TUBE SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>Control Grid to Cathode</th>
<th>Screen to Cathode</th>
<th>Plate to Cathode</th>
<th>Plate M.A.</th>
<th>Tube Socket Voltages Heaters or Filament Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7 1st Det.</td>
<td>3</td>
<td>100</td>
<td>250</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>OSC.</td>
<td>4</td>
<td></td>
<td>90</td>
<td>4</td>
<td>...</td>
</tr>
<tr>
<td>78—I. F.</td>
<td>3</td>
<td>100</td>
<td>250</td>
<td>7</td>
<td>6.3</td>
</tr>
<tr>
<td>75—2nd Det. A. V. C.</td>
<td>1.5</td>
<td></td>
<td>75</td>
<td>8</td>
<td>6.3</td>
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<tr>
<td>42—Audio</td>
<td>16</td>
<td>250</td>
<td>235</td>
<td>34</td>
<td>6.3</td>
</tr>
<tr>
<td>80—Rect.</td>
<td></td>
<td></td>
<td></td>
<td>29 per plate</td>
<td>5.0</td>
</tr>
</tbody>
</table>

All voltage readings taken with 1000 ohm per volt voltmeter using test leads.
*10 volt scale, voltage from ground to terminal on candohm with 500M on resistor.
**10 volt scale, voltage readings from ground to terminal on candohm with single black wire.
***250 volt scale, voltage readings from ground to terminal on candohm connected to filter condenser.
### SERVICE NOTES for Detrola 5-B All Wave Receiver

The Detrola 5-B is a five-tube, three-band, all-wave, superheterodyne receiver designed for the reception of frequencies from 540 to 16,000 KC. The broadcast band covers frequencies from 540 to 1700 KC; the police band covers frequencies from 1.6 to 5.5 MC and the foreign band covers frequencies from 5.4 to 16 MC.

The 5-B employs the following tubes, used in their respective circuits: 1 type 6A7 first detector and oscillator; 1 type 78 intermediate amplifier; 1 type 75 delayed AVC, second detector and final audio; 1 type 42 final audio stage; 1 type 80 double wave rectifier.

#### RF and IF ALIGNMENT

The RF and IF circuits of the 5-B are properly aligned and tested and should need no further adjustment. Should it become necessary, however, to check the adjustment the following equipment will be necessary: 1 calibrated oscillator calibrated for all the frequencies used in this receiver, both IF and RF, and a sensitive output meter.

In order to prevent the AVC from operating and giving a false reading on the output meter the following procedure should be followed: The oscillator should be loosely coupled to the receiver so that only a small deflection will show on the output meter with the volume control of the receiver on the maximum position. This applies to both IF and RF adjustments.

#### IF ALIGNMENT—To align the intermediate transformers, adjust the test oscillator to 370 KC and couple to the control grid of the first detector and adjust the trimmer condensers on the intermediate transformers for the maximum reading on the output meter.

#### RF ALIGNMENT—To align the RF circuit: (1) Set pointer on tuning chart to 1400 KC with band switch in broadcast position. (2) Adjust oscillator to 1400 KC and connect to antennae terminal on chassis. (3) Adjust trimmer on tuning condenser for maximum reading. (4) Reset dial pointer and test oscillator to 600 KC and adjust 600 KC padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment. (5) Reset dial pointer and oscillator to 1400 KC and readjust trimmer on tuning condenser for maximum reading.

#### SHORTWAVE ALIGNMENT—(1) Set dial pointer on 3.5 MC and band switch on center position. (2) Adjust oscillator to approximately 3.5 MC or for maximum reading on output meter. (3) Adjust 3.5 MC padding condenser for further increase on the output meter. (4) Set band switch on right hand position. (5) Set dial pointer to 15 MC. (6) Readjust test oscillator to approximately 15 MC or for maximum reading on output meter and adjust 15 MC padding condenser for further increase on output meter.

#### ADJUSTMENT OF WAVE TRAP

To adjust wave trap to prevent the reception of commercial code signals from stations operating on or about 370 KC, connect test oscillator to antennae terminal on chassis and set to 370 KC and adjust wave trap padding condenser for minimum signal on output meter.

The high and low frequency padding condensers are mounted on the right hand end of the chassis in the following order from front to back: 3.5 MC, 15 MC, 600 KC, and wave trap.

### REPLACEMENT PARTS MODEL 5-B

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>563</td>
<td>.05 mf—400 volt tubular condenser</td>
<td>$9.15</td>
</tr>
<tr>
<td>572</td>
<td>.1 mf—200 volt tubular condenser</td>
<td>.15</td>
</tr>
<tr>
<td>575</td>
<td>.1 mf—400 volt tubular condenser</td>
<td>.15</td>
</tr>
<tr>
<td>578</td>
<td>Electrolytic condenser, 10 mfd, 30 volts</td>
<td>.65</td>
</tr>
<tr>
<td>589</td>
<td>50 mfd mica condenser, type &quot;W&quot;</td>
<td>.15</td>
</tr>
<tr>
<td>590</td>
<td>250 mfd mica condenser, type &quot;W&quot;</td>
<td>.15</td>
</tr>
<tr>
<td>602</td>
<td>250,000 ohm carbon resistor, 1/2 watt</td>
<td>.15</td>
</tr>
<tr>
<td>603</td>
<td>100,000 ohm carbon resistor, 1/2 watt</td>
<td>.15</td>
</tr>
<tr>
<td>615</td>
<td>500,000 ohm carbon resistor, 1/2 watt</td>
<td>.15</td>
</tr>
<tr>
<td>631</td>
<td>50,000 ohm carbon resistor, 1/2 watt</td>
<td>.15</td>
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<tr>
<td>934</td>
<td>Attachment cord—6 feet</td>
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<td>936</td>
<td>4 prong socket No. 80</td>
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<tr>
<td>937</td>
<td>6 prong socket No. 42</td>
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<tr>
<td>939</td>
<td>6 prong socket No. 78</td>
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<tr>
<td>1028</td>
<td>6 prong socket No. 75</td>
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<tr>
<td>1083</td>
<td>Tone control with A. C. switch, 250,000 ohms</td>
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<tr>
<td>1084</td>
<td>Volume control, 1 megohm</td>
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<tr>
<td>1096</td>
<td>Tube shield (aluminum), natural finish</td>
<td>.15</td>
</tr>
<tr>
<td>1097</td>
<td>Tube shield cap (aluminum)</td>
<td>.15</td>
</tr>
<tr>
<td>1098</td>
<td>Tube shield base (aluminum)</td>
<td>.10</td>
</tr>
<tr>
<td>1107</td>
<td>550 mfd mica condenser, type &quot;W&quot;</td>
<td>.20</td>
</tr>
<tr>
<td>1199</td>
<td>Pointer</td>
<td>.10</td>
</tr>
<tr>
<td>1274</td>
<td>Escutcheon plate</td>
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<tr>
<td>1392</td>
<td>By-pass condenser block</td>
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<tr>
<td>1393</td>
<td>2 gang variable condenser</td>
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<td>1396</td>
<td>Antenna coil can—natural finish</td>
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<tr>
<td>1397</td>
<td>Oscillator coil can—natural finish</td>
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</tr>
<tr>
<td>1398</td>
<td>Electrolytic condenser, 8-8 mfd, 450 volts</td>
<td>2.10</td>
</tr>
<tr>
<td>1399</td>
<td>Power transformer</td>
<td>3.20</td>
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<tr>
<td>1400</td>
<td>Cardioid resistor</td>
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<td>1401</td>
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<tr>
<td>1402</td>
<td>Single stage padder</td>
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<td>1404</td>
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<td>Dial chart</td>
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<td>1750 mfd mica condenser, type &quot;W&quot;</td>
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<td>3900 mfd mica condenser, type &quot;W&quot;</td>
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<tr>
<td>1414</td>
<td>25,000 ohm carbon resistor, 1 watt</td>
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<tr>
<td>1415</td>
<td>6’ speaker</td>
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<tr>
<td>1423</td>
<td>Knobs</td>
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<tr>
<td>1427</td>
<td>Cabinet</td>
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<tr>
<td>1441</td>
<td>Oscillator coil</td>
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<tr>
<td>1442</td>
<td>Antenna coil</td>
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<tr>
<td>1443</td>
<td>Wave trap</td>
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<tr>
<td>1444</td>
<td>1st IF transformer</td>
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</tr>
<tr>
<td>1445</td>
<td>2nd IF transformer</td>
<td>2.40</td>
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</table>
Schematic Diagram

**Tube Socket Voltages**

<table>
<thead>
<tr>
<th>Tube No.</th>
<th>Cathode to Heater Voltage</th>
<th>Cathode to Screen Voltage</th>
<th>Cathode to Plate Voltage</th>
<th>Cathode to Control Grid Voltage</th>
<th>Plate M.A.</th>
<th>Heater Voltage</th>
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</thead>
<tbody>
<tr>
<td>78—1st Det.</td>
<td>4.5</td>
<td>100</td>
<td>230</td>
<td>*6.5</td>
<td>4.25</td>
<td>6.3</td>
</tr>
<tr>
<td>6F7 Pentode I. F. Triode OSC.</td>
<td>3</td>
<td>100</td>
<td>235</td>
<td>*4.5</td>
<td>6.0</td>
<td>6.3</td>
</tr>
<tr>
<td>75—2nd Det.</td>
<td>...</td>
<td>...</td>
<td>220</td>
<td>*1.75</td>
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<td>6.3</td>
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<tr>
<td>42—2nd Audio</td>
<td>...</td>
<td>235</td>
<td>220</td>
<td>**16.5</td>
<td>28</td>
<td>6.3</td>
</tr>
<tr>
<td>80—Rect.</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>27 per plate</td>
<td>5.0</td>
<td></td>
</tr>
</tbody>
</table>

*Voltage from cathode to terminal No. 2 on the voltage divider.

**Voltage from cathode to terminal No. 1 on the voltage divider.

All voltage readings taken with high resistance Volt Meter (1000 ohms per volt) using test leads, all tubes in sockets, antenna grounded to chassis, no signal.

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SERVİCE NOTES for

Detrola 5-D Dual-Band Receiver

The Detrola 5-D is a five tube superheterodyne, dual-wave receiver covering broadcast frequencies of 550 to 1500 kilocycles and short-wave frequencies of 1.5 to 4.75 megacycles.

It employs the following tubes: Type 78, first detector; type 6F7, intermediate stage and oscillator (the pentode section being used for the intermediate stage, and the triode for the oscillator); type 75, delayed AVC, second detector, and first audio (one diode being used for the AVC and the other for the detector, triode being used for the first audio stage); type 42, final amplifier; type 80, rectifier.

R. F. and I. F. ALIGNMENT

The R. F. and I. F. circuits are properly aligned at the factory with a crystal control oscillator and should require little or no attention. Should it become necessary, however, to check the alignment, an output meter and a calibrated oscillator will be necessary. The automatic volume control in the receiver will defeat the purpose of the output meter unless the following precautions are taken:

I. F. ALIGNMENT—To align the intermediate frequency transformers (1) adjust test oscillator to 455 kilocycles and couple to the control grid of first detector (reduce coupling so that only small deflection is obtained on output meter with volume control in the maximum position). (2) Adjust I. F. trimmers for maximum reading on output meter.

R. F. ALIGNMENT—To align the R. F. circuits (1) set the pointer on the tuning chart to 1400 kilocycles and adjust test oscillator to the 1400 kilocycles. (2) Connect oscillator to antenna connection of chassis, reducing coupling as outlined in I. F. adjustments and adjust trimmer on front of chassis for maximum reading. The above procedure should be repeated at 600 kilocycles adjusting ONLY THE LOW FREQUENCY TRIMMER ON TOP OF CHASSIS.

The short-wave band may be aligned by setting the test oscillator on 1400 kilocycles and using the 2800 kilocycles harmonic and setting the pointer on the tuning chart to approximately 2.8 megacycles and adjusting trimmers on tuning condenser for maximum reading.

For a more detailed explanation concerning the operation of the delayed automatic volume control used in this receiver and for further service suggestions, refer to the service notes of the Detrola 7-A.

REPLACEMENT PARTS MODEL 5-D

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>DESCRIPTION</th>
<th>List Price</th>
<th>Stock No.</th>
<th>DESCRIPTION</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>532</td>
<td>Knobs</td>
<td>$0.10</td>
<td>937</td>
<td>6 prong socket No. 42</td>
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<tr>
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<td>939</td>
<td>6 prong socket No. 78</td>
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</tr>
<tr>
<td>568</td>
<td>.01 mfd 400 volt condenser</td>
<td>.15</td>
<td>993</td>
<td>Oscillator coil shield</td>
<td>.10</td>
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<tr>
<td>572</td>
<td>.1 mfd 200 volt condenser</td>
<td>.15</td>
<td>997</td>
<td>Tube shield base</td>
<td>.15</td>
</tr>
<tr>
<td>575</td>
<td>.1 mfd 400 volt condenser</td>
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<td>1013</td>
<td>Power transformer</td>
<td>2.90</td>
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<tr>
<td>576</td>
<td>.02 mfd 400 volt condenser</td>
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<td>1014</td>
<td>8-8 mfd 450 volt filter condenser</td>
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<td>.25 mfd 200 volt condenser</td>
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<td>1016</td>
<td>.00002 padder condenser</td>
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<td>.005 mfd 600 volt condenser</td>
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<td>1017</td>
<td>.0005 padder condenser</td>
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<td>50 mfd mica condenser</td>
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<td>1019</td>
<td>2nd IF transformer</td>
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<td>1022</td>
<td>Cabinet</td>
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<td>250,000 ohm resistor, 1/4 watt</td>
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<td>1027</td>
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<tr>
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<td>75,000 ohm resistor, 1/2 watt</td>
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<td>1028</td>
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<td>500,000 ohm resistor</td>
<td>.35</td>
<td>1034</td>
<td>Speaker</td>
<td>6.90</td>
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<tr>
<td>631</td>
<td>50,000 ohm resistor</td>
<td>.15</td>
<td>1038</td>
<td>Pyralin diffuser—blue</td>
<td>.10</td>
</tr>
<tr>
<td>791</td>
<td>Tube shield</td>
<td>.10</td>
<td>1042</td>
<td>Escutcheon plate</td>
<td>.30</td>
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<tr>
<td>912</td>
<td>Station selector dial</td>
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<td>1052</td>
<td>Candohm resistor, 1000 ohms</td>
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<td>919</td>
<td>Volume control</td>
<td>.70</td>
<td>1054</td>
<td>935 mfd mica condenser</td>
<td>.20</td>
</tr>
<tr>
<td>921</td>
<td>Tone control with A.C. switch</td>
<td>.90</td>
<td>1029</td>
<td>Candohm resistor, 350 ohms</td>
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</tr>
<tr>
<td>922</td>
<td>Candohm resistor, 32,500 ohms</td>
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<td>1124</td>
<td>Antenna coil</td>
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<tr>
<td>926</td>
<td>Tuning condenser</td>
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<td>1126</td>
<td>Oscillator coil</td>
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<tr>
<td>934</td>
<td>Power cord</td>
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<td>1128</td>
<td>Pyralin diffuser—red</td>
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<tr>
<td>936</td>
<td>4 prong socket No. 80</td>
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<td>1168</td>
<td>Pilot light socket</td>
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</table>
# DETROLA PAGE 6-7

## DETROLA RADIO CORP.

### TUBE SOCKET VOLTAGES

<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 Socket Voltages Heater or Filament Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7 OSC.</td>
<td>*2</td>
<td>80</td>
<td>210</td>
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<td>6.3</td>
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<td>6D6 I. F.</td>
<td>2</td>
<td>80</td>
<td>210</td>
<td>4.</td>
<td>6.3</td>
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<tr>
<td>75 2nd Det.</td>
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<td>100</td>
<td></td>
<td>.5</td>
<td>6.3</td>
</tr>
<tr>
<td>42 2nd Audio</td>
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<td>210</td>
<td>190</td>
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<td>6.3</td>
</tr>
<tr>
<td>80 Rect.</td>
<td></td>
<td></td>
<td></td>
<td>25 Per Plate</td>
<td></td>
</tr>
</tbody>
</table>

*Terminal No. 5 on candohm to ground.
**Terminal No. 6 on candohm to ground.

### DESCRIPTION

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>565</td>
<td>.01 mf. 200 volt tubular condenser</td>
</tr>
<tr>
<td>568</td>
<td>.01 mf. 400 volt tubular condenser</td>
</tr>
<tr>
<td>572</td>
<td>.1 mf. 200 volt tubular condenser</td>
</tr>
<tr>
<td>575</td>
<td>.1 mf. 400 volt tubular condenser</td>
</tr>
<tr>
<td>581</td>
<td>.005 mf. 600 volt tubular condenser</td>
</tr>
<tr>
<td>576</td>
<td>.02 mf. 400 volt tubular condenser</td>
</tr>
<tr>
<td>590</td>
<td>250 mfF. Mica condenser plus-minus 10%</td>
</tr>
<tr>
<td>602</td>
<td>250,000 ohm carbon resistors, 1/5 watt</td>
</tr>
<tr>
<td>615</td>
<td>500,000 ohm carbon resistors, 1/5 watt</td>
</tr>
<tr>
<td>624</td>
<td>1 megohm carbon resistors, 1/5 watt</td>
</tr>
<tr>
<td>631</td>
<td>50,000 ohm carbon resistors, 1/5 watt</td>
</tr>
<tr>
<td>791</td>
<td>Goat tube shields with ring</td>
</tr>
<tr>
<td>936</td>
<td>4-prong tube socket, marked No. 80</td>
</tr>
</tbody>
</table>

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The Detrola 5-X is a 5 tube superheterodyne designed for receivers on frequencies from 540 to 1500 KC and from 5300 to 17,000 KC.
MODELS 5X & 6X

Service Notes

I. F. ALIGNMENT

To align the intermediate transformer the test oscillator should be adjusted to 370 KC and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT

The R.F. circuits: (1) Set pointer on tuning chart to 1400 KC with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 KC and connect to antennas terminal on chassis. (3) Adjust trimmer on tuning condenser for maximum reading. (4) Reset dial pointer on test oscillator to 600 KC. (5) Reset test oscillator to 600 KC. (6) Adjust 600 KC padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment. (7) Reset dial pointer and test oscillator to 1400 KC and readjust trimmer on tuning condenser for maximum reading on output meter. (The 600 KC padding condenser is the right hand condenser mounted on the rear of the chassis.)

SHORT WAVE ALIGNMENT

(1) Set dial pointer on 10 MC and band switch on short wave position. (2) Adjust test oscillator to approximately 10 MC or for maximum reading on output meter. (3) Adjust 10 MC padding condenser mounting on top of chassis near tuning condenser for a further increase reading on output meter. (The wave trap trimmer condenser is the left hand condenser on the rear of the chassis.)

WAVE TRAP ADJUSTMENT

(1) To adjust wave trap to prevent reception of commercial code signals from stations operating on or about 370 KC, connect test oscillator to antennas terminal on chassis. (2) Adjust test oscillator to 370 KC. (3) Adjust wave trap condenser mounted on right hand end of the chassis for minimum signal on output meter.

POWER SUPPLY:

The 6-X is designed to operate on 110 volts A.C. or D.C. current. The Model 5-D.X may be supplied for operation on different sources of power supply; namely, 110 volts, 25 cycles; 110 volts, 60 cycles; and 200 volts, 60 cycles.

MODELS 5W & 6W

I. F. ALIGNMENT:

To align the intermediate transformer the test oscillator should be adjusted to 370 K.C. and coupled to the control grid of the first detector and adjust the trimmer condensers on the first and second intermediate transformers for maximum reading on the output meter.

R. F. ALIGNMENT:

To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K.C. with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 K.C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K.C. (5) Adjust 600 K.C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K.C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K.C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K.C. (14) Set band change switch in broadcasting position and adjust 1400 K.C. trimmer for maximum reading (the 1400 K.C. trimmer is mounted under the chassis directly over the antenna coil).

WAVE TRAP ADJUSTMENT:

This receiver is designed with a wave trap to prevent interference from commercial code stations operating on or about 370 K.C. To adjust the wave trap, set test oscillator on 370 K.C. and connect to antenna lead on chassis and adjust wave trap trimmer condenser for minimum signal on the output meter (the wave trap is mounted on the rear left end of the chassis).

POWER SUPPLY:

The 5-W is designed for operation on different sources of power supply: namely, 110 volts, 25 cycles; 110 volts, 60 cycles; and 220 volts, 60 cycles.
Service Data

Type and Number of Tubes Used:

- 2 Type 74
- 1 Type 687
- 1 Type 84
- 1 Type 815

Total Battery Current: 6.3 Amps.
Unidistor Output: 3 Watts
Speaker Field Current: 1 Amp.
Rectifier Output Voltage: 250
Total Plate Current: 50 M.A.

Plate Supply Unit

The receiver uses a vibrator type inverter and tube rectifier to provide a source of direct current voltage as plate and grid supply for all the tubes. This unit is very accurately adjusted at the factory, and service adjustment should not be attempted.

Low Volume

Low volume may be caused by weak or defective tubes (replace with set of tubes known to be in good condition), or antennas grounded or shielded due to wire not cut off from the metal construction of the top.

Low Voltage

Low voltage may be caused by defective rectifier, shorted filter or bypass condenser, defective power transformer or vibrator unit.

Excessive Hum

Excessive hum may be caused by defective 84 tube, or defective vibrator unit. In cases where the vibrator unit proves to be defective no adjustment should be attempted, the unit should be replaced with a new or replacement unit.

Continuity Test

By referring to the schematic diagrams in Figures 3 and 4 a complete continuity test for open and shorts can be made for all parts of the receiver. A suitable continuity test can be made by using 5 to 30 volt voltmeter and a 45 volt B battery. More accurate readings can be obtained by using a calibrated ohm meter.

R.F. and I.F. Adjustments

The trimmers on the tuning condenser and the intermediate transformers are very accurately adjusted. If required, recheck the factory adjustments or new or replacement units should be replaced.

I.F. Adjustments

In order to make the I.F. adjustments it is necessary to remove the top and bottom cover of the receiver, case and proceed as follows: Adjust test oscillator at 262 kilocycles, place the receiver in operation and connect the oscillator output to the grid of the first detector tube and connect the output meter across the voice coil of the loud speaker. Then connect the antenna lead to the grid of the chassis and adjust the tuning condenser so that no signal except the I.F. oscillator is heard at maximum volume. With the volume control at minimum, reduce the external oscillator output coupling until a small deflection is obtained at the output meter. Unless this is done the action of the A.V.C. will make it impossible to obtain a correct adjustment. Adjust trimmers for minimum reading on output meter.

R.F. Adjustments

The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the padder condenser adjusted at 600 kilocycles respectively. Proceed as follows: Adjust test oscillator at 1400 kilocycles and couple to the antenna off the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1550 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 710 M.F. Padder condenser (mounted on the chassis near the loud speaker) for maximum reading.

All the above voltage readings were taken by a high resistance voltmeter (1000 ohms per volt) using test leads, all tubes in sockets no signal. (***750 volt scale) (**250 volt scale).

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Model 6R is the same as Model 6M, but it has no tone control and uses a 5-inch speaker.
Drilling Template
Packed in each receiver package is a drilling template, which contains the exact location of the mounting holes. This template is furnished to aid in locating mounting holes for the chassis, doing away with the necessity of man holding the chassis while another locates the holes. However, in using this template—try to utter a word of caution: Do not overlook any rods, wires or units mounted on the dash, which might not interfere with the location of the template, but which would prohibit the mounting of the set. In this way, unnecessary drilling of holes will be avoided.

Antenna Lead-in Connection
An antenna lead-in shield is furnished in the receiver package. The antenna lead wire should be run through this shield, and the shield extended up to where the lead-in leaves the corner post. In order to shield the entire length of the lead-in wire, the other end of the lead-in wire should be soldered to a small ferrule which makes connection with a spring socket on the inside of the chassis. At the other end of the shield there is a small piece of braid which should be securely grounded to the dash of the car. (See Fig. 2.)

Caution: Clean surface thoroughly where shield braid is fastened to the dash, in order to insure a good ground.

Solder Skinned Section Do Lead Wire To Ferrule.

Fig. 2

Antenna Lead-in Wire from Corner Post
Antenna Contact Ferrule.

III. The Control Unit
The control unit is a combined Station Selector Dial (marked in kilocycles), tuning cable, volume control, and switch cable, all in one. The control unit is designed to be fastened to the "template" of the instrument panel by means of two thumb screws.

In locating the position for the control unit, it is advisable to leave this operation until the receiver has been mounted and located. Then the best position for the control unit is determined which will not only allow easy accessibility for the driver, but will also allow for the least possible bend in the "Control Cables" which will ensure as smooth as possible operation of those cables, with a minimum possibility of the cable binding due to an extremely sharp bend.

Connecting Drive Cables and Casing to Control Unit
We would suggest that the "Drive Cables" be connected to the "Control Unit" before it is permanently fastened to the instrument panel. The cable connections to the receiver should be made on the bench, before the set is installed and it should not be necessary to remove these cables in making the installation.

The cable which enters the receiver at the top is the volume control and is connected to the volume control shaft by a slot milled in the end of the shaft and held in place by metal sleeve (A). See Fig. 3. The lower shaft is the tuning control and is connected in the same manner as the volume control.

![Figure 3](attachment:image3.png)

Adjusting the Dial Pointer
To adjust the dial pointer for the correct kilocycle reading, tune the receiver to a station of known frequency and adjust pointer with a screwdriver by turning the adjusting screw on the knob of the control head. (See Fig. No. 4.)

![Figure 4](attachment:image4.png)

R. F. and I. F. Adjustments
The trimmers on the tuning condenser and the intermediate transformers are very accurately adjusted with a crystal control oscillator before the receiver leaves the factory and should need little or no attention; however, to check the adjustments the following procedure should be followed.

I. F. Adjustments
In order to make the I. F. adjustments it is necessary to remove the top and bottom cover of the receiver case and proceed as follows: adjust test oscillator at 242 kilocycles, place the receiver in operation and connect the oscillator output to the grid of the first detector tube and connect the output meter across the voice coil of the loud speaker. Then connect the antenna lead to the ground of the chassis and adjust the tuning condenser so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output coupling until a small deflection is obtained.

![Table](attachment:image_table.png)

at the output meter. Unless this is done the action of the A. V. C. will make it impossible to obtain a correct adjustment. Adjust trimmers for maximum reading on output meter.

R. F. Adjustments
The trimmers on the tuning condenser should be adjusted at 1400 kilocycles, and the pad condenser adjusted at 600 kilocycles respectively. Proceed as follows, adjust the test oscillator at 1400 kilocycles and couple to the antenna of the receiver. Set tuning condenser at minimum capacity and adjust pointer to 1550 kilocycles, reset tuning control to 1400 kilocycles. Place oscillator and receiver in operation and adjust oscillator output so that a weak signal is obtained on the output meter, adjust trimmers for maximum reading. To adjust 600 kilocycle position readjust oscillator and tuning control to 600 kilocycles and adjust the 750 M. F. pad condenser (mounted on the chassis near the loud speaker) for maximum reading.
**TUBE SOCKET VOLTAGE**

<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>Heater Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7</td>
<td>1st Det. *2</td>
<td>85</td>
<td>210</td>
<td>3</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>OSC.</td>
<td></td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>78—1st I.F.</td>
<td>*2</td>
<td>85</td>
<td>150</td>
<td>7</td>
<td>6.3</td>
</tr>
<tr>
<td>78—2nd I.F.</td>
<td>*2</td>
<td>85</td>
<td>210</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>75—2nd Det.</td>
<td>*2</td>
<td>110</td>
<td></td>
<td>.5</td>
<td>6.3</td>
</tr>
<tr>
<td>42—2nd Audio</td>
<td>**15</td>
<td>210</td>
<td>190</td>
<td>32</td>
<td>6.3</td>
</tr>
<tr>
<td>80—Rect.</td>
<td></td>
<td></td>
<td></td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Per Plate</td>
<td></td>
</tr>
</tbody>
</table>

*Terminal No. 5 on cathode to ground.

**Terminal No. 6 on cathode to ground.**

---

**Stock No.**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>Stock No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>.01 mf. 200 volt condenser</td>
<td>565</td>
</tr>
<tr>
<td>.01 mf. 400 volt condenser</td>
<td>568</td>
</tr>
<tr>
<td>.1 mf. 200 volt condenser</td>
<td>572</td>
</tr>
<tr>
<td>.1 mf. 400 volt condenser</td>
<td>575</td>
</tr>
<tr>
<td>10 mf. 30 volt electrolytic condenser</td>
<td>578</td>
</tr>
<tr>
<td>.02 mf. 400 volt condenser</td>
<td>576</td>
</tr>
<tr>
<td>.005 mf. 600 volt condenser</td>
<td>581</td>
</tr>
<tr>
<td>50 mfn. Mica condenser</td>
<td>589</td>
</tr>
<tr>
<td>250 mfn. Mica condenser</td>
<td>590</td>
</tr>
<tr>
<td>250,000 ohm carbon resistor, 1/5 watt</td>
<td>602</td>
</tr>
<tr>
<td>100,000 ohm carbon resistor, 1/5 watt</td>
<td>603</td>
</tr>
<tr>
<td>15,000 ohm carbon resistor, 1/5 watt</td>
<td>609</td>
</tr>
<tr>
<td>7,500 ohm carbon resistor, 1/5 watt</td>
<td>610</td>
</tr>
<tr>
<td>50,000 ohm carbon resistor, 1/5 watt</td>
<td>615</td>
</tr>
<tr>
<td>1 megohm carbon resistor, 1/5 watt</td>
<td>624</td>
</tr>
<tr>
<td>50,000 ohm carbon resistor, 1/5 watt</td>
<td>631</td>
</tr>
<tr>
<td>4-prong tube socket, marked 80</td>
<td>936</td>
</tr>
<tr>
<td>6-prong tube socket, marked 42</td>
<td>937</td>
</tr>
<tr>
<td>6-prong tube socket, marked 78</td>
<td>939</td>
</tr>
<tr>
<td>Power transformer</td>
<td>1013A</td>
</tr>
<tr>
<td>6-prong tube socket, marked 75</td>
<td>1028</td>
</tr>
<tr>
<td>6&quot; dynamic speaker</td>
<td>1034</td>
</tr>
<tr>
<td>Dial cable</td>
<td>1277</td>
</tr>
<tr>
<td>Single padder condenser</td>
<td>1402</td>
</tr>
<tr>
<td>7-prong tube socket, marked 6A7</td>
<td>1404</td>
</tr>
<tr>
<td>1750 mfn. Mica condenser</td>
<td>1412</td>
</tr>
<tr>
<td>Volume control</td>
<td>1572</td>
</tr>
<tr>
<td>Tone control and AC switch</td>
<td>1573</td>
</tr>
<tr>
<td>Glass crystal</td>
<td>1597</td>
</tr>
<tr>
<td>8-8 mf. 450 volt electrolytic condenser</td>
<td>1624A</td>
</tr>
<tr>
<td>Dial chart</td>
<td>1714</td>
</tr>
<tr>
<td>Candohm resistor</td>
<td>1715</td>
</tr>
<tr>
<td>3-way, 12 point switch</td>
<td>1716A</td>
</tr>
<tr>
<td>Goat shield bases</td>
<td>1727</td>
</tr>
<tr>
<td>2000 mfn. Mica condenser</td>
<td>1724</td>
</tr>
<tr>
<td>Cabinet</td>
<td>1733</td>
</tr>
<tr>
<td>Wave band escutcheon plate</td>
<td>1741</td>
</tr>
<tr>
<td>Wave band pointer knob</td>
<td>1742</td>
</tr>
<tr>
<td>Dual midget trimmer</td>
<td>1745</td>
</tr>
<tr>
<td>1st I.F. transformer</td>
<td>1768</td>
</tr>
<tr>
<td>2nd I.F. transformer</td>
<td>1769</td>
</tr>
<tr>
<td>Wave trap</td>
<td>1770</td>
</tr>
<tr>
<td>Oscillator coil</td>
<td>1765</td>
</tr>
<tr>
<td>Short wave antenna coil</td>
<td>1764</td>
</tr>
<tr>
<td>B. C. antenna coil</td>
<td>1763</td>
</tr>
</tbody>
</table>
The Model 6-X is a 6-tube superheterodyne receiver designed for receptions on standard broadcast, police and amateur and European short wave broadcast, covering frequencies from 540 to 17,000 K.C.

### TUBE SOCKET VOLTAGES

<table>
<thead>
<tr>
<th>Tube Number</th>
<th>Grid to Cathode</th>
<th>Screen to Cathode</th>
<th>Plate to Cathode</th>
<th>M.A. Plate</th>
<th>Tube Voltages or Plating Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7 1st Det.</td>
<td>0</td>
<td>50</td>
<td>95</td>
<td>1.5</td>
<td>6.3</td>
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<tr>
<td>OSC.</td>
<td>2</td>
<td></td>
<td>95</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>78 – 1st I.F.</td>
<td>0</td>
<td>95</td>
<td>50</td>
<td>2.5</td>
<td>6.3</td>
</tr>
<tr>
<td>78 – 2nd I.F.</td>
<td>0</td>
<td>95</td>
<td>95</td>
<td>5</td>
<td>6.3</td>
</tr>
<tr>
<td>75 – 2nd Det.</td>
<td>1</td>
<td></td>
<td>30</td>
<td>.25</td>
<td>6.3</td>
</tr>
<tr>
<td>43 – 2nd Audio</td>
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<td>95</td>
<td>75</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>25x5 – Rect.</td>
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<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
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</table>

### Stock Parts List

<table>
<thead>
<tr>
<th>Stock No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>532</td>
<td>Bakelite knobs, K.K.</td>
</tr>
<tr>
<td>565</td>
<td>.01 mf. 200 volt tubular condenser</td>
</tr>
<tr>
<td>568</td>
<td>.01 mf. 200 volt tubular condenser</td>
</tr>
<tr>
<td>572</td>
<td>.1 mf. 200 volt tubular condenser</td>
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<td>579</td>
<td>.25 mf. 200 volt tubular condenser</td>
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<tr>
<td>580</td>
<td>.05 mf. 200 volt tubular condenser</td>
</tr>
<tr>
<td>588</td>
<td>500 mlf. Mica condenser</td>
</tr>
<tr>
<td>589</td>
<td>50 mlf. Mica condenser</td>
</tr>
<tr>
<td>590</td>
<td>250 mlf. Mica condenser</td>
</tr>
<tr>
<td>600</td>
<td>10,000 ohm carbon resistor, 1/5 watt</td>
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<tr>
<td>610</td>
<td>7,500 ohm carbon resistor, 1/5 watt</td>
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<tr>
<td>615</td>
<td>50,000 ohm carbon resistor, 1/5 watt</td>
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<tr>
<td>617</td>
<td>20,000 ohm carbon resistor, 1/5 watt</td>
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<tr>
<td>621</td>
<td>25,000 ohm carbon resistor, 1/5 watt</td>
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<tr>
<td>624</td>
<td>1 megohm carbon resistor, 1/5 watt</td>
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<td>636</td>
<td>40,000 ohm carbon resistor, 1/5 watt</td>
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<td>1666</td>
<td>Candelom resistor, 60 ohms</td>
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<tr>
<td>1667</td>
<td>Filter choke</td>
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<tr>
<td>1675</td>
<td>Volume control with hex. nut</td>
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<tr>
<td>1676</td>
<td>Tone and A.C. switch with hex. nut</td>
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<tr>
<td>1677</td>
<td>Dual wave switch and hex. nut</td>
</tr>
<tr>
<td>1678</td>
<td>Elec. cond., 16-8-5-5 mfd.</td>
</tr>
<tr>
<td>1679</td>
<td>A.C. – D.C. cord, 90 ohms</td>
</tr>
<tr>
<td>1680</td>
<td>Double stage trimmer</td>
</tr>
<tr>
<td>1683</td>
<td>450 ohm carbon resistor, ¼ watt</td>
</tr>
<tr>
<td>1687</td>
<td>6-prong tube socket, marked 43</td>
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<tr>
<td>1688</td>
<td>6-prong tube socket, marked 25x5</td>
</tr>
<tr>
<td>1690</td>
<td>2-gang variable condenser</td>
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<tr>
<td>1693</td>
<td>5&quot; dynamic Rol-a-speaker</td>
</tr>
<tr>
<td>1646</td>
<td>1st I.F. transformer assembly</td>
</tr>
<tr>
<td>1647</td>
<td>2nd I.F. transformer assembly</td>
</tr>
<tr>
<td>1649</td>
<td>Short wave antenna coil</td>
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<td>1540</td>
<td>Broadcast antenna coil</td>
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<tr>
<td>1707</td>
<td>Oscillator coil</td>
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<tr>
<td>1711</td>
<td>Wave trap</td>
</tr>
<tr>
<td>Tube No.</td>
<td>Heater to Cathode Voltage</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>1—R. F.</td>
<td>0</td>
</tr>
<tr>
<td>2—1st Det.</td>
<td>0</td>
</tr>
<tr>
<td>3—L. F.</td>
<td>0</td>
</tr>
<tr>
<td>4—2nd Det. AVG.</td>
<td>0</td>
</tr>
<tr>
<td>5—Osc.</td>
<td>0</td>
</tr>
<tr>
<td>6—Audio</td>
<td>0</td>
</tr>
<tr>
<td>7—Rect.</td>
<td>0</td>
</tr>
</tbody>
</table>

Voltage setting taken with 1000 ohms voltmeter using test leads. All tubes in sockets. Ant. ground to chassis, no signal.

**Voltage from ground to terminal No. 2 ON THE VOLTAGE DIVIDER.

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SERVICE NOTES for Detrola 7-A All-Wave Receiver

The Detrola 7-A is a seven tube all-wave superhet with low frequency adjustment for tuning broadcast frequencies 550 kHz to 1550 kcs and short-wave frequencies of 1.5 to 18.5 megacycles, 1.5 to 10 megacycles.

The schematic diagram of this receiver is shown at Figs. 1 and 2. A metal shield acts as a ground plane for all the circuit components, the wiring being carried out on the top side of the metal shield. The circuit is designed in such a way that the high frequency and the audio frequency circuits are isolated from each other in order to eliminate the possibility of interference from radio stations.

The receiver is operated on one battery of 4.5 volts. The receiver is equipped with a single dial, the face of which contains 800 stations. The dial is divided into three sections: B, F, and E. The B section covers the broadcast band from 550 kHz to 1550 kHz, the F section covers the short-wave band from 1.5 MHz to 18.5 MHz, and the E section covers the extra-short-wave band from 1.5 MHz to 18.5 MHz.

The receiver is equipped with a speaker that can be connected to an external speaker or an earphone. The receiver is also equipped with a volume control that can be adjusted to the desired level.

The receiver is equipped with a dial whose face is marked with station numbers. The dial can be turned to select the desired station. The receiver is also equipped with a tuning control that can be used to tune the frequency of the receiver to the desired station.

The receiver is also equipped with a power switch that can be used to turn the receiver on or off. The receiver is powered by a battery that can be recharged or replaced as needed.

The receiver is also equipped with a reset button that can be used to reset the receiver to its default settings. The reset button is located on the front panel of the receiver, and is marked with a reset label.

The receiver is equipped with a transparent cover that can be removed for access to the circuit components. The cover is held in place by a set of screws that can be removed for access to the circuit components.

The receiver is also equipped with a set of instructions that can be used to operate the receiver. The instructions are printed on a label that is attached to the front panel of the receiver.

The receiver is equipped with a set of controls that can be used to adjust the frequency of the receiver to the desired station. The controls are located on the front panel of the receiver, and are marked with labels that indicate their function.

The receiver is equipped with a set of connections that can be used to connect the receiver to an external power source. The connections are located on the rear panel of the receiver, and are marked with labels that indicate their function.

The receiver is equipped with a set of indicators that can be used to determine the status of the receiver. The indicators are located on the front panel of the receiver, and are marked with labels that indicate their function.

The receiver is equipped with a set of audible tones that can be used to indicate the status of the receiver. The tones are produced by the receiver, and are audible to the user.

The receiver is equipped with a set of warning lights that can be used to alert the user to potential problems with the receiver. The lights are located on the front panel of the receiver, and are marked with labels that indicate their function.

The receiver is equipped with a set of warning labels that can be used to alert the user to potential hazards with the receiver. The labels are located on the front panel of the receiver, and are marked with labels that indicate their function.

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The Model 403 is a 4 Tube Receiver operating on A.C. or D.C., 110-120 Volts, 25-60 Cycles.

**OPERATION**

Turn set on by turning ON-OFF switch. Allow 30 seconds for tubes to heat, turn volume control knob to middle position and then secure desired station by turning the station selector knob. When tuning in a station, set tuning control carefully to maximum station volume, then adjust with volume control knob to desired volume.

When operated on Direct Current if no reception is heard approximately one minute after set is turned on, reverse plug in outlet. No ground wire is required with this set.

**TUBES**

1-606, 1-605, 1-43, and 1-1223

**ANTENNA**

Unwind Antenna and place along baseboard or in any convenient location, the Antenna may also be grounded. For additional signal strength an outside Antenna may be used.

**IMPORTANT**

Do not touch ground wire to chassis.

---

**NUMBERS & LIST PRICES OF REPLACEMENT PARTS**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>1331</td>
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<tr>
<td>1332</td>
<td>Detector Coil</td>
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<td>Electrolytic Cond.</td>
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<td>2056</td>
<td>.01 Cub Cond.</td>
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</tr>
<tr>
<td>2046</td>
<td>.05 ''</td>
<td>.35</td>
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<tr>
<td>1544</td>
<td>B Choke</td>
<td>.75</td>
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<tr>
<td>6912</td>
<td>Knobs</td>
<td>.20</td>
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</table>
DEWALD RADIO

Model 505-R
Schematic, Socket Alignment, Parts

DEWALD PAGE 6-5

The frequency ranges 540 to 1700 kilocycles, and 5.5 to 17.5 megacycles, (360-1760, 56-176) meters.
MODEL 506-R INSTRUCTION SHEET

The Model 506-R receiver is a universal receiver operating on A.C. or D.C. 110-125 volts 40-60 cycles.

With an additional 220 volt ballast plug, set will operate on A.C. or D.C. 210-240 volts, 40-60 cycles.

OPERATION ON 110 A.C.

Insert line cord plug into receptacle. On direct current if no reception is heard one minute after switch has been turned on, reverse line plug in receptacle.

OPERATION ON D.C. SUPPLY

TUBES

ANTENNA

The antenna may be placed along the baseboard, or may be grounded. For additional power, an outside antenna may be used.

NOTE: The antenna must be wound or the receiver will not operate satisfactorily. No ground wire is necessary for the operation of the set.

IMPORTANT

DO NOT TOUCH GROUND WIRE TO CHASSIS.

BROADCAST:

Turn wave bend switch located in rear of cabinet to broadcast position, locate desired station by turning tuning control.

SHORT-WAVE:

Turn wave bend switch to the short wave position and turn tuning control as in Broadcast position. Use Bend Two for Dial settings.

WARRANTY

This receiver is guaranteed to be free from defective materials and workmanship for a period of ninety days from date of purchase. We agree to remedy any such defects or to furnish new parts in exchange for any part of any unit of our manufacture which under normal installation or use in service discloses any defects within the stipulated guarantee period. This unit must be delivered by the owner to us or to our representative from whom purchase was made, intact, for our examination. All replacements for defective material will be made providing examination discloses in our judgment that it is thus defective. All transportation charges must be prepaid on merchandise returned to our factory for any cause whatsoever.

REPLACEMENT PARTS PRICE LIST

<table>
<thead>
<tr>
<th>PART #</th>
<th>PRICE</th>
<th>PART #</th>
<th>PRICE</th>
</tr>
</thead>
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<tr>
<td>1326 Ant. Coll</td>
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<td>2033 .05 Wfd. Cond.</td>
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<tr>
<td>1327 Det. Coll</td>
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<td>2081 .00025 Wfd. Mica Cap</td>
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<td>1328 B Choke</td>
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<td>7172 Speaker</td>
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<td>2064 .004 &quot; &quot;</td>
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<td>8521 Wave Band Switch</td>
<td>.45</td>
</tr>
<tr>
<td>2086 .01 &quot; &quot;</td>
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<td>8512 Knobs</td>
<td>.20</td>
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</table>
MODEL 605
Alignment
Socket, Trimmers
Parts Data

DEWALD RADIO

INT. FREQ. ALIGNMENT
175 K.C. Connect test oscillator to grid of A.M. and ground oscillator
Condenser during this operation.

R.F. ALIGNMENT
Connect test oscillator to antenna
and align trimmer condensers on variable condensers for max.

SERVICE NOTES

LOCATION DATA
1. Screw unalloyed end of mounting bolt
   tightly up to the threaded hole in the
   rear of receiver.

2. Determine loca-
   tion of set and drill an
   1/2-inch hole in the
   case.

3. Screw on lock nut firmly.

To replace vibrator,
turn tension spring to
the left 90°, then
pull a slight amount
forward. After the
vibrator has been
removed, the tension
spring will be in the
normal position.

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The Model 609 receiver is a 6-tube superheterodyne receiver operating on A.C. or D.C. 110-125 volts 40-60 cycles.

with an additional 220 volt ballast plug, set will operate on A.C. or D.C. 210-246 volts, 40-60 cycles.

OPERATION ON 110 A.C. OR D.C. SUPPLY

Insert line cord plug into receptacle. On direct current if no reception is heard one minute after switch has been turned on, reverse line plug in receptacle.

TUBES

1-6A7, 1-6R7, 1-6J7, 1-43, 1-2528 and 1 Resistor Tube.

ANTENNA

The antenna may be placed along the baseboard, or may be grounded. For additional power, an outside antenna may be used. NOTE: The antenna must be unwound or the receiver will not operate satisfactorily. No ground wire is necessary for the operation of the set.

IMPORTANT

DO NOT TOUCH GROUND WIRE TO CHASSIS.

BROADCAST:

Turn wave band switch located in rear of cabinet to "Long" position, locate desired station by turning tuning control.

SHORT-WAVE:

Turn wave band switch to the "short" position and turn tuning control as in Broadcast position. Use Band Two for Dial settings.

REPLACEMENT PARTS PRICE LIST

<table>
<thead>
<tr>
<th>PART #</th>
<th>PRICE</th>
<th>PART #</th>
<th>PRICE</th>
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<tr>
<td>1328</td>
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<td>1331</td>
<td>.50</td>
<td>2295</td>
<td>2 Gang Var.</td>
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<td>1354</td>
<td>.55</td>
<td>2294</td>
<td>Comb. Elect.</td>
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<td>Dual L.V. Transformer</td>
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<td>2054</td>
<td>.004 Mfd. Cub Cond.</td>
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<td>.009 Mfd. Cub Cond.</td>
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<td>2122</td>
<td>.0001 Mfd. Mica Cond.</td>
<td>.40</td>
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</table>

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DEWALD RADIO

**INTERMEDIATE FREQUENCY ALIGNMENT**
Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 664 and chassis. Ground stator of front section of Variable Condenser during this operation.

**TOP ALIGNMENT**
Connect test oscillator to antenna and ground connections and set dial to 1500 K.C. and peak trimmers "A" for maximum signal. For low frequency adjustment set dial at 600 K.C. and repeak padder condenser (not on front of chassis). Next readjust at 1500 K.C.

**BANK 2**
Police band adjustments for 610 only. Set test oscillator to 456 K.C. Repeak the two trimmers located underneath chassis for maximum gain. Next set variable condenser at 1600 K.C. and repeak padder (screw) on front panel of chassis. Next readjust trimmers underneath the chassis at 4000 Kilocycles.

Long wave adjustment for 610 L.W. only. These adjustments same as police except low frequency setting is 170 K.C. and high frequency setting is 350 K.C.

**SHORT WAVE**
Set variable condenser to 15 Megacycles and connect test oscillator to antenna and ground and repeak trimmers "B" for maximum gain. The low frequency setting is automatically taken care of. The short wave coils are carefully matched for this setting and a fixed calibrated padder peaks the short waves for the low frequency setting.

**MODEL 610**
Numbers and list prices of replacement parts:

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Number</th>
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<tbody>
<tr>
<td>1345</td>
<td>Power Transformer</td>
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<td>1346</td>
<td>Comb. Antenna Coil</td>
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<td>Comb. Pol. Coil</td>
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<tr>
<td>1348</td>
<td>Oscillator Coil</td>
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<tr>
<td>1349</td>
<td>Comb. Transformer</td>
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<td>1350</td>
<td>Sec. Detector Condenser</td>
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<tr>
<td>2054</td>
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<tr>
<td>2055</td>
<td>.0028 Mica Condenser</td>
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<tr>
<td>2047</td>
<td>.00025 Mica Condenser</td>
<td>.55</td>
</tr>
</tbody>
</table>

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INTERMEDIATE
FREQUENCY
ALIGNMENT
Intermediate frequency peaked at 456 K.C. Connect test oscillator to grid of 6AS and chassis. Short Circuit stator of Front section of Variable Condenser during this operation.

RANGE: Model 611 covers the following ranges: - Broadcast - 545 to 1600 Kilocycles; Police - 1600 to 4600 Kilocycles and Short Wave - 5.5 to 16.5 Megacycles.

Model 611 L.W. covers the following ranges: - Long Wave - 150 to 410 Kilocycles; Broadcast - 545 to 1600 Kilocycles and Short Wave 5.5 to 16.5 Megacycles.

RF. ALIGNMENT Connect test oscillator to antenna and chassis, (See Sketch) and set dial to 1500 K.C. and peak trimmers "A" for maximum gain. For low frequency adjustment, set dial at 600 K.C. and repeak padding condenser (Nut on front of chassis). Next readjust at 1500 K.C.

BAND 2
ALIGNMENT Police band adjustments for 611 only. Set test oscillator at 4000 K.C. Repeak the two trimmers "C" (see sketch) for maximum gain. Next set Variable Condenser at 1600 K.C. and repeak padder (screw) on front panel of chassis. Next readjust trimmers at 4000 Kilocycles.

Long Wave adjustment for 611 L.W. only. These adjustments same as police except low frequency setting is 170 K.C. and high frequency setting is 350 K.C.

SHORT WAVE
ALIGNMENT Set Variable Condenser to 15 Megacycles and connect test oscillator to antenna end ground and repeak trimmers "B" for maximum gain. The low frequency setting is automatically taken care of. The Short Wave coils are carefully matched for this setting and a fixed calibrated padder peaks the short waves for the low frequency setting.

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DEWALD RADIO

MODELS 612, 612-LW, 615, 615-LW
Schematic, Socket, Alignment, Parts

MODELS G12 - G15:
FREQ. RANGES 545 TO 1700 KC & 5.5 TO 17 MEGACYCLES.
MODELS 612 LW, - 615 LW.
RANGES 545 TO 1700 KC & 150 TO 353 KC.

SERVICE NOTES

INT. FREQ. ALIGNMENT. Intermediate frequency peaked
at 456 K.C. Connect test oscillator to grid of 618
and chassis. (Ground stator of front section of variable
condenser during this operation.)

L.F. ALIGNMENT

Connect test oscillator to antenna and chassis and
set dial to 1500 K.C. and peak variable condensers.

For low frequency adjustment, set dial at 600 K.C. and peak
padder condenser on front of chassis, rocking variable
condenser at the same time. Short "See Calibration is automatically
taken care of by repeating at 1500 K.C. The short wave coils
are matched carefully for this setting. A fixed calibrated
meter automatically peaks the short waves for the low
frequency setting.

LONG WAVE ALIGNMENT ON 612 L.W., - 615 L.W.

Turn wave band switch to "Foreign" position, and align
the Long Wave trimmers at 370 K.C. Adjust the Long Wave
padder (screw section) at 175 K.C.

LIST OF REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>LIST PRICE</th>
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<th>LIST PRICE</th>
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<td>.0031 Tubular Cond.</td>
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©John F. Rider, Publisher
The models 604 and 605 are all-wave superhet type receivers, designed to operate on 100-120 or 200-220 volts, alternating current, 60-60 cycle only. The primary tap on top of the power transformer must be connected properly for the voltage to be used.

When plugging into the power line, make sure that the line voltage and current frequency agrees with the above. If not, it may cause a few troubles; sometimes on wires in place, and check the power line to see if it is properly pushed into the socket at the rear of the chassis.

TUBES
2N1056, 2N1057, 12A4, 12A6, 12AX7, 6J5, 6N6, 1600

INSTALLATION
This receiver is arranged for a "remote" antenna system, or an antenna single wire system. For connections of either type see Fig. 26a & 26b. A good antenna is essential for the performance of this receiver; especially when near reception is expected. The lead-in portion of the antenna should be placed as high as possible above the ground and surrounding objects, e.g., in solid or insulated wire. A flexible wire for the lead-in portion should be used, and should be kept away from metal structures or objects which might block or obstruct the natural advantages of the receiver. The aerial wire should be kept away from all nearby wires and should be run at right angles to any other wires which are possible. It should be brought into the house at the nearest point convenient to the radio room. A pair of ears does not always suffice in the phase of the receiver to avoid picking up noise from nearby electrical devices.

FREQUENCY BANDS
All bands are easily accessible, with quick adjustment from one to another. A good connection to water or other grounded pipe.

FIG. 2

FIG. 3

The models 604 and 605 are all-wave superhet type receivers designed to operate on 100-120 or 200-220 volts, alternating current, 60-60 cycle only. The primary tap on top of the power transformer must be connected properly for the voltage to be used.

When plugging into the power line, make sure that the line voltage and current frequency agree with the above. If not, it may cause a few troubles; sometimes on wires in place, and check the power line to see if it is properly pushed into the socket at the rear of the chassis.

TUBES
2N1056, 2N1057, 12A4, 12A6, 12AX7, 6J5, 6N6, 1600

INSTALLATION
This receiver is arranged for a "remote" antenna system, or an antenna single wire system. For connections of either type see Fig. 26a & 26b. A good antenna is essential for the performance of this receiver; especially when near reception is expected. The lead-in portion of the antenna should be placed as high as possible above the ground and surrounding objects, e.g., in solid or insulated wire. A flexible wire for the lead-in portion should be used, and should be kept away from metal structures or objects which might block or obstruct the natural advantages of the receiver. The aerial wire should be kept away from all nearby wires and should be run at right angles to any other wires which are possible. It should be brought into the house at the nearest point convenient to the radio room. A pair of ears does not always suffice in the phase of the receiver to avoid picking up noise from nearby electrical devices.

FREQUENCY BANDS
All bands are easily accessible, with quick adjustment from one to another. A good connection to water or other grounded pipe.
ECHOPHONE RADIO MFG. CO.

MODEL S 139, 139C
Schematic, Socket
Trimmers
This receiver is a six tube superheterodyne, designed to operate on 105 to 120 volts alternating current, 60 cycle and can also be furnished for 25 cycle.

Tube complement:
1 - 6A7 - first detector and oscillator
1 - 6D6 - I F amplifier
1 - 75 - second detector-AVC- lst audio
2 - 42 - in parallel - power output
1 - 80 - rectifier

This receiver covers the following three wave bands:
540 - 1720 kilocycles
1720- 5000 kilocycles
5.5- 16 megacycles

Very satisfactory results should be obtained with an antenna of from 40 to 75 feet long, well insulated and erected well up above ground and at least ten feet away from surrounding objects.

To align receiver, proceed as follows:

1 - Apply 456 KC note to control grid of 6A7 and peak I F transformers for maximum gain.
2 - Apply 4000 KC note to antenna wire; set band switch to second band and align trimmer on oscillator section of variable condenser to track with 4000 KC on dial.
3 - Turn band switch to broadcast band; apply 1500 KC note to antenna wire, adjust trimmer on RF section of variable condenser for maximum gain.
4 - Apply 600 KC note to antenna, adjust paddler condenser for maximum gain, swinging condenser back and forth across 600 KC signal.
5 - Check 1400 KC signal for alignment.
6 - Turn band switch to second band; check 4000 KC signal for alignment and adjust trimmer on antenna coil for greatest gain at 4000 KC.
7 - Turn band switch to last band and adjust trimmer on antenna coil for greatest noise on 12 megacycles.
EL REY RADIO MFG. CO.

**Four Tube Tuned Radio Frequency**

I.F. 465 K.C.

NOTICE

The Tone Control of 25,000 ohms is incorporated only in Model 15.

**Six tube A.V.C. Superheterodyne.**

I.F. 465 K.C.

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NOTE: Detector trimmer condenser of gang is removed and separate trimmer condensers TC-1, TC-2, TC-3, and TC-A are used for each band.
EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 5A
Schematic
MODEL 6A
Schematic, Voltage

IF PEAK 172.5 KC.

MODEL 5A

For Alignment Data, see that of Model 5-A.

MODEL 6A
EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 5A
Alignment, Voltage
MODEL 6A
Alignment

Remove bottom cover. See that all tubes are pushed down in their sockets, and that the grid clips are in place. Remove clamp holding vibrator in socket by removing screw fastening it to transformer case. Note whether vibrator is polarized correctly (i.e., if receiver is to be installed in car having the negative side of the battery grounded, the red arrow on transformer case should point to (—) on top of the vibrator). The polarity may be changed by removing the vibrator from socket, turning the complete unit until correct polarity sign is indicated by arrow, and then re-inserting into socket. The polarity must be correct, otherwise serious damage might be incurred to both vibrator and receiver. Replace the clamp over the vibrator after this has been checked.

Below is a list of cars and their correct polarization:

**Positive Ground**
- Auburn
- Austin
- Cadillac
- Chrysler
- De Soto
- Dodge
- Buick
- Chevrolet
- Duesenberg

**Negative Ground**
- Ford
- Graham
- Hudson
- Hupmobile
- La Fayette
- La Salle
- Lincoln
- Oldsmobile
- Pontiac
- Nash
- Packard
- Pierce Arrow
- Plymouth
- Studebaker
- Terraplane
- Reo
- Stutz
- Willys

**Intermediate Transformers**

To align the intermediate frequency transformers, use a good modulated oscillator set for 172½ kc. Set the volume control for maximum volume and turn the dial to a point where little or no signal is received; then ground the antenna.

Connect the oscillator output between the grid of the 6A7 tube and ground. Connect an output meter across the primary of the speaker transformer, or across the voice coil. Using the smallest output from the test oscillator that will give a small reading on the meter, adjust the two i.f. transformers for the largest reading obtainable. Use a non-metallic screw driver if possible.

**Radio Frequency and Oscillator**

To align the r.f. and oscillator sections, couple the oscillator through a standard dummy antenna to the antenna lead and ground of the receiver. Set the test oscillator to some frequency near 1400 kc. Set the dial to the frequency selected. Adjust trimmers on the variable condenser, beginning with the oscillator trimmer. Reduce the output of the test oscillator and repeat. In the absence of an oscillator, the r.f. sections may be aligned on broadcast signals. Tune in a weak station between 1350 and 1450 kc. and align as before. If an output meter is not available, adjust for maximum volume, then reduce the input and repeat.

**Voltage Analysis:**

**Note:** All “B” and “C” voltages should be measured on a high resistance voltmeter of 1000 ohms per volt or over.

The voltages are measured to ground from the points named. Ground the antenna to its shield when taking readings.

**Battery volts—6.3, voltage across heaters—5.5, voltage across speaker field—5.5:**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Suppressor</th>
<th>Osc. Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>215</td>
<td>110</td>
<td>10</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td>6A7</td>
<td>215</td>
<td>110</td>
<td>10</td>
<td>—</td>
<td>110</td>
</tr>
<tr>
<td>78</td>
<td>215</td>
<td>110</td>
<td>10</td>
<td>10</td>
<td>—</td>
</tr>
<tr>
<td>85</td>
<td>95</td>
<td>—</td>
<td>9.5</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>42</td>
<td>205</td>
<td>215</td>
<td>12.5</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

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EMERSON RADIO AND PHONOGRAPH CORPORATION

I.F. 456 K.C.

CAUTION — UNDER NO CIRCUMSTANCE ALLOW A GROUND WIRE TO COME IN CONTACT WITH THE METAL PARTS OF THIS RECEIVER.

Voltage Readings:

Measurements should be made with the volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements are given from the point indicated to ground, with an input power line voltage of 117.5 volts, 60 cycles.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A7 Oscillator-mixer</td>
<td>105</td>
<td>53</td>
<td>1.5</td>
<td>100</td>
</tr>
<tr>
<td>6F7 Triode</td>
<td>105</td>
<td>—</td>
<td>2.5</td>
<td>—</td>
</tr>
<tr>
<td>6F7 Pentode</td>
<td>50</td>
<td>15</td>
<td>2.5</td>
<td>—</td>
</tr>
<tr>
<td>43 Power pentode</td>
<td>95</td>
<td>100</td>
<td>14</td>
<td>—</td>
</tr>
</tbody>
</table>

Voltage across speaker field, 112 volts, d-c.

For operation on power line voltages other than 105 to 130 volts special ballast resistors may be secured.

REPLACEMENT PARTS

KKT-134 Antenna Coil ................. KKC-142 Two-gang variable condenser .................
KKT-135 Oscillator Coil ............... KKC-143 12 and 8 mf dry electrolytic filter condenser ..........
KKT-136 First i-f transformer assembly. KKC-145 Dual 5 mf, 25 volt, dry electrolytic bypass condenser ..........
KKT-137A Second i-f transformer assembly KSW-38B 5 dynamic speaker .................
KKT-138 Iron-core filter choke .......... KS-38B 5 dynamic speaker .................
KKR-134A Volume control ............... KKW-46A 185 ohm, 17 watt, resistor line cord ...
FIVE-TUBE SUPERHETERODYNE RECEIVER
A.C.-D.C....105-130 Volts...25-70 Cycles

Short-Wave Range
1500—3000 Kilocycles
200—100 Meters

Broadcast Range
540—1500 Kilocycles
550—200 Meters

REPLACEMENT PARTS

Part No. Description
GGT-131 Antenna coil
GGT-133 Second i-f transformer
KT-4 Filter choke
GGR-143 Volume control
GGR-128 Ballast resistor

Voltage Readings:
687 Oscillator-modulator
686 A.F. (43 Out.)
555 Capacitor
100 Superpower

100 100 100 120 volts.

CAUTION: UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH THE METAL CHASSIS OF THIS RECEIVER. Readings should be taken with volume control on full, using a d-c voltmeter of 1000 ohms-per-volt. Measurements given are for a line voltage of 117.5 volts. (6) cycles and are measured from the point indicated to ground with the antenna grounded to the metal chassis.
Frequency range .................. 540-1715 kc., 1670-4740 kc., 5.5-16 mc.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to ground, with no signal. Line voltage for these readings was 117.5 v., a.c., 60 cycles.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Osc. Plate</th>
<th>Cathode</th>
<th>Fil</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8</td>
<td>250</td>
<td>75</td>
<td>160</td>
<td>5</td>
<td>6.3 a-c</td>
</tr>
<tr>
<td>6K7 1st i-f</td>
<td>250</td>
<td>75</td>
<td></td>
<td>5</td>
<td>6.3 a-c</td>
</tr>
<tr>
<td>6K7 2nd i-f</td>
<td>145</td>
<td>75</td>
<td></td>
<td>5</td>
<td>6.3 a-c</td>
</tr>
<tr>
<td>75</td>
<td>100</td>
<td>—</td>
<td>—</td>
<td>0</td>
<td>6.3 a-c</td>
</tr>
<tr>
<td>6F6</td>
<td>225</td>
<td>250</td>
<td>—</td>
<td>0</td>
<td>6.3 a-c</td>
</tr>
</tbody>
</table>

B plus at 80 filament—355 volts.
Voltage across speaker field—105 volts.
ADJUSTMENTS

This receiver was carefully aligned and adjusted at the factory. No one but a serviceman experienced with short-wave receivers should attempt to realign the receiver.

An oscillator with frequencies of 456, 600, 1600, 1800, 4500 and 15,000 kc. should be used. In addition, an output meter should be used across the voice coil or output transformer for indicating maximum response.

Alignment Procedure:
1. Set variable condenser to minimum and turn wave-band switch to broadcast (clockwise). Introduce a 456 kc. signal on grid of the 6AS tube. Adjust both trimmers of each of the two transformers for maximum deflection on the output meter (maximum response). Repeat the process.
2. Remove 456 kc. signal from 6AS grid and feed it through the antenna. Adjust the 456 kc. interference trap trimmer for minimum response. The trap trimmer is at the rear wall beneath the chassis deck.
3. With pointer at 600 feed 600 kc. through the antenna and adjust the broadcast series padder (headless set-screw, closest to front) for maximum response. Move pointer to 1600, feed 1600 kc., and align the broadcast oscillator (on left, nearest front) and then the antenna (on right, furthest from front). Return to 600 kc. and readjust padder, rocking the variable condenser for maximum response. Return to 1600 kc. again and check. (See General Instructions below).
4. Set switch at police-band (central position) and pointer at 1800. Feed 1800 kc. and align police-band series padder (headless set-screw, furthest from front). Move pointer to 4500, feed 4500 kc., and align oscillator (middle one at left) and antenna (middle one at right). Return to 1800 kc. and readjust series padder, rocking for maximum response. Return again to 4500 kc. and check.
5. Set switch at short-wave (counter-clockwise) and pointer at 15 megacycles (the thin line on the dial marking the edge of the 15 meter band). Feed 15,000 kc. and align the short-wave oscillator (further from front at left), choosing the minimum capacity peak, and then the antenna (nearest front at right) choosing the maximum capacity peak. The receiver is now completely aligned.

General Instructions

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, not a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a source of noise, frequency drift and microphonism.

In aligning antenna trimmers on the high-frequency signals there is usually a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep re-tuning the variable condenser as you align.

GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 42 tube out of its respective socket, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-volt battery (bias cell). Do not put a voltmeter across this bias cell. Check it by temporarily replacing with a new cell or some other one-volt source and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup. The cell assembly is mounted on a bakelite strip on the side of the right-hand chassis wall. On replacing the cell be sure the clip makes good contact.
3. Pilot lights may be replaced by slipping the push-on sockets off the dial and unscrewing the bulb. It is not necessary to remove either the dial or chassis from cabinet.
4. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from hitting the cabinet, otherwise microphonism will result.

REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>MMT-149</td>
<td>456 kc tunable wave trap.</td>
</tr>
<tr>
<td>T1, T2, T3</td>
<td>XXT-165</td>
<td>Three band antenna coil assembly.</td>
</tr>
<tr>
<td>T4, T5, T6</td>
<td>XXT-187</td>
<td>Three band oscillator coil assembly.</td>
</tr>
<tr>
<td>T7</td>
<td>XXT-182A</td>
<td>456 kc 1st rf transformer.</td>
</tr>
<tr>
<td>T8</td>
<td>XXT-183A</td>
<td>456 kc 2nd rf transformer.</td>
</tr>
<tr>
<td>T9</td>
<td>XXT-190</td>
<td>Power transformer.</td>
</tr>
<tr>
<td>R11</td>
<td>XXR-185A</td>
<td>Volume control—25 megohm.</td>
</tr>
<tr>
<td>R17, S2</td>
<td>XXR-186A</td>
<td>Tone control with switch—25 megohm.</td>
</tr>
<tr>
<td>R7</td>
<td>KR-51</td>
<td>2.500/3 ohm—¼ watt carbon resistor.</td>
</tr>
<tr>
<td>R1, R9</td>
<td>KR-53</td>
<td>1.000/3 ohm—¼ watt carbon resistor.</td>
</tr>
<tr>
<td>R10, R14</td>
<td>KR-54</td>
<td>500,000 ohm variable resistor.</td>
</tr>
<tr>
<td>R13</td>
<td>LE-51</td>
<td>200,000 ohm variable resistor.</td>
</tr>
<tr>
<td>R16</td>
<td>XRX-202</td>
<td>210,000 ohm variable resistor.</td>
</tr>
<tr>
<td>R6</td>
<td>KR-55</td>
<td>250,000 ohm variable resistor.</td>
</tr>
<tr>
<td>R12</td>
<td>KR-56</td>
<td>500,000 ohm variable resistor.</td>
</tr>
<tr>
<td>R4</td>
<td>KR-57</td>
<td>1 meg.</td>
</tr>
<tr>
<td>R15</td>
<td>XXR-203</td>
<td>500 ohm wire-wound resistor—½ watt.</td>
</tr>
<tr>
<td>R5</td>
<td>XXR-194</td>
<td>30,000 ohm metal clad wire wound tapped resistor.</td>
</tr>
<tr>
<td>C9, C4</td>
<td>XXC-187</td>
<td>Two-pole variable condenser.</td>
</tr>
<tr>
<td>C28, C29</td>
<td>XXC-188</td>
<td>Dual 8 mf dry electrolytic condenser.</td>
</tr>
<tr>
<td>C6, C7</td>
<td>JUC-144D</td>
<td>Dual pad condenser.</td>
</tr>
<tr>
<td>R3</td>
<td>XXR-230</td>
<td>Dual 0.1 mf, 250 volt condenser.</td>
</tr>
</tbody>
</table>

Models 3C, D6

EMERSON RADIO AND PHONOGRAPH CORPORATION

When Ordering Replacement Parts Specify Part Number

*Item number locates the article on the Schematic Diagram.
Model 36

Chassis Model B5

115-120 Volts...A.C. 60 Cycle

Description:
The Model 36 is a five-tube superheterodyne radio receiver. Readings are to be taken with all the tubes in their places, bringing in regular broadcast stations, and, in addition, stations volume control turned on full and antenna wire grounded to chassis. on the short-wave band down to 100 meters.

The following tubes are employed:

1 -- 6D6 R.F. Pentode (1st Detector-Oscillator)
1 -- 6D6 I.F. Amplifier
1 -- 76 Triode (2nd Detector)
1 -- 42 Output-Pentode
1 -- 40 Rectifier

Unless marked otherwise, this receiver is designed to operate on 105-125 volts, 50-60 cycles, alternating current only.

Voltage across speaker field, 60.
The tube complement is as follows:

1—C6 Pentagrid converter and 1st detector.
2—34 Pentode i-f amplifier.
3—25S Duplex diode-triode 2nd detector and a.v.c.
4—30 Audio amplifier.
5—33 Pentode output.
6—LLL-25 Ballast tube for 3-volt operation.

CHASSIS MODEL F5

MODEL 103

BROADCAST RANGE
540 to 1700 kilocycles
(555 to 176 meters)

SHORT-WAVE RANGE
1620 to 3950 kilocycles
(185 to 76 meters)

Readings should be taken with 1000 ohms-per-volt voltmeter with 135 volts of "B" battery and 3 volts of "A" battery. Voltages listed below are from point indicated to ground.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Bias</th>
<th>Osc. Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>135</td>
<td>135</td>
<td>-16.5</td>
<td>—</td>
</tr>
<tr>
<td>30</td>
<td>90</td>
<td>—</td>
<td>-3.0</td>
<td>—</td>
</tr>
<tr>
<td>25S</td>
<td>80</td>
<td>—</td>
<td>-1.5</td>
<td>—</td>
</tr>
<tr>
<td>34</td>
<td>135</td>
<td>67.5</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>1C6</td>
<td>135</td>
<td>67.5</td>
<td>0</td>
<td>80</td>
</tr>
</tbody>
</table>

I.F. 456 K.C.
Note;
Tone control omitted in early models.
Alignment Procedure:

1. Short circuit the oscillator stator of the variable condenser to ground.
2. Introduce a 456 kc signal on the grid of the 6A7 tube.
3. Adjust both trimmers of each of the two i-f transformers for maximum response on the output meter. Repeat the process.
4. Remove the short circuit from the oscillator stator of the variable condenser.
5. Remove the 456 signal from 6A7 grid and connect to the antenna.
6. Set the range switch to the broadcast band.
7. Set the pointer at the low frequency end of the dial.
8. Adjust the 456 kc interference trap trimmer for minimum response. The trap trimmer is across the ½ inch coil form just behind the speaker.
9. Make sure that the pointer on the dial reaches its extreme positions at both ends of the broadcast band when the gang condenser is at the maximum and minimum positions. If it does not, loosen the set screws on the hub of the dial and rotate the gang condenser to maximum capacity. Then rotate the pointer of the dial, by means of the selector knob, to its extreme position at the 550 kc end of the broadcast band. Tighten the set screws securely and proceed to re-align the set.
10. Set the pointer to 1600 kc on the dial.
11. Introduce a 1600 kc signal into the antenna.
12. Adjust the oscillator trimmer (the one farthest from the chassis, on the oscillator coil) and the antenna trimmer (at the bottom of the large antenna coil on top of the chassis) for maximum response. The oscillator coil is on the underside of the chassis.
13. Introduce a 600 kc signal into the antenna. Rock the gang condenser back and forth around the 600 kc dial reading and, at the same time, adjust the series padding condenser for maximum output. Leave the series padder set at the point of maximum sensitivity. The series padder is on the front of the chassis.
14. Repeat steps 12 and 13 until no further readjustment of the trimmer and padder is necessary.
15. Throw the range switch to the short-wave position and introduce a 15 megacycle (mc) signal into the antenna.
16. Set the dial to 15 mc. Adjust the short-wave oscillator trimmer for maximum response. If two peaks are evident, the correct one is at the maximum capacity end. The short-wave oscillator trimmer is the one nearest the chassis on the oscillator coil beneath the chassis.
17. Connect an outside antenna to the set antenna lead and adjust the interstage coil trimmer for maximum noise when the pointer on the dial is set at 14 mc. Two peaks may be noticed. The correct peak is the one nearest the minimum capacity end. The interstage coil is on top of the chassis immediately behind the large antenna coil.
18. Set range switch to broadcast band and set pointer to 600 kc. Feed 456 to antenna and again adjust the interference trap trimmer for minimum response.
19. The set is now ready for operation.

Voltage Analysis:

Readings should be taken with a 1000 ohms per volt meter.

Voltages listed below are from the point indicated to ground.

<table>
<thead>
<tr>
<th></th>
<th>Plate</th>
<th>Screen</th>
<th>Suppressor</th>
<th>Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6 R.f.</td>
<td>80</td>
<td>45</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6A7 Oscillator-Modulator</td>
<td>100</td>
<td>45</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>6D6 I.f.</td>
<td>100</td>
<td>100</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>75 A.f.</td>
<td>35</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>43 Output</td>
<td>95</td>
<td>100</td>
<td>—</td>
<td>13.5</td>
</tr>
</tbody>
</table>

The pilot light used is Mazda No. 40, 6-8 volts and .15 ampere, brown bead.

Voltage across field—120 volts, d.c. Line voltage—117.5 volts a.c.
The tube complement is as follows:

1. 6K7 (metal) — R-f amplifier
2. 6K7 (metal) — 1st i-f amplifier
3. 6K7 (metal) — 2nd i-f amplifier
4. 6K7 (metal) — Automatic tone control and interstation noise suppressor
5. 6AS (metal) — Pentagrid oscillator-modulator
6. 6H6 (metal) — Diode detector and automatic volume control
7. 6C5 (metal) — 1st audio amplifier
8. 6F5 (metal) — Class "A B" driver
9. 6F5's (metal) — Push-pull output
10. 5E3 (glass) — Full-wave rectifier

I.F. 456 K.c.

MODEL 105
Chassis Model A11

Voltage rating: 110-120 volts a-c
Current drain: 1.15 amps
Frequency ranges: 540 to 1800 kc, 1710 to 5950 kc,
5.5 to 19.0 megacycles

WAVE BAND-SWITCH
POSITION NO. 1 — SW
POSITION NO. 2 — POLICE
POSITION NO. 3 — BC

SCHEMATIC DIAGRAM
PILOT LIGHTS
GENERAL NOTES

1. A jack is provided at the rear of the chassis for a phonograph attachment. The pickup to be used should be of the high output type. A separate phonograph-type volume control is required to control the volume output as determined by the type of pickup used. The pickup leads should be connected to the two outside terminals of the volume control in such a manner that the jack to the pickup is plugged in front of the volume control or the pickup is plugged in front of the jack. A lead from this terminal should be plugged into the hole in the phonograph jack assembly and the socket of the chassis. A lead from the rear terminal of the volume control should be connected to the jack for either the pickup or the speaker (parts "L2" and "L3" in the parts list of this set) and the extreme capacitance (coil) resistance of the volume control when operating phonograph. Since the pickup is part of the starting type of volume control, care should be taken that the leads are not pinched when the jack is being disconnected. This precaution is not necessary when the jack is being connected.

2. The receiver should never be turned on with the speaker plug or the GPF tubes out of their sockets, since the rapid rise in another noise would damage the electrostatic cover.

3. Pilot lights may be replaced by slipping the push-on terminals of the dial and removing the bulbs. It is not necessary to remove either the dial or chassis from cabinet.

4. In moving antennas, do not lift them over any screw so much that chasis will not fall into place, and do not use thumbscrews on the chassis. Care should be taken that the adjacent screws are not damaged.

5. The color in the power transformer leads is as follows:

- primary—green braid
- primary—red braid
- 12-volt, 10-amp braid
- 6-volt, 25-amp braid
- 6-volt, 25-amp braid

ADJUSTMENTS

The receiver was carefully aligned and checked at the factory by means of an oscillograph, and it is strongly recommended thatAlignment be done for readjustment.

Alignment with phonograph is done with 820, 825, 1000, 2000, and 7000 cycles, and with voltages being 1000, 1500, and 2000 cycles.

1. Output voltage should be used across the voice coil or output transformer for observing maximum response.

2. Check a field of operation.

On the oscillograph screen the points of the sensitivity curve (i.e., response curve with fidelity-sensitivity switch in listening position) should be in a position midway between the two peaks of the high-frequency curve of the response curve with fidelity-sensitivity switch in fidelity position, preferably in the middle of the curve. In other words, the output to the speaker should be made by means of the oscillograph screen with the vertical central axis of the high-frequency curve.

3. Change the sensitivity until the receiver is properly balanced, and make sure the sensitivity switches are properly aligned.

4. Check the alignment of the speaker and output transformer. Tunes the speaker to the same position, and repeats the adjustment.

5. Two peaks should be observed on the output meter, approximately 1½ to 2½ cycles above the sensitivity peak.

7. IMPORTANT:

All adjustments should be made with the fidelity-sensitivity switch in the position selected. Divider, if any, should be removed.

1. Alignment

On all transformers, 2AT-29, 2AT-24, and 2AT-24 are located on extreme left side of chassis. Set wave-band switch at position 2 and external resistor to maximum value. Feed 450 ft. of grid of tube. Adjust the fill of output transformer for maximum response. Then adjust the fill of the volume control for maximum response. Finally, adjust the filling of all other transformers for maximum response. (See General Instructions.)

2. Broadcast Alignment

The three pole-contacts are the smaller ones located on bottom side of the tuner unit, in row left of wave-band switch as viewed from inside rear of the unit. The antenna coil on the left is for broadcast reception of long waves, and the antenna coil on the right is for medium waves. Each of the three inductors has a screen terminal, and the center of the two pole-contacts is 4 3/4 in. from the front of the chassis. The two pole-contacts should be the same length, and the middle of the pole-contact should be the same distance from the front of the chassis. The three pole-contacts are the smaller ones located on bottom side of the tuner unit, in row left of wave-band switch as viewed from inside rear of the unit. Adjust the fill of output transformer for maximum response. Then adjust the fill of the volume control for maximum response. Finally, adjust the filling of all other transformers for maximum response. (See General Instructions.)

3. Phone Alignment

The three pole-contacts are the nearer ones located on bottom side of the tuner unit, in row left of wave-band switch as viewed from inside rear of the unit. The antenna coil on the left is for broadcast reception of long waves, and the antenna coil on the right is for medium waves. Each of the three inductors has a screen terminal, and the center of the two pole-contacts is 4 3/4 in. from the front of the chassis. The two pole-contacts should be the same length, and the middle of the pole-contact should be the same distance from the front of the chassis. The three pole-contacts are the smaller ones located on bottom side of the tuner unit, in row left of wave-band switch as viewed from inside rear of the unit. Adjust the fill of output transformer for maximum response. Then adjust the fill of the volume control for maximum response. Finally, adjust the filling of all other transformers for maximum response. (See General Instructions.)

4. Short-Wave Alignment

The three pole-contacts are the nearer ones located on bottom side of the tuner unit, in row left of wave-band switch as viewed from inside rear of the unit. The antenna coil on the left is for broadcast reception of long waves, and the antenna coil on the right is for medium waves. Each of the three inductors has a screen terminal, and the center of the two pole-contacts is 4 3/4 in. from the front of the chassis. The two pole-contacts should be the same length, and the middle of the pole-contact should be the same distance from the front of the chassis. The three pole-contacts are the smaller ones located on bottom side of the tuner unit, in row left of wave-band switch as viewed from inside rear of the unit. Adjust the fill of output transformer for maximum response. Then adjust the fill of the volume control for maximum response. Finally, adjust the filling of all other transformers for maximum response. (See General Instructions.)

5. General Instructions

The output of the receiver in the high-frequency range will be reduced when the tube is removed from the socket. This is due to the condenser present in the high-frequency range which, when the tube is removed, results in an increase of capacitance between the two leads. This increase of capacitance results in a decrease of the output voltage of the selector, and the output voltage of the output transformer. Therefore, it is important that the output transformer be kept in the socket at all times when the tube is not in use. If the tube is removed from the socket, the output transformer should be placed in the cabinet, and the end of the tube should be left on the cabinet. A small light should be used to check the alignment of the tube. The tube should be checked for proper alignment before it is used for the first time. The tube should be checked for proper alignment before it is used for the first time. The tube should be checked for proper alignment before it is used for the first time. The tube should be checked for proper alignment before it is used for the first time. The tube should be checked for proper alignment before it is used for the first time.
EMERSON RADIO AND PHONOGRAPH CORPORATION

MODEL 106 (2 Types)
Chassis U6B
Below Serial 636901
Above Serial 636901
Schematics

This schematic applies to any receiver bearing a serial number higher than 636000.

Schematic No. 1

Wave Band Switch shown in broadcast position

Schematic No. 2

Wave Band Switch shown in broadcast position

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MODELS 107 and 111
Chassis Model U6A

These service notes apply only to chassis model U6A. Different service notes are available for chassis model U6F also used in the models 107 and 111 cabinets. The chassis model number for this receiver is the group of symbols before the dash in the serial number printed on the license plate.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (cathode of 43 tube). Line voltage for these readings was 117.5 volts, a.c., 60 cycles.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Osc. Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A8</td>
<td>82</td>
<td>50</td>
<td>2</td>
<td>82</td>
</tr>
<tr>
<td>6K7 1st i-f</td>
<td>107</td>
<td>107</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>6K7 2nd i-f</td>
<td>65</td>
<td>50</td>
<td>5</td>
<td>—</td>
</tr>
<tr>
<td>75</td>
<td>50</td>
<td>—</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>43</td>
<td>95</td>
<td>107</td>
<td>0</td>
<td>—</td>
</tr>
</tbody>
</table>

Voltage across speaker field (25Z5 cathode to line switch) — 107 volts.
Voltage across choke (43 cathode to line switch) — 22 volts.

Voltage rating — 105-130 volts.
Current drain — 0.43 amps.
Frequency ranges 540-1660 kc, 1580-4750 kc, 5.5—16 mc.

I.F. 456 K.C.
GENERAL NOTES

1. To take the chassis out of the Model 107 cabinet first remove the knobs (knobs are of push-on-type), and then the cabinet bottom. Remove the two wood screws and four nuts holding the chassis to the cabinet. With the receiver bottom side up, slide the chassis towards the back and lift out of cabinet.

2. If replacements are made or the wiring disturbed in the R-F section of the circuit, the receiver should be carefully re-araanged.

3. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small one-cell battery (blue cell). The cell assembly is mounted on a basic strip in the front corner of the chassis near the volume control. Do not put a millivolt across this bias cell. Check it by momentarily replacing with new cell, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cup.

ADJUSTMENTS

An oscillator with frequencies of 456, 600, 1600, 1790, 45v and 15,000 cycles should be used. In addition, an output meter should be used across the voice coil of output transformer for obtaining maximum response.

1. Alignment

The l of transformers Z5T-194 and Z5T-195 are located on the top of the chassis. The four trimmers, for each i transformer, are located at the top of the case. Set the waveband switch to broadcast (extend clockwork position) and rotate variable condenser to minimum. Feed 600 k or grid of the 6AG5 tube and adjust the four i trimmers for maximum response. Then feed 45v through the antenna and adjust the wave-trap trimmer for minimum response. The trimmer is on the wave-trap, which is located on the top of the chassis behind the speaker.

Location of coils

The inductors for the three bands are wound on one form and mounted on top of the chassis to the right of the speaker. The trimmers for these coils are mounted on a basic strip above the tuning. The trimmer nearest the speaker is for the short-wave antenna coil. The output meter for the voice coil, and the trimmer furthest from speaker is for the broadcast antenna coil.

The trimmers for the three bands are wound on one form and mounted underneath the chassis to the right of the speaker. The trimmers for the three bands are wound on one form and mounted underneath the chassis to the right of the speaker. The trimmers for the three bands are wound on one form and mounted underneath the chassis to the right of the speaker.

Broadcast Alignment

Set waveband switch to broadcast position, extend clockwork, and dial point to 600. Feed 600 k through antenna and adjust broadcast padder (lower row on right wall, closest to front) for maximum response. Set pointer to 1500, feed 45v and adjust the broadcast oscillator trimmer (top row on right wall, closest to front) for maximum response. This is the broadcast antenna trimmer (on antenna coil, furthest from speaker). Rotate pointer to 600 and check the variable condenser (rotate condenser back and forth through small arc) while adjusting the broadcast padder for maximum response. If a readjustment is necessary return to 1500 and recheck the antenna and oscillator trimmers.

Police Alignment

Set waveband switch to police (central position), pointer to 1200 and feed 1200 k through antenna lead. Adjust police band padder (furthest from front on right wall, lower row) for maximum response. Set pointer to 4500 and feed 4500 k. Adjust police band oscillator trimmer (central trimmer on right wall, upper row) for maximum response. If two peaks are obtained, select the one of minimum capacity (see General Instructions below). Then adjust police band antenna trimmer (central trimmer on right wall) for maximum response, selecting the peak of maximum capacity. Again feed 1200 k, with pointer at 1200, turn variable condenser and adjust police band padder for maximum response. Readjust at 4500 k if necessary.

Short-Wave Alignment

Set waveband switch to short-wave position and pointer to 10 megacycles. Feed 15,000 k through antenna. Adjust short-wave trimmers (furthest from front on right wall, top row) for maximum response. If two peaks are obtained, select the one of minimum capacity. Check all three bands for dial quit or incorrect meter response.

General Instructions

The set's oscillator is higher in frequency than the signal on the frequency side of the signal. Always select the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna and r-f trimmers. The last motion in adjusting trimmers should always be a tightening one.

Never apply too much strain on the screw. Either bend the plate up or remove the screw entirely. Screws are a source of noise, frequency drift and microphonics.

When ordering replacement parts specify part number.

Production Changes

In early production runs C3 was a 0.03 mf capacitor. Later it was changed to a 0.1 mf, 200 v. and subsequently removed entirely from the circuit.

In later production runs, the following changes were made:

C36 added and circuit broken at X. C36 a 0.03 mf, 200 v. C36 removed. C104 placed in the condenser block. R11 changed from 1 megohm carbon resistor to 20 megohms, 1/2 watt carbon resistor, our part KR-56. R15 changed from 0.5 megohm carbon resistor to 30 megohms, 1/2 watt carbon resistor, our part KR-56.
MODELS 108 and 110

Chassis Model USA

Voltage rating 108-190 volts
Current drain 0.4 amp.
Frequency ranges 550-1550 kc, 1500-3800 kc.

GENERAL NOTES

1. Bias for the grid of the audio section of the 75 tube is obtained by means of a very small mono-ovol battery (bias cell). The cell assembly is mounted on a baffle strip on top of the chassis. Do not put a voltmeter across this bias cell. If the cell is not inserted, check the cell by temporarily replacing with a new cell, or some other one-oval source, and noting results. To remove the bias cell, simply pull up on the spring clip and lift the cell from its cap. On replacing it be sure the clip makes good contact.

2. If replacements are made or the wires distorted in the r-f section of the circuit, the receiver should be carefully realigned.

3. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.

4. The filament dropping resistor, (R15—see schematic), is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.

5. In operating the receiver on de it may be necessary to reverse the line plug for correct polarity.

6. The color coding of the l-f transformer leads is as follows:

- Grid—green
- Grid return—black
- Plate—blue
- B plus—red

ADJUSTMENTS

The diagrams, Fig 2 and Fig 3, on the second page illustrate the location of the trimmers on the chassis. Note that the first 6-f transformer, part No. 212-290, has two trimmers, located at the top of the core. The second 6-f transformer is mounted on the inside of the right-hand chassis wall and has one trimmer, accessible through a hole in the chassis. Two trimmers are located on the metal strap at the rear of the chassis. The trimmer nearest the wave-band switch is for the broadcast oscillator coil. The trimmer furthest away from the wave-band switch is for the short-wave antenna coil. The antenna stage trimmer will be found on the front section of the variable condenser and the oscillator stage trimmer on the rear section.

Alignment Procedure:

An oscillator with frequencies of 456, 1429, 2560 and 3600 kc. should be used.

An output meter should be used across the voice coil or output transformer for observing maximum response.

1. Turn the wave-band switch clockwise, to the broadcast position, and rotate the variable condenser to minimum.

2. Feed a 456 kc signal to the grid of the 6A7 tube.

3. Adjust the three 6-f trimmers for maximum response.

4. Turn the wave-band switch counter-clockwise, to the short-wave position.

5. Set the dial pointer to 3600 and feed 3600 kc through the antenna lead.

6. Adjust the variable condenser oscillator trimmer (rear) for maximum response.

7. Turn wave-band switch to broadcast position and set the dial pointer to 1429.

8. Feed 1429 kc through the antenna and adjust the broadcast oscillator trimmer (on rear cabinet strip, nearest bank switch) for maximum response. Then adjust the antenna (front section) of variable condenser for maximum response.

9. Turn the wave-band switch counter-clockwise to the short-wave position. Set the dial pointer to 2560 and feed 2560 kc through the antenna.

10. Adjust the short-wave antenna trimmer (on rear strip, furthest from band switch) for maximum response.

TUBE DATA

The tube layout is illustrated in a diagram on the next page, Fig 2. The complement of tubes and their functions are as indicated in the following table:

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
<th>Grid Plate</th>
<th>Fil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6AD7</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>6</td>
</tr>
<tr>
<td>6G6</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>6</td>
</tr>
<tr>
<td>75</td>
<td>105</td>
<td>105</td>
<td></td>
<td>105</td>
<td>6</td>
</tr>
<tr>
<td>43</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>6</td>
</tr>
</tbody>
</table>

Voltage across speaker field (2553 cathode to line switch)—125 volts.
Voltage across speaker (variable to line switch)—20 volts.

REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>Filter choke—500 ohms</td>
</tr>
<tr>
<td>T1, L1</td>
<td>Two-band antenna coil with 456 kc wave trap</td>
</tr>
<tr>
<td>T2</td>
<td>Two-band oscillator coil</td>
</tr>
<tr>
<td>T3</td>
<td>6000 ohm 1/4 watt carbon resistor</td>
</tr>
<tr>
<td>R1</td>
<td>5000 ohm 1/4 watt wire-wound resistor</td>
</tr>
<tr>
<td>R2</td>
<td>3500 ohm 1/4 watt carbon resistor</td>
</tr>
<tr>
<td>R3</td>
<td>2500 ohm 1/4 watt carbon resistor</td>
</tr>
<tr>
<td>R4</td>
<td>1500 ohm 1/4 watt wire-wound resistor</td>
</tr>
<tr>
<td>R5, R6, R7, R8</td>
<td>1500 ohm 1/4 watt carbon resistor</td>
</tr>
<tr>
<td>R9, R10, R11, R12</td>
<td>1500 ohm 1/4 watt carbon resistor</td>
</tr>
<tr>
<td>R13</td>
<td>1500 ohm 1/4 watt carbon resistor</td>
</tr>
<tr>
<td>C1, C2</td>
<td>0.0065 mfd mica condenser</td>
</tr>
<tr>
<td>C3, C8</td>
<td>0.0065 mfd mica condenser</td>
</tr>
<tr>
<td>C4, C6</td>
<td>Two gang variable condenser</td>
</tr>
<tr>
<td>C5, C14, C21</td>
<td>Dual trimmer on baffle strip</td>
</tr>
<tr>
<td>C7, C8, C10</td>
<td>0.020 mfd mica condenser</td>
</tr>
<tr>
<td>C9, C24A, C25A</td>
<td>0.020 mfd mica condenser</td>
</tr>
<tr>
<td>C12, C13, C17</td>
<td>0.020 mfd mica condenser</td>
</tr>
<tr>
<td>C16, C17</td>
<td>0.020 mfd mica condenser</td>
</tr>
<tr>
<td>C19, C20</td>
<td>0.020 mfd mica condenser</td>
</tr>
<tr>
<td>B1</td>
<td>Bias cell, one volt</td>
</tr>
<tr>
<td>S1</td>
<td>Wave-band switch</td>
</tr>
<tr>
<td>X72A</td>
<td>5&quot; dynamic speaker</td>
</tr>
<tr>
<td>S2</td>
<td>Pilot light, 6-8 volt, 15 amp.</td>
</tr>
<tr>
<td>KDW-43</td>
<td>Line cord with built-in resistor wire (B-20)</td>
</tr>
<tr>
<td>DWD-43</td>
<td>Dial Assembly</td>
</tr>
<tr>
<td>DWD-43A</td>
<td>Dial scale and bracket</td>
</tr>
<tr>
<td>DWD-43B</td>
<td>Pyramidal drive box</td>
</tr>
<tr>
<td>DWD-43C</td>
<td>Vernier friction drive</td>
</tr>
<tr>
<td>DWD-43D</td>
<td>Dial crystal</td>
</tr>
<tr>
<td>DWD-43E</td>
<td>Dial pointer</td>
</tr>
</tbody>
</table>
### DESCRIPTION

The following batteries are required:

- For filament supply, one of the following: 2 volt storage battery, 2 1/2 volt air cell, 3 volt dry cell pack or 4 volt storage battery.
- High voltage: either 135 or 180 volts of B batteries.
- Bias: either 3 or 4 1/2 volts of C battery. (3 volts if 135 volt B is used, 4 1/2 volts if 180 volt B is used.)
- Use of 180 volts (four 45 volt blocks) of B battery is justified only when an unusually loud volume is required. For home use 135 volts (three 45 volt blocks) is sufficient.

Connect battery cable according to the markings:

- yellow A to positive (+) side of filament supply. (A battery)
- black A to negative (-) side of filament supply
- white B to side of B battery
- brown C to side of 4 1/2 volt tapped C battery
- red B-180 B-135 to + 180 or + 135 B
- green C-45 C-3 to - 45 if 180 volt B is used, - 3 if 135 volt B is used.

**Voltage Analysis:**

- readings should be taken with 1000 ohms-per-volt voltmeter with 135 volts of B battery and 3 volts of C battery. Voltages are from points listed to ground.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate</th>
<th>S. O.</th>
<th>Bias</th>
<th>Oct. plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>118</td>
<td>115</td>
<td>-3 to +3C</td>
<td>83</td>
</tr>
<tr>
<td>34</td>
<td>118</td>
<td>45-50</td>
<td>-6</td>
<td></td>
</tr>
<tr>
<td>146</td>
<td>70</td>
<td>32-38</td>
<td>-3.8</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>116</td>
<td>115</td>
<td>-15</td>
<td></td>
</tr>
</tbody>
</table>

Measure bias voltage along resistor series circuit below chassis. Pilot light is 2 volt .06 amp. No other should be operated without it.

The ballistic (voltage regulator) tube is used only when a 3 volt dry cell pack is employed for filament supply. With a new dry cell unit the filament voltage on the tubes should not exceed 2.2 volts as measured with an accurate 1000 ohms-per-volt voltmeter. When the dry cell voltage has dropped to 2.2 volts, the filament voltage should not be less than 1.8 volts. A dry cell pack showing less than 2.2 volts with load should be discarded.

### ADJUSTMENTS

This instrument is carefully aligned and adjusted at the factory. No one but a service man experienced with short-wave receivers should attempt to realign the receiver. If it becomes necessary, the following procedure may be accurately followed.

- An oscillator with frequencies of 135, 550, 1600 and 15000 kc (15 mc) should be used.

In addition, an output meter should be used across the voice coil for the precise results necessary.

**Alignment Procedure:**

1. Set the range switch to the broadcast band.
2. Short circuit oscillator terminal of the variable condenser to ground. (Front section.)
3. Introduce the 406 kc signal on the grid of IC8 tube.
4. Adjust the single-tuned i-f transformer for maximum response on the output meter.
5. Adjust both trimmers on first two i-f transformers for maximum response.
6. Remove 456 kc signal from IC8 grid.
7. Remove the short circuit from the stator of the oscillator section of the gang condenser.
8. Make sure that the dial reaches its extreme position at both ends of the broadcast band when the gang condenser is at maximum and minimum. If the dial does not do this, loosen the set screws on the hub and rotate the gang condenser to maximum capacity. Then rotate the dial (by means of the selector knob) to extreme position at the 550 kc end of the broadcast band. Tighten the set-screws securely and proceed to realign the set.
9. Set the dial to 1600 kc.
10. Introduce a 1600 kc signal into the antenna.
11. Adjust broadcast oscillator trimmer (on universal-wound oscillator coil under chassis) for maximum response.
12. Adjust trimmer on top of b.c. detector coil (long coil on top of chassis) for maximum response.
13. Introduce a 550 kc signal into the antenna. Rock the gang condenser back and forth around the 550 kc dial reading and at the same time adjust the series padding condenser for maximum output. Leave the series padding set at the point of maximum sensitivity. The series padding is on the front of the chassis.
14. Return to 1600 kc and repeat 11 and 12.
15. Now throw the range switch to short-wave position and introduce a 15 megacycles (mc) signal into the antenna.
16. Set the dial to 15 mc.
17. Adjust oscillator trimmer for maximum output. The short-wave oscillator trimmer is on the heavy-wire coil beneath the chassis.
18. Connect an outside antenna to the set and adjust the s.w. detector coil trimmer for maximum noise at 15 mc. The s.w. detector coil is the heavy-wire coil on top of the chassis. Before starting the adjustment turn the trimmer out so as to have minimum capacity, and then gradually increase it. A peak will be noticed and then the capacity is increased and diminishes and disappears. When the capacity is increased further, the noise may increase again. The correct peak is the one at the minimum capacity end.

### SERVICE PARTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LL7-130</td>
<td>Broadcast antenna coil</td>
<td>L9-135</td>
<td>Battery terminal strip</td>
</tr>
<tr>
<td>LL7-140</td>
<td>Short-wave antenna coil</td>
<td>L9-143</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-141</td>
<td>Broadcast oscillator coil</td>
<td>L9-145</td>
<td>Battery terminal strip</td>
</tr>
<tr>
<td>LL7-142</td>
<td>Short-wave oscillator coil</td>
<td>L9-153</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-143A</td>
<td>Filament d-f choke coil</td>
<td>L9-155</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-144</td>
<td>Dual tuned first i-f transformer</td>
<td>L9-157</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>D7-121</td>
<td>Dual tuned second i-f transformer</td>
<td>L9-159</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-155</td>
<td>Single tuned third i-f transformer</td>
<td>L9-161</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-164</td>
<td>Voice control</td>
<td>L9-163</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-146</td>
<td>5 ohm air coil resistor</td>
<td>L9-165</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-147</td>
<td>6.5 ohm 8 watt resistor (16 volt operation)</td>
<td>L9-167</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-148</td>
<td>3 mfd 250 volt tubular condenser</td>
<td>L9-169</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>LL7-149</td>
<td>Multiple condenser bank</td>
<td>L9-171</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>L9-150</td>
<td>9 mfd tubular condenser</td>
<td>L9-173</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>L9-187</td>
<td>0.093 mfd (4000 microfarads) mica condenser</td>
<td>L9-175</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>L9-188</td>
<td>33 socket</td>
<td>L9-177</td>
<td>Vernier dial and scale</td>
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<tr>
<td>L9-189</td>
<td>34 socket</td>
<td>L9-179</td>
<td>Vernier dial and scale</td>
</tr>
<tr>
<td>L9-190</td>
<td>146 socket</td>
<td>L9-181</td>
<td>Vernier dial and scale</td>
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<td>L9-191</td>
<td>Wave band switch</td>
<td>L9-183</td>
<td>Vernier dial and scale</td>
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<td>Vernier dial and scale</td>
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<tr>
<td>L9-193</td>
<td>Wave band switch</td>
<td>L9-187</td>
<td>Vernier dial and scale</td>
</tr>
</tbody>
</table>
NOTE: In some receivers 6D6 is used instead of 6K7 and a 42 is used in place of the 6F6.

1. F. TRANS. 2. F. TRANS.
FRI. - 14.5 OHMS FRI. - 14.5 OHMS
SEC. - 14.5 SEC. - 14.5

NOTE: In sets using 6D6, the cathode of 6D6 joins resistor 45 and units 52 and 53 are not used. In these receivers 35 is .01 MFD. and 36 is .25 MFD.
MODEL 150
Alignment, Trimmers
Socket, Voltage

FADA RADIO & ELECTRIC CORP.

COMPENSATING INSTRUCTIONS FOR
MODEL 150 SERIES

In order to adjust accurately the various aligning condensers of the
receiver in addition to the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier
signal output which can be attenuated at 450 Kc, 600 Kc, 1500 Kc, 6 Kc and 19 Kc.

This receiver is equipped with an automatic volume control which neces-
sitates setting the manual volume control of the receiver to its max-
imum position to insure accuracy in alignment. To control the signal
output of the receiver it will be necessary to use the attenuator con-
ductor of the signal generator.

ADJUSTMENT OF THE I.F. COMPENSATORS

The four (4) intermediate frequency (I.F.) condensers are located as
shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.
2nd - Disconnect the control grid lead from the 6AT tube.
3rd - Connect the high potential lead of the signal generator to the
control grid of the 6AT tube, and the low poten-
tial side to the receiver "ground" lead.
4th - Place an output meter (copper oxide type) across the
speaker wire coil so that variations in signal output
can be noted.
5th - Place the signal generator in operation and adjust the
carrier frequency output to 450 Kc. Regulate the attenuator con-
ductor of the signal generator so that the output sig-
als is low enough to insure accuracy in adjusting the
I.F. condensers.
6th - With the aid of a calibrated dial, adjust the
I.F. condensers to resonate as indicated by
the greatest swing of the needle on the output meter.
Perform these adjustments as there is a slight intercon-
necting in the I.F. condensers.

ADJUSTMENT OF S.W. SHUNT COMPENSATOR

The condensers are located as indicated on the sketch.

1st - Remove the signal generator connection from the control
grid of the S.W. tube and replace the control grid leads.
2nd - Connect the antenna wire of the receiver chassis through a
400 ohm carbon resistor to the high potential side of the
signal generator. The ground wire should remain con-
nected to the signal generator.
3rd - Adjust the carrier frequency output of the signal generator
so carrier frequency is 15 Kc.
4th - Turn the wave band selector switch to the left - short
wave position. Set the calibrated dial of the receiver to
the 15 Kc mark.
5th - Adjust the S.W. oscillator shunt compensator for maximum
signal output. If two peaks are noted on this adjust-
ment, the proper one is that with the compensator farthest
to "left." To determine that this compensator has been
readjusted to the image frequency, turn the receiver
dial to approximately 15.5 Kc. If no signal can be heard at
this setting, even with a greater signal generator output
input, the S.W. oscillator shunt compensator has been
improperly adjusted and it will be necessary to return
the dial to 15 Kc and adjust the signal generator output
peak. After re-adjusting signal to stay that the image frequency comes
in at 15 Kc on the receiver dial, perform the following steps.
Connect the high potential lead of the signal generator to the con-
ductor through these adjustments that the signal generator output
should be wider than the original (fundamental) signal
frequency.
6th - Having determined the correct peak and maximum setting,
for the S.W. oscillator shunt compensator, adjust the
S.W. oscillator shunt compensator for maximum signal output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES PADDER

1st - Adjust the carrier frequency output of the signal gener-
ator to 6 Kc.
2nd - Turn the calibrated dial of the receiver to pick up this
6 Kc signal.
3rd - With the aid of a calibrated dial, adjust the
S.W. oscillator series pad. (See sketch) until a max-
imum output signal is indicated on the output meter.
4th - Having determined the maximum peak of the S.W. oscillator
series pad, readjust the carrier frequency of maximum
signal generator to 15 Kc. Turn the calibrated dial to
150 Kc and readjust the S.W. oscillator shunt compensator
so that the signal generator output is equal to the signal
generator output.

CONTINUITY AND VOLTAGE CHARTS

TYPE OF
POSITIVE PLATE PLATE CATHODE SCREEN
VOLTAGE

GRID VOLTS

4A7 1st Det.-Ges. 162 1.9 4.0 80
6D6 1st. Freq. 162 5.5 4.0 80
6J2 2nd Det. 188 0.3 1.5 250
6G2 2nd Aud. 188 0.3 1.5 175
800 Restorer 42.0 TOTAL

6A4.0. O.o.v. voltage - 150 and Current - 4.8 ma.
These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTRODE TO ELECTRODE

This section

Primary Secondary

Speaker Input transformer 500. 335.0 ohms
Field coil 3,000 1,000 ohms
Voice coil 2.3 2.4
Bucking coil .345 .305

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COMPENSATING INSTRUCTIONS FOR

MODEL 155

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 456 KC and 1500 KC.

This receiver is equipped with an automatic overload control which necessitates setting the manual volume control of the receiver to the maximum position, to assure accuracy in alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

NOTE: Do not remove knobs, screws or chassis from the cabinet before removing the line cord plug from the power line socket. If the above precaution is not followed a severe electric shock, or damage to the receiver, may result.

ADJUSTMENT OF I.F. CONDENSERS

The three (3) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Turn the rotor plates of the ganged variable condenser to a position where no broadcast station carrier is heard. If this is not possible, the oscillator grid lead to the ganged variable condenser may be shorted to chassis.

2nd - Disconnect the control grid lead from the 6A7 oscillator-grid tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6A7 oscillator-grid tube, and the low potential lead to the receiver chassis.

4th - Place an output meter (copper oxide type) across the speaker voice coil terminals so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the three (3) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter.

ADJUSTMENT OF THE GANGED VARIABLE CONDENSER

The condensers are located at the top of the respective tuning condenser section and can be adjusted with the aid of a screw driver.

1st - Remove signal generator connection from control grid of 6A7 oscillator-grid tube and replace control grid lead.

2nd - Connect the antenna wire of the receiver to the high potential lead of the signal generator through a 250 mmfd. condenser.

3rd - Adjust the carrier frequency of the signal generator to 1500 KC.

4th - Set the dial of the receiver to 1500 KC.

5th - Starting with the condenser nearest the front of the receiver, adjust each condenser (as indicated on sketch) for maximum signal output. Do not disturb the setting of the gang condenser during these operations.

<table>
<thead>
<tr>
<th>TYPE OF TUBES</th>
<th>POSITION OF TUBES</th>
<th>PLATE VOLTS</th>
<th>PLATE CURRENT</th>
<th>CONTROL GRID VOLTAGE</th>
<th>SCREEN VOLTAGE</th>
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<tr>
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<td>2.0</td>
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<td>Int. Freq.</td>
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<tr>
<td>2S25</td>
<td>Rectifier</td>
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</tbody>
</table>

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

** Correct readings cannot be obtained at control grid, due to series resistors. To be measured across each respective bias resistor.
ADJUSTMENT OF S.W. SHORT CIRCUIT

The compensators are located as indicated on the sketch. The S.W. oscillator series trimmer is the high potential side of the signal generator. The trimmer should be adjusted so the signal generator's output is as close as possible to 1000 Kc. Once this is achieved, turn the control grid of the 6AQ5 and discharge the control grid lead. Turn the calibrated dial to 15 Kc and observe the output of the receiver. If the output is not zero, adjust the signal generator's output until it is. This will bring the receiver's output to a constant level.

1st - Adjust the control grid of the 6AQ5 to increase the output of the receiver.

2nd - Adjust the control grid of the 6AQ5 to decrease the output of the receiver.

3rd - Adjust the signal generator's output to bring the receiver's output to a constant level.

4th - Adjust the signal generator's output to bring the receiver's output to a constant level.

ADJUSTMENT OF S.W. SHORT CIRCUIT

The compensator is located as indicated on the sketch. Turn the calibrated dial to 15 Kc and observe the output of the receiver. If the output is not zero, adjust the signal generator's output until it is. This will bring the receiver's output to a constant level.

1st - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

2nd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

3rd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

4th - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

ADJUSTMENT OF S.W. SHORT CIRCUIT

The compensator is located as indicated on the sketch. Turn the calibrated dial to 15 Kc and observe the output of the receiver. If the output is not zero, adjust the signal generator's output until it is. This will bring the receiver's output to a constant level.

1st - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

2nd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

3rd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

4th - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

ADJUSTMENT OF S.W. SHORT CIRCUIT

The compensator is located as indicated on the sketch. Turn the calibrated dial to 15 Kc and observe the output of the receiver. If the output is not zero, adjust the signal generator's output until it is. This will bring the receiver's output to a constant level.

1st - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

2nd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

3rd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

4th - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

ADJUSTMENT OF S.W. SHORT CIRCUIT

The compensator is located as indicated on the sketch. Turn the calibrated dial to 15 Kc and observe the output of the receiver. If the output is not zero, adjust the signal generator's output until it is. This will bring the receiver's output to a constant level.

1st - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

2nd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

3rd - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.

4th - Adjust the calibrated dial of the receiver to bring the receiver's output to a constant level.
4th - with the aid of the remote control unit, turn on the receiver.

5th - select the channel you wish to listen to. The signal generator will be transmitted to the selected channel.

6th - connect the signal generator to the receiver input. The signal generator will be transmitted to the receiver output.

7th - adjust the carrier frequency output of the signal generator to the desired frequency.

8th - check the signal generator output with a signal meter. If the output is not within the desired range, adjust the carrier frequency output accordingly.

9th - connect the signal generator output to the receiver input. The signal generator will be transmitted to the receiver output.

10th - adjust the carrier frequency output of the signal generator to the desired frequency. The signal generator will be transmitted to the receiver output.

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MODEL 170
Socket, Trimmers, Alignment, Voltage

NECESSITATING INSTRUCTIONS FOR
MODEL 170 RECEIVERS

In order to adjust accurately the various triode condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be adjusted in 400 KC, 500 KC, 1000 KC, 1500 KC and 2000 KC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position, as specified in the instructions. To cancel the signal output the receiver will be necessary to use the attenuator control of the signal generator.

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.
2nd - Disconnect the control grid lead from the 6AB6 tube.
3rd - Connect the high potential lead of the signal generator to the control grid of the 6AB6 tube and the low potential side to the receiver "ground" lead.
4th - Place an output meter (copper oxide type) across the speaker voice coil and note that variations in signal output can be noted.
5th - Place the signal generator in operation and adjust the carrier frequency to 450 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensors to resonance, adjusting first the S.R. condenser across the secondary winding of the 2nd I.F. transformer and then each in turn, adding with slight adjustment of the condenser across the primary winding of the 1st I.F. transformer.

ADJUSTMENT OF S.R. DETECTOR COMPENSATORS

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 500 ohm, 1/2 watt resistor in its place.
2nd - Turn the wave band selector switch to the right - broadband position.
3rd - Adjust the carrier frequency to 1500 KC.
4th - Set the calibrated dial of the receiver to read 1500 MC.
5th - Adjust the S.R. oscillator shunt capacitor (48) for maximum signal output.
6th - Adjust the S.R. detector shunt compensator (47) for maximum signal output.

JUDGMENT OF S.R. OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.
2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.
3rd - With the aid of a bakelite type screw driver, adjust the S.R. oscillator series trimmer (see sketch) until a maximum signal output is indicated on the output meter. To insure perfect alignment it is necessary to "lock" the ganged variable condenser in order to follow the maximum signal output.
4th - Having determined the maximum peak of the S.R. oscillator series trimmer, readjust the carrier frequency of the signal generator to 1500 KC. Turn the calibrated dial to 15 MC, and re-adjust S.R. oscillator shunt compensator (48), and then, S.R. detector shunt compensator (47) for maximum signal output. Checking for image points as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON
MODEL 170 SERIES

Line Voltage 110 - Output Current .6 amp.
In Signal Input - Wave Band Switch - Right

TYPE OF METER

<table>
<thead>
<tr>
<th>RESISTANCE VALUES</th>
<th>PRIMARY</th>
<th>SECONDARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.C. RESISTANCE VALUES</td>
<td>PRIMARY</td>
<td>SECONDARY</td>
</tr>
<tr>
<td>D.C. RESISTANCE VALUES</td>
<td>PRIMARY</td>
<td>SECONDARY</td>
</tr>
</tbody>
</table>

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MODEL 190
Socket, Trimmers, Alignment

**CONVERSATION INSTRUCTIONS FOR MODEL 190 SERIES**

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to follow the included step-by-step instructions capable of giving a modulated carrier which can be attenuated at 456 KE, 600 KC, 1500 KE, 3750 KE, 4 MC, 10 MC and 20 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position for all adjustments and alignments. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

**ADJUSTMENT OF I.F. CONDENSERS**

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.
2nd - Disconnect the control grid lead from the 646 tube.
3rd - Connect the high potential lead of the signal generator to the control grid of the 646 tube, and the low potential side to the receiver "ground" lead.
4th - Place an output meter (zapper type) across the speaker valve coil terminals so that variations in signal output can be noted.
5th - Place the signal generator in operation and adjust the carrier output to 40 MC. Regulate the attenuator of the signal generator so that the output is low enough to insure accuracy in adjusting the I.F. condensers.
6th - With the aid of a bakelite type screwdriver, adjust the six (6) I.F. condensers to resonance. From a fidelity standpoint the best procedure for aligning the I.F. system is to adjust the I.F. condenser compensator across the secondary winding feeding into the plate (2nd detector), then the link circuit condenser and finally the primary circuit condenser. The same procedure is to be followed in adjusting the 1st condenser. Do not adjust the I.F. condensers at random but follow the above sequence of alignment carefully.

**ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS**

The compensators are located as indicated in the sketch.

1st - Remove the signal generator connection from the control grid of the 646 tube and replace the control grid lead.
2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator.
3rd - Adjust the carrier output of the signal generator to 30 MC.
4th - Turn the wave band selector switch to band "A" - left. Set the calibrated dial of the receiver to read 30 MC.
5th - Adjust the S.W. band "A" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that indicated under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image.
6th - Having determined the correct peak, and maximum setting, for the S.W. band "A" oscillator shunt compensator, adjust the S.W. band "B" R.F. stage shunt compensator and the S.W. band "C" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (9 MC) to determine that both condensers have been adjusted to the correct peak (See paragraph 5 for determining image).

7th - Adjust the carrier frequency output of the signal generator to 10 MC.
8th - Turn the calibrated dial of the receiver to pick up the 10 MC signal and check for sensitivity at this point. There is no variable oscillator series condenser at this frequency to adjust as the receiver employs a fixed oscillator series padder.

**ADJUSTMENT OF S.W. BAND "B" SHUNT COMPENSATORS**

The compensators are located as indicated in the sketch.

1st - Maintaining the same signal generator output (10 MC) turn the wave band selector switch to band "B".
2nd - Turn the calibrated dial of the receiver to 10 MC on wave band "B".
3rd - Adjust the S.W. band "B" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that indicated under the heading "ADJUSTMENT OF S.W. BAND "B" SHUNT COMPENSATORS" for determining image.
4th - Having determined the correct peak and maximum setting, for the S.W. band "B" oscillator shunt compensator, adjust the S.W. band "B" R.F. stage shunt compensator and the S.W. band "C" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (9 MC) to determine that both condensers have been adjusted to the correct peak (See paragraph 5 of the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).
5th - Adjust the carrier frequency output of the signal generator to 25 MC.
6th - Turn the calibrated dial of the receiver to pick up this 4 MC signal and check for sensitivity at this point. There is no variable oscillator series condenser to adjust at this frequency as the receiver employs a fixed oscillator series padder.

**ADJUSTMENT OF S.W. BAND "C" SHUNT COMPENSATORS**

The compensators are located as indicated in the sketch.

1st - Adjust the carrier frequency output of the signal generator to 3.75 MC.
2nd - Turn the calibrated dial of the receiver to 3.75 MC on wave band "C".
3rd - Adjust the S.W. band "C" oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that indicated under the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image.
4th - Having determined the correct peak and maximum setting, for the S.W. band "C" oscillator shunt compensator, adjust the S.W. band "C" R.F. stage shunt compensator and the S.W. band "C" detector shunt compensator for maximum signal output. Turn the receiver dial to the image point (1500 KC) to determine that both condensers have been adjusted to the correct peak (See paragraph 5 of the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).
5th - Adjust the carrier frequency output of the signal generator to 1.5 MC.
6th - Turn the calibrated dial of the receiver to pick up this 1.5 MC signal.
7th - Adjust the S.W. band "C" oscillator series trimmer (see sketch) until a maximum output signal is indicated on the output meter. To insure accuracy it is necessary to "rack" the ganged variable condenser in order to follow the maximum signal output.
8th - Having determined the maximum peak of the S.W. band "C" oscillator series trimmer adjust the carrier frequency of the signal generator to 3.75 MC. Turn the calibrated dial of the receiver to 3.75 MC and re-adjust S.W. band "C" oscillator shunt compensator and then S.W. band "C" R.F. stage shunt compensator and S.W. band "C" detector shunt compensator for maximum signal output; checking for peak (See paragraph 5 of the heading "ADJUSTMENT OF S.W. BAND "A" SHUNT COMPENSATORS" for determining image).

**ADJUSTMENT OF HC BAND "D" SHUNT COMPENSATORS**

The compensators are located as indicated in the sketch.

1st - Remove the 400 ohm carbon resistor from the high potential side of the signal generator and insert a 2050 microhm., 10,000 volt, condenser in its place.
2nd - Turn the wave band selector switch to band "D" - broadest position.
3rd - Adjust the carrier frequency of the signal generator to 1500 MC.
4th - Set the calibrated dial of the receiver to 1500 MC.
5th - Adjust the HC band "D" oscillator shunt compensator and then the HC band "D" R.F. stage shunt compensator and HC detector shunt compensator for maximum signal output.

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ADJUSTMENT OF BC BAND "D" OSCILLATOR SERIES TRIMMER

1st - Adjust the carrier frequency output of the signal generator to 600 KC.

2nd - Turn the calibrated dial of the receiver to pick up this 600 KC signal.

3rd - Adjust the BC band "D" oscillator series trimmer (see sketch) until a maximum signal is indicated on the output meter. To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

4th - Having determined the maximum peak of the oscillator series trimmer, re-adjust the carrier of the signal generator to 1500 KC. Turn the calibrated dial to 1500 KC and then, re-adjust the BC band "D" shunt compensators as outlined in the foregoing instructions.

CONTINUITY AND VOLTAGE READINGS ON

MODEL 190 SERIES

Line Voltage 118 - Input Current .74 Amp.
No Signal Input - Wave Band Switch - Right
A.T.C. Toggle Control Switch "ON"

<table>
<thead>
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<th>TYPE OF TUBE</th>
<th>POSITION OF TUBE</th>
<th>PLATE VOLTS</th>
<th>PLATE CURRENT MA</th>
<th>CATHODE VOLTS</th>
<th>SCREEN VOLTS</th>
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<td>R.F.</td>
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<td>.15</td>
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<td>80.0 TOTAL</td>
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6A8 Osc. Anode Voltage -- 166 and current -- 3.7 ma.

* These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages.

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS
1st (#20.7) 372 2nd (#20.4) 232

Voltage across speaker field: .................. 140 volts
" " 25,000 ohm 1/2 watt resistor (#30.33) ....... 133 "
" " 25,000 " 1/2 " #30.41 .................. 72 "
" " 5,000 " 1/3 " #30.1 .................. 14 "
" " 2,000 " 1/3 " #30.15 .................. 6 "
" " 5,000 " 1/3 " #30.1 .................. 22 "

** Resistor in series with Osc. & 1st A.F. "B" Supply

D.C. RESISTANCE VALUES

<table>
<thead>
<tr>
<th>PRIMARY</th>
<th>SECONDARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker input transformer</td>
<td>392 ohms</td>
</tr>
<tr>
<td>field coil</td>
<td>1,540 &quot;</td>
</tr>
<tr>
<td>voice coil</td>
<td>1.9 &quot;</td>
</tr>
<tr>
<td>bucking coil</td>
<td>2,440 &quot;</td>
</tr>
<tr>
<td>Audio Coupling Choke (#40.7)</td>
<td>2,440 &quot;</td>
</tr>
<tr>
<td>R.F. plate circuit choke (#3216)</td>
<td>2,440 &quot;</td>
</tr>
</tbody>
</table>
### COMPENSATING INSTRUCTIONS FOR MODEL 192 SERIES

In order to adjust accurately the various trimmer condensers of the receiver, it is essential to use a shielded signal generator capable of giving a modulated carrier signal as described in the instructions for adjusting the detector shunt compensator. 2500 MA, 2500 KHz, 15 MC, 25 MC, and 30 MC.

This receiver is equipped with an automatic volume control which necessitates setting the manual volume control of the receiver to its maximum position before proceeding to alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

### Adjustment of the I.F. Condensers

The six (6) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.
2nd - Disconnect the control grid lead from the 6AB tube.
3rd - Connect the high potential lead of the signal generator to the control grid of the 6AB tube, and the low potential side to the receiver "ground" lead.
4th - Place an output meter (proper scale type) across the speaker voice coil terminals so that variations in signal output can be noted.
5th - Place the signal generator in operation and adjust the carrier frequency output to 456 KC. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.
6th - With the aid of a bakelite type screw driver, adjust the six (6) I.F. condensers to resonance. From a fixed standpoint use the test procedure for aligning the I.F. system to adjust the I.F. condenser connected across the secondary winding feeding into the diode (2nd detector), then the link circuit condenser and finally the primary circuit. This same procedure is to be followed in adjusting the last I.F. transformer. Do not adjust the I.F. condenser at random but follow the above procedure of alignment carefully.

### Adjustment of S.W. Short Condensers

The condensers are located as indicated in the sketch.

1st - Remove the signal generator connection from the control grid of the 6AB tube and replace the control grid lead.
2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.
3rd - Adjust the carrier frequency output of the signal generator to 15 MC.
4th - Turn the wave band selector switch to the short wave position and then, with the S.W. oscillator series trimmer, adjust the S.W. oscillator shunt compensator for maximum signal output. Adjust to the maximum output signal and adjust the oscillator series trimmer, the oscillator series trimmer, and the S.W. oscillator shunt compensator. Then, the S.W. RF stage shunt compensator and S.W. detector shunt compensator for maximum signal output, checking for image point as outlined in the foregoing instructions.

### Adjustment of S.W. Oscillator Series Trimmer

1st - Adjust the carrier frequency output of the signal generator to 6 MC.
2nd - Turn the calibrated dial of the receiver to pick up this 6 MC signal.
3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer for maximum signal output.
4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the oscillator frequency of the signal generator to 6 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator, and then, the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output.
5th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the oscillator frequency of the signal generator to 15 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator, and then, the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output.

### Adjustment of S.W. Oscillator Series Trimmer

The S.W. condensers are located as indicated in the sketch.

1st - Remove the 400 ohm resistor from the high potential side of the signal generator and insert a 150 micro- micro mica condenser in its place.
2nd - Turn the wave band selector switch to the right broadcast position.
3rd - Adjust the carrier frequency to 1500 MC.
4th - Set the calibrated dial of the receiver to read 1500 MC.
5th - Adjust the S.W. oscillator shunt compensator for maximum signal output.
6th - Adjust the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output.

### Adjustment of S.W. Oscillator Series Trimmer

1st - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer for maximum signal output.
2nd - Turn the calibrated dial of the receiver to pick up 6 MC signal.
3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer for maximum signal output.
4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the oscillator frequency of the signal generator to 6 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator, and then, the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output.

### CONTINUITY AND VOLTAGE READINGS ON MODEL 192 SERIES

**Line Voltage 118 - Input Current, 8.20 amp.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Current</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>647</td>
<td>96</td>
<td>107</td>
<td>618</td>
<td>27.0</td>
</tr>
<tr>
<td>647</td>
<td>1st Det.</td>
<td>115</td>
<td>668</td>
<td>15</td>
</tr>
<tr>
<td>648</td>
<td>2nd Det.</td>
<td>107</td>
<td>669</td>
<td>15</td>
</tr>
<tr>
<td>647</td>
<td>1st Aud.</td>
<td>91</td>
<td>669</td>
<td>15</td>
</tr>
<tr>
<td>668</td>
<td>2nd Aud.</td>
<td>107</td>
<td>669</td>
<td>15</td>
</tr>
<tr>
<td>668</td>
<td>3rd</td>
<td>80</td>
<td>669</td>
<td>15</td>
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<tr>
<td>668</td>
<td>4th</td>
<td>173</td>
<td>669</td>
<td>15</td>
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<tr>
<td>668</td>
<td>5th</td>
<td>173</td>
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</tr>
<tr>
<td>668</td>
<td>6th</td>
<td>173</td>
<td>669</td>
<td>15</td>
</tr>
</tbody>
</table>

### Tube Data

- **6E7 R.P.**
  - 90 mA
  - 200 V
- **6A9 1st Aud.**
  - 200 V
- **626**
  - 300 V
- **626**
  - 300 V
- **6E7 1st Aud.**
  - 200 V
- **626**
  - 300 V
- **6E7 1st Aud.**
  - 200 V
- **626**
  - 300 V
- **6E7 1st Aud.**
  - 200 V

### Audio Coupling Choke

- **0.35 mH**

### Voltage Across Speaker Field

- **56 volts**
- **4,000 ohm resistor**
- **20,000 ohm resistor**

### D.C. Resistance Values

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>614</td>
<td>300 ohm</td>
<td>340 ohm</td>
</tr>
</tbody>
</table>

The chassis of the receiver is equipped with a calibrated dial calibrated in accordance with the following instructions.

**Adaptation of the S.W. Oscillator Series Trimmer**

1st - Adjust the carrier frequency output of the signal generator to 6 MC.
2nd - Turn the calibrated dial of the receiver to pick up this signal.
3rd - With the aid of a bakelite type screw driver, adjust the S.W. oscillator series trimmer for maximum signal output.
4th - Having determined the maximum peak of the S.W. oscillator series trimmer, re-adjust the oscillator frequency of the signal generator to 6 MC. Turn the calibrated dial to 15 MC, and re-adjust S.W. oscillator shunt compensator, and then, the S.W. RF stage shunt compensator and the S.W. detector shunt compensator for maximum signal output.

### Table of Tube Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Model</th>
<th>Type</th>
<th>Voltage</th>
<th>Current</th>
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<td>647</td>
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<td>618</td>
</tr>
<tr>
<td>647</td>
<td>669</td>
<td>15</td>
<td>15</td>
<td>618</td>
</tr>
</tbody>
</table>

### Table of Voltage Across Speaker Field

- **56 volts**
- **4,000 ohm resistor**
- **20,000 ohm resistor**

### Table of D.C. Resistance Values

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>614</td>
<td>300 ohm</td>
<td>340 ohm</td>
</tr>
</tbody>
</table>

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www.americanradiohistory.com
NOTE:
In some receivers 6D6 is used instead of 6K7 and 37 is used in place of 6C5.
COMPENSATING INSTRUCTIONS FOR MODEL 1462 SERIES

In order to adjust accurately the various trimmer condensers of the receiver in accordance with the following instructions, it is essential to use a shielded signal generator capable of giving a modulated carrier which can be attenuated at 6000, 3000, 1500, 600 and 150 Kc.

This receiver is supplied with an automatic control volume which necessitates setting of the manual control volume of the receiver to its maximum position to secure proper alignment. To control the signal output of the receiver it will be necessary to use the attenuator control of the signal generator.

1. Disconnect the outside antenna system from the receiver.

2. Disconnect the control grid lead from the 6AV tube.

3. Connect the high potential lead of the signal generator to the control grid of the 6AV tube, and the low potential lead to the receiver "ground" lead.

4. Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5. Place the signal generator in operation and adjust the carrier frequency to 400 Kc. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6. With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF I.F. CONDENSERS

The four (4) intermediate frequency (I.F.) condensers are located as shown in the sketch.

1st - Disconnect the outside antenna system from the receiver.

2nd - Disconnect the control grid lead from the 6AV tube.

3rd - Connect the high potential lead of the signal generator to the control grid of the 6AV tube, and the low potential lead to the receiver "ground" lead.

4th - Place an output meter (copper oxide type) across the speaker voice coil so that variations in signal output can be noted.

5th - Place the signal generator in operation and adjust the carrier frequency to 400 Kc. Regulate the attenuator control of the signal generator so that the output signal is low enough to insure accuracy in adjusting the I.F. condensers.

6th - With the aid of a bakelite type screw driver, adjust the four (4) I.F. condensers to resonance as indicated by the greatest swing of the needle on the output meter. Repeat these adjustments as there is a slight interlocking effect.

ADJUSTMENT OF S.W. SERIES PADDER

The condensers are located as indicated on the sketch.

1st - Remove the signal generator connection from the control grid of the 6AV tube and replace the control grid lead.

2nd - Connect the antenna wire of the receiver chassis through a 400 ohm carbon resistor to the high potential side of the signal generator. The ground wire should remain connected to the signal generator.

3rd - Adjust the carrier frequency output of the signal generator to 150 Kc.

4th - Turn the wave band selector switch to the left - short wave position. Set the calibrated dial of the receiver to read 15 MC.

5th - Adjust the S.W. oscillator shunt compensator for maximum signal output. If two peaks are noted on this adjustment, the proper one is that with the compensator farthest in. To determine that this compensator has not been adjusted to the image frequency, turn the receiver dial to approximately 1020 MC. If no peak can be heard at this setting, even with a greater signal generator output, the S.W. oscillator shunt compensator has been improperly adjusted and it will be necessary to return the dial to 15 MC and adjust to the proper peak. After re-adjusting check to see that the image frequency comes in at this point on the receiver dial. It is well to be in and throughout these adjustments that with the same signal generator, the image response point should be weaker than the original (fundamental) signal frequency.

6th - Having determined the correct peak, and maximum setting, for the S.W. oscillator shunt compensator, adjust the S.W. detector shunt compensator for maximum signal output.

ADJUSTMENT OF S.W. OSCILLATOR SERIES PADDER

1st - Adjust the carrier frequency output of the signal generator to 6 MC.
RESISTANCE TESTS

These tests should be made with an accurate ohm-meter. The speaker should be connected. All tubes should be removed from the set. The volume and tone controls should be full "on." The A. C. line plug must be removed from the A. C. outlet.

RESISTANCE AND VOLTAGE ANALYSIS CHART

LINE VOLTAGE 115

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
<th>Resistance in Ohms</th>
<th>MEASURED VOLTAGE</th>
<th>**Meter Range in Volts</th>
<th>If Reading Does More Than 10% plus or minus from Stated Value Check These Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>644</td>
<td>1</td>
<td>Heater</td>
<td>2</td>
<td>62 A.C.</td>
<td>62 A.C.</td>
</tr>
<tr>
<td>644</td>
<td>2</td>
<td>Plate</td>
<td>Ground</td>
<td>55,000</td>
<td>217 217</td>
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<tr>
<td>644</td>
<td>3</td>
<td>Screen</td>
<td>Ground</td>
<td>40,000</td>
<td>90 80</td>
</tr>
<tr>
<td>644</td>
<td>4</td>
<td>Suppressor</td>
<td>Ground</td>
<td>300</td>
<td>2 22</td>
</tr>
<tr>
<td>644</td>
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<td>Cathode</td>
<td>Ground</td>
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<td>22</td>
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<td>644</td>
<td>6</td>
<td>Heater</td>
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<td>0</td>
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<tr>
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<td>7</td>
<td>Grid</td>
<td>Ground</td>
<td>1,890,000</td>
<td></td>
</tr>
</tbody>
</table>

VOLTAGE TESTS

These readings should be taken with all tubes in their sockets. The volume and tone controls should be full "on." The antenna should be disconnected. Tune the set to a point where no signal is received.

STANDARD R M A

Resistor and Condenser Color Code

The Body Color represents the first figure of the resistance value.
The End Color represents the second figure of the resistance value.
The Dot Color represents the number of ciphers following the first two figures.

Mica Condensers

(Capacity in Micro-Microfarads)
The First Dot on the condenser represents the first figure of the capacity.
The Second Dot on the condenser represents the second figure of the capacity.
The Third Dot on the condenser represents the number of ciphers following the first two figures.
The colors on the condensers should be read from left to right with the condenser in an upright position.
FAIRBANKS-MORSE HOME APP., INC.

MODEL 60

456 KC I.F.
540-1740 KC.
5.5 - 16 MC.

MODEL 60

FIELD-2000 OHMS
R.F.C.1-R.F. PLATE CHOKER
R.F.C.2-OSC. PLATE CHOKER

All switches are shown in broadcast position, No. 1.

Switch connections on early production.

Table of Values

<table>
<thead>
<tr>
<th>Capacitor (µF)</th>
<th>Resistance (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 - 100</td>
<td>R1 - 300</td>
</tr>
<tr>
<td>C2 - 0.01</td>
<td>R2 - 500</td>
</tr>
<tr>
<td>C3 - 0.05</td>
<td>R3 - 1000</td>
</tr>
<tr>
<td>C4 - 0.01</td>
<td>R4 - 600</td>
</tr>
<tr>
<td>C5 - 0.01</td>
<td>R5 - 300</td>
</tr>
<tr>
<td>C6 - 3</td>
<td>R6 - 500</td>
</tr>
<tr>
<td>C7 - 0.05</td>
<td>R7 - 1000</td>
</tr>
<tr>
<td>C8 - 0.01</td>
<td>R8 - 400</td>
</tr>
<tr>
<td>C9 - 0.05</td>
<td>R9 - 200</td>
</tr>
<tr>
<td>C10 - 0.01</td>
<td>R10 - 100</td>
</tr>
<tr>
<td>C11 - 0.05</td>
<td>R11 - 150</td>
</tr>
<tr>
<td>C12 - 0.01</td>
<td>R12 - 250</td>
</tr>
<tr>
<td>C13 - 0.05</td>
<td>R13 - 500</td>
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<tr>
<td>C14 - 0.01</td>
<td>R14 - 150</td>
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<tr>
<td>C15 - 0.05</td>
<td>R15 - 250</td>
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<tr>
<td>C16 - 0.01</td>
<td>R16 - 500</td>
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<tr>
<td>C17 - 0.05</td>
<td>R17 - 250</td>
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<tr>
<td>C18 - 0.01</td>
<td>R18 - 500</td>
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<tr>
<td>C19 - 0.05</td>
<td>R19 - 300</td>
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<tr>
<td>C20 - 0.01</td>
<td>R20 - 500</td>
</tr>
</tbody>
</table>

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I. F. ALIGNMENT

All intermediate frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 Kilocycle signal from an accurate service oscillator, to the grid of the k.t. tube. It is advisable to connect a small condenser (about 400 MFD) in series with the lead from the service oscillator to prevent the characteristics of the service oscillator circuit from affecting the set.

2. Adjust the grid circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The grid circuit trimmer condenser of the first intermediate frequency transformer is controlled by the right hand adjustment screw located on the front of the intermediate frequency transformer (see Figure 4).

3. Adjust the plate circuit trimmer condenser of the first intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the first intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer (see Figure 4).

4. Adjust the plate circuit trimmer condenser of the second intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer (see Figure 4).

5. Adjust the plate circuit trimmer condenser of the second intermediate frequency transformer, carefully, for maximum output with minimum input from the service oscillator. The plate circuit trimmer condenser of the second intermediate frequency transformer is controlled by the left hand adjustment screw located on the front of the intermediate frequency transformer (see Figure 4).

6. Much of the sensitivity and selectivity of the receiver depends upon the proper setting of these critical adjustments. For this reason it is necessary to go back over them to make sure they are correct.

R. F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use in aligning the broadcast and short wave bands of the Model 60. The part number of this jig is 14726, it may be obtained through any Fairbanks-Morse jobber.

BROADCAST BAND

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1700 Kilocycles. Supply a 1700 Kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 3) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal to make sure that the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R. F. circuit. Since, in most cases, the R. F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made to the service oscillator trimmer, and the signal is brought to the peak of greatest intensity, the dial reading will be correct for the dial reading.

2. Adjust the broadcast band antenna trimmer (Figure 3) for maximum output with minimum input from the service oscillator.

3. Supply a 600 Kilocycle signal to the antenna of the set. Turn the gang condenser to 600 Kilocycles. Adjust the low frequency padding condenser (Figure 4) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure that the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.

2. Adjust the short wave R. F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure that the peak of greatest intensity is obtained. This is desirable because of the reflected effect of the adjustment of one stage on the other.

NOTE: After all alignment adjustments have been completed the set should be slowly turned from one end to the other, on the short wave band. If a howl or "squeak" is heard at any point it is advisable to "crossing track." To remedy this condition loosen the short wave oscillator trimmer (Figure 5) slowly and carefully to the point where the howl disappears.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions, the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

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TABLE OF VALUES

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>List Price</th>
</tr>
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<tbody>
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<td>1. F. Transformer, First</td>
<td>$2.00</td>
</tr>
<tr>
<td>A-14716</td>
<td>1. F. Transformer, Second</td>
<td>$2.00</td>
</tr>
<tr>
<td>A-14853</td>
<td>Coil Assembly in Can, Antenna</td>
<td>$3.00</td>
</tr>
<tr>
<td>A-14854</td>
<td>Coil Assembly in Can, oscillator</td>
<td>$3.00</td>
</tr>
<tr>
<td>A-14855</td>
<td>Coil Assembly in Can, M. F.</td>
<td>$3.00</td>
</tr>
<tr>
<td>14551</td>
<td>Choke Coil, Iron Core, Tapped</td>
<td>$2.50</td>
</tr>
<tr>
<td>14728</td>
<td>Dial Assembly Complete</td>
<td>$2.50</td>
</tr>
<tr>
<td>14729</td>
<td>Dial Drive Roller (small)</td>
<td>$2.25</td>
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<tr>
<td>14720</td>
<td>Dial Drive Taper</td>
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<tr>
<td>14731</td>
<td>Dial Drive Shaft</td>
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<tr>
<td>14856</td>
<td>Dial Scale, Calibrated</td>
<td>$2.75</td>
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<tr>
<td>14704</td>
<td>Dial Face, extruded celluloid</td>
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<tr>
<td>14404</td>
<td>Dial escutcheon</td>
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<td>14720</td>
<td>Pilot Lamp 6-Volt Tubular</td>
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<td>Pilot Lamp Leads, 2 Conductor Tinsel</td>
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<td>K-686</td>
<td>Knob, Inlaid Wood</td>
<td>$2.00</td>
</tr>
<tr>
<td>K-621</td>
<td>Knob, Black Bakelite</td>
<td>$2.00</td>
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<tr>
<td>X-7220</td>
<td>Screws, Chassis Mounting, 10-24 x 7/8&quot;</td>
<td>$1.05</td>
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<tr>
<td>X-7228</td>
<td>Screws, Decorative Head, 8-32 x 1&quot;</td>
<td>$0.50</td>
</tr>
<tr>
<td>F-625</td>
<td>Tip Jack with washers</td>
<td>$1.25</td>
</tr>
<tr>
<td>S-5907</td>
<td>Socket, Speaker</td>
<td>$1.00</td>
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<td>S-5918</td>
<td>Socket, 6X</td>
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<td>Socket, 25X</td>
<td>$1.00</td>
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<td>S-5819</td>
<td>Shield Cap, Vacuum Tube</td>
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<tr>
<td>S-5820</td>
<td>Shield, Vacuum Tube</td>
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<tr>
<td>S-5821</td>
<td>Shield Cap, Vacuum Tube</td>
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<tr>
<td>R-5009</td>
<td>Thermal Strip, Condon, Metal Clar</td>
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<td>SW-6102</td>
<td>Switch, Selectivity</td>
<td>$3.25</td>
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<tr>
<td>14852</td>
<td>Switch, Band Selector</td>
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<tr>
<td>14862</td>
<td>Switch, AG-OK</td>
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<tr>
<td>14837</td>
<td>Power Cord and Plug, 110-120 Volt</td>
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<tr>
<td>14844</td>
<td>Adapter Cord and Plug, 220-240 Volt</td>
<td>$1.00</td>
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</tbody>
</table>

PARTS LIST MODEL 62

Speaker cones cannot be supplied. Speakers on which cones have been damaged will be repaired at the following list prices:

- 6 inch speaker cone repair: $2.50
- 8 inch speaker cone repair: $2.00

We reserve the right to make changes in specifications and prices at any time without incurring any obligation on parts or sets previously sold. All sets are subject to standard NM or Code guarantee.

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**Alignment Procedure**

**General:** To insure the performance the model 62 is capable of delivering the following instructions should be carefully studied before any adjustments are undertaken.

Proper adjustment of the various tuned circuits will only be possible through the use of a reliable all wave, service oscillator and an output meter.

The output meter should be connected across the secondary of the output transformers. The voice coil should not be disconnected but a larger meter indication will be obtained, on a given signal, when the voice coil is disconnected.

All adjustments are made with the volume control "full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

**1. Supply a 650 kilocycle signal, from an accurate service oscillator, to the grid of the 6A7 tube.**

2. **Adjust the grid and plate circuit trimmer condensers, of the first I.F. transformer, for maximum output with minimum input from the service oscillator. The first I.F. transformer is located at the rear center of the chassis.**

3. **Adjust the grid and plate circuit trimmer condensers of the second I.F. transformer for maximum output with minimum input from the service oscillator.**

4. **Adjust the R.F. and antenna trimmers.**

**General:** The adjustment condensers, or trimmers, for the antenna, R.F., and oscillator stages are located in the same shielded box as the R.F. coils. These coils are contained in three large round shield cans located at the right of the gang condenser on the front of the chassis. These cans are located in the side of each of these cans, through which each of the trimmer adjusting screw is accessible. The trimmer adjusting screw on the antenna coil should be used when adjusting the antenna stage on the 19 to 82 meter band, the trimmer located on the front section of the gang condenser should be used.

**Figure 4**

**Recommended Phono Connections**

On each coil can the upper screw is for the 19 to 82 meter band, the center screw is for the 19 to 555 meter band, and the lower screw is for the 19 to 82 meter band.

The shield, from the front of the chassis, contains the coils, trimmers, and the third or rear shield contains the coil and trimmers.

An alignment jig is available for use in aligning the various bands on the model 62. The part number of this jig is given in the parts list. It may be obtained through any Fairbanks Morse Home App. Inc.

**Alignment Jig**

The bands must be aligned in the following order: the 197 to 555 meter band first, the 610 to 2000 meter band, second, and the 190 to 82 meter band third.

**Model 610, 6544**

1. **Place the alignment jig on the front of the chassis, turn the gang condenser all the way out of mesh, and then turn the gang condenser all the way out of mesh and adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.**

2. **Turn the gang condenser to 200 meters. Supply a 220 meter signal (1600 kilocycles) to the antenna of the set. Adjust the R.F. trimmer condenser for maximum output with minimum input from the service oscillator.**

3. **Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator. The trimmer is located on the front section of the gang condenser.**

4. **Supply a 600 meter (600 kilocycle) signal to the antenna of the set. Turn the gang condenser to 600 meters. Adjust the low frequency output of the gang condenser should be turned back and forth, across the signal, while this adjustment is being made, to insure the peak of greatest intensity.**

**19 to 82 Meter Band:**

1. **Supply an 830 meter (276 kilocycle) signal to the antenna of the set. Turn the gang condenser to 830 meters. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.**

2. **Supply a 220 meter signal (533 kilocycle) to the antenna of the set. Turn the gang condenser to 220 meters. Adjust the R.F. trimmer condenser for maximum output with minimum input from the service oscillator.**

3. **Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator.**

4. **Supply an 1800 meter (167 kilocycle) signal to the antenna of the set. Turn the gang condenser to 1800 meters. Adjust the low frequency output of the gang condenser should be turned back and forth, across the signal, while this adjustment is being made, to insure the peak of greatest intensity.**

**19 to 555 Meter Band:**

1. **Supply an 18.5 meter (16 megacycle) signal to the antenna of the set. Turn the gang condenser all the way out of mesh, and then turn the gang condenser all the way out of mesh. Adjust the oscillator trimmer condenser for maximum output with minimum input from the service oscillator.**

2. **Supply a 22 meter (13.6 megacycle) signal to the antenna of the set. Turn the gang condenser to 22 meters. Adjust the gang condenser all the way out of mesh and adjust the trimmer condenser for maximum output with minimum input from the service oscillator.**

3. **Adjust the antenna trimmer condenser for maximum output with minimum input from the service oscillator.**

**Dial Calibration in Cabinet**

After the set has been aligned in accordance with the foregoing instructions and the dial readings will be approximately correct on all frequencies. Then the chassis has been bolted down in the cabinet and the differentials in calibration can be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.
ALIGNMENT PROCEDURE

The following instructions should be carefully studied before any alignment adjustments are attempted. All adjustments should be made with volume control "full on". Any desired variations in signal strength should be obtained by adjusting the output of the service oscillator.

I.F. ALIGNMENT

All intermediate frequency alignment adjustments must be made with the band selector switch in the broadcast (left hand) position.

1. Supply a 456 kilocycle signal to the grid of the 106 tube.
2. Adjust the grid circuit and the plate circuit trimmer condensers of the first I.F. transformer, carefully, for maximum output with minimum input from the service oscillator (see Figure 6).
3. Repeat number 2 on the second I.F. transformer.

R.F. AND OSCILLATOR ALIGNMENT

An alignment jig is available for use on the Model 81. The part number is 14769, it may be ordered from any Fairbanks-Morse jobber.

BROADCAST BAND

1. Place the alignment jig on the front of the chassis. Tune the gang condenser to 1400 kilocycles. Supply a 1400 kilocycle signal from the service oscillator to the antenna of the set. Adjust the broadcast band oscillator trimmer (see Figure 5) for maximum output with minimum input from the service oscillator. It is advisable to turn the gang condenser back and forth across the signal while this adjustment is being made to make sure the peak of greatest intensity is obtained. This is necessary to bring the oscillator into track with the R.F. circuit since, in most cases, the R.F. circuit has no trimmer. If the dial reading is incorrect after this adjustment has been made the travelite disc should be adjusted until the reading is correct.
2. Adjust the broadcast band antenna trimmer (gang condenser) for maximum output with minimum input from the service oscillator.
3. Supply a 600 kilocycle signal to the antenna of the set. Tune the gang condenser to 600 kilocycles. Adjust the low frequency padding condenser (Figure 6) for maximum output with minimum input from the service oscillator. While making this adjustment turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained.

SHORT WAVE BAND

1. Supply a 15 megacycle signal to the antenna of the set. Turn the gang condenser to 15 megacycles. Adjust the short wave oscillator trimmer (Figure 5) for maximum output with minimum input from the service oscillator.
2. Adjust the short wave R.F. trimmer (Figure 5) for maximum output with minimum input from the service oscillator. While making this adjustment it is advisable to turn the gang condenser back and forth across the signal to make sure the peak of greatest intensity is obtained. This is desirable because of the reflected effect of the adjustment of one stage on the other.

DIAL CALIBRATION IN CABINET

After the set has been aligned in accordance with the foregoing instructions the dial readings will be approximately correct on all frequencies. When the chassis is placed in the cabinet it should be bolted down and any differences in calibration should be adjusted by loosening the set screw in the travelite disc hub and turning the travelite disc until the reading is correct and then tightening the set screw.

SPEAKER ADJUSTMENT PROCEDURE

1. Loosen adjustment screw number two about one fourth turn (see Figure 4).
2. Turn screw number one (Figure 4) until the correct adjustment is obtained.
3. Tighten screw number two.

In extreme cases it may be necessary to reset the balanced adjustment blocks (see Figure 4). This can be accomplished by turning screws number two and three. Loosen either screw number two or three about one fourth turn. Tighten the other screw the same amount. If this does not correct the condition the procedure should be reversed.

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MODELS 79, 80
Schematic
Voltage, Socket

FEDERATED PURCHASER

NOTE—ALL VOLTAGES TAKEN FROM THIS
POINT. ALL VOLTAGE READINGS TAKEN
ON FULL AND NO SIGNAL. USE 1000 OHMS
PER VOLT VOMETER.

INTERMEDIATE FREQUENCY = 175 K.C.
SHELL INDICATES 500V SCALE UNLESS OTHERWISE SPECIFIED.
LINP = 115V, 60 CYCLE.
NUMBERS IN CIRCLES INDICATE TUBE ELEMENT
IN ACCORDANCE WITH R.C.A. RADTROON
PANDELAY LAYOUT.
FEDERATED PURCHASER

MODEL 117
Voltage Alignment

SHORT WAVE TRIMMER: A short wave trimmer control is incorporated in the receiver and is used for a fine tuning adjustment when tuning for short wave reception from 1.5 megacycles to 24 megacycles. The trimmer is used for adjusting the short wave trimmer and the large rear section is the band selector switch knob. When tuning for short wave reception always rotate the tuning control slowly until a station is heard with maximum volume. Don't hurriedly skim over the dial or pass up any weak signals. After adjusting the tuning control so as to bring the station in at its loudest point adjust the short wave trimmer control by turning the trimmer knob first in the clockwise and then in the counter-clockwise direction to the position of greatest volume. Occasionally after tuning in this manner still better results may be obtained by readjusting the tuning control, and then further fine adjustment should be made with the short wave trimmer for maximum volume. It may be found that when adjusting the short wave trimmer that the signal will disappear, indicated by the elimination of signal checking and background noise. Rotating the short wave trimmer control slightly either clockwise or counter-clockwise will bring the signal in again. When operating the receiver on the broadcast band (1500 K.C. to 540 K.C.) the trimmer is inoperative.

VOLTAGTABLE

<table>
<thead>
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<th>Line Voltage</th>
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<th>Volume Control: Full on</th>
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<tbody>
<tr>
<td>Wave Band</td>
<td>Broadcast</td>
<td>Grid No. 1</td>
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<tr>
<td>2A7 Oscillator 1st Detector</td>
<td>2.45</td>
<td>220</td>
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<tr>
<td>2B First I. F. Amplifier</td>
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<td>2A6 Second I. F. Amplifier</td>
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<tr>
<td>2A5 Output</td>
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</tr>
<tr>
<td>80 Rectifier</td>
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<td>220</td>
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</tbody>
</table>

## Triode Plate. Comparative voltage only. The voltmeter is in series with high resistance and is therefore not the true voltage applied. Read all voltages from socket to chassis unless otherwise specified.

ALIGNMENT PROCEDURE: Only when an antenna, oscillator or I.F. transformer has become defective due to an open or shorted winding should it be necessary to realign the receiver. For aligning either the intermediate transformer or variable condenser it is necessary that an oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENT:

1. Connect the high side of the oscillator output to the control grid of the 2A7 First Detector tube, leaving the grid clip disconnected. The ground side of the oscillator should be connected to the chassis.

2. Set the oscillator at 465 kilocycles (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter.

3. Align the first intermediate transformer by turning the brass hex nut of the first intermediate transformer trimmer up and down until maximum reading is obtained on the output meter, then adjust the trimmer screw located inside of the brass hex nut in the same manner. The intermediate transformer trimmer screws are accessible through the small hole in the top of the intermediate transformer shields.

4. The second and third I.F. transformers should next be adjusted in the same manner as the first I.F. transformer.

TO ALIGN THE VARIABLE CONDENSER: It is important when aligning the variable condenser and padding condensers to follow the procedure given carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect.

1. Connect the high side of the oscillator output to the antenna and the ground to the chassis.

2. Place the band switch selector for operation on the 1.5 to 4 megacycle band. Tune the receiver to exactly 1.7 megacycles on the dial, set the short wave trimmer about half the distance between maximum clockwise and counter-clockwise rotation and adjust the oscillator frequency to exactly 1.7 megacycles. Next, bring this 1.7 megacycle signal in to maximum output by adjusting the padding condenser accessible through the hole in the front and rear sides close to the rear of the chassis.

3. Leave the band selector switch for operation on the 1.5 to 4 megacycle band and tune the receiver to exactly 3.4 megacycles on the dial.

4. Next, set the test oscillator to exactly 3.4 megacycles and tune the signal in by adjusting the oscillator variable condenser trimmer mounted on top of the variable condenser. The middle section of the variable condenser is the oscillator section. Recheck the 1.7 megacycle adjustment after making the adjustment at 4 megacycles. For best results it is always advisable to check each adjustment several times. NOTE: This completes the short wave adjustment.

5. Adjust the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver to exactly 1400 kilocycles on the dial and set the oscillator to this frequency. Turn the trimmer knob and bring this 1400 kilocycle signal in to maximum output by adjusting the trimmer screw on the small trimmer which is located adjacent to the short wave switch underneath the chassis.

6. Next, adjust the antenna and preselector variable condenser section trimmers mounted on top of the variable condenser for maximum signal output. (These are the front and rear gang sections).

7. Leave the band selector switch for operation on the broadcast band (1500 to 540 kilocycles) and tune the receiver and oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding condenser which is located on the right hand side and towards the front of the chassis for maximum output reading. This adjustment is quite critical and it is necessary to stock the condenser slightly to the right and left to obtain maximum sensitivity.

Always recheck the 1400 kilocycle alignment after making the adjustment at 600 kilocycles.

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FORD MOTOR CAR CO.

FORD TYPE POLICE AUTO RADIO RECEIVER WITH MOTOR-GENERATOR "B" SUPPLY

MODEL Ford Police
Auto Radio
Built by Grigsby-Grunow
Schematic

©John F. Rider, Publisher

www.americanradiohistory.com
The New Ford Auto Radio Incorporates:

Receiver mounts directly above steering column, out of sight and out of the way.

Controls go into ash tray opening. A special drilling template is furnished with each receiver by means of which the receiver can be mounted in cars without ash tray equipment.

These instructions have been carefully prepared for your use in installing the 40-1880-S-E receiver in Ford 1953 and 1944 cars. Read them carefully in every detail before attempting an installation.

Antenna
Antenna have been built in all closed Ford cars for some time with aerial lead coming down at the rear of the body or the right-hand windshield pillar. Closed cars of recent manufacture have aerial leads coming down the left-hand windshield pillar. (See Fig. 268.)

When installing this radio in a car having the antenna lead-in at the rear of the body, cut this lead-in (40-18812-AK) off as short as possible (taping the end and fastening it securely to prevent shorting the antenna through contact with the metal of the body) and install the new lead-in (40-18812-A). Loosen the front left-hand heading of the headlining sufficiently to pass the single end of the lead-in through the center of the front L.H. pillar and solder that portion of the lead-in which is stripped to the wire roof netting (after two turns of the lead-in have been made around the netting). See Figure 268 connection “X”. The roof netting must be scraped clean of any paint where the lead-in is to be soldered. A braided “pigtail” which is soldered to the male connector at the receiver end of the aerial lead must be grounded to a body brace just at the base of the pillar. This can be soldered or fastened with a sheet metal screw. Scrape the surface of the brace clean with a file to insure a good connection. (See “S” Figure 268.)

The spare wheel antenna, Part No. 40-18812-C should be used on all open cars.

Antenna extension lead, Part No. 40-18818, will have to be used on some cars having lead-in coming down right-hand windshield pillar. For the majority of cars, the lead is long enough to reach without this extension. Connect lead below glove box, then slip up and over top of box. Plug the extension into receiver lead, place it over the top of the glove box and plug it into aerial lead socket at right-hand pillar.

Radio Location and Installation
Refer to Figure 269 for location of receiver mounting holes.
Place cardboard template on body ledge under left-hand hood as indicated in Figure 269 and prick punch hole locations. Drill 7/10" holes. Assemble T bolts loosely as shown in Figure 270.

Remove speedometer cable clip bolt and relocate speedometer cable to the left of the radio receiver. Relocate gas gauge line on the right of the radio receiver.

Install receiver above steering column with speaker facing towards driver and hook the T bolts into the brackets on top of the receiver. Tighten receiver into place. Bring aerial lead around rear of receiver and connect it into male plug on the end of the car antenna.

Ammeter Lead
Place the fuse and fuse insulator in the metal housing and assemble. Now connect the eyelet terminal to the hot (left) side of the fuse block.

Instrument Panel Control
Remove ash receptacle by dropping it forward and bending retaining clips toward the center. See Figure 271.

With a pair of pliers, bend upward ash receptacle back-stop to allow clearance for control head. Assemble control head and cables in this hole by means of the U-clamp and two wing nuts. Draw up the wing nuts until the cover plate is against the instrument panel. See Figure 272.

The rowel ventilator handle should pass between the two flexable shafts. The shaft on the right with the male end is the station selector and is pushed into the right hand bushing on the receiver (closest to the dash). The left shaft is the switch and volume control. This has a female end and should be pushed into the bushing on the receiver nearest the instrument board. (See Figure 268.) After the shafts are properly seated, tighten the two shaft couplings. Plug the dial light wire into its receptacle close to the switch volume control bushing.

Installing Dash Controls in Cars Without Ash Receptacle
Place the template on the instrument panel, as indicated in Figure 273. Be sure that the throttle and choke rods come to the bottom of the slots in the top of the template and that the bottom of the template is flush with the bottom of the instrument panel. With a sharp-pointed instrument score the panel around the opening in the template. Cut out dash to these lines by drilling around inside of mark with a 3/8 drill and filing. Care must be taken not to mar the instrument board or file beyond line during this operation.
Dial Calibration

The receiver is calibrated in kilocycles with the last "O" omitted. Turn an area by means of the left-hand knob in a clockwise direction. It will take a few minutes for the tubes to heat up. Time it a station of known frequency. Remove the right-hand knob by pulling gently on the center of the knob. Set the split-box or spring clamp. Leave the set screw in place (Fig. 270). Under most conditions the pointer moves slowly. Now take the pointer to the frequency of the station to be tuned in, tighten set screw and replace knob. Check accuracy of dial by tuning in other stations at different points on the dial and adjust further if necessary.

Spark Noise Elimination

Cut off the spark terminals on all spark plug wires at the spark plug and screw them on the angle runners. See Figure 274.

Fig. 274

Remove the round knurled nut and in its place set a non-magnetic furnished. Press res. on each nut.

The bypass condenser with special end-bracket should be screwed on the ignition wire at the terminal, as shown in Figure 275.

These operations should reduce the interference to a satisfactory level. However, there may be an occasional car which will require an additional B-8007 (ambipole, either on the ignition switch or at the fuse block).

The condenser to be used at the fuse block can be acquired underneath the box which holds the terminal adjacent to the fuse block. Connect the wire leading from the condenser to the terminal on either side of the fuse.

If this condenser is to be used at the ignition switch a small bolt should be drilled in the instrument board flange just to the right of the panel column, using an 8-32 bolt, nut and bakelite to make a condenser box. The wire from the condenser should be attached to either terminal at the ignition switch.

If the above operations do not reduce the electrical interference to a satisfactory point, it may be necessary to reduce the distance between the ignition cord and the terminal plate condenser. Remove the distributor cap and terminal plate and clean electrodes with a small file or knife. Bushing these contacts with rosin core solder about 1/2". Replace terminal plate and cap and make secure with cramp, leaving ignition switch off, remove terminal plate or if necessary, removing excess solder which may have appeared.

Repeat this same operation on the other side of the distributor.

Operating Instructions

To turn on the receiver, turn the left-hand knob slightly in a clockwise direction. The balance of the dial and of the tuning control of the radio receiver. Thus receiver is equipped with a highly developed volume control and tuning control which tends to maintain the volume at a constant level. However, there are some places—under violettes, tunnels, bridges, etc., where the radio signal becomes weak, that it cannot be heard. When driving under rocky areas or in many locations, it is advisable to tune in on a strong local station.

Be sure the receiver is tuned in accurately, otherwise distorted reception will result and local electrical interference will be magnified.

When turning off the receiver be sure the left-hand knob is turned counterclockwise until a step is heard and the dial light goes off, otherwise the receiver will remain on and discharge the battery.

Page 64 Ford

Model N Center Control Socket, Alignment Service Notes

Ford Motor Car Co.

Dial Calibration

The receiver is calibrated in kilocycles with the last "O" omitted. Turn an area by means of the left-hand knob in a clockwise direction. It will take a few minutes for the tubes to heat up. Time it a station of known frequency. Remove the right-hand knob by pulling gently on the center of the knob. Set the split-box or spring clamp. Leave the set screw in place (Fig. 270). Under most conditions the pointer moves slowly. Now take the pointer to the frequency of the station to be tuned in, tighten set screw and replace knob. Check accuracy of dial by tuning in other stations at different points on the dial and adjust further if necessary.

Spark Noise Elimination

Cut off the spark terminals on all spark plug wires at the spark plug and screw them on the angle runners. See Figure 274.

Fig. 274

Remove the round knurled nut and in its place set a non-magnetic furnished. Press res. on each nut.

The bypass condenser with special end-bracket should be screwed on the ignition wire at the terminal, as shown in Figure 275.

These operations should reduce the interference to a satisfactory level. However, there may be an occasional car which will require an additional B-8007 (ambipole, either on the ignition switch or at the fuse block).

The condenser to be used at the fuse block can be acquired underneath the box which holds the terminal adjacent to the fuse block. Connect the wire leading from the condenser to the terminal on either side of the fuse.

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Page 64 Ford

Model N Center Control Socket, Alignment Service Notes

Ford Motor Car Co.

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Spark Noise Elimination

Cut off the spark terminals on all spark plug wires at the spark plug and screw them on the angle runners. See Figure 274.

Fig. 274

Remove the round knurled nut and in its place set a non-magnetic furnished. Press res. on each nut.

The bypass condenser with special end-bracket should be screwed on the ignition wire at the terminal, as shown in Figure 275.

These operations should reduce the interference to a satisfactory level. However, there may be an occasional car which will require an additional B-8007 (ambipole, either on the ignition switch or at the fuse block).

The condenser to be used at the fuse block can be acquired underneath the box which holds the terminal adjacent to the fuse block. Connect the wire leading from the condenser to the terminal on either side of the fuse.

If this condenser is to be used at the ignition switch a small bolt should be drilled in the instrument board flange just to the right of the panel column, using an 8-32 bolt, nut and bakelite to make a condenser box. The wire from the condenser should be attached to either terminal at the ignition switch.

If the above operations do not reduce the electrical interference to a satisfactory point, it may be necessary to reduce the distance between the ignition cord and the terminal plate condenser. Remove the distributor cap and terminal plate and clean electrodes with a small file or knife. Bushing these contacts with rosin core solder about 1/2". Replace terminal plate and cap and make secure with cramp, leaving ignition switch off, remove terminal plate or if necessary, removing excess solder which may have appeared.

Repeat this same operation on the other side of the distributor.

Operating Instructions

To turn on the receiver, turn the left-hand knob slightly in a clockwise direction. The balance of the dial and of the tuning control of the radio receiver. Thus receiver is equipped with a highly developed volume control and tuning control which tends to maintain the volume at a constant level. However, there are some places—under violettes, tunnels, bridges, etc., where the radio signal becomes weak, that it cannot be heard. When driving under rocky areas or in many locations, it is advisable to tune in on a strong local station.

Be sure the receiver is tuned in accurately, otherwise distorted reception will result and local electrical interference will be magnified.

When turning off the receiver be sure the left-hand knob is turned counterclockwise until a step is heard and the dial light goes off, otherwise the receiver will remain on and discharge the battery.
FULTON RADIO CORP.

MODEL Pre
MODEL 15B
MODEL Z
Schematics

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