td>5.6</td>
<td>245</td>
<td>105</td>
<td>5.2</td>
</tr>
<tr>
<td>6C6</td>
<td>1st Det. Osc.</td>
<td>5.6</td>
<td>245</td>
<td>105</td>
<td>0.2</td>
</tr>
<tr>
<td>6D6</td>
<td>L. F. Amp.</td>
<td>5.6</td>
<td>245</td>
<td>105</td>
<td>5.2</td>
</tr>
<tr>
<td>75</td>
<td>2nd Det.</td>
<td>5.8</td>
<td>120(1)</td>
<td>1.4</td>
<td>0.14</td>
</tr>
<tr>
<td>41</td>
<td>Power</td>
<td>5.8</td>
<td>235</td>
<td>245</td>
<td>15.0(2)</td>
</tr>
<tr>
<td>84</td>
<td>Rectifier</td>
<td>5.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) With 250,000 Ohm Meter
(2) Read Across Filter Choke

Antenna

IMPORTANT—If the car antenna is of high capacity (600 mmf. or higher) insert the antenna plug with the mark on the HC side—See Fig. 10. If it is a low capacity antenna, insert the plug with the mark on the LC side.

The General Motors cars have steel roofs, and a running board or other under car antenna must be used. These are low capacity antennas. The Chrysler motor cars (except Plymouth) have a steel roof separated from the body proper, which is used as the antenna. These are high capacity antennas. Other cars without steel roofs such as Ford and Plymouth have a built-in roof antenna which is of low capacity.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

Fig. 10—Antenna Plug Insertion

©John F. Rider, Publisher
Adjusting Antenna 600 KC 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 at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

As shown in this illustration, the antenna plug is inserted in one of two ways, depending on whether the car has a high or low capacity antenna. Full instructions are in the installation manual packed with each radio.

600 KC Adjustment

Set the volume control at the maximum position. Place the receiver in the car and apply the signal generator to the 600 KC antenna trimmer and the antenna connection. Then turn the volume control to the desired setting. Adjust the 600 KC trimmer for maximum output. Then adjust the volume control to the same setting as before, and the output should be the same.

R.F. Alignment

Set the volume control at the maximum position. Place the receiver in the car and apply the signal generator to the R.F. tube. Then turn the volume control to the desired setting. Adjust the R.F. tube for maximum output. Then adjust the volume control to the same setting as before, and the output should be the same.

Set the signal generator to 150 KC and adjust the antenna trimmer for maximum output. Then adjust the volume control to the desired setting. Adjust the antenna trimmer for maximum output. Then adjust the volume control to the same setting as before, and the output should be the same.

1400 KC Adjustment

Set the signal generator to 1400 KC and adjust the antenna trimmer for maximum output. Then adjust the volume control to the desired setting. Adjust the antenna trimmer for maximum output. Then adjust the volume control to the same setting as before, and the output should be the same.

© John F. Rider, Publisher
It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.
ALIGNMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

ALIGNING THE I.F. STAGES AT 465 KILOCYCLES
1. Use a .00025 ufd condenser in series with the signal generator output.
2. Connect an output meter across the voice coil of the speakers.
3. Tun the tone equaliser to the "sharp-tone" position.
4. Turn the volume control up to 10 or more, and adjust the signal generator output until a reading of one volt is obtained when a signal is applied.
5. Align the third I.F. transformer first by connecting the signal generator to the grid of the 6G6 second I.F. tube. Now adjust the third I.F. transformer until a maximum deflection is obtained on the output meter.
6. Align the second I.F. transformer by connecting the output of the signal generator to the grid of the 6G6, first I.F. tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the second I.F. transformer until a maximum deflection of the output meter is obtained.
7. Connect the output of the signal generator to the grid of the 6A7 tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the first I.F. transformer until a maximum deflection of the output meter is obtained.

ALIGNING THE 540-1700 KILOCYCLE BAND
1. Use a .00025 ufd condenser in series with the signal generator output.
2. Set the wave band switch for reception on the broadcast band.
3. Run the dial pointer to the extreme left position. This will adjust the tuning condensers to maximum capacity.
4. Holding the tuning condensers at maximum capacity, adjust the dial pointer to a position at the end of the horizontal scale. This is done by sliding the pointer on the dial string.
5. Connect the signal generator output to the grid of the 6A7 tube, tune the radio and signal generator to 600 KC and adjust the 600 KC grid for maximum deflection of the output meter.
6. Turn the signal generator and radio to 1400 KC and adjust the 1400 KC oscillator trimmer for maximum deflection of the output meter.
7. Leave the signal generator and radio set at 1400 KC, connect the signal generator output to the antenna binding post "A", connect binding post "B" to ground and adjust the 1400 KC R.F. trimmer and the 1400 KC antenna trimmer for maximum deflection of the output meter.

ALIGNING THE 1680-5350 KILOCYCLE BAND
1. Use a 400 ohm resistor in series with the signal generator output when connecting to the antenna binding post. Use both this resistor and a .00025 ufd condenser when connecting to the 6A7 grid.
2. Set the band switch for reception on the foreign band.
3. Connect the output of the signal generator to the grid of the 6A7 tube, set the signal generator and the radio to 1700 KC and adjust the 1700 KC grid for maximum deflection on the output meter.
4. Set the signal generator and radio to 5000 KC and adjust the 5000 KC oscillator trimmer for maximum deflection of the output meter.
5. Leave the signal generator and radio set at 5000 KC, connect the signal generator output to the antenna binding post "A", and adjust the 5000 KC R.F. trimmer and the 5000 KC antenna trimmer for maximum deflection of the output meter.

ALIGNING THE 5.6-18.0 MEGACYCLE BAND
1. Use a 400 ohm resistor in series with the signal generator when connecting to the antenna post. Use both this resistor and a .00025 ufd condenser when connecting to the 6A7 grid.
2. Set the band switch for reception on the foreign band.
3. Connect the signal generator output to the grid of the 6A7 tube, set the signal generator and the radio to 16 megacycles and adjust the 16 megacycle oscillator trimmer for maximum deflection of the output meter.
4. Leave the signal generator and radio set for 16 megacycles, connect the signal generator output to the antenna binding post "A", and adjust the 16 megacycle R.F. trimmer and the 16 megacycle antenna trimmer for maximum deflection of the output meter.

RESTRING THE DIAL CABLE

To restring the cable on this model, it is necessary first to remove the glass dial. Bend back the small metal ears that hold the glass in place, on the left and lower sides only. Slip the three dividing strips from the assembly and the four glass strips will be easily removable. Slip the brown backing from the assembly exposing the cable tension spring inside the disc.

Remove the spring "A" from the small hook "B", and tie one end of cable to the spring, laying it through the opening in the groove of the disc, allowing about 1/2 inch between the end of the spring and the inside edge of the groove. Proceed around the disc in a clockwise direction for one complete revolution, continue around the drive shaft "C" for 1 1/2 turns in a clockwise direction up through the left-hand idler pulley "D", across the top and around the right-hand idler pulley "E", downward around the disc in a clockwise direction, through the opening in the groove and secure it to the spring, until the other end can be secured to the hook. Replace the dial strips in their original locations and the operation is completed.
MISCELLANEOUS NOTES

The radio chassis must "float" freely and it is, therefore, important that none of the knobs touch the panel. The four holes in the radio support bracket "A" Fig. 1, are sufficiently large to permit adjustment of the chassis until it "floats" properly. Be sure that this "floating" condition exists before attempting to tighten the screws "A" Fig. 1, after replacing the chassis in the cabinet.

If one of the push-button switches does not function, remove the radio panel in the manner outlined in the foregoing instructions, and check the switch contacts. It is entirely probable that the trouble can be corrected by either cleaning the contacts or by bending them so that they form a solid connection.

When the release button on the radio push-button assembly is depressed, the switch arm nearest the end of the assembly must break one contact before making the other contact. Failure of the release button switch to operate in this manner will cause the "set-up" pilot lamp to burn out, in which case the arm of the switch should be bent until the "break-before-make" action is obtained.

Due to the extremely high sensitivity of the receiver, it is possible for some excessively strong signals to overload and cause distortion in the radio. This condition is very rare and occurs only on a very strong signal when the receiver has a very efficient antenna. This difficulty is recognized by distortion on a strong signal and being absent on weak signals. To correct this trouble, it is necessary to connect a 500 ohm resistor across the broadcast antenna primary to ground. The terminal for making this connection is available at the rear of the I.F. transformer on the top of the chassis. Connect the resistor from the lug having the red-with-blue tracer lead connected to it, to the ground bus wire which ties the three trimmer condensers together.

It is possible for the distortion mentioned above, to occur due to defective 6ES tubes. The second I.F. tube is more susceptible to this difficulty and should be replaced before checking the first I.F. tube.

When push-button tuning is used, the dial pointer may have a tendency to "hunt" on either side of the desired frequency before coming to rest. This condition is caused by insufficient pressure of the small spring at the rear of the tuning motor, against the armature shaft. The spring should be "kinked" slightly to provide additional pressure, using a pair of long-nosed pliers to make the adjustment.

If a distinct hum is heard in the speakers when using the radio, the 6FS tube should be replaced as a possible cure. It is extremely important that the grid lead of the 6FS tube is shielded near to the cap of the tube as is possible, or hum will be picked up in this lead.

The two .05 mfd. condensers connected across the two motor push-button switches should be removed to prevent a "scrapping" noise that may be apparent when the receiver is tuned manually.

The 1000 ohm bias resistor in the cathode circuit of the 6AT tube should be replaced with a 300 ohm resistor to increase the stability of the receiver.

Some of the earlier models were not equipped with electric muting. This feature may be incorporated by following the instructions outlined below.

1. Remove the two jumpers shunting the cathodes and plates of the 6ES tube.

2. One cathode (6) is left at ground potential and the other cathode (4) is connected to the tuning motor as shown in the above schematic.

3. One plate (8) is left in its original circuit connection and the other plate (6) is connected to the junction of the 1 megohm and 300,000 ohm resistors that have been inserted in series with R-22 to ground.

4. Install one .05 mfd. condenser from the junction of R-22 and the 1 megohm resistor to ground.

5. Ground the side of the transformer winding that connects to the tuning motor, completing the operation.
MAGNAVOX RADIO CHASSIS
CR-102, 103, 104 AND 105

CR-102 -- Used in Concerto combination
CR-103 -- Used in Chairsdie combination
CR-104 -- Same as CR-102 except for addition of Items 11, 12, C-20 and R-22.
CR-105 -- Same as CR-103 except for addition of Items 11, 12, C-20 and R-22.

Speaker:
Field Coil... 750 ohms;
Transformer... 7000 ohms;

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C., bass compensation in volume control for phonograph pickup.
It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.
CR-106 -- Used in Concerto combination.
CR-109 -- Used in Chaise side combination.
CR-111 -- Used in Berkeley combination.

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C., bass compensation in volume control for phonograph pickup.

Speaker:
Field Coil............. 750 ohms;
Transformer............ 7000 ohms;

595/55
117 V, AC; CR-106
90 watts;
5.5 watts;

Compliments of www.nucow.com
Compliments of www.nucow.com
Primary voltage .......... 117 V. AC-DC;
Power consumption .......... 80 watts;
Power output ............. 6 watts;

Speaker:
Field coil ............. 1800 ohms;
Transformer ............. 3000 ohms;

Tuning frequency range 540 - 1730 KC;
1.7 - 5.6 MC;
5.7 - 18.3 MC;

Type Circuit: Superheterodyne with three
tuning ranges, tone control, A.V.C., bass
compensation in volume control for phono-

©John F. Rider, Publisher
CR-107 -- Used in AC-DC Concerto combination.
Has .005 mf2 condenser for item 24.
10 KC filter consisting of items 5A and 8A are omitted.

CR-110 -- Has brackets for mounting in Chairside cabinet.

CR-112 -- Has brackets insulated from chassis for mounting in Berkeley cabinet.

CR-120 -- Speaker mounted on the chassis for use in AC-DC Playfellow combination.

CR-126 -- Has brackets for mounting in Berkeley cabinet.

CR-127 -- Has brackets for mounting in Hepplewhite cabinet.

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.
ALIGNING THE I.F. STAGES AT 455 K.C.

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.

2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to its maximum setting.

3. Peak each of the second I.F. transformer trimmer condensers.

4. Peak each of the first I.F. transformer trimmer condensers.

ALIGNING THE 540-1750 K.C. BAND

Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.

Set the test oscillator frequency and receiver dial to EXACTLY 1750 kilocycles. Adjust the 1750 kilocycle oscillator trimmer to bring in 1750 kilocycle test oscillator signal to maximum output.

Tune the receiver and test oscillator frequency to EXACTLY 1400 kilocycles and adjust the 1400 kilocycle antenna trimmer for maximum output as indicated on the output meter.

Set the test oscillator and receiver frequency to approximately 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator trimmer for maximum signal.

ALIGNING THE 1.7-5.8 M.G. BAND

Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the antenna lead.

Tune the receiver and test oscillator frequency to EXACTLY 5 megacycles and adjust the 5 megacycle antenna trimmer for maximum output.

ALIGNING THE 5.7-18.3 M.G. BAND

Leave the 400 ohm resistor in series with the test oscillator lead and set the band selector switch for operation on the 5.7 - 18.3 megacycle band (short wave).

Set the receiver and test oscillator frequency to EXACTLY 18.3 megacycles.

Adjust the 18.3 megacycle oscillator trimmer for maximum signal as indicated on the output meter.

When adjusting this trimmer two peaks may be noticed, in which case CARE MUST BE TAKEN THAT THE PROPER PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.3 M.G. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak — if more than one is noticed — which is the correct one to use, is tuned in.

Set the receiver and test oscillator frequency to EXACTLY 18.3 megacycles.

Hook the gang condenser slightly to the right and to the left, adjusting the 15 megacycle antenna trimmer for maximum signal as indicated on the output meter.

ALIGNING THE 4.0-18.0 MEGACYCLE BAND

1. Set the band selector for operation on the foreign band.

2. Set the receiver and test oscillator frequency to 4 megacycles and adjust the 4 megacycle antenna trimmer for maximum output.

10 KILOCYCLE FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the test note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser on the rear of the chassis adjacent to the speaker socket.
It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.
Type Circuit: Superheterodyne with two tuning ranges, tone control, A.V.C.
base compensation in volume control for phonograph pickup.

CHASSIS CR117
Schematic Voltage

IF - 455 K.C.

FOR ALIGNMENT
SEE INDEX

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

Speaker:
Transformer:...56 watts; Power output:..............3 watts;
Primary voltage:......117 V, A.C.;
Field coil:............1800 ohms; Voltage..................5000 ohms;

©John F. Rider, Publisher

Compliments of www.nucow.com
MAGNAVOX RADIO CHASSIS
CR-117

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.
It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.
TO REMOVE THE CHASSIS FROM THE CABINET: SEE CHASSIS CR-106.
CR-123, 128

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

Intermediate frequency........ 455 KC; Speaker: Primary voltage........ 117 V. AC;
Tuning frequency range: 535 - 1730 KC; Field Coil... 750 ohms; Power consumption........ 90 watts;
5.7 - 18.1 MC; Transformer... 3600 ohms; Power output........ 6 watts;
Circuit: Superheterodyne with two tuning ranges, treble control, A. V. C.;
bass compensation in volume control for phonograph pickup; push-button condenser-type tuner.

CR-123 -- Used in Concerto, Chairside and Hepplewhite combinations.
Same as CR-123 except:
Item 61 is eliminated.
Item 27 is .03 mfd.

CR-128 -- Used in Hepplewhite automatic combination.
ALIGMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

TUNING FREQUENCY RANGE: 550 - 1750 Kc. 1.7 - 5.8 & 5.65 - 16.3 Mc.

FOLLOW ALIGNMENT PROCEDURE OF MAGNAVOX CHARGES ON 106.

10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the best note between the two carriers, it may be eliminated by retuning the 10 Kc output filter by means of the 100 Kc trimmer condenser at the rear center of the chassis.

MAGNAVOX CO., INC.

MAYBE CH 117

ALIGNING THE I.F. STAGES AT 455 KILOCYCLES

1. Connect the output of the test oscillator to the chassis or radio ground lead. Connect the other end of the test oscillator to the grid of the last RF triode through a 5000 ohm, series condenser. DO NOT REMOVE THE GRID CLIP.

2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to maximum setting.

3. Peak each of the second I.F. transformer trimmer condensers.

4. Peak each of the first I.F. transformer trimmer condensers.

To insure most accurate tuning setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING THE 540-1720 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the RF tube and attach it to the receiver antenna lead (blue) through a 5000 ohm, series condenser.

2. Check tuning dial adjustment by turning the gang condenser until plates are completely punched, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.

3. Set the receiver and test oscillator frequency to EXACTLY 1720 kilocycles.

4. Adjust the oscillator trimmer 16' Figs. 8, for maximum output as indicated on the output meter.

5. Set the receiver and test oscillator frequency to EXACTLY 1400 kilocycles.

6. Adjust the antenna trimmer 11' Figs. 8, for maximum output as indicated on the output meter.

7. Now set the receiver and test oscillator frequency to 600 kilocycles, and adjust the oscillator plate condenser 11' Figs. 8, accessible from the top of the chassis, for maximum output.

ALIGNING THE 2.3-6.5 MEGACYCLE BAND

1. Substitute a 400 ohm resistor for the 2000 ohm, condenser in series with the antenna lead.

2. Adjust the band selector switch for short-wave lead and tune the receiver and test oscillator frequency to EXACTLY 4.5 megacycles.

3. Now adjust the 4-5 megacycle oscillator trimmer 11 Figs. 8, for maximum deflection on the output meter.

4. Set the receiver and test oscillator frequency to EXACTLY 6 megacycles, and adjust the 6 Kc antenna trimmer 19' Figs. 8, for maximum deflection on the output meter.

ALIGNING THE 5.7-18.1 MEGACYCLE BAND

1. Substitute a 400 ohm resistor for the 2000 ohm, condenser in series with the antenna lead.

2. Adjust the band selector switch to the 5.7-15.1 megacycle (foreign) band, tune the receiver and test oscillator frequency to EXACTLY 15 megacycles, and adjust the 15 megacycle oscillator trimmer and antenna trimmer for maximum output as indicated on the output meter.

While adjusting the oscillator trimmer, two peaks may be noted, in which case more must be taken so that the proper peak is heard for aligning the megacycles. Always break off the trimmer until the second peak (10 more than one) is noted (which is the correct one, to tune in.

10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the best note between the two carriers, it may be eliminated by retuning the 10 Kc output filter by means of the 100 Kc trimmer condenser at the rear center of the chassis.
The tubes used are:

1-6A7 Frequency converter
1-6D6 Intermediate frequency amplifier
1-75 Second detector, AVC, and audio driver
1-25L6G Beam power output
1-2S5Z Rectifier
1-149B Plug-in ballast resistor
IF PEAK 455 KC

Compliments of www.nucow.com
This receiver is a 5 tube AC-DC compact type radio receiver employing tuned radio frequency circuit. The tuning range covers all frequencies between 528 kilocycles and 1750 kilocycles (171 meters to 565 meters). These frequencies cover the standard broadcast band and in addition police calls and some amateur transmitters. This receiver is designed to operate on 50-60 cycle AC or DC at voltages between 105 and 130. These are standard voltages used practically all over the United States and in some foreign countries. The audio power output of the receiver is a maximum of 2 watts. The receiver should not be connected to any power line having higher voltage than mentioned above. On DC operation reverse plug if receiver does not commence operating one minute after switch is turned on. On AC operation reversal of the plug in some cases may degrade hum.

**TUBES**

The following tube numbers are employed:

<table>
<thead>
<tr>
<th>Tube</th>
<th>Purpose</th>
<th>Kind</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>Radio frequency amplifier</td>
<td>GLASS</td>
</tr>
<tr>
<td>6C6</td>
<td>Power detector</td>
<td>GLASS</td>
</tr>
<tr>
<td>25L6G</td>
<td>Beam Power Output</td>
<td>GLASS</td>
</tr>
<tr>
<td>2525</td>
<td>Rectifier</td>
<td>GLASS</td>
</tr>
<tr>
<td>YU95 (BK55B)</td>
<td>Line Ballast Tube</td>
<td>METAL</td>
</tr>
</tbody>
</table>
In a super-heterodyne it is very important when realigning the receiver, to use the same frequencies as are used at the factory. Alignment is best accomplished by using an output meter across the voice coil and aligning for maximum. The I.F. frequency is 455 K.C. The short wave must be aligned before the broadcast band. This is done at only one frequency, 6 megacycles. On the broadcast band the alignment frequencies are 1500 and 600 K.C. 1500 K.C. is the first to be aligned using the shunt trimmers. When aligning 600 K.C., adjust the series pad, rocking the gang capacitor to assure proper alignment.
ALIGNMENT

IF 455KC:
- Adjust trimmers C13, C14, C16, C17 for maximum signal; attenuate signal to avoid misalignment due to A.V.C.

SW BAND:
- Ground signal gen. to chassis through .1 mf cond. Osc. at 7.2 MC through 400 ohm carbon resistor to Ant. lead (blue). Turn band selector c’clockwise to 3rd pos. from extreme left. Variable fully open; set C7 at minimum cap. tighten to signal. Osc. at 6 MC tune receiver to signal, adjust C2 to max. and adjust dial calibration. Check band at 4.25 and 2.40 MC.

BC BAND:
- Band selector and tone control switch to extreme left. Apply 600 KC through 200 mmf cond to Ant. lead, dial at 600 KC; adj. C9 to max. signal. Osc. at 1750 KC, dial at 1750 KC; adj. C8 to max. sig. Signal at 1500 KC, dial to signal, adj. C3 to max. sig. Osc. at 600 KC adjust C9 to max. sig. with variable. Osc at 1500 KC, tune to max. sig., readjust C3 to maximum signal.

WAVE TRAP:
- Band sw. in BC position, dial below 650KC where no station is heard. Apply 455KC, Adj.C1 to min.
Correct alignment is extremely important. The receiver is properly aligned at the factory and should not be disturbed unless it is absolutely necessary. The procedure is as follows: Turn wave change switch to broadcast position (full counter clock wise) and rotate variable condenser until it is about 50% engaged. Apply a 455 KC signal to the grid of 6A8G mixer tube through a tubular condenser on the order of .1 MFD. Referring to chassis layout, adjust C30, C29, C31 and C32 for maximum signal using of course some sort of indicating device such as an AC volt meter or output meter across the voice coil of the speaker. It may be necessary to apply a very strong signal to "find" the signal until alignment is approached. It is advisable to maintain as low a signal input as conveniently possible in order to minimize the possibility of misalignment resulting from A.V.C. and overload effects. If a squeal is heard while tuning, rotate the gang condenser slightly and it should disappear. Naturally, the ground side of the generator should be connected to the chassis either directly or through the .1 MFD condenser.

**SHORT WAVE BAND**

Rotate the wave band switch to full clock wise position. Connect high side of generator output to antenna lead through a 400 ohm dummy antenna. Completely disengage variable condenser. Apply 18.5 meg. signal. Unscrew trimmer C26 to a minimum capacity, slowly turn the screw so that the trimmer capacity increases until the signal is heard. Apply 16 meg. signal, rotate gang condenser until this signal is heard. Adjust C23 for maximum response. It may be found advisable to "rock" generator frequency back and forth through signal to offset detuning effect from inter action between input and oscillator circuits at high frequencies. Check alignment through medium of sensitivity at 11 meg. and 6
ALIGNMENT - Turn wave change switch to BC pos. and rotate var. cond. until about 50 percent engaged. Apply a 455 KC sig. to 6A8G thru a .1 mf cond. Adjust trimmers marked "Trim 455 Kc" for maximum signal.

SHORT WAVE BAND - Rotate wave band switch to full clockwise pos. Connect high side of gen. o-p. to ant. lead thru 400 ohm dummy ant. Set dial at 18 MC - Apply 18 MC signal. Adj. C56 trim. to min. cap., slowly turn screw so trim. cap. increases until signal is heard. Apply 18 MC sig. and adj. C7 and C1 for max. - Check align. thru medium of sensitivity at 11 meg. and 6 meg. resp. - When align. at 18 MC the C7 trim. may indicate 2 maxima. Maxima obtained with trimmer tighter is the desired one. Check by leaving gang cond. set and shifting to higher freq. : 19 meg. where image should appear. If properly aligned it should require about 10 times six. volt. for image to give same O.P. as real signal.

POLICE BAND - Shift waveband switch to middle pos. - Apply 5 MC sig. - Dial at 5 Mc. - Adj. C54 trim. as previous band until max. sig. is heard. Apply 5 meg. sig. and adj. Check alignment at 3.5 and 2 MC resp. Check for image same as previous band.

BROADCAST BAND - Use a 200 mmf cond. for dummy ant. on this band. Shift wave band sw. to full counter clockwise. Adj. trims. C5 and C9 to medium tight pos. - Dial at 600 Kc. Apply 600 KC sig. and adj. paddler C32 for max. - Dial at 1500 KC and 1500 KC sig. adj. C33 for same. Then adj. trims. C5 and C9 for max. - Shift gang to 600 KC and apply 600 KC sig. - Adjust C4 for max. sig. - Recheck 1500 KC trimming.

©John F. Rider, Publisher
There are three terminals on back of chassis marked A D G. Terminal A is for use with ordinary outdoor antennas from 30 to 50 feet in length. Terminal G is for connection to a suitable ground such as a water pipe, although radiators or other type grounds are often used successfully. Terminal D is to be used in connection with A when a doublet type antenna is used and under these conditions there should be no connection between terminals D and G.

For phonograph and tuner data, see index.
PHONOGRAPH—For phonograph, you can use the MAJESTIC Wireless record player, Model 9 FW, or any standard record player. When using a standard record player, place it in the pickup tray in the radio marked "PHONO" on the rear of the receiver. If you set under turn, reverse these pickup tips. Push the push-button marked "PHONO" and adjust the Volume, Tone, Volume Expansion and Bass Compensation by means of the controls on the receiver.

SETTING UP OF PUSH BUTTONS

To adjust the push buttons, turn the band switch knob, the second one from the left, all the way to the left, to the position marked "L" on the collar. Going to the back of the receiver, adjust the coil marked No. in figure 2 (L) by turning the screw in the center of the coil by means of a screw driver, until the station you desire to hear is heard with maximum volume and best tone.

It is recommendable to turn the tone control to full-counterclockwise when listening on the push-buttons.

Only local or strong stations should be set up on the push-buttons.

<table>
<thead>
<tr>
<th>Push-button Number</th>
<th>Model 156X</th>
<th>Model 1656X</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1250 and 1750 KC's</td>
<td>AFC</td>
</tr>
<tr>
<td>2</td>
<td>950 and 1500 KC's</td>
<td>1250 and 1750 KC's</td>
</tr>
<tr>
<td>3</td>
<td>900 and 1500 KC's</td>
<td>950 and 1500 KC's</td>
</tr>
<tr>
<td>4</td>
<td>680 and 1110 KC's</td>
<td>680 and 1110 KC's</td>
</tr>
<tr>
<td>5</td>
<td>600 and 1110 KC's</td>
<td>600 and 1110 KC's</td>
</tr>
<tr>
<td>6</td>
<td>540 and 720 KC's</td>
<td>540 and 720 KC's</td>
</tr>
<tr>
<td>7</td>
<td>540 and 720 KC's</td>
<td>540 and 720 KC's</td>
</tr>
<tr>
<td>8</td>
<td>PHONO</td>
<td>PHONO</td>
</tr>
<tr>
<td>9</td>
<td>540 and 720 KC's</td>
<td>540 and 720 KC's</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When the buttons are set up and the wave band switch is turned all the way to the left, counter clockwise, pushing any one of the buttons will cause the receiver to receive the station set up on that particular button.

WARNING

When operating this set on "RECO," make certain that the phonograph push button is out. If it is not, pushing slightly downwards on the push-button will cause it to be released and come out.
Model # D8 1938

Drawn by
Approved by
Engineering Dept.
Date 12-28-37

Band 1: 550-1800 K.C.
Band 2: 5.5-16 M.C.
I.F. Peak: 175 K.C.
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 realignment should not be attempted unless all other possible causes of the faulty operation have 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 5.8-18.5 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 .03 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. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—see Fig. 2. The opening to the trimmer condensers is covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

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. Attenuate 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 pointer screw and set the pointer at the 1500 K.C. mark on broadcast band scale. Retighten pointer 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...
**Short Wave Band Adjustment**

**Compliments of www.nucow.com**

---

**Short Wave Band Adjustment**

**Compliments of www.nucow.com**

---

**Description of Diagram and Text**

- **Voltages at Terminals**
  - **Line Voltage**
  - **Antenna Shorted to Ground**
  - **Function**
  - **Across Pins**
  - **Positive to Ground**
  - **Negative to Ground**
  - **Normal Voltage**

<table>
<thead>
<tr>
<th>Function</th>
<th>Across Pins</th>
<th>Positive to Ground</th>
<th>Negative to Ground</th>
<th>Normal Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. F.</td>
<td>6.3</td>
<td>246 106</td>
<td>3.604</td>
<td>5.1</td>
</tr>
<tr>
<td>1st Det.</td>
<td>6.3</td>
<td>227 97</td>
<td>8.006</td>
<td>3.6</td>
</tr>
<tr>
<td>Overload</td>
<td>6.3</td>
<td>165</td>
<td>5.669</td>
<td>4.3</td>
</tr>
<tr>
<td>L. F.</td>
<td>6.3</td>
<td>264 130</td>
<td>3.010</td>
<td>8.3</td>
</tr>
<tr>
<td>2nd Det.</td>
<td>6.3</td>
<td>401 70</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>6.3</td>
<td>204 215</td>
<td>17.003</td>
<td>33.2</td>
</tr>
<tr>
<td>Rectifier</td>
<td>5.0</td>
<td></td>
<td>12.00</td>
<td></td>
</tr>
</tbody>
</table>

---

**Rectifier**

- **Rectifier**
  - **Rating**
  - **Color**

---

**Caution**

In the diagram, the rectifier is shown as a component, indicating the necessity of careful handling to avoid damage.

---

**Description of Text**

- **Replacing Drive Cord**
  - **Remove chassis from cabinet.**
  - **Take off the pilot light assembly by lifting off the two toggle screws.**
  - **Detach the large pointer by removing the screw at the rear of the chassis.**
  - **Loosen the dial assembly by taking out the two screws which hold the bottom of this assembly to the chassis.**
  - **Then lay the complete dial assembly face downward in front of the chassis.**
  - **Insert the new cord into the chassis.**
  - **Secure the new cord with the same screws that held the old cord in place.**

---

**Pilot Light Assembly**

**Compliments of www.nucow.com**

---

**Twelve-five Cycle Receivers**

**Compliments of www.nucow.com**

---

**Twenty-Five Cycle Receivers**

**Compliments of www.nucow.com**

---

**Power Unit**

**Compliments of www.nucow.com**

---

**Changes in Early Models**

**Compliments of www.nucow.com**

---

**Short Wave Oscillator**

**Compliments of www.nucow.com**

---

**Ten twenty-five cycle receiver differs from the sixty-cycle receiver, only in that a different power transformer is used. The current power transformer is shown in the parts list.**

**Twenty-five cycle chassis can be operated satisfactorily from a twelve-cycle power supply. However, the reverse is not true. The circuit is designed for a twelve-cycle power supply.**

**A 110-220 volt, 40-60 cycle Power Transformer is also available for this model.**

---

**REPAIR PARTS LIST FOR 7 TUBE BROADCAST AND SHORT WAVE RECEIVER**

**Compliments of www.nucow.com**

---

**Compliments of www.nucow.com**
ALIGNING I.F. TRANSFORMERS: (465 K.C.)

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-83D) to resonance.
   (b) Move oscillator output clip from grid of 6S7G to grid of 6T7G and adjust input I.F. transformer (No. 108-82C) to resonance.
   (c) With oscillator still connected to 6D8G, readjust output I.F. transformer (108-83D) if necessary.

R.F. ALIGNMENT: (535-1725 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mfd. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.
OPERATION:
The two control knobs in sequence from left to right are (see Fig. No. 2)

Knob 1, Volume Control and On-Off Switch.
Knob 2, Tuning Knob. (Side of Cabinet).

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. MANUAL TUNING:
This radio may be used to tune in stations either by the conventional manual method or by using the Automatic levers. The tuning range of the radio is from 535 to 1735 kilocycles, the dial being calibrated in channel numbers. It covers all standard broadcast channels and one police band.

To convert channel numbers to kilocycles, add one zero. For example, 170 is 1700 kilocycles.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:
There are six levers on the dial by means of which six stations may be selected, (See "B," Fig. 2).

TYPICAL TUNING DATA
The procedure for setting the Automatic Levers is the same for all the above mentioned models. However, the number of Automatic Levers may differ.

The locking screw "C" and automatic levers shown in both Figs. 1 and 2 are for the Model 62-552 receiver. However, this is a typical receiver.
ALIGNMENT PROCEDURE

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter, Non-Metallic Screwdriver,
Dummy Antennas — .1 mf., 200 mf., and 400 ohms.

<table>
<thead>
<tr>
<th>STEP</th>
<th>BAND SWITCH SETTINGS</th>
<th>DUMMY ANTENNA SETTINGS</th>
<th>SIGNAL GENERATOR CONNECTION AT BASE</th>
<th>TRANSMITTERS ADJUSTED</th>
<th>INITIAL STEPS</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF</td>
<td>Range B .1 mf. 485 KC</td>
<td>B of 1st Det. 1st LC (C13) &amp; (C14) 2nd LC (C16) &amp; (C17)</td>
<td>Turn Rotor to Full Open Adjust to Maximum Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RANGE B</td>
<td>Range B 200 mf. 1720 KC</td>
<td>Antenna Lead Oscillator Range B (C9)</td>
<td>Turn Rotor to Full Open Adjust to Maximum Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range B 200 mf. 1500 KC</td>
<td>Antenna Lead 1st Ant. Range B (C7) 2nd Ant. Range B (C6)</td>
<td>Set Indicator to 1500 KC—See Note 6</td>
<td>Adjust to Maximum Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RANGE D</td>
<td>Range D 400 Ohm 18500 KC</td>
<td>Antenna Lead Oscillator Range D (C8)</td>
<td>Turn Rotor to Full Open Adjust to Maximum Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range D 400 Ohm 15000 KC</td>
<td>Antenna Lead Ant. Range D (C5)</td>
<td>Turn Rotor to Max. Output</td>
<td>Adjust to Maximum Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range D 400 Ohm 6000 KC</td>
<td>Antenna Lead 6000 KC (C3)</td>
<td>Turn Rotor to Max. Output</td>
<td>Adjust to Maximum Output</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE—In sets using the finger tip tuning dial, remove the retaining ring which holds the dial scale in position. Readjust to minimum output. Hold the station selector ring and turn the dial scale until the pointer is at the 1500 KC mark. Replace the retaining ring.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

ATTENuate the signal from the signal generator to prevent the leveling-off action of the AVG. After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

CAUTION—If aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The image will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

A synchroscopic type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also reduces the current in the secondary circuits.

If, after a new 2 section dry electrolytic condenser has been installed, vibrator noise is encountered, reverse the connections of the 2 sections.

VOLTAGE AT SOCKETS

Volume Control Maximum Readings taken with 1000 Ohm-per-volt meter.

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1C70</td>
<td>1st Det. &quot;Ost.&quot;</td>
</tr>
<tr>
<td>1C96</td>
<td>L.F.</td>
</tr>
<tr>
<td>1N40</td>
<td>2nd Det.</td>
</tr>
<tr>
<td>1N50</td>
<td>Audio Amp.</td>
</tr>
<tr>
<td>1N40</td>
<td>Driver</td>
</tr>
<tr>
<td>1N40</td>
<td>Output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TUBE</th>
<th>VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1C70</td>
<td>Prong No. 2 Prong No. 1 Prong No. 4 Prong No. 5 Prong No. 6 Prong No. 7 Control Grid Bias</td>
</tr>
<tr>
<td>1C96</td>
<td>0 102 66 102 2</td>
</tr>
<tr>
<td>1N40</td>
<td>0 102 66 102 2</td>
</tr>
<tr>
<td>1N50</td>
<td>0 66 102 2</td>
</tr>
<tr>
<td>1N40</td>
<td>0 66 102 2</td>
</tr>
<tr>
<td>1N40</td>
<td>0 66 102 2</td>
</tr>
</tbody>
</table>

(1) As read on 1000 volt scale.
NOTE: Circuit diagram and voltage chart indicate connections and voltage measurements for the cathode-ray tuning eye tube type 6U5. This data only applies to the model 62-323; the model 62-353 is not equipped with a cathode-ray tuning eye.
TABLE 1.


ALIGNMENT PROCEDURE

1. **Volume control**—Maximum all adjustments.
2. Connect audio chokes to ground point of signal generator with a short heavy lead.
3. Connect dummy antenna value in series with generator output lead.
4. Connect output meter across primary of output transformer.
5. Allow chokes and signal generator to "heat up" for several minutes.

**BAND**

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>SIGNAL GENERATOR</th>
<th>Antenna Lead</th>
<th>Position of Head Switch</th>
<th>Variable Condenser Setting</th>
<th>Valves/Adjustable in Order Shown</th>
<th>Transistor</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. P. 60-2000 Hz</td>
<td>Grid of 827</td>
<td>120 dB</td>
<td>Full open (antenna on)</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
<tr>
<td>60Hz</td>
<td>Grid of 833</td>
<td>140 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
</tbody>
</table>

**SHORT WAVE BAND**

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>SIGNAL GENERATOR</th>
<th>Antenna Lead</th>
<th>Position of Head Switch</th>
<th>Variable Condenser Setting</th>
<th>Valves/Adjustable in Order Shown</th>
<th>Transistor</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Mceter</td>
<td>440 ohms</td>
<td>100 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
<tr>
<td>2 Mceter</td>
<td>440 ohms</td>
<td>120 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
</tbody>
</table>

**BROAD CAST BAND**

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>SIGNAL GENERATOR</th>
<th>Antenna Lead</th>
<th>Position of Head Switch</th>
<th>Variable Condenser Setting</th>
<th>Valves/Adjustable in Order Shown</th>
<th>Transistor</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Mceter</td>
<td>440 ohms</td>
<td>100 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
<tr>
<td>2 Mceter</td>
<td>440 ohms</td>
<td>120 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
</tbody>
</table>

**NOTE**

1. Adjust dummy antenna to maximum in series with generator output lead.
2. Connect output meter across primary of output transformer.
3. Allow chokes and signal generator to "heat up" for several minutes.

**SERVICE NOTES**

- Voltages taken from different points of circuit to chassis are measured with voltmeter 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 the voltage chart are measured with 111 volts on the primary of the power transformer.

**ALIGNING INSTRUCTIONS**

**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 circuits, and others.

**NOTE**

1. Always adjust the signal from the signal generator to prevent the levelling-off action of the AVC.
2. After each step is completed, repeat the procedure as a final check.

**ALIGNMENT PROCEDURE**

**NOTE**

- Volume control—Maximum all adjustments.
- Connect audio chokes to ground point of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chokes and signal generator to "heat up" for several minutes.

**BAND**

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>SIGNAL GENERATOR</th>
<th>Antenna Lead</th>
<th>Position of Head Switch</th>
<th>Variable Condenser Setting</th>
<th>Valves/Adjustable in Order Shown</th>
<th>Transistor</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. P. 60-2000 Hz</td>
<td>Grid of 827</td>
<td>120 dB</td>
<td>Full open (antenna on)</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
<tr>
<td>60Hz</td>
<td>Grid of 833</td>
<td>140 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
</tbody>
</table>

**SHORT WAVE BAND**

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>SIGNAL GENERATOR</th>
<th>Antenna Lead</th>
<th>Position of Head Switch</th>
<th>Variable Condenser Setting</th>
<th>Valves/Adjustable in Order Shown</th>
<th>Transistor</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Mceter</td>
<td>440 ohms</td>
<td>100 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
<tr>
<td>2 Mceter</td>
<td>440 ohms</td>
<td>120 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
</tbody>
</table>

**BROAD CAST BAND**

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>SIGNAL GENERATOR</th>
<th>Antenna Lead</th>
<th>Position of Head Switch</th>
<th>Variable Condenser Setting</th>
<th>Valves/Adjustable in Order Shown</th>
<th>Transistor</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Mceter</td>
<td>440 ohms</td>
<td>100 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
<tr>
<td>2 Mceter</td>
<td>440 ohms</td>
<td>120 dB</td>
<td>2 transistors on top</td>
<td>2 transistors on top</td>
<td>Output</td>
<td>I. P.</td>
<td>Maximum output</td>
</tr>
</tbody>
</table>
IF ALIGNMENT - 465 KC
Vol. Control full on, variable condenser in minimum capacity position.
Adjust to resonance 2 trimmers at 465 KC thru a .1 mf condenser.

SHORT WAVE ALIGNMENT - 2000 to 7000 KC
Dial at 6 KC, adjust to resonance the SW oscillator trimmer (at top of rear variable gang condenser) and SW Antenna trimmer No. 1 (fig. 1) at 6 M.C. thru a .1 mf condenser and 400 ohm resistor series.

BROADCAST ALIGNMENT - 555 to 1720 KC
Gang condenser in minimum capacity position; signal generator in series with a 200 mmf condenser and 20 ohm resistor series:
(a) Adjust oscillator trimmer No. 3 fig. 3, to resonance at 1720 KC.
(b) Adjust Antenna trimmer No. 2 fig. 3, to resonance at 1400 KC.
(c) Adjust Padder No. 4 fig. 3, to resonance at 600 KC.
(d) Repeat adjustments a & c until sensitivity is at maximum.
(e) Check for tracking & sensitivity at 1400, 1000 and 600 KC.

Do not bend plates of condenser to correct tracking.

©John F. Rider, Publisher
Model 62-324
Schematic, Voltage

Parts (Serial No. 88261220 and up)

Resistors
- R1 130-103 100M ohm - 1/3 w, 10%
- R2 130-12 50M ohm - 1/3 w, 20%
- R3 130-123 15M ohm - 1/2 w, 10%
- R4 130-196 30M ohm - 1 w, 10%
- R5 130-4 3 megohm - 1/3 w, 20%
- R6 101-104 1 megohm volume control
- R7 130-198 40 ohm - 1/2 w, 10%
- R8 130-197 20 ohm - 1/3 w, 20%
- R9 130-4 3 megohm - 1/3 w, 20%
- R10 130-103 100M ohm - 1/3 w, 16%
- R11 101-105 300M ohm - tone control
- R12 130-163 400M ohm - 1/3 w, 10%
- R13 130-22 5M ohm - 1/3 w, 20%
- R14 130-103 100M ohm - 1/3 w, 10%
- R15 130-12 50M ohm - 1/3 w, 20%
- R16 130-102 50M ohm - 1/3 w, 10%
- R17 130-195 250 ohm - 1.2 w, 10%

Condensers
- C 102-6 3 gang variable
- C1 100-22 .05 x 20, 25%
- C2 129-67 .0004 Mica 10%
- C3 100-26 .002 x 600 v, 25%

I.F.-Vol.contr.full on Var.at 1400KC. At 465KC-.1 mfd., dummy to grid cap of 6K7 tube, align output, I.P., signal to 6A8 grid cap, align input I.P.

B.C.BAND-Sw.in B.C.pos., var.at min. cap, 200mfd., and 20 ohm series resistor dummy to ten ant. lead. At 1750KC adjust trimmer E' to resonance. At 1400KC trimmer A' and pre-SEL section of var. to resonance. At 6000KC trimmer F' to resonance. Repeat all adjustments of the band. Check sensitivity at 1000 KC.

S.W.BAND-.1 mfd., cond. in series with 400 ohm resistor as dummy, band sw. in S.W. pos. At 17MC, dial at 17MC, adjust G' and C' to resonance. At 6 MC check sensitivity for band coverage check set at 18, 1 and 5.5 KC.

MIDDLE BAND-Band sw. at middle wave pos. Dummy as for S.W., adjustments. At 5000 KC, dial at 5000 KC, adjust D' and B' to resonance. At 1900KC check sensitivity; then recheck B.C. Band alignment.

© John F. Rider, Publisher
MONTGOMERY WARD & CO.

MODELS 62-370, 62-470, 62-700
Alignment, Trimmers

Power Consumption - 50 Watts (At 117 volts 60 cycles)
Power Output - 1.0 Watts Un-Distorted
Selectivity - 38 KC Broad at 1000 times Signal
Sensitivity

B Range (Manual Tuning) - 15 Microvolts Average
B Range (Automatic Tuning) - 15 Microvolts Average
D Range - 25 Microvolts Average

Intermediate Frequency - 456 KC
Speaker - E" or 8" Dynamic

Tuning Frequency Range
B Range (Manual Tuning) - 528 to 1790 KC (Kilocycles)
D Range (Manual Tuning) - 5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning) - 820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning) - 650 to 1500 KC
Buttons 5 and 6 (Automatic Tuning) - 520 to 980 KC

ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- An Output Indicating Meter - Non-Metallic Screwdriver.
- Dummy Antennas - 1 mf., 200 mmf., and 400 ohms.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR FREQUENCY SETTING</th>
<th>CONNECTION AT RADIO</th>
<th>DUMMY ANTENNA BAND SWITCH</th>
<th>CONDENSER SETTING ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>456 KC Grid of 1st Det.</td>
<td>.1 mf. B Range</td>
<td>Turn Rotor to Full Open 1st I.F. (C16) &amp; (C17) 2nd I.F. (C19) &amp; (C20)</td>
</tr>
<tr>
<td>RANGE B</td>
<td>1730 KC Antenna Lead</td>
<td>200 mmf. B Range</td>
<td>Turn Rotor to Full Open Oscillator Range B (C1)</td>
</tr>
<tr>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. B Range</td>
<td>Turn Rotor to Max. Output Set Indicator to 1500 KC - See Note A Ant. Range B (C4)</td>
</tr>
<tr>
<td>600 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. B Range</td>
<td>Turn Rotor to Max. Output 600 KC (C9) Rock Rotor - See Note B</td>
</tr>
<tr>
<td>WAVE TRAP</td>
<td>456 KC Antenna Lead</td>
<td>200 mmf. B Range</td>
<td>Turn Rotor to 600 KC Adjust Sig. Gsc. - See Note C Wave Trap (C1) Adjust for MINIMUM Output</td>
</tr>
<tr>
<td>RANGE D</td>
<td>18,300 KC Antenna Lead</td>
<td>400 Ohm D Range</td>
<td>Turn Rotor to Full Open Oscillator Range D (C7)</td>
</tr>
<tr>
<td>15,000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm D Range</td>
<td>Turn Rotor to Max. Output Ant. Range D (C3) Rock Rotor - See Note B</td>
</tr>
<tr>
<td>PERMEABILITY TUNING UNIT</td>
<td>BUTTON DEPRESSED (Band Switch in Push Button Position)</td>
<td>TURN SETTING SCREW TO MAXIMUM OUTPUT - See Instruction Book</td>
<td>ADJUST COIL POSITION TO MAXIMUM OUTPUT - See Note D</td>
</tr>
<tr>
<td>1100 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. No. 1 Setting Screw No. 1</td>
<td>Antenna Coil No. 1</td>
</tr>
<tr>
<td>1100 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. No. 2 Setting Screw No. 2</td>
<td>Antenna Coil No. 2</td>
</tr>
<tr>
<td>850 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. No. 3 Setting Screw No. 3</td>
<td>Antenna Coil No. 3</td>
</tr>
<tr>
<td>850 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. No. 4 Setting Screw No. 4</td>
<td>Antenna Coil No. 4</td>
</tr>
<tr>
<td>700 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. No. 5 Setting Screw No. 5</td>
<td>Antenna Coil No. 5</td>
</tr>
<tr>
<td>700 KC</td>
<td>Antenna Lead</td>
<td>200 mmf. No. 6 Setting Screw No. 6</td>
<td>Antenna Coil No. 6</td>
</tr>
</tbody>
</table>

Adjust the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A — If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B — Turn the rotor back forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C — Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at 456 KC.

NOTE D — At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (near) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION — When aligning the short wave bands be sure NOT to adjust the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.
Selecting the Stations to be Set

There are 6 buttons on the push-button tuning dial by means of which stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position—See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screwdriver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, accurately tune in this station. The station is now set on this button.

To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.

Procedure for Setting the Automatic Tuner Pushbuttons

To lock the tuner mechanism insert a screwdriver through the hole in the escutcheon panel and press in and turn the reset locking screw to the left, until it cannot be turned any further without forcing it.

This will lock the tuner mechanism and all the stations that have been set up on the pushbuttons will be locked in place for automatic tuning.

Press in any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.
ALIGNING I.F. TRANSFORMERS (465 K.C.):
1. Connect an output meter across the voice coil of the speaker or across the primary of the output transformer.
2. Connect an external oscillator which has been adjusted to 465 K.C. in series with a .1 mfd. condenser, to the control grid of the 6A8-G tube.
3. Connect the oscillator ground to the black chassis ground lead.
4. Adjust I.F. trimmers Nos. 6, 8, 9 and 11 to resonance, at the same time reducing the output of the oscillator as required.

With the gang condenser in a minimum position (plates entirely out of mesh) the dial reading should be at the end marking of the scale.
1. Connect the test oscillator in series with a 200 mnf. condenser to the tan antenna lead from the chassis.
2. Set the oscillator and gang condenser to 1500 K.C. and adjust oscillator trimmer No. 29 (rear section of condenser gang).
3. Set the test oscillator and gang to 1400 K.C. and adjust antenna trimmer No. 5 (front section of condenser gang).
4. Check sensitivity at 1000 and 600 K.C.
FIG. 1—TOP VIEW

D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

VOLUME CONTROL AT MIN. ANT. GROUNDED.

2 VOLT X AND 20 VOLT B BATTERIES.

A CANNOT BE READ WITH VOLTMETER.

The following batteries are required:

2—45 Volt "B" Batteries.

1—3 Volt Dry "A" Battery or 2 Volt Storage Battery.

Check the Position of the Knob on the Back of the Radio Before Making any Battery Connections.

ALIGNMENT PROCEDURE:

1. Volume control—Maximum all adjustments.
2. Connect radio chassis to ground port of signal generator with a short heavy lead.
3. Connect dummy antenna wire in series with generator output lead.
4. Connect output meter across primary of output transformer.
5. Allow chassis and signal generator to "heat up" for several minutes.


<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Rotor full open</td>
<td>Two trimmers on top</td>
<td>Input L.F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>(Flutes out of mesh)</td>
<td>(See Fig. 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Rotor full open</td>
<td>Two trimmers on top</td>
<td>Output L.F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>(Flutes out of mesh)</td>
<td>(See Fig. 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>175 Kc</td>
<td>200 mms.</td>
<td>Antenna Lead</td>
<td>Trimmer—Top of rear section of gang (See Fig. 1)</td>
<td>Broadcast Oscillator</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>200 mms.</td>
<td>Antenna Lead</td>
<td>Trimmer—Top of front section of gang (See Fig. 1)</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C. After each band is completed, repeat the procedure as a final check.
MODELS 62-471, 62-472
Socket, Trimmers, Tuner, Alignment, Voltage, Drive Cord Data

Montgomery-Ward & Co.

ALIGNMENT PROCEDURE

The following equipment is required for aligning:
- All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies listed.
- Output indicator Meter: Non-Metallic Screwdriver.
- Dummy Antenna—1 ft. 200 mm., and 400 ohms.

ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>STEP</th>
<th>BAND SWITCH</th>
<th>RHYTHM</th>
<th>FREQUENCY</th>
<th>CONNECTION AT RADIO</th>
<th>TRIMMERS ADJUSTED</th>
<th>INITIAL STEP</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LF 456 KC</td>
<td>Range E</td>
<td>456 KC</td>
<td>Gold of 1st. Lt.</td>
<td>Range Q</td>
<td>0.15</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>456 KC</td>
<td>Lt. U. (C1) &amp; (C1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RANGE B</td>
<td>Range B</td>
<td>1750 KC</td>
<td>Lt. U. (C1) &amp; (C1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range B</td>
<td>200 mfd.</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Output Range B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range B</td>
<td>200 mfd.</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Lt. Ant. Range A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range B</td>
<td>200 mfd.</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Lt. Ant. Range A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RANGE D</td>
<td>Range D</td>
<td>400 Ohms</td>
<td>400 ohms</td>
<td>Range Q</td>
<td>0.15</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range D</td>
<td>400 ohms</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Output Range Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range D</td>
<td>400 ohms</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Lt. Ant. Range A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RANGE D</td>
<td>Range D</td>
<td>400 Ohms</td>
<td>400 ohms</td>
<td>Range Q</td>
<td>0.15</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range D</td>
<td>400 Ohms</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Output Range Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1750 KC</td>
<td>Range D</td>
<td>400 Ohms</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>Lt. Ant. Range A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adjust the signal from the signal generator to the antenna line, on the antenna line, at a point in the antenna line, just before the antenna line joins the 200 mfd. capacitor. If the signal is not strong enough, increase the signal input to the signal generator. If the signal is too strong, reduce the signal input to the signal generator.

NOTES:
- After the 456 KC adjustment is made, the dial indicator should be at the 1000 KC mark on the dial scale of the signal generator. If it is not the proper position of the dial indicator, it should be moved to the proper position of the dial indicator, then the signal generator should be turned to the 1000 KC mark on the dial scale of the signal generator.
- If the dial indicator is not at the 1000 KC mark on the dial scale of the signal generator, it should be moved to the proper position of the dial indicator, then the signal generator should be turned to the 1000 KC mark on the dial scale of the signal generator.
- Adjust the signal generator to the antenna line, on the antenna line, at a point in the antenna line, just before the antenna line joins the 200 mfd. capacitor. If the signal is not strong enough, increase the signal input to the signal generator. If the signal is too strong, reduce the signal input to the signal generator.

VOLTAGES AT SOCKETS

Line Voltage: 117—VOLUME CONTROL: Maximum

Leadings taken with a 1000 Ohm-per-turn meter.

Antenna Shorted to Ground.

Position of Band Switch Standard Waveform.

TABLE

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6X5</td>
<td>1st Lt.</td>
</tr>
<tr>
<td>6X6</td>
<td>One.</td>
</tr>
<tr>
<td>6U7</td>
<td>U.</td>
</tr>
<tr>
<td>6C70</td>
<td>1st Lt. &amp; 6 Lt. Audio</td>
</tr>
<tr>
<td>6F5</td>
<td>Output</td>
</tr>
<tr>
<td>6L7</td>
<td>Output</td>
</tr>
<tr>
<td>6F5</td>
<td>Output</td>
</tr>
<tr>
<td>6L7</td>
<td>Output</td>
</tr>
</tbody>
</table>

TABLE

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6X5</td>
<td>Tuning Indicator</td>
</tr>
<tr>
<td>6X6</td>
<td>Plane to Thread</td>
</tr>
<tr>
<td>6L7</td>
<td>Plane to Ground</td>
</tr>
<tr>
<td>6F5</td>
<td>Plane to Ground</td>
</tr>
<tr>
<td>6L7</td>
<td>Plane to Ground</td>
</tr>
</tbody>
</table>

TABLE

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6X5</td>
<td>A.C. voltage test point terminals 2 and 7.</td>
</tr>
<tr>
<td>6X6</td>
<td>A.C. voltage test point terminals 2 and 8.</td>
</tr>
<tr>
<td>6L7</td>
<td>A.C. voltage test point terminals 2 and 8.</td>
</tr>
<tr>
<td>6F5</td>
<td>A.C. voltage test point terminals 4 and 5.</td>
</tr>
</tbody>
</table>

Replacing Drive Cords

Three drive cords, Nos. 1, 2, and 3, as shown in Fig. 5, are used. To replace any of these cords, proceed as follows:

Cord No. 1

Turn the gang condenser to full open position. The drive shaft so that the holes for the cords are vertical. The position of the drive shaft and drive drum are shown in Fig. 5.

A double knot in one end of the cord. From the bottom of knot (A) in drive shaft, thread the other end of the cord through the hole.

Slide a piece of fabric tubing on the cord, placing it near the bottom end. Fasten the ends of the two springs used to the ends of the cord, making the distance between the two knots 271/4 inches.

Starting at the point where the cord leaves hole (E), wind around the shaft 31/2 times as shown in Fig. 5. Bring the eye up to the double groove (B) in the drive drum and wind on 31/2 turns, progressing toward the edge of the groove. Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

Cord No. 2

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

The double knot in one end of the cord.

From the top of hole (E) the drive shaft, thread the other end of the cord through the hole.

Slide a piece of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 21 inches between the knots.

Starting at the point where the cord leaves hole (E), wind around the shaft 31/2 times as shown in Fig. 5. Bring the eye up to the double groove (B) in the drive drum, but put the loop in the slip knot over pin (D) and drive drum clockwise about 31/2 turns. This will unwind the cord on the drive shaft.

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

Cord No. 3

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

The double knot in one end of the cord.

From the top of hole (E) the drive shaft, thread the other end of the cord through the hole.

Slide a piece of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 21 inches between the knots.

Starting at the point where the cord leaves hole (E), wind around the shaft 31/2 times as shown in Fig. 5. Bring the eye up to the double groove (B) in the drive drum, but put the loop in the slip knot over pin (D) and drive drum clockwise about 31/2 turns. This will unwind the cord on the drive shaft.

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

The gang condenser and drive drum should be in the same position as explained for Cord No. 1.

To end the cord on hook (H).

Slide a piece of fabric tubing over the cord. Place this tubing approximately 151/2 inches from the end of the cord to be attached to the spring.

The other end of the cord to the largest of the two springs used. The length of the cord between the knots should be 34 inches.

Pass the cord through slot (J) in groove (F) of the drive drum. Bring the cord up to pull (K), around the other pullies as shown in Fig. 4, and down to groove (F). After passing the cord around the drive drum 2 turns in groove (F), fasten the 34 inch to hook (L).

Attaching Dial Points—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. After the pointer has been moved to the correct position, clamp it tightly over the fabric tubing on the cord—See Fig. 5.

Levers Tung Assembly Adjustments

Pressure of Spacers on Heart Cams — The heart cams must rotate freely relative to the shaft when the tightening lever is in the "lock" position and must not rotate relative to the shaft spacers when this lever is in the "tight" position.

Pressure of the spacers against the heart cam is determined by the position of nut (R) on the threaded shaft—See Fig. 5. If, after the tightening lever is turned to the "tight" position, the arm can turn relative to the shaft, this nut must be tightened back on the washers (S)—See Fig. 5, and tighten nut (R) about 15 turn. Bend the ears of the washers down on nut (R). Tighten the tightening lever and see if the arms are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about 1/8 inch from the end of the shaft in the tightening washers when a reasonable amount of pressure is exercised on this lever.

Connecting Between Gang Condenser and Cam Shaft—One screw only should be used in the unviva-sal joint connection between the condenser shaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.

©John F. Rider, Publisher

Compliments of www.nucow.com
TO REMOVE CHASSIS FROM THE CABINET:

To remove chassis from the cabinet unscrew the locking screw in the center of the tuning knob and pull tuning knob and volume knob off their shafts. Remove the four mounting screws that hold the bottom plate and chassis to the cabinet. Pull off the five buttons on the levers. Move the chassis toward back of cabinet so that control shafts and dial assembly clear holes in cabinet. Then chassis can be slipped out.


©John F. Rider, Publisher

Compliments of www.nucow.com
### Parts (Serial 286.700 and UP)

**Resistors**
- R1: 20M ohm, volume control
- R2: 50M ohm, 55W
- R3: 35M ohm, 55W
- R4: 6M ohm, 55W
- R5: 2megohm, 55W
- R6: 250M ohm, 55W
- R7: 500M ohm, 55W
- R8: 160 ohm, 55W

**Capacitors**
- C1: 220µF, mica
- C2: 30µF, mica
- C3: 68µF, mica
- C4: 220µF, mica
- C5: 10µF, mica
- C6: 47µF, mica
- C7: 22µF, mica
- C8: 10µF, mica
- C9: 47µF, mica
- C10: 10µF, mica
- C11: 22µF, mica
- C12: 10µF, mica
- C13: 47µF, mica
- C14: 10µF, mica
- C15: 22µF, mica
- C16: 10µF, mica

**Alignment Procedure**
- Volume control—Maximum all adjustments.
- Connect B of radio chassis to ground post of signal generator through 1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to “heat up” for several minutes.

### Table

<table>
<thead>
<tr>
<th>Band</th>
<th>Generator Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F.</td>
<td>465 Kc.</td>
<td>1 MFD.</td>
<td>Grid of 6A8</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers</td>
<td>L.F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROADCAST</td>
<td>1720 Kc.</td>
<td>100 mnf.</td>
<td>Antenna Lead</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Trimmer—Top of rear section of gang</td>
<td>Broadcast Oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BAND</td>
<td>1400 Kc.</td>
<td>100 mnf.</td>
<td>Antenna Lead</td>
<td>Set dial at 1400 Kc.</td>
<td>Trimmer—Top of front section of gang</td>
<td>Broadcast Antenna</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>
Frequency Range 540-1650 Kilocycles
I. F. Frequency 465 K.C.

NOTE: In ISSUE A, a 12SQ7 is used as 2nd Det.-A.V.C.-1st. Audio; Resistor R10, part BE 130282, 2000 ohm 1 watt, and PI, part BE 10794, 6.8 V. Pilot Light are used. For all other parts see parts list.
### ALIGNMENT PROCEDURE


<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>Antenna Setting</th>
<th>Variable Condenser Setting</th>
<th>Trimmer Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F.</td>
<td>60 Kc. 1 MHz.</td>
<td>Grid of DIS F.</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.R.O.D.</td>
<td>570 Kc. 230 Kc.</td>
<td>Antenna lead</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Kc. 230 Kc.</td>
<td>Antenna lead</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 Kc. 230 Kc.</td>
<td>Antenna lead</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Models 62-558, 62-2550

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>Antenna Setting</th>
<th>Variable Condenser Setting</th>
<th>Trimmer Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F.</td>
<td>60 Kc. 1 MHz.</td>
<td>Grid of DIS F.</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.R.O.D.</td>
<td>570 Kc. 230 Kc.</td>
<td>Antenna lead</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 Kc. 230 Kc.</td>
<td>Antenna lead</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 Kc. 230 Kc.</td>
<td>Antenna lead</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SHORT WAVE BAND

<table>
<thead>
<tr>
<th>Frequency Setting</th>
<th>Antenna Setting</th>
<th>Variable Condenser Setting</th>
<th>Trimmer Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Mc. 45 Kc.</td>
<td>Grid of DIS F.</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Mc. 45 Kc.</td>
<td>Grid of DIS F.</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Mc. 45 Kc.</td>
<td>Grid of DIS F.</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tube (Points out of line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ALIGNMENT PROCEDURE Model 62-655

1. Set the signal generator for 458 Kc and connect the output of the signal generator through a 300 ohm precision resistor to the control grid of the 6N27 1st detector tube (pin No. 2). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control to maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the leveling off of the AVC. Then adjust the 4 trimmers until the maximum output is obtained. Three of the trimmers are in the speaker unit—see Fig. 2. One trimmer is at the top of the tuning unit—see Fig. 4. Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacitance of the antenna cable and dummy antenna should be 50 μf if the cable, for example, has a capacitance of 25 μf, use a 35 μf condenser for the dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacitance to the output of the signal generator. Set the signal generator for 1500 Kc. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

2. Set the signal generator for 1000 Kc. Turn the tuning knob until maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C8 for maximum output—see Fig. 1. Reassemble the radio and install it in the automobile. Insert the antenna cable. Tune in a weak signal near 1000 Kc and readjust the antenna trimmer C8 for maximum output. Calibration—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—see article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 Kc. Locate the set screw of the large gear that drives the tuning drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.

**CAUTION**—If it is necessary to calibrate the radio, remove the back cover. Turn the tuning control drum until the 2 set screws on the dial hub near the volume control can be reached with a scriber. Loosen these 2 set screws by turning them about 1/8 turn in a counterclockwise direction. Insert in 400 Kc signal. Hold the tuning control handle steady until the 400 Kc signal is heard. Then slowly turn the tuning control drum until the 400 Kc signal can be heard and adjusted with a scriber. Close to see that the dial has remained in calibration. Dummy Antenna—1 cm. 

**NOTE:** Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the loop to the rail with braid. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal barn, etc.).

©John F. Rider, Publisher

Compliments of www.nucow.com
Procedure for Setting the Station Buttons

TYPICAL TUNING DATA (FOR NUMBER OF BUTTONS AND LOCATION OF LOCKING SCREWS—SEE FIGURES).

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you may wish to receive.

Depress the manual tuning button and keep it depressed during the entire setting operation as described below. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

UNLOCK THE TUNING MECHANISM by inserting a SMALL HANDLE screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counterclockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot.

Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them do not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

This continues to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

NOW LOOK THE TUNING MECHANISM by inserting the SMALL HANDLE screwdriver, as shown in Fig. 1, in the locking screw opening. Turn the locking screw in a clockwise direction until it is tight. DO NOT tighten too much to avoid stripping the threads.
PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

IMPORTANT—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

NOW, PROCEED AS FOLLOWS:—

1. Pull the dial tuning knob all the way out (See Illus. "B," Fig. 3), and rotate the tuning knob to the left (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)

2. Press down all the way any one of the automatic tuner levers. Holding it down firmly, press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be pressed in (See Illus. "E," Fig. 3). Turn the dial tuning knob very slowly back and forth (while still holding the automatic tuner lever in downward position), noting the width of the shadow on the screen of the cathode-ray tuning indicator. Minimum width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down another automatic tuner lever. Holding it down firmly, press in on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob all the way out (See Illus. "B," Fig. 3) and rotate the tuning knob to the right (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3).

TYPICAL TUNING DATA

The procedure for setting the Automatic Levers is the same for all the above mentioned models. However, the number of Automatic Levers may differ.
### Voltage, Alignment, Trimmers


<table>
<thead>
<tr>
<th>Band</th>
<th>Signal Generator</th>
<th>Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmer Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.F.</td>
<td>455 kc.</td>
<td>.1 MFD.</td>
<td>Grid of 6x7</td>
<td>Broadcast</td>
<td>Rotor left peak</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>455 kc.</td>
<td>.1 MFD.</td>
<td>Grid of 6x9</td>
<td>Broadcast</td>
<td>Rotor left peak</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Broad-Cast Band</td>
<td>1500 kc.</td>
<td>.2 MFD.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Rotor left peak</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Short-Wave Band</td>
<td>17 Mc.</td>
<td>.45 ohm</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Rotor left peak</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Short-Wave Band</td>
<td>17 Mc.</td>
<td>.45 ohm</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Rotor left peak</td>
<td>Two trimmers on top</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>
| Note: "A" Then the dial back and forth slightly (slow) and adjust trimmer until the peak of the signal is obtained. Adjust the signal from the generator to prevent the leveling off action of the AVC. After each band is completed, repeat the procedure as a final check.  

#### Bottom View of Chassis

Voltage measured with 3000 OHM per volt. Voltage between socket terminals & chassis. All voltages are to be measured with 6.3 volts input to receiver. (1) = longer wire. (2) = shorter wire.  

---

© John F. Rider, Publisher

Compliments of www.nucow.com
Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-quarters on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (−) terminal of the car battery is grounded, line up the − mark on the top of the vibrator with the arrow on the chassis base.
Compliments of www.nucow.com

MODELS 62-666, 62-1656, 62-2656
MODELS 93BR454A, 93BR1455A MONTGOMERY WARD & CO.
MODEL 93BR713A

### Alignment

- Volume control: Maintain all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna wires across with output lead.
- Connect output across primary of transmit transformer.
- Allow chassis and signal generator to "heat-up" for several minutes.

#### Band

**Band** | **Signal Generator** | **Frequency Setting** | **Connection in Rads** | **Position of Band Switch** | **Variable Condenser Setting** | **Trigger A Adjusted** | **Trigger B Adjusted** | **Adjustment**
---|---|---|---|---|---|---|---|---
I.F. | 46 Kc. | .1 MFD. | Grid of ING Tube | Broadcast | 110 volt open (Plugs out of jack) | Two vibrators on top (See Fig. 3) | Output to L.F. | Adjust to maximum output
| 46 Kc. | .1 MFD. | Grid of ING Tube | Broadcast | 110 volt open (Plugs out of jack) | Two vibrators on top (See Fig. 3) | Output to L.F. | Adjust to maximum output

#### Short Wave Band

**Band** | **Antenna Lead** | **Variable Condenser Setting** | **Trigger A Adjusted** | **Trigger B Adjusted** | **Adjustment**
---|---|---|---|---|---
17 Mc. | 46 ohms Antenna Lead | Sheet Wave | Set dial | Short Wave | Adjust to maximum output
| 17 Mc. | 46 ohms Antenna Lead | Short Wave | Set dial | Short Wave | Adjust to maximum output

#### Broadcast Band

**Band** | **Antenna Lead** | **Variable Condenser Setting** | **Trigger A Adjusted** | **Trigger B Adjusted** | **Adjustment**
---|---|---|---|---|---
138 Mc. | 20 mfd. Antenna Lead | Broadcast | Set dial | Broadcast | Adjust to maximum output
| 140 Mc. | 20 mfd. Antenna Lead | Broadcast | Set dial | Broadcast | Adjust to maximum output
| 80 Mc. | 20 mfd. Antenna Lead | Broadcast | Set dial | Broadcast | Adjust to maximum output

#### Band Switch

**Band** | **Frequency Range**
---|---
Ext. Right Reception | Short Wave
Ext. Left Reception | Broadcast

### Compliments of www.nucow.com

© John F. Rider, Publisher

Compliments of www.nucow.com
The following equipment is required for aligning:

- An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output Indicating Meter—Non-Metallic Screwdriver.
- Dummy Antennas: 1 mf, 200 mf, and 400 ohms.

**ALIGNMENT PROCEDURE**

**Volume Control—Maximum All Adjustments.**

Connect radio chassis to ground foot of Signal Generator with a Short Heavy Lead, Allow Chassis and Signal Generator to "Heat Up" for several minutes.

**IMPORTANT—Follow procedure in the order shown.**

**SIGNAL GENERATOR**

**FREQUENCY SETTING AT RADIO**

L.F. 456 Kc

WAVE TRAP 456 Kc

**RANGE B** 1500 Kc

**RANGE D** 18,000 Kc

**ADJUST TRIMMERS TO MASHAUN**

**NOTE** A—Turn the dial back and forth slightly (walk) and adjust trimmer until the peak of gramma intensity is obtained.

**NOTE** B—SiDEC is the image frequency of SiDEC. Adjust Trimmer (C) until a minimum output is obtained.

**NOTE** C—Trimmer (C) is graduated at factory and should not be tampered with.

Approximate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

---

**Model 62-001**

**Drive Cord Replacement**

- Tie a knot with a small loop at one end of the new drive cord. Slide a 4-5 length of fabric tubing over the loop. Tie the free end of the drive cord to the tension spring. The distance between knots should be 4-5 inches.

- Arrange to keep the gain condenser in the completely closed position.

- Place the looped end of the drive cord over hole A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E. Continue cord down to shaft F and wind 2-4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum.

- Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

**DIAL POINTER ATTACHMENT**

- Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

**Phonograph Connections**

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knockout 1-3/84 inches in diameter. An orbital base socket is mounted in this knockout opening and wired as shown in the schematic.

A phonograph cable assembly may then be purchased (See parts list). On one end of this cable is an oval plug and on the other end is a phonograph-radio switch and double tip jack.
ALIGNMENT PROCEDURE

The following equipment is required for alignment:

A New Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output indicating meter—Non-Metallic Screwdriver.

Dummy Antennas—1 m, 200 mm, and 400 ohms.

**SIGNAL GENERATOR**

**FREQUENCY**

**CONNECT**

**ANTENNA**

**BAND**

**SWITCH**

**CONDENSER SETTING**

**ADJUST**

**TRIMMERS TO**

**MAXIMUM**

1 m, 200 mm, 400 ohms.

**45 khz**

Grid of 1st Oct.

1 m, B Range

Turn Rotor to Full Open

1 m, C1 (1) & C1 (2)

2 m, C1 (2) & C1 (3)

**RANGE D**

**170 khz**

Antenna Lead

200 m, B Range

Turn Rotor to Full Open

2 m, C2 (1) & C2 (2)

**500 khz**

Antenna Lead

200 m, B Range

Turn Rotor to Max. Output

2 m, C3 (1)

**RANGE E**

18.3 kHz

Antenna Lead

4 ohm, D Range

Turn Rotor to Max. Output

2 m, C4 (1) & C4 (2)

**600 kHz**

Antenna Lead

4 ohm, D Range

Turn Rotor to Max. Output

2 m, C5 (1)

**CAUTION:** When aligning the short wave band, be very careful to adjust the signal generator. Let it be heard from a distance of 100 ft.

**NOTE:** Adjust the signal generator for 150 kHz. The signal should be heard from a distance of 100 ft. The signal generator should be adjusted to a peak of 40 kHz.

**Dial Pointers Adjustment:**

Turn the knob to the approximate frequency on the dial scale. Pass the cord through the staded hole—see Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

**Drive Cord Replacement:**

Place the looped end of the drive cord over a conductor. It should be the same cord as used in the previous step. Pass the cord through the slot C in the drum and wind one turn in a clockwise direction (front of chassis) around conductor drive drum B. The cord should be adjusted to a peak of 40 kHz.

**NOTE:** The signal generator will provide an accurately calibrated signal at the test frequencies as listed.

**Output indicating meter—Non-Metallic Screwdriver.

Dummy Antennas—1 m, 200 mm, and 400 ohms.

**ALIGNMENT PROCEDURE**

The following equipment is required for alignment:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output indicating meter—Non-Metallic Screwdriver.

Dummy Antennas—1 m, 200 mm, and 400 ohms.

**SIGNAL GENERATOR**

**FREQUENCY**

**CONNECT**

**ANTENNA**

**BAND**

**SWITCH**

**CONDENSER SETTING**

**ADJUST TRIMMERS TO**

**MAXIMUM**

1 m, 200 mm, 400 ohms.

**45 khz**

Grid of 1st Oct.

1 m, B Range

Turn Rotor to Full Open

1 m, C1 (1) & C1 (2)

2 m, C1 (2) & C1 (3)

**RANGE D**

**170 khz**

Antenna Lead

200 m, B Range

Turn Rotor to Full Open

2 m, C2 (1) & C2 (2)

**500 khz**

Antenna Lead

200 m, B Range

Turn Rotor to Max. Output

2 m, C3 (1)

**RANGE E**

18.3 kHz

Antenna Lead

4 ohm, D Range

Turn Rotor to Max. Output

2 m, C4 (1) & C4 (2)

**600 kHz**

Antenna Lead

4 ohm, D Range

Turn Rotor to Max. Output

2 m, C5 (1)

**CAUTION:** When aligning the short wave band, be very careful to adjust the signal generator. Let it be heard from a distance of 100 ft.

**NOTE:** Adjust the signal generator for 150 kHz. The signal should be heard from a distance of 100 ft. The signal generator should be adjusted to a peak of 40 kHz.

**Dial Pointers Adjustment:**

Turn the knob to the approximate frequency on the dial scale. Pass the cord through the staded hole—see Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

**Drive Cord Replacement:**

Place the looped end of the drive cord over a conductor. It should be the same cord as used in the previous step. Pass the cord through the slot C in the drum and wind one turn in a clockwise direction (front of chassis) around conductor drive drum B. The cord should be adjusted to a peak of 40 kHz.

**NOTE:** The signal generator will provide an accurately calibrated signal at the test frequencies as listed.

**Output indicating meter—Non-Metallic Screwdriver.

Dummy Antennas—1 m, 200 mm, and 400 ohms.
**SPECIFICATIONS**

- **Power Consumption**: - 60 Watts (At 17 volts, 60 cycles)
- **Power Output**: - 3.0 Watts Radiated
- **Selectivity**: - 40 KC Broad at 1000 times Signal
- **Intermediate Frequency**: - 456 KC
- **Speaker**: - 10" Dynamic

**Tuning Frequency Range**
- **B Range**: 550 to 1750 KC (Kilocycles)
- **D Range**: 1750 to 18000 KC (Kilocycles)

**Sensitivity** (For 0.5 watt output)
- **B Range**: 25 Microvolts Average
- **D Range**: 10 Microvolts Average

---

**“B” Issue Models**

The issue letter is the last letter of the chassis number on the chassis number label.

In “B” issue models, the screen grid circuits of the 1st Detector and I.F. tubes are supplied through separate resistors as shown in the schematic.

If distortion is encountered at high signal levels in the “A” issue models, change the screen grid circuits of the 1st Detector and I.F. tubes according to the schematic.
The chassis used in this model is almost identical to the chassis used in Model 62-905. The differences are in the re-mounting of the electrolytic condenser in order to keep them upright when the chassis is mounted in the cabinet, the addition of a phone motor socket to the back panel of the chassis, and the phone attachment parts. The alignment procedure and other service data given for Model 62-905 also applies to this model.

© John F. Rider, Publisher
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Connect Radio On-axis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes. IMPORTANT—Follow procedure in the order shown.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR FREQUENCY SETTINGS</th>
<th>CONNECTION AT RADIO</th>
<th>DUMMY ANTENNA</th>
<th>BAND SWITCHING</th>
<th>CONDENSER OR DIAL SETTING</th>
<th>ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>L.F.</td>
<td></td>
<td></td>
<td></td>
<td>1st LF: C(14) &amp; C(17)</td>
</tr>
<tr>
<td>456 KC</td>
<td>Grid of 1st Det.</td>
<td>.1 mf.</td>
<td>B Range</td>
<td>Turn Rotor to Full Open</td>
<td>2nd LF: C(14) &amp; C(17)</td>
</tr>
<tr>
<td>WAVE TRAP</td>
<td>456 KC</td>
<td>Antenna Lead</td>
<td>200 mm.</td>
<td>B Range</td>
<td>Wave Trap (CS) Adjust for MINIMUM Output</td>
</tr>
<tr>
<td>RANGE B</td>
<td>Turn Rotor to Full Closed Position. Pointer should be at low frequency and mark on scale—See Note A.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>200 mm.</td>
<td>B Range</td>
<td>Turn Rotor until dial pointer is at 1500 KC</td>
<td>Oscillator Range B (C14)</td>
</tr>
<tr>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>300 mm.</td>
<td>B Range</td>
<td>Left Raised above setting</td>
<td>Ant Range B (C1)</td>
</tr>
<tr>
<td>600 KC</td>
<td>Antenna Lead</td>
<td>300 mm.</td>
<td>B Range</td>
<td>Rotor Rotor to Max. Output</td>
<td>Ant Range B (C1)</td>
</tr>
<tr>
<td>RANGE D</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range D (C8)</td>
<td></td>
<td>Rock Rotor—See Note B</td>
<td></td>
</tr>
<tr>
<td>15,000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>D Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range D (C8)</td>
</tr>
<tr>
<td>15,000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>D Range</td>
<td>Turn Rotor to Max. Output</td>
<td>Rock Rotor—See Note B</td>
</tr>
</tbody>
</table>

NOTE A—The low frequency and mark is a small dot at the left side of the signal wave scale under the "L" of the number 6.8 and to the right of the "C" of the figures. If the pointer is not set at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

General Service Data

Drive Cord Replacement

To a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 6½ inches between the knots.

Turn the gantry end to the completely closed position.

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gantry condenser to the full open position. Hook the cord on slot B and turn the gantry condenser to the completely closed position. Unhook the cord from slot D and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind ½ turn counter-clockwise (from front of chassis) around the drive shaft spindle, bringing it up over the drive drum. Guiding the cord in the groove of the drive drum, turn the gantry condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.

EARLY MODELS—In the early models using a larger drive shaft spindle (See Fig. 4), there should be a distance of 6⅛ inches between the knots.

DIAL POINTER ATTACHMENT

—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

Rock and Pinion Assembly

If it is ever necessary to reassemble the automatic tuning tool, proceed as follows: The pinion gear should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the 8th tooth on each side of the lower rack.
MODEL 62-905
Schematic, Socket
Cables, Voltage

MONTGOMERY-WARD & CO.

SPECIFICATIONS

Power Consumption: 65 Watts (At 117 volts 60 cycles)

Power Output: 3.5 Watts Ununstaged
2.0 Watts Maximum

Selectivity: 40 KC Broad at 1000 times Signal

Intermediate Frequency: 456 KC

Speaker: 10" Dynamic

Tuning Frequency Range

8 Range: 528 to 1710 KC (Kilocycles)

2 Range: 3700 to 3000 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

8 Range: 25 Microvolts Average

2 Range: 40 Microvolts Average

Twenty-Five Cycle Models

Models 62-902 and 62-906

Compliments of www.nucow.com
ALIGNMENT PROCEDURE

IMPORTANT: See Aligning Instructions on Page 4.
- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Grid of 125k 1. F.</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. I)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>455 kc. 1 MFD.</td>
<td>Grid of 125k 1. F.</td>
<td></td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. I)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>BROAD-CAST BAND</td>
<td>1400 kc. 1 MFD.</td>
<td>Grid of 125k 1. F.</td>
<td></td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. I)</td>
<td>Output I. F.</td>
<td>Adjust to maximum output</td>
</tr>
</tbody>
</table>

NOTE "A" — A 20k ohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer. The loop antennas must be disconnected from the chassis.

NOTE "B" — Remove the 20k ohm resistor from the loop antenna leads; mount the chassis and the loop antennas in the cabinet; connect the loop antennas to the chassis. Adjust the antenna trimmer through hole in both chassis. Connect the loop antennas to the trimmers. Turn up the output of the generator, making sure the energy in the loop antenna without any electrical connection from the signal generator.

ALTERNATIVE PROCEDURE

NOTE "C" — Lay the output lead from the signal generator in back of the loop antennas. Turn up the output of the generator, making sure the energy in the loop antenna without any electrical connection from the signal generator.

NOTE "A" — A 20k ohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer. The loop antennas must be disconnected from the chassis.

NOTE "B" — Remove the 20k ohm resistor from the loop antenna leads; mount the chassis and the loop antennas in the cabinet; connect the loop antennas to the trimmers. Adjust the antenna trimmer through hole in both chassis. Connect the loop antennas to the trimmers. Turn up the output of the generator, making sure the energy in the loop antenna without any electrical connection from the signal generator.

MODEL No. 938508A
Model No. 938509A

MODELS 38BR508A, 938509A

CHASSIS No. 938508A and 938509A

Tuning Frequency Range — 560 to 1650 kc. Power Consumption — 25 Watts (at 117 Volts 50 / 60 Cycles) 2.5 Amps. at 6.3 Volts

Sensitivity (for .5 Watts Output) — 25 Microvolts Average

Selectivity — 45 kc Broad at 1000 Times Signal at 1000 kc

Tuning Frequency Range — 560 to 1650 kc.

Intermediate Frequency — 465 kc

Speaker — 6 in. P. M. Dynamic

Attenuates the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.
ALIGNMENT PROCEDURE

- Tune control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "blow up" for several minutes.

NOTE: "A" Do not remove the trimmers on the output I.F. Transformer.

NOTE: "B" Turn the dial back and forth slightly (clockwise) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE: The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequency as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antenna—1 ft. coiled, 28 mil. and 60 ohm.

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>dummy watt</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmer Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>46 Kc. 1 MFD.</td>
<td>Grid of I.F. Tube</td>
<td>Broadcast</td>
<td>Two trimmers on top (see Fig. 1)</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>46 Kc. 1 MFD.</td>
<td>Grid of I.F. Tube</td>
<td>Broadcast</td>
<td>Two trimmers on top (see Fig. 1)</td>
<td>I.F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Short Wave</td>
<td>17 Mc. 40 ohm</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Wave Band</td>
<td>17 Mc. 40 ohm</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 Mc. 40 ohm</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Broadcast</td>
<td>1700 Mc. 20 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1450 Mc. 20 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>660 Mc. 10 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Antenna tie into the signal generator to prevent the loading-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Model No. 93BR-460A and 93BR-1460A

Power Consumption: A Battery 26 Il MA; B Battery 11.5 MA.
Power Output: 150 Millivols. Undistorted
Sensitivity (8.5 Watts): 45 Microvolts Average

Selectivity: 45 Kc. Broad at 1000 Times Signal at 1000 Kc.
Tuning Ranges: Broadcast 355-1720 Kc. Shortwave 5.5-18.3 Mc.
Intermediate Frequency: 465 Kc.
Speaker: 6 in. P. M. Dynamic

ALIGNMENT PROCEDURE

- Volume control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "blow up" for several minutes.

NOTE: The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequency as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antenna—1 ft. coiled, 28 mil. and 60 ohm.

<table>
<thead>
<tr>
<th>Band</th>
<th>Frequency Setting</th>
<th>dummy watt</th>
<th>Connection to Radio</th>
<th>Variable Condenser Setting</th>
<th>Trimmer Adjusted (In Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>46 Kc. 1 MFD.</td>
<td>Grid of I.F. Tube</td>
<td>Broadcast</td>
<td>Two trimmers on top (see Fig. 1)</td>
<td>Output</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>46 Kc. 1 MFD.</td>
<td>Grid of I.F. Tube</td>
<td>Broadcast</td>
<td>Two trimmers on top (see Fig. 1)</td>
<td>I.F.</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td>Broadcast</td>
<td>1700 Mc. 20 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1450 Mc. 20 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1080 Mc. 10 mfd.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Trimmer 1</td>
<td>Trimmer 2</td>
<td>Adjust to maximum output</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Antenna tie into the signal generator to prevent the loading-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

©John F. Rider, Publisher
Chassis No. 98BBR57A

Power Consumption ......... 2.5 Amps at 6.3 Volts
Power Output .............. 6 Watts Undistorted
Sensitivity (for .05 Watts Output) Broadcast 10 Microvolts Average
Shortwave 20 Microvolts Average

- Volume control.—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna values in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for tuning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequency.
- An oscilloscope for tuning.
- A non-metallic screwdriver.
- Dummy antennas—1 m, 200 mill and 400 ohms.

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Frequency Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Capacitor Setting</th>
<th>Trimmer Separated (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Grid of 6SK7</td>
<td>Broadcast</td>
<td>Two trimmers on top</td>
<td>See Fig. 0</td>
<td>Input</td>
<td>Adjust</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Plates out of sight)</td>
<td>See Fig. 0</td>
<td></td>
<td>to minimum</td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Grid of 6DG</td>
<td>Broadcast</td>
<td>Two trimmers on top</td>
<td>See Fig. 0</td>
<td>Input</td>
<td>Adjust</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Plates out of sight)</td>
<td>See Fig. 0</td>
<td></td>
<td>to minimum</td>
</tr>
</tbody>
</table>

| SHORT WAVE BAND       |                                   |               |                     |                         |                                |                                  |                  |            |
|                       | 17 Mc                               | 430 ohms      | Antenna lead       | Short Wave              | Set Dial                   | See Fig. 2                      | Trimmer (C)      | Adjust to  |
|                       |                                    |               |                     |                         | (See Fig. 2)               |                                  |                  | maximum     |
|                       | 17 Mc                               | 430 ohms      | Antenna lead       | Short Wave              | Set Dial                   | See Fig. 2                      | Trimmer (C)      | Adjust to  |
|                       |                                    |               |                     |                         | (See Fig. 2)               |                                  |                  | maximum     |
|                       | 6 Mc                                | 430 ohms      | Antenna lead       | Short Wave              | Set Dial                   | See Fig. 2                      | Trimmer (C)      | Adjust to  |
|                       |                                    |               |                     |                         | (See Fig. 2)               |                                  |                  | maximum     |

| BROADCAST BAND        |                                   |               |                     |                         |                                |                                  |                  |            |
|                       | 1750 Kc                             | 200 mill      | Antenna lead       | Broadcast               | Set Dial                   | See Fig. 2                      | Trimmer (C)      | Adjust to  |
|                       |                                    |               |                     |                         | (Plates out of sight)       |                                  |                  | maximum     |
|                       | 300 Kc                              | 200 mill      | Antenna lead       | Broadcast               | Set Dial                   | See Fig. 2                      | Trimmer (C)      | Adjust to  |
|                       |                                    |               |                     |                         | (Plates out of sight)       |                                  |                  | maximum     |
|                       | 600 Kc                              | 200 mill      | Antenna lead       | Broadcast               | Set Dial                   | See Fig. 2                      | Trimmer (C)      | Adjust to  |
|                       |                                    |               |                     |                         | (Plates out of sight)       |                                  |                  | maximum     |

NOTE: "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

After each band is completed, repeat the procedure as a final check.

FIG. 2—MODEL 62-381 A. C. POWER UNIT

MODEL 62-381 Power Unit

(For 105-125 Volt 50/60 Cycle A. C. Operation)

TUBES:
The following complement of this chassis consists of the following octal base glass and metal tubes:
1-Type 6DG6 First Detector-oscillator.
1-Type 6SK7 Remote Cut-Off Pentode, I. F. Amplifier (65 k. C.)
1-Type 67G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1-Type 6G6Q Output Amplifier.
1-Type 6A656 D. C. Amplifier.
1-Type 6AD666 Cathode-Ray Tuning Eye.

NOTE:—If the 62-381 A. C. power unit is installed in place of the 6 volt power unit, the tube complement of the radio will consist of one more tube:
1-Type 5Y3G Rectifier.
BALANCING INSTRUCTIONS

ARVIN MODEL 7A CAR RADIO

All sensitivities given for 1/2 watt output equal 1.4 V. across Voice Coil

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Bal.</th>
<th>Bal. Oscillator To</th>
<th>Adjust Padder</th>
<th>Dial</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6AS Grid</td>
<td>650</td>
<td>1, 2, 3, and 4</td>
<td>550 KC</td>
<td>0.10 uv</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Coupler</td>
<td>1400</td>
<td>5</td>
<td>1600</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Through 20 uuf</td>
<td>1600</td>
<td>6</td>
<td>1400</td>
<td>0.10 uv</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>600</td>
<td>7</td>
<td>600</td>
<td>0.10 uv</td>
</tr>
</tbody>
</table>

*Operation No. 4 adjusts bias on 6AS to obtain 0.1 uv sensitivity; for metropolitan areas this sensitivity may be set as low as 0.03 uv, and in mountainous areas as high as 0.1 uv, to secure the most satisfactory reception.
ARVIN MODELS 828AT, 838AT
Noblitt-Sparks Industries, Inc.
Alignment, Tuner Data
Sensitivity

ARVIN 828AT-838AT AUTOMATIC DIAL TUNING INDICATOR

This receiver should first be removed from its carton and the cabinet carefully cleaned with a soft rag to remove packing lint.

The hook bolts or clips which secure the chassis to the cabinet should be fully tight during shipment; if not, they should be tightened. One will be found on each side of the chassis. Do not loosen these with the brackets which suspend the chassis through rubber grommets. These latter brackets should not be moved unless it is necessary to service the receiver.

The receiver may be prepared for operation by connecting an antenna lead at "A" on the rear terminal strip and connecting a ground lead at "G", leaving the jumper from "D" to "G" in place; or by removing the jumper and connecting the transmission line lead from an ARVIN all-wave antenna kit. (Black lead to "D" and red lead to "A".) Plug the line cord into a suitable receptacle.

Make a list of six stations in your locality which you desire to set up on the station selector, arranging this list so that the stations appear in the order of their frequencies. Cut the call letters of these stations from the sheets supplied with this receiver, leaving a white tab on each end of the piece cut out.

The receiver is placed in operation by turning the right-hand knob in a clockwise direction. This knob also functions as a tone control. The second knob or the left should be turned to the maximum counter-clockwise or manual tuning position.

Tune in the first station on your list, using the tuning indicator to determine whether station is properly tuned in. Change the Manual-Automatic Tuning switch under proper instructions. Unless one of the buttons about to be adjusted happens to be set at this point the receiver will now appear to be inoperative. (It may be necessary to push the button down to be set at the proper point—no adjustment is necessary. If the pilot light is not in proper rotation, the sockets may be exchanged from the rear.) Looking at the rear of the dial and on the side towards which the pointer is now pointing, place the button in the clockwise position. Set the other end of this point to the highest pilot light on that side of the dial. Lower this button by means of a turn in the counter-clockwise direction and slide the button in its track slowly until a point is reached where the receiver operates. The correct location for this button is directly behind the kite strap carried by the arm behind the plate on which the buttons are mounted. If this correct location cannot be attained by sliding the button in the particular track it now occupies, the button should be slid along the track to the point where it may be taken out and inserted in a track where this adjustment is possible.

The Manual-Automatic Tuning switch should now be returned to the Manual position; the second station on the list tuned in; the Manual-Automatic Tuning switch again thrown to the Automatic Tuning position; the button at the rear of the dial selected whose lead goes to the second pilot light; this button should be loosened, slid along the track and again tightened at the point where the receiver operates.

This same procedure should be continued for each station successively right around the dial, which then complete the setup.

When the receiver is being operated with the Manual-Automatic Tuning switch in the manual position, the receiver tunes sharply and any station within the range of the receiver may be selected with will. Tone quality to suit the taste of the listener may be obtained by adjustment of the tone control.

On the other hand, when the Manual-Automatic Tuning switch is in the automatic tuning position, the receiver functions in an entirely different manner. Throwing this switch automatically broadens the selectivity characteristics of the receiver.

It should be noted that this broad selectivity will only function satisfactorily on the lower stations, that is, those which are normally selected for use on the ARVIN Station-Selector. (This broadened selectivity is not practical in the main tuning position because of inter-station interference which would inevitably result.)

Should the listener so desire, this increased fidelity can be corrected for by readjusting the setting of the tone control.

When this receiver is being operated on the police- amateur or foreign-short wave band, tuning should always be done manually and no attempt made to utilize the station selector of which feature has been set up for the broadcast band.

BALANCING INSTRUCTIONS MODELS 828AT AND 838AT

SENSITIVITY:
A. Broadcast Band—50 Microvolts Minimum
B. Police Band—75 Microvolts Minimum
C. Short Wave Band—100 Microvolts Minimum

Notes: Standard output is considered 300 milliwatts which is equal to 1.12 R.M.S. AC volts across the voice coil of the speaker. Sensitivity is determined by the amount of input in microvolts required to produce 1.12 volts at the voice coil. Measurement may be made with any AC voltmeter or output meter. The intermediate frequency transformers embodied in the circuit of ARVIN MODELS 828AT-838AT are of the semi-parametric type, the only adjustment being variable iron cores in the fields of the transformers. It is advisable before attempting to rebalance the intermediate stages of this receiver, therefore, to check the overall intermediate frequency stage sensitivity. This may be accomplished by connecting the 455 K. C. output of a standard signal generator to the grid end of the 6AG7 tube after removing the grid clip. Connection should be made through a standard 300 ohm dummy antenna. Check sensitivity and perform all balancing procedure with the automatic tuning in the "off" position. The intermediate frequency sensitivity should be at least 75 microvolts for 50 milliwatts output. If the I.F. sensitivity is within the limits prescribed the following instructions for balancing may then be followed.

If the I.F. sensitivity is low then adjust screws 1, 2, 3 and 4 for maximum output:
1. Connect the signal generator to the A and G terminals on the rear of the radio. Rotate the condenser until it is fully in mesh (maximum clock-wise position.) The dial pointer should point to the center of the station window which is alongside 550 kilocycles (56 on the American broadcast band).
2. Rotate dial pointer to 1,400 K. C. Set band switch to Broadcast Position. Adjust paddder No. 5 to resonance. Adjust paddder No. 6 for maximum output.
3. Rotate dial pointer to 600 K. C. With 600 K. C. input from the signal generator adjust paddder No. 7 for resonance.
4. Set band switch to mid-band position. Rotate dial pointer to 5.0 megacycles. With 5,000 K. C. input from signal generator adjust paddder No. 8 for resonance. Adjust paddder No. 9 for maximum output.
5. Set band switch to short-wave band position. Rotate dial pointer to 15.0 megacycles. With 15 megacycles from signal generator turn paddder No. 10 to the extreme clockwise position.

Compliments of www.nucow.com
BALANCING INSTRUCTIONS:
All sensitivities given for 1/4 watt output — 1.4 V. across Voice Coil

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6A8 Grid</td>
<td>455</td>
<td>1, 2, 3 &amp; 4</td>
<td>5</td>
<td>500 KC</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Coupler</td>
<td>1400</td>
<td></td>
<td>5</td>
<td>1400</td>
</tr>
<tr>
<td>3</td>
<td>Through 20 uuf</td>
<td>1400</td>
<td>6</td>
<td>1400</td>
<td>10 uv</td>
</tr>
<tr>
<td>4</td>
<td>&quot;</td>
<td>600</td>
<td>7</td>
<td>600</td>
<td>10 uv</td>
</tr>
</tbody>
</table>

RESISTORS:

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5</td>
<td>17-2070</td>
<td>500,000 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R9</td>
<td>17-2080</td>
<td>1,000,000 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R65</td>
<td>17-14281</td>
<td>25,000 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R170</td>
<td>17-14287</td>
<td>80 ohm, 1 W.</td>
</tr>
<tr>
<td>R171</td>
<td>17-14288</td>
<td>15,000,000 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R172</td>
<td>17-14289</td>
<td>100 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R173</td>
<td>17-14290</td>
<td>200 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R174</td>
<td>17-14291</td>
<td>20,000 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R175</td>
<td>17-14292</td>
<td>40,000,000 ohm, 1/4 W.</td>
</tr>
<tr>
<td>R176</td>
<td>17-14225</td>
<td>500,000 ohm, var. control</td>
</tr>
</tbody>
</table>

CONDENSERS:

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C182</td>
<td>29-16217</td>
<td>Tuning Condenser</td>
</tr>
<tr>
<td>C195</td>
<td>17-14217</td>
<td>.0002 mfd, 600 V.</td>
</tr>
<tr>
<td>C165</td>
<td>17-14230</td>
<td>.000 mfd, 1200 V.</td>
</tr>
<tr>
<td>C193</td>
<td>17-14224</td>
<td>.003 mfd, 600 V.</td>
</tr>
<tr>
<td>C189</td>
<td>17-14266</td>
<td>.0005 mfd, pad.</td>
</tr>
<tr>
<td>C191</td>
<td>17-14272</td>
<td>.01 mfd, 400 V.</td>
</tr>
<tr>
<td>C192</td>
<td>17-14273</td>
<td>.0025 mfd, 600 V.</td>
</tr>
<tr>
<td>C193</td>
<td>17-14274</td>
<td>.05 mfd, 200 V.</td>
</tr>
<tr>
<td>C195</td>
<td>17-14276</td>
<td>.05 mfd, 400 V.</td>
</tr>
<tr>
<td>C196</td>
<td>17-14277</td>
<td>.1 mfd, 200 V.</td>
</tr>
<tr>
<td>C197</td>
<td>17-14278</td>
<td>.0001 mfd, 600 V.</td>
</tr>
<tr>
<td>C198</td>
<td>17-14279</td>
<td>.0005 mfd, 400 V.</td>
</tr>
<tr>
<td>C199</td>
<td>17-14283</td>
<td>.02 mfd, 200 V.</td>
</tr>
<tr>
<td>C201</td>
<td>17-14285</td>
<td>.5 mfd, -150 V.</td>
</tr>
<tr>
<td>C202</td>
<td>17-15286</td>
<td>10-10 mfd, 300 V.</td>
</tr>
<tr>
<td>C203</td>
<td>20-15242</td>
<td>2 mfd, 200 V.</td>
</tr>
</tbody>
</table>

COILS and TRANSFORMERS:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>00-18218</td>
</tr>
<tr>
<td>T-2</td>
<td>00-18220</td>
</tr>
<tr>
<td>T-3</td>
<td>00-18221</td>
</tr>
<tr>
<td>T-4</td>
<td>00-18222</td>
</tr>
<tr>
<td>T-5</td>
<td>00-18223</td>
</tr>
<tr>
<td>T-6</td>
<td>00-18224</td>
</tr>
<tr>
<td>X-1</td>
<td>20-13455</td>
</tr>
<tr>
<td>X-2</td>
<td>20-13459</td>
</tr>
<tr>
<td>TL</td>
<td>00-18233</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 578B
Alignment Voltage

NOBLITT-SPARKS INDUSTRIES, INC.

Data

<table>
<thead>
<tr>
<th>Tube</th>
<th>Heater</th>
<th>Plate</th>
<th>Suppressor Grid</th>
<th>Screen Grid</th>
<th>Plate</th>
<th>Oscillator Grid</th>
<th>Amode Grid</th>
<th>Diode Plates</th>
<th>Control Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>6.3</td>
<td>650</td>
<td>0</td>
<td>0</td>
<td>75</td>
<td>175</td>
<td>3.4</td>
<td>3.4</td>
<td>0</td>
</tr>
<tr>
<td>6A7</td>
<td>6.3</td>
<td>650</td>
<td>0</td>
<td>0</td>
<td>75</td>
<td>175</td>
<td>3.4</td>
<td>3.4</td>
<td>0</td>
</tr>
<tr>
<td>78</td>
<td>6.3</td>
<td>650</td>
<td>3.2</td>
<td>0</td>
<td>75</td>
<td>90</td>
<td>20</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>6.3</td>
<td>650</td>
<td>0</td>
<td>0</td>
<td>175</td>
<td>172</td>
<td>170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>6.3</td>
<td>195</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Socket voltages given in table are for an input of 5.8 volts at the tubes in the receiver. 5.8 volts is the average obtained in various cars after allowing for drop in car wiring.

MODEL 578B ARVIN RADIO

TUBES: 1C7G—1st Detector-Oscillator
       1D5G—I. F. Amplifier
       1H6G—2nd Detector
       1G5G—Audio Output Amplifier

FREQUENCY RANGE: 540 to 1,725 Kilocycles

POWER OUTPUT: 300 Milliwatts

SPEAKER:
       6” Permanent Magnet Dynamic
       3 ohm voice coil—400 cycles

VOLTAGE AND POWER CONSUMPTION:
       "A" Battery—360 milliamperes at 2.1 volts
       "B" Battery—12-15 milliamperes at 90 volts

SENSITIVITY:
       1000 KC.—100 Microvolts for 50 milliwatts output
       456 KC.—200 Microvolts for 50 milliwatts output

---

CONNECT an output meter or A. C. Voltmeter across the speaker coil leads.

1. Connect the signal generator to the grid cap of the 1C7G tube and with an input of 456 K. C. adjust padders 1, 2, 3 and 4 for maximum output.

2. Connect the signal generator through a standard 200 micromicrofarad dummy antenna to the antenna (green) lead wire on the rear of the chassis. Ground the generator to the (black) ground wire.

3. Rotate the tuning condenser to the wide open position. Check the dial pointer to see that it is parallel to the horizontal line across the dial face.

4. Rotate the dial pointer to 1,400 K. C. and with an input of that frequency adjust padde No. 5 to resonance. Adjust padde No. 6 for maximum output.

5. Rotate the dial pointer to 600 K. C. and with an input of that frequency adjust the series padde No. 7 to resonance.

6. Return to 1,400 K. C. and recheck the settings of padders No. 5 and No. 6.
Alignment, Trimmers

NOBLITT-SPARKS INDUSTRIES, INC.

Sensitivity

ARVIN RADIO CHASSIS RE27

RADIO MODELS 89 and 91

6A8

6K7

6Q7G

6V6G

235V

235V

140V

225V

225V

220V

220V

220V

170V

300V.AC

5V3G

6U5

295V

All voltage readings taken to chassis base. Allowable voltage variation, plus or minus 20% from values shown.

BALANCING INSTRUCTIONS

ARVIN MODELS 89 & 91 -- RE27 CHASSIS

All sensitivity is given for 200 milliwatts output - .78 V across voice coil.

Operation

Connect A.C. Input Frequency Padder No. Dial Band Switch Sensitivity

1 6A8 Grid 455 KC 1,2,3,4 4 600 K Broadcast 70 uv

2 Antenna Wire 1600 KC 5 1600 K Broadcast

3 Antenna Wire 1600 KC 6 1600 K Broadcast 25 uv

4 Antenna Wire 600 KC 7 600 K Broadcast 40 uv

5 Antenna Wire 15 MC 8 15 MC Short Wave

6 Antenna Wire 15 MC 9 15 MC Short Wave 120 uv

7 Antenna Wire 7 MC 10 7 MC Short Wave 150 uv

* Dial pointer should be parallel with horizontal line across center of dial with tuning condenser in closed position (max. capacity) before proceeding with adjustments.

** After balancing 600 K padder, return and recheck the adjustments of padders 1, 2 & 3.

Cable & Antenna

Ref. No. Part No. Description Price
96 00-19995 Power Transformer 4.50
95 00-19996 6 Volt Transformer 1.75
94 00-19998 12 Volt Transformer 3.00
93 00-19999 24 Volt Transformer 4.50

Speaker Dial Parts, Cabinet & Miscellaneous

Ref. No. Part No. Description Price
29-3188 Instruction Sheet .02
28-3156 Dial Drive Assembly (cabinet) .30
21-3592 Speaker Mount .15
29-15856 Dial Drive Cord .15
31-15960 Dial Drive Cord Spring .05
17-15970 Taping Eye Cable .40
17-15970 Dial Light Fixture .15
17-15970X 100 V. Wire Cord .40
29-15970A Dial Pointer .12
31-16000 Dial Glass .25
17-16500 Band Switch .75
17-16500 Volume Control .75
17-16500 Tone Control 1.00
29-16502 Mouthpiece .10
31-16502 Elect. Eye Recondition .25
31-16502 Reconditioning Plate (Table) .50
31-16502 Reconditioning Plate (Table) .25
17-16502 Speaker 4.50
17-16510 Cabinet Model 90 11.00
29-16512 Cabinet Model 90 30.00
29-16512 Knob (Tuning and volume) .15

©John F. Rider, Publisher

Compliments of www.nucow.com
578B Top Chassis View

578B Bottom Chassis View

©John F. Rider, Publisher
FIG. 1 MODEL 982083 - CIRCUIT DIAGRAM

The Oldsmobile Model 982083 is a six tube single unit receiver with variable tone control. This receiver was designed specifically for 1938 Model Oldsmobiles and is equipped with an instrument panel tuning control having a variable tone control in addition to the tuning and volume controls.
SUBJECT—VIBRATOR "HASH" NOISE

Caution: Only radios that have a vibrator hash noise should have this correction made. If there is no hash noise and these changes are made to prevent hash development, it will only tend toward driving hash noise into the radio.

CORRECTION

The following procedure to correct vibrator hash is:

Deluxe Model - 982084 ONLY

1. The Bond that grounds the Gang Condenser to the Antenna Coil can should be held against the Gang Condenser bracket and soldered. This is shown in Figure 1 before change, and Figure 2 after change.

2. Bend vibrator prongs away from receiver case as shown in Figure 4.

3. Tighten power supply mounting nuts.

Standard Model - 982083 ONLY

1. Ground the Gang condenser can as shown in Figure 2.

2. Bend vibrator prongs away from receiver case as shown in Figure 4.

3. Tighten power supply mounting nuts.

4. Remove the receiver from the car and add a .0008 MFD condenser from the small terminal strip to ground. Solder one end of condenser to the same terminal that the two small resistors are soldered to and solder the other end of the condenser to the chassis ground, as shown in Figure 6.
The Oldsmobile Model 982084 is an eight tube Dash Speaker Deluxe Receiver with tone and sensitivity controls. This receiver was designed specifically for 1938 Oldsmobiles and is equipped with an instrument panel tuning control having a sensitivity switch and variable tone control in addition to the tuning and volume controls.

The antenna circuit is directly coupled to the antenna, in contrast with the capacity coupled circuit used in some previous Oldsmobile models. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna, either of which is provided for on the frequency end of the band (1400 K.C.) instead of the low frequency end, as with the capacity coupled sets. There are two taps provided on the Antenna Coil. One for use with the Running Boards Antenna and the other for use with the overhead (Roof) type Antennas.
1. Aligning I-F Stages at 260 Kilocycles:

**IMPORTANT:** The sensitivity switch on the tuning control should be in the "Distance" position when aligning the receiver, or the cable from the control unit to the receiver disconnected.

a. Connect the signal lead of the test oscillator to the grid cap of the 2A96 tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

b. Connect the ground lead of the test oscillator to the chassis frame.

c. Connect the output meter across the plate power of the output tube. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. Voltages.

d. Set the test oscillator to exactly 260 K.C.

e. Adjust the trimmers on the I-F coils (Illustration 6 and 7, Figure 2) for maximum output. These adjustments should be repeated several times and during alignment, the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1580 Kilocycles:

a. Leave the test oscillator leads connected the same as for aligning the I-F circuits.

b. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

c. Set the test oscillator to 1580 Kilocycles.

d. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illustration 6, Figure 3) for maximum output. (It is very important that this frequency be set accurately, as a slight mis-setting will cause the receiver to go out of track over the entire high frequency end of the dial.)

3. Aligning at 540 Kilocycles:

a. Leave test oscillator leads connected the same as before.

b. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

c. Set the test oscillator to 540 K.C.

d. Adjust the oscillator tuning condenser (Illustration 8B, Figure 2) located on the mounting plate of the receiver to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles:

a. Remove the signal lead of the test oscillator from the grid of the Translating tube and connect to the antenna terminal of the receiver through a .00056 mfd. Mica Condenser connected in place of the .1 mfd. condenser previously used. (It is very important that a .00056 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.)

b. Set the test oscillator to 1400 K.C.

c. Turn the condenser rotor plates until the frequency is tuned in with maximum output.

d. Adjust the R-F parallel trimmer on the condenser gang (Illustration 11B) and the antenna compensating condenser which is in series with the parallel trimmer on the Condenser Gang (Illustration 11A, Figure 1).

5. Aligning at 900 Kilocycles:

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to re-set the oscillator tracking condenser at 900 K.C. in order to make the receiver track properly and to secure full sensitivity.

a. Set the test oscillator on 900 K.C.

b. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

c. Maintain a low output signal from the test oscillator and readjust the oscillator gang tuning shaft back and forth through the signal.

d. This operation should be continued until no further increase in output can be obtained.

**NOTE:** If the entire alignment procedure has been accomplished correctly, the receiver should be nearly uniformly sensitive over the entire frequency range.

---

**OLDSMOBILE DIV. — GEN. MOTORS**

10231 292684

1952 1953

ALIGNMENT, Voltage

FIG. 5 TUBE FROTH VOLTAGES

| DISTANCE | 0 VOLTS |
| AUTOMATIC | 40 VOLTS |
| LOCAL | 11 VOLTS |

Current drain 7.1 to 7.5 Amperes
Supply drain approximately 46 M.A. to 56 M.A.

**BOTTOM VIEW OF TUBE SOCKETS**

Readings taken from tube socket contacts to ground with A.D.C. Voltmeter having a resistance of 1000 ohms per volt; A' Battery 6 Volts
CIRCUIT DESCRIPTION

The circuit used in this receiver is the conventional superheterodyne type and does not employ regeneration.

An Automatic Speed Volume Control, which increases volume with car speed, is incorporated in the receiver.
Circuit Diagram

Olds Model 982127

Date: April 20, 1939

The antenna circuit is capacity coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the low frequency end of the band (600 K.C.). There are two antenna receptacles provided on the receiver. One for use with the Running Boards Antenna and the other for use with Side Cowl Mounted type Antenna.
OLDSMOBILE DIV.—GEN. MOTORS

Compliments of www.nucow.com
1. Aligning I-F Stages at 266 Kilocycles:
   a. Connect the signal lead of the test oscillator to the grid cap of the 6A8G tube through a .1 mfd condenser, leaving the tube's grid clip in place.
   b. Connect the ground lead of the test oscillator to the chassis frame.
   c. Connect the output meter from the plate prong of the 6V6Q to ground. Care should be taken when connecting the output meter to insert a .005 mfd condenser to protect the meter from d.c. voltages.
   d. Set the test oscillator to exactly 266 K.C.
   e. Adjust the trimmers on the I-F coils (Illustration 6 and 7, Figure 5) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1540 Kilocycles:
   a. Leave the test oscillator leads connected the same as for aligning the I-F circuits.
   b. Turn the rotor plates of the gap condenser all the way out and against the high frequency stop.
   c. Set the test oscillator to 1540 kilocycles.
   d. Adjust the parallel trimmer for the oscillator section of the condenser gap (Illustration 11C, Figure 5) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles:
   a. Leave test oscillator leads connected the same as before.
   b. Turn the rotor plates of the gap condenser all the way into mesh so that they rest against the low frequency stop.
   c. Set the test oscillator to 540 K.C.
   d. Adjust the oscillator tapping condenser (Illustration 20, Figure 7) located on the outer plate of the oscillator to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles:
   a. Remove the signal lead of the test oscillator from the grid of the Transistor tube and connect to the antenna terminal of the receiver THROUGH A .0005 mfd. MICA CONDENSER in place of the .1 mfd. condenser previously used. (It is very important that a .0005 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscilators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.)
   b. Set the test oscillator to 1400 K.C.
   c. Turn the condenser rotor plates until the frequency is tuned in with maximum output.

5. Adjust the R-F parallel trimmer on the condenser gap (Illustration 14-8) and the antenna compensating condenser which is the parallel trimmer on the Condenser Gap (Illustration 14-4, Figure 5).

   b. Turn the condenser rotor plates until the signal from the test oscillator is in the maximum output.
   c. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illustration 20, Figure 7) while rocking the variable condenser gap tuning shaft back and forth through the signal.
   d. This operation should be continued until no further increase in output is obtained. Note if the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.
CONVERSION CONTROL UNIT 412304

1213385 Arm Assembly
723608 Bezel Assembly
5271383 Cable & Plug Assembly
Cable & Plug Assembly
1213397 Off-On Switch Actuating
7236443 Pulley Assembly
1213391 Tone Control
7236230 Pulley Assembly
1213389 Tone Control
1209883 Resistors
7236230 Insulated 50,000 ohms, 1/2 Watt
Resistor
502433 Insulated 100,000 ohms, 1/2 Watt
1213388 Resistor
1209883 Screw 4-36 x 3/16 Bezel Mounting
1213387 Station Indicator
1213390 Shaft
Station Selector
1213386 Shaft
Volume Control
115273 Stud
1213384 Idler & Pinion
1213386 Driving Pinion
1213378 Switch
1213378 Off-On
7236583 Knob
1213347 Driving Pinion
1213378 Switch
7236739 Knob
7236481 Control Mounting
1213381 Gear Assembly
1213389 Gear Assembly
6 Prong Cable and Plug Assembly
1213394 Switch
1213379 6 Prong Cable and Plug Assembly
5271569

Note that Remote Control, 412073, for Radio 982153 is the same as 412304 except it will be less the following:

7236739 Knob
1213394 Switch
5271569 6 Prong Cable and Plug Assembly

Olds Model 982153
Date: Dec. 30, 1938

Compliments of www.nucow.com
INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0038 mica condenser for short circuit.

This receiver is designed to operate over two tuning ranges:
from 540 K.C. to 1730 and from 5800 K.C. to 18000 K.C.
MODEL 36
110-115 volts A.C. or D.C.

FOR ALIGNMENT, SEE THAT OF MODEL 35
ON PACIFIC PAGE 9-6, RIDER'S VOL. IX

SWITCH POSITION          BAND          RANGE IN KILOCYCLES
Left                     Broadcast      540—1710 KC
Center                   Intermediate   1710—5800 KC
Right                    Short Wave (foreign) 5800—17500 KC

©John F. Rider, Publisher
This receiver is designed to operate on 110-115 volts A.C. 60 cycles.
TOUCH TUNING PROCEDURE.
Station with lowest frequency is assigned to Button No. 1. Push this to "IN" position, select station by turning Coax, screw No. 1 for maximum volume and adjust further with Ant. Trimmer screw No. 2. Set other four buttons in the same way with their respective adjustments. Do not use button marked "Dial" to change from manual tuning; just push button for station desired.

Ant. Trimmer is in front corner of box. To trim remove button in box. Turn station knob until stop is reached. Adjust pointer to the right hand stop line on dial face. Tune in a weak signal between 550 and 650 kc and adjust trimer for maximum volume. This is the only adjustment to match the receiver to the antenna. If antenna capacity is too high, use a series by-pass condenser, 250-500 muf at the receiver and shield it. Dial adjustment is made by removing the pilot light in rear of control head and inserting a small screw-driver in slot, turning pointer to desired setting.
Model 160 Automatic

The automatic frequency control in the Model 160 Packard-Bell radio is so arranged that it does not interfere with the normal selectivity of the receiver. Any station that can be received without automatic frequency control can also be received with it. The only instances where A.F.C. will give preference to a more powerful station is when the stronger station will be heard in the background of the weaker one. From this it is obvious that an A.F.C. switch is unnecessary. This eliminates a control which would have been confusing to most people.

INFORMATION FOR SETTING MARLINS ON CONTROLLER. To begin with, in setting the motor controller (mounted at center rear of chassis) one must first determine what stations are desired on the right station key.

To do this examine the station selector dial and determine the location of stations related to each side of dial center. This done, it is then necessary to allow a sufficient number of sliders (station markers) corresponding to push-button switches on station keyboard of receiver panel below large dial.

Let us take, for example, a choice which would give us 5 stations between center and left hand side of dial, and 3 between center and right hand side of dial. When considering push-button switches to correlate in numerical order with stations chosen as follows: KBQ, KBQF, KBQH, WAX, KMBS, all being, and KAX, giving KBQA No. 1 position, others following consecutively, completing with KFX as No. 8. Considering push-buttons on panel from left to right as reading from 1 to 8, the correct sequence will result for control sliders at rear of chassis. Control sliders are set up to correspond with buttons in correct numerical order. That is, on rear slider rail you will find buttons, and on front slider rail 4 buttons. Sliders or buttons on front are odd numbers, i.e. 1-3-5-7, and on rear are even numbers, i.e. 2-4-6-8. Locking from rear the right hand slider corresponds to left front panel push button looking from front.

OPERATION: Starting with KBQA, push button No. 1 until it locks. Then release and push slider 2 back and forth until dial pointer comes to rest at KBQA as marked on dial. Follow this procedure for all other stations.

The buttons marked R and L are used to tune in stations not set up on the keyboard. For example, if one is listening to KBQ and decides to change to KBQH then all that is necessary is to press the button L down until pointer turns to KBQH, then release button and pointer will stop, or if one is listening to KBQ and wants to change to KBQH just press the button R down and hold until the pointer gets to KBQH, then release. In other words button R controls the motor to the right and button L to the left.

Alignment Procedure

Turn the dial (manually) to 1740 kc position (plate of tuning condenser completely unassembled) and set volume control at maximum. Turn the band switch to broadcast position. Short the cathode of 6BA tube (now connected to 2 meg. resistor) to chassis so that the automatic frequency control will be nullified during alignment. Connect the output lead of the signal generator to the grid of the 688 tube through a .006 condenser and set dial of generator to 450 kc. Adjust i.f. trimmers 1, 2 and 3 until maximum output is obtained, wile maintaining as low a value of signal as will allow obtaining of accurate adjustment.

Now turn signal generator to 1740 kc and connect output lead through .006 condenser to antenna post of receiver. Turn dial pointer of receiver to horizontal position and adjust oscillator trimmer 5, antenna trimmer 7 and first detector trimmer 8 for maximum output. Next tune the generator to 600 kc. Turn dial pointer of radio to point of maximum signal and adjust trimmer 8 for increase in signal. At the same time rock the tuning condenser back and forth through resonance while adjusting the slider until maximum output is obtained. This should occur when the receiver dial is set at approximately 600 kc. Now tune back across the dial and if not exactly on 600 kc at the high frequency end readjust trimmers 6 and 7 for correction. Do not attempt to play the receiver with only one speaker as there are two audio channels and the tone quality will be very poor unless both speakers are used.

Band Number 4. (1.6 to 6.0 Mc) Turn knob of waveband switch to amateur position. Tune signal generator to 5.6 kc and set radio dial to 5.6 position. Adjust oscillator trimmer 9 and antenae trimmer 10 for maximum output. There is no k.f.c. stage on the amateur and foreign bands.

Band Number 5. (5.6 to 16.0 Mc) Turn knob of waveband switch to foreign position. Tune signal generator to 15 mc and connect output lead to antenna post through a 250 ma condenser and a 400 ohm resistor. Set volume control at maximum. Turn radio dial to 15 mc and adjust oscillator trimmer 11 and first detector trimmer 12 for maximum output. After completing alignment of all bands then disconnect 6BA cathode jumper so that the A.F.C. will be active again. The discriminator circuit is adjusted at the factory and should not be touched under any circumstances.
PHILCO RADIO & TELEV. CORP.

Schematic Diagram

Models 39-6, 39-7, Code 121

Frequency Range: 530 to 1720 K.C.
Intermediate Frequency: 470 K.C.

Philco Tubes Used: 6A7, First Detector Oscillator; 78, I.F. Amplifier; 75, Second Detector, A.V.C., First Audio; 41, Audio Output and 84, Rectifier.

Power Supply: 115 V., 50 to 60 cycle A.C.
Power Transformers are available for operation on 115 V., 25 to 40 cycles A.C.

Power Consumption: 30 watts.
Audio Output: One (1) watt.

© John F. Rider, Publisher

Compliments of www.nucow.com
Alignment of Compensators

EQUIPMENT REQUIRED:

1. Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 30,000 K.C. is the correct instrument for this purpose.

2. Output Meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.

3. Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3106.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and screen terminals of the type 41 tube and adjusted for the 0 to 30 V.A.C. scale. After connecting the output meter, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown on Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

TYPE OF CIRCUIT: Models 39-6, code 121; and 39-7, code 121, employ a five-tube A.C. operated superheterodyne circuit, covering standard broadcast frequencies; Automatic Volume Control, and Pentode Audio Output. In general the two models are similar but differ in their tuning mechanisms and cabinets.

Model 39-6 is manually tuned and is assembled in cabinet type C.

Model 39-7, code 121, in addition to being manually tuned, is equipped with six Electric Automatic Push-Buttons. Five push-buttons are used for selecting any one of five stations in the standard broadcast range, and one push-button for changing to manual tuning. The procedure for adjusting the push-buttons for reception of stations will be found in the instructions supplied with each set.

Copyright 1938—Philco Radio & Television Corp.

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A</td>
<td>Silver Mica Cond. (20 mfd.) (39-7)</td>
<td>20-1123</td>
</tr>
<tr>
<td>7</td>
<td>1st I.F. Trans. Assy. (39-6)</td>
<td>22-1120</td>
</tr>
<tr>
<td>8</td>
<td>1st I.F. Trans. Assy. (39-7)</td>
<td>22-1211</td>
</tr>
<tr>
<td>9</td>
<td>Resistor (50,000 ohms, ½ watt)</td>
<td>33-350339</td>
</tr>
<tr>
<td>10</td>
<td>Resistor (25,000 ohms, ½ watt)</td>
<td>33-325339</td>
</tr>
<tr>
<td>11</td>
<td>Tubular Cond. (.05 mfd.)</td>
<td>30-4444</td>
</tr>
<tr>
<td>12</td>
<td>2nd I.F. Trans. Assy.</td>
<td>32-2674</td>
</tr>
<tr>
<td>13</td>
<td>Resistor (50,000 ohms, ½ watt)</td>
<td>33-351339</td>
</tr>
<tr>
<td>14</td>
<td>Volume Control (.5 meg.)</td>
<td>33-5254</td>
</tr>
<tr>
<td>15</td>
<td>Tubular Cond. (.01 mfd.)</td>
<td>30-4479</td>
</tr>
<tr>
<td>16</td>
<td>Resistor (40,000 ohms, ¼ watt)</td>
<td>33-340339</td>
</tr>
<tr>
<td>17</td>
<td>Resistor (100,000 ohms, ½ watt)</td>
<td>33-416339</td>
</tr>
<tr>
<td>18</td>
<td>Tubular Cond. (.01 mfd.)</td>
<td>30-4169</td>
</tr>
<tr>
<td>19</td>
<td>Tubular Cond. (.01 mfd.) (39-7)</td>
<td>30-4572</td>
</tr>
<tr>
<td>20</td>
<td>Mica Cond. (.0001 mfd.)</td>
<td>30-1032</td>
</tr>
<tr>
<td>21</td>
<td>Resistor (50,000 ohms, ½ watt)</td>
<td>33-351339</td>
</tr>
<tr>
<td>22</td>
<td>Output Trans. (Speaker 36-1461)</td>
<td>36-4095</td>
</tr>
<tr>
<td>23</td>
<td>Cone and Voice Coil Assy. (Speaker 36-1461)</td>
<td>36-4095</td>
</tr>
<tr>
<td>24</td>
<td>Resistor (70 ohms, ½ watt)</td>
<td>33-070339</td>
</tr>
<tr>
<td>25</td>
<td>Model 39-6</td>
<td>33-070339</td>
</tr>
<tr>
<td>26</td>
<td>Model 39-7</td>
<td>33-050339</td>
</tr>
<tr>
<td>27</td>
<td>Resistor (250 ohms, ½ watt)</td>
<td>33-250339</td>
</tr>
<tr>
<td>28</td>
<td>Electrolytic Cond. (12 mfd., 300 V.)</td>
<td>30-2327</td>
</tr>
<tr>
<td>29</td>
<td>Field Coil (Replace Speaker 36-1461)</td>
<td>36-2328</td>
</tr>
<tr>
<td>30</td>
<td>Power Trans. (115 V., 50 to 60 cycles)</td>
<td>32-2979</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna Note A</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Lead</td>
<td>100 mfd.</td>
<td>1550 K.C.</td>
</tr>
</tbody>
</table>

NOTE A—The "DUMMY ANTENNA" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: With the tuning condenser in "maximum capacity" position (plates fully meshed), set the dial pointer between the two horizontal lines at the low frequency end of the scale (550 K.C.).
**REPLACEMENT PARTS**

**Model 39-17; Codes 121 & 122**

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer</td>
<td>32-0339</td>
</tr>
<tr>
<td>2</td>
<td>Condenser (.05 mfd. tubular)</td>
<td>30-4519</td>
</tr>
<tr>
<td>3</td>
<td>Tuning Condenser Assembly</td>
<td>31-2265</td>
</tr>
<tr>
<td>4</td>
<td>Resistor (.5000 ohms, ½ watt)</td>
<td>33-351259</td>
</tr>
<tr>
<td>5</td>
<td>Condenser (110 ufd. mica)</td>
<td>30-051</td>
</tr>
<tr>
<td>6</td>
<td>Condenser (25 wfd., silver plated mica)</td>
<td>30-30112</td>
</tr>
<tr>
<td>7</td>
<td>Oscillator Transformer</td>
<td>32-3040</td>
</tr>
<tr>
<td>8</td>
<td>Resistor (3.0 megohm)</td>
<td>33-530339</td>
</tr>
<tr>
<td>9</td>
<td>Condenser (.01 mfd. tubular)</td>
<td>30-4449</td>
</tr>
<tr>
<td>10</td>
<td>Resistor (4.000 ohms, ½ watt)</td>
<td>33-340339</td>
</tr>
<tr>
<td>11</td>
<td>1st IF Transformer Assembly</td>
<td>32-3725</td>
</tr>
<tr>
<td>12</td>
<td>2nd IF Transformer Assembly</td>
<td>32-2944</td>
</tr>
<tr>
<td>13</td>
<td>Resistor</td>
<td>33-311339</td>
</tr>
<tr>
<td>14</td>
<td>Volume Control and On-Off Switch</td>
<td>33-5276</td>
</tr>
<tr>
<td>15</td>
<td>Condenser (.01 mfd. tubular)</td>
<td>30-4479</td>
</tr>
<tr>
<td>16</td>
<td>Condenser (mica) 0.250 mfd.</td>
<td>35-1032</td>
</tr>
<tr>
<td>17</td>
<td>Condenser (.01 mfd. tubular)</td>
<td>30-4572</td>
</tr>
<tr>
<td>18</td>
<td>Resistor (16000 ohms, ¼ watt)</td>
<td>33-316339</td>
</tr>
<tr>
<td>19</td>
<td>Resistor (1.0 megohm, ½ watt)</td>
<td>37-50339</td>
</tr>
<tr>
<td>20</td>
<td>Resistor (4.000 ohms, ½ watt)</td>
<td>33-340339</td>
</tr>
<tr>
<td>21</td>
<td>Condenser (.01 mfd. tubular)</td>
<td>30-4572</td>
</tr>
<tr>
<td>22</td>
<td>Output Transformer</td>
<td>32-7980</td>
</tr>
<tr>
<td>23</td>
<td>Cone and Voice Coil Assembly for Speaker (Part No. 36-1426-1)</td>
<td>36-4083</td>
</tr>
<tr>
<td>24</td>
<td>Resistor (250 ohms, wire wound)</td>
<td>33-125431</td>
</tr>
<tr>
<td>25</td>
<td>Resistor (70 ohms, ¼ watt)</td>
<td>32-070339</td>
</tr>
<tr>
<td>26</td>
<td>Field Coil for Speaker</td>
<td>33-2219</td>
</tr>
<tr>
<td>27</td>
<td>Conductor (12 mfd. electrolytic)</td>
<td>30-2236</td>
</tr>
<tr>
<td>28</td>
<td>Condenser (.02 mfd. tubular)</td>
<td>30-4449</td>
</tr>
<tr>
<td>29</td>
<td>Power Transformer (15 volts, 30-60 cycles)</td>
<td>32-7974</td>
</tr>
<tr>
<td>30</td>
<td>Condenser (.01 mfd. 35 mfd. electrolytic)</td>
<td>3903DG</td>
</tr>
<tr>
<td>31</td>
<td>Pilot Lamp</td>
<td>34-2064</td>
</tr>
<tr>
<td>32</td>
<td>Pilot Lamp</td>
<td>34-2064</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS PARTS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Tuning Unit (complete)</td>
<td>31-2282</td>
</tr>
<tr>
<td>Bezel Assembly (diode)</td>
<td>32-9486</td>
</tr>
<tr>
<td>Bezel Gasket (diode)</td>
<td>27-9714</td>
</tr>
<tr>
<td>Bezel (push buttons)</td>
<td>39-8921</td>
</tr>
<tr>
<td>Bezel Gasket (push buttons)</td>
<td>27-9218</td>
</tr>
<tr>
<td>Bezel Clamp (diode)</td>
<td>28-5153</td>
</tr>
</tbody>
</table>

---

**Fig. 1. Schematic Diagram—Model 39-17, Codes 121-122**

**Fig. 4. Part Locations, Underside of Chassis**

- **Replace Speaker.**
- *When ordering Speaker or Cone assembly specify which of the small numbers (1 or 3) following the part number is required.*

© John F. Rider, Publisher

PHILCO RADIO & TELEVISION CORP.

PHILCO PAGE 108

MODEL 39-17

Codes: 121, 122

June 1938
PHILCO RADIO & TELEV. CORP.

SPECIFICATIONS

TYPE OF CIRCUIT: A.C. operated; superheterodyne circuit, TUNING RANGE: 540 to 1720 K.C.

PHILCO TUBES USED: Five tubes: 1-6A7, 1st detector and oscillator; 1-78, I.F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

SPECIAL INSTRUCTIONS:

- Receiver: The circuit consists of the following basic sections: (1) Oscillator, (2) Detector, (3) Audio Amplifier, (4) Automatic Volume Control, (5) Tone Control, (6) Headphones, and (7) Power Supply.
- The receiver is designed to operate from a Philco Utility Aerial, part No. 45-2480. This aerial system should be used to obtain maximum performance from the receiver.
- The power supply allows for the use of 115 volt AC, 50-60 cycles, and 40 watts of power consumption.

INTERMEDIATE FREQUENCY: 470 K.C.

Alignment of Compensators

<table>
<thead>
<tr>
<th>Receiver</th>
<th>Dial Setting</th>
<th>Vol. Cont. (Max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>580 K.C.</td>
<td>1595 K.C.</td>
<td>100 m ( \mu )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operations In Order</th>
<th>647 Grid</th>
<th>470 K.C.</th>
<th>1595 K.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100 m ( \mu )</td>
<td>1595 K.C.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE A**: The "Dummy Astral 2" consists of a condenser, series R.C., and a shunt R.C. Use the capacities specified in each case. Then, adjust the above settings until the readings are correct.

**NOTE B**: Dial calibration. In order to adjust the receiver correctly, dial the meter to track properly with the readings.

Compliments of www.nucow.com
### Alignment of Compensators

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A.C.

#### Equipment Required:
1. Signal Generator: Philco Model 077 Signal Generator, which has a fundamental frequency range from 115 to 36,000 KC, is the correct instrument for this purpose.
2. Output meter: Philco Model 027 Circuit Tester incorporates a sensitive output meter and is recommended.

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>Signal Generator</th>
<th>Receiver</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna (Note A)</td>
<td>Dial Setting</td>
</tr>
<tr>
<td>1</td>
<td>6A7 Grid</td>
<td>.1 mf.</td>
<td>470 KC</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Ter.</td>
<td>100 mmf.</td>
<td>1550 KC</td>
</tr>
</tbody>
</table>

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B**—Insert the signal generator output lead into the "Med" jack and the ground lead into the "Grid" jack of the signal generator. Connect the other end of the output lead to terminal No. 1 on the Set Transformer, part No. 32-2763, and the cable ground to terminal No. 2, Nos. 3 and 4 terminals of Set Transformer are then connected to the chassis and 6A7 grid respectively of the receiver with short pieces of wire. Insert the .1 mf. in series with the No. 4 lead which connects to the grid.

**NOTE C**—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned so track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push-button shaft at its closed stop, the push-button coupling is tightened on the gang shaft.

**NOTE D**—Insert the signal generator output lead into the "Med" jack and the ground lead into the "Grid" jack of the signal generator. Connect the other end of the output lead to terminal No. 1 on the Set Transformer, part No. 32-2763, and the cable ground to terminal No. 2, Nos. 3 and 4 terminals of Set Transformer are then connected to the chassis and antenna lead respectively of the receiver with short pieces of wire. Insert the 100 mmf. in series with the No. 4 lead which connects to the antenna lead.
REPLACEMENT PARTS
Model 39-19, Codes 121 & 122

<table>
<thead>
<tr>
<th>Schem. No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer</td>
<td>32-2822</td>
</tr>
<tr>
<td>2</td>
<td>Antenna Transformer</td>
<td>32-2821</td>
</tr>
<tr>
<td>3</td>
<td>Condenser (.03 mfd, tubular)</td>
<td>30-4519</td>
</tr>
<tr>
<td>4</td>
<td>Tuning Condenser Assembly</td>
<td>31-2273</td>
</tr>
<tr>
<td>5</td>
<td>Resistor (51,000 ohms, ¾ watt)</td>
<td>33-351339</td>
</tr>
<tr>
<td>6</td>
<td>Oscillator Transformer</td>
<td>32-3038</td>
</tr>
<tr>
<td>7</td>
<td>Resistor (20 ohms, ½ watt)</td>
<td>33-203339</td>
</tr>
<tr>
<td>8</td>
<td>Tuning Condenser Assembly</td>
<td>31-2273</td>
</tr>
<tr>
<td>9</td>
<td>Condenser (370 mfd, silver plated mica)</td>
<td>32-35139</td>
</tr>
<tr>
<td>10</td>
<td>Condenser (3500 mfd, mica)</td>
<td>20-1204</td>
</tr>
<tr>
<td>11</td>
<td>Condenser (250 mfd, mica)</td>
<td>20-1032</td>
</tr>
<tr>
<td>12</td>
<td>Resistor (5000 ohms, ¾ watt)</td>
<td>33-250339</td>
</tr>
<tr>
<td>13</td>
<td>1st I. F. Transformer Assembly</td>
<td>32-2073</td>
</tr>
<tr>
<td>14</td>
<td>2nd I. F. Transformer Assembly</td>
<td>32-2944</td>
</tr>
<tr>
<td>15</td>
<td>Condenser (.03 mfd, tubular)</td>
<td>30-4499</td>
</tr>
<tr>
<td>16</td>
<td>Resistor (32,000 ohms, ¾ watt)</td>
<td>33-323339</td>
</tr>
<tr>
<td>17</td>
<td>Resistor (100,000 ohms, ½ watt)</td>
<td>33-204939</td>
</tr>
<tr>
<td>18</td>
<td>Resistor (200,000 ohms, ½ watt)</td>
<td>33-323339</td>
</tr>
<tr>
<td>19</td>
<td>Condenser (110 mfd, pica)</td>
<td>30-1204</td>
</tr>
<tr>
<td>20</td>
<td>Condenser (250 mfd, mica)</td>
<td>30-1032</td>
</tr>
<tr>
<td>21</td>
<td>Condenser (500 mfd, tubular)</td>
<td>30-4472</td>
</tr>
<tr>
<td>22</td>
<td>Resistor (99,000 ohms, ¾ watt)</td>
<td>33-399339</td>
</tr>
<tr>
<td>23</td>
<td>Condenser (490,000 ohms, ¾ watt)</td>
<td>32-449339</td>
</tr>
<tr>
<td>24</td>
<td>Field Coil for Speaker (Part No. 36-1426)</td>
<td>36-4083</td>
</tr>
<tr>
<td>25</td>
<td>Point for Speaker (Part No. 36-1626)</td>
<td>36-4085</td>
</tr>
<tr>
<td>26</td>
<td>Condenser (8 mfd, electrolytic)</td>
<td>33-254473</td>
</tr>
<tr>
<td>27</td>
<td>Field Coil for Speaker (Part No. 36-1426)</td>
<td>36-4083</td>
</tr>
<tr>
<td>28</td>
<td>Field Coil for Speaker (Part No. 36-1426)</td>
<td>36-4085</td>
</tr>
<tr>
<td>29</td>
<td>Condenser (120 mfd, tubular)</td>
<td>30-4499</td>
</tr>
<tr>
<td>30</td>
<td>Resistor (4.0 mfd, electrolytic)</td>
<td>33-254473</td>
</tr>
<tr>
<td>31</td>
<td>Condenser (8 mfd, electrolytic)</td>
<td>33-125473</td>
</tr>
<tr>
<td>32</td>
<td>Output Transformer</td>
<td>32-2790</td>
</tr>
<tr>
<td>33</td>
<td>Tone and Voice Coil Assembly</td>
<td>36-4083</td>
</tr>
<tr>
<td>34</td>
<td>Tone and Voice Coil Assembly</td>
<td>36-4085</td>
</tr>
<tr>
<td>35</td>
<td>Field Coil for Speaker (Part No. 36-1426)</td>
<td>36-4083</td>
</tr>
<tr>
<td>36</td>
<td>Field Coil for Speaker (Part No. 36-1426)</td>
<td>36-4085</td>
</tr>
<tr>
<td>37</td>
<td>Condenser (200,000 ohms, wire wound)</td>
<td>33-2790</td>
</tr>
<tr>
<td>38</td>
<td>Power Transformer, 15 t, 86-60 cycle</td>
<td>32-7974</td>
</tr>
<tr>
<td>39</td>
<td>Condenser (.01 mfd, tubular)</td>
<td>30-2046</td>
</tr>
<tr>
<td>40</td>
<td>Pilot Lamp</td>
<td>34-2046</td>
</tr>
<tr>
<td>41</td>
<td>Wave Switch</td>
<td>42-1449</td>
</tr>
</tbody>
</table>

Fig. 3. Schematic Diagram, Model 39-19, Code 121-122

I.F. = 470 KC.

Fig. 4. Part Locations, Underside of Chassis

June 1938

*When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -2) following the part number is required.
PHILCO RADIO & TELEVISION CORP.

**SPECIFICATIONS**

**TYPE OF CIRCUIT:** A. C. operated; superhetrodyne circuit with **TUNING RANGES:** 540 K. C. to 1720 K. C. 5.5 M. C. to 1720 K. C.) and short wave (56 M. C. to 1900 M. C.) frequencies; Automatic Volume Control; and moment output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

**POWER SUPPLY:** Voltage—115 volts. Frequency—50-60 cycles.

Power consumption—40 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

---

**ALIGNMENT OF COMPENSATORS**

**EQUIPMENT REQUIRED:**
1. Signal Generator, Philco Model 067 or 068 Signal Generator, which has a fundamental frequency for this purpose. Phioc Model 067 Circuit Meter, incorporating a sensitive output meter and is recommended.

**OUTPUT METER:** The plate and cathode terminals of the type 4 tube, 815, set the receiver to the 0-20 volt scale.

**Special Instructions**
- Adjust Controls in Order:
  - (1A) (1B) (13A) (14A) (14B) (4A) (4B) (8A) (8B)

**Roll and Shunt Condenser**

**Operations in Order**
1. 6A7 Grid
2. 18 MC
3. 1550 KC
4. 1550 KC
5. 1550 KC

**NOTE:** Adjust the dial and cathode terminals of the type 4 tube, 815, set the receiver to the 0-20 volt scale.

**NOTE:** The "Dummy Antenna" consists of a condenser connected in series with a 1.0 m. F. and the capacity as specified in each step of the above procedure. The antenna must be adjusted for proper output and is connected to the receiver at the right side of the input line. The diode line is to be adjusted for proper output and is connected to the receiver at the right side of the input line.

---

**CABINETS:** Code 121 chassis in type "T" cabinet. Code 122 chassis in type "F" cabinet.

---

©John F. Rider, Publisher

Compliments of www.nucow.com
TYPE OF CIRCUIT: A.C. operated; superheterodyne circuit with two tuning ranges, covering standard broadcast (540 K.C. to 1720 K.C.) and short wave (490 M.C. to 580 M.C.) frequencies; Automatic Volume Control; and periodical output.

The receiver is designed to operate from a "Philco Safety Aerial," as part No. 46-607. The aerial system should be used to obtain maximum performance from the receiver.


INTERMEDIATE FREQUENCY: 470 K.C.

TUNING RANGES: 540 K.C. to 1720 K.C.; 490 M.C. to 580 M.C.

PHILCO TUBES USED: 6A8G, 1st detector and oscillator; 1A7, L.F.; 1A7-5, 2nd detector, Automatic Volume Control; and 1A8, Output; and 1A4, Rectifier.


CABINETS: Types "F" and "XF".

Alignment of Compensators

EQUIPMENT REQUIRED: (1) Signal Generator: Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 3,000 K.C. is the correct instrument for this purpose. (2) Output Meter: Philco Model 077 Circuit Tester, incorporates a sensitive output meter and is recommended. (3) Philco Fiber Handle Screw Driver, part No. 27-7069, and Fiber wrench, part No. 3164.

OUTPUT METER: The Philco 077 Output Meter is connected to the plate and cathode terminals of the Type 41 tube. Set the meter to use the 0-30 volt scale. After connecting the output meter adjust compensators in the order as given below.

<table>
<thead>
<tr>
<th>Operation in Order</th>
<th>Output Connections to Receiver</th>
<th>Dummy Antenna (Note A)</th>
<th>Dial Setting</th>
<th>Dial Setting</th>
<th>Control Setting</th>
<th>Adjust Compensators in Order</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6A8G Grid</td>
<td>1 mf.</td>
<td>470 KC</td>
<td>580 KC</td>
<td>Vol. Cont. max.</td>
<td>(3A) (12B) (12A)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ant. Ter.</td>
<td>100 mmf.</td>
<td>18.0 MC</td>
<td>18.0 MC</td>
<td>Vol. Cont. max.</td>
<td>(4B)</td>
<td>See Note B</td>
</tr>
<tr>
<td>3</td>
<td>Ant. Ter.</td>
<td>100 mmf.</td>
<td>1550 KC</td>
<td>1550 KC</td>
<td>Vol. Cont. max.</td>
<td>(5) (4A)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ant. Ter.</td>
<td>100 mmf.</td>
<td>580 KC</td>
<td>580 KC</td>
<td>Vol. Cont. max.</td>
<td>(5A)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ant. Ter.</td>
<td>100 mmf.</td>
<td>1550 KC</td>
<td>1550 KC</td>
<td>Vol. Cont. max.</td>
<td>(5)</td>
<td></td>
</tr>
</tbody>
</table>

NOTE A—The "Dummy Antenna" consists of a dummy grid in series with the output generator output load (high side). Use the capacitors specified in each step of the above procedure.

These detailed instructions have been prepared to make sure the correct procedure is followed in setting the stations on the Philco Electric Push-Button Tuning models. The work requires the use of a Philco Model 077 Station Setter and a part No. 27-7069 Insulated Screw Driver.

(A) Select eight of the most popular stations received in the locality and remove their call letters from the call letter sheets supplied. Place the call letters in the windows above the buttons, making sure that each respective button covers the frequency of the station for which it is to be used. The frequency range of the circuits are as follows:

Circuits | Frequency Range
---|---
1 and 2 | 340 to 1020 kilocycles
3 and 4 | 620 to 1300 kilocycles
5 and 6 | 900 to 1470 kilocycles
7 and 8 | 1170 to 1600 kilocycles

These numbers are stamped on the unit as seen from the rear. Looking at the front of the cabinet the numbers read from left to right.

(B) Connect the aerial and ground to the "ANT" and "GND" terminals of the receiver.

NOTE B—PRIOR CALIBRATION: In order to adjust the receiver correctly the dial pointer must be aligned to each frequency with the tuning range selector and the receiver tuned to the station on the extreme left side of the dial to the left frequency of the station. Calibrate all controls in this manner and proceed as follows:

(C) Turn the receiver Tuning Range Selector to position two ("Manual Tuning") and tune the receiver to the stations to be set on the first button.

(D) Plug the output leads of the Station Setter into the "Highband" and "Gnd" jacks and turn the output controls to maximum.

Turn the modulation control to "Modulation On." Connect the output lead of the Station Setter to the "ANT" and "GND" terminals of the receiver and tune to the frequency of the station being received. As the indicator on the frequency of the station there will be two points at which a high pitched swish will be heard, one above and one below the frequency of the station. When the indicator is on the frequency of the station, minimum high pitched swish will be heard.

(E) Set the modulation control of the Station Setter for "Modulation On." The modulated signal of the Station Setter will then be heard through the receiver.

(F) Turn the receiver Tuning Range Selector to position one (Automatic Tuning) and push in the first button. Using the Part No. 27-7069 Insulated Screw Driver, turn the number 1 "OSC" screw until the modulated signal of the Station Setter is tuned in to maximum volume. Then adjust the number 2 "ANT" screw for maximum signal.

(G) Remove the output lead of the Philco Station Setter from the "ANT" terminal of the receiver and turn its indicator off the frequency of the station. The program of the desired station will then be heard on the receiver.

(H) With the volume of the receiver low, slowly turn the number 1 "OSC" back and forth until maximum output is received. Repeat the same procedure for the number 1 "ANT" screw.

After setting up the first station, the same procedure given under (C) to (H) is used for the other stations.
MODEL RP-1
CODE - 122

WIRELESS RECORD PLAYER

The Model RP-1 is a remote type record player which can be used in conjunction with any standard broadcast receiver to reproduce phonograph records.

To place unit in operation:

First. Remove all packing material, being sure to save the small envelope attached to the tone arm. This envelope contains needles, needle screw, and rubber bumper.

Second. Lift off record turn-table and remove motor support tape by carefully pulling out tack and cutting the tape. Replace turn-table.

Third. Disengage tone arm (pickup") by rolling rubber locking ring down along arm rest and pushing sideways on tone arm. Do not lift arm vertically when locked.

Fourth. Place rubber bumper (contained in small envelope attached to tone arm) between the jaws of the arm rest, large end up. This forms a suitable rest for tone arm when not in use.

Fifth. Insert needle as far as possible into the tone arm head, and tighten securely with the needle screw, which should be inserted in the head of the tone arm. A Philco needle (like furnished) is recommended for best results.

Sixth. Check to make sure your electric supply agrees with that specified on the name label located on under side of cabinet and insert line cord plug into a convenient power outlet.

If in doubt as to the electric supply, check with your local power company.

The unit is now ready for operation. Place record on turn-table and slide “Off-On Switch” (Diagram “A”) to “On” position; this will be indicated by pilot light in tone arm.

After allowing sufficient time for tubes to warm up, place tone arm on record; this automatically starts motor.

Next go to your radio and tune to approximately 740 KC (54 on most dials), at which setting the phonograph signal will be picked up. Volume can be regulated by the radio receiver’s volume control in the normal way.

At the end of the record, return the tone arm to rest position, which will automatically turn motor off. It is not necessary to slide “Off-On Switch” to the “Off” position between records.

If interference from broadcast stations is encountered the frequency of the unit can be changed to any other frequency between 730 KC and 780 KC by adjusting the small screw indicated in Diagram “B.” Turning screw clockwise lowers the frequency, counter-clockwise raises the frequency. This adjustment is best made while the unit is in operation.

If hum is experienced it may be necessary to reverse the power plug of the record player, the radio, or both. In some cases it may be advisable to use the same receptacle for record player and radio.

No definite rule can be established for the relative location of the record player to your radio; individual trial will establish best location. However, in general, satisfactory operation may be obtained up to a distance of fifty (50) feet, provided local noise conditions are not too severe.

IMPORTANT . . . Do not attempt to force tone arm past stops.

©John F. Rider, Publisher
### Page 10-14 Philco

**Models 39-30, 39-35, Code 121**

**Philco Radio & Television Corp.**

**Chassis Parts List**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Transformer (short wave)</td>
<td>33-2025</td>
</tr>
<tr>
<td>2</td>
<td>Antenna Transformer (broadcast)</td>
<td>33-4519</td>
</tr>
<tr>
<td>3</td>
<td>Tuning Condenser, Assembly</td>
<td>33-2296</td>
</tr>
<tr>
<td>4</td>
<td>Dual Padder Unit</td>
<td>33-6235</td>
</tr>
<tr>
<td>5</td>
<td>Oscillator Transformer</td>
<td>33-3026</td>
</tr>
<tr>
<td>6</td>
<td>Condenser (250 mmf, mica)</td>
<td>36-1032</td>
</tr>
<tr>
<td>7</td>
<td>Condenser (450 mmf, mica)</td>
<td>36-1100</td>
</tr>
<tr>
<td>8</td>
<td>Resistor (500 ohms, ½ watt)</td>
<td>33-31139</td>
</tr>
<tr>
<td>9</td>
<td>Condenser (500 mmf, silver plated mica)</td>
<td>33-31110</td>
</tr>
<tr>
<td>10</td>
<td>Condenser (700 mmf, silver plated mica)</td>
<td>33-31110</td>
</tr>
<tr>
<td>11</td>
<td>1 N. F. Transformer Assembly</td>
<td>33-30318</td>
</tr>
<tr>
<td>12</td>
<td>Condenser (110 mmf, mica)</td>
<td>33-4435</td>
</tr>
<tr>
<td>13</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>14</td>
<td>Resistor (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>15</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>16</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>17</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>18</td>
<td>Condenser (110 mmf, mica)</td>
<td>36-1031</td>
</tr>
<tr>
<td>19</td>
<td>2 N. F. Transformer Assembly</td>
<td>33-30318</td>
</tr>
<tr>
<td>20</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>21</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>22</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>23</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>24</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>25</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>26</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>27</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>28</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>29</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>30</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>31</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>32</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>33</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>34</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>35</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>36</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>37</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>38</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>39</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>40</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>41</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>42</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>43</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>44</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>45</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>46</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>47</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>48</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>49</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>50</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>51</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>52</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>53</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>54</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>55</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>56</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>57</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>58</td>
<td>Condenser (16 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>59</td>
<td>Condenser (250 mmf, 250 V.)</td>
<td>36-2331</td>
</tr>
<tr>
<td>60</td>
<td>Condenser (5000 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>61</td>
<td>Condenser (4500 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
<tr>
<td>62</td>
<td>Condenser (2200 ohms, ½ watt)</td>
<td>33-32639</td>
</tr>
</tbody>
</table>

**Voltages Measured from Socket Contacts to Chassis**

<table>
<thead>
<tr>
<th>Taps</th>
<th>Voltage (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60 - 70</td>
</tr>
<tr>
<td>2</td>
<td>70 - 80</td>
</tr>
<tr>
<td>3</td>
<td>80 - 90</td>
</tr>
<tr>
<td>4</td>
<td>90 - 100</td>
</tr>
<tr>
<td>5</td>
<td>100 - 110</td>
</tr>
<tr>
<td>6</td>
<td>110 - 120</td>
</tr>
<tr>
<td>7</td>
<td>120 - 130</td>
</tr>
<tr>
<td>8</td>
<td>130 - 140</td>
</tr>
<tr>
<td>9</td>
<td>140 - 150</td>
</tr>
<tr>
<td>10</td>
<td>150 - 160</td>
</tr>
</tbody>
</table>

**Type of Circuit:** A.C. operated; superheterodyne circuit with two tuning ranges, covering standard broadcast (540 K. C. to 1720 K. C.) and short-wave (4.9 M. C. to 18.0 M. C.) frequencies; Automatic Volume Control; and pentode output.

The receiver is designed to operate from a "Philco Safety Aerial," Part No. 40-6371. This aerial system should be used to obtain maximum performance from the receiver.

**Power Supply:** Voltage, 115 volts. Frequency, 50-60 cycles. Power consumption, 45 watts.

**Intermediate Frequency:** 470 K. C.

**Tuning Ranges:** 540 K. C. to 1720 K. C.; 4.9 M. C. to 18.0 M. C.

**Philco Tubes Used:** 1-648G, 1st detector and oscillator; 1-78, I. F.; 1-37, 2nd detector, Automatic Volume Control; 1-75, first audio; 1-41, output; and 1-84, Rectifier.


**Cabinets:** Types: "T" for 39-30 and "XX" for 39-35.

*Replace Speaker* 

© John F. Rider, Publisher

Compliments of www.nucow.com
### ALIGNMENT

**MODELS 39-50, 39-35 (CODE 121), S1622.**

**Equipment** — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Set Tester, 27-7169 Padding screw driver.

**General** — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio 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 generator output lead must be connected to the Radio housing.

**MODELS 39-50, 39-35, CODE 121.**

<table>
<thead>
<tr>
<th>Operations</th>
<th>Signal Generator</th>
<th>Receiver</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dummy Antenna (Note A)</td>
<td>Dial Setting</td>
<td>Control Settings</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Ter.</td>
<td>100 mmf.</td>
<td>18.0 M. C.</td>
</tr>
</tbody>
</table>

**NOTE A** — The “Dummy Antenna” consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**MODEL S-1622**

**OPERATION** | **SIGNAL GENERATOR** | **DUMMY CAPACITY** | **SPECIAL INSTRUCTIONS** | **ADJUST PADDER** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press the Automatic Station Selector button until “DIAL” appears in the window and stations can be tuned in by Manual Tuning.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>470 K.C. To Antenna Receptacle on Radio</td>
<td>35 Mmfd. See Note 1</td>
<td>Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.</td>
<td>2 2</td>
</tr>
<tr>
<td>3</td>
<td>1580 K.C. To Antenna Receptacle on Radio</td>
<td>35 Mmfd. See Note 1</td>
<td>Note 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1500 K.C. To Antenna Receptacle on Radio</td>
<td>35 Mmfd. See Note 1</td>
<td>Set Tuning Condenser at 1500 K.C.</td>
<td>3 Note 3</td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**NOTE 1** — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the antenna lead.

**NOTE 2** — Turn the condenser rotor plates completely out of mesh as far as they will go.

**NOTE 3** — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

©John F. Rider, Publisher
### SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>Operation Order</th>
<th>Output Connections to Receiver</th>
<th>Dummy Antenna Net A</th>
<th>Dial Setting</th>
<th>Dial Setting</th>
<th>Control Settings</th>
<th>Adjust Compensators in Order</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Ant. Ter.</td>
<td>10 mmf.</td>
<td>1400 K. C.</td>
<td>1400 K. C.</td>
<td>Vol. Cent. Max. 2A</td>
<td>See Note C</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE A** — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (High side). Use the capacity or resistance as specified in each step of the above procedure.

**NOTE B** — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set horizontally at the low frequency end of the scale (540 K. C.).

**NOTE C** — Compensators 2A and 2B are at the top of the tuning condenser. Compensator 2A is on the front section and compensator 2B on the rear section. When padding the I. F., the signal generator can be attached to the TC7 grid on the front section of the tuning condenser.

### ADJUSTING PUSH BUTTON TUNING

- **MODELS 39, 50, 39-55, 610 (CODE 121); 40-150, 40-155; 39-50, 39-55, & 108 (CODE 121); SEE PARTS LISTS OF THESE MODELS**

In order to adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Model 027 and 028 should be used. In addition, an insulated pushing screw driver part No. 45-2610 and Loktal aligning adapter part No. 45-2677 are required. With this equipment at hand proceed as follows:

1. Insert the station call letters into the windows above the buttons. The station with the lowest frequency is placed in the first button on the left and the highest frequency is placed in the button on the extreme right. Each push button is adjusted by two set screws located on the rear of the push button unit. Each set of screws is numbered and covers a frequency range as follows:

   **MODELS 40-185, 40-200**

<table>
<thead>
<tr>
<th>Push-Button Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3</td>
</tr>
<tr>
<td>4, 5</td>
</tr>
<tr>
<td>6, 7, 8</td>
</tr>
</tbody>
</table>

   **MODELS 40-150, 40-155, 40-180, 40-185, 40-190**

<table>
<thead>
<tr>
<th>Push-Button Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3</td>
</tr>
<tr>
<td>4, 5</td>
</tr>
<tr>
<td>6, 7</td>
</tr>
</tbody>
</table>

Looking at the front of the cabinet, the first button on the

### VACUUM TUBE VOLTMETER

To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Remove the TC6 tube from its socket and insert the aligning adapter, Part No. 45-2767, then replace the tube in the adapter. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adapter. Attach the positive terminal of the voltmeter to the chassis. The positive terminal is connected to the chassis. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

<table>
<thead>
<tr>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push &quot;IN&quot; Manual Button Model 40-125</td>
</tr>
</tbody>
</table>

**Fig. 1**

© John F. Rider. Publisher

Compliments of www.nucow.com
TYPE CIRCUIT: Philco Model 28-35, code 158, is a six tube, A.C. operated heterodyne circuit with a tuning range covering standard broadcast (660-1700 K.C.) and shortwave (5.5 C.M. to 18.5 C.M.) frequencies. In addition, the receiver employs Electric Automatic Push-button Tuning for automatically selecting any of eight standard broadcast stations, continuously variable tone control, automatic volume control, and pentode audio output.

POWER SUPPLY: 115 V., 60 cycle A.C. 45 watts. For operation on 115 V., up to 60 cycles, A.C. current or 120 V., 60 to 60 cycles A.C. current, different power transformers are required, and can be obtained from your distributor.

OUTPUT FREQUENCY: 450 K.C.


CONTROLS: The new Philco Disc Control are used on this model for adjusting tuning, volume, tone and frequency range.

CABINET—Type XX.

Alignment of Compensators

SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>Operations</th>
<th>Dummy Antenna (Note A)</th>
<th>Dial Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6AY Grid.</td>
<td>470 K.C.</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Ter.</td>
<td>1500 K.C.</td>
</tr>
<tr>
<td>3</td>
<td>Ant. Ter.</td>
<td>1500 K.C.</td>
</tr>
<tr>
<td>4</td>
<td>Ant. Ter.</td>
<td>1500 K.C.</td>
</tr>
</tbody>
</table>

NOTE A—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacitor size indicated in each step of the above procedure.

NOTE B—Dial Calibration. In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacitance), set the dial pointer on the extreme left index line at the low frequency end of the broadcast band. The alignment of the drive cable is shown in Service Bulletin No. 395.

SIGNAL TRANSMITTER

<table>
<thead>
<tr>
<th>Dial Setting</th>
<th>Control Settings</th>
<th>Adjust Compensators</th>
</tr>
</thead>
<tbody>
<tr>
<td>470 K.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500 K.C.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Output Meter: The Philco 28-35 Output Meter is connected to the plate and cathode terminals of the type 45 tube. After connecting the Output Meter, adjust compensators in the order given in table below. Locations of the compensators are shown in Fig. 1.

COMPENSATOR PARTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-216</td>
<td>Ant. Cond.</td>
</tr>
<tr>
<td>22-217</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>22-218</td>
<td>Tube Cond.</td>
</tr>
<tr>
<td>22-219</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>22-220</td>
<td>Tube Cond.</td>
</tr>
<tr>
<td>22-221</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>22-222</td>
<td>Tube Cond.</td>
</tr>
<tr>
<td>22-223</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>22-224</td>
<td>Tube Cond.</td>
</tr>
</tbody>
</table>

Miscellaneous Parts

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-219</td>
<td>Antenna Cond.</td>
</tr>
<tr>
<td>21-220</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>21-221</td>
<td>Tube Cond.</td>
</tr>
<tr>
<td>21-222</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>21-223</td>
<td>Tube Cond.</td>
</tr>
<tr>
<td>21-224</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>21-225</td>
<td>Tube Cond.</td>
</tr>
<tr>
<td>21-226</td>
<td>Cond. Cond.</td>
</tr>
<tr>
<td>21-227</td>
<td>Tube Cond.</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
ADJUSTING ELECTRIC PUSH-BUTTON TUNING FOR MODELS 39-36, 39-40, AND 39-45

In order to set the Electric Push-Buttons correctly for each station, the procedure as given below should be carefully followed. Accurate adjustment of the buttons requires the use of a Philco Model 077 Station Setter and a part No. 27-7659 insulated screwdriver.

(A) Select either of the most popular stations received in the locality and remove their call letters from the call letter sheets supplied. Place the call letters in the windows above the buttons, making sure that each button covers the frequency of the station for which it is to be used. Two adjustment screws for each button are located on the rear of the push-button unit. Each set of screws is numbered and covers a frequency range as follows:

<table>
<thead>
<tr>
<th>Push-Button</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 and 2</td>
<td>56-1039 KC.</td>
</tr>
<tr>
<td>3 and 4</td>
<td>570-1160 KC.</td>
</tr>
<tr>
<td>5 and 6</td>
<td>900-1470 KC.</td>
</tr>
<tr>
<td>7 and 8</td>
<td>1100-1600 KC.</td>
</tr>
</tbody>
</table>

Looking at the front of the cabinet, the first button on the left is adjusted by set screw No. 1, the next button by set screw No. 2, and the remaining buttons in the same order.

(B) Connect the aerial and grounds to the "ANT" and "GND" terminals of the receiver.

(C) Turn the receiver Tuning Range Selector to position 2 (Broadcast) and tune the receiver to the station to be set on the first button.

(D) Plug the output leads of the Station Setter into the "High" and "Gnd" jacks, and turn the output control to maximum.

Turn the modulation control to "Modulation On." Connect the output lead of the station setter to the "ANT" and "GND" terminals of the receiver and tune to the frequency of the station being received. As the indicator is slowly tuned through the frequency of the station, there will be two points at which a whistle will be heard, one above and one below the frequency of the station. When the indicator is on the frequency of the station the whistle will be eliminated and the modulated signal of the station setter will then be clearly heard through the receiver.

(E) Turn the receiver Tuning Range Selector to position 1 (Push-Button) and press in the first button. Using the part No. 27-7659 insulated screwdriver; turn the No. 1 "OSC" screw until the broadcast station identified by the station setter signal is tuned to Maximum Volume.

(F) Remove the output lead of the station setter from the "ANT" terminal of the receiver and turn the indicator of the Station Setter off the frequency of the station. The program of the desired station will then be heard in the receiver without the modulated signal.

(G) With the volume of the receiver low, slowly turn the No.1 "OSC" screw back and forth until maximum output is received. Repeat the same procedure for the No. 1 "ANT" screw.

After setting up the first station, the same procedure given under (C) to (G) is used for the other stations.

### ALIGNMENT ON MODEL 39-40

<table>
<thead>
<tr>
<th>Operations</th>
<th>Signal Generator</th>
<th>Dummy Antenna ((A))</th>
<th>Dial Setting</th>
<th>Control Setting</th>
<th>Adjust Capacitors to Max Reading</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6A7</td>
<td>.1 mf</td>
<td>470 KC</td>
<td>580 KC</td>
<td>Vol Max. Range Switch Broadcast</td>
<td>26B, 26A, 23B, 21A</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Ter.</td>
<td>150 mf</td>
<td>1500 KC</td>
<td>580 KC</td>
<td>See Note B and C</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Ant. Ter.</td>
<td>150 mf</td>
<td>580 KC</td>
<td>1500 KC</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ant. Ter.</td>
<td>150 mf</td>
<td>580 KC</td>
<td>1500 KC</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ant. Ter.</td>
<td>400 ohms</td>
<td>18.0 MC</td>
<td>10.0 MC</td>
<td>Range Switch S. W.</td>
<td>15A, 12, 5</td>
</tr>
</tbody>
</table>

**NOTE A:** The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B:** Dial Calibration. In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown on page 3.

**NOTE C:** Capacitors (7A) and (8B) are located on top of the tuning condenser. Capacitor (7A) is the first one from the tuning drum side.

### ALIGNMENT ON MODEL 39-45

<table>
<thead>
<tr>
<th>Operations</th>
<th>Signal Generator</th>
<th>Dummy Antenna ((A))</th>
<th>Dial Setting</th>
<th>Control Setting</th>
<th>Adjust Capacitors to Max Reading</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6A7</td>
<td>.1 mf</td>
<td>470 KC</td>
<td>470 KC</td>
<td>Vol Max. Range Switch Broadcast</td>
<td>26B, 30A, 27B, 27A</td>
</tr>
<tr>
<td>2</td>
<td>Antenna</td>
<td>150 mf</td>
<td>1500 KC</td>
<td>580 KC</td>
<td>See Note B and C</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Antenna</td>
<td>150 mf</td>
<td>580 KC</td>
<td>1500 KC</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Antenna</td>
<td>250 mf</td>
<td>1500 KC</td>
<td>580 KC</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Antenna</td>
<td>400 ohms</td>
<td>5.0 MC</td>
<td>Range Switch S.</td>
<td>21A</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna</td>
<td>400 ohms</td>
<td>18.0 MC</td>
<td>18.0 MC</td>
<td>Range Switch S. W.</td>
<td>21B, 14, 4</td>
</tr>
</tbody>
</table>

**NOTE A:** The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B:** Dial Calibration. In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown on page 3.

**NOTE C:** Capacitors (7A) and (8B) are located on top of the tuning condenser. Capacitor (7A) is the first one from the tuning drum side.

© John F. Rider, Publisher
MODEL 39-71
Schematic, Voltage, Socket PHILCO RADIO & TELEV. CORP.
Alignment, Trimmers, Parts

**Operations in Order**

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Output Connections to Receiver</td>
<td>Dummy Antenna (Note A)</td>
<td>Dial Setting</td>
</tr>
<tr>
<td></td>
<td>1A7G Grid</td>
<td>.1 mfd.</td>
<td>400 K. C.</td>
</tr>
</tbody>
</table>

**NOTE A** — The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

**NOTE B** — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser.

To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With tuning condenser in this position set the pointer to the small "black dot" at the low frequency end of the dial scale.

**NOTE C** — To adjust the I. F. compensators, remove the back from the cabinet, which is held in place by four screws. The chassis is then taken out or removed from the top and rear of the cabinet, and the Tuning and Volume knobs. The I. F. compensators are located on top of the G. F. transformers.

When adjusting the Antenna (3A) and Oscillator (3B) compensator, the chassis must be assembled in the cabinet with the batteries in place. The Signal Generator output leads with the "Dummy Antenna" is then connected to the terminals marked "Ant" and "Grd" underneath the cabinet. The antenna and oscillator compensators are then adjusted through the holes in the bottom of the cabinet.

**BATTERIES REQUIRED:** One (1) Philco "A" Pack, Part No. 41-8017; two (2) Philco "B" Packs, Part No. 41-8018.

**BATTERY DRAIN:** "A" — 240 Ma.; "B" 8.5 Ma. Total current with no signal.

---

**AERIAL AND GROUND:** In localities where station signals are weak, an aerial and ground may be necessary. A terminal strip will be found underneath the cabinet marked "Ant" "Grd" for this purpose.

---

**Copyright, 1938, Philco Radio and Television Corp.**

---

**© John F. Rider, Publisher**
Alignment Notes

NOTE A—The “Dummy Antenna” consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser.

Model 39-70 and 39-80—To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With the tuning condenser in this position, set the pointer horizontally across the dial.

Model 39-75—With the tuning condenser in the maximum capacity position (plates fully meshed), loosen the coupling screws connecting the push-button unit to the condenser. The pointer is then set on the extreme left edge of the index line (low frequency end of the scale) with the tuning condenser fully closed. The gang is then opened until the pointer is at the right edge of the index line. The push-button shaft is then turned counter-clockwise to its “stop.” With the tuning condenser and push-button shaft in these positions tighten the coupling set screws.

NOTE C—The locations of the compensators in Models 39-70, 39-75 and 39-80 are shown in Figs. (1), (2) and (3) respectively.

I.F. = 470 KC.

SCHEMATIC DIAGRAM MODEL 39-70 & 39-75

©John F. Rider, Publisher
POWER SUPPLY: 115 Volts, 25 and 60 cycle AC.

POWER CONSUMPTION: 60 watts.

AUDIO OUTPUT: 2 watts.

FREQUENCY TUNING RANGES: Three.
- 540 to 1550 K.C.
- 1.5 to 3.4 K.C.
- 6.0 to 18 M.C.

Compliments of www.nucow.com
Alignment of Compensating Condensers

Equipment Required

(1) Signal Generator. In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 07 is required. This signal generator covers a frequency range of 540 to 30,000 K. C. (2) Indicating Device. To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. When using the vacuum tube voltmeter, an aligning condenser, Philco Part No. 45-2767, is necessary for connecting to the A. V. C. circuit. These testers also contain an audio output meter which may also be used as an indicating device. (3) Aligning Tools, Fiber handle screwdriver, Philco Part No. 45-2610, and fiber wrench, Philco Part No. 7686.

Connecting Aligning Instruments

VACUUM TUBE VOLTMETER—To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I. F. Circuit.
   Remove the 1232 R. F. tube from its socket and insert the adjusting aligning condenser, then replace the tube in the adapter. Connect the negative terminal of the vacuum tube voltmeter to the wire (light color) which protrudes from the side of the adapter. Attach the positive terminal of the voltmeter to the black wire.

   To adjust the R. F. circuit, the aligning condenser is inserted in the 7C6 A. F. tubes socket. The vacuum tube voltmeter remains connected to the adapter as given in the above paragraph. With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41 output tubes and adjust the output meter for the 0 to 50 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram, page 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I. F. paddles, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When adjusting the R. F. paddles a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders that the receiver be left in the cabinet.

Models 40-150, 40-155 40-180 – 185 – 190

<table>
<thead>
<tr>
<th>Operations</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Connections</td>
<td>Dial Frequency</td>
<td>Dial Frequency</td>
</tr>
<tr>
<td>2</td>
<td>Use Loop on Generator</td>
<td>18 M. C.</td>
</tr>
<tr>
<td>6</td>
<td>Use Loop on Generator</td>
<td>18 M. C.</td>
</tr>
</tbody>
</table>

NOTE A—A “Dummy Antenna” consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B—DIAL CALIBRATION. In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic diagram.

NOTE C—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output then vary the tuning condenser or the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output readings.

NOTE D—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be bound (much weaker) by turning the receiver dial 510 K. C. below the frequency being used on any high frequency range.

© John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 101
Schematic, Socket, Trimmers
Alignment, Parts

PHILCO RADIO & TELEV. CORP.

Compliments of www.nucow.com

Model 101 is a combination Phonograph and Radio Receiver. The phonograph section is designed to play 10 or 12 inch standard records (78 R. P. M.) and includes a manually operated crystal pickup and Turntable Motor.

The radio receiver employs an A. C. or D. C. operated superheterodyne circuit covering standard broadcast and police stations. (540 to 1720 K.C.)

POWER SUPPLY: Radio, 115 volts A. C. or D. C. Phonograph, 115 volts — 50 cycles only.

POWER CONSUMPTION: 57 watts.

INTERMEDIATE FREQUENCY: 470 K.C.

PHILCO TUBES USED: Five tubes; 1-7A8, first detector oscillator; 1-7B7, I. F. amplifier; 1-7C6, 2nd detector; A. V. C., first audio; 1-35A5, audio output, and 1-3523, rectifier.

ALIGNMENT OF COMPENSATORS

<table>
<thead>
<tr>
<th>SIGMA GENERATOR OPERATIONS</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output Connect. to Receiver</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
</tr>
<tr>
<td></td>
<td>Dummy Antenna Note A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Ant. Section of Gang</td>
<td>.004 mfd.</td>
<td>470 K.C.</td>
<td>540 K.C.</td>
</tr>
<tr>
<td>2 Ant.</td>
<td>100 mmd.</td>
<td>1500 K.C.</td>
<td>1500 K.C.</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 108, CODE 121.

ALIGNMENT OF COMPENSATORS

EQUIPMENT REQUIRED:
2. Output Meter, Philco 027 Vacuum Tube Voltmeter and Circuit Tester.
3. Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

OUTPUT METER: The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. The Vacuum Tube Voltmeter can also be used in aligning the receiver by connecting the Positive terminals through a one megohm Resistor to the 6A7 grid. The Positive terminal is connected to the chassis. After connecting the Output Meter, adjust compensators in the order as given in tabulation below. Locations of the compensators are shown in Fig. 1.

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: in order to adjust the receiver correctly, it must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown in Service Bulletin No. 105.

NOTE C — Compensators (4A) and (4B) are located on top of the tuning condenser. Compensator (4B) is the first one from the tuning drum side.

©John F. Rider, Publisher
PHILCO RADIO & TELEV. CORP.

POWER SUPPLY: 115 Volts, 25 and 60 cycle A. C.
POWER CONSUMPTION: 110 watts.
FREQUENCY TUNING RANGES: (Three)
540 to 1550 K. C.  1.5 to 4.0 M. C.  6.0 to 18 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.
AUDIO OUTPUT: 5 watts.

©John F. Rider, Publisher
TYPE OF CIRCUIT: Models 40-196 and 40-200 are Electric Push-Button and dial tuned radios incorporating the new Philco Built-in Super Aerial system which eliminates an outside aerial and reduces local static interference to a minimum. These models are also designed to receive the sound of a television program tuned in by special type Philco Television Sets.

PHILCO BUILT-IN SUPER AERIAL SYSTEM:

Included in the built-in aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. The feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference, or it may be turned to the position where best reception is obtained.

In general, both radios are similar with the exception of the number of tubes used and cabinet design. Models 40-196 and 40-200 employ ten and eleven tubes respectively.

Aligning of Compensating Condensers

Equipment Required

Each receiver is equipped with eight electric tuning push-buttons for automatically selecting stations. Seven of the push buttons are used for broadcast stations and one push button (left hand push button preferably) may be set up for use with a Philco wireless Record Player or the sound programs tuned in by Special Philco Television sets.

PHILCO TUBES USED:

1232, R. F.; 777, Converter; 7BT, I. F.; 76C, Second Detector, A. V. C.; and First Audio; 37, Phase Inverter; two 37, Drivers; two 42, Audio Power Outputs; 80, Rectifier.

Model 40-200:
1232, R. F.; 777, Converter; 7BT, I. F.; 76A Detector A. V. C.; 76B First Audio; 37, Phase Inverter; two 37, Drivers; two 42, Audio Power Outputs; 80, Rectifier.

CABINET DIMENSIONS:

Height Width Depth
Model 40-195 type "XX".... 38" 29½" 18½"  
Model 40-200 type "RX".... 36½" 34½" 14½"

Connecting Aligning Instruments

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR:
When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

<table>
<thead>
<tr>
<th>OPERATIONS IN ORDER</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT</td>
<td>CONNECTIONS TO RECEIVER</td>
<td>DUMMY ANTENNA</td>
</tr>
<tr>
<td>1</td>
<td>High Side to No. 1 Tor. Loop Panel</td>
<td>.1 mfd.</td>
</tr>
<tr>
<td>2</td>
<td>Use Loop on Generator</td>
<td>1500 K. C.</td>
</tr>
<tr>
<td>3</td>
<td>Use Loop on Generator</td>
<td>580 K. C.</td>
</tr>
<tr>
<td>5</td>
<td>Use Loop on Generator</td>
<td>3.5 M. C.</td>
</tr>
<tr>
<td>6</td>
<td>Use Loop on Generator</td>
<td>18.0 M. C.</td>
</tr>
</tbody>
</table>

NOTE A — A "DUMMY ANTENNA" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer at the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is 4.5, antenna and R. F. compensators of the high frequency tuning ranges; the receiver tuning condenser must be adjusted (called) as follows: First tune the compensator for maximum output, then vary the tuning condenser for receiver maximum output. New turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE D — To accurately adjust the high frequency oscillator trimmer compensator to the fundamental instead of the image signal, turn the oscillator compensator to the "full capacitance position (clockwise). From this position slowly turn the compensator (counter-clockwise) until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal should not be present in the receiver. Turn the receiver dial 010 K. C. below the frequency being used on any high frequency range.
POWER SUPPLY: 115 V., 60 cycle A. C.  

Model 105 is a combination Phonograph and Electric Automatic Tuning Radio Receiver. The phonograph is designed to play 10 or 12 inch standard records (78 R. P. M.) and consists of a semi-automatically operated crystal pickup and Turntable Motor.

The radio receiver consists of a five tube A. C. operated superheterodyne circuit, covering standard broadcast frequencies (530 to 1700 K. C.) with Automatic Volume Control and Pentode Audio Output. In addition to being manually tuned, there are six Electric Automatic Push Buttons. Five push buttons are used for selecting any one of five stations and one for changing to manual tuning. The procedure for adjusting the push buttons for reception of stations will be found in the instructions supplied with each receiver.

NOTE — DIAL CALIBRATION: With the tuning condenser in “maximum capacity” position (plates fully meshed), set the dial pointer between the two horizontal lines at the low frequency end of the scale (550 K. C.).

**ALIGNMENT OF COMPENSATORS**

<table>
<thead>
<tr>
<th>Operations in Order</th>
<th>SIGNAL GENERATOR</th>
<th>RECEIVER</th>
<th>SPECIAL INSTRUCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Connections to Receiver</td>
<td>Dunmor Antenna Note A</td>
<td>Dial Setting</td>
<td>Dial Setting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ant. Trans.</td>
<td>35-3030</td>
<td>17</td>
<td>Tubular Cond. (.01 mf.)</td>
<td>30-4572</td>
<td>29</td>
<td>Condenser (.006 mf., molded)</td>
<td>30-4423</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tubular Cond. (.05 mf.)</td>
<td>30-4517</td>
<td>18</td>
<td>Misc. Cond. (250 mfd.)</td>
<td>30-1832</td>
<td>30</td>
<td>Pilot Lamp (6 v., 1 1/2 watt)</td>
<td>30-5880</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tuning Cond.</td>
<td>31-3238</td>
<td>19</td>
<td>Resistor (.1 ohm, .5 watt)</td>
<td>30-12539</td>
<td>31</td>
<td>Pilot Lamp Resistor (10 ohm, .5 watt)</td>
<td>30-4843</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Resistor</td>
<td>32-3233</td>
<td>20</td>
<td>Tunable Cond. (.003 mf.)</td>
<td>30-4622</td>
<td>32</td>
<td>Push Button Switch</td>
<td>30-5072</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4A</td>
<td>Resistor (.02 ohm, .5 watt)</td>
<td>33-3232</td>
<td>21</td>
<td>Output Trans.</td>
<td>32-5760</td>
<td>33</td>
<td>Padder Bldg. Assy.</td>
<td>30-4833</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Resistor (.10 mfd.)</td>
<td>34-3231</td>
<td>22</td>
<td>Con. Note Cell Assy</td>
<td>30-4895</td>
<td>34</td>
<td>Tubular Cond. (.1 mf.)</td>
<td>30-12522</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Condens.</td>
<td>35-3234</td>
<td>23</td>
<td>Resistor (.5 ohm, .5 watt)</td>
<td>33-65039</td>
<td>35</td>
<td>Phone Motor</td>
<td>30-1150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6A</td>
<td>Condens. (.25 mfd., silver cap)</td>
<td>36-3235</td>
<td>24</td>
<td>Resistor (500 ohm, .5 watt)</td>
<td>33-65039</td>
<td>36</td>
<td>Crystal Pickup (without mic. parts)</td>
<td>30-2531</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ant. Trans.</td>
<td>37-3236</td>
<td>25</td>
<td>Tubular Cond.</td>
<td>30-2404</td>
<td>37</td>
<td>crystals from 33-41229 to 33-41245</td>
<td>35-2531</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Resistor (1.0 ohm, .5 watt)</td>
<td>38-3237</td>
<td>26</td>
<td>Electrolytic Cond. (12 mfd., 300 V.)</td>
<td>30-4565</td>
<td>38</td>
<td>Crystal Pickup complete with mic. parts</td>
<td>35-2027</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Resistor (.05 ohm, .5 watt)</td>
<td>39-3238</td>
<td>27</td>
<td>Field Coil</td>
<td>30-2404</td>
<td>39</td>
<td>Parts</td>
<td>30-4283</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Tubular Cond. (.01 mf.)</td>
<td>40-3239</td>
<td>28</td>
<td>Power Trans. (10 V., 50-60 cyclic)</td>
<td>32-7075</td>
<td>40</td>
<td>Line Control (1.0 mfd.)</td>
<td>35-2230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>J. F. T. Trans.</td>
<td>41-3240</td>
<td>29</td>
<td>Replace Speaker Part No. 34-1440, Run (12)</td>
<td>30-4588</td>
<td>41</td>
<td>Tubular Cond. (.006 mf.)</td>
<td>30-4581</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Resistor (100 ohm, .5 watt)</td>
<td>42-3241</td>
<td>30</td>
<td>Speaker Part No. 34-1472, Run (12)</td>
<td>30-4588</td>
<td>42</td>
<td>Motor Switch</td>
<td>42-1088</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Volume Control (1.0 mfd.)</td>
<td>43-3242</td>
<td>31</td>
<td>Phone Volume Control (1.0 mfd.)</td>
<td>33-6532</td>
<td>43</td>
<td>Phone Volume Control</td>
<td>30-4115</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Tubular Cond. (.05 mf.)</td>
<td>44-3243</td>
<td>32</td>
<td>Tubular Cond. (.04 mf.)</td>
<td>30-4115</td>
<td>44</td>
<td>Phone Valve</td>
<td>30-4115</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher
ADJUSTING ELECTRIC PUSH BUTTON TUNING: For frequency ranges of buttons see parts 51A through 51H in parts list. For adjusting procedure see INDEX.


INTERMEDIATE FREQUENCY: 470 K. C.
PHILCO MODEL 936

I.F. = 470 KC

FOR ALIGNMENT, SEE INDEX

MODEL 936 PARTS LIST

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 937 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

_Equipment_ — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco set Tester, 27-7188 Paddling screw driver.

_General_ — The output meter must be connected by means of an adapter to the plate of the type 82 output tube and to the Radio chassis. With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control full off and set the signal generator attenuation 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 generator output lead must be connected to the Radio housing.

### Table 1: Adjustments

<table>
<thead>
<tr>
<th>Operation</th>
<th>Frequency</th>
<th>Signal Generator</th>
<th>Dummy Capacity</th>
<th>Special Instructions</th>
<th>Adjust Pad</th>
<th>Pad Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING</td>
<td>470 K.C.</td>
<td>To Grid of 6AT Tube</td>
<td>.1 mfd.</td>
<td>Tone tuning condenser fully out of mesh as far as they will go.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2 1500 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3 1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4 900 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 1</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5 1500 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6 1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7 1320 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 5</td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**Note 1** — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mfmd. condenser in series between the signal generator and the antenna lead.

**Note 2** — Turn the condenser rotor plates completely out of mesh as far as they will go.

**Note 3** — Rock the tuning condenser while adjusting the low frequency padding. Tune the condenser to the signal and adjust the padding for maximum output. Repeat the tuning condenser back and forth slightly for maximum output. Then readjust the padding for maximum output. Repeat this procedure until an improvement is noticed.

**Note 4** — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

**Note 5** — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broad band signal between 1200 and 1400 Kilocycles on the control knob. Remove the plug button on the end of the radio and adjust the antenna compensator @ (See Figure 2) for maximum signal.

MODEL 936 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

_Equipment_ — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco set Tester, 27-7188 Paddling screw driver.

_General_ — The output meter must be connected by means of an adapter to the plate of the type 82 output tube and to the Radio chassis. With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control full off and set the signal generator attenuation 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 generator output lead must be connected to the Radio housing.

### Table 2: Adjustments

<table>
<thead>
<tr>
<th>Operation</th>
<th>Frequency</th>
<th>Signal Generator</th>
<th>Dummy Capacity</th>
<th>Special Instructions</th>
<th>Adjust Pad</th>
<th>Pad Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ADJUST THE ANTENNA COMPENSATOR</td>
<td>470 K.C.</td>
<td>To Grid of 6AT Tube</td>
<td>.1 mfd.</td>
<td>Tuning condenser fully out of mesh as far as they will go.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2 1500 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3 1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4 900 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 1</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5 1500 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 2</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>6 1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>7 1320 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td></td>
<td>See Note 5</td>
<td></td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**Note 1** — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mfmd. condenser in series between the signal generator and the antenna lead.

**Note 2** — Turn the condenser rotor plates completely out of mesh as far as they will go.

**Note 3** — Rock the tuning condenser while adjusting the low frequency padding. Tune the condenser to the signal and adjust the padding for maximum output. Repeat the tuning condenser back and forth slightly for maximum output. Then readjust the padding for maximum output. Repeat this procedure until an improvement is noticed.

**Note 4** — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

**Note 5** — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broad band signal between 1200 and 1400 Kilocycles on the control knob. Remove the plug button on the end of the radio and adjust the antenna compensator @ (See Figure 2) for maximum signal.
Alignment MODEL 938K

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery of 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the type 6Y7G output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio 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 generator output lead must be connected to the Radio housing.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>FREQUENCY</th>
<th>CONNECTION</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>470 K.C.</td>
<td>To Grid of 6A7 Tube</td>
<td>.1 Mfd.</td>
<td>Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.</td>
<td>✔️ ✔️ ✔️</td>
</tr>
<tr>
<td>2</td>
<td>1580 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Note 2</td>
<td>✔️</td>
</tr>
<tr>
<td>3</td>
<td>1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 1400 K.C.</td>
<td>✔️ Note 4</td>
</tr>
<tr>
<td>4</td>
<td>580 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 580 K.C.</td>
<td>✔️ Note 3</td>
</tr>
<tr>
<td>5</td>
<td>1580 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Note 2</td>
<td>✔️</td>
</tr>
<tr>
<td>6</td>
<td>1400 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Set Tuning Condenser at 1400 K.C.</td>
<td>✔️ Note 4</td>
</tr>
<tr>
<td>7</td>
<td>1200 to 1400 K.C.</td>
<td>Note 5</td>
<td>Note 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator (See Figure 2) for maximum signal.
ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no real adjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

**Equipment** — Fully charged heavy-duty storage battery or 6-volt power pack, 077A or 177 Philco Set Tester, 27-1100 Padding screw driver.

**General** — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio 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 generator output lead must be connected to the Radio housing.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>FREQUENCY</th>
<th>SIGNAL GENERATOR</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400 K.C.</td>
<td>To Grid of 6A7 Tube</td>
<td>.5 Mfd.</td>
<td>Turn Variator to the Indexed Position</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>950 to 1500 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>*25 Mmfld.</td>
<td>Press Push Button No. 1 and adjust No. 1 Antenna Padder and No. 1 Oscillator Coll (Fig. 4)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>950 to 1500 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Note 2 Fig. 4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>750 to 1250 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>*25 Mmfld.</td>
<td>Press Push Button No. 2 and adjust No. 2 Antenna Padder and No. 2 Oscillator Coll (Fig. 4)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>750 to 1250 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Note 2 Fig. 4</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>550 to 950 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>*25 Mmfld.</td>
<td>Press Push Button No. 4 and adjust No. 4 Antenna Padder and No. 4 Oscillator Coll (Fig. 4)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>550 to 950 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>See Note 1</td>
<td>Note 2 Fig. 4</td>
<td></td>
</tr>
</tbody>
</table>

**Frequency Range**

- 920 TO 1920 Kilocycles
- 950 TO 1500 Kilocycles
- 750 TO 1250 Kilocycles
- 750 TO 1250 Kilocycles
- 550 TO 850 Kilocycles
- 550 TO 850 Kilocycles

**Push Buttons**

Make all adjustments for maximum reading on the output meter.

**Note 1** — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 25 Mmfld. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the vertical antenna is used follow the above procedure. Be sure that the lead to the antenna transformer is plugged into the "SKY" socket of the Antenna Transformer.

*When the undercar is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the radio. Connect a 250 Mmfld. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "ROAD" socket of the antenna transformer.*

**Note 2** — The antenna padder screw is on the right, the oscillator coil screw is on the left (see Figure 4).

**ALL ADJUSTMENTS MUST BE REPEATED.**
# CHRYSLER MODEL C-1608 SINGLE UNIT DELUXE CAR RADIO

## Important Notes:
- HIGH VOLTAGE: DO NOT TOUCH ANY PARTS OF 3000 VOLTS OR MORE.
- Use only parts specified by the PHILCO RADIO & TELEVISION CORP.
- For replacement parts, contact NUCOW.

## Schematic:

### FIGURE 1

#### PARTS LIST

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Part No.</th>
<th>No.</th>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna Choke</td>
<td>06-0026</td>
<td>11</td>
<td>Oscillator Transformer (Hi. Pres.)</td>
<td>62-0008</td>
</tr>
<tr>
<td>2</td>
<td>Antenna Transformer</td>
<td>65-0021</td>
<td>12</td>
<td>Oscillator Transformer (Med. Pres.)</td>
<td>62-0039</td>
</tr>
<tr>
<td>3</td>
<td>Condenser (0.1 mf.)</td>
<td>01-0041</td>
<td>13</td>
<td>Condenser (1.0 mf.)</td>
<td>61-0070</td>
</tr>
<tr>
<td>4</td>
<td>Condenser (1.0 mf.)</td>
<td>01-0041</td>
<td>14</td>
<td>Condenser (10.0 mf.)</td>
<td>61-0070</td>
</tr>
<tr>
<td>5</td>
<td>Condenser (250 microf.)</td>
<td>61-0033</td>
<td>15</td>
<td>Resistor (20,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>6</td>
<td>Resistor (10,000 ohm)</td>
<td>33-21037</td>
<td>16</td>
<td>Resistor (5,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>7</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>17</td>
<td>Resistor (250,000 ohm)</td>
<td>61-0048</td>
</tr>
<tr>
<td>8</td>
<td>Resistor (250,000 ohm)</td>
<td>61-0048</td>
<td>18</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>9</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>19</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>10</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>20</td>
<td>Resistor (250,000 ohm)</td>
<td>61-0048</td>
</tr>
<tr>
<td>11</td>
<td>Resistor (250,000 ohm)</td>
<td>61-0048</td>
<td>21</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>12</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>22</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>13</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>23</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>14</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>24</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>15</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>25</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>16</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>26</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>17</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>27</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>18</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>28</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>19</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>29</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
<tr>
<td>20</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
<td>30</td>
<td>Resistor (1,000 ohm)</td>
<td>33-21037</td>
</tr>
</tbody>
</table>

### FIGURE 2

#### Notes:
- IF = 470 KC
- OCTOBER, 1938

© John F. Rider, Publisher
ADJUSTMENTS

Adjustments are carefully made at the factory and only readjustments are necessary.

Equipment - Fully charged heavy duty storage battery or 6-volt power pack, 086A or 099 Philco Set Tester, 27-711B Padlock screw driver.

General - The output meter must be connected by means of an adapter to the plate of the type B output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio 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 generator output lead must be connected to the Radio housing.

### Model C-1608

<table>
<thead>
<tr>
<th>Operation</th>
<th>Frequency</th>
<th>Generator Connection</th>
<th>Dummy Capacity</th>
<th>Special Instructions</th>
<th>Padlock Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>470 K.C.</td>
<td>To Grid of 6A7 Tube</td>
<td>.8 Mfd.</td>
<td>Turn tuning condenser plate out of mesh as far as they will go. Note 2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>560 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>25 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>610 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>25 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>660 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>25 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>710 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>25 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>760 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>25 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>810 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>25 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**NOTE 1** - Connect the antenna lead, Part No. L-7265, to the antenna receptacle in the radio. Connect a 25 Mfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "SKY" socket of the antenna transformer.

**Special Note:** When the aerial is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "ROAD" socket of the antenna transformer.

**NOTE 2** - Turn the tuning condenser rotor plates completely out of mesh as far as they will go.

**NOTE 3** - Rock the tuning condenser while adjusting the low frequency paddle. Tune the condenser to the signal and adjust the paddle for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the paddle for maximum output. Repeat this procedure until no further improvement is noticed.

**NOTE 4** - When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

### Model S-1616

<table>
<thead>
<tr>
<th>Operation</th>
<th>Frequency</th>
<th>Generator Connection</th>
<th>Dummy Capacity</th>
<th>Special Instructions</th>
<th>Padlock Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>470 K.C.</td>
<td>To Grid of 6A7 Tube</td>
<td>.1 Mfd.</td>
<td>Turn tuning condenser plate out of mesh as far as they will go. Note 2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>560 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>610 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>660 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>710 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>760 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>810 K.C.</td>
<td>To Antenna Receptacle on Radio</td>
<td>20 Mfd.</td>
<td>See Note 1</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**NOTE 1** - Connect the antenna lead, Part No. L-7265, to the antenna receptacle in the radio. Connect a 20 Mfd. condenser in series between the signal generator and the antenna lead.

**NOTE 2** - Turn the condenser rotor plates completely out of mesh as far as they will go.

**NOTE 3** - Rock the tuning condenser while adjusting the low frequency paddle. Tune the condenser to the signal and adjust the paddle for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the paddle for maximum output. Repeat this procedure until no further improvement is noticed.

**NOTE 4** - When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.
MODEL P-1617

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 065A or 099 Philco Set Tester, 27-7189 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the Type 81 output tube and to the radio chassis.

With the radio and signal generator set up for operation at the prescribed frequency, turn the radio 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 generator output lead must be connected to the radio housing.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>SIGNAL GENERATOR POSITION</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press the Automatic Station Selector button until &quot;DIAL&quot; appears in the window, and stations can be tuned in by Manual Tuning</td>
<td>.1 mfd.</td>
<td>Turn Tuning Condenser Plate Out of Mesh as far as they will Go.</td>
<td>20 mfd.</td>
</tr>
<tr>
<td>2</td>
<td>470 K.C. To Grid of 6AT7 Tube</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1500 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>20000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 4</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L2765, to the antenna receptacle in the radio. Connect a 20 Mfd. condenser in series between the signal generator and the antenna lead.

Special Note: — When the signal generator is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the black terminal of the Antenna Transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rack the tuning condenser while adjusting the low frequency padding. Tune the condenser to the signal and adjust the padding for maximum output. Repeat the condenser back and forth slightly for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the radio installed in the car, the radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

MODEL P-1630

ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy duty storage battery or 6-volt power pack, 065A or 099 Philco Set Tester, 27-7189 Padding screw driver.

General — The output meter must be connected by means of an adapter to the plate of the Type 81 output tube and to the radio chassis.

With the radio and signal generator set up for operation at the prescribed frequency, turn the radio 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 generator output lead must be connected to the radio housing.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>SIGNAL GENERATOR POSITION</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press the Automatic Station Selector button until &quot;DIAL&quot; appears in the window, and stations can be tuned in by Manual Tuning</td>
<td>.1 mfd.</td>
<td>Turn Tuning Condenser Plate Out of Mesh as far as they will Go.</td>
<td>20 mfd.</td>
</tr>
<tr>
<td>2</td>
<td>470 K.C. To Grid of 6AT7 Tube</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1500 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 4</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>20000 K.C. To Antenna Receptacle on Radio</td>
<td>20 mfd.</td>
<td>See Notes 1 and 2 Note 4</td>
<td></td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L2765, to the antenna receptacle in the radio. Connect a 20 Mfd. condenser in series between the signal generator and the antenna lead.

Special Note: — When the signal generator is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the black terminal of the Antenna Transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rack the tuning condenser while adjusting the low frequency padding. Tune the condenser to the signal and adjust the padding for maximum output. Repeat the condenser back and forth slightly for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the radio installed in the car, the radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.
ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

**Equipment** — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Set Tester, 27-7150 Padding screw driver.

**General** — The output meter must be connected by means of an adapter to the plate of the type 6T7G output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio 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 generator output lead must be connected to the Radio housing.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>SIGNAL GENERATOR</th>
<th>DUMMY CAPACITY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>ADJUST PADDERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press the return to dial button until stations can be tuned in by manual tuning.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>470 K.C. To Grid of 6A7 Tube</td>
<td>.1 Mfd.</td>
<td>Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go.</td>
<td>3A 3</td>
</tr>
<tr>
<td>3</td>
<td>1580 K.C. To Antenna Receptacle on Radio</td>
<td>*250 Mmfld. See Note 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1400 K.C. To Antenna Receptacle on Radio</td>
<td>*250 Mmfld. See Note 1</td>
<td>Set Tuning Condenser at 1400 K.C.</td>
<td>Note 2</td>
</tr>
<tr>
<td>5</td>
<td>580 K.C. To Antenna Receptacle on Radio</td>
<td>*250 Mmfld. See Note 1</td>
<td>Set Tuning Condenser at 580 K.C.</td>
<td>Note 3</td>
</tr>
<tr>
<td>6</td>
<td>1580 K.C. To Antenna Receptacle on Radio</td>
<td>*250 Mmfld. See Note 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1400 K.C. To Antenna Receptacle on Radio</td>
<td>*250 Mmfld. See Note 1</td>
<td>Set Tuning Condenser at 1400 K.C.</td>
<td>Note 4</td>
</tr>
</tbody>
</table>

Make all adjustments for maximum reading on the output meter.

**NOTE 1** — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 250 Mmfld. Condenser in series between the signal generator and the antenna lead.

**Special Note:** — When the roof or undercarriage antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the red terminal of the Antenna Transformer.

*When the cowl antenna is used, connect the antenna lead, Part No. L-2765, to the antenna receptacle in the Radio. Connect a 20 mmfld. condenser in series with the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the black terminal of the antenna transformer.

**NOTE 2** — Turn the condenser rotor plates completely out of mesh as far as they will go.

**NOTE 3** — Rock the tuning condenser while adjusting the low frequency paddler. Tune the condenser to the signal and adjust the paddler for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the paddler for maximum output. Repeat this procedure until no further improvement is noticed.

**NOTE 4** — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.
The letter "P" is stamped on the left end of the housing near the top cover on all Ford Philco Model F-1640 Radios.
Make all adjustments for maximum reading on the output meter.

**NOTE 1** — Connect the antenna lead, Part No. 95-0063, to the antenna receptacle in the radio. Connect a 30 Mmfd. Condenser in series between the signal generator and the antenna lead.

**NOTE 2** — Turn the condenser rotor plates completely out of mesh as far as they will go.

**NOTE 3** — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

**NOTE 4** — When the antenna stage adjustment is made with the radio installed in the car, the radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

---

### ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

- **Equipment** — The output meter must be connected by means of an adapter to the plate of the type 92 output tube and to the radio chassis.

With the radio and signal generator set up for operation at the prescribed frequency, turn the radio 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 generator output lead must be connected to the radio housing.

---

### ADJUST PADDERS

<table>
<thead>
<tr>
<th><strong>SPECIAL INSTRUCTIONS</strong></th>
<th><strong>ADJUST PADDERS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn Tuning Condenser 1000 K.C.</td>
<td>1000 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 1000 K.C.</td>
<td>1000 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 300 K.C.</td>
<td>300 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 300 K.C.</td>
<td>300 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 100 K.C.</td>
<td>100 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 100 K.C.</td>
<td>100 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 50 K.C.</td>
<td>50 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 50 K.C.</td>
<td>50 K.C.</td>
</tr>
<tr>
<td>Set Tuning Condenser 5 K.C.</td>
<td>5 K.C.</td>
</tr>
</tbody>
</table>

---

© John F. Rider, Publisher

Compliments of www.nucow.com
PHILCO RADIO & TELEV. CORP.

MODEL L-1550

Socket, Trimmers

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 800 Mfd. condenser in series between the signal generator and the antenna lead.

Special Note: — When the tire compartment door antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the red terminal of the Antenna Transformer. *When the cowl antenna is used, connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the Radio. No dummy capacity is necessary. Be sure the lead to the antenna transformer is connected to the black terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency paddler. Tune the condenser to the signal and adjust the paddler for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the paddler for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

ADJUSTMENTS

All paddling adjustments are carefully made at the factory, and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

Equipment — Fully charged heavy-duty storage battery or 6-volt power pack, 0.68 A or 0.099 Philco Socket Tester, 20-153-99. Paddling screwdriver.

General — The output meter must be connected by means of an adapter in the place of the type 22 out-

put tube and to the Radio chassis. With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio 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 generator output lead must be connected to the Radio housing.

©John F. Rider, Publisher

Compliments of www.nucow.com
PILOT RADIO CORP.

Alignment Procedure

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver must be incorrect, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to move the hand tuning control while making this adjustment. Finally return and repeat the 1500 k. adjustments and then tighten the lock nut on trimer #9 and #10.

Next, set the generator frequency to 600 k., and accurately set the 600 k. mark. Then adjust trimmers #11 and #12 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 k. adjustments and then tighten the lock nut on trimmers #6 and #8.

Band 2 (Model H-324 & H-324 Short-Wave)

- Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.
- Before aligning this band refer to the paragraph headed "Image Frequency".

Then adjust trimmers #11 and #12 for maximum reading of the output meter. Readjust trimmer #15 if necessary to correct the calibration.

Band 1 (Model H-324 & H-324 Short-Wave)

Connections and dummy antennas are the same as on Band 1 above.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 15 mc., and the ROTOR dial to 22. Adjust trimmer #18 to 25 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

Image Frequency

All Bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment such that the receiver will select the wrong frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency. The chances of doing this may be eliminated by adjusting the generator to the correct Image Frequency, and then adjusting the receiver to see what the Image Frequency is. The generator is then re-adjusted to the correct Image Frequency.

Miscellaneous Service Notes

Under these conditions, if a howling noise (sometimes referred to as Electromagnetic Feedback) is heard, it is very probably because the four screws on the back of the cabinet have not been removed, along with the two narrow metal strips between the chassis and the back of the cabinet. These strips and screws are only intended as additional bracing during shipment, and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chassis rubs against the cabinet. The remedy is obvious.

©John F. Rider, Publisher

Compliments of www.nucow.com
Models H-372, H-373
Chassis H-370

Pilot Radio Corp.

Voltage, Socket, Trimmers Alignment

L.F. Alignment

Long Wave Band (Model H-375)
Connect the "hot" terminal of the generator to the blue antenna wire through the .0006 mh. condenser. Set the generator frequency to 375 kilocycles and with the Band Selector Switch set to the Long Wave Band, turn the pointer of the receiver to 375 kilocycles. Adjust trimmer #6 for maximum reading of the output meter. Adjust trimmer #7 for maximum reading of the output meter. Then set the generator frequency to 375 kilocycles and the receiver dial pointer to approximately the same frequency. Adjust the screw of trimmer #10 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 375 kilocycle alignment.

Broadcast, or Medium Wave Band (Models H-373 and H-372)
Connections are the same for the alignment of this band as they are for the Long Wave Band.
Set the generator frequency to 1500 kilocycles, and the receiver dial pointer to the same frequency, with the Band Selector Switch set appropriately. Also adjust trimmer #8 of Model H-375, or trimmer #6 of Model H-372 for maximum reading of the output meter. Also adjust trimmer #6 of Model H-375, or trimmer #7 of Model H-372 for maximum reading of the output meter. Next, set the generator frequency to 1500 kilocycles. Then with the receiver dial pointer set at approximately the same frequency, adjust trimmer #10 for maximum reading of the output meter while carefully "rocking" the gang condenser. Finally, return and repeat the 1500 kilocycle adjustment.

Short Wave Band (Model H-372)
When aligning this band connect the "hot" terminal of the signal generator to the blue antenna wire of the receiver through the 500 ohm resistor. Before aligning this band, refer to the paragraph headed "Image Frequency".
Set the generator frequency to 17 mc., and also tune the receiver to this frequency, as marked on the dial. Carefully adjust trimmer #5 for maximum reading of the output meter. Be careful you do not adjust to the "Image Frequency". Then adjust trimmer #6 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #5, if necessary, to keep the calibration correct.

Image Frequency
The Short Wave Band in model H-372 must be aligned with the oscillator frequency lower than the signal frequency. On the high frequency band, it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency. The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, turn the tuning knob so that the dial pointer points to that one which comes in at the lower frequency marking on the dial.

Wave Trap Alignment
With the Band Selector Switch set on the Broadcast or Medium Wave position, connect the generator to the blue antenna wire, with the .0002 mh. condenser. Set the generator frequency to 465 kilocycles and adjust trimmer #5 for minimum reading of the output meter. It must always be sufficient output from the Signal Generator to have a reading on the output meter to make this adjustment.

Socket Terminals D.C. Socket Voltages

<table>
<thead>
<tr>
<th>Tube</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>688</td>
<td>-</td>
<td>102(100)</td>
<td>86(110)</td>
<td>-</td>
<td>86(110)</td>
<td>-</td>
<td>2.2(2.6)</td>
<td>-</td>
</tr>
<tr>
<td>677</td>
<td>-</td>
<td>102(100)</td>
<td>86(110)</td>
<td>1.7(2.5)</td>
<td>-</td>
<td>-</td>
<td>1.7(2.5)</td>
<td>-</td>
</tr>
<tr>
<td>530</td>
<td>-</td>
<td>45(55)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>45(55)</td>
<td>-</td>
</tr>
<tr>
<td>3056</td>
<td>-</td>
<td>96(126)</td>
<td>102(130)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.9(9.3)</td>
<td>-</td>
</tr>
<tr>
<td>2926</td>
<td>-</td>
<td>110(145)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>110(145)</td>
</tr>
</tbody>
</table>

Above figures in parenthesis are for Ballast tube #61972.
Figures not in parenthesis are for Ballast tube #61971.

©John F. Rider, Publisher

Compliments of www.nucow.com
PILOT RADIO CORP.

Alignment Procedure

IF Amplifier Alignment

Turn the Band Selector to Band 3 and turn the receiver dial pointer to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6SK tube through the .1 mfd condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 465 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear bread in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and align the last IF transformer. Always finish the alignment with the signal input to the 6SK tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment

With the Band Selector Switch set on the Broadcast Band, replace the .1 mfd dummy antenna with the .0002 mfd dummy antenna. Set the generator frequency at 455 kc and tune trimmer #11 for minimum reading of the output meter. There must be sufficient output from the signal generator to always have a reading on the output meter; do not allow the meter to go to zero and call that the correct adjustment point.

R.F. Alignment

Band 1 (Model 455 Short-Wave)

Remove the .0002 mfd dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 18 mc and also set the receiver dial pointer to this frequency. Carefully adjust trimmer #8 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model 454 - Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed, "Image Frequency".

Set the generator and the receiver dial pointer to 9 mc. Adjust trimmer #9 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #13 for maximum reading of the output meter while slightly "rocking" the gang condenser. Readjust trimmer #9 if necessary to correct the calibration.

Band 3 (Model 454 Long-Wave)

Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd condenser.

Set the generator frequency to 330 kc and with the Band Selector Switch set to Band 3, turn the receiver dial pointer to 330 kc. Adjust trimmer #6 for maximum reading of the output meter. Do likewise with trimmer #13. Then set the generator frequency to 175 kc and the receiver dial pointer to approximately the same. Adjust trimmer #6 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc alignment.

Band 2 (Model 455) Band 3 (Model 454) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the long-wave band.

Set the generator frequency to 1500 kc, and the receiver dial pointer to the same frequency, with the band selector switch set appropriately. Adjust trimmer #7 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmer #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc, and accurately set the receiver dial pointer to the 600 kc mark. Then adjust trimmer #15 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc adjustments and then tighten the lock nut on trimmer #7.

Band 1 (Model 455 Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed, "Image Frequency".

Set the generator and the receiver dial pointer to 9 mc. Adjust trimmer #9 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model 454 - Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed, "Image Frequency".

Set the generator and the receiver dial pointer to 9 mc. Adjust trimmer #9 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #13 for maximum reading of the output meter while slightly "rocking" the gang condenser. Readjust trimmer #9 if necessary to correct the calibration.

Band 1 Alignment (Model 454 Short-Wave)

Connections and dummy antenna are the same as on Band 2 of model 454.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 24 mc and the receiver dial pointer to 24 mc. Adjust trimmer #10 to 24 mc for maximum reading of the output meter.

Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmer #14 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #10 so that calibration is correct if necessary.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the long-wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the image frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator pick up two signals with the receiver, separated by twice the intermediate frequency, set the receiver dial pointer to that one which comes in at the higher frequency marking on the receiver dial pointer.

©John F. Rider, Publisher
PILOT RADIO CORP.

Voltage, Socket Trimmers, Alignment

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the A.C. supply voltage is correct for the ballast tube being used at the time of measurement. Figures in parenthesis are for ballast tube #61972, other figures are for ballast tube #61971.

### Socket Terminals

<table>
<thead>
<tr>
<th>Tube</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6EE</td>
<td></td>
<td>96(125)</td>
<td>96(125)</td>
<td></td>
<td>96(125)</td>
<td></td>
<td>2.3(3)</td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td></td>
<td>86(115)</td>
<td>95(125)</td>
<td></td>
<td>3(4)</td>
<td></td>
<td>3(4)</td>
<td></td>
</tr>
<tr>
<td>6Q7</td>
<td></td>
<td>60(80)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.1(1)</td>
<td></td>
</tr>
<tr>
<td>25LA-G</td>
<td></td>
<td>91(119)</td>
<td>95(125)</td>
<td></td>
<td></td>
<td>6(8.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>256G-G</td>
<td></td>
<td>110(140)</td>
<td></td>
<td></td>
<td></td>
<td>110(140)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Power Supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Ballast Tube</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>110-125</td>
<td>#61971</td>
<td>50</td>
</tr>
<tr>
<td>250-240</td>
<td>#61972</td>
<td>11A</td>
</tr>
</tbody>
</table>

**Intermediate Frequency** 455 kHz

**Tuning Ranges**

**The model H-474 chassis has the following tuning ranges:**

- **Band 1:** 24.9 to 8.3 mc or 12.09 to 36.1 meters
- **Band 2:** 9.7 to 2.9 mc or 40.9 to 106.4 meters
- **Band 3:** 1755 to 550 kc or 174 to 566 meters

**The model H-475 chassis has the following tuning ranges:**

- **Band 1:** 18.9 to 5.55 mc or 15.95 to 56.04 meters
- **Band 2:** 1725 to 530 kc or 174 to 566 meters
- **Band 3:** 375 to 145 kc or 800 to 2065 meters
Alignment Procedure

Connect the black and yellow wires together and to the ground post of the signal generator.
Connect the "hot" post of the generator through the correct dummy antenna or condenser to the appropriate point as noted in the text. All the measurements to follow, the output meter should be connected to the plate and screen grid terminals of the 3S2A through 0.1 mfd condenser in any convenient manner.

IF Amplifier Adjustment
Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.
Connect the output meter as described under "Connections," and connect the "hot" post of the signal generator to the grid of the 6SN7 tube through the 0.1 mfd condenser. Then proceed with the alignment as follows:

1. Adjust the Signal Generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.
2. Adjust the screws 1, 2, 3, and 4, (see figure) for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be exact, as the AGC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and align the last IF transformers. Always finish the alignment with the signal input to the 6SN7 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment
With the Band Selector Switch set on the Broadcast Band, replace the .1 mfd. dummy antenna with the .0005 mfd. dummy antenna. Set the generator frequency at 455 kc. and tune trimmer #11 for maximum reading of the output meter. There must be sufficient output from the signal generator to always have a reading on the output meter. Do not allow the meter to go zero and call that the correct adjustment point.

R.F. Alignment
Band 3 (Model H-475 - Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0005 mfd. condenser.
Set the generator frequency to 300 kc., and with the Band Selector Switch set to Band 3, turn the ROTOR dial to 300 kc. Adjust trimmer #6 for maximum reading of the output meter. Do likewise with trimmer #13. Then set the generator frequency to 175 kc., and the ROTOR dial to approximately the same. Adjust trimmer #5 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc. alignment.

Band 2 (Model H-475) Band 3 (Model H-474) (Standard Broadcast)
Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1800 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #7 for maximum reading of the output meter. This trimmer is adjusted by moving the brass rod in or out, with a hooked wire end, and twisting the motion. First loosen the lock nut. Then without touching any tuning controls adjust trimmer #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and accurately set the ROTOR dial to the 500 kc. mark. Then adjust trimmer #15 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally, return and repeat the 1800 kc. adjustments and then tighten the lock nut on trimmer #7.

Band 1 (Model H-475 - Short-Wave)
Remove the .0005 mfd dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency". Set the generator frequency to 18 mc. and also set the ROTOR dial to this frequency. Carefully adjust trimmer #8 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency. Then adjust trimmer #10 to get maximum meter reading, while slightly "rocking" the gang condenser. Re-adjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model H-474 - Short-Wave)
Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency". Set the generator and the ROTOR dial to 9 mc. Adjust trimmer #9 for maximum reading of the output meter. Be careful that the receiver is not adjusted at the Image Frequency. Then adjust trimmer #13 for maximum output meter reading, while slightly "rocking" the gang condenser. Re-adjust trimmer #9 if necessary to correct the calibration.

Band 2 (Model H-475 - Short-Wave)
Connections and dummy antenna are the same as on Band 1 above.

Before aligning this band, refer to the paragraph headed "Image Frequency". Set the generator frequency to 24 mc. and the ROTOR dial to 24 mc. Adjust trimmer #10 to 24 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted at the Image Frequency. Then adjust trimmer #14, while "rocking" the gang condenser for maximum reading of the output meter. Reset trimmer #10 so that calibration is correct if necessary.

Image Frequency
All bands in the two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency. The chances of doing this may be eliminated by adjusting the receiver to the correct aligning frequency, and with sufficient output from the generator, to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the ROTOR dial to that one which comes in at the highest frequency marking on the ROTOR dial.

Miscellaneous Service Notes
If a howling noise (sometimes referred to as Microphonic Howl) is heard, it is very probably because the four red screws under the cabinet have not been removed along with the two narrow metal strips between the chassis and the bottom of the cabinet. These strips and screws are only intended as additional bracing during the assembly. They must be removed before the receiver is put in operation. The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chassis rubs against the cabinet. The remedy is obvious.
In replacing or resetting the ROTOR dial, always set the gang condenser at maximum capacity.
To reset the dial, loosen the set screws in the ROTOR dial pinch gear. Then, adjust the dial so that the low frequency end of the calibration line, at the base of the arrow tip, is directly under the indicator wire. Then, tighten the pinch gear on the pinch gear knob.
If it should be necessary to remove the ROTOR dial, first remove the top plate which carries the Tuning Bezel Clamps. Next, remove the bearing plate which holds the dial shaft in place, and lift out the whole dial assembly. Be careful not to damage the "Backlash" springs in the double gear approximately 1/8 of an inch.

Never loosen the set screws which connect the link motion to the gang condenser. If this should be done, the calibration of the receiver will be affected.
IP Amplifier Alignment. Turn the Band Selector Switch to Band 2 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections," and connect the "hot" post of the signal generator to the grid of the A-68A tube through the 1 mfd. condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 1500 kcs, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

R.F. ALIGNMENT

Band 3 (Model H-485, Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the 10000 mfd. condenser.

Set the generator frequency to 300 kcs, and with the Band Selector Switch set to Band 3, turn the ROTOR dial to 300 kcs. Adjust trimmer #2 for maximum reading of the output meter. Do likewise with trimmer #6 and #7. Then set the generator frequency to 160 kcs and the ROTOR dial to approximately the same. Adjust trimmer #21 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kcs alignment.

Band 2 (Model H-484, Short-Wave) Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kcs, and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #5 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut.) Then without touching any tuning controls, adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kcs and accurately set the ROTOR dial to the 600 kcs mark. Then adjust trimmer #11 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally, return and repeat the 1500 kcs adjustments and then tighten the lock nut on trimmers #6 and #7.

Band 1 (Model H-485 Short-Wave) Remove the 10000 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor. Before aligning this band, refer to the paragraph headed "Image Frequency." Set the generator frequency to 17.5 kcs, and also set the ROTOR dial to this frequency. Carefully adjust trimmer #12 for maximum reading of the output meter. Be careful you do not tune in at the image frequency. Then adjust trimmers #13 and #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #12 if necessary to keep the calibration correct. These are the only adjustments on this band.
Panel Controls

12 PIANO TUNING keys, Volume Control, Tone Control with On-Off switch, Band Selector Switch, and Motor and Manual Tuning Controls.

Tuning Ranges

<table>
<thead>
<tr>
<th>Band</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25.3 mc</td>
<td>6.92 mc</td>
</tr>
<tr>
<td>2</td>
<td>9.88 mc</td>
<td>3.97 mc</td>
</tr>
<tr>
<td>3</td>
<td>1750 kHz</td>
<td>526 kHz</td>
</tr>
</tbody>
</table>

Maximum Power Output: 12 watts

Power Supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Frequency</th>
<th>Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td>115, 120, 220, 240V</td>
<td>60 cycles</td>
<td>90</td>
</tr>
</tbody>
</table>

Universal Transformer

(Not supplied in the United States.)

R.F. Amplifier

Oscillator Control

Oscillator Frequency Control

IF Amplifiers

Discriminator

Universal Transformer

Output Tubes

Power Supply Rectifier

Cathode Ray Tuning Beam

Circuit

Super-Heterodyne, with push-pull output stage, and with Automatic Frequency Control of the oscillator on the Standard Broadcast Band. An R.F. stage is used on all bands. Iron Core, Permeability Tuned IF and Discriminator Transformers, which are, in addition, Silver-Mica Condensers.

Other features of the Receiver are:-

- Continuously variable Tone Control, Tone Compensated Volume Control, Visible Indicators on all controls, Motor operated PIANO TUNING on the Broadcast Band. Manual Tuning is instantly available without extra switching. Motor Tuning, without the keys is also available on all bands. These receivers are supplied with a fuse in the power supply circuit, and a jack is provided for plugging in a high impedance phonograph pick-up. There is also provision for an external speaker.

© John F. Rider, Publisher
**PILOT RADIO CORP.**

**MODEL H-70**

**Socket, Trimmers, Alignment**

**Front View**

- **Antenna Coils**
- **Detector Coils**
- **Oscillator Coils**
- **Filter Choke**
- **Dial & Drive Assy**
- **Volume Control**
- **Speaker**
- **R.F. Socket**
- **Power Transformer**
- **Line Choke**
- **Rear View**

**Left Side of Chassis**

- **Top View of Chassis**
- **Rear View of Chassis**

**Receiver Alignment**

1. **Signal Generator.** One using fundamental frequencies for all the frequencies used in the receiver is preferred. Generally a 500 W.M. transmitter is the most convenient.
2. **A. Dummy antenna.** A 500 W.M. dummy condenser.
3. **B. IF Amplifier Alignment.**
   - **Connector**
   - **Rotor**
   - **Dial**

**Rotor**

Connect the output meter as described under "Connections," and connect the "Rot" port of the generator to the grid of the 6SC tube through the 500 W.M. condenser. See note on page 9 for adjustment of the output meter. Then proceed with the alignment as follows:

1. **R.F. Alignment.**
   - **Band 1 (Standard Broadcast)**
   - **Band 2 (Short Wave)**
   - **Band 3 (Short Wave)**
   - **Band 4 (Short Wave)**

**Connections**

- **Input**
- **Output**
- **-coil**
- **wire**
- **socket**
- **plug**
- **chassis**

**Compliments of www.nucow.com**

©John F. Rider, Publisher

Compliments of www.nucow.com
D.C. SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6R7</td>
<td></td>
<td>240</td>
<td>95</td>
<td>95</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6R7</td>
<td></td>
<td>240</td>
<td>95</td>
<td>95</td>
<td>3.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>627</td>
<td></td>
<td>225</td>
<td>245</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>676-G</td>
<td></td>
<td>225</td>
<td>245</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>675-G</td>
<td></td>
<td>340</td>
<td>340</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Voltages at the points that tube cannot be measured, however, if the tube is removed from the socket, the voltages on the various terminals may be measured. As all these measured voltages would be measured through a high resistance, except the cathode which is grounded, none of them are noted here.

* Not true value, but as measured with voltmeter.

--

IF Amplifier Alignment

Turn the Band Selector Switch to the Broadcast, or Medium Wave Band, and tune the grid condenser to the low frequency end of the dial. That is the condenser plates completely unsheathed.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6L6 tube through the .0008 mfd condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the trimmer screws 1, 2, 5, and 4, (see figure for maximum reading of the output meter. Keep reducing the generator output until the output meter reading increases. When the reading of the output meter cannot be increased by adjusting the four screws of the IF transformers, the IF amplifier is aligned.

If the output of the generator is too great, while aligning the receivers, the alignment will be incorrect. It is very important that this be kept in mind.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifiers and then align the last IF amplifier transformer. Always finish the alignment of the IF amplifier with the signal input to the grid of the 6L6 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment

With the Band Selector Switch set on the Broadcast, or Medium Wave, position connect the generator to the blue antenna wire with the .0008 mfd condenser. Set the generator frequency to 455 kilocycles and adjust trimmer #5 for minimum reading of the output meter. There must always be sufficient output from the signal generator to have a reading on the output meter to make this adjustment.

R.F. ALIGNMENT

Long Wave Band (Model H-763). Connect the "hot" terminal of the generator to the blue antenna wire through the .0008 mfd condenser. Set the generator frequency to 375 kilocycles and with the Band Selector Switch on the Long Wave Band turn the pointer of the receiver to 375 kilocycles. Adjust trimmer #7 for maximum reading of the output meter. Do likewise with trimmer #4. Then set the generator frequency to 150 kilocycles and the receiver dial pointer to approximately the same frequency. Adjust the screw of trimmer #20 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 375 kilocycle alignment.

Broadcast, or Medium Wave Band (Models H-763 & H-762) Connections are the same for the alignment of this band as they are for the Long Wave Band. Set the generator frequency to 1500 kilocycles, and the receiver dial pointer to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #9 of Model H-763, or trimmer #9 of Model H-762 for maximum reading of the output meter. Also adjust trimmer #6 of Model H-763, or trimmer #7 of Model H-762 for maximum reading of the output meter. Set the generator frequency to 600 kilocycles. Then with the receiver dial pointer set at approximately the same frequency, adjust trimmer #10 for maximum reading of the output meter while carefully "rocking" the gang condenser. Finally, return and repeat the 1500 kilocycle adjustment.

Short Wave Band (Model H-762)

When aligning this band connect the "hot" terminal of the signal generator to the blue antenna wire of the receiver through the 400 ohm resistor.

Before aligning this band, refer to the paragraph headed "Image Frequency." Set the generator frequency to 17 kc., and also the receiver to this frequency, as marked on the dial. Carefully adjust trimmer #9 for maximum reading of the output meter. Be careful you do not adjust to the Image Frequency.

Then adjust trimmer #6 for maximum output meter reading, while slightly "rocking" the gang condenser.

Adjust trimmer #2, if necessary, to keep the calibration correct.
PILOT RADIO CORP.

Alignment Procedure

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.

2. Output Meter. Generally a copper-oxide rectifier meter is the most convenient.

3. Dummy Antenna. .0002 mfd. condenser 400 ohm, non-inductive resistor.

Alignment Procedure

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much. If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the action will become too great, and the amplifier will appear bad in a listening test.

3. It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the oscillator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals, with the receiver, separated-by twice the Intermediate Frequency, the ROTOR-DIAL to that one which comes in at the higher frequency marked on the ROTOR-DIAL.
All voltage measurements are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

The model N-620A chassis has the following ranges:

<table>
<thead>
<tr>
<th>Tube</th>
<th>Socket Terminals</th>
<th>Bend 1</th>
<th>Bend 2</th>
<th>Bend 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>R7</td>
<td>6ST-7</td>
<td>145</td>
<td>62.5</td>
<td>2.5</td>
</tr>
<tr>
<td>1st Det. 6X0</td>
<td>150</td>
<td>62.5</td>
<td>140</td>
<td>1.5</td>
</tr>
<tr>
<td>2nd Det. 6X7</td>
<td>80</td>
<td></td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>A7</td>
<td>6L5-G</td>
<td>125</td>
<td></td>
<td>6.7</td>
</tr>
<tr>
<td>A8</td>
<td>12A6</td>
<td>145</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Res. 627G</td>
<td>-</td>
<td>-</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

Maximum Power Output: 2 watts

Power Supply: 32 volt Storage Battery, .5 amperes drain
110-120 or 220-240 volts AC, 50-60 cycles 18 Watts

Intermediate Frequency: 455 kHz

The above voltages apply with either the nominal Battery Supply or with the AC supply.
Compliments of www.nucow.com
The receiver is designed to operate over the following two tuning ranges:

- **Broadcast**—550 to 1600 kilocycles
- **Short-Wave**—6 to 18 megacycles (16 to 51 meters)

**CONVENTIONAL ALIGNMENT**

SEE SPECIAL SECTION VOL. VIII.

**STANDARD MODEL**
- 100-125 Volts
- AC or DC Current
- 40-60 Cycles
- 65 Watts
- higher than ¾ to 1 amp.

**EUROPEAN MODEL**—A special switch is provided on the motor-plate located underneath the pick-up arm, and is marked “110-220.” With this switch in 220 Volt position, the PORT-O-MATIC will operate safely on voltages from 200 to 250. To avoid damage, if switch is accidentally placed in wrong position, this particular model is equipped with a fused plug at the end of the electric cord. Should these fuses blow, replace same with no standard automobile cartridge fuses.
This portable radio will operate on any current or principal voltage throughout the world. By setting the knob, in the back of the radio, it can be used on AC or DC at 120, 160, or 240 volts.

The receiver is designed to operate over the following three tuning ranges:

- **Broadcast**—550 to 1600 kilocycles
- **Short-Wave**—6 to 18 megacycles (16 to 51 meters)
- **Long-Wave**—800-2000 Meters

**IMPORTANT:** To avoid damage if switch is accidentally placed in wrong position, this particular model is equipped with a fused plug at the end of the electric cord. Should these fuses blow, replace with no higher than 3/4 to 1 amp. standard automobile cartridge fuses.
Operation Model TRK-5

The power-volume control on the broadcast radio receiver turns on the power for the complete receiver. Pushing the button marked “Television” on the push button panel turns on the Television receiver, if the above power control is “On.” The volume control of the broadcast receiver also controls the Television sound volume level.

Station Selector and Fine Tuning.—The outer ring “O” section of the central dual control knob on the Television panel selects the station from which it is desired to receive television transmission.

Five television channels are covered as follows:

1. 84 to 90 M.C.
2. 78 to 84 M.C.
3. 66 to 72 M.C.
4. 50 to 56 M.C.
5. 44 to 50 M.C.

Set the station selector to the number corresponding to the frequency of the station from which it is desired to receive Television Broadcasts.

The inner section “I” of this knob is used for fine tuning and may eliminate moving ripples or distortion if due to interfering radio signals. A slight inward pressure must be exerted on the knob while turning.

Before the Television portion of the receiver is turned “ON” it is advisable to turn the Brightness and Contrast controls completely counter-clockwise to reduce the illumination of the spot which appears on the Kinescope before the sweep circuits have started functioning.

Contrast and Brightness Controls.—The inner “I” section of the “Contrast” “Brightness” controls is the “Contrast” control and varies the black and white tones of the picture being received. Too little contrast makes the picture all half-tones or gray. Turning clockwise increases contrast from gray to black and white. See Test Pattern Figs. 2, 4, and 5. Page 10-21.

The outer ring “O” is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See test pattern Figs. 2, 3, 4.

Hold Controls.—The dual knobs on the Television panel marked “Horizontal” and “Vertical” Hold, control the picture stability. The inner section designated by “I” is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture “locks in” horizontally. See test pattern Fig. 6. Page 10-22.

The outer ring section designated by “O” is the Vertical Hold Control and when being set should be turned to the point where the picture “locks in” vertically. Pattern Fig. 7.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An occasional resetting may be necessary due to changing to a different station, and to the gradual aging of the tubes.

Focus Control.—This control is located on the rear of the Video chassis, and controls the electron beam focus of the Kinescope. Ordinarily, after once being focused the Kinescope should not require refocusing for a considerable length of time. See test pattern Fig. 3.

Operation Model TT-5

The operation of Model TT-5 is the same as that for the Model TRK-5 except that there is a separate “ON-OFF” switch, and a separate sound volume control because the broadcast radio receiver is not included in this model. When Model TT-5 is connected to a broadcast receiver for the Television sound reproduction, the broadcast receiver volume control should be turned to maximum and the Television sound volume controlled with the control on the Television Receiver.

Kinescope Installation Models TRK-3, TT-5: Refer to figure 3.

1. Remove back cover from cabinet.
2. Remove Kinescope mounting shield from shipping carton.
3. Using gloves and goggles remove Kinescope from shipping carton and place in the cone-shaped mounting shield.
4. Guide the Kinescope and mounting shield carefully into the cabinet, placing the Kinescope firmly up against the mask and viewing window. Fasten the mounting shield firmly in place with the thumb screw provided, so that it holds the Kinescope firmly against the mask. If the Kinescope does not line up properly with the mask, loosen the screws “A” and nut “B” and adjust in the desired direction.
5. After the receiver is operating, the Kinescope may be rotated to properly square up the picture with the mask.

CAUTION: When rotating tube the power should be turned “OFF.”

Adjustments.—There are a series of screwdriver slot adjustments at the rear of the Video chassis used to obtain the proper picture size and centering. These adjustments are explained fully in the receiver operating instructions, and also in the booklet: Practical Television by RCA.

When the receiver is moved from one location to another, some readjustment of these controls may be necessary.

Compliments of www.nucow.com
Antenna Installation:

In most cases, the antenna should not be installed permanently on the apartment or residence roof until the quality of the picture reception has been observed on a Television Receiver. A temporary transmission line can be run between receiver and antenna allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant on the roof to find an antenna location, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of only a few feet in antenna position or direction may effect a tremendous difference in picture reception. Whenever possible, the antenna location should be chosen or erected so that the antenna is not only on a road or side of the transmitter but removed as far as possible from highvoltage offices, hospitals and doctors' offices, and similar sources of interference. Auto ignition and diathermy apparatus may cause noise interference which spoils the picture.

In mounting an antenna, care must be taken to keep the antenna rods or pickup wires and other antennas, metal roofs and gutters or metal objects at least 6 feet away from other antennas.

Under certain unusual conditions, it may be possible to rotate or position the antenna so it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions, a wet surface has been known to have different reflecting characteristics than a dry surface.

In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals because:

1. Intervening obstacles have a pronounced shielding effect on the ultra-high frequency waves producing low intensity signals. Severe trouble with multi-path transmissions may be experienced, especially in congested city areas.
2. The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.
3. It must be continually remembered that the discernment of the eye is much more critical than that of the ear.

The Transmission Line

RCA Victor has made available two types of exterior transmission lines. One is a special low loss weather-proofed line having the correct surge impedance to match the RCA Victor Television antennas and the RCA Victor Television receivers. It is carried as Stock No. 9882 in 1,000 foot rolls. The second type is a standard weather-proofed line also having the correct surge impedance for proper antenna and receiver matching. It is carried as Stock No. 12430 in 90 ft. rolls, Stock No. 12429 in 40 ft. rolls and is available in 1,000 ft. spools as Stock No. 9881. Use of improper lines may result in excessive loss or may lead to line reflections, resulting in multiple images or "ghosts," thus marred the reception.

For transmission line runs up to 200 feet, and where the signal strength on the antenna is relatively high, the Stock No. 12430, or Stock No. 12429 transmission line may be used. For all other applications the Stock No. 9882 transmission line is recommended.

---

Figure 7—Voltage Diagram Television Chassis
Video Chassis KC-3 (TT-5)

KC-3A (TRK-5)

No attempt should ever be made to measure the high (2,000 volts) voltage, because of the dangers and difficulties involved. If at any time it becomes necessary to service the high voltage circuit, the suspected parts should be replaced by parts known to be in good operating condition. Always replace the red can over the 879 high voltage rectifier.

The most dangerous portion of the receiver is the plate (top cap) lead for the 879 high voltage rectifier. Always be very careful when working near or with this lead.

When working on the high voltage supply portion of the chassis, the following precautions should be observed:
1. Remove power supply cord from the power supply socket.
2. Use only one hand at a time.
3. Connect a shorting lead between ground (firstly) and to the high voltage side.
4. Whenever working with the oil-filled high voltage filter capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

When any change are made on the Video portion of the chassis, the locations of leads and parts should be returned as closely as possible to their original positions.

Service Hints:
1. In some cases the horizontal sweep oscillator circuit will radiate energy to nearby broadcast receiving antennas and lead-ins, causing interference with standard broadcast receivers. It has been found that this trouble has been cleared up in some cases by use of an RCA "Magic Wave" antenna for the broadcast receiver receiving the interference.
2. In the picture "tears out" when the receiver is jarred it may be due to microphonic 1852, 1833, or 6J5 tubes. The 6J5 oscillator tube should be removed without rocking it in its socket to loosen it, as the motion may cause the 80.3 mef capacitor C16 to break off.
3. The coils or strays in the h.f. oscillator circuits should not be touched or moved or the alignment of the receiver will be disturbed.
4. The two Video coupling capacitors C44, 245, should be kept clear of chassis.
5. In some cases the metal Kinescope mounting shield may become magnetized by the earth's or some nearby magnetic field, and thus distort the picture on the screen towards the magnetized portion of the shield. The shield can be demagnetized by passing it slowly through a solenoid which is energized by an a.c. current.

The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and use care in its installation.

The RCA Double Dipole Antenna, Stock No. 9871, is recommended for use with these receivers. Both this antenna and the "V" type antenna described below are especially designed for a sufficient broad frequency response to cover the contemplated television spectrum, with good efficiency and are therefore superior to a single Dipole type antenna.

Antenna

When greater signal pickup, or where a shielding effect from noise pickup or image reflections are desired, a reflector assembly Stock No. 9872 may be added to the Stock No. 9871 Antenna to obtain an improved signal-to-noise ratio. The RCA Double "V" Wire type Television Antenna is alternative type of antenna designed for television sight and sound reception. Two points of support are necessary. It serves adequately in suburban areas but may not be sufficiently flexible and efficient for congested city areas where bad reflections and interference are encountered.
**Model TRK-5**

**Receiver Chassis RC-429**

**Specifications, Dial Data**

---

**Electrical Specifications**

- **Frequency Ranges**
  - Standard Broadcast ("A" band) ........................................ 540-1720 kc
  - Intermediate Frequency .................................................. 540-1720 kc
  - Medium Wave ("B" band) .................................................. 2.3-7.0 mc
  - Short Wave ("C" band) .................................................... 7.0-22 mc
  - Interim Wave ............................................................... 455 kc

- **Tube Complement**
  - (1) RCA-6A8-G ......................................................... 1st-Det., and Osc.
  - (2) RCA-6K7 .............................................................. J-F Amplifier
  - (3) RCA-6Q7 .............................................................. 2nd-Det., A.V.C., 1st Audio
  - (4) RCA-6J5 .............................................................. Phase Inverter
  - (5) RCA-6K6-G .............................................................. Power Output
  - (6) RCA-6K6-G .............................................................. Power Output
  - (7) RCA-6U5 .............................................................. "Magic Eye"
  - (8) RCA-5Y3-G (in SPU RS-49A) ....................................... Full-Wave Rectifier

- **Dial Lamps** .............................................................. Mazda No. 44, 6.3 volts, 15 amp.

- **Power Supply Rating** .................................................. 105-125 volts, 60 cycles, 75 watts

- **Power Output** ........................................................... 5 watts
  - Undistorted .................................................................. 5 watts
  - Maximum ...................................................................... 5.5 watts

- **Electric Tuning Ranges**
  - Two stations between approximately ......................... 550-950 kc

---

**Mechanical Specifications**

- **RC-429 Chassis Base Dimensions:**
  - Height .................................................................. 2-1/2 inches
  - Width .................................................................... 13 inches
  - Depth .................................................................. 6-1/2 inches
  - Overall Chassis Height ................................................. 6-1/2 inches
  - Tuning Drive Ratio ..................................................... 12 to 1

---

**General Description**

Radio receiver chassis No. RC-429 is used in RCA Victor Television console Model TRK-5. The audio output of the television chassis is connected to the audio input of the RC-429 chassis by means of jack X-8 and the left-hand push-button switch (S44, S45, S46).

A separate plug-in power supply unit, RS-89A, is used to supply heater and plate voltage to the RC-427 chassis. Service data and diagrams for the power unit are contained in the following pages.

---

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

©John F. Rider, Publisher
**Alignment Procedure**  
(RADIO CHASSIS)

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (C), and keep the output as low as possible to avoid a-vc action.

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial if fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft where the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ½-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointers for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the “180°” mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet “RCA Victor Receiver Alignment.”

<table>
<thead>
<tr>
<th>Step</th>
<th>Connect the high side of test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap, in series with .01 mfd.</td>
<td>456 kc</td>
<td>“A” band, Quiet Point between 550-750 kc</td>
<td>L12 and L13 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6A8-G 1st-Det. grid cap, in series with .01 mfd.</td>
<td>600 kc</td>
<td>600 kc 150.5°</td>
<td>L10 and L11 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna terminal, in series with 200 mfd.</td>
<td>1,500 kc</td>
<td>1,500 kc 28°</td>
<td>C25 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>20 mc</td>
<td>20 mc 22°</td>
<td>C21 (osc.)*</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna terminal, in series with 300 ohms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Follow “Adjustments for Electric Tuning.”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained, and check for image by tuning radio approximately 910 kc lower.

**Note:** The oscillator tracks above the signal on all bands.

**Adjustments for Electric Tuning**

These models have eight push buttons. The left-hand button is a Television switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different sections in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use a insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.
5. Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
6. Adjust for each of the remaining five stations in the same manner.
7. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the “Magic Eye” to ensure sharp peaking.

©John F. Rider, Publisher
S.P.U. Schematic Diagram, RS-89A

R-F Wiring Diagram, Chassis No. RC-429

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

At Left—Dial Mechanism
## REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased at authorized dealers.

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31289</td>
<td>Sockets—Dial lamp socket, one wire terminal</td>
<td>0.09</td>
</tr>
<tr>
<td>31290</td>
<td>Sockets—Dial lamp socket, one wire terminal</td>
<td>0.09</td>
</tr>
<tr>
<td>31284</td>
<td>Sockets—Dial lamp switch, one wire terminal</td>
<td>0.09</td>
</tr>
<tr>
<td>31283</td>
<td>Sockets—Dial lamp switch, one wire terminal</td>
<td>0.09</td>
</tr>
<tr>
<td>31278</td>
<td>Switches—selector switch, push button</td>
<td>0.09</td>
</tr>
<tr>
<td>31279</td>
<td>Switches—selector switch, push button</td>
<td>0.09</td>
</tr>
<tr>
<td>31285</td>
<td>Switches—selector switch, push button</td>
<td>0.09</td>
</tr>
<tr>
<td>31286</td>
<td>Switches—selector switch, push button</td>
<td>0.09</td>
</tr>
<tr>
<td>31287</td>
<td>Switches—selector switch, push button</td>
<td>0.09</td>
</tr>
<tr>
<td>31288</td>
<td>Switches—selector switch, push button</td>
<td>0.09</td>
</tr>
</tbody>
</table>

**POWER SUPPLY UNIT**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31291</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31292</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31293</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31294</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31295</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31296</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31297</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31298</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
</tbody>
</table>

**SPEAKERS ASSEMBLY**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31299</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31300</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31301</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31302</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31303</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31304</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31305</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31306</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS ASSEMBLY**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31307</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31308</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31309</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31310</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31311</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31312</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31313</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
<tr>
<td>31314</td>
<td>Transformers—EE-99-A transformer</td>
<td>0.09</td>
</tr>
</tbody>
</table>

---

All parts are subject to change or withdrawal without notice.
No attempt should ever be made to measure the high (7,500 volts) voltage because of the difficulties and dangers involved. If, at any time it becomes necessary to service the SPU, the suspected parts should be replaced by parts known to be in good operating condition.

Socket Power Units KK7, KK7A

These precautions should be observed when any work on the SPU is being done:

1. Remove power supply cord from the power supply socket.

2. Use only one hand at a time. It is advisable to keep the other hand in one's pocket.

3. Connect a shorting lead between ground (first) and the high voltage side of C114.

4. Whenever working with the oil-filled capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.

5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

---

CAUTION

DISCONNECT BOTH OF THESE LEADS, AND CONNECT THE TERMINAL OF C114 TO GROUND BEFORE MAKING ANY VOLTAGE MEASUREMENTS EITHER ON THIS CHASSIS, OR THE TELEVISION CHASSIS.

---

NOTE: FOCUS CONTROL POTENTIOMETER AND ROD WILL BE TURNED 90° ON LATER PRODUCTION MODELS.
Figure 2—CORRECT PICTURE

Figure 3—INCORRECT FOCUS
To correct—Adjust Focusing Control counterclockwise and Brightness Control clockwise for sharpest image.

Figure 4—TOO MUCH CONTRAST
To correct—Turn Contrast Control counterclockwise.

Figure 5—TOO LITTLE CONTRAST
To correct—Turn Contrast Control clockwise.

Figure 6—INCORRECT HORIZONTAL HOLD
To correct—Adjust Horizontal Hold Control until picture "locks in".

Figure 7—INCORRECT VERTICAL HOLD
To correct—Adjust Vertical Hold Control (screwdriver adjustment) to center picture horizontally.

Figure 8—INCORRECT HORIZONTAL CENTERING
To correct—Adjust Horizontal Centering Control (screwdriver adjustment) to center picture vertically.

Figure 9—INCORRECT VERTICAL CENTERING
To correct—Adjust Vertical Centering Control (screwdriver adjustment) to center picture vertically.

Figure 10—INCORRECT WIDTH
To correct—Adjust Width Control (screwdriver adjustment) for correct width of picture.

Figure 11—INCORRECT HEIGHT
To correct—Adjust Height Control (screwdriver adjustment) for correct height of picture.

Figure 12—INCORRECT VERTICAL LINEARITY—(Circles flattened at bottom)
To correct—Turn Vertical Linearity Control clockwise and Height Control counter-clockwise (screwdriver adjustments).

Figure 13—INCORRECT VERTICAL LINEARITY—(Circles flattened at top)
To correct—Turn Vertical Linearity Control clockwise and Height Control counter-clockwise (screwdriver adjustments).
Compliments of www.nucow.com

Antenna

A television receiving antenna and its installation must conform to such high standards for the interception of International Short Wave and Standard Broadcast signals because:

(1) At the short wave lengths employed, interfering processes have a marked effect on both the receiving antenna signal intensity, and also severe trouble with multi-path transmissions; these produce blurring and miscellaneous signals.

(2) The picture signal is comprised of a very wide band or range of frequencies, and no part of this must be received with good efficiency.

Only an RCA Television Antenna which has been designed to these particular instructions should be used with the TRK 12 to insure best results. Three types are available:

1. The Double "V" Type, Stock No. 9870.
2. The Double Dipole, Stock No. 9871.
3. The Double Dipole, Stock No. 9871, with Reflectors, Stock No. 9872.

Under favorable conditions, good pictures may be obtained with the Double "V" Wire Type. In areas of weak signals or where interference or dead spots may occur the picture a Double Dipole or Double Dipole and Reflectors become necessary.

Full instructions for all RCA Television antennas and these instructions must be followed implicitly.

The leads from the antenna transmission line are for connection to the terminals A1 and A2 showing at the back of the cabinet of the television receiver. Terminal G must be connected to a good ground such as a cold water pipe. Terminals A3 and G are connected to the Radio chassis and the circuit is designed so that the Television Antenna is also available for Standard and Shortwave Reception.

An RCA Radio Antenna such as the RCA Magic Wave or RCA Spider-Matic is not recommended.

Television Fixed Controls

1. Horizontal Centering—This is a screwdriver adjustment at the top of the control. It serves to center the picture horizontally on the Kinescope screen and is made at the time of installation of the receiver. A slight downward pressure must be exerted on the knob while turning.

2. Vertical Linearity—The coarse control of the third point (1) shown in Figures 2 and 5. These controls are used to effect the correct setting of the control.

3. Height—The coarse control determines the height of the picture and is adjusted when the receiver is installed. Further adjustment may occasionally be necessary in order to compensate for the gradual reduction in horizontal deflection with time. See Figure 10.

4. Vertical Linearity—The third control is applied on conjunction with the Height Control, No. 4, to give the correct vertical proportions to the picture. It may require readjustment due to changing of the Height Control and due to the gradual ageing of the tubes. See Figures 12 and 13. If the picture fills the frame but is crowded near the top, turn the vertical Linearity control clockwise and Height Control counterclockwise.

5. Pilot Lights—A little jewel pilot light at the bottom of the front of the cabinet, when illuminated, indicates that the receiver is turned on. It is advantageous to unplug the power to the receiver when rotated clockwise from its extreme "OFF" position. Rotating it further increases sound and picture for Television, Radio, or Phonograph (when an attachment is used).

6. Power-Volume Control—The knob near the front of the cabinet on the left hand side turns the power to the receiver when rotated clockwise from its extreme "OFF" position. It further increases sound and picture for Television, Radio, or Phonograph (when an attachment is used).
Electric Tuning Mechanism

When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first audio amplifier. This prevents audio amplification and mutes the set. While the mechanism is operating, the brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal with the operating-end at the left (viewed from rear). The brass is beveled at this end. The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

LUBRICATION

Motor bearings and gear bearings; use light machine oil. Gear faces; use “Pure Oil No. 611” or petroleum jelly. Dia-indicator pulleys and rails; use “Castorag” or petroleum jelly.

Selector disc; apply thin film of petroleum jelly.

Adjustments for Electric Tuning

With power turned off, disconnect the antenna transmission line and ground connection, turn fidelity control to radio (3rd radio position—6th position from full counter-clockwise). Remove the back from the cabinet and reconnect the antenna transmission line and ground connection. The two interlock switches on the side panels should not be touched and care should be taken not to press on them when making the push-button set-up. Then turn on power, set range selector to “A,” allow a few moments warm-up period and proceed as follows:

1. Make a list of the desired nine stations, arranged in order from low to high frequencies.
2. Turn on power-volume control, turn range selector to “A” band, and allow a few minutes for warming up.
3. Press down the “dial-tuning” (right-hand) button.

Components of Station Setting Contact

At Right—Dial Mechanism

4. Manually tune in the first station on the list, using the “Magic Eye” for accurate tuning.
5. Hold down the “dial-tuning” button and press down station button No. 1 (left-hand). Both buttons will stay down. Move station adjuster contact pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out completely.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Tune to some other section on the dial, and then press down station button No. 1 again; the electric tuning mechanism will function to tune in the first station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.

©John F. Rider, Publisher
Precautions in Handling Kinescopes

All RCA Kinescopes are shipped in special cartons and should always be left in the cartons until ready for installation in the receiver. Keep the carton for future use.

The RCA-1803-P4 (12-inch) Kinescope is equipped with a protective lid and shield. Do not open at any time. Remove the close-fitting cone-shaped section of the protective shield from the Kinescope. This section should be installed with the tube in the cabinet and is designed to protect the user while handling the glass bulb.

REPLACEMENT PARTS (Continued)

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33246</td>
<td>Cable—Low capacity Kinescope grid cable (Model TRK-9 only)</td>
<td>$1.35</td>
<td>33605</td>
<td>Cable—Low capacity Kinescope grid cable (Model TRK-9 only)</td>
<td>$1.35</td>
</tr>
<tr>
<td>33597</td>
<td>Caps—Blue photo lamp (Model TRK-9 only)</td>
<td>$0.20</td>
<td>32897</td>
<td>Clamp—Deflecting yoke clamp assembly</td>
<td>$0.65</td>
</tr>
<tr>
<td>4573</td>
<td>8-amp female connector for power supply circuit (X23)</td>
<td>$0.30</td>
<td>33633</td>
<td>Connector—8-amp female connector, used on interlock cable (X34)</td>
<td>$0.45</td>
</tr>
<tr>
<td>33005</td>
<td>Coupling—Flexible brown copper (Used in 5th production receivers)</td>
<td>$0.10</td>
<td>31456</td>
<td>Cover—Right protective jar for push button markers</td>
<td>$0.08</td>
</tr>
<tr>
<td>32815</td>
<td>Cushion—Kinescope masking cushion (Model TRK-9 only)</td>
<td>$2.30</td>
<td>33619</td>
<td>Cushion—Kinescope masking cushion (Model TRK-9 only)</td>
<td>$1.90</td>
</tr>
<tr>
<td>33643</td>
<td>Cushion—Television chassis mounting cushion with screw, washer and plastic cover (for one chassis)</td>
<td>$0.40</td>
<td>33542</td>
<td>Dial—Three-hand glass (Model TRK-9 only)</td>
<td>$1.25</td>
</tr>
<tr>
<td>33339</td>
<td>Escutcheon—Dial escutcheon less buttons, button shaft and dial scale</td>
<td>$0.65</td>
<td>32085</td>
<td>Frame—Dial frame with screen less pointer, cartridge cord and rod</td>
<td>$1.50</td>
</tr>
<tr>
<td>33725</td>
<td>Fuse—3 amp fuse, 200 volt</td>
<td>$0.08</td>
<td>33764</td>
<td>Glass—4½ by ½ inch safety protective glass (Model TRK-9 only)</td>
<td>$3.00</td>
</tr>
<tr>
<td>33646</td>
<td>Hinge—Piano type lid hinge and screws</td>
<td>$2.00</td>
<td>33648</td>
<td>Hinge—Piano type lid hinge and screws</td>
<td>$2.00</td>
</tr>
<tr>
<td>33476</td>
<td>Knob—Radio tuning, volume or range selector knob</td>
<td>$1.10</td>
<td>33470</td>
<td>Knob—Television “Control” knob</td>
<td>$0.60</td>
</tr>
<tr>
<td>33471</td>
<td>Knob—Television “Brightness” or “Vivid” knob</td>
<td>$0.25</td>
<td>33473</td>
<td>Knob—Television “Brightness” or “Vivid” knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33469</td>
<td>Knob—“Victrona—Radio Television Fidelity selection” knob</td>
<td>$0.20</td>
<td>31481</td>
<td>Lamp—6V. V. pilot lamp, 1/4 in. lens</td>
<td>$0.17</td>
</tr>
<tr>
<td>31358</td>
<td>Marker—Complete set of call letter markers</td>
<td>$0.35</td>
<td>31320</td>
<td>Marker—“Tuning” push button marker</td>
<td>$0.05</td>
</tr>
<tr>
<td>33075</td>
<td>Mirror—2½ by 1½ in. viewing mirror</td>
<td>$0.90</td>
<td>33075</td>
<td>Nut—Screw nut for mounting high frequency coil assemblies</td>
<td>$0.01</td>
</tr>
<tr>
<td>33255</td>
<td>Plug—6-prong male plug for power supply circuit (X23)</td>
<td>$1.45</td>
<td>4577</td>
<td>Plug—6-prong male plug, used on interlock cable (X22)</td>
<td>$0.45</td>
</tr>
<tr>
<td>33166</td>
<td>Plug—6-prong male plug for Kinescope grid-cathode cable (X4)</td>
<td>$1.20</td>
<td>33215</td>
<td>Plug—6-prong male plug for deflecting yoke cable (X8)</td>
<td>$0.20</td>
</tr>
<tr>
<td>31632</td>
<td>Plug—6-prong male plug for Kinescope grid-cathode cable (X4)</td>
<td>$1.20</td>
<td>31493</td>
<td>Plug—6-prong female speaker cable plug (X9)</td>
<td>$0.65</td>
</tr>
<tr>
<td>31631</td>
<td>Plug—6-prong male plug for Television chassis power supply cable (X4)</td>
<td>$0.48</td>
<td>31631</td>
<td>Plug—8-prong male plug for Television chassis power supply cable (X4)</td>
<td>$0.48</td>
</tr>
<tr>
<td>31570</td>
<td>Pointer—Station selector pointer with carriage</td>
<td>$0.35</td>
<td>31534</td>
<td>Rod—Dial frame pointer slide rod</td>
<td>$0.15</td>
</tr>
<tr>
<td>31450</td>
<td>Screen—Dial frame 1½ in. long, rivets rivet rivets rivet rivets (12 required)</td>
<td>$0.08</td>
<td>33517</td>
<td>Screen—Bell mouth sleeve for screw-driver adjustments (Model TRK-9 only)</td>
<td>$0.05</td>
</tr>
<tr>
<td>33568</td>
<td>Spring—Knob spring for stock Nos. 33468, 33471, 33472, 33486 knobs</td>
<td>$0.05</td>
<td>33330</td>
<td>Spring—Knob spring for stock Nos. 33470, 33471, 33472, 33486 knobs</td>
<td>$0.03</td>
</tr>
<tr>
<td>33362</td>
<td>Switch—Interlock switch with lead screw</td>
<td>$1.80</td>
<td>33140</td>
<td>Support—Left hand lid support</td>
<td>$2.25</td>
</tr>
<tr>
<td>33140</td>
<td>Support—Right hand lid support</td>
<td>$2.25</td>
<td>31478</td>
<td>Yoke—Deflecting yoke complete with cable and 4-prong plug (L45, L46, R65)</td>
<td>$17.50</td>
</tr>
</tbody>
</table>

Compliments of www.nucow.com
Schematic, Transformer Data
RCA MFG. CO., INC. 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q6E, 5Q6F, 5Q6G, 5Q6H, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

FREQUENCY RANGES
"Standard Broadcast" (A) ............... 540-1,720 kc (555-174 m)
"Medium Wave" (B) ............... 1,720-3,000 kc (350-600 m)
"Short Wave" (C) ............... 3,000-26,000 kc (110-42.8 m)
Intermediate Frequency .......... 455 kc

RCA TUBE COMPLEMENT
(1) RCA-6S67T ............... First Detector-Oscillator
(2) RCA-6S67 ............... Intermediate Amplifier
(3) RCA-6S67T ............... Second-Detector, A.V.C., and A-F Amplifier
(4) RCA-66G ............... Power Output
(5) RCA-6V6-G ............... Full-Wave Rectifier
(6) RCA-6US (Model 6Q7) ............... "Magic Eye"
Fighting Lamp (1) ............... Mazda 44, 6.3 volts, 0.55 amp.

POWER OUTPUT RATING
Undistorted .......... 1.5 watts
Maximum .......... 3.8 watts

General Description
Models 5Q5, 5Q5A, 5Q6B, 6Q7 are three-band table type superheterodyne receivers. They are designed to cover the standard broadcast range of 540 to 1,720 kilocycles, and the short-wave range from 3.3 to 28 megacycles.
Models 5Q6 and 6Q7 are Export Types.

Features of design include: Magnetite-core I.F. transformers; magnetite-core "A" band oscillator coil; automatic volume control; continuously-variable high-frequency tone control on Model 6Q7; edge-lighted straight-line dial; band indicator in dial; jack for Victrola Attachment; and dust-proof electrodynamic loudspeaker.

Models 5Q5, 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q6E, 5Q6F, 5Q6G, 5Q6H, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

Electrical Data

Power Supply Ratings
Rating A .......... 105-125 volts, 50-60 cycles, 70 watts
Rating B .......... 105-125 volts, 55-60 cycles, 75 watts
Rating C .......... 105-125/200-250 volts, 50-60 cycles, 70 watts

Cabinet Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight (net)</th>
<th>Overall Chassis Height</th>
<th>Tuning Drive Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>5Q5</td>
<td>98 inches</td>
<td>12.56/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>5Q5A</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>5Q6B</td>
<td>98 inches</td>
<td>12.5 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7A</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7C</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7D</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7E</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7F</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7G</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
<tr>
<td>6Q7H</td>
<td>98 inches</td>
<td>12.5/16 inches</td>
<td>8 inches</td>
<td>184 pounds</td>
<td>163 pounds</td>
<td>5 inches</td>
</tr>
</tbody>
</table>

Electrical Data

Connections of Universal Power Transformer Primary for 220 and 110 Volts

Precautonary Lead Dress
1. Lead from 2nd I.F. (E) to volume control should be kept close to chassis.
2. R.F. coil leads should be kept short and away from coil.
3. Leads of 6,000 m.m.f. (C10) should be as short as possible and condenser dressed away from chassis, bearing against 10 ohm (R12) resistor.
4. Connections and Colors of Speaker and Cable
Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.
Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the felters and fasten a dust cover in place with loudspeaker cement.

©John F. Rider, Publisher
### Alignment Procedure

**Oscilloscope Alignment**
- The oscilloscope is aligned in the following manner:
  - The oscilloscope is set to a 100μs/division sweep rate.
  - The vertical sensitivity is set to 1mV/division.
  - The horizontal sensitivity is set to 1μs/division.
  - The oscilloscope is aligned by adjusting the controls for zero and max deflection.

**RCA FET Receiver Alignment**
- The FET receiver is aligned in the following manner:
  - The receiver is set to a 100μs/division sweep rate.
  - The vertical sensitivity is set to 1mV/division.
  - The horizontal sensitivity is set to 1μs/division.
  - The receiver is aligned by adjusting the controls for zero and max deflection.

### RCA MFG. CO., INC.

#### MODELS 50SA, 50SB, 50SC, 50SD, 50SE
- **MODEL 60F, Chassis RO-414A**
- **Alignment, Parts List**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32901</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32902</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32903</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32904</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32905</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32906</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32907</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32908</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32909</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32910</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
</tbody>
</table>

**Parts List**

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>32911</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32912</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32913</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32914</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32915</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32916</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
<tr>
<td>32917</td>
<td>Transformer, output transformer, 125-250 volts, 250/125 volts, 150/150 volts, 150/150 volts</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher

Compliments of www.nucow.com
Model 5X5 Series (Chassis No. RC-406)

Five-Tube, Single-Band, AC-DC Multiplex Superheterodyne Receiver

Model PLF-10

Power Line Filter Coupling Unit

General Description

The following features are incorporated in the design of the Little Nipper Multiplex 5X5 Series Receiver. First, it is a "standard broadcast" receiver. Second, it will operate on any other radio in the home by "remote control" without the use of connecting wires. Third, records may be reproduced through the Little Nipper when used with Victrola Attachment. Fourth, the Model 5X5 (when used with Victrola Attachment) will reproduce record through any other radio in the home without the use of connecting wires.

When using the 5X5 as a remote control, the Model PLF-10 Power Line Filter Coupling Unit should be used in conjunction with the receiver to be controlled. The filter is connected between the power line receptacle and the receiver being controlled, as shown in accompanying drawing.

Alignment Procedure

Output Meter Alignment—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—Connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor, and keep the output as low as possible.

The Remote Control Oscillator in the 5X5 is set at the factory to approximately 540 kc. The frequency may be varied between 540 and 800 kc to suit local conditions by adjusting the trimmer condenser C7.

Power-Supply Polarity—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

If the electric supply circuit is a three-wire system, it may be necessary to connect a .01 mfd 700-volt capacitor between the two outside lines of the three-wire system.

Replacement Parts

Stock on genuine factory-labeled parts, which are readily identified and may be purchased from authorized dealers.

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Lst Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12357</td>
<td>Capacitor—60 mfd.</td>
<td>.35</td>
</tr>
<tr>
<td>12458</td>
<td>Capacitor—25 mfd.</td>
<td>.35</td>
</tr>
<tr>
<td>12952</td>
<td>Capacitor—50 mfd.</td>
<td>.35</td>
</tr>
<tr>
<td>30430</td>
<td>Capacitor—100 mfd.</td>
<td>.35</td>
</tr>
<tr>
<td>12563</td>
<td>Capacitor—1 mfd.</td>
<td>.35</td>
</tr>
<tr>
<td>12870</td>
<td>Capacitor—2 mfd.</td>
<td>.25</td>
</tr>
<tr>
<td>12569</td>
<td>Capacitor—4 mfd.</td>
<td>.20</td>
</tr>
<tr>
<td>12445</td>
<td>Capacitor—6 mfd.</td>
<td>.20</td>
</tr>
<tr>
<td>32321</td>
<td>Capacitor—Electrolytic, 2 sections 30 mfd. each</td>
<td>1.00</td>
</tr>
<tr>
<td>32579</td>
<td>Coll.—Antenna coil</td>
<td>.60</td>
</tr>
<tr>
<td>32330</td>
<td>Coll.—Duplex oscillator coil</td>
<td>.90</td>
</tr>
<tr>
<td>32962</td>
<td>Coll.—Oscillator coil</td>
<td>.90</td>
</tr>
<tr>
<td>32323</td>
<td>Condenser—Trimmer 50-150 mfd</td>
<td>.35</td>
</tr>
<tr>
<td>32964</td>
<td>Condenser—5-gang variable tuning</td>
<td>2.25</td>
</tr>
<tr>
<td>32834</td>
<td>Cord—Drive cord</td>
<td>.10</td>
</tr>
<tr>
<td>32448</td>
<td>Drum—Condenser drive drum</td>
<td>.50</td>
</tr>
<tr>
<td>32149</td>
<td>Lamp—Dial lamp—Mazda No. 47</td>
<td>.50</td>
</tr>
<tr>
<td>12469</td>
<td>Leaf—Antenna lead</td>
<td>.45</td>
</tr>
<tr>
<td>32322</td>
<td>Resistor—5 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>14671</td>
<td>Resistor—33 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>13482</td>
<td>Resistor—150 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>13488</td>
<td>Resistor—250,000 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>12454</td>
<td>Resistor—50,000 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>12442</td>
<td>Resistor—100,000 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>12564</td>
<td>Resistor—200,000 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>12569</td>
<td>Resistor—470,000 ohms, 5 watts</td>
<td>.20</td>
</tr>
<tr>
<td>13486</td>
<td>Resistor—0.01 mfd</td>
<td>.20</td>
</tr>
<tr>
<td>13601</td>
<td>Resistor—10 mfd, 1 watt</td>
<td>.20</td>
</tr>
<tr>
<td>32445</td>
<td>Shaft—Tuning knob shaft and bushing</td>
<td>.20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Lst Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32959</td>
<td>Socket—Dial lamp socket</td>
<td>.25</td>
</tr>
<tr>
<td>14279</td>
<td>Socket—Photograph socket</td>
<td>.25</td>
</tr>
<tr>
<td>32527</td>
<td>Socket—Tube socket</td>
<td>.20</td>
</tr>
<tr>
<td>32552</td>
<td>Spring—Drive cord spring</td>
<td>.08</td>
</tr>
<tr>
<td>33324</td>
<td>Switch—Photograph switch</td>
<td>.50</td>
</tr>
<tr>
<td>33319</td>
<td>Transformer—First 14 transformer</td>
<td>1.40</td>
</tr>
<tr>
<td>33578</td>
<td>Transformer—Second 14 transformer</td>
<td>1.25</td>
</tr>
<tr>
<td>32578</td>
<td>Volume control and power switch</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Power Line Filter PLF-10

Stock

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Lst Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12075</td>
<td>Capacitor—60 mfd.</td>
<td>.35</td>
</tr>
<tr>
<td>12445</td>
<td>Capacitor—0.25 mfd.</td>
<td>.20</td>
</tr>
<tr>
<td>32448</td>
<td>Coll.—Choke coil</td>
<td>.50</td>
</tr>
<tr>
<td>32493</td>
<td>Receptacle—Power receptacle</td>
<td>.40</td>
</tr>
<tr>
<td>32491</td>
<td>Switch</td>
<td>.55</td>
</tr>
</tbody>
</table>

Speaker Assemblies (39105—10)

Stock

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Lst Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32963</td>
<td>Speaker complete</td>
<td>3.95</td>
</tr>
<tr>
<td>32964</td>
<td>Transformer—Output transformer</td>
<td>1.55</td>
</tr>
</tbody>
</table>

Miscellaneous Assemblies

Stock

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit Lst Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-639</td>
<td>Cabinet—Ivory finish—Model 5X5I</td>
<td>2.20</td>
</tr>
<tr>
<td>X-639</td>
<td>Cabinet—Walnut finish—Model 5X5W</td>
<td>1.35</td>
</tr>
<tr>
<td>32942</td>
<td>Dial—Glass dial scale</td>
<td>.20</td>
</tr>
<tr>
<td>32331</td>
<td>Fastener—Push</td>
<td>.02</td>
</tr>
<tr>
<td>32307</td>
<td>Knob—Black tuning knob—Model 5X5I</td>
<td>.15</td>
</tr>
<tr>
<td>32447</td>
<td>Knob—Ivory knob—Model 5X5W</td>
<td>.15</td>
</tr>
<tr>
<td>32943</td>
<td>Nut—Speed nut to hold dial</td>
<td>.01</td>
</tr>
<tr>
<td>31446</td>
<td>Spring—Knob retaining spring</td>
<td>.02</td>
</tr>
</tbody>
</table>

Compliments of www.nucow.com
Socket Trimers

RCA MFG. CO., INC.

MODELS 5X5I, 5X5W

Chassis RC-406

MODEL PLF-10 Coupling Unit

Schematics, Tuner, Voltage

-IF PEAK 455 KC-

-POWER CORD-

-FILTER CHOKE-

-D.C.T. SWITCH-

-PLF-10 POWER LINE FILTER COUPLED UNIT-

-ELECTRICAL AND MECHANICAL SPECIFICATIONS-

**Electrical and Mechanical Specifications**

**Frequency Range**
-Receiver: 540-1,520 kc
-Remote Control Oscillator: 540-800 kc

**Tune Complement**

1- RCA-12S7
2- RCA-212Q
3- RCA-12SC
4- RCA-267GT

**Intermediate Frequency**

- Maza 47.6 Volts, 0.15 amp.

**Set-up Procedure for Remote Control**

1. Install the 5X5 and tune in any desired station.
2. Turn the control switch on the back of the 5X5 to its clockwise position marked "Remote." The 5X5 becomes silent.
3. Next turn the main receiver to the exact frequency of transmission of the 5X5, usually 540 kc. Tune carefully to this frequency, setting the volume control as high as permissible with regard to hum and noise conditions. The station to which the 5X5 was tuned will be heard. If the receiver is equipped with tuning indicator, the correct point will most easily be obtained by observing the indicator.
4. Now any station tuned in on the 5X5 dial will be heard on the controlled receiver. The volume will also be controlled with the 5X5 volume control.
5. If it is desired to operate the controlled receiver on its own controls, it is only necessary to set the switch on the Power Line Filter Coupling Unit to its position marked "Radio."
6. In the event that, with the 5X5 being used as a remote control, other receivers in the home are in use, trouble may be experienced due to static and hum. To avoid this, connect a Power Line Filter Coupling Unit, RCA Victor PLF-10, to each of these other receivers, as shown in the accompanying drawing.

**Precautionary Lead Dress**

1. Dress 1st I.F. plate and grid leads against chassis and away from each other. Dress plate lead from 12C8 close to chassis.
2. Dress A.V.C. condenser (0.1) close to chassis and tight to 0.35 mmf. condenser.

**Radio Receiver to be Controlled**

**Antenna**
- The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

**Victrola Attachment**
- A jack is provided on the rear of chassis for connecting a Victrola Attachment to the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

**First Edition**

©John F. Rider, Publisher

Compliments of www.nucow.com
RCA Victor MODEL U-8 (Chassis No. RC-404A)

Model U-8W
Walnut Finish
Model U-3M
Blonde Mahogany Finish

Cross Section of Motor Assembly

Motor Coil Assembly and Connections

Replacement Parts

**Table:**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>12488</td>
<td>Capacitor—250 mfd.</td>
<td>.35</td>
<td>31045</td>
<td>MOTOR ASSEMBLY Base—Motor support, damper, and bearing cup assembly</td>
</tr>
<tr>
<td>12490</td>
<td>Capacitor—300 mfd.</td>
<td>.35</td>
<td>31046</td>
<td>Bearing—Motor bearing cap</td>
</tr>
<tr>
<td>4383</td>
<td>Capacitor—.005 mfd.</td>
<td>.35</td>
<td>33353</td>
<td>Cap—Turntable spindle cap (rubber)</td>
</tr>
<tr>
<td>4937</td>
<td>Capacitor—.01 mfd.</td>
<td>.35</td>
<td>33355</td>
<td>Coll—Motor field coil (20 cycle)</td>
</tr>
<tr>
<td>32926</td>
<td>Coll—Oscillator coil</td>
<td>.70</td>
<td>33357</td>
<td>Coll—Motor field coil (60 cycle)</td>
</tr>
<tr>
<td>33057</td>
<td>Condenser—.05 mfd.</td>
<td>.35</td>
<td>31015</td>
<td>Coll—Motor field coil (105-120 volts, 50 cycle)</td>
</tr>
<tr>
<td>30453</td>
<td>Condenser—400 mfd.</td>
<td>.35</td>
<td>31017</td>
<td>Coll—Motor field coil (105-120 volts, 60 cycle)</td>
</tr>
<tr>
<td>33558</td>
<td>Condenser—.005 mfd.</td>
<td>.40</td>
<td>31040</td>
<td>Cushion—One set rubber cushion for turntable mounting</td>
</tr>
<tr>
<td>33559</td>
<td>Condenser—.05 mfd.</td>
<td>.40</td>
<td>33356</td>
<td>Cushion—Rubber cushion for rotor bearing</td>
</tr>
<tr>
<td>32966</td>
<td>Condenser—.1 mfd.</td>
<td>.90</td>
<td>33358</td>
<td>Frame—Motor frame and spindle—60 cycle</td>
</tr>
<tr>
<td>32968</td>
<td>Condenser—2-gang variable tuning</td>
<td>2.25</td>
<td>33359</td>
<td>Lamination—Rotor laminations—60 cycle</td>
</tr>
<tr>
<td>33284</td>
<td>Drive—Drive cord</td>
<td>.40</td>
<td>33360</td>
<td>Lamination—Stator laminations—60 cycle</td>
</tr>
<tr>
<td>33289</td>
<td>Dial—Glass dial scale</td>
<td>.60</td>
<td>33361</td>
<td>Lamination—Stator laminations—less coil 60 cycle</td>
</tr>
<tr>
<td>33297</td>
<td>Drive—Drum drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled</td>
<td>.85</td>
<td>33362</td>
<td>Motor—105-120 volts, 50 cycle</td>
</tr>
<tr>
<td>33006</td>
<td>Feet—Rubber feet</td>
<td>.03</td>
<td>33363</td>
<td>Motor—105-120 volts, 60 cycle</td>
</tr>
<tr>
<td>33295</td>
<td>Indicator—Dial pointer</td>
<td>.15</td>
<td>33365</td>
<td>Motor—105-120 volts, 60 cycle</td>
</tr>
<tr>
<td>33251</td>
<td>Knob—knob (turning)</td>
<td>.15</td>
<td>33366</td>
<td>Ring—Lead ring for turntable—25 cycle</td>
</tr>
<tr>
<td>11765</td>
<td>Lamp—Dial lamp—Mazda 51</td>
<td>.15</td>
<td>33367</td>
<td>Ring—Retaining ring and washer for spindle cap</td>
</tr>
<tr>
<td>33193</td>
<td>Lead—Antenna lead</td>
<td>.50</td>
<td>33368</td>
<td>Rotor—Motor frame, laminations, and spindle shaft assembled 25 cycle</td>
</tr>
<tr>
<td>32939</td>
<td>Plate—Dial plate</td>
<td>.25</td>
<td>33369</td>
<td>Rotor—Motor frame, laminations, and spindle shaft assembled 50 cycle</td>
</tr>
<tr>
<td>33294</td>
<td>Pulley—Drive cord pulley</td>
<td>.15</td>
<td>31049</td>
<td>Rotor—Turntable and rotor laminations for 60 cycle</td>
</tr>
<tr>
<td>33528</td>
<td>Resistor—66 ohms</td>
<td>.15</td>
<td>31042</td>
<td>Stator—Stator assembly comprising coils and laminations for 60 cycle operation</td>
</tr>
<tr>
<td>33526</td>
<td>Resistor—150 ohms</td>
<td>.20</td>
<td>33276</td>
<td>Turntable—Finished turntable plate only 60 cycle</td>
</tr>
<tr>
<td>31054</td>
<td>Resistor—500 ohms</td>
<td>.20</td>
<td>33139</td>
<td>Turntable—Finished turntable plate only 50 cycle</td>
</tr>
<tr>
<td>31055</td>
<td>Resistor—100,000 ohms</td>
<td>.20</td>
<td>4089</td>
<td>Washer—Leather Washer</td>
</tr>
<tr>
<td>31056</td>
<td>Resistor—200,000 ohms</td>
<td>.20</td>
<td>53348</td>
<td>Washers—Leather and metal washers for stator bearing</td>
</tr>
<tr>
<td>31057</td>
<td>Resistor—300,000 ohms</td>
<td>.20</td>
<td>14251</td>
<td>Washer—Metal spacing washer</td>
</tr>
<tr>
<td>31058</td>
<td>Resistor—500,000 ohms</td>
<td>.20</td>
<td>32074</td>
<td>Weight—One upper and one lower weight for stator—25 cycle (2 each required)</td>
</tr>
<tr>
<td>31059</td>
<td>Resistor—1 meg., + watt</td>
<td>.20</td>
<td>33807</td>
<td>SPEAKER ASSEMBLY Cap—Cone dust cap</td>
</tr>
<tr>
<td>31060</td>
<td>Resistor—5 meg., + watt</td>
<td>.20</td>
<td>35091</td>
<td>Coll—Speaker field coil</td>
</tr>
<tr>
<td>31061</td>
<td>Resistor—10 meg., + watt</td>
<td>.20</td>
<td>35090</td>
<td>Cone—Speaker cone and voice coil</td>
</tr>
<tr>
<td>31062</td>
<td>Resistor—20 meg., + watt</td>
<td>.20</td>
<td>35094</td>
<td>Speaker complete (no output transformer)</td>
</tr>
<tr>
<td>31063</td>
<td>Resistor—50 meg., + watt</td>
<td>.20</td>
<td>33809</td>
<td>MISCELLANEOUS ASSEMBLY Control—Tone control and Radio-Record switch</td>
</tr>
<tr>
<td>31064</td>
<td>Rotor—Drive cord tension spring</td>
<td>.01</td>
<td>33847</td>
<td>Control—Potentiometer</td>
</tr>
<tr>
<td>31065</td>
<td>Spring—Drive cord tension spring</td>
<td>.01</td>
<td>30863</td>
<td>Knob—The control knob</td>
</tr>
<tr>
<td>31066</td>
<td>Spring—Knob or drive drum retaining spring</td>
<td>.02</td>
<td>30868</td>
<td>Knob—Tuning or volume control knob</td>
</tr>
<tr>
<td>31067</td>
<td>Spring—Knob or drive drum retaining spring</td>
<td>.02</td>
<td>33280</td>
<td>Mounting—Pickup arm rubber cushion, washer and nut</td>
</tr>
<tr>
<td>31068</td>
<td>Transformer—First the transformer</td>
<td>1.85</td>
<td>30870</td>
<td>Plug—3-prong for pickup armature</td>
</tr>
<tr>
<td>31069</td>
<td>Transformer—Second the transformer</td>
<td>1.05</td>
<td>32620</td>
<td>Rest—Pickup arm rest</td>
</tr>
<tr>
<td>31070</td>
<td>Transformer—Output transformer</td>
<td>1.55</td>
<td>32621</td>
<td></td>
</tr>
<tr>
<td>33004</td>
<td>Volume control and power switch</td>
<td>1.50</td>
<td><strong>ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.</strong></td>
<td></td>
</tr>
</tbody>
</table>

First Edition
Printed in U. S. A.

©John F. Rider, Publisher
RCA MFG. CO., INC. Chassis RC-404A
Schematic, Socket, Trimmers, Alignment, Phone, Data, Voltage

TUBE AND TRIMMER LOCATIONS

--- 1999 No. 21 ---

Electrical and Mechanical Specifications

**Frequency Range** .............................. 540-1720 kc
**Intermediate Frequency** ...................... 455 kc

**Tube Complement**
1. RCA-12SK7 ....................................... 1st-Detector-Oscillator
2. RCA-12ST7 ....................................... 1st-I.F. Amplifier
3. RCA-12ST7 ....................................... 2nd-Detector, 1st A-F, and A.V.C.
4. RCA-35L6GT ....................................... Power Output
5. RCA-35Z5GT ....................................... Half-Wave Rectifier

**Power Supply Ratings**
A-6 .................................................. 105-125 volts, 50 cycles, 40 watts
A-6 .................................................. 105-125 volts, 60 cycles, 40 watts

**Alignment Procedure**

- **Output Meter Alignment** — Connect the meter across the voice coil and turn the receiver volume control to maximum.
- **Test Oscillator** — Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.
- **Antenna** — The set is equipped with a length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mfd. capacitor in series with the lead-in.

**Precautionary Lead Dress**
1. Dress 1st I.F. plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against chassis apron.

**Phonograph Service Data**

The motor is started by turning the radio-phone tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

- **Hum and Vibration** — A small amount of hum at starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:
  1. Inadequate lubrication, or any failure that will cause binding.
  2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
  3. Motor not properly supported from motor board.
  4. Burs on poles of motor or stator. Remove with fine emery cloth.

- **Power Supply** — Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of tone oscillator to...</th>
<th>Tune tone-osc. to...</th>
<th>Turn radio dial to...</th>
<th>Adjust the following for max. peak output...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuning condenser stator (osc.) in series with .01 mfd.</td>
<td>450 kc</td>
<td>Quiet point at 1,600 kc end of dial</td>
<td>C1, C9, C8, C4 (1st and 2nd I.F. transformers)</td>
</tr>
<tr>
<td>2</td>
<td>Antenna term. of ant. trans. in series with 100 mfd.</td>
<td>1,720 kc</td>
<td>Full clockwise (out of mesh)</td>
<td>C6 (oscillator)</td>
</tr>
<tr>
<td>3</td>
<td>1,500 kc</td>
<td></td>
<td>Resonance on 1,500 kc signal</td>
<td></td>
</tr>
</tbody>
</table>

5. The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

Removing Rotor — The rotor and turntable assembly rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment — Loosen the three screws that hold the rotor to the turntable, insert three 16-foil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication — Oil points are indicated in the diagram.

©John F. Rider, Publisher
"Little Nipper" Models 9SX-1, -2, -3, -4, -5, -6, -7, and -8

Five-Tube, Two-Band, AC-DC Superheterodyne Receivers

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3193</td>
<td>Antenna—35 ft. antenna wire—wound on reel</td>
<td>.50</td>
<td>32444</td>
<td>Knob—Station selector knob—Black</td>
</tr>
<tr>
<td>X-566</td>
<td>Cabinet—Walnut and Ivory cabinet (9SX-2)</td>
<td>3.50 net</td>
<td>32445</td>
<td>Knob—Station selector knob—Maroon</td>
</tr>
<tr>
<td>X-576</td>
<td>Cabinet—Blue and Onyx cabinet (9SX-6)</td>
<td>3.50 net</td>
<td>32446</td>
<td>Knob—Volume control or range switch knob—Red</td>
</tr>
<tr>
<td>X-577</td>
<td>Cabinet—Onyx cabinet (9SX-7)</td>
<td>3.50 net</td>
<td>32447</td>
<td>Knob—Volume control or range switch knob—Ivory</td>
</tr>
<tr>
<td>X-578</td>
<td>Cabinet—Walnut cabinet (9SX-1)</td>
<td>3.50 net</td>
<td>32448</td>
<td>Knob—Volume control or range switch knob—Blue</td>
</tr>
<tr>
<td>X-573</td>
<td>Cabinet—Mahogany finish (9TX-1)</td>
<td>3.50 net</td>
<td>32449</td>
<td>Knob—Volume control or range switch knob—Red</td>
</tr>
<tr>
<td>X-574</td>
<td>Cabinet—Marble cabinet (9SX-8)</td>
<td>3.50 net</td>
<td>32450</td>
<td>Knob—Volume control or range switch knob—Black</td>
</tr>
<tr>
<td>X-571</td>
<td>Cabinet—Red and Ivory cabinet (9SX-4)</td>
<td>3.50 net</td>
<td>32451</td>
<td>Knob—Volume control or range switch knob—Black</td>
</tr>
<tr>
<td>X-579</td>
<td>Cabinet—Black and Marble cabinet (9SX-5)</td>
<td>3.50 net</td>
<td>32452</td>
<td>Knob—Volume control or range switch knob—Red</td>
</tr>
<tr>
<td>32392</td>
<td>Capacitor—0.005 mfd.</td>
<td>.25</td>
<td>32393</td>
<td>Knob—Volume control or range switch knob—Red</td>
</tr>
<tr>
<td>32393</td>
<td>Capacitor—0.005 mfd.</td>
<td>.25</td>
<td>32394</td>
<td>Knob—Volume control or range switch knob—Red</td>
</tr>
<tr>
<td>4858</td>
<td>Capacitor—0.01 mfd.</td>
<td>.25</td>
<td>4859</td>
<td>Capacitor—0.02 mfd.</td>
</tr>
<tr>
<td>4858</td>
<td>Capacitor—0.05 mfd.</td>
<td>.25</td>
<td>4860</td>
<td>Capacitor—0.1 mfd.</td>
</tr>
<tr>
<td>4858</td>
<td>Capacitor—0.5 mfd.</td>
<td>.25</td>
<td>4861</td>
<td>Capacitor—10-20 mfd., Electrolytic</td>
</tr>
<tr>
<td>32385</td>
<td>Capacitor—Triode capacitor 1,700 K.C. ad-</td>
<td>.50</td>
<td>32395</td>
<td>Capacitor—Triode capacitor 1,700 K.C. ad-</td>
</tr>
<tr>
<td>32387</td>
<td>Coll—Antenna coil (T1)</td>
<td>.50</td>
<td>32388</td>
<td>Coll—Oscillator coil (T2)</td>
</tr>
<tr>
<td>32388</td>
<td>Coll—Oscillator coil (T2)</td>
<td>.50</td>
<td>32389</td>
<td>Coll—Short wave antenna coil (T3)</td>
</tr>
<tr>
<td>32389</td>
<td>Coll—Short wave antenna coil (T3)</td>
<td>.50</td>
<td>32390</td>
<td>Condenser—Variable tuning condenser</td>
</tr>
<tr>
<td>32389</td>
<td>Condenser—Variable tuning condenser</td>
<td>.25</td>
<td>32391</td>
<td>Dial—Tuned variable control cord</td>
</tr>
<tr>
<td>32391</td>
<td>Cord—Tuned variable control cord</td>
<td>.25</td>
<td>32392</td>
<td>Dial—Tuned variable control cord</td>
</tr>
<tr>
<td>32392</td>
<td>Dial—Tuned variable control cord</td>
<td>.25</td>
<td>32393</td>
<td>Knob—Station selector knob—Walnut</td>
</tr>
<tr>
<td>32393</td>
<td>Knob—Station selector knob—Walnut</td>
<td>.25</td>
<td>32394</td>
<td>Knob—Station selector knob—Ivory</td>
</tr>
<tr>
<td>32394</td>
<td>Knob—Station selector knob—Ivory</td>
<td>.25</td>
<td>32395</td>
<td>Knob—Station selector knob—Blue</td>
</tr>
<tr>
<td>32395</td>
<td>Knob—Station selector knob—Blue</td>
<td>.25</td>
<td>32396</td>
<td>Volume Control and Switch</td>
</tr>
</tbody>
</table>

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

"Little Nipper—2nd" Models 9TX-1, -2, -3, -4, and -5

Five-Tube, Single-Band, AC-DC Superheterodyne Receivers

Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-687</td>
<td>Cabinet for 9TX1 (Walnut finish)</td>
<td>1.50 net</td>
<td>32570</td>
<td>Knob—Maroon volume control knob for 9TX1 and 9TX3</td>
</tr>
<tr>
<td>X-688</td>
<td>Cabinet for 9TX2 (Ivory finish)</td>
<td>2.50 net</td>
<td>32571</td>
<td>Knob—Maroon volume control knob for 9TX1 and 9TX3</td>
</tr>
<tr>
<td>X-691</td>
<td>Cabinet for 9TX3 (Wood, Mahogany finish)</td>
<td>3.50 net</td>
<td>32572</td>
<td>Knob—Maroon volume control knob for 9TX1 and 9TX3</td>
</tr>
<tr>
<td>X-691</td>
<td>Cabinet for 9TX4 (Arizona Cream Onyx finish)</td>
<td>4.50 net</td>
<td>32573</td>
<td>Knob—Maroon volume control knob for 9TX1 and 9TX3</td>
</tr>
<tr>
<td>32572</td>
<td>Coll—Antenna coil</td>
<td>.50</td>
<td>14439</td>
<td>Lamp—Diode lamp—Maroon</td>
</tr>
<tr>
<td>32573</td>
<td>Coll—Oscillator coil</td>
<td>.50</td>
<td>12409</td>
<td>Lead—Antenna lead</td>
</tr>
<tr>
<td>13067</td>
<td>Condenser—250 mfd.</td>
<td>.35</td>
<td>13068</td>
<td>Resist—100 ohms, 1 watt</td>
</tr>
<tr>
<td>13068</td>
<td>Condenser—300 mfd.</td>
<td>.35</td>
<td>13069</td>
<td>Resist—150 ohms, 1/2 watt</td>
</tr>
<tr>
<td>13069</td>
<td>Condenser—400 mfd.</td>
<td>.35</td>
<td>13070</td>
<td>Resist—250 ohms, 1/2 watt</td>
</tr>
<tr>
<td>4868</td>
<td>Condenser—60 mfd.</td>
<td>.25</td>
<td>13071</td>
<td>Resist—500 ohms, 1/2 watt</td>
</tr>
<tr>
<td>4866</td>
<td>Condenser—80 mfd.</td>
<td>.20</td>
<td>13072</td>
<td>Resist—10 meg., 1/2 watt</td>
</tr>
<tr>
<td>4867</td>
<td>Condenser—100 mfd.</td>
<td>.20</td>
<td>13073</td>
<td>Shield—Diode lamp shield—Models 9TX1, 9TX2, 9TX3, and 9TX5</td>
</tr>
<tr>
<td>4868</td>
<td>Condenser—150 mfd.</td>
<td>.20</td>
<td>32574</td>
<td>Transformer—First i.f. transformer</td>
</tr>
<tr>
<td>4869</td>
<td>Condenser—250 mfd.</td>
<td>.20</td>
<td>32575</td>
<td>Transformer—Second i.f. transformer</td>
</tr>
<tr>
<td>4870</td>
<td>Condenser—300 mfd.</td>
<td>.20</td>
<td>32576</td>
<td>Transformer—Output transformer</td>
</tr>
<tr>
<td>4871</td>
<td>Condenser—400 mfd.</td>
<td>.20</td>
<td>32577</td>
<td>Transformer—Power transformer</td>
</tr>
<tr>
<td>4872</td>
<td>Condenser—500 mfd.</td>
<td>.20</td>
<td>32578</td>
<td>Volume Control and Power Switch—Models 9TX1, 9TX2, and 9TX3</td>
</tr>
<tr>
<td>4873</td>
<td>Condenser—1,000 mfd.</td>
<td>.20</td>
<td>32579</td>
<td>Volume Control and Power Switch—Models 9TX4 and 9TX5</td>
</tr>
</tbody>
</table>

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

©John F. Rider, Publisher
Precautionary Lead Dress

1. Dress 1st I.F. plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.

Electrical and Mechanical Specifications

FREQUENCY RANGE .............................................. 510-1,720 kc

TUBE COMPLEMENT
(1) RCA-6AS .................................................. 1st-Detector—Oscillator
(2) RCA-6SK7 .............................................. 1-F Amplifier
(3) RCA-5607 .............................................. 2nd-Det., 1st A.F. and A.V.C.
(4) RCA-6K5 .............................................. Power Output
(5) RCA-25ZG .............................................. Half-Wave Rectifier
Dial Lamp (1) .............................................. Mazda 47, 3.3 volts, 15 amp.

POWER SUPPLY RATINGS
A.C. Rating .................................................. 105-125 volts, 50-60 cycles, 50 watts
D.C. Rating .................................................. 105-125 volts, direct current, 50 watts

Schematic, Voltage, Socket, Trimmers, Alignment

Alignment Procedure

Output Meter Alignment—Connect the meter across the voice coil.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Rewiring in Power Cord.—The power cord contains a resistor which becomes warm during operation.

Antenna.—The set is equipped with a wire antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 300 mmd. capacitor in series with the lead-in.

Compliments of www.nucow.com
Compliments of www.nucow.com

Schematic, Voltage, Socket Trimmers, Alignment, Data

RCA MFG. CO., INC.

FREQUENCY RANGE 520-1,720 kc

TUBE COMPLEMENT
(1) RCA-6A8 1st-Detector—Oscillator
(2) RCA-6SK7 IF Amplifier
(3) RCA-635Q 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 Power Output
(5) RCA-25Z0 Half-Wave Rectifier
Dial Lamp (1) Mazda 47, 6.3 volts, 15 amp.

POWER SUPPLY RATINGS
A-C Rating 100-125 volts, 60-60 cycles, 50 watts
D-C Rating 100-125 volts, direct current, 50 watts
Power-Supply Polarity—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord — The power cord contains a resistor which becomes warm during operation.

INTERMEDIATE FREQUENCY 455 kc

POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted 1.5 watts
Maximum 2.0 watts

LOUDSPEAKER
Type 4-inch Electrodynamic

Cabinet Dimensions, 5½ in. high, 8½ in. wide, 4½ in. deep
Weight (approx.) 7 pounds (shipping)

Antenna — The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 m minimum, capacitor in series with the lead-in.

Precautionary Lead Dress
1. Dress 1st I-F plate and grid leads against chassis and away from other each. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.

Alignment Procedure

© John F. Rider, Publisher

Compliments of www.nucow.com
## Models 9TX-21, -22, and -23

### Chassis No. RC-403

#### Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-638</td>
<td>Cabinet for 9TX21 (Walnut Finish)</td>
<td>1.35</td>
<td>32943</td>
<td>Nut—speed nut to fasten dial—Models 9TX21 and 9TX22</td>
</tr>
<tr>
<td>X-639</td>
<td>Cabinet for 9TX22 (Ivory Finish)</td>
<td>2.20</td>
<td>32992</td>
<td>Plate—Dial color plate—Model 9TX23</td>
</tr>
<tr>
<td>X-639</td>
<td>Cabinet for 9TX22 (Wood-Walnut Finish)</td>
<td>5.20</td>
<td>32993</td>
<td>Pulley—Drive cord pulley—Model 9TX23</td>
</tr>
<tr>
<td>32072</td>
<td>Coil—Antenna coil</td>
<td>.60</td>
<td>14439</td>
<td>Resistor—100 ohms, 1 watt</td>
</tr>
<tr>
<td>32076</td>
<td>Coil—220 mfd.</td>
<td>.60</td>
<td>32535</td>
<td>Resistor—120 ohms, wire wound</td>
</tr>
<tr>
<td>32078</td>
<td>Condenser—60 mfd.</td>
<td>.60</td>
<td>32432</td>
<td>Resistor—470,000 ohms, 1 watt</td>
</tr>
<tr>
<td>32082</td>
<td>Condenser—800 mfd.</td>
<td>.60</td>
<td>32434</td>
<td>Resistor—470,000 ohms, 1 watt</td>
</tr>
<tr>
<td>32433</td>
<td>Condenser—400 mfd.</td>
<td>.60</td>
<td>32855</td>
<td>Resistor—470,000 ohms, 1 watt</td>
</tr>
<tr>
<td>32548</td>
<td>Condenser—01 mfd.</td>
<td>.20</td>
<td>32579</td>
<td>Resistor—2.2 meg., 1 watt</td>
</tr>
<tr>
<td>32549</td>
<td>Condenser—05 mfd.</td>
<td>.20</td>
<td>32578</td>
<td>Resistor—19 meg., 1 watt</td>
</tr>
<tr>
<td>32550</td>
<td>Condenser—03 mfd.</td>
<td>.20</td>
<td>39485</td>
<td>Shaft—tuning knob shaft—Models 9TX21 and 9TX22</td>
</tr>
<tr>
<td>32575</td>
<td>Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.</td>
<td>.20</td>
<td>32938</td>
<td>Shaft—tuning knob shaft—Model 9TX21 and 9TX22</td>
</tr>
<tr>
<td>32944</td>
<td>Condenser—D-gang variable 0.05 uf.</td>
<td>.20</td>
<td>32940</td>
<td>Socket—Dial lamp socket</td>
</tr>
<tr>
<td>32834</td>
<td>Condenser—Drive cord</td>
<td>.10</td>
<td>32857</td>
<td>Speaker—Complete with transformer</td>
</tr>
<tr>
<td>32871</td>
<td>Condenser—Resistance power coil</td>
<td>.10</td>
<td>32863</td>
<td>Speaker—Model 9TX23</td>
</tr>
<tr>
<td>32892</td>
<td>Dial—Glass dial scale—Models 9TX21, 9TX22</td>
<td>.30</td>
<td>32947</td>
<td>Spring—Dial knob spring</td>
</tr>
<tr>
<td>32893</td>
<td>Dial—Glass dial scale—Model 9TX23</td>
<td>.30</td>
<td>32948</td>
<td>Spring—Drive cord tension spring—Models 9TX21 and 9TX22</td>
</tr>
<tr>
<td>32946</td>
<td>Drive—Dial drive mechanism comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled—Model 9TX23</td>
<td>.65</td>
<td>32949</td>
<td>Spring—Drive cord tension spring—Model 9TX23</td>
</tr>
<tr>
<td>32947</td>
<td>Drum—Variable condenser drive drum and indicator disc—Models 9TX21 and 9TX22</td>
<td>.35</td>
<td>32949</td>
<td>Spring—Drive drum retaining spring—Model 9TX23</td>
</tr>
<tr>
<td>32992</td>
<td>Foot—Knee for 9TX21 and 9TX22</td>
<td>.03</td>
<td>32950</td>
<td>Transformer—First if, transformer</td>
</tr>
<tr>
<td>32955</td>
<td>Indicator—Dial pointer—Model 9TX23</td>
<td>.25</td>
<td>32951</td>
<td>Transformer—Output transformer</td>
</tr>
<tr>
<td>32956</td>
<td>Knob—T-tan knob (tuning or volume) Models 9TX21 and 9TX22</td>
<td>.15</td>
<td>32952</td>
<td>Transformer—Second if transformer</td>
</tr>
<tr>
<td>32963</td>
<td>Lamp—Dial lamp—Maza 47</td>
<td>.20</td>
<td>32957</td>
<td>Volume Control and switch—Models 9TX21 and 9TX22</td>
</tr>
<tr>
<td>32964</td>
<td>Lead—Antenna lead</td>
<td>.45</td>
<td>32958</td>
<td>Volume Control and switch—Model 9TX23</td>
</tr>
</tbody>
</table>

### Models 9TX-31, 9TX-32, 9TX-33

#### Chassis No. RC-405, RC-405A, RC-405B

#### Replacement Parts

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-638</td>
<td>Cabinet for 9TX31 (Walnut Finish)</td>
<td>1.35</td>
<td>32927</td>
<td>Drive—Dial drive mechanism comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled (Model 9TX33)</td>
</tr>
<tr>
<td>X-639</td>
<td>Cabinet for 9TX32 (Ivory Finish)</td>
<td>2.20</td>
<td>32946</td>
<td>Drum—Variable condenser drive drum and indicator disc (Models 9TX31 and 9TX33)</td>
</tr>
<tr>
<td>X-640</td>
<td>Cabinet for 9TX33 (Wood—Walnut Finish)</td>
<td>5.20</td>
<td>32946</td>
<td>Foot—Rubber feet for 9TX33</td>
</tr>
<tr>
<td>12498</td>
<td>Capacitor—500 mfd.</td>
<td>.35</td>
<td>32946</td>
<td>Indicator—Dial pointer (Model 9TX33)</td>
</tr>
<tr>
<td>12928</td>
<td>Capacitor—500 mfd.</td>
<td>.35</td>
<td>32946</td>
<td>Knob—Ivory knob (tuning or volume) (Model 9TX32)</td>
</tr>
<tr>
<td>4937</td>
<td>Capacitor—005 mfd.</td>
<td>.35</td>
<td>32946</td>
<td>Knob—T-tan knob (tuning or volume)</td>
</tr>
<tr>
<td>32827</td>
<td>Capacitor—0.35 mfd.</td>
<td>.30</td>
<td>32946</td>
<td>Lamp—Dial lamp—Maza 47</td>
</tr>
<tr>
<td>32938</td>
<td>Capacitor—Antenna coil</td>
<td>.30</td>
<td>32946</td>
<td>Lead—Antenna lead</td>
</tr>
<tr>
<td>32947</td>
<td>Capacitor—Electrolytic, one section 20 mfd., one section 12 mfd.</td>
<td>.35</td>
<td>32946</td>
<td>Nut—Speed nut to fasten dial (Models 9TX31 and 9TX33)</td>
</tr>
<tr>
<td>32968</td>
<td>Condenser—005 mfd.</td>
<td>.20</td>
<td>32946</td>
<td>Plate—Dial color plate section 20 mfd.</td>
</tr>
<tr>
<td>32974</td>
<td>Condenser—03 mfd.</td>
<td>.20</td>
<td>32946</td>
<td>Pulley—Drive cord pulley (Model 9TX33)</td>
</tr>
<tr>
<td>32976</td>
<td>Condenser—Drive cord</td>
<td>.20</td>
<td>32946</td>
<td>Resistor—Dial lamp resistor—24 ohms</td>
</tr>
<tr>
<td>32984</td>
<td>Dial—Glass dial scale—Models 9TX31 and 9TX33</td>
<td>.85</td>
<td>32946</td>
<td>Resistor—Series dropping resistor—42 ohms</td>
</tr>
<tr>
<td>32985</td>
<td>Dial—Glass dial scale—Model 9TX32</td>
<td>.85</td>
<td>32946</td>
<td>Resistor—150 ohms, 1 watt</td>
</tr>
<tr>
<td>13998</td>
<td>Resistor—24,000 ohms, 1 watt</td>
<td>.20</td>
<td>32946</td>
<td>Resistor—390 ohms, 1 watt</td>
</tr>
<tr>
<td>12412</td>
<td>Resistor—47,000 ohms, 1 watt</td>
<td>.20</td>
<td>32946</td>
<td>Spring—Dial knob spring</td>
</tr>
<tr>
<td>12246</td>
<td>Resistor—270,000 ohms, 1 watt</td>
<td>.20</td>
<td>32946</td>
<td>Spring—Drive cord tension spring (Models 9TX31 and 9TX33)</td>
</tr>
<tr>
<td>12285</td>
<td>Resistor—470,000 ohms, 1 watt</td>
<td>.20</td>
<td>32946</td>
<td>Spring—Drive cord tension spring (Model 9TX33)</td>
</tr>
<tr>
<td>12397</td>
<td>Resistor—640,000 ohms, 1 watt</td>
<td>.20</td>
<td>32946</td>
<td>Spring—Drive drum retaining spring (Model 9TX33)</td>
</tr>
<tr>
<td>13801</td>
<td>Resistor—10 meg., 1 watt</td>
<td>.20</td>
<td>32946</td>
<td>Spring—Knee or drive drum retaining spring</td>
</tr>
<tr>
<td>32945</td>
<td>Shaft—Tuning knob shaft (Models 9TX31 and 9TX32)</td>
<td>.20</td>
<td>32946</td>
<td>Transformer—First if, transformer</td>
</tr>
<tr>
<td>32946</td>
<td>Shaft—Tuning knob shaft and bushing (Model 9TX31 and 9TX32)</td>
<td>.30</td>
<td>32946</td>
<td>Transformer—Second if transformer</td>
</tr>
<tr>
<td>32857</td>
<td>Socket—Dial lamp socket</td>
<td>.20</td>
<td>32946</td>
<td>Transformer—Output transformer</td>
</tr>
<tr>
<td>32878</td>
<td>Socket—Phonograph socket</td>
<td>.20</td>
<td>32946</td>
<td>Volume Control and power transformer (Models 9TX31 and 9TX32)</td>
</tr>
<tr>
<td>32893</td>
<td>Speaker—Complete with transformer</td>
<td>3.85</td>
<td>32946</td>
<td>Volume Control and switch (Models 9TX31 and 9TX32)</td>
</tr>
</tbody>
</table>

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.**

©John F. Rider, Publisher

Compliments of www.nucow.com
Schematic Changes

Parts

Model D22-1A

Service Data for Model D22-1 are directly applicable to these instruments except as follows:
(1) The schematic circuit diagram for Model D22-1A is shown by figure 5.
(2) The metal rectifier socket wiring for tube No. 14 is shown by figure 2.
(3) Figure 3 shows the Pickup details.
(4) The phonograph motor is of the capacitor type.
Light machine oil should be used to lubricate the motor bearings. The motor is wired in this instrument as follows: One power-supply lead connects to one terminal of switch S201. The other terminal of S201 connects to one terminal of the brake switch S202. The other terminal of S202 connects to the yellow motor lead. The green motor lead connects to one lead of the motor capacitor. The red motor lead connects to the other capacitor lead and to the remaining power-supply lead.
(5) The Radotron socket voltages (figure 4 herein) apply to all Models D22-1 or D22-1A and should be used in place of figure 4 of the D22-1 Service Data.
(6) The resistor assembly R44 and R45 is mounted on the front chassis apron instead of the rear chassis apron.
(7) Change price on Stock No. 11879 Transformer from $3.50 to $8.15.
(8) Change price on Stock No. 11541 Arm from $0.82 to $8.15.

SEE RIDER’S VOL. VI FOR OTHER DATA

Figures 1, 2, 3, and 5

RCA MFG. CO., INC.

MODEL D22-1A

(9) Change price on Stock No. 11480 Microphone from $7.05 to $7.50.
(10) Refer to Substitute and Additional Replacement Parts contained herein for other parts changes.

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>LIST Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>11405</td>
<td>Armature—Pickup armature</td>
<td>.95</td>
</tr>
<tr>
<td>4870</td>
<td>Capacitor—0.25 mfd. (C47)</td>
<td>.20</td>
</tr>
<tr>
<td>11195</td>
<td>Socket—Five-contact Rectifier Radiotron socket for tube No. 14</td>
<td>.15</td>
</tr>
<tr>
<td>11887</td>
<td>Transformer—Power transformer—105-125 volts—25-50 cycles</td>
<td>6.95</td>
</tr>
<tr>
<td>11880</td>
<td>Transformer—Power transformer—105-125 volts—50-60 cycles—(T1)</td>
<td>5.80</td>
</tr>
<tr>
<td>12051</td>
<td>Capacitor—2 mfd. complete with 2-contact male connector for use with motor Stock No. 9650 or 9651—(C217)</td>
<td>4.18</td>
</tr>
<tr>
<td>13101</td>
<td>Capacitor—4 mfd. complete with 2-contact male connector for use with motor Stock No. 9735—(C217)</td>
<td>5.05</td>
</tr>
<tr>
<td>4674</td>
<td>Connector—2-contact male connector for capacitor Stock No. 12051 or 13101</td>
<td>2.25</td>
</tr>
<tr>
<td>9735</td>
<td>Motor—105-125 volts—25 cycles</td>
<td>49.50</td>
</tr>
<tr>
<td>9651</td>
<td>Motor—105-125 volts—50 cycles</td>
<td>35.35</td>
</tr>
<tr>
<td>9650</td>
<td>Motor—105-125 volts—60 cycles</td>
<td>35.35</td>
</tr>
<tr>
<td>12050</td>
<td>Suspension spring—Motor mounting spring, washer, and stud assembly—comprising six springs, six cup washers, three spring washers and three studs</td>
<td>.60</td>
</tr>
<tr>
<td>11957</td>
<td>Capacitor—75 mfd. (C216)</td>
<td>.64</td>
</tr>
<tr>
<td>12752</td>
<td>Filter—Microphone and pickup input filter pack</td>
<td>1.85</td>
</tr>
</tbody>
</table>

Stock Nos. 4858 (C47), 11273, 4794 (tube 14), 8062, 8061, 9479, 9478, 9477, and 4562, are not used in Model D22-1A.

The prices quoted above are subject to change without notice.

©John F. Rider, Publisher

Compliments of www.nucow.com
Figure 4—Radiotron Socket Voltages (D22-1 and D22-1A)
Measured at 115 volts, 60-cycle supply—No signal being received
Compliments of www.nucow.com

RCA MFG. CO., INC.

General Description

These receivers employ a ten-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include: "Electric Tuning" for eight broadcast stations; a link-coupled antenna circuit; magnetite-core i.f. transformers and "A"-band oscillator coil; full automatic volume control; continuously variable high-frequency tone control; provision for armchair control attachment; illuminated band indicator; noise-reducing antenna adjustment on "A" band; temperature-stabilized capacitors; phase inverter audio amplifier; and push-pull power output stage.

The phonograph has a self-starting motor, crystal pickup, and may be set to play ten-inch and twelve-inch records singly, or automatically. In the automatic position, seven twelve-inch; eight ten-inch; or a mixed group of seven, ten and twelve-inch records, may be played in succession. The output of the pickup is "shorted" out when the pickup is on the pickup rest.

Tube Complement
1. RCA-6AS..............First Det.
2. RCA-477..............Oscillator
3. RCA-6K7..............I.F. Amp.
4. RCA-6H6..2nd Det. and A.V.C.
5. RCA-6F5..............First Audio
6. RCA-6F5..............Phase Inverter
7. RCA-6F6-G...........Power Output
8. RCA-6F6-G...........Power Output
9. RCA-3U4-G...........Rectifier
10. RCA-6U5............."Magic Eye"

R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately \pm 20\% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.
ALIGNMENT PROCEDURE

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plate full of frequency is applied. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After restoring the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 500 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Service Data

Loadspeaker.—Centricing the loudspeaker is made in the usual manner with three narrow celluloid or paper discs after first removing the front dust cover. A dust cover should be cemented in place upon completion of adjustment.

Precautionary Lead Dress.—(1) The lead from the left pilot light should be kept behind the bulb and toward the Magic Eye, to keep it away from the 6FS grid cap, (2) leads from nite trimmers to coil should be kept away from the coil and other parts, (3) leads on oscillator coil which are an extended part of the coil winding should be as short as possible, (4) "C" band series capacitor G31 must have leads as short as possible, (5) all leads from antenna board to antenna coils should be dressed toward back apron, (6) the outer end of the line cord and the primary lead of the power transformer which run to the power switch should be twisted together, (7) shielding on leads to Victrola switch should be kept away from the switch terminals and jack.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-oscillator to</th>
<th>Tune test-oscillator to</th>
<th>Range Selector</th>
<th>Set tuning gang to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>6K7 1-F grid cap in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot;</td>
<td>Quiet point between 550-750 kc</td>
<td>L10, L11 (10 and 1-F Transformer)</td>
</tr>
<tr>
<td>No. 2</td>
<td>6A8 Det. grid cap in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot;</td>
<td></td>
<td>L8, L9 (1-F Transformer)</td>
</tr>
<tr>
<td>No. 3</td>
<td>Connect A1 to chassis.</td>
<td>20 mc</td>
<td>&quot;C&quot;</td>
<td>20 mc (147.5°)</td>
<td>C24 (osc.)* C8 (det.)</td>
</tr>
<tr>
<td>No. 4</td>
<td>A3 in series with 100 mfd. Connect A3 to chassis.</td>
<td>6,100 kc</td>
<td>&quot;B&quot;</td>
<td>6,100 kc (145.5°)</td>
<td>C25 (osc.)**</td>
</tr>
<tr>
<td>No. 5</td>
<td>A2 in series with 100 mfd. Connect A2 to chassis.</td>
<td>1,500 kc</td>
<td>&quot;A&quot;</td>
<td>1,500 kc (151.5°)</td>
<td>C29 (osc.)</td>
</tr>
<tr>
<td>No. 6</td>
<td>A2 in series with 100 mfd. Connect A2 to chassis.</td>
<td>600 kc</td>
<td>&quot;A&quot;</td>
<td>600 kc (28.5°)</td>
<td>L17 (osc.)</td>
</tr>
<tr>
<td>No. 7</td>
<td>A2 in series with 100 mfd. Connect A2 to chassis.</td>
<td>1,500 kc</td>
<td>&quot;A&quot;</td>
<td>1,500 kc (151.5°)</td>
<td>C29 (osc.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 145° (19,090 kc), at which point a weaker signal should be received.

† Rock gang condenser and use maximum capacity peak if two peaks can be obtained with C8.

ADJUSTMENTS FOR ELECTRIC TUNING

1. Make a list of the desired eight stations, arranged in order from low to high frequencies.
2. Turn range selector to "A" band, turn power on, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button, and press down station button No. 1 (second from left). Both buttons will stay down. Move adjusting pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Then press down station button No. 1 again. The electric tuning mechanism will function to tune in the station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.

Antenna Connections

RCA Victor Master Antenna Kit.—Connect the twisted-pair transmission line to terminals A1 and A2 on the terminal board at rear of chassis. Connect the counter-poise to A3. Terminal G may be connected to ground, but this connection is not necessary for correct operation.

Noise-Reducing Adjustment.—After the RCA Victor Master Antenna Kit is connected to the receiver, tune the receiver to a point near 900 kc where no station is heard. Turn volume control clockwise until noise is heard. If no noise of a regular character is audible, start any brush-type motor-driven appliance, such as a vacuum cleaner, electric razor, refrigerator, etc., but do not bring it too near the receiver. This will generate noise as a continuous cracking, or buzz. Adjust C5, which is mounted behind the antenna terminal board, to a point where this noise is reduced to a minimum.

Adjustment of the noise reducing trimmer C5 should be made in the customer's home, with the RCA Victor Master Antenna connected to the receiver.

This adjustment is effective only when the RCA Victor Master Antenna is used. For all other types of antennas, the noise-adjustment trimmer C5 should be turned all the way down.

Other Antennas.—Use terminals A1 and A3 on the receiver terminal board as antenna and ground connecting points respectively. Terminal A1 may be connected to terminal G, unless this causes interference, in which case this connection should be omitted.
Compliments of www.nucow.com

Tuning Mechanism Diagram

Component Parts of Station Setting Contact

At left—Dial Mechanism

When a station button is pushed in, it completes the 64-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This excites the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first audio amplifier. This prevents audio amplification and makes the set quiet or mute while the mechanism is operating.

The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating-end at the left (viewed from rear). The operating-end has dark insulating material and the brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

Lubrication

Motor bearings and gear bearings; use light machine oil.

For faces; use "Pure Oil No. 611" or petroleum jelly.

Dial indicator pulleys and rails; use "Castor Oil" or petroleum jelly.

Selector disc; apply thin film of petroleum jelly.

Armchair Control Unit

Station-Setting Contacts and Selector Disc

This illustration shows connections for a GSA Armchair Control Unit. This unit is not supplied with the receiver but may be added as an accessory.

<table>
<thead>
<tr>
<th>Station Button</th>
<th>Color of Lead To Station-Setting Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1 ........................</td>
<td>Black</td>
</tr>
<tr>
<td>No. 2 ........................</td>
<td>Brown</td>
</tr>
<tr>
<td>No. 3 ........................</td>
<td>Blue</td>
</tr>
<tr>
<td>No. 4 ........................</td>
<td>Green</td>
</tr>
<tr>
<td>No. 5 ........................</td>
<td>Red</td>
</tr>
<tr>
<td>No. 6 ........................</td>
<td>Brown-black</td>
</tr>
<tr>
<td>No. 7 ........................</td>
<td>Red-yellow</td>
</tr>
<tr>
<td>No. 8 ........................</td>
<td></td>
</tr>
</tbody>
</table>

When a Model GSA Armchair Control is connected to the receiver it duplicates the action of the push-buttons on the front panel when No. 1 button is pressed down. The black lead from push-button No. 1 is unsoldered from No. 1 station-setting contact and soldered to a terminal board which is to be mounted on the frame of selector mechanism. If desired one of the other seven station buttons on the set may be used in place of No. 1 button.

This arrangement allows the use of only seven of the eight buttons when tuning in stations at the set, but allows the use of the entire eight buttons on the Armchair Control. In operating the GSA Armchair Control the push-button must be held down until the station has been tuned in. Care must be taken not to hold two of the station-buttons down at one time as both windings of the motor may be engaged instantaneously causing the motor to be inoperative and overheated.

© John F. Rider, Publisher

Compliments of www.nucow.com
Automatic Record Changer

GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled. All such parts may usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its changeover by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a set of set-screws which are torqued down. Any loose or missing parts must be properly replaced.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates under pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate when the lever is in the up position.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the friction lever "77" through a friction clutch "4." If the motion of the pickup is abruptly accelerated or becomes irregular due to sliding in the eccentric groove, the trip finger "77" moves the trip pawl "22" into engagement with the pawl on the main gear, and the changeover cycle starts. Proper adjustment of the friction clutch "57" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tending to retard the changeover cycle. Adjustment should be such that the answer is "easy" to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will ride on the stylus of the pickup cable, and will not move forward. If adjustment is too loose, tripping will not occur at the end of the cycle.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "77" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer in "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknut "C" to obtain 1 inch spacing between needle point and turntable top plate.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record of 3/32 inch in diameter. Adjustment is made by raising or lowering the needle when the control knob is set to "out." To adjust for needle landing on a 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board. The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A." 

2. Needle does not land properly on both 12 inch records—Make complete adjustments "D" and "E." 

3. Needle does not land properly on 12 inch record, but does land properly on 10 inch records—Adjust "D" and "E." 

4. Failure to trip at end of record—Increase clutch "57" by means of screw "B." Also, see that levers "77" and "12" are free to move without touching each other.

5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment in "C."

6. Needle does not track after landing—Friction clutch "57" adjustment "B" may be too tight; bind in tone arm vertical shaft; lever "17" and "12" fouled; or pickup output cable twisted.

7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "57" is too tight.

8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F.).

9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.

10. Record not released properly—Adjust record shelf as necessary in respect to shaft by means of adjustment "H."

11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "24."
## REPLACEMENT PARTS

*Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.*

### CHASSIS ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>112141</td>
<td>Board—508 J-508, W-508, and W-508 var.</td>
<td>.15</td>
</tr>
<tr>
<td>112142</td>
<td>Body—Complete unit at $9.50 (2)</td>
<td>.15</td>
</tr>
<tr>
<td>112143</td>
<td>Valve—Complete at $1.00 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112144</td>
<td>Switch—Connect at $1.25 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112145</td>
<td>Plate—Connect at $1.25 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112146</td>
<td>Board—508 J-508, W-508, and W-508 var.</td>
<td>.15</td>
</tr>
<tr>
<td>112147</td>
<td>Body—Complete unit at $9.50 (2)</td>
<td>.15</td>
</tr>
<tr>
<td>112148</td>
<td>Valve—Complete at $1.00 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112149</td>
<td>Switch—Connect at $1.25 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112150</td>
<td>Plate—Connect at $1.25 (2)</td>
<td>.10</td>
</tr>
</tbody>
</table>

### OPERATING MECHANISM

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>112164</td>
<td>Switch—Pickup bending arm mounting bracket (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112165</td>
<td>Switch—Pickup bending arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112166</td>
<td>Switch—Pickup bending arm switch (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112167</td>
<td>Switch—Pickup bending arm switch (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112168</td>
<td>Switch—Pickup bending arm switch (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112169</td>
<td>Switch—Pickup bending arm switch (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112170</td>
<td>Switch—Pickup bending arm switch (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112171</td>
<td>Switch—Pickup bending arm switch (1)</td>
<td>.10</td>
</tr>
</tbody>
</table>

### PICKUP AND ARM ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>112172</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112173</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112174</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112175</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112176</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112177</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
<tr>
<td>112178</td>
<td>Arm—Pickup arm (1)</td>
<td>.10</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>112179</td>
<td>Board—508 J-508, W-508, and W-508 var.</td>
<td>.15</td>
</tr>
<tr>
<td>112180</td>
<td>Body—Complete unit at $9.50 (2)</td>
<td>.15</td>
</tr>
<tr>
<td>112181</td>
<td>Valve—Complete at $1.00 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112182</td>
<td>Switch—Connect at $1.25 (2)</td>
<td>.10</td>
</tr>
<tr>
<td>112183</td>
<td>Plate—Connect at $1.25 (2)</td>
<td>.10</td>
</tr>
</tbody>
</table>

---

**NOTICE:** All prices are subject to change or withdrawal without notice.
Alignment Procedure

Output Meter Alignment—If this method is used connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test oscillator—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Pre-setting Dial—with gang condenser in full mesh, the pointer should be horizontal.

Steps | Connect the high side of test oscillator to | Tune test oscillator to | Turn radio dial to | Adjust the following for max. peak output—
--- | --- | --- | --- | ---
1 | 1A7G 1st Det. grid cap, in series with .01 mfd. | 655 kc | 455 k cps end of dial | C1, C6, C5, C4 (1st and 2nd I-F transformers)
2 | Antenna lead (blue) in series with 100 mfd. | 1780 kc | Full clockwise (out of mesh) | C6 (oscillator)
3 | 1,500 kc | 1,800 kc | Resonance on 1,500 kc signal | C6 (antenna)

IF PEAK 455 KC

MODEL BT-40

RCA TUBE COMPLIMENT
(1) RCA 1AT-G-G........... 1st Det.—Osc.
(2) RCA 1NS-G........... 1st I-F Amplifier
(3) RCA 1GL-G, and A.V.C.
(4) RCA 1CB-G........... Output
LOUDSPEAKER
Type......................... 4-inch permanent-magnet dynamite
Voice-coil Impedance........ 2 ohms at 400 cycles
Height Width Depth..... 9.5 x 8.5 x 6.1/4"/16"
Cabinet Dimensions (inches) 13 x 11 x 9.5"
Cabinet Base Dimensions (inches) 11.5 x 9"
Over-all Chassis Height 250,000 ohms, 2 watts.
Net weight................. 44 pounds
Tuning Drive Ratio........ 1/1 to 1

The RCA Victor Model BT-40 is a table type battery operated radio receiver. It is designed for operation on a combination 111-volt—90-volt A-B Pack Battery.

-1939 No. 8-

A-B PACK BATTERY

RCA MFG. CO., INC.

PAGE 10-45 RCA SCHEMATIC INSTALATION OF PARTS

All prices are subject to change or withdrawal without notice.
**General Description**

Model M50 is a five-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case. The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with embroid cement after adjustment has been completed.

**Electrical Specifications**

- **Frequency Range**: 550-1,550 kc
- **Power Output**
  - Type: Pentode
  - Undistorted: 2 watts
  - Maximum: 3.5 watts
- **Dial Lamp**: 6-8 volts, 0.2 amp, Mazda 51

**Alignment Frequencies**

- **I-F**: 455 kc
- **Ant.**: 600 and 1,400 kc
- **Oscil.**: No Adjustment

**Tube Sockets**

- **IF**: PEAK 455 KC

RCA MFG. CO., INC.

---

Model M50, chassis RC-5570 Schematic, Voltage Data

- **TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKETS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES ARE TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.**
Preliminary:
Output meter connections. Across speaker voice coil
Output meter readings to indicate 1 watt. 1.8 volts
Generator ground lead connections. To chassis
Generator modulation. 30%, 400 cycles
Position of Volume Control. Fully clockwise
Chassis must be in its case with front end removed, when aligning R-F circuit.

**MODEL M50**  
**Chassis No. RC 357J**

<table>
<thead>
<tr>
<th>Position of Dial Pointer</th>
<th>Generator Frequency</th>
<th>Dummy Antenna</th>
<th>Generator Connection</th>
<th>Adjustment Symbol</th>
<th>Circuit Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Signal 550-750 kc</td>
<td>455 kc</td>
<td>.001 mfd.</td>
<td>6X7 Grid</td>
<td>L-10</td>
<td>2nd I.F. Trans.</td>
</tr>
<tr>
<td>No Signal 550-750 kc</td>
<td>455 kc</td>
<td>.001 mfd.</td>
<td>6A8 Grid</td>
<td>L-8, L-9</td>
<td>1st I.F. Trans.</td>
</tr>
<tr>
<td>1,400 kc</td>
<td>1,400 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>C-3</td>
<td>Ant.</td>
</tr>
<tr>
<td>600 kc</td>
<td>600 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>L-2</td>
<td>Ant.</td>
</tr>
<tr>
<td>1,400 kc</td>
<td>1,400 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>C-3 *</td>
<td>Ant.</td>
</tr>
</tbody>
</table>

**NOTE:** No oscillator alignment adjustments are required in this receiver.
† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.
* Re-adjust C-3 after installation as outlined under "Antenna Circuit"
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.
Alignment adjustment locations are shown on the top and bottom parts location views of chassis.
Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.
Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is pre-adjusted for inductance in the factory.
Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

**MODEL M60**  
**Chassis No. RC 357K**

<table>
<thead>
<tr>
<th>Position of Dial Pointer</th>
<th>Generator Frequency</th>
<th>Dummy Antenna</th>
<th>Generator Connection</th>
<th>Adjustment Symbol</th>
<th>Circuit Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Signal 550-750 kc</td>
<td>455 kc</td>
<td>.001 mfd.</td>
<td>6K7 I.F. Grid</td>
<td>L-10, L-11</td>
<td>2nd I.F. Trans.</td>
</tr>
<tr>
<td>No Signal 550-750 kc</td>
<td>455 kc</td>
<td>.001 mfd.</td>
<td>6A8 Grid</td>
<td>L-8, L-9</td>
<td>1st I.F. Trans.</td>
</tr>
<tr>
<td>Rock Through 600 kc</td>
<td>600 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>L-7</td>
<td>Osc.</td>
</tr>
<tr>
<td>1,400 kc **</td>
<td>1,400 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>C-5</td>
<td>Det.</td>
</tr>
<tr>
<td>1,400 kc **</td>
<td>1,400 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>C-3</td>
<td>Ant.</td>
</tr>
<tr>
<td>Rock Through 600 kc</td>
<td>600 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>L-7</td>
<td>Osc.</td>
</tr>
<tr>
<td>1,400 kc **</td>
<td>1,400 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>C-5</td>
<td>Det.</td>
</tr>
<tr>
<td>1,400 kc **</td>
<td>1,400 kc</td>
<td>.0001 mfd. †</td>
<td>Ant. Lead</td>
<td>C-3 *</td>
<td>Ant.</td>
</tr>
</tbody>
</table>

† Make the generator connection to the receiver through a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If a capacitor has been added in series with the lead from antenna filter L-1 to the antenna coil, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.
* Re-adjust C-3 after installation as outlined under "Antenna Circuit"
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.
Alignment adjustment locations are shown on the top and bottom parts location views of chassis.
Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

**Oscillator Circuit**
A magnetic core is used to provide temperature stability. The conventional high frequency trimmer has been replaced with a fixed temperature-compensating capacitor (C-12) which determines the high frequency range. Since the inductance of L-7 is adjustable, the conventional series trimmer has been replaced with a fixed capacitor (C-10). C-10 is a special capacitor having zero temperature coefficient to provide for oscillator stability in the low frequency range. Aligning the receiver for 600 kc is accomplished by adjusting L-7 to the antenna and det. circuits (gang condenser must be rocked while making this adjustment). The 1,400 kc alignment is accomplished by adjusting the antenna and the det. trimmers (C-3 and C-5) to the oscillator.
Antenna Circuit

The antenna circuit is designed to work with a low capacity antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If larger antennas, such as screened top or a double under the running-board having a total capacity of 200 to 350 mmf. is to be used, it will be necessary to reduce the value of the antenna coupling capacitor C-2 from .01 to approximately 200 mmf. (.0002). For even larger antennas such as insulated steel tops, a correspondingly smaller value of C-2 (approximately 135 to 150 mmf.) should be used keeping in mind to use the largest value possible with which the antenna circuit can be aligned.

M60

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf, the capacitor added should be approximately 300 mmf. The insulated running-board type having an approximate capacity of 350 mmf. will require a capacitor of approximately 200 mmf. Cars using an insulated steel top of approximately 3,500 mmf. will require a series capacitor of 130 mmf.

M50 M60

After installation, and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer (C-3) for maximum signal output. This trimmer is accessible by prying off the nameplate between the control knobs.

Antenna Filter

A filter is included in the antenna circuit. Being completely shielded, it prevents radiating ignition interference within the set. It also reduces the possibility of picking up vibrator interference. The filter unit is mounted inside a steel shell which is turned off to the chassis. The shielded antenna lead-in makes contact with the filter unit within the steel shell and is held in place by a bayonet type connector.

Push Button Tuning Mechanism

The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft. The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

Setting Up Stations

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating. Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:
1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.

Adjustments

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.
1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissors gear.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plate touching the frame.
3. The drive cord should have 8½ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off the drive cord.

Manual Tuning

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. A sketch shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.
### RCA MFG. CO., INC.

**Parts List Drive Data**

#### RCA PAGE 10-59

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12097</td>
<td>Capacitor-12 mmf. (C1)</td>
<td>.35</td>
</tr>
<tr>
<td>21725</td>
<td>Capacitor-37 mmf. (C14)</td>
<td>.35</td>
</tr>
<tr>
<td>23843</td>
<td>Capacitor-37 mmf. (C16)</td>
<td>.35</td>
</tr>
<tr>
<td>23849</td>
<td>Capacitor-66 mmf. (C16)</td>
<td>.35</td>
</tr>
<tr>
<td>23842</td>
<td>Capacitor-100 mmf. (C14)</td>
<td>.35</td>
</tr>
<tr>
<td>12098</td>
<td>Capacitor-250 mmf. (C14)</td>
<td>.35</td>
</tr>
<tr>
<td>12095</td>
<td>Capacitor-250 mmf. (C16)</td>
<td>.35</td>
</tr>
<tr>
<td>12091</td>
<td>Capacitor-350 mmf. (C16)</td>
<td>.35</td>
</tr>
<tr>
<td>12085</td>
<td>Capacitor-400 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23848</td>
<td>Capacitor-500 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23841</td>
<td>Capacitor-570 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23845</td>
<td>Capacitor-670 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23846</td>
<td>Capacitor-850 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23847</td>
<td>Capacitor-1070 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23844</td>
<td>Capacitor-1270 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23840</td>
<td>Capacitor-1570 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23839</td>
<td>Capacitor-1870 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23838</td>
<td>Capacitor-2070 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23837</td>
<td>Capacitor-2270 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23835</td>
<td>Capacitor-2570 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23833</td>
<td>Capacitor-2870 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23832</td>
<td>Capacitor-3070 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23831</td>
<td>Capacitor-3270 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23830</td>
<td>Capacitor-3570 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23829</td>
<td>Capacitor-3770 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23828</td>
<td>Capacitor-4070 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23827</td>
<td>Capacitor-4370 mmf. (C26)</td>
<td>.40</td>
</tr>
<tr>
<td>23826</td>
<td>Capacitor-4670 mmf. (C26)</td>
<td>.40</td>
</tr>
</tbody>
</table>

**COMPLIMENTS OF www.nucow.com**
RCA MFG. CO., INC.

MODEL U50, Chas. RC-414C
Schematic, Voltage
R-F Chassis Wiring

IF PEAK 455 KC

CATHODE CURRENTS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Current (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>0.30</td>
</tr>
<tr>
<td>6547</td>
<td>12.42</td>
</tr>
<tr>
<td>6N47</td>
<td>0.50</td>
</tr>
<tr>
<td>6N507</td>
<td>0.30</td>
</tr>
<tr>
<td>6N20</td>
<td>0.30</td>
</tr>
</tbody>
</table>

TOTAL RECTIFIED B'CURRENT = 64.8 mA.

FREQUENCY RANGES

- Standard Broadcast (A): 540-1720 kc (555-174 m)
- Medium Wave (B): 2.3-7.0 mc (190-423 m)
- Short Wave (C): 10.0-32 mc (458-1168 m)
- Intermediate Frequency: 455 kc

OSCILLOSCOPE CONNECTIONS

VERTICAL: To this term Vertical 1 to Chassis

All Heaters, 6.3 VAC, Except 5Y3G, 5.0 VAC.

R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±10% with 117-volt ac supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

©John F. Rider, Publisher
The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 32° on the calibration scale corresponds to approximately 7.0 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

```
<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to-</th>
<th>Turn radio dial to-</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F cap. in series with .01 mfd.</td>
<td>405 kc</td>
<td>L10 and L11</td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser stator (osc.) in series with .01 mfd.</td>
<td>405 kc</td>
<td>L9 and L9 (1st I.F. trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna lead in series with 200 mmd.</td>
<td>600 kc</td>
<td>L7</td>
</tr>
<tr>
<td>4</td>
<td>Antenna lead in series with 200 mmd.</td>
<td>1,500 kc</td>
<td>C9 (ant.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna lead in series with 400 ohms.</td>
<td>20 mc</td>
<td>C6 (osc.)</td>
</tr>
<tr>
<td>7</td>
<td>Antenna lead in series with 400 ohms.</td>
<td>6 mc</td>
<td>C6 (osc.)</td>
</tr>
<tr>
<td>8</td>
<td>Antenna lead in series with 200 mmd.</td>
<td>1,500 kc</td>
<td>C8 (osc.)</td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained
† Rock gang condenser slightly while adjusting L7.

Tone Control, Volume Control, & Power Switch

Phonograph Mechanism:
The phonograph motor is a self-starting, constant-speed induction type. It should be lubricated every six months by applying a few drops of light machine oil to the spindle bearing and oil hole.

The motor spindle, rubber piece, and grinding rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

A metal washer is placed on the spindle under the rubber piece. The washer has sets on the under side which fit over a pin that projects through the spindle.

The motor switch is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1½ inches from the center line of the spindle.

Arrangement of Drive Cord for Tuning Condenser and Dial Indicator. Drum Shown with Gang at Maximum Capacity shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

Power-Line Antenna:
At the back of the motorboard is a terminal board for antenna and ground connections. When it is desired to use the power line antenna, a jumper should be placed across the two outside binding posts, thus connecting the antenna input of the receiver through a capacitor to the power line. The center binding post is for the ground connection. When an external antenna is used, it should be connected to the post marked "ANT."

Precautionary Lead Drapes:
1. Lead from 2nd I-F transformer to volume control should be kept close to the chassis and dressed against frost apron.
2. C10 should be dressed away from the antenna section of the variable condenser (C-4).
General Description

Model M60 is a six-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading “Push Button Tuning Mechanism.” The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

Loudspeaker.—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with amberoid cement after adjustment has been completed.

**Alignment Frequencies**
- I-F: 455 kc
- Antenna: 1,400 kc
- R-F: 1,400 kc
- Oscillator: 600 kc

** Tubes and Functions**
1. RCA-6K7 — R-F Amplifier
2. RCA-6A8 — First Detector-Oscillator
3. RCA-6K7 — I-F Amplifier
4. RCA-6Q7 — Second Detector, A-F Amplifier and A.V.C.
5. RCA-6K6GT — Output
6. RCA-0Z4G — Rectifier

---

**Bottom View of Parts and Socket Voltages**

(Measured at 6.3 volts battery supply — Volume control minimum — No signal input —)

To duplicate the conditions under which the above voltages were measured requires a 1,000-ohm-per-volt d-c meter having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the indicated voltage value. Each value should hold within ± 20% when the receiver is normally operating at its rated battery voltage.
Adjustment of Push-Button Mechanism

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissor gear, as shown in the illustration.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus, correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have 6½ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off of the drive cord.

©John F. Rider, Publisher
Alignment Procedure

Text Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output signal as low as possible to avoid a-v-c action.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are as follows: Vertical “H1” to terminal “C” on 2nd I-F transformer; vertical “O” to chassis.

Output Meter.—Connect the output meter across the speaker, voice-coil and turn the receiver volume control to maximum (fully clockwise) and tone control to middle of range.

Dial Calibration.—Rotate the gang condenser to its full (maximum-capacity) position and then adjust dial scale so that the pointer is aligned to the last calibration mark at the low-frequency end of the scale.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc to</th>
<th>Tune test-osc to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6SK7 I-F grid (No. 4 pin) in series with .001 mfd.</td>
<td>260 kc</td>
<td>No Signal 550-750 kc</td>
<td>L10 and L11 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6A8 Det. grid cap in series with .01 mfd.</td>
<td>260 kc</td>
<td>600 kc</td>
<td>L8 and L9 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>* Ant. connector in series with .001 mfd.</td>
<td>600 kc</td>
<td>600 kc</td>
<td>L7 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>* Ant. connector in series with .001 mfd.</td>
<td>1,400 kc</td>
<td>1,400 kc signal</td>
<td>C7 (det.) (C1 + ant.)</td>
</tr>
<tr>
<td>5</td>
<td>* Ant. connector in series with .001 mfd.</td>
<td>600 kc</td>
<td>600 kc (rock)</td>
<td>L7 (osc.)</td>
</tr>
<tr>
<td>6</td>
<td>* Ant. connector in series with .001 mfd.</td>
<td>1,400 kc</td>
<td>1,400 kc signal</td>
<td>C7 (det.) (C1 + ant.) **</td>
</tr>
</tbody>
</table>

* Note 1.—This 60 mfd. capacitor must be inserted at the antenna connector of the receiver. The lead from the test oscillator to the 60 mfd. capacitor may be shielded if desired, but no shielding should be used between capacitor and antenna connector.

† Note 2.—These adjustments should be made with unit enclosed in its shielded case, through holes provided for adjustment purposes.

** Note 3.—Final adjustment of C1 must be made after the receiver has been installed and the antenna connected. See “Antenna Circuit.”

Antenna Circuit

It is very important that these instructions be followed when installing the M-70 receiver.

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mfd. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from the antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mfd., the capacitor added should be approximately 500 mfd. The insulated running board type having an approximate capacity of 350 mfd. requires a capacitor of approximately 150 mfd. Cars using an insulated

Push Button Adjustment

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.
3. Tighten the push button securely with fingers. Do not force with piers.
4. Adjust the push button fully in and then gently release so as not to jar mechanism.
5. Proceed in same manner to adjust the other four push buttons.

Loudspeaker

The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting the front dust cover. A new cover should be cemented in place upon completion of the adjustment.
Alignment Procedure

Cathode-ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Steps | Connect the high side of test-oscillator to | Tune test-osc. to | Turn radio dial to | Adjust the following for max. peak output
--- | --- | --- | --- | ---
1 | 1NS-G I-F grid cap., in series with 0.01 mfd. | 455 kc | Quiet point between 250-750 kc | L7 and L8 (2nd I-F transformer)
2 | 1A7-G 1st-det. grid cap., in series with 0.01 mfd. | 455 kc | | L5 and L6 (1st I-F transformer)
3 | Antenna lead, in series with 200 mmd. | 600 kc | 600 kc | L4 (oscillator) L3 (antenna)
4 | Antenna lead, in series with 200 mmd. | 1,500 kc | 1,500 kc | C15 (oscillator) C8 (antenna)

† Trimmer C16 on gang condenser should be unscrewed one complete turn from tight, before adjusting C15.

Precautionary Lead Dress

1. Red lead from second I-F transformer to screen terminal of 1NS-G must be dressed close to and along edge of chassis.
2. Twisted green wire from antenna coil to gang must be 9 turns and kept clear of rotor.
3. Blue and green leads to volume control must be dressed close to chassis and between gang and front apron.

Electrical and Mechanical Specifications

Power Output

Undistorted: 0.115 watt
Maximum: 0.280 watt

Loudspeaker

Type: Permanent Magnet Dynamic Diameter: 94BK1, 6 inches; 94BT1, 5 inches
Voice Coil impedance: 3 ohms at 400 cycles

Cabinet Dimensions (94BT1): 12 in. x 10 in. x 6 1/8 in.
Cabinet Dimensions (94BK1): 10 1/2 in. x 11 in. x 6 in.
Chassis Base Dimensions: 2 in. x 9 1/2 in. x 6 in.
Overall Chassis Height: 6 1/2 in.
Weight (94BT1): 26 lbs. net; 68 lbs. shipping
Weight (94BK1): 28 lbs. net; 89 lbs. shipping

Operating Controls: (1) Power Switch—Volume; (2) Tuning
Tuning Drive Ratio: 8 to 1
Frequency Range: 540 to 1,720 kc
RF Alignment Frequency: 900 kc (sec., ant.), 1,800 kc (sec., ant.)
Intermediate Frequency: 455 kc

© John F. Rider, Publisher

Compliments of www.nucow.com
## Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

**Output Meter Alignment:** If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

**Test Oscillator:** For all alignment operations, connect the low side of the test oscillator to the chassis, and keep the output as low as possible to avoid a v.c. action.

**Calibration Marks:** The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,600 kc, and 15.2 mc have been stenciled on the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference alignment.

**Dial Indicator Adjustment:** With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment".

### Tube and Trimmer Locations

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the High Side of Test Oscillator to:</th>
<th>Tune Test Oscillator to:</th>
<th>Push Button</th>
<th>Tune Radio Dia to:</th>
<th>Adjust for Maximum Peak Output:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1NS-G L.F grid cap in series with .01 mfd</td>
<td>455 kc</td>
<td>B.C. (5)</td>
<td></td>
<td>L12 and L14</td>
</tr>
<tr>
<td>2</td>
<td>1AV-G Det. grid cap in series with .01 mfd</td>
<td>455 kc</td>
<td>B.C. (5)</td>
<td></td>
<td>(2nd L.F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>1,000 kc</td>
<td>No. 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>600 kc</td>
<td>No. 1</td>
<td>550—700 kc</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>1,000 kc</td>
<td>No. 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>600 kc</td>
<td>No. 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>1,000 kc</td>
<td>B.C. (5)</td>
<td>1,500 kc</td>
<td>C30 (occ.) C8 (ant.)</td>
</tr>
<tr>
<td>8</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>600 kc</td>
<td>B.C. (5)</td>
<td>600 kc</td>
<td>L6 (occ.) L4 (ant.)</td>
</tr>
<tr>
<td>9</td>
<td>Antenna Lead (blue) in series with 200 mmfd.</td>
<td>1,000 kc</td>
<td>B.C. (5)</td>
<td>1,500 kc</td>
<td>C30 (occ.) C8 (ant.)</td>
</tr>
<tr>
<td>10</td>
<td>Antenna Lead (blue) in series with 300 ohms.</td>
<td>15.2 mc</td>
<td>S.W. (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Follow the &quot;Adjustments for Electric Tuning.&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Adjust L29—L39 (No. 1 push button adjustment) and L6 at the same time, rocking in for maximum signal.

** Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal. A weaker signal (image) should be received about one-quarter inch to the left on the dial plate.

† If two signals are received, set the dial to the higher frequency (right hand) position.

---

**Precautionary Lead Dress**

1. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.
2. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.
3. Leads to push button coils must be dressed close to the coils.
4. Red and blue leads to gang condenser must be dressed away from chassis.
5. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.

© John F. Rider, Publisher

Compliments of www.nucow.com
Adjustments for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard broadcast band. Each station button connects separate oscillator and antenna coils which are tandem-tuned by ganged magnetite cores, and may be adjusted for the desired station. Use a small screwdriver or alignment tool such as RCA Stock No. 31083, following at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:
1. Make a list of the four desired stations, arranged in order from low to high frequencies.

Location of Controls

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32258</td>
<td>Capacitor—5-section variable trimmer capacitor</td>
<td>.65</td>
<td></td>
<td>4669</td>
<td>Screw—No. 8-32 square head set screw from drum</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>30849</td>
<td>Capacitor—68 mmfd. (C17, C18, C19, C20)</td>
<td>.85</td>
<td></td>
<td>32261</td>
<td>Screw—Push button oscillator adjustment screw and mounting nut</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>12723</td>
<td>Capacitor—68 mmfd. (C1)</td>
<td>.35</td>
<td></td>
<td>32245</td>
<td>Shaft—Tuning knob</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>32004</td>
<td>Capacitor—100 mmfd. (C2)</td>
<td>.35</td>
<td></td>
<td>32249</td>
<td>Shaft—Tuning knob assembly</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>11730</td>
<td>Capacitor—130 mmfd. (C3)</td>
<td>.35</td>
<td></td>
<td>32251</td>
<td>Shaft—Tuning knob assembly</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>12734</td>
<td>Capacitor—130 mmfd. (C7)</td>
<td>.35</td>
<td></td>
<td>12007</td>
<td>Spring—Retaining spring for oscillator coil adjustment screw</td>
<td>.05</td>
<td></td>
</tr>
<tr>
<td>12200</td>
<td>Capacitor—220 mmfd. (C15)</td>
<td>.35</td>
<td></td>
<td>32255</td>
<td>Switch—Tuning knob switch (S18, S19, S30, S31, S32, S33, S34, S35)</td>
<td>2.95</td>
<td></td>
</tr>
<tr>
<td>30433</td>
<td>Capacitor—470 mmfd. (C27)</td>
<td>.35</td>
<td></td>
<td>32383</td>
<td>Transformer—First I.F. transformer (L1, L18, C17, C18)</td>
<td>5.30</td>
<td></td>
</tr>
<tr>
<td>32288</td>
<td>Capacitor—629 mmfd. (C13)</td>
<td>.40</td>
<td></td>
<td>32244</td>
<td>Transformer—Second I.F. transformer (L19, L14, C19, C30, C31)</td>
<td>5.50</td>
<td></td>
</tr>
<tr>
<td>14498</td>
<td>Capacitor—880 mmfd. (C48)</td>
<td>.65</td>
<td></td>
<td>32262</td>
<td>Volume control and power switch (S5, S1, S2)</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>12385</td>
<td>Capacitor—1,000 mmfd. (C11, C26, C36)</td>
<td>.70</td>
<td></td>
<td>32271</td>
<td>Speaker—Cone and voice coil (L15)</td>
<td>1.70</td>
<td></td>
</tr>
<tr>
<td>4401</td>
<td>Capacitor—1,000 mmfd. (C21)</td>
<td>.70</td>
<td></td>
<td>5118</td>
<td>Plug—2-contact male for speaker</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>2107</td>
<td>Capacitor—2,000 mmfd. (C24)</td>
<td>.95</td>
<td></td>
<td>32279</td>
<td>Speaker—Complete assembly</td>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td>43293</td>
<td>Capacitor—01 mmfd. (C14)</td>
<td>.95</td>
<td></td>
<td>32277</td>
<td>Transformer—Output transformer (T1)</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>13825</td>
<td>Capacitor—16 mmfd. (C7)</td>
<td>.95</td>
<td></td>
<td>32268</td>
<td>Speaker—Complete speaker assembly</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>32254</td>
<td>Coil—Broadcast oscillator coil (L9)</td>
<td>1.20</td>
<td></td>
<td>32274</td>
<td>Speaker—Cone and voice coil (L15)</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Coil—Antenna coil (L1, L2, L3, L4)</td>
<td>1.50</td>
<td></td>
<td>32273</td>
<td>Speaker—Complete speaker assembly</td>
<td>7.60</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button antenna and oscillator coil (L5, L6)</td>
<td>1.60</td>
<td></td>
<td>32272</td>
<td>Transformer—Output transformer (T1)</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L7, L8)</td>
<td>1.60</td>
<td></td>
<td>32257</td>
<td>Transformer—Output transformer (T1)</td>
<td>1.60</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L7, L8)</td>
<td>1.60</td>
<td></td>
<td>32249</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L9, L10)</td>
<td>1.60</td>
<td></td>
<td>32260</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L10, L11)</td>
<td>1.60</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L11, L12)</td>
<td>1.60</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L12, L3)</td>
<td>1.60</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Coil—Push button oscillator coil (L13, L4)</td>
<td>1.60</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32256</td>
<td>Condenser—5-pole variable condenser (C5, C6, C10)</td>
<td>1.60</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32268</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32268</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>32258</td>
<td>Condenser—Drive cord</td>
<td>.35</td>
<td></td>
<td>32258</td>
<td>Capacitor—5-contact female for speaker cable</td>
<td>.30</td>
<td></td>
</tr>
</tbody>
</table>

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

©John F. Rider, Publisher

Compliments of www.nucow.com
RCA MFG. CO., INC.

MODEL 94BP4, CHASSIS RC-410
Schematic, Voltage Alignment, Chassis Wiring, Socket Trimmers, Lead Dress

**Alignment Procedure**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test oscillator to:</th>
<th>Tune test oscillator to:</th>
<th>Turn radio dial to:</th>
<th>Adjust the following for max. peak output:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1N5-G grid cap, in series with .001 mfd.</td>
<td>455 kC</td>
<td>Quiet point between 500-700 kC</td>
<td>L5 and L6 (2nd I-F transformer)</td>
</tr>
<tr>
<td>2</td>
<td>1A7-G grid cap, in series with .001 mfd.</td>
<td>455 kC</td>
<td></td>
<td>L5 and L4 (3rd I-F transformer)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna terminal, in series with 206 mfd. Connect low side of test oscillator to &quot;G&quot; term.</td>
<td>1500 kC</td>
<td>1500 kC*</td>
<td>C17 (osc.) C1 (ant.)</td>
</tr>
<tr>
<td>4</td>
<td>1000 kC</td>
<td>600 kC</td>
<td>L8 (osc.) Rock in</td>
<td>* Use bottom of &quot;1&quot; in &quot;150&quot; for 1500 kC calibration point, and use center of &quot;0&quot; in &quot;60&quot; for 600 kC calibration point.</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
### Specifications and Replacement Parts

**LOUDSPEAKER**

- **Type**: 5-inch permanent-magnet dynamic
- **Voice-coil Impedance**: 2.3 ohms at 400 cycles

<table>
<thead>
<tr>
<th>Cabinet Dimensions (inches)</th>
<th>71</th>
<th>14</th>
<th>68</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis Base Dimensions (inches)</td>
<td>2</td>
<td>73</td>
<td>53</td>
</tr>
<tr>
<td>Over-all Chassis Height</td>
<td>53 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight—Shipping weight, less batteries</td>
<td>125 pounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net weight, with batteries</td>
<td>14 pounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuning Drive Ratio</td>
<td>8 to 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Battery Arrangement**

- **B**: 1-15/16 inches
- **A**: 1-1/4 inches

**Chassis Assemblies (RC-410)**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32502</td>
<td>Brackets—Dial bracket</td>
<td>.15</td>
</tr>
<tr>
<td>12620</td>
<td>Capacitors—6 mmfd. (C6)</td>
<td>.06</td>
</tr>
<tr>
<td>12723</td>
<td>Capacitors—60 mmfd. (C12)</td>
<td>.06</td>
</tr>
<tr>
<td>14082</td>
<td>Capacitors—100 mmfd. (C5)</td>
<td>.06</td>
</tr>
<tr>
<td>14948</td>
<td>Capacitors—150 mmfd. (C6)</td>
<td>.06</td>
</tr>
<tr>
<td>14948</td>
<td>Capacitors—22 mmfd. (C1)</td>
<td>.06</td>
</tr>
<tr>
<td>19488</td>
<td>Capacitors—56 mmfd. (C1, C4, C5, C6)</td>
<td>.06</td>
</tr>
<tr>
<td>19723</td>
<td>Capacitors—90 mmfd. (C12)</td>
<td>.06</td>
</tr>
<tr>
<td>19933</td>
<td>Capacitors—100 mmfd. (C9)</td>
<td>.06</td>
</tr>
<tr>
<td>13794</td>
<td>Capacitors—150 mmfd. (C5)</td>
<td>.06</td>
</tr>
<tr>
<td>13856</td>
<td>Capacitors—200 mmfd. (C6)</td>
<td>.06</td>
</tr>
<tr>
<td>13993</td>
<td>Capacitors—30 mmfd. (C11)</td>
<td>.06</td>
</tr>
<tr>
<td>23120</td>
<td>Capacitors—50 mmfd. (C12)</td>
<td>.06</td>
</tr>
<tr>
<td>32148</td>
<td>Capacitors—8 mmfd. 150 volts (C19)</td>
<td>.05</td>
</tr>
<tr>
<td>32168</td>
<td>Capacitors—3-gang variable (C1, C6, C15, C17)</td>
<td>.05</td>
</tr>
<tr>
<td>32184</td>
<td>Cord—Condenser and pointer drive cord</td>
<td>.10</td>
</tr>
<tr>
<td>32593</td>
<td>Dial—Dial scale</td>
<td>.05</td>
</tr>
<tr>
<td>34802</td>
<td>Indicator—Dial indicator pointer</td>
<td>.30</td>
</tr>
<tr>
<td>35005</td>
<td>Plug—2-contact male for “A” leads</td>
<td>.50</td>
</tr>
<tr>
<td>35298</td>
<td>Plug—3-contact male for “B” leads</td>
<td>.10</td>
</tr>
<tr>
<td>35798</td>
<td>Resistor—820 ohms, # watt</td>
<td>.20</td>
</tr>
<tr>
<td>13775</td>
<td>Resistor—68,000 ohms, # watt (R8)</td>
<td>.20</td>
</tr>
<tr>
<td>14850</td>
<td>Resistor—100,000 ohms, # watt (R10)</td>
<td>.20</td>
</tr>
<tr>
<td>13968</td>
<td>Resistor—200 ohms, # watt</td>
<td>.20</td>
</tr>
<tr>
<td>13790</td>
<td>Resistor—1 meg., # watt (R7)</td>
<td>.20</td>
</tr>
</tbody>
</table>

**Miscellaneous Assemblies**

- **32602**: Bezel—Dial bezel and crystal | .50 |
- **32183**: Cone—Speaker cone and voice coil (L7) | .50 |
- **32600**: Knob—Speaker knob | .30 |
- **32683**: Handle—Carrying handle | .20 |
- **32684**: Loop—Antenna loop complete | .20 |
- **32697**: Transformer—First I.F. transformer (L3, L5, L6, C3, C4) | .20 |
- **32698**: Transformer—Second I.F. transformer (L3, L5, C3, C4) | .20 |
- **32699**: Volume control and switch (R5, S1, S2) | .50 |

**Speaker Assemblies (Model 94BT1)**

- **32165**: Speaker—Complete | .10 |

**Speaker Assemblies (Model 94BK1)**

- **32164**: Speaker—Complete | .10 |

**Speaker Assemblies (Model 94BK1)**

- **32163**: Speaker—Complete | .10 |

**Speaker Assemblies (Model 94BT1)**

- **32162**: Speaker—Complete | .10 |

**Miscellaneous Assemblies**

- **32972**: Speaker—Speaker cone and voice coil (L9) | .50 |
- **32973**: Speaker—Transformer—Output transformer (T1) | .50 |

---

**Parts List**

- **94BK1, 94BT1**: **Parts List**

All prices are subject to change or withdrawal without notice.
RCA MFG. CO., INC.

Model 9BT61, Chassis RC-333C

Schematic, Voltage, Alignment

Socket, Trimmers, Chassis Wiring

**Socket Voltages and Location of Parts**

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.*

Measurements made to chassis unless otherwise indicated, with the set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with 6 volts "A."

**Alignment Procedure**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-oscillator to:</th>
<th>Tune test-osc. to:</th>
<th>Turn radio dial to:</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td>857-G I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>Quiet point between 550-750 kc</td>
<td>L7 and L8 (2nd I-F transformer)</td>
</tr>
<tr>
<td>No. 2</td>
<td>6D8-G 1st-det. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td></td>
<td>L5 and L6 (1st I-F transformer)</td>
</tr>
<tr>
<td>No. 3</td>
<td>Antenna lead, in series with 200 mmd.</td>
<td>600 kc</td>
<td>600 kc</td>
<td>L4 (oscillator)</td>
</tr>
<tr>
<td>No. 4</td>
<td>Antenna lead, in series with 200 mmd.</td>
<td>1,500 kc</td>
<td>1,500 kc</td>
<td>C28 (oscillator or oscillation transformer)</td>
</tr>
</tbody>
</table>

* Adjust C24 on gang condenser to one complete turn from tight before adjusting C28.

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 96BT61 Chassis No. RC-392 Precautionary Lead Dress

1. Capacitors C24 and C26 must be grounded with as short a lead as possible. C4 and C27 are soldered direct (no leads).

2. The "A" supply choke (L18) must be dressed clear of chassis. The H.V. secondary leads (brown, green, and C18), and R12 must be dressed clear of the chassis and away from other leads.

3. The H.V. secondary wind-tap (brown-black) lead, and the brown lead from L18 to L17 must be dressed clear of the chassis and away from other parts.

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE. These are current prices, which are subject to change or withdrawal without notice. Always check with your local dealer for the most current prices.

Compliments of www.nucow.com
Schematic Circuit Diagram for Models 96BK6, 96BT6, and CV-9 A-C Power Unit

With RS-79B d-c power supply unit

6.3 volt; total current drain 1.85 amperes.

POWER OUTPUT

With a-c power unit.......................... 1.5 watts

With d-c power unit.......................... 3.5 watts

LOUDSPEAKER

Type........................................ Permanent Magnet Dynamic

Voice Coil Impedance......................... 2.2 ohms at 400 cycles

Diameter..................................... 96BK6, 8 inches; 96BT6, 6 inches

Power Supply Units

The receiver chassis has a seven-prong male plug for connection to the power-supply unit. Both a-c and d-c power supply units are available, as listed under "Power Supply Ratings." The receiver is shipped with a d-c power unit for use with a 6-volt supply. If an a-c unit is desired, it must be purchased separately as Model CV-9.

If no receiver chassis is available the a-c unit (CV-9) may be tested for proper operation by connecting a 5,000-ohm, 10-watt resistor between terminals 3 and 4 on the male socket and shorting terminals 1 and 7. With one voltmeter prod on terminal 2 (ground) the following readings should be obtained; terminal 3, 500 volts d.c.; terminal 4, +200 volts d.c.; terminal 5, 5.9 volts d.c.; terminal 6, 6.5 volts a-c. Values should be within ± 20% with rated supply voltage.

Precautionary Lead Dress—

1. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.

2. Leads to push button coils must be dressed close to coils.

3. Red and blue leads to gang condenser must be dressed away from chassis.

4. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.

5. Bias cell must be installed with carbon disc connected to chassis.

6. Leads from power switch to connector plug must be dressed away from other leads.

7. Parts under push button coils must be dressed down away from them.

8. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.
Compliments of www.nucow.com
<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Stock No.</th>
<th>Description</th>
<th>Stock No.</th>
<th>Description</th>
<th>Stock No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>16520</td>
<td>Board—36006-3, 36006-4, &amp; 36006-5</td>
<td>16580</td>
<td>Board—36016-3, 36016-4, &amp; 36016-5</td>
<td>16640</td>
<td>Board—36026-3, 36026-4, &amp; 36026-5</td>
<td>16700</td>
<td>Board—36036-3, 36036-4, &amp; 36036-5</td>
</tr>
<tr>
<td>16530</td>
<td>Board—36006-6, 36006-7, &amp; 36006-8</td>
<td>16590</td>
<td>Board—36016-6, 36016-7, &amp; 36016-8</td>
<td>16650</td>
<td>Board—36026-6, 36026-7, &amp; 36026-8</td>
<td>16710</td>
<td>Board—36036-6, 36036-7, &amp; 36036-8</td>
</tr>
<tr>
<td>16540</td>
<td>Board—36006-9, 36006-10, &amp; 36006-11</td>
<td>16550</td>
<td>Board—36016-9, 36016-10, &amp; 36016-11</td>
<td>16660</td>
<td>Board—36026-9, 36026-10, &amp; 36026-11</td>
<td>16720</td>
<td>Board—36036-9, 36036-10, &amp; 36036-11</td>
</tr>
<tr>
<td>16560</td>
<td>Board—36006-12, 36006-13, &amp; 36006-14</td>
<td>16570</td>
<td>Board—36016-12, 36016-13, &amp; 36016-14</td>
<td>16680</td>
<td>Board—36026-12, 36026-13, &amp; 36026-14</td>
<td>16730</td>
<td>Board—36036-12, 36036-13, &amp; 36036-14</td>
</tr>
<tr>
<td>16580</td>
<td>Board—36006-15, 36006-16, &amp; 36006-17</td>
<td>16590</td>
<td>Board—36016-15, 36016-16, &amp; 36016-17</td>
<td>16690</td>
<td>Board—36026-15, 36026-16, &amp; 36026-17</td>
<td>16740</td>
<td>Board—36036-15, 36036-16, &amp; 36036-17</td>
</tr>
<tr>
<td>16600</td>
<td>Board—36006-18, 36006-19, &amp; 36006-20</td>
<td>16610</td>
<td>Board—36016-18, 36016-19, &amp; 36016-20</td>
<td>16700</td>
<td>Board—36026-18, 36026-19, &amp; 36026-20</td>
<td>16750</td>
<td>Board—36036-18, 36036-19, &amp; 36036-20</td>
</tr>
<tr>
<td>16620</td>
<td>Board—36006-21, 36006-22, &amp; 36006-23</td>
<td>16630</td>
<td>Board—36016-21, 36016-22, &amp; 36016-23</td>
<td>16710</td>
<td>Board—36026-21, 36026-22, &amp; 36026-23</td>
<td>16760</td>
<td>Board—36036-21, 36036-22, &amp; 36036-23</td>
</tr>
</tbody>
</table>

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE**
Compliments of www.nucow.com

Page 10-80 RCA

RCA MFG. CO., INC. Tuner Adjustments

Alignment, Socket, Trimmers

IN 97K2, 97T2 ONLY

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end mark, and gang condenser fully meshed.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 A-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band, Quiet Point between 550-750 kc</td>
<td>L12 and L13 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6K8 det. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band</td>
<td>L10 and L11 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Terminal, in series with 300 mmmf.</td>
<td>600 kc</td>
<td>600 kc (150.5&quot;)</td>
<td>L9</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 400 ohms</td>
<td>1,500 kc</td>
<td>1,500 kc (28&quot;)</td>
<td>C25 (osc.) C30 (ant.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna Terminal, in series with 400 ohms</td>
<td>6 mc</td>
<td>6 mc (26.5&quot;)</td>
<td>C23 (osc.)*</td>
</tr>
<tr>
<td>7</td>
<td>Antenna Terminal, in series with 400 ohms</td>
<td>20 mc</td>
<td>20 mc (22&quot;)</td>
<td>C21 (osc.)*</td>
</tr>
<tr>
<td>8</td>
<td>Follow &quot;Adjustments for Electric Tuning.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

Note.—Oscillator tracks 455 kc above signal on all bands.

Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:
1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station. Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

©John F. Rider, Publisher

Compliments of www.nucow.com
Compliments of www.nucow.com
All models have electric tuning for five stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; high-frequency tone control; straight-line dial; dust-proof permanent magnet dynamic loudspeaker.

Power Supply Polarity. On d-c operation, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the position of the plug. On a-c operation, a similar reversal of the plug may reduce hum.

© John F. Rider, Publisher

Compliments of www.nucow.com
Mechanical Specifications

<table>
<thead>
<tr>
<th>Models</th>
<th>9ET4</th>
<th>9ET5</th>
<th>9ET6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (inches)</td>
<td>9 1/2</td>
<td>9 1/2</td>
<td>11 1/2</td>
</tr>
<tr>
<td>Width (inches)</td>
<td>12</td>
<td>12</td>
<td>13 1/2</td>
</tr>
<tr>
<td>Depth (inches)</td>
<td>6 1/4</td>
<td>6 1/4</td>
<td>6 7/8</td>
</tr>
<tr>
<td>Net Weight (pounds)</td>
<td>11</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Shipping Weight (pounds)</td>
<td>13</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Chassis Base Dimensions</td>
<td>11 1/8-in. wide, 5-in. deep, 2 13/16-in. high</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Chassis Height</td>
<td>8 1/4 inches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuning Drive Ratio</td>
<td>8 to 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and tune the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kcs, 1,500 kcs, and 15.2 mc. have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

 Tube and Trimmer Locations

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high</th>
<th>Tune test-</th>
<th>Turn radio</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>&quot;A&quot; band, Quiet Point between 500-750 kc</td>
<td>L7 and L8 (1st I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>Tuning condenser Stator (osc.) in series with .01 mfd.</td>
<td>455 kc</td>
<td></td>
<td>L0 and L10 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Lead (Blue), in series with 300 mmmf.</td>
<td>1,500 kc</td>
<td>1,500 kc (Cal. Mark)</td>
<td>C28 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Lead (Blue), in series with 300 mmmf.</td>
<td>600 kc</td>
<td>800 kc (Cal. Mark)</td>
<td>C29 (osc.)</td>
</tr>
<tr>
<td>5</td>
<td>Repeat steps 3 and 4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Antenna Lead (Blue), in series with 400 ohms</td>
<td>15.3 mc</td>
<td>15.3 mc (Cal. Mark)</td>
<td>C27 (osc.)</td>
</tr>
<tr>
<td>7</td>
<td>Follow &quot;Adjustments for Electric Tuning.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Rock gang slightly while peaking C27, and use minimum capacity peak if two peaks can be obtained on C27.

Note.—Oscillator tracks 455 kc above signal on both bands.

Miscellaneous Service Data

Diode-Indicator and Drive Mechanism

Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing.

©John F. Rider, Publisher
Adjustments for Electric Tuning

These models have five push buttons for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetic oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:
1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Turn Range Control Knob to "Broadcast" position and tune in station No. 1 (560 kc in example) by Manual Dial Tuning, for reference.
3. Push in station-button No. 1 and turn Range Selector to "PB" position. Adjust No. 1 oscillator core (L32) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer (C32) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)
6. Make a final careful adjustment of the oscillator cores and antenna trimmers, using one or two feet of wire as an antenna to ensure sharp peaking.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32546</td>
<td>Ballast—Ballast resistor tube—type BK498B</td>
<td>.80</td>
</tr>
<tr>
<td>31979</td>
<td>Capacitor—Dual trimmer, comprising one 5-30 mfd. and one 2-10 mfd. sections (C27, C38)</td>
<td>.40</td>
</tr>
<tr>
<td>12873</td>
<td>Capacitor—8 mfd. (C4)</td>
<td>.35</td>
</tr>
<tr>
<td>14946</td>
<td>Capacitor—106 mfd. (C7, C8)</td>
<td>.35</td>
</tr>
<tr>
<td>15842</td>
<td>Capacitor—120 mfd. (C9, C19)</td>
<td>.30</td>
</tr>
<tr>
<td>14715</td>
<td>Capacitor—180 mfd. (C11)</td>
<td>.30</td>
</tr>
<tr>
<td>12848</td>
<td>Capacitor—970 mfd. (C14)</td>
<td>.35</td>
</tr>
<tr>
<td>30433</td>
<td>Capacitor—770 mfd. (C9)</td>
<td>.35</td>
</tr>
<tr>
<td>19237</td>
<td>Capacitor—560 mfd. (C21)</td>
<td>.35</td>
</tr>
<tr>
<td>32718</td>
<td>Capacitor—390 mfd. (C36)</td>
<td>.30</td>
</tr>
<tr>
<td>13901</td>
<td>Capacitor—1000 mfd. (C1)</td>
<td>.50</td>
</tr>
<tr>
<td>51097</td>
<td>Capacitor—5000 mfd., 700 volts (C1)</td>
<td>.20</td>
</tr>
<tr>
<td>48786</td>
<td>Photocell—1000 volts (C15, C16, C38)</td>
<td>.30</td>
</tr>
<tr>
<td>48793</td>
<td>Capacitor—1000 volts (C19)</td>
<td>.30</td>
</tr>
<tr>
<td>48749</td>
<td>Capacitor—1000 volts (C20, C21)</td>
<td>.30</td>
</tr>
<tr>
<td>32708</td>
<td>Capacitor—Electrolytic, comprising two 40 mfd., and one 20 mfd. sections (C15, C20, C31)</td>
<td>1.35</td>
</tr>
<tr>
<td>32705</td>
<td>Capacitor—Push button trimmer capacitor bank (C5, C8, C34, C35, C36)</td>
<td>1.30</td>
</tr>
<tr>
<td>32706</td>
<td>Clip—Push button coil mounting clip</td>
<td>.04</td>
</tr>
<tr>
<td>32707</td>
<td>Coil—Antenna coil (L1, L2, L3, L4)</td>
<td>1.25</td>
</tr>
<tr>
<td>32708</td>
<td>Coil—Oscillator coil (L5, L6)</td>
<td>1.25</td>
</tr>
<tr>
<td>32845</td>
<td>Coil—Push button oscillator coil—less core 600-950 KC. (L58)</td>
<td>.30</td>
</tr>
<tr>
<td>32704</td>
<td>Coil—Push button oscillator coil—less core 690-1,020 KC. (L59)</td>
<td>.35</td>
</tr>
<tr>
<td>32540</td>
<td>Coil—Push button oscillator coil—less core 690-1,825 KC. (L54)</td>
<td>.35</td>
</tr>
<tr>
<td>31585</td>
<td>Condenser—5 gang variable (C19, C20, C24)</td>
<td>2.70</td>
</tr>
<tr>
<td>31413</td>
<td>Control—Volume control, tone control, and power switch (R6, R9, R1)</td>
<td>3.20</td>
</tr>
<tr>
<td>30894</td>
<td>Cord—Drive cord</td>
<td>.10</td>
</tr>
<tr>
<td>31898</td>
<td>Core—Core and stud coil, Stock Nos. 31893, 31895, and 32704</td>
<td>.10</td>
</tr>
<tr>
<td>32648</td>
<td>Core—Core and stud core, Stock No. 32240</td>
<td>.10</td>
</tr>
<tr>
<td>32713</td>
<td>Core—Core and stud core coil, Stock No. 32707</td>
<td>.25</td>
</tr>
<tr>
<td>32661</td>
<td>Condenser—Drive condenser</td>
<td>.10</td>
</tr>
<tr>
<td>31891</td>
<td>Indicator—Drive indicator pointer</td>
<td>.10</td>
</tr>
<tr>
<td>31891</td>
<td>Lamp—Lamp socket</td>
<td>.10</td>
</tr>
<tr>
<td>31090</td>
<td>Plug—Screws, female for speaker cable</td>
<td>.10</td>
</tr>
<tr>
<td>31288</td>
<td>Switch—Switch knob</td>
<td>.10</td>
</tr>
<tr>
<td>32709</td>
<td>Motor—Motor control knob</td>
<td>.10</td>
</tr>
<tr>
<td>14489</td>
<td>Motor—Motor control knob</td>
<td>.10</td>
</tr>
<tr>
<td>14490</td>
<td>Motor—Motor control knob</td>
<td>.10</td>
</tr>
</tbody>
</table>

SPEAKER ASSEMBLIES ($4238-4)

Models 9674 and 9675

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32716</td>
<td>Cone—Speaker cone and voice coil in housing (L11)</td>
<td>1.80</td>
</tr>
<tr>
<td>32716</td>
<td>Speaker—Complete</td>
<td>6.70</td>
</tr>
<tr>
<td>32717</td>
<td>Transformer—Output transformer (T1)</td>
<td>1.40</td>
</tr>
</tbody>
</table>

SPEAKER ASSEMBLIES ($4507-4)

Models 9674

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32719</td>
<td>Cone—Speaker cone and voice coil in housing (L11)</td>
<td>2.00</td>
</tr>
<tr>
<td>32719</td>
<td>Speaker—Speaker complete</td>
<td>6.00</td>
</tr>
<tr>
<td>32720</td>
<td>Transformer—Output transformer (T1)</td>
<td>1.45</td>
</tr>
</tbody>
</table>

MISCELLANEOUS ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31429</td>
<td>Button—Push button and spring</td>
<td>.08</td>
</tr>
<tr>
<td>31487</td>
<td>Clip—Spring clip to hold dial scale</td>
<td>.12</td>
</tr>
<tr>
<td>32721</td>
<td>Cover—One set protective covers for call letter markers</td>
<td>1.00</td>
</tr>
<tr>
<td>32722</td>
<td>Glass—Glass scale</td>
<td>.45</td>
</tr>
<tr>
<td>32722</td>
<td>Ejector—Ejector scale (no crystal)</td>
<td>.55</td>
</tr>
<tr>
<td>32722</td>
<td>Knob—Range control knob</td>
<td>1.35</td>
</tr>
<tr>
<td>14599</td>
<td>Knob—Volume control knob</td>
<td>.15</td>
</tr>
<tr>
<td>14599</td>
<td>Knob—Tone control knob</td>
<td>.10</td>
</tr>
<tr>
<td>14599</td>
<td>Knob—Volume control knob</td>
<td>.20</td>
</tr>
<tr>
<td>30991</td>
<td>Marker—One set call letter markers</td>
<td>.40</td>
</tr>
<tr>
<td>32721</td>
<td>Spring—Push button spring</td>
<td>.08</td>
</tr>
<tr>
<td>32721</td>
<td>Spring—Retaining spring for range switch or volume control knob</td>
<td>.08</td>
</tr>
<tr>
<td>32721</td>
<td>Spring—Retaining spring for tone control knob</td>
<td>.08</td>
</tr>
<tr>
<td>32721</td>
<td>Spring—Retaining spring for tuning knob</td>
<td>.05</td>
</tr>
</tbody>
</table>
MODELS 96X-1, -2, -3, -4 and -11, -12, -13, -14
Chassis No. RC-400 and RC-400A

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>32999</td>
<td>Back—Cardboard back for cabinet</td>
<td>.10</td>
<td>4588</td>
<td>Condenser—.01 mfd.</td>
</tr>
<tr>
<td>32518</td>
<td>Ballast—Ballast removed</td>
<td>.50</td>
<td>4589</td>
<td>Condenser—.05 mfd.</td>
</tr>
<tr>
<td>32530</td>
<td>Button—Ivy push button for 96X11, 96X12, and 96X13</td>
<td>.15</td>
<td>4590</td>
<td>Condenser—.1 mfd.</td>
</tr>
<tr>
<td>32528</td>
<td>Button—Walnut push button for 96X11</td>
<td>.15</td>
<td>32348</td>
<td>Condenser—Electrolytic, one 15 mfd. and one 20 mfd. sections</td>
</tr>
<tr>
<td>X-580</td>
<td>Cabinet for 96X11</td>
<td>.05</td>
<td>32538</td>
<td>Condenser—Variable tuning condenser</td>
</tr>
<tr>
<td>X-581</td>
<td>Cabinet for 96X12</td>
<td>.10</td>
<td>31455</td>
<td>Cover—Set protective covers for push button markers</td>
</tr>
<tr>
<td>X-582</td>
<td>Cabinet for 96X13</td>
<td>.25</td>
<td>32539</td>
<td>Cord—Condenser drive cord</td>
</tr>
<tr>
<td>X-583</td>
<td>Cabinet for 96X14</td>
<td>.15</td>
<td>32540</td>
<td>Cord—Dial drive cord</td>
</tr>
<tr>
<td>X-584</td>
<td>Cabinet for 96X11</td>
<td>.25</td>
<td>32541</td>
<td>Dial—Black dial scale for 96X4 and 96X4A</td>
</tr>
<tr>
<td>X-586</td>
<td>Cabinet for 96X13</td>
<td>.35</td>
<td>32542</td>
<td>Dial—Ivy scale for 96X4 and 96X4A</td>
</tr>
<tr>
<td>X-587</td>
<td>Cabinet for 96X14</td>
<td>.35</td>
<td>32543</td>
<td>Dial—Walnut dial scale for 96X5, 96X12, and 96X13</td>
</tr>
<tr>
<td>32531</td>
<td>Col.—Antenna coil</td>
<td>.75</td>
<td>52200</td>
<td>Gear—Sector gear fastens on cam shaft of tuning mechanism—Models 96X11, 96X12, 96X13, 96X14</td>
</tr>
<tr>
<td>32547</td>
<td>Col.—Antenna coil</td>
<td>1.00</td>
<td>32544</td>
<td>Indicator—Dial indicator drum</td>
</tr>
<tr>
<td>31579</td>
<td>Condenser—Trimmer, one 3-20 mfd. and one 2-10 mfd. sections (C6, C7)</td>
<td>.40</td>
<td>32545</td>
<td>Knob—Ivy knob for 96X11, 96X12, 96X4, 96X4A, 96X13, 96X14</td>
</tr>
<tr>
<td>14078</td>
<td>Condenser—6-20 mfd.</td>
<td>.35</td>
<td>32546</td>
<td>Knob—Tan knob for 96X5 and 96X13</td>
</tr>
<tr>
<td>14077</td>
<td>Condenser—8-20 mfd.</td>
<td>.35</td>
<td>32532</td>
<td>Screw—No. 8-32 set screw for condenser drive pulley or sector gear</td>
</tr>
<tr>
<td>31399</td>
<td>Condenser—4,700 mfd.</td>
<td>.85</td>
<td>31429</td>
<td>Screw—No. 8-32 set screw for condenser drive bulb socket</td>
</tr>
<tr>
<td>31385</td>
<td>Lamp—Dial—Dial lamp</td>
<td>.25</td>
<td>32510</td>
<td>Screw—Push button lamp base—Models 96X11, 96X12, 96X13, 96X14</td>
</tr>
<tr>
<td>32810</td>
<td>Mechanism—Push button mechanism, comprising push arm, cam plate, frame, and mounting bracket assembled—Models 96X11, 96X12, 96X13, 96X14</td>
<td>5.40</td>
<td>32547</td>
<td>Shaft—Tuning knob shaft</td>
</tr>
<tr>
<td>32538</td>
<td>Pulley—Condenser drive pulley and gear—Models 96X11, 96X12, 96X13, 96X14</td>
<td>.20</td>
<td>32543</td>
<td>Socket—Dial lamp socket and bracket</td>
</tr>
<tr>
<td>32544</td>
<td>Pulley—Condenser drive pulley—Models 96X11, 96X12, 96X13, 96X14</td>
<td>.85</td>
<td>32548</td>
<td>Socket—Tube socket</td>
</tr>
<tr>
<td>31606</td>
<td>Pulley—Indicator drum pulley</td>
<td>.20</td>
<td>32553</td>
<td>Transformer—First if. transformer</td>
</tr>
<tr>
<td>32827</td>
<td>Resistor—Controller resistor 100 ohms</td>
<td>.20</td>
<td>32534</td>
<td>Transformer—Second if. transformer</td>
</tr>
<tr>
<td>44495</td>
<td>Resistor—1000 ohms</td>
<td>.20</td>
<td>32545</td>
<td>Volume control and power switch</td>
</tr>
<tr>
<td>15664</td>
<td>Resistor—20,000 ohms</td>
<td>.20</td>
<td>31502</td>
<td>Cone—Speaker cone and voice coil</td>
</tr>
<tr>
<td>15665</td>
<td>Resistor—20,000 ohms</td>
<td>.20</td>
<td>31504</td>
<td>Speaker complete</td>
</tr>
<tr>
<td>15666</td>
<td>Resistor—20,000 ohms</td>
<td>.20</td>
<td>31503</td>
<td>Transformer—Output transformer</td>
</tr>
<tr>
<td>15686</td>
<td>Resistor—47,000 ohms</td>
<td>.20</td>
<td>12859</td>
<td>Screw—Pickup needle screw</td>
</tr>
<tr>
<td>15684</td>
<td>Resistor—50,000 ohms</td>
<td>.20</td>
<td>12849</td>
<td>Pickup arm pivot shaft and base assembly</td>
</tr>
<tr>
<td>15678</td>
<td>Resistor—60,000 ohms</td>
<td>.20</td>
<td>32226</td>
<td>Bushing—Bushing and ferrule insert for condenser cap</td>
</tr>
<tr>
<td>15679</td>
<td>Resistor—80,000 ohms</td>
<td>.20</td>
<td>4286</td>
<td>Cap—Pickup cable connector cap</td>
</tr>
<tr>
<td>15687</td>
<td>Resistor—120,000 ohms</td>
<td>.20</td>
<td>32510</td>
<td>Crystal—Pickup crystal and needle screw</td>
</tr>
<tr>
<td>15690</td>
<td>Resistor—20,000 ohms</td>
<td>.20</td>
<td>32277</td>
<td>Pickup arm and crystal assembly—less mounting, Stock No. 31054</td>
</tr>
<tr>
<td>156918</td>
<td>Resistor—20,000 ohms</td>
<td>.20</td>
<td>12839</td>
<td>Screw—Pickup needle screw</td>
</tr>
<tr>
<td>31325</td>
<td>Capacitor—Lamp capacitor 1500 uF (C15)</td>
<td>.25</td>
<td>9841</td>
<td>Motor—110-volt, 60-cycle—complete with mounting (N1)</td>
</tr>
<tr>
<td>32075</td>
<td>Col.—Antenna coil (L1, L3)</td>
<td>1.00</td>
<td>32034</td>
<td>Motor—110-volt, 60-cycle—less mounting (N1)</td>
</tr>
<tr>
<td>32033</td>
<td>Col.—N.P. coil (L2, L4)</td>
<td>1.00</td>
<td>32037</td>
<td>Transformer—Complete for 50-cycle operation</td>
</tr>
<tr>
<td>31115</td>
<td>Condenser—Spring, variable tuning condenser—Models 96X11, 96X12, 96X13, 96X14</td>
<td>1.30</td>
<td>32036</td>
<td>Furnace—Variable and rotor lamination assembly—complete for 60-cycle operation</td>
</tr>
<tr>
<td>14056</td>
<td>Condenser—Power cord</td>
<td>.65</td>
<td>31043</td>
<td>Stator—Stator assembly—complete with coils and laminations for 50-cycle operation</td>
</tr>
<tr>
<td>31325</td>
<td>Condenser—Variable condenser drive cord</td>
<td>.35</td>
<td>31043</td>
<td>Stator—Stator assembly—complete with coils and laminations for 60-cycle operation</td>
</tr>
<tr>
<td>31200</td>
<td>Dial—Station selector dial scale and plate assembly for Models 96X11, 96X12, 96X13, 96X14</td>
<td>.30</td>
<td>31043</td>
<td>Stator—Rotor transformer assembly completely with coils and laminations for 50-cycle operation</td>
</tr>
<tr>
<td>4286</td>
<td>Ferrule—Ferrule for dial lamp connector</td>
<td>.17</td>
<td>31043</td>
<td>Stator—Stator assembly—complete with coils and laminations for 60-cycle operation</td>
</tr>
<tr>
<td>4296</td>
<td>Lamp—Dial lamp</td>
<td>.30</td>
<td>31043</td>
<td>Stator—Stator assembly—complete with coils and laminations for 50-cycle operation</td>
</tr>
<tr>
<td>31193</td>
<td>Lead—Antenna lead</td>
<td>.50</td>
<td>31202</td>
<td>Cone—Speaker cone (L5)</td>
</tr>
<tr>
<td>31968</td>
<td>Plug—Female motor cable plug</td>
<td>.20</td>
<td>31302</td>
<td>Speaker—Speaker complete</td>
</tr>
<tr>
<td>31196</td>
<td>Pointer—Station selector indicator pointer</td>
<td>.35</td>
<td>31303</td>
<td>Transformer—Output transformer (T1)</td>
</tr>
<tr>
<td>32847</td>
<td>Resistor—Ballast resistor (E1, R8)</td>
<td>.30</td>
<td>31205</td>
<td>Crystal—Station selector dial crystal</td>
</tr>
<tr>
<td>30850</td>
<td>Resistor—150 ohms</td>
<td>.20</td>
<td>31206</td>
<td>Knob—Station selector or power switch knob</td>
</tr>
<tr>
<td>30724</td>
<td>Resistor—240,000 ohms</td>
<td>.20</td>
<td>30863</td>
<td>Mounting—Pickup arm rubber base and not</td>
</tr>
<tr>
<td>32472</td>
<td>Resistor—3,200 ohms</td>
<td>.20</td>
<td>30864</td>
<td>Plug—2-contact male plug for complete assembly (R1, S1)</td>
</tr>
<tr>
<td>31963</td>
<td>Volume Control—(Phono) (R11)</td>
<td>1.00</td>
<td>30870</td>
<td>Screw—Chassis mounting screw</td>
</tr>
<tr>
<td>32305</td>
<td>Volume Control—(Phono) (R11)</td>
<td>1.00</td>
<td>31457</td>
<td>Screw—Speaker mounting screw assembly complete</td>
</tr>
<tr>
<td>4285</td>
<td>Washer—Insulating washer for dial lamp connector</td>
<td>.02</td>
<td>31453</td>
<td>Screw—Motor mounting screw assembly complete</td>
</tr>
</tbody>
</table>

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.
Schematic Specifications

RCA MFG. CO., INC.

Without Push-Button Tuning

96X-1
96X-2
96X-3
96X-4
Walnut Finish
Black Finish
Walnut and
Ivory Finish
Ivory Finish

With Push-Button Tuning

96X-11
96X-12
96X-13
96X-14
Walnut Finish
Black Finish
Walnut and
Walnut Finish
Ivory Finish

Electrical and Mechanical Specifications

Frequency Ranges
“Standard Broadcast” (A) (left) .......................................................... 540-1,750 kc
“Short Wave” (C) (right) ................................................................. 5,000-18,000 kc

Tube Complement
1. RCA-6G8 ................................................................. 1st. Detector—Oscillator
2. RCA-6SK7 ............................................................... I-F Amplifier
3. RCA-6SQ7 .............................................................. 2nd. Det., 1st A-F, and A.V.C.
4. RCA-6SL6 .............................................................. Power Output
5. RCA-2526 .............................................................. Half-Wave Rectifier
6. RCA-BK49B .............................................................. Ballast

Pilot Lamp ............................................................... Mazda, No. 47, 6.3 volts, 0.15 amp.

Output Meter Alignment Connect the meter across the voice coil, and turn the receiver volume control to maximum. Test-Oscillator Clip the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Dial Setting Remove bakelite button and loosen screw two turns with a screwdriver or coin. Tune in the desired station by means of the right-hand control knob. Press push lever down as far as it will go and tighten screw. Release lever and put on push-button.

Alignment Procedure

Steps
1. Tuning condenser 
   stator (osc.) in series with 
   .01 mfd. t
   455 kc
   Quiet point between 
   400-750 kc
   C1, C2, C3, C4 
   (1st and 2nd I-F 
   transformer)

2. Antenna lead 
   (yellow) in series with 
   400 ohms
   19.25 mc
   Full 
   clockwise
   "C" band
   C5* (osc.)

3. Same as step 2
   15.0 mc
   15.0 mc 
   Test oscillator 
   signal
   C6** (ant.) 
   See Note No. 1

4. Antenna lead 
   in series with 
   200 mic 
   condenser
   1.745 kc
   Full 
   clockwise
   "A" band
   C7 (osc.)

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly and check to determine if C2 has been adjusted to the correct peak by tuning to approximately 14.09 mc, where a weaker signal should be received.
*** Make test oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.

Note No. 1—Accurately tune receiver to the 15.0 mc test oscillator signal. This signal will appear twice (14.09 and 15.0 mc) as dial is turned. Use the higher frequency setting of the tuning condensers (gang furthest out of mesh).

Note No. 2—Oscillator tracks 455 kc above signal on all bands.

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 97K, Chassis RC-351F
RC-351F "M", RC-351F "R"
Specifications, Calibration Scale

MODEL 97K

CHASSIS No. RC-351F, RC-351F "M", RC-351F "R"

Electrical Specifications

**FREQUENCY RANGES**

"Standard Broadcast" (A) ........... 540-1,720 kc  
Six Electric Tuning Positions ........ 550 to 1,500 kc  
Two stations between approximately 350-850 kc  
Two stations between approximately 680-1,180 kc (RC-351F)  
Two stations between approximately 690-1,225 kc (RC-351F "M", RC-351F "R")  
Two stations between approximately 890-1,500 kc

Intermediate Frequency ........... 455 kc

RCA Tube Complement

1. RCA-6G5 ............. First Detector-Oscillator  
2. RCA-6G7 ............. Intermediate-Frequency Amplifier  
3. RCA-6H6 ............. Second Detector and A.V.C.  
4. RCA-6F5 ............. Audio Voltage Amplifier  
5. RCA-6G6-G ............. Audio Power Output  
6. RCA-5Y3-G ............. Full-Wave Rectifier  
7. RCA-6U5 ............. Tuning Indicator

Pilot Lamps (2) .................. Mazda No. 47, 6.3 volts, 0.15 amp.

**POWER SUPPLY RATINGS**

Rating A .................. 105-125 volts, 50-60 cycles, 80 watts  
Rating B .................. 105-125 volts, 25-60 cycles, 80 watts  
Rating C .................. 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

**POWER OUTPUT**

Undistorted ................. 2.5 watts  
Maximum .................. 4.5 watts

**LOUDSPEAKER**

Type ............ 12-inch, electrodynamic  
Voice Coil Impedance at 400 cycles ........ 2.2 ohms

**Calibration Scale, RC-351F and RC-351F "M"**

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the lower calibration to the same point on the upper calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band in RC-351F and RC-351F "M."

In RC-351F "R," 27.4° corresponds to 1,500 kc, and 15° corresponds to 18 mc.

**General Description**

This receiver employs a two-band superheterodyne circuit which is operated either manually or by electric tuning on standard broadcast, and includes foreign short-wave, aircraft, police, and amateur stations on the short-wave band.

There are three different productions of Model 97K, conveniently identified by rear chassis stamping as RC-351F, RC-351F "M," and RC-351F "R."

Features of design include magnetite-core adjustable if transformers and "Electric Tuning" oscillator coils; jack and switch for Victrola attachment; aural-compensated volume control; continuously variable tone-control; automatic volume control; dust-proof electrodynamic speaker; and straight-line dial.

**Precautionary Lead Dress.**—(1) Dress 110-volt leads away from audio wiring. (2) All leads in vicinity of antenna and oscillator coils must be dressed away from the coils. (3) Electric Tuning lamp leads from push-button switch must be dressed against front apron. (4) Keep speaker leads away from Victrola jack. (5) Lead from C19 in electrolytic (RC-351F "R") must be dressed around left-end of push-button switch, and against chassis base. (6) The leads across back of chassis in RC-351F must be dressed under the electrolytic capacitor to prevent approaching the Victrola jack.

**Victrola Attachment.**—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

©John F. Rider, Publisher

Compliments of www.nucow.com
Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.

Above.—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.

©John F. Rider, Publisher
**MODEL 97K Chas. RC-351F "R"**  
Voltage, Chassis Wiring  
Transformer, Speaker Data

**Chassis No. RC-351F "R"**  
*R-F Wiring Diagram and Socket Voltages*

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

*NOTE:* Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.

---

Above.—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.

---

©John F. Rider, Publisher
**ALIGNMENT PROCEDURE**

**Tuner Adjustments**

**Compliments of www.nucow.com**

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator Drive Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/4-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 180° mark on the calibration scale when the plates are fully meshed.

**RC-351F and RC-351F “M”**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 1-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” band, Quiet Point between 550-750 kc</td>
<td>L10 and L11 (2nd 1-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6K8 det. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” band, Quiet Point between 550-750 kc</td>
<td>L10 and L11 (1st 1-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Terminal, in series with 400 ohms</td>
<td>16.2 mc (33.5°)</td>
<td>“C” band</td>
<td>C21* (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 200 mfd.</td>
<td>1,500 kc</td>
<td>“A” band</td>
<td>C25 (osc.)</td>
</tr>
<tr>
<td>5</td>
<td>Follow “Adjustments for Electric Tuning”</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly while adjusting C20. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 40.5° (14.29 mc), where a weaker signal should be received.
Note.—Oscillograph tracks 455 kc above signal on both bands.

**ADJUSTMENTS FOR ELECTRIC TUNING**

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:
1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Use one or two feet of wire as an antenna to ensure sharp peaking.
3. Push in the dial-tuning button, and manually tune in the first station on the list.
4. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
5. Adjust No. 1 antenna trimmer (C35) for maximum output on this station.

**Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**
6. Adjust for each of the remaining five stations in the same manner.
7. Make a final readjustment of the magnetite-cores.

©John F. Rider, Publisher

**RC-351F “R”**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to</th>
<th>Tune test-osc. to</th>
<th>Turn radio dial to</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 1-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” band, Quiet Point between 550-750 kc</td>
<td>L10 and L11 (2nd 1-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6K8 det. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” band, Quiet Point between 550-750 kc</td>
<td>L10 and L11 (1st 1-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Terminal, in series with 200 mfd.</td>
<td>1,500 kc</td>
<td>“A” band</td>
<td>C25 (osc.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 400 ohms</td>
<td>18 mc</td>
<td>“A” band</td>
<td>C21 (osc.)</td>
</tr>
</tbody>
</table>

* Rock gang slightly while peaking C21, and use minimum capacity peak if two peaks can be obtained on C21.
Note.—Oscillograph tracks 455 kc above signal on both bands.
## Parts List

### CHASSIS ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>30752</td>
<td>Bracket—Magic Eye mounting bracket</td>
<td>.25</td>
<td>124058</td>
<td>Resistor—5,000 ohms, 1 watt (R3)</td>
</tr>
<tr>
<td>14517</td>
<td>Board—Antenna—ground terminal board</td>
<td>.25</td>
<td>11398</td>
<td>Resistor—30,000 ohms, 1/10 watt (R3) used in RC-531F “R”</td>
</tr>
<tr>
<td>12110</td>
<td>Cap—Tube shield cap</td>
<td>.14</td>
<td>12264</td>
<td>Resistor—220,000 ohms, 1/10 watt (R3) used in RC-531F and RC-531F “M” only</td>
</tr>
<tr>
<td>31378</td>
<td>Capacitor—trimmer (C5) used in RC-531F and RC-531F “M” only</td>
<td>.40</td>
<td>12285</td>
<td>Resistor—240,000 ohms, 1 watt (R3)</td>
</tr>
<tr>
<td>14079</td>
<td>Capacitor—50 mfd. (C1) used in RC-531F and RC-531F “M” only</td>
<td>.35</td>
<td>12286</td>
<td>Resistor—1 meg., 1/10 watt (R5)</td>
</tr>
<tr>
<td>12286</td>
<td>Capacitor—10 mfd. (C1) used in RC-531F and RC-531F “R” only</td>
<td>.35</td>
<td>13679</td>
<td>Resistor—2.2 meg., 1 watt (R3)</td>
</tr>
<tr>
<td>31387</td>
<td>Capacitor—Antenna coil trimmer capacitor bank, (Coil—PUSH button: C35, C36, and C37) used in RC-531F only</td>
<td>1.30</td>
<td>14343</td>
<td>Retainer—Retaining spring for station selector knob shaft</td>
</tr>
<tr>
<td>32498</td>
<td>Capacitor—Antenna coil trimmer capacitor bank, (Coil—C31, C32, C34, C35, and C36) used in RC-531F only</td>
<td>.90</td>
<td>14349</td>
<td>Retainer—Drive cord pulley retainer</td>
</tr>
<tr>
<td>12948</td>
<td>Capacitor—330 mfd. (C4)</td>
<td>.35</td>
<td>14669</td>
<td>Screw—No. 0-32 square head set screw for drum Stock No. 31372</td>
</tr>
<tr>
<td>12720</td>
<td>Capacitor—100 mfd. (C4)</td>
<td>.35</td>
<td>31388</td>
<td>Shaft—Station selector knob shaft and pulley</td>
</tr>
<tr>
<td>30954</td>
<td>Capacitor—100 mfd. (C4) used in RC-531F and RC-531F “M” only</td>
<td>.35</td>
<td>31418</td>
<td>Spring—Indicator, or drum cord drive tension spring</td>
</tr>
<tr>
<td>14620</td>
<td>Capacitor—100 mfd. (C5 and C6) used in RC-531F and RC-531F “R” only</td>
<td>.30</td>
<td>31486</td>
<td>Socket—magnifier lamp socket</td>
</tr>
<tr>
<td>12424</td>
<td>Capacitor—120 mfd. (C7 and C8) used in RC-531F and RC-531F “M” only</td>
<td>.25</td>
<td>31365</td>
<td>Socket—Electric tuning indicator lamp socket (insulated)</td>
</tr>
<tr>
<td>31274</td>
<td>Capacitor—120 mfd. (C12)</td>
<td>.25</td>
<td>13871</td>
<td>Socket—Magic Eye socket</td>
</tr>
<tr>
<td>13003</td>
<td>Capacitor—180 mfd. (C37) mounted under chassis (RC-531F “R” only)</td>
<td>.35</td>
<td>14278</td>
<td>Socket—Pickup socket</td>
</tr>
<tr>
<td>14712</td>
<td>Capacitor—180 mfd. (C37) mounted in 2nd chassis (RC-531F “R” only)</td>
<td>.30</td>
<td>31805</td>
<td>Socket—Tube socket</td>
</tr>
<tr>
<td>32499</td>
<td>Capacitor—530 mfd. (C46) in RC-531F “R” only</td>
<td>.30</td>
<td>32490</td>
<td>Switch—Range switch (S1) used in RC-531F and RC-531F “M” only</td>
</tr>
<tr>
<td>31381</td>
<td>Capacitor—620 mfd. (C47) in RC-531F and RC-531F “M” only</td>
<td>.40</td>
<td>30902</td>
<td>Transformer—1st LF transformer (L1, L2, L3, L4, C5, C6) used in RC-531F and RC-531F “M” only</td>
</tr>
<tr>
<td>31425</td>
<td>Capacitor—4700 mfd. (C48)</td>
<td>.45</td>
<td>14376</td>
<td>Transformer—1st LF transformer (L1, L2, L3, L4, C5, C6) used in RC-531F “R” only</td>
</tr>
<tr>
<td>31389</td>
<td>Capacitor—4,700 mfd. (C49)</td>
<td>.35</td>
<td>30903</td>
<td>Transformer—2nd LF transformer (L1, L2, L3, L4, C7, C8) used in RC-531F and RC-531F “M” only</td>
</tr>
<tr>
<td>31267</td>
<td>Capacitor—800 mfd. (C14, C17)</td>
<td>.30</td>
<td>31683</td>
<td>Transformer—2nd LF transformer (L1, L2, L3, L4, C7, C8, C37, R4, R5) used in RC-531F “R” only</td>
</tr>
<tr>
<td>4838</td>
<td>Capacitor—1 mfd. (C10)</td>
<td>.30</td>
<td>31445</td>
<td>Transformer—Power transformer 100-150 volts, 50-60 cycle (T1)</td>
</tr>
<tr>
<td>14398</td>
<td>Capacitor—5 mfd. (C10)</td>
<td>.20</td>
<td>31380</td>
<td>Transformer—Power transformer 100-150 volts, 50-60 cycle (T1)</td>
</tr>
<tr>
<td>4559</td>
<td>Capacitor—0.1 mfd. (C6, C8, C9)</td>
<td>.30</td>
<td>31446</td>
<td>Transformer—Power transformer 150-250 volts, 160/195-250 volts, 50-60 cycle (T1)</td>
</tr>
</tbody>
</table>

### SPEAKER ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>31386</td>
<td>Cap—Dust cap for cone center</td>
</tr>
<tr>
<td>31449</td>
<td>Coil—Field coil (L14)</td>
</tr>
<tr>
<td>31455</td>
<td>Coil—Hum neutralizing coil (C14)</td>
</tr>
<tr>
<td>31275</td>
<td>Cone—Speaker cone and voice coil (L18)</td>
</tr>
<tr>
<td>31365</td>
<td>Plug—4-contact male plug (L18)</td>
</tr>
<tr>
<td>31360</td>
<td>Speaker—Speaker complete</td>
</tr>
<tr>
<td>14358</td>
<td>Screw—Screw, washer, and lockwasher to hold core in yoke</td>
</tr>
<tr>
<td>31357</td>
<td>Transformer—Output transformer</td>
</tr>
<tr>
<td>31358</td>
<td>Washer—Spring washer to hold field coil</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS ASSEMBLIES

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>31365</td>
<td>Band—Rubber band for Magic Eye</td>
</tr>
<tr>
<td>31397</td>
<td>Button—Station selector push button</td>
</tr>
<tr>
<td>31396</td>
<td>Marker—Station selector switch for push button markers</td>
</tr>
<tr>
<td>33258</td>
<td>Dial—Dial scale (glass) used in RC-531F and RC-531F “M” only</td>
</tr>
<tr>
<td>32558</td>
<td>Dial—Dial scale (glass) used in RC-531F “R” only</td>
</tr>
<tr>
<td>31407</td>
<td>Euchatome—Electric eye or Magic eye indicator indicator indicator indicator indicator</td>
</tr>
<tr>
<td>31392</td>
<td>Marker—Station select knob</td>
</tr>
<tr>
<td>13405</td>
<td>Knob—Rings switch knob</td>
</tr>
<tr>
<td>31393</td>
<td>Knob—Station selector knob</td>
</tr>
<tr>
<td>33284</td>
<td>Tone control knob</td>
</tr>
<tr>
<td>30708</td>
<td>Knob—Volume control knob</td>
</tr>
</tbody>
</table>

---

All prices are subject to change or withdrawal without notice.

©John F. Rider, Publisher
**RCA MFG. CO., INC.**

**MODEL R-38, Chassis RS-77**

**Schematic, Voltage, Socket, Speaker Connections**

---

**1939 No. 26**

*NOTE*: Values with star are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

**RCA TUBE COMPLEMENT**

1. RCA-675 .................................. 1st Audio Amplifier
2. RCA-665 .................................. 2nd Audio Amplifier
3. RCA-2A3 .................................. Power Output
4. RCA-2A3 .................................. Power Output
5. RCA-501 .................................. Rectifier

**POWER SUPPLY RATING**

A: 156-175 volts, 60-60 cycles, 175 watts
A-7: 156-175 volts, 60 cycles, 175 watts

**POWER OUTPUT**

- Undistorted: 12 watts
- Maximum: 13.5 watts

**CABINET**

- Height: 143 inches
- Weight (Shipping): 54 pounds

**GENERAL DESCRIPTION AND SERVICE DATA**

The model R-38 Victrola consists of a crystal pickup, a five tube audio amplifier, a eight inch dust-proof electrodynamic speaker, and a motor turntable mechanism all combined in a hinged-top, table type walnut veneer cabinet. This instrument will reproduce records up to 12-inches in size.

The crystal pickup unit is securely sealed in a metal casing, for protection against extreme changes in atmospheric conditions. If failure occurs, a new replacement crystal unit should be installed.

---

©John F. Rider, Publisher

Compliments of www.nucow.com
Motor Lubrication and Adjustments

Motor Voltage Adjustment

Motor Lubrication and Adjustments

Adjust main cam so that switch trips into the "off" position when motor is 1 1/4 inches from the center line of motor spindle.

Replacement Parts

Install on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12723</td>
<td>Capacitor—66 mfd. (C3, C4)</td>
<td>.35</td>
<td>51618</td>
<td>Coil—Field coils and laminations for 60 cycle motor</td>
<td>5.50</td>
</tr>
<tr>
<td>12635</td>
<td>Capacitor—1,000 mfd. (C5, C6)</td>
<td>.50</td>
<td>11703</td>
<td>Governor—Governor complete for 60 cycle motor</td>
<td>3.05</td>
</tr>
<tr>
<td>31033</td>
<td>Capacitor—0.003 mfd. (C7, C8)</td>
<td>.35</td>
<td>51623</td>
<td>Governor—Governor complete for 60 cycle motor</td>
<td>2.80</td>
</tr>
<tr>
<td>30053</td>
<td>Capacitor—0.002 mfd. (C9, C10)</td>
<td>.40</td>
<td>51482</td>
<td>Motor—105-125 volts, 50-60 cycle</td>
<td>20.00</td>
</tr>
<tr>
<td>51488</td>
<td>Capacitor—0.002 mfd. (C11)</td>
<td>.20</td>
<td>51481</td>
<td>Motor—105-125 volts, 60 cycle</td>
<td>20.00</td>
</tr>
<tr>
<td>51487</td>
<td>Capacitor—0.01 mfd. (C3)</td>
<td>.20</td>
<td>51616</td>
<td>Screw—Rotor bearing screw and nut for 60 and 50-60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>53787</td>
<td>Capacitor—0.06 mfd. (C9)</td>
<td>.20</td>
<td>51620</td>
<td>Screw—Speed regulator screw and nut for 60 and 50-60 cycle motor</td>
<td>1.20</td>
</tr>
<tr>
<td>14626</td>
<td>Capacitor—0.07 mfd. (C11)</td>
<td>.25</td>
<td>51621</td>
<td>Shaft—Turntable spindle and gears for 60 cycle motor</td>
<td>1.90</td>
</tr>
<tr>
<td>13484</td>
<td>Capacitor—0.25 mfd. (C10, C19, C20)</td>
<td>.30</td>
<td>52914</td>
<td>Washer—one felt and one metal thrust washer for turntable spindle</td>
<td>.10</td>
</tr>
<tr>
<td>11203</td>
<td>Capacitor—0.10 mfd. (C20)</td>
<td>1.15</td>
<td>52912</td>
<td>Governor weight and spring for 60 cycle motor</td>
<td>.30</td>
</tr>
<tr>
<td>11498</td>
<td>Capacitor—Electrolytic, 18 mfd. (C21)</td>
<td>.50</td>
<td>52913</td>
<td>Governor weight and spring for 60 cycle motor</td>
<td>.30</td>
</tr>
<tr>
<td>14078</td>
<td>Capacitor—Electrolytic, 20 mfd. (C19)</td>
<td>.55</td>
<td>52915</td>
<td>Governor weight and spring for 60 cycle motor</td>
<td>.30</td>
</tr>
<tr>
<td>33396</td>
<td>Control—H.F. tone control and switch (S1, S4)</td>
<td>1.00</td>
<td>52916</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>33397</td>
<td>Control—L.F. tone control (S3)</td>
<td>.85</td>
<td>52917</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>5040</td>
<td>Plug—Speaker cable plug</td>
<td>.50</td>
<td>52918</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>53346</td>
<td>Transformer—Filter resistor (L1)</td>
<td>4.80</td>
<td>52919</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>13195</td>
<td>Resistor—1,000 mill. (R10)</td>
<td>.20</td>
<td>52920</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>53342</td>
<td>Resistor—voltage divider, 3,800 ohms (R14)</td>
<td>.75</td>
<td>52921</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>13714</td>
<td>Resistor—5,600 ohms (R6)</td>
<td>.20</td>
<td>52922</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>14835</td>
<td>Resistor—10,000 ohms (R7)</td>
<td>.20</td>
<td>52923</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>12758</td>
<td>Resistor—27,000 ohms (R4)</td>
<td>.20</td>
<td>52924</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>12586</td>
<td>Resistor—33,000 ohms (R5)</td>
<td>.20</td>
<td>52925</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>12886</td>
<td>Resistor—55,000 ohms (R6)</td>
<td>.20</td>
<td>52926</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>13486</td>
<td>Resistor—100,000 ohms (R7)</td>
<td>.20</td>
<td>52927</td>
<td>Switch—Turntable spindle and gears for 60 cycle motor</td>
<td>1.75</td>
</tr>
<tr>
<td>13824</td>
<td>Resistor—120,000 ohms (R8)</td>
<td>.20</td>
<td>52928</td>
<td>Speaker—&quot;C&quot; washer for acquiring lever shaft.</td>
<td>.10</td>
</tr>
<tr>
<td>13210</td>
<td>Resistor—470,000 ohms (R9)</td>
<td>.20</td>
<td>14189</td>
<td>Screw—No. 10-32 x 1/8&quot; set screw for cam hub.</td>
<td>.05</td>
</tr>
<tr>
<td>4794</td>
<td>Socket—TUBE socket—6-prong</td>
<td>.25</td>
<td>32384</td>
<td>Screw—No. 10-32 x 1/8&quot; set screw for cam hub.</td>
<td>.05</td>
</tr>
<tr>
<td>32357</td>
<td>Socket—TUBE socket—6-prong</td>
<td>.25</td>
<td>32867</td>
<td>Spring—Actuating lever tension spring.</td>
<td>.05</td>
</tr>
<tr>
<td>14271</td>
<td>Socket—Contact female for motor power.</td>
<td>.25</td>
<td>32868</td>
<td>Spring—Actuating lever tension spring.</td>
<td>.05</td>
</tr>
<tr>
<td>14274</td>
<td>Socket—Contact female for motor power.</td>
<td>.25</td>
<td>32869</td>
<td>Spring—Actuating lever tension spring.</td>
<td>.05</td>
</tr>
<tr>
<td>13464</td>
<td>Transformer—Driver transformer (T2)</td>
<td>3.70</td>
<td>32870</td>
<td>Support—Switch support and terminal board.</td>
<td>.45</td>
</tr>
<tr>
<td>14921</td>
<td>Transformer—Output transformer (T5)</td>
<td>8.50</td>
<td>32871</td>
<td>Support—Switch support and terminal board.</td>
<td>.45</td>
</tr>
<tr>
<td>14971</td>
<td>Transformer—Power transformer, 105-120 volts, 1 1/4 kw.</td>
<td>7.55</td>
<td>32872</td>
<td>Support—Switch support and terminal board.</td>
<td>.45</td>
</tr>
<tr>
<td>33999</td>
<td>Volume Control (R6)</td>
<td>1.50</td>
<td>33490</td>
<td>Speaker complete (No Output Transformer)</td>
<td>5.50</td>
</tr>
</tbody>
</table>

Motor Assemblies

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33399</td>
<td>Arm—Pickup arm less crystal cartridge, cable, and base and pivot shaft.</td>
<td>1.60</td>
<td>13103</td>
<td>Cap—Pilot lamp bullseye</td>
<td>.15</td>
</tr>
<tr>
<td>33409</td>
<td>Base—Pickup arm base and pivot shaft</td>
<td>1.05</td>
<td>32403</td>
<td>Cap—New needle cup</td>
<td>.50</td>
</tr>
<tr>
<td>33385</td>
<td>Cable—Pickup arm cable and plug.</td>
<td>.50</td>
<td>9848</td>
<td>Damper—New needle cup</td>
<td>.75</td>
</tr>
<tr>
<td>31156</td>
<td>Crystal—Pickup crystal cartridge and screw.</td>
<td>1.25</td>
<td>31464</td>
<td>Damper—Turntable damper sleeve and plate.</td>
<td>.50</td>
</tr>
<tr>
<td>31160</td>
<td>Screw—Pickup needle screw</td>
<td>.12</td>
<td>11771</td>
<td>Foot—Cabinet foot</td>
<td>.25</td>
</tr>
</tbody>
</table>

Miscellaneous Assemblies

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31617</td>
<td>Bracket—Governor end bearing bracket less bearing for 60 cycle motors</td>
<td>.30</td>
<td>31058</td>
<td>Spring—Retaining spring for knobs.</td>
<td>.05</td>
</tr>
<tr>
<td>31618</td>
<td>Coil—Field coils and laminations for 60 cycle motor</td>
<td>.75</td>
<td>51164</td>
<td>Support—Cabinet lid support</td>
<td>.45</td>
</tr>
</tbody>
</table>

All prices are subject to change or withdrawal without notice.

@John F. Rider, Publisher

Compliments of www.nucow.com
Alignment Procedure

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in alignment, check the position of the drum. The 100° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 8 inches. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the “180°” mark on the calibration scale when the plates are fully meshed.

*The minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C32 and C31.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, move the dial indicator on the drive cable to the left-hand end mark on dial, with gang condenser fully meshed.

FOR DIAL CALIBRATION
SEE INDEX

©John P. Rider, Publisher
## Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard broadcast range. The station buttons connect to separate magnetically-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31051. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:
1. Make a list of desired six stations, arranged in order of low to high frequencies.
2. Push the dialing button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received, trimmer coil loose.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to

- **Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

---

### STOCK No. | DESCRIPTION | Unit Price | STOCK No. | DESCRIPTION | Unit Price
---|---|---|---|---|---
30752 | Bracker—Magic eye bracket and clip | .25 | 14817 | Retainer—Retainer for pointer indicator drive cord pulley | .01
14517 | Beard—"Antenna" Gnd terminal board | .15 | 14523 | Retainer—Retaining ring for tuning knob shaft | .03
52145 | Capacitor—Dry electrolytic, 200 mfd., each | .50 | 32671 | Shaft—Tuning drive shaft and pulley | .35
31400 | Capacitor—Mica trimmer capacitor, 3 mfd. | .50 | 31619 | Shield—Dia. lamp shield | .22
32886 | Capacitor—Trimmer capacitor bank for push button switch (C34, C35) | .50 | 31617 | Socket—Dia. lamp socket | .30
12720 | Capacitor—Dia. mfd. | .35 | 32669 | Socket—Insulated socket for electric tuning indicator lamp | .30
30405 | Capacitor—100 mfd. (C39) | .35 | 14376 | Transformer—First I, transformer (L10, L11, C6, C7) | .45
14356 | Capacitor—100 mfd., C5, C6 | .35 | 14923 | Transformer—Secondary I, transformer (L12, L13, C7, C8, C11, R4, R5) | .50
14904 | Capacitor—Dia. mfd. | .30 | 31445 | Transformer—Reverse switch, 20, 550/60 cycle (T1) | .70
14712 | Capacitor—Dia. mfd. | .30 | 32144 | Transformer—Power transformer, 110 volt, 50/60 cycle (T2) | .70
30932 | Capacitor—Dia. mfd. | .40 | 13866 | Speaker—Power speaker, 110/120—150—250 volts, 60 cycle (L10) | .05
31492 | Capacitor—Dia. mfd. | .40 | 13901 | Coil—Field coil (L16) | .25
31480 | Capacitor—Dia. mfd. | .40 | 11697 | Coil—Neutralizing coil (L7, L10) | .25
4881 | Capacitor—Dia. mfd. | .25 | 31277 | Cone—Speaker cone and voice coil (114) | .15
51400 | Capacitor—Dia. mfd. | .25 | 31627 | Plug—6-contact marker (101) | .25
31460 | Capacitor—Dia. mfd. | .15 | 32146 | Speaker complete | .12
52668 | Capacitor—Dia. mfd. | .10 | 13544 | Transformer—Output transformer (T2) | .35
31569 | Capacitor—Dia. mfd. | .10 | 13557 | Transformer—Output transformer (T2) | .45
32668 | Condenser—5 adjustable variable tuning condenser (C28, C29, C30) | .60 | 32688 | Speaker—Speaker coil (L10) | .35
32669 | Condenser—5 adjustable variable tuning condenser (C28, C29, C30) | .35 | 32688 | Speaker—Speaker coil (L10) | .35
12800 | Control—Volume control, tone control | .35 | 32667 | Transformer—Output transformer (T3) | .15
31372 | Drum—Variable condenser drive cord drum | .65 | 32667 | Speaker—Speaker coil (L10) | .35
21057 | Indicator—Indicator pointer assembly | .15 | 31370 | Plate—Dial color plate (Metal) | .75
32670 | Lamp—Dia. tuning indicator lamp | .17 | 32670 | Plate—Dial color plate (Metal) | .75
39069 | Pulley—Drive cord pulley (1 in. dia.) | .08 | 31397 | Button—Station selector push button | .15
51018 | Resistor—180 ohms, .1 watt (R6) | .20 | 31465 | Cover—Protection markers | .08
12454 | Resistor—22,000 ohms, 1/4 watt (R4) | .15 | 32673 | Dial—Station selector glass dial | .60
12450 | Resistor—33,000 ohms, .05 watt (R2, R13) | .20 | 32675 | Push button—Station selector push buttons | .35
12451 | Resistor—56,000 ohms, .01 watt | .20 | 31385 | Plate—Dial range switch plate | .50
14660 | Resistor—100,000 ohms, .05 watt (R25) | .20 | 31386 | Push button—Station selector push buttons | .35
12199 | Resistor—20,000 ohms, .01 watt (R15, R19) | .20 | 31385 | Push button—Station selector push buttons | .35
31397 | Resistor—35,000 ohms, .05 watt (R20, R21) | .20 | 32673 | Push button—Station selector push buttons | .35
31396 | Resistor—56,000 ohms, .01 watt (R18) | .20 | 31386 | Push button—Station selector push buttons | .35
13730 | Resistor—1 meg., .1 watt (R1) | .15 | 31468 | Knob—Tone control knob | .15
12390 | Resistor—1,000 ohms (R16) | .20 | 31468 | Knob—Tone control knob | .15
12679 | Resistor—2 meg., .1 watt (R3) | .20 | 32673 | Push button—Station selector push buttons | .35
32143 | Resistors—U.S. aluminum, 0.4 mfd. 370 volts, sm. 3000 ohms, 11,000 ohms (R14, R22, R23, R24) | .90 | 31457 | Push button—Station selector push buttons | .50

---

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

©John F. Rider, Publisher

Compliments of www.nucow.com
**RCA Victor Model R-100 Victrola Attachment**

**Motor Data**

Smooth starting and running will be insured by keeping the bearings well cleaned and oiled. Hum and Vibration—A small amount of hum when starting, decreasing to a negligible amount while running, is normal. If excessive vibration occurs, it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Washer not oiled. (Check to make sure that the leather and steel washers are arranged in proper sequence, as shown in the drawings.)
3. Motor not properly fastened in cabinet.
4. Burrs on poles of motor or stator.
5. Slight eccentricity of rotor or spindle.
7. Improper horizontal alignment of the rotor and stator (pertaining only to the type motor shown in Figure 1). Correct horizontal alignment is as shown in the motor assembly drawing.

The position of the stator is raised or lowered by adding or removing washers below the leather washer. In the type motor shown in Figure 2, no adjustment is necessary because correct horizontal alignment is provided by the design of the motor.

The damper spring must fit without binding or chattering, in the slot in the stator. The stator must be free to deflect in either direction without the limits of the damper spring. Any binding in the washers or stator bearing which prevents the movement of the stator may cause speed variations in the motor. The damper spring must exert equal force in restoring the stator to its mid-position when the stator is deflected manually in either direction.

**Tone Compensation**

Where a decrease in high-frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in Figure 4 is applicable. In this circuit, C2 acts as loading-on the pickup and is also a controlling factor on the high-frequency response. Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high-frequency reduction; increasing R3 decreases highs.

The suggested values shown in Figures 3 and 4 should serve as a basis from which slight alterations may be made to suit individual cases.

**Replacement Parts**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>33121</td>
<td>Arm—Pickup arm complete-less crystal cartridge</td>
<td>1.75</td>
<td>31042</td>
<td>Stator—Stator assembly comprising coils and laminations for 60 cycle operation</td>
</tr>
<tr>
<td>33124</td>
<td>Base—Pickup arm base and pivot shaft</td>
<td>.60</td>
<td>33076</td>
<td>Turntable—Finished turntable plate only—25 cycle</td>
</tr>
<tr>
<td>33123</td>
<td>Crystal—Pickup crystal cartridge and pedestal</td>
<td>.25</td>
<td>31039</td>
<td>Turntable—Finished turntable plate only—60 cycle</td>
</tr>
<tr>
<td>33123</td>
<td>Screw—Pickup needle screw</td>
<td>.15</td>
<td>4083</td>
<td>Washer—Leather washer</td>
</tr>
<tr>
<td>35329</td>
<td>Screw—Pickup needle screw</td>
<td>.15</td>
<td>33348</td>
<td>Washers—Leather and metal washers for stator bearing</td>
</tr>
<tr>
<td>31045</td>
<td>Motor assembly (see figure 1)</td>
<td></td>
<td>14231</td>
<td>Washer—Metal spacing washer</td>
</tr>
<tr>
<td>33346</td>
<td>Bearing—Rivets, 250 and 25 cycle</td>
<td>.70</td>
<td>39774</td>
<td>Weight—One upper and one lower weight for stator—25 cycle (2 each required)</td>
</tr>
<tr>
<td>33353</td>
<td>Cap—Turntable spindle cap (rubber)</td>
<td>.10</td>
<td>33345</td>
<td>Cap—Turntable spindle cap (rubber) 60 cycle</td>
</tr>
<tr>
<td>33357</td>
<td>Coil—Motor field coil—105-120 volts, 50 cycle</td>
<td>.80</td>
<td>33346</td>
<td>Coil—Motor field coil—105-120 volts, 60 cycle</td>
</tr>
<tr>
<td>33118</td>
<td>Coll—Motor field coil—105-120 volts, 50 cycle</td>
<td>.70</td>
<td>32059</td>
<td>Cushion—One set rubber cushion for turntable mounting</td>
</tr>
<tr>
<td>31040</td>
<td>Cushion—Rubber cushion for rotor bearing</td>
<td>.15</td>
<td>33349</td>
<td>Cushion—One set rubber cushion for turntable mounting</td>
</tr>
<tr>
<td>33347</td>
<td>Lamination—Rotor laminations—25 cycle</td>
<td>.30</td>
<td>33350</td>
<td>Lamination—Rotor laminations and bearing—less field coils—60 cycle</td>
</tr>
<tr>
<td>33354</td>
<td>Lamination—Stator laminations—less coil 50 cycle</td>
<td>.25</td>
<td>33348</td>
<td>Lamination—Rotor laminations and bearing—less field coils—60 cycle</td>
</tr>
<tr>
<td>33355</td>
<td>Motor—105-120 volts, 50 cycle</td>
<td>.90</td>
<td>33344</td>
<td>Motor—Rivets, 250 and 25 cycle</td>
</tr>
<tr>
<td>33351</td>
<td>Motor—105-120 volts, 60 cycle</td>
<td>.75</td>
<td>33345</td>
<td>Motor—Rivets, 250 and 25 cycle</td>
</tr>
<tr>
<td>33350</td>
<td>Motor—105-120 volts, 60 cycle</td>
<td>.75</td>
<td>33341</td>
<td>Motor—Rivets, 250 and 25 cycle</td>
</tr>
<tr>
<td>33575</td>
<td>Ring—Lead ring for turntable—25 cycle</td>
<td>.85</td>
<td>33344</td>
<td>Ring—Rivets, 250 and 25 cycle</td>
</tr>
<tr>
<td>33541</td>
<td>Ring—Rivets, 250 and 25 cycle</td>
<td>.06</td>
<td>10501</td>
<td>Knob—Volume control and switch knob</td>
</tr>
<tr>
<td>33355</td>
<td>Rotor—Rivets, 250 and 25 cycle</td>
<td>.25</td>
<td>3961</td>
<td>Knob—Volume control and switch knob</td>
</tr>
<tr>
<td>33352</td>
<td>Rotor—Rivets, 250 and 25 cycle</td>
<td>.25</td>
<td>32500</td>
<td>Mounting—Pickup arm mounting comprising one rubber cushion, 1 washers, 1 washers</td>
</tr>
<tr>
<td>33036</td>
<td>Rotor—Turntable and rotor laminations for 60 cycle</td>
<td>.85</td>
<td>31048</td>
<td>Plug—2-contact male plugs for output cable</td>
</tr>
<tr>
<td>33359</td>
<td>Rotor—Rivets, 250 and 25 cycle</td>
<td>.55</td>
<td>33359</td>
<td>Volume control and switch R1, R2, S1</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31051</td>
<td>Foot—Cabinet foot</td>
<td>.04</td>
</tr>
<tr>
<td>25500</td>
<td>Knob—Volume control and switch knob</td>
<td>.10</td>
</tr>
<tr>
<td>23250</td>
<td>Mounting—Pickup arm mounting comprising one rubber cushion, 1 washers, 1 washers</td>
<td>.15</td>
</tr>
<tr>
<td>31048</td>
<td>Plug—2-contacts male plugs for output cable</td>
<td>.15</td>
</tr>
<tr>
<td>33359</td>
<td>Volume control and switch R1, R2, S1</td>
<td>1.50</td>
</tr>
</tbody>
</table>

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.**

Motor, Pick-up Details
Receiver Connections

RCA MFG. CO., INC.

Crystals and Tuning Details

Electrical and Mechanical Specifications

Motor

RCA PAGE 10-101

---

Compliments of www.nucow.com

---

Connecting Victrola Attachment to Radio Receivers

Methods of connecting the Victrola Attachment to various types of audio systems are given in the accompanying text and illustrations. Also included are the model numbers of the various Victrola Receivers to which the particular method applies. The data given requires that an RCA Stock No. 9934 Radio-Phono switch be used for switching from radio to phonograph, as desired. For ease in connecting the "Phono" lead to the Stock No. 9934 switch, the male plug on the end of the lead should be removed and/or by cutting it off.

1939 RCA Radios of the "90" Series:

Plug male connector on the end of the "Phono" lead into the female connector on the receiver chassis. Pull or turn the "Phono" switch to "Phono" position, and operate the Victrola Attachment according to instructions.

Radio Receivers Having "Phono" Terminal Boards

Electrical and mechanical assembly for these models is similar to that for the "90" Series, except for the addition of a 6V3T relay for operation of the phono switch. The following are the model numbers of the various Victrola Receivers to which the method given applies:

Radio Receivers Whose First Audio Tube Is of the Grid Cap Type, and Fixed Bias for Tube Is Obtained Through Grid Lead

Radio Receivers Whose First Audio Amplifier Tube Is of the Grid Cap Type

Radio Receivers Whose First Audio Tube Is of the Grid Cap Type and Fixed Bias for Tube Is Obtained Through Grid Lead

---

©John F. Rider, Publisher

---

Compliments of www.nucow.com
RCA MFG. CO., INC.

MODEL U-104
Chassis RG-545H
Chassis Wiring, Lead Dress
Pick-up, Phono Data

Precautionary Lead Dress
1. Dress power cord and line bypass CI2 away from detector coil.
2. Plate lead from 6K7 to detector coil must be dressed close to chassis and run through center of chassis.
3. Green lead from detector coil to gang must be dressed clear of other leads.
4. Green lead from antenna coil to CI1 must be dressed against front apron.
5. Dress all heater leads close to base.
6. Yellow lead from cathode of 6K7 to volume control must be dressed against chassis, under gang condenser and against front apron.

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

Antenna.—The set is equipped with a 25-foot antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100- to 200-mfd. capacitor in series with the lead-in.

PHONOGRAPH SERVICE DATA

U-104

Pickup Connections
The motor is started by turning the phono-radio tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)

Cross Section of Motor Assembly
This drawing shows the lubrication points

3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.
5. The damper spring must fit without binding or chattering in the slots in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rотор Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication.—Oil points are indicated in the diagram.

On Phonograph Operation, turn the radio volume control to minimum, and tune to a quiet point on the dial.

Motor Coil Assembly and Connections
D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms

© John F. Rider, Publisher
<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32135</td>
<td>Motor—105-125 volts, 60 cycle, (Motor No. 8448-4, 3, or 4)</td>
<td>1.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32136</td>
<td>Capacitor—Field coil and laminations, 110 volts, 60 cycle (For Motor 8448-4)</td>
<td>5.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32137</td>
<td>Capacitor—Field coil and laminations, 110 volts, 50 cycle (For Motor 8448-4)</td>
<td>5.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32138</td>
<td>Capacitor—Field coil and laminations, 25 cycle (For Motor 8448-4)</td>
<td>6.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32139</td>
<td>Capacitor—Field coil and laminations, 50 cycle (For Motor 8448-4)</td>
<td>12.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32140</td>
<td>Capacitor—Turntable spindle shaft and fibre gear—50 cycle</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32141</td>
<td>Capacitor—Comprising 2 sections 8 mfd. each (C16, C17)</td>
<td>1.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32142</td>
<td>Speaker coil</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32143</td>
<td>Speaker coil (C3, C5, C8, C33)</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32144</td>
<td>Speaker coil (L1, L3, L4)</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32145</td>
<td>Speaker coil (C16, C17)</td>
<td>0.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32146</td>
<td>Speaker coil (L1, L2)</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32147</td>
<td>Indicator—Station selector indicator point</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32148</td>
<td>Plate—Dial color plate</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32149</td>
<td>Plug—2-contact female plug for motor power leads</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32150</td>
<td>Indicator—Station selector drive cord</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32151</td>
<td>Resistor—Variable condenser drive cord resistors</td>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32152</td>
<td>Resistor—300 ohm, 1 watt (R9)</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32153</td>
<td>Resistor—10,000 ohms, 1 watt (R17)</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32154</td>
<td>Resistor—120,000 ohms, 0.1 watt (R15)</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32155</td>
<td>Resistor—270,000 ohms, 0.1 watt (R7)</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32156</td>
<td>Resistor—820,000 ohms, 0.1 watt (R18)</td>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32157</td>
<td>Transformer—First i/d transformer (L1, L6, C7, C8)</td>
<td>3.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32158</td>
<td>Transformer—Second i/d transformer (L7, L8, C9, C10)</td>
<td>1.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32159</td>
<td>Transformer—Power transformer, 100-120 volts, 60-50 cycle (12 volt)</td>
<td>6.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32160</td>
<td>Transformer—Power transformer, 100-120 volts, 25 cycle (25 volt)</td>
<td>6.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32161</td>
<td>Transformer—Power transformer, 200-240 volts (50 cycle)</td>
<td>6.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32162</td>
<td>Bearing—Rotor thrust bearing screw and nut</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32163</td>
<td>Field—Motor field coils and laminations</td>
<td>2.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PICKUP AND ARM ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31121</td>
<td>Base—Pickup arm pivot shaft, trip lever, and mounting base assembly</td>
<td>0.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31241</td>
<td>Cable—Shielded cable and male plug for pickup arm</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31559</td>
<td>Crystal—Pickup crystal and needle screw</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32137</td>
<td>Pickup and arm complete</td>
<td>7.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32138</td>
<td>Screw—Pickup needle screw</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPEAKER ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31443</td>
<td>Cone—Speaker cone and voice coil (L6)—for Speaker No. 84397-1</td>
<td>1.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31463</td>
<td>Speaker complete (No. 84397-1)</td>
<td>4.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31477</td>
<td>Transformer—Output transformer (T2)—(For Speaker No. 84397-1)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32556</td>
<td>Speaker cone and voice coil for Speaker No. 84397-3</td>
<td>2.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32557</td>
<td>Speaker—Field coil for Speaker No. 84397-3</td>
<td>2.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32558</td>
<td>Transformer—Output transformer for Speaker No. 84397-3</td>
<td>1.45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MISCELLANEOUS ASSEMBLIES**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>14603</td>
<td>Brake—Automatic brake complete</td>
<td>2.95</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31248</td>
<td>Button—Station selector switch push button</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31487</td>
<td>Clip—Spring clip to hold dial</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31454</td>
<td>Damper—One rubber cap for motor spindle, and one metal damper plate</td>
<td>0.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31497</td>
<td>Dial—Station selector glass dial</td>
<td>0.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31235</td>
<td>Disc—16 protective discs for call letter markers</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31567</td>
<td>Escutcheon—Turning dial escutcheon</td>
<td>0.55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32140</td>
<td>Hinge—Cabinet lid hinge</td>
<td>0.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31355</td>
<td>Knob—Station selector or radio-record switch knob (small)</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31391</td>
<td>Knob—Tone control and power switch knob (small)</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30773</td>
<td>Knob—Volume control or station selector knob (large)</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31394</td>
<td>Markers—Push button call letter markers, and screw-sufficient for one marker</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32139</td>
<td>Mounting—Motor mounting spacers, washers, and screw-sufficient for one mount</td>
<td>0.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32140</td>
<td>Spring—Retaining spring for knob, Stock Nos. 31395, 30775, 30776</td>
<td>0.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31391</td>
<td>Spring—Retaining spring for knob, Stock No. 31391</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31393</td>
<td>Springs—Tension springs for automatic brake—one long and one short</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31454</td>
<td>Switch—Automatic brake switch (25 volt)</td>
<td>0.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31487</td>
<td>Switch—Radio-Record switch (25 volt)</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TRIMMER CAPACITOR BANK AND ELECTRIC-TUNING OSCILLATOR COILS**

(Refer to Electrical Specifications for frequency ranges)

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31418</td>
<td>Capacitor—Trimmer capacitor bank (C20, 21, 22, 23, and 24)</td>
<td>1.20</td>
<td>30066</td>
<td>1.20</td>
<td>32239</td>
<td>1.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31415</td>
<td>Capacitor (L13)</td>
<td>3.00</td>
<td>31415</td>
<td>3.00</td>
<td>31415</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31294</td>
<td>Capacitor (L14)</td>
<td>3.00</td>
<td>31294</td>
<td>3.00</td>
<td>31294</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31293</td>
<td>Capacitor (L14)</td>
<td>3.00</td>
<td>31293</td>
<td>3.00</td>
<td>31293</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31292</td>
<td>Capacitor (L14)</td>
<td>3.00</td>
<td>31292</td>
<td>3.00</td>
<td>31292</td>
<td>3.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.**

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL U-115
RCA MFG. CO., INC.
Chassis RC-548E, RC-548 "MOD" RC-548E "M"

Motors Used in Model U-115
At left, cast-frame type, Drawing No. 84430.
At right, drawn-metal type, Drawing No. 84484.

Victrola Mechanism

Calibration Marks.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment. There are calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum Indicator Adjustment.—As the first step in r-f alignment, check the position of the drum on the front of the shaft of the condenser. With the drum at maximum (full mesh) the drum set-screw should be pointed directly down as shown in the drawing. With the drum in this position, and the gang at maximum, move the dial indicator.

Steps
1. Connect the high side of test-osc. to—
2. Tune test-osc. to—
3. Turn radio dial to—
4. Adjust the following for max. peak output

Push-Button Adjustments

Adjustments for Electric Tuning

Directions for Electric Tuning. These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna transformers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 3103. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:
1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning (right-hand) button, and manually tune in the first station on the list.

Power Supply Ratings
A-5. 105-125 volts, 60 cycles, 100 watts
A-4. 105-125 volts, 50 cycles, 100 watts
A-3. 105-125 volts, 25 cycles, 100 watts
B-5. 205-235 volts, 60 cycles, 100 watts
C-5. 205-235 volts, 50 cycles, 100 watts

Power-Tone/Volume

* CONTROL 1 2 3 4 5

Turning Tone/Volume

Push Button Ranges: RC-548E RC-548E "MOD" RC-548E "M"
Button No. 1 (left) 650-900 kc 550-900 kc 550-900 kc
Button No. 2 850-1,080 kc 550-900 kc 550-900 kc
Button No. 3 850-1,080 kc 650-900 kc 600-900 kc
Button No. 4 850-1,080 kc 650-1,050 kc 650-1,050 kc
Button No. 5 850-1,050 kc 650-1,050 kc 650-1,050 kc

Along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

After completion of alignment and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, loosen the drum set-screw (which is accessible through a slot in the bottom of the cabinet), turn the drum slightly so that the indicator is at this mark, and then tighten the set-screw.

After completion of alignment, seal the r-f core-adjustment screws with household cement.

For additional details, refer to booklet, "RCA Victor Receiver Alignment."

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.
RCA MFG. CO., INC.

MODEL S U-121, Ch. RC-348J
U-123 (Single Band) Ch. RC-348H
U-127E, Chassis RC-348L
Schematic, Chassis Wiring
Voltage

Precautionary Lead Dress—(1) Dress green lead from antenna coil to switch away from the chassis and gang. (2) Ground bus from 616 socket must be close to chassis. (3) Dress leads away from oscillator coil adjustment screws. (4) Dress power transformer primary leads toward left-hand end of chassis. (5) Dress plate lead from output tube close to chassis.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
Note the following additional d-c resistances: Voice-coil, 2 ohms; primary of output transformer, 375 ohms; 60-cycle power transformer, primary 9 ohms, secondary 735 ohms.

Precautionary Lead Dress—Dress the oscillator grid condenser (C7) away from chassis. Leads along back of chassis must be dressed in corner of chassis and away from contact "E" of 2nd i-f transformer. Keep a-c leads against end of chassis. Dial drum must be 5/32-inch from front apron.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
RCA MFG. CO., INC.

U-127E, Chassis RC-348L
Alignment, Socket, Trimmers
Phono Data

RCA PAGE 10-109
MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H, RC-421

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing. Turn the receiver volume control to maximum.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate in front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum and Dial Indicator Adjustment.—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down (RC-348 series) and up for RC-421. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, move the pointer the required distance along the cord.

RC-348J, RC-348H, and RC-348L

Steps | Connect the high side of test-osc. to | Tune test-osc. to | Turn radio dial to | Adjust the following for max. peak output
--- | --- | --- | --- | ---
1 | 6K7 L-F grid cap, in series with .01 mfd. | 455 kc | Quiet point | L7 and L8 (2nd L-F Trans.)
2 | 6A8-G grid cap, in series with .01 mfd. | 455 kc | 550-750 kc | L6 and L6 (1st L-F Trans.)
3 | Antenna lead (blue) in series with 200 mmd. | 1,500 kc | 1,500 kc calibration mark | C8 (osc.)
4 | Follow "Adjustments for Electric Tuning." *

RC-421 (Two-band Model U-123)

Steps | Connect the high side of test-osc. to | Tune test-osc. to | Turn radio dial to | Adjust the following for max. peak output
--- | --- | --- | --- | ---
1 | 6K7 L-F grid cap, in series with .01 mfd. | 455 kc | Quiet point | L9 and L10 (2nd L-F Trans.)
2 | Stator of ant. section of gang | 455 kc | 800-750 kc | L7 and L6 (1st L-F Trans.)
3 | Antenna lead, in series with 200 mmd. | 600 kc | 800 kc calibration mark | L6 (osc.)
4 | 1,500 kc | 1,500 kc calibration mark | C11 (osc.)
5 | Repeat steps 3 and 4.
6 | Antenna lead, in series with 400 ohms | 15.2 mc | 16.2 mc calibration mark | C10 (osc.)
7 | Follow "Adjustments for Electric Tuning." *

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through the top of the case, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak at 1,500 kc.

RC-421 (Two-band Model U-123)

Steps | Connect the high side of test-osc. to | Tune test-osc. to | Turn radio dial to | Adjust the following for max. peak output
--- | --- | --- | --- | ---
1 | 6K7 L-F grid cap, in series with .01 mfd. | 455 kc | Quiet point | L9 and L10 (2nd L-F Trans.)
2 | Stator of ant. section of gang | 455 kc | 800-750 kc | L7 and L6 (1st L-F Trans.)
3 | Antenna lead, in series with 200 mmd. | 600 kc | 800 kc calibration mark | L6 (osc.)
4 | 1,500 kc | 1,500 kc calibration mark | C11 (osc.)
5 | Repeat steps 3 and 4.
6 | Antenna lead, in series with 400 ohms | 15.2 mc | 16.2 mc calibration mark | C10 (osc.)
7 | Follow "Adjustments for Electric Tuning." *

* Rock gang for maximum output while adjusting C10. Note.—The oscillator tracks above the signal on both bands.

© John F. Rider, Publisher

Compliments of www.nucow.com
by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each radio is generally the lower record to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut to give .058-.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "G" to a point where its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf is .075-.078 inch.

H. Record Support Shelf.—The record shelf revolves through one complete cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and shaft assembly to the main lever "15," and it is necessary that this adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch apart. Tighten the blunt nose screw "H." Run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

I. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, if the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "G" in relation to the main lever "13" generally controls the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller will enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

NOTE: Numbers refer to parts—letters refer to adjustments
Specifications, Tuner Data
Record Changer Details

RCA MFG. CO., INC.

Models U-121L, Ch. RC-545L
U-123, Ch. 546H, and 546L

Power Output (RC-245L, 546H, and 546L)
Undistorted........ 2 watts, Maximum........ 4 watts

Power Output (RC-421)
Undistorted........ 2.5 watts, Maximum........ 4.5 watts

Power Supply Ratings
A-6........ 105-125 volts, 60 cycles, 100 watts total
A-5........ 105-125 volts, 50 cycles, 100 watts total
B-5........ 105-125 volts, 25 cycles, 100 watts total
C-5........ 105-125/210-230 volts, 60 cycles, 100 watts total
C-6........ 105-125/210-230 volts, 50 cycles, 100 watts total

U-121 (RC-545H)
U-123 (RC-545L)
U-123 (RC-421)
U-123 (RC-421)

Top View of Automatic Record Changer

Details of Record Shelf Posts and Locating Lever Assemblies

Turntable Assembly (All Models)

Adjustments for Electric Tuning

Push-Button Ranges in RC-545L, 546H, and 546L

Model U-121L and U-27E have a two-band automatic stop and a self-adjusting constant-speed induction type motor.

The crystal pickup is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Motor Lubrication (Models U-121 and U-27E)—Apply a few drops of light machine oil to the spindle bearing and oil every six months. The oil hole is located in the motor casing, adjacent to the spindle bearing, and has a screw plug.

The automatic stop (Models U-121 and U-27E) should be adjusted so that the lever will snap to the "off" position when the pickup needle is 18 inches from the center line of the spindle.

Dial Mechanism

© John F. Rider, Publisher

Compliments of www.nucow.com
<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31515</td>
<td>Crystal—Pickup crystal cartridge and needle screw</td>
<td></td>
<td>4.95</td>
</tr>
<tr>
<td>32846</td>
<td>Pickup and arm complete</td>
<td></td>
<td>7.65</td>
</tr>
<tr>
<td>31180</td>
<td>Screw—Pickup needle screw</td>
<td></td>
<td>0.12</td>
</tr>
<tr>
<td>31381</td>
<td>Shaft—Pickup pivot arm and shaft assembly</td>
<td></td>
<td>0.45</td>
</tr>
</tbody>
</table>

**MOTOR ASSEMBLIES**

**Model U-121 and U-127E**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31464</td>
<td>Damper—Comprising 1 rubber spindle sleeve and</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>metal damper plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32652</td>
<td>Field—Motor coils a n d laminations, 105-120</td>
<td></td>
<td>6.90</td>
</tr>
<tr>
<td></td>
<td>volts, 60-cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32650</td>
<td>Field—Motor coils and laminations, 105-120</td>
<td></td>
<td>5.10</td>
</tr>
<tr>
<td></td>
<td>volts, 60-cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32538</td>
<td>Motor—105-120 volts, 60-cycle</td>
<td></td>
<td>5.10</td>
</tr>
<tr>
<td>32683</td>
<td>Motor—105-120 volts, 60-cycle</td>
<td></td>
<td>12.40</td>
</tr>
<tr>
<td>32655</td>
<td>Motor—105-120 volts, 60-cycle</td>
<td></td>
<td>15.00</td>
</tr>
<tr>
<td>32658</td>
<td>Plug—S-Contact male plug for 50-cycle motor</td>
<td></td>
<td>0.35</td>
</tr>
<tr>
<td>32655</td>
<td>Shaft—Turntable shaft and gear for 50-cycle</td>
<td></td>
<td>1.50</td>
</tr>
<tr>
<td></td>
<td>motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32651</td>
<td>Shaft—Turntable shaft and gear for 50-cycle</td>
<td></td>
<td>1.30</td>
</tr>
<tr>
<td>32537</td>
<td>Shaft—Turntable shaft and gear for 50-cycle</td>
<td></td>
<td>1.40</td>
</tr>
</tbody>
</table>

**MOTOR ASSEMBLIES**

**Model U-123**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>32958</td>
<td>Coil—Field coil and laminations for 25-cycle</td>
<td></td>
<td>7.15</td>
</tr>
<tr>
<td></td>
<td>motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32955</td>
<td>Coil—Field coil and laminations for 50-cycle</td>
<td></td>
<td>5.90</td>
</tr>
<tr>
<td></td>
<td>motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32954</td>
<td>Coil—Field coil and laminations for 60-cycle</td>
<td></td>
<td>5.35</td>
</tr>
<tr>
<td></td>
<td>motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32960</td>
<td>Gear—Motor spindle and sleeve and metal damper</td>
<td></td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32875</td>
<td>Motor—Motor complete, 25-cycle, 110 volts AC</td>
<td></td>
<td>11.65</td>
</tr>
<tr>
<td></td>
<td>Motor—Motor complete, 60-cycle, 110 volts AC</td>
<td></td>
<td>23.85</td>
</tr>
<tr>
<td>32870</td>
<td>Plug—S-Contact male plug for 50-cycle motor</td>
<td></td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>motor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32743</td>
<td>Switch—Radio-Record switch (S27)</td>
<td></td>
<td>2.90</td>
</tr>
<tr>
<td></td>
<td>Switch—Radio-Record switch (S27) (S29)</td>
<td></td>
<td>3.05</td>
</tr>
<tr>
<td></td>
<td>Switch—Radio-Record switch (S27) (50)</td>
<td></td>
<td>3.55</td>
</tr>
<tr>
<td></td>
<td>Motor—Turntable motor</td>
<td></td>
<td>4.05</td>
</tr>
</tbody>
</table>

**MOTORBOARD ASSEMBLIES**

**Model U-121 and U-127E**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31149</td>
<td>Base—Tone arm mounting base</td>
<td></td>
<td>0.35</td>
</tr>
<tr>
<td>32876</td>
<td>Board—Motorboard complete with all riveted and</td>
<td></td>
<td>2.50</td>
</tr>
<tr>
<td></td>
<td>welded posts and brackets—less operating</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mechanisms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14009</td>
<td>Bumper—Main lever rubber bumper (1)</td>
<td></td>
<td>0.08</td>
</tr>
<tr>
<td>9848</td>
<td>Cup—Use needle cup, rest, and lid complete</td>
<td></td>
<td>0.75</td>
</tr>
<tr>
<td>32977</td>
<td>Escutcheon—Index stretcher</td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td>31151</td>
<td>Guide—Pickup lift cable guide (coil spring, 80T</td>
<td></td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>2-m. large) (50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32955</td>
<td>Mounting—Pickup arm base rubber mounting complete</td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td>31155</td>
<td>Needle—Cup lid tension spring</td>
<td></td>
<td>0.04</td>
</tr>
</tbody>
</table>

**OPERATING MECHANISM**

**Model U-123**

<table>
<thead>
<tr>
<th>STOCK No.</th>
<th>DESCRIPTION</th>
<th>Unit</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31124</td>
<td>Bracket—Pickup locating lever mounting bracket</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32878</td>
<td>Cam—Cam and drive gear (42)</td>
<td></td>
<td>2.30</td>
</tr>
<tr>
<td>32879</td>
<td>Clutch—Trip lever friction clutch assembly (50)</td>
<td></td>
<td>0.20</td>
</tr>
<tr>
<td>31129</td>
<td>Cover—Cap for top of record post</td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td>32885</td>
<td>Damper—Motor spindle rubber drive and</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>metal damper plate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31116</td>
<td>Finger—Trip lever friction finger assembly (7)</td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>Rear rack gear for 25-cycle motor</td>
<td></td>
<td>0.45</td>
</tr>
<tr>
<td>32880</td>
<td>Gear—Rack gear for rear right-hand record post</td>
<td></td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>(40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31121</td>
<td>Gear—Record post gear (10)</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Guide—Main lever spring guide (11)</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td>31114</td>
<td>Lever—Index lever assembly (18)</td>
<td></td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>Lever—Index lever assembly (18)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31137</td>
<td>Lever—Locating lever and pawl assembly (14)</td>
<td></td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>Lever—Main lever assembly (19)</td>
<td></td>
<td>1.30</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
Compliments of www.nucow.com


Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ½ inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the “180°” mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 500 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet “RCA Victor Receiver Alignment.”

<table>
<thead>
<tr>
<th>Steps</th>
<th>Connect the high side of test-osc. to—</th>
<th>Tune test-osc. to—</th>
<th>Turn radio dial to—</th>
<th>Adjust the following for max. peak output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6K7 I-F grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>“A” band, Quiet Point between 550-750 kc</td>
<td>L12 and L13 (2nd I-F Trans.)</td>
</tr>
<tr>
<td>2</td>
<td>6A8-G det. grid cap, in series with .01 mfd.</td>
<td>455 kc</td>
<td>20 mc (28&quot;) “C” band</td>
<td>L10 and L11 (1st I-F Trans.)</td>
</tr>
<tr>
<td>3</td>
<td>Antenna Terminal, in series with 500 ohms</td>
<td>20 mc</td>
<td>6 mc (33&quot;) “B” band</td>
<td>C21* (osc.) C30** (ant.)</td>
</tr>
<tr>
<td>4</td>
<td>Antenna Terminal, in series with 500 ohms</td>
<td>6 mc</td>
<td>6 mc (33&quot;) “B” band</td>
<td>C23 (osc.)†</td>
</tr>
<tr>
<td>5</td>
<td>Antenna Terminal, in series with 200 mnf.</td>
<td>1,500 kc</td>
<td>1,500 kc (28&quot;) “A” band</td>
<td>C25 (osc.)</td>
</tr>
</tbody>
</table>

Follow “Adjustments for Electric Tuning”

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly and use maximum capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28" (19.09 mc), where a weaker signal (image) should be received.

† Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by tuning to approximately 51° (5.09 mc), at which point a weaker signal (image) should be received.

Note.—Oscillator tracks 455 kc above signal on all bands.

**ADJUSTMENTS FOR ELECTRIC TUNING**

This model has eight push-buttons. The front button is the Victrola switch. The rear button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnet-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

Use one or two feet of wire as an antenna to ensure sharp peaking.

The procedure is as follows:
1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from front) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.

6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Precautionary Lead Dress.—
1. Dress red leads from power transformer to power switch (S1), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.
On some models R-26 is 3 meg. For replacement, use 1.5 meg. resistor Stock No. 12201.

**LOUDSPEAKER**
- **Type**: 12-inch Electrodynamic
- **Voice Coil Impedance**: 2.2 ohms at 400 cycles
- **Pickup**
  - **Type**: Crystal
- **Impedance**: 100,000 ohms at 1,000 cycles
- **Average Output**: 1.5 volts at 1,000 cycles across 500,000 ohm load
- **Phonograph**
  - **Type**: Automatic
  - **Record Capacity**: Eight 10-inch or seven 12-inch
  - **Turntable Speed**: 78 r.p.m., adjustable
# REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

## STOCK No. DESCRIPTION

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit List Price</th>
<th>Stock No.</th>
<th>Description</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>14376</td>
<td>Transformer—First i.f. transformer (L10, L11, C9, C10)</td>
<td>2.45</td>
<td>14378</td>
<td>Transformer—Second i.f. transformer (L12, L13, C7, C9, C14, R4, R5)</td>
<td>3.80</td>
</tr>
<tr>
<td>31445</td>
<td>Transformer—Power transformer 105-125 volts, 50-60 cycles (T10)</td>
<td>7.80</td>
<td>31464</td>
<td>Transformer—Power transformer 105-125/145 volts, 50-60 cycles (T11)</td>
<td>8.05</td>
</tr>
<tr>
<td>31468</td>
<td>Transformer—Power transformer 145-500 volts, 50-60 cycles (T11)</td>
<td>8.85</td>
<td>31478</td>
<td>Transformer—Power transformer 145-500 volts, 50-60 cycles (T11)</td>
<td>9.75</td>
</tr>
</tbody>
</table>

## SPEAKER ASSEMBLIES (RL-70H-S)

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>15889</td>
<td>Cap—Dust cap for comp center</td>
<td>.03</td>
</tr>
<tr>
<td>19012</td>
<td>Cap—Field (L18)</td>
<td>.20</td>
</tr>
<tr>
<td>15888</td>
<td>Cap—Neutering coil (L15)</td>
<td>1.40</td>
</tr>
<tr>
<td>31276</td>
<td>Cap—Speaker cone and voice coil (L14)</td>
<td>1.75</td>
</tr>
<tr>
<td>31219</td>
<td>Cap—Plug for contact (C30)</td>
<td>.30</td>
</tr>
<tr>
<td>31218</td>
<td>Speaker complete</td>
<td>15.10</td>
</tr>
<tr>
<td>15857</td>
<td>Washer—Ballasted coil ([email protected])</td>
<td>1.00</td>
</tr>
</tbody>
</table>

## MOTORBOARD ASSEMBLIES

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31149</td>
<td>Base—Tone arm mounting base</td>
<td>.55</td>
</tr>
<tr>
<td>31130</td>
<td>Base—Record arm, notes sheet welded and riveted parts and bearings—less all operating parts</td>
<td>7.90</td>
</tr>
<tr>
<td>14200</td>
<td>Bumper—Main lever rubber bumper (1)</td>
<td>.08</td>
</tr>
<tr>
<td>31147</td>
<td>Cup—Used needle cup, post, and lid complete</td>
<td>.40</td>
</tr>
<tr>
<td>31145</td>
<td>Externoscope—Index tension spring (C18, C44)</td>
<td>.10</td>
</tr>
<tr>
<td>31150</td>
<td>Guide—Pickup lift cable guide (Coil spring, 80T 90T)</td>
<td>.10</td>
</tr>
<tr>
<td>31150</td>
<td>Mounting—Pickup arm base rubber mounting coil</td>
<td>.45</td>
</tr>
<tr>
<td>31150</td>
<td>Spring—Needle cup lid tension spring</td>
<td>.04</td>
</tr>
</tbody>
</table>

## OPERATING MECHANISM

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
<th>Unit List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>31114</td>
<td>Bracket—Pickup locating lever mounting bracket (3) and 5/8&quot; screw</td>
<td>.30</td>
</tr>
<tr>
<td>31114</td>
<td>Cam—Cam and gear assembly (4)</td>
<td>2.20</td>
</tr>
<tr>
<td>31114</td>
<td>Coupling—Tripping lever assembly (6)</td>
<td>.55</td>
</tr>
<tr>
<td>31144</td>
<td>Coupling—Motor coupling complete with turntable drive gear, rubber strip, motor coupling, and driving armature</td>
<td>1.80</td>
</tr>
<tr>
<td>31119</td>
<td>Cover—Cap for top of record post</td>
<td>.45</td>
</tr>
<tr>
<td>31119</td>
<td>Finger—Tripping lever pinch on finger tip</td>
<td>.75</td>
</tr>
<tr>
<td>31119</td>
<td>Gear—Long arm and rack gear for front left, hand record post (9)</td>
<td>.60</td>
</tr>
<tr>
<td>31119</td>
<td>Gear—Short arm and rack gear for rear right hand record post (9)</td>
<td>.55</td>
</tr>
<tr>
<td>31131</td>
<td>Guide—Main lever spring guide (11)</td>
<td>.40</td>
</tr>
<tr>
<td>31151</td>
<td>Lever—Index lever assembly</td>
<td>.75</td>
</tr>
<tr>
<td>31137</td>
<td>Lever—Index lever spring lever (13)</td>
<td>.30</td>
</tr>
<tr>
<td>31136</td>
<td>Lever—Locating lever and pawl assembly (14)</td>
<td>.35</td>
</tr>
<tr>
<td>31146</td>
<td>Lever—Pickup lever assembly (15)</td>
<td>1.35</td>
</tr>
<tr>
<td>31140</td>
<td>Lever—Pickup lift cable lever and spring assembly (19)</td>
<td>.55</td>
</tr>
<tr>
<td>31135</td>
<td>Lever—Pickup locating lever assembly (17)</td>
<td>.85</td>
</tr>
<tr>
<td>31135</td>
<td>Lever—Record separator assembly with adjustment screws (11)</td>
<td>.20</td>
</tr>
<tr>
<td>31135</td>
<td>Lever—Tripping lever (19)</td>
<td>.30</td>
</tr>
<tr>
<td>31135</td>
<td>Lever—Tripping lever assembly (20)</td>
<td>.25</td>
</tr>
<tr>
<td>31135</td>
<td>Lever—Tripping lever assembly (21)</td>
<td>.20</td>
</tr>
<tr>
<td>31135</td>
<td>Lever—Tripping lever (22)</td>
<td>.30</td>
</tr>
<tr>
<td>31148</td>
<td>Pin—Record post drive pin (23)</td>
<td>.04</td>
</tr>
<tr>
<td>31149</td>
<td>Roller—Pickup lift cable roller and bracket assembly (54)</td>
<td>.55</td>
</tr>
<tr>
<td>31118</td>
<td>Screw—One pointed set screw for trip lever hub or record post shelf</td>
<td>.06</td>
</tr>
<tr>
<td>31116</td>
<td>Screw—Pickup lift cable screw and nuts</td>
<td>.50</td>
</tr>
<tr>
<td>31117</td>
<td>Screw—Set screw for track ball assembly (57)</td>
<td>.50</td>
</tr>
<tr>
<td>31118</td>
<td>Screw—Special screw to adjust friction clutch tension</td>
<td>.05</td>
</tr>
<tr>
<td>31117</td>
<td>Separator—Record separator screw (26)</td>
<td>.75</td>
</tr>
<tr>
<td>31117</td>
<td>Shaft—Record separator post shaft (30)</td>
<td>.40</td>
</tr>
<tr>
<td>31117</td>
<td>Shield—Record post shelf assembly (27)</td>
<td>1.50</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Turnable shaft spring and lever (12 turns, 190-in. O.D., 45/64-in. I.G.)</td>
<td>.04</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Pickup locating lever short spring or locating lever spring tension spring (28) (15 turns, 190-in. O.D., 15/32-in. I.G.)</td>
<td>.08</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Main lever tension spring (28) (15 turns, 9/16-in. O.D., 5-in. I.G.)</td>
<td>.05</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Index lever tension spring (25) (15 turns, 180-in. O.D., 15/16-in. I.G.)</td>
<td>.05</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Pickup lift cable tension spring (31) (20 turns, 190-in. O.D., 5-in. I.G.)</td>
<td>.04</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Record separator pressure spring (32) (18 turns, 190-in. O.D., 5-in. I.G.)</td>
<td>.02</td>
</tr>
<tr>
<td>31117</td>
<td>Spring—Trip detenting lever tension spring (33) (15 turns, 190-in. O.D., 45/64-in. I.G.)</td>
<td>.04</td>
</tr>
<tr>
<td>31875</td>
<td>Spring—Locating lever tension spring (34) (14 turns, 220-in. O.D., 27/32-in. I.G.)</td>
<td>.04</td>
</tr>
</tbody>
</table>

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.**

© John F. Rider, Publisher

Compliments of www.nucow.com
RADIO MFG. ENGINEERS, INC.

FOR SCHEMATIC SEE VOLUME VII.
SERVICE NOTES FOR THE RME-69 RECEIVER

ALIGNMENT

One of the first evidences of misalignment in a receiver is low over-all gain of the receiver. In the RME-69 Receiver this is evidenced by low meter readings on signals which were formerly capable of producing higher meter readings. Due to the tremendous gain available in the audio system of the RME-69 Receiver, misalignment to loss of gain may not be noticed if the condition of the receiver is judged by audio output, since it may be possible to turn the volume control to the maximum output position and still obtain high values of audio output. Misalignment, however, does not affect the circuits of the audio amplifier and has only to do with the intermediate frequency amplifier and, to some extent, the radio frequency amplifiers. Principal among the contributions to low gain is the part which the intermediate frequency amplifier plays in providing over-all sensitivity and selectivity of a satisfactory order.

Misalignment of the radio frequency section (principally, that part of the section which is made up of the high frequency oscillator) is the control of the receiver calibration. This also is susceptible to certain outside influences which can cause variations to such a degree that the stated calibration of the receiver is changed to other values. However, this effect is not a common effect and usually the calibration of the receiver, unless tampered with by inexperienced hands, will remain very close to its stated value indefinitely.

This loss of gain when occurring in the radio frequency section of the receiver is usually due to the fact that the oscillator has been greatly misaligned so that it does not operate in the frequency calibration of the receiver. In other words, it might well be said that a loss of sensitivity in the receiver is occurring simultaneously with a wide-spread condition of off calibration which may indicate the fact that the loss of gain is caused by misalignment of the radio frequency section of the receiver.

On the other hand, if the gain of the receiver is low, but the calibration is correct, it might be said that the most probable cause for the low gain is the misalignment of the intermediate frequency amplifiers relative to the trimming condensers of the intermediate frequency transformers.

It is for the purpose of realignment of these intermediate frequency transformers that the following test procedure is outlined. IMPORTANT NOTE: It is essential that the 465 KC intermediate signal which is used for realignment of the intermediate frequency amplifier is not set according to any arbitrary calibration on the test oscillator itself since it has been found that commercial test oscillators for service work vary considerably, at least to an extent which will not permit proper alignment of a communication type receiver in which is installed a quartz filter. It is therefore better if no test oscillator is used, since a broadcast station of constant signal strength will furnish adequate test signal for alignment of the intermediate frequency amplifier. A quartz filter for establishing the proper IF as indicated in the following procedure.

The meter on the RME-69 receiver affords an excellent method of indicating the peak alignment of each of the transformers. The location of the meter is given on Figure 4 of the illustrated sheet attached. The two padding condensers located in each of the transformers is a means of ensuring that the alignment of the top of the shield can also be seen.

OUTLINE OF PROCEDURE FOR CORRECT ALIGNMENT OF THE INTERMEDIATE FREQUENCY AMPLIFIER TRANSFORMERS OF THE RME-69 RECEIVER.

The intermediate frequency amplifiers in the RME-69 Receiver are designed for a frequency of 465 KC. Since these receivers are always supplied with a quartz crystal filter, it is essential that the intermediate frequency amplifier transformers be accurately aligned with the crystal frequency. Crystals are supplied in frequencies slightly at variance from the above stated value of intermediate frequency by an amount not greater than one kilocycle plus or minus 465 KC. Rather than align the intermediate frequency amplifier stages of the RME-69 to a set frequency of 465, it is essential that the alignment be done in such a degree as herein outlined is followed. If the alignment is done accurately, maximum results will be obtained. The use of any other process of a general type will produce inferior results.

The first step in the alignment procedure is to tune in a broadcast station, preferably in the low frequency portion of the broadcast band. The signal should be one of medium signal strength so that the R meter indicates a signal level of 90 or slightly less. If no station of this amplitude is available but a stronger station is available, a reduction in the efficiency of the antenna by the connection of a short wire to the antenna post may help to bring the signal strength to a level of 90. Usually between 260 and 800 KC in most any territory a station can be received at most any time for this test and adjustment.

When the station has been chosen, let us assume that its frequency is 700 KC, the next step is to slightly detune the main tuning control so that the frequency reads approximately 715 or 780 KC. This of course will tune the station out. It does not necessarily have to be the frequency mentioned or the exact frequency of detune, but the general procedure is to tune the main tuning control slightly higher than the chosen station so that it may be brought back to resonance by decreasing the scale reading of the band-spread control. This is done merely to provide vernier tuning.

With the station chosen and resonated on the band-spread scale, the crystal filter is switched to the series position which is the middle position of the three available. The band-spread scale is then adjusted with respect to the signal so
that a maximum motor reading is obtained. This procedure is one which requires patience and accuracy of adjustment since the receiver is Ultra sharp with the crystal filter in place and there will be a definitely sharp peak indicating crystal resonance. The receiver should be tuned to this peak and left on it during all adjustments to be made regarding the intermediate frequency amplifier.

When this peak has been tuned to the receiver it is at maximum reading, a small standard intermediate frequency trimmer of the insulated screwdriver type should be used. Then the control "T", Figure 2A, should be set so that the condenser is set at 500 M.U. Then, without particular attention to a course of procedure in tuning, any transformer may be adjusted at any particular time, the important factor being that they all be adjusted so that the R meter is brought to and left at a maximum motor reading. Usually this adjustment will not require very much turning of the adjustment screws. A good procedure to follow is to start with the No. 1 transformer and align in sequence No. 2 and No. 3. All adjustments should be made as before mentioned so that the motor reading is maximum.

It is advisable from time to time to make sure that the signal is still adjusted to peak resonance of the crystal by slightly varying the adjustment of the bandspread control. When this procedure has been completed as outlined and all transformers have been adjusted and left at maximum motor reading, the intermediate frequency amplifier of the receiver is in peak adjustment and the crystal aligned with it for maximum of selectivity in filter action.

RME-69 RECEIVER INTERMEDIATE FREQUENCY AMPLIFIER ALIGNMENT WITH SILENCER INSTALLED

The general procedure for alignment of the intermediate frequency amplifier as described above also applies to receivers in which the ES-1 silencer has been installed. Preliminary adjustment as above described should be made followed with the intermediate transformer and the silencer transformer may be peaked by turning the band switch to No. 8 band on the receiver and tuning in the desired frequency band around 50 megacycles so that the receiver is sensitive at that point. Then under conditions of automobile ignition interference the silencer control should be set to maximum counter-clockwise rotation and the small trimmer knob of the noise suppressing transformer located on the silencer auxiliary amplifier should be adjusted for a minimum noise. The alignment of these two units will ensure the highest selectivity of the receiver through the hole in the noise suppressor transformer located on the silencer auxiliary amplifier.

After the intermediate frequency amplifier has been aligned as described in the instruction articles the article "Intermediate Frequency Transformer Alignment, a check of the phasing of the crystal filter should be made. Tune in a broadcast station, preferably on the low frequency end of Band 1. Then tune the main tuning control slightly so that the frequency of the receiver is 90 or more higher in frequency than the selected station.

Then resonate the station again by means of the bandspread control. Next set the crystal switch to the series position as indicated on Figure 3A by the position "A" on control "B". Now vary the bandspread control as may be required to produce peak reading of the signal on the R meter with resonating the crystal resonance peak.

With this setting achieved, vary the dial number 1 slightly higher to produce a new peak on the dial. This can be approximated by the calibration of the dial (one half division each way since one division is representative of 10 kilocycles) and notice the drop in the R meter reading. The drop so achieved by varying the setting of Dial 1 five kilocycles above and below the selected signal should be productive of an R meter drop of 40 db, or greater. In other words, if the signal is resonated produces an R meter reading of 60 db, on the R meter scale, setting the dial number 1 five kilocycles higher in frequency than the frequency of the signal being used should make the R meter fall to 20 db, or less. Similarly, setting the dial number 1 five kilocycles lower in frequency than the station being used, the R meter should again fall from 60 db, on the scale to 20 db, or less. Should it fail to do this, the phasing condenser (D-1, Figure 4) should be adjusted and a test made as just described by five kilocycle above and below adjustment of Dial 1 until the proper variation in the R meter is achieved.

It will be found that the condenser C-1 will usually run at a very low value of capacity, very close to its minimum capacity adjustment. Therefore, only slight turning of this condenser will be productive of changes which materially affect the attenuation of the crystal filter. It is usually found that this condenser is not required to be adjusted since it holds its setting very well over long periods of time. The procedure just outlined gives the proper method for checking the phasing and adjusting when necessary.

ALIGNMENT OF RADIO FREQUENCY SECTION OF THE RME-69 RECEIVER

Alignment of the radio frequency section of the receiver will affect basically the small arrow of the receiver. Within certain limits this of course will also affect the sensitivity. A small variation in frequency (up to 25) will not materially reduce the sensitivity of the receiver although they of course will show up as variations in the calibration as indicated by the required setting of the main tuning dial indicator. Correction for any variation in calibration can be made by following the suggestions outlined below.

Band 1 includes the frequencies between 550 and 1500 kc. For Band 1 there are two frequency adjustments for adjusting the receiver. One of these is, as adjusted as indicated on Figure 4 through the top of the shield can just in the rear of the main tuning condenser assembly and the other is, as adjusted as indicated on Figure 4 through the top of the shield can just in the rear of the main tuning condenser assembly. Just in front of this aperture and on the main tuning condenser assembly is C4 which is used to adjust the...
frequency for the high frequency end of Band 1. The process is this: put the main tuning indicator to a position so that the main tuning condensers are fully charged. The pointer of the main tuning control should then be set at maximum left end of scale so that the pointer falls just below the line above the cursors indicating the free channels. In this respect it will partially cover the top half of the numerals indicating the different tuning bands on the scale. In other words, the line which borders the semi-circular scale at the extreme counter-clockwise position should rest on the top edge of the pointer as it is turned to maximum counter-clockwise rotation and the condenser plates are at full mesh.

The next step is to choose a station or a signal of accurately known frequency, around 700 Kc, and set the main indicator to the frequency of the signal which is to be used for the test. For example, there is a station available with fairly good signal strength or a test oscillator is available which can accurately be set at 700 Kc. If the receiver indicator on the main tuning dial is set at 700, and the receiver is considerably out of calibration of course the signal will not be received. However, leave the indicator at the correct frequency of the signal being used for the test and set the band-spread control to a reading of 180 on the dial at which position it has no material effect on the tuning circuits of the receiver and permits the calibration of the main tuning dial to indicate accurately the frequency of setting.

Then by means of condenser C4 (Figure 4) accessible through the trimming hole in the oscillator shield can for Band 1, adjust until the signal is brought in with the pointer at the proper frequency. Then choose a signal at about 1800 or 1300 kilocycles, and set the main tuning dial indicator to the correct frequency for that signal and bring the signal in on that setting with trimmer C4. It will then be necessary to return to the former frequency setting of 700 Kc to make sure that the variation of C4 has not made some slight change in the setting for the lower frequency calibration point and it may be necessary to readjust C4 slightly again. Then in order to make certain of the accuracy of both settings return to the frequency chosen between 1200 and 1300 Kc and if necessary, slightly readjust C4 again. After several checks on each frequency, it will be found that the calibration can be made satisfactorily.

Calibrations on the higher frequency bands are controlled C5, C2, C3, C4, C5, C6, C7 (Figure 11-B) respectively. High side beat is used on all frequencies in the WES-69 Receiver which means that all of the condensers C2, C3, C4, C5, C6, C7 must be set to the lowest capacity setting which will provide a beat and the proper calibration for the frequencies in the respective bands. Calibration frequencies used are as follows:

- Band 1: 2 megacycles and 3 megacycles.
- Band 2: 4 megacycles, 5 megacycles, 6 megacycles.
- Band 3: 7 megacycles, 9 megacycles, 11 megacycles, 13 megacycles.
- Band 4: 14 megacycles, 15 megacycles, 17 megacycles.
- Band 5: 30 megacycles.

After the calibration has been made accurately on all of the frequencies, or if the receiver has been found to be accurately set in any other way, with a steady incoming signal on between 14 and 15 megacycles and the most effective setting of the control "P" on signal in that region, and with the antenna connected, the condensers C6 is adjusted for maximum meter reading. With these same conditions existing on 30 megacycles, with the band switch set on Band 6 and the antenna connected, C6 is adjusted for maximum response on a given steady signal. All other trimming and adjusting is done manually by means of control "P", Figure 2-A, and is a variable RF amplifier and detector grid paddler which can be critically adjusted for peak resonance at any frequency it is desired to tune to.

It is of importance to note the setting of the condenser C0 (Figure 4). This is the antenna coupling condenser used when the receiver is set to Band 1. It as well as condenser C5 (Figure 4) should be set to practically minimum capacity in order to provide constant alignment and proper coupling to the antenna when using Band 1. Excessive capacity in the condenser C0 will cause misalignment of the RF amplifier and hence, noise and whistling tones will be received on the high frequency end of the broadcast band. Excessive capacitance C0 will somewhat control the tone of the receiver to the same result but will, more than that, reduce the sensitivity on the broadcast band. When the receiver leaves the calibration, set at a low material capacity and should not be set at any other capacity or material reduction in the efficiency of operation will be produced.

Whenever the receiver is gone over for alignment, it is well to remove the dust cover from the condenser assembly and remove the set-screws. Permanence of the position of the rotor plates of the ganged condenser controlled by the knob "P", This is situated between the two main variable condensers and is located underneath the dust cover which is removable by unscrewing the two thumb screws holding it down on the condenser assembly. Some times the rotors become loosed and misplaced angularly with respect to each other. They should always be adjusted so that the rotors are at full mesh at the same time. Any slight angular displacement of one rotor with respect to the other will materially reduce the sensitivity of the receiver and destroy the preselection, thereby reducing the image frequency rejection and also the sensitivity, especially on the higher frequency bands.

The paddlers C4 and C5 (Figure 11-B) materially contribute to the image signal rejection on the bands 3 and 6. Special care should therefore be taken in the adjustment of these condensers when the receiver is aligned.
CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME VIII.

FREQUENCY RANGES AND ALIGNMENT FREQUENCIES:

BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT. to maximum peak of 1400 KC, then pad the oscillator circuit at 600 KC while rocking gang condenser.

SHORT WAVE - 5800 to 15200 KC - Adjust the OSC and ANT. trimmers to maximum peak of 14000 KC. No padding required.

POLICE - 1700 to 5000 KC - Adjust the ANT. coil trimmer to a maximum peak of 4000 KC. No other adjustments are required.

©John F. Rider, Publisher
MODEL 4H
Schematic, Socket
Trimmers, Alignment

RADIO PRODUCTS CORP.

Compliments of www.nucow.com

CAPACITORS

<table>
<thead>
<tr>
<th>№</th>
<th>Heating</th>
<th>Type</th>
<th>MFD</th>
<th>100V</th>
<th>Type</th>
<th>MFD</th>
<th>Heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>.1</td>
<td>200V</td>
<td>C6</td>
<td>.01</td>
<td>400V</td>
<td>C6</td>
<td>.01</td>
</tr>
<tr>
<td>C2</td>
<td>.25</td>
<td>200V</td>
<td>C6</td>
<td>.02</td>
<td>400V</td>
<td>C6</td>
<td>.02</td>
</tr>
<tr>
<td>C3</td>
<td>.1</td>
<td>200V</td>
<td>C7</td>
<td>10.0</td>
<td>ELECT.</td>
<td>CB</td>
<td>3000</td>
</tr>
<tr>
<td>C4</td>
<td>.00025</td>
<td>MICA</td>
<td>CB</td>
<td>3000</td>
<td>ELECT.</td>
<td>CB</td>
<td>3000</td>
</tr>
</tbody>
</table>

RESISTORS

<table>
<thead>
<tr>
<th>№</th>
<th>OHMS</th>
<th>WATTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>250</td>
<td>1/4</td>
</tr>
<tr>
<td>R2</td>
<td>250</td>
<td>1/4</td>
</tr>
<tr>
<td>R3</td>
<td>2000</td>
<td>1/4</td>
</tr>
<tr>
<td>R4</td>
<td>500,000</td>
<td>1/4</td>
</tr>
<tr>
<td>R5</td>
<td>110</td>
<td>1/2</td>
</tr>
<tr>
<td>R6</td>
<td>500,000</td>
<td>1/2</td>
</tr>
</tbody>
</table>

RESISTANCE OF LINE CORD 173 OHMS

SCHEMATIC DIAGRAM

MODEL 4H

4 TUBE T.R.F. RECEIVER, RANGE 535-1730 KILOCYCLES.
POWER SUPPLY: AC (60 CYCLE) OR DC, 105-125 VOLTS.
CAUTION: DO NOT USE A GROUND ON THIS RECEIVER.
ALIGN AT 1400 KC THROUGH 100 MMF. CONDENSER.

©John F. Rider, Publisher
RADIO PRODUCTS CORP.

SCHEMATIC DIAGRAM
MODEL 5F

FOR ALIGNMENT OF MODEL 5F, SEE THAT FOR MODEL 4A, PAGE 9-1

©John F. Rider, Publisher
ALIGNMENT DATA AND SERVICING

Connect the signal generator through a .1 mfd. condenser to the grid of the 6D6 tube. Connect an output meter across the voice coil of the speaker. Set the generator to 456 K.C. and align the I.F. transformer for maximum reading on the output meter. Set the sensitivity control about 1/4 turn counter-clockwise from the point where the whistles start and re-align the I.F.

Feed the generator through a 100 mmf. condenser to the antenna lead of the receiver. Set the generator to 1400 K.C. Turn the dial of the radio to 1400 K.C. Align the oscillator and antenna trimmers on the gang condenser for maximum output on the meter.

ADJUSTMENT OF SENSITIVITY CONTROL

The sensitivity control is accessible from the rear of the cabinet, (see layout) and takes the form of a trimmer condenser, which may be adjusted with a small screw driver or knife blade. This control is adjusted at the factory to give normal sensitivity for a set of this type; and in most locations there will be no need for re-adjustment. However, in rural areas where signal strength is low, the gain of the receiver can be increased by three or four times by turning the trimmer in the following manner:

1. Tune in a station.
2. Increase sensitivity by turning trimmer in a clockwise direction until the station signal is distorted by a whistle.
3. Turn trimmer slowly counter-clockwise until whistle ceases. This is the point of maximum sensitivity.
4. Tune in several stations. If some of these signals still whistle, the sensitivity must be again retarded slightly.
CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION VOL. VIII

FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT trimmers to a maximum peak of 1400 KC, then pad the Oscillator circuit at 600 KC while rocking gang condenser.

SHORTWAVE - 5800 to 15200 KC - Adjust the OSC and ANT trimmers to a maximum peak of 14000 KC. No padding required.

POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to a maximum peak of 4000 KC. No other adjustments required.
R.F. ALIGNMENT. Adjust the test oscillator to 1560 K.C. and connect the output to the antenna through a 0.0005 mfd. mica condenser to give the equivalent of a low capacity average auto antenna. When this adjustment is made, the signal must be introduced into the receiver through the 'shielded low capacity lead. The low capacity lead should be inserted into the receiver through the 'shielded lead. Should the signal be lost, turn the knob to a higher sensitivity and repeat the test.

The next step is to set the test oscillator and receiver to 1400 K.C. and adjust the front trimmer of the gang condenser to peak. The rear section of the gang condenser section tunes the detector grid cell of the 6A8G tube.

L.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output to the grid of the first detector tube, 6A8G, through a 0.1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second L.F. transformers to peak or maximum reading on the output meter.
SETTING UP PUSH BUTTONS:-

The push button set up may be changed as follows:

The selection of stations should be arranged with the location of the lowest frequency station on the extreme left button. A resonance indicator or output meter will aid in making the adjustments. With the band switch on "BC", tune in the desired station with the selector, depress the button and turn the band switch to "A". Now with a screwdriver adjust the trimmer on the top of the chassis nearest the back and adjacent to the speaker. When the desired station is tuned in adjust the trimmer nearest the front panel for maximum volume. Now turn the band switch to "BC" to check the adjustment. Proceed with the next lower frequency station for the next set of trimmers with the band switch on "A".

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOLUME VIII.

The mixer coil is located on the right side of the variable condenser and the oscillator coil on the left side. Trimmers for oscillator and mixer coils are adjustable through holes in the coil supports.

The broadcast trimmers are at the top, the medium wave in the middle and the short wave nearest the bottom of the support.

Trimmers for the I.F. transformers are accessible through openings in the top of the I.F. transformer shields.

VOLTAGE READINGS
- A.C. voltages: Line 120 volts; Heaters-6 volts; Rectifier filament-5 volts.
- D.C. voltages (Taken with no signal from ground to points indicated) 80 Rectifier filament---250 volts; 42 plate--255 volts; 42 Screen--250 volts; 42 bias--20 volts; 6SK7---audio plate 60---audio screen 10, I.F. plate 250,---I.F. screen 100,---and I.F. bias 2.5 volts; 6K8----plate 250,---oscillator plate 90,---screen 100, and bias supply 2.5 volts.
GENERAL INFORMATION & SERVICE HINTS

Should it be necessary to remove the chassis from the cabinet it is important when reassembling the receiver that the selector knob not be pushed on the shaft so far that it will arrest the operation of the push buttons.

Should there be instances where it is difficult to set the push buttons accurately, on a station it is very possible that the trouble is caused by a slight burr on the end of the screw insert in the push button knob; remove the screw in question and remove the burr that might be on the end of the screw.

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:

GAT .................................. Transmitter-Detector 41 .................................. Output
GEX .................................. IF 60 .................................. Rectifier
GEO .................................. A.V.O., detector, last audio

POWER SUPPLY:

115 - 120 Volts, 60-60 Cycle A.C. .................................. 47 Watts

FREQUENCY RANGE:

540-1750 KO

ALIGNMENT FREQUENCIES:

Oscill. Ant.-Trans.
Trimmer

Broadcast .................................. 1400 KO 1600 KO

INTERMEDIATE FREQUENCY

600 KO

POWER OUTPUT:

LOAD SPEAKER:

Single Pentode Type: Dynamic
B.C.S. .................................. 2.52 Watts
B.C. .................................. 1 watt
Maximum .................................. 3.2 Watts
Field resistance .................................. 2000 ohms

STANDARD SPECIFICATIONS

OPERATING CONTROLS:

1. Left knob: "On-Off" switch and Volume 2. Center knob: Tone Control 3. Right knob: Station Selector

CONTROL OPERATION: Turning right: Power on; turning left: Power off

Tuning control: Station tuning set to 555-KO. Fully clockwise.

Position: 550 KO; fully clockwise for first band, 500 KO for second band.

©John F. Rider, Publisher

Compliments of www.nucow.com
**MODEL 4700. CHASSIS 104.235. ALIGNMENT PROCEDURE**

**PRELIMINARY:**

- Output meter connections: Across loud speaker voice coil.
- Output meter readings to indicate volts.
- Average sensitivity microvolts for 1 watt output.
- See chart below.
- Generator modulation: 505, 400 cycles.
- Dummy antenna value to be in series with generator output.
- See chart below.
- Generator modulation: 505, 400 cycles.
- Cover must be on chassis when making R.F. adjustments.

**Position of Dial Pointer**

- Generator Frequency
- Dummy Antenna
- Generaor Connections
- Adjustment Symbol
- Adjusted Microvolts

- **5200**
  - 456 Kc: .001 Mfd. 600 grid
  - .001 Mfd. 600 grid
  - .001 Mfd. Ant. Lead
  - .001 Mfd. Ant. Lead
  - 600 Kc: .001 Mfd. Ant. Lead
  - .001 Mfd. Ant. Lead
  - .001 Mfd. Ant. Lead
  - .001 Mfd. Ant. Lead

**IMPORTANT ALIGNMENT NOTES**

- Make generator connection to receiver through a shielded lead having not more than 50 mfd. capacity. A series condenser has been employed as outlined in the first paragraph under "General Information and Service Hints" the dummy antenna should be the same as the antenna itself.
- Adjust C-6 after installation as outlined under "Antenna Matching in Service Hints." Each step of the Alignment Procedure should be repeated in order to afford greater accuracy. Always keep the output from the signal generator at its lowest possible value to prevent any possible A.V. action.
- Alignment adjustment screws are shown in Figures 3 and 4.
- Only the dummy antenna indicated in the chart for any particular frequency should be used.
- Grid cap leads should remain in place during alignment.
- Oscillator circuit alignment may be made at high frequencies. A fixed header is used in series with the return of the oscillator coil secondary. Oscillator coil Inductance is preadjusted at factory.
- Values shown under "Microvolts" are only approximate.

**Dial Adjustments:**

- Rotate dial completely to the right.
- Then rotate dial completely to the left. Now dial will be set properly.

- If controls operate with too much difficulty it indicates that the control cables are bent too sharply. This should be avoided.

**TABLE OF ADJUSTMENTS FOR GENERAL NOISE CONDITIONS**

- When making proper installation of receiver, you encounter noises you cannot eliminate refer to H.R. No. 50, 50, 80, 81, 82, 83, 137, for suggestions and remedies.

**ELIMINATING WHISTLE AT 900 TO 3800 KC:**

- In locations were a strong 900 to 3800 kc Station is in operation, a whistle may be experienced at 900 to 2600 kc. This whistle is due to a beat between the second harmonics (910 kc) of the 526 kc L.F. and the 910 kc Station. Such a condition can be corrected by changing the L.F. frequency to a higher or lower value until the whistle disappears. However, the L.F. amplifier should not be shifted to a frequency higher than 465 kc nor lower than 440 kc but should be as close to 455 kc as possible.

- If the L.F. Frequency is changed, it will be necessary to realign the rest of the receiver as described under "Alignment Procedure."

**Antenna Matching:**

- An antenna pad condenser is used to match antenna capacitances up to 500 mfd. If, in the rattling, this pad is not effective, it is because the capacitance of the antenna is over 500 mfd. In that case a fixed capacity of 500 mfd. or less should be connected in series with the antenna. The location of the antenna adjustment is found on Fig. 2.
### Alignment Notes

- The generator should be adjusted for high output. The trimmer should be adjusted for minimum output with reading instead of the usual maximum reading. If the frequency of an interfering station around 465 kHz is known, the generator should be adjusted to the frequency of that station instead of 465 kHz.

---

### Table: Wave Band

<table>
<thead>
<tr>
<th>WAVE BAND</th>
<th>POSITION</th>
<th>VARIABLE</th>
<th>GEN. FREQ.</th>
<th>DUMMY ANT.</th>
<th>GENERATOR ADJUSTED</th>
<th>IF OUTPUT</th>
<th>IF INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot;</td>
<td>CLOSED</td>
<td>465SEC</td>
<td>IMPED.</td>
<td></td>
<td>465 SEC. 1076 GRID</td>
<td>TETI TETI</td>
<td>TETI TETI</td>
</tr>
<tr>
<td></td>
<td>600HC</td>
<td>465SEC</td>
<td>COOPEPT.</td>
<td>AN.TERM.</td>
<td>01 02 01 01 02 01 01</td>
<td>TETI TETI</td>
<td>TETI TETI</td>
</tr>
<tr>
<td></td>
<td>600HC</td>
<td>465SEC</td>
<td>COOPEPT.</td>
<td>AN.TERM.</td>
<td>C8</td>
<td>TETI TETI</td>
<td>TETI TETI</td>
</tr>
<tr>
<td></td>
<td>6072</td>
<td>FULLY OPEN</td>
<td>10500/COOPEPT.</td>
<td>AN.TERM.</td>
<td>C7</td>
<td>TETI TETI</td>
<td>TETI TETI</td>
</tr>
<tr>
<td>&quot;B&quot;</td>
<td>OPEN</td>
<td>17500</td>
<td>COOPEPT.</td>
<td>AN.TERM.</td>
<td>01 06 02 02 02 02 02 02</td>
<td>TETI TETI</td>
<td>TETI TETI</td>
</tr>
<tr>
<td></td>
<td>6072</td>
<td>FULLY OPEN</td>
<td>10500/COOPEPT.</td>
<td>AN.TERM.</td>
<td>C7</td>
<td>TETI TETI</td>
<td>TETI TETI</td>
</tr>
</tbody>
</table>

### Alignment Procedure

1. **Compliments of www.nucow.com**
2. The generator should be adjusted for high output. The trimmer should be adjusted for minimum output with reading instead of the usual maximum reading. If the frequency of an interfering station around 465 kHz is known, the generator should be adjusted to the frequency of that station instead of 465 kHz.
3. The alignment procedure should be repeated steps by steps, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the alignment of the receiver ineffective.
**Models 4644A, 4645A**

**SEARS ROEBUCK & CO.**

**Models 6010, 6040**

**Models 6050, 6053**

**Models 6054, 6055**

Alignment

**Models 4644A, 4645A Chassis 101, 604; 6010, 6040 Chassis 101, 610; 6050, 6053 Chassis 101, 625; 6054, 6055 Chassis 101, 632.**

**Use of Table:** Only one model for each chassis is shown in the table below, for example 4644A indicates chassis 101, 604 and model 4644A.

Output meter connections, models 4644A, 6010, 6050 ———— Across loud speaker voice coil.

Model 6050 ———— 400 ohm Weston meter, across speaker terminals.

Output reading to indicate 50 milliamperes, models 4644A, 6010, 6050 ———— 0.37 volts.

Model 6050 ———— 0.40 volts.

Generator ground lead connection ———— Regular chassis.

Dummy antenna value to be in series with generator output ———— See chart below.

Connection of generator output lead ———— See chart below.

Generator modulation ———— 300, 400 cycles.

Approximate average sensitivity in microvolts for 50 milliamperes output ———— See chart below.

Position of volume control ———— Fully on.

Position of tone control, models 4644A, 6010, 6050 ———— "Hi."

**Trimmers Adjustments (in order shown):**

**Approximate Microvolts:**

<table>
<thead>
<tr>
<th>Position of Variable</th>
<th>Generation Frequency</th>
<th>Dummy Antenna</th>
<th>Generator Connection</th>
<th>Transformer Function</th>
<th>Approximate Microvolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>465 khz</td>
<td>.1 mf4</td>
<td>1070 Trans.</td>
<td>72,71</td>
<td>IF</td>
</tr>
<tr>
<td>600 khz</td>
<td>.0002 mf4 Antenna Term.</td>
<td>C2</td>
<td>C1, C6</td>
<td>1070 IF Trans.</td>
<td>160</td>
</tr>
<tr>
<td>Fully Open</td>
<td>1700 khz</td>
<td>.0001 mf4 Ant. Clip</td>
<td>C4</td>
<td>1070 IF Trans.</td>
<td>165</td>
</tr>
<tr>
<td>1400 khz **</td>
<td>1400 khz</td>
<td>.0001 mf4 Antenna Term C5</td>
<td>C6, C6C, C7, C7C</td>
<td>1070 IF Trans.</td>
<td>225</td>
</tr>
<tr>
<td>600 khz (rock)</td>
<td>600 khz</td>
<td>.0002 mf4 Antenna Term C6</td>
<td>C5, C6, C7, C7C</td>
<td>1070 IF Trans.</td>
<td>160</td>
</tr>
</tbody>
</table>

The generator should be adjusted to give high output. The trimmer should be adjusted for minimum output meter reading instead of usual maximum output meter reading. If the frequency of an interfering code station near 465 khz is known, the generator should be adjusted to that frequency instead of 465 khz.

Using the dial as a template make a dummy dial of cardboard with only the 1400 khz calibration on it. Slip this dummy dial over the shaft, hold it horizontal so the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 khz mark. (The dial pointer should be horizontal when the emitter is fully open or fully meshed.)

The variable should be raised back and forth a degree or two while tuning the 600 khz adjustment. The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power to the receiver at its lowest possible value to prevent the ACF of the receiver from interfering with accurate alignment.

Values shown under "Microvolts" are only approximate.

**Eliminating Whistle at 900 khz:** Models 4644A, 6050, 6054, 6055, 6010.

A whistle, due to a beat between the second harmonic (900 khz) of the 465 khz IF, and a 950 khz signal may be expected. In localities where the 930 khz station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 khz the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 khz would not be objectionable, the IF should be realigned at 915/2 or 457.5 khz. Try to select the new IF frequency as near to 465 khz as possible. Align the IF at the new frequency and then realign the rest of the receiver as described.

**Locations of Parts on Top of Chassis:**

**Locations of Parts Under Chassis:**

©John F. Rider, Publisher

Compliments of www.nucow.com
GENERAL INFORMATION & SERVICE HINTS

INSTRUCTIONS FOR SETTING UP PUSH BUTTON STATIONS:

1. Remove the two screws that secure the push button. Remove the celluloid call letter holders. A label will be seen palling out frequency (kilowatts) stations can be set up on each button. Each button can be used for only one station in its frequency range.

2. Move the Switch knob to the "American" position and use the turning knob to tune in the station chosen for #1 button. Then turn the Wave band switch to the Push Button position and then tune in the station chosen for #2 button.

3. There will be some occasional numbers for each button, an upper on and a lower one. Using a screwdriver, turn the lower adjusting screw for #1 button until the station is tuned in as accurately as possible. As indicated by the tuning knob, the adjustment, you obtain a strong Signal indication, but do not hear your station, turn the upper adjusting screw one or two turns to the right and then proceed with the lower screw adjusting. To check whether you are adjusting to the correct station, turn the Wave Switch knob back to the "American" position momentarily.

4. After the best possible setting of the lower screw has been made, adjust the #1 upper screw right or left to make the #2 of the tuning eye still narrower.

5. Proceed in the same manner for each button. Be sure the Wave Switch knob is in the #2 Push Button position and that you have pushed in the proper button before turning the screw adjustment for that button. The lower screw for each button must be adjusted before the upper screw for that button. The Wave Switch knob can be turned back to "American" position momentarily at any time, to check whether you are adjusting to the correct station.

6. Place the call letters for the chosen stations in the celluloid call letter holders. Be sure to insert the call letters in the proper order so that they will be over the push button for their respective stations. Then replace the celluloid call letter holders and the celluloids.

THE A.C.V. CIRCUIT:

The diode current of the 815 tube, flowing through the 820uH resistor, R11, creates a voltage that is used as a reference point of the rectifier, E1, and also to provide a voltage to apply to the control grid of the RF, Translator, and IF tubes to provide A.V.

OSCILLATION:

Be sure the tube diodes are making good contact to their base clips. Poor contact may cause oscillation.

ELIMINATING WHISTLE AT 900 kc:

A whistle, due to a beat between the second harmonics (900 kc) of the 460 kc IF, and a 900 kc signal may be experienced. It occurs when the 900 kc station is one that is frequency-shifted. The IF should be realigned at 550 kc or at 460 kc. The IF should be realigned at 550 kc to shift the whistle down to 460 kc and it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 550 kc and 900 kc the whistle will be least objectionable. Dividing this frequency by two will give you the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 910 kc would not be objectionable, the IF should be realigned at 550 kc. Try to choose the new IF frequency as near to 460 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under "EQUIPMENT PROCEDURE." It will also be necessary to readjust any stations set up on the Push Button Tuning Mechanism.

WAVE TRAPS:

A wave trap, designed to eliminate noise interference from other transmitters, airports, or air heater stations in the vicinity of the receiver, is built into the receiver. This device is placed in the IF amplifier, to be certain that any noise present on the filter line is eliminated. The wave trap is made of the same material as the main filter used on the receiver.

The wave trap is connected to the chassis mounting shelf or to the inside of the cabinet by means of wire passing through the holes in the back of the chassis. This wire must be connected to the wire from one of the wave traps to the chassis in such a way that the wire trap will have the correct amount of capacitance per section.

The trap has two terminals marked "ANT" and "CAT." Disconnect the antenna lead from the receiver. In order to test the trap, connect the "ANT" terminal to the "CAT" terminal of the trap from the "ANT" terminal of the chassis. The ground connection to the chassis must be removed. If the trap is in series between the antenna and the receiver, the trap should be removed. If the trap is connected in parallel with the antenna, the trap should be removed. The sensitivity of the receiver will increase if the trap is removed. If the trap is removed, the wave trap is removed. The full frequency to which the trap is tuned is 460 kc. The trap should be removed.

INSTALLATION OF A PHONOGRAPH PICKUP JAC, OR AN EARPHONE JACK FOR CHASSIS 1101458 ONLY:

A kit, part #4011171920, can be ordered from Colonial Radio Corporation, 305 Bay Street, Buffalo, N. Y. The retail selling price is $1.10. This kit contains the necessary parts for installing a phonograph pickup jack or an earphone jack, or both, a phonograph pickup jack and an earphone jack. It will be necessary to use the kit for installation of the jack on all the way for the additional jacks.

PHONOGRAPH PICKUP JACK: A hole, covered with a brass insert, is provided in the rear of the chassis. Remove the brass insert and mount the jack in this hole. Install the jack securely. For the phonograph pickup jack, the brass insert is the jack. In addition, changes must be made in the wiring to the speaker socket and the electrolytic capacitors. As the schematic section shows, these changes and the connections to the jack as follows:

Disconnexion the lead from the speaker socket and connect it to the ground. Disconnect the lead from the speaker socket and connect it to the ground.

There is a hole in the front of the chassis, between the Tone Control and the right side of the chassis. Mount one of the terminal boards, supplied in the kit, in this hole.

There is an electrolytic capacitor mentioned above the terminal board mentioned in the preceding paragraph. Mount the three leads that are soldered to the terminal board and connect them to the terminal board mentioned in the preceding paragraph.

Solder a lead from the mounting of the electrolytic, mentioned in the preceding paragraph, to probing #1 of the speaker socket.

Solder a lead from the mounting of the electrolytic, mentioned in the preceding paragraph, to probing #1 of the speaker socket.

There is a terminal board mounted under one of the nuts that mount the IF output transformer. Mount the terminal board supplied in the kit under this nut. Connect the #1 condenser, supplied in the kit, between this new terminal board and terminal #1 of the jack.

Run a lead from the new terminal board to the cathode of the 815 tube.

There are two terminal boards mounted on the front of the Wave switch assembly bracket. Run a lead from the terminal of this board that is nearest the Volume Control to the ground of the jack.

Run a lead from the ground of the jack to probing #1 of the speaker socket.

Connect the #1 condenser, mentioned above from the jack to the grid of the 815 tube.

Connect the #1 condenser, mentioned above from the jack to the grid of the 815 tube.
TUBES AND FUNCTIONS:
6AT7 ...... Translator-Oscillator
6D6 ...... IF
76 ...... AVC-Detector

POWER SUPPLY:
All models available 105-125 volts, 60 cycle, 53 watts

FREQUENCY RANGES:
American Band 540-1730 KC
Foreign Band 5.7-18.3 KC

INTERMEDIATE FREQUENCY
456 kc

POWER OUTPUT:
Type Pentode
Undistorted 2.6 watts
Maximum 3.9 watts

OPERATING FEATURES:
Tone Control Two Point
Automatic Volume Control
Crystal Phonograph Pickup

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left Knob Wave Change
2. Next to Left Knob Tone Control
3. Next to Right Knob Tuning
4. Right Knob Power Switch

CONTROL OPERATION:
Clockwise "AM" Anti-Clockwise "FOR"
Ratio 12:1
Turn Right: Power On; Volume Increase

©John F. Rider, Publisher
ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections .................................................. Across speaker voice coil
Output meter reading to indicate .000 watt. ................................... 18.7 volts
Average sensitivity in microvolts for .000 watt output ....................... See chart below
Dummy antenna value to be in series with generator output ......... See chart below
Connection of generator output lead ........................................ To chassis
Connection of generator ground lead .......................................... App. 20% - 400 cycles
Position of volume control .................................................. Fully clockwise
Position of tone control ..................................................... Fully clockwise
Position of dial pointer with variable fully meshed ....................... Horizontal

<table>
<thead>
<tr>
<th>WAVE BAND</th>
<th>POSITION OF DIAL</th>
<th>GENERATOR FREQUENCY</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR CONNECTION</th>
<th>TRIMMERS ADJUSTED IN ORDER SHOWN</th>
<th>TRIMMER APPROXIMATE FUNCTION</th>
<th>MICROVOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.C.</td>
<td>160</td>
<td>456</td>
<td>.02 mfd.</td>
<td>6A7 Grid</td>
<td>C15, C16</td>
<td>I. F. 50</td>
<td></td>
</tr>
<tr>
<td>B.C.</td>
<td>160</td>
<td>456</td>
<td>.0002 mfd.</td>
<td>Ant. Lead</td>
<td>C3</td>
<td>Wave trap Trim. for minimum response</td>
<td></td>
</tr>
<tr>
<td>S.W.</td>
<td>16</td>
<td>16 mc.</td>
<td>400 ohm</td>
<td>Ant. Lead</td>
<td>C9, C5</td>
<td>Osc., R.F. 17</td>
<td></td>
</tr>
<tr>
<td>B.C. (rock)</td>
<td>600</td>
<td>600 kc.</td>
<td>.0002 mfd.</td>
<td>Ant. Lead</td>
<td>C12</td>
<td>Osc. 10</td>
<td></td>
</tr>
</tbody>
</table>

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.
INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK:

A kit, part #103117189, can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N.Y. The retail selling price is $4.11. This kit contains the necessary parts for installing either a phonograph pick-up jack or an earphone jack. If the customer desires both a phonograph pick-up jack and an earphone jack, it will be necessary to use two kits and to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Disconnect the jumper that is between prongs 1 and 4 of the speaker socket and move the lead on prong 1 to prong 4.

Locate the electrolytic condenser mounted alongside the power transformer. A green lead runs from the anode (center terminal) of this electrolytic to prong 2 of the speaker socket. Transfer the connections of this lead from the anode to the cathode (mounting nut) of the electrolytic and from prong 2 to prong 1 of the speaker socket.

There is a jumper between the cathodes of the two electrolytics. Disconnect this jumper. Run a jumper between the anodes of the two electrolytics.

There is a four-terminal board mounted under the nut that holds the IF output transformer. Run a lead from the terminal nearest the speaker socket on this board to prong 3 of the speaker socket.

Run a lead from lug 1 of the jack to the cathode of the 6Q7G tube.

Connect the .05 mfd. condenser from lug 2 of the jack to the blank prong (3rd one clockwise from the locating pin when viewed from the underside) of the 6Q7G tube socket.

Run a lead from lug 3 of the jack to the coil terminal shown in the illustration.

Connect the 500 ohm resistor, supplied in the kit, between lug 4 of the jack and prong 1 of the speaker socket.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal 2 of the jack to the grid prong of the 6V6G output tube.

Connect terminal 3 of the jack to terminal 5 of the speaker socket.

Connect terminal 4 of the jack to terminal 3 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.
The trap has two terminals marked "ANT" and "SET". If a conventional antenna is being used (not a doublet), the trap will be connected as follows. Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

If a doublet antenna is installed with the receiver, the trap must be connected between the antenna lug of the broadcast antenna coil primary and the wave switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the "ANT" terminal of the trap to the wave switch lug. Connect the "SET" terminal of the trap to the antenna coil lug. See Illustration below.
ALIGNMENT PROCEDURE

PRELIMINARY:
Output meter connections
Output meter reading to indicate 5 watts output
Approximate average sensitivity in microvolts for 5 watts output
Dummy antenna value to be in series with generator output
Connection of generator output lead
Connection of generator ground lead
Generator modulation
Position of volume control
Position of tone control
Position of selectivity control
Position of dial pointer with variable fully closed

MATE BAND
SWITCH POSITION OF VARIABLE GENERATOR DUMMY TRIMMER
POSITION ANTENNA CORRECTION ADJUSTED (IN ORDER TRIMMER APPROXIMATE
OF ANTENNA FUNCTION) FUNCTION VALUE

*INT* 1.5 m. 465 ke .0005 mfd. 6L34 Grid
*AM* 1500 ke 465 ke .0005 mfd. Ant. Term. G8, G9, G10, Oscillator, 20
*AM* 500 ke (rock) 600 ke .0005 mfd. Ant. Term. G8, G9, G10, Oscillator, 15
*INT* 3 m. 400 ohms Ant. Term. G8, G9, G10, Oscillator, 15
*INT* 3 m. (rock) 3 m. 400 ohms Ant. Term. G8, G9, G10, Oscillator, 15
*FOR* 15 m. 15 m. 400 ohms Ant. Term. G8, G9, G10, Oscillator, 15
*FOR* 15 m. (rock) 15 m. 400 ohms Ant. Term. G8, G9, G10, Oscillator, 15

IMPORTANT ALIGNMENT NOTES
* If the frequency of an interfering code station is known, the generator should be ad-
justed to that frequency instead of to 465 ke. The trap should be adjusted to give mini-
imum output meter deflection instead of the usual maximum reading.

Location of parts on top of chassis:

LOCATION OF PARTS UNDER CHASSIS

No connection should be made to the doublet terminals on the antenna connection block.
THE AUTOMATIC TUNING DIAL

The method of setting up the Automatic Tuning Dial follows in detail. In some cases frequency drift due to aging of the dial, and in others due to changing of the coil which may cause the dial to drift, the mechanism will need to be adjusted. To do this, proceed as follows:

1. With the dial set to the frequency you want to adjust, carefully pull out the key allowing the button to snap back into position. If the button does not come back fully, it may be necessary to adjust the button assembly as shown in Fig. 16. The button must be in its correct position before proceeding to the next step.

2. With the button in its correct position, rotate the tuning shaft until the indicator on the tuning dial aligns with the desired frequency. This will set the station to the desired frequency. The button must be in its correct position before proceeding to the next step.

3. Check the mechanism by moving the shaft to the right as indicated by the forefinger and arrow in Fig. 10. Note that one hand is holding the mechanism at the outer edge of the button so that they are not pushed in accidentally.

4. You can check the accuracy of your setting by listening to the signal and adjusting the button as necessary. If the signal is not clear, turn the knob on the side of the tuning shaft until it resonates. The signal can also be tuned by rotating the center shaft as illustrated in Fig. 11. When you are satisfied with the tuning, turn the dial back to the correct frequency.

Make a list of the stations you want to set up on the Automatic Tuning Dial. Mark down the frequencies of the stations as well as their call letters. Arrange the stations in the order of their frequency. The one at the lowest frequency first, the next highest frequency second, etc.

If there are fewer stations than the dial shows, then proceed to adjust the dial as described in the following paragraphs. In the case of a new station, set the button to the approximate frequency using the dial. After setting the button, proceed to adjust the dial as described above.

'LO-NOISE AND SELECTIVITY CONTROL' and 'PULLING KNOB STRAIGHT OFF OF TUNING SHAFT.'

Fig. 9, Note: The tuning mechanism will then appear as in Fig. 9. Note the numbering of the buttons.

In the illustrations all buttons are shown as if they were turned to the right, the shafts to the left, and the dials to the right. The tuning shafts are shown as being turned to the right, and the button is in position to be adjusted. Your station for button # may be set to station between #1 and approximately #100 since this is the frequency range of this button.

The key (Fig. 18), has a hole at one end. Insert the end of the key into the button #. Turn the key to the right until the button is in position to be adjusted. The key is in the correct position when the key can be turned more than one-half circle. See Fig. 12.

If button # cannot be turned in more than onehalf circle to turn the button, it will be necessary to use the dial to turn the button. Then proceed to adjust the dial as described in the following paragraphs. If button # is released, the key will turn back to its original position when button # is released. When this occurs, turn the key to the right until the button is in position to be adjusted. The key must be in the correct position when the key can be turned more than one-half circle.

Fig. 12

TUNING IN #1 STATION WITH KEY.

Turn the key to the right as shown in the diagram. The key should turn to the right and the button will turn back to its original position. The key must be in the correct position when the key can be turned more than one-half circle.

Fig. 13

TUNING IN #1 STATION WITH KEY.

Turn the key to the right as shown in the diagram. The key should turn to the right and the button will turn back to its original position. The key must be in the correct position when the key can be turned more than one-half circle.

Fig. 14

CAP WITH CALL LETTERS IN PLACE.

On button #1.
SUBJECT: READJUSTING THE AUTOMATIC TUNING DIAL STOP BUTTON TO MAKE IT POSSIBLE TO SET UP DESIRED STATIONS, THAT ARE CLOSE IN FREQUENCY, ON ADJACENT BUTTONS.

By referring to ranges it will be seen that WMAQ, 570 kc, would be set up on button #3; WGN, 720 kc, would be set up on button #4; WBBM, 770 kc, would be set up on button #5. Since these three stations come within the frequency range of only two of the buttons, the customer would ordinarily have to give up one of the three stations for AUTOMATIC TUNING.

It is possible, however, to change the setting of the "fixed" button and make it possible to set up three such stations, close together in frequency, on three separate buttons. The method of doing this is as follows:

FIRST:-
Make a full size reproduction of button frequency ranges on a suitable paper or cardboard,- an eleven division scale, one division for each button range as illustrated.

SECOND:-
Likewise make a full size reproduction of the AMERICAN band on suitable paper or cardboard.

Make a light pencil mark on the reproduction of the tuning scale at the frequency of each of the eleven desired stations. Then lay the eleven division scale against the reproduction of the tuning scale and move the eleven division scale to such a position that each of the pencil marked positions for the eleven desired stations will fall within the range of a different button. However, the eleven division scale can only be moved so that its left index mark comes between the dotted lines of the reproduction of the tuning scale, as shown in Fig. 2. In Fig. 2 it will be seen that by moving the eleven division scale to the point shown, WMAQ will be within the range of button #3; WGN will be within the range of button #4; and WBBM will be within the range of button #5.

When a position of the eleven division scale is found that will allow the eleven desired stations to fall within the range of separate buttons, carefully note at what point on the reproduction of the dial scale the left index mark of the eleven division scale comes. In the illustration for stations WMAQ, WGN, and WBBM, the index mark is just about opposite 550 kc on the dial scale. (Fig. 2).

Remove the chassis from its cabinet. Leave the AUTOMATIC TUNING dial escutcheon off.

Turn the AUTOMATIC TUNING dial to its stop so that the variable is fully meshed. Now move the pointer along its drive cable to the point on the dial that corresponds exactly to the position of the left index mark of the eleven division scale, as described in the preceding paragraph. As can be seen by inspection, the pointer is pinned onto the drive cable and it will be necessary to pry this pinching open slightly so that the pointer can be moved along the cable. The AUTOMATIC TUNING dial must be kept turned all the way to the left to its stop during the operation of moving the pointer. After the pointer has been moved to its new position it should be pinned onto the cable again so that it cannot slip.

Loosen the set screw that holds the variable condenser drive drum to the variable condenser shaft.

Unlock the AUTOMATIC TUNING dial mechanism by moving the studs counter-clockwise. Pull out the "hair pin" clip that will be found on the unnumbered stop button. This button can then be pushed in and turned the same as the other eleven numbered buttons. Push in the unnumbered button and turn it to such position that when the AUTOMATIC TUNING dial mechanism is turned to its limit the pointer will be at its original stop at the left end of the dial. Then lock the mechanism by rotating the studs clockwise. (Be careful not to push in button #1 while the unnumbered button is pushed in as this may jam the mechanism. If this should happen the mechanism can be freed by pushing in the stop latch, as will be seen by inspection.) Replace the "hair pin" clip on the unnumbered button.

With the mechanism turned all the way to the left to its stop and with the dial pointer at its left limit on the dial, fully mesh the variable condenser by turning the movable plates with the fingers. Then retighten the set screw that holds the condenser drive drum to the variable condenser shaft.

The eleven desired stations can then be set up on the eleven adjustable buttons in accordance with the instructions. (See preceding pages).

The new frequency of the buttons will be determined by holding the eleven division scale against the reproduction of the tuning scale, with the left index mark of the eleven division scale at the proper point between the dotted lines on the reproduction of the Tuning dial scale.

©John F. Rider, Publisher
Compliments of www.nucow.com
ALIGNMENT

1- Apply 456 KC note to control grid of 6A7 and peak IF trans. for max. gain.
2- Apply 4000 KC note to antenna wire; set band switch to 2nd 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 padier 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 2nd 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.

RECEIVER RANGE - THREE WAVE BANDS

540 - 1720 kilocycles; 1720 - 5000 kilocycles; 5.5 - 16 megacycles

©John F. Rider, Publisher
ALIGNMENT PROCEDURE

PRELIMINARY:
Output meter connections ........................................... Across speaker voice coil
Output meter reading to indicate 1.0 watt output ........... 1.5 volts
Approximate average sensitivity in microvolts for 1.0 watt output .... See chart below
Dummy antenna value to be inserted in series with generator output .... See chart below
Connection of generator output leads .......................... See chart below
Connection of generator ground lead ............................ To chassis
Generator modulation .............................................. 50%, 400 cycles
Position of Radio-Phono. switch ................................. Counter-clockwise
Position of Volume Control ....................................... Fully clockwise
Position of Tone Control ......................................... Fully clockwise
Position of Dial Pointer with variable tuning condenser fully closed .... To fall on last calibration mark at 840 KC and of "American" band.

WAVE-BAND

<table>
<thead>
<tr>
<th>SWITCH</th>
<th>POSITION OF DIAL POINTER</th>
<th>GENERATOR DUMMY ANTENNA</th>
<th>GENERATOR CONNECTION</th>
<th>THROTTLE ADJUSTMENT</th>
<th>THROTTLE</th>
<th>APPROXIMATE MICROVOLTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>500-700 KC</td>
<td>4-00 kc</td>
<td>0.001 mfd.</td>
<td>AM: 0 Grid: 0.011</td>
<td>0 dB</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>500-1200 kc</td>
<td>4-00 kc</td>
<td>0.001 mfd.</td>
<td>AM: 0 Grid: 0.011</td>
<td>0 dB</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>1500-3000 kc</td>
<td>1500 kc</td>
<td>0.0008 mfd.</td>
<td>AM: 0 Grid: 0.011</td>
<td>0 dB</td>
<td>20,000</td>
</tr>
<tr>
<td>A-F</td>
<td>500-700 kc</td>
<td>1500 kc</td>
<td>0.0008 mfd.</td>
<td>AM: 0 Grid: 0.011</td>
<td>0 dB</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>1500-3000 kc</td>
<td>1500 kc</td>
<td>0.0008 mfd.</td>
<td>AM: 0 Grid: 0.011</td>
<td>0 dB</td>
<td>20,000</td>
</tr>
</tbody>
</table>

IMPORTANT ADJUSTMENT NOTES

**Use maximum capacity peak if two peaks can be obtained.

Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "End," the variable tuning condenser should be backed off and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the e-w action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Leave the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

Values shown under "Microvolts," are only approximate.

GENERAL INFORMATION AND SERVICE HINTS

ELIMINATING WHISTLE AT 860 KC:

A whistle due to a beat between the second harmonic (860 kc) of the 460 kc I.F., and a 860 kc signal may be experienced. In localities where the 460 kc station is one that is frequently listened to, it will be undesirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the I.F. frequency of the receiver.

Determine at what point between 860 kc and 450 kc the whistle will be least objectionable. Dividing this frequency by two will give the new I.F. frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 900 kc would not be objectionable, the I.F. should be re-aligned at 900/2 or 450 kc. Try to select the new I.F. frequency as close as possible to 450 kc.

An interfering whistle may also be caused by two stations having a frequency difference equal to the I.F. frequency (460 kc) of the receiver and will be evidenced by a whistle appearing when the receiver is tuned to either of these stations. It may be further localized by tuning the receiver to each of these stations and then stopping the oscillator in each case, by grounding the oscillator output section of the variable tuning condenser on to chassis. If the whistle, in each case, still persists, it is being caused by the beat between these two stations and may be corrected by shifting the I.F. frequency of the receiver, to a frequency other than the difference frequency of the two local or strong signals (stations).

The I.F. amplifier should not be shifted to a frequency higher than 675 kc, nor lower than 445 kc, but should be close to 450 kc as possible.

Align the I.F. at the set frequency and then re-align the rest of the receiver as described under "ALIGNMENT PROCEDURE."

AUTOMATIC RECOIL MECHANISM

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated in this booklet.

It is important, when servicing the automatic mechanism, to have it placed on a level surface. It is also important to retain free forcing the mechanism in service, since a tendency to bind or jam, since bent levers and broken parts will result. Application of oil to the pivot points is required. Use only oil against the pivot pins. The pivot pin will ensure smooth operation.

CAUTION: Do not leave record stuck on record holder, when not in use, as they are liable to warp, particularly so in warm climates.

LOUDSPEAKER:

Testing of the loudspeaker is made in the usual manner with three, narrow-range testers, with a meter across the cone and an ear close by. It may be necessary to add some cement with a light application of cement, using care not to allow the cement to flow into the air gap. The dust cover should be removed and wash up by using the washup adjustment.

DIAL POINTER AND COMPASS DRIVE HOOK-UP:

The drive hook-up for the dial pointer and the variable condenser is illustrated.

--END--
USE ONLY WITH ALTERNATING CURRENT

UNLESS OTHERWISE SPECIFIED ON BACK OF CHASSIS, THIS RECEIVER IS FOR USE WITH 105 TO 120 VOLT ALTERNATING CURRENT ONLY.
ELECTRICAL SPECIFICATIONS

Power Supply: 5 to 8 volts D.C. Starting current: 6 amps for 1 second
No current used while at rest
Returning current: 5 amps for 2 seconds

GENERAL INFORMATION AND SERVICE HINTS

MOUNTING MOTO-MATIC TUNER:

Fasten mounting brackets A and B to receiver with four #8-32 machine screws and lockwashers.

Determine the angular position of key in variable condenser drive fitting that is located directly under the tuning cable opening in the radio case. Lower Moto-matic tuner into place between mounting brackets and rotate shaft on Moto-matic tuner so that slot has the same angular position as the key on variable condenser drive fitting. When lowered all the way into place no play should exist between key on variable condenser drive fitting and the slot on Moto-matic shaft. This is very important, and if there is play it should be corrected by lightly pinching together the slot on Moto-matic shaft.

Fasten tuner with four #8-32 machine screws and lockwashers, remove plug button C as shown in Fig. 1 and plug in power lead.

NOTE: Check worm gear on the gang condenser for slipping of the clutch which is provided, as this will cause the tuner to tune inaccurately. This gear should not slip except when the condenser plates are all the way open or all the way closed, when the worm is rotated in the direction to open or close the plates.

SUBJECT: ADDITION OF A DRIFT COMPENSATING CONDENSER TO MAINTAIN ACCURACY OF STATION TUNING.

A drift compensating condenser, to eliminate frequency drift of the receiver as it warms up, is available from source 101. This condenser is connected across the oscillator trimmer as shown by the Schematic sections in this Supplement.

CHASSIS 101.496 & 101.496X

AUGUST 25, 1938

CHASSIS 101.495 & 101.495X
ALIGNMENT PROCEDURE

Before attempting to align the receiver check to see that the dial pointer is in a horizontal position when the gang condenser is in full mesh. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full mesh position.

Output meter connections:
- Across voice coil leads
- 0.500 watts
- See chart below

Connection of Generator Ground:
- Receiver chassis

Connection of Generator Output Lead:
- See chart below

Position of volume control:
- Maximum clockwise

<table>
<thead>
<tr>
<th>DUTY ANT.</th>
<th>CONNECTION OF SIG. GENERATOR WITH SIG. GEN.</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RANGE SWITCH POSITION</th>
<th>RECEIVER DIAL SETTING</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>SENSITIVITY MICRO-VOLTS</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>.002 MFH AMPLIFIER</td>
<td>CONTROL GRID OF 6AE-9 TUBE</td>
<td>465 KC</td>
<td>AMERICAN &quot;AM&quot; (Center)</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1-2</td>
<td>2nd I.F.</td>
<td>85</td>
<td>ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>465 KC</td>
<td>AMERICAN &quot;AM&quot; (Center)</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>3-4</td>
<td>1st I.F.</td>
<td>-</td>
<td>ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>1500 KC</td>
<td>AMERICAN &quot;AM&quot; (Center)</td>
<td>1500 KC</td>
<td>5</td>
<td>WAVE TRAP</td>
<td>-</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>1500 KC</td>
<td>AMERICAN &quot;AM&quot; (Center)</td>
<td>TUNE TO 1500 KC GENERATOR SIGNAL</td>
<td>7</td>
<td>&quot;AMERICAN&quot; ANTENNA (Series Pad)</td>
<td>40</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>600 KC</td>
<td>AMERICAN &quot;AM&quot; (Center)</td>
<td>TUNE TO 600 KC GENERATOR SIGNAL</td>
<td>8</td>
<td>&quot;AMERICAN&quot; OSCILLATOR (Series Pad)</td>
<td>30</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY STOPPING TRIMMER AND BUMPING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>14 MC</td>
<td>FOREIGN &quot;FM&quot; (Counter-Clockwise)</td>
<td>14 MC</td>
<td>9</td>
<td>&quot;FOREIGN&quot; OSCILLATOR (Shunt)</td>
<td>-</td>
<td>ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUMING IN IMAGE AT APPROX. 15 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 15 MC. WITH TRIMMER SCREW PANther OUT, RECHECK IMAGE.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>14 MC</td>
<td>FOREIGN &quot;FM&quot; (Counter-Clockwise)</td>
<td>14 MC</td>
<td>10</td>
<td>&quot;FOREIGN&quot; ANTENNA</td>
<td>30</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY STOPPING TRIMMER AND BUMPING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher
Compliments of www.nucow.com


SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPh PICKUP JACKS:

Part number 1015119581 jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101. Retail selling price is $9.92.

The schematic section on the back of this sheet shows the connections.

If a crystal pick-up is used, a filter composed of a .01 ufd capacitor and a 100 ohm resistor connected in series, should be connected across the pick-up to prevent excessive base response. This filter will also act as a partial scratch filter.
The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 460 kHz is known, the generator should be adjusted to the frequency of that station instead of 460 kHz.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AFC action of the receiver ineffective.
BATTERY REPLACEMENT:

The dry cell volt "A" battery should be replaced when its voltage drops to 5.4 volts, under load. The dry cell volt "D" battery should be replaced when the voltage of the battery has dropped to 4.5 volts, under load. The life ratings of the various size batteries, given on the next page, are for an average use of three hours a day.

THE "A" CIRCUIT:

Since the "A" supply is four volts and the tube filaments are rated at two volts, a series parallel arrangement is used for the filament circuit. A simplified diagram is shown below. If any one tube burns out (except the 1N40 first AP), the filament voltage and current of the other tubes will be affected.

A catalog #6000 adapter must be used on the "A" cable plug when a storage "A" battery is used. The owner should be warned not to attempt the use of a six volt automobile storage battery. Only a four volt storage "A" battery should be used.
MOTOR COIL WIRING

POWER SUPPLY RATINGS AVAILABLE

FREQUENCY RANGE:
Broadcast ................................... 540-1,720 kc
ALIGNMENT FREQUENCY:
Broadcast .................................. 1,500 kc (osc., ant.)
INTERMEDIATE FREQUENCY

Loudspeaker:
Centring of the loudspeaker voice-coil is made in the usual manner with three, narrow-paper feelers, after first removing the front dust-cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid after adjustment has been completed.
## Alignment Procedure

**Preliminary:**
- **Model:** 6659, 6158 Chassis 101-517
- **Across speaker voice coil output:** 1.0 volt
- **Approximate average sensitivity in microvolts for 1.0 volt output:**
- **Dummy antenna variable to be inserted in series with generator output:**
- **Connection of generator output lead:**
- **Connection of antenna ground lead:**
- **Generator modulation:** 50% 400 cycles
- **Position of Volume Control:** Fully clockwise
- **Position of Dial Pointer with variable tuning condenser fully closed:** To coincide with horizontal lines on dial

### Alignment Procedure Details

<table>
<thead>
<tr>
<th>Position of Dial Pointer</th>
<th>Generator Frequency</th>
<th>Dummy Antenna</th>
<th>Generator Connection</th>
<th>Trimmed</th>
<th>Trimmer Function</th>
<th>Approximately Micro-ams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low End</td>
<td>1,500 kc</td>
<td>1,500 mfd</td>
<td>648 Grid</td>
<td>L5, L6</td>
<td>2nd IF Trans.</td>
<td>15,000</td>
</tr>
<tr>
<td>Low End</td>
<td>455 kc</td>
<td>0.001 mfd</td>
<td>647 Grid</td>
<td>L5, L6</td>
<td>1st IF Trans.</td>
<td>270</td>
</tr>
<tr>
<td></td>
<td>1,500 kc</td>
<td>1,500 mfd</td>
<td>Ant. Lead</td>
<td>C19, C3</td>
<td>Osc. Ant.</td>
<td>25</td>
</tr>
</tbody>
</table>

**Important Alignment Notes:**

- Trimmer C17, on opposite side of gang condenser from C18, should be screwed clockwise for maximum capacity before adjusting C18.

Each step of the alignment should be recorded in original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the action of the meter from interfering with accurate alignment.

### Eliminating Whistle at 910 KC

A whistle, due to a heat between the second harmonic (910 kc) of the 455 kc IF, and a 910 kc signal may be experienced. In localities where the 910 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 880 and 940 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would be least objectionable, the IF should be realigned at 457.5 kc. Try to select the new IF frequency as near to 455 kc as possible.

### Eliminating Whistle at 930 KC

A whistle, due to a heat between the second harmonic (930 kc) of the 455 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 890 and 970 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 930 kc would be least objectionable, the IF should be realigned at 465 kc. Try to select the new IF frequency as close to 465 kc as possible.

### Operating Features

- **Phonograph Radio Operation:**
- **Magnet-sinking, spokeshave-type motor:**
- **Two-pole Time Control:**
- **Automatic Volume Control:**

### Chassis Features

<table>
<thead>
<tr>
<th>Input Stage</th>
<th>Output Stage</th>
<th>One Antenna</th>
<th>Double or Conventional Line Noise Electronic Transformer Unit</th>
<th>Magnet Core Adjusted IF Transformers</th>
</tr>
</thead>
</table>

---

**Locations of Parts on Top of Chassis:**

**Locations of Parts Under Chassis:**

---

© John F. Rider Publisher

Compliments of www.nucow.com
1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilograms) that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, shortwave stations that can be tuned in on the #8, #12, or #16 no bands can be set up for push button tuning. The stations included must give good and reliable reception. The band switch knob must be turned to the proper position for the stations selected.

2. Pull the volume control and tuning knobs off of their shafts. Remove the snap-in buttons that are covered by the knobs. The escutcheon (the plate through which the push buttons protrude) can then be removed. Be careful not to lose the snap-in buttons.

3. Replace the tuning knob on its shaft. Push the knob in and turn it so that the dial pointer comes to the left end of the dial. A key will be found in the instruction leaflet envelope. Engage this key with the slotted shaft that is between the tuning knob and the push buttons. Unblock the mechanisms by pushing the shaft in and unscrewing it from counter-clockwise as far as it will go. Do not force it. About 6 turns is sufficient to loosen it completely. (A screwdriver can be used for unlocking the mechanism instead of the key supplied.) Then remove the key.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in, as indicated by the dial pointer being at the right end of the dial. When this is accurately tuned you will be able to turn the push button which is connected with the tuning knob, making sure not to turn the tuning knob. (Turning the knob while the push button is pushed in would spoil the accuracy of the adjustment.)

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately, then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. Then lock the mechanism by securely tightening (turning clockwise) the slotted shaft, using the key supplied or a screwdriver.

7. Punch out the cell letters of your desired stations from the cell letter sheets supplied. Insert the cell letters in the celluloid holders at the back of the escutcheon. Be sure to insert the cell letters so that they are opposite their respective push buttons. Then replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanisms as described in Step 5. Adjusting the tuning to the new station, as described in Step 4, and then relocking the mechanism as described in Step 6. The cell letters of the new station should be inserted in the cell letter holder in their proper position.

OPERATION:

Push the button, indicated for your desired station, all the way in. Your station will then be tuned in, as selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating that station is tuned in, until you push another button or the tuning knob.
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.517

SEARS-ROEBUCK & CO.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE 115 VOLS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

INTERMEDIATE FREQUENCY

465 kc

FOR TUBE DATA AND ALIGNMENT, SEE INDEX

ALIGNMENT FREQUENCIES:

Oscill. Ant.-Trans.

Frequency Ranges:

Band "AM" 540-1750 kc
Band "FM" 9.0 to 18.1 kc
Band "VHF" 9.4 to 5.7 kc
Band "II" 11.8 to 12.1 kc
Band "II" 14.6 to 15.8 kc

LOAD SPEAKERS:

Type Dynamic

Size 18 inch

Field coil counts 800

App. field coil voltage drop 95 V.

TUBE LAYOUT

6AE6G (3)

6AD6G (3)

6J5G (3)

POWER OUTPUT:

Type Push pull beam tubes

Undistorted 8.5 watts

Maximum 12 watts

POWER SUPPLY:

All models available

100-125 volts, 60-60 cycle, 150 watts

105-125 volts, 25 cycle, 160 watts

57 RL 119

JUNE 27, 1938

©John F. Rider, Publisher
ALIGNMENT PROCEDURE

Model 6070, 6170 Chassis 110.169

Before attempting to align the receiver, check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial scale when the gang condenser is in full open. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full-open position.

Output meter connections: Across voice coil leads

Output meter reading to indicate 0.05 volt per division on 0.50 volt output Average sensitivity in microvolts for 0.05 volt output — See chart below

Connections of Generator Output Leads: See chart below

Dial Antenna and Signal Generator Output Lead: See chart below

Generator modulation: Position of volume control — Maximum clockwise

---

**NOTE:**

The following chart shows the adjustments necessary to align the receiver. The adjustments are given in the form of voltages, microvolts, or divisions of frequency. The voltages and microvolts are given in terms of the 100 microvolt meter, and the frequency adjustments are given in terms of the frequency dial reading.

**Alignment Procedure:**

Model 6070, 6170 Chassis 110.169

Output meter readings to indicate 0.05 volt per division on 0.50 volt output

For Weston Type 671 output meter on 10 volt scale — 9 volts

Average sensitivity in volts for 0.05 volt output — 100 microvolts

Connections of generator output leads — See chart below

Generator modulation — Position of volume control — Fully clockwise

---

**IMPORTANT ALIGNMENT NOTES:**

The following notes should be observed during the alignment procedure:

1. **Shorten the sweep time to 0.1 second.**
2. **Keep the output from the test oscillator at its lowest possible value.**
3. **The sensitivity of the receiver is increased by alignment.**
4. **Values shown under "Microvolts" are only approximate.**

**Alignment Procedure:**

Model 7225 Chassis 110.255

Output meter readings to indicate 0.05 volt per division on 0.50 volt output

For Weston Type 671 output meter on 10 volt scale — 9 volts

Average sensitivity in volts for 0.05 volt output — 100 microvolts

Connections of generator output leads — See chart below

Generator modulation — Position of volume control — Fully clockwise

---

**Alignment Procedure:**

Model 7225 Chassis 110.255

Output meter readings to indicate 0.05 volt per division on 0.50 volt output

For Weston Type 671 output meter on 10 volt scale — 9 volts

Average sensitivity in volts for 0.05 volt output — 100 microvolts

Connections of generator output leads — See chart below

Generator modulation — Position of volume control — Fully clockwise

---

**IMPORTANT ALIGNMENT NOTES:**

The following notes should be observed during the alignment procedure:

1. **Shorten the sweep time to 0.1 second.**
2. **Keep the output from the test oscillator at its lowest possible value.**
3. **The sensitivity of the receiver is increased by alignment.**
4. **Values shown under "Microvolts" are only approximate.**

**Alignment Procedure:**

Model 7225 Chassis 110.255

Output meter readings to indicate 0.05 volt per division on 0.50 volt output

For Weston Type 671 output meter on 10 volt scale — 9 volts

Average sensitivity in volts for 0.05 volt output — 100 microvolts

Connections of generator output leads — See chart below

Generator modulation — Position of volume control — Fully clockwise

---

**IMPORTANT ALIGNMENT NOTES:**

The following notes should be observed during the alignment procedure:

1. **Shorten the sweep time to 0.1 second.**
2. **Keep the output from the test oscillator at its lowest possible value.**
3. **The sensitivity of the receiver is increased by alignment.**
4. **Values shown under "Microvolts" are only approximate.**

**Alignment Procedure:**

Model 7225 Chassis 110.255

Output meter readings to indicate 0.05 volt per division on 0.50 volt output

For Weston Type 671 output meter on 10 volt scale — 9 volts

Average sensitivity in volts for 0.05 volt output — 100 microvolts

Connections of generator output leads — See chart below

Generator modulation — Position of volume control — Fully clockwise

---

**IMPORTANT ALIGNMENT NOTES:**

The following notes should be observed during the alignment procedure:

1. **Shorten the sweep time to 0.1 second.**
2. **Keep the output from the test oscillator at its lowest possible value.**
3. **The sensitivity of the receiver is increased by alignment.**
4. **Values shown under "Microvolts" are only approximate.**
**Preliminary:**

- Output meter connections... Across loud speaker voice coil.
- Output meter reading to indicate 1 watt...
- Average sensitivity microvolts for 1 watt output...
- Generator ground lead connection...
- Dummy antenna value to be in series with generator output...
- Connection of generator output lead...
- Generator modulation...
- Position of Volume Control...
- Position of Antenna Tap...

The chassis must be in its case although the covers may be removed during the alignment procedure.

**Alignment Procedure**

<table>
<thead>
<tr>
<th>Position of Variable</th>
<th>Generator Frequency</th>
<th>Dummy Antenna</th>
<th>Generator Connection</th>
<th>Trimmer Adjustments (in Order)</th>
<th>Trimmer Function</th>
<th>Approximate Microvolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>355 kHz</td>
<td>.1 nfd.</td>
<td>SANS Grid</td>
<td>T2, T1</td>
<td>IF</td>
<td>600 600</td>
</tr>
<tr>
<td>Fully Open</td>
<td>1520 kHz</td>
<td>.0028 nfd.</td>
<td>Antenna Conn.</td>
<td>T7</td>
<td>Oscillator, Trim</td>
<td>1.5 1.0</td>
</tr>
<tr>
<td></td>
<td>1400 kHz</td>
<td>.0028 nfd.</td>
<td>Antenna Conn.</td>
<td>G1, G6</td>
<td>Antenna, Transl</td>
<td>1.5 1.0</td>
</tr>
<tr>
<td></td>
<td>600 kHz (rock)</td>
<td>.0003 nfd.</td>
<td>Antenna Conn.</td>
<td>G7</td>
<td>Padder</td>
<td>2.8 2.0</td>
</tr>
</tbody>
</table>

**Model 6101-C165**

The variable should be rocked back and forth a degree or two while making the 600 kHz adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

**Operating Features:**

- Automatic Volume Control

**Locations of Parts Under Power Supply**

- Use insulated Type Resistors for Replacement Where Used Originally

**Chassis Features:**

- Automatic Tone Control
- Number RF stages: One
- Number IF stages: One
- Number condensers in gang: Three
- Tapped antenna coil for matching antenna capacity.
- Variable antenna trimmer
- Non- synchronous vibrator
- Provision for combined Tune and Sensitivity control unit accessory.
- Provision for Push Button Automatic Motor Tuner Accessory.
- Provision for Auxiliary Speaker.

**With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.**
Compliments of www.nucow.com
THE ANTENNA:
MODEL 6125, CHASSIS 101,627.

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna lead-in.

THE FILAMENT CIRCUIT:

All of the tubes are connected in series. Accordingly, if any one tube burns out, the others will not light. The full line voltage will appear across the heater prongs of the burnt out tube. The power cord contains a resistor, in series with the tube heaters, and it is normal for the cord to become warm during operation.

LOCATIONS OF PARTS ON TOP OF CHASSIS:
MODEL 6125, CHASSIS 101,627.

LOCATIONS OF PARTS UNDER CHASSIS:

LOCATIONS OF PARTS UNDER CHASSIS.
Push Button Tuning Mechanism:
The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any predetermined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft—(See Figures 1 and 2.) The scissors gear prevents back-lash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

The cams (Figure 2) which determine the stop points for each button are mounted on the push arms and are locked in place by the locking screws and lock-shoes, which press firmly against the cams when the locking screws are tightened. Care should be used when locking screws are tightened not to use excessive force as the threads may become damaged or stripped.

Adjustments for Push Button Tuning are very easily made. To adjust a push button for any station proceed as follows:

1. Pull the push button off the push arm.
2. Loosen the cam locking screw one-half turn.
3. Using the Dial Tuning Control turn in the station.
4. Press the push arm in as far as it will go and accurately retune station.
5. With the push button still held down, tighten cam locking screw.
6. Replace the push button.

With the locking screw tight, the cam is locked in position and when the button is pushed in, the cam pressure causes the rocker plate to assume the position that tunes in the desired station (See Figure 2.)

Manual Tuning Dial:
A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. Figure 6 shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.
FREQUENCY RANGE: 545-1790 kc
OPERATING FEATURES:
Push button tuning (8 button)
Frequency calibrated tuning knob
POWER OUTPUT:
Type: Pentode
Undistorted: 0.85 watts
Maximum: 1.6 watts

ALIGNMENT FREQUENCY: 1400 kc
CHASSIS FEATURES:
Number of RF stages: Two
Number of stages in gang: Two
Antenna: Attached
LOUD SPEAKER:
Type: Dynamic
Size: 5"
ADJUSTING THE PUSH BUTTONS:

Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune to the desired station while the button is held firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Push the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.

**TUBE, SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.**

**OCT. 6, 1938**

ALIGNMENT PROCEDURE:

Either a separate aligner or a 200 meter standard generator can be used. The standard generator used should be regulated so that the output signal is just audible in order to have alignment. The set has no A.C. coupling, so that a tone may not be used.

SEARS ROEBUCK & CO.

SEARS PAPERS PAGE 1972

CHASSIS FEATURES:

- Number of Wires: 30 wires
- Number of Connectors: 1 connector
- Number of Resistors: 2 resistors
- Number of Capacitors: 1 capacitor
- Number of Diodes: 1 diode
- Number of Transformers: 1 transformer
- Number of Inductors: 1 inductor
- Number of Switches: 1 switch
- Number of Light Bulbs: 1 light bulb
- Number of Motors: 1 motor
- Number of Speakers: 1 speaker

SEARS PAPERS PAGE 1972

APPENDIX D: ADJUSTING THE PUSH BUTTONS:

1. Push button tuning (6 button)
2. Frequency calibrated tuning knob
3. POWER OUTPUT: Type: Pentode, Undistorted: 0.85 watts, Maximum: 1.8 watts
4. POWER SUPPLY: All models available: 115-125 volts, 50-60 cycles, 40 watts
5. FREQUENCY RANGE: 540-1720 kc

ALIMENTATION: 1400 kc
Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs, supplied.

Be careful not to drop the call letter tags inside the receiver when inserting them in the push buttons.

ALIGNMENT PROCEDURE:
Either a BC Station or of about 1400KC or a sig. gen. can be used for align. Chassis to be removed for C9 trimmer align.—Volume Cont. setting be reduced so signal is just audible to facilitate accurate adj.

This set has no AVC so that a strong input signal may be used.
Compliments of www.nucow.com

CAUTION: Under certain conditions, the chassis may be above ground potential by an amount equal to the line voltage. Accordingly, appropriate precautions should be taken when working on the chassis. 6U7G

6J8G

INTERMEDIATE FREQUENCY . . . . . . 455 kc

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 Volts.

WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SPAKER PLUG CONNECTIONS

1. Yellow
2. Black
3. Brown
4. Blank
5. Green

PRONG VIEW

PUSH BUTTON TUNING

SETTING UP:

Unscrew (turn counter-clockwise) the push button two or three turns. (Use a penny in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time turn in your desired station. With your station tuned in, look at the adjustment by tightening the push button knob (turn clockwise). Hold the button in while tightening it. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.
DIAL LIGHT REPLACEMENT:
The lamps that illuminate the push button call letters are made accessible for replacement by removing the push button escutcheon.

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:
Part number 1015119531 jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.
Compliments of www.nucow.com
HOW TO SET UP AND USE YOUR PUSH BUTTON TUNER.

1. SET UP TUNER:
A. Turn on the set and allow it to operate at least one quarter hour before setting up the buttons below.

B. Turn a list of station call letters for one nearby powerful broadcast station for which you wish to set one of the buttons. Make sure the station is clear of any jamming stations on its right, and unobstructed by other stations on its left. Make sure the button is set to the correct frequency of the desired station by using a frequency counter. The buttons are numbered 1 to 10. All buttons are numbered on the front panel of the set.

C. After setting the button, the setting is complete. The station call letters will be printed on the front of the set, and if desired, on the rear of the set. This allows easy access to the station list.

2. USE THE TUNER:
A. Turn on the set and allow it to operate at least one quarter hour before setting up the buttons below.

B. Turn a list of station call letters for one nearby powerful broadcast station for which you wish to set one of the buttons. Make sure the station is clear of any jamming stations on its right, and unobstructed by other stations on its left. Make sure the button is set to the correct frequency of the desired station by using a frequency counter. The buttons are numbered 1 to 10. All buttons are numbered on the front panel of the set.

C. After setting the button, the setting is complete. The station call letters will be printed on the front of the set, and if desired, on the rear of the set. This allows easy access to the station list.
SUBJECT: ADDITION OF VOLUME CONTROL WITH A "MASTER" SWITCH.

There has been effected a change to further promote the satisfaction to be derived from this equipment by the incorporation of a volume control with the "Master" switch control.

To place the volume control in a position for easier operation, the "Master" switch has been placed on the right hand side of the equipment, the "Motor" switch taking up its position on the left hand side of the equipment.

To place the equipment in operation, the right hand switch marked "Master" should be turned on and advanced to the limit of its clockwise turn, which will place the volume control "Full-on" slightly to the left of the right hand control will be noticed a small metal cap. This should be prised up with the screw driver furnished to gain entrance to the tuning control, instead of making this adjustment from the bottom as directed — then the usual procedure should be gone through as indicated under "Set Up Procedure".

The volume control can now be set at a level indicated by the satisfaction of the user. Turning the control to the right increases volume, turning it to the left decreases volume.
**Electrical Specifications**

**Type Complement:**
- 647: Model-oscillator
- 642: Receiver

**Frequency Range:**
- The frequency range is 750 to 840 kilocycles.

**Power Supply:**
- Model 6226 is supplied for operation from 110 to 120 volts, 60 cycles AC only.
- 85 cycles and 50 cycles units are available by special order.
- Power Consumption: 50 Watts.

**Mechanical Specifications:**

**Operating Controls:**
- Left hand knob: "Master" switch
- Right hand knob: "Motor" switch

**Control Operation:**
- Turning the "Master" switch to control power supply to the receiver.
- Turning the "Motor" switch to control power supply to the motor.
- When turning on, the "Master" switch should be turned off during operation or changing of records, and the table should be stopped when changing records by turning switch off to the left.

**Notes:**
- In changing records, operate only the right hand control. The pilot light will illuminate the transmitter for receptivity on the receiver.
- The volume control should be turned off when changing records and the motor should be started or stopped by the use of the master control.
- The quality of the tone response will be destroyed by the use of a radio receiver. For full tone response a good receiver should be used.
- It is essential that the tone channel selected for operation of the record player should be practically free from noise or hum.
- A few types of phonograph records, including some symphony recordings, give a heavy signal when used with modern record players and better results can be secured with these records by the use of soft tone bands.

**Operational Check:**
- The Model No. 6226, carrying identification no. 125-600, is so designed that it has a tuning range of 750 to 840 kilocycles. This range is selected on the inner part of the broadcast band and is ample in latitude because in any geographical location there will be found a space somewhere in this latitude of frequency where a powerful carrier does not exist and satisfactory operation may be had by tuning the equipment to this frequency. This section of the broadcast band is chosen because there are more clear channels in this part of the frequency band than in the higher part of the band.

**Summary:**
- This wireless remote record player is designed to be connected to any additional antenna and during such times there is high atmospheric interference or unreliability of the receiver, it is advisable to turn off the receiver when the antenna is not in use.

**Price Sheet:**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Section Location</th>
<th>Description</th>
<th>Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>1234-02</td>
<td>1234-02</td>
<td>Radio Tube</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Authorized Replacement Parts for this model may be obtained from any Sears, Roebuck & Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.**
SEARS ROEBUCK & CO.

ALIGNMENT PROCEDURE

Either a broadcast signal between 1400 and 1500 KHz may be used.

The antenna of the receiver should be extended as in normal use. Tune in a station between 1400 and 1500 KHz. and adjust the trimmers on top of the variable condenser for maximum signal.

If a signal generator is used, extend the antenna as described above, run a wire from the generator parallel to, but insulated from the antenna. Set the generator at 1720 KHz. Turn the variable condenser all the way to the right (minimum capacity). Tune in the signal from the generator with the trimmer on the front section of the variable condenser. Set the generator at about 1400 KHz. Tune in the signal and adjust the trimmer on the rear section of the variable condenser for maximum signal.

The signal generator method is most satisfactory and should always be used when available.

CAUTION:
Under no condition should a ground be attached to this receiver, also no grounded object should be allowed to come in contact with the chassis.

POWER SUPPLY:
105-125 volts, 50-60 cycle or D. C. 45 Watts on 115 volt line.

FREQUENCY RANGE:
Broadcast and other services 540 to 1720 KHz.

POWER OUTPUT:
Type: Beam Power
Undistorted: 1 Watt
Maximum: 2.0 Watts

ALIGNMENT FREQUENCIES:
1720 and 1000 KHz.

LOUD SPEAKER:
Type: Dynamic
Size: 3/4
Field Resistance: 450 Ohms

MECHANICAL SPECIFICATIONS

CONTROLS:
Upper Knob: Tuning
Lower Knob: Volume control, On-Off Switch

CONTROL OPERATION:
Direct Drive
Turn right to turn power on and to increase volume.

© John F. Rider, Publisher
THE ALIGNMENT PROCEDURE

The following alignment instructions are given with the assumption that the service station has an oscillator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be 0 to 5 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 4s power tube in series with an 8 MFD paper condenser.

1. THE I.F. STAGES

The I.F.'s are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6A7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers number C1, C2, C3, C4. (See pictorial diagram).

The sensitivity of the I.F. stages will be 40 microvolts or better.

Always use as low an output as possible from the test oscillator in making the various adjustments.

II. ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be easily lined up by loosening the set screw behind the dial card in the drive hub.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale).

3. Peak trimmer condenser C-11 of the oscillator coil ( See pictorial 6-2) to resonance with 17 M.C. fed into antenna.

4. Peak Ant. coil trimmer C-7 at same setting to 17 M.C.

III. SHORT WAVE BAND 1.7 TO 5.5 M.C.

1. Turn wave switch to middle position.

2. Set dial hand to 5 megacycles on the 1.7 to 5.5 M.C. inner scale.

Peak oscillator trimmer C-10 to 5 M.C. from test oscillator. And Ant. coil trimmer C-6 to same frequency.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the alternator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV. THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale).

2. Peak oscillator trimmer C-9 to 1400 KC, the Antenna preselector C-12 (variable condenser trimmer) to 1400 KC, and trimmer C-5 to 1400 KC.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C-8 to 550 KC.

4. Recheck dial at 1400 KC as in number (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

V. NOTES

1. Seal all trimmers after their final adjustment.

2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

3. Refer to the schematic for the voltages at the tube sockets.
ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>CONNECT</th>
<th>SIGNAL</th>
<th>RECEIVER</th>
<th>RECEIVER</th>
<th>TRIMMER</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNAL</td>
<td>GENERATOR</td>
<td>DIAL</td>
<td>WAVE BAND</td>
<td>SWITCH AT</td>
<td></td>
</tr>
<tr>
<td>GENERATOR</td>
<td>FREQUENCY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6A7 Grid 456 KC
Antenna 6. MC 6. MC SW
Antenna " " " "

Note: SW low frequency padder, not to be adjusted, but must oscillate at 2.5 MC.

Antenna 1720 KC 1720 KC BC
Antenna 1720 KC 1720 KC BC

Antenna 600 KC 600 KC BC
Antenna 1720 KC (Recheck 1720 KC alignment for maximum output)

*1- Located under chassis near electrolytic condenser.
*2- " on top of chassis near dial.
*3- " under chassis near outer edge.
*4- " on top of chassis near IF transformers.
MODEL 7176
Schematic, Socket, Trimmers
Alignment

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL VIII

LEGEND
C17 - 350 MFD. Var. Cond.
C24 - 5 MFD. 35V. Elect.
C25 - 16-8-5 MFD
C58 - .005 MFD. 800V.
C315 - .01 MFD. 200V
C316 - .01 MFD. 400V
C320 - .02 MFD. 200V
C330 - .05 MFD. 200V
C336 - .1 MFD. 400V
C401 - .0001 Mica
R13 - 50 OHMS.
R51 - 135 OHM. Cord ohm
R68 - 400 OHMS
R307 - 2,500 OHMS
R316 - 15,000 OHMS
R322 - 50,000 OHMS
R328 - 1 MEG.
RE408 - 300,000 OHM Vol. Cont.
P.L. - Pilot Lights
S.L. - Speaker Field

© John F. Rider, Publisher
Compliments of www.nucow.com
POWER SUPPLY: All models 105-125 volts, 50-60 cycle or DC, 40 watts

FREQUENCY RANGE: Broadcast ............... 540-1470 KC

POWER OUTPUT: APRIL 7, 1938
Type .......... Beam Power
Undistorted ...... 1 watt
Maximum .......... 1.5 watts

POWER SUPPLY: All models 105-125 volts, 25-60 cycle or DC, 35 watts

FREQUENCY RANGE: Broadcast ............... 540-1700 KC

POWER OUTPUT: APRIL 7, 1938
Type .......... Single Pentode
Undistorted ...... .3 watts
Maximum .......... .6 watts
This radio leaves the factory with the push button unset, and the user will have to make the necessary adjustments for setting the buttons.

The following is the procedure to be followed in making the adjustments for each station.

1. Decide on the station you wish to receive.
2. Tune the set to the station you wish to receive. Then, with the tuning control in the middle position, adjust the volume control for maximum volume.
3. Turn the tuning control slowly to the left until the station is tuned in. Then, adjust the tuning control slowly to the right until the station is tuned out. Repeat this process until the station is tuned in the middle of the dial.
4. Move the tuning control to the right end of the dial and adjust the volume control for maximum volume. Then, move the tuning control to the left end of the dial and adjust the volume control for maximum volume.
5. Repeat this process until the station is tuned in the middle of the dial.

Each station has two knobs, one for tuning and one for volume. The tuning knob is used to tune the station into the middle of the dial, and the volume knob is used to adjust the volume of the station.}

IMPORTANT ALIGNMENT NOTES

When indicated by the word, "Room", the variable should be rocked back and forth a degree or two while making the adjustments.

Always keep the output from the test oscillator at the lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.
SEARS-ROEBUCK & CO.

MODEL 7220, Ch.110, 7220

Schematic Notes

**ELECTRICAL SPECIFICATIONS**

**APRIL 7, 1938**

**TUBES AND FUNCTIONS:**

- 6A7: Translator-Oscillator 25160 Output
- 6C6: IF 2525 Rectifier
- 75: AVC, detector, 1st audio M494E Ballast tube

**POWER SUPPLY:**

All models available 105-125 volts, 25-60 cycle or DC, 45 watts

**FREQUENCY RANGES:**

- Broadcast 540-1700 KC
- Short Wave 2150-7200 KC

**POWER OUTPUT:**

- Type Beam Power
- Undistorted 0.6 watts
- Maximum 1.5 watts

**ALIGNMENT FREQUENCIES:**

- Oscil. Pedder
- Trimmer Pedder
- Broadcast 1500 KC 6000 KC
- Short Wave 6 MC Fixed

**LOUD SPEAKER:**

- Type Dynamic
- Size 5"
- Field resistance 450 ohms

**OPERATING CONTROLS:**

- Left Knob "On-Off" switch, volume control
- Center Knob Wave change switch
- Right Knob Tuning

- Control Operation: Turning right; power on; volume increase
- Left Foreign; right Broadcast

Under certain conditions, the chassis may be above ground potential. Do not allow any grounded object to come into contact with the chassis while the line cord is plugged in. Also, be careful when working on the chassis out of its cabinet, to avoid shocks.

If the power supply is DC, the power cord plug must be in its receptacle in the proper way. If the receiver does not operate after being turned on for a minute, reverse the polarity by removing the power cord plug from its receptacle and turning it half way around before re-inserting it in the receptacle.

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 7215 50, 110, 7215
Schematics, Socket, Tuner
Trimmers

SEARS-ROEBUCK & CO.

POWER SUPPLY:
All models available
105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast
540-1700 KC

ALIGNMENT FREQUENCIES:
Oscill. Oscill.
Trimmer Fader

Broadcast
1500 KC
600 KC

POWER OUTPUT:
Type
Beam Power
Undistorted
1.2
Maximum
1.8

LOUD SPEAKER:
Type
Dynamic
Size
5"

AUTOMATIC TUNING CONTROL:
There are six buttons on the front panel. Five of them can be set so that by simply pushing the button marked with the station's call letters, any of five different broadcast stations can be received.

The sixth button is used to cut out the automatic tuning and convert the set for use with the regular dial and manual tuning.

AUTOMATIC TUNING ADJUSTMENTS

APRIL 7, 1938

©John F. Rider, Publisher
SEARS-ROEBUCK & CO.

MODEL 7225, Ch. 110, 255
Schematic, Socket, Trimmers, Voltage, Alignment

FOR TUNER, SEE INDEX

POWER SUPPLY:
All models available . . . . . . . . . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 540-1740 KC

ALIGNMENT FREQUENCIES:
Osc. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Osc. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
Broadcast Trimmer Padder
1600 KC 600 KC

POWER OUTPUT:
Type: Beam Power . . . . . . . . . . . . . . . . . . . . . . . . . . 1.
Undistorted . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 1.6
Maximum . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 1.6

LOUD SPEAKER:
Type: Dynamic
Size: 5"
Field resistance: 450 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
Left knob, "On-Off" switch, volume control
Upper Right knob . . . . . . . . . . . . . . . . . . . . . . . . . . tuning

CONTROL, OPERATION:
Turning right; power on; vol., increase

©John F. Rider, Publisher
Compliments of www.nucow.com
THE GROUND:

In noisy locations, it may be desirable to connect the black lead in rear of chassis to a water pipe or radiator. This may eliminate much of the interference.

CAUTION: Do not connect a ground wire directly to the chassis; otherwise harm will result.

©John F. Rider, Publisher
SERVICE NOTES for “AUTOMATIC-TUNE” WHEEL DIAL

Used with Models 76R, 78SR, 82A, 82A5, 86A5, 813, and 828

DIAL MECHANISM

When installing Part No. 4000 Glass Assembly with No. 4005 shaft attached: Carefully follow procedure in order given:
(a) Insert No. 4005 shaft into main bushing attached to the cadmium plated bracket on back of dial face.
(b) Place steel spacer washer and brass tension spring in order named over end of No. 4005 shaft.
(c) Place the small die cast primary pulley No. 4009 on shaft—do not tighten No. 2754 set screws.
(d) Loosen the two set screws in brass spacer collar on the No. 4005 shaft.
(e) Adjust brass spacer collar—by sliding collar on shaft—so that there will be approximately 1/8" clearance between the bottom of metal tab holder and the face plate. Firmly retighten brass collar and No. 2754 die cast pulley set screws. Failure to provide proper clearance will result in scratches on dial face and the dial mechanism will not operate freely.

TO INSTALL No. 3814 PRIMARY DRIVE CORD:
(a) Looking at back of dial, wrap dial cord twice around No. 4355 drive shaft in clockwise direction.
(b) Hook No. 3462 tension spring into loops of end of dial cord.

NEVER LOOSEN THE FOUR SCREWS THAT HOLD THE CADMIUM PLATED BRACKET TO DIAL FACE—OTHERWISE THE MAIN BUSHING WILL BE THROWN OUT OF CENTER.

REPLACING No. 4000 GLASS SCALE ASSEMBLY
As it requires special tools to properly set part No. 4005 shaft assembly on part No. 4000 glass scale—we will ship all orders for No. 4000 glass scales with the No. 4005 shaft assembled on the glass scale.
TO INSTALL No. 4013 SECONDARY DRIVE CORD:

The dial mechanism picture shows and refers to eye terminals on drive cord—these were used in early production. Loops made by knots in the cords are now used to attach cord to lugs in the No. 4009 die cast pulley and to the No. 4032 & 4362 tension springs.

(a) Looking at the front of dial rotate dial scale COUNTER-CLOCKWISE until dial stops is reached.
(b) Loosen the two No. 2754 set screws in small die cast pulley No. 4009.
(c) Locking at front of dial turn the small die cast pulley so that the cut out in pulley will be towards the left and approximately in line with the upper edge of the dial light bracket. This bracket which is only used in six volt battery and 110 volt AC models is shown mounted on the button plated dial face plate bracket in dial mechanism picture.
(d) Hook No. 4352 tension spring in dial cord loop.
(e) Turn No. 4011 drum so that the hole in the No. 4012 large die cast pulley—through which the secondary drive cord is pulled—is towards the top of face plate. This will bring the hole approximately in line with the left hand edge (looking at back of dial) of face plate.

Take long end of No. 4013 secondary drive cord—measured from knot at spring to end of cord—then looking at the front of dial, wrap cord one complete turn CLOCK WISE around the No. 4009 small die cast pulley. The other end of the cord (short end) is placed on bottom half of secondary and primary die cast pulleys.

(f) Firmly tighten No. 2754 set screws in small die cast pulley.

**COMPLETE WHEEL DIAL ASSEMBLY LESS ESCUTCHEON**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4016</td>
<td>Celluloid Envelope</td>
<td>.05</td>
</tr>
<tr>
<td>3914</td>
<td>Cord</td>
<td>.15</td>
</tr>
<tr>
<td>4013</td>
<td>Secondary Drive Cord</td>
<td>.15</td>
</tr>
<tr>
<td>3995</td>
<td>Band Indicator Assem.</td>
<td>.75</td>
</tr>
<tr>
<td>3992</td>
<td>Band Indicator Assem.</td>
<td>.75</td>
</tr>
<tr>
<td>4011</td>
<td>Drive Drum Assm. with 4012 Secondary Pulley &amp; Rubber Disc Coupler.</td>
<td>1.25</td>
</tr>
<tr>
<td>4352</td>
<td>Drive Shaft</td>
<td>.12</td>
</tr>
<tr>
<td>3984</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>4024</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>4032</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>3771</td>
<td>Escutcheon</td>
<td>.80</td>
</tr>
<tr>
<td>4017</td>
<td>Frame</td>
<td>.55</td>
</tr>
<tr>
<td>4046</td>
<td>Hub Cap</td>
<td>.55</td>
</tr>
<tr>
<td>4015</td>
<td>Knurled Tab</td>
<td>.05</td>
</tr>
<tr>
<td>4009</td>
<td>Pulley</td>
<td>.45</td>
</tr>
<tr>
<td>4000</td>
<td>Seat</td>
<td>.25</td>
</tr>
<tr>
<td>8071</td>
<td>Screw</td>
<td>.05</td>
</tr>
<tr>
<td>2754</td>
<td>Screw</td>
<td>.01</td>
</tr>
<tr>
<td>4356</td>
<td>Spring Lock</td>
<td>.01</td>
</tr>
<tr>
<td>4355</td>
<td>Spring Tension</td>
<td>.07</td>
</tr>
<tr>
<td>3462</td>
<td>Spring Tension</td>
<td>.07</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4016</td>
<td>Celluloid Envelope</td>
<td>.05</td>
</tr>
<tr>
<td>3984</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>4011</td>
<td>Drive Drum Assm. with 4012 Secondary Pulley &amp; Rubber Disc Coupler.</td>
<td>1.25</td>
</tr>
<tr>
<td>4352</td>
<td>Drive Shaft</td>
<td>.12</td>
</tr>
<tr>
<td>3984</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>4024</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>4032</td>
<td>Disc</td>
<td>.50</td>
</tr>
<tr>
<td>3771</td>
<td>Escutcheon</td>
<td>.80</td>
</tr>
<tr>
<td>4017</td>
<td>Frame</td>
<td>.55</td>
</tr>
<tr>
<td>4046</td>
<td>Hub Cap</td>
<td>.55</td>
</tr>
<tr>
<td>4015</td>
<td>Knurled Tab</td>
<td>.05</td>
</tr>
<tr>
<td>4009</td>
<td>Pulley</td>
<td>.45</td>
</tr>
<tr>
<td>4000</td>
<td>Seat</td>
<td>.25</td>
</tr>
<tr>
<td>8071</td>
<td>Screw</td>
<td>.05</td>
</tr>
<tr>
<td>2754</td>
<td>Screw</td>
<td>.01</td>
</tr>
<tr>
<td>4356</td>
<td>Spring Lock</td>
<td>.01</td>
</tr>
<tr>
<td>4355</td>
<td>Spring Tension</td>
<td>.07</td>
</tr>
</tbody>
</table>

Prices are subject to change without notice.
**Model 56U**

**Eight Tube AC-DC Superheterodyne Receiver**

**ALIGNING I. F. STAGE AT 455 METERS:**

(a) Connect the high side of the test oscillator output to the control grid of the 6AR modular tube through a 400 Mfd. condenser. Leave the grid snap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver base through a 2 Mfd. condenser.

(b) Test oscillator frequency to 655 meters (this must be accurate).

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**ALIGNING 16.5-31.7 METER BAND:**

(a) Connect the high output side of the test oscillator through a 400 ohm resistor to receiver antenna lead and the low side to the set ground through a 0.2 Mfd. condenser.

(b) Check tuning dial adjustment by turning gang condenser until pointer touches maximum capacity stop (complete in mesh), at which point the dial needle must be exactly even with the last line at the high wave length end of the dial calibration. If the dial needle does not point exactly to the last line, move receiver dial to correct position.

(c) Place the band selector switch for operation on the 15.5-31.7 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 16.5 meters. Then tune in the 16.5 METER SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 16.5 METER OSCILLATOR TRIMMER.

**NOTE:** When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE RIGHT PEAK IS USED FOR ALIGNING THE RECEIVER AT 16.5 METERS. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the SECOND PEAK which is the proper one to use is tuned in. If the trimmer is screwed down too far to the point where the first peak is received, the incorrect peak will be tuned in.

(d) Tune the receiver dial and set test oscillator frequency to EXACTLY 16.5 METERS. Adjust 20 meter antenna trimmer for maximum 20 meter test signal sensitivity.

**ALIGNING 172-2140 METER BAND:**

(a) Replace 400 ohm resistor with series with test oscillator lead with a 200 Mfd. condenser, place the band selector switch for operation on the 172-2140 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 172 METERS. BRING IN THE 172 METER TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 172 METER OSCILLATOR TRIMMER.

(b) Set test oscillator frequency and receiver dial to EXACTLY 215 METERS. Adjust 215 meter preset condenser for maximum 215 test oscillator signal sensitivity.

(c) Tune receiver dial and set test oscillator frequency to approximately 500 meters. While rocking gang condenser slightly to right and left adjust 500 meter oscillator paddle for maximum sensitivity.

**Model 67L**

**Six Tube Superheterodyne Receiver**

**ALIGNING LP. STAGE AT 465 KILOCYCLES:**

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead to the grid tap of the 6AF7 tube through a 0.2 Mfd. condenser DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and tune receiver voltmeter control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

**ADJUSTING 465 KILOCYCLE WAVE TRAP:**

(a) Connect the high output side of the test oscillator through 30005 Mfd. condenser to the receiver antenna lead and the low side to the set ground.

(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust the 465 K.C. wave trap trimmer condenser mounted on and accessible through hole in rear of chassis for MINIMUM 465 kilocycle signal response.

**ALIGNING 1720-580 KILOCYCLE BAND:**

(a) Replace band selector switch for operation on 1720-580 kilocycle band and leave test oscillator connected to receiver antenna lead through the 30005 Mfd. condenser.

(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles.

(c) Adjust 1720 K.C. oscillator trimmer to bring in 1720 K.C. test oscillator signal to maximum output.

(d) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(e) Adjust 1400 K.C. antenna trimmer for maximum sensitivity.

(f) Set receiver dial and test oscillator frequency to approximately 1575 meters. Then while rocking gang condenser slightly to right and left adjust 1575 meter padding condenser for maximum sensitivity.

**ALIGNING 23.6 MEGACYCLE BAND:**

(a) Replace 30005 Mfd. test oscillator lead series condenser with a 400 ohm resistor. Adjust band selector switch for operation on 6.3 to 2.3 megacycle band, and tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.

(b) Adjust 6.3 M.C. oscillator trimmer to bring in 6.3 megacycle test oscillator signal to maximum output.

(c) Tune receiver dial and set test oscillator frequency to 5.8 megacycles, and while rocking gang condenser slightly to right and left adjust 5.8 M.C. antenna trimmer for maximum sensitivity.

(d) No adjustment is required at low frequency end of this band as a feed oscillator pod is used.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.
SERVICE NOTES for PUSH BUTTON DIAL

PUSH BUTTON CUP
PLACE PROPER CALL LETTER TAB HERE WITH CELLULOID DISC ON TOP.

PUSH BUTTON CAP
GENTLY PRESS OVER PUSH BUTTON CUP AFTER CALL LETTER TAB AND CELLULOID DISC ARE IN POSITION.

CELLULOID DISC
PLACE ON TOP OF STATION CALL LETTER TAB.

STATION CALL LETTER TAB
PLACE ON TOP OF PUSH BUTTON CUP.

PUSH BUTTON ASSEMBLY

FROM ONE TO TEN STATIONS OPERATING ON FREQUENCIES SEPARATED BY FORTY KILOCYCLES OR MORE MAY BE AUTOMATICALLY TUNED BY PROPERLY SETTING PUSH BUTTONS.

IT IS A SIMPLE MATTER TO "AUTOMATIC TUNE" AFTER THE STATIONS PUSH BUTTONS HAVE BEEN PROPERLY SET, BUT IT IS NECESSARY TO ADJUST THE PULSE BUTTON TO MATCH THE CALL LETTERS AND POPULATION OF THE STATION. PULSING THE CORRECT CALL LETTERS FOR THIRTY SECONDS WILL INCREASE THE FREQUENCY OF THE SELECTED STATION TO THE DESIRED STATION. PULSING THE CALL LETTERS OF ALL STATIONS THE STATION SHOULD BE SELECTED WILL INCREASE THE FREQUENCY OF THE SELECTED STATION IN THE CORRECT DIRECTION.

WHILE A PUSH BUTTON MAY BE SET FOR DISTANT STATIONS, BETTER RESULTS WILL BE OBTAINED IF THE STATIONS SELECTED FOR AUTOMATIC PUSH BUTTON TUNING ARE STRONG NEARBY OR LOCAL STATIONS.

IT IS UNKNOWN WHAT STATIONS YOU WISH TO "AUTOMATIC PUSH BUTTON TUNE" OR THE FREQUENCY USED AND CALL LETTERS OF THESE STATIONS AND SET PUSH BUTTONS BY:

SET STATION PUSH BUTTONS BY:

a. Gently press desired round paper station call letter tabs out of station tabs.
b. Always set the first push button for the station to which all the buttons in the group are tuned to on the lowest frequency. The lowest frequency of this station should be set for all of the stations.

c. Ensure Push Button locking screws are turned as set for all Push Buttons by grasping each screw and gently pulling outward, then turn each screw.
d. Carefully tune the station which broadcasts on the lowest frequency, then tune up the highest station in the group.

e. Slide the Pull button nearest to the lowest frequency and up to the highest frequency of the group of stations to which all the buttons in the group are tuned.
f. Place the printed pages station call letter tabs, having all call letters of stations tuned to on the highest frequency, then place all call letter tabs on top of the highest frequency in the group.

After the ten push buttons have been properly set they will not require further attention. Except when moved from their position or when an additional tab is included, which would disturb the position of the other tabs.

FOR OTHER ASSEMBLIES SEE "AUTOMATIC TUNE" PUSH BUTTON ASSEMBLIES.

PARTS LIST

COMPLETE PUSH BUTTON DIAL ASSEMBLY LESS ESCUTCHEON

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>211</td>
<td>Dial Assembly</td>
<td>Used with Model 91B Complete Assembly Less Escutcheon</td>
<td>$12.75</td>
</tr>
<tr>
<td>212</td>
<td>Dial Assembly</td>
<td>Used with Model 79B Complete Assembly Less Escutcheon</td>
<td>$12.75</td>
</tr>
<tr>
<td>213</td>
<td>Dial Assembly</td>
<td>Used with Model 92A Complete Assembly Less Escutcheon</td>
<td>$12.75</td>
</tr>
<tr>
<td>214</td>
<td>Dial Assembly</td>
<td>Used with Model 62AE &amp; 66AE Complete Assembly Less Escutcheon</td>
<td>$12.75</td>
</tr>
<tr>
<td>215</td>
<td>Dial Assembly</td>
<td>Used with Model 91B Complete Assembly Less Escutcheon</td>
<td>$12.25</td>
</tr>
</tbody>
</table>

MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>4027</td>
<td>Cap</td>
<td>Push Button</td>
<td>.15</td>
</tr>
<tr>
<td>4046</td>
<td>Cable</td>
<td>Station Coil Letter Cover</td>
<td>.05</td>
</tr>
<tr>
<td>4010</td>
<td>Cord</td>
<td>Primary Drive Cord</td>
<td>.15</td>
</tr>
<tr>
<td>4013</td>
<td>Cord</td>
<td>Secondary Drive Cord</td>
<td>.15</td>
</tr>
<tr>
<td>4014</td>
<td>Cap</td>
<td>Push Button</td>
<td>.15</td>
</tr>
<tr>
<td>3990</td>
<td>Cap</td>
<td>Binding Assem. For Model 79B 6/9 &amp; 6/58</td>
<td>.75</td>
</tr>
<tr>
<td>3992</td>
<td>Cap</td>
<td>Binding Assem. For Model 82A 6/9 &amp; 6/68 &amp; 6AE</td>
<td>.75</td>
</tr>
<tr>
<td>4011</td>
<td>Drive Drum Assm. with 602 Secondary Pulley and Rubber Disc Coupler</td>
<td>.25</td>
<td></td>
</tr>
<tr>
<td>4025</td>
<td>Drive Shaft</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>4039</td>
<td>Disc</td>
<td>Translucen Dial Scale Back-aworn for Model 79B</td>
<td>.50</td>
</tr>
<tr>
<td>4044</td>
<td>Disc</td>
<td>Translucen Dial Scale Back-aworn for Model 62AE &amp; 66AE</td>
<td>.55</td>
</tr>
<tr>
<td>4024</td>
<td>Disc</td>
<td>Translucen Dial Scale Back-aworn for Model 82A</td>
<td>.55</td>
</tr>
<tr>
<td>4029</td>
<td>Disc</td>
<td>Translucen Dial Scale Back-aworn for Model 91B 9/58 &amp; 7/68</td>
<td>.50</td>
</tr>
<tr>
<td>4071</td>
<td>Escutcheon</td>
<td>For Cabinets - All Models</td>
<td>1.00</td>
</tr>
<tr>
<td>4040</td>
<td>Hub Cap</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>4009</td>
<td>Pulley</td>
<td>Dial Scale Drive Disk Coat</td>
<td>.45</td>
</tr>
<tr>
<td>4046</td>
<td>Plate</td>
<td>Slide Stop</td>
<td>.10</td>
</tr>
<tr>
<td>4000</td>
<td>Scale</td>
<td>Calibrated Glass Scale With 4005 Shaft Assm</td>
<td>2.75</td>
</tr>
<tr>
<td>4071</td>
<td>Screw</td>
<td>For Hub Cap 3/4 &amp; 1/4&quot; O.D.M.</td>
<td>.06</td>
</tr>
<tr>
<td>2754</td>
<td>Screw</td>
<td>For Pulley 3/4 &amp; 1/4&quot; E.I.H.C. Cup Point</td>
<td>.31</td>
</tr>
<tr>
<td>4327</td>
<td>Screw</td>
<td>Push Button Stop</td>
<td>.10</td>
</tr>
<tr>
<td>4356</td>
<td>Spring Lock</td>
<td>For Drive Shaft</td>
<td>.01</td>
</tr>
<tr>
<td>4302</td>
<td>Spring Tension</td>
<td>For Secondary Cord</td>
<td>.07</td>
</tr>
<tr>
<td>3462</td>
<td>Spring Tension</td>
<td>For Primary Cord</td>
<td>.07</td>
</tr>
</tbody>
</table>

Prices are subject to change without notice.

When ordering parts be sure to mention part number and order all parts from:

Compliments of www.nucow.com
ALIGNMENT PROCEDURE:
Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY. WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:
(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CAP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:
(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .0025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plate touch maximum capacity step (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator pad condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:
(a) Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer on top of coil located underneath chassis.
(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer which is mounted on coil located on top of chassis for maximum sensitivity.
SENTINEL-ERLA MODEL 99AE

ALIGNMENT PROCEDURE:

 Lack of sensitivity, selectivity, or poor tone quality may be due to one or a combination of causes such as weak or defective tubes or speaker, bypass condensers, inductances or excessive leads, loose antenna, etc. Never attempt to adjust set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INEFFECTIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMER AND PADDED CONDENSORS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING 465 KC CYCLE BAND:

(a) Connect the ground lead of the test oscillator to the chassis or set ground post. Connect the other lead of the test oscillator to the grid cap of the 6L7 tube through a .005 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the first I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ADJUSTING 465 KILOCYCLE WAVE TRAP:

(a) Connect the high output side of the test oscillator through a .0025 Mfd. condenser to the receiver antenna "A" post and the low side to the set ground.

(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust 465 kilocycle wave trap trimmer condenser for minimum 465 kilocycle signal response.

ALIGNING 179.411 CYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plateans maximum capacitance stop (completely meshed) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(b) Leave test oscillator lead connected to receiver antenna "A" post through a .00025 Mfd. series condenser.

(c) Adjust band selector switch for operation on 179.411 kilocycle band, tune receiver dial and set test oscillator frequency to EXACTLY 179.411 kilocycles.

(d) Bring in 411 kilocycle test signal to maximum output by adjusting 411 K.C. B.D. oscillator trimmer.


(f) Tune receiver dial and set test oscillator frequency to approximately 150 kilocycles—then while rocking gang condenser slightly to right and left, adjust 150 kilocycle oscillator podder for maximum sensitivity.

ALIGNING 1720-540 CYCLE BAND:

(a) Leave .0025 Mfd. condenser in series with test oscillator lead. Adjust lead selector switch for operation on the 1720-540 kilocycle band.

(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles. ADJUST 1720 KILOCYCLE OSCILLATOR TRIMMER (I) TO BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 160 K.C. antenna (C) and R.F. (f) trimmers for maximum sensitivity.

(d) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser ability to right and left, adjust 600 kilocycle oscillator podder for maximum signal response.

ALIGNING 2.3-7.5 MEGACYCLE BAND:

(a) Replace .0025 Mfd. test oscillator lead series condenser with a 400 ohm carbon resistor.

(b) Adjust band selector switch to 2.3-7.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 7.5 megacycles—then adjust 7.5 megacycle oscillator (D) trimmer for maximum 7.5 megacycle test signal output.

(c) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles—adjust 6 M.C. antenna (E) and R.F. (f) trimmers for maximum sensitivity.

ALIGNING 7.5-24.3 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 7.5-24.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 24.3 megacycles.

(b) Adjust 24.3 M.C. oscillator trimmer (G) to bring in 24.3 megacycle test signal to maximum output.

NOTE: 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 24.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacitance) 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 24.3 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 24.3 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 23.3 megacycles. Then vary the receiver dial slightly to the right and left of 23.3 megacycles and if the fundamental peak was used in aligning at 24.3 megacycles the test oscillator signal will be heard at approximately 23.3 megacycles on the receiver dial.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 20 megacycles.

(d) Adjust 20 M.C. antenna (G) and R.F. (f) trimmers for maximum 20 megacycle test signal response.

To assure most accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

MODELS 144X, 144XB, 149A, 149B, and 159A.

ALIGNMENT PROCEDURE IN TUBULAR FORM

In order to follow procedure correctly and in the order given—otherwise the receiver will be innaccurate and the dial calibration incorrect. For alignment proceed as follows:

NOTE: When adjusting test oscillator trimmers, check tuning dial adjustments by tuning gang condenser until plateans maximum capacitance stop (completely meshed). At which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If this needle does not point exactly to the last line move needle to correct position.

Here again dial adjustment is entered with some type of output measuring device.

Place band
switch for operation on

<table>
<thead>
<tr>
<th>Place band switch for operation on</th>
<th>Set receiver dial to</th>
<th>Adjust test oscillator frequency to</th>
<th>Use dummy antenna in series with, and set test oscillator condenser to</th>
<th>Attach output of test oscillator to</th>
<th>Refer to parts layout diagram for location of trimmers mentioned below each</th>
</tr>
</thead>
</table>
| 5.5 to 18.1 M.C. BAND | 18.1 M.C. | 18.1 M.C. | 540 Ohm carbon resistor | Receiver blue ministrip lead | 15 M.C. antenna trimmer for maximum output.

NOTE: WHEN ADJUSTING THE 5.5 TO 18.1 MEGACYCLE TRIMMER, THE RECEIVER MUST BE TUNED TO THE 18.1 MEGACYCLE OR THE GROUND SMITH SWINGER MUST BE IN THE 18.1 MEGACYCLE Position.
**SENTINEL-ERLA MODEL 107AE**

**ALIGNMENT PROCEDURE:**

Look of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as poor or defective tubes, or speaker, or open or grounded bias resistor, bypass condenser, or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE ERRONEOUS. THE TRIMMERS AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

**ALIGNING LF, STAGE AT 485 Kilocycles:**

(a) Carefully tune in the selected station that broadcasts on the lowest frequency—the number of kilocycles.

(b) Carefully tune in the selected station that broadcasts on the lowest frequency—the number of kilocycles.

(c) Place a little muck into the back of the receiver. Press the paper call letter tab—so that the printed call letters of the station tuned in are at the top of the dial—into the round depression on the cabinet front that is nearest to the dial pointer. By placing the paper call letter tab on the printout the call letter can easily be read with the receiver in either a standing or uprightness position.

(d) Tune in the next station having the lowest station frequency, pressing the call letter for this station into the round cabinet depression nearest to the dial pointer—correcting the signal. This way until station call letters have been placed into all nine cabinet depressions.

After the station call letters are set it will be a simple matter to determine the approximate dial position of any of these stations—just rotate tuning knob until dial pointer needle points to station call letter of desired station. It must be remembered that only the approximate tuning location will be indicated by the dial pointer needle—each station must be correctly tuned in by ROTATING THE TUNING CONTROL KNOB UNTIL A STATION IS TUNED IN WITH GREATEST CLARITY.

**ALIGNMENT PROCEDURE:**

Look of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as poor or defective tubes, or speaker, or open or grounded bias resistor, bypass condenser, inadquate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE ERRONEOUS. THE TRIMMERS AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

**ALIGNING 1720-540 Kilocycle Band:**

**ALIGNING 2.36 MEGACYCLE BAND:**

**MODEL 106A FOR TRIMMER LOCATIONS AND CHASSIS, SEE INDEX**

THIS RADIO IS DESIGNED SO THAT IT MAY BE PLACED IN A HORIZONTAL OR UPRIGHT POSITION. AS THE OPERATION AND PERFORMANCE OF THE RECEIVER IS THE SAME IN EITHER POSITION, IT IS A MATTER OF PERSONAL PREFERENCE AS TO WHICH POSITION TO USE.

The approximate position on the dial that any nine stations will be tuned in may be quickly determined—by pressing paper tab having the station call letters into the round depressions on the front of the cabinet.

THE STATIONS SELECTED MUST OPERATE ON A FREQUENCY 40 Kilocycles or MORE APRT. OTHERWISE IT WILL BE IMPOSSIBLE TO PLACE THE CALL LETTER TABS IN THEIR PROPER POSITION IN CABINET DEPRESSIONS.

While it will be found that only the approximate location will be indicated, the station call letters properly located will be an extremely helpful tuning aid.

To set the proper station call letter tabs into the cabinet depressions proceed as follows:

(a) Determine which nine stations call letters you wish to have on the cabinet—press call letter tabs out of the call letter sheet provided.
PUSH-BUTTON ADJUSTMENT

Nine stations operating in the 1500-540 kilocycle band may be automatically pushed button tuned by properly setting each station selector push button.

AS THE PUSH BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATION BE SURE TO SET THEM BY:

(a) Turn receiver which is to be used with the set, to the frequency at which you wish to receive stations.
(b) Push button tuning.

Before Attempting to Set Push Buttons—Be Sure to:

(a) Have aerial which will be used with the receiver attached to the receiver when setting push buttons.
(b) Operate radio at least 15 minutes before adjusting push buttons.
(c) Obtain transmitter frequency—number of kilocycles—and call letters of the nine stations you wish to push button tune from radio log or newspaper radio station list.

Adjust Push Buttons for Selected Stations by:

(a) Rotate band switch knob to the NEXT TO MAXIMUM RIGHT HAND POSITION—540-1730 KILOCYCLE BAND MANUAL TUNING POSITION.
(b) Using regular tuning knobs, adjust to exact frequency of each station through which you want to listen.
(c) Obtain transmitter frequency—number of kilocycles—and call letters of the stations you wish to push button tune from radio log or newspaper radio station list.
(d) Rotate band switch knob to the MAXIMUM RIGHT HAND POSITION.
(e) Press in one of the three push buttons marked 540-880 kilocycles on diagram.
(f) Press station call letter of the station you wish to tune into.

IMPORTANT

For Manual Tuning the Band Switch must be in the NEXT TO MAXIMUM RIGHT HAND POSITION. When adjusting Push Button tuning after Push Buttons have been set, Band Switch must be in the NEXT TO MAXIMUM RIGHT HAND POSITION.

INSTRUCTIONS FOR INSTALLING AND OPERATING "AUTOMATIC PUSH BUTTON"

Five stations operating in the 1720-540 kilocycle band may be tuned by using the "AUTOMATIC PUSH BUTTON" tuned by properly setting the trimmer screws accessible through holes in the back of the chassis.

AS THE PUSH BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATION BE SURE TO SET THEM BY:

(a) It is important to have the serial, which will be used with the set, attached to the radio when adjusting.
(b) Be sure to operate the set at least one-half hour before adjusting trimmers. If set is not thoroughly warmed up when trimmers are adjusted, the trimmers may shift position after they become warm.
(c) For best results use push buttons for local or strong nearby stations only. Obtain the transmission frequency—number of kilocycles—and call letters of the stations you wish to push button tune from radio log or newspaper radio station list.
(d) Place push switch for each station on 1720-540 kilocycle band.
(e) Press in "MANUAL" tuning button. Set diagram.
(f) It is advisable that if a station is selected whose transmission frequency is somewhere between 1720-540 kilocycles that the two trimmers marked 660-1170 K.C. on paper label attached to back of chassis be adjusted first.
(g) Using regular tuning knobs carefully tune in selected station whose transmission frequency is between 1720-540 kilocycles.
(h) Adjust trimmers marked 660-1170 K.C. on paper label. Note: Station signal will disappear or may be heard in some instances another station may be heard.
(i) As the trimmers should never be too loosely or too tightly adjusted it is important that the trimmers marked "1A" and "1B" or trimmers marked "2A" and "2B". Trimmers marked 1A and 1B should not be used because they would have to be loosely adjusted, which is objectionable because trimmers should never be too loosely or too tightly adjusted. Inasmuch as 660 kilocycles falls within the maximum—minimum range of fid trimmers marked "1A and 1B" these should be used instead.

In some instances it may be necessary after the set is operated for a period of time to reset the trimmers as they may drift due to heat, humidity, etc.

USE FOR STATION BETWEEN 540 TO 582 K.C.

1A 1B 2A 2B 3A 3B 4A 4B 5A 5B

This diagram, which is similar to the one attached to the back of chassis over frequency holes, shows the minimum—maximum range of the five groups of trimmers.
ALIGNMENT PROCEDURE:

SHOULD REALIGNMENT BE NECESSARY, THERE ARE SEVERAL PRECAUTIONS THAT MUST BE CAREFULLY OBSERVED. THESE ARE:

1. Do not align set until it has reached normal operating temperature. Place the receiver in operation at least 15 minutes before attempting to recalibrate it.

2. The importance of using the proper type of test equipment and following the ALIGNMENT PROCEDURE EXACTLY AS GIVEN CANNOT BE TOO STRONGLY EMPHASIZED. Failure to do so will result in the wrong frequency, poor selectivity, incorrect dial calibration, distortion, and unsatisfactory operation of the automatic frequency control.

3. It is absolutely necessary that an accurately calibrated test oscillator with a type of output measuring device and a double scale milliammeter—0 to 1 M. A. and 0 to 5 M. A. be used.

ALIGNING LF STAGE AT 455 Kilocycles:

(a) Place automatic frequency control knob in the middle A.F. "off" position.

(b) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid of the 6AQ7 tube through a 50 M. O. resistor. The grid lead should be shorted to the metal chassis.

(c) Tune receiver dial to exactly 455 kilocycles and set volume control on full.

(d) Remove shields held in place by snap fasteners over A.F.C. test jack and move trimmer screw holes in the test and second L.F. transformer shield case.

(e) Peak second L.F. transformer trimmers for maximum 455 kilocycle output by adjusting the two trimmers accessible through the two top holes in the second L.F. transformer shield case. DO NOT TOUCH DISCRIMINATOR (BOTTOM) SCREW.

(f) Peak each of the first L.F. transformer trimmers for maximum 455 kilocycle signal output.

ALIGNING DISCRIMINATOR CIRCUIT:

(a) Place switch underneath push button assembly (above tuning condenser) in A.F.C. "on" position. Leave test oscillator set to EXACTLY 455 Kilocycles and connect input grid of 6AS7 tube through a 25 M. O. condenser—insert lead of double leads 0 to 1 and 0 to 2 milliammeter into A.F.C. test jack located on top of chassis adjacent to the 6AQ7 tube. To avoid possibility of damaging the meter, one of the milliammeter leads short to the metal chassis.

(b) ALWAYS TURN OFF RECEIVER WHEN INSERTING OR REMOVING MILLIAMMETERS LEADS FROM A.F.C. TEST JACKET.

(c) Short out A.F.C. test switch by extending the second from the left (looking at the front of the chassis) of the four leads mounted on top of the dial assembly. The proper lead to ground is indicated in the "Note X" on chassis top part view.

(d) Tune receiver dial and set test oscillator frequency to EXACTLY 456 kilocycles. Adjust 450 K.C. test oscillator output consistent with readable oscillator meter scale deflection.

(e) Verify oscillator output at 456 kilocycles and 450 K.C. test oscillator output is approximately 600 kilocycles. Then, while taking a recording conditioner slightly to right and left, adjust 600 K.C. oscillator trimmer for maximum signal response.

ALIGNING 1.52-5.50 MEGACYCLE BAND:

(a) Set A.F.C. test oscillator output and receiver dial to approximately 600 kilocycles. While taking a recording conditioner slightly to right and left, adjust 600 K.C. oscillator trimmer for maximum selectivity.

(b) Tune receiver dial and test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. R.F. and antenna trimmers for maximum selectivity.

(c) Verify receiver frequency and receiver dial at approximately 600 kilocycles. Then, while taking a recording conditioner slightly to right and left, adjust 600 K.C. oscillator trimmer for maximum signal response.

ALIGNING 5.5-15.5 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.5-15.5 megacycle band. Tune receiver dial and set test oscillator frequency to EXACTLY 18.5 megacycles.

(b) Check tuning dial adjustment by turning band conditioner and receiver dial to maximum capacity and then turn receiver dial to 18.5 megacycle at maximum output.

(c) Note: When adjusting the trimmer two peaks, the fundamental and no image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.5 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 second one to tune in.

(d) If the trimmer is screwed down beyond the point where the first peak is received the interesting image peak will be tuned in. After resetting adjustment of the oscillator trimmer at 18.5 megacycles, always check to see if the peak is in the fundamental, then the test oscillator frequency at 18.5 megacycles. Increase the output of the test oscillator and be sure receiver dial is properly aligned. Then vary the receiver dial slightly to the right and left of the 18.5 megacycles, and note the fundamental peak is in alignment at 18.5 megacycles, and the receiver signal will be heard at approximately 18.5 megacycles on the receiver dial.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 18.5 megacycles. Back gang conditioner slightly to right and left adjust 18.5 M.C. oscillator trimmer for maximum signal response.

(f) Note: Before making any adjustments, several times always listen for possible test oscillator output consistent with readable output meter scale deflection.
ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on one band, make the adjustments marked (1) first, (2) next, (3) third.

Before starting alignment:
(a) Check tuning dial adjustment by turning gain condenser until plates reach maximum capacity stop (completely mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line, move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.
(d) Press in manual tuning button.

<table>
<thead>
<tr>
<th>Set receiver dial to:</th>
<th>Adjust test oscillator frequency to:</th>
<th>Use dummy antenna in series with output of test oscillator consisting of:</th>
<th>Attach output of test oscillator to:</th>
<th>Refer to parts layout diagram for location of trimmers mentioned below:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any point where no interfering signal is received</td>
<td>455 K.C.</td>
<td>.02 MFD. Condenser</td>
<td>High side to grid terminal of 6AS6 tube. DO NOT REMOVE CAP.</td>
<td>Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. trimmers for maximum output.</td>
</tr>
<tr>
<td>(1) Exactly 1730 K.C.</td>
<td>1730 K.C.</td>
<td>.0025 MFD. condenser</td>
<td>Receiver blue antenna lead</td>
<td>Adjust 1730 K.C. oscillator trimmer for maximum output.</td>
</tr>
<tr>
<td>(2) Exactly 1400 K.C.</td>
<td>Approx. 1400 K.C.</td>
<td>.00025 MFD. condenser</td>
<td>Receiver blue antenna lead</td>
<td>Adjust 1400 K.C. antenna trimmer for maximum output.</td>
</tr>
<tr>
<td>(3) Approx. 600 K.C.</td>
<td>Approx. 600 K.C.</td>
<td>.00025 MFD. condenser</td>
<td>Receiver blue antenna lead</td>
<td>While making gain condenser adjust 600 K.C. oscillator padding for maximum receive.</td>
</tr>
</tbody>
</table>

NOTE: 870 K.C. oscillator trimmer need be adjusted only if 870-1520 K.C. Push Button does not tune from 870 to 1520 K.C.

If necessary to adjust, proceed by:
(a) Attach test oscillator to set antenna and ground leads.
(b) Set test oscillator to exactly 870 K.C.—with attenuator adjusted for maximum signal output.
(c) Press in 870-1520 K.C. push button.
(d) Adjust 870-1520 K.C. oscillator push button to bring in 870 K.C. test signal to maximum output & leave in this position.
(e) Reset test oscillator frequency to exactly 870 K.C.
(f) Adjust 870 K.C. oscillator trimmer to bring in 870 K.C. test oscillator signal to maximum output.
ALIGNMENT PROCEDURE IN TABULATED FORM

(a) Check tuning dial adjustment by turning gang condenser until plate output maximum capacity tubes (completely straight) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.
(d) Push in manual push button.

<table>
<thead>
<tr>
<th>Place band switch for operation on:</th>
<th>Set receiver dial to:</th>
<th>Adjust test oscillator frequency to:</th>
<th>Use dummy antenna in place with output of test oscillator connecting at:</th>
<th>Attach output of test oscillator to:</th>
<th>Refer to parts layout diagram for location of trimmers mentioned below:</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F. alignment and any band position</td>
<td>Any point where no interfering signals are received</td>
<td>Exactly 450 K.C.</td>
<td>.02 Mfd. condenser</td>
<td>High side to grid cap of 4K5 tube. Do not remove cap</td>
<td>Adjust each of the second I.F. transformer trimmers for maximum output.</td>
</tr>
<tr>
<td></td>
<td>(2) 1400 K.C.</td>
<td>1400 K.C.</td>
<td>.0005 Mfd. condenser</td>
<td>Receiver blue antenna lead</td>
<td>While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.</td>
</tr>
<tr>
<td></td>
<td>(3) 600 K.C.</td>
<td>600 K.C.</td>
<td>.0005 Mfd. condenser</td>
<td>Receiver blue antenna lead</td>
<td>While rocking gang condenser adjust 600 K.C. oscillator pad for maximum output.</td>
</tr>
<tr>
<td>5.7 to 18.3 M.C. band</td>
<td>(1) Exactly 18.3 M.C.</td>
<td>Exactly 18.3 M.C.</td>
<td>400 Ohm carbon resistor</td>
<td>Receiver blue antenna lead</td>
<td>Adjust 18.3 M.C. oscillator trimmer for maximum output—they are sure to use proper peak.</td>
</tr>
<tr>
<td></td>
<td>(2) 15 M.C.</td>
<td>15 M.C.</td>
<td>400 Ohm carbon resistor</td>
<td>Receiver blue antenna lead</td>
<td>If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use—is tuned in.</td>
</tr>
</tbody>
</table>

NOTE: (For Models Only)

1100 K.C. antenna pad for 870-1520 K.C. (No. 5) pushbutton need be adjusted only if there is an appreciable change in volume when same station is push button and manual tuned.

Should there be a great difference adjust 1100 K.C. antenna pad for:
(a) Attach test oscillator to set antenna and ground leads with .0005 dummy ant. load.
(b) Screw any two push buttons—except 870-1520 K.C. (No. 5) push button—all the way in—and the other two push buttons all the way out.
(c) Recheck oscillator to exactly 1100 K.C.
(d) Press in 870-1520 K.C. push button and adjust this button for maximum test signal response.
4 TUBE — SENTINEL MODEL 127B

1½ Volt Battery Operated Superheterodyne Receiver
### ALIGNMENT PROCEDURE IN Tabulated FORM

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF ATTACH</td>
<td>170 K.C.</td>
</tr>
<tr>
<td>IF DETECTOR</td>
<td>800 K.C.</td>
</tr>
<tr>
<td>IF AMPLIFIER</td>
<td>181 M.C.</td>
</tr>
<tr>
<td>IF AMPLIFIER 2</td>
<td>181 M.C.</td>
</tr>
<tr>
<td>IF AMPLIFIER 3</td>
<td>181 M.C.</td>
</tr>
</tbody>
</table>

### Diagram:

- **GND.**
- **ANT.**
- **BLACK**
- **BLUE**
- **6D8G OSC.**
- **6S7 I.F.**
- **6776 AUDIO**
- **666G POWER**
- **3702(6E) SOCKET & CABLE ASSEM.**
- **600 K.C. OSC.**
- **PADDER**
- **1400 KC. ANT. TRIMMER**

© John F. Rider, Publisher

Compliments of www.nucow.com
SENTINEL PAGE 10-65

MODELS 144X, 144XE
Schematic, Voltage
Socket

©John F. Rider, Publisher

Compliments of www.nucow.com
5 tube A.C. Operated Superheterodyne Receiver

NOTES:
1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESES ARE ILLUSTRATION NUMBERS.
4. CONNECTION A-B NOT USED WITH UNIVERSAL TRANS. DOTTED PORTION FOR UNIVERSAL TRANS. 10242 & 10243 ONLY.
5. SOME MODELS ARE EQUIPPED WITH A TONE CONTROL SWITCH. DOTTED LINES SHOW CONNECTIONS.

6A7
MOD-OSC.

6K7
I.F.

6Q7G
DET-A.V.C.B.A.F.

41
POWER

NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOMMETER.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

PART N-146-A

SEE NOTE 4

POWER TRANS.
115V - 50 CYC - 10240 - (27)
115V - 25 CYC - 10241 - (24)
110V - 230V - 50 CYC - 10242 - (28)
110V - 230V - 25 CYC - 10243 - (50)
220V - 50 CYC - 10244 - (31)
ALIGNMENT PROCEDURE IN TABLED FORM

- Use dummy antenna in series with test oscillator consisting of .02 MFD condenser
- Adjust test oscillator frequency to 455 K.C.
- Attach output wire from test oscillator to input of first I.F. transformer
- Adjust each of the second I.F. transformer trimmers for desired output—then adjust each of the first I.F. trimmers for maximum output.
- Receiver blue antenna lead
- Receiver Blue output lead
- Receiver Blue output lead
- Add 1000 K.C. to frequency
- Adjust trimmer for maximum output
- Add 1000 K.C. to frequency
- Trim for maximum output
- Have ground lead of test oscillator attached to chassis.

Before starting alignment:
- Check tuning dial adjustment by turning gain and tuning condenser until plates touch. Maximum output should stop completely in circuit of which point the dial must be securely set with the lock line of the low frequency end of the dial.

Remember:
- When earphone or meter is connected to the receiver output lead, the trimmer must be adjusted for maximum output.

©John F. Rider, Publisher
**ALIGNMENT PROCEDURE IN TABULATED FORM**

Before starting alignment, check tuning dial calibrated by trimmer condenser until point where maximum capacity stops completely in mesh at which point the dial indicator must be exactly even with the test lines at the low frequency end of the dial calibration. If dial needle does not point exactly to last nice move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

**MODEL 163UL**

**BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABSINET AND THE CABSINET BACK CLOSED.**

When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, place test oscillator in series with set loop key:

1. Remove the blank with white tracer wire used to connect loop antenna to Fuhnestock clip on chassis.

2. Attach test oscillator to terminal marked "A" and "B" on parts layout diagram.

**IMPORTANT:** No condensers should be in series with generator leads.

<table>
<thead>
<tr>
<th>Set receiver dial to</th>
<th>Adjust test oscillator frequency to</th>
<th>Use dummy antenna in series with output of test oscillator consisting of</th>
<th>Attach output of test oscillator to</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 K.C.</td>
<td>.02 MFD condenser</td>
<td>Refer to parts layout diagram for location/trimmer mentioned below—end.</td>
</tr>
<tr>
<td>Any point where no</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>interfering signal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is received</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Exactly 1650 K.C.**

2. **Approx. 1400 K.C.**

<table>
<thead>
<tr>
<th>Set receiver dial to</th>
<th>Adjust test oscillator frequency to</th>
<th>Use dummy antenna in series with output of test oscillator consisting of</th>
<th>Attach output of test oscillator to</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 K.C.</td>
<td>.02 MFD condenser</td>
<td>Refer to parts layout diagram for location/trimmer mentioned below—end.</td>
</tr>
<tr>
<td>Any point where no</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>interfering signal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is received</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MODEL 175UL**

**IMPORTANT:** Before aligning, place loop antenna in the same approximate position in the back of chassis it will be in when the set is in the cabinet and the back attached.

When adjusting 1650 K.C. oscillator trimmer and 1400 K.C. antenna trimmer, couple test oscillator to set loop by placing lead from right side of test oscillator on top of or near set loop. Be sure that neither the loop or test oscillator lead move during alignment.

**DO NOT ATTACH LOW SIDE OF TEST OSCILLATOR TO RECEIVER—LEAVE UNCONNECTED.**

**TEST OSCILLATOR**

<table>
<thead>
<tr>
<th>Set receiver dial to</th>
<th>Adjust test oscillator frequency to</th>
<th>Use dummy antenna in series with output of test oscillator consisting of</th>
<th>Attach output of test oscillator to</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>455 K.C.</td>
<td>.02 MFD condenser</td>
<td>Refer to parts layout diagram for location/trimmer mentioned below—end.</td>
</tr>
<tr>
<td>Any point where no</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>interfering signal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>is received</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Exactly 1650 K.C.**

2. **Approx. 1400 K.C.**

**ALIGNMENT PROCEDURE SEE INDEX.**
## ALIGNMENT PROCEDURE IN TABULATED FORM

### Sentinel Model 141AE

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. P. Alignment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Set receiver dial to 000 E.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Adjust 1400 E.C. oscillator to 300 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Adjust 1700 E.C. oscillator to 300 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sentinel Model 123B

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Set receiver dial to 000 E.C.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Adjust 1400 E.C. oscillator to 300 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Adjust 1700 E.C. oscillator to 300 kHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Receiver blue antenna lead</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Sentinel Models 127B, 137B, 147B, 167B, and 177B

**ALIGNMENT PROCEDURE IN TABULATED FORM**

Be sure to follow procedure carefully and to check the receiver test points for correct operation. Alignment procedure read instructions from top to bottom. If more than one adjustment is required on any one step, make the adjustments marked (1), (2), (3), etc., in the order listed above.

(a) Check tuning dial adjustment by turning tuning condenser until purity tonal quality stops (completely) at which point the dial needle must be exactly even with the exact line of the dial calibration. Dial must be tuned exactly to the same point exactly to be able to make tests correctly.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Use ground lead or test oscillator attached to ground condenser.

---

### Models 138AE, 138UE, 140B, 140E, 144AE, and 164AE

**ALIGNMENT PROCEDURE IN TABULATED FORM**

Be sure to follow procedure carefully and to check the receiver test points for correct operation. Alignment procedure read instructions from top to bottom. If more than one adjustment is required on any one step, make the adjustments marked (1), (2), (3), etc., in the order listed above.

(a) Check tuning dial adjustment by turning tuning condenser until purity tonal quality stops (completely) at which point the dial needle must be exactly even with the exact line of the dial calibration. Dial must be tuned exactly to the same point exactly to be able to make tests correctly.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Use ground lead or test oscillator attached to ground condenser.
NOTE: Original production models did not have resistor R6 and condenser C10 included in the circuit as shown above. In these first run production sets, resistor R1 connected across the microphone tip jacks in the same position as shown for resistor R6. The above change can be made easily, when servicing any of the first run Models 219-P Wireless Phonographs.

The SPARTON Wireless Phonograph Models 219-P and 219-PD are shipped from the factory for operation at approximately 1550 kilocycles.

This frequency may be changed by adjusting a trimmer condenser which is reached through the hole in the bottom of the chassis. An insulated shaft screwdriver should be used. Turning the screw clockwise lowers the frequency and turning the screw counter-clockwise increases the frequency. The normal range of adjustment is from approximately 1200 kilocycles to approximately 1700 kilocycles.

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7</td>
<td>Oscillator-Modulator</td>
<td>No. 1</td>
</tr>
<tr>
<td>2525</td>
<td>Rectifier</td>
<td>6.5*</td>
</tr>
<tr>
<td>HK-49G6B</td>
<td>Ballast</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

#AC volts.
MODEL 409-GL
INTERMEDIATE
FREQUENCY 456 K.C.

VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage of Socket Prongs to Grid (See Prong Nos. on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A9GT</td>
<td>Converter</td>
<td>0 115 115 42 2.8 115 5.8 10 0 Grid Cap</td>
</tr>
<tr>
<td>6J7GT</td>
<td>Detector</td>
<td>0 5.8 0 0 0 0 0 0</td>
</tr>
<tr>
<td>25L6GT</td>
<td>P.O.</td>
<td>0 0 0 0 0 0 7 7.2</td>
</tr>
<tr>
<td>2556GT</td>
<td>Rectifier</td>
<td>0 115 115 143 115 54 143 0</td>
</tr>
<tr>
<td>8K11J</td>
<td>Ballast</td>
<td>0 0 0 0 0 0 0 0</td>
</tr>
</tbody>
</table>

Notes: Voltage readings are for schematic diagram. All DC voltages are with respect to ground. All AC voltages are with respect to AC voltages.

Alignment:
1. At 400KHz, the dial should be set to zero, and the generator should be connected to the dummy antenna.
2. The generator frequency should be set to 456 KHz. The trimmer should be adjusted for maximum output.
3. The output should be measured at 1000 KHz. The trimmer should be adjusted for maximum output.
4. The output should be measured at 2000 KHz. The trimmer should be adjusted for maximum output.
5. The output should be measured at 3000 KHz. The trimmer should be adjusted for maximum output.
6. The output should be measured at 4000 KHz. The trimmer should be adjusted for maximum output.
7. The output should be measured at 5000 KHz. The trimmer should be adjusted for maximum output.
8. The output should be measured at 6000 KHz. The trimmer should be adjusted for maximum output.
9. The output should be measured at 7000 KHz. The trimmer should be adjusted for maximum output.
10. The output should be measured at 8000 KHz. The trimmer should be adjusted for maximum output.

© John F. Rider, Publisher
SPARTON SUPERHETERODYNE MODEL 549-I
INTERMEDIATE FREQUENCY 456 K.C.

VOLTAGE CHART

Condition of "A" Battery - Good (1.5 volts)
Condition of "B" Battery - Good (90 volts)
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast Band

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>No. 1</th>
<th>No. 2</th>
<th>No. 3</th>
<th>No. 4</th>
<th>No. 5</th>
<th>No. 6</th>
<th>No. 7</th>
<th>No. 8</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA7G</td>
<td>Converter</td>
<td>80</td>
<td>1.4</td>
<td>80</td>
<td>50</td>
<td>*</td>
<td>70</td>
<td>0</td>
<td>60</td>
<td>*</td>
</tr>
<tr>
<td>IN5G</td>
<td>1st I.F. Amp.</td>
<td>*</td>
<td>1.4</td>
<td>76</td>
<td>80</td>
<td>0</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IN5G</td>
<td>2nd I.F. Amp.</td>
<td>0</td>
<td>1.4</td>
<td>78</td>
<td>80</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>IHS5G</td>
<td>2nd Det.-AUX-1st Audio</td>
<td>0</td>
<td>1.4</td>
<td>*</td>
<td>0</td>
<td>-1</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ICS5G</td>
<td>Power Amp.</td>
<td>1.4</td>
<td>1.4</td>
<td>78</td>
<td>80</td>
<td>0</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.

*Cannot be accurately measured with Model 665 Weston analyzer.

(Original) Effective Feb. 1, 1959
### Model 549-1 ALIGNMENT

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>ALIGNMENT OF</th>
<th>GENERATOR CONNECTED TO</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR FREQUENCY</th>
<th>BAND SWITCH SETTING</th>
<th>TUNING COND. SETTING</th>
<th>TRIMMER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Set pointer to end of scale with tuning condenser gang closed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I.F.</td>
<td>1A7G Grid</td>
<td>.1 mf</td>
<td>456 KC</td>
<td>BC</td>
<td>Open</td>
<td>C14 A, B</td>
<td>5 I.F. Transformer</td>
</tr>
<tr>
<td>3</td>
<td>Broadcast</td>
<td>Ant.</td>
<td>200</td>
<td>1600 KC</td>
<td>BC</td>
<td>1600 KC</td>
<td>C7 Ant.</td>
<td>Peak accurately</td>
</tr>
<tr>
<td>4</td>
<td>Band</td>
<td></td>
<td>600</td>
<td>600 KC</td>
<td>BC</td>
<td>600 KC</td>
<td>C3 Ant.</td>
<td>Peak accurately</td>
</tr>
<tr>
<td>5</td>
<td>(Repeat operation 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>SW Band</td>
<td>Ant.</td>
<td>*</td>
<td>18 MC</td>
<td>SW</td>
<td>18 MC</td>
<td>C4 Ant.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>SW Band</td>
<td>Ant.</td>
<td>*</td>
<td>18 MC</td>
<td>SW</td>
<td>18 MC</td>
<td>C4 Ant.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>SW Band</td>
<td>Ant.</td>
<td>*</td>
<td>18 MC</td>
<td>SW</td>
<td>18 MC</td>
<td>C4 Ant.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>(Check operation 4 to 8 inclusive)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**200 mmf. condenser and 100 ohm non-inductive resistor in series.**

**Check calibration and sensitivity at 600 KC, 900 KC, and 1500 KC.**

**Check operation 4 to 8 inclusive.**

---

### Spartron Superheterodyne Model 699

**VOLTAGE CHART**

Battery Voltage: 6.3 volts

Position of Volume Controls: Full with Antenna Disconnected

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R.F. Amp.</td>
<td>No. 1: 180 75 6.2* 6.2* 5.5 - - 0</td>
</tr>
<tr>
<td>6A7</td>
<td>Converter</td>
<td>No. 2: 190 75 6.2* 6.2* 6.5 - - 0</td>
</tr>
<tr>
<td>6Q7</td>
<td>2nd Det. AVC 1st Audio</td>
<td>No. 3: 180 75 6.2* 6.2* 6.5 - - 0</td>
</tr>
<tr>
<td>41</td>
<td>P.A.</td>
<td>No. 4: 190 75 6.2* 6.2* 6.5 - - 0</td>
</tr>
<tr>
<td>024</td>
<td>Rectifier</td>
<td>No. 5: 190 75 6.2* 6.2* 6.5 - - 0</td>
</tr>
</tbody>
</table>

*Or 8.6 volts depending on position of sensitivity switch.**

**AC volts**

---

### ALIGNMENT

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>ALIGNMENT OF</th>
<th>GENERATOR CONNECTED TO</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR FREQUENCY</th>
<th>TUNING COND. SETTING</th>
<th>TRIMMER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I.F.</td>
<td>1A7G Grid</td>
<td>.1 mf</td>
<td>262</td>
<td>Closed</td>
<td>2 trimmers</td>
<td>2nd I.F.</td>
</tr>
<tr>
<td>2</td>
<td>Broadcast</td>
<td>Ant.</td>
<td>250 mmf.</td>
<td>1500</td>
<td>Open</td>
<td>2 trimmers</td>
<td>1st I.F.</td>
</tr>
<tr>
<td>3</td>
<td>Broadcast</td>
<td>Ant.</td>
<td>250 mmf.</td>
<td>1400</td>
<td>Ant.</td>
<td>Adj. to max.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Check sensitivity at 1000 KC and 600 KC.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2nd I.F.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Check operations 1 to 4 inclusive.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adj. to max.</td>
<td></td>
</tr>
</tbody>
</table>
A. Alignment of Intermediate-Frequency Stages

1. Turn on receiver and test oscillator and allow with to operate several minutes before attempting to adjust any condensers.
2. Turn the band selector switch to the broadcast position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.
3. Connect "antenna" of test oscillator to grid cap of Type 107G converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 107G tube to ground.

Note: For proper alignment of these chassis, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when condenser plates are fully meshed. If the pointer does not read correctly, loosen the two small set screws directly back of the diffusion disc and dial drum, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, and tighten the set screws.

IMPORTANT: All adjustments should be made with receiver disconnected from the power line.

B. Alignment of Broadcast Band

1. Connect 200 ma. dummy antenna in series with the antenna feed, tune test oscillator and receiver to a frequency of 1500 kilocycles and adjust condenser C4 (broadcast band oscillator trimmer) and 150 kilocycle broadcast antenna trimmer) reached from the bottom of the chassis.
2. Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5 (broadcast antenna pad) reached from the front of the chassis.
3. Retune test oscillator and receiver to 1500 kilocycles and check adjustments of condenser C4 and condenser C5. Calibration of the broadcast band should also be checked at 1500 kilocycles and 0 kilocycles. C5 in Models 527-2, 587-2.

C. Alignment of Short-Wave Band

1. Turn the band selector switch to the short wave or "foreign" band.
2. Remove the 100 ma. dummy condenser from the test oscillator "antenna" lead and replace with a 400 ohm non-inductive resistor dummy antenna.
3. Tune test oscillator and receiver to a frequency of 15,000 kilocycles (15 megacycles) and adjust condenser C5 (short wave antenna trimmer) reached from the bottom of the chassis.

Caution: On this band care must be taken to adjust this condenser to the fundamental of the 15 megacycle signal and not to the image. This image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

A set that is adjusted to the image frequency instead of the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condenser for this band has probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector of the receiver to approximately 15,000 kilocycles. If a strong signal is found approximately at this frequency, it indicates the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus 150 kilocycles or approximately 14,850 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

Caution: There are no other trimmers for the short-wave or foreign band.
Sparton Superheterodyne Models

649-6L    649-6S

VOLTAGE CHART

Battery Condition: Good
Battery Voltage: 6.3 volts
Position of Volume Control: Full with Antenna Disconnected
Band Selector Switch: Broadcast

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G66G</td>
<td>Converter</td>
<td>No. 1 6.2 140 140 -14 140 0 0 .14</td>
</tr>
<tr>
<td>L65G</td>
<td>1st I-F Amp.</td>
<td>No. 2 0 140 49 140 .2</td>
</tr>
<tr>
<td>L656P</td>
<td>2nd I-F Amp.</td>
<td>No. 3 2.4 150 49 0 .2</td>
</tr>
<tr>
<td>G67G</td>
<td>Det-AVC-1st A.F.</td>
<td>No. 4 0 5.6 4 -2 R -2 R .2</td>
</tr>
<tr>
<td>G68G</td>
<td>Power Amplifier</td>
<td>No. 5 0 135 135 -1.0</td>
</tr>
<tr>
<td>L656G</td>
<td>Rectifier</td>
<td>No. 6 2.4 0 0 0 0 .02</td>
</tr>
<tr>
<td>L656G</td>
<td></td>
<td>No. 7 0 0 0 0 0 0 .02</td>
</tr>
<tr>
<td>L656G</td>
<td></td>
<td>No. 8 6 0 180* 0 180* 0 0 .14</td>
</tr>
<tr>
<td>L656G</td>
<td></td>
<td>Grid Cap</td>
</tr>
</tbody>
</table>

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% ± or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are - DC voltages.

*AC: A - 10 V. Scale
     B - 25 V. Scale
     C - 1 V. Scale
HOW TO ADJUST THE SPARTON SELECTRON

MODEL 1068, 1268, 1568 ETC.

NOTE: Each paragraph refers to all models unless otherwise indicated.

1. The six 600-ohm discriminator tubes are arranged in groups corresponding to frequency limits of 250 to 900 kc., 750 to 1500 kc., and 1500 to 2500 kc. (See illustration also back cover of catalog). Each tube in the group has the same frequency characteristic as the others in the group, but the tubes in different groups are not identical. The tubes are interchangeable within a group, but cannot be used interchangeably in different groups.

2. The six 600-ohm discriminator tubes are arranged in groups corresponding to frequency limits of 250 to 900 kc., 750 to 1500 kc., and 1500 to 2500 kc. (See illustration also back cover of catalog). Each tube in the group has the same frequency characteristic as the others in the group, but the tubes in different groups are not identical. The tubes are interchangeable within a group, but cannot be used interchangeably in different groups.

3. To make the check, connect the oscilloscope to the discriminator tube lead and observe the waveforms on the scope. The difference in waveform should be less than 0.01 volt between the two tubes in the group.

4. Repeat the procedure for each of the six tubes in the group.

5. If the difference in waveform is greater than 0.01 volt, replace the tube that is giving the greater waveform.

6. Repeat the procedure for all six tubes in the group.

7. When all tubes have been properly adjusted, replace the discriminator tube and attach the selectron trimmers to the cabinet front panel as shown in the diagram.

8. Procedure for adjusting the SPARTON selectron is the same as for the SPARTON selectron except that the SPARTON selectron has been replaced by the SPARTON selectron. The SPARTON selectron is adjusted by using the SPARTON selectron as an indicator to determine the accuracy of the SPARTON selectron.

9. Repeat the procedure for all six tubes in the group.

10. When all tubes have been properly adjusted, replace the discriminator tube and attach the selectron trimmers to the cabinet front panel as shown in the diagram.

11. Procedure for adjusting the SPARTON selectron is the same as for the SPARTON selectron except that the SPARTON selectron has been replaced by the SPARTON selectron. The SPARTON selectron is adjusted by using the SPARTON selectron as an indicator to determine the accuracy of the SPARTON selectron.

12. Repeat the procedure for all six tubes in the group.

13. When all tubes have been properly adjusted, replace the discriminator tube and attach the selectron trimmers to the cabinet front panel as shown in the diagram.

14. Procedure for adjusting the SPARTON selectron is the same as for the SPARTON selectron except that the SPARTON selectron has been replaced by the SPARTON selectron. The SPARTON selectron is adjusted by using the SPARTON selectron as an indicator to determine the accuracy of the SPARTON selectron.
### ALIGNMENT

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>ALIGNMENT OF</th>
<th>GENERATOR CONNECTED TO</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR FREQUENCY</th>
<th>BAND SWITCH SETTING</th>
<th>TUNING COND. SETTING</th>
<th>TRIMMER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Broadcast Band</td>
<td>Ant.</td>
<td>200 mf.</td>
<td>1500</td>
<td>BC</td>
<td>1500</td>
<td>C5</td>
<td>Osc.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Ant.</td>
<td>200 mf.</td>
<td>600</td>
<td>BC</td>
<td>600</td>
<td>C11</td>
<td>Pad</td>
</tr>
<tr>
<td>5</td>
<td>(Repeat operation 5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(Check calibration and sensitivity 1500 KC, 900 KC and 600 KC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1st Short Wave</td>
<td>Ant.</td>
<td>100 ohm 200 mf. series</td>
<td>6 MC.</td>
<td>1st S.W.</td>
<td>6 MC.</td>
<td>C9</td>
<td>Osc.</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Ant.</td>
<td>200 mf.</td>
<td>1.95 MC.</td>
<td>1st S.W.</td>
<td>1.95 MC.</td>
<td>C12</td>
<td>Pad</td>
</tr>
<tr>
<td>9</td>
<td>(Repeat operation 7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>(Check calibration and sensitivity at 6 MC. and 1.95 MC.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2nd Short-Wave Band</td>
<td>Ant.</td>
<td>100 ohm 200 mf. series</td>
<td>18 MC.</td>
<td>2nd S.W.</td>
<td>18 MC.</td>
<td>C10</td>
<td>Osc.</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Ant.</td>
<td></td>
<td>6 MC.</td>
<td>2nd S.W.</td>
<td>6 MC.</td>
<td>C13</td>
<td>Pad</td>
</tr>
<tr>
<td>13</td>
<td>(Repeat operation 11)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>(Check calibration and sensitivity at 18 MC. and 6 MC.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>(Check operations 1 to 14 inclusive)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

**NOTE:** Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser control plate is fully meshed with stator plate.

### VOLTAGE CHART

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. 1</td>
</tr>
<tr>
<td>G76G</td>
<td>R.F.</td>
<td>0</td>
</tr>
<tr>
<td>G68G</td>
<td>Converter</td>
<td>0</td>
</tr>
<tr>
<td>G72G</td>
<td>I.F.</td>
<td>0</td>
</tr>
<tr>
<td>G77G</td>
<td>2nd I.F.</td>
<td>0</td>
</tr>
<tr>
<td>G66G</td>
<td>Discriminator</td>
<td>0</td>
</tr>
<tr>
<td>G67G</td>
<td>A.F.C.</td>
<td>0</td>
</tr>
<tr>
<td>G67G</td>
<td>2nd Det. AVC-1st Audio</td>
<td>0</td>
</tr>
<tr>
<td>G66G</td>
<td>P.A.</td>
<td>0</td>
</tr>
<tr>
<td>G65G</td>
<td>Rect.</td>
<td>550*</td>
</tr>
<tr>
<td>G65G</td>
<td>Viso-Glo</td>
<td>65</td>
</tr>
</tbody>
</table>

**Notes:** Voltage readings are for schematic diagram on back of box. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

©John F. Rider, Publisher
SCHEMATIC DIAGRAM CHANGES
(SERIAL NO.'S 000761 AND UP)

The following changes, which should be made in the Model 1867 schematic diagram are effective Nov. 50, 1956, and are included in all SPARTON Model 1867 chassis with serial numbers above 000760.

1. Replace condenser C49 Part No. C-720-152 (.005 mf. 250v.) by Part No. C-720-144 (.003 mf. 250v.). This condenser connects from ground to the mid-point between the tone control (R14) and resistor R55.

2. Add resistor R67 Part No. C-2796-82B (77000 ohms 1/2 w.). This resistor connects across condenser C49.

3. Replace resistor R56 Part No. C-2796-62C (12000 ohms 1 W.) by resistor Part No. C-2796-74C (10000 ohms 1/2 W.). This resistor is in the cathode circuit of the Type 27G0 I-F amplifier tube.

© John F. Rider, Publisher

Compliments of www.nucow.com
HOW TO ADJUST THE SPARTON SELECTRONNE IN THE MODELS

5218  6218  7618

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. Remove the Selectrnone escutcheon plate from the front of the cabinet by means of the two screws and insert the station call letter tabs. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles (K.C.) will be at the extreme left.

3. Using a small screwdriver or other tool that will fit the slot in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in paragraph 3 for each of the remaining five buttons.

5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

6. Replace Selectronne escutcheon.

7. Any of the six stations to which the SPARTON Selectronne has been adjusted may now be received simply by pushing the Selectronne button for the desired station.

---

**VOLTAGE CHART**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7</td>
<td>Converter</td>
<td>No. 1 No. 2 No. 3 No. 4 No. 5 No. 6 No. 7 No. 8 Grid Cap</td>
</tr>
<tr>
<td>78</td>
<td>I.F. Amp.</td>
<td>6.1 230 60 150 -9 0 0 -0</td>
</tr>
<tr>
<td>75</td>
<td>End Det. AVC-Audio</td>
<td>6.1 57 0 -5.1 -5.1 0 - - -</td>
</tr>
<tr>
<td>78</td>
<td>Driver</td>
<td>6.1 230 0 10 0 - - - -</td>
</tr>
<tr>
<td>6AG6</td>
<td>P.A.</td>
<td>0 0 225 0 10 0 6.1 - -</td>
</tr>
<tr>
<td>80</td>
<td>Rectifier</td>
<td>325 270 270 325 - - - -</td>
</tr>
<tr>
<td>6ES</td>
<td>Viso-Glo</td>
<td>6.1 50 0.2 230 5 0 - -</td>
</tr>
</tbody>
</table>

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

The Viso-Glo 6ES is not used on Model 5218.

**ALIGNMENT**

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>ALIGNMENT OF</th>
<th>GENERATOR CONNECTED TO</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR FREQUENCY</th>
<th>BAND SWITCH SETTING</th>
<th>TUNING COND. SETTING</th>
<th>TRIMMER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Set dial pointer to last mark on scale when condenser plates are flush)</td>
<td>6A7 Grid</td>
<td>.1 mf.</td>
<td>456 KC</td>
<td>BC</td>
<td>Open</td>
<td>5CA,A, B, C, A, B, C</td>
<td>Adjust to approx. peak</td>
</tr>
<tr>
<td>2</td>
<td>I.F.</td>
<td>6A7 Grid</td>
<td>.1 mf.</td>
<td>456 KC</td>
<td>BC</td>
<td>Open</td>
<td>5CA, B, C, A, B, C</td>
<td>Adjust by tightening ± t.</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>530</td>
<td>225</td>
<td>0</td>
<td>10</td>
<td>6.1</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*100 ohm non-inductive resistor
and 200 mf. condenser in series.

**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.
### ALIGNMENT

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>ALIGNMENT OF</th>
<th>GENERATOR CONNECTED TO</th>
<th>DUMMY ANTENNA</th>
<th>GENERATOR FREQUENCY</th>
<th>TUNING COND. SETTING</th>
<th>TRIMMER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Set dial pointer to end of scale with condenser gang closed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I.F.</td>
<td>6A7 Grid</td>
<td>.1 mf.</td>
<td>456</td>
<td>Closed</td>
<td>C10 A,B</td>
<td>(2nd I.F.)</td>
</tr>
<tr>
<td>3</td>
<td>Rejector</td>
<td>Ant.</td>
<td>150 mmf.</td>
<td>456</td>
<td>Closed</td>
<td>C8 A,B</td>
<td>(1st I.F.)</td>
</tr>
<tr>
<td>4</td>
<td>Broadcast</td>
<td>Band</td>
<td>Ant.</td>
<td>1500</td>
<td>1600</td>
<td>C2 A</td>
<td>Ant.</td>
</tr>
<tr>
<td>5</td>
<td>(Check for dial reading and sensitivity at 600 kc., 1000 kc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(Check operations 1 to 5 inclusive)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Select four favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. The tabs should be inserted in the ends of the knobs. For convenience it is recommended that the call letter tabs be arranged in sequence so that the tab for the station having the highest frequency (greatest number of kilocycles (k.c.)) will be at the extreme left. This, however, is not vital, since the Selectronne will operate with any arrangement of the tabs.

3. TO ADJUST SELECTRONNE BUTTONS, loosen selected button by turning one-half turn to left (counterclockwise). Push this loosened button in as far as it will go, and while in this position, tune in manually the station desired or indicated by tab in end of this loosened button.

Then, with the button still pushed in as far as it will go, tighten by turning button to the right (clockwise) until it can be tightened no more.

Be sure the station is tuned in accurately when pushed in button is tightened.

4. Repeat the procedure in paragraph 3 for each of the remaining three buttons and stations.

5. Be sure the Selectronne buttons have been tightened firmly.

6. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned in properly.

7. Any of the four stations to which the SPARTON Selectronne has been adjusted may now be instantly received simply by pushing the Selectronne Button for the desired station.
Sparton Superheterodyne Model

5028

INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

Notes: Voltage readings are for schematic diagram. Voltage of Socket Prongs to Gnd.

Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmetter. All AC voltages with rectifier type voltmeter. Unless denated otherwise, voltages are + DC voltages. Allow 10% + or - on all measurements.

# Voltage Voltages: 117 volts

Position of Volume Control: Full with Antenna Disconnected

ALIGNMENT

OPERATION

ALIGNMENT OF

GENERATOR CONNECTED TO

DUMMY ANTENNA

GENERATOR FREQUENCY

BAND SWITCH SETTING

TUNING COND. SETTING

TRIMMER

REMARKS

1. Set dial pointer at horizontal lines at end of scale with condenser closed

2. (Back off, i.e., turn counter-clockwise, regeneration cond. C9 "red spot" before I.F. is aligned)

3. 1.8 - 60 grid

4. Adjust C9 "red spot," turning in clockwise until oscil. occurs, turn out C9 until oscil. stops

5. Re却ter Ant. 200 mnf. 456 KC

6. Broadcast Band Ant. 600 mnf. 1500 KC

7. Band Ant. 600 KC

8. (Repeat operation 6)

9. (Check calibration and sensitivity at 600 KC, 1000 KC and 1600 KC)

10. (Connect set to regular antenna and check reception of stations. Readjust C9 if set howls or oscillates on strong signals. Then reread sensitivity)

* This model has Broadcast Band only.
ALIGNMENT

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>ALIGNMENT OF</th>
<th>GENERATOR CONNECTED TO</th>
<th>DOMED ANTENNA</th>
<th>GENERATOR FREQUENCY</th>
<th>TUNING COND. SETTING</th>
<th>TRIMMER</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Get pointer to last mark below 550 KC with tuning condenser plates flush)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>L.F.</td>
<td>.2 mfd.</td>
<td>456 BC</td>
<td>Open</td>
<td>C-2, S1 (a,b)</td>
<td>Adjust to max. AFC off.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rejector</td>
<td>200 mfd.</td>
<td>456 BC</td>
<td>Closed</td>
<td>C-2</td>
<td>Adjust to minima.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Broadcast</td>
<td>200 mfd.</td>
<td>1500 BC</td>
<td>1500</td>
<td>C-2 Ant.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>600 BC</td>
<td>600</td>
<td>C-2 Pad.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>(Repeat operation 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>(Check operation of AFC circuit*)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Police</td>
<td>Ant.</td>
<td>100 ohm</td>
<td>200 mfd. series</td>
<td>C-2 Dec.</td>
<td>C1 RF</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>(Check calibration and sensitivity at 100 KC, 500 KC and 2.5 KC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Wave</td>
<td>Ant.</td>
<td>100 ohm</td>
<td>200 mfd. series</td>
<td>C1 Dec.</td>
<td>C1 RF</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>(Check calibration and sensitivity at 100 KC, 500 KC and 2.5 KC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Check operation of AFC circuit by connecting generator to grid cap of G2 and tune generator and receiver to 1000 KC. Increase generator signal so that VIS-O-GLO just closes. Tune accurately with AFC switch "OFF". Now snap AFC switch "ON" and note the sensitivity as indicated on the VIS-O-GLO. If the sensitivity changes, the AFC (Discriminator) is not properly aligned and should be touched up (trimmer C-312) until the AFC switch can be snapped "ON" and "OFF" without any change on the VIS-O-GLO.
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 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 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.

INFORMATIONAL ALIGNMENT:

1. Connect the output of the test oscillator to the control grid of the 6C6 modulator tube through .03 Mfd. condenser. Leave the grid wire 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 the center frequency of the receiver.
3. Adjust the second intermediate transformer by turning one of the trimmers screws accessible through holes in the top of the transformer 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 for 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 gauge condenser, padding and trimmer condenser 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 are 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 ground.
2. Place the band selector switch for operation on the 55 to 60 megacycle band, tune the receiver dial, and set the band oscillator frequency to exactly 55 MEGACYCLES. Move the test oscillator in the 55 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 55 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer, it is considered that the fundamental and the second harmonic peaks are not too close together. The fundamental and the second harmonic peaks will be noticed when the receiver is tuned to the right frequency. The second harmonic peak will be noticed when the receiver is tuned to the wrong frequency. The second harmonic peak will be noticed when the receiver is tuned to the right frequency.
3. With the band selector switch set for operation on the 155 to 160 megacycle band, tune the receiver dial, and set the band oscillator frequency to exactly 160 MEGACYCLES. Move the test oscillator in the 55 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 55 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer, it is considered that the fundamental and the second harmonic peaks are not too close together. The fundamental and the second harmonic peaks will be noticed when the receiver is tuned to the right frequency. The second harmonic peak will be noticed when the receiver is tuned to the wrong frequency. The second harmonic peak will be noticed when the receiver is tuned to the right frequency.
4. With the band selector switch for operation on the 175 to 180 megacycle band, tune the receiver dial, and set the band oscillator frequency to exactly 180 MEGACYCLES. Move the test oscillator in the 55 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 55 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer, it is considered that the fundamental and the second harmonic peaks are not too close together. The fundamental and the second harmonic peaks will be noticed when the receiver is tuned to the right frequency. The second harmonic peak will be noticed when the receiver is tuned to the wrong frequency. The second harmonic peak will be noticed when the receiver is tuned to the right frequency.
5. With the band selector switch for operation on the 215 to 220 megacycle band, tune the receiver dial, and set the band oscillator frequency to exactly 220 MEGACYCLES. Move the test oscillator in the 55 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 55 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer, it is considered that the fundamental and the second harmonic peaks are not too close together. The fundamental and the second harmonic peaks will be noticed when the receiver is tuned to the right frequency. The second harmonic peak will be noticed when the receiver is tuned to the wrong frequency. The second harmonic peak will be noticed when the receiver is tuned to the right frequency.

To realign the 6C6 modulator tube:

1. Replace the 6C6 modulator tube with a 6C6 or 607 modulator tube. Then tune the receiver dial and set the band oscillator frequency to exactly 1700 Kilocycles. Move the test oscillator in the 55 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 1700 KILOCYCLE OSCILLATOR TRIMMER. When adjusting this trimmer, it is considered that the fundamental and the second harmonic peaks are not too close together. The fundamental and the second harmonic peaks will be noticed when the receiver is tuned to the right frequency. The second harmonic peak will be noticed when the receiver is tuned to the wrong frequency. The second harmonic peak will be noticed when the receiver is tuned to the right frequency.

2. With band selector switch placed for operation on the 540 to 720 kilocycle band, tune receiver dial and set oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator pad for maximum sensitivity.

3. With band selector switch placed for operation on the 540 to 720 kilocycle band, tune receiver dial and set oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator pad for maximum sensitivity.

4. With band selector switch placed for operation on the 540 to 720 kilocycle band, tune receiver dial and set oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator pad for maximum sensitivity.

5. With band selector switch placed for operation on the 540 to 720 kilocycle band, tune receiver dial and set oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator pad for maximum sensitivity.

©John F. Rider, Publisher
GENERAL DATA

The alignment of this receiver is done at the factory with the following adjustments which will cover the operation of the receiver at 600, 1400, 2800, 4200, 6500, 5000, 12000, and 24000 kc and an output meter which is to be connected across the primary of a secondary output transformer, if possible. The output power should be made with the volume control on maximum and the test oscillator input at its lowest possible position, to prevent excessive heating and give false readings.

CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stage should be aligned properly or as close to it as possible by adjusting the I.F. transformers with no tuning control connected. The C53, I.F. transformers have been properly adjusted and judged, the Bandswings should always be the exact procedure after which, either or both of the Short Wave Bands may be aligned.

BAND ALIGNMENT

To adjust the test oscillator to 6500 kc and connect the crystal to the grid of the first detector, remove the receiver from the receiver table (6500 kc and 100 kc) and attach the intermediate frequency coil to the I.F. transformers with no tuning control connected. The first detector should now be adjusted to the grid of the final detector.
IF ALIGNMENT

Adjust the test oscillator to 450 KC and connect the output to the grid of the first detector condenser. The ground on the test oscillator can be connected to the chassis ground. Align all IF trimmers to peak or minimum reading on the output meter.

BROADCAST BAND ALIGNMENT

...
ANTENNA BALANCER

First, tune in a weak station at or very near to 600 KC on the dial. Second, without changing any other control, insert a small screwdriver into the antenna balancer screw shown in Figure 10 and turn it either to the left or right until the volume of the station is at its maximum point.
This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 250 meters), Police and Aviation Band which extends from 1700 to 550 Kilocycles (KC) (52 to 175 meters) and the Intercontinental Short Wave Band which extends from 5500 to 18000 Kilocycles (KC) (16.5 to 55 meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31, and 49 meter bands.
Compliments of www.nucow.com


INSTALLATION: For operation on 110-120 volts, 60 cycle A.C. or D.C.
Automatic Tuner Dual Range
6 Volt Superheterodyne

This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 465 K.C. Feed this to the grid of the pentagrid (5A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 K.C and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mf. micro condenser. Set the pointer on the dial to 1400 K.C making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Reset the dial pointer on the receiver and on the test oscillator to 600 K.C. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 K.C alignment as the adjustment at 600 K.C may have slightly disturbed the original 1400 K.C setting.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 60K ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 K.C to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 micro condenser for short circuit.
All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

**INTERMEDIATE FREQUENCY:** Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

**BROADCAST BAND:** Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Reset the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.
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 and inside of and accessible through the holes found in the top of the scabom shield (mounted on top and in the left front corner of the receiver) 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 selection switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.
3. Rotate the gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 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 18.8 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 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.
4. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antennas and R.F. trimmers to maximum 15 megacycle signal sensitivity.
5. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator trimmer for maximum sensitivity.
6. Place band selector switch for operation on 1.8 to 6.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.
7. Rotate the gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.
8. With the band selector switch set for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.
9. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator trimmer for maximum sensitivity.
10. 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 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.
11. Rotate the gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.
12. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R, F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
13. 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 trimmer for maximum sensitivity.

| VOLTAGE TABLE |
| LINE VOLTAGE: 115 VOLS AC |
| MEASURE VOLTAGES BETWEEN CHASSIS AND SOCKET PROXIES |

©John F. Rider, Publisher  Compliments of www.nucow.com
The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 660, 880, 1440, 1600, 1800, and 2400 Kc, and an output meter which should be connected with the volume control set at maximum and the output control set at minimum.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 660, 880, 1440, 1600, 1800, and 2400 Kc, and an output meter which should be connected with the volume control set at maximum and the output control set at minimum.

1. Set the dial pointer on the receiver end of the output meter to the best position. Connect the antenna of the test oscillator to the output meter, and the output of the test oscillator to the input of the receiver. Set the oscillator to 660 Kc.

2. Adjust the oscillator for maximum output, and then decrease the setting as indicated on the output meter, until the maximum reading is obtained on the output transformer.

3. Repeat the procedure for each of the following frequencies, 880, 1440, 1600, 1800, and 2400 Kc.

4. When all frequencies have been checked, the receiver should be ready for normal operation.

©John F. Rider, Publisher
Push Button Station Selector

The five stations wanted should be decided upon as this will determine which button must be used. Button number 1 as indicated in figure one is used for stations whose transmitting frequencies are between 50 and 1000 K.C. (as shown on the dial). Button 2 and 3 for stations whose frequencies are between 750 and 1400 K.C. Button 4 by itself for stations whose frequency is from 950 to 1100 and button 5 for stations whose frequencies are between 540 and 1000 K.C.

Front View

If a desired station falls in the range of button 1, tune the radio to this station with the colored button on the push button control panel pressed in (this button releases the automatic tuner and provides for manual tuning of the receiver.)

Now press button 1 and with a screwdriver turn adjusting screws 1B and 2B as shown in figure 2 until this same station is heard, then turn screw 1A until the station is heard with maximum volume as indicated by the closing of the electric eye on the front panel. Carefully re-adjust 1A and 1B again for maximum volume.

Do not force the screws as the threads may be abraded and rendered useless. This may happen if you do not observe what range the station falls into, and thus use the wrong push button.

Proceed with button 2 in a similar way, first pressing in the manual tuning button and tuning to the desired station then to the desired 2 and adjusting screws 2B and 2A to the same program. Buttons 3, 4, and 5 are adjusted in a similar manner using screws 3B and 3A for the third button, 4B and 4A for the fourth button, etc.

Connections Rear View

Figure 2 To Chassis

Note: In some models the odd colored release button is located to the extreme left instead of to the right as indicated in figure one. Thus if the release button is to the extreme left the adjustment screws in figure 2 are reversed. Reading from left to right they become 5B-4A-3A-2B-1A etc.

It is important that the adjustment be carefully made otherwise the reception of the radio station will be distorted and lacking in volume. In some instances it is advisable to re-adjust all the screws a few days after the initial setting to compensate for any drift due to room temperature, humidity, etc.

Operation

For manual tuning, press the release button and proceed to tune stations in the usual manner with the station selector knob. Do not attempt to press more than one button at a time as this will not tune any odd colored stations. Although this will not get you to the station you desire, this may result in the radio receiver squealing and having excessive interference.

To operate the automatic station tuning control it is only necessary to press in any one of the five station tuning buttons. This automatically disconnects the manual tuning control from the electrical circuit. Thus it is possible to leave the dial tuned to any station and yet use the automatic push button station selector.

The odd colored release button should always be in whenever the regular tuning knob is used to select the stations.

Station Call Letters may be inserted in the spaces provided and can be changed at will.

Front of Cabinet

INSTOMATIC TUNING

The purpose of Instomatic tuning is to give the user instant, automatic tuning of any one of a selection of favorite broadcast stations. The control buttons are conveniently located just below the tuning dial. Pushing in any button will release any other button which happens to be already in. After the Instomatic tuning feature has been properly adjusted, this will instantly and automatically tune the station selected by the push button.

Before attempting to adjust or use Instomatic tuning, the "Installation" and "Operation" instructions must be carefully followed. When the receiver is operating satisfactorily using the tuning dial with the "Dial Tuning" button pressed in, the Instomatic feature may be easily adjusted by carefully following these instructions.

Located on the back of the chassis is a row of five pair of small balancing adjustment knobs. Each pair of these knobs controls the tuning of the station for the Instomatic button which is in the same relative position.

With the receiver operating with the "Dial Tuning" button in and the switch on broadcast position, turn the tuning knob to the left until the 540 K.C. end of the band has been reached. Then turn the tuning knob to the right until a station, for which it is desired to have Instomatic tuning, is heard. Press the Button No. 1. This is the button at the left hand end of the row. Reach around to the back of the receiver and turn upper knob of the Pair No. 1 until the same program is heard. Unless the wrong knob is being turned, several different stations will be heard during this procedure. If necessary to check that the same program is now tuned in, the "Dial Tuning" button may again be pressed.

In this way it can be determined that the same station is tuned in with the Instomatic button as when the "Dial Tuning" button is in. If it is not the same station the adjustment knob should be turned again and these operations repeated until the same program is heard when either of these two buttons is pressed.

The bottom adjustment knob of the first pair is now turned until the station is heard best. Both top and bottom knobs may then be adjusted to exact tuning by watching the magic eye and adjusting until the two edges of the green section are as close together as it is possible to get them.

The first Instomatic button is now properly adjusted for the station which was tuned in on the dial and the station's call letters may be pushed out of the station list, moistened on the back, and pressed into the hollow end of the button.

With the "Dial Tuning" button pressed in, the tuning knob is again turned to the right until the next station for which Instomatic tuning is wanted is tuned in. The adjustment process for this station is the same as before, except that the Button No. 2 and Pair No. 2 adjustment knobs are used. Proceeding in this way all five of the buttons may be properly adjusted for the stations desired.

It must be remembered that the "Dial Tuning" button must be pressed in whenever it is desired to tune in stations with the tuning knob, regardless of which wave band is in use. It must also be remembered that the wave width must be in the broadcast position when Instomatic tuning is being used.
### SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 60-85 4000</td>
<td>500 OHM CARBON RES.</td>
<td>33 6107 25000</td>
<td>150 OHM</td>
<td>34 6050 120</td>
<td>500 OHM CARBON RES.</td>
</tr>
<tr>
<td>38 60-100 200 DWH</td>
<td>IN WIRE WOUND</td>
<td>39 6035 50</td>
<td>150 OHM</td>
<td>40 6039 60</td>
<td>500 OHM CARBON RES.</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

- **F- Filament**
- **P- Plate**
- **K- Cathode**
- **S- Screen Grid**
- **Su- Suppressor**
- **Dp- Diode Plate**
- **Gc- Control Grid**
- **G- Osc. Grid**
- **Ga- Osc. Plate**

### FILAMENT VOLTAGES MEASURED ACROSS SOCKET

- **80**: 5.8v AC
- **41**: 5.8v AC
- **75**: 5.8v AC

**FILAMENT VOLTAGES MEASURED ACROSS SOCKET**

- **ALL OTHER VOLTAGES MEASURED TO GROUND WITH 1000 OHM PRE-VOLT VOMETER**

---

This receiver is a 7 tube alternating current operated superheterodyne. The tubes used are a 76 as audio amplifier, a 6A7 as modulator, a 6D6 as I.F. amplifier, a 75 as audio amplifier, and a 6G5 as tuning indicator.

This receiver is made to cover 2 tuning bands, the standard broadcast band which ranges from 1730 K.C. to 535 K.C. and the middle or police band which has a frequency range of from 6.4 M.C. to 2.1 M.C.
DESCRIPTION

This receiver is an 11 tube alternating current operated superheterodyne.

The tubes used are a 6C5G oscillator, a 6AQ5 modulator, a 6K7G 1F. amplifier, a 6C5G A.V.C. rectifier, a 6H6G detector, a pair of 6J7G audio amplifiers, a pair of 6V6G power amplifiers, an 80 rectifier, and a 6C5 tuning indicator or magic eye.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.
ALIGNMENT PROCEDURE

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a 5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Press in the dial Tuning button. Models 2070, 2071, 4076 and 4076.\(^1\)

Connect the signal generator to the grid cap of the 6AT tube through a 5 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 458 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This sets the I.F.

Leaving the signal generator connected to the grid cap of the 6AT, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 1500 M.C. Tune in the signal by adjusting the 150 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the lopest. Also when the dial of the receiver is turned the signal will be heard again at about 150 M.C. If the signal is heard at about 150 M.C. on the dial instead of 150 M.C., the wrong setting has been used and should be corrected.

Set the wave switch on broadcast position, turn the dial to the extreme high frequency end. Feed a 3600 K.C. signal to the receiver antenna post through a 00025 M.F. mica condenser. Adjust the 1800 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer, and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the 00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

Connect the output meter, through a 5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 1000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6AT tube through a 1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position, press in the dial tuning button and set the dial to about 1000 K.C. Then feed in a 458 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This sets the I.F.

Leaving the wave switch on broadcast position, turn the dial to the extreme high frequency end. Feed a 3600 K.C. signal to the receiver antenna post through a 00025 M.F. mica condenser. Adjust the 1720 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a 00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave antenna trimmer for maximum output.

©John F. Rider, Publisher

Compliments of www.nucow.com
Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, improperly connected or low battery, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

**ALIGNING IF STAGE AT 465 KILOCYCLES:**

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the No. 6D8G modulator tube through a .02 Mfd. condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second IF transformer trimmers.

(d) Peak each of the first IF transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times, always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**ALIGNING ANTENNA AND OSCILLATOR CIRCUIT:**

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

(h) While rocking the tuning condenser back and forth adjust 600 K.C. oscillator padder condenser which is installed through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.
SPIEGEL INC.

MODEL 2302, 2303 Chas. 78-780
Schematic, Socket, Trimmers
Alignment

IF PEAK 175 KC

L.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second L.F. transformers to peak or maximum reading on the output meter.

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

©John F. Rider, Publisher
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

Peak IF at 465 KC. Connect oscillator at 6A7 grid cap. Use .02 mfd. series condenser, DO NOT REMOVE GRID CAP. Peak second and first IF trimmers.

1720-540 KC Band.

Connect oscillator to antenna lead through .00025 mfd. series condenser.

Gang condenser at maximum capacity, calibrate dial so needle falls on last line in this position.

Set oscillator signal at 1720 KC, tune dial to 1400 KC. Trim osc. sect. of gang condenser to maximum output.

With signal generator at 1400 KC, trim antenna section of gang condenser for maximum output.

Now adjust 600 KC padder for maximum signal while rocking condenser.

2.3-6.5 MC Band

Signal at 6.3 MC through 400 ohm and .00025 mfd. dummy to antenna lead.

Band switch in 2.3-6.5 MC position. Adjust 6.3 MC osc. trimmer to maximum output.

Tune dial to 6 MC. Signal at 6 MC. Adjust 6 MC antenna trimmer for maximum sensitivity.
DESCRIPTION

This receiver is an 8 tube alternating current operated superheterodyne.

The tubes used are a 6A7 as oscillator modulator, a 46R as I.F. amplifier,
a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 6F5 as audio
phase inverter, an 80 as a power rectifier, a 6G5 as tuning indicator and two
type 42 tubes as push pull audio amplifiers.

This receiver is made to cover 3 tuning bands: the standard broadcast band
which ranges from 1680 K.C. to 535 K.C., the middle or police band which has
a frequency range of from 5.6 M.C. to 17 M.C. and high frequency or foreign
band which is from 20 M.C. to 5.4 M.C.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOMETER.

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT: The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies: 465, 1400, 1600, 5100, 18000, and 15,000 KC.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter, which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. micro condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Adjust trimmer (underneath chassis) on B.F. coil for greatest output. Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE BAND: For a dummy antenna use a .0002 mfd. micro condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.
ALIGNMENT: The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies 455, 1400 and 4000 KC. The I.F. coils are aligned for maximum signal as indicated by an output meter which is to be connected across the output transformer. I.F. frequency is 455 KC. There are four adjustments for I.F. alignment.

To align broadcast band it is only necessary to align receiver at 4500 KC because of the initial setting at the factory. A 200 mmHg. condenser is necessary in this position. That is inserted in series with the test oscillator and the antenna connection of the radio receiver. Set oscillator and pointer on dial to 4000 KC and adjust the two trimmer condensers on the tuning condenser for maximum output. Turn Band Switch to Short Wave position. Feed a 4000 KC signal from the test oscillator and check receiver.

©John F. Rider, Publisher
The tube sections used are 6A7 as A.V.C. and audio rectifier, a 6Y7 as audio voltage amplifier, and a 6G6 as a power rectifier, a 6G5 as tuning indicator and two 6G6 tubes as push-pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 880 K.C. to 1550 K.C., the medium frequency band which has a starting frequency of 1540 K.C. to 50 K.C., and the high-frequency or foreign broadcast band which is from 19 M.C. to 50 M.C.
Intermediate Frequency: Unless an intermediate transformer has become defective due to an overheating of the primary winding, it should not be necessary to readjust the intermediate stage. Should this occur, it is essential that the oscillator be used with some type of output metering device to correctly trim the L.F. transformers. Connect the high-side of the oscillator output to the control grid cap (grid No. 6) of the 6AQ7 cathode follower tube, leaving the grid cap disconnected. Connect a 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6AQ7 TO THE BODY FRAME OF THE V-MOTOR CONDENSER. If the output of the oscillator is too high, the value of this resistor may be reduced. The ground side of the test oscillator should be connected to the chassis. Set the oscillator to 800 K.C. (this must be accurate) and adjust the detector by increasing or reducing the value of the capacitors so that the intermediate reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to reset the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first L.F. transformer is double-tuned, the trimmer of which is accessible through the side of the L.F. case, one section of which is adjusted by turning the brass hex nut and another section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible through the top of the intermediate transformer shield case. After both intermediate transformers are correctly aligned, the alignment of the intermediate stage is complete and the trimmers should not be further disturbed.

Variable Condenser Alignment: If the intermediate frequency stage has been realigned or if the antenna, L.F. or oscillator stage has been replaced, it will be necessary to realign the variable condenser. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis to prevent the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will distort the receiver. The values should be noted in the shield be compared with the values provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the alignment is properly grounded to the receiver chassis. Normal receiver and "T" unit is removed from the set housing be sure to set the receiver on top of the "T" unit, otherwise the variable L.F. and audio lead will be damaged. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the variable condenser to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the oscillator to 1500 K.C. Pack, USING THE PHASE OF THE VARYING MODULATION SECTION SWITCH, adjusting for the most intense modulation reading. The variable condenser trimmer is mounted on the left side of the condenser and resonated to the bottom of the trimmers are, oscillator, L.F. and variable condenser. After the oscillator section has been properly tuned, adjust the antenna and L.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted to 1500 K.C. tune the receiver to 800 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator with a read-out on the output meter, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the audio output is limited to the output meter reading, in the side of the set housing. It may be necessary to turn the variable condenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is not correctly followed, the receiver will not track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.
ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and alignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:
1. A signal generator which will provide an accurately calibrated signal at any frequency from 450 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable indication for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

IF ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator through the grid of the 6L6 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Adjust IF alignment screws of second IF transformer adjacent to EPI power tube to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.
4. Adjust alignment of first IF transformer (directly behind tuning condenser) to maximum output as described above.
5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustments.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator to 18 megacycles.
2. Set the dial scale to 18 megacycles and adjust the trimmer condenser (C4-A) to resonance using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C3-D) to maximum response, rocked the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

1. With the test oscillator connected as above set the oscillator and dial to 5.8 megacycles.
2. Adjust oscillator trimmer condenser (C4-D) for maximum response using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C3-D) to maximum response rocking the gang condenser as described above.

TRIMMER LAYOUT

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.
2. Adjust broadcast oscillator trimmer (C4-D) to obtain maximum response.
3. Adjust antenna circuit trimmer (C3-F) for maximum output.
4. Adjust preset trimmer (C2-G) for maximum output.
5. Set test oscillator and dial to 456 kilocycles and turn in the signal, then adjust broadcast band padding condenser (C6-H) for maximum output. This pad is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two to obtain proper maximum.
6. Repeat the 1600 KC adjustments described above for greater accuracy.
This radio receiver is designed for operation on standard American broadcasts, Police, Amateur, aviation, ships, foreign and U.S. governmental time and weather broadcasts. This vast coverage in radio entertainment and utility is divided into four parts or bands indicated on the tuning dial and the wave band indicating device.

The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated from 150 to 375 K.C. (2000 to 800 meters) and covers the range necessary for receiving governmental time and weather reports. The second band from the center is for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The third band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The fourth band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39 and 49 meter channels.
The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated from 150 to 375 K.C. (2000 to 800 meters) and covers the range necessary for receiving governmental time and weather reports. The second band from the center is for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The third band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The fourth band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39 and 49 meter channels.

© John F. Rider, Publisher
ALIGNMENT
IF trimmer adj. at 456 KC through .05 or .1 mf dummy condenser.
BC osc. trimmer and ant. trimmer adj. at 1400 KC through .001 mf dummy.
Padder at 600 KC. Recheck at 1400 KC.
Foreign Band: Through .0001 mf dummy, adj. at 14000 KC both the S.W. oscillator and S.W. trimmers. Check for image frequency at 13100 KC for proper weaker signal.
Police Band: Through 400 ohm resistor .0001 mf cond. series dummy, adjust osc. trimmer and ant. trimmer at 4000 KC. Padder adj. 1500 KC. Recheck at 4000 KC.
Wave Trap: At rear of chassis near grd. & ant. post adj. wave trap screw at 456 KC.
Dial Calibration - Government & Weather Reports - 150 to 375 KC.
Broadcast 550 to 1700 KC.
Police, Amateur, Aircraft & Ships 1700 to 5400 KC.
Short Wave 5.5 to 18 megacycles.
R.F. Alignment:

With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust the antenna trimmer located on rear section of variable condenser. Adjust 1st detector trimmer under the chassis across preselector. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.
ALIGNMENT FREQUENCIES:

IF 262 KC thru .1 mf dummy
OSC. 1870 KC thru .00025 mf dummy
Ant. & RF 1400 KC " "
Padder 600 KC " "

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII

procedures for alignment at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Solder the output meter leads from output plate (P) to screen (S) of the 70L7GT tube (see voltage chart). The leads must be soldered securely, and all bottom cover must be replaced during alignment. The output meter leads can be brought through the power cord opening.

2. Connect the ground lead of the signal generator through a .25 mfd. condenser to some portion of the chassis in the VICINITY OF THE GANG CONDENSER.

3. Remove the connector between the antenna terminals on the bottom of the set.

4. Turn the volume control to the maximum volume position and keep it in this position while aligning.

5. The tuning knob should be adjusted so that the dial which appears on the outer part of the knob is accurately centered and points away from the chassis when the gang condenser is in full mesh.

 carefully calibrated signal generator are required.

### Dummy Antenna with Sig. Gen.

<table>
<thead>
<tr>
<th>Dummy Antenna with Sig. Gen.</th>
<th>Connection of Sig. Generator Output to Receiver</th>
<th>Signal Generator Frequency</th>
<th>Receiver Dial Setting</th>
<th>Trimmer Number</th>
<th>Trimmer Description</th>
<th>Type of Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>.1 MFD. Condenser</td>
<td>Lug on bottom gang condenser</td>
<td>455 KC</td>
<td>Any point where it does not affect signal</td>
<td>1</td>
<td>2nd I.F.</td>
<td>Adjust for maximum output. Then repeat adjustment if the set oscillates, see precautions under heading ‘I. F. Oscillation.’</td>
</tr>
<tr>
<td>200 MMFD. Mica Condenser</td>
<td>Antenna terminal on bottom (terminal nearest back of chassis)</td>
<td>1500 KC</td>
<td>1500 KC</td>
<td>4</td>
<td>Broadcast Oscillator (Shunt)</td>
<td>Adjust trimmer for maximum output.</td>
</tr>
<tr>
<td>200 MMFD. Mica Condenser</td>
<td>Antenna terminal on bottom (terminal nearest back of chassis)</td>
<td>1500 KC</td>
<td>Tune to 1500 KC Generator Signal</td>
<td>5</td>
<td>Broadcast Antenna</td>
<td>Adjust for maximum output.</td>
</tr>
</tbody>
</table>

### I. F. OSCILLATION

When aligning this set, I. F. oscillation may be encountered if the following precautions are not observed:

1. Keep the bottom cover plate on during alignment.

2. Keep the signal generator leads as far from the chassis as possible in order to prevent unnecessary feed-back.

3. Connect the ground lead of the signal generator through a .25 mfd. condenser to some part of the chassis in the VICINITY OF THE GANG CONDENSER.

4. Keep the orange lead of the volume control away from the 2nd I.F. transformer. Separating this lead from the others surrounding it at the base of the 22A8GT tube will also help.

### BUILT-IN ANTENNA SYSTEM

The built-in antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This built-in antenna will function when the terminals on the bottom of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting these terminals and connect an external antenna to the terminal marked “External Aerial.” This is the terminal nearest the back of the set.

The built-in antenna condenser No. 12 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R.F. choke No. 21 is an iron-cored choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 31 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting the antenna terminals on the bottom of the set should be removed. This will prevent picking up signals which might interfere with the alignment procedure.
**STEWART - WARNER CORP.**

**MODELS 91-531 to 91-539**

Chassis 91-53
9-531 to 9-539

Chassis 910-53
8-531 to 8-539

Alignment, Trimmers

These chassis are S-tube, two band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1735 KC and 8.4 to 15.6 M. The I.F. is 466 KC.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 M are required.

1. Connect the output meter across the voice coil or between the plate of the 6K6-0 output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.

3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it may be necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

<table>
<thead>
<tr>
<th>IMPEDANT ANT.</th>
<th>IN SERIES WITH SIG. GENERATOR</th>
<th>OUTPUT TO SIG. GENERATOR</th>
<th>BAND SWITCH</th>
<th>RECEIVER DIAL</th>
<th>TRIMMER NO.</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 MFD Condenser</td>
<td>CONTROL GRID OF 6A8-0</td>
<td>TUBE 465 KC</td>
<td>BROADCAST</td>
<td>BUTTON PULSED IN</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1-2</td>
<td>2nd I.F.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>465 KC</td>
<td>BROADCAST</td>
<td>BUTTON PULSED IN</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>3-4</td>
<td>1st I.F.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>1500 KC</td>
<td>BROADCAST</td>
<td>BUTTON PULSED IN</td>
<td>1500 KC SIGNAL</td>
<td>5</td>
<td>WAVE TRAP</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>1500 KC</td>
<td>BROADCAST</td>
<td>BUTTON PULSED IN</td>
<td>1500 KC GENERATOR SIGNAL</td>
<td>6</td>
<td>BROADCAST OSCILLATOR (Shunt)</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>600 KC</td>
<td>BROADCAST</td>
<td>BUTTON PULSED IN</td>
<td>600 KC GENERATOR SIGNAL</td>
<td>7</td>
<td>BROADCAST ANTENNA</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>14 MC</td>
<td>FOREIGN</td>
<td>BUTTON PULSED IN</td>
<td>14 MC</td>
<td>8</td>
<td>BROADCAST OSCILLATOR (Series Pad)</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>14 MC</td>
<td>FOREIGN</td>
<td>BUTTON PULSED IN</td>
<td>14 MC</td>
<td>9</td>
<td>FOREIGN OSCILLATOR (Shunt)</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA LEAD (Blue Wire)</td>
<td>14 MC</td>
<td>FOREIGN</td>
<td>BUTTON PULSED IN</td>
<td>14 MC</td>
<td>10</td>
<td>FOREIGN ANTENNA</td>
</tr>
</tbody>
</table>

©John Y. Rider, Publisher

Compliments of www.nucow.com
HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the set is connected to a good antenna system.
2. Turn on the set and allow it to operate for at least one-half hour before setting up the push buttons.
3. Make a list of the five nearest stations to which you wish to set the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS in the operating range of a button before attempting to set up that button for the particular station. AS THE TRIGGER SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. For example, suppose you want to set a button to station WLM whose frequency is 700 KC. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 1 and No. 2 whose range is 550 to 1000 KC. Therefore, either of these buttons may be set to WLM.

4. Remove the escutcheon surrounding the push-buttons by turning the screw holding it to the cover clockwise. This will expose to view the terminal adjustment screws of the unit which is used to set the buttons for a station.

5. Push the button in which is labelled "Broadcast" and use the tuning knob to bring in the station that you want on button No. 1. This is done so that you may identify the station by hearing its program.

6. Push in button No. 1 (See Fig. 1). You will note that when this button is pushed in, your station will appear as the station that the push-button switch is set to. If the station is not visible, you will have to adjust the trembler screw until the station comes up on the correct channel. To do this, remove the trimmer screw from the front of the chassis and slide the trimmer screw up until the tab has come up on the display. This is done to make the correct station appear on the display.

7. Set up button No. 2 for the selected station in a similar manner, using trimmer screws No. 3 and No. 4. Proceed to set the remaining buttons in the same manner.

8. Label each button with the call letters of the station you have selected, using the call letter tabs and the celluloid covers for the buttons. The printed paper tab should be inserted in the button holes and held in place with celluloid cover. The celluloid cover tab should be placed in a similar manner and placed on top of the button.
Compliments of www.nucow.com

1937 Models

MODELS 1471 to 1479
Chassis R-147

MODELS 1481 to 1489
Chassis R-148

Hum Elimination

FOR HUM ELIMINATION IN THE MODEL R-147 CHASSIS

November 28, 1936

FOR REMOVAL (between-station hum)

1. Remove the .5 uf, condenser, part number 19929, connected from chassis to the speaker. The speaker, a 12" paper cone, is driven by the 12.5 volt Exciter-Transformer and is not part of the power transformer. Replace the .5 uf. condenser with a 10 uf. 25 volt electrolytic condenser, our part number 68025. The positive terminal of this condenser must be connected to the chassis. This change should always be made in conjunction with the following one, since either change may increase the hum if made alone.

2. Remove the 120,000 ohm resistor connected from the plate of the 6A7 tube to one of the heater leads. (a) Disconnect the end of this resistor going to the 6A7 socket. (b) Connect the added 12,000 ohm resistor in series with the disconnected end of the above 120,000 ohm resistor and the lug on the 6A7 socket from which it was connected.

3. Connect the added .5uf condenser from chassis to the lug on the 6A7 socket from which the above resistor was removed.

4. Remove the twisted green and brown wires connecting to the tone control and speaker terminals and touch the colored pair supplied by Stewart-Warner. Ground the shield at both ends. Route the colored wire so that it is not in contact with the mounting nut on the electrolytic condenser nearest the power transformer.

5. Connect the single green volume control wire from the power transformer and the 6A7 leads.

6. In all cases of either residual or modulation hum, tighten down the power transformer mounting screws after the set is set.

If there is still too much hum after making the above changes be sure to check for defective tubes.

The following material is required for this work:

1 - 68025 - 10 uf, 25 volt Electrolytic Condenser
1 - 68250 - 10 uf, 25 volt Carbon Resistor
1 - Special Shielded Twin Control Cable
1 - 81-9445 - 120,000 ohm Carbon Resistor

December 4, 1936

FOR MODULATION HUM (in sections only) Make this change even though no indication how it is heard in the shop.

1. Remove the 120,000 ohm condenser connected to the speaker grid circuit of the 6A7 tube.
2. Install it with a .5 uf, 150 volt paper condenser, our part number 16599.

FOR REPAIR (between-station hum)

1. Locate the red-blue wire running from the 845 socket heater terminal to the speaker socket.
2. Disconnect one end of the wire and re-route the wire along the back of the chassis so that it is at least two inches above the 845 and 800 sockets when the chassis is upside down. Disconnect the wire.
3. The blue and black twisted wire supplied by Stewart-Warner should be placed along the front of the chassis so it can be used to connect the screen plate of the 845 tube and the stud of the 6A7 socket. First connect the black wire to the ground terminal of the 6A7 socket and the blue wire to the hot heater terminal of the same socket. The other end of the black wire must be connected to the ground heater terminal of the 6A7, nearest the front of the chassis and the other end of the blue wire must be connected to the hot heater terminal of the other 6A7 socket (the one nearest the 845).
4. To locate the transformer mounting screws connect the front of the set. Rotate the transformer around its mounting screws until the frame is level and the speaker is facing the audience. There is a hole in the chassis at the proper point to mount the transformer by means of the small machine screw, lock-washer and nut. Pull the transformer away from the tube sockets.
5. Sometimes an incorrect position of the transformer will result in a noise but this noise will not cause hum or any of the new mounting holes.

SPACER CRD REPLACEMENT IN 1937 RADIO MODELS

We can now supply replacement cones which can be installed without special tools. The Stewart-Warner spacers replacing the horn models with the exception of some of the small five inch speakers. In describing the replacement of the cones we are dividing the various speaker models into three general groups as follows

(a) - 8 and 12 inch speakers with spindles spaced to the pole piece

In order to facilitate the replacement of the cones in our 8 and 12 inch speakers the spindles should be marked at the center of the pole piece. We will furnish special cones which can be installed without any special tools or equipment as described under "INSTALLING NEW CONES".

These cones have spindles fastened to the outside of the voice coils. The spindles are carried on the speaker shell by means of screws. The necessary holes are already punched in the shell. The special cones are supplied complete with the necessary horns and mounting hardware under the part number in the table shown on page 20 of this bulletin.

(b) - SPEAKERS HAVING SPINDLES MOUNTED WITH SCREWS

The cones in these speakers can be replaced in the conventional manner as described later in this bulletin under "INSTALLING NEW CONES". The correct part numbers are tabulated below.

(c) - 4-1/8 INCH SPEAKERS WITH SPINDLES SPACED TO THE POLE PIECE.

SPEAKERS IN THIS GROUP CANNOT BE SATISFIERLY REPAIRED WITHOUT SPECIAL EQUIPMENT AND THEREFORE MUST BE RETURNED TO THE FACTORY FOR REPAIR. IF THE SPEAKER IS DAMAGED OR IF THE SPEAKER IS NOT IN THE SUITABLE SHAPE THE COST OF REPLACING THE CONES WILL BE THE COST OF THE CONES PLUS A FIFTY CENT LABOR CHARGE. WE WILL ALLOW NO TRANSPORTATION CHARGES UNDER THESE CONDITIONS.

INSTALLATION for REPLACING new CONES

1. In steady weather select the old cones around the outer edge and break the speaker from the cover under which it is mounted. This speaker should be left in place. In models having the speaker secured with screws, remove the screws and then cut the cone around the outer edge. Secure the cone, voice coil and speaker assembly and clamp away all traces of the old cone and cover where the cone was cemented to the frame.
2. Clean any particles from the air gap.
3. Glue an even coat of glue, using household or speaker cement over the face of the speaker frame. If two complete speakers are pasted with the cone put the thin one on the front and cover it with cement. If only one complete gasket is desired it should be applied later as described paragraph 4.
4. Let the replacement cone in place with the voice coil in the air gap. Make sure that the cones in the mounting line up with the bolts in the speaker shell.
5. (i) In the B-741a, B-742d and B-756-8 speakers, place the small opening between the speaker and the shell. Insert the screws through the shell, speaker and speaker assembly on the inside air gap to keep the voice coil centered.
6. (ii) In other speakers place the small brackets, part No. 2002, over the speaker mounting bracket with the cone in the shell.
7. (iii) Mount the voice coil mounting screws through the holes in the shell and screw them into the brackets. Leave the screw loose.
8. Insert three or four thin shims in the inside air gap to keep the voice coil centered.
10. Cement the correct gasket to the edge of the cone, place the speaker on its face until the cement is thoroughly dry.
11. Tighten the speaker mounting screws, and then add two or three thin shims from the air gap.
12. Make sure that the voice coil is centered by pressing in on the cone near the outer edge and listening for evidence of rubbing. If the voice coil is rubbing, the speaker mounting screws should be loosened and the voice coil centered as it does not rub.
13. Select the flexible voice coil, leads to the proper terminals.

REPLACEMENT CONE PART NUMBERS

( FOR ALL 1936-1937 SPEAKER MODELS

<table>
<thead>
<tr>
<th>Speaker No.</th>
<th>Receiver Type</th>
<th>Replacement Cone</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-264-A</td>
<td>D-264-A</td>
<td>Replacement Cone</td>
<td>1.00</td>
</tr>
<tr>
<td>B-265-A</td>
<td>D-265-A</td>
<td>Replacement Cone</td>
<td>1.00</td>
</tr>
<tr>
<td>B-254-A</td>
<td>D-254-A</td>
<td>Replacement Cone</td>
<td>1.00</td>
</tr>
<tr>
<td>B-255-A</td>
<td>D-255-A</td>
<td>Replacement Cone</td>
<td>1.00</td>
</tr>
<tr>
<td>B-256-A</td>
<td>D-256-A</td>
<td>Replacement Cone</td>
<td>1.00</td>
</tr>
<tr>
<td>B-257-A</td>
<td>D-257-A</td>
<td>Replacement Cone</td>
<td>1.00</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
NOTE

TERMINALS OF SWITCH AND COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM AT THE RIGHT. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.
RELAX, PLEASURE TO CHANGE WITHOUT NOTICE.

DIAL AND MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>118745</td>
<td>Clip - coil mounting (sec. &amp; ant.)</td>
<td>$0.01</td>
</tr>
<tr>
<td>118746</td>
<td>Clip - for sq. wave traps coil</td>
<td>$0.16</td>
</tr>
<tr>
<td>133795</td>
<td>Cord - band indicator (28&quot; required) (supplied)</td>
<td>$0.30</td>
</tr>
<tr>
<td>133796</td>
<td>Pins - 4 ft.</td>
<td>$0.10</td>
</tr>
<tr>
<td>133797</td>
<td>Condenser - drive drum &amp; pinion gear</td>
<td>$0.70</td>
</tr>
<tr>
<td>133798</td>
<td>Screw - turn, No. 1/2 hex. head</td>
<td>$0.25</td>
</tr>
<tr>
<td>118735</td>
<td>Dial &amp; pulley assembly</td>
<td>$0.50</td>
</tr>
<tr>
<td>142501</td>
<td>Dial scale</td>
<td>$0.10</td>
</tr>
<tr>
<td>142502</td>
<td>Dial scale</td>
<td>$0.25</td>
</tr>
<tr>
<td>133799</td>
<td>Socket - for dial lamp</td>
<td>$0.15</td>
</tr>
<tr>
<td>118798</td>
<td>Socket - coaxial m.t. No. 3/8&quot;</td>
<td>$0.10</td>
</tr>
<tr>
<td>142503</td>
<td>Socket - octal base (standard)</td>
<td>$0.15</td>
</tr>
<tr>
<td>118799</td>
<td>Socket - octal base (special)</td>
<td>$0.15</td>
</tr>
<tr>
<td>133800</td>
<td>Spring - between gear sections</td>
<td>$0.05</td>
</tr>
<tr>
<td>133801</td>
<td>Spring - for key return</td>
<td>$0.05</td>
</tr>
<tr>
<td>118793</td>
<td>Terminal strip</td>
<td>$0.25</td>
</tr>
<tr>
<td>118794</td>
<td>Terminal strip</td>
<td>$0.25</td>
</tr>
<tr>
<td>118795</td>
<td>Terminal strip</td>
<td>$0.25</td>
</tr>
<tr>
<td>118796</td>
<td>Terminal strip</td>
<td>$0.25</td>
</tr>
<tr>
<td>118797</td>
<td>Terminal strip</td>
<td>$0.25</td>
</tr>
<tr>
<td>118798</td>
<td>Terminal strip</td>
<td>$0.25</td>
</tr>
</tbody>
</table>

PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The phonograph turntable is wired directly to the line cord. A socket is inserted in parallel with this power supply line into which is plugged the phonograph pickup for the radio chassis.

The phonograph pickup is connected into the audio amplifier section of the radio by means of a double pole double throw switch located in the top panel. With this switch in the phonograph position the receiver volume control is disconnected and the crystal pickup unit is the only source of audio in the receiver. The volume control is then used to adjust the volume of the radio. When the phonograph switch is in the phonograph position, the Phonograph pickup is connected into the audio amplifier section of the radio. The volume control is then used to adjust the volume of the radio.

TESTING

When the phonograph pickup is disconnected as this model chassis is removed from the cabinet for testing, the set will not operate unless the proper connections are made at the phonograph terminals. The two outside terminals must be connected together and the center terminal must be grounded to the chassis.

Alignment, Trimmers, Phone, Data, Tuner Data

© John F. Rider, Publisher

Compliments of www.nucow.com
**Schematic, Voltage, Socket**

**4.55 Kc.**

**Antenna Coupling.**

- **6F6G:** Output
- **607G:** 6H6 2nd DET A.C.
- **6K7:** DET A.C. 450V 20mA 30W

**Socket Voltages.**

- **6AG:** 1/1 DET A.C. 450V 20mA 30W
- **5W46:** Rectifier

**REAR OF CHASSIS.**

- Use a high resistance voltmeter of at least 100,000 ohms per volt.

**Note:** A. The bias for the control grid of the 6FYG tube is 1/2 the voltage across resistor number 12.

---

### ELECTRICAL PARTS LIST

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Port</th>
<th>Number</th>
<th>List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacitor, mica, 250 volt</td>
<td>1</td>
<td>63539</td>
<td>0.20</td>
</tr>
<tr>
<td>Capacitor, mica, 500 volt</td>
<td>2</td>
<td>63540</td>
<td>0.60</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>3</td>
<td>63541</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, polar, 400 volt</td>
<td>4</td>
<td>63542</td>
<td>0.25</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>5</td>
<td>63543</td>
<td>0.25</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>6</td>
<td>63544</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, mica, 50 volt</td>
<td>7</td>
<td>63545</td>
<td>0.50</td>
</tr>
<tr>
<td>Condenser, mica, 500 volt</td>
<td>8</td>
<td>63546</td>
<td>1.00</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>9</td>
<td>63547</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>10</td>
<td>63548</td>
<td>0.25</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>11</td>
<td>63549</td>
<td>0.25</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>12</td>
<td>63550</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, mica, 50 volt</td>
<td>13</td>
<td>63551</td>
<td>0.50</td>
</tr>
<tr>
<td>Condenser, mica, 500 volt</td>
<td>14</td>
<td>63552</td>
<td>1.00</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>15</td>
<td>63553</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>16</td>
<td>63554</td>
<td>0.25</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>17</td>
<td>63555</td>
<td>0.25</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>18</td>
<td>63556</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, mica, 50 volt</td>
<td>19</td>
<td>63557</td>
<td>0.50</td>
</tr>
<tr>
<td>Condenser, mica, 500 volt</td>
<td>20</td>
<td>63558</td>
<td>1.00</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>21</td>
<td>63559</td>
<td>1.50</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>22</td>
<td>63560</td>
<td>0.25</td>
</tr>
<tr>
<td>Condenser, polar, 600 volt</td>
<td>23</td>
<td>63561</td>
<td>0.25</td>
</tr>
<tr>
<td>Switch, push-pull, DPDT</td>
<td>24</td>
<td>63562</td>
<td>1.50</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 91-648 Ch. 91-64
(With "S" stamped on chassis) STEWART-WARNER CORP.
Alignment, Trimmers, Tuner
Phone Connections

THIS APPLIES ONLY TO THE 91-648 RECEIVER IDENTIFIED BY THE LETTER S STAMPED ON BACK OF CHASSIS.

ALIGNMENT PROCEDURE

For Alignment, an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6FG output tube and ground through a .1 mfd capacitor. The connection will depend upon the type of meter. (The more sensitive instrument should be connected across the voice coil.)

2. Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.

3. Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.

4. With the variable condenser in the full mesh position, the pointer should be at the last dial division, at the left end of the dial scale. With the gang condenser in this position the set screw on the large drum should be nearly straight down.

5. IF YOU DISCONNECT THE PHONOGRAPH PICK-UP CABLE, PUT A JUMPER BETWEEN THE TWO OUTSIDE TERMINALS OF THE TERMINAL STRIP, AND GROUND THE CENTER TERMINAL TO CHASSIS.

### DIAL AND MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>11370</td>
<td>Adjusting lug for Push button shaft</td>
<td>$0.01</td>
</tr>
<tr>
<td>112775</td>
<td>Clip—f for coil mkp</td>
<td>.01</td>
</tr>
<tr>
<td>112776</td>
<td>Clip—f for wire-trap coil mkp</td>
<td>.01</td>
</tr>
<tr>
<td>90031</td>
<td>Clip—Grounding for Tube Base</td>
<td>.02</td>
</tr>
<tr>
<td>113778</td>
<td>Cond—dial drum supplied in 4-pk. length</td>
<td>.54</td>
</tr>
<tr>
<td>13804</td>
<td>Dial drive drum and Pinion Gear for gang condenser</td>
<td>.70</td>
</tr>
<tr>
<td>13812</td>
<td>Dial Frame and Pullay Assembly</td>
<td>.64</td>
</tr>
<tr>
<td>11432</td>
<td>Dial scale</td>
<td>.30</td>
</tr>
<tr>
<td>113901</td>
<td>Dial Scale Retainer Clip</td>
<td>.30</td>
</tr>
<tr>
<td>113755</td>
<td>Etcutcheon for dial</td>
<td>.40</td>
</tr>
<tr>
<td>113757</td>
<td>Etcutcheon for push buttons</td>
<td>.32</td>
</tr>
<tr>
<td>113902</td>
<td>Knob</td>
<td>.10</td>
</tr>
<tr>
<td>113903</td>
<td>Mechanical Push Button Mechanism, complete</td>
<td>.10</td>
</tr>
<tr>
<td>113904</td>
<td>Wiring connector for Push button shaft</td>
<td>.04</td>
</tr>
<tr>
<td>113905</td>
<td>Plug for speaker</td>
<td>.12</td>
</tr>
<tr>
<td>113906</td>
<td>Pointer—sdt</td>
<td>.06</td>
</tr>
<tr>
<td>113907</td>
<td>Push Button</td>
<td>.04</td>
</tr>
<tr>
<td>113908</td>
<td>Receptacle for 2-prong plug for phone motor</td>
<td>.50</td>
</tr>
<tr>
<td>81140</td>
<td>Retaining Clip for tuning shaft</td>
<td>.50</td>
</tr>
<tr>
<td>113909</td>
<td>Rubber tube for tuning shaft</td>
<td>.01</td>
</tr>
<tr>
<td>113910</td>
<td>Screw—f for mkp adjustment lug No. 10x9 Hex. Hgd.</td>
<td>.35</td>
</tr>
<tr>
<td>113911</td>
<td>Screw—chassis mkp. No. 10x9 Hex.</td>
<td>.35</td>
</tr>
<tr>
<td>113912</td>
<td>Screw—f for setting up push buttons No. 10x9 Hex.</td>
<td>.01</td>
</tr>
<tr>
<td>113913</td>
<td>Screw—f for mkp. receptacle, Phillips head</td>
<td>.15</td>
</tr>
<tr>
<td>113914</td>
<td>Screw—f for push button etcutcheon mkp. No. 2x10</td>
<td>.01</td>
</tr>
<tr>
<td>113915</td>
<td>Screw—f for needle; for heads</td>
<td>.03</td>
</tr>
<tr>
<td>85827</td>
<td>Set Screw—No. 8-32 Square Head</td>
<td>.02</td>
</tr>
<tr>
<td>113920</td>
<td>Short—tuning</td>
<td>.08</td>
</tr>
<tr>
<td>88143</td>
<td>Shield Cap</td>
<td>.06</td>
</tr>
<tr>
<td>88151</td>
<td>Shield tube</td>
<td>.08</td>
</tr>
<tr>
<td>88911</td>
<td>Shield—Base</td>
<td>.04</td>
</tr>
<tr>
<td>88427</td>
<td>Socket—actil base standard</td>
<td>.32</td>
</tr>
<tr>
<td>113922</td>
<td>Socket—actil base with special ground</td>
<td>.15</td>
</tr>
<tr>
<td>113921</td>
<td>Socket for speaker plug</td>
<td>.16</td>
</tr>
<tr>
<td>113923</td>
<td>Socket—for dial lamp</td>
<td>.15</td>
</tr>
<tr>
<td>113924</td>
<td>Screw—f for cord tension.</td>
<td>.05</td>
</tr>
<tr>
<td>1139041</td>
<td>Tubo—station call letters</td>
<td>.35</td>
</tr>
<tr>
<td>85814</td>
<td>Terminal Strip—photo</td>
<td>.03</td>
</tr>
<tr>
<td>116410</td>
<td>Tunable</td>
<td>.20</td>
</tr>
<tr>
<td>116411</td>
<td>Washers—for back of knob</td>
<td>.05</td>
</tr>
<tr>
<td>116530</td>
<td>Washers—for chassis mkp</td>
<td>.01</td>
</tr>
</tbody>
</table>

### PHONOCONNECTIONS

This receiver is equipped with a phonoconfortable turntable and a crystal pickup transducer. The crystal pickup transducer is switched into the audio amplifier section of the radio by means of a double-pole double-throw switch adjacent to the turntable. With this switch in the position marked P, the receiver volume control is disconnected from the low side of the 2nd L.F. transformer and connected across the crystal pickup unit. The radio frequency

---

© John F. Rider, Publisher

Compliments of www.nucow.com
STEWART-WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 Kc. to 16.0 Mc. are required.

1. Connect the output meter across the voice coil or between the plate of the 6SL7 tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2. Connect the ground lead of the signal generator to the chassis of the receiver.

3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4. With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT: THE BROADCAST BAND MUST BE ADJUSTED AFTER THE SHORT-WAVE BAND.

<table>
<thead>
<tr>
<th>DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR</th>
<th>CONNECTION OF OUTPUT TO RECEIVER</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RANGE SWITCH POSITION</th>
<th>RECEIVER SETTING</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>.01 MF DUAL CONDENSER</td>
<td>CONTROL GRID OF 6SL7 TUBE</td>
<td>465 KC.</td>
<td>BROADCAST (MANUAL TUNING)</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1-2</td>
<td>1ST I.F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>465 KC.</td>
<td>BROADCAST (MANUAL TUNING)</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>3-4</td>
<td>2ND I.F.</td>
<td>ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>16 MC.</td>
<td>SHORT WAVE (COUNTER-CLOCKWISE)</td>
<td>16 MC.</td>
<td>5</td>
<td>WAVE TRAP</td>
<td>ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REAL AT 15 MC. WITH TRIMMER SCREW PARTIALLY OUT. RECORDER IMAGE.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>16 MC.</td>
<td>SHORT WAVE (COUNTER-CLOCKWISE)</td>
<td>TUNE TO 16 MC. GENERATOR SIGNAL</td>
<td>6</td>
<td>SHORT WAVE OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETERMINING TRIMMER AND DETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>5.0 MC.</td>
<td>POLICE</td>
<td>5.0 MC.</td>
<td>7</td>
<td>SHORT WAVE ANTENNA OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REAL AT 5.0 MC. WITH TRIMMER SCREW PARTIALLY OUT. RECORDER IMAGE.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>5.0 MC.</td>
<td>POLICE</td>
<td>TUNE TO 5.0 MC. GENERATOR SIGNAL</td>
<td>8</td>
<td>POLICE OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETERMINING TRIMMER AND DETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>1500 KC.</td>
<td>BROADCAST (MANUAL TUNING)</td>
<td>1500 KC.</td>
<td>9</td>
<td>SHORT WAVE ANTENNA OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETERMINING TRIMMER AND DETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>1500 KC.</td>
<td>BROADCAST (MANUAL TUNING)</td>
<td>TUNE TO 1500 KC. GENER. SIG.</td>
<td>10</td>
<td>BROADCAST OSCILLATOR (Sweep)</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
<tr>
<td>400 OHM CARBON RESISTOR</td>
<td>ANTENNA TERMINAL</td>
<td>600 KC.</td>
<td>BROADCAST (MANUAL TUNING)</td>
<td>TUNE TO 600 KC. GENERATOR SIGNAL</td>
<td>11</td>
<td>BROADCAST OSCILLATOR (Series Pad)</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETERMINING TRIMMER AND DETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to the two signal transformers and that both transformers are set-up using the antenna (or the antenna is in the service shop) with the signal transformers, the current transformers, and the signal transformers, and the signal transformers being aligned.

2. Turn the set on and allow it to operate at least one-quarter hour before setting up the push buttons.

3. Make a list of six nearby stations to which you wish to set up the push buttons. These stations are set near any powerful stations, since weak signals will be give poor results. Also, select the station to which you wish to set the push button for each station.

4. Set up the push buttons for each station by selecting the station and the push button for each station.

5. When the buttons on your Push Button Tuner have a definite operating range, as shown in Fig. 1, it is imperative that you select the station which is in the operating range of a button before attempting to set up that button. The stations are set in the following order: 1, 2, 3, 4, 5, and 6.

6. In some instances it may be necessary to adjust the dial cord. Fully turn the dial condenser. The holes in drum 1 should be in the top position as shown in Fig. 2.

HOW TO REPLACE THE DIAL CORD

1. Cut the old dial cord and replace with a new cord. The new cord should be cut to length with a pair of scissors. The ends of the cord should be stripped with a wire stripper.

2. Insert the new cord into the push button and secure it with a screw. The screw should be tightened securely. The push button should then be screwed into place.

3. Make sure that the push button is securely attached and that the new cord is properly secured.

4. Test the new cord by adjusting the dial condenser.

5. If the condenser does not operate properly, check the connections and the cord.

ELECTRICAL PARTS

<table>
<thead>
<tr>
<th>PART</th>
<th>DESCRIPTION</th>
<th>LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Condenser</td>
<td>.025</td>
</tr>
<tr>
<td>2</td>
<td>Mica phone</td>
<td>.025</td>
</tr>
<tr>
<td>3</td>
<td>Mica core</td>
<td>.025</td>
</tr>
<tr>
<td>4</td>
<td>Mica core</td>
<td>.025</td>
</tr>
<tr>
<td>5</td>
<td>Mica core</td>
<td>.025</td>
</tr>
<tr>
<td>6</td>
<td>Mica core</td>
<td>.025</td>
</tr>
<tr>
<td>7</td>
<td>Mica core</td>
<td>.025</td>
</tr>
<tr>
<td>8</td>
<td>Mica core</td>
<td>.025</td>
</tr>
<tr>
<td>9</td>
<td>Mica core</td>
<td>.025</td>
</tr>
</tbody>
</table>

(continued)
HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the customer has an adequate antenna system and that the push button trimmers are set up using this antenna (not the antenna in the service shop) because the antenna trimmer will be incorrectly aligned.

2. Turn on the set and allow it to operate at least one quarter-hour before setting up the push buttons.

3. Make a list of the frequencies, of six nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak or distant stations may not be good for future use. Also be SURE to SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE RECEIVING SET, so as indicated in Fig. 1.

4. Each of the buttons on your Push Button Tuner has a definite operating range, as shown in Fig. 2. Be sure to choose a button whose frequency is in the operating range of a button before attempting to set-up that button for the particular station.

5. The ADJUSTING SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED. IT IS IMPORTANT THAT THEY BE SELECTED. The frequencies of your local stations may be obtained from your newspaper or radio call maga- zines. For the sake of completeness, let us assume a button to stations WLV whose frequency is 700 kilocycles. Refer to Fig. 1 which shows that this frequency falls within the tuning range of buttons Nos. 3 or No. 4, whose range is 550 to 1000 KC. Therefore either button No. 3 or No. 4 can be used in the automatic tuning of WLV.

6. IT SHOULD BE NOTED THAT WHENEVER IT IS POSSIBLE TO USE ANY OF THE FOUR ADJUSTING SCREWS TO SELECT A GIVEN STATION, THE CORRECT BUTTON TO USE WHEN THE TRIMMER SCREWS ARE NOT TOO LOOSELY SET. DRIFTING IS A DIRECT RESULT OF LOOSE ADJUSTMENTS, AND THEREFORE SUCH SETTINGS OF TRIMMER SCREWS SHOULD BE AVOIDED IF POSSIBLE.

7. Remember the eccentric on the push button by turning out the two screws holding it to the cabinet. This will enable you to view twelve adjusting screws. The button is used to turn the buttons to their correct station. The trimmers associated with each button are shown in Figure 1.

8. Turn on the broadcast band and select the station you desire in the broadcast area. This is done so that you may identify the station by hearing its program.

9. No matter how the switch has been adjusted, the words "MAGIC KEYBOARD" will now appear in the dial scale opening. You will know that this switch is turned the station tuned in will not be heard.

10. Now push in the third button from the left (No. 3 in Fig. 1.) Using a small screwdriver insert it in the second button from the left, Fig. 1, and turn it until the button is rotated to the correct button.

11. The radio dial is now in the correct position. The words "MAGIC KEYBOARD" will now appear in the dial scale opening. You will know that this switch is turned the button tuned in will not be heard.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

1. To change the frequency range of the button, place the button on the front of the chassis. The button is now ready to be set to any station whose frequency is within the range of this new trimmer unit.

REPLACING THE ROLLER DIAL DRIVE CORE

1. Tie a tension spring, part number 113717, to one end of about 30" of special dial cord part No. 111002.

2. Tie a large knot in the cord, 6 1/4" from the tension spring.

3. The range switch to the short-wave position— all the way counterclockwise. Pull the range switch knob from the position shown in Fig. 2.

4. Place the knob on the cord in slot B.

5. With the long free end of the cord (not the end with the spring attached), take 1 1/4 turns clockwise around pulley A, then thread the end up through hole B. C back of pulley D and up to the front of pulley E.

6. Turn pulley E until the slot F is up as shown in the figure. Now with the 6 1/4" end of the cord wind clockwise, 1 1/4 turns around E, cut through slot F, 1 turn around G, back through slot F, and 1 1/4 turns around E.

7. With the cord down back of pulley H and leave it hang for time being.

8. With the end of the cord to which the tension spring is attached, take 1 1/4 turns counterclockwise around pulley A, (when viewed from the right end) and thread the cord up through hole C.

9. Tie the free end of the cord hanging over pulley H, to the upper end of the tension spring.

10. The spring should be extended in such a way that it is approximately 1 1/4" longer when the tension in the cord is equalized.

11. If the Short Wave scale on the dial is not in the proper position under the pointer, loosen the set screw in hole G, rotate the dial scale to the proper position and tighten the set screw.
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

1. Connect the output meter across the voice coil or across the plates of the 6K6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2. Connect ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis.

3. Connect the output meter to the maximum volume position and keep it in this position throughout the alignment procedure.

4. With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screw.

<table>
<thead>
<tr>
<th>Dummy Ant. in Series with Sig. Gen.</th>
<th>Connection of Sig. Generator Output to Receiver</th>
<th>Signal Generator Frequency</th>
<th>Band Switch Position (Indicated by Racer Dial)</th>
<th>Receiver Dial Setting</th>
<th>Trimmer Number</th>
<th>Trimmer Description</th>
<th>Type of Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>600 KC</td>
<td>Broadcast</td>
<td>Any Point Where 600 KC Is Followed</td>
<td>1-2</td>
<td>2nd LP</td>
<td>Adjust for Minimum Output, Then Repeat Adjustment</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>1500 KC</td>
<td>Broadcast</td>
<td>Any Point Where 1500 KC Is Followed</td>
<td>3-4</td>
<td>1st LP</td>
<td>Adjust for Minimum Output, Then Repeat Adjustment</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>6 MC</td>
<td>Intermediate</td>
<td>6 MC</td>
<td>5</td>
<td>Wave Tube</td>
<td>Adjust for Minimum Output, Using a Strong Generator Signal</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>1500 KC</td>
<td>Broadcast</td>
<td>1500 KC</td>
<td>6</td>
<td>Broadband Oscillator (Station)</td>
<td>Adjust for Maximum Output</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>6 MC</td>
<td>Intermediate</td>
<td>6 MC</td>
<td>7</td>
<td>Broadband Detector</td>
<td>Adjust for Minimum Output</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>20 MC</td>
<td>Foreign</td>
<td>20 MC</td>
<td>8</td>
<td>Broadband Antenna</td>
<td>Adjust for Minimum Output</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>6 MC</td>
<td>Intermediate</td>
<td>6 MC</td>
<td>9</td>
<td>Broadband Oscillator (Station)</td>
<td>Adjust for Minimum Output, Try to Increase Output by Turning Trimmer and Repeating Receiver Dial until Minimum Output is Obtained</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>6 MC</td>
<td>Intermediate</td>
<td>6 MC</td>
<td>10</td>
<td>Intermediate Oscillator</td>
<td>Adjust for Minimum Output, Check to see if Proper Peak was Obtained by Tuning in Image at 6 MC. If Image does not appear, Bad Ring at DMC, with Trimmer. Screw farther Out. Recheck Image</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>20 MC</td>
<td>Foreign</td>
<td>20 MC</td>
<td>11</td>
<td>Intermediate Antenna</td>
<td>Adjust for Minimum Output, Check to see if Proper Peak was Obtained by Tuning in Image at 20 MC. If Image does not appear, Bad Ring at DMC, with Trimmer. Screw farther Out. Recheck Image</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>20 MC</td>
<td>Foreign</td>
<td>20 MC</td>
<td>12</td>
<td>Foreign Oscillator</td>
<td>Adjust for Minimum Output, Try to Increase Output by Turning Trimmer and Repeating Receiver Dial until Minimum Output is Obtained</td>
</tr>
<tr>
<td>600 OHM Carbon Resistor</td>
<td>Antenna Terminal</td>
<td>20 MC</td>
<td>Foreign</td>
<td>20 MC</td>
<td>13</td>
<td>Foreign Antenna</td>
<td>Adjust for Minimum Output, Try to Increase Output by Turning Trimmer and Repeating Receiver Dial until Minimum Output is Obtained</td>
</tr>
</tbody>
</table>
Compliments of www.nucow.com

STEWART WARNER CORP.

MODELS 97-621 to 97-629
Chassis 97-62
Alignment, Trimmers

Chassis Model
97-62

This chassis is a 5 tube, single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-49-B bellast resistor tube. The tuning range of this receiver is 540 to 1720 KC. The intermediate frequency is 465 KC.

Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How To Set Up The Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:
1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the two sections of the anti back-lash gear on the left side of the unit in order that it functions properly. Both anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they slide into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play". In other words the push-button shaft must have a minimum of movement in a vertical direction.

For ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 250C-0 output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd., condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale.
   If the pointer is only slightly off calibration, loosen the set screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive core by spreading the clip on the pointer. Then slide the pointer along the core until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

**Table:**

<table>
<thead>
<tr>
<th>Duty Ant. in Series with Sig. Generator</th>
<th>Connection of Sig. Generator to Receiver</th>
<th>Signal Generator Frequency</th>
<th>Receiver Dial Setting</th>
<th>Trimmer Number</th>
<th>Trimmer Number</th>
<th>Type of Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>.1 MFD Condenser</td>
<td>Control Grid of 240-0 Tube</td>
<td>465 KC</td>
<td>Any Point Where It Does Not Affect the Signal</td>
<td>1-2</td>
<td>1st I.F.</td>
<td>Adjust for maximum output. Then repeat adjustment.</td>
</tr>
<tr>
<td>400 OHM Carbon Resistor</td>
<td>Antenna Lead (Blue Wire)</td>
<td>465 KC</td>
<td>Any Point Where It Does Not Affect the Signal</td>
<td>3-4</td>
<td>2nd I.F.</td>
<td></td>
</tr>
<tr>
<td>400 OHM Carbon Resistor</td>
<td>Antenna Lead (Blue Wire)</td>
<td>1500 KC 1500 KC</td>
<td></td>
<td>5</td>
<td>Wave Trap</td>
<td>Adjust for minimum output using a strong generator signal.</td>
</tr>
<tr>
<td>400 OHM Carbon Resistor</td>
<td>Antenna Lead (Blue Wire)</td>
<td>1500 KC 1500 KC</td>
<td></td>
<td>6</td>
<td>Broadcast Oscillator (Shunt)</td>
<td>Adjust trimmer to bring in signal.</td>
</tr>
<tr>
<td>400 OHM Carbon Resistor</td>
<td>Antenna Lead (Blue Wire)</td>
<td>1500 KC</td>
<td>TUNE TO 1500 KC Generator SIGNAL</td>
<td>7</td>
<td>Broadcast Antenna (Shunt)</td>
<td>Adjust for maximum output.</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
The large tuning knob at the side of your set has a screw located in the center. Grasp this tuning knob firmly and then use a screwdriver or a pair of needle-nose pliers to turn the screw clockwise or counterclockwise. You may find it necessary to turn the screw one or two full turns. (Viewed from the side of the cabinet.)

5. Push down any one of the four buttons that you wish to set to a station. Be sure to push the button all the way down, otherwise the setting will be incorrect.

6. Hold the push-button down firmly, turn the tuning knob until the station you desire is tuned in. Tune in strong nearby stations for best results. Be sure to tune in the stations correctly by tuning to the point where the program is heard with the least hiss or distortion and not to the point of greatest volume.

7. Release the push-button when you have tuned in your desired station. Do not attempt to use any button until you have completed the set-up of the four buttons. Do not re-tighten the set-up screw until all buttons have been set-up.

8. Proceed to set-up the next button by pushing down on the button firmly and tuning in the desired station, using the tuning knob. The rest of the buttons should be set-up in a similar manner.

9. After all of the buttons have been set-up YOU MUST RE-TIGHTEN THE SCREW IN THE TUNING KNOB; OTHERWISE ALL SETTINGS ON THE BUTTONS WILL BE DESTROYED. GRASP THE KNOB FIRMLY AND THEN USE A SCREW DRIVER OR A COIN TO TIGHTEN THE SCREW SECURELY.

10. The push buttons should now be labelled with their proper call letters. The call letter sheets are supplied with your receiver. The individual call letter tab should be fastened on the ganged side and stuck to the small square in the cabinet panel just about the push button.

97-56 CHASSIS ONLY

THE INTERMEDIATE FREQUENCY AMPLIFIER.

This 97-56 chassis employs one stage of intermediate frequency amplification. The intermediate frequency transformer at 67-6 grid and 66-6 tube. This signal is introduced into the 67-6 grid circuit through a coupling coil, which is a part of the secondary coil. This transformer increases the amplification and selectivity obtainable from this stage, and makes the performance of this set comparable to that which is obtained from a set employing an additional I.F. transformer.

When aligning the intermediate frequency amplifier, the output of the signal generator at 485 Kc and is coupled to the grid of the 66-6 tube in the customary manner. The primary and secondary windings are tuned by adjusting Trimmer Screw No. 1. A signal deflection is obtained on the output meter. If the set has a tendency to oscillate when adjusting these trimmer screws, turn Trimmer Screw No. 2 to the left (counter-clockwise) until the oscillation ceases. The signal generator is then coupled to the grid of the 66-6 tube and Trimmers No. 3 and No. 4 are aligned for maximum output, using a generator frequency of 485 Kc and coupling the set to the customer's antenna and tuning in a station on the low frequency end of the dial. The regeneration control, Trimmer No. 6 is now adjusted to give maximum output of the set, consistent with good stability and signal quality. After changing the settings of Trimers, it is necessary to re-adjust Trimers No. 1 and No. 2, as their setting will be found to have changed slightly. The output of the signal generator is set at 485 Kc and is coupled to the grid of the 66-6 tube through a 1 Nf condenser and Trimmers No. 1 and No. 2 adjusted, as was done previously.

A-C OPERATION

When the set is used on alternating current, all D-C potentials are supplied by a 2862 rectifier tube and its associated filter circuit. The tube is connected for half-wave rectification of the A-C supply.

If any hum is noticed when the set is used on A-C, reversing the power plug in the receptacle will sometimes reduce the hum level. When the set has not been used for some time, or the filter condensers have been replaced, a slight hum may be audible when the set is first turned on. This hum may not clear up immediately upon reversing the power plug. However, it will probably be eliminated after approximately five minutes operation by which time the anode plates of the electrolytic capacitors in the filter system will have re-formed.

D-C OPERATION

If the set fails to operate after allowing time for the tubes to reach their operating temperature, reverse the power plug in the receptacle. When the set is used on direct current, the 2862 rectifier tube and the filter system remain in the circuit and serve the same purposes. If the power cord should be plugged in with incorrect polarity, the 2862 rectifier tube and the filter condensers will be damaged. On correct D-C polarity the 2862 rectifier tube and the filter circuit will be in smoothing the supply voltage, thus minimizing line noises.

97-56 S CHASSIS ONLY

I.F. TRANSFORMER & REGULATION CONTROL

This 97-56-8 chassis employs only one intermediate frequency transformer, the windings of which are capacitively coupled. The two trimmers used to tune the primary and secondary of this transformer are mounted on the transformer assembly, and are accessible from the rear of the chassis. Also associated with this intermediate frequency transformer is an additional trimmer condenser, which is accessible through a hole in the rear of the chassis. This condenser is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 66-6 tube. This signal is introduced into the 637-G grid circuit through a coupling coil, which is a part of the secondary coil. This transformer increases the amplification and selectivity obtainable from this stage, and makes the performance of this set comparable to that which is obtained from a set employing an intermediate frequency transformer.

ADJUSTMENT OF REGULATION CONTROL.

If distant stations are used with insufficient volume: Through the opening near the bottom of the center of the back of the cabinet; you will see an adjusting screw. Using a non-metallic instrument, a piece of wood whittled in the shape of a screw driver will serve the purpose. Turn this screw clockwise to increase volume. If you turn counterclockwise, the volume will be decreased to a certain point at which the set will begin to squeal. Turn the screw clockwise until the squeal just disappears and good tone quality is obtained.

If the receiver howls or squeals: Using the same screw mentioned above and a non-metallic instrument (a piece of wood whittled in the shape of a screw driver) will serve the purpose. Turn the screw clockwise very, very slightly until the squeal or howl ceases.

© John F. Rider, Publisher
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 25LA-6 output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the indicator to the last mark on the top end of the dial scale. If the pointer is only slightly off calibration, it may be possible to slip the dial drum just enough to correct for this slight mis-calibration. If the dial is several divisions off calibration, loosen the set screw on the condenser shaft. Then grasp the end of the tuning shaft and turn the dial until the last division of the scale is directly under the indicator, when the gang is in full mesh. Then retighten the set-screw.

TO CALIBRATE THE DIAL— Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which completes the gang condenser shaft with the tuning unit, holding the gang in full mesh. Turn the dial until the last dial division (just below 50) on the low frequency end is exactly 4 3/8 inches above the table surface. Now retighten the set screw in the coupling collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

<table>
<thead>
<tr>
<th>BAND</th>
<th>ANTENNA</th>
<th>CONN. OF SIGNAL GENERATOR</th>
<th>OUTPUT TO RECEIVER</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RECEIVER DIAL SETTING</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MFD.</td>
<td>CONTROL GRID</td>
<td>CONTROL GRID</td>
<td>OF 26A-5 TUBE</td>
<td>465 KC</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1-2</td>
<td>I. F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TURN POTENTIOMETER TO REACH SIGNAL. REPEAT ADJUSTMENT.</td>
</tr>
<tr>
<td>200 MFD.</td>
<td>CONTROL GRID</td>
<td>ANTENNA LEAD</td>
<td>(BLUE WIRE)</td>
<td>1500 KC</td>
<td>+ 1500 KC</td>
<td>3</td>
<td>BROADCAST OSCILLATOR (3000 KC)</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
<tr>
<td>200 MFD.</td>
<td>CONTROL GRID</td>
<td>ANTENNA LEAD</td>
<td>(RED WIRE)</td>
<td>1500 KC</td>
<td>TUNE TO 1500 KC</td>
<td>4</td>
<td>BROADCAST ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
</tbody>
</table>

CONNECT RECEIVER IN GANGED METER ANTENNA OR TO A .05 MFD. MICA CONDENSER IN SERIES WITH THE SIGNAL GENERATOR IN ORDER TO INCREASE SIGNAL INTENSITY. A WEAK SIGNAL ON THE LOW FREQUENCY END OF THE DIAL INDICATES THAT THE VOLUME CONTROL MAY BE SET TO MAXIMUM VOLUME POSITION.

1. Connect the output meter across the voice coil or between the plate of the 25LA-6 output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the indicator to the last mark on the top end of the dial scale. If the pointer is only slightly off calibration, it may be possible to slip the dial drum just enough to correct for this slight mis-calibration. If the dial is several divisions off calibration, loosen the set screw on the condenser shaft. Then grasp the end of the tuning shaft and turn the dial until the last division of the scale is directly under the indicator, when the gang is in full mesh. Then retighten the set-screw.

TO CALIBRATE THE DIAL— Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which completes the gang condenser shaft with the tuning unit, holding the gang in full mesh. Turn the dial until the last dial division (just below 50) on the low frequency end is exactly 4 3/8 inches above the table surface. Now retighten the set screw in the coupling collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

<table>
<thead>
<tr>
<th>BAND</th>
<th>ANTENNA</th>
<th>CONN. OF SIGNAL GENERATOR</th>
<th>OUTPUT TO RECEIVER</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RECEIVER DIAL SETTING</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MFD.</td>
<td>CONTROL GRID</td>
<td>CONTROL GRID</td>
<td>OF 26A-5 TUBE</td>
<td>465 KC</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1-2</td>
<td>I. F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TURN POTENTIOMETER TO REACH SIGNAL. REPEAT ADJUSTMENT.</td>
</tr>
</tbody>
</table>

THIS ADJUSTMENT MUST AGAIN BE MADE AFTER THE REGENERATION CONTROL TRIMMER HAS BEEN SET.

On chassis 97-56-3, turn clockwise.
On chassis 97-56, turn counterclockwise.

©John F. Rider, Publisher
## 97-56 CHASSIS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Condenser - mica 250 mfd.</td>
<td>.80</td>
</tr>
<tr>
<td>2</td>
<td>Condenser - mica 250 mfd.</td>
<td>.80</td>
</tr>
<tr>
<td>3-4-5</td>
<td>Condenser - paper .06 mfd.</td>
<td>.25</td>
</tr>
<tr>
<td>6</td>
<td>Condenser - paper .004 mfd.</td>
<td>.25</td>
</tr>
<tr>
<td>7-8-9-10-11</td>
<td>Condenser - paper .1 mfd.</td>
<td>.25</td>
</tr>
<tr>
<td>12-13</td>
<td>Condenser - paper .25 mfd.</td>
<td>.32</td>
</tr>
<tr>
<td>14</td>
<td>Condenser - wire 5 mfd.</td>
<td>.12</td>
</tr>
<tr>
<td>15-16</td>
<td>Condenser - carbon 220,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>17</td>
<td>Condenser - carbon 470,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>18</td>
<td>Condenser - carbon 220,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>19</td>
<td>Condenser - carbon 35,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>20</td>
<td>Condenser - carbon 10,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>21</td>
<td>Condenser - carbon 2.2 mfd.</td>
<td>.15</td>
</tr>
<tr>
<td>22</td>
<td>Condenser - carbon 68,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>23</td>
<td>Condenser - carbon 350,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>24</td>
<td>Condenser - carbon 690,000 ohm 1/4 watt</td>
<td>.12</td>
</tr>
<tr>
<td>25-26-27</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>27-28</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>29-30</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>31</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>32</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>33</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>34</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>35</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
<tr>
<td>36</td>
<td>Condenser - electrolytic 150 volt, 150 mfd.</td>
<td>.50</td>
</tr>
</tbody>
</table>

### DIAL & MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>65564</td>
<td>Screw - Self Tapping 8 X 1/4</td>
<td>.01</td>
</tr>
<tr>
<td>65647</td>
<td>Socket - tube, 8 prongs</td>
<td>.01</td>
</tr>
<tr>
<td>65648</td>
<td>Screw - 8/20 square head</td>
<td>.02</td>
</tr>
<tr>
<td>112745</td>
<td>Clip - coil mounting (os. &amp; ant.)</td>
<td>.01</td>
</tr>
<tr>
<td>112930</td>
<td>Key - tuning, ivory</td>
<td>.04</td>
</tr>
<tr>
<td>112931</td>
<td>Knob - tuning, ivory</td>
<td>.04</td>
</tr>
<tr>
<td>112932</td>
<td>Screw - for tuning knob &amp; set-up</td>
<td>.18</td>
</tr>
<tr>
<td>112933</td>
<td>Rack - dial lamp</td>
<td>.12</td>
</tr>
<tr>
<td>112934</td>
<td>Rack - station call letters</td>
<td>.18</td>
</tr>
<tr>
<td>112936</td>
<td>Key - for push button tuning (os. &amp; ant.)</td>
<td>.24</td>
</tr>
<tr>
<td>112937</td>
<td>Key - for push button tuning (os. &amp; ant.)</td>
<td>.24</td>
</tr>
<tr>
<td>112938</td>
<td>Rack - dial lamp</td>
<td>.12</td>
</tr>
<tr>
<td>112939</td>
<td>Dial Scale - celluloid Strips</td>
<td>.18</td>
</tr>
<tr>
<td>112940</td>
<td>Dial Scale - celluloid Strips</td>
<td>.18</td>
</tr>
<tr>
<td>112941</td>
<td>Rack - station call letters</td>
<td>.18</td>
</tr>
<tr>
<td>112942</td>
<td>Key - for push button tuning (os. &amp; ant.)</td>
<td>.24</td>
</tr>
</tbody>
</table>

**Chassis Model 97-56**

- 97-561 to 97-569
- Made for use with L-56-B Ballast Resistor tube. The tuning range of the receiver is 340 to 1,700 kc.

### Important:

In case where it is found that the push-button tuner does not tune in stations correctly due to extreme shortwave tuning it is only necessary to turn counter clockwise the regeneration control trimmer (#5) slightly. This will make tuning more accurate and will result in more accurate tuning when using the push button tuner.

**Chassis Model 97-56**

- 97-561 to 97-569
- Made for use with L-56-B Ballast Resistor tube. The tuning range of the receiver is 340 to 1,700 kc.

### Important:

In case where it is found that the push-button tuner does not tune in stations correctly due to extreme shortwave tuning it is only necessary to turn the regeneration control trimmer (#5) slightly clockwise. This will make tuning more accurate and will result in more accurate tuning when using the push button tuner.

©John F. Rider, Publisher

Compliments of www.nucow.com
FEBRUARY 1939.

CIRCUIT CHANGE

Resistor No. 18 connected in parallel with the dial bulb has been changed to a 3 watt molded wire wound resistor, Part No. 116479. This size is being used in place of the original 1/2 watt rating, to prevent failure of the resistor if the dial bulb burns out. The 3 watt resistor should be used for replacement in all cases.

TUBE CHANGE

A small percentage of these chassis was equipped with 6K7 metal I.F. tubes but most of them are using the 6K7G glass tube. Because of shield requirements, these tubes cannot be used interchangeably. In other words, a metal tube must be used to replace a metal tube, while in a chassis originally equipped with a glass I.F. tube, a glass tube must be used as a replacement.

CONNECTING OSCILLATION & SQUEALING

If a "squeal" develops with the volume control fairly well advanced, separate the 6Q7G grid lead and the speaker wires as much as possible by pulling the grid lead to the side of the 6Q7G nearest the variable condenser.

If there is a loud heterodyne whistle when tuning in stations, the I.F. stage may be oscillating. If this happens, move the lead from the 6A8G cathode to the 6Q7G cathode as close to the chassis as possible. According to other wires as possible. If necessary, connect a .05 mfd. 200 volt condenser to one of the above cathode terminals which does not already have such a condenser connected directly to it.

MODELS 97-571 to 97-579

97-57 CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 25L6G-0 tube is +5.0 volts, measured across resistor number 52.
The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function whether terminals A and A₁ on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A₁ and connect an external antenna to terminal A₁. In some locations, due to peculiar power line conditions, hum or noise may be excessive when the Built-In Antenna is used. In such cases reverse the power line plug. If this doesn't correct the condition, remove the connector between A and A₁ on the back of the chassis, and connect an external antenna to A₁.
POWER SUPPLY & BATTERY CONNECTIONS

The power supply of this receiver consists of three "B" batteries and one "A" battery. No "C" battery is needed as the first 22-1/2 volts of the "B" battery supply serves as a "C" battery. Proper intermediate bias voltages are secured from the tapped condenser resistor number 26.

The 42-1/2 volt tap on the "B" battery is the negative connection for the plate supply and it is connected to "L" and ground. This allows a maximum plate supply voltage of 115-1/2 volts with fresh batteries.

The "A" supply may be a 2-1/2 volt Air Cell, a 3 volt dry battery, or a 2 volt storage battery since the filaments of all tubes in the receiver are supplied through a type 861 voltage regulator tube. The purpose of this tube is to maintain a safe filament voltage with battery voltages ranging from 2 to 3 volts. The voltage drop across the tube will decrease as the battery voltage decreases thus maintaining nearly a constant filament potential.

If a 2 volt storage cell is to be used and the tubes in the receiver are not new it is desirable to remove the 861 voltage regulator tube and replace it by a plug which merely shorts out the two large terminals of the 861 tube socket. This plug may be made up by removing the base of an old 4 prong tube and connecting the two large pins together with a piece of wire. Be careful not to connect anything to either of the small pins or the other tube may be damaged.

In order to simplify connections to the batteries, plugs are provided and the method of connection to the battery is shown in the diagram on the right.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 16 KC. are required.

1. Connect the output meter across the voice coil or between the plate of the 33 tube and ground depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer on the horizontal blank line below 540 KC. on the dial.
5. Using a plausible screw driver proceed to align in exactly the same order as shown in the table below.

<table>
<thead>
<tr>
<th>ORDER OF ALIGN.</th>
<th>DUMMY ANT. CONNECTED TO SIGNAL GENERATOR</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RANGE SWITCH POSITION</th>
<th>RECEIVER DIAL SETTING</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>.1 MFD. CONDENSER</td>
<td>465 KC.</td>
<td>BROADCAST (Center Position)</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1</td>
<td>2ND. I.F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.</td>
</tr>
<tr>
<td>B</td>
<td>DITTO</td>
<td>DITTO</td>
<td>DITTO</td>
<td>DITTO</td>
<td>3</td>
<td>1ST. I.F.</td>
<td>ADJUST TRIMMER 3 &amp; 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 &amp; 2. SEE NOTE A BELOW.</td>
</tr>
<tr>
<td>C</td>
<td>400 OHM CARBON RESISTOR</td>
<td>1700 KC.</td>
<td>DITTO</td>
<td>DITTO</td>
<td>5</td>
<td>BROADCAST OSCILLATOR (Output)</td>
<td>ADJUST TRIMMER TO BRING IN SIGNAL.</td>
</tr>
<tr>
<td>D</td>
<td>DITTO</td>
<td>4500 KC.</td>
<td>DITTO</td>
<td>DITTO</td>
<td>6</td>
<td>BROADCAST OSCILLATOR (Output)</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
<tr>
<td>E</td>
<td>DITTO</td>
<td>600 KC.</td>
<td>DITTO</td>
<td>DITTO</td>
<td>7</td>
<td>BROADCAST OSCILLATOR (Series Pad)</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DEFEATING TRIMMER AND DETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
<tr>
<td>F</td>
<td>DITTO</td>
<td>16 KC.</td>
<td>DITTO</td>
<td>DITTO</td>
<td>8</td>
<td>SHORT-WAVE ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DEFEATING TRIMMER AND DETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.</td>
</tr>
</tbody>
</table>

NOTE A: Now repeat adjustment of trimmers 3 and 4 again for greater sensitivity. This may cause oscillation. If oscillation occurs repeat steps 1 and 2 and disregard the adjustment mentioned in this note, i.e., after adjusting 1 and 2, do not repeat adjustment 3 and 4. Important: Please note that in repeating step 1, the signal generator must be connected to the 34 control grid. In step 2, the connection is to the 106 grid.

DIAL DRIVE & MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>112205</td>
<td>Cable - battery (with plugs)</td>
<td>$ .90</td>
</tr>
<tr>
<td>112204</td>
<td>Dial - complete assembly</td>
<td>$ 5.70</td>
</tr>
<tr>
<td>112207</td>
<td>Receiver - with window</td>
<td>$ 1.75</td>
</tr>
<tr>
<td>112208</td>
<td>Knob - tuning</td>
<td>$ .25</td>
</tr>
<tr>
<td>112209</td>
<td>Knob - volume and range switch</td>
<td>$ .45</td>
</tr>
<tr>
<td>112210</td>
<td>Plug - &quot;A&quot; battery (3 prong)</td>
<td>$ .15</td>
</tr>
<tr>
<td>112211</td>
<td>Plug - &quot;A&quot; battery (3 prong)</td>
<td>$ .15</td>
</tr>
<tr>
<td>112203</td>
<td>Pointer - dial</td>
<td>$ .35</td>
</tr>
<tr>
<td>112209</td>
<td>Scale - dial</td>
<td>$ 1.00</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher

Compliments of www.nucow.com
CIRCUIT DESCRIPTION

The model R-192-D chassis is a six volt battery powered superheterodyne receiver. It has an intermediate frequency of 465 Kc. and the tuning range is from 540 to 1720 kc.

The incoming signal picked up by the antenna is induced in the tuned secondary of the antenna coil and impressed on the control grid of the 6AG7 first detector and oscillator tube. The oscillator circuit is tuned to a frequency 465 kc. higher than that of the incoming signal, and the resultant 465 kc. output is amplified in the I.F. stage, using a 6AF7 tube. The amplified I.F. voltage is impressed on the grid of the 6AG7 second detector tube. The plate of the 6AG7 tube is grounded and the grid acts as the plate of a linear diode detector and A.V.C. source. The direct current voltage developed across the 1/2 megohm diode load resistor is used as A.V.C. voltage and applied to the control grids of the 6AG7 and 6AF7 (I.F.) tubes through a resistance capacity filter system. Self bias is obtained across the cathode resistor 25 to maintain bias at all times.

The potentiometer type volume control 49 serves as a continuously variable voltage divider of the audio voltage developed. Any portion of the audio voltage can be applied to the control grid of the 6SH7 A.F. tube. It should be noted that the bias for the 6SH7 A.F. tube is obtained from a bias cell. The 6SH7 A.F. tube is resistance coupled to the 41 power output tube. Grid bias for the output tube is obtained across the cathode resistor 25.

The continuously variable resistor type tone control regulates the high note content of the audio output.

All tube heaters are connected directly to the six volt supply circuit. A 6V. voltage is supplied by a synchronous full wave vibrator (48). The complete 6V. supply, consisting of vibrator, power transformer, chokes and condensers, is housed in a metal shield to eliminate interference. R.F. filter chokes in the power supply input and output circuit prevent interference from getting into the "A" and "B" leads.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 Kc. to 1000 Kc. are required.

1. Connect the output meter between the plate of the 41 tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.
4. With the gang condenser in full mesh set the pointer on the black horizontal line below 550 kc. on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

<table>
<thead>
<tr>
<th>ORDER OF ALIGN.</th>
<th>SUPPLY AMT. IN SERIES WITH SIG. GEN.</th>
<th>CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RECEIVER DIAL SETTING</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 MFD. CONDENSER</td>
<td>CONTROL GRID OF 6AG7 TUBE</td>
<td>465 Kc.</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1</td>
<td>1ST I.F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.</td>
</tr>
<tr>
<td>B</td>
<td>1 MFD. CONDENSER</td>
<td>CONTROL GRID OF 6AG7 TUBE</td>
<td>465 Kc.</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>3</td>
<td>2ND I.F.</td>
<td>ADJUST TRIMMERS 3 &amp; 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 &amp; 2.</td>
</tr>
<tr>
<td>C</td>
<td>250 MFD. CONDENSER</td>
<td>ANTENNA LEAD</td>
<td>1700 Kc.</td>
<td>1700 Kc.</td>
<td>5</td>
<td>OSCILLATOR (Shunt)</td>
<td>ADJUST TRIMMER TO BRING IN SIGNAL.</td>
</tr>
<tr>
<td>D</td>
<td>250 MFD. CONDENSER</td>
<td>ANTENNA LEAD</td>
<td>1500 Kc.</td>
<td>TUNE TO 1500 Kc. GENERATOR SIGNAL</td>
<td>6</td>
<td>ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
<tr>
<td>E</td>
<td>250 MFD. CONDENSER</td>
<td>ANTENNA LEAD</td>
<td>600 Kc.</td>
<td>TUNE TO 600 Kc. GENERATOR SIGNAL</td>
<td>7</td>
<td>OSCILLATOR (Series Pad)</td>
<td>ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETURNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS ACHIEVED.</td>
</tr>
</tbody>
</table>
OCTOBER 1937

COMPLIMENTS OF WWW.NUCOW.COM

DIAGRAM | PART NUMBER | DESCRIPTION | LIST PRICE
--- | --- | --- | ---
14 | 6A8G | 1st DET. & OSC. | 5.00
2 | 6S7G | L.F. | 5.00
3 | 6L5G | 2nd DET.-A.V.C. | 5.00
4 | 6S7G | A.F. | 5.00
5 | 6L5G | DRIVER | 5.00
6 | 19 | OUTPUT | 5.00

IF 465 K.C.
MODELS 1921 to 1929
R-192-D CHASSIS

SOCKET VOLTAGES

BATTERY VOLTAGE 6.6
DIAL TUNED TO 540 KC

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
BATTERY DRAIN 2.5 AMPS
B. SUPPLY DRAIN 17 MILS

REAR OF CHASSIS

COMPLIMENTS OF WWW.NUCOW.COM

SWANER PAGE 10.5

SWANER PAGE 10.5

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6S7G A.F. tube is -1.0 volt supplied by the bias cell. Due to the high resistance of the cell, the ammeter will indicate only a fraction of a volt.

NOTE B: Because of the high resistance of the plate and screen circuits of the 6S7G A.F. tube only a slight deflection of the voltmeter will be obtained.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

© John F. Rider, Publisher

STEWART-WARNER CORP.

SCHMATIC, CHASSIS R-192D

1921 to 1929

SWANER PAGE 10.5
MODEL R-192-D CHASSIS (RECEIVER MODELS 1921 to 1929)

The model R-192-D receiver is a six volt battery powered superheterodyne receiver. The circuit employed includes automatic volume control and a push pull class B output system.

The 6L6G second detector is connected as a diode, the plate being grounded and the control grid acting as a diode plate. If a voltage is supplied by a synchronous full-wave vibrator.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 405 kc. to 10 Mc. are required.

1. Connect the output meter across the plates of the 18 tube, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2. Connect the grid lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.

3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.

4. With the gang condenser in full mesh set the pointer on the black horizontal line below 550 kc. on the dial.

5. Proceed to align in exactly the same order as shown in the table below.

<table>
<thead>
<tr>
<th>ORDER</th>
<th>NAME OF PART</th>
<th>VALUATION</th>
<th>TUNING CONTROL</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>SELECTED TUNING FREQUENCY</th>
<th>RECEIVER DIAL SETTING</th>
<th>TRIMMER NBR.</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 MD. COND.</td>
<td>465 KC.</td>
<td>BROADCAST C1-Clawless</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1</td>
<td>1ST. I.F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1 MD. CO.</td>
<td>460 KC.</td>
<td>BROADCAST C2-Clawless</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>2</td>
<td>2ND. I.F.</td>
<td>ADJUST TRIMMER S &amp; T FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 &amp; 2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>400 GM. CARBON RESISTOR</td>
<td>1700 KC.</td>
<td>BROADCAST C3-Clawless</td>
<td>1700 KC.</td>
<td>3</td>
<td>BROADBAND OSCILLATOR (Smt.)</td>
<td>ADJUST TRIMMER TO BRING IN SIGNAL.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>400 GM. CARBON RESISTOR</td>
<td>1500 KC.</td>
<td>BROADCAST C4-Clawless</td>
<td>1500 KC.</td>
<td>4</td>
<td>BROADBAND ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>400 GM. CARBON RESISTOR</td>
<td>1500 KC.</td>
<td>BROADCAST C5-Clawless</td>
<td>1500 KC.</td>
<td>5</td>
<td>BROADCAST ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>400 GM. CARBON RESISTOR</td>
<td>500 KC.</td>
<td>BROADCAST C6-Clawless</td>
<td>BROADCAST OSCILLATOR Series Pad</td>
<td>6</td>
<td>BROADCAST ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>400 GM. CARBON RESISTOR</td>
<td>500 KC.</td>
<td>POLICE (Center)</td>
<td>5.0 MC.</td>
<td>7</td>
<td>POLICE OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>400 GM. CARBON RESISTOR</td>
<td>500 KC.</td>
<td>POLICE (Center)</td>
<td>5.0 MC.</td>
<td>8</td>
<td>POLICE OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>400 GM. CARBON RESISTOR</td>
<td>16.0 MC.</td>
<td>SHORT-WAVE Counter-clockwise</td>
<td>16.0 MC.</td>
<td>9</td>
<td>SHORT-WAVE OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>400 GM. CARBON RESISTOR</td>
<td>16.0 MC.</td>
<td>SHORT-WAVE Counter-clockwise</td>
<td>16.0 MC.</td>
<td>10</td>
<td>SHORT-WAVE OSCILLATOR</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIAL DRIVE & MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>112556</td>
<td>Arm - for band indicator drive</td>
<td>8.25</td>
</tr>
<tr>
<td>112557</td>
<td>Shaft - for pointer drive</td>
<td>0.20</td>
</tr>
<tr>
<td>112558</td>
<td>Shaft - for turner</td>
<td>0.05</td>
</tr>
<tr>
<td>112559</td>
<td>Shield - for speaker</td>
<td>2.00</td>
</tr>
<tr>
<td>112561</td>
<td>Rocking bar - for cutout</td>
<td>0.25</td>
</tr>
<tr>
<td>112563</td>
<td>Terminal</td>
<td>0.05</td>
</tr>
<tr>
<td>112564</td>
<td>Rocker shaft</td>
<td>0.05</td>
</tr>
<tr>
<td>112565</td>
<td>Drum &amp; flexible coupler</td>
<td>0.20</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher

Compliments of www.nucow.com
The model R-304 chassis is a five tube superheterodyne receiver. It has an intermediate frequency of 465 KC, and a tuning range from 540 to 1725 KC.

**SOCKET VOLTAGES**

**VOLUME CONTROL ON FULL**

**DIAL TUNED TO 540 KC.**

**NOTE A:** The bias for the control grids of the 6K6G, 6N7G, and the diode plate of the 6VQG is 2.0 volts measured across section AB of resistor number 22.

**NOTE B:** The bias for the control grid of the 6N7G is -3.5 volts measured across section AC of resistor number 22.

**NOTE C:** The bias for the control grid of the 6VQG output tube is -10 volts measured across section AD of resistor number 22.

---

© John F. Rider, Publisher
**ALIGNMENT EQUIPMENT & PROCEDURE**

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1800 KC. are required.

1. Connect the output meter between the plate of the 6K6 tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer to the 540 KC. division on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

<table>
<thead>
<tr>
<th>ORDER OF ALIGN.</th>
<th>DUMMY ANT. IN SERIES WITH SIG.-GEN.</th>
<th>CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>RECEIVER DIAL SETTINGS</th>
<th>TRIMMER NUMBER</th>
<th>TRIMMER DESCRIPTION</th>
<th>TYPE OF ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>.1 MFD. CONDENSER</td>
<td>CONTROL GRID OF GAGG TUBE</td>
<td>405 KC.</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>1</td>
<td>1ST I.F.</td>
<td>ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.</td>
</tr>
<tr>
<td>B</td>
<td>.1 MFD. CONDENSER</td>
<td>CONTROL GRID OF GAGG TUBE</td>
<td>405 KC.</td>
<td>ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL</td>
<td>3</td>
<td>2ND I.F.</td>
<td>ADJUST TRIMMERS 3 &amp; 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 &amp; 2.</td>
</tr>
<tr>
<td>C</td>
<td>400 QGH CARBON RESISTOR</td>
<td>ANTENNA LEAD</td>
<td>1600 KC.</td>
<td>TUNE TO 1500 KC. GENERATOR SIGNAL</td>
<td>6</td>
<td>ANTENNA</td>
<td>ADJUST FOR MAXIMUM OUTPUT.</td>
</tr>
</tbody>
</table>

**NOTE:** The oscillator section of the gang is provided with two trimmers connected in parallel, one on the top (No. 5) and one on the bottom. Normally the bottom trimmer will require no adjustment, but if trimmer No. 6 has to be turned too far out or too far in the bottom trimmer should be adjusted until trimmer No. 5 peaks about half way in.

**DIAL CORD INSTALLATION:** The dial cord to be used should be approximately 27 inches long. Open the gang condenser all the way (plates all out) and unclip the tension spring from drum A.

1. Thread both ends of the dial cord through the opening at the top of drum A and tie them to one end of the tension spring.
2. Wind one complete turn counter-clockwise around drum A. (Use only one end of the cord.)
3. Run the cord around pulley B from back to front, then across to the front of pulley C.
4. Run the cord around pulley C, over drum A (in back of windings) down to shaft B.
5. Wind three complete turns around shaft B.
6. Run the cord up to drum A and wind one complete turn counter-clockwise around the drum.
7. Fasten the tension spring to the clip inside the drum.
8. With the gang condenser fully closed, clip the pointer to the dial cord so that it comes opposite the 540 KC. mark on the dial.

**ELIMINATION OF OSCILLATION:** Some of the model R-304 receivers may oscillate or "grow" especially when tuned to weak stations or between stations. This oscillation can always be eliminated by connecting a ground to the receiver. However, if the set is used without a ground, it can be kept from oscillating by connecting a buffer condenser from one side of the power line to the chassis within the receiver. The condenser should have a capacity of .01 mfd. and a voltage rating of 1000 volts. Later production receivers are built with such a line buffer condenser to prevent oscillation. Sets using the condenser can be identified by the letter "S" on the back of the chassis also on the packing carton near the serial number.
### ALIGNMENT EQUIPMENT & PROCEDURE

**01-52, 08-52, and 010-52 CHASSIS**

**Models 01-521 to 01-529, 08-521 to 08-529, 010-521 to 010-529**

**Alignment, Trimmers, Tuner**

<table>
<thead>
<tr>
<th>Models 01-521 to 01-529</th>
<th>STEWART-WARNER CORP.</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-521 to 01-529</td>
<td>01-521S to 01-529S</td>
</tr>
<tr>
<td>010-521 to 010-529</td>
<td>010-521S to 010-529S</td>
</tr>
</tbody>
</table>

**Alignment, Trimmers**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Type of Adjustment</th>
<th>Transmitter Setting</th>
<th>Receiver Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>34 kHz</td>
<td>Maximum current</td>
<td>1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>14 kHz</td>
<td>Maximum current</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>14 kHz</td>
<td>Maximum current</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>60 kHz</td>
<td>Maximum current</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

**Alignment Equipment & Procedure**

1. Connect the signal generator to the instrument's input. Make sure the generator is set to the lowest frequency range of 45 kHz to 14 kHz.
2. Adjust the alignment until the meter readings are within 10% of the maximum range.
3. Gradually increase the signal generator's output until the meter readings are within 5% of the maximum range.
4. Gradually decrease the signal generator's output until the meter readings are within 5% of the minimum range.
5. Gradually increase the signal generator's output until the meter readings are within 5% of the maximum range again.

**Compliments of www.nucow.com**
01-54, 01-54S, 08-54, 010-54, and 010-54S CHASSIS
ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1600 MC are required.
1. Connect the output meter across the voice coil or between the plate of the 6BE6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4. With the dummy condenser in full mesh, set the pointer to the last mark on the right of the dial scale. If the pointer is not sharply off calibration, loosen the set-screw in the dial-drive drum at the left side of the dummy condenser, and set the pointer to the last mark on the right of the dial scale when the dummy condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right of the dial scale. Hold it in place to check if the dummy condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or appliance cement on the cord and pointer clip to prevent the pointer from slipping.

HOW TO SET UP PUSH BUTTONS
1. Before setting up buttons, they must be at least 15 minutes. To obtain a correct reading, each push button should be in mesh with condenser connected, dummy condenser in mesh, and dummy condenser connected.
2. Arrange the condensers in the same way, with the exception of the dummy condenser, which is replaced with the dummy condenser.

HOW TO REPLACE DIAL POINTER DRIVE CORD
1. Close the dummy condenser and turn one end of the cord through the bushing and bushing through the bushing and bushing through the bushing and bushing through the bushing.
2. Open the cord from the dummy condenser. The cord is then wound through the bushing and bushing through the bushing and bushing through the bushing.
3. Pull the cord through the hole and pull it through the hole and pull it through the hole and pull it through the hole and pull it through the hole.
4. The cord is then wound through the bushing and bushing through the bushing and bushing through the bushing and bushing through the bushing.
5. The cord is then wound through the bushing and bushing through the bushing and bushing through the bushing and bushing through the bushing.

HOW TO REPLACE DIAL DRIVE CORD
1. Close the dummy condenser and turn one end of the cord through the bushing and bushing through the bushing and bushing through the bushing.
2. Open the cord from the dummy condenser. The cord is then wound through the bushing and bushing through the bushing and bushing through the bushing.
3. Pull the cord through the hole and pull it through the hole and pull it through the hole and pull it through the hole and pull it through the hole.
4. The cord is then wound through the bushing and bushing through the bushing and bushing through the bushing and bushing through the bushing.
5. The cord is then wound through the bushing and bushing through the bushing and bushing through the bushing and bushing through the bushing.

DIAL & MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>011750</td>
<td>Clip for connecting condenser.</td>
</tr>
<tr>
<td>011748</td>
<td>Clip for connecting condenser.</td>
</tr>
<tr>
<td>011746</td>
<td>Condenser (760 ohms).</td>
</tr>
<tr>
<td>011751</td>
<td>Condenser (600 ohms).</td>
</tr>
<tr>
<td>011752</td>
<td>Condenser (450 ohms).</td>
</tr>
<tr>
<td>011753</td>
<td>Condenser (300 ohms).</td>
</tr>
<tr>
<td>011754</td>
<td>Condenser (150 ohms).</td>
</tr>
<tr>
<td>011755</td>
<td>Condenser (75 ohms).</td>
</tr>
<tr>
<td>011756</td>
<td>Condenser (30 ohms).</td>
</tr>
<tr>
<td>011757</td>
<td>Condenser (18 ohms).</td>
</tr>
<tr>
<td>011758</td>
<td>Condenser (12 ohms).</td>
</tr>
<tr>
<td>011759</td>
<td>Condenser (6 ohms).</td>
</tr>
<tr>
<td>011760</td>
<td>Condenser (3 ohms).</td>
</tr>
<tr>
<td>011761</td>
<td>Condenser (1 ohm).</td>
</tr>
<tr>
<td>011762</td>
<td>Condenser (0.5 ohm).</td>
</tr>
<tr>
<td>011763</td>
<td>Condenser (0.25 ohm).</td>
</tr>
<tr>
<td>011764</td>
<td>Condenser (0.125 ohm).</td>
</tr>
<tr>
<td>011765</td>
<td>Condenser (0.0625 ohm).</td>
</tr>
<tr>
<td>011766</td>
<td>Condenser (0.03125 ohm).</td>
</tr>
<tr>
<td>011767</td>
<td>Condenser (0.015625 ohm).</td>
</tr>
<tr>
<td>011768</td>
<td>Condenser (0.0078125 ohm).</td>
</tr>
<tr>
<td>011769</td>
<td>Condenser (0.00390625 ohm).</td>
</tr>
<tr>
<td>011770</td>
<td>Condenser (0.001953125 ohm).</td>
</tr>
</tbody>
</table>
ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.
1. Connect the output meter across the voice coil or between the plate of the IC5G output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the Ground Terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the grid condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the grid in the full mesh position.

<table>
<thead>
<tr>
<th>Dummy Ant. in Series with Sig. Gen.</th>
<th>Connection of Sig. Generator Output to Receiver</th>
<th>Signal Generator Frequency</th>
<th>Receiver Dial Setting</th>
<th>Trimmer Number</th>
<th>Trimmer Description</th>
<th>Type of Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>.1 MFD. Condenser</td>
<td>Control Grid of 1A7G</td>
<td>465 KC</td>
<td>Any Point Where It Does Not Affect Signal</td>
<td>1</td>
<td>2nd I.F.</td>
<td>Adjust for maximum output. Then repeat adjustment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
<td>1st I.F.</td>
<td></td>
</tr>
</tbody>
</table>

Before proceeding further with alignment, disconnect the output meter, and replace chassis, batteries and loop in cabinet, being sure to connect the loop. Using a weak signal from the signal generator, make the following adjustments by ear. The trimmers may be reached through the holes in the bottom of the cabinet by removing corks.

<table>
<thead>
<tr>
<th>400 Ohm Carbon Resistor</th>
<th>Antenna Terminal on Bottom of Cabinet</th>
<th>1500 KC</th>
<th>1500 KC</th>
<th>4</th>
<th>Broadcast Oscillator (Shunt)</th>
<th>Adjust trimmer for maximum output.</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 Ohm Carbon Resistor</td>
<td>Antenna Terminal on Bottom of Cabinet</td>
<td>1500 KC</td>
<td>Tune To 1500 KC Generator Signal</td>
<td>5</td>
<td>Broadcast Antenna</td>
<td>Adjust for maximum output.</td>
</tr>
</tbody>
</table>

INSTALLATION OF BATTERIES

The following 1½ volt "A" batteries will fit the space provided: Burgess No. 4FAPl, Eveready No. 742, or Ray-O-Vac No. 94A. "B" batteries of the proper size are Burgess 300P, Eveready No. 762 and Ray-O-Vac No. 5303.

A plug and clip connection on the loop is provided to facilitate the installation of batteries. Before replacing the back of the cabinet always be sure that this plug is pushed into the clip and that the blocks are holding the batteries firmly in their positions.

Do not permit any of the battery cable plugs to come in contact with the receiver chassis or any battery terminal other than that to which it is to be connected.

LOOP ANTENNA

A built-in loop antenna is incorporated in this receiver. Due to the directional effect of this type of antenna it will often be possible to increase the signal volume by rotating the entire set.

In some locations it may be desirable to install an external antenna to increase the volume of weak or distant stations. This external antenna should be connected to the screw marked A on the terminal strip located on the bottom of the receiver case. Connect a ground wire to the post marked G on the same terminal strip.

NOTE: You must connect a ground wire to this receiver when using a separate outside aerial, otherwise you will not obtain a satisfactory increase in signal pickup.
ALIGNMENT PROCEDURE

1. **Dummy Antenna** in Series with Signal Generator

<table>
<thead>
<tr>
<th>Dummy Antenna Type</th>
<th>Connection of Sig. Generator to Receiver</th>
<th>Signal Generator Frequency</th>
<th>Receiver Dial Setting</th>
<th>Trimmer Number</th>
<th>Trimmer Description</th>
<th>Type of Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 MFD. MICA Condenser</td>
<td>Control Grid of 6AG-6 Tube</td>
<td>485 KC</td>
<td>Any Point Where It Does Not Affect the Signal</td>
<td>1-2</td>
<td>1st I.F.</td>
<td>Adjust for Maximum Output Then Repeat Adjustment</td>
</tr>
<tr>
<td>200 MFD. MICA Condenser</td>
<td>Antenna Terminal (A)</td>
<td>1500 KC</td>
<td>1500 KC</td>
<td>3</td>
<td>2nd I.F.</td>
<td></td>
</tr>
<tr>
<td>200 MFD. MICA Condenser</td>
<td>Antenna Terminal (A)</td>
<td>1500 KC</td>
<td>Tune to 1500 KC Generator Signal</td>
<td>4</td>
<td>Broadcast Oscillator (Shunt)</td>
<td>Adjust Trimmer to Bring in Signal</td>
</tr>
</tbody>
</table>

2. **Built-In Antenna System**

   - The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A1 on the back of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A1 and connect an external antenna to terminal A.

3. **Miscellaneous Parts**

   - **Cabinets**
     - 114800---Cabinet - Ivory (plastic) for 07-512--- 5.50
     - 114850---Cabinet - Walnut for 07-511--- 3.00
     - 116338---Cabinet - Spray Painted Ivory for 07-513--- 4.25
     - 116339---Cabinet - Metallic Blue--- 4.25
     - 116340---Cabinet - Metallic Red--- 4.25
     - 116341---Cabinet - Metallic Green--- 4.25

   - **Cabinet Backs**
     - 116369---Cabinet Back (Ivory) for 07-512--- 10
     - 116370---Cabinet Back (Walnut) for 07-511 & 07-515--- 10

   - **Tuning Knobs**
     - 114973---Knob - Tuning (Red)--- 0.45
     - 116267---Knob - Tuning (Ivory)--- 0.40

   - **Volume Knobs**
     - 114967---Knob - Volume (Red)--- 0.08
     - 116269---Knob - Volume (Ivory)--- 0.08

©John F. Rider, Publisher
GROUNDS MARKED "Z"

07-55 CHASSIS: ALL GROUNDS MARKED "Z" ARE NOT CONNECTED DIRECTLY TO CHASSIS BUT ARE CONNECTED TOGETHER AND GROUNDED TO CHASSIS THROUGH .1 MFD. CAPACITOR (PART NO. 8942).

07-51H CHASSIS: GROUNDS MARKED "Z" CONNECTED DIRECTLY TO CHASSIS.
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. On the 07-51H, connect the output meter across the voice coil or between the plate of the 35L6GT output tube and chassis through a 1 mil condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil. THE CONNECTIONS FOR THE 07-55 ARE THE SAME EXCEPT CONNECT THE GROUND LEAD TO THE POINT SHOWN IN FIG. 1 INSTEAD OF TO CHASSIS.

2. When aligning the 07-51H chassis, connect the ground lead of the signal generator to the chassis of the receiver through a 25 mil condenser and keep it connected in this manner throughout the entire alignment procedure. FOR THE GROUND LEAD CONNECTION TO THE 07-55 CHASSIS, REFER TO "BOTTOM VIEW", FIG. 2.

3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4. Remove the connector between Terminals A and A1.

### MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>116485</td>
<td>Asbestos Pod-Model 07-55 only</td>
<td>$0.03</td>
</tr>
<tr>
<td>116487</td>
<td>Base—Condenser Mounting</td>
<td>$0.04</td>
</tr>
<tr>
<td>116471</td>
<td>Cover for elect. condenser—07-55 only</td>
<td>$0.05</td>
</tr>
<tr>
<td>116551</td>
<td>Clamp for power cord—07-55 only</td>
<td>$0.01</td>
</tr>
<tr>
<td>127245</td>
<td>Clip—coil mounting</td>
<td>$0.01</td>
</tr>
<tr>
<td>148845</td>
<td>Socket—dial lamp</td>
<td>$0.20</td>
</tr>
<tr>
<td>148401</td>
<td>Screw—No. 6 Hex. Rd.—Per C</td>
<td>$0.25</td>
</tr>
<tr>
<td>116223</td>
<td>Terminal strip—antenna (A.A.)</td>
<td>$0.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CABINETS</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>116705</td>
<td>Cabinet—wood—07-51H and 07-554</td>
<td>$7.00</td>
</tr>
<tr>
<td>116341</td>
<td>Cabinet—metallic green—07-51H and 07-554</td>
<td>$2.75</td>
</tr>
<tr>
<td>116343</td>
<td>Cabinet—metallic red—07-51H and 07-554</td>
<td>$2.75</td>
</tr>
<tr>
<td>116359</td>
<td>Cabinet—metallic blue—07-51H and 07-554</td>
<td>$2.75</td>
</tr>
<tr>
<td>116358</td>
<td>Cabinet—sprayed ivory—07-51H and 07-554</td>
<td>$2.75</td>
</tr>
<tr>
<td>116350</td>
<td>Cabinet—walnut—07-51H and 07-551</td>
<td>$2.05</td>
</tr>
<tr>
<td>114900</td>
<td>Cabinet—ivory planks—07-51H and 07-551</td>
<td>$2.45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CABINET BACK</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>116497</td>
<td>Cabinet Back—walnut—07-51H and 07-513H</td>
<td>$0.12</td>
</tr>
<tr>
<td>116498</td>
<td>Cabinet Back—ivory—07-513H</td>
<td>$0.12</td>
</tr>
<tr>
<td>116489</td>
<td>Cabinet Back—dial lamp</td>
<td>$0.12</td>
</tr>
<tr>
<td>116490</td>
<td>Cabinet Back—walnut—07-551 and 07-553</td>
<td>$0.12</td>
</tr>
<tr>
<td>116477</td>
<td>Cabinet Back—ivory—07-551 and 07-553</td>
<td>$0.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TUNING KNOBS</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>116387</td>
<td>Knob—tuning (ivory)—07-51H and 07-553</td>
<td>$0.15</td>
</tr>
<tr>
<td>114933</td>
<td>Knob—tuning (walnut)—07-51H and 07-514H</td>
<td>$0.15</td>
</tr>
<tr>
<td>114973</td>
<td>Knob—tuning (ivory)—07-514H and 07-514H</td>
<td>$0.15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOLUME KNOBS</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>116390</td>
<td>Knob—tuning (walnut)—07-51H and 07-514H</td>
<td>$0.12</td>
</tr>
<tr>
<td>114977</td>
<td>Knob—tuning (ivory)—07-514H and 07-514H</td>
<td>$0.12</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher

Compliments of www.nucow.com
**ALIGNMENT EQUIPMENT & PROCEDURE**

**FOR ALIGNMENT:** An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 25LG output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

2. Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the pointer clip to prevent the pointer from slipping.

<table>
<thead>
<tr>
<th>Dummy Ant. in Series with Sig. Gen.</th>
<th>Connection of Sig. Generator Output to Receiver</th>
<th>Signal Generator Frequency</th>
<th>Receiver Dial Setting</th>
<th>Trimmer Number</th>
<th>Trimmer Description</th>
<th>Type of Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 MMFD. Micro Condenser</td>
<td>Antenna Lead (Blue Wire)</td>
<td>465 KC</td>
<td>Any Point Where It Does Not Affect The Signal</td>
<td>3-4</td>
<td>2nd I.F.</td>
<td>Adjust for Minimum Output Using a Strong Generator Signal.</td>
</tr>
<tr>
<td>200 MMFD. Micro Condenser</td>
<td>Antenna Lead (Blue Wire)</td>
<td>1500 KC</td>
<td>1500 KC</td>
<td>5</td>
<td>Wave Trap</td>
<td>Adjust Trimmer to Bring in Signal.</td>
</tr>
<tr>
<td>200 MMFD. Micro Condenser</td>
<td>Antenna Lead (Blue Wire)</td>
<td>1500 KC</td>
<td>Tune To 1500 KC Generator Signal</td>
<td>6</td>
<td>Broadcast Oscillator (Shunt)</td>
<td>Adjust for Maximum Output.</td>
</tr>
</tbody>
</table>

**HOW TO SET UP PUSH BUTTONS**

1. Before setting up buttons, turn on set for at least 15 minutes. To set up a push button, pull off the button cap by grasping the button and pulling outward on it. When the button is removed, the screw in this screw will be exposed to view (see Fig. 1). Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).

2. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, the two tuning knobs and tune in the desired station. Then rotate the adjusting screw, turning clockwise until reasonably tight.

**WARNING:** Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.

**HOW TO REPLACE THE DIAL DRIVE CORD**

1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.

2. The one end of the dial cord to the spring L and thread the other end through hole A and down the front of the drum to the tuning shaft. Continue around the shaft, then over pulley B and up the rear side of the drum.

**GANG CONDENSER I3350**

**DRUM I3374**

**CLIP I2764**

**SET-UP SCREW I14431**

**SHAFT I3376**

**MECANICAL TUNER UNIT LESS GANG & CORD DRIVE PARTS E3494**

**CORD I33176**

1. Close the gang condenser and thread one end of the cord through eyelet G and tie it to spring K.

2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.

3. Continue back to pulley J and down the front of the drum. Carry the end of the cord around the drum and thread through eyelet G. IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overloading.

4. Be sure the gang condenser is closed, then set the dial pointer to the last dial division mark on the right side, and clip it to the cord.
Stromberg-Carlson
No. 255 Radio Receivers

Type of Circuit: Superheterodyne with Automatic Frequency Control
Tuning Ranges:
A—530 to 1600 Kc; B—1600 to 4800 Kc; C—4800 to 11,000 Kc;
D—11,000 to 22,000 Kc; E—22,000 to 60,000 Kc.

Number and Types of Tubes:
2 No. 6K7, 1 No. 6A8, 2 No. 6J7, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5,
1 No. 6C5, 2 No. 6L6, 1 No. 665, 1 No. 5U4G

Input Voltage Rating: 105 to 125 Volts A. C.
Power Frequency Rating: 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating: 145 Watts

Frequency of Intermediate Amplifier: 465 Kilocycles

Fig. 6. Chassis Assembly.
PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A method having three components is provided on the rear of the chassis and is named by the "6000" recording/playing mechanism. This method has been designed to be used with a phonograph record. A high-quality phonograph record can be obtained with this method, just as with a phonograph record.

The first step is to set the phonograph record on the turntable. The second step is to set the record on the spool. The third step is to set the record on the turntable. The fourth step is to set the record on the turntable.

If the phonograph record is not used and the electric pickup by the use of a high-speed groove, it will be necessary to use a similar method. The method below is obtained with the record on the turntable. The turntable can be used with the record on the turntable.

If the phonograph record is not used, a high-speed groove will be necessary to set the record on the turntable. The method below is obtained with the record on the turntable. The turntable can be used with the record on the turntable.

If the phonograph record is not used, a high-speed groove will be necessary to set the record on the turntable. The method below is obtained with the record on the turntable. The turntable can be used with the record on the turntable.

If the phonograph record is not used, a high-speed groove will be necessary to set the record on the turntable. The method below is obtained with the record on the turntable. The turntable can be used with the record on the turntable.

If the phonograph record is not used, a high-speed groove will be necessary to set the record on the turntable. The method below is obtained with the record on the turntable. The turntable can be used with the record on the turntable.

If the phonograph record is not used, a high-speed groove will be necessary to set the record on the turntable. The method below is obtained with the record on the turntable. The turntable can be used with the record on the turntable.
ALIGNMENT DATA

Dial Adjustment
Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the generator used in the check. The dial register, the "Radio Station Selector" knob in a counterclockwise direction so that the dial tuning capacitor is set at its maximum capacitance. The dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two setscrew located on the back of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The indicator line should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments
The intermediate frequency in these receivers is a fixed circuit. The first I.F. amplifier is coupled to the second I.F. amplifier through the No. 567A tube. The second and third I.F. transformers are connected in a high input low output (H.I.L.O.) manner. The third I.F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I.F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6A8 tube supplies the characteristic voltage demanded by the output transformer. The fourth I.F. transformer feeds the diode plates of the No. 6A8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is desirable to do so, A.F. adjustments be made in the factory. The factory adjustments are made to give a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control to the "Normal" position, and the "On-Off" Control knob to its "Normal" position.

2. Apply between the chassis base or (ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 46 kilocycles from the signal generator, using a 0.5 mA. capacitor in series with the connection with the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not connect the chassis ground connecting chord to this tube. The grid (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.

3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I.F. transformers include the following:

- Adjust the third I.F. transformer primary circuit for maximum output.
- Adjust the fourth I.F. transformer primary circuit for maximum output.
- Adjust the third I.F. transformer discriminator circuit midway between the peaks where maximum output is obtained.
- Adjust the second I.F. transformer discriminator circuit for maximum output.
- Adjust the second I.F. primary circuit for maximum output.
- Adjust the first I.F. secondary circuit for maximum output.
- Adjust the first I.F. primary circuit for maximum output.
- Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

- Check the position of the A. F. C. control knob which should be set to the "off" position. Before making this adjustment aligned so that the I. F. Amplifier is tuned exactly 465 kilocycles. With the signal generator still set at a frequency of 46 kilocycles, adjust the signal generator so that the maximum output is fed into the No. 6A8 modulator tube. Now, slowly turn the knob of the discriminator control in the "on" position, while watching the output meter. When the output has increased to a level of 50,000 to 60,000 microamps, adjust the discriminator control knob so that the maximum output is obtained. With the discriminator control knob in the "on" position, observe whether there is any change in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "on" position to the "off" position. There should be no change in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" position to the "on" position. If there is a change in the milliammeter reading while rotating the Automatic Frequency Control knob to the "on" or "off" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjusted attenuator located in the receiver directly under the meter, until the maximum output is obtained with the control knob in the "on" position. The A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained in the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments
The alignment of the radiophonic frequency circuits in these receivers should be very carefully made and in the order given.

When making any adjustment of these circuits, the A. F. C. Control knob should be set to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "On-Off" on-Bias-Phase" graph should be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)
In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

1. Operating the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the A.F. equalization lead for the "E" band, with another 0.1 mfd. capacitor in series with the A.F. equalization lead for the "E" band. This is because the "E" band is located outside this frequency range, and the A.F. equalization lead for the "E" band is connected to the A.F. equalization lead for the "D" band, which is located outside this frequency range. The A.F. equalization lead for the "E" band should be connected to the grounding point on the receiver.

2. Operate the Range Switch to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.

3. Adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimmer to 0.5 megacycles. (Note: 0.5 megacycles must be used on this receiver for the "E" range trimmer only.)

4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)
In aligning the radio frequency circuits for this range use the same artificial antenna (400-4000 kilocycle type) receiver in series with the output terminals of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 50 megacycles.

2. Adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

3. Set the signal generator's frequency and the receiver's tuning dial to 1 megacycles and adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)
In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis that was used for aligning the "D" range as follows:

1. Operate the Range Switch to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 50 megacycles.

2. Adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

3. Set the signal generator's frequency and the receiver's tuning dial to 1 megacycles and adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)
In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "D" range, and align this range as follows:

1. Operate the Range Switch to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 45 megacycles.

2. Adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

3. Set the signal generator's frequency and the receiver's tuning dial to 1 megacycles and adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Standard Broadcast Range (Also referred to as "A" Band)
In aligning the radio frequency circuits for this range, replace the 0.4 mfd. capacitor in series with the signal generator's output with a capacitor of the same type and magnitude and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1 megacycles.

2. Adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

3. Set the signal generator's frequency and the receiver's tuning dial to 1 megacycles and adjust the capacitance of the A. F. C. generator and the receiver's tuning dial to 100 megacycles.

4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.
3. Set the signal generator's frequency and the receiver's tuning dial to 6.0 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and of the same time rotate the gang tuning capacitor back and forth through required until maximum voltage output is obtained on the output meter.

4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 3.

**Adjustment of 10 Kilocycle Audio Cut-Off Filter**

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

**Instructions for Setting Up the A. F. C. Flash Tuning Unit**

1. Remove the flash tuner lamp unit escutcheon plate by removing the four screws.

2. Remove the list of station letters from the P-35420 package assembly which is tucked inside of the cabinet.

3. Remove the seven paper squares on which are printed the words "Tone", "Beau", "Kcal"再也不", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.

4. Remove the station letters of the seven stations which is desired to be set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partially cut squares to facilitate easy in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit.

5. Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash unit contacts located on the rear of the chassis base adjusted for the seven favorite stations.

6. Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position—slightly clockwise from this position which turns the set "on" (indicated by illumination of the dial). Wait a few seconds to reach operating temperature. Check the position of the Automatic Frequency Control knob which should be rotated to the "Off" position, and the Fidelity Control knob to the "Hi-Fi" position. Now carefully turn the desired station having the highest frequency, watching the tuning indicator so that the receiver will be correctly tuned in this station.

7. Carefully tune to the desired station by rotating the A. F. C. Control knob to the "On" position. Now, noting from Figure 4, the sketch which shows the contactor assembly, the hand and loosen the thumbscrew on the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as shown in Figure 4. Where the point is properly engaged between the rollers, the lamp of the lamp unit located behind the station letters of the desired station having the highest frequency will light. This station is the one desired, and the lamp unit will automatically tune in on this station. If it is not, it is probably due to the fact that the lamp unit is not properly adjusted. If the lamp unit is properly adjusted, rotate the tuning control knob clockwise until the lamp lights. Following this, the lamp unit will automatically tune in on this station.

8. Now rotate the A. F. C. Control knob to the "Off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.

9. When no change is noted after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating. Provided it has no hummings, static or other noises, it will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channels. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly, with this condition the strong signal will suffer some tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

**A. F. C. Flash Tuner Parts**

- Spring Washer
- Lever
- Bed for Attaching A. F. C. Switching Mechanism
- Lever and Spring Combination
- Contactors’ Assembly
- Contact Disc for Contactors
- Escutcheons Dye between Contactors
- White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- Orange Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- Green Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- Brown Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- Slate Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- Red Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
- A. F. C. Switch Gate Assembly
- Reel-in, Flexible, 10 Ohm

©John P. Bres, Publisher

Compliments of www.nucow.com
STROMBERG-CARLSON TEL. MFG. CO.

Type of Circuit: Superheterodyne

Tuning Ranges: A—530 to 1700 Kc.; C—5900 to 18,000 Kc.

Number and Types of Tubes: 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80

Voltage Rating: 105 to 125 Volts, A. C.

Input Power Frequency: 25 to 60 Cycles and 50 to 60 Cycles

Input Power Rating: 40 Watts

Frequency of Intermediate Amplifier: 455 Kilocycles

©John F. Rider, Publisher

Compliments of www.nucow.com
Compliments of www.nucow.com

### Termsinals of Sockets

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Socket Terminal Numbers</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8</td>
<td>Mod.—Osc.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>174</td>
<td>64</td>
<td>-7.2</td>
<td>176</td>
<td>6.1</td>
<td>1.8</td>
<td>2-7</td>
<td>6.1</td>
</tr>
<tr>
<td>6K7</td>
<td>I. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>176</td>
<td>62</td>
<td>1.8</td>
<td>210</td>
<td>6.1</td>
<td>1.8</td>
<td>2-7</td>
<td>6.1</td>
</tr>
<tr>
<td>6Q7G</td>
<td>Dem.—A. V. C.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+65</td>
<td>0</td>
<td>0</td>
<td>+65</td>
<td>6.1</td>
<td>0</td>
<td>2-7</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>—Audio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>6V6G</td>
<td>Audio Output</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>167</td>
<td>176</td>
<td>0</td>
<td>0</td>
<td>6.1</td>
<td>8.2</td>
</tr>
<tr>
<td>80</td>
<td>Rectifier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>260</td>
<td>258</td>
<td>258</td>
<td>260</td>
<td>1-4</td>
</tr>
</tbody>
</table>

**Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.**

© John F. Rider, Publisher

Fig. 3. Wiring Diagram of Chassis.
ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjust ment is necessary. However, should it become necessary to make any readjustments, the alignment crite ria given in the following paragraphs should be carefully followed. It is necessary to make these alignment ad justments in an easy and satisfactory manner. It is recommended that the Portions在外 and F-20064

In making any alignment adjustments, always adjust the oscillator output to its maximum value where a good signal may be found. Never attempt to make any alignment adjustments using a signal generator, before proceeding with the alignment of any circuits in these receivers. Be sure that the "Off-On Tone" control is set for minimum noise response (position where tone is set in on "0"). Figure 1, shows the location of all the oscillating capacitors in these receivers.

In making any alignment adjustments in these receivers, it will not be necessary to remove the chassis from the cabinet. The alignment capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the alignment capacitors for the radio frequency circuits are easily accessible from the bottom of the cabinet or through the bottom of the cabinet depending upon the style of cabinet.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to allow the tuning capacitors to properly align the receiver's dial. To accomplish this, rotate the dial control located at the signal input in the direction of listener BR.

Set the dial point to the extreme low frequency position on the receiver's dial. Rotate the "Off-On Tone" control, and select the most suitable combination which is the "normal" position. Rotate the Volume control knob to its maximum position (maximum volume).

Apply the chassis base for ground to the receiver and the grid of the No. 64. Adjust the alignment capacitors for the intermediate frequency circuits of these receivers with the adjustment controls for the grid to the maximum position. Turn the trimmer capacitor for the radio frequency circuit to its minimum value, and then, with the tuning capacitor in this position, the dial point should be centered over the inside, lower right-hand corner of the dial face (immediately below the 300 line-calibration mark on the "Dial Scale").

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. To make these adjustments, always align the circuits in the order given in these instructions.

1. Rotate the Range Switch control knob to the Standard Broadcast Range position (arrow on knob pointing in direction of listener BR).

Set the dial point to the extreme high frequency position on the receiver's dial. Rotate the "Off-On Tone" control and select the most suitable combination which is the "normal" position. Rotate the Volume control knob to its maximum position (maximum volume).

Apply the chassis base for ground to the receiver and the grid of the No. 64. Adjust the alignment capacitors for the intermediate frequency circuits of these receivers with the adjustment controls for the grid to the maximum position. Turn the trimmer capacitor for the radio frequency circuit to its minimum value, and then, with the tuning capacitor in this position, the dial point should be centered over the inside, lower right-hand corner of the dial face (immediately below the 300 line-calibration mark on the "Dial Scale").

2. Now, noting from Figure 1, the aligning capacitors for the 1st and second 1. P. transformers, align the 1, 2. F. circuits in the following manner.

Secondary of 2nd F. transformer, Primers of 1st F. transformers.

Secondary of 1st F. transformer, Primers of 1st F. transformers.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referenced to as "C" Range)

In aligning the radio-frequency circuits for this range, replace the 4 microfarad capacitor which was placed in series with the test oscillator's output load for the 1. P. alignments, with a 455 microfarad capacitor. The load should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.

2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
STROMBERG-CARLSON TEL. MFG. CO.

ELECTRICAL SPECIFICATIONS

Type of Circuit: Superheterodyne with Electric Tuning
Tuning Range: 530 to 1700 Kc.; 5800 to 18,000 Kc.
Number and Type of Tubes: 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7, 1 No. 6V6G, 1 No. 80
Voltage Rating: 105 to 125 Volts
Power Frequency Rating: 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating: 42 Watts
Frequency of Intermediate Amplifier: 455 Kilocycles

APPARATUS SPECIFICATIONS

No. 325-J Receiver: 50 to 60 Cycles; P-28816 Chassis Assembly
No. 325-JB Receiver: 25 to 60 Cycles; P-28817 Chassis Assembly
No. 325-N Receiver: 50 to 60 Cycles; P-28817 Chassis Assembly
No. 325-NB Receiver: 25 to 60 Cycles; P-28817 Chassis Assembly
No. 325-S Receiver: 50 to 60 Cycles; P-28816 Chassis Assembly
No. 325-SB Receiver: 25 to 60 Cycles; P-28817 Chassis Assembly
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 100 ohms per volt should be used for measuring the D.C. voltage of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

1. From Table I, the alignment capacitors for the first and second L.F. transformers, align the L.F. circuits in the following manner:
   - Primary of second L.F. transformer.
   - Primary of second L.F. transformer.
   - Primary of first L.F. transformer.

2. Adjust the receiver to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.4-microfarad capacitor which was placed across the test oscillator's output leads with a 600-ohm carbon type resistor. This load should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 15 megacycles.

2. Adjust the oscillator's "C" range high frequency aligner for maximum output.

3. Adjust the antenna's "C" range low frequency aligner for maximum output, and then the same rotate the tuning control back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 0.4-microfarad capacitor which was placed across the test oscillator's output leads with a 600-ohm carbon type resistor and align this circuit as follows:

1. Rotate the Range Switch control knob to the Standard broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 15 megacycles.

2. Adjust the oscillator's "A" range high frequency aligner for maximum output.

3. Adjust the antenna's "A" range low frequency aligner for maximum output.

4. The test oscillator's frequency and the receiver's tuning dial to 15 megacycles.

5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the tuning control slightly back and forth through resonance until maximum output is obtained.

6. Reset both the test oscillator's frequency and receiver's tuning dial to 15 megacycles and repeat operation.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the Standard Broadcast Range position and set the dial to 15 megacycles.

Connect a 300-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal in the receiver and adjust the wave trap until a maximum indication is obtained on the output meter.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 325 Receiver, the following instructions should be followed.

1. To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-32599 Switch Assembly. The rear of the chassis base of the receiver is already drilled for mounting this switch assembly. Complete instructions as to how to install and operate this switch are furnished with each P-32599 Switch Assembly.

2. Apply, between the chassis base (or ground binding post) of the receiver and the grid of the No. 648 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 45-7 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 648 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Table I, the alignment capacitors for the first and second L.F. transformers, align the L.F. circuits in the following manner:
   - Secondary of second L.F. transformer.
   - Secondary of first L.F. transformer.
   - Primary of first L.F. transformer.
Fig. 2. Schematic Circuit of Receiver.

Type of Circuit: Superheterodyne with Electric Tuning
Tuning Ranges: 53 to 1.7 Mc.; 2.25 to 7.6 Mc.; 7.6 to 23 Mc.
Number and Type of Tubes: 1 No. 6K8, 1 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6G, 1 No. 6U5, 1 No. 80
Voltage Rating: 105 to 125 Volts
Power Frequency Rating: 25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating: 70 Watts
Frequency of Intermediate Amplifier: 455 Kilocycles
These receivers are equipped with a three-contact phonograph socket, which is connected to the receiver circuit by a short connecting cable. This cable is fastened to the chassis base. A three-prong plug is furnished for connecting the pick-up cable to the phonograph socket.

Manually or electrically tuning for the Standard Broadcast range is easily obtainable by simply rotating the Range Switch control knob so that the arrow on the knob points toward the direction of the designation for the desired type of tuning. When manually tuning the receiver, either of the Standard Broadcast ranges, the electric tuning arrangement is made by moving the tone control in the direction of the desired stations. Manual tuning ranges are used when the operator desires to change stations. A signal is indicated by means of the tone control and the station letters of the six stations which are set up for electric tuning become illuminated. When manually tuning these receivers or when using the tone control, the station selector is set to the desired station and the tone control is moved in the direction of the signal indicated by the tone control. The tone control is moved to the maximum clockwise position (maximum volume). The station selector is then moved to the desired station, the tone control is moved to the minimum clockwise position (minimum volume) and the tone control is then adjusted to the desired volume level.

Automatic tuning for the Standard Broadcast range is obtained by rotating the Range Switch control knob so that the arrow on the knob points toward the direction of the designation for the desired type of tuning. When automatically tuning the receiver, the dial pointers automatically move in the direction of the desired stations. The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.

The dial pointers are marked with the station letters of the six stations which are set up for automatic tuning (see Fig. 1). The dial pointers are moved in the direction of the signal indicated by the dial pointers and the tone control is moved to the maximum clockwise position (maximum volume) and the tone control is then adjusted to the desired volume level.
APPARATUS SPECIFICATIONS

A special temperature controlled compensating capacitor is used in the oscillator circuit of these receivers when operating the electric tuning arrangement in order to eliminate drift in the oscillator's frequency. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control.

NORMAL VOLTAGE READINGS

The 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 full operation when the measurements are made. Figure 4, shows the terminal layout of the sockets with the proper terminal numbers.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Voltages Between Heater Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K8</td>
<td>Mod. Osc.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+92</td>
<td>-6.5</td>
<td>+73</td>
<td>6.3</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6K7</td>
<td>L. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+70</td>
<td>-290</td>
<td>6.3</td>
<td>0</td>
<td>2.7</td>
<td>6.3</td>
</tr>
<tr>
<td>6164</td>
<td>Dem. A. V.C.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-6.5</td>
<td>+73</td>
<td>6.3</td>
<td>0</td>
<td>2.7</td>
<td>6.3</td>
</tr>
<tr>
<td>6F5</td>
<td>Audio Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+92</td>
<td>-6.5</td>
<td>+73</td>
<td>6.3</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6F5C</td>
<td>Audio Output</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+92</td>
<td>-6.5</td>
<td>+73</td>
<td>6.3</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6F5D</td>
<td>Tuning Ind.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+92</td>
<td>6.3</td>
<td>0</td>
<td>2.7</td>
<td>6.3</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Receiver tuned manually to 1000 Kc, no signal. A.C. voltages are indicated by italics.

Fig. 4. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

Models 330, 350, 350B

Table of Values

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Voltages Between Heater Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>R. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+99</td>
<td>-5.9</td>
<td>+99</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6A8</td>
<td>Modulator</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+227</td>
<td>-49</td>
<td>-5.9</td>
<td>+99</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6A8C</td>
<td>Oscillator and Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+153</td>
<td>-7.8</td>
<td>-5.9</td>
<td>+192</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6K7</td>
<td>L. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+99</td>
<td>-5.9</td>
<td>+99</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
<td>6.2</td>
</tr>
<tr>
<td>6H6</td>
<td>Discriminator, Demodulator, A. V.C.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6B8</td>
<td>Discriminator, Audio Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+200</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>6C5</td>
<td>Audio Ind.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+120</td>
<td>-290</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
<td>6.2</td>
<td>-5.9</td>
</tr>
<tr>
<td>6P6</td>
<td>Audio Output</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+99</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6P6</td>
<td>Audio Output</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+99</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6G5</td>
<td>Tuning Ind.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+99</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>5Z2</td>
<td>Rectifier</td>
<td>-410</td>
<td>397</td>
<td>397</td>
<td>-410</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
</tr>
<tr>
<td>Speaker Socket</td>
<td>-410</td>
<td>397</td>
<td>397</td>
<td>-410</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
<td>0</td>
<td>2.7</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Receiver tuned manually to 1000 Kc, no signal. A.C. voltages are indicated by italics.
Compliments of www.nucow.com


ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-adjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedures given in the following paragraphs should be carefully followed, in order to make these alignment adjustments in an easy and satisfactory manner. It is recommended that the Stromberg-Carlson 2-P9680 Signalizing Tool be used.

To adjust the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loudspeaker under test. In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value which will permit the alignment adjustments to be made, or attempt to adjust the receiver in one of the weakest signals present. Before proceeding with the alignment of any circuits in these receivers, make sure that the “OIF-0” Test Switch is in a position to indicate the maximum clockwise position, slightly clockwise to position where set turns out”, and that the slotted shafts of the electric tuning driving switch, located on the rear of the chassis, points in the direction of the word “SETUP.” When the flange adjustments have been completed, the slotted shafts of the electric tuning set-up switch should be rotated so that the slot points in the direction of the word “OPERATE.” Figure 1 shows the location of all the aligning capacitors in these receivers.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitor. To do this, place the dial in a position where the gang tuning capacitors are to the extreme right-hand edge of the chassis plate. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these alignment adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letters “BR”). Set the dial pointer to the extreme low frequency position on the receiver dial, and rotate the Volume Control knob to its maximum clockwise position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Switch, located at the rear of the chassis, points in the direction of the word “SETUP.” Rotate the Volume Control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 885 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1-microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 885 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low) side terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, note from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner: Secondary of second I. F. transformer. Primary of second I. F. transformer. Secondary of first I. F. transformer. Primary of first I. F. transformer.

4. Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short-Wave Range (Also referred to as “OIF-0” Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. circuits, with a 680-meter carbon type resistor. This is inserted to prevent the test oscillator's output lead from being driven to cutoff when the test oscillator is connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave (“OIF-0”) range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.

2. Adjust the oscillator's “OIF-0” range high frequency aligner for maximum output.

3. Adjust the antenna's “OIF-0” range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also referred to as “AIF-0” Range)

In aligning the radio frequency circuits for this range, replace the 400-msh carbon type resistor in series with the test oscillator's output lead with a 200-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast Range (“AIF-0”) range position and set the test oscillator's frequency and the receiver's tuning dial to 3.5 megacycles.

2. Adjust the oscillator's “AIF-0” range high frequency aligner for maximum output.

3. Adjust the antenna's “AIF-0” range high frequency aligner for maximum output.

4. Set the test oscillator's frequency and the receiver's tuning dial to 6 MHz.

5. Adjust the oscillator's “AIF-0” range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.

6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of letters “BR”), set the dial pointer to 100 kilocycles and the Electric Tuning Set-Up Switch, located on the back of the receiver chassis, to the “SETUP” position.

Connect a 200-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter. IMPORTANT: When all the aligning adjustments have been completed, it is important that the Electric Tuning Set-Up Switch (located on the rear of the receiver chassis) be reset to the “OPERATE” position.

OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS FOR NOS. 340 AND 341 RECEIVERS NOT EQUIPPED WITH A RECORD PLAYING UNIT

To obtain reproduction from phonograph records in conjunction with these receivers, the following instructions shall be followed:

1. To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-29712 Package Assembly. The rear of the chassis base of the receiver is already drilled for this assembly. Complete instructions on how to install and operate this assembly are furnished with each P-29712 Package Assembly.

2. To claim the test quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor and uses a crystal type pick-up in conjunction with a specially designed circuit.

3. If the Stromberg-Carlson Record Player is not used and the electric pick-up is to be used, it will be necessary to connect a low capacitance shielded cable between the three-grommet socket and plug of the P-29712 Package Assembly, and the pick-up. This shielded cable should be of a low capacitance type. The length of the shielded cable used should be kept as short as possible.

4. If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-grommet socket and plug of the P-29712 Package Assembly, and the pick-up. The transformer should be located as near to the receiver as possible in which case it will not be necessary to use a shielded cable.
ELECTRICAL SPECIFICATIONS

Type of Circuit: Superheterodyne with Electric Tuning

Tuning Ranges: A—53 to 1.7 Mc.; B—2.25 to 7.6 Mc.; C—7.6 to 23 Mc.

Number and Type of Tubes: 1 No. 6K8, 2 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6C5, 2 No. 6V6G, 1 No. 6U5, 1 No. 80

Voltage Rating: 105 to 125 Volts

Power Frequency Rating: 25 to 60 Cycles and 50 to 60 Cycles

Input Power Rating: 85 Watts

Frequency of Intermediate Amplifier: 455 Kilocycles

APPARATUS SPECIFICATIONS

No. 345-F Receiver: 50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
No. 345-FB Receiver: 25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker
No. 345-M Receiver: 50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
No. 345-MB Receiver: 25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker
NORMAL VOLTAGE READINGS

The 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 the normal operating condition when these 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 proper resistance. However, values except when an intermix appears after any given voltage value in which case the 250 volt scan was used.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Sum Total</th>
<th>Potential A.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>GK7</td>
<td>R.F. Amp.</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-240</td>
<td>-81</td>
<td>2.5</td>
<td>-220</td>
<td>6.3</td>
<td>+2.5</td>
</tr>
<tr>
<td>GK8</td>
<td>Mod. Osc.</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+215</td>
<td>-75</td>
<td>4.0</td>
<td>-81</td>
<td>6.3</td>
<td>2.7</td>
</tr>
<tr>
<td>GK7</td>
<td>I.F. Amp.</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>-240</td>
<td>-81</td>
<td>2.5</td>
<td>6.3</td>
<td>2.7</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>GF3</td>
<td>Audio Amp.</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-83*</td>
<td>-1.0</td>
<td>4.1</td>
<td>6.3</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>GC5</td>
<td>Audio Inv.</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>G6VG</td>
<td>Audio Output.</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>+205</td>
<td>-240</td>
<td>0</td>
<td>6.3</td>
<td>+14</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>G6VG</td>
<td>Audio Output.</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>+205</td>
<td>-240</td>
<td>0</td>
<td>6.3</td>
<td>+14</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>G5U</td>
<td>Tuning Ind.</td>
<td>6.3</td>
<td>4.5</td>
<td>+20*</td>
<td>+1</td>
<td>240</td>
<td>0</td>
<td>6.3</td>
<td>---</td>
<td>1-6</td>
<td></td>
</tr>
<tr>
<td>S0</td>
<td>Rectifier.</td>
<td>+570</td>
<td>360</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1-4</td>
<td></td>
</tr>
<tr>
<td>Speaker Socket</td>
<td>+570</td>
<td>0</td>
<td>0</td>
<td>-370</td>
<td>+240</td>
<td>0</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Receiver tuned manually to 1000 Kc, no signal. A.C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-adjustments are necessary. However, should it become necessary to make any re-adjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these alignment adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-34686 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

IMPORTANT: In making any R.F. or I.F. alignment adjustments, always adjust the test oscillator's output to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any R.F. or I.F. circuits in these receivers, be sure that the "Off-On-Tune" control knob is set for maximum treble response, and that the Electric Tuning Set-Up Switch is set to the "Station Selector" position, when the "Audio Jack" is not in use. When the alignment adjustments have been completed the Electric Tuning Set-Up Switch should be pushed back to the "Operate" position. Figure 1, shows the location of all the aligning capacitors in these receivers.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gain tuning capacitors. To check whether the dial is set correctly with respect to the gain tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gain tuning capacitors are set to their maximum capacity position. Then, with the gain tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 655 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-

Time" control knob slightly clockwise from its most counter-clockwise position. By aid of a screwdriver, move the right end of the Electric Tuning Set-Up Switch located at the rear of the chassis base, so that the slot points in the direction of the word "Set-Up". Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply the chassis base (or ground binding post) of the receiver and the grid of the No. 6K5 modulator-oscillator tube to a modulated signal of 465 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K5 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal of the receiver.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I.F. transformers, align the I.F. circuits in the following manner:

- Secondary of second I.F. transformer.
- Primary of second I.F. transformer.
- Secondary of first I.F. transformer.
- Primary of first I.F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

CAUTION: Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

Alignment of Short Wave Range, "C"

In aligning the radio frequency circuits for this range, replace the 0.1 microfarad capacitor which was placed in series with the test oscillator's output lead for the I.F. alignments, with a 0.05 microfarad carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the "C" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range H.F. aligner for maximum output.
3. Adjust the receiver's oscillator "C" range H.F. aligner for maximum output and at the same time rotate the gain tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range H.F. aligner for maximum output and at the same time rotate the gain tuning capacitors back and forth through resonance until maximum output is obtained.

Alignment of Short Wave Range, "B"

In aligning the radio frequency circuits for this range, use the same artificial antenna (400 ohm resistor) and antenna binding post as was used for aligning the "C" range, and align as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the "B" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range H.F. aligner for maximum output.
3. Adjust the receiver's oscillator "B" range H.F. aligner for maximum output and at the same time rotate the gain tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "B" range H.F. aligner for maximum output and at the same time rotate the gain tuning capacitors back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range, "A"

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the oscillator's output lead with a 200-microfarad carbon capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H.F. aligner for maximum output.
3. Adjust the receiver's oscillator "A" range H.F. aligner for maximum output.
4. Adjust the antenna "A" range H.F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range L.F. aligner (series aligner) for maximum output, and at the same time rotate the gain tuning capacitors slightly back and forth through resonance until maximum output is obtained.
7. Reset the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 3, 3 and 4.
Fig. 3. Wiring Diagram, No. 350 Receiver.
ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in this section of the manual should be followed. If, in the course of the alignment, the signal generator is not available, or if the signal generator is not of suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator, the procedure should be followed. If, in the course of the alignment, the signal generator is not available, or if the signal generator is not of suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator, this section of the manual should be followed.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of producing signals of at least 500,000 volts and having an output impedance of not more than 50,000 ohms. It will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a suitable oscilloscope should be used to measure the signal waveform developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary to use a millimeter having a sensitivity of at least 1 millimeter per volt in series with that of the cathode of the No. 68-G tube which is used in the oscillator control circuit by means of an adjustable plug inserted between the tube and its socket. The leads to the meter should not be longer than 15', and should be shielded at the socket connections by a capacitor of not less than 0.35 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson 115-P-36681 line be used. Before proceeding with the alignment of any circuits in these receivers, except when specifically directed direct, be sure that the Fidelity Control knob is set for the "Normal" position. The "Off-In-Bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value at which a good alignment may still be obtained, except when specifically directed in these instructions. Figure 3 shows the location of all the aligning capacitors or adjustments for this receiver.

Dial Adjustment

Before adjusting the circuits of these receivers, the tuning dial must be properly aligned to "track" with the same tuning capacitor. To check whether the dial is set correctly with respect to the tuning capacitor, rotate the "Tuned Station Selector" knob in a clockwise direction so that the gap between the two insulators is at its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator light should be exactly covered over the dial alignment line on each side of the dial. If these lines do not cover the illuminated dial indicator lines, loosen the two sets screws located on the hub of the dial. Then rotate the dial so that these alignment lines are covered over the illuminated dial indicator line. The two sets screws of the dial hub should then be securely tightened.

Intermediate Frequency Adjustments

The intermediate frequency in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve for these stages in a high fidelity receiver, it is recommended that unless it is absolutely necessary, these I.F. adjustments be unmodified. In the factory these adjustments are made prior to the wiring of the receiver as the operator will see the exact shape of the resonance curve. For this reason, any alignment adjustments for this receiver should not be made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and receiver's tuning dial to 15 megacycles. Adjust the receiver's oscillator frequency and the receiver's tuning dial to 15 megacycles.

2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.

3. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the tuning control back and forth through resonance until maximum output is obtained.

4. Set the receiver's oscillator's frequency and the receiver's tuning dial to 6 megacycles.

5. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner), and at the same time rotate the tuning control back and forth through resonance until maximum output is obtained.

6. Reset both the test oscillator's frequency and the receiver's tuning dial to 15 megacycles and repeat each step of the above procedure.

Alignment of Medium Wave Range (Also Referred to as "B" Range)

In aligning the medium wave range for this receiver, replace the 0.1-microfarad capacitor with a 300-microfarad capacitor and use the following alignment procedure. For these alignment adjustments:

1. Operate the Range Switch on the receiver chassis to the medium wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 15 megacycles.

2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.

3. Reset both the test oscillator's frequency and the receiver's tuning dial to 15 megacycles and repeat each step of the above procedure.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 0.001-microfarad capacitor with a 0.0001-microfarad capacitor and use the following alignment procedure. For these alignment adjustments:

1. Operate the Range Switch on the receiver chassis to the broadcast ("A") range position, and set the test oscillator's frequency and the receiver's tuning dial to 0.5 megacycles.

2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.

3. Set the receiver's antenna "A" range high frequency aligner for maximum output.

4. Set both the test oscillator's frequency and the receiver's tuning dial to 0.5 megacycles.

5. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the tuning control back and forth through resonance until maximum output is obtained.

6. Reset both the test oscillator's frequency and the receiver's tuning dial to 0.5 megacycles and repeat each step of the above procedure.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of gold dot). Set the tuning dial to 1000 kilocycles. Connect a 200-microfarad capacitor across the output terminal of the modulated test oscillator and the antenna binding post of the receiver, and the ground binding post of the receiver. Then connect the modulated test oscillator to the filter of the intermediate amplifier, 665 kilocycles, and apply a strong signal to the receiver and adjust the wave trap trimmer until a minimum indication is obtained on the output meter.

1. Test speaker socket with speaker left out.

2. Plug speaker in speaker socket for all other tests.

3. Set A.F.C. Switch on rear of chassis base to "Operate" position for all tests unless otherwise specified.


A. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 120Ω.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

B. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 550,000Ω.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

C. Operating volume control clockwise should read from "S" to 800,000Ω.

Other tests not shown on chart. FOR OTHER SERVICING DATA, SEE INDEX.

Test from Electric tuning pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "0". Operate Manual-Electric switch to "Electric" position; should read "S".

Test from main dial pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "S". Operate Manual-Electric switch to "Electric" position; should read "0".

Test from Ant. terminal on back of chassis base. Operate range switch to "A" band; should read 3W. Operate range switch to "B" band; should read 1W. Operate range switch to "C" band; should read 5W.

Test from Grid. terminal on back of chassis base; should read 9V.

Test from terminals of A.C. plug to chassis base; should read "9V".

Test between terminals of A.C. plug; should read 3W with A.C. switch closed; should read "0" with A.C. switch open.

Test from the Statior Plates of the oscillator section of the variable capacitor (located near front of chassis) to the switch side of the 001 capacitor (located next to the "A" and "B" band series aligner). Operate range switch to "A" band; should read 10Ω. Operate range switch to "B" band; should read 2Ω. Operate range switch to "C" band; should read 1Ω.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Grid</th>
<th>Terminal of Sockets</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-J-5</td>
<td>Geo. Control</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6-A-8</td>
<td>Mod. Osc.</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>6-K-7</td>
<td>I.F. Amp.</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>6-H-6</td>
<td>Discrimin.</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>6-B-8</td>
<td>A.V.C. Audio</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>6-F-6</td>
<td>Output</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>6-U-5</td>
<td>Tuning Ind.</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>5-Y-4G</td>
<td>Rectifier</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Spk. Socket</td>
<td>Output Rear of Chas.</td>
<td>300000Ω</td>
<td>S</td>
</tr>
</tbody>
</table>

© John F. Rider, Publisher
Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various pin number contacts and the chassis base, with all 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 signal 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 reading a resistance of 100 ohms per volt should be used for determining the D.C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-25, 0-10, 0-200, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used, or when a double asterisk appears the 1000 volt scale was used.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Heaters Voltages Between Heaters Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>H.F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+104</td>
<td>0</td>
<td>+82</td>
<td>6.2</td>
<td>0</td>
<td>2-7</td>
</tr>
<tr>
<td>6A8</td>
<td>Modulator</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+227</td>
<td>+82</td>
<td>-8.6*</td>
<td>+82</td>
<td>6.2</td>
<td>0</td>
<td>2-7</td>
</tr>
<tr>
<td>6FP-G</td>
<td>Oscillator and Oscillator Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+172</td>
<td>+3.3</td>
<td>-8.6*</td>
<td>+170</td>
<td>6.2</td>
<td>0</td>
<td>2-7</td>
</tr>
<tr>
<td>6K7</td>
<td>I.F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+260</td>
<td>+104</td>
<td>+3.3</td>
<td>0</td>
<td>6.2</td>
<td>+3.3</td>
<td>2-7</td>
</tr>
<tr>
<td>6BB</td>
<td>I.F. Amp. and A.V.C.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+218</td>
<td>0</td>
<td>0</td>
<td>+104</td>
<td>6.2</td>
<td>0</td>
<td>2-7</td>
</tr>
<tr>
<td>6R7</td>
<td>Demodulator and Bass Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+100*</td>
<td>0</td>
<td>0</td>
<td>+25*</td>
<td>6.2</td>
<td>+3.8</td>
<td>2-7</td>
</tr>
<tr>
<td>6H6</td>
<td>Discriminator</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6.2</td>
<td>0</td>
<td>2-7</td>
</tr>
<tr>
<td>6N7</td>
<td>Audio Inv.</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>+160</td>
<td>0</td>
<td>0</td>
<td>+155</td>
<td>6.2</td>
<td>+20</td>
<td>2-7</td>
</tr>
<tr>
<td>6F6</td>
<td>Audio Output</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>+312</td>
<td>+320</td>
<td>0</td>
<td>6.2</td>
<td>+19.5</td>
<td>2-7</td>
<td>6.2</td>
</tr>
<tr>
<td>5Z8</td>
<td>Rectifier</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1-6</td>
</tr>
<tr>
<td>Speaker Socket</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Heaters Voltages Between Heaters Terminals

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

VOLTAGE ACROSS RECEIVERS

22 Receiver tuned manually to 1000 Kc, no signal. A.C. voltages are indicated by italics.
Fig. 2. Schematic Circuit of Receiver.
VOLTAGES --

Plates 6A7, 78, and 41 ... 210 volts. 
E plate 75 .................... 60 v. 
Screen 41 ...................... 210 v. 
Screens 6A7 and 78 .......... 65 v. 
Anode grid 6A7 ............. 160 v. 

Cathodes (as measured by a 1000 ohm per volt meter)

34 Oscillator coil
35 I.F. Coil
36 I.F. Coil
37 Speaker
38 Filter choke
39 Power trans.
40 R.F. Choke
41 Band switch
42 Power switch
43 Vibrator
44 Pilot light
45 Tone switch
46 .002 mfd.
47 S.W. Padder
48 B.C. Padder

The antenna for the Model EQ (table model) and FQ (console) should be about 100 feet long and as high as possible. No ground connection is necessary. A continuously variable tone control is used in Model FQ.

©John F. Rider, Publisher
--- VOLTAGES ---

<table>
<thead>
<tr>
<th>Plates 6A7, 78, and 42's</th>
<th>200 v.</th>
<th>Cathode 6A7</th>
<th>.25 v</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plate 37</td>
<td>50 v.</td>
<td>&quot;   78</td>
<td>2 v.</td>
</tr>
<tr>
<td>Plate 75</td>
<td>50 v.</td>
<td>&quot;   75</td>
<td>.5 v.</td>
</tr>
<tr>
<td>Screens 6A7 and 78</td>
<td>50 v.</td>
<td>&quot;   37</td>
<td>4 v.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;   42's</td>
<td>15 v.</td>
</tr>
</tbody>
</table>

1. Gang condenser
2. .1 mfd.
3. .0001 mica
4. .002 mfd.
5. .01 mfd.
6. .0005 mfd.
7. 10 mfd. electr.
8. .005 mfd.
9. 5 mfd. electr.
10. .005 mfd.
11. 8 mfd. electr.
12. 16 mfd. electr.
13. .25 mfd.
14. .02 mfd.
15. .25 mfd.
16. 1 mfd.
17. .25 mfd.

© John F. Rider, Publisher
ALIGNMENT PROCEDURE

Adjust IF coils to 456 KC.

Switch to shortwave band and turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output. Switch to broadcast band and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser. Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

Model EQ-59 has the same circuit as the 6A9G plus a tuning eye. The type 6A9G tube has been found to give better oscillator performance than the 6D88 and is used in all Model EQ-59's except those built in the earlier part of the season.

Model EQ-59 may be operated on either 52 volts DC or 110 volts AC. To switch the set for 110 volt operation, the following instructions must be carried out:

1. Disconnect set from 110 volt line.
2. Remove cover from power pack and pull out vibrator.
3. Replace cover and fit switch lever back into slot in switch shaft.
4. Remove screw holding lever and throw switch to right.
5. Reset screw in hole at the right.

If set is inoperative, check fuse (2 amp. 250 volt). An ordinary car fuse may be substituted. Fuse protects the set from lightning as well as from line voltage overloads.

ALIGNMENT PROCEDURE

Put dial to closed gang position and make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust the I.F. coils to 456 KC.

Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers in antenna and oscillator coils to maximum output.

Switch to police band (middle band) set dial at 5 MC and adjust the second trimmers from the bottom to maximum output.

Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the radier located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.

The type 6A9G tube has been found to give better oscillator performance than the 6D88 and is used in present production. The switch which turns the tuning eye and dial lights off and on is located on the back of the panel.

Chassis layout EQ-59

Model EQ-59, EQ-69

ALIGNMENT PROCEDURE

Adjust IF coils to 456 KC.

Switch to shortwave band; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output. Switch to broadcast and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser. Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

Model AC-59, BC-69

ALIGNMENT PROCEDURE

Adjust IF coils to 456 KC.

Switch to shortwave band; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output. Switch to broadcast and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser. Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.
Alignment procedure

To adjust I.F. coils: Oscillator at 175KC to grid of 6D8G tube; adjust I.F. trimmers to maximum output.

To adjust R.F. coils: Set oscillator at 1400 KC connect to antenna lead, dial at 1400 KC, adjust oscillator pad on the rear of the gang condenser, to maximum. Then adjust the two other padders on the gang condenser to maximum output.

Voltages: (As measured by a 1000 ohm per volt meter)

- B+ 140 - 180 volts
- Cathode voltages
  - Anode grid 6D8G 60-70 v.
  - Plate RF 6S7G 60-70 v.
  - Screens 6D8G & 6S7G 50-60 v.
- 6S7G's 2 volts
- 6D8G 2.5 volts
- 6T7G 1 volt
- 41 11 volts

Voltages on the Model NO extra model, are somewhat lower than the above. Some changes in circuit constants in sets built prior to Aug. 1937, will be found. "Motorboating on this set can be corrected by separating the grid leads on the gang condenser as far as possible.

© John F. Rider, Publisher
L'TATRO MFG. CO.

MODELS SP-67, TP-67
Schematic

Plates 6A8G, 6S7G, 6L5G, 6Z7G
and oscillator grid of 6A8G 140 v
Plate 6T7G .......................... 12 v.
Screens 6A8G and 6S7G .......... 40 v.

Voltages when set is on AC are higher.
1 Gang condenser 16 .25 mfd. 31 Preselector coil
2 .10 mfd. 17 400 ohms 32 Antenna coil
3 .0025 mfd. 18 25M ohms 33 Oscillator coil
4 .002 mfd. 19 1 megohm 34 Iron core I.F.
5 .01 mfd. 20 50M ohm 35 I.F. coil
6 .00025 mfd. 21 25M ohm 36 Input trans.
7 .0025 mfd. 22 1 megohm 37 Speaker
8 5 mfd. elect. 23 5M ohms 38 Filter choke
9 10 mfd. elect. 24 .5 meg. control 39 Power trans.
10 8 mfd. elect. 25 Tone control 40 Band switch
11 16 mfd. elect. 26 1 megohm 41 Pilot lights
12 .005 mfd. 1600 v. 27 1500 ohms 42 Tuning eye and
dialite switch
13 10 mfd. elect. 28 10M ohms 43 Power switch
14 .5 mfd. 29 .5 megohm. 44 Tuning eye
15 .10 mfd. 30 1500 ohms

The TP-67 is a console model; the SP-67 is a table model. The anten-
na should be as high as possible and about 100 feet long. A good
ground is essential for good reception. The blue wire from the set
is the antenna lead. If the set is to be operated on 110 volts
continuously, the vibrator should be removed.

©John F. Rider, Publisher
MODELS AQ-69, BQ-69

Schematic

Compliments of www.nucow.com

L’TATRO MFG. CO.

IF PEAK 456 KC

110 VAC.

VOLTAGES

Plates 6D8G, 6S7G, and 41 150 volts
Plate 6T7G 50 volts
Screens 6D8G and 6S7G 50 volts.

When set is on AC, voltages will be somewhat higher.

1 .1 mfd. 18 1500 ohms 35 RF choke
2 .01 mfd. 19 ½ Megohm 36 Tuning eye
3 Ant. section of gang 20 50M ohms 37 Band switch
4 .0002 mfd. 21 25M ohms 38 7500 ohms
5 Osc. section of gang 22 ½ Megohm 39 650 ohms
6 .002 mfd. 23 1 Megohm 40 Pilot light
7 10 mfd. electr. 24 ½ Meg. control 41 .5 mfd.
8 5 mfd. electr. 25 1 Megohm 42 Tone-light switch
9 .002 mfd. 26 800 ohms 43 .0025 mfd.
10 8 mfd. electr. 27 10M ohms 44 Pilot light
11 16 mfd. electr. 28 Ant. coil 45 Tone control
12 .005 mfd. 1500 v. 29 Osc. coil 46 .005 mfd.
13 10 mfd. 50 v. 30 I.F. coil 47 Power switch
14 .5 mfd. 31 I.F. coil 48 Tuning eye and
dialite switch
15 50M ohms 32 Speaker 49 Power trans.
16 400 ohms 33 Filter choke
17 ½ Megohm 34

Items 36, 45 and 46 are used in Model BQ only. Items 42, 43 and 44 are used in Model AQ only.

©John F. Rider, Publisher
VOLTAGE READINGS:

Readings should be taken with volume control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

IP PEAK 456 KC

Six Tube Superheterodyne Receiver
A.C. or D.C. 105-125 Volts
Also available up to 240 V.

Short Wave
17.5 - 53 Meters
17000 - 5600 Kilocycles

Broadcast
190 - 560 Meters
1580 - 535 Kilocycles

25Z5
Compliments of www.nucow.com
MODEL 5-Tube AC-DC Superhets.

**Alignment**

- **I.F. Peak 456 K.C.**

**TUBE AC-DC Superheterodyne**

**Conventional Alignment**

- See Special Section Vol. VIII

© John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 455L ALIGNMENT:
I.F. --- 456 KC, B.C.Osc. 1720 KC
Antenna 1400 KC, Check at 600 KC.

MODELS 420A, 420S
MODEL 420A (1 BAND) MODEL 420S 2 BAND
ALIGNMENT:
R.F. Trimmer --- 1750 KC R.F. Trimmer --- 1560 KC
Ant. Trimmer --- 1400 KC Ant. Trimmer --- 1400 KC
Check at 600 KC. SW Band --- No adjustment.

FOR OTHER DATA, SEE INDEX.
CURRENT SUPPLY

The current supply switch at the rear of the chassis must be set to 115 or 230 volts to correspond to the available current and should never be changed while that current is being used! Be absolutely sure this switch is set right before you plug in the radio. If it is set for 115 volts and 230 volts is used, the transformer will burn out.

SUPPLY VOLTAGE

This receiver operates from any 110 volt light socket of any frequency AC or straight DC. When operating on a DC socket, the plug may have to be reversed in the socket to obtain the correct polarity, as it will work only in one position on DC current.
ALIGNMENT: 8 TUBE BATTERY OR A.C. and MODEL 539M.

L.F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the frequency of the signal generator until the signal is heard in the radio speaker. Adjust the L.F. trimmers for maximum output, starting with the third L.F. and working back. Decrease the generator output as the speaker output increases.

LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .002 mfd. condenser as dummy antenna, to terminal "A1", with the metal strip connected across A2 and G. Set the dial and generator to 362 K.C. and adjust the L.W. oscillator trimmer for maximum output. Adjust the L.W. oscillator pad for maximum output at 200 K.C. by adjusting the dial and pad together. Check the alignment again at 320 K.C.

BROADCAST BAND ALIGNMENT

Using the .002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. Align the RF and ANT trimmers at 1400 K.C. Align the B.C. oscillator pad at 600 K.C. by adjusting the dial and pad together. Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C.

Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. and the R.F. and Antenna trimmers at 22 M.C.

Check for alignment at 8 M.C.

NOTICE

If a Standard All Wave dummy Antenna is available, it should be used in place of the .002 mfd. condenser, and the 400 ohm resistor.

On all bands the oscillator trimmers are adjusted with the variable condenser full open.

ALIGNMENT: MODELS 6tube Battery or A.C., 457M, 456M 460M, 456M, 459M, and 465E.

NOTE: No intermediate band on Models 465M and 466M.

L.F. From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the L.F. trimmers for maximum output, decreasing the generator output as the speaker output increases.

6. Connect the signal generator lead thru a .002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. oscillator trimmer for maximum output.

Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C. and adjust the B.C. oscillator pad for maximum output by adjusting dial and pad together.

Check alignment again at 1400 K.C.

S.W. Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6000 K.C and adjust the P.B. oscillator trimmer for maximum output. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

S.W. Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. and dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8 M.C.

ALIGNMENT: 6 TUBE AUTO RADIO

1. Set variable condenser with rotor plate in open position. Set signal generator to 1000, dummy antenna lead to grid cap of 6AS7 using a .05uf condenser as a dummy antenna. Set 29 V.F. trimmers for maximum output. Adjust R.F. trimmer for maximum output by rotating variable condenser.

2. Set signal generator to 1500 K.C., dummy antenna lead to speaker plate on set using a .0005 condenser as dummy antenna. Set L.F. trimmers for maximum output, increasing the signal generator to 1500 K.C. until the signal is heard in the radio speaker. Set 29 V.F. trimmers for maximum output, adjusting the generator output as the speaker output increases.

3. Set signal generator to 1500 K.C., dummy antenna lead to speaker plate on set using a .0005 condenser as dummy antenna. Set L.F. trimmers for maximum output, increasing the signal generator to 1500 K.C. until the signal is heard in the radio speaker. Set 29 V.F. trimmers for maximum output, adjusting the generator output as the speaker output increases.

4. Set signal generator to 1500 K.C., dummy antenna lead to speaker plate on set using a .0005 condenser as dummy antenna. Set L.F. trimmers for maximum output, increasing the signal generator to 1500 K.C. until the signal is heard in the radio speaker. Set 29 V.F. trimmers for maximum output, adjusting the generator output as the speaker output increases.

5. Recheck alignment adjustments at 1600 and 1400 K.C.
LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to the "A" terminal, with the metal strip connected across A2 and G. Set the dial and generator to 362 K.C. and adjust the oscillator for maximum output. Align the L.W. oscillator and antenna trimmers at 320 K.C. Align the L.W. oscillator at 200 K.C. by adjusting the dip and pad together. Check the alignment again at 320 K.C.

BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. for maximum output. Align the R.F. and antenna trimmers at 1400 K.C. Align the B.C. oscillator and pad at 600 K.C. by adjusting the dial and pad together. Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C. Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. and the R.F. and Antenna trimmers at 22 M.C. Check for alignment at 8 M.C.
FIG. 2--DELCO MODEL R-663 CIRCUIT DIAGRAM

VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTOMETER HAVING RESISTANCE OF 1000 Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.

CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 5.6 AMPERES.

"B" SUPPLY DRAIN APPROX. 35 M.A.
CIRCUIT CHANGE

Some sets were made with the 2 mfd. section of the electrolytic omitted (Illus. #52C) and Illus. #58 .05 mfd. 600 volt tubular condenser added. For replacement of electrolytic in these sets clip the green lead of replacement condenser.

©John F. Rider, Publisher
FIG. 1.--CIRCUIT DIAGRAM--DELCO-MATIC TUNER

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
<th>Description</th>
<th>Part No.</th>
<th>Part Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*1880010</td>
<td>Switch</td>
<td>Motor reversing</td>
<td>134530</td>
<td>Nut</td>
<td>Pivot screw locking</td>
</tr>
<tr>
<td>122169</td>
<td>Screw</td>
<td>Switch mounting</td>
<td>7234957</td>
<td>Gear</td>
<td>Large drive</td>
</tr>
<tr>
<td>1880007</td>
<td>Lever</td>
<td>Switch contact assy.</td>
<td>7234768</td>
<td>Washer</td>
<td>Mounting</td>
</tr>
<tr>
<td>147460</td>
<td>Screw</td>
<td>Switch lever set screw</td>
<td>7234769</td>
<td>Screw</td>
<td>Mounting</td>
</tr>
<tr>
<td>7234714</td>
<td>Bracket</td>
<td>Mounting</td>
<td>7232713</td>
<td>Spacer</td>
<td>Rubber mounting</td>
</tr>
<tr>
<td>132892</td>
<td>Screw</td>
<td>Mounting bracket</td>
<td>138530</td>
<td>Washer</td>
<td>#6 int. shakeproof</td>
</tr>
<tr>
<td>1880065</td>
<td>Spring</td>
<td>Trip bar</td>
<td>7234745</td>
<td>Shaft</td>
<td>Condenser drive--flex.</td>
</tr>
<tr>
<td>7235711</td>
<td>Spring</td>
<td>Pawl</td>
<td>1880122</td>
<td>Control</td>
<td>Push button--complete</td>
</tr>
<tr>
<td>1880049</td>
<td>Screw</td>
<td>Long pivot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1880066</td>
<td>Screw</td>
<td>Short pivot</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For replacement only on late sets having metal stops between switch contact blades.
FIG. 2--PARTS LAYOUT--DELCO-MATIC TUNER

FIG. 3--PARTS LAYOUT--DELCO-MATIC TUNER
UNITED MOTORS SERVICE INC.

MODELS 8667, 8669
Delco-Matic Tuner
Operating and Service Notes, Part 1

GENERAL: The Delco Model B-667 is a six tube, two unit auto radio with "Delco-Matic" Tuner mounting. The service parts and alignment procedure are identical to the Delco Model B-606.

The Delco Model B-569 is a seven tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model B-606.

SETTING UP "DELCO-MATIC" TUNER

(a) Press a button and allow the selector mechanisms to come to rest.
(b) Continue to hold the button down, and tune in the desired station by manual control.
(c) Release button, and set up remaining buttons in the same manner.

When the button is held down after the mechanical tune has come to rest, the panel is held in the panel slot, locking the panel in position. The panel is allowed to slip on the shaft during the manual tuning process, by a clutch spring which is a part of the panel assembly.

OPERATION OF "DELCO-MATIC" TUNER

The "Delco-Matic" Tuner is a motor driven mechanical device for tuning in stations quickly and efficiently by remote push button control. When a button is depressed, a relay coil pulls a corresponding panel against a selector cam (Fig. 1). At the same time, a hold-down coil in the control head holds the button down until the cycle of operation is complete. A trigger on the panel presses against a switch operating trip rod, which in turn operates the power switch. The degree of movement of the trip rod, which is controlled by a high and low side on the selector cam, determines the direction of the operation. When the cam is rotated to a position where the panel drops into the selector cam slot, the degree of movement of the trip rod operates a spring contact on the power switch which results in the current to the motor and magnetic clutch and releases all relays.

1. PUSH BUTTON HEAD

The push buttons in the control head complete the circuit for the operation of the hold-down magnet, relay switch and the corresponding station selector magnets. The buttons are held down magnetically until released by the "cut-off" switch on the tuner unit, actuated by the station selector panel dropping into the slot in the selector cam.

2. STATION SELECTOR PANEL

The station selector panels are magnetically operated and controlled directly from the contacts in the push-button head. Upon pressing a button in the control head, a circuit is closed, energizing a station selector magnet coil, which pulls a corresponding panel down on a station selector cam. The panel rides on the cam until it drops into the cam slot and cuts off the motor and releases all relays.

3. STATION SELECTOR CAMS

The station selector cams are circular discs with high and low sides for operation of the motor reversing switch and a stop slot for operation of the motor cut-off switch. Six of these cams are provided on a shaft, each with a friction clutch which allows the cam to be slipped on the shaft in setting the cam on the desired station.

4. REVERSING AND CUT-OFF SWITCH

The reversing and cut-off switch is a combination switch actuated by the trigger on the station selector panel. The reversing switch causes the motor to run in the direction of the station tuning and the cut-off switch cuts the motor off when a station is tuned in, and also releases the push-button hold-down magnets and the magnetic clutch.

The forward and reverse positions of the reversing switch are dependent upon whether the station panel in push and pulled against the high or low side of the station selector cam. The cut-off switch is actuated when the panel drops into the cam slot as a station is tuned in.

5. MAGNETIC CLUTCH

The magnetic clutch consists of an electromagnet and two iron discs which are held together magnetically when the field is energized. One of the discs is coupled to the motor and the other to the gear handle.

The clutch is designed to lock the motor driving power from the tuning conditioner gear as the instant the panel drops into the cam slot and actuates the motor cut-off switch.

6. MASTER RELAY

The master relay is controlled directly from the push-button head and the purpose is to allow the motor current to be fed directly to the motor rather than through the relay control circuits. A set of "wave" contacts are provided along with the "a" power contacts for feeding the audio system of the set with the motor driving the tuning mechanisms.

SERVICE PROCEDURE

The logical procedure to employ in servicing the automatic tuner will depend on a large extent upon the nature of the trouble encountered and whether the tuner is partially or totally inoperative. In most cases the solution to the trouble will be found by checking the points in the order named:

1. TUNING CONTROL AND CABLE
2. BATTERY VOLTAGE AT TUNER
3. STATION SELECTOR PANELS
4. PUSH BUTTON HEAD
5. REVERSING AND CUT-OFF SWITCH

The tuning control and tuning cable should be checked along with the battery voltage at the "A" terminal on tuner before removing chassis or push button head from car for servicing the system. Make all checks on bench with a tuning control connected to the tuner for proper loading. Detailed procedure for checking the above points is as follows:

Checking Tuning Control and Cables

In order for the automatic tuner to operate properly it is necessary that the tuning control be free from links and noise, as not to impose an excessive load on the tuner motor. Tuning control knob manually move to the "off" or "on" position to determine whether trouble is in set or tuning control. If trouble is in set, a careful check of the large die-cast gears should be made for proper meshing.

Checking Battery Voltage at "A" Terminal on Tuner

The magnetic, relay and motor in the automatic tuner have been designed to operate satisfactorily on voltages as low as 4.5 volts measured at the "A" terminal or the tuner unit with the motor running. Low battery voltages will cause erratic operation of the tuner.

Before Attempting Any Tuner Repair, First Measure the "A" Voltage at the Large "A" Terminal on the Tuner Unit with the Tuner Motor Operating. To order to allow the motor to run long enough to get an accurate reading before it cuts out, test the case which appear to be working normally at opposite ends of the dial press corresponding buttons, reading carefully while motor is running. If voltage is lower than 4.5 volts, check all connectors and terminals for poor contact. Measure voltage at car ammeter with set loaded only. This should be 5.0 volts or more.

NOTE: In testing these automatic tuners on UB Radio Test Panels, it is very important that proper voltage be available for test. Otherwise incorrect diagnosis of the trouble will be made. A heavy duty battery and a Power Cut should be used. Also, all connector should be clean and heavy "A" supply leads used for connecting set to "A" supply terminals. On the 8667 Test Panel it is recommended that all automatic tuner tests be made using the power supply terminals on the left side of the panel. This will give a slightly higher "A" voltage to test.

Checking Station Selector Panels

In most instances a visual inspection will determine if the selector panel selector panels are operating satisfactorily. A check can be made by simply pressing the push buttons and noting if the corresponding panels push down against the selector cam. Failure of the panel to operate may be caused by excessive spring tension on the panel spring. Upon selector magnet circuits or low voltage.

To reduce spring tension on push spring, unhook top end of spring with a pair of long nose pliers and stretch spring slightly. Be careful not to stretch spring too far as panel will have a tendency to stick in the cam slot when a station is tuned in.

Voltage measurements at selector magnet coil terminals on laboratory terminal board should not be less than 4.5 volts.

Checking Push Button Head

The push button head is working normally when the following actions take place.

1. Buttons should stay down magnetically when pressed, until station is tuned in or push button drops in case slot.
2. Corresponding station panel in tuner should push down against cam.
3. Both the button pressed and its corresponding station panel in the tuner should release when a station is tuned in or when the panel drops into case slot.

It should be noted that buttons will not release unless tuner motor is operating and station panel trips the cut-off switch.

If push button head does not function as covered above and a duplicate head (Parts #3600277) is not available for substitution, make complete check of head as follows with push button cable plug disconnected from receiver.

©John F. Rider, Publisher
TEXTURED PUSH BUTTON HEAD:

(a) Disconnect push button control plug from receiver chassis.
(b) Press buttons one by one and release slowly. Note if any button or buttons have a tendency to stick or do not seat fully. If so, adjust the full distance when released. Failure of a button to release in the full seat will cause the switch selector plate to stick in the can slot when a station is tuned in (see paragraph "C").
(c) If sticking buttons are encountered, remove the mechanism from the can slot, reseating the back cover plate and taking out the rear read head screws. A small burr on either the small button or the lower plate of the push-button shaft, or in the push button hole in the die-casting or wire touching the button shaft will cause the button to stick. Removal of the burrs with fine sandpaper will eliminate this sticking.

NOTE: Do not hold the control head in an inverted position when removing mechanism from case.

B. CHECKING CIRCUIT FOR BLOW-DOWN:

(1) Square control cable plug from receiver chassis.
(2) Connect 4 volts D.C., across progs #9 and #6 as shown.
(3) Press button one at a time, interrupting battery circuit to release release after each test.
(4) If none of the buttons will stay down when pressed, make continuity check across progs #6 and #9 for open circuit or hold down magnets or cable wiring.
(5) If one or two buttons will not stay down when pressed, first check to see if any wires are caught behind button shafts. If not, then remove mechanism from die-cast head and check for excessive spring tension in switch contact springs or the button shaft kick-out spring.

C. CHECKING PUSH BUTTON SWITCH CONTACTS:

(1) The switches in the control head are made to contact during the first 1/8th of downward travel. It is, therefore, important that the contacts extend out to the full distance when released by the hold down magnet, as covered in the "Mechanical Test of Push-Button Head".

The switch contacts may be checked by applying 4 volts D.C. across the progs 9 and 6, pressing each button under test, and interrupting the circuit after each test. Check remaining contacts similarly as follows:

Press Button No. Apply 4 volts D.C. across:

1 Progs #9 and 1
2 Progs #6 and 1
3 Progs #9 and 4
4 Progs #6 and 4
5 Progs #9 and 6
6 Progs #6 and 6

It will be noted that if the switch contacts are making proper contact and all preceding checks made, the hold down magnet in the head will be energized as each button is pressed.

Charging the Reversing and Cut-Off Switch

Proper operation of the switch mechanism on the tuner is of vital importance. Raising action of the tuner due to low battery voltage very often results in the trouble being erroneously diagnosed as switch trouble. It is therefore important that all other points be checked first to possible causes of the trouble before attempting any adjustments to the switch mechanism.

There are four positions of the switch mechanism, "normal", "pawl on high side of can", "pawl on low side of can", and "pawl in slot". Figure 1 to illustrate the proper position of the switch contacts in each of the four switch positions. These contacts can be checked visually by observing the action under actual operating conditions or by disconnecting the "A" power and duplicating the position by pressing the push down against the can manually. Before making any adjustments it should be definitely known that an adjustment is necessary.

In the normal position it will be noted that one set of reversing contacts are closed and that the ground contact on the switch arm is making contact. Also, there should be a slight gap (1/8" on Fig. 7) between the trigger and the trip bar to prevent any movement of the switch arm when the pawl is pressed against the high side of the can.

In this position the contacts should be in exactly the same position as in the "normal" position. The trigger rests against the trip bar but there should not be any movement of the trip bar when the switch is pressed. The normally closed reversing contacts are at any point on the high side of the can.

In this position the pawl is riding on the low side of the can and a complete change has taken place in the reversing switch. The set of contacts which were normally closed when the pawl was riding on the high side of the can have opened and the other set of contacts are now closed. The ground contact on the switch arm remains closed.

It will be noted in this position that the set of contacts which are closed when the pawl is riding on the low side of the can remain closed and the ground contact on the switch arm which has remained closed through each of the three previous positions is now open.

Switch Adjustments

In the case where more than two or three cases are not working satisfactorily, individual adjustments can be made to the contact mechanism by bending the small triggers arms up or down or with a pair of pliers, to obtain proper action of the reversing and cut-off switches.

In making these adjustments it is very important that the triggers are adjusted so that they do not open the reversing contacts normally closed when the pawl is riding on the high side of the can. Also, there should be a slight gap in the ground contact or the cut-off switch when the pawl drops to the bottom of the can slot. This ground gap should be kept as small as possible, remaining sufficient clearance so that the contacts will remain open when the condenser gang is turned from one end of the switch to the other, with the switch arm holding the can stationary.

In those cases the switching mechanism does not operate satisfactorily on any can, a careful check should be made of the switch trip bar to see that it does not move the switch lever when the pawl is pressed against the high side of the can.

DO NOT CHANGE POSITION OF EITHER THE REVERSING SWITCH OR SWITCH ARM AS SPECIAL EQUIPMENT IS REQUIRED TO OBTAIN ACCURATE ALIGNMENT OF THESE PARTS.

The normal position of the phosphor bronze switch springs with the switch are pulled back should be as shown in Fig. 10 illustrating the switch position with the pawl in the can slot.

If a complete test of the tuning mechanism indicates that it cannot be repaired or adjusted as outlined, the replacement of the complete chassis should be made in accordance with Mr. C. D. Sussex's letter of April 11, 1950, Subject—"Service Policy—Delco-Matic Radio Models B-667 and B-669 Automatic Motor".

©John F. Rider, Publisher
FIG. 2--DELCO MODEL R-668-9 CIRCUIT DIAGRAM
1. Aligning I-F Stages at 262.5 Kilocycles
   (a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6KG tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.
   (b) Connect output meter across plates of 6KG tube.
   (c) Set Signal Generator to exactly 262.5 kilocycles and turn volume control on full.
   (d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within normal limits there is no appreciable change in output.
   (e) Adjust trimmers A, B, C & D through the cut-outs on the side of the chassis (Illustr. 12 & 13, Fig. 5) carefully for maximum output.
   (f) Repeat adjustments of I-F trimmers A, B, C & D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 5000 Kilocycles
   (a) Turn band switch to police band (clockwise).
   (b) Leave Signal Generator leads connected the same as for I-F adjustments.
   (c) Turn tuning condenser plates all the way out and against high frequency stop.
   (d) Set Signal Generator to exactly 5000 kilocycles and adjust oscillator trimmer "G" (Fig. 4) carefully for maximum output, being careful to peak the signal received with trimmer "G" out at minimum capacity.

3. Aligning at 1530 Kilocycles
   (a) Turn band switch to broadcast band (counter clockwise).
   (b) Set Signal Generator to 1530 kilocycles and leave the tuning condenser against high frequency stop.
   (c) Adjust oscillator trimmer "L" (Fig. 4) for maximum output.

4. Aligning at 600 Kilocycles
   (a) Connect Signal Generator leads to 6KG, R-F grid, leaving the grid clip in place.
   (b) Set Signal Generator to 600 kilocycles and tune the receiver to this signal.
   (c) Adjust oscillator padder condenser "M" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.
   (d) Remove signal generator lead from 6KG tube clip and connect to the antenna terminal through a .0002 mfd. condenser.
   (e) Adjust antenna series condenser "E" (Fig. 5) for maximum output.

5. Aligning at 1400 Kilocycles
   (a) Set Signal Generator at 1400 kilocycles.
   (b) Tune set to this signal and adjust R-F trimmer "H" (Fig. 4) and antenna trimmer "M" (Fig. 4) to maximum output.

6. Aligning at 4000 Kilocycles
   (a) Turn band switch to police band.
   (b) Set Signal Generator to 4000 kilocycles and tune receiver to this signal.
   (c) Adjust police band antenna trimmer "F" (Fig. 4) for maximum output.

7. Aligning at 1800 Kilocycles
   (a) Set Signal Generator at 1800 kilocycles and tune receiver to this signal.
   (b) Adjust oscillator padder condenser "J" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.
   (c) Close gang and check to see if tuning range extends to 3600 kilocycles.

8. Realigning at 1400 Kilocycles
   (a) Turn band switch to broadcast band.
   (b) Set Signal Generator to 1400 kilocycles.
   (c) Tune set to this signal and adjust R-F trimmer "H" and antenna trimmer "M" to maximum output (Fig. 4).

9. Realigning at 600 Kilocycles
   (a) Check alignment of antenna series condenser "E" (Fig. 5) for maximum output.

10. Checking I-F Band Spread
    The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 5) to ground.
SETTING UP AUTOMATIC TUNING  DELCO MODELS R-1134-35-39 HOME RADIO

1. Loosen RESET LOCK SCREW in center of tuning knob.

2. Press any one of the automatic tuner levers all the way down. Stations may be set up in any sequence desired.

3. Hold the lever down firmly and tune set to station desired. When desired station is clearly tuned in, release the lever and follow same procedure until all levers have been set up.

4. Rotate the tuning knob to the right (clockwise) as far as it will turn and firmly tighten RESET LOCK SCREW.

DELCO MODELS R-1134-35-39 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator in series with a .1 mfd. condenser to B- (pin #8 on 256L0 tube). Connect the signal lead of the signal generator to the grid cap of the 6AG6 tube, leaving grid clip in place.

(b) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 256L0 output tube.

(c) Set signal generator to exactly 455 kilocycles and turn volume control on full.

(d) Turn the rotor plates of the condenser gan all the way out of mesh and against the high frequency stop.

(e) Adjust the trimmers (E-F) on the second I-F coil and then the trimmers on the first I-F coil (D-D Fig. 3) carefully for maximum output.

(f) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1720 Kilocycles

(a) Leave ground lead of signal generator connected to B- through a .1 mfd. condenser as before. Connect the signal lead of signal generator through a .0001 mfd. condenser to the antenna terminal.

(b) Turn tuning condenser plates all the way out and against high frequency stop.

(c) Set signal generator to exactly 1720 kilocycles and adjust oscillator trimmer (7B Fig. 3) carefully for maximum output, being careful to peak the signal with trimmer screw out or at minimum capacity.

3. Aligning at 1400 Kilocycles

(a) Set signal generator to 1400 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

(b) Adjust the antenna trimmer (7A Fig. 3) for maximum output. Do not disturb the 1720 kilocycle adjustment of the oscillator trimmer.

DELCO MODEL R-3215 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

(a) Attach the ground lead of the signal generator to the chassis ground post. Connect the other lead to the grid cap of the 6KB tube through a .02 mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set the signal generator to EXACTLY 455 kilocycles and turn receiver volume control on full.

(c) Peak each of the 9th I-F coil trimmers, 2A & 2B, (Illus. 2, Fig. 3).

(d) Peak each of the 1st I-F coil trimmers, 1A & 1B, (Illus. 1, Fig. 3).

(e) To assure most accurate trimmer setting repeat above adjustments several times always using lowest possible signal generator output consistent with readable output meter scale deflection.

2. Aligning "American Broadcast" 1730-540 Kilocycle Band

(a) Connect signal generator antenna lead to receiver antenna terminal through a .00025 mfd. condenser, and the other signal generator lead to ground terminal.

(b) Adjust band selector switch for operation on 1730-540 kilocycle band.

(c) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the needle does not point exactly to the last line move needle to correct position.

(d) Set signal generator frequency and receiver dial to EXACTLY 1730 kilocycles, and bring in 1720 kilocycle signal generator signal to maximum output by adjusting 1720 kilocycle oscillator trimmer, (Illus. 7C Fig. 4).

(e) Set signal generator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 kilocycle oscillator padder (Illus. 6, Fig. 3) for maximum output.

(f) Padder (Illus. 8, Fig. 3) for maximum signal response.

3. Aligning "Foreign Short Wave" 5-8-18.1 Megacycle Band

(a) Place band selector switch for operation on 5-8-18.1 megacycle band, tune receiver dial and set signal generator frequency to EXACTLY 18.1 megacycles.

(b) Adjust 18.1 megacycle oscillator trimmer (Illus. 7B, Fig 4) to bring in 18.1 megacycle test signal to maximum output. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak is tuned in.

(c) Tune receiver dial and set signal generator frequency to EXACTLY 15 megacycles.

(d) While rocking gang condenser slightly to right and left, adjust 15 megacycle antenna trimmer (Illus. 7A, Fig. 4) for maximum 15 megacycle test signal response.
FIG. 2—DELCO MODEL R-1140 CIRCUIT DIAGRAM
GENERAL: The Delco Model R-1140 is a 5 tube, 110 volt A.C. superheterodyne automatic electric tuning receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switches which control adjustable permeability tuned coils. Tuning range is from 530 to 1720 kilocycles. Five push buttons are used for automatic tuning, a sixth for switching from automatic to manual tuning.  

The function of each button is, left to right:
1. Automatic tuning 350-600 K.C.
2. Automatic tuning 530-800 K.C.
3. Automatic tuning 660-1100 K.C.
4. Automatic tuning 660-1100 K.C.
5. Automatic tuning 975-1560 K.C.
6. Switch-Manual to automatic tuning

SETTING UP AUTOMATIC ELECTRIC TUNING

Setting up the stations is accomplished by means of a single adjustment for each button, accessible from the rear of the chassis.

1. Turn on the set, and allow 15 minutes for the set to "warm up" before setting the station adjustment screws for the push buttons.
2. Press button #6 and tune in the desired station by means of the manual tuning control.
3. Press one of the buttons #1 to #5 which range corresponds to the station frequency and, with a small screwdriver adjust screw on back of chassis corresponding to button pressed until the same station is accurately tuned in.
4. Press button #6, changing from "Push Button to "Dial Tuning" to ascertain that the same program is heard for both.
5. Moisten and insert the call letters of the station on the front of the button.
6. Repeat the operation for the other buttons.

CIRCUIT ALIGNMENT

For alignment purposes, a test scale is stamped on the inside of the dial drum on the condenser shaft. Before starting alignment procedure, turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop and make an indicating mark on the front support bracket in line with the high frequency mark on test scale for future reference.

1. Aligning I-F Stages at 455 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.
(b) Connect the signal lead of the signal generator to the grid cap on the 6K6G tube through a .1 mf condenser, leaving grid clip in place.
(c) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 6K6G output tube.
(d) Press #5 button (Dial Tuning), turn the volume control on full and the tone control to extreme clockwise (treble) position.
(e) Set the signal generator to exactly 455 kilocycles and turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.
(f) Adjust the trimmers on the second I-F coil (Illus. 5, Fig. 3) and then the trimmers on the first I-F coil (Illus. 4, Fig. 3) carefully for maximum output.
(g) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1600 Kilocycles

(a) Connect the signal lead of signal generator through a .001 mf condenser to the antenna terminal. Connect ground lead of signal generator to chassis.
(b) Set signal generator to 1600 kilocycles.
(c) Turn tuning condenser plates until test scale dial is at the 1600 kilocycles position as noted from the reference mark you made on the front support bracket.
(d) Adjust oscillator trimmer (Illus. 10B, Fig. 3) carefully for maximum output, being careful to peak the signal received with trimmer screw out at minimum capacity.
(e) Adjust the antenna trimmer (Illus. 10A, Fig. 3) for maximum output with as low an output from the signal generator as possible, for more accurate alignment.
(f) After completing the alignment procedure, the alignment should be checked with the cathode ray oscillograph. Connect the oscillograph across the volume control.

FIG. 1--TUBE SOCKET VOLTAGES

BOTTOM VIEW

OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 40 WATTS
1. BIAS -2.75 V READ ACROSS 60A RESISTOR
2. CANNOT BE READ WITH VOLTMETER.
3. 500 V.A.C. BETWEEN PINS F & P.
4. 500 V.A.C. BETWEEN PINS P & P.
5. -14.5 BIAS READ BETWEEN 250 OHM RES. AND GROUND.

REAR OF CHASSIS

6K7 6A8G
5Y3G
GENERAL: The Delco Model R-1141 is a six tube, two band superheterodyne receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switched automatic control. The frequency ranges of the push buttons are left to right:

1. 555 to 650 K.C.
2. 555 to 1200 K.C.
3. 720 to 1120 K.C.
4. 720 to 1200 K.C.
5. 1000 to 1500 K.C.
6. 1000 to 1500 K.C.
ALIGNMENT FOR MODELS R1141, R1142 and R1143

1. Adjusting 1-F Stages at 450 Kilocycles
   (a) Connect the ground lead of the signal generator to the chassis frame.
   (b) Connect the signal lead of the signal generator to the grid of the #616 tube through a 1.0 mfd. condenser, leaving the grid clip in place.
   (c) Connect the output meter across the plate and screen of the #616 tube.
   (d) Press a button, turn the band change switch to the automatic (left hand) position, volume control on full and the tone control in the treble position.
   (e) Set the signal generator to exactly 450 kilocycles and adjust the trimmers on the second 1-F coil (illum. A, Fig. 3) and the first 1-F coil (illum. C, Fig. 4) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter. Do not adjust the 1-F coils in the MANUAL (CENTER) POSITION.
   (f) After completing the Alignment Procedure, the alignment should be checked with the Mod. 260 Orthodichymeter. Connect the oscillograph across the volume control. 'Low' on OS (Fig. 5) and 'High' on OS (Fig. 5) at 450 kilocycles.

2. Adjusting at 17 Megacycles
   (a) Connect the signal lead of the signal generator from the grid of the #616 and connect to the antenna terminal of the receiver through a 400 ohm resistor. 'Low' on OS (Fig. 5) and 'High' on OS (Fig. 5) at 450 kilocycles.
   (b) Turn the band change switch to the short wave (right hand) position.
   (c) Set the signal generator to exactly 17 megacycles and rotate the variable condenser to increase the condenser gap until a 30 megacycles in the test scale.
   (d) Adjust the signal generator trimmer condenser (illum. B, Fig. 4) for maximum output.
   (e) Adjust the antenna trimmer condenser (illum. 2, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.
   (f) Increase the signal from the signal generator and check for image frequency response. If the image does not fall at approximately 1550 megacycles, repeat section 2.

3. Adjusting at 5 Megacycles (Models R1141, R1142 only)
   (a) Connect the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0001 mfd. condenser.
   (b) Set the signal generator to exactly 5 megacycles and rotate the variable condenser to increase the condenser gap until a 6 megacycles in the test scale.
   (c) Adjust the oscillator trimmer condenser (illum. C, Fig. 5) for maximum output.
   (d) Adjust the antenna trimmer condenser (illum. C, Fig. 5) for maximum output.

4. Adjusting at 1550 Kilocycles (Model R1143 only)
   (a) Connect the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0001 mfd. condenser.
   (b) Set the signal generator to exactly 1550 kilocycles and rotate the variable condenser to increase the condenser gap until a 1650 kilocycles in the test scale.
   (c) Adjust the oscillator trimmer condenser (illum. C, Fig. 5) for maximum output.
   (d) Adjust the antenna trimmer condenser (illum. C, Fig. 5) for maximum output.

5. Adjusting at 450 Kilocycles (Model R1143 only)
   (a) Connect the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0001 mfd. condenser.
   (b) Set the signal generator to exactly 450 kilocycles and rotate the variable condenser to increase the condenser gap until a 460 kilocycles in the test scale.
   (c) Adjust the oscillator trimmer condenser (illum. C, Fig. 5) for maximum output.
   (d) Adjust the antenna trimmer condenser (illum. C, Fig. 5) for maximum output.
   (e) Adjust the oscillator trimmer condenser (illum. C, Fig. 5) for maximum output.

6. Adjusting for Image Frequency Response
   (a) Connect the signal generator to 300 kilocycles.
   (b) Rotate the variable plate of the condenser gang until the signal is tuned in.
   (c) Adjust the trimmer condenser (illum. C, Fig. 5) for maximum output.
   (d) Adjust the variable plate of the condenser gang until the signal is tuned in.
   (e) Adjust the oscillator trimmer condenser (illum. C, Fig. 5) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

7. Repeat Sections 4 and 5 for Maximum Output
8. Repeat Section 5 for Minimum Output
9. Repeat Section 5 for Maximum Output

©John F. Rider, Publisher
A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer.

The switch must be in the "radio" position during the alignment procedure.

GENERAL: The Delco Model R-1142 is a seven tube, two band superheterodyne receiver with a 10" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:

1. 535 to 820 K.C.
2. 535 to 820 K.C.
3. 730 to 1120 K.C.
4. 730 to 1120 K.C.
5. 1000 to 1560 K.C.
6. 1000 to 1560 K.C.
FIG. 3--PARTS LAYOUT--Top View

FIG. 4--PARTS LAYOUT Bottom View

FIG. 1--TUBE SOCKET VOLTAGES

BOTTOM VIEW OF ChASSIS

(1) CANNOT BE READ WITH A VOLT METER
(2) BIAS 2.8V AS READ ACROSS RESISTOR 61
(3) CAN BE READ ONLY WHEN PUSH BUTTONS 7 TO 7 ARE "IN"
(4) CAN BE READ ONLY WHEN PUSH BUTTONS 5, 6, 8 ARE "IN"
(5) HEATER VOLTAGE A.O.V. A.C. ACROSS PINS F & F
(6) 750 V.A.C. AS READ ACROSS PINS P & P.

© John F. Rider, Publisher
GENERAL: The Delco Model R-1144 is a ten tube, A.C., three band superheterodyne receiver with a 12" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switches which control adjustable permeability tuned coils. Band switching is accomplished by the same series of switches which are, left to right:

1. Off Switch
2. Broadcast Band (Manual Tuning) 535-1690 K.C.
3. Intermediate Band (Manual Tuning) 1660-5500 K.C.
4. Short Wave Band (Manual Tuning) 5.3 - 18.0 M.C.
5. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
6. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
7. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
8. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
9. Broadcast Band (Automatic Tuning) 520 - 830 K.C.
10. Broadcast Band (Automatic Tuning) 520 - 830 K.C.

FOR TUNER SEE INDEX

9-2-38

A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer. The switch must be in the "radio" position during the alignment procedure.
1. **Aligning 1-F Stages at 460 Kilocycles**

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the grid cap of the 6SK tube through a .1 mf condenser, leaving the grid clip in place.

(c) Connect the output meter across the plates of the 6SK tube.

(d) Press #2 button (Broadcast Manual), turn the volume control on full and tune control on treble and turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

(e) Set the signal generator to exactly 460 kilocycles and adjust the trimmer on the second 1-F coil (Illus. 16A, Fig. 3) and the first 1-F coil (Illus. 16A, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter.

(f) After completing the Alignment Procedure, the alignment should be checked with the Model 207 Cathode Ray Oscillograph. Connect the oscillograph from point (Fig. 4) to ground.

2. **Aligning at 1600 Kilocycles**

(a) Disconnect the signal lead of the signal generator from the grid of the 6SK and connect to the antenna terminal of the receiver through a 0.002 mf condenser.

(b) With the control set as above, adjust the broadcast oscillator trimming for maximum output (Illus. 1, Fig. 4).

3. **Aligning at 1400 Kilocycles**

(a) Set the signal generator to approximately 1400 Kilocycles.

(b) Rotate the variable section of the condenser gang until the signal is tuned in with maximum output.

(c) Adjust the antenna trimmer (Illus. 6, Fig. 4) and B-F trimmer (Illus. 6, Fig. 4) for maximum output.

4. **Aligning at 600 Kilocycles**

(a) Set the signal generator to approximately 600 Kilocycles.

(b) Rotate the variable section of the condenser gang until the signal is tuned in with maximum output.

(c) Adjust the oscillator series condenser (Illus. 3, Fig. 4) while rocking the condenser gang back and forth through the signal until maximum output is obtained.

5. **Aligning at 17.5 Megacycles**

(a) Remove the .0006 mf condenser and connect the signal lead of the signal generator to the antenna trimmer of the receiver through a 600 ohm resistor.

(b) Press # button (Short Wave Band / Manual).

(c) Set the signal generator to exactly 17.5 megacycles and rotate the variable section of the condenser gang to indicate 17.5 megacycles on the test scale.

(d) Adjust the oscillator trimmer condenser (Illus. 3, Fig. 4) for maximum output.

(e) Adjust the B-F trimmer condenser (Illus. 6, Fig. 4) and antenna trimmer (Illus. 6, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

(f) Increase the signal output from the signal generator and check for image frequency. If the image does not fall at approximately 1650 megacycles, repeat section 5.

6. **Aligning at 5 Megacycles**

(a) Press # button (Medium Wave Band / Manual).

(b) Set the signal generator to exactly 5 megacycles and rotate the variable section of the condenser gang to indicate 5 megacycles on the test scale.

(c) Adjust the oscillator trimmer condenser (Illus. 6, Fig. 4) and B-F trimmer (Illus. 6, Fig. 4) and antenna trimmer (Illus. 6, Fig. 4) for maximum output.

7. **Repeat Sections 2, 3 and 4.**
**UNITED MOTORS SERVICE INC.**

**MODEL R1142 Delco**

**MODEL R1145 Delco**

**MODEL R3215 Delco**

**Voltage**

---

**BOTTOM VIEW OF CHASSIS**

- **6AC5G**
  - [1] Cannot be read with Voltmeter
  - [2] 615 V.A.C. read across terminals P & P

- **5Y3G**
  - [2] 305

- **6P5G**
  - 6.3 A.C.

- **6Q7G**
  - 133
  - [1] 242

- **6SK7**
  - 90
  - [1] 242 0

- **6K8G**
  - 90
  - [1] 242

**VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTOMETER BETWEEN SOCKET TERMINALS AND CHASSIS.**

A.C. LINE VOLTAGE 115 VOLTS.

POWER CONSUMPTION 50 WATTS.

---

**REAR OF CHASSIS**

- **6K8G**
  - 90
  - [1] 225 0

- **6A8G**
  - 0
  - [1] 225 0

---

**NOTE:** ALL VOLTAGES EXCEPT SOCKET TERMINALS MEASURED ACROSS SOCKET TERMINALS AND VOLTOMETER CONNECTED IN SERIES WITH 1000 OHM RESISTOR.

POWER CONSUMPTION 80 WATTS.
FIG. 3 -- PARTS LAYOUT -- Top View

FIG. 4 -- PARTS LAYOUT -- Bottom View
**Description**

The receiver is a 7 tube alternating current operated superheterodyne type and is designed to handle the broadcast band, the superheterodyne band, and the foreign band which is from 20 M.C. to 5.4 M.C.
WALGREEN CO.

MODEL 308
Chassis 801, 802
Schematic, Socket
Trimmers, Alignment
Voltage

NOTE: Long-wave band is omitted in model 801.
VOLTAGE READINGS TAKEN WITH 100 OHM-PER-VOLT VOLTMETER.

INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6L7 converter tube and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shield) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the Calibration chart to obtain the proper setting of the test oscillator.

3. Set the tone control to the left. Align the output intermediate frequency transformer by turning the top screw at the rear of the output transformer until the output frequency is obtained on the output meter. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequency transformer in the same manner.

ALIGNMENT OF TUNING CIRCUITS

5. Connect the output of the test oscillator to the antenna lead of the receiver through a .00025 M.F.P.D. condenser and connect the ground side (shielding) to the chassis.

6. Set the wave change switch to the long-wave position (Red). Set the dial and test oscillator to 800 meters. Adjust the long-wave oscillator trimmer until the signal is brought in. Then adjust the long-wave trimmer to obtain the correct adjustment. Return to 800 meters and repeat the entire procedure.

7. Then adjust the long-wave and R.F. trimmers for maximum response. Set the dial and test oscillator to 1800 meters and adjust the long-wave and R.F. trimmers for maximum response while rocking the gang condenser. Then rock the gang trimmer and adjust the gang trimmer for maximum response while rocking the gang condenser.

8. Set the wave change switch to the broadcast position (Yellow). Set the dial and test oscillator to 154 meters (1450 K.C.). Adjust the B.C. oscillator, R.F. and antenna trimmers for maximum response. Set the dial and test oscillator to 800 K.C. and adjust the B.C. and antenna trimmers while rocking the gang till maximum response is obtained.

9. Set the wave change switch to the high frequency band (Short-wave Green). Substitute a 1000 ohm resistor for the .00025 M.F.P.D. condenser in the antenna circuit. Set the dial and test oscillator to 30 meters (10 megacycles). Alignment the receiver on end and adjust the 30 meter oscillator coil (located to the right of switch when viewed from bottom) till the signal is brought in. Stop at first peak. Screwing the trimmer down still more will give another peak which is the name and must not be used. To make certain the set is not tuned to the image, set the test oscillator to 11 megacycles and if another signal is received, then the set is correctly tuned. Reset the test oscillator to 30 meters and adjust the R.F. and antenna trimmers for maximum response, while rocking the gang. Then rock the gang till maximum response is obtained.

10. Set the wave-change switch to the ultra high frequency band (White). Set the test oscillator to dial 14.1 meters (57.3 megacycles). Adjust the oscillator trimmer until the signal is brought in. Continue on through to the second peak. The image signal will now be found at 60.3 megacycles if the oscillator trimmer adjustment is correct. Reset the dial to 14.1 meters and adjust the R.F. and antenna trimmers for maximum response while rocking the gang.

Set the dial and test oscillator to 30 meters and check for sensitivity.

©John F. Rider, Publisher

Compliments of www.nucow.com
MODEL 400

105 to 125 volts. 50-60 cycles, A.C. power supply.

The four tubes used in this set are as follows: 1—No. 280 Full Wave Rectifier; 1—No. 77 Radio Audio Amplifier; 1—No. 78 Detector; 1—No. 42 Audio Amplifier.

Set band switch

in the left-hand position, broadcast stations on frequencies between 550 and 1500 Kilocycles will be received. When the band switch is thrown to the right, stations operating on frequencies ranging from 1500 to 4800 Kilocycles will be heard.

CHASSIS 4.2

SERVICE SUGGESTIONS

In changing tubes always remove the plug from light socket. Make sure all tubes are pushed firmly into their proper sockets and that clips are always fastened to caps on tops of tubes.

Be sure that aerial and ground are properly connected. A thirty to fifty-foot aerial is recommended for best operation.

To remove chassis from cabinet, first remove knobs. Then remove four screws from bottom of cabinet holding base. Remove screws holding speaker in cabinet and remove speaker and chassis as a unit.

MODEL 660 AUTORADIO

PARTS LIST

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 660</td>
<td>Battery Cable—Plug Type</td>
<td>.75</td>
</tr>
<tr>
<td>B 304</td>
<td>Cable Shell Bracket</td>
<td>.35</td>
</tr>
<tr>
<td>b 660</td>
<td>Antenna Cable—Plug Type</td>
<td>.60</td>
</tr>
<tr>
<td>C 106</td>
<td>Baffle Couplings</td>
<td>.35</td>
</tr>
<tr>
<td>C 117</td>
<td>&quot;A&quot; Choke—Small</td>
<td>.25</td>
</tr>
<tr>
<td>C 118</td>
<td>&quot;A&quot; Choke—Large</td>
<td>.35</td>
</tr>
<tr>
<td>C 144</td>
<td>Dual 1-250 Volt Condenser</td>
<td>.35</td>
</tr>
<tr>
<td>C 152</td>
<td>.00025 Mica Condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C 153</td>
<td>.0005 Mica Condenser</td>
<td>.20</td>
</tr>
<tr>
<td>C 158</td>
<td>.01-400 Volt Condenser</td>
<td>.25</td>
</tr>
<tr>
<td>C 224</td>
<td>Dual .055 Condenser</td>
<td>.30</td>
</tr>
<tr>
<td>C 355</td>
<td>Dual 1-250 Volt Condenser</td>
<td>.35</td>
</tr>
<tr>
<td>C 543</td>
<td>3 Gang Condenser</td>
<td>.75</td>
</tr>
<tr>
<td>C 543A</td>
<td>R.F. Coil</td>
<td>.80</td>
</tr>
<tr>
<td>C 543A</td>
<td>Antenna Coil</td>
<td>.70</td>
</tr>
<tr>
<td>C 543B</td>
<td>Oscillator Coil</td>
<td>.70</td>
</tr>
<tr>
<td>C 545C</td>
<td>Input I.F. Transformer</td>
<td>1.25</td>
</tr>
<tr>
<td>C 545D</td>
<td>Output I.F. Transformer with Parts</td>
<td>2.50</td>
</tr>
<tr>
<td>C 547</td>
<td>1-250 Volt Condenser</td>
<td>.30</td>
</tr>
<tr>
<td>C 549</td>
<td>600 Ohm Choke</td>
<td>1.40</td>
</tr>
<tr>
<td>C 550</td>
<td>8-8 Mfd. Electrolytic Condenser</td>
<td>.25</td>
</tr>
<tr>
<td>C 551</td>
<td>1 Mfd.—120 Volt Condenser</td>
<td>.25</td>
</tr>
<tr>
<td>C 552</td>
<td>.05-200 Volt Condenser</td>
<td>.25</td>
</tr>
<tr>
<td>C 554</td>
<td>.05-200 Volt Condenser</td>
<td>.25</td>
</tr>
<tr>
<td>R 122</td>
<td>Special 500 Ohm Resistor Identified with .35</td>
<td></td>
</tr>
<tr>
<td>R 279</td>
<td>30,000 Ohm Resistor</td>
<td>.80</td>
</tr>
<tr>
<td>R 281</td>
<td>100 Ohm Resistor</td>
<td>.20</td>
</tr>
<tr>
<td>S 338</td>
<td>18&quot; Volume Control Shaft</td>
<td>1.25</td>
</tr>
<tr>
<td>S 339</td>
<td>18&quot; Selector Control Shaft</td>
<td>1.25</td>
</tr>
<tr>
<td>S 385</td>
<td>Special 24&quot; Volume Control Shaft</td>
<td>1.50</td>
</tr>
<tr>
<td>S 385S</td>
<td>Special 24&quot; Selector Control Shaft</td>
<td>1.50</td>
</tr>
<tr>
<td>V 660</td>
<td>Complete &quot;B&quot; Unit—BAK 8.00</td>
<td></td>
</tr>
<tr>
<td>V 603</td>
<td>Volume Control</td>
<td>1.50</td>
</tr>
<tr>
<td>V 660</td>
<td>Rectifier Control Head Complete Less Shaft</td>
<td>.50</td>
</tr>
<tr>
<td></td>
<td>20 Ampere Fuses</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td>Mounting Bolts</td>
<td>.25</td>
</tr>
<tr>
<td>All carbon resistors</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>All sockets</td>
<td>.20</td>
<td></td>
</tr>
<tr>
<td>Dynamic speakers</td>
<td>.50</td>
<td></td>
</tr>
</tbody>
</table>

MODEL 660 AUTORADIO

SCHEMATIC DIAGRAM

DECIMAL ARE MICROPARADIS WHOLE NUMBERS ARE OMS.

LETTER PREFIXED NUMBERS ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND.

VOLUME CONTROL ON FULL X-INDICATORS ARE CONNECTED IN I.P. COIL CAN C 545 D.

K. FC X-INDICATORS ARE LABELLED UNIT B 479 30K-955A, L-CHASSIS GROUND O-GROUNDED AT ONE COMMON POINT.

TF PEAK 175 Kc

Fig 1
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).

<table>
<thead>
<tr>
<th>Tube Number</th>
<th>Control Grid to Cathode</th>
<th>Screen to Cathode</th>
<th>Plate to Cathode</th>
<th>M.A. Plate</th>
<th>Tube Model</th>
<th>Voltage from Plate or Filament to Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7</td>
<td>1.75</td>
<td>92</td>
<td>225</td>
<td>4</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>OSC</td>
<td>0</td>
<td>0</td>
<td>225</td>
<td>4</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>78—I.F.</td>
<td>1.75</td>
<td>92</td>
<td>225</td>
<td>7</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>75—2nd Det.</td>
<td>1.75</td>
<td>0</td>
<td><strong>110</strong></td>
<td>8</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>42—2nd Audio</td>
<td>***17</td>
<td>225</td>
<td>212</td>
<td>34</td>
<td>6.3</td>
<td></td>
</tr>
</tbody>
</table>

***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.

For conventional align. see spec. sect. Vol VIII
WALGREEN CO.

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 — 0.03 x 600 Volts
- Common Black to Green — 1 x 200 Volts
- Common Black to Red — 1 x 200 Volts
- Common Black to Orange — 0.25 x 200 Volts
- Blue to Blue — 0.04 x 400 Volts

Part No. 145-3
- Common Black to Brown — 1 x 200 Volts
- Common Black to Green — 0.07 x 200 Volts
- Common Black to Orange — 0.07 x 200 Volts
- Common Black to Yellow — 0.07 x 200 Volts

Aligning I. F. Transformer

Voltage

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 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 2A3 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) oscillator trimmers of variable condenser to resonance.
   c. Check tracking at 1500, 1200, 1000, 800, 600 and 510 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.

MODEL 575 SUPERHETERODYNE 550 to 1720 Kilocycles

FIVE TUBES: 1-58, 1-2A5, 1-80, 2-57

Legend:

- CONDENSERS
- RESISTORS
- NOTE:


©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNING INSTRUCTIONS

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

(1) LF Dummy—Consists of a 0.5 mfd. condenser connected in parallel with an external coil of 30 trimmer coils.

(2) Broadcast Dummy—Consists of a 0.5 mfd. condenser connected in parallel with an external coil of 1 mfd. trimmer coils.

(3) Internal to Low Wave Dummy—Consists of a 0.5 mfd. condenser and a 0.25 mfd. trimmer coil connected in series with each other and in series with the external trimmer coil.

Alignment

Use the LF dummy to check all receiver adjustments. Use a stimulus generator to check all receiver adjustments. Use a stimulus generator to check all receiver adjustments.

SERIES A

Alignment

No trimming adjustments should be attempted without first thoroughly checking for possible trouble, such as poor installation, or a bridge grounded antenna system, due to undue gain and sensitivity at frequencies and distances.

1. With variable condenser in series, the extreme right is the proper position, with variable condenser at its minimum position, and with variable condenser at its maximum position, the variable condenser is in series, and with variable condenser at its minimum position.

2. With variable condenser in series, the extreme right is the proper position, with variable condenser at its minimum position, and with variable condenser at its maximum position, the variable condenser is in series, and with variable condenser at its minimum position.

3. With variable condenser in series, the extreme right is the proper position, with variable condenser at its minimum position, and with variable condenser at its maximum position, the variable condenser is in series, and with variable condenser at its minimum position.

4. With variable condenser in series, the extreme right is the proper position, with variable condenser at its minimum position, and with variable condenser at its maximum position, the variable condenser is in series, and with variable condenser at its minimum position.

5. With variable condenser in series, the extreme right is the proper position, with variable condenser at its minimum position, and with variable condenser at its maximum position, the variable condenser is in series, and with variable condenser at its minimum position.

6. With variable condenser in series, the extreme right is the proper position, with variable condenser at its minimum position, and with variable condenser at its maximum position, the variable condenser is in series, and with variable condenser at its minimum position.

Schematic, Voltage Socket, Trimmers, Alignment

Short Wave Band Alignment—(7.5 - 23.0 Megacycles)

1. This band is aligned after all the above adjustments have been made. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.

2. With external oscillator set at 21 megacycles and connected to the transformer lead is series with the short wave dummy and to the black ground lead, adjust the oscillator lead until the oscillator lead is permanently connected to the inductance in the front of the chassis of the group of the four trimmers located next to the gang condenser (set top view of chassis).

3. Adjust short wave antenna trimmers to resonant. This adjustment is in the area of the trimmer lead near the short wave coil trimmer. (See top view of chassis)

4. Reset external oscillator for trimmers to resonate. This adjustment is in the area of the trimmer lead near the short wave coil trimmer. (See top view of chassis)

Intermediate Band Alignment—(2.3 - 7.6 Megacycles)

1. With wave selector switch in the center position and with dial pointer set at 7 megacycles, make the following adjustments:

(a) With external oscillator set at 7 megacycles and connected to the transformer lead in series with the short wave dummy and black ground lead, adjust the oscillator lead until the oscillator lead is permanently connected to the inductance in the front of the chassis of the group of the four trimmers located next to the gang condenser (set top view of chassis).

(b) Adjust antenna trimmers to resonate. This adjustment is in the area of the trimmer lead near the short wave coil trimmer. (See top view of chassis)

(c) Reset external oscillator for trimmers to resonate. This adjustment is in the area of the trimmer lead near the short wave coil trimmer. (See top view of chassis)

(d) With wave selector switch in the center position and with dial pointer set at 7 megacycles, make the following adjustments:

(e) With external oscillator set at 7 megacycles and connected to the transformer lead in series with the short wave dummy and black ground lead, adjust the oscillator lead until the oscillator lead is permanently connected to the inductance in the front of the chassis of the group of the four trimmers located next to the gang condenser (set top view of chassis).

(f) Adjust antenna trimmers to resonate. This adjustment is in the area of the trimmer lead near the short wave coil trimmer. (See top view of chassis)

(g) Reset external oscillator for trimmers to resonate. This adjustment is in the area of the trimmer lead near the short wave coil trimmer. (See top view of chassis)

Service Notes

To check for open bypass condensers, adjust each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the diode with it is located. Open bypass condensers frequently cause noise and distorted tone. Determine the short wave trimmers to resonate. The setting should be checked with a short wave trimmer and resonant action is obtained for trimmer trimmers. Check the short wave trimmers and resonant action is obtained. The setting should be checked with a short wave trimmer and resonant action is obtained. The setting should be checked with a short wave trimmer and resonant action is obtained. The setting should be checked with a short wave trimmer and resonant action is obtained. The setting should be checked with a short wave trimmer and resonant action is obtained. The setting should be checked with a short wave trimmer and resonant action is obtained.
Align I-F transformer trimmers to 465 KC.  BROADCAST - Dial and generator to 1400 KC, peak the oscillator and antenna trimmers. Dial and generator to 600 KC, pad the oscillator circuit to maximum peak while rocking variable condenser. POLICE - Dial and generator to 4 MC, peak oscillator trimmer and antenna trimmer. SHORTWAVE - Dial and generator to 16 MC, peak oscillator and antenna trimmers.
Standard Broadcast Band 550-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts

**Conventional Alignment, See Special Section Vol. VIII**

**Conductors**

**Resistors**

<table>
<thead>
<tr>
<th>No</th>
<th>Value</th>
<th>No</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>50 MICA</td>
<td>R1</td>
<td>50 M. 1/2W</td>
</tr>
<tr>
<td>C2</td>
<td>490 MICA</td>
<td>R2</td>
<td>50 M. 1/2W</td>
</tr>
<tr>
<td>C3</td>
<td>5 MICA</td>
<td>R3</td>
<td>500 M. 1/2W</td>
</tr>
<tr>
<td>C4</td>
<td>40 X 500V</td>
<td>R4</td>
<td>50 M. 1/2W</td>
</tr>
<tr>
<td>C5</td>
<td>0.05 X 500V</td>
<td>R5</td>
<td>500 M. 1/2W</td>
</tr>
<tr>
<td>C6</td>
<td>100 MICA</td>
<td>R6</td>
<td>500 M. 1/2W</td>
</tr>
<tr>
<td>C7</td>
<td>100 MICA</td>
<td>R7</td>
<td>250 M. 1/2W</td>
</tr>
<tr>
<td>C8</td>
<td>0.05 X 500V</td>
<td>R8</td>
<td>250 M. 1/2W</td>
</tr>
<tr>
<td>C9</td>
<td>0.05 X 400V</td>
<td>R9</td>
<td>1000</td>
</tr>
<tr>
<td>C10</td>
<td>0.033 X 400V</td>
<td>R10</td>
<td>275</td>
</tr>
<tr>
<td>C11</td>
<td>0.02 X 400V</td>
<td>R11</td>
<td>15M</td>
</tr>
<tr>
<td>C12</td>
<td>0.01 X 200V</td>
<td>R12</td>
<td>25M 1/2W</td>
</tr>
<tr>
<td>C13</td>
<td>0.01 X 200V</td>
<td>R13</td>
<td>250 M. 1/2W</td>
</tr>
<tr>
<td>C14</td>
<td>25 X 200V</td>
<td>R14</td>
<td>750 M. 1/2W</td>
</tr>
<tr>
<td>C15</td>
<td>25 X 200V</td>
<td>R15</td>
<td>10 M. 1/2W</td>
</tr>
<tr>
<td>C16</td>
<td>18 MFD. 550V</td>
<td>P103-3</td>
<td></td>
</tr>
<tr>
<td>C17</td>
<td>14 MFD. 400V</td>
<td>P103-4</td>
<td></td>
</tr>
<tr>
<td>C18</td>
<td>13 MFD. 400V</td>
<td>P103-5</td>
<td></td>
</tr>
<tr>
<td>C19</td>
<td>0.0147</td>
<td>CF0.0005 MICA.</td>
<td></td>
</tr>
</tbody>
</table>

**Condensers C10, C11 in Dual Unit.**

C14, C15, C13, C4

**Resistors R9, R10, R11 in one unit P106-13**

Numbers prefixed by letter 'P' are part numbers.
TO ALIGN THE VARIABLE CONDENSER:

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

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.

If the RF and antenna coils are not defective, and if the rotor and stator plates of the gang condenser have not been bent so as to destroy proper spacing, the receiver will correctly track over the entire tuning range.
DESCRIPTION

This receiver is a portable, four (4) tube, battery operated superheterodyne with self-contained loop antenna and batteries.

The tubes used are a 1A7GT as an oscillator converter; a 1N5GT as an I.F. amplifier; a 1H5GT as an A.V.C. detector and audio amplifier; and a 1C5GT as a power output.

This receiver is made to cover the standard broadcast band from 1620 K.C. to 535 K.C.

BATTERIES

Listed below are various manufacturers of batteries and their part numbers that may be used to make up the combination of batteries to be used with this receiver.

<table>
<thead>
<tr>
<th>(Batteries)</th>
<th>Their Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgess:</td>
<td></td>
</tr>
<tr>
<td>B Battery</td>
<td>B30</td>
</tr>
<tr>
<td>A Battery</td>
<td>4F</td>
</tr>
<tr>
<td>Ray-O-Vac:</td>
<td></td>
</tr>
<tr>
<td>B Battery</td>
<td>P-5303</td>
</tr>
<tr>
<td>A Battery</td>
<td>P-94A</td>
</tr>
<tr>
<td>Ever-Ready:</td>
<td></td>
</tr>
<tr>
<td>B Battery</td>
<td>762</td>
</tr>
<tr>
<td>A Battery</td>
<td>742</td>
</tr>
<tr>
<td>General:</td>
<td></td>
</tr>
<tr>
<td>B Battery</td>
<td>V30B</td>
</tr>
<tr>
<td>A Battery</td>
<td>4F1</td>
</tr>
</tbody>
</table>
ATTACHMENT

There is incorporated in this Phone-Oscillator unit a tip jack terminal strip microphone connection. The microphone is supplied as an attachment and can be purchased under the part No. 79-263 from your dealer. In its attachment to the receiver, plug in the ends of the microphone cord into the tip jacks (see pictorial) and have switch in the first position. That is, in the position to operate the oscillator but not the phono-motor.

Note:—Be sure to shut off the record player completely when it is not in use by turning the switch to the "off position".

PARTS PRICE LIST

<table>
<thead>
<tr>
<th>Part No.</th>
<th>DESCRIPTION</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-130</td>
<td>Tone Arm Assem.</td>
<td>$ 2.25</td>
</tr>
<tr>
<td>59-3</td>
<td>Motor Assem.</td>
<td>7.00</td>
</tr>
<tr>
<td>49-213</td>
<td>Cabinet and Cover Assem.</td>
<td>8.75</td>
</tr>
<tr>
<td>12-1</td>
<td>Microphone Jack</td>
<td>.40</td>
</tr>
<tr>
<td>79-263</td>
<td>Microphone Supplied as an Attachment.</td>
<td>5.00</td>
</tr>
<tr>
<td>69-129</td>
<td>Switch Dual</td>
<td>.75</td>
</tr>
<tr>
<td>10-240</td>
<td>Oscillator Trans.</td>
<td>.75</td>
</tr>
<tr>
<td>20-119</td>
<td>Trimmer</td>
<td>.25</td>
</tr>
<tr>
<td>18-241</td>
<td>Electolytic Cond. 20x10 mf, 100 V.</td>
<td>1.00</td>
</tr>
<tr>
<td>69-231</td>
<td>Res. 465 Ohms</td>
<td>.50</td>
</tr>
</tbody>
</table>

Prices subject to change without notice.
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET POSITIONS ARE TO
COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITIES ARE IN MICROFARADS.

WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO
VOLTAGE OR A VERY LOW READING.
ADJUSTMENT MUST BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CAPACITOR.

LOCATION OF PARTS UNDER CHASSIS

LOCATION OF PARTS ON TOP OF CHASSIS
ALIGNMENT PROCEDURE

Position of Volume Control

POSSIBLE VALUES

440 Hz
Antenna Control C7

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER

INVERTED GENERATOR FUNDAMENTAL FREQUENCY TRIMMER

INVERTED GENERATOR ADJUSTMENT TRIMMER

INVERTED GENERATOR FREQUENCY TRIMMER
Automobile Receiver

Frequency Range 540-1520 Kilocycles

© John F. Rider, Publisher
This receiver is a 6-tube AC/DC current operated Superheterodyne. The tubes used are: a 6A7 as an oscillator-converter; a 6D6 as an I.F. amplifier; a 75 as an A.V.C. detector and audio amplifier; a 25L6G as a beam output; a 25Z9 as a power rectifier; and a BK49B as a voltage divider.

This receiver is made to cover from 1750 KC. to 535 KC., which covers the standard broadcast band and the first police band.
MODEL No.
9-220 to 9-229, Inclusive

STANDARD BROADCAST RECEIVER
Model No. 9-222 is a 2 tube, T.R.F. radio receiver for operation on a 117 Volt A.C. supply. The tubes used are a 555A and 25L6G as an R.F. Amplifier and Detector and a 6N5G as a Power Amplifier and Detector.

This receiver covers a frequency range from 540 Kilocycles to 1760 Kilocycles (less the final zero). Standard broadcast stations are listed in kilocycles in most station lists.

©John F. Rider, Publisher

Location of Parts on Top of Chassis
Model 404

This receiver will operate on either alternating or direct current, from a power supply of 105 to 125 volts. Do not connect it to any other source.

1—6K7 R.F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier

Model 510C

Conventional Alignment: See Special Section Vol. VIII.

©John F. Rider, Publisher
Alignment Procedure

1. Connect the output meter, through a .5 MFD condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate and screen pins of the 1FG tube.

2. Connect the signal generator to the grid cap of the 6DG8 tube through a 1000 K potentiometer.

3. Adjust the first and second I.F. trimmers until the maximum output is obtained.

4. Turn the dial to the extreme high frequency end. Feed a 140 K.C. signal to the receiver antenna lead through a .0025 MFD mica condenser. Set the generator to about 1000 K.C. and tune in the receiver. Then, adjust the 1740 K.C. antenna trimmer to maximum output. This completes the adjustment of the receiver.
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and
with the signal input from the generator reduced to as low a value as possible
while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance
of such a value as to make the total meter resistance approximately 7000 ohms,
to the two small pins of the speaker plug. The output meter remains connected
during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a
.1 M.F. condenser. Connect the ground of the generator to the receiver chassis
through another .1 M.F. condenser. With the wave switch on broadcast position
and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the
trimmers of the first and second I.F. transformers until the maximum output
is obtained. This aligns the I.F.

Turn the wave switch to the short wave position and set the dial to 6.0 M.C.
Feed a 6.0 M.C. signal to the receiver antenna led through a .00025 M.F. mica
condenser. Tune the 6.0 M.C. Oscillator trimmer to give resonance. Two points
may be found where this signal can be heard. The correct setting is the one
where the trimmer is screwed the loosest. This may also be checked by turning
the dial to about 5.0 M.C. where the signal should again be heard.

Then turn the wave switch to broadcast position and turn the dial to the
extreme high frequency end. Feed in a 1720 K.C. signal and adjust the broad-
cast oscillator trimmer, which is located under the receiver at the wave switch,
to resonance. Then set the signal generator to 1500 K.C. and tune in this
signal on the receiver. Adjust the 1500 K.C. antenna trimmer for maximum
output.

Again turn the wave switch to short wave position and tune in a 6.0 M.C.
signal from the generator. Adjust the 6.0 M.C. antenna trimmer to maximum
output.
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a 5 MFD capacitor and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate and screen pins of output tube, or a low voltage A.C. meter, may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator, to the grid cap of the 6A7 tube, through a 1 MFD capacitor. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a 0.0025 MFD mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in signal on receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. This completes the alignment.
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a 0.5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1A6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second i.f. transformers until the maximum output is obtained. This aligns the i.f.

Leaving the signal generator connected to the grid cap of the 1A6, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 7500 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

Set the wave switch on broadcast position and turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmers for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.
FOR TUNER SEE INDEX

TUBE SOCKETS ARE VIEWED FROM UNDER RING OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET HOLE ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT
THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE IS SHOWN AT SOCKET HOLE, IT
INDEEDS ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.

ALIGNMENT PROCEDURE

PRELIMINARY
Output Meter Connections
Output Meter Reading to Indicate 1 Watt Across Loud Speaker Voice Coil
Generator Ground Lead Connection 1.85 Volts
Dummy Antenna Value to Be in Series with Generator Output Receiver Chassis
Connection of Generator Output Lead See Chart Below
Generator Modulation 30%, 400 Cycles
Position of Volume Control Fully On

<table>
<thead>
<tr>
<th>Position of Variable</th>
<th>Generator Frequency</th>
<th>Dummy Antenna</th>
<th>Generator Connections</th>
<th>Trimmer Adjustment</th>
<th>Trimmer Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed</td>
<td>262 KC</td>
<td>.1 mfd.</td>
<td>6A8 Grid (In Order Shown)</td>
<td>T5, T4</td>
<td>I.F.</td>
</tr>
<tr>
<td>Fully Open</td>
<td>1380 KC</td>
<td>.0002 mfd.</td>
<td>Antenna Conn.</td>
<td>C3</td>
<td>Oscillator Trimmer</td>
</tr>
<tr>
<td>600 KC (Rock)</td>
<td>600 KC</td>
<td>.1 mfd.</td>
<td>6K7 R.F. Grid</td>
<td>C9</td>
<td>Padder Oscillator</td>
</tr>
<tr>
<td>630 KC</td>
<td>600 KC</td>
<td>.0002 mfd.</td>
<td>Antenna Conn.</td>
<td>C5</td>
<td>Padder Antenna</td>
</tr>
</tbody>
</table>

The variable condenser should be rocked back and forth a degree or two while making the 600 K.C. adjustment on oscillator padder only.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

A final adjustment of the antenna padder condenser C5 is always made after the receiver is installed in the car, in order to match the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.
This receiver is a 6-tube alternating current operated superheterodyne. The tubes used are: a 6A7 as oscillator modulator, a 6D6 as L.F. amplifier, a 76 as A.V.C., and audio rectifier and audio voltage amplifier, a 6AC5G as a power audio amplifier, and a 80 as a power rectifier.

This receiver is made to cover two tuning bands—the standard broadcast band which ranges from 1740 Kc to 540 Kc, and the short wave band which has a frequency range from 24 MC to 5.9 MC.

ALIGNMENT

FOLLOW PROCEDURE AS FOR MODEL 648 BUT ALIGN OSC-PAD, (C13 shown on chassis layout above) AT 600 KC as a final adjustment.

© John F. Rider, Publisher
ALIGNMENT

IF  Through 0.1 mfd dummy antenna, adjust trimmers at 456 KC.

BC  Adjust osc trimmer at 1760 KC through 0.0025 dummy. Adjust padders at 600 KC.

POLICE  Through 0.00025 mfd dummy, adjust antenna trimmer at 4 M.

Short Wave  Adjust antenna trimmer at 15 MC.

VOLTAGE DIAGRAM

- HEATER
- CATHODE
- PLATE
- CC CONTROL GRID
- GI OSC GRID
- GP OSC PLATE
- SG SCREEN GRID
- SU SUPPRESSOR
- DP DIODE PLATE

©John F. Rider, Publisher
ALIGNMENT

IF: Through 0.1 mfd. dummy antenna, adjust trimmers at 262 KC.

BC: Through 0.00025 mfd., adjust osc. trimmer at 1580 KC. Adjust antenna trimmer at 1400 KC. Adjust pad at 600 KC. Adjust antenna compensator at 600 KC. for best sensitivity with signal.
WARWICK MFG. CORP.

This receiver is made to cover two tuning bands, the standard broadcast band which ranges from 1740 K.C. to 540 K.C., and the short wave band which has a frequency range of from 24 M.C. to 3.9 M.C.

FOR TUNER SEE INDEX

©John F. Rider, Publisher
For Conventional Alignment See Special Section Vol. VIII

**FREQUENCY CALIBRATION ADJUSTMENT**

While a station of known frequency is tuned in, remove the pilot light socket. In the tuning control head, immediately in front of position from which the dial light socket has been removed, will be seen a small screw head. This is the calibration adjustment screw. By turning this screw with a small screwdriver, the frequency indicated by the dial may be made to correspond to the frequency of the station tuned in. After adjusting calibration by this means the dial light socket is replaced.

After the receiver is installed the 600 K.C. antenna compensator condenser is adjusted to give best sensitivity while the receiver is tuned to as weak a station as can be heard near 600 K.C. The volume control should be turned full on while making this adjustment.

©John F. Rider, Publisher
This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 335 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 3.4 M.C.

**ALIGNMENT**

IF Adjust at 456 KC through a 0.1 mfd. condenser.

SW Proper adjustment is loose trimmer setting at 15 MC, as signal is heard at 2 settings. Signal must be heard only at about 14 MC dial setting and not at 16 MC.

BC Adjust oscillator trimmer at 1680 KC through 0.00025 mfd. condenser. Adjust antenna trimmer at 1500 KC. Adjust padder at 600 KC.

Police Adjust antenna trimmer at 4 MC., through 0.00025 condenser.

**VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.**

ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND.

©John F. Rider, Publisher
MODEL 761
Alignment
MODELS 768, 768B
Alignment, Socket
Trimmers

PUSH BUTTON TUNING ADJUSTMENTS

After receiver is installed and antenna and ground properly connected, plug line cord into a convenient outlet. Then turn the volume control to about the center of rotation. This will turn the receiver on and put it in an operating condition. Time must be allowed for the tubes to heat up before stations can be tuned. This should be approximated one-half minute.

The automatic tuning feature of your radio makes it possible to set up 6 favorite American broadcast stations and tune them in quickly with the automatic tuning feature for push-button operation heard with good volume at all times.

Cut the call letters of your 6 selected stations from the list supplied with your receiver and slip them into the Tab Holder from the top, with the clear celluloid in front of the call letters to protect them. Arrange the call letters in the Tab Holder from right to left. Have the call letters of the lowest frequency station at the extreme right and work progressively to the left so that the highest frequency call letters will be at the extreme left.

Follow the procedure outlined below, in order to adjust the push-buttons properly.

1. By means of the Station Selector knob tune in with the right hand as accurately as possible the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand end of your dial.

2. After the station has been tuned in accurately with the right hand, continue to hold in it its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector knob in its exact position, PUSH BUMPER IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station will be at the extreme right of the Call Letter Holders.

Follow through with this same procedure, setting up the other 5 stations in the order of frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of the setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically on any of your four selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment of the receiver is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning the receiver is an output meter and a modulated source of radio frequency (a signal generator or microphone). The source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on with the signal from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total resistance approximately 50,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post on the back of the wave switch on broadcast position and the dial set to about 1000 K.C. feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second i.f. transformers until the maximum output is obtained. This aligns the i.f.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1600 K.C. signal to the receiver antenna post through a 3000 M.F. mica condenser. Adjust the 1900 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1590 K.C. and tune in this signal on the receiver. Then adjust the 1900 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.9 M.C. signal to the receiver antenna post through a 3000 M.F. condenser. Turn the wave switch to the center position. Turn the receiver to this signal. Adjust the 4.6 M.C. police antenna trimmer for best output.

DESCRIPTION

This receiver is a 1 tube, 6 volt storage battery operated AC/DC type.

The tubes used are a 30 as oscillator, a 6BG as modulator, two 1A4 tubes as i.f. amplifiers, a 6F7G as A.V.C. and audio rectifier and an audio voltage amplifier, a 6LY as audio driver and a 19 as power audio amplifier.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1000 K.C. to 555 K.C., the middle or phone band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 26 M.C. to 51 M.C.

While a ground is not always necessary with receivers which are made to use the lighting mains as a source of power, a battery operated receiver always requires a good ground if best performance and distance reception is expected. A ground may be made to a water supply system or to a galvanized pipe driven into ground that is moist most of the time. The use of a lightning arrester is very good insurance against damage by lightning. Input types are or the market and may be obtained very easily. Soldering all antenna and ground leads will eliminate any noise which may be caused by loose connections.

The antenna and ground leads connect to the marked binding posts located on the back of the chassis.

A 6 volt storage battery is the only power supply required for this receiver. The yellow battery lead connects to the positive (+) terminal of the battery and the black lead connects to the negative (-) terminal. If these connections are reversed the receiver will not operate and may be seriously damaged if left this way for more than a short time. Never charge the battery while operating the receiver. Attempting to use any other source of power supply will cause serious damage to the receiver.

©John F. Rider, Publisher
Compliments of www.nucow.com
Instructions for Mounting the New 7 Station Automatic Tuning Panel on the 7, 9, 11 and 13 Tube Chassis

REPLACING MOTOR DRIVE PANEL

New 7 Station Automatic Tuning Panel

There are 6 panel buttons: Antenna 1 to 6 and 1 to 5. A step in the Tuning mechanism buttons, to

Before mounting the new panel on the chassis, cut

Mounting New Automatic Tuning Panel on the Chassis

For 10 inches of tuning time, put the position

Front View of Panel

The mounting screws are used to align the

Mounting New Panel on Early Chassis Equipped with First Motor Drive Panels

Chassis equipped with the single type motor drive

Alignment

After the new panel is installed, realign the

Parts Shipped With 7 Station Automatic Tuning Panel

All parts not listed are included in the

Compliments of www.nucow.com
9 AND 11 TUBE RADIOS
Input Voltages and Currents
- "A" Battery: 2 Volts—3 Amperes
- "B" Battery: 80 Volts—1.5 to 1.8 Amperes
Power Output: 135 Milliwatts Undistorted
Selectivity: 40 KC Broad at 1000 Times Signal

Intermediate Frequency: 456 KC
Speaker: 6" Dynamic
Tuning Frequency Range: 528 to 1730 KC
Sensitivity: 40 Microvolts

Compliments of www.nucow.com

JULY, 1937

Fig. 1—Schematic Circuit Diagram
ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>STEP</th>
<th>Dummy Antenna</th>
<th>Signal Generator Frequency Setting</th>
<th>Connection at Radio</th>
<th>Trimmers Adjusted</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>.1 mf.</td>
<td>456 KC</td>
<td>Grid of 1st Det.</td>
<td>2nd I.F. (C9) &amp; (C10)</td>
<td>Turn rotor to full open</td>
</tr>
<tr>
<td>1730 KC Adj.</td>
<td>200 mmf.</td>
<td>1730 KC</td>
<td>Antenna Lead</td>
<td>Osc. (C4)</td>
<td>Turn rotor to full open</td>
</tr>
<tr>
<td>1500 KC Adj.</td>
<td>200 mmf.</td>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>Ant. (C3)</td>
<td>Turn Rotor to Max. Output</td>
</tr>
</tbody>
</table>

VOLTAGES AT SOCKETS
Volume Control: Maximum
Antenna Switch to Ground
"A" Battery—2 Volts

Table
<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Plate to Ground</th>
<th>Screen to Ground</th>
<th>Control Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID7G</td>
<td>1st Det.-Dec.</td>
<td>2.0</td>
<td>87</td>
<td>64</td>
</tr>
<tr>
<td>ID5G</td>
<td>L.F.</td>
<td>2.0</td>
<td>87</td>
<td>64</td>
</tr>
<tr>
<td>IH6G</td>
<td>2nd Det.-1st Audio</td>
<td>2.0</td>
<td>32(2)</td>
<td>1.28(4)</td>
</tr>
<tr>
<td>IF5G</td>
<td>Power</td>
<td>2.0</td>
<td>82</td>
<td>87</td>
</tr>
</tbody>
</table>

(1) Anode Grid (G3) to ground
(2) Grid across A1 and R7
(3) R7 on 100 ohm scale (1000 ohms per volt meter). Subject
(4) As read across R9

Fig. 2—Tube Arrangement

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, note the position of the pointer and remove the chassis from the cabinet. Loosen the pointer screw and set the pointer so that it will be at the 800 KC mark. Tighten the pointer screw and replace the chassis in the cabinet. If the pointer is not at the 800 KC mark another adjustment will be necessary.
### Alignment Procedure: Series S1

**Volume Control—Maximum All Adjustments.**

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>FREQUENCY SETTINGS</th>
<th>DUMMY ANTENNA</th>
<th>BAND SWITCH SETTING</th>
<th>TRIMMERS ADJUSTED TO MAXIMUM</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I.F.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>INITIAL STEPS</strong></td>
</tr>
<tr>
<td>2200 KC</td>
<td>Range B</td>
<td>.1 mf.</td>
<td>456 KC, Grid of I.F.</td>
<td>2nd I.F. 1 (C19) &amp; (C20)</td>
<td>Turn Rater to Full Open</td>
</tr>
<tr>
<td>2200 KC</td>
<td>Range B</td>
<td>.1 mf.</td>
<td>466 KC, Grid of I.F.</td>
<td>1st I.F. 1 (C17) &amp; (C18)</td>
<td>Turn Rater to Full Open</td>
</tr>
<tr>
<td><strong>RANGE D</strong></td>
<td>2000 KC</td>
<td>Range D</td>
<td>400 Ohm</td>
<td>20000 KC, Antenna Lead</td>
<td>Oscillator Range D (C7)</td>
</tr>
<tr>
<td><strong>RANGE C</strong></td>
<td>6500 KC</td>
<td>Range C</td>
<td>400 Ohm</td>
<td>65000 KC, Antenna Lead</td>
<td>Oscillator Range C (C8)</td>
</tr>
<tr>
<td><strong>RANGE B</strong></td>
<td>1800 KC</td>
<td>Range B</td>
<td>200 Ohm</td>
<td>18000 KC, Antenna Lead</td>
<td>Oscillator Range B (C9)</td>
</tr>
<tr>
<td><strong>RANGE A</strong></td>
<td>1500 KC</td>
<td>Range B</td>
<td>200 Ohm</td>
<td>15000 KC, Antenna Lead</td>
<td>1st Ant. Range A (C10)</td>
</tr>
<tr>
<td><strong>RANGE D</strong></td>
<td>600 KC</td>
<td>Range B</td>
<td>200 Ohm</td>
<td>60000 KC, Antenna Lead</td>
<td>2nd Ant. Range B (C11)</td>
</tr>
</tbody>
</table>

**CAUTION:** When adjusting the short wave bands, be sure NOT to adjust the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

### Alignment Procedure: Series S2

**Volume Control—Maximum All Adjustments.**

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>FREQUENCY SETTINGS</th>
<th>DUMMY ANTENNA</th>
<th>BAND SWITCH SETTING</th>
<th>CONDENSER SETTING</th>
<th>TRIMMERS ADJUSTED TO MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I.F.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1st I.F. (C15) &amp; (C16)</td>
</tr>
<tr>
<td>456 KC</td>
<td></td>
<td></td>
<td>9 Range</td>
<td>Turn Rater to Full Open</td>
<td>2nd I.F. 1 (C17) &amp; (C18)</td>
</tr>
<tr>
<td><strong>RANGE B</strong></td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>200 Ohm</td>
<td>Turn Rater to Full Open</td>
<td>Oscillator Range B (C7)</td>
</tr>
<tr>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>200 Ohm</td>
<td>9 Range</td>
<td>Turn Rater to Full Open</td>
<td>Oscillator Range B (C7)</td>
</tr>
<tr>
<td><strong>RANGE D</strong></td>
<td>600 KC</td>
<td>Antenna Lead</td>
<td>200 Ohm</td>
<td>Turn Rater to Full Open</td>
<td>Oscillator Range B (C7)</td>
</tr>
<tr>
<td><strong>RANGE A</strong></td>
<td>1800 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>Turn Rater to Full Open</td>
<td>Oscillator Range B (C7)</td>
</tr>
<tr>
<td><strong>RANGE D</strong></td>
<td>15000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>Turn Rater to Full Open</td>
<td>Oscillator Range B (C7)</td>
</tr>
</tbody>
</table>

**PERMEABILITY TUNING UNIT**

<table>
<thead>
<tr>
<th>PERMEABILITY TUNING UNIT</th>
<th>BUTTON DEPRESSED</th>
<th>TURN SETTING SCREW TO MAXIMUM OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100 KC</td>
<td>No. 1</td>
<td>Setting Screw No. 1</td>
</tr>
<tr>
<td>1100 KC</td>
<td>No. 2</td>
<td>Setting Screw No. 2</td>
</tr>
<tr>
<td>850 KC</td>
<td>No. 3</td>
<td>Setting Screw No. 3</td>
</tr>
<tr>
<td>850 KC</td>
<td>No. 4</td>
<td>Setting Screw No. 4</td>
</tr>
<tr>
<td>700 KC</td>
<td>No. 5</td>
<td>Setting Screw No. 5</td>
</tr>
<tr>
<td>700 KC</td>
<td>No. 6</td>
<td>Setting Screw No. 6</td>
</tr>
</tbody>
</table>

**ATTEND the signal from the signal generator to prevent the breaking off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

**NOTE A—If the pointer is not at 1500 KC on the dial, move the 2 jumpers which hold the pointer assembly on the cord, move the pointer in the 1500 KC mark, and tightens the clamps.**

**NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.**

**NOTE C—At the top of the permeability tuning unit can be seen the "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" openings of the proper button and adjust the position of the antenna (rear) coil by holding the pliers or screwdriver until maximum output is obtained.
Sensitivity

B Range: 13.5 Microvolts Average
D Range: 21.0 Microvolts Average

Tuning Frequency Range

B Range: 520 to 1730 KC
D Range: 5750 to 18300 KC

Power Consumption: 1.3 Amperes at 6.3 Volts

Power Output: 360 Milliwatts Undistorted
725 Milliwatts Maximum

Selectivity: 35 KC Broad at 1000 times Signal

Intermediate Frequency: 456 KC

Speaker: 6" F.M. Dynamic—Mantel Models
8" F.M. Dynamic—Console Models
### ALIGNMENT PROCEDURE

**Volume Control—Maximum All Adjustments.**

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
- An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output Indicating Meter: Non-Relay (Screwdriver).
- Dummy Antennas — .1 mf, 200 mmf., and 400 ohms.

<table>
<thead>
<tr>
<th>STEP / BAND / FREQUENCY</th>
<th>SWITCH SETTINGS</th>
<th>DUMMY ANTENNA SETTINGS</th>
<th>SIGNAL GENERATOR SETTINGS</th>
<th>CONNECTION AT RADIO</th>
<th>TRIMMERS ADJUSTED</th>
<th>PROCESS</th>
<th>INITIAL STEPS</th>
<th>ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>LF 1000 KC</td>
<td>Range B</td>
<td>.1 mf</td>
<td>456 KC</td>
<td>Grid of 1st Det.</td>
<td>1st LF, (C18) &amp; (C14)</td>
<td>Turn Rotor to Full Open</td>
<td>Adjust to Maximum Output</td>
<td></td>
</tr>
<tr>
<td>RANGE B</td>
<td>1750 KC</td>
<td>Range B</td>
<td>200 mmf.</td>
<td>1725 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range 5 (C9)</td>
<td>Turn Rotor to Full Open</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td>1500 KC</td>
<td>Range B</td>
<td>200 mmf.</td>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range 5 (C9)</td>
<td>Turn Rotor to Max. Output</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td>600 KC</td>
<td>Range B</td>
<td>200 mmf.</td>
<td>450 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range 5 (C9)</td>
<td>Turn Rotor to Max. Output</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td>RANGE D</td>
<td>1500 KC</td>
<td>Range D</td>
<td>400 Ohm</td>
<td>1800 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range 5 (C9)</td>
<td>Turn Rotor to Full Open</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td>1500 KC</td>
<td>Range D</td>
<td>400 Ohm</td>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range 5 (C9)</td>
<td>Turn Rotor to Max. Output</td>
<td>Adjust to Maximum Output</td>
</tr>
<tr>
<td></td>
<td>6000 KC</td>
<td>Range D</td>
<td>400 Ohm</td>
<td>6000 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range 5 (C9)</td>
<td>Turn Rotor to Max. Output</td>
<td>Adjust to Maximum Output</td>
</tr>
</tbody>
</table>

**NOTE:** When setting the range tuning dial, remove the retaining ring which holds the dial scale in position. Refer to maximum output. Hold the station selector ring and turn the dial scale until the pointer is at the 1500 KC mark. Replace the retaining ring.

**NOTE:** Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Alternate the signal from the signal generator to prevent the beating-off action of the AVG.

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, no further adjustments of the Range B trimmers, if this is done, it will be necessary to realign Range D.

CAUTION:—When aligning the short wave bands, be sure NOT to adjust the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 Hz on the meter. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

A synchronous type vibrator is used in the power unit. This vibrator introduces the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

If, after new 2 section dry electrolytic condenser has been installed, vibrator heels is encountered, reverse the connections of the 2 sections.
**MODEL 17**

**ALIGNMENT PROCEDURE**

The following equipment is required for aligning:
- All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output-indicating Meter - Non-Metallic Screwdriver.
- Dummy Antenna - 1 m, 200 mW, and 400 ohms.

**FREQUENCY RANGE AND SETTINGS**

<table>
<thead>
<tr>
<th>FREQUENCY</th>
<th>CONNECTION AT RADIO</th>
<th>SWITCH</th>
<th>CONDENSER SETTING</th>
<th>ADJUST TRIMMERS TO MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 KC</td>
<td>Grid of 1st Div.</td>
<td>J, J</td>
<td>Range B</td>
<td></td>
</tr>
<tr>
<td>RANGE D</td>
<td>18,300 KC</td>
<td>A Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range D (C18)</td>
</tr>
<tr>
<td>15,000 KC</td>
<td>A Range</td>
<td>B Range</td>
<td>Turn Rotor to Max.</td>
<td></td>
</tr>
<tr>
<td>RANGE C</td>
<td>5400 KC</td>
<td>C Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range C (C19)</td>
</tr>
<tr>
<td>RANGE B</td>
<td>1800 KC</td>
<td>A Range</td>
<td>Turn Rotor to Max.</td>
<td></td>
</tr>
<tr>
<td>600 KC</td>
<td>A Range</td>
<td>B Range</td>
<td>Turn Rotor to Max.</td>
<td></td>
</tr>
</tbody>
</table>

Phonograph Connections

Phonograph connections are made in the schematic circuit diagram - Fig. 2. On the top of the chassis base and between two of the 18 tube sockets is a round knockout 1-inch diameter. An oval base socket is mounted in this knockout opening and wired in the schematic.

**Tone Control**

There are 2 wiring lug on the tone control. One of the end lugs connects to one end of the tone control resistor. The other end lug connects to the slider. The other end lug on the tone control is used for external wiring purposes only and is not connected to the tone control resistor in any way. One side of the tone control condenser and a wire from the R+ line are connected to this lug.

**Twenty-Five Cycle Models**

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different ferrite transformer is used.

**Volatges at Sockets**

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltages indicated are between the socket terminal and ground.

**Alignment Procedure**

1. Connect radio to ground post of signal generator with a short heavy lead.
2. Allow chassis and signal generator to "heat up" for several minutes.
3. Connect dummy antenna to the "dummy" terminal of the signal generator.
4. Adjust signal generator to "oscillator range A" of the test frequencies as listed. 
5. Output-indicating meter is adjusted to non-metallic screwdriver.
6. Dummy antenna is 1 m, 200 mW, and 400 ohms.

**Model T2**

**ALIGNMENT PROCEDURE**

The following equipment is required for aligning:
- All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output-indicating Meter - Non-Metallic Screwdriver.
- Dummy Antenna - 1 m, 200 mW, and 400 ohms.

**FREQUENCY RANGE AND SETTINGS**

<table>
<thead>
<tr>
<th>FREQUENCY</th>
<th>CONNECTION AT RADIO</th>
<th>SWITCH</th>
<th>CONDENSER SETTING</th>
<th>ADJUST TRIMMERS TO MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>450 KC</td>
<td>Grid of 1st Div.</td>
<td>J, J</td>
<td>Range B</td>
<td></td>
</tr>
<tr>
<td>RANGE B</td>
<td>1720 KC</td>
<td>A Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range B (C18)</td>
</tr>
<tr>
<td>1500 KC</td>
<td>A Range</td>
<td>B Range</td>
<td>Turn Rotor to Max.</td>
<td></td>
</tr>
<tr>
<td>RANGE C</td>
<td>5400 KC</td>
<td>C Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range C (C19)</td>
</tr>
<tr>
<td>RANGE D</td>
<td>1800 KC</td>
<td>A Range</td>
<td>Turn Rotor to Max.</td>
<td></td>
</tr>
<tr>
<td>600 KC</td>
<td>A Range</td>
<td>B Range</td>
<td>Turn Rotor to Max.</td>
<td></td>
</tr>
</tbody>
</table>

**Alignment Procedure**

1. Connect radio to ground post of signal generator with a short heavy lead.
2. Allow chassis and signal generator to "heat up" for several minutes.
3. Connect dummy antenna to the "dummy" terminal of the signal generator.
4. Adjust signal generator to "oscillator range A" of the test frequencies as listed.
5. Output-indicating meter - Non-Metallic Screwdriver.
6. Dummy antenna is 1 m, 200 mW, and 400 ohms.

**Permeability Tuning Unit**

- **Button**
  - **Turn setting screw to maximum output**
- **Turn coil no. 1 to maximum output**
- **Adjust coil position to maximum output**

**Alignment Procedure**

1. Connect radio to ground post of signal generator with a short heavy lead.
2. Allow chassis and signal generator to "heat up" for several minutes.
3. Connect dummy antenna to the "dummy" terminal of the signal generator.
4. Adjust signal generator to "oscillator range A" of the test frequencies as listed.
5. Output-indicating meter - Non-Metallic Screwdriver.
6. Dummy antenna is 1 m, 200 mW, and 400 ohms.
WG Series A23

Tuning Frequency Ranges

- 500 to 1700 Kc (25-1150 kHz)
- 500 to 1800 Kc (25-1150 kHz)
- 500 to 1900 Kc (25-1150 kHz)
- 500 to 2000 Kc (25-1150 kHz)

Sensitivity

- 60-650 Kc
- 60-650 Kc
- 60-650 Kc

Power Consumption

- 60-650 W (at 115-volt 60-cycles)
- 60-650 W (at 115-volt 60-cycles)
- 60-650 W (at 115-volt 60-cycles)

Power Output

- 50-750 W (at 115-volt 60-cycles)
- 50-750 W (at 115-volt 60-cycles)
- 50-750 W (at 115-volt 60-cycles)

Selectivity

- 45 Kc at 1000 Kc
- 45 Kc at 1000 Kc
- 45 Kc at 1000 Kc

Intermediate Frequency

- 465 Kc
- 465 Kc
- 465 Kc

Speaker

- 6", 8", or 10" Dynamic
- 6", 8", or 10" Dynamic
- 6", 8", or 10" Dynamic

For drive cord data, rack and panel assembly, see index.

The following equipment is required for aligning:

- A Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter—Non-Metallic Screwdriver.
- Dummy Antennas—1 m, 200 m, and 400 ohms.

Aligning Procedure

- Volume control—Maximum All Adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Allow chassis and signal generator to "Heat Up" for several minutes.

Adjust trimmers to maximum.

- L.F.
- Wave trap
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead
- Antenna lead

Connect radio chassis to ground post of signal generator with a short heavy lead. Allow chassis and signal generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

Drive Cord Replacement

- Tied with a small loop at one end of the new drive cord.
- The free end of the drive cord to the tension spring. The distance between knobs should be 4½ inches.
- Pass drive cord over pulley D and B as shown. Continue cord down to shaft P and wind four turns clockwise, progressing towards the chassis. Wing cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B as shown.
- Attach the signal from the signal generator to prevent the breaking-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency and mark is not suitable for use at the frequency under the LF. The signal generator is not for use at the frequency under the LF. The signal generator is not for use at the frequency under the LF.

NOTE B—Tie the wave trap and adjust the trimmer until the lead of greatest intensity is obtained.

Drive Cord Replacement

- Tied with a small loop at one end of the new drive cord.
- The free end of the drive cord to the tension spring. The distance between knobs should be 4½ inches.
- Pass drive cord over pulley D and B as shown. Continue cord down to shaft P and wind four turns clockwise, progressing towards the chassis. Wing cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B as shown.
- Attach the signal from the signal generator to prevent the breaking-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency and mark is not suitable for use at the frequency under the LF. The signal generator is not for use at the frequency under the LF. The signal generator is not for use at the frequency under the LF.

NOTE B—Tie the wave trap and adjust the trimmer until the lead of greatest intensity is obtained.

Drive Cord Replacement

- Tied with a small loop at one end of the new drive cord.
- The free end of the drive cord to the tension spring. The distance between knobs should be 4½ inches.
- Pass drive cord over pulley D and B as shown. Continue cord down to shaft P and wind four turns clockwise, progressing towards the chassis. Wing cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B as shown.
- Attach the signal from the signal generator to prevent the breaking-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency and mark is not suitable for use at the frequency under the LF. The signal generator is not for use at the frequency under the LF. The signal generator is not for use at the frequency under the LF.

NOTE B—Tie the wave trap and adjust the trimmer until the lead of greatest intensity is obtained.
CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

CALIBRATION (For model with pointer in back of collodium dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If the pointer is at a higher KC mark than 800 KC, grasp the drive cord below the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord down until the pointer is at the 800 KC mark. If the pointer is at a lower KC mark than 800 KC, grasp the drive cord above the tension spring, hold the tuning control shaft motionless and slowly pull the drive cord up until the pointer is at the 800 KC mark.

Adjusting Antenna Trimmer

After the batteries are installed and the back of the cabinet is in place, adjust the antenna trimmer.

Accurately tune in a weak station signal between 1400 and 1500 KC on the dial. With a screwdriver turn the adjusting screw of the antenna trimmer up or down until maximum output is obtained. This trimmer is reached through an opening in the bottom of the cabinet—see illustration. CAUTION: Do not remove the cork from the other opening at the bottom of the cabinet.

© John F. Rider, Publisher
Alignment and Calibration

Set the signal generator for 175 kc and connect the output of the signal generator through a 0.05 mF condenser to the grid of the last detector section of the tuning condenser. Connect the ground lead of the signal generator to the chassis. The chassis should be in the case, not the volume control at maximum and the L-D switch in the distance position. Attempt the signal from the signal generator to prevent the leaking of action of the AVC. Then adjust the three I.F. trimmers until maximum output is obtained—See Fig. 2.

Set the signal generator for 1500 kc. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mF condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained.

Adjust the signal generator for 1400 kc. Carefully turn the rotor of the tuning condenser until maximum output is obtained. Add the last detector and antenna 1400 kc trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Set the signal generator for 600 kc. Connect the output through a 0.65 mF condenser to the control grid of the 6K7 R.F. tube. Hook the tuning condenser rotor and adjust the 600 kc oscillator condenser. See Fig. 2.4.7 until the peak of greatest intensity is obtained.

Remove the signal generator set for 600 kc and re-connect the output to the shielded antenna lead through a 120 mF condenser. Adjust the 600 kc antenna trimmer to maximum. (This trimmer is reached from outside of the case—See Fig. 1.)

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the HC side if a low capacity (70 mF) car antenna is used.

Adjusting Antenna 600 kc Trim — After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 kc with the volume control about three-fourths on. Turn the adjusting knobs of the antenna 600 kc trimmer up or down until maximum output is obtained.

Calibrating the Radio — To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the dial unit. The calibration screw is at the bottom of the dial lamp tube. Hold the tuning knob. Insert a fine blade screwdriver and turn the 1st detector and antenna 1400 kc trimmer in a clockwise direction until it is at the frequency of the station being received.

Components of www.nucow.com

©John F. Rider, Publisher
Procedure for Setting the Station Buttons

There are 5 buttons on the automatic tuning dial, by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Make a list of your favorite stations and the buttons you use in regular use.

It is better to list the station with the highest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Depress the manual tuning button and keep it depressed until the entire station is accurately tuned. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1000 KC end of the dial until the station is reached.

Unlock the tuning mechanism by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counterclockwise as far as it will go.

To set stations accurately, do not jar the radio or buttons while the mechanism is unlocked.

Keep the manual tuning button depressed with one hand, and, with the other hand, depress the first (left) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

Turn the manual tuning knob back and forth until the above mentioned station is accurately tuned. See Fig. 1 for location of stations.

Caution—Do not touch this button again, as the mechanism is unlocked as the tuning may be altered.

Next keep the manual tuning button depressed with one hand, and, with the other hand, push in the off button a slight amount—only enough to release any station button which is depressed. Should the off button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1000 KC end of the dial, until the station is reached.

Antenna
A shielded antenna cable with bayonet connector plug is required. The plug on the antenna cable is inserted in the socket at the bottom of the tuning unit case as shown in Fig. 1. The wire at the other end of the cable is connected to the antenna.

Low Capacity Antenna
This antenna is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 15 to 100 milliamperes.

Types of Low Capacity Antennas
—Door hinge; fender; overhead types which are mounted quite a distance from the metal roof of the car.

The antenna should be mounted on the same side of the car as the tuning unit.

High Capacity Antenna
If this radio is to be installed with a high capacity car antenna (200 milliamperes), the total capacity of antenna and shielded cable is in one adapter.

The adapter is inserted in the socket at the bottom of the tuning unit case. Then the antenna plug is installed in the adapter.

Alignment Procedure

Remove grille and speaker from speaker unit.

Remove the chassis from the tuning unit case in accordance with the article under "General Installation and Wiring" in this manual.

Set the signal generator for 450 KC and connect the output of the signal generator to the tuning unit chassis. Set the volume control at maximum and the -D-A switch to the position. Antennate the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 L.F. trimmers until maximum output is obtained.

Three of the trimmers are in the signal generator and the 4th trimmer is at the top of the tuning unit.

(See Fig. 6.)

Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 50 milliamperes. If the cable, for example, has a capacity of 25 milliamperes, use a 5 milliamperes condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1500 KC. Turn the tuning knob until the iron cores are as far out of the tuning unit as possible. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

Adjusting Antenna Trimmer

The antenna is connected, in a weak signal at approximately 1000 KC with the volume control about half-way. Turn the adjusting screw of the antenna trimmer C2 (Fig. 6) until maximum output is obtained. See Fig. 1 for location of this trimmer.
WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE

The following equipment is required for aligning: An all wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed. Output Indicating Meter, Non-Metallic Screwdriver, Dummy Antennas—1 m, 200 mm, and 400 ohms.

VOLTAGES AT SOCKETS


Position of Band Switch; Standard Wave.

TUBE PANEL FUNCTION

<table>
<thead>
<tr>
<th>TUBE</th>
<th>Function</th>
<th>Frequency No. 1</th>
<th>Frequency No. 2</th>
<th>Frequency No. 3</th>
<th>Frequency No. 4</th>
<th>Frequency No. 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4AE4</td>
<td>1st Det.</td>
<td>6,160</td>
<td>95</td>
<td>6,160</td>
<td>95</td>
<td>6,160</td>
</tr>
<tr>
<td>6AG7</td>
<td>2nd Det.</td>
<td>120</td>
<td>95</td>
<td>6,160</td>
<td>95</td>
<td>6,160</td>
</tr>
<tr>
<td>6CG7</td>
<td>3rd Det.</td>
<td>6,160</td>
<td>95</td>
<td>6,160</td>
<td>95</td>
<td>6,160</td>
</tr>
<tr>
<td>6X6</td>
<td>Output</td>
<td>6,160</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>6,160</td>
</tr>
<tr>
<td>7275</td>
<td>Oscillator</td>
<td>6,160</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>6,160</td>
</tr>
</tbody>
</table>

(1) A.C. voltage read across element terminals 2 and 7.
(2) BIAS (12 volts) as read across 830.
(3) Bias voltage as read across 830 and 831.
(4) A.C. voltage as read across element terminals 2 and 8.
(5) A.C. voltage as read across element terminals 8 and 9.

LOAD TUNING ADJUSTMENTS

Pressure of Spacers on Heart Cams—The heart cams must rotate freely relative to the shaft spacers when the tightening lever is in the “slight” position and must not rotate relative to the shaft spacers when the lever is in the “tight” position.

Pressure of the spacers against the heart cams is determined by the position of nut (R) on the threaded shaft—See Fig. 5. If, after the tightening lever is turned to the “tight” position, the spacers can turn relative to the shaft, this nut must be tightened.

Bend back the ears of washer (S)—See Fig. 5, and tighten nut (R) about 1/4 turn. Bend the ears of the washer down again on nut (R). Tighten the tightening lever and see if the spacers are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about 3/4 inch from the end of the slot in the tightening lever. When a reasonable amount of pressure is exerted on this lever...

Connection between Gearing and Cam Shaft—One screw only should be used in the universal joint connection between the camshaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.
ALIGNMENT: Adjust IF trimmers at 175 KC thru .05 mf dummy. Adjust Osc. trimmer at 1501 KC thru 120 mmf dummy if 60 inch cable 70 mmf is used - or thru 25 mmf dummy if 30 inch cable 35 mmf dummy is used. Adjust Interstage and Antenna trimmers at 1400 KC. Readjust Antenna trimmer C2 at 1400 KC.
**ALIGNMENT PROCEDURE**

The following equipment is required for aligning:
- An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies listed.
- Output Indicating Meter—Non-Metallic Screwdriver.
- Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

---

**Table:**

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR</th>
<th>CONNECTION AT RADIO</th>
<th>DUMMY ANTENNA</th>
<th>BAND SWITCH</th>
<th>CONDENSER SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I.F.</strong></td>
<td>Grid of 1st Det.</td>
<td>.1 mf.</td>
<td>B Range</td>
<td>Turn Rotor to Full Open</td>
</tr>
<tr>
<td>Range B</td>
<td>1750 KC</td>
<td>Antenna Lead</td>
<td>200 mmf.</td>
<td>Turn Rotor to Full Open</td>
</tr>
<tr>
<td></td>
<td>1500 KC</td>
<td>Antenna Lead</td>
<td>200 mmf.</td>
<td>Turn Rotor to Max. Output</td>
</tr>
<tr>
<td></td>
<td>400 KC</td>
<td>Antenna Lead</td>
<td>200 mmf.</td>
<td>Turn Rotor to Max. Output</td>
</tr>
<tr>
<td>Range D</td>
<td>18300 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>Turn Rotor to Full Open</td>
</tr>
<tr>
<td></td>
<td>15000 KC</td>
<td>Antenna Lead</td>
<td>400 Ohm</td>
<td>Turn Rotor to Max. Output</td>
</tr>
</tbody>
</table>

**Permeability Tuning Unit**

<table>
<thead>
<tr>
<th>BUTTON DEPRESSED (Band Switch in Push Button Position)</th>
<th>TURN SETTING SCREW TO MAXIMUM OUTPUT</th>
<th>ADJUST COIL POSITION TO MAXIMUM OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>—See Instruction Book</td>
<td>—See Note D</td>
</tr>
<tr>
<td>1100 KC Antenna Lead 200 mmf. No. 1</td>
<td>Setting Screw No. 1</td>
<td>Antenna Coil No. 1</td>
</tr>
<tr>
<td>1100 KC Antenna Lead 200 mmf. No. 2</td>
<td>Setting Screw No. 2</td>
<td>Antenna Coil No. 2</td>
</tr>
<tr>
<td>1100 KC Antenna Lead 200 mmf. No. 3</td>
<td>Setting Screw No. 3</td>
<td>Antenna Coil No. 3</td>
</tr>
<tr>
<td>1100 KC Antenna Lead 200 mmf. No. 4</td>
<td>Setting Screw No. 4</td>
<td>Antenna Coil No. 4</td>
</tr>
<tr>
<td>700 KC Antenna Lead 200 mmf. No. 5</td>
<td>Setting Screw No. 5</td>
<td>Antenna Coil No. 5</td>
</tr>
<tr>
<td>700 KC Antenna Lead 200 mmf. No. 6</td>
<td>Setting Screw No. 6</td>
<td>Antenna Coil No. 6</td>
</tr>
</tbody>
</table>

---

**Diagram:**

- **Fig. 2—Location of Trimmers**

---

©John F. Rider, Publisher

---

**Notes:**
- Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
- After each range is completed, repeat the procedure as a final check.
- **NOTE A:** If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.
- **NOTE B:** Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.
- **NOTE C:** Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.
- **NOTE D:** At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna rear call by twisting the pliers or screwdriver until maximum output is obtained.
- **CAUTION:** When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 as the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.
ALIGNMENT PROCEDURE

To calibrate the radio, tune it to a station of known frequency between 500 and 1500 kHz on the broadcast band. Hold the tuning knob in position and turn the tuning control until it is at the same frequency as the station you are trying to align. This will help prevent the tuning knob from being turned too far in either direction.

ADJUSTING THE RADIO

1. **Sensitivity Adjustment**
   - Turn the tuning knob fully to the left (low frequency) and then back to the right (high frequency). Adjust the sensitivity control to obtain the highest possible signal strength without distortion.

2. **Intermediate Frequency Alignment**
   - Adjust the intermediate frequency control for maximum signal strength at 456 kHz.

3. **Power Output Adjustment**
   - Adjust the power output control to obtain a power output of 50 watts.

Movie Dial Adjustments and General Service Data

**Adjusting Height of Image on Screen**

The image height should be adjusted so that the center of the screen is vertically centered. If the image is not centered, move the centering screws on the front panel of the set until the image is centered.

**Calibrating the Radio**

To calibrate the radio, tune it to a station of known frequency between 500 and 1500 kHz on the broadcast band. Hold the tuning knob in position and turn the tuning control until it is at the same frequency as the station you are trying to align. This will help prevent the tuning knob from being turned too far in either direction.

**Basic Model**

The basic model of the radio has a simple circuit design. It uses a vacuum tube for amplification, and the signal is fed into a speaker for output. The circuit is designed to be easy to understand and repair. It is well-suited for hobbyists and DIY enthusiasts.

**Intermediate Frequency**

The intermediate frequency is 456 kHz. This frequency is used to separate the audio and modulated signal from the carrier and sidebands.

**Power Output**

The power output of the radio is 50 watts. This is sufficient for most applications and ensures that the radio can be heard in noisy environments.

**Sensitivity**

The sensitivity of the radio is 2.0 microvolts at 500 kHz and 3.0 microvolts at 1500 kHz.

**Selectivity**

The selectivity of the radio is 250 kHz at 500 kHz and 100 kHz at 1500 kHz. This ensures that the radio can receive multiple stations without interference from adjacent stations.

**Intermediate Frequency - 456 KC**

The intermediate frequency of the radio is 456 kHz. This frequency is used to separate the audio and modulated signal from the carrier and sidebands.

**Power Consumption**

The power consumption of the radio is 80 watts. This is sufficient for most applications and ensures that the radio can be heard in noisy environments.
**MODEL A80 Series**

**Schematic, Voltage Socket, Coils Specifications**

**SPECIFICATIONS**

- **Power Consumption**: 65 Watts (At 117 volts 60 cycles)
- **Power Output**: 5.0 Watts Undistorted
  - 4.5 Watts Minimum
- **Selectivity**: 40 KC Broad at 1900 times Signal
- **Intermediate Frequency**: 456 KC
- **Speaker**: 8" or 10" Dynamic

**Tuning Frequency Range**

<table>
<thead>
<tr>
<th>Range</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>525 to 1700 KC (Kilocycles)</td>
</tr>
<tr>
<td>D</td>
<td>3750 to 16000 KC (Kilocycles)</td>
</tr>
</tbody>
</table>

**Sensitivity**

- **B Range**: 15 Microvolts Average
- **D Range**: 41 Microvolts Average

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltages indicated are between the socket terminal and ground. These voltages are read under the following conditions:

- **Line Voltage**: 117.
- **Volume Control**: Maximum.
- **Antenna**: Shorted to Ground.
- **Readings**: Taken with 1000 ohm-per-volt meter.

© John F. Rider, Publisher

Compliments of www.nucow.com
Selecting the Stations to be Set

There are 6 buttons on the push button tuning dial by means of which 6 stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lowest kilocycle number next, and so on.

Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from button 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate. When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position—See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in clockwise will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, acquire the exact tuning in this station. The station is now set on this button.

To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the correct position again and tune in with the setting screw.

Remove the station call letter tab from the sheet provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will immediately change the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through it in the celluloid tab and through the call letter tab.

**WG SERIES A20 ALIGNMENT, DRIVE CORD DATA, PHONOGRAPH NOTES.**

**ALIGNMENT PROCEDURE**

**Voltage at Sockets**

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground. These voltages are read under the following conditions:

- Line Voltage—117V
- Volume Control—Maximum
- Antenna Shorted to Ground
- Readings taken with 1000 ohm-per-volt meter.

**Models**

- **A20**
- **S2**

**Phonograph Connections**

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knockout 1 3/4 inches in diameter. An empty base socket is mounted in this knockout opening and wired as shown in the schematic. A phone cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

---

Drive Cord Replacement

 Tie a knot with a small loop at one end of the new drive cord. Slide a 14" length of fabric tubing over the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 4 3/4 inches.

Arrange to keep the gang condenser in the completely closed position.

Place the loop end of the drive cord over knob A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum B. Pass the cord over pulleys D and E as shown. Be sure that the fabric tubing is now between pulleys D and E. Continue cord down to shaft F and wind 2 1/2 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord on setting tension spring through slot C and secure the free end of the spring on knob A.

DIAL POINTERS ATTACHMENT

-Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

---

©John F. Rider, Publisher
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to “Heat Up” for several minutes. IMPORTANT—Follow procedure in the order shown.

<table>
<thead>
<tr>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>CONNECTION AT RADIO</th>
<th>DUMMY ANTENNA</th>
<th>BAND SWITCH SETTING</th>
<th>CONDENSER OR DIAL SETTING</th>
<th>ADJUST TRIMMERS TO MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F. 456 KC Grid of 1st Det, 5 mf.</td>
<td>B Range</td>
<td>Turn Rotor to Full Open</td>
<td>2nd L.F. (C16) &amp; (C17) 1st L.F. (C14) &amp; (C15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAVE TRAP 456 KC Antenna Lead 200 mf.</td>
<td>B Range</td>
<td>400 KC</td>
<td>Wave Trap (C5) Adjust for MINIMUM Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RANGE B</td>
<td>Turn Rotor to Full Closed Position. Pointer should be at low frequency and mark on scale—see Note A.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500 KC Antenna Lead 200 mf.</td>
<td>B Range</td>
<td>Turn Rotor until dial pointer is at 1500 KC</td>
<td>Oscillator Range B (C11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500 KC Antenna Lead 200 mf.</td>
<td>B Range</td>
<td>Leave Rotor at above setting</td>
<td>Anti. Range B (C3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 KC Antenna Lead 200 mf.</td>
<td>B Range</td>
<td>Turn Rotor to Max. Output</td>
<td>600 KC (C4) Rack Rotor—See Note B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RANGE D 18,500 KC Antenna Lead 400 Qhm</td>
<td>D Range</td>
<td>Turn Rotor to Full Open</td>
<td>Oscillator Range D (C4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,000 KC Antenna Lead 400 Qhm</td>
<td>D Range</td>
<td>Turn Rotor to Max. Output</td>
<td>Anti. Range D (C1) Rack Rotor—See Note B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE A—The low frequency mark is at a small dot at the left side of the short wave beam under the “L.” of the number 58 and to the right of the “C” of the letters KG. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmers until the peak of greatest intensity is obtained.

NOTE C—After each range is completed, repeat the procedure as a final check.

General Service Data

Drive Cord Replacement

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gland condenser to the full open position. Hook the cord in slot B and turn the gland condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counter-clockwise (from front of chassis) around the drive shaft-spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gland condenser to the full open position. If necessary, stretch the tension spring and pull the cord over the drum. Pass drive cord through slot B and secure the loop to the tension spring at point G.

EARLY MODELS—In the early models using a larger drive shaft-spool (See Fig. 4), there should be a distance of 65½ inches between the knots.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5. The lower rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the rack and pinion assembly. The rear and side brackets can then be mounted on the rack and pinion assembly.

© John F. Rider, Publisher

Compliments of www.nucow.com
The chassis used in this model is almost identical to the chassis used in WG Series, except for the re-mounting of the electrolytic condenser in order to keep the motor socket to the back panel of the chassis, and the phone attachment piece. The alignment procedure and other service data given for Series A22 also applies to this model.

© John F. Rider, Publisher
INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the Western Auto Supply Company requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:

1. Master Selector: This includes the Selectors, the Drive, and the Selector Accessory. Two parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

2. Motor and Drive: This assembly consists of the motor driving a mechanical drive clutch with magnetic chucks, and a train of gears operating directly on the Manual Station Selector drive shaft. No oiling is necessary.

3. Push Button Assembly: These buttons are located on the front of the chassis, and serve as the ejection switch above the circuit. Stations are tuned in automatically when the button with the call letters for the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic timer counts the time of the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR

As a means of simplifying these operations, list ten of your favorite local or strong nearby stations according to frequency or position on the dial. Setting up week or distant stations is not recommended. Call the station nearest the left-hand end of the dial (near 600 kc) the No. 1 station; and number the other stations similarly, starting from left to right across the dial. For example, assume that your favorite stations operate on frequencies of 400 kc, 700 kc, 800 kc, 900 kc, 1000 kc, 1100 kc, 1200 kc, and 1500 kc. Each of the above frequencies above the circuit would then be No. 1, the 700 kc station would be No. 2, and so on down the list with the 1500 kc station being designated No. 10.

Reference to the push buttons is not necessary since they are not used until after the Master Selector has been set up.

On the back of the receiver will be found the Selectors and the ten Contact Pins which determine the points at which the receiver will stop when the buttons are pressed. Referring to the diagrams, Fig. 1 shows the general layout and relation of the drive and contacts. Fig. 2 shows one of the contact pins in detail. Note that while the position of the contact may be varied at will by sliding it along the pin is held in place by a spring which will allow it to move when the selector switch is turned off. Fig. 3 shows the arrangement of the Contact Pins, each pin being numbered according to the system suggested for numbering the stations, thus pin No. 1 will be used for Station No. 1, pin No. 2 will be used for Station No. 2, and so on down the list.

On the Selector are two pairs of Contact Ribbons. Note that there is a Pulsed Dot on the edge of the drum opposite the position of the contact ribbon in the upper half of the drum. This Pulsed Dot is for the purpose of bearing the approximate position at which a Contact Pin is set in order to have the drum stop at a particular station.

It is very important that the following steps be followed exactly as outlined, any deviation necessitate re-setting of the stations:

1. Set the receiver for reception of Standard Broadcast Stations at the approximate positions of the call letters. Then plug the Master Control Switch to the extreme right-hand position and wait about five minutes to allow the lamp to reach its final operating temperature.

2. Using the Manual Station Selector, "knob" turn the knob in the No. 1 station, that is, the one nearest the 600 kc end of the dial. Watch the tuning eye closing, making certain that the station is tuned in perfectly.

3. Face the rear of the chassis. Attach the lead from the Station Selector to the No. 1 Contact Pin, using the pin head which is to be used to strike the contact ribbon. When the pin is directly opposite the Pulsed Dot, the lamp will go out, indicating that the circuit is properly set. To insure greater accuracy in making the setting, slide the pin back and forth across the position, leaving it set half way between the position and leaving the position of the lamp lights. Be very careful not to move the Selector while the pin is being set. When the pin is properly in its proper position, Disconnect the Selector Light Lead from the Pin.

5. Repeat the above procedure for No. 2 station; tune in the station, connect the Selector Lead to the No. 2 contact pin, move this pin to the Position of the station, disconnect the Selector Lead, and then the light is on.

6. Using similar procedure, set up the other eight stations, in each case using the Contact Pin bearing the number as that assigned to the station being set up. Always Disconnect the Compliments of www.nucow.com
Compliments of www.nucow.com

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Part No.</th>
<th>Description</th>
<th>R4</th>
<th>617</th>
<th>20 M 1/3 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1.2.3</td>
<td>4354</td>
<td>Variable Condenser R5</td>
<td>4530</td>
<td>30 M 1 W</td>
<td></td>
</tr>
<tr>
<td>C4.9</td>
<td>1611</td>
<td>3-35 MMF trimmer R7.11.13</td>
<td>624</td>
<td>1 Meg 1/3 W</td>
<td></td>
</tr>
<tr>
<td>C5.6.7.8</td>
<td>2597</td>
<td>1-10 MMF trimmer R9</td>
<td>500 M volume control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R11</td>
<td>2793</td>
<td>0.066-600 V 5% R12.22</td>
<td>627</td>
<td>2 Meg tone control</td>
<td></td>
</tr>
<tr>
<td>R12</td>
<td>2741</td>
<td>1330 MMF mica 5% R14.18.19.20.21</td>
<td>2730</td>
<td>1 Meg 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C13</td>
<td>2560</td>
<td>200-400 MMF padder R15</td>
<td>2730</td>
<td>200 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C14</td>
<td>2576</td>
<td>0.02-400 V R16</td>
<td>2730</td>
<td>200 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C15</td>
<td>2576</td>
<td>IF trimmers R17</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C16.25</td>
<td>2892</td>
<td>2-200 V R23</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C17</td>
<td>4528</td>
<td>4 MF—150 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C18.32</td>
<td>1286</td>
<td>250 MMF mica R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C19</td>
<td>576</td>
<td>0.02-400 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C20</td>
<td>572</td>
<td>0.05-600 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C21</td>
<td>581</td>
<td>0.05-600 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C22.24</td>
<td>2600</td>
<td>0.02-600 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C23</td>
<td>2600</td>
<td>0.05-600 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C26.27</td>
<td>2691</td>
<td>0.01-600 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C28</td>
<td>3135</td>
<td>0.035-800 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C9</td>
<td>3375</td>
<td>16 MF—450 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C30</td>
<td>4062</td>
<td>30 MF—275 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>C31</td>
<td>580</td>
<td>0.05-200 V R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>R1.6.8</td>
<td>631</td>
<td>200 M 1/3 W R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
<tr>
<td>R2.3</td>
<td>2689</td>
<td>50 ohm 1/3 W 10% R24</td>
<td>3500</td>
<td>10 M 1/3 W 10%</td>
<td></td>
</tr>
</tbody>
</table>

Do not use tubes of types different from those shown above.

ALIGNMENT PROCEDURE

IF: Connect the generator ground to receiver chassis. Using a 1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6D6 IF amplifier and align second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF: (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1680 kc. signal to antenna terminal and adjust broadcast oscillator for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment.
alignment of short-wave bands

An A-20 ohm resistance must be used in series with the generator as a "dummy" antenna for proper alignment of the two short-wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 5000 kc., then align the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 16,000 kc., and align the antenna trimmer at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second turn. The antenna trimmer should be screwed down tight, then unscrew to the last turn. This procedure must be followed in order that the oscillator and RC circuits will be in correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

Tubes required are:
1. 6AL7 Oscillator-translactor
2. 6D6 Intermediate Frequency Amplifier
3. 6G7GT Detent AVC—First Audio Amplifier
4. 76 Driver—Phase Inverter
5. 76 Shunt
6. 42 Power Output
7. 80 Rectifier
8. 6G2 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Operating suggestions:

Be sure that your stations are listed in the proper order according to your frequency or position on the dial. Do not continue to tune your receiver until you have found the station you are looking for. If you use a station in exactly the same place as a station in another, you will not be able to do so. Also, do not adjust the receiver to any point in the lower half of the dial. Always make sure that the receiver is properly adjusted before starting to listen.

William A. Rider, Publisher
Tubes must be in proper position and connected as shown.

Tubes required are:
1—76 Driver—Phase Inverter
1—6A7 Oscillator-translator
2—6D6 Intermediate Frequency Amplifiers
1—76 Automatic Bias Control
1—75 Detector AVC—First Audio Amplifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Do not use tubes of types different from those shown above. When replacing tubes or checking connections, refer to the TUBE LAYOUT CHART.

Connections

Turn the lower right knob to the left as far as it will go. This turns the power switch "off."

Connect the antenna and ground leads to the receiver as shown on the diagrams below. For use with a single wire antenna, connect as shown on Figure 1. If used with a doublet antenna, connect according to Figure 2.
RANGE C ALIGNMENT

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the i.f. frequency. This can be checked at the 3000 kc. for the signal generator. Connect the antenna lead of the receiver through the 400 ohm resistor to the output of the signal generator. Connect the antenna lead of the receiver through the 400 ohm resistor to the output of the signal generator. Set the signal generator for 500 kc. and adjust the trimmer for maximum output. Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjust

Set the signal generator for 1800 kc. and adjust the trimmer for maximum output. Do not change the setting of the oscillator Range C trimmer.

RANGE D ALIGNMENT

Set the signal generator for 1500 kc. and adjust the trimmer for maximum output. Do not change the setting of the oscillator Range B trimmer.

600 KC Adjust

Set the signal generator for 600 kc. and adjust the trimmer for maximum output. Do not change the setting of the oscillator Range D trimmer.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjust

Set the signal generator for 6000 kc. and adjust the trimmer for maximum output. Do not change the setting of the oscillator Range D trimmer.

TRIMMER REPLACEMENT

If the trimmer on the gang trimmer strip should become defective, it is necessary to replace the entire strip. A single trimmer P-1702 is shown in the receiver. There may be none. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the trimmer with a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ground lead as far from ground as possible.

PLANETARY DRIVE ASSEMBLY

The planetary assembly is the unit that is integral with the tuning shaft. If the nut on the back end of this assembly is too tight, the drive will be jerky and will run hard in high speed. If this condition exists, back off the nut one or two turns and note the effect.

If the行星 assembly is too loose, the drive will slip in slow speed and in slow speed in the case of a non-planetary assembly. The planetary assembly is integral with the tuning shaft. This may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

PHONOGRAPH CONNECTIONS

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Connect the output of the phonograph jack to the phone switch—See Fig. 7. The phone switch should be mounted with one set of terminals nearest the bottom of the chassis base. The connections are made by opening the phone jack switch at the volume control. This is done by removing the wire connecting the center conductor to the speaker terminals. The connections are made by opening the phone switch at the volume control. This is done by removing the wire connecting the center conductor to the speaker terminals. The connections are made by opening the phone switch at the volume control. This is done by removing the wire connecting the center conductor to the speaker terminals.
Western Auto Supply Co.

Model D307

Schematic Print Data

Compliments of www.nucow.com

Tuning Frequency Range
- 456 KC.

Intermediate Frequency - 456 KC.

Sensitivity
- B Range: 1.0 Microvolts Average
- C Range: 1.0 Microvolts Average
- D Range: 2.0 Microvolts Average

MAY, 1937

Fig. 2 - Schematic Circuit Diagram

Speaker 12" Dynamic

Transformer Data

Power Output - 100 Watts
(At 177 volts 60 cycle)
9.8 Watts minimum

Power Consumption - 100 Watts
ALIGNMENT PROCEDURE

The following equipment is required for aligning:
- An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output Indicating Meter — Non-Metallic Screwdriver.
- Dummy Antennas — .1 mF, 200 mV, and 400 ohms.

**Alignment** and **Circuit Data**

**WESER AUTO SUPPLY CO.**

**Trimmers, Coils**

11 TUBE • 3 BAND • ALL WAVE

**Compliments of www.nucow.com**
### WESTERN AUTO SUPPLY CO.

**VOLTAGES AT SOCKETS**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltages taken with 1000 Ohm-per-volt meter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>R.F.</td>
<td>0, 6.1 (7)</td>
</tr>
<tr>
<td>4516</td>
<td>P.R.</td>
<td>0, 6.1 (7)</td>
</tr>
<tr>
<td>4516</td>
<td>1st Dec.</td>
<td>0, 6.1 (7)</td>
</tr>
<tr>
<td>455S</td>
<td></td>
<td>250, 125 (10)</td>
</tr>
<tr>
<td>456S</td>
<td></td>
<td>250, 100 (10)</td>
</tr>
<tr>
<td>456S</td>
<td></td>
<td>0, 10 (10)</td>
</tr>
<tr>
<td>456S</td>
<td></td>
<td>9.7 (10)</td>
</tr>
<tr>
<td>456S</td>
<td></td>
<td>8.9 (10)</td>
</tr>
<tr>
<td>456S</td>
<td></td>
<td>7.5 (10)</td>
</tr>
</tbody>
</table>

**VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)**

<table>
<thead>
<tr>
<th>Socket</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Prong No. 7</th>
<th>Prong No. 8</th>
<th>Prong No. 9</th>
<th>Prong No. 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>456S</td>
<td>20</td>
<td>250</td>
<td>0</td>
<td>6.1 A.C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### PHONOGRAPH CONNECTIONS

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1½ inches in diameter. An octal base socket is mounted in this knockout, opening and wired as shown in the schematic.

---

### REPLACEMENT PARTS

**NOTICE:** There is a large letter on the chassis which identifies the set as a major part changer. When ordering parts, please be sure to mention the serial number and this large letter.

---

### MISCELLANEOUS SOCKETS

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>4516</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>455S</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>C28</td>
<td></td>
</tr>
</tbody>
</table>

---

### ELECTROLYTIC CONDENSERS

<table>
<thead>
<tr>
<th>Part</th>
<th>Code</th>
<th>Description</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>4516</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>455S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
<tr>
<td>456S</td>
<td>20</td>
<td>C28</td>
<td></td>
</tr>
</tbody>
</table>

---

### RESISTORS

<table>
<thead>
<tr>
<th>Part</th>
<th>Code</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>4516</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>455S</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>5.0 Ohm</td>
</tr>
</tbody>
</table>

---

### TRANSFORMERS AND COILS

<table>
<thead>
<tr>
<th>Part</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>4516</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>455S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
</tbody>
</table>

---

### PHono ATTACHMENT PARTS

<table>
<thead>
<tr>
<th>Part</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>457</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>4516</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>455S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
<tr>
<td>456S</td>
<td>25</td>
<td>C28</td>
</tr>
</tbody>
</table>

---

©John F. Rider, Publisher

Compliments of www.nucow.com
Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters may be push buttons.
No. 11 Dial—17 Button Telephone Dial—Station call letters may be push buttons, brown.
No. 10 Dial—17 Button Telephone Dial—Station call letters may be rectangular in shape and are mounted in rectangular openings in a cardboard ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.
No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

The following description will identify the chassis used with the above dials:

8 Tube—D697
11 Tube—D697

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-selecting a number of broadcasting stations and tuning in those stations at any time by depressing a button and rotating the dial to a stop position. The apparatus is mounted on an assembly attached to the rear of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in nil time between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it. In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal, or if one of these buttons, it can be corrected as follows:

If Noise Occurs on All Buttons—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to remove any good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

If Noise Occurs on One Button Only—This is due to a poor contact between the pulley ring stud, spring, contact washer and contact ring—See Fig. 1. Clean the flat contact spring and contact ring, as mentioned previously, so as to provide a good electrical connection.

Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord. Remove the telephone dial assembly. Loosen the rubber pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not come in contact with the stop pin. If it does, there is a possibility of the stoppin being pushed back and it may also throw off the balance of the condenser.

Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

Telephone Dial Replacements

Replacing Complete Dial and Gang Condenser Assembly

Remove the grid lead clip from the tube grid cap. Remove silencer cable from the coaxial spring assembly. Un solder dial lamp lead from terminal of tube socket. Un solder the three stator section connections of the gang condenser. Un solder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a copper pin. Remove only the copper pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushioning slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the previous procedure as given above.

Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from ground of the tube socket. Pull this lead through and out to the front of the assembly. Remove the four screws which hold the eccentric pulley ring and glass crystal in place. The dial axle pointer is removed by unhooking it from the center shaft. Un solder and pull remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin should be directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the correct position—see Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—see Fig. 2.

Place the pulley ring assembly on the shaft with the lines of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) 1/2 revolution until the stop pin passes over the right gate and comes to rest against the left gate—see Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the fixed gear only (front) of the condenser drive gear assembly. Hold the pulley ring assembly and drop in a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—see Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, by the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button space ring. Solder the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly Only.

The stop gate assembly is then removed by taking off the two screws at the bottom of the assembly.

©John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT PROCEEDURE

The following equipment is required for aligning:

**An All Wave Signal Generator**, which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter — Non-Metallic Screwdriver.

Dummy Antennas — .1 mf., 200 mic., and 400 ohms.

**Initial Steps**

1. Turn the receiver off and unplug it.
2. Disconnect all the external connections.
3. Remove the cover from the receiver.
4. Remove the front panel from the receiver.

**Alignment Procedure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Band Switch Setting</th>
<th>Dummy Antenna Setting</th>
<th>Signal Generator Setting</th>
<th>Transmitters Adjusted</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. A</td>
<td>1.4 Mf. Adj.</td>
<td>Range D</td>
<td>22,000 KC</td>
<td>Antenna Lead</td>
<td>Oscillator Range D (C19)</td>
</tr>
</tbody>
</table>

**Tubes**

- **1.4 Mf. Adj.**
- **1.4 Mf. Adj.**
- **1.4 Mf. Adj.**
- **1.4 Mf. Adj.**
- **1.4 Mf. Adj.**
- **1.4 Mf. Adj.**

**Wattage at Sockets**

- **220 VAC**
- **110 VAC**
- **110 VAC**
- **110 VAC**
- **110 VAC**
- **110 VAC**

**Compliments of www.nucow.com**
Compliments of www.nucow.com

**Circuit**

This model is a three band radio with a tuning range in the AM band. The circuit is shown in the schematic diagram. AM band coverage is accomplished by means of three sections of R, F, and oscillator and in a two-section triode type switch.

**Alignment and Calibration**

Current alignment is important in order to ensure proper alignment with all wave radios. The receiver has been properly aligned at the factory with precision instruments and should not be attempted unless all other possible causes of the faulty operation have been investigated. Unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 455 kHz, 1500, 600, 500, 1000, 1800, 15,000, and 6000 kHz and an output indicating meter is required. It should be practically impossible to align the receiver without the use of special equipment.

Use a non-magnetic screwdriver for the adjustment. The complete procedure is as follows:

**L.F. Adjustment**

Set the signal generator for a signal of 456 kHz.

Connect the output of the signal generator through an A.M. coupling to the grid of the A.F.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the normal position and keep it in this position for all adjustments.

Set the volume control to the maximum position. Switch the A.F. coupling to the standard wave band.

Adjust the coupling to the signal generator in order to prevent the feedback of signal from the A.F.

**Range B Alignment**

Connect the antenna of the receiver to the full open position.

Connect the band selector to the standard wave band.

Set the antenna of the receiver to the full open position.

Connect the signal generator to the antenna of the receiver.

Connect the oscillator of the receiver to the output of the signal generator.

Set the signal generator to 1750 kHz. Turn the volume control to the maximum position and adjust the oscillator of the receiver until maximum output is obtained. Set the oscillator of the receiver to the 1750 kHz mark and the maximum output is obtained. Set the oscillator of the receiver to the 1500 kHz mark and the maximum output is obtained. Set the oscillator of the receiver to the 600 kHz mark and the maximum output is obtained. Set the oscillator of the receiver to the 1800 kHz mark and the maximum output is obtained. Set the oscillator of the receiver to the 2000 kHz mark and the maximum output is obtained.

**Range A Alignment**

Connect the antenna of the receiver to the full open position.

Connect the signal generator to the antenna of the receiver.

Connect the oscillator of the receiver to the output of the signal generator.

Set the signal generator to 1150 kHz. Turn the volume control to the maximum position and adjust the oscillator of the receiver until maximum output is obtained. Set the oscillator of the receiver to the 1150 kHz mark and the maximum output is obtained. Set the oscillator of the receiver to the 1500 kHz mark and the maximum output is obtained. Set the oscillator of the receiver to the 1500 kHz mark and the maximum output is obtained.

**Trimmer Replacement**

If a trimmer of the gain trimmer strip has become defective, it is not necessary to replace the entire strip. A single trimmer F-71-A may be used to replace the trimmer section. Connect the lead from the old trimmer to the new trimmer and the gain trimmer strip is replaced.
Drive Assembly

This model uses a two-speed planetary drive.

All of the early sets are equipped with a flat belt and may be identified by the 1/4 inch wide belt. The later sets use the same type of drive, but have a black cord belt. This is a bronze cable with a black fabric covering. It is about 1/4 inch in diameter.

The belt type also has an idler pulley which the cord type does not have.

The planetary assembly is the unit that is integral with the pulley shaft. It is at the bottom of the pulley. If the nut of this assembly is too tight, the drive will be jerky in corners and turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in low speed. The remedy in this case is, of course, to tighten the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too loose and a new one will be required. In the sets with the flat belt type of drive, there is an idler pulley which can be positioned, and by means of which the belt tension can be increased. In this type, therefore, the belt tension should be increased before attempting to put on a new one.

The replacement parts list shows the parts used in each type of drive and the parts common to both types.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knobs are provided in the back panel of the chassis for mounting the phone jack and phone switch. See Fig. 8.

The phone switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unplug the 01 mf condenser C27 from the volume control.

Strip about 3/4 inches of the sheathing from each of the ends of the cable furnished with the phone attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phone switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phone switch as shown in Fig. 7. Both of the shielded cable leads connected to the phone switch are connected to the switch terminals nearest the chassis base.

Before connecting the cable leads to the phone switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6k7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lug on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the 01 mf, tubular condenser C16 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phone switch and the lead between the tone control and tubular condenser C16.

After making the phone connections, the I.F. stages should be realigned.
**Drive Cord Replacement**

**LATE MODELS**—Tie a knot with a small loop at one end of the new drive cord. Slide a 1 1/2 inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56 inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3 1/2 turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

**EARLY MODELS**—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 48 inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

**Permeability Tuning and Band Switch Assemblies—Differences in Early Models**

A few of the first models used a station button plunger 6 1/2 inches long. These models may be identified by red paint mark on the front bracket of the tuning unit at the upper right corner. On later models, this length was changed to 8 1/2 inches. These models have an orange paint mark in place of the red mark. It is important, therefore, that the length be noted when ordering this part and the correct part number, as shown in the parts list, be specified.

---

**ATTACHING DIAL POINTER**—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.
"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 regulator 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.

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 filament. 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.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the push button 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 plate 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 the hole far enough to tie a knot near the end. Make this knot tight 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 1/4" 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 over 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 on the drive shaft 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 hook in the spring in order to put greater tension on the spring.

Replace the on-off indicator dial, care being taken that the indicator tape lines up with the pointer and place it in the dial assembly.

If the rivets are broken use No. 7 by 3/4" 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.

Alignment Procedure and Dial Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at particular calls 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 power meter are required for indicating the effect of adjustments. Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

1. F. Adjustment

Set the signal generator for a signal of 175 KC. Connect the antenna lead of the signal generator thru the 1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser to a lug at the bottom of the B, 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 1. 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 150 mfd. 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

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>15 microvolts absolute</td>
</tr>
<tr>
<td>Tuning Range</td>
<td>530 to 1750 KC</td>
</tr>
<tr>
<td>Intermediate Frequency</td>
<td>175 KC</td>
</tr>
<tr>
<td>Speaker</td>
<td>6&quot; magnetic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input Voltages</th>
<th>Power Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A' Battery 3.0 volts</td>
<td>1 Watt (Undistorted)</td>
</tr>
<tr>
<td>'B' Batteries 750 volts</td>
<td>450 watts, 9 and 855 volts</td>
</tr>
<tr>
<td>'C' Batteries 135 volts</td>
<td>200 watts, 450 and 855 volts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage at Sockets</th>
<th>Volume Control at Maximum</th>
<th>Antenna Shorted to Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Plate</td>
<td>Grid</td>
</tr>
<tr>
<td>3.0</td>
<td>2.0</td>
<td>0.5</td>
</tr>
<tr>
<td>3.4</td>
<td>2.0</td>
<td>0.5</td>
</tr>
<tr>
<td>3.7</td>
<td>2.0</td>
<td>0.5</td>
</tr>
<tr>
<td>3.9</td>
<td>2.0</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Compliments of www.nucow.com

May, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

Following are the D.C. resistances of the various windings in the chassis.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Code</th>
<th>D.C. Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A3R1</td>
<td>T1</td>
<td>17.</td>
</tr>
<tr>
<td>9A3R3</td>
<td>T1</td>
<td>3.5</td>
</tr>
<tr>
<td>9A3R3</td>
<td>T2</td>
<td>5.5</td>
</tr>
<tr>
<td>9A3R3</td>
<td>T3</td>
<td>80.</td>
</tr>
<tr>
<td>9A3R3</td>
<td>T3</td>
<td>101.</td>
</tr>
<tr>
<td>9A3R3</td>
<td>T4</td>
<td>50.</td>
</tr>
<tr>
<td>9A3R3</td>
<td>L1</td>
<td>Small</td>
</tr>
<tr>
<td>9A3R3</td>
<td>L2</td>
<td>Small</td>
</tr>
<tr>
<td>58X11</td>
<td>T3</td>
<td>950.</td>
</tr>
<tr>
<td>58X11</td>
<td>T3</td>
<td>600.</td>
</tr>
<tr>
<td>58X11</td>
<td>T3</td>
<td>550.</td>
</tr>
<tr>
<td>58X11</td>
<td>T3</td>
<td>250.</td>
</tr>
<tr>
<td>58X11</td>
<td>T3</td>
<td>250.</td>
</tr>
</tbody>
</table>

R1 10 MEG OHM .2 W.
R2 10,000 OHM .5 W.
R3 60,000 OHM .5 W.
R4 900 OHM .2 W.
R5 6,000 OHM .2 W.
R6 2.0 MEG OHM .2 W.
R7 100,000 OHM .5 W.
R8 40,000 OHM .5 W.
R9 10 MEG OHM .2 W.

L1 SINGLE FILAMENT REACTOR (P-9A281)
L2 SINGLE FILAMENT REACTOR (P-9A281)
T1 DOUBLE TUNED ANTENNA COIL (P-9A381)
T2 1ST I.F. COIL (P-9A382)
T3 O.S.C. Coil (P-9A382)
T4 S.S.B. COIL (P-9A384)
T5 AUDIO INPUT TRANS. (P-50X11)

©John F. Rider, Publisher
Six Tube 6 Volt Battery Dual Wave Superheterodyne

This receiver is designed to operate over two tuning ranges from 335 to 1730 Kilocycles (KC) (1734 to 561 meters), and from 550 to 8,100 Kilocycles (KC) (165.5 to 53 meters). This receiver requires a good ground.

**Schematic**

**Socket Trimmers Alignment**

**PROCEDURE**

**I.F. ALIGNMENT**

1. Adjust the short wave band alignment to give the best signal reception.
2. Adjust the broadcast band alignment to give the best signal reception.
3. Set the oscillator trimmer at its minimum setting.
4. Connect the broadcast oscillator to the oscillator trimmer. The signal should be at its maximum.
5. Adjust the oscillator trimmer until the broadcast oscillator signal is at its maximum.
6. Connect the short wave oscillator to the oscillator trimmer. The signal should be at its maximum.
7. Adjust the oscillator trimmer until the short wave oscillator signal is at its maximum.

**SHORT WAVE BAND ALIGNMENT**

1. Adjust the short wave band alignment to give the best signal reception.
2. Adjust the broadcast band alignment to give the best signal reception.
3. Set the oscillator trimmer at its minimum setting.
4. Connect the broadcast oscillator to the oscillator trimmer. The signal should be at its maximum.
5. Adjust the oscillator trimmer until the broadcast oscillator signal is at its maximum.
6. Connect the short wave oscillator to the oscillator trimmer. The signal should be at its maximum.
7. Adjust the oscillator trimmer until the short wave oscillator signal is at its maximum.

**BROADCAST BAND ALIGNMENT**

1. Adjust the broadcast band alignment to give the best signal reception.
2. Adjust the short wave band alignment to give the best signal reception.
3. Set the oscillator trimmer at its minimum setting.
4. Connect the broadcast oscillator to the oscillator trimmer. The signal should be at its maximum.
5. Adjust the oscillator trimmer until the broadcast oscillator signal is at its maximum.
6. Connect the short wave oscillator to the oscillator trimmer. The signal should be at its maximum.
7. Adjust the oscillator trimmer until the short wave oscillator signal is at its maximum.

**COMPLEMENTS OF WWW.NUCOW.COM**
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 at 456, 1700, 1500, 600, 1800, 15000, and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory operation 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 antenna lead of the signal generator through 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.

130 KC Adjustment

Set the signal generator for 1700 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 210 MF 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.

2000 KC Adjustment

Set the signal generator for 2000 KC.

Adjust the oscillator standard wave trimmer (C19) carefully until maximum output is obtained.

3000 KC Adjustment

Set the signal generator for 3000 KC.

Adjust the oscillator standard wave trimmer (C19) carefully until maximum output is obtained.

4500 KC Adjustment

Set the signal generator for 4500 KC.

Adjust the oscillator standard wave trimmer (C19) carefully until maximum output is obtained.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Adjust the oscillator standard wave trimmer (C19) carefully until maximum output is obtained.

Adjust the oscillator standard wave trimmer (C19) carefully until maximum output is obtained.
**Models D-710, D-711, S-710, S-711 (1935)**

**Phonograph Connections**

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knuckleouts are provided in the back panel of the chassis for mounting the phonograph jack and phone switch — see Fig. 8.

For mounting the 12 mfd. 25 volt 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 1/4" from the bottom, 3/4" and 3/4" 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. Pull the 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 to the phone 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 phone switch as shown in Fig. 7. To this same terminal on the phone 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 phone volume and tone.

**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 necessary to remove one of the 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 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.

**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.

**PHONO ATTACHMENT PARTS**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A183</td>
<td>Phone Switch</td>
<td>75</td>
</tr>
<tr>
<td>9A282</td>
<td>Phone Jack</td>
<td>75</td>
</tr>
<tr>
<td>9A283</td>
<td>12 Volt. Dry Electrolytic Condenser</td>
<td>75</td>
</tr>
<tr>
<td>9A284</td>
<td>47 KI. 6 Volt. Resistor</td>
<td>75</td>
</tr>
<tr>
<td>9A285</td>
<td>1/4 KI. 6 Volt. Resistor</td>
<td>75</td>
</tr>
<tr>
<td>9A286</td>
<td>1/2 KI. 6 Volt. Resistor</td>
<td>75</td>
</tr>
</tbody>
</table>

**Fig. 1—Arrangement of Controls**

**Fig. 2—Antenna Transformer in Early Models**

**Fig. 3—Phonograph Connections**

**Fig. 4—Phone Connectors**

**Fig. 5—Location of Phono Jacks**

**Fig. 6—Knobout for Phone Jack**

**Fig. 7—Phonograph Connections**

**Fig. 8—Location of Phone Knobs**

**Fig. 9—Phonograph Connections**

**Fig. 10—Location of Phone Knobs**
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 in- stallation and adjustment, so attempts made to adjust the receiver should be confined to the points herein mentioned and unless the service technician has been instructed in the work, use of the incorrect equipment may only confuse the problem.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1900, 2000, 2700, 1800, 2200, 1500 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver unless the equipment is accurately adjusted.

1. F. Adjustment
Set the signal generator for a signal of 456 KC. Connect the output of the signal generator through a 600 ohm resistor to the output of the signal generator. Turn the rotor to the full position of the oscillator. Then adjust the LF trimmers until maximum output is obtained. The adjustments are reached from the top of the chassis, and the location is shown in Fig. 1.

2. Range B Alignment
3. 1730 KC Adjustment
Set the signal generator for 1730 KC. Adjust the trimmer 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 the 600 ohm resistor to the output of the signal generator. For this and all subsequent adjustments keep the volume control at the maximum position and disconnect the output of the signal generator to prevent A.V.C. action. Adjust the oscillator Range B trimmer (C12) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

4. 1500 KC Adjustment
Set the range trimmer for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

5. 600 KC Adjustment
Set the signal generator for 600 KC. Turn the tuning condenser rotor until maximum output is obtained. Then 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 trimmer.

6. Range C Alignment
5000 KC Adjustment
Set the signal generator for 5000 KC. Connect the antenna lead of the receiver through the 6000 ohm resistor to the output of the signal generator. Turn the rotor of the tuning condenser to the full open position. Then adjust the LF trimmers until maximum output is obtained. Adjust the oscillator Range C trimmer (C3) until maximum output is obtained. See Fig. 3 for location of this trimmer.

7. 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 oscillator Range C trimmer (C3) to maximum. Do not change the setting of the oscillator Range D trimmer.

8. Range D Alignment
18,300 KC Adjustment
Set the signal generator for 18,300 KC. Keep the antenna lead of the receiver through the 600 ohm resistor to the output of the signal generator. Turn the rotor of the tuning condenser to the full open position. Then adjust the LF trimmers until maximum output is obtained. Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

9. 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 oscillator Range D trimmer (C29) and the tuning condenser slowly back and forth. The condition will be satisfied when the tuning condenser rotor slowly back and forth to the peak of greatest intensity is obtained.

D. C. Resistance of Windings
Refer to Fig. 4. Following are the D. C. resistance of the various windings in the chassis. The values given below will vary slightly in different sets.

<table>
<thead>
<tr>
<th>Post No.</th>
<th>Description</th>
<th>Resistance (ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-342A6</td>
<td>Antenna</td>
<td>1.5</td>
</tr>
<tr>
<td>F-343A4</td>
<td>Primary</td>
<td>2.1</td>
</tr>
<tr>
<td>F-345A5</td>
<td>Secondary</td>
<td>1.1</td>
</tr>
<tr>
<td>F-347A6</td>
<td>Primary</td>
<td>3.0</td>
</tr>
<tr>
<td>F-348A6</td>
<td>Secondary</td>
<td>2.0</td>
</tr>
<tr>
<td>F-349A7</td>
<td>Primary</td>
<td>4.0</td>
</tr>
<tr>
<td>F-344A7</td>
<td>Secondary</td>
<td>3.0</td>
</tr>
<tr>
<td>F-346A8</td>
<td>Primary</td>
<td>5.0</td>
</tr>
<tr>
<td>F-345A8</td>
<td>Secondary</td>
<td>4.0</td>
</tr>
<tr>
<td>F-347A9</td>
<td>Primary</td>
<td>6.0</td>
</tr>
<tr>
<td>F-348A9</td>
<td>Secondary</td>
<td>5.0</td>
</tr>
<tr>
<td>F-349A10</td>
<td>Primary</td>
<td>7.0</td>
</tr>
<tr>
<td>F-344A10</td>
<td>Secondary</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Phonograph Connections
Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in a parts list.

To mount the phonograph and phonograph jack, drill holes in the chassis, and mount the phonograph jack on the left hand side. The parts included are as follows:

- Back of Chassis
- Front Panel
- Speaker coil
- Speaker cord
- Speaker
- Speaker plug
- Speaker plug cord
- Speaker plug connector
- Speaker plug control
- Speaker plug control cord
- Speaker plug control connector
- Speaker plug control knob
- Speaker plug control knob cord
- Speaker plug control knob connector
Fig. 11—Color Coding of Coil Wires and D.C. Resistance of Windings
(Also See Complete D.C. Resistance List)

Fig. 9—Arrangement of Trimmers

©John F. Rider, Publisher
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 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.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Windings</th>
<th>Code</th>
<th>D.C. Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-9A416</td>
<td>Antenna R.F. Transformer</td>
<td>T1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Range A Primary Winding</td>
<td></td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Range B Primary Winding</td>
<td></td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>Range C Primary Winding</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Range D Primary Winding</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Range A Secondary Winding</td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Range B Secondary Winding</td>
<td></td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Range C Secondary Winding</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Range D Secondary Winding</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td>P 9A392</td>
<td>Interstage R.F. Transformer</td>
<td>T2</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Range A Primary Winding</td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Range B Primary Winding</td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Range C Primary Winding</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Range D Primary Winding</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Range B Secondary Winding</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Range C Secondary Winding</td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td>Range D Secondary Winding</td>
<td></td>
<td>Small</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Windings</th>
<th>Code</th>
<th>D.C. Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-9A394</td>
<td>1st I.F. Transformer</td>
<td>T4</td>
<td>Primary Winding</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>11.4</td>
</tr>
<tr>
<td>P-9A395</td>
<td>2nd I.F. Transformer</td>
<td>T5</td>
<td>Primary Winding</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>11.4</td>
</tr>
<tr>
<td>P-9A396</td>
<td>3rd I.F. Transformer</td>
<td>T6</td>
<td>Primary Winding</td>
</tr>
<tr>
<td></td>
<td>Tap to B-</td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Tap to Variable Trimmer</td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>126.0</td>
</tr>
<tr>
<td>P 50X11</td>
<td>Audio Input Transformer</td>
<td>T7</td>
<td>Primary Winding</td>
</tr>
<tr>
<td></td>
<td>Secondary Winding</td>
<td></td>
<td>590.0</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Inside</td>
<td></td>
<td>630.0</td>
</tr>
<tr>
<td></td>
<td>Center Tap to Outside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-12A218</td>
<td>Magnetic Speaker</td>
<td></td>
<td>Center Tap to Inside</td>
</tr>
<tr>
<td></td>
<td>Speaker Coil</td>
<td></td>
<td>Center Tap to Outside</td>
</tr>
<tr>
<td>P-9A281</td>
<td>Single Filament Rectifier</td>
<td>L1</td>
<td></td>
</tr>
<tr>
<td>P-9A391</td>
<td>High Frequency Oscillator Tracking Coil</td>
<td>L2</td>
<td></td>
</tr>
<tr>
<td>P-9A281</td>
<td>Single Filament Rectifier</td>
<td>L3</td>
<td></td>
</tr>
</tbody>
</table>
ALIGNING INSTRUCTIONS:

CAUTION—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations of condenser, resistance tubes, condensers and resistors. In order to properly align this chassis, an oscilloscope (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE—The front of the signal drum has a calibrated scale; it is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

ALIGNMENT PROCEDURE

- Signal generator
- Dummy antenna
- Contactless antenna
- Pushbutton
- Dummy condenser
- Trimmer

Table:

<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR</th>
<th>Dummy Antenna</th>
<th>Contactless Antenna</th>
<th>Pushbutton</th>
<th>Dummy Condenser</th>
<th>Trimmer Adjusted</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F.</td>
<td>465 Kc. .1 MFD. Grid of 602</td>
<td>Broadcast (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
</tr>
<tr>
<td>465 Kc. .1 MFD. Grid of 602</td>
<td>Broadcast (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700 kc. 200 mfd. Antenna lead</td>
<td>Broadcast (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000 kc. 200 mfd. Antenna lead</td>
<td>Broadcast (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 kc. 200 mfd. Antenna lead</td>
<td>Broadcast (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>465 kc. 200 mfd. Antenna lead</td>
<td>Broadcast (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHORT WAVE BAND</td>
<td>17 mc. 400 mfd. Antenna lead</td>
<td>Short Wave (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
</tr>
<tr>
<td>17 mc. 400 mfd. Antenna lead</td>
<td>Short Wave (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mc. 400 mfd. Antenna lead</td>
<td>Short Wave (Figs. 1-4)</td>
<td>Trimmer (C/D)</td>
<td>Output</td>
<td>Trimmer (C/D)</td>
<td>L.F.</td>
<td>Maximum output</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

SERVICE NOTES:

- Voltages taken from different points of circuit to chassis are measured with voltmeter full on all tubes in their sockets and 100 volts added to 1000 ohms by the primary of the power transformer.

- Resistance of coil windings is indicated in ohms on the schematic circuit diagram.

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

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

PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHERS:

- Important: All the radio coil 'warm up' for about 15 minutes before setting the station adjustment screws for the pushers.

- After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (see Fig. 3). Adjust screw through station.

NOTE: After each band is completed, repeat the procedure as a final check.

- After each band is completed, repeat the procedure as a final check.

- Following this procedure for each button until you have selected all of your stations. The automatic buttons are now set for quick tuning and no further adjustment is necessary.

- NOTE: The automatic pushbutton station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order of sequence of programs with that on dial tuning.

- Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snipped into place over each of the station call letter tabs.
Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with cans. This is due to the fact that the trimmers are soldered to the cans and cannot be easily dismantled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 9.

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 a point on the outer edge of the external 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.

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 10,000 ohm resistor R9 (covered with saturated sleeve in early models) from the lug at the volume control and from the shielded lead which runs from the J. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 10,000 ohm resistor R9 to the same lug and the other side to the phone 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 sleeve.
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 audio coils and a third section triple throw switch.

Referring to the schematic circuits diagram, Fig. 1, T1 and T3 are the R.T. transformers. R.F. transformer T1 and oscillator T3 are shown in each assembly are indicated by the letters B, C, 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 coil use, it also short circuits the R.F. transformer secondary and oscillator coil of lower frequency 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 and 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 T7, Fig. 2, B, C and D refer to the standard wave, short wave and 2nd short wave oscillator coils respectively. The oscillator circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

Alignment and Calibration

Use a non-phonograph 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 1.1 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.

Adjust 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 Adjustment

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 its 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 (C13) to maximum.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Then 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.

Range C Adjustment

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 (2nd 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 (C31) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Adjustment

18300 KC Adjustment

Set the signal generator for 18300 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.
Alignment and Calibration

Correct alignment is extremely important in connection with A.H. wave receivers. The receivers are all properly aligned at the factory with precision in- stallation, 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 450, 1700, 1100, 600, 500, 1000, 1800, 5100 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:

1. F. Adjustment

Set the signal generator for a signal of 456 KC. Connect the output of the signal generator to the grid of the 1st detector through a 0.1 MF condenser. Connect the ground post of the signal generator to the ground post of the signal generator. Turn the band selector to the Range B position (standard wave band—purple dial color).

2. Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

3. Turn the volume control to the maximum position.

4. Adjust the antenna lead to the maximum position.

5. Turn the rotor of the tuning condenser to the full open position.

6. Adjust the antenna lead of the receiver through a 200 mfl condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attain the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1700 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 1700 KC mark on the standard wave band. Retighten the set screw.

Adjust the 1st and 2nd in stage Range B trimmers (C8 and C13) and antenna Range C trimmer (C3) 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.

Be sure to use a non-metallic screwdriver for this adjustment.

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 (standard wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attain the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C40) 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. Adj ust the 1st and 2nd in stage Range C trimmers (C9 and C14) and antenna Range C trimmer (C5) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18300 KC Adjustment

Set the signal generator for 18300 KC. Keep the antenna lead of the receiver connected through the 600 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).

As mentioned above, keep the volume control at the maximum position and attain the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C41) 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 1st and 2nd in stage Range D trimmers (C10 and C15) and antenna Range D trimmer (C44) to maximum.

When adjusting the 2nd in stage 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 15,000 KC adjustment. 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.

Use a non-metallic screwdriver for this adjustment.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different type of 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 115-210 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.
WESTERN AUTO SUPPLY CO.

Power Consumption - 140 Watts (at 115 volts 60 cycles)
Power Output - ....... 15 Watts Undistorted

Tuning Frequency Range
B Range
C Range
D Range

535 to 1720 KC.
1715 to 5800 KC.
5750 to 18300 KC.

Schematic

© John F. Rider, Publisher

Compliments of www.nucow.com
Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)

Fig. 5—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage 115 - Antenna Shorted to Ground
Volume Control at Maximum

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Across Heater</th>
<th>Plate to Ground</th>
<th>Screen to Ground</th>
<th>Cath to Ground</th>
<th>Cath M. A</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>R. F.</td>
<td>6.2</td>
<td>245</td>
<td>80</td>
<td>28</td>
<td>7.6</td>
</tr>
<tr>
<td>6K7</td>
<td>1st Det.</td>
<td>6.2</td>
<td>245</td>
<td>90</td>
<td>6.5</td>
<td>2.6</td>
</tr>
<tr>
<td>7b</td>
<td>Osc.</td>
<td>6.2</td>
<td>90</td>
<td></td>
<td></td>
<td>5.3</td>
</tr>
<tr>
<td>6K7</td>
<td>1st I. F.</td>
<td>6.2</td>
<td>245</td>
<td>80</td>
<td>28</td>
<td>7.6</td>
</tr>
<tr>
<td>6K7</td>
<td>2nd I. F.</td>
<td>6.2</td>
<td>245</td>
<td>74</td>
<td>3.9</td>
<td>7.0</td>
</tr>
<tr>
<td>76</td>
<td>2nd Det.</td>
<td>6.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>1st A. F.</td>
<td>6.2</td>
<td>110</td>
<td></td>
<td>5.6</td>
<td>2.1</td>
</tr>
<tr>
<td>6F6</td>
<td>Driver</td>
<td>6.2</td>
<td>235</td>
<td>230</td>
<td>20.0</td>
<td>27.0</td>
</tr>
<tr>
<td>6F6</td>
<td>Power</td>
<td>6.2</td>
<td>345</td>
<td>345</td>
<td>38.0</td>
<td>22.5</td>
</tr>
<tr>
<td>80</td>
<td>Rectifier</td>
<td>5.1</td>
<td>500(0.1)</td>
<td></td>
<td>140(0.04)</td>
<td></td>
</tr>
</tbody>
</table>

(1) As read across R9
(2) Plate to Center Tap
(3) Grid to Ground
(4) Two tubes in parallel

Fig. 7—Phonograph Connections

©John F. Rider, Publisher
Figure 4—Schematic Circuit Diagram

**Figure 3—Tube Socket Voltages**

*Note: Values with star (*) are operating voltages. Values not starred are actual measured voltages. Measurements made to chassis unless otherwise indicated.*

©John F. Rider, Publisher
### Diagram Description

#### Parts List

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description of Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antenna coil assembly</td>
</tr>
<tr>
<td>2</td>
<td>Trap coil – part of RC 95237</td>
</tr>
<tr>
<td>3</td>
<td>Trimmer condenser, 30-60 mfd. - part of RC 95237</td>
</tr>
<tr>
<td>4</td>
<td>Trimmer condenser, 1.5-10 mfd. - part of RC 95237</td>
</tr>
<tr>
<td>5</td>
<td>Trimmer condenser, 0.01 mfd. - part of RC 95237</td>
</tr>
<tr>
<td>6</td>
<td>Variable condenser - 2 gang</td>
</tr>
<tr>
<td>7</td>
<td>Trimmer condenser, 50-100 mfd. - part of RC 95238</td>
</tr>
<tr>
<td>8</td>
<td>Trimmer condenser, 4-8 mfd. - part of RC 95238</td>
</tr>
<tr>
<td>9</td>
<td>CN 95266 40,000 mfd. condenser series condenser</td>
</tr>
<tr>
<td>10</td>
<td>600 ohm, 1/4 W. resistor</td>
</tr>
<tr>
<td>11</td>
<td>Trimmer condenser, 48-155 mfd. - part of RC 95239</td>
</tr>
<tr>
<td>12</td>
<td>IC 9669 1st I.F. coil (465 Kc.)</td>
</tr>
<tr>
<td>13</td>
<td>Trimmer condenser, 15-155 mfd. - part of IC 9669</td>
</tr>
<tr>
<td>14</td>
<td>RC 95117 500 ohm, 1/4 W. resistor</td>
</tr>
<tr>
<td>15</td>
<td>Trimmer condenser, 15-200 mfd. - part of IC 9574</td>
</tr>
<tr>
<td>16</td>
<td>IC 9574 2nd I.F. coil (465 Kc.)</td>
</tr>
<tr>
<td>17</td>
<td>CW 2-06 0.05 mfd. - 200 Kc. condenser</td>
</tr>
<tr>
<td>18</td>
<td>MW 9574 1 mfd. - 1/4 W. resistor</td>
</tr>
<tr>
<td>19</td>
<td>CW 4-02 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>20</td>
<td>Trimmer condenser, 15-200 mfd. - part of IC 9574</td>
</tr>
<tr>
<td>21</td>
<td>VR 9533 0.001 mfd. mica condenser - part of IC 9574</td>
</tr>
<tr>
<td>22</td>
<td>MW 9564 0.001 mfd. - 500 Kc. condenser</td>
</tr>
<tr>
<td>23</td>
<td>CW 4-02 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>24</td>
<td>MW 9564 Grid bias cell</td>
</tr>
<tr>
<td>25</td>
<td>RC 9574 1 mfd. - 1/4 W. resistor</td>
</tr>
<tr>
<td>26</td>
<td>MW 9574 1/4 mfd. - 1/4 W. resistor</td>
</tr>
<tr>
<td>27</td>
<td>MW 9572 1/4 mfd. - 1/4 W. resistor</td>
</tr>
<tr>
<td>28</td>
<td>CW 4-02 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>29</td>
<td>CN 4-02 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>30</td>
<td>CN 4-02 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>31</td>
<td>SA 95265 4000 Kc. condenser</td>
</tr>
<tr>
<td>32</td>
<td>SA 95265 4000 Kc. condenser</td>
</tr>
<tr>
<td>33</td>
<td>SA 95265 4000 Kc. condenser</td>
</tr>
<tr>
<td>34</td>
<td>SA 95265 4000 Kc. condenser</td>
</tr>
<tr>
<td>35</td>
<td>SV 9558 Switch control switch</td>
</tr>
<tr>
<td>36</td>
<td>SK 9529 Speaker</td>
</tr>
<tr>
<td>37</td>
<td>RC 95236 Oscillator coil</td>
</tr>
<tr>
<td>38</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>39</td>
<td>SA 95254 45 Kc. condenser</td>
</tr>
<tr>
<td>40</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>41</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>42</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>43</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>44</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>45</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>46</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>47</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>48</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>49</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>50</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>51</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>52</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>53</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>54</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>55</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>56</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>57</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>58</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>59</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>60</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>61</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>62</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>63</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>64</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>65</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>66</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
<tr>
<td>67</td>
<td>MW 9552 0.05 mfd. - 400 V. condenser</td>
</tr>
</tbody>
</table>

#### Instructions

- **Volume Control Switch**: Set the volume control to the maximum position, the tone control to the treble position, and the dial pointer to approximately 600 Kc. Set the test oscillator to 465 Kc., and apply the test signal to the grid of the type 845 1.7 A. amplifier tube through a .4 mfd. condenser. Adjust trimmer condenser #18 and #20 to maximum output.

- **Wave Change Switch**: Apply the test signal to the grid of the type 845 1.7 A. amplifier tube and adjust trimmer condenser #18 and #19 to maximum output. Apply the test signal to the antenna lead of the receiver and adjust the trap coil trimmer #5 to minimum output.

#### Short-Wave Band Adjustments

- Set the test oscillator and dial indicator to 6000 Kc, and adjust the short-wave oscillator trimmer condenser #7, to maximum output.

- Check the receiver over the short-wave band for sensitivity and calibration.
Set the volume control to the maximum position, the tone control to the treble position, the wave change switch on the broadcast band and the dial indicator to approximately 600 K. O.

Set the test oscillator to 468 K. and apply the test signal to the grid of the type 1A4 tube, through a 0.06 mfd. blocking condenser, and adjust the I.F. trimmer condenser #16 to #25 to maximum output.

Set the test oscillator to 468 K. and apply the test signal to the grid of the type 1A4 tube, through a 0.06 mfd. blocking condenser, and adjust the I.F. trimmer condenser #16 to #25 to maximum output.

To the antenna of the receiver through a 0.06 mfd. condenser.

2. Adjust the broadcast oscillator trimmer condenser #8 to maximum output.

3. Adjust the broadcast preselctor trimmer condenser #7 to maximum output.

4. Set the test oscillator and dial indicator to 600 K. and adjust the oscillator series condenser #7 to maximum output at the same time rocking the variable condenser to minimum output.

5. Return the test oscillator and dial indicator to 1600 K. and check the adjustment of trimmer condensers #8 and #9 for accuracy.

SHORT WAVE BAND ADJUSTMENTS

1. Set the wave change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 600 K. and adjust the short-wave trimmer condenser #7 to maximum output.

3. Adjust the short-wave preselctor trimmer condenser #8 to maximum output.

4. Check the receiver over the short-wave band for sensitivity and calibration.
Alignment Specifications

Compliments of www.nucow.com

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR256

Schematic Voltage

Precautionary Lead Dress
1. Power transformer leads and power cord must be dressed toward rear apron away from volume control.
2. Blue lead from "A" terminal of 2nd I.F. transformer to volume control must be dressed toward front apron away from other parts.
3. Speaker cable leads must be dressed close to chassis base, away from 6X8-G socket and volume control.

Connections for No. 3808 Transformer

Cathode Currents

Tube Socket Voltages and Location of Parts

Alignment Procedure

Steps | Connect the high side of test-oscillator to | Tune test-osc. dial to | Turn radio dial to | Adjust the following for max. power output
--- | --- | --- | --- | ---
1 | 6K7 I.F. grid cap. in series with .01 | 455 kc | L7 and L8 | 1st I.F. Transformer
2 | 6A3 1st-det. grid cap. in series with .01 | 455 kc | L5 and L6 | 2nd I.F. Transformer
3 | Antenna lead | 1,500 kc | C6 (oscillator) | 200 mmid.

©John F. Rider, Publisher

Compliments of www.nucow.com
### TELEVISION CHASSIS ASSEMBLIES

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33635</td>
<td>Adjuster - Magnetic core and stud in tube for high frequency oscillator circuit adjustment (used with 33131)</td>
<td>$0.60</td>
</tr>
<tr>
<td>333120</td>
<td>Choke - Filter choke (133)</td>
<td>$3.25</td>
</tr>
</tbody>
</table>

### 1-BAND RADIO RECEIVER

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33752</td>
<td>Bracket - &quot;Precision Eye&quot; bracket</td>
<td>$0.25</td>
</tr>
<tr>
<td>33760</td>
<td>Cap - Rubber cap for &quot;Precision Eye&quot;</td>
<td>$0.15</td>
</tr>
<tr>
<td>33871</td>
<td>Socket - &quot;Precision Eye&quot; socket</td>
<td>$0.45</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS ASSEMBLIES

** học Model WR-700 & WR-701**

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33327</td>
<td>Cap - Pilot lamp &quot;pulls eye&quot; (Model WR-701 only)</td>
<td>$0.05</td>
</tr>
<tr>
<td>33116</td>
<td>Escutcheon - Dial escutcheon less scale and buttons (Model WR-701 only)</td>
<td>$14.00</td>
</tr>
<tr>
<td>33140</td>
<td>Button - Station selector push button (Model WR-701 only)</td>
<td>$0.10</td>
</tr>
<tr>
<td>33175</td>
<td>Dial - 3 Band glass dial scale (Model WR-701 only)</td>
<td>$1.70</td>
</tr>
<tr>
<td>33179</td>
<td>Dial - Package of 9 protective cover discs for push buttons (Model WR-701 only)</td>
<td>$0.10</td>
</tr>
<tr>
<td>33194</td>
<td>Glass - Safety protective glass for tunerscope (Model WR-701 only)</td>
<td>$2.50</td>
</tr>
<tr>
<td>33195</td>
<td>Knob - Band switch knob (Model WR-701 only)</td>
<td>$0.12</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33317</td>
<td>Knob - Radio tuning knob (Model WR-701 only)</td>
<td>$0.20</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; control knob (Model WR-701 only)</td>
<td>$0.25</td>
</tr>
<tr>
<td>33185</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot; or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Television &quot;Contrast&quot;, &quot;Hor. Hold&quot;, or &quot;Fine Tuning&quot; or Radio &quot;Tone Control&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot;, &quot;Vert. Hold&quot;, or Radio &quot;Volume&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - Television &quot;Station Selector&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Volume Control&quot; knob (Model WR-701 only)</td>
<td>$0.40</td>
</tr>
</tbody>
</table>

### 3-BAND RADIO RECEIVER CHASSIS

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33715</td>
<td>Clip - Precision eye mounting clip with wing screw</td>
<td>$0.15</td>
</tr>
<tr>
<td>33734</td>
<td>Cord - Variable condenser drive cord</td>
<td>$0.45</td>
</tr>
<tr>
<td>33725</td>
<td>Cushion - Kinescope masking cushion (Model WR-701 only)</td>
<td>$2.30</td>
</tr>
<tr>
<td>33733</td>
<td>Cushion - Kinescope masking cushion (Model WR-701 only)</td>
<td>$2.00</td>
</tr>
<tr>
<td>33710</td>
<td>Di - 3 Band glass dial scale</td>
<td>$2.30</td>
</tr>
<tr>
<td>33711</td>
<td>Knob - 11 escutcheon-Dial escutcheon less buttons, button shaft, and dial scale</td>
<td>$4.75</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS ASSEMBLIES

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>33285</td>
<td>Button - Station selector push button</td>
<td>$0.20</td>
</tr>
<tr>
<td>33287</td>
<td>Cap - Orange pilot lamp &quot;Pulls Eye&quot;</td>
<td>$0.95</td>
</tr>
<tr>
<td>33753</td>
<td>Cushion - Kinescope masking cushion (Model WR-701 only)</td>
<td>$2.30</td>
</tr>
<tr>
<td>33753</td>
<td>Cushion - Kinescope masking cushion (Model WR-701 only)</td>
<td>$2.00</td>
</tr>
<tr>
<td>33710</td>
<td>Dial - Three band glass dial scale</td>
<td>$2.30</td>
</tr>
<tr>
<td>33711</td>
<td>Knob - Escutcheon-Dial escutcheon less buttons, button shaft, and dial scale</td>
<td>$4.75</td>
</tr>
<tr>
<td>33315</td>
<td>Knob - Radio tuning, volume, or range selector knob</td>
<td>$0.12</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot; or &quot;Vert. Hold&quot; knob</td>
<td>$0.15</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - &quot;Victrola&quot;, Radio, Television - Fidelity selection knob</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Complete set of call letter markers</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot; or &quot;Vert. Hold&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - &quot;Victrola&quot;, Radio, Television - Fidelity selection knob</td>
<td>$0.40</td>
</tr>
<tr>
<td>33201</td>
<td>Knob - Complete set of call letter markers</td>
<td>$0.15</td>
</tr>
<tr>
<td>33181</td>
<td>Knob - Television &quot;Brightness&quot; or &quot;Vert. Hold&quot; knob</td>
<td>$0.25</td>
</tr>
<tr>
<td>33178</td>
<td>Knob - &quot;Victrola&quot;, Radio, Television - Fidelity selection knob</td>
<td>$0.40</td>
</tr>
</tbody>
</table>

Prices subject to change without notice.
For other data see index

**LINE-UP CAPACITOR ADJUSTMENTS**

To properly align the circuits of this receiver, with the general layout of the chassis, it is essential to use a high grade variable tank condenser, the output of which can be continuously varied and read. The chassis are shown in Figures 1 and 2. The individual circuits of the receiver actual work is started.

1. Set the volume control to maximum position and wave change switch to standard broadcast band.
2. Connect the output meter across the voice coil terminals of the speaker.
3. Set the test oscillator to 685 K.C. and adjust its output to produce a measurable reading on the output meter when the test signal is applied to the grid of the type 6A7 first detector-oscillator tube through a 0.05 mfd. blocking capacitor.
4. Adjust trimmers #1 and #2 to maximum output.

**ALIGNMENT OF OSCILLATOR AND R.F.**

1. Check the pointer setting to be sure that it is exactly horizontal when the tuning condenser is completely closed.
2. Set the test oscillator and dial indicator to 1400 K.C. and adjust the oscillator trimmer condenser #7 to maximum output.
3. Apply the test signal to the antenna of the receiver through a 0.001 mfd. blocking capacitor and adjust trimmer condenser #6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change switch to the shortwave band and check the sensitivity over scale.
**MODEL WR209**

**Alignment, Socket, Trimmers, Chassis**

**WESTINGHOUSE ELECTRIC INTERNATIONAL CO.**

**Figure No. 1**

- **Type and Number of Tubes**
  - 1 6BT, 1 12AU7, 1 12AX7, 1 6AU6, 1 6P6, Total 5
- **Power Supply**
  - 115 to 125 volts, 50 to 60 cycles A.C.
- **Power Consumption**
  - 100 watts
- **Tuning Range**
  - 40 to 1500 K.C. and 1500 to 3500 K.C.
- **Maximum Undistorted Output**
  - 1.5 watts
- **Line-Up Frequencies**

**Figure No. 2**

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.

1. Set volume controls on full, turn tone control knob to the right hand position. Set wave form selector on the broadcast position and the dial indicator at approximately 600 K.C.
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 grid of the 696 I.F. tube thru a .8 mfd. blocking condenser.
4. Adjust #10 (see Fig. #3) to maximum gain.
5. Apply test signal to grid of 697 first detector-oscillator tube and adjust #10 and #12 (Fig. #1) to minimum output.

6. With test signal still on grid of 697 tube, repeat the above adjustments for greatest sensitivity.

**ADJUSTMENT OF BROADCAST BAND**

1. Leave test signal on grid of 697 tube and set test oscillator to 465 K.C.
2. Tune the gain condenser to its maximum position. Adjust dial indicator until the dial is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1800 K.C.
3. Adjust trimmer #6 to maximum output.
4. Apply test signal to antenna of set thru a .0005 mfd. condenser and adjust trimmer #7 to maximum output.

**ADJUSTMENT OF POLICE BAND**

When adjustments are completed, the police band may be tested without the unit being changed. This test consists of setting the test oscillator and station indicator to 1700 K.C. and applying test signal to antenna lead. The police band tuning is indicated by "A" in Fig. #2. Adjust the position of this indication by sliding it back and forth on the scale until maximum output is indicated on the output meter. This indication should then be secured in place by applying a thin coat of cement.
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

LOCATION OF TUBES

<table>
<thead>
<tr>
<th>CODE</th>
<th>PART NO.</th>
<th>RESISTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>53-998</td>
<td>50,000 Ohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>22</td>
<td>53-1002</td>
<td>250 Ohm Wirewound Resistor</td>
</tr>
<tr>
<td>23</td>
<td>53-1042</td>
<td>25,000 Ohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>24</td>
<td>53-1028</td>
<td>100,000 Ohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>25</td>
<td>2G-2009</td>
<td>173 Ohm Resistor in Power Line Cord</td>
</tr>
<tr>
<td>26</td>
<td>53-926</td>
<td>1 Megohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>27</td>
<td>53-1063</td>
<td>500 Ohm Wirewound Resistor</td>
</tr>
<tr>
<td>28</td>
<td>53-1053</td>
<td>500 Ohm Wirewound Resistor</td>
</tr>
<tr>
<td>29</td>
<td>53-919</td>
<td>5,000 Ohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>30</td>
<td>53-926</td>
<td>250,000 Ohm Tone Control</td>
</tr>
<tr>
<td>31</td>
<td>18-2009</td>
<td>1/4 Watt Resistor</td>
</tr>
<tr>
<td>32</td>
<td>53-226</td>
<td>100,000 Ohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>33</td>
<td>53-226</td>
<td>250,000 Ohm Tone Control</td>
</tr>
<tr>
<td>34</td>
<td>53-226</td>
<td>1/4 Watt Resistor</td>
</tr>
<tr>
<td>35</td>
<td>53-226</td>
<td>100,000 Ohm 1/4 Watt Resistor</td>
</tr>
<tr>
<td>36</td>
<td>18-2007</td>
<td>250,000 Ohm Volume Control &amp; Off-On Switch</td>
</tr>
</tbody>
</table>

SOCKET VOLTAGES: Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V, Speaker field 125 V. Line voltage was 120 at 60 cycles.

C1, C2 78-2003 40-2400 mfd Two Gang Trimmer Condenser
C3, C4 78-2003 40-2400 mfd Two Gang Trimmer Condenser
C5, C6 78-2003 40-2400 mfd Two Gang Trimmer Condenser
C7, C8 78-2003 40-2400 mfd Two Gang Trimmer Condenser
C9, C10 78-2003 40-2400 mfd Two Gang Trimmer Condenser
C11, C12 78-2003 40-2400 mfd Two Gang Trimmer Condenser
C13 76-2002 .00005 Mfd, High Condenser
C14 76-2002 .00005 Mfd, High Condenser
C15 76-207 .00005 Mfd, High Condenser
C16 76-265 .001 Mfd, High Condenser
C17 76-265 .001 Mfd, High Condenser
C18 76-2002 .004 Mfd, 600 V Paper Condenser
C19 76-2003 .01 Mfd, 400 V Paper Condenser
C20 76-2005 .01 Mfd, 400 V Paper Condenser
C21 76-2005 .1 Mfd, 200 V Paper Condenser
C22 76-2005 .1 Mfd, 200 V Paper Condenser
C23 76-2006 .1 Mfd, 200 V Paper Condenser
C24 76-2006 .1 Mfd, 200 V Paper Condenser
C25 76-2006 .1 Mfd, 200 V Paper Condenser
C26 76-2006 .1 Mfd, 200 V Paper Condenser
C27 76-2006 .1 Mfd, 200 V Paper Condenser
C28 76-2006 .1 Mfd, 200 V Paper Condenser
C29 76-2006 .1 Mfd, 200 V Paper Condenser
C30 76-2011 .0 Mfd, 200 V Paper Condenser
C31 18-828 25 Mfd, 65 V Dry Electrolytic Cond.
C32, C33 18-2009 EN Mfd, 10 Mfd, 150 V, Dry Electrolytic Cond.

INDUCTANCES
L1 17-2159 Oscillator Coil Assembly
L2 17-2200 Preselector Coils Assembly
L3 66-2001 First T. F. Transformer Assembly
L4 66-2067 Second T. F. Transformer Assembly
L5 64-2065 6" Speaker, 2100 Ohm, 43 Tube Output Trans.
L6 14-2002 20 Henry Filter Choke

©John F. Rider, Publisher
SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

CONDENSERS
- C1, C2 77-2007 2 Gang Variable Condenser
- C3 76-200 0.01 Mfd. Mini Condenser
- C4 76-200 0.04 Mfd. 200 V. Paper Condenser
- C5 76-200 0.1 Mfd. 200 V. Paper Condenser
- C6 76-200 0.0005 Mfd. Mini Condenser
- C7 76-200 0.1 Mfd. 200 V. Paper Condenser
- C8 76-200 0.1 Mfd. 200 V. Paper Condenser
- C9 76-200 0.1 Mfd. 200 V. Paper Condenser
- C10 75-200 0.1 Mfd. 200 V. Paper Condenser
- C11 75-200 0.1 Mfd. 200 V. Paper Condenser
- C12 75-200 0.1 Mfd. 200 V. Paper Condenser
- C13 75-200 0.1 Mfd. 200 V. Paper Condenser
- C14 75-200 0.1 Mfd. 200 V. Paper Condenser
- C15 76-200 0.0005 Mfd. Mini Condenser
- C16 76-200 0.01 Mfd. Mini Condenser
- C17 75-200 0.004 Mfd. 600 V. Paper Condenser
- C18 76-200 0.004 Mfd. 600 V. Paper Condenser
- C19 18-206 25 Mfd. 25 V. Dry Electrolytic Cond.
- C20 76-2000 0.004 Mfd. 200 V. Paper Condenser

INDUCTANCES
- L1 17-2204 Oscillator Coil Assembly
- L2 17-2202 Preselector Coil Assembly
- L3 66-2061 First I.F. Transformer Assembly
- L4 66-2062 Second I.F. Transformer Assembly
- L5 66-2056 4" Speaker, 2100 Ohm, 43 Tube Output Trans
- L6 16-2002 20 Henry Filter Choke

©John F. Rider, Publisher
INSTALLATION, OPERATION AND SERVICE AUTOMATIC RECORD CHANGER

This Record Changer will automatically play a series of eight 10- or seven 12-inch records of the 78 revolutions-per-minute type or, if you so desire, you may change records, of any size up to 12 inches, manually. Records of the last few years with the standard eccentric or spiral stopping groove will operate the automatic mechanism and change your records for you.

The Automatic Record Changer as supplied consists of two units:
1. The Motorboard Unit which includes the automatic record changer mechanism, the turntable, and the pickup.
2. The Motor Unit which includes the support plate assembly.

The units are supplied ready for mounting on a cabinet rail. This rail must be drilled in accordance with the information and dimensions shown on page 4. Wooden support blocks as shown, must be provided by the customer. All other necessary parts are included in your purchase. It is essential for proper operation that the rail and support blocks provide for the mounting of the motor support plate exactly 2 1/4 inches below the top surface of the motorboard. The support blocks should be attached to the rail with heavy wood screws. Decide on the mounting, with all necessary dimensions, are given on page 4.

1. Install the Motor Unit with support plate loosely in position as shown on page 4. Do not tighten the mounting screws.
2. Loosen the two set screws in the collar of the flexible coupling on the Motorboard Unit, a detail of which is shown on page 3.
3. Place the Motorboard Unit in position on the cabinet rail with the upper mounting springs in place as shown on page 4. Make sure that the guide pins extending from the motor support enter the rubber grommets in the Motorboard Unit without binding.
4. Secure Motorboard in position using the screws and lower mounting springs as shown on page 4. Tighten up the four motorboard mounting screws to compress all eight mounting springs to the dimensions shown. Make sure that the Motorboard Assembly is level in the cabinet.
5. Tighten up the mounting screws on the Motor Unit support plate assembly so that they are firmly down against the spacers.
6. Check the installation to be sure that there is no binding between the collar of the flexible coupling and the collar of the motor spindle. See page 3.

OPERATION

4. Do not leave records on the record holder posts, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use. If any records should become warped, place them on a flat surface with a flat heavy article, such as a large book, on top and leave them in this position for a few days.

Controls and Moving Mechanism

Index and Record Reject Lever.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"MANUAL," "12," "10," and "REJECT." When you desire to change record selections manually, this lever should be set in the "MANUAL" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "REJECT" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "MANUAL" position when not actually playing records automatically.
ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, trapping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by .014 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip pawl "21" through a friction clutch "5". If the motion of the pickup is abruptly accelerated or becomes irregular due to swelling in the eccentric groove, the friction "5" may prevent engagement of the trip pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B". An adjustment too tight on the trip pawl will keep the needle from dropping smoothly; if too loose, tripping will not occur at the end of the record.

C. Pickup Blade and Screws.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup liftable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "G" to obtain 1 inch spacing between needle point and turntable top surface.

D. E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20", determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on the 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17". The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten the pointed screw "O".

After adjusting for needle landing, place a 10 inch record on the turntable, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5 11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end of stud "E" is in contact with "Step T" on lever "17" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur. Place 10 inch record again.

F. G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record changer shoe and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shell "27" be accurately maintained. The 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .035-.038 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "G", adjust screw "F" so that its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .075-.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both position are retained simultaneously by a gear and rack coupled to the main lever "15"; and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H", run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm rest support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from the trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light oil and whenever the turntable is removed, or as required for proper operation. Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual minor adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be made.

2. Needle does not land properly on both 10 and 12 inch records.—Make complete adjustments "D" and "E".

3. Needle does not land properly on 12 inch record but correct on 10 inch.—Effect adjustment "E".

4. Failure to trip at end of record.—Increase clutch "y" friction by means of screw "B". Also, see that levers "14" and "12" are free to move without touching each other.

5. Pickup strikes lower record of stack or slips across top—record on turntable.—Adjust lift cable and adjustment "C".

6. Needle does not track after landing.—Friction clutch "Y" adjustment "B" may be needed; land the tone arm vertical bearing; levers "14" and "12" found; or pickup output cable twisted.

7. Cycle compenences before record is complete.—Record is defective, or adjustment "B" of friction clutch "5" is too tight.

8. Fades in record reproduction.—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal record speed.

9. Record knifes strike edge of records.—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.

10. Record not released properly.—Adjust record shelf assembly in respect to shaft by means of adjustment "H".

11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed.—Increase tension of pickup locating lever spring "30".
ZENITH RADIO CORP.

MODEL 169-31 Automatic Record Changer

Details/Notes

Turntable Switch.—The toggle switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, throw the switch to the "ON" position. To stop the turntable throw the switch to the "OFF" position.

Pickup and Top-Loading Needle Socket.—The pickup is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pickup arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pickup arm in the grooves and the pickup over the needle gauge plate. The pickup must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pickup, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

Needle Ejector.—The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pickup as described above.

Record Holder Shelves.—To place a record on the turntable or to remove records, raise the record holder shelves, by lifting with the fingers under the shelf, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. Before loading the magazine for Automatic Operation swing the record holder shelves back into position.

Automatic Operation

1. See that pickup is over needle gauge plate with needle properly in place. If not, complete a "cycle" as explained in the first paragraph under "OPERATION."
2. With Index and Record Reject Lever at "MANUAL," place the first of the series of records on the turntable and the remainder of the series (up to seven 10-inch or six 12-inch records) on the record holder posts (as shown in Figure 1). The records should be arranged in the desired order with the desired selection face up and the last selection on top.
3. Set the Index and Record Reject Lever to the proper position. (See CONTROLS: INDEX AND RECORD REJECT LEVER.)
4. Throw Turntable Switch to the left—"ON"—turntable should commence to revolve.
5. When revoluntary has attained speed, lift pickup and lower gently onto the record so that the needle point enters the outside groove.
6. Close the lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

The whole series of records will now play without further attention, and the last record will repeat until the Turntable Switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it onto the pickup rest with pickup over needle gauge plate. The record player is then ready for reloading, or for manual operation.

Manual Operation

To play records manually:
1. Proceed as in step 1, under "AUTOMATIC OPERATION."
2. Place record on turntable with desired selection upwards.
3. Set Index and Record Reject Lever to "MANUAL" position.
4. Proceed as in steps 4, 5 and 6 under "AUTOMATIC OPERATION."

When you have finished playing, be sure that the turntable has stopped and the pickup is in the rest position over needle gauge plate. Never leave pickup with needle resting on a record or on the turntable.

Good reproduction can only be obtained with the turntable revolving at 78 revolutions per minute. For speed check and regulation see INSTALLATION.
All voltages measured using Zenith No. 228 battery pack.

**ALIGNMENT PROCEDURE**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Test Oscillator to</th>
<th>Dummy Antenna</th>
<th>Set Test Osc. to</th>
<th>Band</th>
<th>Set Dial At</th>
<th>Adjust Trimmers</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st Det. Grid</td>
<td>1/2 Mfd.</td>
<td>455</td>
<td>Br'dc'</td>
<td>600</td>
<td>ABCD</td>
<td>I. F. Alignment</td>
</tr>
<tr>
<td>2</td>
<td>Rec. Ant. Lead</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>&quot;</td>
<td>1500</td>
<td>F</td>
<td>Set Osc. to Scale</td>
</tr>
<tr>
<td>3</td>
<td>&quot;</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>&quot;</td>
<td>1500</td>
<td>G</td>
<td>Alignment of Ant.</td>
</tr>
</tbody>
</table>

**NOTE**

All voltages measured from point indicated to chassis using a 1000 ohm per volt meter.

Antenna disconnected — volume control at minimum and condenser plates in full mesh.
MODEL 4K329, Chas. 5413
Schematic, Voltage
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Test Oscillator to</th>
<th>Dummy Antenna</th>
<th>Set Test Osc. to</th>
<th>Band</th>
<th>Set Dial At</th>
<th>Adjust Trimmers</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st Det. Grid</td>
<td>½ Mfd.</td>
<td>456</td>
<td>Br’d’c’t</td>
<td>600</td>
<td>ABCD</td>
<td>I. F. Algn’t.</td>
</tr>
<tr>
<td>2</td>
<td>Rec. Ant. Lead</td>
<td>200 Mmf.</td>
<td>1500</td>
<td></td>
<td>1500</td>
<td>F</td>
<td>Set Osc. to Scale</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>200 Mmf.</td>
<td>1500</td>
<td></td>
<td>1500</td>
<td>G</td>
<td>Algn’t of Ant.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>200 Mmf.</td>
<td>600</td>
<td></td>
<td>600</td>
<td>J</td>
<td>Rock gong &amp; adj. for max. output</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>200 Mmf.</td>
<td>1500</td>
<td></td>
<td>1500</td>
<td>FG</td>
<td>Rpt. 3 &amp; 4</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
 SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>TUBE</th>
<th>POSITION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A6</td>
<td>1st Det.</td>
<td></td>
<td>6</td>
<td>AC</td>
<td>220</td>
<td>90</td>
<td>6</td>
<td>125</td>
<td>AC</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Osc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6P7</td>
<td>I.F.</td>
<td></td>
<td>6</td>
<td>AC</td>
<td>0</td>
<td>220</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>2nd Det.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6F6</td>
<td>PWR</td>
<td></td>
<td>0</td>
<td>200</td>
<td>220</td>
<td>-1</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5Y3</td>
<td>Rect.</td>
<td></td>
<td>0</td>
<td>220</td>
<td></td>
<td></td>
<td>250</td>
<td>250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Line Voltage 110

**Antenna and Ground**
Disconnected.

All voltages measured from point indicated to ground, using a 1000 ohm per volt D.C. meter (unless marked otherwise.)

**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.
IMPORTANT — ANTENNA ALIGNMENT

Model 5-M-294, chassis 5520

Due to the large variation in electrical capacity of different automobile antennas, it is necessary to adjust the receiver to the particular antenna used after installation has been made for maximum performance. Model 5-M-294 is equipped with two adjusting screws to accomplish this alignment. The green tag on the side of the receiver case shows the location of the two adjusting screws.

To align, first turn the receiver on with the center knob shown in Fig. 2. Press the tuning knob IN. This places the tuning mechanism in the manual operating position. Tune to a weak station near 1400 K.C. and adjust the trimmer directly below the antenna connector to maximum volume. Next turn the receiver to a weak station near 600 K.C. and adjust the trimmer nearest the power pack case for maximum volume. Repeat the adjustments for greatest accuracy.

AUTOMATIC

To set the automatic button, first pull the tuning knob OUT. This shifts the tuning mechanism to the automatic position. Press Automatic button A and turn the volume up and with a small screwdriver carefully adjust screw A at bottom of the Automatic unit shown in Fig. 3 to a local station between 1500 to 1050 K.C. Set to exact position of maximum volume and clearest tone. Next adjust switch A1 for maximum volume and clearest tone on the same station. It should be noted that there are two trimmer adjustments to each station button. To set the second button press B and turn trimmer B to a local station between 1250 to 850 K.C. Trim with adjustment B1 to best volume and tone on the same station. To set the third button press C and turn trimmer C to a station between 1000 to 700 K.C. and corresponding adjustment C1 again for maximum volume of the selected station. Follow the same procedure for the fourth button by pressing button D and using trimmers D and D1 on a local station between 885 to 540 K.C. After all four buttons have been set, cut the call letters of stations selected from the punched call letter sheet supplied with the receiver. Remove the escutcheon over the automatic buttons by turning the three screws which hold it in position. Remove the celluloid strip and paste the station call letters in their proper positions by wetting the back of the call letter sticker. The lines on the celluloid strips point the exact position at which the gummed labels are placed. After the call letter stickers are attached replace the celluloid and the escutcheon plate.

SOCKET VOLTAGES

Model S-592, 5X-246, 5X-274 — Chassis 5523

<table>
<thead>
<tr>
<th>Tube</th>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AS</td>
<td>1st Det. Gnd</td>
<td>0</td>
<td>10</td>
<td>145</td>
<td>50</td>
<td>0</td>
<td>135</td>
<td>2.5</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>6FL</td>
<td>i.f.</td>
<td>0</td>
<td>16.5</td>
<td>154</td>
<td>50</td>
<td>0</td>
<td>135</td>
<td>2.5</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>6L7</td>
<td>2nd Det. A.V.C.</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>662</td>
<td>R.f.</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 XS</td>
<td>Gnd.</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

All voltages measured from point indicated to ground using a 1000 Ohm per voltage meter, antenna and ground disconnected. Line voltage 51.5 volts. Consumption 3.6 amps.
Total current consumption 7.1 amperes.
Sensitivity at 1 watt output 5-10M
Maximum power output 3.2 watts.

All voltages measured with 1000 ohms per volt D. C. meter.

<table>
<thead>
<tr>
<th>Tube</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8G</td>
<td>0</td>
<td>0</td>
<td>240</td>
<td>93.0</td>
<td>*</td>
<td>147</td>
<td>6.0</td>
<td>**</td>
<td>—</td>
</tr>
<tr>
<td>6K7G</td>
<td>0</td>
<td>0</td>
<td>240</td>
<td>93.0</td>
<td>***</td>
<td>—</td>
<td>6.0</td>
<td>***</td>
<td>—</td>
</tr>
<tr>
<td>6Q7G</td>
<td>0</td>
<td>0</td>
<td>112</td>
<td>6.0</td>
<td>—</td>
<td>—</td>
<td>1.8</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>6F6G</td>
<td>0</td>
<td>0</td>
<td>235</td>
<td>250</td>
<td>—</td>
<td>—</td>
<td>6.0</td>
<td>—</td>
<td>16.0</td>
</tr>
<tr>
<td>6X5G</td>
<td>—</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.0</td>
<td>250</td>
<td>—</td>
</tr>
</tbody>
</table>

-5.8 manual  
+4.2 automatic  
+5.0 automatic  
+4.9 automatic  
+4.4 manual  
+5.2 manual
ZENITH RADIO CORP.

MODELS 5A518, 5A325
Chassis 5632A
Voltage, Tuner Data
Socket

FIG. 1

AUTOMATIC

1. Select a station in the tuning range of the No. 1 button.
2. Place the band switch on BROADCAST and tune this station
   manually in the conventional manner.
3. Set the band switch to the AUTOMATIC position and press No. 1
   button.
4. Remove the cap above the button by inserting a pin or your finger
   nail under the edge and pulling out.
5. Turn the exposed screw in either direction until the previously selected
   station is heard. (Redo by switching back to BROADCAST.)
6. Replace cap and the call letters of the station from the call sheet
   furnished with the receiver. Wet the rear surface of the tab, and
   place it in the space provided on the cap.
7. Follow the above operations in setting the remaining four buttons.
8. The call letter sheets should be preserved for use in the event it is
   desired to change any of the buttons to some other station.

VOLTAGES

SOCKET VOLTAGES

(T) Vacs for 6SJ6—6UG7 and
diodes of 6C7 measured across
resistor R14.
(B) Vacs for triode section of
6Q7G and 6K6C measured
across R13 and R14.

LEGEND: N.C.—No Connections; S.H.—Shield; H.—Heater; P.—
Plate; S.—Screen; S.U.—Suppressor Grid; G.—Grid; D.I. Diode; K.—
Cathode.

© John F. Rider, Publisher
MODEL 55313B
Chassis 5535BT
Schematic

CONVERTER
6J5G

L.F.
6J7G

DET-AMP
6Q7G

POWER AMP
6K6G

PILOT LIGHT

SWITCH ON
VOL CONTROL

RECTIFIER
6X5G

POWER AMP
6K6G

SPEAKER

MODEL
49-295-5
55313B

ZENITH RADIO CORP.

Total power consumption 45 watts.

Power output 3.5 watts.

© John F. Rider, Publisher
UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D.C.).

Chassis 5532A only is designed to operate on 25 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the transformer. The proper position of the switch for either voltage is marked on the transformer case.

ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Test Oscillator to</th>
<th>Dummy Antenna</th>
<th>Set Test Osc. to (Meters)</th>
<th>Wave Band</th>
<th>Adj. Trimmers</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st Det. Grid</td>
<td>½ Mfd</td>
<td>600</td>
<td>Med.</td>
<td>ABCD</td>
<td>L.F. Alignment</td>
</tr>
<tr>
<td>2</td>
<td>Rec. Ant. Lead</td>
<td>200 Mmfd.</td>
<td>600</td>
<td>Med.</td>
<td>E</td>
<td>Set Osc. to Scale</td>
</tr>
<tr>
<td>3</td>
<td>Rec. Ant. Lead</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>Med.</td>
<td>F</td>
<td>Adj. of Antenn</td>
</tr>
<tr>
<td>4</td>
<td>Rec. Ant. Lead</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>Med.</td>
<td>G</td>
<td>Rock gang &amp; adj. for max. output</td>
</tr>
<tr>
<td>5</td>
<td>Rec. Ant. Lead</td>
<td>400 ohms</td>
<td>18000</td>
<td>S.W.</td>
<td>F ± G</td>
<td>Repeat 2 &amp; 3</td>
</tr>
<tr>
<td>7</td>
<td>Rec. Ant. Lead</td>
<td>400 ohms</td>
<td>18000</td>
<td>S.W.</td>
<td>L</td>
<td>Rock gang &amp; adj. for max. output</td>
</tr>
</tbody>
</table>

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna, connected and receiver operating in Medium Wave position.
The total consumption is 65 watts. Power output 4.5 watts.
### ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Test Oscillator to</th>
<th>Dummy Antenna</th>
<th>Set Test Osc. to</th>
<th>Band</th>
<th>Set Dial At</th>
<th>Adjust Trimmers</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st Det. Grid</td>
<td>1/2 Mfd.</td>
<td>455</td>
<td>Br'-dc'</td>
<td>600</td>
<td>ABCD</td>
<td>I. F. Alignment</td>
</tr>
<tr>
<td>2</td>
<td>Rec. Ant. Lead</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>&quot;</td>
<td>1500</td>
<td>F</td>
<td>Set Osc. to Scale</td>
</tr>
<tr>
<td>3</td>
<td>&quot;</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>&quot;</td>
<td>1500</td>
<td>G</td>
<td>Alignment of Ant.</td>
</tr>
</tbody>
</table>

---

**NOTE**

Voltages measured from No. 7 pin on ballast tube to point indicated using a 1000 ohm per volt meter. Vol. control disconnected.

All filament voltages measured across each respective tube, using a 0.30 A.C. volt meter.

(A) Plate volatge of 2526 shows 110 volts across Filament of 2526 to No. 7 pin of 6Q7.}

---

© John F. Rider, Publisher
Alignment Procedure

1. Tune the receiver carefully to a local station, and adjust the volume to the lowest desired setting.

2. Remove the knob by pulling directly away from the panel, and insert the short headless screw into the hole provided in the rear of the volume control shaft.

3. It may be necessary to move the screw to the next hole in either direction before it is definitely determined what volume level is desired.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
</tr>
<tr>
<td>3</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
</tr>
<tr>
<td>4</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
</tr>
<tr>
<td>5</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
</tr>
<tr>
<td>6</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
<td>50000 ohms</td>
</tr>
<tr>
<td>7</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
<td>200 mfd</td>
</tr>
<tr>
<td>8</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
<td>15000 ohms</td>
</tr>
<tr>
<td>9</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
<td>33000 ohms</td>
</tr>
<tr>
<td>10</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
<td>10000 ohms</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
Zenith Radio Corp.

Models 6A205, 6A223, 6A229
6A239, 6A241, Ch. 5640AT
Models 6DL120 to 6DL122
Chassis 5636 AC-DC

Schematics

Power output 15 watts.
Current consumption 44 watts

For other data
See index

Power output 4.5 watts.
The total consumption is 65 watts

© John F. Rider, Publisher

Compliments of www.nucow.com
ALIGNMENT PROCEDURE

1. Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

2. Set the signal generator to 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

3. Change the signal generator to the antenna and ground terminals of the receiver.

4. Set signal generator at 1500 K.C., switch receiver to broadcast band and adjust oscillator trimmer on gain for correct dial reading at 200 meters. Also adjust antenna trimmer on gain for resonance.

5. Set signal generator to 600 K.C., rock pointer past 500 meters on dial while adjusting the broadcast paddler (adjacent to gain) to combination giving the greatest output reading.

6. Repeat operation No. 4.

7. Set signal generator at 375 K.C., switch receiver to long wave band and adjust long wave oscillator trimmer (located on oscillator coil underneath chassis) for correct dial reading at 800 meters. Also adjust trimmer on top of coil adjacent to gain for greatest output reading.

8. Set the signal generator at 167 K.C., rock the pointer past 1800 meters on dial and adjust the long wave paddler to point giving the highest output.

9. Repeat operation No. 7.
## ZENITH RADIO CORP.

### MODELS 6-M-292, 6-M-293, 6-M-295

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Test Oscillator To</th>
<th>Dummy Antenna</th>
<th>Set Test Osc. To</th>
<th>Manual or Automatic Position</th>
<th>Set Gang Cond.</th>
<th>Adjust Trimmers</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st Det. Grid</td>
<td>½ Mid.</td>
<td>252.5</td>
<td>Manual</td>
<td>Max. Cap.</td>
<td>DEFG</td>
<td>I. F. Alignment</td>
</tr>
<tr>
<td>5</td>
<td>Rec. Ant. Lead</td>
<td>50 Mmfd.</td>
<td>—</td>
<td>Manual</td>
<td>Tune To A Station Around 900 K. C. and Set Dial for Calibration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Connect Car Antenna to Set — Tune to Weak Station Around 1400 K. C. — Trim Antenna Trimmer “A” for Maximum Peak Output.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Trim Automatic Antenna Trimmer “B” to Car Antenna on a Weak Station around 1000 K. C. on Range #2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See tube layouts for location of aligning trimmers

---

**Fig. 7**

** Tube Position **

---

**Fig. 8**

**ANTENNA ALIGNMENT**

Fig. 8 shows the location of the antenna tap jacks on the side of the receiver case. Remove the capping plug from over this jack assembly, and insert the antenna pin lead in the “H” or “L” position, depending on the capacity of the antenna being used. The “H” position must be used for antennas with a capacity in the range of from 100 to 500 mmd. The “L” connection must be used for low capacity antennas of from 0 to 125 mmd. Compare this listing with that given under the various antennas, and the proper position will easily be recognized. After selecting the position desired, place the capping plug back over the hole to prevent motor noise from entering into the antenna circuit of the receiver. Connect the antenna properly by means of the Delco-Remy connector shown in Fig. 8.
ANTENNA ALIGNMENT

**Manual Tuning:** Press the MANUAL button on the automatic key board.

This disconnects the automatic system and allows operation of the receiver from the standard tuning mechanism. After adjusting the dial calibration accurately, turn the volume control up full and tune to a weak station near 1400 K.C. Adjust the antenna trimmer A (Fig. 8) to the point of greatest volume. This completes antenna alignment for manual operation. The trimmer does not have to be adjusted at any other point on the dial.

**Automatic Tuning:** Press automatic button 2 (Fig. 8) This will disconnect the manual tuning mechanism and place the automatic buttons into service. After button 2 has been pressed, turn adjusting screw 2 in either direction until a weak station between 1100 to 1000 K.C. is heard. Now adjust trimmers B and C on the automatic assembly for maximum signal strength of the weak station tuned in by the number 2 adjusting screw. The automatic is in complete resonance with the antenna over the entire automatic button range and need not be resonated at any other button setting. Adjusting screw 2 may now be tuned to a local station as outlined under “AUTOMATIC” with no further attention to adjustments B or C.

AUTOMATIC

Study Fig. 8 carefully. Although simple in adjustment, best results will only be obtained if made accurately and by the following procedure.

1. Press button 1. (This button will be on the left if automatic unit is mounted on edge of instrument panel.)

2. Adjust automatic trimmer screw (until a desired local station between 1600 and 1000 K.C. is heard. Turn the screw slowly back and forth over the station as if tuning the dial of a receiver, for clearest reception and best tone quality and allow the screw setting to remain at that point.

3. Press button 2 and tune for a station between 1450 and 900 K.C. on automatic adjusting screw 2.

4. Follow above procedure for buttons 3, 4 and 5 using the ranges shown on Fig. 8.

5. Remove the chrome bezel over the parts adjacent to the automatic buttons and insert the station call letters cut from the sheet supplied. After placing the proper station calls in correct order over the port holes, fasten the escutcheon back in place.

6. Repeat careful adjustment of each automatic trimmer pressing the corresponding button in order from 1 to 5 to obtain best tone, loudest signal and greatest freedom from noise.
NOTE: This receiver is equipped with a fixed-variable sensitivity control located on the chassis base below the tuning control shaft of the variable condenser. (See Fig. 5.) The control can be adjusted with a screwdriver at either front or rear of the chassis, and is set at the factory to a position which gives a sensitivity of 10 microvolts at 1 watt output. In most cases it is found advisable to hold the receiver to this level as any higher sensitivity might result in increased motor noise or excessive back-ground noise. Unless laboratory equipment capable of accurately measuring the input and output of the receiver is available, it is not advisable to alter this adjustment.

MANUAL DIAL ADJUSTMENT: The manual control dial must be aligned with the receiver for correct calibration. To do this, turn the manual tuning knob in one direction as far as it will go. Now do the same in the opposite direction. Then, turn in a station of known frequency, and note if the dial reading corresponds. If the frequency reading is not correct, hold the tuning knob firmly and move the dial drum with your fingers through the bezel to the correct frequency reading of the station being received.

AUTOMATIC DIAL SYNCHRONIZATION: Before setting the station adjusting screws for automatic tuning, it may be necessary to synchronize the automatic dial to the receiver which is done as follows: Turn on receiver, and try to tune in a station with the manual tuning control. If no station can be picked up, push the automatic station selector button until a position is found where stations can be received. Remove the automatic dial assembly by pulling out from the rear and turn the station indicator drum downward until the word "Tone" appears in the cover plate. The adjusting screws in the receiver can now be resonated for the stations shown around the automatic dial as the automatic button is operated. It is very important that these adjusting screws be set on a weak signal from the station so that the circuit may be sharply tuned. A very short piece of wire used as an antenna will hold the signal strength. Always be sure the antenna characteristics are similar to actual car conditions. 2.28 mm id, condenser from antenna to ground will provide the necessary input capacity.

AUTOMATIC TUNING ADJUSTMENTS: 1. Turn the receiver on and allow it to operate until thoroughly heated. Leave the screws holding the cover plate over the automatic adjustments, and slide it upward exposing the adjusting screws and recording strip. This plate is on the front of the receiver. (See Fig. 4.)

2. Push the automatic station selector button until the word "Tone" is at the automatic dial window. Tune manually on the station whose call letters are in the No. 1 position on the dial (the lowest frequency station—see Fig. 3) and note the program so that it can be identified. Push the automatic station selector button once, and this station's call letters will appear at the automatic window.

3. With a small screwdriver, turn the station setting screw A (see Fig. 4) in the upper row to the right or left until that station is tuned in accurately. Now adjust the corresponding screw A in the lower row until maximum volume is obtained. Make these adjustments very carefully as it is quite easy to pass the resonant point due to the unusual selectivity of the receiver.

4. Press the automatic station selector button until "Tone" again is at the automatic dial window and tune in manually on the station, whose call letters are in the No. 2 position (the next higher frequency) on the automatic dial. Press the automatic station selector button twice to bring the No. 2 station's call letters into the cover plate, and leave B and B1 screws in this station. Repeat this procedure until each of the five pairs of adjusting screws have been carefully set to their resonant positions. It is necessary that the IMPORTANT: Unless certain dummy antenna capacitances are employed with either the signal generator or in making adjustments on stations, the receiver will not respond properly. The values provided in the Zenith dummy antenna are given on the diagram in Fig. 5. If identical adjustments are used the instrument will operate properly when reinstalled in the automobile. The Zenith dummy antenna S6740 is especially priced at 25c net to service stations, and should be purchased for use in servicing Zenith built Ford receivers.

©John F. Rider, Publisher
Align Socket Trimmers

Compliments of www.nucow.com
The total consumption is 70 watts. Power output 4.5 watts.
**ALIGNMENT PROCEDURE**

Chassis 5802-A

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 6 M.C.—Switch receiver to Band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.

(5) Set signal generator at 1000 K.C.—Switch receiver to band A and adjust broadcast trimmer for correct dial reading at 200 meters. Also adjust ant. and det. trimmer on gang to resonance.

(6) Set signal generator at 17.5 M.C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 17 meters on the dial to the combination giving the greatest output.

(7) Set signal generator at 600 K.C.—Switch receiver to band A, and rock pointer past 500 meters on dial while adjusting the broadcast oscillator (located adjacent to gang condenser) to combination giving the greatest output reading.

(8) Repeat operation No. 5.

(9) Set signal generator at 375 K.C. Switch receiver to Band D and adjust long wave osc. trimmer for correct dial reading at 800 meters. Also adjust long wave det. and ant. trimmers (located on side and rear of chassis), for maximum output reading.

(10) Set signal generator at 150 K.C. and rock pointer past 2000 meters on dial while adjusting the long wave osc. pad to combination giving the highest output reading.

(11) Repeat operation No. 9.
ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>Operation</th>
<th>Connect Test Oscillator to</th>
<th>Dummy Antenna</th>
<th>Set Test Osc. to</th>
<th>Band</th>
<th>Set Dial At</th>
<th>Adjust Trimmers</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1st Det. Grid</td>
<td>1/2 Mfd.</td>
<td>455</td>
<td>Br'dc'f</td>
<td>600</td>
<td>ABCD</td>
<td>L. F. Alignment</td>
</tr>
<tr>
<td>2</td>
<td>Rec. Ant. Post</td>
<td>200 Mmfd.</td>
<td>455</td>
<td></td>
<td>600</td>
<td>E</td>
<td>See Note</td>
</tr>
<tr>
<td>3</td>
<td>&quot;</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>&quot;</td>
<td>1500</td>
<td>F</td>
<td>Set Osc. to Scale</td>
</tr>
<tr>
<td>4</td>
<td>&quot;</td>
<td>200 Mmfd.</td>
<td>1500</td>
<td>&quot;</td>
<td>1500</td>
<td>G</td>
<td>Alignment of Ant.</td>
</tr>
<tr>
<td>5</td>
<td>&quot;</td>
<td>200 Mmfd.</td>
<td>600</td>
<td>&quot;</td>
<td>600</td>
<td>J</td>
<td>Rock gang &amp; adj. for max. output</td>
</tr>
<tr>
<td>6</td>
<td>&quot;</td>
<td>200 Mmfd.</td>
<td>600</td>
<td>&quot;</td>
<td>600</td>
<td>FG</td>
<td>Repeat 3 &amp; 4</td>
</tr>
<tr>
<td>7</td>
<td>&quot;</td>
<td>400 Ohms</td>
<td>18000</td>
<td>S.W.</td>
<td>18000</td>
<td>K</td>
<td>Set Osc. to Scale</td>
</tr>
<tr>
<td>8</td>
<td>&quot;</td>
<td>400 Ohms</td>
<td>18000</td>
<td>S.W.</td>
<td>18000</td>
<td>L</td>
<td>Rock Gang &amp; adj. for max. output</td>
</tr>
<tr>
<td>9</td>
<td>&quot;</td>
<td>400 Ohms</td>
<td>6000</td>
<td>Police</td>
<td>6000</td>
<td>N</td>
<td>Rock Gang &amp; adj. for max. output</td>
</tr>
</tbody>
</table>

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.
Models 1102, 1106, and 834. Chassis 1002

All components used in these models are the same as those used in Zenith Chassis 1001 - 1001A, excepting the following changes:

Parts added:
- 20-76 Complete Dial and Drive Assembly.
- 26-75 Dial scale only.
- 22-305 (2) 35 mfd. Condensers.
- 22-245 Padler.
- S-3317 Long wave ant coil Assm.
- S-3318 Long wave osc. coil...
- S-3321 Long Wave Detector Coil Assm.

The long wave band has two trimmers on each stage. The oscillator stage has a trimmer and padler assembly of the nut and screw type. The nut is the trimmer and the screw is the padler.

The detector and R.F. stages each have two trimmers whose actions are dependent. The arrangement consists of a coupling condenser and a coil trimmer.

The coil trimmer can be distinguished in that one side is grounded. Maximum gain with this system is obtained by having the coupling condenser with as much capacity as possible and still able to obtain peak on the coil trimmer.

Balancing Procedure for Long Wave:

Connect service oscillator to antenna post and set at 375 KC. Set dial at 375 KC. Adjust nut on oscillator trimmer assembly to bring in signal. Open R.F. and detector coil trimmers as far as possible and still leave enough capacity for peaking (about 2 or 3 turns). Open coupling condensers until what appears to be resonance is obtained. Then repeat coil trimmers to resonance. Remember the resonance obtained by means of the coupling condensers is not true resonance and the coil trimmers must be re-adjusted for true resonance.

Move I.F. selector switch to 160 KC, and set dial at this point. Adjust padler screw in oscillator coil assembly for maximum gain, peaking condenser to reach this point, wherever it happens to fall. Repeat 375 KC, as it will be thrown off by the movements of the padler.
To align receiver, proceed as follows:

1. Peak I F transformer, applying a 456 KC note on the 6AY control grid.
2. Turn variable condenser all the way open and apply a 1712 KC note to the antenna. Set oscillator trimmer on oscillator section of variable condenser first, then line up R F section.
3. Adjust low frequency padder at 600 KC, rocking condenser back and forth across 600 KC signal and adjust for maximum gain.
4. Go back and check 1400 KC alignment.
5. Long Wave - Apply 150 KC note to antenna. Set long wave oscillator and R F trimmers, through holes at front of chassis, for maximum gain.
6. Apply a 300 KC note to the antenna and adjust long wave padder, through hole on front of chassis, for maximum gain - rocking condenser back and forth while adjusting.
7. Go back and check 150 KC again for alignment.

NOTE: Supply cord of set gets warm while operating set, this is normal. 
Make sure that all tubes are pushed firmly in their proper sockets. 
Unreal antenna supplied with set, to full length and place along the floor or drop out of window, if an outdoor antenna is used, make sure connection to set antenna (brown wire) is good, DO NOT ATTACH A GROUND WIRE TO THIS SET. 
If necessary to service chassis, under no circumstances remove the chassis without first removing plug from receptacle.
NOTE: The chassis and power pack layout are the same as for the early model, for which see the Index.

© John F. Rider, Publisher
### CHASSIS 5636 SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube</th>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8</td>
<td>1st Det. Osc.</td>
<td>0</td>
<td>AC</td>
<td>100</td>
<td>90</td>
<td>-5</td>
<td>100</td>
<td>AC</td>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>6K7</td>
<td>I. F.</td>
<td>0</td>
<td>AC</td>
<td>100</td>
<td>100</td>
<td>5</td>
<td>—</td>
<td>—</td>
<td>AC</td>
<td>5</td>
</tr>
<tr>
<td>6Q7</td>
<td>2nd Det. A.V.C.</td>
<td>0</td>
<td>AC</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>AC</td>
<td>1</td>
</tr>
<tr>
<td>25A6</td>
<td>Power</td>
<td>0</td>
<td>AC</td>
<td>90</td>
<td>100</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>AC</td>
<td>0</td>
</tr>
<tr>
<td>25Z6</td>
<td>Rectifier</td>
<td>0</td>
<td>AC</td>
<td>AC</td>
<td>AC</td>
<td>100</td>
<td>—</td>
<td>—</td>
<td>AC</td>
<td>125</td>
</tr>
<tr>
<td>100-37</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected. Line Voltage 112V (A.C.)

### CHASSIS 5640AT SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube</th>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L7</td>
<td>1st Det.</td>
<td>0</td>
<td>231</td>
<td>141</td>
<td>-10</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.3</td>
<td>2.5</td>
</tr>
<tr>
<td>6J5</td>
<td>Osc.</td>
<td>0</td>
<td>6.3</td>
<td>129</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>6K7</td>
<td>IF</td>
<td>0</td>
<td>6.3</td>
<td>324</td>
<td>65</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6Q7</td>
<td>2nd Det. Audio</td>
<td>0</td>
<td>88</td>
<td>—</td>
<td>-5</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.3</td>
<td>-1</td>
</tr>
<tr>
<td>6V6</td>
<td>Power</td>
<td>0</td>
<td>210</td>
<td>234</td>
<td>-2</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.3</td>
<td>-1.5</td>
</tr>
<tr>
<td>5Y4</td>
<td>Rect.</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>AC</td>
<td>AC</td>
<td>AC</td>
<td>1882</td>
<td>288</td>
<td>288</td>
</tr>
</tbody>
</table>

### CHASSIS 5802A SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube</th>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>1st Det. Osc.</td>
<td>0</td>
<td>6AC</td>
<td>250</td>
<td>68</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6K7</td>
<td>I. F.</td>
<td>0</td>
<td>6AC</td>
<td>250</td>
<td>68</td>
<td>-4</td>
<td>120</td>
<td>—</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>6H6</td>
<td>2nd Det. A.V.C.</td>
<td>0</td>
<td>6AC</td>
<td>-3</td>
<td>-3</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6F5</td>
<td>1st Audio</td>
<td>0</td>
<td>6AC</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6F6</td>
<td>Power</td>
<td>0</td>
<td>6AC</td>
<td>235</td>
<td>250</td>
<td>-4</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6C5</td>
<td>Target Tuning Amp.</td>
<td>0</td>
<td>6AC</td>
<td>—</td>
<td>-5</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5Y4</td>
<td>Rectifier</td>
<td>0</td>
<td>310</td>
<td>—</td>
<td>AC</td>
<td>AC</td>
<td>AC</td>
<td>—</td>
<td>—</td>
<td>310</td>
</tr>
</tbody>
</table>

All voltages measured from point indicated to ground, using a 2500 ohm per volt meter. Line Voltage 112V.

### CHASSIS 5804AT SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube</th>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>RF</td>
<td>0</td>
<td>216</td>
<td>90</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6L7</td>
<td>1st Det.</td>
<td>0</td>
<td>216</td>
<td>130</td>
<td>-3</td>
<td>—</td>
<td>—</td>
<td>6.2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>6J5</td>
<td>Osc.</td>
<td>0</td>
<td>6.2</td>
<td>116</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6K7</td>
<td>IF</td>
<td>0</td>
<td>6.2</td>
<td>212</td>
<td>90</td>
<td>0</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6Q7</td>
<td>2nd Det. Audio</td>
<td>0</td>
<td>70</td>
<td>—</td>
<td>-2</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.2</td>
<td>-2</td>
</tr>
<tr>
<td>6V6</td>
<td>Power</td>
<td>0</td>
<td>210</td>
<td>216</td>
<td>-3</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.2</td>
<td>-4</td>
</tr>
<tr>
<td>5Y4</td>
<td>Rect.</td>
<td>0</td>
<td>—</td>
<td>AC</td>
<td>—</td>
<td>AC</td>
<td>—</td>
<td>276</td>
<td>276</td>
<td>—</td>
</tr>
<tr>
<td>6T5</td>
<td>Eye</td>
<td>0</td>
<td>10</td>
<td>—</td>
<td>-2</td>
<td>216</td>
<td>-2</td>
<td>6.2</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Line Voltage 112V.
ZEPHYR RADIO CO.

Model 3M7

IF PEAK 262 KC

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

Model 3MB

IF PEAK 262 KC

© John F. Rider, Publisher
PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these.

Fig. 1 also shows the tuning range or frequencies covered by each button.

The remaining two (2) push buttons, located at the extreme left hand end of the push button plate are for tone control.

1. Choose a station having a frequency within the range of button No. 1 540 kc. to 595 kc.
2. With the middle knob in the "broadcast" position, tune this station conventionally by using the selector knob.

NOTE: It is advisable to retain the call letter sheet in case of station change later on.

3. Now turn the middle knob to the "automatic" position and press button No. 1 and turn the adjusting screw in either direction until the previously selected station is heard. Adjust the screw for maximum volume and sensitivity.

4. Remove the call letters of the station from the call letter sheet and insert in the window of the adjusting screw. Insert "Med" and "Base" tabs in windows as shown in Fig. 1.

5. Repeat the above procedure for the remaining five (5) stations.
I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

<table>
<thead>
<tr>
<th>SCHEMATIC LOCATION</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Antenna Coil</td>
<td>BA110</td>
<td>$0.50</td>
</tr>
<tr>
<td>L2</td>
<td>Oscillator Coil</td>
<td>BO110</td>
<td>.40</td>
</tr>
<tr>
<td>L3, L4</td>
<td>1st I. F. Coil</td>
<td>LC110</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>2nd I. F. Coil</td>
<td>LC112</td>
<td>.80</td>
</tr>
<tr>
<td>C1, C2</td>
<td>Speaker</td>
<td>SD23</td>
<td>3.50</td>
</tr>
<tr>
<td>C3, C4, C5, C6, C7</td>
<td>Tuning Condenser</td>
<td>CV25</td>
<td>1.80</td>
</tr>
<tr>
<td>C8, C9, C16</td>
<td>Fixed &quot;</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Mica</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Mica</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>C10</td>
<td>Variable Padder</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>C10</td>
<td>.550mmf</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>C11, C12, C13</td>
<td>Fixed .001mfd-200v</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Fixed .100mfd-600v</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Fixed .002mfd-600v</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>C18</td>
<td>Electrolytic Condenser Block</td>
<td>CE20</td>
<td>1.40</td>
</tr>
<tr>
<td>S1, S2</td>
<td>Line Switch (On Vol. Control)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>Tone Control Switch</td>
<td>S12</td>
<td>.40</td>
</tr>
<tr>
<td>R2</td>
<td>Volume Control 1½ megohm</td>
<td>RV18</td>
<td>.80</td>
</tr>
<tr>
<td>R3, R4, R5, R6, R7</td>
<td>Resistors 50,000 ohms-1½ Watt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R8, R9</td>
<td>25,000 ohms-1½ Watt</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>R10, R11, R12</td>
<td>100 ohms-1½ Watt</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>30 ohms-1½ Watt</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>25 ohms-1½ Watt</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

**Note:** Prices subject to change without notice.
ANTENNA

The antenna built into this set will perform with best results in most localities. However, in localities more than 100 miles from a broadcasting station an outdoor antenna of 50 to 75 feet attached to the end of the built-in antenna will be sufficient to give the best performance. THIS RECEIVER WAS DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THIS RECEIVER.
Arvin 618, 618A, etc.

In order to eliminate the hum in the chassis used in these and other six-tube models, follow this procedure:

Remove the chassis from the cabinet. Locate the ground lug on the 6Q7G tube socket (see chassis layout on page 8-10 of Rider's Volume VIII). This lug is fastened to the chassis by a rivet which attaches the 6Q7G socket to the chassis. Bend this lug over and solder it to the chassis and then recheck for hum. If this is done correctly, the hum level should be brought to a minimum.

Pilot XI14, XI15

Changes have been made in the chassis used in these models, which have a similar schematic to the one shown on page 6-15 in Rider's Volume IX. The condensers C32 and C33 in the plate circuit of the second detector have been removed from the circuit, so that now the switch S3 is used to short out only the one condenser, C34, which now has a value of 250 mmf.

The value of the 10,000-ohm resistor No. 26 has been changed to 6,000 ohms. This is in the primary circuit of the pushpull input transformer.

A line condenser (1000-volt, paper) has been added across the primary of the power transformer. This is a dual condenser, grounded between the 0.01-0.01 mf sections.

Automatic 960 A

The accompanying partial schematic shows a change which was incorporated in the 960 series, the schematic of which is shown on page 9-2 in Rider's Volume IX. Note also that the receivers in which this change has been made have an 1/2 peak of 480 kc, instead of 456 kc and that they are identified by the letter "A" after the model number.

Remove the chassis from the cabinet. Unsolder the 250,000-ohm plate resistor of the 6F5G tube from the B+ terminal, which is the lug on the 16-mf-300 volt electrolytic condenser. See chassis layout on page 8-20 of Rider's Volume VIII. Connect this resistor to the first tap down from B+ on the voltage divider resistor R87. This voltage tap supplies the potential for the 6AG6 anode grid, Recheck for hum, which now should be reduced to a satisfactory level.

Oldsmobile 982043

In some of the early receivers (under serial A-20,000) of this model, several differences exist which should be noted on page 9-1 in Rider's Volume IX.

Resistor No. 46 is 100,000-ohms instead of 20,000.

Resistor No. 54 is 125,000 instead of 100,000-ohms and No. 55 is 75,000 instead of 100,000-ohms.

Resistor No. 44 and condenser No. 26 have been transposed, i.e., the resistor is connected to the grounded end of resistor No. 53 instead of the condenser.

The value of condenser No. 82 is indicated as 0.000065-mf and its connections are as follows: one terminal is connected to the junction of condenser No. 26 and the tap from resistor No. 58 and the other terminal is connected to the junction of condenser No. 18 and the left end of resistor No. 58.

Emerson Chassis AF

Receivers using this chassis and bearing serial numbers above 1,244,716 differ from the schematic shown on page 8-45 in Rider's Volume VIII. The condenser C-17 is omitted and the negative side of the filament circuit is grounded to the chassis.

Fairbanks-Morse 9A

Refer to the schematic shown on page 8-9 of Rider's Volume VIII. During production, the 47,000-ohm resistor (8) and the filter condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 1-meg-ohm resistor (9). A 1000-ohm variable resistor was added in the cathode circuit of the 6J7G AFC control tube (at 37) to make possible compensation for variation in calibration due to variation in tube characteristics. This control was found unnecessary and was removed in later runs.

Fairbanks-Morse 8A

Refer to schematic shown on page 8-7 of Rider's Volume VIII. During production, the 47,000-ohm resistor (16) and the 0.05-mf condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 470,000-ohm resistor (17).

G.E. G-57

This model is identical to model G-55, except for the cabinet and the loudspeaker, which has a part number R5-95. The 12-inch cone of this unit has a part number RC-943.

The servicing data for model G-55, found on pages 9-3, 9-4, and 9-5 of Rider's Volume IX, apply to the G-57. This additional model number should be added to the listing in your Index.

Stromberg-Carlson Push-Button Tuners

The push buttons on all the new receivers, such as those whose servicing data are found in Rider's Volume IX, which employ paddling condensers for tuning purposes are set up from the front of the chassis. It is unnecessary to get into the back of the receiver to set up the desired stations, except to adjust the electric tuning switch on the rear of the chassis.

To set up the stations, it is only necessary to remove the escutcheon over the push buttons and the adjusting screws become readily accessible. These escutcheons are held in place by several Phillips type screws, which can be removed with any small pointed instrument, such as a small nailfile or an old knife blade. However, the use of a special tool is recommended, as this will not mar the surface of the screw head.

De'Wald 1106

This model is identical with the Models 1104 and 1105, shown on pages 9-1 and 9-10 of Rider's Volume IX, except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

RCA 8M3, 8M4

On 8M3 and 8M4 receivers, it is often advantageous to connect the 22-mmf condenser (Cl. on page 9-37 of Rider's Volume IX) from the output end of coil L1 to ground, instead of from the antenna end. Later runs of sets include this change. Note that good electrical contact is required between vibrator-transformer and chassis to minimize internal noise.
Majestic 11356

This model is found on pages 9-8, 9-11 and 9-12 of Rider's Volume IX. A new electric tuning system has been incorporated in later runs of this receiver and is illustrated in Fig. 1. The procedure for indexing this tuning system for desired stations is as follows:

1. Set receiver to Standard Broadcast band.
2. Place "Manual-Electric" lever in "Manual" position, which is extreme counter-clockwise. Be sure the tone control is in the "Normal" position as shown by the indicator.
3. Pull out Indexing Rod located at center bottom of the escutcheon. This rod has numbers on it which correspond to the push buttons (counting from left to right.)
4. Set Indexing Rod so that the number on the rod corresponding to the push button you wish to index is in line with the escutcheon plate.
5. Turn tuning knob until the pointer has covered the entire dial. This is essential to engage the tuning disc.
6. Tune in the desired station accurately, using the tuning eye.
7. Push Indexing Rod all the way in, and that particular station will always be tuned in automatically when that particular button is depressed while the "Manual-Electric" lever is in the "Electric" position.

Caution: When using electric tuning, do not depress more than one button at a time. Depressing two buttons will cause the motor to run continuously or until the automatic thermal switch operates to prevent the motor from burning out. If this happens, it may take fifteen minutes for the motor to become cool enough for the electric tuning to become operative again.

Run No. 5. Resistor No. 11, 70,000-ohms changed to 40,000-ohms, Part No. 33-340339 in order to improve the oscillator circuit performance. See page 8-67 in Rider's Volume VIII.

Spiegel Chassis X1

This chassis is used in the following models: 1900, 1920, 1931, 1970, 4502, 9922, and 9925. It is quite similar to the chassis used in the Spiegel Model 100 found on page 9-1 of Rider's Volume IX, the difference being as follows:

The 250,000-ohm resistor in the plate circuit of the 75 second detector is connected directly to +B. This means that the 100,000-ohm resistor and the 0.1-mf by-pass condenser are not used in this chassis. An 0.05-mf condenser is used across the 110-volt a-c leads to the power transformer primary instead of one with a value of 0.02 mf.

No wave trap is used in the X1 chassis, such as is shown in the broadcast-band antenna coil. Also no condenser is shunted across the short-wave oscillator coil. The value of the fixed condenser connected between the Police-band oscillator coil and ground is 0.005 mf instead of 0.012 mf.

RCA 10K11, 10T11

The chassis and speakers of these two models are identical to models 10K and 10T, which will be found in Rider's Volume VII on page 7-132. The service data starting on that page applies to these new model numbers with the exception of some minor replacement parts for the new cabinets in which these chassis are housed.

Majestic 11056, 11057, 11058

Models 11056 and 11058 are found on pages 9-8 to 9-10 of Rider's Volume IX. The data given there also apply to Model 11057. Alignment instructions for these three models are given in the table below.

| Signal Generator Connection Frequency Band Switch Position Dial Position | Trimmer Designation Output Signal |
|--------------------------|----------------------------------|---------------------------------|
| 6A8G Mixer Control Grid Antenna (3) | 455 kc (1) | BC | SW | 18 mc | 18 mc | Osc | Tram 455 kc |
| | 11 mc | SW | To Gen. | | | |
| | 6 mc | SW | To Gen. | | | |
| | 19 mc | SW | 18 mc | | | |
| | 6 mc | POL | 6 mc | Osc | 6 mc | Max. |
| | 7 mc | POL | 6 mc | R-F | 6 mc | Max. |
| | 1500 kc | BC | 1500 kc | Osc | 1500 kc | Max. |
| | 600 kc | BC | 600 kc | R-F | 1500 kc | Max. |
| | 1500 kc | BC | 1500 kc | Ant | 1500 kc | Max. |
| | 600 kc | BC | 600 kc | Ant | 1500 kc | Max. |

Note (1) - Apply through 0.1-mf condenser; use smallest possible signal from generator to prevent AVC action from affecting readings.
Note (2) - Gang condenser about 50% engaged; if a squeal is heard, rotate gang until squeal is removed.
Note (3) - Apply through 200-mw dummy antenna.
Note (4) - Trim by-pass trimmer to minimum, then slowly turn screw to increase capacity until signal is heard.
Note (5) - Check sensitivity.
Note (6) - Image check; if alignment is correct, about 10 times as much signal generator input will be required to give image same output reading as did the desired signal.
Note (7) - Apply through 200-mw dummy condenser as dummy antenna.
Note (8) - While peaked gang condenser.

© John F. Rider, Publisher

Compliments of www.nucow.com
Philo 38-12

Run No. 3. It is important that the following leads be dressed in order to eliminate hum:

- Dress the green wire connecting the diode of the 75 tube to the 2nd i-f transformer as far as possible from the filament prongs of the 75.
- The brown wire connecting the 51,000-ohm resistor to the high side of the volume control should be dressed under the coil of the 2nd i-f transformer.
- The grid lead of the 75 tube should be dressed toward the back of the receiver and between the tube and shield.

New i-f transformer for Philco models 38-12 and 38-14.

The second i-f transformer, No. 12 in the schematic on page 8-69 of Rider's Volume VIII, has been changed from Part No. 32-2674 to No. 32-2944. Note that condenser 12B and 12C are part of the padder in these transformers. The wiring of this new transformer is shown in the accompanying illustration.

Philo 38-14

In the list of parts on page 8-72 in Rider's Volume VIII, the parts numbers of the following are incorrect:

- Schematic Incorrect Correct

<table>
<thead>
<tr>
<th>No.</th>
<th>No.</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>31-6209</td>
<td>31-6100</td>
</tr>
<tr>
<td>20</td>
<td>33-5236</td>
<td>33-5230</td>
</tr>
</tbody>
</table>

A condenser, 5 mmf, was connected across the secondary of the short-wave transformer, No. 2. This condenser is connected to lugs No. 3 and 4 of the transformer shown on the schematic. See page 8-71 of Rider's Volume VIII.

Run No. 2. The second i-f trans-
former, No. 17, was changed from Part No. 32-2674 to No. 32-2944. The wiring lugs on the new transformer are slightly changed. The drawing of this transformer is shown in the preceding change notice covering Philco 38-12. Note that in the case of Model 38-12, the middle left-hand lead in the sketch goes to chassis ground, but in the Model 38-14, this same lead goes to B.

Philo 38-4

Run No. 5. The two condensers, Part No. 30-1097, which were connected in parallel with the new air pad-
ner, No. 16 in Run No. 3 receivers (see SUCCESSFUL SERVICING, July 1938, page 2) have been removed, starting with Run No. 5. For schematic see page 8-61 in Rider's Volume VIII. In place of these condensers, a thermal compensator, Part No. 31-6227 is connected in parallel with the air pad-
er. The air padder, Part No. 31-6206, has also been relocated and is now mounted between the 6U7G r-f tube and the 6F6G output tube. (See page 8-63 for chassis layout). The thermal compensator, Part No. 31-6227, is also mounted in the same position with the thermostatic plate facing the power transformer.

The oscillator transformer, No. 15, was changed from Part No. 32-2631 to 32-2894. Connection No. 1 of the new transformer has been increased in length for soldering to the air pad-
er in the new location.

Philo 38-14 (121, 124)

Run No. 4. Code 121. In order to eliminate hum modulation, the electrolytic condenser, No. 32, was changed from 16-mf to 40-mf, Part No. 30-2237. The electrolytic condenser in Code 124 receivers was also changed from 16- to 40-mf, Part No. 30-2256. The oscillator blocking con-
denser No. 8, 250-mmfd was changed to 50-mmfd, Part No. 30-1029.

See page 8-71 in Rider's Volume VIII for schematic of both codes.

Philo 38-33 (121)

Run No. 3. Resistor No. 20, 8000-
ths, was changed to 20,000-ohms, Part No. 33-320339. It was removed from the 90-volt wire (see schematic on page 9-3 of Rider's Volume IX) and reconnected to the 135-volt wire of the battery cable. The battery cable as-
sembly was also changed to Part No. 41-3402.

Signal
Generator
Connection Signal Generator Frequency Dia
d Position
Det-Osc. 456 kc — —
Control Grid Antenna 456 kc — —
Antenna 6 mc 6 mc — —
Antenna 1400 kc 1400 kc — —
Antenna 18 mc 18 mc — —
Antenna 600 kc 600 kc — —
Antenna 1400 kc 1400 kc — —

Wave-Band
Number
Switch Position
Trimmer 4-F Trimmers Max.
Output
Signal
Wave-Trap Trim. Min.
(Rear of chassis)
Osc. Trim. — — — —
Band A Band B Band C Band D
Broadcast Trim.1 Max.
Antenna Trim. Max.
Short-Wave Trim. Max.
Broadcast Trim.2 Max.
Antenna Trim. Max.

Note 1—Use smallest possible signal from generator to prevent AVC action from affecting other readings.
Note 2—Adjust for correct dial reading.
Note 3—While rocking.

Zenith Chassis 5516, 5634, 5707

The alignment instructions for the three chassis mentioned above are identical and will be found below. The model numbers of the receivers in which these chassis are used will be found on the pages of Rider's Volume VIII. The schematics and trimmer locations for the respective chassis will be found on these pages: Chassis 5516, schematic page 7-7, trimmers page 7-2; Chassis 5634, schematic page 7-17, trimmers page 7-9; Chassis 5707, schematic page 7-18, trimmers page 7-11.

Belmont 665,765

It will be noticed that another model number, 765, has been added to 665, which appears in the Index to Rider's Volume IX. This new series starts with serial 9A532400 for which the model numbers are 665 Series A, Issue B and 765 Series A. The servicing data on both these models are the same as the information published in Rider's Volume IX with the following changes:

- A 6U5 tuning indicator tube has been added in the model 765. The grid of the 6U5 is connected to the jun-
ction of No. 5 terminal of the 6Q7G and R8; the target to +B; and the cathode to the junction of R10 and R12.
- See schematic on page 9-21 in Rider's Volume IX.

The short pieces of wire on the ant-
ena coil, which are designated as CA and CB in the schematic, have been removed.
- A resistor, R17, 2000 ohms, has been shunted across P and H terminals of the oscillator coil.
- A 0.008-mf, 800-volt condenser, C21, has been added between the plate of the output tube, 6AC5G, and ground.

The short-wave oscillator padder, C12, was not shown on the bottom view of the chassis. This is located on the layout just above and between the trimmers C8 and C11. Note that this padder C12 is adjusted at the factory and needs no other adjustment.
RCA U-112, Late U-111 and U-112

The U-112 is a 5-tube superheterodyne-Victrola combination similar to U-111 except that the cabinet has been enlarged to permit the playing of 12-inch records. The service data for the U-111 found on pages 9-109 and 9-170 of Rider’s Volume IX apply to these later models, with the following exceptions:

In the U-112, the rectifier has been changed to a 5W4.
A 12,000-ohm resistor, R18, has been added in series with the 0.005-mfd condenser across the pickup in U-112.
Model U-112 is made in three power supply ratings, all 105-125 volts with 80 watts consumption:

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency</th>
<th>60 cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-6</td>
<td>50</td>
<td>25</td>
</tr>
</tbody>
</table>

The 25-cycle power transformer for U-112 has a d-c resistance of 13.7 ohms in its primary and 1190 ohms in the secondary. The speaker in this model, 8426-5-4, has the following d-c resistances: Field coil—1300 ohms; Primary of output transformer—420 ohms; Voice coil—2 ohms.

Later production of both the U-111 and U-112 models have the following changes:
The antenna coil has been changed from stock number 30894 (1-ohm primary) to 32338 (35-ohm primary). This last coil may be used to replace the former.
A 270-mmf condenser, C23, is con- nec ted from the triode plate of the 6Q7G to the chassis.

The following additional alignment data apply to both models: On r-f alignment, turn the gang condenser all the way out of mesh and with the test oscillator tuned to 1720 kc, align the oscillator trimmer C18. Set the test oscillator to 1500 kc, tune the receiver to the 1500-kc signal and align the antenna trimmer C3 for maximum output.

Note that the connections for the motor-assembly coil, shown on page 9-170, has been revised. The connections shown in the left-hand view of the stator are used for both 25-cycle and 60-cycle operation on 110 volts and are unchanged. For 110-volt, 50-cycle operation, the red and yellow designations in the right-hand sketch should be reversed; in other words, the yellow of the left-hand coil is connected to the red of the right coil, making the leads at the bottom, red from the left coil and yellow from the right. Note also that the d-c resistance of each coil for 25-cycles in 250 ohms, those for 50- and 60-cycles remaining 82 ohms. These notes apply to both U-111 and U-112.

RCA 5T

Two different speakers are used on Model 5T, and are identified by the numbers stamped on them as follows: (1) RL-63C1 and (2) ?2203-5. Replacement parts for No. RL-63C1 are listed in the service data for Model 5T, shown on page 9-14 of Rider’s Volume VIII, and the replacement parts for No. 72203-5 are listed below:

Stock No. | Description
--- | ---
9579 | Coil—Field coil
9533 | Cone—Reproducer cone mounted and centered in housing
5118 | Connector—4-contact male connector for reproducer
9578 | Reproducer complete
4818 | Transformer—Output transformer

RCA 5X

Late-production Model 5X receivers include the following minor changes from the original Model 5X which is found on pages 7-18 to 7-20 of Rider’s Volume VIII: (1) a fixed-tuned wave trap is used in place of the adjustable wave trap and (2) a few changes in component parts which are listed below. For late-production Model 5X, under “Alignment Procedure,” omit the wave-trap adjustment. Early- and late-production receivers can be distinguished readily by inspection of the wave-trap. Component part changes for late-production models are as follows:

Stock No. | Description
--- | ---
11414 | Capacitor—0.1 mf (C19)
13837 | Capacitor pack—Comprising one 10-mf and two 16-mf sections (C23, C24, C26)
12695 | Resistor—15,000 ohms, insulated, 4/4 watt (R2)
12679 | Resistor—22 megohms, insulated, 4/4 watt (R3, R7)
13836 | Switch—Range switch (S2, S3, S4, S5)
13838 | Trap—Wave trap (L1, L2)
13149 | Coil—Reproducer field coil (L1, L5)

Stock Nos. 12537, 4835, 12398, 12410, 12411, 12399, 3404, 12402, 12395, 12497, 12499, 12731, 12498, 9684, 12500, 13150, 13071, 12936 and 12937 are not used in Model 5X with fixed wave trap.

RCA 8T2

Four different speakers are used with Model 8T2 receiver, and are identified by the numbers stamped on them as follows: (1) RL-63-4, (2) 7636-5-1, (3) 7636-5-3 and (4) RL-63C2. Replacement parts for Nos. RL-63-4 and 7636-5-1 are listed on page 8-40 of Rider’s Volume VIII, and Nos. 7636-5-3 is listed on the schematic on page 8-41. The replacement parts for No. RL-63C2 are listed below:

Stock No. | Description
--- | ---
12641 | Board—Reproducer terminal board
12640 | Bracket—Output transformer mounting bracket
11254 | Coil—Field coil
11233 | Coil—Hum neutralizing coil

12642 | Cone—Reproducer cone and dust cap
5118 | Connector—3-contact male connector for reproducer
9773 | Reproducer complete
11253 | Transformer—Output transformer

RCA 8U

Two different phonograph turntable motors are used on Model 8U, and are distinguished by the numbers stamped on the motor name plate as follows: (1) 72444-1 and (2) 56992-1. No. 72444-1 is an induction motor with a governor-type speed regulator; No. 56992-1 is a synchronous motor. Replacement parts for No. 72444-1 are listed on page 8-51 of Rider’s Volume VIII; replacement parts for No. 56992-1 are listed below:

Stock No. | Description
--- | ---
8989 | Motor complete, 105-125 volts, 60 cycles
8993 | Rotor and shaft for Stock No. 8989
5998 | Spring—Motor mounting spring assembly
3817 | Stud—Motor mounting stud

RCA 87K1, 87K2, 87T2

The service data and replacement parts for the Model 87K1 are shown on pages 9-83 to 9-86 of Rider’s Volume IX. Three replacement parts have been added as follows:

Stock No. | Description
--- | ---
30846 | Core—Inductance adjustment for instantaneous tuning coils
12007 | Spring—Retaining spring for core Stock No. 30846
30995 | Card—Station call-letter card for push buttons

All service data and replacement parts for Model 87K1 apply directly to Model 87K2, including the three additional replacement parts listed above for Model 87K1.

All service data and replacement parts for Model 87K2 apply directly to Model 87T2, except that the Reproducer Replacement Parts listed below should be used instead of those listed for Model 87K1.

Stock No. | Description
--- | ---
14614 | Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-1 or 84001-3)
14934 | Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-2 or 84001-6)
5118 | Plug—3-contact male plug for reproducer
14613 | Reproducer complete (marked 84001-2 or 84001-6 but interchangeable with speaker marked 84091-1 or 84091-2 respectively)
14615 | Transformer—Output transformer (T2) (for speaker marked 84091-1 or 84001-3)
14915 | Transformer—Output transformer (T2) (for speaker marked 84091-2 or 84001-6)

Stock Nos. 13866, 14354, 11469, 12667, 14395, 14358, 14335 and 14357 for Model 87K1 Reproducer Assemblies are not used in Model 87T2.
Silversonic 7127, 7133

The schematic for the chassis used in these models will be found on Sears page 7-03 in Rider's Volume VIII. The alignment has just been obtained and will be found below.

Apply a 456-kc signal at the control grid of the 2A7 and adjust the i-f trimmers.

Apply a 1712-kc signal at the antenna. Turn condenser all the way open. First adjust oscillator trimmer on the oscillator coil, then the r-f trimmer on the condenser.

Adjust the low-frequency paddler at 600 kc while rocking the condenser.

Check at 1400 kc for alignment.

Short-wave Adjustment: Adjust the small trimmer found under the chassis on short-wave antenna coil for maximum output. If short wave does not track with dial, adjust trimmer on oscillator section of variable condenser until correct. Make all adjustments for short wave with the variable condenser turned to center of 25-meter location on scale.

Silversonic 4600

A .1-mf condenser should be added to eliminate bad chassis pickup as shown in Fig. 1, the partial schematic. This type of pickup is heard as noise when the car engine is running and the antenna is disconnected from the receiver.

![Fig. 1. Partial schematic of Silversonic model 4600 in which is shown where the .1-mf condenser is connected to eliminate chassis pickup.](image1)

This instruction applies to sets having identification number 101.458 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.458B or a subsequent letter. See location in Fig. 2. Note that the schematic is shown on Sears page 9-35 of Rider's Volume IX.

![Fig. 2. Bottom of chassis showing location of the added condenser.](image2)

Silversonic 4601

A .1-mf condenser should be added to eliminate bad chassis pickup, as shown in the partial schematic of Fig. 1. This type of pickup is heard as noise when the car engine is running and the antenna is disconnected from the receiver. This instruction applies to sets having identification number 101.463 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.463B or a subsequent letter.

![Fig. 1. Where the .01-mf condenser is added in Silversonic 4601 to eliminate chassis pickup.](image3)

The location of this condenser is shown in Fig. 2, the bottom view of the chassis. Note that the Silversonic '4601, shown on Sears page 8-75 of Rider's Volume VIII, does not show this condenser; it may be assumed, therefore, that this is Chassis 101.463.

Silversonic 4414, 4415, etc.

The original production of this chassis (No. 101,393) used part number 1012814032, r-f coil and detector coil (iron core). Later production, which can be identified by the letter "C" or a subsequent letter rubber-stamped on the chassis, used part number 1012818509 detector coil and number 1012818510, r-f coil (air core). When the new air-core type coils are used, the 350-ohm resistor, R2, in series with the volume control, is changed to 150 ohms.

Later production used part number 1012418344 as volume control, instead of the one used originally. The new control incorporates the 150-ohm resistor, R2, mentioned above, as a tap on the resistance element, eliminating R2 as an external resistor. The new control can be used to replace the old one in those sets using a 350-ohm R2 by substituting a 200-ohm resistor, as the 150 ohms are incorporated in the control itself. It can be used to replace the original control in those sets that use a 150-ohm external resistor for R2 by removing R2 and connecting to the tap on the volume control.

Please notice that three more model numbers have been added to this chassis and these should be added to the listing in the index, which should now read: 4414, 4415, 4500, 4505, 4506, 4509, 4510, 4511, Chassis 101.393. The schematic for this chassis will be found on page 8-15 in Rider's Volume VIII.

Silversonic 4502, 4504, etc.

The same changes relating to Chassis 101.393 also apply to these models, with the exception that the later production is identified by the letter "A" or a subsequent letter rubber-stamped on the chassis.

New model numbers have also been added to this chassis and they should be incorporated in your index, which should read: 4502, 4502A, 4504, 4508, 4512, 4513, 4514. Chassis 101.427. The schematic of this chassis will be found on page 8-38 in Rider's Volume VIII.

Silversonic 4487, 4587, 4587A

If one of these models has been out of service for several months, the 25-mf electrolytic condenser may lose its formation, causing the 5Y3G rectifier tube plates to become redhot or the tube to burn out. While this condition seldom occurs, the electrolytic can be reformed and the condition remedied as follows:

Using a 5Y3 plug and a 5X4 socket, make an adapter by connecting together the prongs indicated below. Then put a 5X4G rectifier tube in the adapter socket and push the adapter plug into the rectifier socket of the receiver. (It is advisable to remove the output tubes from their sockets during the reforming period.) The receiver should be turned on for about five minutes, the 5X4G tube being used to reform the electrolytic. After this period, the 5Y3G tube can be replaced in its socket and the receiver will perform normally.

This same remedy can be applied to other chassis, although it is very unlikely that this condition will be often encountered.

**5X4G Plug**

<table>
<thead>
<tr>
<th>3</th>
<th>connects to</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>&quot;</td>
</tr>
<tr>
<td>7</td>
<td>&quot;</td>
</tr>
<tr>
<td>8</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

**5Y3G Socket**

<table>
<thead>
<tr>
<th>3</th>
<th>connects to</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>&quot;</td>
</tr>
<tr>
<td>6</td>
<td>&quot;</td>
</tr>
<tr>
<td>8</td>
<td>&quot;</td>
</tr>
</tbody>
</table>
Stewart-Warner-Firestone R-1332

The filter system and rectifier tube are protected against breakdown during the warming up period by the Global resistor (No. 15 in the schematic on page 6-15 in Rider’s Volume VI), which functions as follows: The resistance of this unit drops rapidly 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 under the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, this resistor can not be checked with an ordinary ohmmeter as it will show a resistance of several megohms.

1-F Alignment:

This is conventional, the 1-f peak being 456-kc. The trimmers are located on the top of the 1-f transformers and may be reached by removing the top cover. The signal generator is connected between the control grid of the 6A7 and ground.

Dial Calibration:

Tune in a station of known frequency between 800 and 1000-kc. Insert a screwdriver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and adjust the dial pointer with the screwdriver so that the exact station frequency is indicated. 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. In order to reach this trimmer the chassis must be removed from the case as follows:

Remove the flexible shafts and disconnect the receiver.

Remove the four terminals of the speaker cable from the speaker.

Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.

Remove the blue dial-light lead from the socket terminal.

Remove the yellow tone-control lead from the tone control switch.

Remove the six slotted chassis fastening screws and slide the chassis from the case.

Reconnect the red and yellow leads of the speaker cable to the speaker.

Insert the tuning shaft in the gang condenser fitting and reconnect the battery lead.

Set the chassis on a flat metal plate and adjust as follows:

Connect a 0.00025-mf condenser in series with the output of the signal generator and the antenna lead plug on the antenna coil and the ground lead of the signal generator to the chassis of the set. Set signal generator to 600-kc and tune the receiver to maximum volume and set the dial to read exactly 6.0 (600-kc). Set the signal generator to 1400-kc and turn the tuning knob until the dial pointer reaches 14.0 (1400-kc). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang trimmer as directed below.

R-F Alignment:

With the signal generator tuned to 1400 kc, tune the receiver carefully for maximum output. Adjust the output of the signal generator to minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser for maximum output.

Stewart-Warner AC-DC Receivers

There is a tendency for filter condensers and rectifier tubes in AC-DC receivers to fail prematurely. The Stewart-Warner Engineering Department has developed a simple remedy which will be incorporated in all future production of Stewart-Warner AC-DC receivers, and which can be applied easily by the serviceman to existing receivers.

With certain power-line impedances, extremely high surge voltages are developed across the filter condenser. These voltages may be as high as 300 volts, and occur only if the set is turned off on a particular part of the a-c cycle of the power-line current. Such a surge often punctures the filter condenser, and this causes the rectifier tube to fail. Since this difficulty is caused by a power-line condition, if it happens once in a certain customer’s home, it is very likely to happen again.

The remedy for this trouble is to connect an inexpensive 50-ohm 1-watt resistor in series with the connection from the rectifier-tube cathodes to the electrolytic filter condensers. The proper connection of the resistor is shown in the accompanying diagram. The Stewart-Warner part number for this resistor is 116013.

![Diagram of added resistor](image)

Stewart-Warner R-160 Chassis

The circuit description and alignment notes found on page 8-16 in Rider’s Volume VIII, are practically the same as those which apply to models 1601 to 1609 inclusive, the major difference occurring in the section devoted to dial calibration. In the instructions for calibrating a dial for receivers having a dash control head, only the 1400-kc adjustment is used, the 600-kc setting being neglected. The schematic for the R-160 chassis will be found on page 7-8 in Rider’s Volume VII.

RCA 262,263

The a-f driver transformer, T3 has a revised coil design, the d-c resistance of the primary now being 1350 ohms and that of the secondary being 2000 ohms. An extra connection has also been provided on this unit for equalizing the primary and core potentials so that electrolysis between these parts will be reduced. This additional lead is colored red-green and it should be connected to plug “B” of the primary circuit. See schematic diagrams of the early models on pages 5-102 and 5-103 of Rider’s Volume V and the late models on pages 6-51 and 6-53 of Rider’s Volume VI.

Bosch 376BT, 376F, 376S

Please make a note in the table of socket voltages on page 6-2 in Rider’s Volume VI that the filament voltages should be 2.0 instead of 6.2 volts.

© John F. Rider, Publisher

Compliments of www.nucow.com