VOLUME VI
PERPETUAL TROUBLESHOOTER'S MANUAL
JOHN F. RIDER
MODEL 99

The circuit of the Model 99 Radio-Phonograph Combination is the same as Model 94, with the exception of a rotary switch in the detector grid circuit.

For Voltage Readings
Line - 120v.

LINE VOLTAGE: 120v.
SEARS - ROEBUCK & CO.

Sears Radio Models 56, 100

Model 108 Schematics, Voltage

Line Voltage = 120 Volts Cont. Full On

Catalogue Model 56
Schematic - Model 100

SCHEMATIC CIRCUIT DIAGRAM

Model 108

© John F. Rider, Publisher

---

©John F. Rider, Publisher

www.americanradiohistory.com
Sears Roebuck & Co.

MODEL 1506
Schematic
Voltage

Reading Taken with Weston Model 565 Analyzer

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rect.</td>
<td>R. F.</td>
<td>51</td>
<td>2.15</td>
<td>235</td>
<td>2.4</td>
<td>2.5</td>
<td>80.</td>
<td>5.0</td>
</tr>
<tr>
<td>2</td>
<td>Rect.</td>
<td>Autodyne</td>
<td>24</td>
<td>2.15</td>
<td>225</td>
<td>5.0</td>
<td>6.0</td>
<td>75.</td>
<td>3.0</td>
</tr>
<tr>
<td>3</td>
<td>Rect.</td>
<td>I. F.</td>
<td>51</td>
<td>2.15</td>
<td>230</td>
<td>2.4</td>
<td>2.5</td>
<td>75.</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>Rect.</td>
<td>2nd Det.</td>
<td>24</td>
<td>2.15</td>
<td>104</td>
<td>10.</td>
<td>15.</td>
<td>65.</td>
<td>0.6</td>
</tr>
<tr>
<td>5</td>
<td>Rect.</td>
<td>Audio</td>
<td>47</td>
<td>2.25</td>
<td>250</td>
<td>16</td>
<td>0</td>
<td>260</td>
<td>30.</td>
</tr>
<tr>
<td>6</td>
<td>Rect.</td>
<td>Rect.</td>
<td>80</td>
<td>4.4</td>
<td></td>
<td></td>
<td></td>
<td>57.5</td>
<td></td>
</tr>
</tbody>
</table>


Note: Since resistance tolerances in the sets are plus or minus 10% and tubes may vary over 20%, your readings may disagree with the above by plus or minus 30%.

©John F. Rider, Publisher
SEARS-ROEBUCK & CO.

READJUSTING TRIMMERS

Number 1 is the antenna trimmer.
Number 2 is the gang condenser trimmer tuning the grid of the Super-autodyne.
Number 3 is the gang condenser trimmer tuning the plate (or oscillator of the super-autodyne).
Number 4 is the oscillator padding trimmer.
Number 5 is the Super-autodyne plate trimmer.
Number 6 is the I. F. grid trimmer.
Number 7 is the second detector grid trimmer.

To readjust the trimmer, it will be necessary that a good design of 175 k. c. oscillator be employed, and that a dependable broadcast test oscillator be on hand so that stages handling intermediate frequency, and those handling radio frequency can be thoroughly checked. It is advisable to use a bakelite screwdriver when making any of these adjustments.

First, connect the 175 k. c. oscillator output leads from the control grid cap of the super-autodyne tube to ground. Do not remove any of the tubes from the sockets, and it is not necessary to disconnect the grid clip from the tube. Reset trimmers numbers 5, 6 and 7 for maximum output. While this test oscillator is working into the intermediate frequency stages, no adjustment of the tuning condenser on the receiver will have any effect, inasmuch as the intermediate frequency stage is fixed tuned.

If your test oscillator is properly designed, it will supply exactly 175 k. c., and when trimmers number 5, 6 and 7 are set for maximum output, they will be correctly adjusted and should be sealed.

Next, disconnect the 175 k. c. test oscillator and connect to the antenna binding post of the receiver, the output lead from your broadcast test oscillator, or tune in a broadcast signal around 1400 k. c., then reset trimmers numbers 2 and 1 respectively for maximum output. This adjustment will track the super-autodyne grid circuit of the R. F. stage.

To check the calibration of the receiver, whether it be high or low, trimmer number 3 should be reset until a station of known high frequency is brought in on the correct dial marking with peak volume. If your broadcast test oscillator is accurately calibrated, it might be used in place of the broadcasting station signal. In this adjustment, a broadcast station or test oscillator signal at about 1400 k. c. is chosen. The setting of the trimmer at 1400 k. c. is more critical than it would be at 600 k. c.; calibration therefore more accurate.

The next adjustment is important and not easily explained in writing, so pay close attention to the following instruction. We will now balance the oscillator to the r. f. and first detector stages.

Tune the external broadcast test oscillator and the receiver both to 600 k. c., then slowly increase or decrease the capacity of No. 4 (oscillator padding trimmer), at the same time and continuously tuning back and forth across the signal with the receiver tuning condenser gang. The output meter needle will now be swinging up and down in step with the variation in tuning. Watch the peak of this swinging closely and readjust No. 4 trimmer until the swinging needle reaches its highest peak.

Retune the receiver and broadcast test oscillator to 1400 k. c. and re-check trimmer No. 3 to make sure that the adjustment of No. 4 has not thrown the receiver out of calibration. If it has, then readjust No. 3 until the calibration is correct, (as previously explained), and check on trimmers No. 2 and No. 1, to make sure that the adjustment of No. 4 has not reduced the sensitivity.

©John F. Rider, Publisher
Occasionally, a 58 oscillator tube refuses to function at the low-frequency end of the scale. Try each of the other tubes in the oscillator section until one is found which operates properly. Some receivers of this model use an 800 ohm resistor instead of the 2000 ohm (R744) resistor in the oscillator circuit to secure better functioning of the oscillator. If difficulty is experienced in finding a suitable 58 oscillator tube, replace the 1000 ohm resistor with the 800 ohm one.
TUBE VOLTAGE and CURRENT CHART

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE VOLTAGE</th>
<th>SCREEN VOLTAGE</th>
<th>GRID VOLTAGE</th>
<th>PLATE M.A.</th>
<th>SCREEN M.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>58 - Oscillator</td>
<td>100</td>
<td>220</td>
<td>-15</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>58 - Translator</td>
<td>210</td>
<td>100</td>
<td>*</td>
<td>1</td>
<td>.4</td>
</tr>
<tr>
<td>58 - 1st I.F.</td>
<td>145</td>
<td>100</td>
<td>*</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>58 - 2nd I.F.</td>
<td>220</td>
<td>100</td>
<td>*</td>
<td>10</td>
<td>215</td>
</tr>
<tr>
<td>227 - 1st A.F.</td>
<td>95</td>
<td>--</td>
<td>-7</td>
<td>1.5</td>
<td>--</td>
</tr>
<tr>
<td>247 - Output</td>
<td>215</td>
<td>220</td>
<td>*</td>
<td>11.5</td>
<td>2</td>
</tr>
<tr>
<td>280 - Rectifier</td>
<td>Max. d.c. volts = 415 volts</td>
<td>Plate Current 50 m.a. each plate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* High series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per voltage meter; others on 750 volt scale. Because the A.V.C. action would change voltages and currents, no signal should be received when readings are taken. These are average values. Usually, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyser since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation.

POWER TRANSFORMER COLOR CODE

<table>
<thead>
<tr>
<th>PRIMARY</th>
<th>RECTIFIER PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green; Black. Stranded wire leads.</td>
<td>Red; Blue. Slate center tap. Stranded wire leads.</td>
</tr>
<tr>
<td>RECTIFIER FILAMENT</td>
<td>R.F. FILAMENTS</td>
</tr>
<tr>
<td>Red. Solid wire leads.</td>
<td>Yellow. Solid wire leads.</td>
</tr>
<tr>
<td></td>
<td>A.F. FILAMENTS</td>
</tr>
<tr>
<td></td>
<td>Orange. Solid wire leads.</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
Output Transformer 5637A

I.F. Output Transformer R7056D

I.F. Input Transformer 1st R7411A

I.F. Input Transformer 1st R7378A

Illustration for Continuity Checking of Coil Windings
Connection Chart for Installing Replacement Coils

Coils Mounted on Top of chassis & viewed from top

Illustration for Service Manual

SEARS-ROEBUCK & CO.

MODEL 1650 Socket, Trimmer, Transformer Data

© John F. Rider, Publisher

www.americanradiohistory.com
TUBE VOLTAGE and CURRENT CHART

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE VOLTAGE</th>
<th>SCREEN VOLTAGE</th>
<th>GRID VOLTAGE</th>
<th>PLATE M.A.</th>
<th>SCREEN M.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>58 - Translator</td>
<td>190</td>
<td>85</td>
<td>-9 *</td>
<td>1,5</td>
<td>.1</td>
</tr>
<tr>
<td>58 - Oscillator</td>
<td>85</td>
<td>210</td>
<td>-12</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>58 - 1st IF</td>
<td>150</td>
<td>95</td>
<td>*</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>58 - 2nd IF</td>
<td>215</td>
<td>95</td>
<td>*</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>227 - 1st AF</td>
<td>80</td>
<td></td>
<td>*</td>
<td>1,2</td>
<td></td>
</tr>
<tr>
<td>46 - Driver</td>
<td>230</td>
<td></td>
<td>*</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>46 - Output</td>
<td>375</td>
<td>43,5</td>
<td>43,5</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>280 - Rectifier</td>
<td>Max. d.c. volts = 375</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Plate Current 20m.a. per plate of ea. tube

* High series resistance.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings should be taken with antenna and ground leads shorted together lest a signal should cause the A.V.C. action to change voltages and currents. These are average values. Usually, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Ordinarily, touching a finger to the grid or plate will stop oscillation.

The receiver should be turned on long enough for the speaker field to become hot before taking readings. Readings taken with the field coil cold will have higher values.

TRANSFORMER COLOR CODES

<table>
<thead>
<tr>
<th>POWER TRANSFORMER</th>
<th>CLASS &quot;B&quot; INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary: Green; Black</td>
<td>Primary: Blue; Red</td>
</tr>
<tr>
<td>Hi-Voltage Secondary: Red; Blue; Slate center tap, stranded leads.</td>
<td>Secondary: Green; Yellow; Slate center tap</td>
</tr>
<tr>
<td>Rectifier Filaments: Red. Heavy wire leads.</td>
<td></td>
</tr>
</tbody>
</table>

CLASS "B" OUTPUT

| Secondary "F": Yellow. Solid wire leads. | Primary: Green; Blue; Red - center tap |
The A.V.C. action should be rendered inoperative when peaking the IF stages. This can be done by connecting a 3 volt battery across R2, with the positive terminal connected to ground and the negative terminal to point (5). R2 is the green resistor with black tip and yellow dot mounted across the 2nd IF tube socket and connected from suppressor to cathode.
SELF OSCILLATING TRANSLATOR

Coils (1) and (2) comprise the grid circuit of the 236 oscillating-translator; coils (3), (4) and (5) the plate circuit. The amplified broadcast signal is applied to the grid by coil (1) which is tuned to the broadcast signal's frequency. Because coil (2) and (3) are coupled together through coil (4) feedback occurs and the tube is made to oscillate. The frequency of oscillation, determined by the tuned coil (4), is made 175 kc higher than the frequency of the broadcast signal and of coil (1). Since both the broadcast signal and a frequency 175 kc higher are impressed on the tube's grid, a 175 kc I.F. signal is created in the plate circuit of the tube. This 175 kc signal is selected by the tuned coil (5) and coupled to the detector grid.

©John F. Rider, Publisher
SEARS-ROEBUCK & CO.

MODEL 1660
Socket, Trimmers
Coil Data

R.F. AMP PLATE

The Self-Oscillating-Translator

DEL GRID

COIL 'A'

- Lug #1: To Middle Terminal of Volume Control
- Lug #2: To Antenna Lead & Volume Control
- Lug #3: To #1 Stator, Variable Tuning Condenser (Stator Nearest Dial)
- Lug #4: To Variable Tuning Condenser Frame (Gnd.)

COIL 'B'

- Lug #1: To Plate Prong of 239 R.F. Amplifier
- Lug #2: To Be
- Lug #3: To #2 Stator, Variable Tuning Condenser
- Lug #4: To Variable Tuning Condenser Frame (Gnd.)

COIL 'C'

- Lug #1: To Lug of Terminal Board Nearest It (B)
- Lug #2: To Red Lead of R 7715 B I.F. Transformer (Top of Chassis)
- Lug #3: To 10k Ohm Resistor & .001 Mfd. Condenser mounted on rear plate of chassis
- Lug #4: To #3 Stator, Variable Tuning Condenser
- Lug #5: To Ground & Gray Lead of R 7713 B I.F. Transformer (Top of Chassis)

I.F. Transformer R 7713B
Mounted on Top of R 7714 Oscillator-Translator Tube

COUPLING WINDING

CONNECTIONS TO SPEAKER TERMINAL STRIP VIEWED FROM REAR

BLACK RED UNUSED GREEN SLATE
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>239 - R. F.</td>
<td>155 135</td>
<td>90 90</td>
<td>-3.5 -30</td>
<td>0.5 0</td>
<td>1.4 0</td>
</tr>
<tr>
<td>236 - Osc. - Trans.</td>
<td>150 160</td>
<td>85 120</td>
<td>-5.3 -7.5</td>
<td>.6 .8</td>
<td>(a) (a)</td>
</tr>
<tr>
<td>236 - Detector</td>
<td>65* 75*</td>
<td>25* 25*</td>
<td>-5 -5</td>
<td>.2 .2</td>
<td>(a) (a)</td>
</tr>
<tr>
<td>89 - Output</td>
<td>145 150</td>
<td>160 170</td>
<td>* * (13 Actual) (13 Actual)</td>
<td>21 26</td>
<td>4 5</td>
</tr>
<tr>
<td>280 - Rectifier</td>
<td>Max. d.c. = 275v.</td>
<td>Plate Current = 20 m.a. per plate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Speaker field voltage = 100V. *(a) Too low to read * - High series resistance Watts = 45

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values. Ordinarily, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at the rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation. These readings were taken with the speaker field hot. Readings taken when the field is cold will be higher because of the lowered field resistance.

Occasionally objectionable hum is encountered. Examine the 236 detector tube. Some tubes of this type have a U shaped heater and others have a reversed helix heater. The U shaped heater sometimes causes hum.

If it becomes necessary to align the oscillator-translator and R.F. stages, it should be done at about 1250 kc and then "touched up" at about 1600 kc. Trouble may be experienced if an attempt is made to secure alignment at 1600 kc without having obtained approximate alignment at 1250 kc. At 1600 kc the capacity of the oscillator-translator trimmer may be sufficient to tune the oscillator-translator stage to the same frequency as the R.F. stage, resulting in feedback and violent oscillation.
Schematic - Model 1670

Condenser Ratings Are Max. Voltage
Resistor Ratings Are Min. Wattage

The Coils Are Numbered & Lettered To
Correspond With The Connection Chart
And Service Illustration.

IF PEAK 175 KC
## TUBE VOLTAGE AND CURRENT CHART

<table>
<thead>
<tr>
<th>TUBE</th>
<th>Plate Voltage</th>
<th>Screen Voltage</th>
<th>Grid Voltage</th>
<th>Plate m.a.</th>
<th>Screen m.a.</th>
</tr>
</thead>
<tbody>
<tr>
<td>58 - Oscillator</td>
<td>90</td>
<td>200</td>
<td>-12.5</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>224A- Oscillator</td>
<td>175</td>
<td>90</td>
<td>-10</td>
<td>1.3</td>
<td>.4</td>
</tr>
<tr>
<td>58 - Translator (with 58 Oscillator)</td>
<td>190</td>
<td>90</td>
<td>-6*</td>
<td>.9</td>
<td>.3</td>
</tr>
<tr>
<td>58 - Translator (with 224A Oscillator)</td>
<td>175</td>
<td>90</td>
<td>-6*</td>
<td>.9</td>
<td>.3</td>
</tr>
<tr>
<td>58 - 1st I.F.</td>
<td>115</td>
<td>95</td>
<td>*</td>
<td>7.5</td>
<td>2</td>
</tr>
<tr>
<td>58 - 2nd I.F.</td>
<td>210</td>
<td>95</td>
<td>*</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>227 - A.F.</td>
<td>70</td>
<td></td>
<td>-6 (Vol. Control at Minimum)</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>247 - Output</td>
<td>200</td>
<td>210</td>
<td>-7* (24 Actual)</td>
<td>6.5</td>
<td>1.1</td>
</tr>
</tbody>
</table>

280 - Rectifier
Max. d.c. = 365v.
Plate current = 13m.a., per plate of each tube

Watts = 100
Speaker field voltage = 135v.
* - Reading low because of high series resistance

Model 1670 receivers are eleven tube super-heterodynes, identical in circuit with Model 1650 receivers except that they use two type 280 rectifier tubes.

Original production used a 58 oscillator and a self-tuned I.F. output transformer (R-7056D).
Later production receivers have a 224A oscillator and a condenser tuned I.F. output transformer (R-6415R) and are somewhat more selective.

Control grid readings taken on 150 volt scale of 1000 ohms per volt meter; others on 750 volt scale. Readings taken with antenna and ground shorted together and no signal received. These are average values. Ordinarily, deviations up to 20% are permissible and do not necessarily indicate a fault. Where series grid resistors prevent grid voltage readings, proper plate current at the rated plate voltage will serve as an indication of proper grid bias and normal functioning of the tube. Care must be used when readings are taken with an analyzer since the capacity of the cable may cause the circuit to oscillate and give erratic readings. Usually, touching a finger to the grid or plate will stop oscillation. These readings were taken with the speaker field hot. Readings taken when the field is cold will be higher because of the lowered field resistance.

© John F. Rider, Publisher
The IF Stages:

1. Connect the low scale of the output meter across the loudspeaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator to the control grid of the 58 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 175 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustration.

5. Change the test oscillator connection to the control grid cap of the 58 translator tube and tune the IF input transformer.

6. In order to secure greater accuracy, repeat the adjustments, starting with the IF output transformer.

RF Alignment (Broadcast):

1. Couple the output of the test oscillator to the green antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1740 kc. Its signal should be tuned in when the variable condenser plates are opened all the way. If the signal cannot be reached, the plate and grid leads to the oscillator coil, socket and wave switch, must be moved away from the chassis to reduce their capacity.

3. Set the test oscillator to 1400 kc. and tune in its signal. Then adjust the broadcast translator coil trimmer, mounted within the coil shield (See Service Illustration) and the trimmer on the antenna section of the variable condenser, for maximum output.

4. Set the test oscillator to 600 kc. and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator padder, mounted under the chassis, for maximum output.

5. Repeat the 1740 kc. and 1400 kc. adjustments.

Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead, as for broadcast alignment.

2. Set the test oscillator to 15000 kc. and adjust the short wave translator coil trimmer for maximum output.
TUBE VOLTAGE CHART

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE</th>
<th>SCREEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>58 Translator</td>
<td>225</td>
<td>70</td>
</tr>
<tr>
<td>56 Oscillator</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>58 IF</td>
<td>240</td>
<td>70</td>
</tr>
<tr>
<td>56 AVC *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2A6 Detector-AF</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>47 Output</td>
<td>225</td>
<td>240</td>
</tr>
</tbody>
</table>

* Used as diode with no applied DC voltages.

© John F. Rider, Publisher
The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator to the control grid of the 8E IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.

4. Set the test oscillator to 1725 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the service illustration.

5. Change the test oscillator connection to the control grid cap of the 8E translator tube and tune the IF input transformer.

6. In order to secure greater accuracy, repeat the adjustments, starting with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC action of the set inoperative. The volume control of the receiver should always be in its full "on" position.

RF Alignment (Broadcast):

1. Couple the output of the test oscillator to the green antenna lead of the set, with the antenna connected.

2. Set the test oscillator to 1725 kc. Its signal should be tuned in when the variable condenser plates are opened all the way. If the signal cannot be reached, the plate and grid leads to the oscillator coil, socket and wave switch, must be moved away from the chassis to reduce their capacity.

3. Set the test oscillator to 1400 kc and tune its signal. Then adjust the broadcast translator coil trimmer, mounted on the antenna section of the variable condenser, for maximum output.

4. Set the test oscillator to 1200 kc and tune its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator pad, mounted under the chassis, for maximum output.

5. Repeat the 1725 kc and 1400 kc adjustments. Be sure that the receiver volume control is always on full and that the output from the test oscillator is kept to the lowest possible value.

Short Wave Alignment:

1. Leave the test oscillator loosely coupled to the green antenna lead, as for broadcast alignment.

2. Set the test oscillator to 14,000 kc and adjust the short wave translator coil trimmer for maximum output.

Parts for this model may be ordered from Colonial Radio Corp., 254 Eano St., Buffalo, N. Y.
MODELS 1822, 1831
Socket, Trimmers
Transformer Data

SEARS-ROEBUCK & CO.

POWER TRANSFORMER TERMINAL BOARD CONNECTIONS
MODELS 1822-1831

1 - RED-RECT PL
2 - BLUE-RECT PL
3 - SLATE-RECT CT
4 - RED TRACER-RECT FIL
5 - RED TRACER-RECT FIL
6 - GREEN TRACER-R.F.-CT

POWER TRANSFORMER TERMINAL BOARD CONNECTIONS
MODELS 1822-1831

1 - RED-RECT PL
2 - BLUE-RECT PL
3 - SLATE-RECT CT
4 - RED TRACER-RECT FIL
5 - RED TRACER-RECT FIL
6 - TAP FOR 6.3V WINDING
FIGURE 47

ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. This condenser should be left attached to the cap and the tube shield must rest in the base.
4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.
5. Change the test oscillator connection to the control grid cap of the 78 IF transistor and tube and the IF output transformer.
6. In order to secure greater accuracy repeat the adjustments of step 4, starting with the IF output transformer.

The IF/AGC Stages: #1 Band (Broadcast):

1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.
2. Set the test oscillator to 1580 kc.
3. Tune the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all the trimmers are shown in the Service Illustrations.
4. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the #1 antenna trimmer and the #1 transistor trimmer for maximum output.
5. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator pad for maximum output.
6. Repeat the 1580 kc and 1400 kc adjustments for greater accuracy.

#2 Band:

1. Leave the test oscillator coupled to the antenna lead as for Broadcast alignment.
2. Set the test oscillator to 4320 kc.
3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.
4. Set the test oscillator to 4000 kc and tune in its signal. Then adjust the #2 antenna trimmer and the #2 transistor trimmer for maximum output.
5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator pad for maximum output.

#3 Band:

1. Set the test oscillator to 10 megacycles.
2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillator trimmer for maximum output. As shown in the service illustrations, this trimmer is mounted inside of its coil, under the chassis.
3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 transistor trimmer for maximum output.
4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and transistor coils to secure maximum sensitivity. Be sure to cement the turns in place.
5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, as they will have been affected by shifting of the turns.

#4 Band:

1. Set the test oscillator to 19 megacycles.
2. Turn the variable condenser plates all the way out. Then adjust the #4 oscillator trimmer for maximum output.
3. Set the test oscillator to 18 megacycles and tune in its signal. Then adjust the #4 antenna trimmer and the #4 transistor trimmer for maximum output.
4. Set the test oscillator to 0.9 megacycles and tune in its signal. If necessary, shift turns on the antenna and transistor coils to secure maximum sensitivity. Be sure to cement the turns in place.
5. If turns have been shifted, repeat the 19 megacycle and the 18 megacycle adjustments since they will have been affected by shifting of the turns.

CAUTION: Care must be taken during the RF Alignment Procedure, that Alignment is not made at the image frequency. See Service Manual Supplement #3.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube. The Tube Band switch should be in the Broadcast position.

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE</th>
<th>SCREEN</th>
<th>CATHODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>RP</td>
<td>225</td>
<td>200</td>
</tr>
<tr>
<td>41</td>
<td>Oscillator</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>78</td>
<td>Transistor</td>
<td>225</td>
<td>200</td>
</tr>
<tr>
<td>78</td>
<td>IF</td>
<td>225</td>
<td>200</td>
</tr>
<tr>
<td>37</td>
<td>AVC</td>
<td>40 diode with no applied DC voltage</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Detector</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Phase Changer</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Drivers</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Outputs</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>525</td>
<td>Restifier</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

REPLACEMENT PARTS AND PRICE LIST

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R10010</td>
<td>Resistor - 1 megohm, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10011</td>
<td>Resistor - 1 megohm, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10012</td>
<td>Resistor - 500 ohms, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10013</td>
<td>Resistor - 2500 ohms, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10014</td>
<td>Resistor - 10 megohms, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10015</td>
<td>Resistor - 100 ohms, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10016</td>
<td>Resistor - 1000 ohms, 1/2 watt carbon</td>
<td>$0.05</td>
</tr>
<tr>
<td>R10017</td>
<td>Transformer - IF output with choke assembly</td>
<td>$0.25</td>
</tr>
<tr>
<td>R10018</td>
<td>Transformer - Power - 60 cycle</td>
<td>$0.25</td>
</tr>
<tr>
<td>R10019</td>
<td>Transformer - Power - 60 cycle, complete assembly</td>
<td>$0.25</td>
</tr>
</tbody>
</table>
ALIGNMENT PROCEDURE

The IF Stages:
1. Connect the low scale of the output meter across the loudspeaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd condenser, to the control grid of the 78 IF tube. The grid clip should be left attached to the cap and the tube shield must be in place.
4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the service illustration.
5. Change the test oscillator connection to the control grid cap of the 78 IF transistor tube and tune the IF input transformer.
6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer.

RF Alignment: #1 Band (Broadcast):
1. Couple the output of the test oscillator to the antenna lead of the set, with the antenna connected.
2. Set the test oscillator to 1360 kc.
3. Turn the variable condenser plates all the way out. Then adjust the #1 oscillator trimmer for maximum output. The locations of all of the trimmers are shown in the Service Illustrations.
4. Set the test oscillator to 1400 kc and tune its signal. Then adjust the #1 antenna trimmer and the #1 transistor trimmer for maximum output.
5. Set the test oscillator to 600 kc and tune its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #1 oscillator pads for maximum output.
6. Repeat the 1360 kc and 1400 kc adjustments for greater accuracy.

#2 Band:
1. Leave the test oscillator coupled to the antenna lead as for broadcast band alignment.
2. Set the test oscillator to 4800 kc.
3. Turn the variable condenser plates all the way out. Then adjust the #2 oscillator trimmer for maximum output.
4. Set the test oscillator to 4000 kc and tune its signal. Then adjust the #2 antenna trimmer and the #2 transistor trimmer for maximum output.

5. Set the test oscillator to 1700 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the #2 oscillator pad for maximum output.

#3 Band:
1. Set the test oscillator to 10 megacycles.
2. Turn the variable condenser plates all the way out. Then adjust the #3 oscillatortrimmer for maximum output. As shown in the Service Illustrations, this trimmer is mounted inside of its coil, under the chassis.
3. Set the test oscillator to 9 megacycles and tune in its signal. Then adjust the #3 antenna trimmer and the #3 transistor trimmer for maximum output.
4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and transistor coils to secure maximum sensitivity. Be sure to count the turns in place.
5. If turns have been shifted, repeat the 10 megacycle and the 9 megacycle adjustments, since t' will have been affected by shifting of the turns.

#5 Band:
1. Set the test oscillator to 19 megacycles.
2. Turn the variable condenser plates all the way out. Then adjust the #5 oscillator trimmer for maximum output.
3. Set the test oscillator to 10 megacycles and tune in its signal. Then adjust the #5 antenna trimmer and the #5 transistor trimmer for maximum output.
4. Set the test oscillator to 4.5 megacycles and tune in its signal. If necessary, shift turns on the antenna and transistor coils to secure maximum sensitivity. Be sure to count the turns in place.
5. If turns have been shifted, repeat the 10 megacycle and 18 megacycle adjustments since they will have been affected by shifting of the turns.

CAUTION: Care must be taken during the RF Alignment Procedure, since the Alignment is not made at the frequency. See Service Manual Supplement #13.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube. The Wave Band switch should be in the Broadcast position.

TUBE PLATE SCREEN

<table>
<thead>
<tr>
<th>TUBE</th>
<th>78</th>
<th>78</th>
<th>78</th>
<th>78</th>
<th>72</th>
<th>72</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>240</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oscillator</td>
<td>200</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transistor</td>
<td>240</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IF</td>
<td>240</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVC</td>
<td>Used as a diode with no applied DC voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detector-AP</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-45</td>
<td>145</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>240</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model 18-84-1130 SEARS ROEBUCK & CO.

Reference: www.americanradiohistory.com
ALIGNMENT PROCEDURE

The IF Stages:
1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .1 mfd, condenser, to the control grid of the 76 second IF tube. The grid clip should be left attached to the cap.
4. Set the test oscillator to 178 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustrations.
5. Change the test oscillator connection to the control grid of the 76 tube and tune the IF input transformer.
6. In order to secure greater accuracy repeat the adjustments, starting with the IF output transformer. Use the lowest possible output from the test oscillator.

The IF stages are resistance-capacity coupled to each other, so that no tuned interstage transformer is used.

HF Alignment Broadcast:
1. Couple the output of the test oscillator to the green antenna lead of the set with the antenna connected.
2. Set the test oscillator to 1500 kc and adjust the broadcast transformer coil trimmer and the trimmer on the antenna section of the variable condenser for maximum output. The locations of the trimmers are shown in the Service Manual Illustrations.
3. Set the test oscillator to 600 kc and tune in its signal. When slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the oscillator pad for maximum output.
4. Repeat the 1500 kc adjustments to secure greater accuracy. Always use the lowest possible output from the test oscillator.

TUNE VOLTAGE CHART

<table>
<thead>
<tr>
<th>TUNE</th>
<th>PLATE</th>
<th>SCREW</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>- Transistor</td>
<td>200</td>
</tr>
<tr>
<td>76</td>
<td>- Oscillator</td>
<td>100</td>
</tr>
<tr>
<td>76</td>
<td>- First IF</td>
<td>175</td>
</tr>
<tr>
<td>76</td>
<td>- Second IF</td>
<td>215</td>
</tr>
<tr>
<td>76</td>
<td>- AVC</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>- Int-IF</td>
<td>100</td>
</tr>
<tr>
<td>76</td>
<td>- Ph. + Changer</td>
<td>130</td>
</tr>
<tr>
<td>6-45</td>
<td>- Drivers</td>
<td>150</td>
</tr>
<tr>
<td>6-45</td>
<td>- Output</td>
<td>210</td>
</tr>
</tbody>
</table>

SHORT WAVE OSC. COIL

5. Set the test oscillator to 3000 kc and tune in its signal. If necessary, turn may be shifted on the short wave translator coil to secure maximum output. If turns are shifted, it will be necessary to repeat the 25,000 kc adjustment.

1. Leave the test oscillator loosely coupled to the green antenna lead as for broadcast alignment.
2. Set the test oscillator to 15,000 kc and tune in its signal. Then adjust the short wave translator trimmer for maximum output.
These tests are to be made with a continuity meter or a meter except where otherwise indicated. If the "Improper Effect" is "Open Circuit", the trouble may be either in the wire or else may be due to a break in one of the cables, possibly right at the plug. If no such break is apparent, return the unit for repair or replacement to the Sears Manufacturing Company, St. Charles, Ill.

### Drive Unit Test

**6 Prong Socket:**

- **Text:**
  - #1 contact to #3 finger
  - #2 contact to #6 finger
  - #3 contact to #5 finger
  - #4 contact to #4 finger
  - #5 contact to #2 finger
  - #6 contact to #1 finger

- **Proper Effect:** Closed Circuit
- **Trouble if Improper Effect:**
  - Closed Circuit
  - Open Circuit
  - Open Circuit
  - Open Circuit
  - Open Circuit
  - Open Circuit

**5 Prong Plug:**

- **Text:**
  - White to case
  - Maroon to green
  - Red to blue

- **Proper Effect:** Closed Circuit
- **Trouble if Improper Effect:**
  - Open Circuit
  - Open Circuit
  - Open Circuit
  - Open Circuit

- **Trouble with 4 prong plug:**
  - Hub should oscillate
  - Inductive drive unit

©John F. Rider, Publisher
The IF Stages:

1. Connect the low scale of the output meter across the loudspeaker voice coil.

2. Connect the ground lead of the test oscillator to the chassis.

3. Connect the other lead of the test oscillator, through a 1.0 uf condenser, to the control grid of the 76 second IF tube. The grid clip should be left attached to the cap.

4. Set the test oscillator to 450 kc and tune the IF output transformer. The locations of its tuning adjustments are shown in the Service Illustrations.

5. Change the test oscillator connections to the control grid of the 76 first IF tube and tune the IF interstage transformer.

6. Change the test oscillator connection to the control grid of the 76 second IF tube and tune the IF input transformer.

7. In order to secure greater accuracy, repeat all of the operations, starting with the IF output transformer.

IF Alignment (Broadcast)

1. Before proceeding with the alignment of the receiver the wave trap must be disconnected. Connect a jumper between the yellow lead on the blue wire terminal of the trap and disconnect the white lead from its terminal. Do not forget to reconnect the trap after finishing the alignment of the receiver.

2. Set the test oscillator to 1750 kc.

3. Loosely couple the output of the oscillator to the antenna lead of the set, with the antenna connected.

4. Turn the variable condenser plates all the way out. Then adjust the oscillator trimmer for maximum output. The locations of the trimmers are shown in the Service Illustrations.

5. Set the test oscillator to 1500 kc and tune in its signal. Then adjust the trimmer on the transmitter section of the variable for maximum output.

6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two end, at the same time, adjust the broadcast oscillator paddle for maximum output.

7. Repeat the 1750 and 1500 kc adjustments.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it coupled to the set's antenna lead as for broadcas alignment.

2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave antenna coil for maximum output.

3. Set the test oscillator to 6 megacycles and tune in its signal. If necessary, turn the knob of the antenna coil to secure accurate alignment at this frequency. Should it be found necessary, to shift turns, the antenna coil trimmer will have to be re-adjusted at 16 megacycles after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

<table>
<thead>
<tr>
<th>Type</th>
<th>Plate Voltage</th>
<th>Screen Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>76</td>
<td>265</td>
<td>80</td>
</tr>
<tr>
<td>41</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>76 First IF</td>
<td>200</td>
<td>80</td>
</tr>
<tr>
<td>76 Second IF</td>
<td>250</td>
<td>80</td>
</tr>
<tr>
<td>37-40V</td>
<td>Used as drive with no applied DC voltage</td>
<td></td>
</tr>
<tr>
<td>76 A2-5</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>37-Phase Changer</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>46 Output</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

Automatic Pre-Selector

There are two units comprising the Automatic Pre-selector. One is the Drive Unit, the other is the Drive Unit, mounted on the chassis. The connections attempt to take the units apart since special tools and gauges are required.

Should the Drive Unit fail to operate properly there are several external adjustments that can be made to it.

The OFF finger on the rotating hub at the rear of the Drive Unit should turn the receiver off just as the finger makes contact with the plunger while the hub is turning in a clockwise direction, as one faces the rear of the chassis. If the finger stops as it touches the plunger but the receiver does not switch off, loosen the hex head screw that positions the OFF finger. The head of this screw is located behind the large knurled tuning ring. Also loosen the large knurled locking ring. Then move the OFF finger slightly forward and tighten the hex head screw and the knurled locking ring. If the OFF finger position still fails to operate properly, loosen the knurled locking ring and the hex head screw again and move the OFF finger backward from its original position. Then re-tighten the ring and screw. Two or three trials may be necessary before the correct position is determined.

2. If the receiver is tuned properly by some of the fingers but is not brought to the peak of resonance for any of the fingers, these may be shifted slightly and should be reset as described in the instruction book. If the set is not tuned properly by any of the fingers, the triangular plate at the rear of the unit may have been shifted. To correct this proceed as follows:

Set the pin for the next quarter hour interval to the S3 position. Then turn the knob of the clock unit so that the receiver is tuned by the OFF finger. Then the OFF finger has been stopped, insert the key in its key hole in the triangular plate. The position of the key should be checked by setting the pin for the next quarter hour interval to the S3 position, and test tuned for exact alignment between the key hole and the hole in the S3 finger. If the holes line up this time the setting is correct and should be left as is for all the fingers.

3. If any finger comes to its stop under the plunger the head of the plunger should be removed to expose inches, approximately the thickness of a postal card, above its housing. If the plunger does not raise above its housing, the screw that positions the housing should be loosened. Then reset the housing so that the plunger does raise the required distance above it when pushed by any of the fingers, and re-tighten the screw.

Caution: Do not make this adjustment unless it is necessary since all of the fingers have to be reset slightly when the alignment of the receiver is changed.

If the foregoing adjustments fail to correct the trouble the Drive Unit should be tested as indicated in the chart that follows. If these tests show that the unit is defective it should be removed from the chassis.

To do as proceed as follows:

1. Remove the receiver chassis from the cabinet.

2. Remove the clip that holds the two plugs in their sockets on the side of the Drive Unit and pull the plugs from their sockets.

3. Loosen the set screws in the Drive Unit center of the coupling.

4. Remove the three screws that hold the unit to its mounting plate.

5. Disconnect the Manual Control Lever and slide the Drive Unit out of the coupling.

Defective units should be returned to the Equipment Manufacturing company, St. Charles, Ill., for repair or replacement.

The receiver can be operated manually without the Drive Unit by plugging a four prong plug, with grid and plate pins, shorted together, into the four prong socket at the rear of the chassis.

When the new Drive Unit is being mounted, care must be taken that the shafts and coupling lines up properly so that the condenser will turn freely. The front mounting feet of the Drive Unit are made of rubber so the necessary alignment adjustment can be made. The two rear legs, of the finger, then should be tightened after the front one has been adjusted.

Turn the variable condenser so that its plates are fully extended. Then turn the knurled tuning ring all the way in the same direction and tighten the set screws in the coupling. If the setting is made correctly, these distinct clicks will be heard when the knurled tuning ring is turned all the way in clockwise. Three more clicks will be heard at the end of travel in the opposite direction. Turn the automatic control shaft on the Drive Unit so that the flat surface of the pinion of the shaft faces upward. Observation can be made on the coupling of the automatic position and should be reset to the correct position by adjusting the small knurled ring.

The Clock Unit

If the tests listed in the chart indicate that the Clock Unit is defective it should be removed from the cabinet and returned to the Oradio Company for repair or replacement. All the plugs out of the Drive Unit and loosen the clock clamping. The clock should be reset sufficiently to allow to rest on the front of the cabinet. Be sure that no damage has been done to the clock unit. The receiver can be operated manually even though the Clock Unit is removed. However, the four prong from the Drive Unit must be inserted in its socket at the rear of the chassis.
**ALIGNMENT PROCEDURE**

The IF Stages:

1. Connect the low scale of the output meter across the loud speaker voice coil.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator, through a .001 mfd. condenser, to the control grid of the 76 second IF tube. The grid clip should be left attached to the cap. Turn the volume control of the receiver to its full "on" position.
4. Set the test oscillator to 445 kc and tune the IF output transformer. The locations of the tuning adjustments are shown in the Service Illustrations.
5. Change the test oscillator connection to the control grid cap of the 76 first IF tube and tune the IF interstage transformer.
6. Change the test oscillator connection to the control grid cap of the 78 translator tube and tune the IF input transformer.
7. In order to secure greater accuracy, repeat all of the operations starting with the IF output transformer. Always use the lowest possible output from the test oscillator.

**RF Alignment: Broadcast:**

See manual page 15 for general alignment information. The broadcast band must be aligned before the short wave band.

1. Set the test oscillator to 750 kc and loosely couple its output to the receiver's antenna lead, with the antenna connected.
2. Turn the variable condenser plates all the way out. Then adjust the broadcast oscillator trimmer for maximum output. The locations of all of the trimmers are indicated in the Service Illustrations.
3. Set the test oscillator to 1400 kc and adjust the trimmers on the antenna and trimmer sections of the variable condenser.
4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator pad for maximum output.
5. Repeat the 1750 kc adjustment and then the 3400 kc adjustment, using the lowest possible output from the test oscillator.

**Short Wave Alignment:**

1. Set the test oscillator to 16 megacycles, leaving it coupled to the receiver's antenna lead as for broadcast alignment.
2. Turn the wave band switch to the short wave position and tune in the test oscillator signal. Then adjust the trimmer on the short wave translator coil for maximum output.

**TUNE VOLTAGE CHART**

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE VOLTAGE</th>
<th>SCREEN VOLTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>76 - Trans.</td>
<td>225</td>
<td>80</td>
</tr>
<tr>
<td>41 - Osc.</td>
<td>120</td>
<td>100</td>
</tr>
<tr>
<td>76 - First IF</td>
<td>845</td>
<td>80</td>
</tr>
<tr>
<td>78 - Second IF</td>
<td>255</td>
<td>80</td>
</tr>
<tr>
<td>37 - AVC</td>
<td>105</td>
<td>Used as diode with no applied DC voltage</td>
</tr>
<tr>
<td>75 - Let-IF</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>37 - Phase Changer</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>45 - Drivers</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>45 - Output</td>
<td>260</td>
<td></td>
</tr>
</tbody>
</table>

The audio circuit, including the 85 tube, the two 37 drivers and the two output tubes is such that, in effect, it constitutes a first audio stage feeding into a push-pull driver stage, which in turn feeds the push-pull output stage. The phase changing circuit eliminates the need for audio coupling transformers.

The 37 AVC tube, which is used as a diode with plate grounded, is fed from the plate of the 76 second IF tube by means of the 33 mfd. condenser. The voltage drop created across the 500 mfd. resistor, connected between grid and cathode, is used for AVC voltages.
WAVE TRAP CONNECTIONS

In locations near the coast, where code interference from
ship stations may be experienced, a wave trap can be added
(fort #1109). Some of the receivers already have this wave
trap incorporated. It is mounted directly behind the IF output
transformer. In receivers in which a trap is not already
incorporated, a terminal board is provided so that one can be
added, as indicated in Fig. 1.

To adjust the wave trap, proceed as follows:

1. With the wave switch in the BROADCAST position, fully
mesh the variable condenser plates.

2. If the interfering signal can be picked up, adjust the
two tuning condensers of the wave trap until the interfering
signal disappears.

3. If the frequency of the interfering signal is known,
the adjustment can be made more quickly and accurately by means
of a test oscillator. Set the oscillator to the interfering
close to 500 kc and this frequency should be used if the interference is not
heard at the time of the service call.

The IF Stages:

ALIGNMENT PROCEDURE

1. Connect the low scale of the output meter across the
load speaker voice coil.

2. Connect the ground lead of the test oscillator to the
chassi.

3. Connect the other lead of the test oscillator, through a .1 mf condenser, to
the control grid of the 58 second IF tube. The grid clip should be left attached to the cap and the
tube shield must be in place.

4. Set the test oscillator to 480 kc and tune the IF output
transformer. The locations of its tuning adjustments are shown
in the Service Illustration.

5. Change the test oscillator connection to the control
grid cap of the 58 first IF tube and tune the IF output
transformer.

6. Change the test oscillator connection to the control
grid cap of the 58 translator tube and tune the IF input
transformer.

RF Alignment (Broadcast):

1. Disconnect the wave trap, if one is used. In receivers
in which the trap is connected to a screw terminal board, the
trap can be disconnected by replacing the jumper between the
yellow wire terminal and the blue wire terminal and disconnecting
the green lead of the trap from its terminal. In receivers in
which the trap has been built in as original equipment, the same
thing must be done by connecting a jumper between the blue and
yellow leads of the trap and unsoldering the green lead.

2. Set the test oscillator to 1785 kc.

3. Couple the output of the oscillator loosely to the
antenna lead of the set with the antenna connected.

4. Turn the variable condenser plates all the way out. Then
adjust the oscillator trimmer for maximum output. This trimmer
is mounted on the terminal board of the broadcast oscillator coil,
as shown in the Service Illustration.

5. Set the test oscillator to 600 kc and tune in its signal.
Then slowly rotate the variable condenser back and forth a degree
or two and, at the same time, adjust the broadcast oscillator
padder for maximum output. The location of this padder condenser
is shown in Service Illustrations.

6. Repeat the adjustment of the oscillator trimmer at 1785
kilocycles.

7. Set the test oscillator to 1500 kc and tune in its
signal. Then adjust the trimmer on the translator section of
the variable condenser for maximum output. In some of the
receivers, this trimmer has been removed from the variable
condenser, in which case this step in the alignment procedure
may be omitted.

Short Wave Alignment:

1. Set the test oscillator to 16 megacycles, leaving it
coupled to the set's antenna lead as for broadcast alignment.

2. Turn the wave band switch to the short wave position and
tune in the test oscillator signal. Then adjust the trimmer on
the short wave translator coil for maximum output.

3. Set the test oscillator to 6 megacycles and tune in its
signal. If necessary, turns may be shifted on the short wave
translator coil to secure accurate alignment on this frequency.
Should it be necessary to shift turns, it will also be
necessary to readjust the translator trimmer at 16 megacycles
after the turns have been shifted.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the
respective element of each tube.

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE</th>
<th>SCREEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>58 - Translator</td>
<td>260</td>
<td>95</td>
</tr>
<tr>
<td>56 - Oscillator</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>58 - First IF</td>
<td>260</td>
<td>95</td>
</tr>
<tr>
<td>58 - Second IF</td>
<td>255</td>
<td>95</td>
</tr>
<tr>
<td>56 - AVC</td>
<td>Used as diode with no applied DC voltage.</td>
<td></td>
</tr>
<tr>
<td>56 - Detector-AP</td>
<td>Used as diode with no applied DC voltage.</td>
<td></td>
</tr>
<tr>
<td>57 - Audio</td>
<td>95</td>
<td>85</td>
</tr>
<tr>
<td>2A5 - Output</td>
<td>250</td>
<td>260</td>
</tr>
</tbody>
</table>
ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter across the loud speaker terminals.
2. Connect the ground lead of the test oscillator to the chassis.
3. Connect the other lead of the test oscillator in series with a 1 mfd condenser, to the grid of the first IF tube. Leave the grid clips attached to the caps.
4. Set the test oscillator to 170 kc and tune the IF output transformer, primary and secondary. Be sure the volume control is turned all the way on.
5. Change the test oscillator connection to the control grid of the translator tube and tune the IF input transformer.
6. Repeat the adjustments to secure greater accuracy. Start with the IF output transformer.

Always use as low an output as possible from the test oscillator in order to render the AVC section of the receiver inoperative.

Broadcast Alignment: #1 Range:

1. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected.
2. Set the test oscillator to 1700 kc.
3. Set the wave switch to the broadcast position, open the variable condenser for maximum output. The indications of all the trimmers are shown in the Service Illustrations.
4. Set the test oscillator to 1400 kc and tune in its signal.
5. Adjust the broadcast translator coil trimmer and then the trimmer on the antenna section of the variable condenser for maximum output.
6. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the broadcast oscillator for maximum output.
7. Repeat the 1700 kc and 1400 kc adjustments. Always use the least possible output from the test oscillator.

Broadcast Alignment: #2 Range:

1. Leave the test oscillator coupled to the set's antenna lead as for broadcast alignment.
2. Open the variable condenser plates all the way and peak the #2 range oscillator trimmer at 3550 kc.
3. Set the test oscillator to 4500 kc and tune in its signal. Then adjust the #2 range translator trimmer for maximum output.
4. Set the test oscillator to 1750 kc and tune in its signal. If necessary, turn may be shifted on the translator coil to secure maximum output. If turns are shifted it will be necessary to repeat the 3550 kc and 4500 kc adjustments.

Broadcast Alignment: #3 Range:

1. Leave the test oscillator coupled to the set's antenna lead as for the lower frequency ranges.
2. Open the variable condenser plates all the way and peak the #3 range oscillator coil trimmer at 15,000 kc.
3. Set the test oscillator to 16,000 kc and tune in its signal. Then adjust the #3 range translator coil trimmer for maximum output.
4. Set the test oscillator to 3825 kc and tune in its signal. If necessary turns may be shifted on the #3 range translator coil to secure maximum output. If turns are shifted it will be necessary to repeat the 15,000 kc and 16,000 kc adjustments.

TUBE VOLTAGE CHART

All readings are to be taken between the chassis and the respective element of each tube.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Plate Voltage</th>
<th>Screen Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>961 - Transistor</td>
<td>120</td>
<td>60</td>
</tr>
<tr>
<td>E20 - Oscillator</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>961 - First IF</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>961 - Second IF</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>E20 - AVO</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>237 - Detector</td>
<td>due to high series resistance in circuit</td>
<td></td>
</tr>
<tr>
<td>E23 - Output</td>
<td>115</td>
<td></td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the output meter (low voltage scale) across the loud speaker voice coil.

2. Connect the ground lead of the test oscillator to the receiver chassis.

3. Connect the other lead of the test oscillator, in series with a .1 mfd. condenser, to the control grid cap of the 78 IF tube, leaving the grid clip attached to the cap.

4. Set the test oscillator to 175 kc and tune the IF output transformer. This transformer is mounted under the chassis and its adjustments are accessible through the hole in the right end of the chassis, as indicated in the Service Illustration.

5. Change the test oscillator connection to the grid of the translator tube and tune the IF input transformer.

6. Repeat the adjustments to secure greater accuracy. The volume control of the receiver should be turned to its full "on" position and the output from the test oscillator kept as low as possible in order to render the AVC action of the set inoperative.

RF Alignment:

1. Connect the test oscillator to the antenna lead through a .0005 mfd. condenser.

2. Set the test oscillator to 1320 kc. Open the variable condenser plates all the way and adjust the oscillator trimmer for maximum output.

3. Set the test oscillator to 1400 kc and adjust the RF and translator trimmers.

4. Set the test oscillator to 600 kc and tune in its signal. Then slowly rotate the variable condenser back and forth a degree or two and, at the same time, adjust the padfer until maximum output is obtained.

5. Repeat the 1520 kc and 1400 kc adjustments. Always leave the receiver's volume control on full and the test oscillator's output at the lowest possible value.

TUBE VOLTAGE CHART

Readings taken with 1000 ohms per volt meter from chassis to indicated tube element.

<table>
<thead>
<tr>
<th>TUBE</th>
<th>PLATE</th>
<th>SCREEN</th>
<th>OSC. PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>78 - RF</td>
<td>230</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>6A7 - Osc-Trans</td>
<td>230</td>
<td>95</td>
<td>160</td>
</tr>
<tr>
<td>78 - IF</td>
<td>230</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>85 - AVC-Det-AF</td>
<td>65</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>41 - Output</td>
<td>230</td>
<td>220</td>
<td></td>
</tr>
</tbody>
</table>
ALIGNMENT, CHASSIS LAYOUT

In none of the sets, the 40 ohm resistor, R14, is omitted and a ground is made to the transformer lead instead.

In earlier production, R3 was a 300 ohm, 1/2 watt resistor. In later production, this was changed to a 250 ohm, 1/2 watt with a 250 ohm resistor, if trouble is experienced due to the set's not operating at the low frequency end of the B Band, which will be due to the oscillator "stalling", replace the 300 ohm resistor with a 250 ohm one.

The coupling between primary and secondary of the IF output transformer is variable and serves as the volume control. Also, it is the resistor which supplies +12V voltage. Residual noise is furnished by R33.

IF OUTPUT TRANSFORMER COLOR CODE

RECTIFIER PLATE: RED. CENTER TAP, GREEN. PRIVY GRID. NEGATIVE BLOCK.

ALIGNMENT PROCEDURE

General:

During all of the alignment procedure, the volume control should be turned and set to the lowest position. All the way down, or else the receiver will merely serve as a noise generator, slightly from the full on position, if returning it is found to damage alignment. The ground lead of the test oscillator should be connected to the chassis through a 3 mf condenser. The other lead of the test oscillator is to be connected in the manner described in the procedure. There are certain to be a control grid condensers, it is desired to leave the grid clip attached to the grid cap and to leave the tube socket in place. The attempt should be made to "kill" the oscillator section of the set during the alignment. The output from the test oscillator always should be kept at the lowest possible value that will give a satisfactory output meter reading and the coupling between the test oscillator and the receiver should be made as loose as possible. In the case of IF alignment on any of the bands, where the test oscillator is coupled to the antenna lead of the receiver with an antenna condenser, alignment will be most accurate if the coupling to the antenna lead is made very loose. (The test oscillator and the oscillator lead separated.) If the test oscillator has a variable control for its power output, it is better to turn this control to its high position and then decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna lead. If an actual antenna is not used and is replaced by a condenser or resistor, as described in the procedure, the input to the receiver should be kept low by decreasing the power output from the test oscillator.

When making the antenna and transistor-trimmer procedure, for all wave bands, the variable condenser should be turned back and forth a dozen or two while the trimmer is being adjusted. This should not be done when checking the oscillator trimmers; in this case, the variable condenser is turned so that the plates are completely out of phase and set in this position during the adjustment. When adjusting the oscillator trimmers, if no peak can be obtained, use the one in which the trimmer is screwed further out (less capacity). Then repeat the alignment. If two peaks are found, use the adjustment in which the trimmer is screwed in. Do not use both. Note that this is exactly opposite to the procedure for the oscillator trimmers.

Sequence of Alignment:

1. Align IF amplifier.
2. Align short wave, Band C.
3. Align short wave, Band B.
4. Align broadcast, Band A.

IF Alignment:

1. Set the test oscillator to 175 kc and connect its output lead to the control grid cap of the 6AK7 tube.
2. Peak the IF output transformer tuning condensers, C13 and C14. These are mounted under the chassis, as shown in the Location of Parts Diagram.
3. Peak the IF input transformer, mounted on top of the chassis.
4. Repeat the adjustments to secure greater accuracy.

IF Alignment; Band C:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected directly to the antenna lead of the receiver, in series with a 400 ohm resistor and with no antenna connected to the receiver.
2. Set the test oscillator to 34500 kc and tune in its signal. Then adjust C5 for maximum output.

IF Alignment; Band B:

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected directly to the antenna lead of the receiver, in series with a 400 ohm resistor and with no antenna connected to the receiver.
2. Set the test oscillator to 6500 kc and tune in its signal. Then adjust C2 for maximum output.

In practical cases, the sets, antenna, and receiver are all assembled so that the receiver will not be disturbed while alignment is being made.

The Volume Control in these models consists of variable coupling between the primary and secondary of the IF output transformer. It sometimes happens that the receiving coil aligns on its shaft with the result that the volume cannot be reduced to zero, or else that it jumps through zero and begins to increase again as the Volume Control knob is turned counter clockwise. This condition can be corrected as follows:

1. Tune to a strong local station.
2. Slightly loosen the set screw that holds the movable coil to the fixing or control shaft, so that the coil can be slipped around the shaft.
3. Turn the Volume Control shaft all the way counter clockwise.
4. Leave the shaft in this full counter-clockwise position, while the receiving coil around the shaft to the point of minimum volume.
5. Securely tighten the set screw.
6. If, with the coil turned to the point of minimum value the volume still is too high, it can be reduced by rearranging the final tuning condensers. Impractically arranged, the capacity coupling of these sets may prevent a low volume range. However, it is a simple matter to shift the leads and so reduce the volume.

John F. Rider, Publisher
IF PEAK 480 KC

ALL RESISTORS 1/2 WATT
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS AND VOLTAGE READINGS TAKEN FROM INDICATED PRONG TO CHASSIS. ALIGNMENT IS AT THE FREQUENCIES SHOWN AT THE TRIMMERS.

GREEN +22 1/2
+ B RED +135

BLACK & YELLOW
+ A BLUE & YELLOW
- B RED & BLACK
ALIGNMENT PROCEDURE

The IF Stages:

1. Connect the high scale of the output meter across the loud speaker.

2. Connect a 480 kc test oscillator, in series with a .1 uf condenser, between the control grid of the 106 and the chassis.

3. Adjust the IF output transformer and the IF input transformer for maximum output. Adjustments should be repeated for greater accuracy.

Broadcast Alignment:

1. The output meter should be left connected as for IF alignment. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected.

2. Set the test oscillator to 1720 kc. Open the variable condenser plates all the way and adjust the trimmer on the oscillator section for maximum output. The oscillator section is the one further from the dial.

3. Set the test oscillator to 1400 kc and tune in its signal. Then adjust the trimmer on the other section of the variable condenser for maximum output. The variable should be rocked back and forth a degree or two while making this adjustment.

4. Set the test oscillator to 600 kc and tune in its signal. Then adjust the oscillator padder, C3, for maximum output. The variable should be rocked back and forth a degree or two while making this adjustment.

5. Repeat the 1720 kc and 1400 kc adjustments for greater accuracy.
Alignment, Socket
Trimmers, Chassis

**Alignment Procedure**

**General**

During all of the alignment procedure, the Volume Control should be turned all the way on and the Tone Control should be turned all the way to the right to its brilliant position. The ground lead of the test oscillator is to be connected to the chassis through a .1 µfd. condenser. This prevents shorting of the grid bias of the tubes. The other lead of the test oscillator is to be connected to the receiver as described in the procedure. A metal clip is made to a control grid cap, it is important to leave the grid clip attached to the grid lead and to leave the tube shields in place. No attempt should be made to "kill" the oscillator section of the 10C during the alignment.

The output from the test oscillator always should be kept at the lowest possible value that will give a satisfactory output reading. During the RF alignment, the coupling between the test oscillator and the antenna lead of the receiver should be made as loose as possible. (An antenna and the oscillator lead separated.) If the test oscillator has a variable control for its power output, turn this control to its high position and then decrease the signal input to the receiver by decreasing the amount of coupling between the test oscillator and the receiver's antenna leads. If no actual antenna is not used and is replaced by a condenser or resistor, as described in the procedure, the input to the receiver should be kept low by decreasing the power output from the test oscillator.

When peaking the antenna and translator trimmers, the variable condenser should be "rocked" back and forth a couple of times or two while the trimmer is being adjusted. This should not be done when peaking the oscillator trimmers. In this case, the variable condenser is turned so that the plates are completely out of mesh and left in this position during the adjustment. If adjusting the oscillator trimmers, if it is found that two peaks can be obtained, use the one in which the trimmer is screwed further (less capacity). If adjusting the antenna and translator trimmers, if two peaks can be obtained, use the adjustment in which the trimmer is screwed furthest. Note that this is exactly opposite to the procedure for the oscillator trimmers.

**Sequence of Alignment**

1. Align IF Amplifier.
2. Align Broadcast Band, Band A
3. Align Short wave Band, Band B

**IF Alignment**

1. Set the test oscillator to 175 kc and connect its output lead to the control grid cap of the 10C tubes.
2. Peak the IF input transformer. This is the square wave on top of the chassis.
3. Peak the IF output transformer secondary. This is the square wave unit with the single adjusting screw mounted at the top rear of the chassis.
4. Peak the IF output transformer primary. This trimmer should be CO in the location of Parts Diagram.
5. It is advisable to repeat the alignment for greater accuracy.

**Broadcast RF Alignment, Band A**

1. Loosely couple the output of the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected, in series with a 4000 ohm resistor, directly to the antenna lead of the receiver.
2. Set the test oscillator to 1500 kc. Open the variable condenser plates all the way and adjust CO, the Broadcast oscillator trimmer, for maximum output.
3. Set the test oscillator to 1400 kc and tune in its signal. Peak the Broadcast antenna and translator trimmers. The antenna trimmer is the one on the variable condenser section nearest the dial. The translator trimmer is the one to the right can unit and next to the square IF unit on top of the chassis.
4. Set the test oscillator to 1600 kc and tune in its signal. Then adjust CO, the Broadcast oscillator trimmer. The variable should be "rocked" back and forth a degree or two during the adjustment.
5. Repeat the 1500 and 1600 kc adjustments.

**Short Wave RF Alignment, Band B**

1. Loosely couple the test oscillator to the antenna lead of the receiver, leaving the antenna connected. If it is impractical to use an actual antenna, the test oscillator can be connected, in series with a 4000 ohm resistor, directly to the antenna lead of the receiver.
2. Set the test oscillator to 16000 kc. Open the variable condenser plates all the way and peak CO, the Short Wave oscillator trimmer.
3. Set the test oscillator to 15000 kc and tune in its signal. Peak CO, the Short Wave translator trimmer.

**Precautions**

Be sure that the wooden strips, inserted for shipping purposes, are removed from under the chassis. Also be certain that neither the control shafts nor knobs touch the chassis. The chassis must float freely on its cushion rubber mountings, to prevent microphonics, particularly on Short waves.

©John F. Rider, Publisher
Alignment
1. I-f peaked at 456 kc.
2. Oscillator trimmer (beneath chassis) and gang condenser trimmers adjusted at 1720 kc.
3. Oscillator padding condenser adjusted at 800 kc. Rock tuning condenser.
4. Check alignment at 1400 kc.
5. Check short wave alignment at 12 megacycle

sockets with 1000 ohm per volt D.C. meter — Line voltage 115 V.

<table>
<thead>
<tr>
<th>Type</th>
<th>Position</th>
<th>EP</th>
<th>KK</th>
<th>RH2</th>
<th>RG3</th>
<th>EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>RF &amp; IF Amp.</td>
<td>0.3</td>
<td>2.2</td>
<td>85</td>
<td>2.2</td>
<td>85</td>
</tr>
<tr>
<td>6A7</td>
<td>1st det. &amp; Osc.</td>
<td>0.3</td>
<td>2.2</td>
<td>85</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>75</td>
<td>2nd det. &amp; AVC</td>
<td>0.3</td>
<td>0.8</td>
<td>85</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>43</td>
<td>Power output</td>
<td>30.</td>
<td>4.8</td>
<td>85</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

- Osc. plate
- 43 grid
- Filament

- Cathode
- Plate
- Screen grid
- Suppressor grid

Parts for this model may be ordered from Electrical Radio Corporation
7511 Indiana Avenue, Chicago, Ill.
MODEL 31-B
ALIGNMENT

PARTS LIST

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>LIST PRICE</th>
<th>PART NUMBER</th>
<th>LIST PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2166</td>
<td>699.60</td>
<td>333</td>
<td>500,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2173</td>
<td>687.90</td>
<td>469</td>
<td>500,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2265</td>
<td>687.90</td>
<td>597</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2277</td>
<td>687.90</td>
<td>728</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2299</td>
<td>687.90</td>
<td>857</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2211</td>
<td>687.90</td>
<td>987</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2221</td>
<td>687.90</td>
<td>1118</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2231</td>
<td>687.90</td>
<td>1248</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2241</td>
<td>687.90</td>
<td>1379</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2251</td>
<td>687.90</td>
<td>1510</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2261</td>
<td>687.90</td>
<td>1641</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2271</td>
<td>687.90</td>
<td>1772</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2281</td>
<td>687.90</td>
<td>1902</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
<tr>
<td>2291</td>
<td>687.90</td>
<td>2032</td>
<td>15,000 OHM 1/3 WATT RESISTOR</td>
</tr>
</tbody>
</table>

SIX VOLT BATTERY OPERATED SIX TUBE SUPERFETRODYNE RECEIVER

ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or P.F. coils has been replaced. A check of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes, battery, or speaker, inadequate or excessively long antenna, oven or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and as weak or defective causes have been definitely proven not to be the cause. If an I.F. tube is replaced it is advisable to realign the I.F. amplifier, particularly if the replacement tube is one of a different manufacturer than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given. Otherwise the receiver will lack sensitivity and the dial calibration will be incorrect. It is imperative that an accurately calibrated oscillator be used with some type of output measuring device.

INTERMEDIATE ALIGNMENTS

1. Connect the high side of the test oscillator output to the center grid of the 165 modulator tube through a 0.02 microfarad condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.

2. Set the test oscillator frequency to 650 kilocycles (This must be accurate).

3. Align the secondary intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer, up and down, (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.

4. Adjust the first intermediate transformer in the same manner as the second I.F. transformer.

To align the variable condenser, it is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully. Otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneat the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 0.02 microfarad to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 18.5 to 5.8 megacycle band, tune the receiver dial to 16 megacycles, and set the test oscillator frequency to exactly 16 megacycles. Then tune in the 16 megacycle signal to maximum output by adjusting the 16 megacycle oscillator trimmer, when adjusting this trimmer two peaks, the fundamental and the image peak, will be noticed. Care must be taken that the fundamental peak and not the image peak is used for aligning the receiver at 16 megacycles. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 16 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 16 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 15 megacycles. Then vary the receiver dial slightly to the right and left of 16 megacycles, and if the fundamental peak was used in aligning at 16 megacycles the test oscillator signal will be heard at approximately 15 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 16 megacycle oscillator trimmer must be properly re-adjusted. After properly adjusting the 16 megacycle oscillator trimmer adjust the 16 megacycle antenna trimmer for maximum 16 megacycle sensitivity.

3. Set the band selector switch for operation on the 18.5 to 5.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to exactly 5 megacycles. Bring in the 5 megacycle signal to maximum output by adjusting the 5 megacycle trimmer. Next adjust the 5 megacycle antenna trimmer for maximum 5 megacycle response.

4. Leave the band selector switch for operation on the 18.5 to 5.8 megacycle band and tune the receiver dial and set the test oscillator frequency to approximately 3 megacycles. While rocking the gang condenser slightly to the right and left, adjust the 2 megacycle oscillator padding condenser for maximum sensitivity.

5. Replace 0.02 microfarad in series with test oscillator lead with 200 microfarad condenser, place the band selector switch for operation on the 535-1700 kilocycle band, and set the test oscillator frequency to exactly 1700 kilocycles. Rotate gang condenser so that plates are completely out of mesh, adjust 1700 kilocycle oscillator trimmer to bring in 1720 kilocycle signal to maximum output.

6. With band selector switch placed for operation on 535-1700 kilocycle band, set the test oscillator frequency and receiver dial to exactly 1000 kilocycles, adjust the 1000 kilocycle preselector and antenna trimmers for maximum 1000 kilocycle signal sensitivity.

7. Leave band selector switch set for operation on 535-1700 kilocycle band and tune receiver dial and set the test oscillator to approximately 600 kilocycles. While rocking the gang condenser slightly to the right and left adjust the 600 kilocycle oscillator pad for maximum sensitivity.

©John F. Hider, Publisher
MODEL 35-B
Alignment Parts List

<table>
<thead>
<tr>
<th>Part Number</th>
<th>List Price</th>
<th>Mfd. Mica Condenser</th>
</tr>
</thead>
<tbody>
<tr>
<td>2166</td>
<td>$1.10</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2163</td>
<td>.90</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2009</td>
<td>.60</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2065</td>
<td>.65</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2041</td>
<td>.75</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2022</td>
<td>.55</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2139</td>
<td>.60</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2097</td>
<td>.60</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2188</td>
<td>.50</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2140</td>
<td>.50</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2199</td>
<td>.40</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>2229</td>
<td>.50</td>
<td>Mfd. Mica Condenser</td>
</tr>
<tr>
<td>9456</td>
<td>.0025</td>
<td>Mfd. Mica Condenser</td>
</tr>
</tbody>
</table>

Note: All parts must be clean and dry before assembly.

No. 1. Connect the high output side of the test oscillator through a 0.02 microfarad condenser to the grid of the 1/2 watt silicon diode, as shown in the circuit diagram. Connect the low frequency side of the test oscillator through a 0.001 microfarad condenser to the grid of the 1/2 watt silicon diode, as shown in the circuit diagram.

No. 2. Adjust the 15 megacycle switch so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 3. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 4. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 5. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 6. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 7. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 8. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 9. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 10. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 11. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 12. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 13. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 14. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 15. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 16. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 17. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 18. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 19. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 20. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 21. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 22. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 23. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 24. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.

No. 25. Place the high frequency switch and the trimmer knob so that the trimmer knob is in the middle position. Then adjust the 15 megacycle switch so that the trimmer knob is in the middle position.
2. Place the band selector switch for operation on the broadcast band, tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to 1400 kilocycles. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CAPACITORS LOCATED ON TOP OF THE GANG CONDENSER.
Read all voltages from socket prong to ground unless otherwise specified. Read from 375 ohm resistor #1267 to ground.
Comparative voltage is not true voltage applied.

Balance at 1400 kc. Trimmers on top of gang condenser
Short wave adjustment at 4 mc. Trimmer on top of coil on top of chassis
Balance at 1720 kc. Trimmer located on top of oscillator section of condenser gang. (front section.)
Oscillator padder condenser adjusted at 600 kc., while rocking tuning condenser. Padding condenser accessible through hole on right hand side of chassis.

I-f aligned at 465 kc.

TUBE FILAMENT PLATE SCREW GRID NO. 2 GRID NO. 3 & 5 CATHODE
6A7 6.4 195 95 125 95 4
6D6 6.4 192
75 6.4 110#
3A8 6.4 187 190
84 6.4 450 ea plate.

4 3.5 18.5 300 d. c.
Read all voltages from socket to receiver ground unless otherwise specified.

2. Place the band selector switch for operation on the 1500-540 kilocycle band, tune the receiver dial and set the test oscillator frequency to exactly 1400 kilocycles. Next adjust the two trimmer condensers located on top of the gang condenser for maximum 1400 kilocycle signal sensitivity.

3. Adjust the band selector switch for operation on the 350-140 kilocycle band, set the receiver dial and the test oscillator frequency to EXACTLY 150 kilocycles. Then bring in the 150 kilocycle signal to maximum output by adjusting the trimmer condenser located on and accessible through the hole in the back of the chassis. If adjustment of this trimmer causes the receiver to oscillate always adjust to the point where oscillation does not occur.

4. Leave the band selector switch for operation on the same band (350-140 kilocycles) and set the receiver dial and the test oscillator frequency to 340 kilocycles. Bring in this 340 kilocycle signal to maximum output by adjusting the trimmer condenser located on the coil underneath the chassis.

5. With the band selector switch, the test oscillator frequency, and the receiver dial set at 340 kilocycles, adjust the trimmer condenser mounted on the coil located above the chassis underneath the metal shield for maximum sensitivity.
S盆地ENEL RADIO CORP.

INTERMEDIATE ALIGNMENT!

Set the test oscillator frequency to 456 kilocycles. (This must be accurate).

Align the first intermediate transformer by turning one of the trimmer screws up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screws of the same transformer for maximum sensitivity.

Adjust the other intermediate transformer in the same manner.

NOTE: Two type intermediate transformer trimmers have been used in this receiver. One type has two parallel holes in the top of the shield; one for each trimmer. The other type has a brass hex nut for adjusting one trimmer, the other intermediate trimmer being adjusted with the trimmer screw located inside of the brass hex nut. Regardless of which type trimmer is used, the procedure is the same.

TO ALIGN THE VERTICAL CYLINDERS:

Adjustment of the trimmer condensers located inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left hand front corner of the receiver) and the pad condensers mounted on the left hand side of the chassis, will be referred to by numbers as indicated on the circuit diagram showing the relative location of these trimmers.

1. Connect the high output side of the test oscillator to the receiver antenna post and the ground to the ground terminal.

2. Place the band selector switch for operation on the 1520 to 535 kilocycle (broadcast) band. Tune the receiver to exactly 1400 kilocycles in the dial. If the test oscillator frequency is EXACTLY 1400 KILOCYCLES, THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER MARKED NO. 2 ON CATACOMB DIAGRAM, after which adjust No. 1 and No. 3 trimmers in the order named for maximum sensitivity.

3. Leave the band selector switch for operation on the broadcast band (1620 to 535 kilocycles) and tune the receiver and set the oscillator to approximately 600 kilocycles. Then adjust the 600 kilocycle padding trimmers, located in the left hand side of the chassis, for maximum sensitivity. As this adjustment is quite critical, it is necessary to rock the variable condenser slightly to the right and to the left to find the point of greatest sensitivity.

4. Recheck the alignment at 1400 kilocycles as the 600 kilocycle adjustment may have changed the alignment at 1400 kilocycles.

5. Place the band selector switch for operation on the 360 to 120 kilocycle band and set the oscillator frequency and tune the receiver dial to EXACTLY 360 KILOCYCLES. THEN TUNE IN THIS 360 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING CATACOMB TRIMMER NO. 5, next adjust trimmers No. 4 and 6 for maximum sensitivity.

6. With the band selector switch in the same position, tune the receiver dial and set the oscillator frequency to approximately 160 kilocycles and then while rocking the variable condenser slightly to the right and left, adjust the 150 kilocycle trimmer No. 12 (located on the left hand side of the chassis) for maximum sensitivity.

7. Recheck 350 kilocycle adjustments.

8. Adjust the band selector switch for operation on the 9.4 to 16 megacycle band and tune the receiver dial and set the oscillator frequency to exactly 15 megacycles. When adjusting catacomb trimmer No. 8 two peaks (the fundamental and the image peak) will be noticed. CARE MUST BE TAKEN SO THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 15 MEGACYCLES. First back off catacomb trimmer No. 8 to minimum capacity, next screw down the trimmer (add capacity) until the first peak which is the fundamental and the one you are trying to adjust is screwed down beyond the point where this first peak is received, the incorrect image peak will be tuned in. When the first peak has been located adjust catacomb trimmer No. 8 TO BRING IN THE 15 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT. After completing this adjustment always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 15 megacycles and increase the output of the test oscillator and then tune the receiver dial to approximately 14 megacycles. Vary the receiver dial slightly to the right and left of 14 megacycles and if the fundamental peak was used in aligning at 15 megacycles the test oscillator signal will be heard at approximately 14 megacycles on the set dial. If it is not possible to receive the signal then the fundamental peak was not used and the 15 megacycle adjustment of trimmer No. 8 must be gone over and properly adjusted. After correctly completing catacomb trimmer No. 8 adjustment adjust catacomb trimmers No. 7 and 9 for maximum sensitivity.

9. Leave the band selector switch for operation on 5.4 to 16 megacycle band, set the oscillator frequency and tune the receiver dial to approximately 6 megacycles. While rocking the variable condenser slightly to the right and left, adjust the 6 megacycle trimmer No. 10 (located on the left hand side of the chassis) for maximum sensitivity.

10. Recheck 15 megacycle adjustments

This completes the alignment and it is recommended that all of the adjustments be gone over again. Generally it will be found that improved results can be obtained if this is done. Assuming that all tubes and component parts of the set are ok, extreme inaccuracies in the dial calibrations, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent, proceed to realign, starting at the IF alignment and carefully follow each step in the order given.

| VOLTAGE TABLE |
|---|---|---|---|---|---|---|
| Line Voltage | 115 volt 60 cycle |
| Wave Control | Full on |
| Wave Band | Broadcast |
| TUBE | PLATE | SCREEN | CATHODE | GRID | GRID | GRID |
| TUBE | NO.1 | NO.2 | NO.3 | 4 & 5 |
| 6A7 Oscillator & 1st Detector | 888 | 888 | 888 | 888 | 888 | 888 |
| 6D6 2nd Detector, 3rd & 4th | 888 | 888 | 888 | 888 | 888 | 888 |
| 6D6 Intermediate Frequency | 888 | 888 | 888 | 888 | 888 | 888 |
| 76 2nd Detector & Audio | 888 | 888 | 888 | 888 | 888 | 888 |
| 76 Automatic Volume Control | 888 | 888 | 888 | 888 | 888 | 888 |
| 41 Output | 888 | 888 | 888 | 888 | 888 | 888 |
| 80 Rectifier | 888 | 888 | 888 | 888 | 888 | 888 |

- Triode Plate
- Read all voltages from socket to chassis with 1000 ohm per volt voltmeter.

©John F. Rider, Publisher
ALIGNMENT PROCEDURE: Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or RF coils has been replaced, and then only the frequency band in which that coil is used. All realignment is based on sensitivity, selectivity, and tone quality. After the frequency band to be realigned has been determined, all other components, and the other frequency bands, are left unadjusted. If any one component is at fault, it will be found by realigning only the frequency band in which it is used, the other frequency bands being left unadjusted. All realignment is carried out with the operating voltages applied to the receiver, and will require a test oscillator signal, which is usually available through the phone jack.

ALIGNMENT: When realignment is necessary, proceed as follows:

1. Connect the high output side of the oscillator through a .00025 ufd. condenser to the set antenna post, and the ground to the set ground.
2. Place the band selector switch for operation on the 10 to 24 megacycle band, tune the receiver dial to exactly 28 megacycles and set the test oscillator frequency to exactly 28 megacycles. Turn tuning knob No. 14. Next rock the gang condensers slightly to the right and left, and adjust trimmers No. 13 and No. 15 for maximum 25 megacycle signal sensitivity. Care must be taken so that the fundamental AND NOT THE IMAGE PEAK is used for aligning the receiver at 25 megacycles. When set, turn back off trimmers No. 13 and No. 15. Then screw down the trimmer (add capacity) until the first peak, which is the fundamental and the one you are to use, is tuned in. After completing adjustment of trimmers No. 14, 14, and No. 15 always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 25 megacycles, increase the output of the test oscillator, and tune the receiver dial to 21 megacycles. Vary the receiver dial slightly to the right and left of 21 megacycles and if the fundamental peak was used in aligning at 25 megacycles the test oscillator signal will be heard at approximately 21 megacycles on the receiver dial. If it is not possible to align the receiver on 25 megacycles, then the fundamental peak was not used and the 22 megacycle adjustment of trimmers No. 15, 14, and 15 must be made over and properly adjusted.
3. Place the band selector switch for operation on the 4 to 11 megacycle band and set the receiver dial and the test oscillator frequency to exactly 9.5 megacycles. When adjusting trimmer No. 10 the fundamental and not the image peak will be noticed. Care must be taken so that the fundamental and not the image peak is used for aligning the receiver at 9.5 megacycles. First back off trimmer No. 10 to minimum capacity then screw down the trimmer (add capacity) until the first peak, which is the fundamental and the one you are to use, is tuned in. Then the first peak has been tuned in, turn trimmer No. 10 to bring in the 9.5 megacycle signal to maximum output. Next adjust trimmers No. 9 and 11 for maximum 9.5 megacycle sensitivity. If it is not possible to align the receiver on 9.5 megacycles, then the fundamental peak was not used and the 9.5 megacycle adjustment of trimmers No. 9, 10 and 11 must be made over and properly adjusted.
4. Leave the band selector switch for operation on the 4 to 11 megacycle band and tune the receiver and set the test oscillator frequency to approximately 4.6 megacycles. Than while rocking the gang condensers slightly to the right and left, adjust modulator condenser No. 12 for maximum sensitivity.
5. Place the band selector switch for operation on the 1.6 to 4.2 megacycle band and tune the receiver dial and set the test oscillator frequency to exactly 3.8 megacycles. Then bring in the 3.8 megacycle signal to maximum output by adjusting trimmer No. 6, after which adjust trimmers No. 5 and 7 for maximum 3.8 megacycle signal sensitivity.
6. With the band selector switch in the same position (1.6 to 4.2 megacycle band) tune the receiver dial and set the test oscillator frequency to approximately 1.6 megacycles. Than while rocking the gang condensers slightly to the right and left, adjust modulator condenser No. 8 for maximum 1.6 megacycle signal sensitivity.
7. Adjust the band selector switch for operation on the 1550 to 535 kilocycle band, tune the receiver dial and set the test oscillator frequency to exactly 1400 kilocycles. Then bring in the 1400 kilocycle signal to maximum output by adjusting trimmer No. 2, after which adjust trimmers No. 1 and 3 for maximum sensitivity.
8. With the band selector switch set for operation on the 1550 to 535 kilocycle band tune the receiver dial and set the test oscillator frequency to approximately 600 kilocycles. Next while rocking the gang condensers slightly to the right and left, adjust modulator condenser No. 4 for maximum 600 kilocycle signal response.
9. Place the band selector switch for operation on the 140 to 370 kilocycle band, tune the receiver dial and set the test oscillator frequency to exactly 340 kilocycles. Then bring in the 340 kilocycle signal to maximum output by adjusting trimmer No. 18, after which adjust trimmers No. 16 and 18 for maximum sensitivity.
10. With the band selector switch set for operation on the 140 to 370 kilocycle band tune the receiver dial and set the test oscillator frequency to approximately 160 kilocycles. Next while rocking the gang condensers slightly to the right and left, adjust modulator condenser No. 19 for maximum 160 kilocycle signal response.

Alignment of all bands will rarely be necessary. If a call on any one of the bands should become ineffective and replacement is necessary, then only the band in which the call was replaced will require realignment. Whenever complete realignment has been once it is recommended that all of the adjustments be gone over again. Generally it will be found that improved results can be obtained if this is done, that all bands and component parts of the set are checked, extreme inaccuracies in the dial calibration, low sensitivity, and poor selectivity are indications that the alignment procedure has not been followed. Should these conditions be apparent proceed to realign and carefully follow each step in the order given.

©John F. Rider, Publisher
MODEL 8200-B
Vol. 16 PAGE 6

SENTINEL RADIO CORP.

TURN
6A7 Oscillator & Modulator
6D6 Radio Frequency
75 Automatic Volume Control
76 End Detector & Audio
41 Input
41 Output
623 Rectifier

PART NUMBER
1481 1560-535 K.C. Band Antenna Coil
1486 1500-535 K.C. Band Oscillator Coll.
1716 1.5-4.2 M.C. Band Antenna Coll.
1704 1.5-4.2 M.C. Band R.F. Coll.
1488 1.5-4.3 M.C. Band Oscillator Coll.
1716 4-11 M.C. Band Antenna Coll.
1717 4-11 M.C. Band R.F. Coll.
1718 4-11 M.C. Band Oscillator Coll.
1720 10-24 M.C. Band Antenna Coll.
1701 10-24 M.C. Band R.F. Coll.
1722 10-24 M.C. Band Oscillator Coll.
1484 140-370 K.C. Band Antenna Coll.
1486 140-370 K.C. Band Oscillator Coll.
1487 Firt I. F. Transformer
1479 Second I. F. Transformer
1415 Interstage Condenser
1709 Wave Switch
9059 Dual 8 Mfd. Dry Electrolytic Condenser
1110 4 Mfd. Dry Electrolytic Condenser
8986 5 Mfd. Dry Electrolytic Condenser
1532 115 Tapped 330 Volts 50-60 Cycle
1533 15 Volt 50-60 Cycle Power Transformer
1702 Full Universal Power Transformer
979 Choke
1420 Antenna and Ground Terminal Post Strip
6576 Phono Jacks
6123 Phono-Receiver Switch
1514 Tuning Dial complete with Glass
1506 No Speed Planetary Drive
6025 6.3 Volt .15 Ampere Pilot Light
1582 Trimmer Condenser
1553 Pedding Condenser
1553 Pedding Condenser

Prices are subject to change without notice.

John F. Rider, Publisher
OPERATING INSTRUCTIONS — MODEL P DUAL-BAND — Foreign and Domestic

CAUTION—Do not attempt to operate on current other than that noted on the instrument.

INSTALLATION—A good aerial, 25 to 50 feet long, well away from surrounding metal structures and power lines, is essential for best results. Power noise often interferes especially with short-wave reception. If the set is located where power noise is prevalent it may be necessary to install an aerial high above the street and use a "transposition" lead-in to the set. A good ground connection (water pipe or equivalent) will also contribute to quieter reception.

CONTROL KNOBS—The left hand knob is, initially, the power switch, and thereafter, tone control. The second knob from the left is band selector switch. The third knob from the left is tuning control. The right hand knob is volume control.

SERVICE NOTES—if the radio fails to operate when unpacked, or stops working after a few days, proceed as follows: (1) Have the tubes checked. (2) Remove the chassis from the cabinet and check for loose connections. (3) Have a competent "Radio Service Man" check over entirely. Do not return unless you have made the above tests. This set left the factory carefully inspected.

The intermediate stages are carefully phased to 456 KC at the factory. Should replacing be necessary, attach the output lead from a 166 KC test oscillator to the grid cap of the 6A7 tube, keep the signal to a very low audible value and carefully adjust the two trimmer screws in the top of each of the two half tanks to locate the correct frequency. An output meter is available if it should be desired to check the output across the two black bands at the speaker transformer. An oscillator covering a frequency from 550 KC to 16 KC should be used to replace the R. F. The test oscillator output is attached to the serial lead of the set. At all times keep the oscillator signal turned down to a low point of audibility. Trim the short-wave band first, then the broadcast band, setting the dial pointer to a frequency near the high frequency end of the scale in each case. The short-wave oscillator trimmer is located directly across the largel (oscillator) coil, looking at the under side of the set, and the R. F. short-wave trimmer at the right hand end of this coil. The broadcast band is next trimmed at the high frequency end of the broadcast scale, applying a signal from the oscillator corresponding to the dial setting and adjust the oscillator trimmer connected between the end of the oscillator coil and the porcelain base trimmer. Next trim the Broadcast R. F. by the trimmer connecting to the band switch. The broadcast band is next trimmed at the 550 KC end of the dial by adjusting the porcelain base trimmer at center of chassis until the signal is heard at the correct location on dial.

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

PHONOGRAPH—Install a single pole double-throw toggle switch near the 75 tube, disconnect the .01 mfd. condenser from the volume control and connect to one side of switch, connect the volume control to center terminal of switch, connect one side of the phonograph pickup to remaining side of the switch and the other side of the pickup to "B" minus.
To rebalance set, remove from cabinet. Intermediates are first balanced by feeding a 456 KC signal into grid of 6AT tube and adjusting trimmers in top of the two tall cans to greatest volume. Adjust wave trap in rear flange of chassis by turning the trimmer screw until a 456 KC signal applied to the antenna lead cannot be heard. Next, set band switch to broadcast position (counter-clock), turn tuning knob to 1400 KC, feed a 1400 KC signal into antenna lead and adjust trimmers on two 3-plate trimmers on under side of the panel to greatest volume. Turn tuning knob to 150 KC, set test oscillator to this frequency and adjust the two 3-plate trimmers on the under side of the panel to greatest volume.

Next, set band switch to long wave (clockwise), turn tuning knob to 960 KC, feed a 960 KC signal into the antenna lead and adjust the two 3-plate trimmers on the under side of the panel to greatest volume. Turn tuning knob to 160 KC, test oscillator to this frequency and adjust the 4-plate section of dual trimmer to maximum volume. Repeat the operations at 360 KC and 160 KC until trimming at one frequency does not affect the other.
Sparton Model 58 Country Home Superheterodyne
(Battery Operated)
Schematic Drawing and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage and Resistance of Each Socket Prong to Ground</th>
</tr>
</thead>
</table>
| 1A6    | 1st Detector-Oscillator   | Measurement  
|        |                           | Prong No. 1 Prong No. 2 Prong No. 3 Prong No. 4 Prong No. 5 Prong No. 6 Grid Cap | |
|        |                           | Volts   | Ohms  | Volts   | Ohms  | Volts   | Ohms  | Volts   | Ohms  | Volts   | Ohms  | Grid Cap |
| 32     | 1st IF Amplifier          | 2.120   | 115   | 115    | 65,000 | 50      | 0      | 0       | 0     | 0       | 0     | 300,000  |
| 32     | 2nd Detector-A.V.C.       | 2.25    | 130   | 130    | 0      | 0       | 0      | 0       | 0     | 0       | 0     | 500,000  |
| 30     | 1st A.F. Amplifier        | 3.05    | 50    | 1      | 0      | 0       | 0      | 0       | 0     | 0       | 0     | 500,000  |
| 33     | Power Amplifier           | 2.110   | 5     | 115    | 0      | 0       | 0      | 0       | 0     | 0       | 0     | 500,000  |

NOTES: Voltage and resistance readings are for schematic diagram shown. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

* Open **Cannot be measured with Weston No. 665, Type 1.

©John F. Rider, Publisher

www.americanradiohistory.com
SPARKS-WITHINGTON CO.

Sparton Models 70 and 77 Country Home Superheterodyne
(Battery Operated)

Schematic Diagram and Voltage Resistance Chart

VOLTAGE-RESISTANCE CHART

Condition of “A”, “B” and “C” Batteries—Good

Position of Volume Control — Full with Antenna Disconnected
Position of Band Selector Switch — Short-Wave

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>R. F. Amplifier.</td>
</tr>
<tr>
<td>1C6</td>
<td>First Detector-Oscillator.</td>
</tr>
<tr>
<td>34</td>
<td>First I. F.-Amplifier.</td>
</tr>
<tr>
<td>34</td>
<td>Second I. F.-Amplifier.</td>
</tr>
<tr>
<td>1A6</td>
<td>Second Detector-A. V. C.</td>
</tr>
<tr>
<td>30</td>
<td>First Audio Amplifier.</td>
</tr>
<tr>
<td>19</td>
<td>Power Amplifier</td>
</tr>
</tbody>
</table>

Voltage and Resistance of Each Socket Prong to Ground
(See Prong Numbers on Schematic Diagram)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts</td>
<td>130</td>
<td>130</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>300,000</td>
</tr>
<tr>
<td>Ohms</td>
<td>0</td>
<td>250,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>500,000</td>
</tr>
<tr>
<td>Volts</td>
<td>130</td>
<td>130</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>600,000</td>
</tr>
<tr>
<td>Ohms</td>
<td>0</td>
<td>*</td>
<td>55,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Volts</td>
<td>130</td>
<td>130</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>600,000</td>
</tr>
<tr>
<td>Ohms</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Volts</td>
<td>130</td>
<td>130</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Ohms</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9,000</td>
</tr>
<tr>
<td>Volts</td>
<td>130</td>
<td>130</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ohms</td>
<td>0</td>
<td>*</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Volts: 2.130 130
Ohms: 600,000

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15-3/4 + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

* Open

End View of Chassis

Top View of Chassis.

©John F. Rider, Publisher
**SPARKS-WITHINGTON CO.**

**Sparton Models 134 and 136 A.C. Superheterodyne**

Schematic Diagram and Voltage-Resistance Chart

**VOLTAGE-RESISTANCE CHART**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
<td>R.F. Amplifier</td>
<td><strong>Volts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>2A7</td>
<td>Converter</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>56</td>
<td>Oscillator</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>58</td>
<td>1st I.F. Amplifier</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>58</td>
<td>2nd I.F. Amplifier</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>56</td>
<td>2nd Detector - A. V. C.</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>56</td>
<td>1st A.F. Amplifier</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>56</td>
<td>2nd A.F. Amplifier</td>
<td>Volts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
</tbody>
</table>

**(4) 2A5**

Power Amplifier

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Prong No. 7</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts</td>
<td>2.5</td>
<td>330</td>
<td>330</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ohms</td>
<td>0</td>
<td>9000</td>
<td>9000</td>
<td>1500</td>
<td>175</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**(5Z3)** Rectifier

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Prong No. 7</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts</td>
<td>650</td>
<td>420</td>
<td>125</td>
<td>450</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ohms</td>
<td>9500</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>9500</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**NOTES:** Voltage and resistance readings are for schematic diagram shown on back of sheet. Allow 10% ± on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.
**Sparton Model 506 A. C.-D. C. Superheterodyne**

**Sparton Model 594 A. C.-D. C. Superheterodyne**

**Schematic Drawing and Voltage-Resistance Chart**

### VOLTAGE-RESISTANCE CHART

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>1st Detector-Oscillator</td>
</tr>
<tr>
<td>78</td>
<td>I-F Amplifier</td>
</tr>
<tr>
<td>75</td>
<td>2d Detector-A.V.C.</td>
</tr>
<tr>
<td>43</td>
<td>Power Amplifier</td>
</tr>
<tr>
<td>2M25</td>
<td>Rectifier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure- ment</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts</td>
<td>31</td>
<td>115</td>
<td>115</td>
<td>**</td>
<td>22</td>
<td>31</td>
<td>15</td>
</tr>
<tr>
<td>Ohms</td>
<td>700</td>
<td>7000</td>
<td>7000</td>
<td>**</td>
<td>2500</td>
<td>700</td>
<td>2100</td>
</tr>
<tr>
<td>Volts</td>
<td>31</td>
<td>115</td>
<td>116</td>
<td>4</td>
<td>4</td>
<td>31</td>
<td>**</td>
</tr>
<tr>
<td>Ohms</td>
<td>700</td>
<td>50000</td>
<td>50000</td>
<td>300</td>
<td>300</td>
<td>700</td>
<td>**</td>
</tr>
<tr>
<td>Volts</td>
<td>31</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>31</td>
<td>**</td>
</tr>
<tr>
<td>Ohms</td>
<td>700</td>
<td>500000</td>
<td>500000</td>
<td>500000</td>
<td>1000</td>
<td>700</td>
<td>500000</td>
</tr>
<tr>
<td>Volts</td>
<td>31</td>
<td>107</td>
<td>115</td>
<td>**</td>
<td>**</td>
<td>31</td>
<td>**</td>
</tr>
<tr>
<td>Ohms</td>
<td>700</td>
<td>50000</td>
<td>50000</td>
<td>500000</td>
<td>0</td>
<td>700</td>
<td>**</td>
</tr>
<tr>
<td>Volts</td>
<td>31</td>
<td>118</td>
<td>116</td>
<td>95</td>
<td>116</td>
<td>31</td>
<td>**</td>
</tr>
<tr>
<td>Ohms</td>
<td>700</td>
<td>850</td>
<td>45000</td>
<td>35000</td>
<td>900</td>
<td>700</td>
<td>**</td>
</tr>
</tbody>
</table>

**NOTES:** Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

**Cannot be measured with Weston No. 665, Type 1.**

---

**MODEL 594 CHASSIS**

©John F. Rider, Publisher
### SPARKS-WITHINGTON CO.

**Sparton Superheterodyne Models**  
616 616-X 666 666-X  
Schematic Diagram and Voltage-Resistance Chart

#### VOLTAGE-RESISTANCE CHART

<table>
<thead>
<tr>
<th>Line Voltage</th>
<th>Position of Tone Control</th>
<th>Position of Volume Control</th>
<th>Position of Band Selector Switch</th>
<th>Measure- ment</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Prong No. 7</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>Full</td>
<td>Full with Antenna Disconnected</td>
<td>Short-Wave</td>
<td>Voltage</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**NOTES:** Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15° + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero or 6.0 volts A.C. depending on twist of filament hook-up wire. When Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7 Tube) should read 6.0, and vice versa.*

**Cannot be measured with Weston No. 665, Type 1.**

---

*Schematic Diagram*  
**TOP VIEW**

---

© John F. Rider, Publisher

---

[www.americanradiohistory.com](http://www.americanradiohistory.com)
### VOLTAGE-RESISTANCE CHART

**Line Supply — A. C.**  
**Line Voltage — 119**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Measure- ment</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Grid Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>1st Detector-Oscillator</td>
<td>Volts</td>
<td>29</td>
<td>90</td>
<td>105</td>
<td>0</td>
<td>17.5</td>
<td>29</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
<td>700</td>
<td>35,000</td>
<td>20,000</td>
<td>0</td>
<td>2500</td>
<td>700</td>
<td>2400</td>
</tr>
<tr>
<td>78</td>
<td>1st I-F Amplifier</td>
<td>Volts</td>
<td>29</td>
<td>105</td>
<td>105</td>
<td>7.5</td>
<td>7.5</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
<td>700</td>
<td>20,000</td>
<td>20,000</td>
<td>1700</td>
<td>1700</td>
<td>700</td>
<td>800,000</td>
</tr>
<tr>
<td>78</td>
<td>2nd I-F Amplifier</td>
<td>Volts</td>
<td>29</td>
<td>80</td>
<td>100</td>
<td>3.3</td>
<td>3.3</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
<td>700</td>
<td>22,000</td>
<td>20,000</td>
<td>600</td>
<td>600</td>
<td>700</td>
<td>800,000</td>
</tr>
<tr>
<td>78</td>
<td>2nd Det.-A.V.C.</td>
<td>Volts</td>
<td>29</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>.64</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
<td>700</td>
<td>500,000</td>
<td>500,000</td>
<td>500,000</td>
<td>100</td>
<td>700</td>
<td>250,000</td>
</tr>
<tr>
<td>43</td>
<td>Power Amplifier</td>
<td>Volts</td>
<td>29</td>
<td>25</td>
<td>105</td>
<td>**</td>
<td>**</td>
<td>29</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
<td>700</td>
<td>20,000</td>
<td>20,000</td>
<td>750,000</td>
<td>0</td>
<td>700</td>
<td>—</td>
</tr>
<tr>
<td>25Z5</td>
<td>Rectifier</td>
<td>Volts</td>
<td>29</td>
<td>28</td>
<td>105</td>
<td>74</td>
<td>30</td>
<td>29</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ohms</td>
<td>700</td>
<td>700</td>
<td>20,000</td>
<td>2000</td>
<td>700</td>
<td>700</td>
<td>700</td>
</tr>
</tbody>
</table>

**NOTES:** Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15/16 + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.  
**Cannot be measured with Weston No. 665, Type 1.**
SPARKS-WITHINGTON CO.

Sparton Superheterodyne Models

716-X  766  766-X  766-XP  766-XS

Schematic Diagram and Voltage-Resistance Chart

VOLTAGE-RESISTANCE CHART

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Voltage and Resistance of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>R-F Amplifier</td>
<td>Prong No. 1 Prong No. 2 Prong No. 3 Prong No. 4 Prong No. 5 Prong No. 6 Prong No. 7 Grid Cap</td>
</tr>
<tr>
<td>6A7</td>
<td>Converter</td>
<td>Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms</td>
</tr>
<tr>
<td>75</td>
<td>1st I-F Amplifier</td>
<td>Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms</td>
</tr>
<tr>
<td>75</td>
<td>2nd I-F Amplifier</td>
<td>Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms</td>
</tr>
<tr>
<td>42</td>
<td>Power Amplifier</td>
<td>Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms</td>
</tr>
<tr>
<td>80</td>
<td>Rectifier</td>
<td>Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms Volts Ohms</td>
</tr>
</tbody>
</table>

NOTES: Voltage and resistance readings are for schematic diagram shown. See note under schematic diagram. Allow 15% + or — on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 1.

*Zero or 6.0 volts, depending on twist of filament hook-up wire. If Prong No. 1 reads zero, Prong No. 6 (Prong No. 7 of Type 6A7) should read 6.0 volts, and vice versa.

**Cannot be measured with Weston No. 665, Type 1.
**Schematic, Socket, Voltage**

**STEWART WARNER CORP.**

---

**I.F. FREQUENCY 456 K.C.**

- **LINE VOLTAGE AT 115 VOLS**
- **VOLUME CONTROL ON FULL**
- **ANTENNA GROUNDED**
- **DIAL SET AT 550 K.C.**

**VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINALS AS SEEN FROM THE BOTTOM**

**Diagram**

- **6A7**
  - 1ST DET. & OSC.
  - 6F7 I.F. & 2ND DET.

**Parts List**

**R-123 PARTS LIST**

(SEE OTHER SIDE FOR MISCELLANEOUS PARTS)

---

**Diagram**

- **Filaments Connect to X**
- **R-244 Speaker**

**Parts List**

- **80 Rect.**
- **22**
- **26**
- **18**
- **19A**

---

**Diag. No.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>List</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 mfd. 100 volt paper condenser</td>
<td>.80</td>
</tr>
<tr>
<td>2</td>
<td>1.1 mfd. 500 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>3</td>
<td>2 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>4</td>
<td>.001 mfd. 500 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>5</td>
<td>.02 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>6</td>
<td>.1 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>7</td>
<td>.4 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>8</td>
<td>.5 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>9</td>
<td>.6 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>10</td>
<td>.7 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>11</td>
<td>.8 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>12</td>
<td>.9 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>13A</td>
<td>2.2 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>13B</td>
<td>3.3 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>14</td>
<td>.001 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>15</td>
<td>.002 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>16</td>
<td>.003 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>17A</td>
<td>.004 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>17B</td>
<td>.005 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>18</td>
<td>.006 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>19A</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>20</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>21</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>22</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>23</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>24</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>25</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>26</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>27</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>28</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
<tr>
<td>29</td>
<td>250 ohm resistor</td>
<td>.20</td>
</tr>
</tbody>
</table>

---

**Diag. No.**

- **Filaments Connect to X**
- **R-244 Speaker**

**Parts List**

- **80 Rect.**
- **22**
- **26**
- **18**
- **19A**

---

**Diag. No.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>List</th>
</tr>
</thead>
<tbody>
<tr>
<td>19A</td>
<td>1 mfd. 200 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>20</td>
<td>2 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>21</td>
<td>3 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>22</td>
<td>4 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>23</td>
<td>5 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>24</td>
<td>6 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>25</td>
<td>7 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>26</td>
<td>8 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>27</td>
<td>9 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>28</td>
<td>10 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
<tr>
<td>29</td>
<td>11 mfd. 100 volt paper condenser</td>
<td>.20</td>
</tr>
</tbody>
</table>

---

**Important:** Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meters. This variation is most marked for second detector plate voltage.

All bias voltages change with position of volume control. Use maximum position.

- **6F7 Pentode Grid Cap to ground 10 volts D.C.**
- **Speaker field voltage with roll arm is 10 volts D.C.**

**Note:** The oscillator grid voltage with the dial set at 530 K.C. and volume control on full should be approximately —4 volts (300 volt scale).
STEWART-WARNER MODEL R-123 CHASSIS
USED IN RECEIVER MODELS 1231 TO 1239

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-123 Chassis is a four tube superheterodyne, having a tuning range of 530 to 1720 kc. The incoming signal goes to the tuned first detector circuit, and there the photo tubes, tubes R-123-A, B, and C, are for the frequency range from 530 to 1250 kc. The R-123-B Chassis is for use in 250 to 600 cycle power circuits. The R-123-B Chassis has a universal power transformer for operation on voltages ranging from 100 to 260 volts and any frequency from 40 to 133 cycles. This universal transformer in the R-123-W has a tapped primary which must be connected for the proper line voltage as shown on the tag attached to the chassis.

CALIBRATION AND ALIGNMENT

TEST EQUIPMENT

A high grade modulated service oscillator and an output meter are absolutely essential in order to properly align the R-123 chassis. The oscillator should be capable of generating frequencies of 456 and 1400 kc.

PRECAUTIONS

When using your oscillator, do not rely on calibration curves for frequency determination but check the frequency by comparison with broadcast station signals. When aligning, keep the oscillator output low so that the second detector does not overload. Use the lowest output meter scale which will provide a steady reading and adjust the oscillator output so that the output meter reads near the center of the scale.

PRELIMINARY STEPS

To align the R-123 Chassis proceed as follows:

1. Check the frequency of the 6A7 tube. Connect the output meter from the 41 plate to chassis through a 25 mdF condenser. The output meter can be connected across the voice coil terminals on the speaker if the meter is sensitive enough to provide at least half-scale reading.

2. Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

1. First I. F. transformer trimmers.
3. Oscillator calibration trimmer.
4. Detector shunt trimmer.

ALIGNMENT OF THE I. F. AMPLIFIER

1. (a) Set the test oscillator to exactly 456 kc.
(b) Connect the output leads of the oscillator to the 6A7 control grid and chassis.
(c) Make certain that no station is tuned in.
(d) Carefully adjust the I. F. transformer trimmers No. 1, 2, and 3 for maximum output meter reading.
(e) Repeat the above steps, since the adjustment of each trimmer has some effect on the others.

DIAL CALIBRATION

1. Check the position of the dial on the condenser shaft by turning the rotor plates of the gang condenser to full mesh. The dial should then read 530 kc.
2. A broadcast station between 1300 and 1420 kc should be used to calibrate the dial. If no such station can be heard, you can use a 1400 kc signal from your oscillator provided its calibration is accurately known. Proceed as follows:
   (a) Tune the receiver dial to the exact frequency reading of the signal (either a station or the oscillator).
   (b) Carefully adjust the oscillator calibration trimmer No. 4 until the signal may be tuned in, with maximum volume at its correct frequency setting.

TUBE LOCATIONS

ALIGNMENT

4. (a) Connect a 400 to 500 ohm, 1 watt carbon resistor in series with the test oscillator output and the receiver antenna lead. This resistor is necessary to secure proper alignment of the detector trimmer.
   (b) Ground the receiver chassis and connect the oscillator ground lead to the chassis.
   (c) Set the test oscillator to about 1400 kc and carefully tune the receiver to the signal.
   (d) Adjust trimmer No. 5 (detector shunt trimmer) for maximum output meter reading.
   (e) Retune the receiver dial to a peak and readjust the trimmer.

MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

©John F. Rider, Publisher
I.F. FREQUENCY 456 K.C.

SOCKET VOLTAGES

LINE VOLTAGE 115 VOLTS Volume Control on Full ANTENNA GROUNDED RANGE SWITCH SET ON BROADCAST POSITION DIAL SET AT 350 K.C.

R-125 PARTS LIST

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-A</td>
<td>Range Switch</td>
<td>1</td>
<td>$0.75</td>
</tr>
<tr>
<td>25-B</td>
<td>16 mfd 350 volt electrolytic condenser</td>
<td>1</td>
<td>$1.50</td>
</tr>
<tr>
<td>27</td>
<td>R.F. Trimmer Condenser (4 to 23 mfd)</td>
<td>1</td>
<td>$0.15</td>
</tr>
<tr>
<td>28</td>
<td>Oscillator Peaking Resistor (300-600 mfd)</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>29-A</td>
<td>400 ohm resistor</td>
<td>1</td>
<td>$0.65</td>
</tr>
<tr>
<td>29-B</td>
<td>225 ohm resistor</td>
<td>1</td>
<td>$0.65</td>
</tr>
<tr>
<td>29-D</td>
<td>250 ohm resistor</td>
<td>1</td>
<td>$0.65</td>
</tr>
<tr>
<td>31</td>
<td>16,000 ohm 250 volt carbon resistor</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>32</td>
<td>250 mfd, molded mica condenser</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>33</td>
<td>100 microfarad, molded mica condenser</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>34</td>
<td>Broadband Freq. Selector Coll. Assem.</td>
<td>1</td>
<td>$1.00</td>
</tr>
<tr>
<td>35</td>
<td>Output Transformer (120 watts only)</td>
<td>1</td>
<td>$2.50</td>
</tr>
<tr>
<td>36</td>
<td>Phonograph Terminal Type (125 V only)</td>
<td>1</td>
<td>$0.80</td>
</tr>
<tr>
<td>37</td>
<td>Power Transformer (1000 to 210 volts, 25 to 125 volts, 125 V only)</td>
<td>1</td>
<td>$2.00</td>
</tr>
<tr>
<td>38</td>
<td>Tone Control Switch</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>39</td>
<td>Diaphragm and Shell Assembly for 222 8&quot; speaker</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>40</td>
<td>Field Coil and Housing for 222 8&quot; speaker</td>
<td>1</td>
<td>$0.50</td>
</tr>
<tr>
<td>41</td>
<td>Field Coil and Housing for 222 12&quot; speaker</td>
<td>1</td>
<td>$0.50</td>
</tr>
</tbody>
</table>
ALIGNING EQUIPMENT

Experience has definitely shown that a selective radio chassis such as a Steward Warner Model R-125 cannot be properly aligned by ear or "on the air". An output meter and a high grade modulated service oscillator are absolutely essential.

The oscillator must be capable of generating the frequencies of 456 K.C., 600 K.C., 1400 K.C., and a short wave range extending to 4000 K.C. or more.

Without an oscillator do not rely on calibration curves for frequency determination but check the frequencies with broadcast station signals.

PRELIMINARY STEPS

To align the R125 chassis proceed as follows:

1. Remove the chassis from the cabinet.
2. Connect the output meter across the primary of the output transformer on the dynamic speaker (center and blue wires on terminal strip.)
3. Turn the volume control to maximum volume position.

ALIGNMENT OF THE I.F. AMPLIFIER

(a) Set the test oscillator to exactly 456 K.C.
(b) Connect the output leads of the oscillator to the 6A7 control grid and ground.
(c) Set the range switch (right hand knob) to the broadcast position (fully clockwise). Make certain that no station is tuned in.
(d) Carefully adjust the I.F. Transformer trimmers Nos. 1, 2, 3, and 4 for maximum output meter deflection.
(e) Repeat the four trimmer adjustments since the adjustment of each trimmer has some effect on the others.

BROADCAST RANGE CALIBRATION

1. Check the position of the dial on the condenser shaft by pushing the rotor plates of the gang condenser to full mesh. The dial should then read 530 K.C. Please note that the plates should be pushed with the fingers and not turned by means of the dial for this check.
2. Turn the range switch (right hand knob) to the maximum the receiver position which is the broadcast setting.
3. Calibrate the set at the high frequency end. Use a broadcast station signal between 1300 and 1420 K.C. to calibrate the receiver dial. If no such station can be heard, you can use a 1400 K.C. signal from your oscillator provided its calibration is accurately known.
4. Tune the set dial to the exact frequency setting of the signal (either a station or the oscillator).
5. (a) Set the test oscillator to approximately 1400 K.C. and carefully tune the receiver to the signal.
(b) Adjust trimmer Nos. 6 and No. 7 (broadcast detector shunt trimmer and broadcast pre-selector shunt trimmer respectively) for maximum output meter reading.
(c) Retune the receiver and check the adjustments of trimmer No. 6 and No. 7. Do not touch trimmer No. 5 since this will change the calibration.
6. (a) Set the test oscillator to approximately 600 K.C. and tune the receiver to the signal.
(b) Adjust Trimmer No. 8 (broadcast oscillator padding trimmer) to get maximum output meter deflection.
(c) Retune the receiver dial to a peak and readjust the trimmer.
(d) Continue this procedure of adjusting the trimmer and retuning until the output meter reading cannot be increased. This procedure must be followed or the receiver will not be properly aligned.
7. Repeat 5 a, b, h, and 5 a.

SHORT WAVE RANGE CALIBRATION

1. Turn the receiver range switch to the short wave band position (counter-clockwise).
2. Adjust the test oscillator to exactly 16,000 K.C. If you cannot obtain this frequency on your oscillator, you may use the second harmonic of 8000 K.C., the third harmonic of 5333 K.C., or the fourth harmonic of 4000 K.C., all of which will give a 16,000 K.C. signal.
3. (a) Set the receiver dial at 16.0 M.C. on the dial scale and adjust trimmer No. 9 (shortwave range oscillator calibration trimmer) until the signal may be tuned in at the correct dial setting with maximum output meter deflection. Usually there will be two peaks. The proper one is that with the trimmer screw farthest out.
4. (b) To be sure you have not adjusted trimmer No. 9 to the image frequency, check this point by setting the receiver dial to the image frequency, approximately 15.1 M.C. and see if the image signal can be heard. The image frequency is always the signal frequency minus twice the I.F. setting or in this case 16,000 - 912 = 15,088 K.C. or approximately 15.1 M.C.)
5. If no signal can be heard at 15.1 M.C. dial setting even with greatly increased test oscillator output, but can be heard at 16.9 M.C. dial setting. Trimmer No. 9 is evidently improperly adjusted to the image frequency and so must be readjusted the proper peak with the screw farther out. After readjusting trimmer No. 9, again check to see that the image comes in at 15.1 M.C. dial setting and not at 16.9 M.C. dial setting.

SHORT WAVE RANGE ALIGNMENT

(a) Tune the set very carefully to the oscillator frequency, 16.0 M.C. for maximum output meter reading.
(b) Adjust trimmer No. 10 (second shortwave range detector shunt trimmer) to a peak. After this is done try to increase the output meter reading by detuning trimmer No. 10 slightly and retuning the receiver dial. Continue detuning trimmer No. 10 and retuning the set until maximum output meter deflection is secured.

IMPORTANT: The antenna coupling condenser marked "A" in the diagram is adjusted to a definite capacity at the factory and should not require any further adjustment. Therefore do not adjust trimmer "A" unless it is found that trimmer No. 10 will not peak or if maximum output is obtained with No. 10 either all the way out or all the way in. If it is necessary to adjust trimmer "A", turn its adjusting screw all the way in and then turn it out just far enough to give a satisfactory peak on No. 10 when trimmer No. 10's adjusting screw is almost all the way out.

Always readjust No. 10 after adjusting trimmer "A".
(c) Check the adjustment of trimmer No. 10 by tuning the receiver to 15.1 M.C. and noting if the image signal is much weaker than the 16.0 M.C. signal. If the signal at 15.1 M.C. dial setting is equal to or stronger than the 16.0 M.C. signal, trimmer No. 10 is not set to the proper peak and must be reset as in 4 (b) until a re-check shows that the signal at the 16.0 M.C. dial setting is much stronger than that at the 15.1 M.C. image dial setting.

NOTE: To prevent the trimmers from being jarred out of adjustment use Duclo Household Cement or some similar product to fasten the trimmer screws in position after completing the alignment. Be careful that you do not apply too much cement because it must not be allowed to run between the trimmer plates.
STEWART-WARNER MODEL R-126 CHASSIS

CIRCUIT DESCRIPTION

The Stewart-Warner Model R-126 chassis is a 12-volt full-wave voltage stabilizer, covering a frequency range from 110 to 140 cycles per second. It incorporates various components, including transformers, diodes, and capacitors, which can be selected by means of the range switch. The chassis provides a stable voltage to the receiver circuitry, regardless of the fluctuations in the electrical supply. It ensures that the audio output is not affected by the variations in the electrical supply. The chassis is particularly useful in radio receivers where a stable voltage is required for proper operation.

PRELIMINARY STEPS

To align the R-126 chassis properly, follow these steps:

1. Remove the chassis from the cabinet.
2. Connect the output meter across the primary of the transformer.
3. Turn the volume control to maximum volume position.

TRIMMER LOCATIONS

1. F. AMPLIFIER
   1. 1st F. transformer trimmers
   2. 2nd F. transformer trimmers
   3. 3rd F. transformer trimmers

RANGE I: 600 TO 1450 K.C. BROADCAST RANGE

7. Range No. 1 (Broadcast) oscillating calibration trimmer.
8. Range No. 1 (Broadcast) detector short circuit.
9. Range No. 1 (Broadcast) oscillating calibration trimmer.

RANGE II: 1500 TO 4000 K.C. SHORTWAVE RANGE

10. Range No. 2 (Detector) short circuit.
11. Range No. 2 (Detector) oscillating calibration trimmer.
12. Range No. 2 (Detector) oscillating calibration trimmer.
13. Range No. 2 (Detector) detector short circuit.
14. Range No. 2 (Detector) detector short circuit.

RANGE III: 430 TO 230 M.C. SHORTWAVE RANGE

15. Range No. 3 (Oscillator) short circuit.
16. Range No. 3 (Oscillator) short circuit.
17. Range No. 4 (Detector) short circuit.
18. Range No. 4 (Detector) short circuit.
19. Range No. 4 (Detector) short circuit.

RANGE IV: 12 TO 200 M.C. SHORTWAVE RANGE

20. Range No. 5 (Oscillator) short circuit.
21. Range No. 5 (Oscillator) short circuit.
22. Range No. 6 (Detector) short circuit.
23. Range No. 6 (Detector) short circuit.
24. Range No. 6 (Detector) detector short circuit.

CALIBRATION AND ALIGNMENT

The following procedure, if properly adjusted, the various trimmers, and the output meter absolutely are essential.

1. Connect the output meter across the primary of the transformer.
2. Turn the volume control to maximum volume position.
3. Adjust the trimmers accordingly, and check the performance of the receiver.
4. Repeat the trimmers adjustments after the amplifier has been turned on for 10 minutes.

RANGE I: 600 TO 1450 K.C. BROADCAST RANGE

6. (a) Adjust trimmers No. 6 and No. 7 (Range No. 1 broadcast short circuit) to 1450 kc.
7. (b) Adjust trimmers No. 6 and No. 7 (Range No. 1 broadcast short circuit) to 1450 kc.
8. (c) Return the receiver to the signal.

RANGE II: 1500 TO 4000 K.C. SHORTWAVE RANGE

10. (a) Adjust trimmers No. 10 and No. 11 (Range No. 2 broadcast short circuit) to 4000 kc.
11. (b) Adjust trimmers No. 10 and No. 11 (Range No. 2 broadcast short circuit) to 4000 kc.
12. (c) Return the receiver to the signal.

RANGE III: 430 TO 230 M.C. SHORTWAVE RANGE

15. (a) Adjust trimmers No. 15 and No. 16 (Range No. 3 oscillator short circuit) to 230 mc.
16. (b) Adjust trimmers No. 15 and No. 16 (Range No. 3 oscillator short circuit) to 230 mc.
17. (c) Return the receiver to the signal.

RANGE IV: 12 TO 200 M.C. SHORTWAVE RANGE

20. (a) Adjust trimmers No. 20 and No. 21 (Range No. 5 oscillator short circuit) to 200 mc.
21. (b) Adjust trimmers No. 20 and No. 21 (Range No. 5 oscillator short circuit) to 200 mc.
22. (c) Return the receiver to the signal.

RANGE NO. 1 (BROADCAST) ALIGNMENT

5. Connect a 400 or 500 ohm, 1 watt carbon resistor in series with the battery feeding the input and the receiver antenna lead. This resistor should be removed after the alignment is complete. Note: All calibration adjustments should be made in order to secure proper alignment of the antenna stage and to keep the oscillator stage from disturbing the broadcast stage.

RANGE NO. 2 ALIGNMENT

11. (a) Adjust trimmer No. 12 (Range No. 2 oscillator short circuit) to a peak.
12. (b) Adjust trimmer No. 12 (Range No. 2 oscillator short circuit) to a peak.
13. (c) Return the receiver to the signal.

RANGE NO. 3 ALIGNMENT

13. Turn the receiver dial switch to the range No. 3 position. (Dial pointer on green scale)
14. (a) Adjust trimmer No. 14 (Range No. 3 oscillator short circuit) to 12,000 kc.
15. (b) Adjust trimmer No. 14 (Range No. 3 oscillator short circuit) to 12,000 kc.
16. (c) Return the receiver to the signal.

RANGE NO. 4 ALIGNMENT

14. (a) Adjust trimmer No. 14 (Range No. 4 oscillator short circuit) to 4000 kc.
15. (b) Adjust trimmer No. 14 (Range No. 4 oscillator short circuit) to 4000 kc.
16. (c) Return the receiver to the signal.

PRECISION

When using your oscillator do not rely on only one calibration curve for this reason. If a test is made by comparing with broadcast station signals, the meter should not be used for more than 10 minutes at a time. It is advisable to use an output meter which will provide a steady reading and an output meter which reads only the output meter scale. Do not rely on the output meter scale for any duration of time.

RANGE I: 600 TO 1450 K.C. BROADCAST RANGE

2. Connect the output meter across the primary of the transformer.
3. Adjust the trimmers accordingly, and check the performance of the receiver.
4. Repeat the trimmers adjustments after the amplifier has been turned on for 10 minutes.

RANGE II: 1500 TO 4000 K.C. SHORTWAVE RANGE

10. Adjust the trimmers accordingly, and check the performance of the receiver.
11. Repeat the trimmers adjustments after the amplifier has been turned on for 10 minutes.

RANGE III: 430 TO 230 M.C. SHORTWAVE RANGE

15. Adjust the trimmers accordingly, and check the performance of the receiver.
16. Repeat the trimmers adjustments after the amplifier has been turned on for 10 minutes.

RANGE IV: 12 TO 200 M.C. SHORTWAVE RANGE

20. Adjust the trimmers accordingly, and check the performance of the receiver.
21. Repeat the trimmers adjustments after the amplifier has been turned on for 10 minutes.

www.americanradiohistory.com
16. Turn the receiver range switch to the No. 4 position, 
(dial pointer on purple dial scale).
(a) Set the receiver dial pointer to exactly 12.0 
mc. on the purple dial scale.
(b) Adjust trimmer No. 18 (range No. 4 oscillator 
padding trimmer) until the signal gives maximum output meter reading.
(c) To be sure that you have not adjusted trimmer 
No. 18 on the image frequency, tune in the image signal at 
approximately 11.1 mc. on the receiving dial. If no signal 
can be heard at 11.1 mc. even with greatly increased test oscillator 
output, but can be heard at 12.9 mc. dial setting, trimmer No. 18 
is evidently adjusted to the image frequency and so must 
be reset to the proper peak with the trimmer screw farther out.
After re-adjusting trimmer No. 18, again check to see that the 
image comes in at 11.1 mc. dial setting and not at the 12.9 mc. 
dial setting.
18. (a) Set the test oscillator to exactly 20.0 kc. If your 
oscillator cannot reach this frequency, use the 2nd harmonic 
of 10,000 kc., the third harmonic of 6666 kc., the fourth 
harmonic of 5000 kc., or the fifth harmonic of 4000 kc. all 
of which will give a 20,000 kc. signal.
(b) Set the receiver dial pointer to exactly 20.0 mc. 
on the purple dial scale.
(c) Adjust trimmer No. 16 (range No. 4 oscillator 
trimmer) until the signal is tuned in with maximum 
volts on the image dial. If no signal, there usually will be two 
peaks. The proper one is that with the trimmer screw farthest 
out.
(d) To be sure you have not adjusted trimmer No. 16 
for the image frequency, check this point by tuning the receiver 
dial to the image frequency, approximately 19.1 mc. and see if 
the image signal can be heard. If no signal can be heard at 19.1 mc. dial setting even with greatly increased test oscillator 
output, but can be heard at 20.9 mc. dial setting, trimmer No. 16 
is evidently improperly adjusted to the image frequency and so 
must be reset to the proper peak with the screw farther out. 
After re-adjusting trimmer No. 16 again check to see that the 
image comes in at 19.1 mc. dial setting and not at 
20.9 mc. dial setting.

RANGE NO. 4 ALIGNMENT
19. (a) Tune the set very carefully to the oscillator fre- 
quency, 20.0 mc., for maximum output meter reading. 
(b) Adjust trimmer No. 17 (range No. 4 detector 
shunt trimmer) to a peak. After this is done try to increase 
the output meter reading by detuning trimmer No. 17 slightly 
and returning the receiver dial. Continue detuning trimmer No. 17 
and returning the set until maximum output meter deflection 
is secured.
(c) Check the adjustment of trimmer No. 17 by tuning 
the receiver to 19.1 mc. and noting if the signal strength 
is much weaker than the 20.0 mc. signal. If the signal at 19.1 mc. 
dial setting is equal to or stronger than the 20.0 mc. signal, trimmer 
No. 17 is not set to the proper peak and must be 
reset as in 19b until a check shows that the signal at the 
20.0 mc. dial setting is much stronger than that at the 19.1 mc. 
dial setting.
20. (a) Set the test oscillator to about 12,000 kc. or use 
the second harmonic of 6000 kc., the third harmonic of 4000 kc. 
and the fourth harmonic of 3000 kc., all of which give a 
12,000 kc. signal.
(b) Tune the set very carefully to the oscillator signal 
at 12.0 mc. to get maximum output meter reading.
(c) Adjust trimmer No. 19 (range No. 4 detector pad-
ing trimmer) to get maximum output meter deflection.
(d) Retune the receiver dial to a peak and readjust the 
trimmer.
(e) Continue this procedure of adjusting the trimmer 
and retuning the receiver until the output meter reading cannot 
be increased.
(f) Check the adjustment of the trimmer of range No. 19 
by tuning the receiver dial to the 19.1 mc. signal 
and noting if the signal strength is much weaker than the 12.0 mc. 
signal. In case the signal at the 11.1 mc. dial setting is 
equal to or stronger than the signal at 12.0 mc. dial setting, 
trimming trimmer No. 19 must be re-adjusted to a different peak as 
in 20 (a), 20 (d) and 20 (e), so that the 11.1 mc. dial setting 
signal is much weaker than the 12.0 mc. dial setting signal.

NOTE: To prevent the trimmers from being jarred out of 
adjustment, use Duco Household Cement or some similar prod-
uct to fasten the trimmer screws in position after completing 
the alignment. Be careful that you do not apply too much 
cement because it must not be allowed to run between the 
trimmer plates.
**STEWART-WARNER MODEL R-127 CHASSIS (RECEIVER MODELS 1271 to 1279)**

**VOLTAGES MEASURED BETWEEN CHASSIS AND SOCKET TERMINALS AS SEEN FROM THE BOTTOM**

<table>
<thead>
<tr>
<th>Diag. No.</th>
<th>Part No.</th>
<th>DESCRIPTION</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>411581</td>
<td>10k, 500k, 50k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411582</td>
<td>100k, 10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411583</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411584</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411585</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411586</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411587</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411588</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411589</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411590</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
</tbody>
</table>

**R-127 PARTS LIST**

**Diag. No.** | **Part No.** | **DESCRIPTION** | **Price** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>411591</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411592</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411593</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411594</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411595</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411596</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411597</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>411598</td>
<td>10k, 1k ohm carbon resistor</td>
<td>.30</td>
<td></td>
</tr>
</tbody>
</table>

**Important:** Use a high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon voltage range of meter, being higher for higher range instruments. This variation is most marked with second detector plate voltage.

**Speaker field voltage with red wire is 73 volts D.C.**

**F. Rider, Publisher**

---

**STEWART WARNER CORP.**

---

**John F. Rider, Publisher**

---

[www.americanradiohistory.com](http://www.americanradiohistory.com)
CIRCUIT DESCRIPTION

The Stewart-Warner Model R-127 Chassis is a five tube allsolid-state radio. It covers a frequency range from 530 kilocycles to 170 megacycles. Four tuning ranges, which can be selected by a single control, are used to cover the entire range of the modulated receiving switch. The range switch is used to change the range of frequencies to suit the broadcast receiver or the amount of material of the antenna which is to be received. The range switch is used to receive all the broadcast frequencies which are part of each tuning range.

The R-127A Chassis is constructed for use on 101 to 125 volt 50 to 60 cycle power circuits and the R-127X is available with 240 volt lines at any frequency from 25 to 133 megacycles. The universal transformer in the R-127X used for the different ranges of voltage and frequency has a tapped primary which must be connected as shown on the tag included in the set.

A special electronically stabilized antenna coil is employed as that efficient, relatively noise free short wave receiver may be secured with a double-tuned antenna without the use of any additional coupling devices. During the manufacture of broadcast stations the incoming signal from the antenna enters the antenna and pre-selector coil, and then goes to the 504 broadcast detector circuit and oscillator. The pre-selector coil is used during the reception of short wave signals. It is designed so that it generates a frequency higher than that of the signal, which is the signal plus the intermediate frequency is then tuned to the intermediate frequency. A by-pass condenser and a control is used to control the output of the signal in which it is to be used. A 504 IF amplifier has been chosen for the high lost value for all types of wave. It is practically automatic in reducing image frequency on the short wave bands. The 504 K.C. signal from the 504 A.B.D. will then be amplified through a special high frequency gain, high selectivity, high power amplifier employing a 504 K.C. type tube. The preselector coil is used to select the signal frequency, so that a modulated D.C. voltage drop is produced across the coil. The signal frequency is then tuned to the intermediate frequency by selecting any selected part of the voltage on the 504 A.D. circuit. The signal frequency is then amplified by a 504 A.B.D. The 504 A.B.D. is fed by a signal path of the 41 tube for additional amplification and power output to the line output.

CALIBRATION AND ALIGNMENT OF MODEL R-127 CHASSIS

TEST EQUIPMENT

Experience has definitely shown that a selective radio chassis such as the Stewart-Warner Model R-127 cannot be properly aligned and adjusted if the test equipment is not complete. An output meter and a high frequency meter and service oscilloscope are absolutely essential. The calibration adjustments and alignment of the chassis will cover the frequency range corresponding to a short wave range extending from 530 K.C. to 10 megacycles. After completing the alignment of the various bands where the A.C.V. circuit will not be changed, the four tuning ranges will be checked separately out of adjustment or for short wave alignment where harmonics may be present.

PRECAUTIONS

1. When using your oscillator do not rely on calibration curves for frequency determination but check the frequencies of the broadcast stations before Zeroing.

2. At times during calibration and alignment use the lower audible tone frequency to provide the tone which you will use to check the tone of the oscillator, so that the output meter readings near the center of the scale will be accurate for this special tone frequency. Use a test oscillator which has a tone frequency of 530 K.C. to 10 megacycles in the frequency range of the short wave band which you plan to align. This is a very critical adjustment of the frequency range extending from 530 K.C. to 10 megacycles. After completing the alignment of the various bands where the A.C.V. circuit will not be changed, the frequency range extending from 530 K.C. to 10 megacycles will be checked separately for continuous alignment.

3. Be sure that the IF stages are accurately tuned before aligning the oscillator. If not accurately tuned the IF stages will be out of adjustment or may not be aligned for short wave alignment where harmonics may be present.

RANGE 1 CALIBRATION

1. Check the position of the disc on the condenser shaft by turning the number plate of the 504 A.B.D. to the desired frequency.

2. Tune the range switch (right hand) to the maximum signal frequency.

3. Set the signal generator to the desired frequency and adjust the trimmer to the maximum signal frequency.

4. Set the signal generator to the desired frequency and adjust the trimmer to the maximum signal frequency.

5. Check the alignment of the oscillator with the aid of a signal generator.

6. Check the alignment of the oscillator with the aid of a signal generator.

7. Check the alignment of the oscillator with the aid of a signal generator.

RANGE 2 CALIBRATION

1. Check the position of the disc on the condenser shaft by turning the number plate of the 504 A.B.D. to the desired frequency.

2. Tune the range switch (right hand) to the maximum signal frequency.

3. Set the signal generator to the desired frequency and adjust the trimmer to the maximum signal frequency.

4. Check the alignment of the oscillator with the aid of a signal generator.

5. Check the alignment of the oscillator with the aid of a signal generator.

6. Check the alignment of the oscillator with the aid of a signal generator.

RANGE 3 CALIBRATION

1. Check the position of the disc on the condenser shaft by turning the number plate of the 504 A.B.D. to the desired frequency.

2. Tune the range switch (right hand) to the maximum signal frequency.

3. Set the signal generator to the desired frequency and adjust the trimmer to the maximum signal frequency.

4. Check the alignment of the oscillator with the aid of a signal generator.

5. Check the alignment of the oscillator with the aid of a signal generator.

6. Check the alignment of the oscillator with the aid of a signal generator.

RANGE 4 CALIBRATION

1. Check the position of the disc on the condenser shaft by turning the number plate of the 504 A.B.D. to the desired frequency.

2. Tune the range switch (right hand) to the maximum signal frequency.

3. Set the signal generator to the desired frequency and adjust the trimmer to the maximum signal frequency.

4. Check the alignment of the oscillator with the aid of a signal generator.

5. Check the alignment of the oscillator with the aid of a signal generator.

6. Check the alignment of the oscillator with the aid of a signal generator.
MODEL R127-X CHASSIS
FOR OPERATION ON 100-260 VOLTS, 25 TO 133 CYCLES

PHONOGRAPH AND UNIVERSAL POWER TRANSFORMER
CONNECTIONS IN MODEL R127-X

SEE PARTS LIST ON FIRST PAGE FOR PART NUMBERS, DESCRIPTIONS AND PRICES.
SERVICE DATA FOR STEWART-WARNER R-131 CHASSIS

CIRCUIT DESCRIPTION

In the R-131 Chassis, the incoming signal is tuned and amplified in the 78 R.F. stage. Further amplification and frequency conversion to 177.5 K.C., take place in the 77 combination first detector and oscillator tube. The 177.5 K.C. signal is amplified in the I.F. stage, using a 78 type tube, and then rectified in the diode section of the 75 second detector tube. The rectified current produces a modulated D.C. voltage across the diode load resistor No. 7. The audio component of this voltage appears across the 500,000 ohm volume control. Any part or all of this audio signal may be impressed on the triode section of the 75 tube where amplification takes place.

The modulated drop across resistor No. 7 is filtered and applied to the grids of the 78 R.F. and I.F. tubes to provide A.V.C.

POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tubes are protected against breakdown during the warming-up period by the Globar resistor connected across the high voltage secondary of the power transformer (No. 12 in the circuit diagram). This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a 0.25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point to connect the 41 plate to ground is at the terminal of the tuning control switch.

During all calibration and alignment adjustments, keep the volume control full on.

I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers which may be reached by removing the front cover. The modulated oscillator should be set to exactly 177.5 K.C. and connected from the 77 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust these three I.F. trimmers to give maximum output reading. In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles, except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the dial can be calibrated as follows:

Tune in a station of known frequency between 800 and 1100 K.C. Insert a screw driver in the slotted shaft on the rear of the control head. Hold the tuning control knob so that the shafts are turned in properly and by turning the screw driver adjust the dial pointer so that it indicates the station frequency.

If the set is badly out of calibration such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below. The gang condenser trimmers can be reached by removing the back cover. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the aerial lead of the receiver. This condenser is absolutely necessary to secure proper alignment of the antenna stage.

Set the test oscillator to exactly 600 K.C. Tune the radio set to the minimum volume. Calibrate the dial at the low frequency end by setting the pointer to read exactly 6.0 (600 K.C.).

Set the test oscillator to exactly 1400 K.C. Turn the tuning knob until the dial pointer indicates 14.0 (1400 K.C.) and then adjust the oscillator shunt trimmer (third one from shaft end of the variable condenser) until the signal is received with maximum output. Then adjust the other two gang condenser trimmers as directed under R.F. alignment.

R. F. ALIGNMENT

With the test oscillator set to approximately 1400 K.C., tune the set very carefully for maximum output. Adjust the output of the oscillator to the minimum value which will give sufficient output to the receiver. This adjustment is made in the R.F. Section. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

MISCELLANEOUS PARTS NOT SHOWN ON DIAGRAM

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>12606</td>
<td>Receiver mag. nut (5'/6&quot;-18 hex.)</td>
<td>$0.02</td>
</tr>
<tr>
<td>17166</td>
<td>Single hole mag. nut</td>
<td>$0.05</td>
</tr>
<tr>
<td>81316</td>
<td>1 lug terminal strip</td>
<td>$0.04</td>
</tr>
<tr>
<td>8344</td>
<td>15,000 ohm spark plug suppressor</td>
<td>$0.35</td>
</tr>
<tr>
<td>83446</td>
<td>10,000 ohm distributor suppressor</td>
<td>$0.35</td>
</tr>
<tr>
<td>83412</td>
<td>No. 8 x ½&quot; self tapping screws (dark finish for mag. back cover and rating brackets)</td>
<td>$0.02</td>
</tr>
<tr>
<td>83519</td>
<td>Fuse insulating tube</td>
<td>$0.06</td>
</tr>
<tr>
<td>83624</td>
<td>No. 8 x ½&quot; self tapping screw (Cabinet plate, for mag. power transformers)</td>
<td>$0.04</td>
</tr>
<tr>
<td>83711</td>
<td>2 lug terminal strip</td>
<td>$0.12</td>
</tr>
<tr>
<td>83719</td>
<td>Front cover jig. splice bolt (3/32&quot;)</td>
<td>$0.01</td>
</tr>
<tr>
<td>83720</td>
<td>4 lug terminal strip</td>
<td>$0.08</td>
</tr>
<tr>
<td>83721</td>
<td>Battery lead plus rubber grommet</td>
<td>$0.02</td>
</tr>
<tr>
<td>83727</td>
<td>Back cover</td>
<td>$0.50</td>
</tr>
<tr>
<td>83737</td>
<td>Front cover knurled nuts</td>
<td>$0.06</td>
</tr>
<tr>
<td>83771</td>
<td>Receiver mounting nut</td>
<td>$0.08</td>
</tr>
<tr>
<td>83772</td>
<td>Receiver mounting dash support washer</td>
<td>$0.01</td>
</tr>
<tr>
<td>83806</td>
<td>Speaker grill cloth</td>
<td>$0.12</td>
</tr>
<tr>
<td>83992</td>
<td>Variable condenser shaft retaining washer</td>
<td>$0.05</td>
</tr>
<tr>
<td>83993</td>
<td>Variable condenser shaft guide bushing</td>
<td>$0.05</td>
</tr>
<tr>
<td>83994</td>
<td>Generator condenser</td>
<td>$0.50</td>
</tr>
<tr>
<td>8453</td>
<td>Front cover assembly</td>
<td>$1.00</td>
</tr>
<tr>
<td>84555</td>
<td>Dial Face (Model 1311)</td>
<td>$2.50</td>
</tr>
<tr>
<td>84560</td>
<td>Case assembly, less covers</td>
<td>$3.75</td>
</tr>
<tr>
<td>84911</td>
<td>Aluminum vibrator shield assembly</td>
<td>$0.50</td>
</tr>
<tr>
<td>84970</td>
<td>Single hole mag. plate</td>
<td>$0.00</td>
</tr>
<tr>
<td>84971</td>
<td>Front cover, self tapping (1/4&quot;)</td>
<td>$0.06</td>
</tr>
<tr>
<td>85021</td>
<td>Case assembly (less covers) (1311) only</td>
<td>$4.00</td>
</tr>
<tr>
<td>85022</td>
<td>Back cover (model 1311)</td>
<td>$1.00</td>
</tr>
<tr>
<td>85037</td>
<td>Front cover assembly (model 1311)</td>
<td>$1.25</td>
</tr>
<tr>
<td>85037</td>
<td>Dial Face (Model 1311)</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

REMOTE CONTROL HEAD PARTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>15214</td>
<td>Long mag. strap, wire 1/0/32 x 1/8&quot; R.H.S.W.</td>
<td>$0.01</td>
</tr>
<tr>
<td>84059</td>
<td>Case screws (4-40 x 3/16&quot;)</td>
<td>For hundred</td>
</tr>
<tr>
<td>84060</td>
<td>Flexible rating set screws</td>
<td>$0.10</td>
</tr>
<tr>
<td>84067</td>
<td>Steering post mag. bracket</td>
<td>$0.25</td>
</tr>
<tr>
<td>84068</td>
<td>Steering post mag. strap</td>
<td>$0.15</td>
</tr>
<tr>
<td>84075</td>
<td>Bazel and gage</td>
<td>$0.10</td>
</tr>
<tr>
<td>84076</td>
<td>Dial light base and socket</td>
<td>$0.25</td>
</tr>
<tr>
<td>84106</td>
<td>Volume control back</td>
<td>$0.10</td>
</tr>
<tr>
<td>84109</td>
<td>Instrument panel mounting brackets</td>
<td>$0.15</td>
</tr>
<tr>
<td>84155</td>
<td>Complete accessories for installation</td>
<td>$5.00</td>
</tr>
</tbody>
</table>

FLEXIBLE SHAFTS

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>84871</td>
<td>Tuning shaft, 2 inches long</td>
<td>$1.50</td>
</tr>
<tr>
<td>84887</td>
<td>Volume control shaft, 20 inches long</td>
<td>$1.50</td>
</tr>
<tr>
<td>84888</td>
<td>Volume control shaft, 20 inches long</td>
<td>$2.00</td>
</tr>
<tr>
<td>84888</td>
<td>Volume control shaft, 30 inches long</td>
<td>$2.00</td>
</tr>
<tr>
<td>84889</td>
<td>Volume control shaft, 30 inches long</td>
<td>$2.00</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.
STEWART WARNER CORP.

I.F. FREQUENCY
456 KC.

R-1332 PARTS LIST

<table>
<thead>
<tr>
<th>Diag. Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>66425</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>61610</td>
<td>0.05</td>
</tr>
<tr>
<td>3</td>
<td>71812</td>
<td>0.05</td>
</tr>
<tr>
<td>4</td>
<td>53007</td>
<td>0.05</td>
</tr>
<tr>
<td>5</td>
<td>53053</td>
<td>0.05</td>
</tr>
<tr>
<td>6</td>
<td>53066</td>
<td>0.05</td>
</tr>
<tr>
<td>7</td>
<td>53010</td>
<td>0.05</td>
</tr>
<tr>
<td>8</td>
<td>53030</td>
<td>0.05</td>
</tr>
<tr>
<td>9</td>
<td>53070</td>
<td>0.05</td>
</tr>
<tr>
<td>10</td>
<td>53071</td>
<td>0.05</td>
</tr>
<tr>
<td>11</td>
<td>53072</td>
<td>0.05</td>
</tr>
<tr>
<td>12</td>
<td>53073</td>
<td>0.05</td>
</tr>
<tr>
<td>13</td>
<td>53074</td>
<td>0.05</td>
</tr>
<tr>
<td>14</td>
<td>53075</td>
<td>0.05</td>
</tr>
<tr>
<td>15</td>
<td>53076</td>
<td>0.05</td>
</tr>
<tr>
<td>16</td>
<td>53077</td>
<td>0.05</td>
</tr>
<tr>
<td>17</td>
<td>53078</td>
<td>0.05</td>
</tr>
<tr>
<td>18</td>
<td>53079</td>
<td>0.05</td>
</tr>
<tr>
<td>19</td>
<td>53080</td>
<td>0.05</td>
</tr>
<tr>
<td>20</td>
<td>53081</td>
<td>0.05</td>
</tr>
<tr>
<td>21</td>
<td>53082</td>
<td>0.05</td>
</tr>
<tr>
<td>22</td>
<td>53083</td>
<td>0.05</td>
</tr>
<tr>
<td>23</td>
<td>53084</td>
<td>0.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diag. Part No.</th>
<th>Description</th>
<th>List Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>84450</td>
<td>0.05</td>
</tr>
<tr>
<td>25</td>
<td>84451</td>
<td>0.05</td>
</tr>
<tr>
<td>26</td>
<td>84452</td>
<td>0.05</td>
</tr>
<tr>
<td>27</td>
<td>84453</td>
<td>0.05</td>
</tr>
<tr>
<td>28</td>
<td>84454</td>
<td>0.05</td>
</tr>
<tr>
<td>29</td>
<td>84455</td>
<td>0.05</td>
</tr>
<tr>
<td>30</td>
<td>84456</td>
<td>0.05</td>
</tr>
<tr>
<td>31</td>
<td>84457</td>
<td>0.05</td>
</tr>
<tr>
<td>32</td>
<td>84458</td>
<td>0.05</td>
</tr>
<tr>
<td>33</td>
<td>84459</td>
<td>0.05</td>
</tr>
<tr>
<td>34</td>
<td>84460</td>
<td>0.05</td>
</tr>
<tr>
<td>35</td>
<td>84461</td>
<td>0.05</td>
</tr>
<tr>
<td>36</td>
<td>84462</td>
<td>0.05</td>
</tr>
<tr>
<td>37</td>
<td>84463</td>
<td>0.05</td>
</tr>
<tr>
<td>38</td>
<td>84464</td>
<td>0.05</td>
</tr>
<tr>
<td>39</td>
<td>84465</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Important: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowances for battery voltage variations.

Note: The actual bias on the grid of the 4L tube is +2 volts as measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about +1 volt at the grid.

Note: The oscillator grid voltage varies from about +5 at 1500 KC. to +10 at 500 KC. The oscillator anode voltage may vary from 115 at 1500 KC. to 128 at 500 KC.
SCHHEMATIC, SOCKET, PARTS

TRIMMERS

1. 1ST I.F. TRANS. TRIMMERS
2. 2ND I.F. TRANS. TRIMMERS
3. BROADCAST OSCILLATOR SHUNT TRIMMER
4. BROADCAST DETECTOR SHUNT TRIMMER
5. BROADCAST ANTENNA SHUNT TRIMMER
6. BROADCAST OSCILLATOR SERIES PADDERS
7. BAND NO. 2 OSCILLATOR SHUNT TRIMMER
8. BAND NO. 2 DETECTOR SHUNT TRIMMER
9. BAND NO. 2 ANTENNA SHUNT TRIMMER
10. BAND NO. 3 OSCILLATOR SHUNT TRIMMER
11. BAND NO. 3 DETECTOR SHUNT TRIMMER
12. BAND NO. 3 ANTENNA SHUNT TRIMMER

TUBE LOCATIONS

FRONT OF SET

1. 6K7 RF
2. 6AB
3. 6K7 IF
4. 6G6 2ND DET. & AVC
5. 524 RECT
6. 6H6 OUTPUT

SCHHEMATIC, SOCKET, PARTS

TRIMMERS

1. 1ST I.F. TRANS. TRIMMERS
2. 2ND I.F. TRANS. TRIMMERS
3. BROADCAST OSCILLATOR SHUNT TRIMMER
4. BROADCAST DETECTOR SHUNT TRIMMER
5. BROADCAST ANTENNA SHUNT TRIMMER
6. BROADCAST OSCILLATOR SERIES PADDERS
7. BAND NO. 2 OSCILLATOR SHUNT TRIMMER
8. BAND NO. 2 DETECTOR SHUNT TRIMMER
9. BAND NO. 2 ANTENNA SHUNT TRIMMER
10. BAND NO. 3 OSCILLATOR SHUNT TRIMMER
11. BAND NO. 3 DETECTOR SHUNT TRIMMER
12. BAND NO. 3 ANTENNA SHUNT TRIMMER

TUBE LOCATIONS

FRONT OF SET

1. 6K7 RF
2. 6AB
3. 6K7 IF
4. 6G6 2ND DET. & AVC
5. 524 RECT
6. 6H6 OUTPUT
Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

Fig. 3. Chassis Assembly.
No. 58-T ...................................... 50-60 Cycles .............................. P-25462 Chassis; P-25464 Loud Speaker
No. 58-TB ...................................... 25-60 Cycles .............................. P-25463 Chassis; P-25464 Loud Speaker
No. 58-L ......................................... 50-60 Cycles .............................. P-25462 Chassis; P-25464 Loud Speaker
No. 58-LB ...................................... 25-60 Cycles .............................. P-25463 Chassis; P-25464 Loud Speaker
No. 58-W ......................................... 50-60 Cycles .............................. P-25604 Chassis; P-23601 Loud Speaker
No. 58-WB ....................................... 25-60 Cycles .............................. P-25605 Chassis; P-23601 Loud Speaker
# ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type of Circuit</th>
<th>Superheterodyne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuning Ranges</td>
<td>A—54 to 1.7 megacycles; B—1.7 to 64 megacycles; C—5.4 to 18 megacycles</td>
</tr>
<tr>
<td>Number and Type of Tubes</td>
<td>3 No. 6K7, 1 No. 6A8, 1 No. 6H6, 2 No. 6F6, 1 No. 5Z3</td>
</tr>
<tr>
<td>Voltage Rating</td>
<td>105 to 125 volts</td>
</tr>
<tr>
<td>Frequency Rating</td>
<td>25-60 cycles and 50-60 cycles</td>
</tr>
<tr>
<td>Wattage Rating</td>
<td>105 watts</td>
</tr>
<tr>
<td>Intermediate Frequency</td>
<td>465 watts</td>
</tr>
</tbody>
</table>

# APPARATUS SPECIFICATIONS

| No. 62 Receiver          | .50-60 Cycles | P-25432 Chassis; P-25687 Loud Speaker |
| No. 62-B Receiver        | 25-60 Cycles  | P-25433 Chassis; P-25687 Loud Speaker |
| No. 63 Receiver          | .50-60 Cycles | P-25684 Chassis; P-25687 Loud Speaker |
| No. 63-B Receiver        | 25-60 Cycles  | P-25685 Chassis; P-25687 Loud Speaker |

# CIRCUIT DESCRIPTION

Eight tubes, A. C. operated, Superheterodyne receiver employing metal tubes and having three tuning ranges. These three tuning ranges cover all the important broadcast and special service bands of both American and Foreign stations. These receivers are also equipped with a high fidelity control providing high fidelity reception by means of a special band widener device and single unit high fidelity speaker. The No. 63 Receiver chassis is the same as the No. 62 Receiver chassis except for the addition of the Visual Tuning Meter. See P-25675, Installation and Operating Instructions, for properly installing and operating the No. 62 Receiver and P-25768, Installation and Operating Instructions, for properly installing and operating the No. 63 Receiver.

The various tubes in this receiver are used as follows: One of the No. 6K7 tubes functions as an R. F. Amplifier, another No. 6K7 is used in the I. F. Amplifier Stage, and the other No. 6K7 operates as an Audio Driver tube. The No. 6A8 tube is used as an Oscillator and also as a Modulator. The No. 6H6 tube is used as a Demodulator—Automatic Volume Control tube. The audio power output stage uses the two No. 6F6 tubes, and the No. 5Z4 is used as the rectifier in the power supply unit.

# NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Heater Voltages Between Terminal Nos. at Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>R. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+95</td>
<td>+3</td>
<td>—</td>
<td>—</td>
<td>+3</td>
<td>2-7, 6.3 volts</td>
</tr>
<tr>
<td>6A8</td>
<td>Mod.-Osc.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+235</td>
<td>+95</td>
<td>0</td>
<td>+150</td>
<td>—</td>
<td>+3</td>
<td>2-7, 6.3 volts</td>
</tr>
<tr>
<td>6K7</td>
<td>I. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+230</td>
<td>+95</td>
<td>+3.5</td>
<td>—</td>
<td>—</td>
<td>+3.5</td>
<td>2-7, 6.3 volts</td>
</tr>
<tr>
<td>6H6</td>
<td>Dem.-A. V. C.</td>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>+35</td>
<td>1.5</td>
<td>—</td>
<td>2-7, 6.3 volts</td>
</tr>
<tr>
<td>6K7</td>
<td>A. F. Amp.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+25</td>
<td>+35</td>
<td>+1.5</td>
<td>—</td>
<td>+1.5</td>
<td>—</td>
<td>2-7, 6.3 volts</td>
</tr>
<tr>
<td>6F6</td>
<td>Output</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+250</td>
<td>+260</td>
<td>0</td>
<td>—</td>
<td>0</td>
<td>+16</td>
<td>2-7, 6.3 volts</td>
</tr>
<tr>
<td>5Z3</td>
<td>Rectifier</td>
<td>—</td>
<td>+128</td>
<td>405</td>
<td>405</td>
<td>+428</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1-4, 4.85 volts</td>
</tr>
<tr>
<td>Speaker Socket</td>
<td>+260</td>
<td>+400</td>
<td>+430</td>
<td>+430</td>
<td>+260</td>
<td>+260</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

Set tuned to 1000 kc., no signal. A. C. voltages are indicated by italics.
IF PEAK 465 KC

Fig. 2. Schematic Circuit of Receiver.

Fig. 3. Chassis Assembly.

©John F. Rider, Publisher
**STROMBERG-CARLSON TEL. MFG. CO.**

**Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.** **CAUTION—**Never Attempt to Align Receiver With Fidelity Control Set At Any Position Other Than the Maximum Counter-Clockwise Position.

**Parts List**

<table>
<thead>
<tr>
<th>Number</th>
<th>Parts Description</th>
<th>Description of Parts</th>
<th>Required per Receiver</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-2110</td>
<td>Binding Post Assembly</td>
<td>Antenna and Grounds</td>
<td>1</td>
<td>9.40</td>
</tr>
<tr>
<td>P-2216</td>
<td>Bracket</td>
<td>Fidelity Control</td>
<td>1</td>
<td>10.60</td>
</tr>
<tr>
<td>P-2313</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.35</td>
</tr>
<tr>
<td>P-2452</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.60</td>
</tr>
<tr>
<td>P-2482</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>P-2549</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>8.50</td>
</tr>
<tr>
<td>P-2442</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>9.80</td>
</tr>
<tr>
<td>P-2594</td>
<td>Capacitor</td>
<td>0.1 MF.</td>
<td>1</td>
<td>9.50</td>
</tr>
<tr>
<td>P-2410</td>
<td>Capacitor</td>
<td>0.05 MF.</td>
<td>1</td>
<td>4.70</td>
</tr>
<tr>
<td>P-2473</td>
<td>Capacitor</td>
<td>0.04 MF.</td>
<td>1</td>
<td>4.70</td>
</tr>
<tr>
<td>P-2518</td>
<td>Capacitor</td>
<td>0.01 MF.</td>
<td>1</td>
<td>9.00</td>
</tr>
<tr>
<td>P-2515</td>
<td>Capacitor</td>
<td>Type 3, 0.008 MF.</td>
<td>1</td>
<td>1.60</td>
</tr>
<tr>
<td>P-2536</td>
<td>Capacitor</td>
<td>0.085 MF.</td>
<td>1</td>
<td>8.00</td>
</tr>
<tr>
<td>P-2409</td>
<td>Capacitor</td>
<td>Type 0, 250 MF.</td>
<td>1</td>
<td>3.25</td>
</tr>
<tr>
<td>P-2459</td>
<td>Capacitor</td>
<td>Type 0, 100 MF.</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>P-2341</td>
<td>Capacitor</td>
<td>Type 0, 5 MF.</td>
<td>1</td>
<td>3.90</td>
</tr>
<tr>
<td>P-2546</td>
<td>Capacitor</td>
<td>Aligning, 220 MF.</td>
<td>1</td>
<td>1.90</td>
</tr>
<tr>
<td>P-2457</td>
<td>Capacitor</td>
<td>Aligning, 255 MF.</td>
<td>1</td>
<td>1.90</td>
</tr>
<tr>
<td>P-2573</td>
<td>Capacitor</td>
<td>Aligning, 1250 MF.</td>
<td>1</td>
<td>1.90</td>
</tr>
<tr>
<td>P-2545</td>
<td>Choke Coil Assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-2572</td>
<td>Coil Assembly</td>
<td>Antenna</td>
<td>1</td>
<td>2.75</td>
</tr>
<tr>
<td>P-2574</td>
<td>Coil Assembly</td>
<td>R.F. Stage</td>
<td>1</td>
<td>2.75</td>
</tr>
<tr>
<td>P-2575</td>
<td>Coil Assembly</td>
<td>Gas Traps</td>
<td>1</td>
<td>2.75</td>
</tr>
<tr>
<td>P-2474</td>
<td>Card</td>
<td>A.C. Supply</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-2539</td>
<td>Filter Assembly</td>
<td>Antenna Wave Trap</td>
<td>1</td>
<td>1.55</td>
</tr>
<tr>
<td>P-2496</td>
<td>Filter Assembly</td>
<td></td>
<td>1</td>
<td>2.50</td>
</tr>
<tr>
<td>P-16030</td>
<td>Lamp</td>
<td>Edit.</td>
<td>2</td>
<td>1.15</td>
</tr>
<tr>
<td>P-3574</td>
<td>Lever</td>
<td>Fidelity Control</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>P-2130</td>
<td>Potentiometer</td>
<td>Volume Control</td>
<td>1</td>
<td>1.85</td>
</tr>
<tr>
<td>P-2237</td>
<td>Potentiometer</td>
<td>Tone Control and “On-Off” Switch</td>
<td>1</td>
<td>1.55</td>
</tr>
<tr>
<td>P-2109</td>
<td>Resistor</td>
<td>Type D, 230 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2170</td>
<td>Resistor</td>
<td>Type D, 500 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2231</td>
<td>Resistor</td>
<td>Type C, 15,000 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type E, 35,000 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type F, 27,000 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type B, 25,000 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type D, 47,000 ohms</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type D, 0.5 megohm</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type D, 0.27 megohm</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2509</td>
<td>Resistor</td>
<td>Type D, 1 megohm</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td>P-2147</td>
<td>Resistor</td>
<td>“B” Voltage Divider</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td>P-2514</td>
<td>Shaft Assembly</td>
<td>Fidelity Control</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>P-2143</td>
<td>Shoulder Screw</td>
<td>Fidelity Control</td>
<td>1</td>
<td>0.65</td>
</tr>
<tr>
<td>P-2108</td>
<td>Shoulder Screw</td>
<td>Fidelity Control</td>
<td>1</td>
<td>0.65</td>
</tr>
<tr>
<td>P-2208</td>
<td>Socket</td>
<td>Tube, 4 Prong</td>
<td>1</td>
<td>0.15</td>
</tr>
<tr>
<td>P-2240</td>
<td>Socket</td>
<td>Tube, 4 Prong</td>
<td>1</td>
<td>0.15</td>
</tr>
<tr>
<td>P-2559</td>
<td>Socket</td>
<td>Tube, 8 Prong</td>
<td>1</td>
<td>0.15</td>
</tr>
<tr>
<td>P-2257</td>
<td>Speaker</td>
<td>High Fidelity Loud Speaker</td>
<td>1</td>
<td>17.75</td>
</tr>
<tr>
<td>P-2537</td>
<td>Switch Assembly</td>
<td>Frequency Range</td>
<td>1</td>
<td>3.90</td>
</tr>
<tr>
<td>P-2547</td>
<td>Transformer Assembly</td>
<td>Audio Driver Stage</td>
<td>1</td>
<td>4.00</td>
</tr>
<tr>
<td>P-2598</td>
<td>Transformer Assembly</td>
<td>Audio Power Output</td>
<td>1</td>
<td>2.90</td>
</tr>
<tr>
<td>P-2584</td>
<td>Transformer Assembly</td>
<td>1st I.F.</td>
<td>1</td>
<td>4.25</td>
</tr>
<tr>
<td>P-2585</td>
<td>Transformer Assembly</td>
<td>2nd I.F.</td>
<td>1</td>
<td>1.15</td>
</tr>
<tr>
<td>P-2544</td>
<td>Transformer</td>
<td>Power, 50-60 Cycles, 110 Volts</td>
<td>1</td>
<td>6.75</td>
</tr>
<tr>
<td>P-2545</td>
<td>Transformer</td>
<td>Power, 25-60 Cycles, 110 Volts</td>
<td>1</td>
<td>12.85</td>
</tr>
</tbody>
</table>

**Additional Parts used only on the No. 63 Receivers**

<table>
<thead>
<tr>
<th>Number</th>
<th>Parts Description</th>
<th>Description of Parts</th>
<th>Required per Receiver</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-2539</td>
<td>Meter</td>
<td>Visual Tuning</td>
<td>1</td>
<td>2.75</td>
</tr>
<tr>
<td>P-1629</td>
<td>Lamp</td>
<td>Pilot</td>
<td>1</td>
<td>0.15</td>
</tr>
</tbody>
</table>
INSTRUCTIONS FOR THE REMOVAL
the nuts, first remove the receiver. Have a small rate, long pliers or a pair of, five hands, and a pair of, for example. After cutting the receiver, first unplug the receiver and remove the receiver. Then, if the receiver is removed, replace the receiver. If we proceed, it is recommended that all No. 54 tubes be ordered. In this way, a suitable set of matched tubes can be obtained which will give maximum results.

APPARATUS SPECIFICATIONS

| No. 70 Receiver | 50-60 Cycles | P-2985 Class; P-2577 Bass Loud Speaker; P-2910 Treble Loud Speaker |
| No. 72 Receiver | 50-60 Cycles | P-2985 Class; P-2577 Bass Loud Speaker; P-2910 Treble Loud Speaker |
| No. 74 Receiver | 50-60 Cycles | P-2985 Class; P-2577 Loud Speaker; P-2910 Treble Loud Speaker; No. 64 Shunt Antenna |
| No. 75 Receiver | 50-60 Cycles | P-2985 Class; P-2577 Loud Speaker; P-2910 Treble Loud Speaker; No. 64 Shunt Antenna |
| No. 76 Receiver | 50-60 Cycles | P-2985 Class; P-2577 Loud Speaker; P-2910 Treble Loud Speaker; No. 64 Shunt Antenna |

CIRCUIT DESCRIPTION

The arrangement and type of tubes used in this receiver are the same as in the No. 70 and 72 receivers, except for the addition of two more 50-60 cycles in the audio output stage, and the additional 60-cycle rectified tube in the power unit of the most important loud speaker.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE TUBE SPEAKER USED IN THE NO. 70, 72, 74, AND 76 RECEIVERS

Use the speaker cord and remove the four main leads running from the speaker to the receiver. Care should be exercised in handling the tubes. Be sure that the leads are not bent or the center may be damaged in the receivers. Before replacing any tube, first remove all the receiver and the radio tube from the base. Then, read the tube and replace the receiver. Do not remove the speaker cord while the receiver is plugged in. In case of order changes, the tubes can be obtained by our distributors.

CENTERING OF THE DIAPHRAGM, OF THE TUBE SPEAKER

Once the coil is correctly centered, it should be used without readjustment. However, in case the center speaker is not correctly located and the adjustment is set, the following instructions are given:

Provide a strip of cloth around the speaker to prevent any damage to the speaker. Be sure that the center speaker is not placed on the floor or on an uneven surface. When the speaker is placed on the floor, it should be placed on the floor at the center of the speaker. The amount of hum in the output of the receiver will be reduced by using the receiver's speakers. The amount of hum in the output of the receiver will be reduced by using the receiver's speakers. The amount of hum in the output of the receiver will be reduced by using the receiver's speakers.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE TUBE SPEAKER USED IN THE NO. 70, 72, 74, AND 76 RECEIVERS

After removing the receiver, remove the diaphragm at each side of the speaker by taking out the necessary retaining screws and securing the speaker. No need to move the receiver. Then, if the speaker is removed, take the receiver out and replace the receiver. Do not replace the speaker. If you are not sure, refer to the instruction sheet, and in case of any question, consult the manufacturer. In performing the covering operation, use great care not to damage the driving coil leads.

INSTRUCTIONS FOR THE REMOVAL AND REPLACEMENT OF THE TUBE SPEAKER USED IN THE NO. 70, 72, 74, AND 76 RECEIVERS

Two different methods of finding the best speaker to the floor of the cabinet have been used in this receiver. In the first method, the receiving circuit is inserted from the cabinet side to the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker. The speaker, after being removed, is placed at the side of the speaker.

©John F. Rider, Publisher
Fig. 4. Chassis Assembly.
Fig. 3. Wiring Diagram of Chassis.

©John F. Rider, Publisher
These voltage readings are obtained by measuring between the various tube socket contacts and the base; with the tubes in place. The Receiver is, therefore, in operation when the measurements are made. Fig. 1, shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1,000 ohms per volt should be used for measuring the D. C. voltages.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap.</th>
<th>Terminals of Sockets</th>
<th>Heater Voltages Between Terminal Nos. at 120 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>Hi-F, R. F.</td>
<td>0</td>
<td>+200 + 87 +3.5 +3.5</td>
<td>1-6, 6.3 volts</td>
</tr>
<tr>
<td>6D6</td>
<td>R. F. Amp.</td>
<td>0</td>
<td>+220 + 87 +3.5 +3.5</td>
<td>1-6, 6.31 volts</td>
</tr>
<tr>
<td>6A7</td>
<td>Mod.</td>
<td>0</td>
<td>+225 + 75 + 75 — 10</td>
<td>1-7, 6.31 volts</td>
</tr>
<tr>
<td>76</td>
<td>Osc.</td>
<td>—</td>
<td>+180 —25 0</td>
<td>1-5, 6.31 volts</td>
</tr>
<tr>
<td>6D6</td>
<td>1st I. F. Amp.</td>
<td>0</td>
<td>+225 + 87 + 10 + 10</td>
<td>1-6, 6.32 volts</td>
</tr>
<tr>
<td>6D6</td>
<td>2nd I. F. Amp.</td>
<td>0</td>
<td>+225 + 87 +3.5 +3.5</td>
<td>1-6, 6.32 volts</td>
</tr>
<tr>
<td>6B7</td>
<td>Dem.-Aud.</td>
<td>3</td>
<td>+130 + 25 + 12 0</td>
<td>1-7, 6.32 volts</td>
</tr>
<tr>
<td>6C6</td>
<td>&quot;Q&quot;</td>
<td>0</td>
<td>+ 12 + 12 0 0</td>
<td>1-6, 6.32 volts</td>
</tr>
<tr>
<td>6C6</td>
<td>Meter</td>
<td>0</td>
<td>+225 + 87 0 0</td>
<td>1-6, 6.32 volts</td>
</tr>
<tr>
<td>42</td>
<td>2nd Audio</td>
<td>—</td>
<td>+220 +220 0 + 20</td>
<td>1-6, 6.32 volts</td>
</tr>
<tr>
<td>2A3s'</td>
<td>Output</td>
<td>—</td>
<td>+ 60 + 375 0 + 60</td>
<td>1-4, 2.53 volts</td>
</tr>
<tr>
<td>5Z3</td>
<td>Rectifier</td>
<td>+410 405 405 +410</td>
<td>1-4, 4.81 volts</td>
<td></td>
</tr>
<tr>
<td>Speaker</td>
<td></td>
<td>0</td>
<td>+388 +228 +365 +388 0</td>
<td></td>
</tr>
</tbody>
</table>

Set tuned to 1000 kc., "A" Band, "Hi" Fidelity Control not operated, "Q" Switch Off, A. C. voltages are indicated by italics.
Fig. 5. Showing the Location of the Various Aligning Capacitors. For all R.F., I.F., and Tertiary Circuits.

Fig. 6. Showing How the Special Aligning Tools Facilitate Making the Adjustments on the Aligning Capacitors.
ALIGNMENT INSTRUCTIONS

The unexcelled performance of a High Fidelity receiver cannot be obtained unless the receiver is properly aligned. In order to obtain this performance, it is necessary that these adjustments be carefully done. In the
High Fidelity type of receiver, these adjustments of selectivity, be more critical than in the maximum radio
receiver.

In making these adjustments, it is necessary that the high signal generator be used. In conjunction with the
cone on the visual tuning meter, it will not be possible to make the alignment adjustments by noting the action of this meter.

1. Remove the chassis from the cabinet but have it near enough to the cabinet so that the cords of the loud
speakers may be plugged in. Then, turn the power switch to the "ON" position. Make sure that the "Q"
switch is in the "OFF" position and that the High Fidelity control is set for the normal selectivity position.
Set the range switch to the "A" band position, and operate the volume control to the maximum position.
Also operate the tone control to the normal position.

Connect the around or low side output terminal of the signal generator to the "G4" and "G" binding posts on the receiver chassis. From the remaining terminal of the artificial antenna connect a wire to the receiver chassis.

2. R. F. Adjustments

Notice the various designated aligning capacitors shown in Figure 5, proceed in the following manner for
aligning the radio frequency and meter circuits.

(a) Operate the range switch on the chassis, to the "A" band position (full clockwise rotation). Align
the receiver at 1500 kc., aligning in the following sequence: Oscillator, R. F. Amplifier, "B" Reac-
tor, Antenna.

Align the oscillator's low frequency aligner (series aligning capacitor) at 600 kc. on this "A" band.
Only the oscillator should be aligned at this frequency.

Check the alignment of all the R. F. circuits again at 1500 kc.

(b) Operate the range switch on the chassis, one position counter-clockwise from the "A" band posi-
tion. This will be the position for the "B" band operation.

Align the receiver at 4 megacycles in the same manner as was done for the 1500 kc. of the "A" band.
Align the oscillator's low frequency aligner (series aligning capacitor) at 1500 kc. on this "B" band.
Only the oscillator should be aligned at this frequency.

Check the alignment of all the R. F. circuits again at 4 megacycles.

(c) Operate the range switch on the chassis, one position counter-clockwise from the "B" band posi-
tion. This will be the position for the "C" band operation.

Align the receiver at 10 megacycles in the same manner as was done for the 1500 kc. of the "A"
band.

Align the oscillator's low frequency aligner (series aligning capacitor) at 4 megacycles on this "C"
band. Only the oscillator should be aligned at this frequency.

Check the alignment of all the R. F. circuits again at 10 megacycles.

(d) Operate the range switch on the chassis, one position counter-clockwise from the "C" band posi-
tion. This will be the position for the "D" band operation.

Align the receiver at 19.8 megacycles in the same manner as was done for the 1500 kc. of the "A"
band.

Align the oscillator's low frequency aligner (series aligning capacitor) at 10 megacycles on this "D"
band. Only the oscillator should be aligned at this frequency.

Check the alignment of all the R. F. circuits again at 19.8 megacycles.

NOTE: It will be noted that no instructions are given for aligning the receivers at other than two frequencies for any band. Every receiver is given an exciting check for "tracking" at various frequen-
cies in each band before leaving the factory. It is felt by the manufacturers that should any receiver
through accident require a check on the "tracking", it should be returned to the factory, where this may be easily and accurately done.

3. Meter Circuit Adjustment

Adjust the signal generator to 600 kc. and tune in this signal on the radio receiver. Be sure to tune for
the maximum or peak as indicated on the visual meter of the chassis. Before adjusting the aligning
capacitors of this circuit, make sure that the volume control is at the maximum selectivity position and
the high fidelity control must be in the normal selectivity position. Also, release the locking nuts of
the aligning capacitors. Then adjust the two aligning capacitors of this circuit, obtaining maximum indica-
tion on the visual tuning meter. After this adjustment, tighten the lock-nuts of these capacitors.

4. I. F. Alignment

Because of the necessity of obtaining the proper shape of response curve of these stages, it is recom-
mended that, unless it is essential, I. F. adjustments be forborne. The I. F. adjustments are made using a visual system, which allows the operator to see the exact shape of the res-
ponse curve. For this reason, it is better to have these adjustments made at the factory. However, in
the case where this cannot be done, the following procedure may be followed.

Set the signal generator to exactly 260 kc., or 375 kc., depending upon the intermediate frequency of
the particular receiver; stamped on the chassis. Operate the range switch of the receiver to the "A" band posi-
tion. Set the receiver tuning dial at its extreme low frequency position and operate the tone control to
the normal position. Turn the high fidelity control to the normal selectivity position. Never attempt to
adjust the I. F. stages in the high fidelity control set at the high fidelity position. Before proceeding
with the aligning, remove the 250 microfarad capacitor (artificial antenna) from the signal gener-
ator lead and substitute for it a capacitor having a value of at least 0.25 microfarad. Now, connect this
tube to the grid cap of the 6DI tube used in the second I. F. amplifier stage. Do not remove the grid
lead from the chassis connecting to this tube. Before attempting to adjust any of the I. F. aligning capacitors,
release the locking-nuts and, after completing the adjustment, make sure that these lock-nuts are securely
tightened.

5. Now, note from Figure 5, the aligning capacitors C-G and C-71, and adjust these capacitors in the
order given for maximum output reading on the output meter.

(b) Move the signal generator lead and capacitor from the grid cap of the 6DI tube used in the second
I. F. amplifier stage to the grid cap of the 6DJ tube used in the first I. F. amplifier stage and adjust
the aligning capacitors C-S and C-55 (in this sequence), for maximum output reading on the output
meter.

(c) Move the signal generator lead from the grid cap of the first 6DJ tube used in the first I. F. amplifier
stage to the grid cap of the 6AQ7 tube. Now, adjust the aligning capacitors C-S and C-54 for max-
imum output reading on the output meter. This completes the necessary adjustments on the I. F.
stages for normal operation of these High Fidelity receivers.

Adjusting the I. F. Tertiary Grid Capacitors

In the High Fidelity receiver, some means must be used to obtain that selectivity which will give the
necessary band width for High Fidelity reproduction. In these receivers, it will be noted from the sche-
diagram that the first and second I. F. transformers are made up of three tuned circuits: the pri-
mary, secondary, and a third which we call the tertiary circuit. Included in each tertiary circuit is a
variable resistance in series with the coil. Incorporated in these variable resistances is a switch which
opens or closes this circuit. When the fidelity control is turned counterclockwise as far as it is possi-
ble, the receiver functions with normal selectivity because the switches (incorporated in the variable
resistors) are open. When the fidelity control is operated in a clockwise direction as far as it is possible,
minimum resistance is inserted in series with the coil, resulting in the tertiary circuits acting as a heavy
load across the secondary circuits, which, of course, results in broader tuning. As the fidelity control is
operated in the opposite direction, more resistance is added in series with the tertiary coils which makes
these circuits less effective, resulting in greater selectivity.

When the B. F. and I. F. circuits are carefully aligned, operate the high fidelity control to the high fidelity
position (maximum clockwise rotation). Note now from Figure 5 the location of the aligning capac-
itors in each tertiary circuit. Then, with the signal generator still set at the intermediate frequency,
and its load connected to the grid cap of the 6AQ7 tube, adjust these capacitors. Adjust the first I. F.
primary alignment capacitor, C-59, until a minimum reading is obtained on the output meter. Then, adjust
the second I. F. tertiary alignment capacitor, C-58, in the same manner.

To make all these aligning adjustments in the most satisfactory manner, it is recommended that the
service man use the special aligning tools manufactured by this company and listed as follows:

1—Piece No. 2607 Insulated Aligning Wrench.
1—Piece No. 2008 Insulated Aligning Screw Driver.

See Figure 6.
Engineering Data
Stromberg-Carlson No. 82 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type of Circuit</th>
<th>Superheterodyne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuning Ranges</td>
<td>A-520 to 1600 Kc.; B-1500 to 4200 Kc.; C-3700 to 10,000 Kc.; D-8500 to 20,000 Kc.</td>
</tr>
<tr>
<td>Number and Type of Tubes</td>
<td>3 No. 6D6, 1 No. 6A7, 2 No. 76, 3 No. 42, 1 No. 5Z3</td>
</tr>
<tr>
<td>Voltage Rating</td>
<td>105-125 Volts</td>
</tr>
<tr>
<td>Frequency Rating</td>
<td>25-60 Cycles and 50-60 Cycles</td>
</tr>
<tr>
<td>Wattage Rating</td>
<td>136 Watts</td>
</tr>
<tr>
<td>Intermediate Frequency</td>
<td>465 Kc.</td>
</tr>
</tbody>
</table>

APPARATUS SPECIFICATIONS

| No. 82 Receiver | 50-60 Cycles | P-22723 Chassis; P-22738 Loud Speaker |
| No. 82-B Receiver | 25-60 Cycles | P-22724 Chassis; P-22738 Loud Speaker |

CIRCUIT DESCRIPTION

Ten tubes, A. C. operated, All-wave superheterodyne receiver having four tuning ranges. See P-25385, Installation and Operating Instructions, for properly installing and operating this receiver.

One No. 6D6 tube functions as an R. F. Amplifier, another No. 6D6 tube is used in the I. F. Amplifier stage and the other No. 6D6 tube operates in the first audio stage which is resistance-coupled to the second audio stage. The No. 6A7 tube is used as a modulator tube only. This is done in order to obtain maximum freedom from detrimental coupling between this modulator and the oscillator tube. One No. 76 tube functions as the oscillator and the other No. 76 tube operates as a Demodulator and Automatic Volume Control tube. One No. 42 tube is operated as a triode audio driver tube for the power output tubes composed of two No. 42 tubes. These output tubes are also connected as triodes. The No. 5Z3 tube is used as the rectifier in the power supply unit.

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the base with the tubes in place. The Receiver is therefore in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers. The terminals of each socket are numbered, starting with one heater or filament pin and proceeding around the pin circle clockwise to the other heater or filament pin. This is done looking at the bottom of the socket.

Voltages are given for a line voltage of 120 volts and allowance should be made for differences when the line voltage is higher or lower. A meter with a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap.</th>
<th>Terminals of Sockets</th>
<th>Heater Voltages Between Terminals Nos. at 120 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R. F. Amp.</td>
<td>0</td>
<td>1 +240 +95 +4 +0</td>
<td>1-6.64 volts</td>
</tr>
<tr>
<td>6A7</td>
<td>Mod.</td>
<td>0</td>
<td>1 +240 +95 +95 -2 +3.1 +0</td>
<td>1-7.64 volts</td>
</tr>
<tr>
<td>76</td>
<td>Osc.</td>
<td>0</td>
<td>1 +195 +30 +0</td>
<td>1-5.64 volts</td>
</tr>
<tr>
<td>6D6</td>
<td>I. F. Amp.</td>
<td>0</td>
<td>1 +240 +95 +3.5 +3.5 +0</td>
<td>1-7.64 volts</td>
</tr>
<tr>
<td>76</td>
<td>Demod-A. V. C.</td>
<td>0</td>
<td>1 +60 +20 +1 +1 +1</td>
<td>1-5.64 volts</td>
</tr>
<tr>
<td>6D6</td>
<td>1st Audio</td>
<td>0</td>
<td>1 +230 +230 +0 +21 +1</td>
<td>1-6.64 volts</td>
</tr>
<tr>
<td>42</td>
<td>2nd Audio</td>
<td>0</td>
<td>1 +390 +390 +0 +37 +1</td>
<td>1-6.64 volts</td>
</tr>
<tr>
<td>5Z3</td>
<td>Rectifier</td>
<td>0</td>
<td>1 +410 +398 +398 +410</td>
<td>1-4.705 volts</td>
</tr>
<tr>
<td>Speaker Socket</td>
<td>0</td>
<td>1 +245 +400 +400 +390 +0</td>
<td>1-6.64 volts</td>
<td></td>
</tr>
</tbody>
</table>

Set tuned to 1000 Kc., "A" Band, A. C. voltages are indicated by italics.

©John F. Rider, Publisher
MODELS 82,82-B
Chassis Assembly  STROMBERG-CARLSON TEL. MFG. CO.

Fig. 4. Chassis Assembly.
STROMBERG-CARLSON TEL. MFG. CO.

MODELS 82, 82-B
Schematic
Chassis Wiring

Fig. 2. Schematic Circuit of Receiver.

Fig. 3. Wiring Diagram of Chassis.
Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

### REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>Piece Number</th>
<th>Parts</th>
<th>Description of Parts</th>
<th>Required per Receiver</th>
<th>List Price Each</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-31463</td>
<td>Binding Post Assembly</td>
<td>Antenna and Ground</td>
<td>1</td>
<td>$0.40</td>
</tr>
<tr>
<td>P-31299</td>
<td>Capacitor Assembly</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>P-22737</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>P-22738</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>P-22729</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>3.00</td>
</tr>
<tr>
<td>P-22720</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.50</td>
</tr>
<tr>
<td>P-22721</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>P-22717</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>2</td>
<td>3.85</td>
</tr>
<tr>
<td>P-22505</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>4.55</td>
</tr>
<tr>
<td>P-22489</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22482</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.50</td>
</tr>
<tr>
<td>P-22194</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.50</td>
</tr>
<tr>
<td>P-22465</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22325</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.25</td>
</tr>
<tr>
<td>P-22149</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.00</td>
</tr>
<tr>
<td>P-22761</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22379</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22320</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.25</td>
</tr>
<tr>
<td>P-22459</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.25</td>
</tr>
<tr>
<td>P-22249</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>2.00</td>
</tr>
<tr>
<td>P-22114</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22141</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22461</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22375</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22466</td>
<td>Capacitor</td>
<td>Electrolytic</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22285</td>
<td>Choke Coil Assembly</td>
<td>Antenna and Ground</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22731</td>
<td>Coil Assembly</td>
<td>R. F., &quot;A&quot; and &quot;C&quot; Bands</td>
<td>1</td>
<td>4.50</td>
</tr>
<tr>
<td>P-22732</td>
<td>Coil Assembly</td>
<td>Oscillator, &quot;A&quot; and &quot;C&quot; Bands</td>
<td>1</td>
<td>4.50</td>
</tr>
<tr>
<td>P-22733</td>
<td>Coil Assembly</td>
<td>Antenna, &quot;B&quot; and &quot;D&quot; Bands</td>
<td>1</td>
<td>4.50</td>
</tr>
<tr>
<td>P-22734</td>
<td>Coil Assembly</td>
<td>R. F., &quot;B&quot; and &quot;D&quot; Bands</td>
<td>1</td>
<td>4.50</td>
</tr>
<tr>
<td>P-22735</td>
<td>Coil Assembly</td>
<td>Oscillator, &quot;B&quot; and &quot;D&quot; Bands</td>
<td>1</td>
<td>4.50</td>
</tr>
<tr>
<td>P-22359</td>
<td>Coil Assembly</td>
<td>40 Millihenry Cap.</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22428</td>
<td>Cord</td>
<td>A. C. Supply</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22179</td>
<td>Filter Assembly</td>
<td>Antenna</td>
<td>1</td>
<td>1.25</td>
</tr>
<tr>
<td>P-22150</td>
<td>Fuse</td>
<td>2 Amperes</td>
<td>1</td>
<td>0.10</td>
</tr>
<tr>
<td>P-22151</td>
<td>Fuse Block</td>
<td>2.25</td>
<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td>P-16320</td>
<td>Lamp</td>
<td>Pilot, 6 Volts</td>
<td>1</td>
<td>7.10</td>
</tr>
<tr>
<td>P-22155</td>
<td>Meter</td>
<td>Visual Tuning</td>
<td>1</td>
<td>1.75</td>
</tr>
<tr>
<td>P-22156</td>
<td>Potentiometer</td>
<td>Volume Control</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>P-22649</td>
<td>Potentiometer</td>
<td>Tone Control and A. C. Switch</td>
<td>1</td>
<td>1.25</td>
</tr>
<tr>
<td>P-22144</td>
<td>Resistor</td>
<td>Type A, 500 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22148</td>
<td>Resistor</td>
<td>Type B, 1,000 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22142</td>
<td>Resistor</td>
<td>Type C, 1,500 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22139</td>
<td>Resistor</td>
<td>Type D, 5,000 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22136</td>
<td>Resistor</td>
<td>Type E, 500 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22133</td>
<td>Resistor</td>
<td>Type F, 5,000 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22124</td>
<td>Resistor</td>
<td>Type G, 500 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22135</td>
<td>Resistor</td>
<td>Type H, 2,000 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22122</td>
<td>Resistor</td>
<td>Type I, 2,000 ohms</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22121</td>
<td>Resistor</td>
<td>&quot;g&quot; Voltage Divider</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>P-22103</td>
<td>Socket</td>
<td>Tube 1</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td>P-22039</td>
<td>Socket</td>
<td>Tube 2</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td>P-22040</td>
<td>Socket</td>
<td>Tube 3</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td>P-22148</td>
<td>Socket</td>
<td>Tube 4</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td>P-22144</td>
<td>Switch Assembly</td>
<td>Frequency Range</td>
<td>1</td>
<td>6.00</td>
</tr>
<tr>
<td>P-22463</td>
<td>Transformer Assembly</td>
<td>Audio Driver Stage</td>
<td>1</td>
<td>4.00</td>
</tr>
<tr>
<td>P-22756</td>
<td>Transformer Assembly</td>
<td>1st i. F.</td>
<td>1</td>
<td>3.00</td>
</tr>
<tr>
<td>P-22749</td>
<td>Transformer Assembly</td>
<td>2nd i. F.</td>
<td>1</td>
<td>2.50</td>
</tr>
<tr>
<td>P-22728</td>
<td>Transformer</td>
<td>Power, 50-60 Cycles, 110 Volts</td>
<td>1</td>
<td>11.00</td>
</tr>
<tr>
<td>P-22729</td>
<td>Transformer</td>
<td>Power, 25-60 Cycles, 110 Volts</td>
<td>1</td>
<td>11.00</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
STROMBERG-CARLSON TEL. MFG. CO.

Engineering Data
Stromberg-Carlson No. 83 Radio Receiver

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
Rochester, New York

ELECTRICAL SPECIFICATIONS

Type of Circuit:                     Superheterodyne
Tuning Ranges:                      A—520 to 1600 kc.; B—1500 to 4200 kc.; C—3.7 to 10 megacycles; D—8.5 to 23 megacycles
Number and Type of Tubes:          3 No. 6K7, 1 No. 6A8, 1 No. 6C5, 1 No. 6H6, 3 No. 6F6, 1 No. 5Z3
Voltage Rating:                     25 to 60 cycles and 50 to 60 cycles
Wattage Rating:                     135 watts
Intermediate Frequency              465 kc.

APPARATUS SPECIFICATIONS

No. 83 Receiver:                    50 to 60 Cycles
No. 83-B Receiver:                  25 to 60 Cycles

CIRCUIT DESCRIPTION

Ten tubes, A. C. operated, Superheterodyne receiver, equipped with four tuning ranges. These four tuning ranges cover all the important broadcasts and special service bands of both American and Foreign stations. High fidelity reproduction is obtained in this receiver by the use of a special band widener device and a Carpinchoe high fidelity speaker. See P-25701, Installation and Operating Instructions, for properly installing and operating this receiver.

The tubes used in this receiver are as follows: One No. 6K7 tube functions as an R. F. Amplifier, another No. 6K7 tube is used in the L. F. Amplifier and the other No. 6K7 tube operates in the First Audio Amplifier. The No. 6A8 tube is used as a Modulator tube only. The No. 6C5 tube is used as the Oscillator tube. The No. 6H6 tube is used as a Demodulator-Automatic Volume Control tube. One No. 6F6 tube is used in the Second Audio Amplifier which drives the two No. 6F6 tubes used in the audio power output stage. The No. 5Z3 tube is the rectifier tube of the power supply unit.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Circuit</th>
<th>Cap.</th>
<th>Terminals of Sockets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>6K7</td>
<td>R. F. Amp.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6A8</td>
<td>Mod.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6C5</td>
<td>Osc.</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>6K7</td>
<td>1. F. Amp.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6H6</td>
<td>Dem. — A. V. C.</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>6K7</td>
<td>1st Audio</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6F6</td>
<td>2nd Audio</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>6F6</td>
<td>Output</td>
<td>—</td>
<td>0</td>
</tr>
<tr>
<td>5Z3</td>
<td>Rectifier</td>
<td>—</td>
<td>410</td>
</tr>
<tr>
<td>Speaker Socket</td>
<td>0</td>
<td>+250</td>
<td>+410</td>
</tr>
</tbody>
</table>

Set tuned to 1000 kc., no signal. A. C. voltages are indicated by italics.
Fig. 4. Wiring Diagram of Chassis.

©John F. Rider, Publisher
Fig. 2. Schematic Circuit of Receiver.

Fig. 3. Chassis Assembly.
Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

CAUTION—Never Attempt to Align Receiver With Fidelity Control Set At Any Position Other Than the Maximum Counter-Clockwise Position.
Tube socket voltage readings:

<table>
<thead>
<tr>
<th>Tube</th>
<th>Use</th>
<th>(a) cathode</th>
<th>screen</th>
<th>*plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>'15</td>
<td>1st det.</td>
<td>3.5 v.</td>
<td>72 v.</td>
<td>154 v.</td>
</tr>
<tr>
<td>'15</td>
<td>2nd det.</td>
<td>1.6 v.</td>
<td>72 v.</td>
<td>154 v.</td>
</tr>
<tr>
<td>'75</td>
<td>1F ampl.</td>
<td>0.5 v.</td>
<td>(none)</td>
<td>42 v.</td>
</tr>
<tr>
<td>'38</td>
<td>Output</td>
<td>13.5 v.</td>
<td>154 v.</td>
<td>144 v.</td>
</tr>
</tbody>
</table>

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.
All measurements made from points indicated to chassis.

The Model H & I is a low-drain highly efficient 4 tube superheterodyne receiver operating from a 6 volt storage battery and requires no B or C batteries. The six volt current from the battery is converted by means of an efficient rectifying filter and power transformer to the high voltage necessary for both B and C apply. The two type 1F tube filament will cause both type 15 tubes to become inoperative.

The colored 'A' battery lead must be connected to the positive terminal of the storage battery, or the set will be inoperative, and will draw abnormal battery current.

If all the tubes light and the receiver fails to function, be sure that the 'A' battery is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts are also best checked by the substitution method.

©John F. Rider, Publisher
Tube socket voltage readings: (with B battery connected)

<table>
<thead>
<tr>
<th>Tube</th>
<th>Use</th>
<th>(a) cathode</th>
<th>screen</th>
<th>plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>'77</td>
<td>1st det.</td>
<td>3.2 v.</td>
<td>77 v.</td>
<td>77 v.</td>
</tr>
<tr>
<td>'78</td>
<td>IF ampl.</td>
<td>2.0 v.</td>
<td>77 v.</td>
<td>77 v.</td>
</tr>
<tr>
<td>'75</td>
<td>2nd det.</td>
<td>0.5 v.</td>
<td>(none)</td>
<td>38 v.</td>
</tr>
<tr>
<td>'38's Output</td>
<td>7.0 v.</td>
<td>77 v.</td>
<td>73 v.</td>
<td></td>
</tr>
</tbody>
</table>

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(*) measured with a voltmeter having a resistance of 300,000 ohms.

All measurements made from points indicated to chassis.

The Model A & B chassis is an efficient 5 tube superheterodyne receiver operating from 32 volt farm lighting systems, and employs a 45 volt B battery to increase the output power without the use of transformers or vibrators.

The failure of one filament will therefore cause all the tubes to become inoperative.

If all the tubes light and the receiver fails to operate, make sure that the 45 volt B battery is connected in the proper direction and try reversing the plug connection to the 32 volt line. If the operation is then unsatisfactory check the tubes one at a time in a normal operating receiver, and replace all defective tubes.
The Model L Chassis is an efficient 5-tube superheterodyne receiver operating directly from 32-volt farm lighting systems, without the use of "B" batteries, transformer or vibrator.

The heaters of type 6A7, 78 and 12A7 in series with 22 Ohm resistor (item No. 9 above) are connected directly across the 32-volt line. Failure of either tube or the resistor will cause the other tubes to become inoperative. The heaters of the type 48 output tubes are in parallel connection across the 32-volt line. Failure of one tube (48) will not cause the set to become inoperative but will greatly reduce volume.

If all the tubes light and the receiver fails to operate, try reversing the plug connection to the 32-volt line. If the operation is then unsatisfactory, check the tubes one at a time in a normal operating receiver and replace all defective tubes.

All measurements taken with a volt meter having a resistance of 100,000 Ohms and with no signal applied to receiver.

Drawing No. 3A6 shows the complete circuit diagram with itemized parts list. In ordering replacements parts always use the part number shown to facilitate filling orders and to eliminate mistakes and delay.

No adjustments are to be made to any trimmer condenser, either I.F. or R.F. without the aid of a correctly calibrated signal generator used in conjunction with a high resistance output meter connected from plate to plate of the type 48 output tubes.

The normal I.F. frequency is 456 K.C.
Tube socket voltage readings:

<table>
<thead>
<tr>
<th>Tube</th>
<th>Use</th>
<th>(a) cathode</th>
<th>(b) screen</th>
<th>(b) plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>'78</td>
<td>RF ampl.</td>
<td>6.0 v.</td>
<td>88.0 v.</td>
<td>210 v.</td>
</tr>
<tr>
<td>'6A7</td>
<td>1st det.</td>
<td>3.0 v.</td>
<td>88.0 v.</td>
<td>210 v.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*155 v.</td>
</tr>
<tr>
<td>'75</td>
<td>IF ampl.</td>
<td>6.0 v.</td>
<td>88.0 v.</td>
<td>210 v.</td>
</tr>
<tr>
<td>'38</td>
<td>2nd det.</td>
<td>1.05 v.</td>
<td>(none)</td>
<td>52 v.</td>
</tr>
<tr>
<td></td>
<td>Output</td>
<td>22.0 v.</td>
<td>210 v.</td>
<td>202 v.</td>
</tr>
</tbody>
</table>

(a) measured with a voltmeter having a resistance of 30,000 ohms.
(b) measured with a voltmeter having a resistance of 300,000 ohms.
(*) '6A7 anode grid voltage.

All measurements made from point indicated to chassis.
Model J & K is a DeLuxe low drain 6 volt battery superheterodyne receiver covering two wave ranges and requires no B or C batteries. The six volt current from the storage battery is converted by means of an efficient rectifying vibrator and power transformer to the high voltage necessary for B & C supply. The two type 15 tube filaments with appropriate shunt resistors are connected in series with the type 19 tube filament so that failure of one of these tube filaments automatically causes the other two tubes to become inoperative.

The colored 'A' battery lead must be connected to the positive terminal of the storage battery, or the set will be inoperative and will draw abnormal battery current.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.

The normal I.F. frequency is 177.5 KC.
The Model F is a DeLuxe 7 tube 32 volt receiver of the superheterodyne type covering two wave ranges. It operates from a 32 volt source without the use of B or C batteries. High voltage B supply current is obtained by means of an efficient vibrator used in conjunction with a transformer and rectifier tube. There are two series filament circuits which are connected in parallel, this combination in turn being in series with the type 84 tube with appropriate series and shunt resistors. Failure of any one tube filament will cause the other tube filaments to operate at incorrect voltages, and operation of the receiver with any tube removed is not recommended.

If all the tubes light and the receiver fails to function, make sure the 'Elkonode' vibrator is operating, and check for defective tubes by substitution in a normally operating receiver. Other suspected faulty parts may also be checked by the substitution method.
MODELS 4, 14, 40
MODELS 5L5, 5U5, 15, 15-5
Schematics, Socket

TROY RADIO MFG. CO.

Models 4, 14, 40 use 25V type tubes
Model 4 uses 6.3V type tubes

TROY RADIO
MODELS 15, 15-5, 5L5, 5U5
WAVE LENGTHS COVERED

©John F. Rider, Publisher
TROY RADIO MFG. CO.

MODELS 62 BU 62 BC

WAVE LENGTH
16 - 55
175-550 METERS

MODELS 62L 62U 62C 62PC

WAVE LENGTH 16-55 175-550 METERS

© John F. Rider, Publisher
TROY RADIO MFG. CO.

MODEL 151-5

MODEL 151-5

16-55 200-550 METERS

TROY RADIO MODELS
162C, 162U
Schematics, Socket

©John F. Rider, Publisher

©John F. Rider, Publisher
UNITED AMERICAN BOSCH CORP.

SCHEMATIC WIRING DIAGRAM

1A6 34 34 32 33

IF = 456 KC.

SERVICE PARTS LIST

Battery Radio Receiver Model 376BT (Table Model)
Battery Radio Receiver Model 376S (Console Model)
Battery Radio Receiver Model 376F (Console Model)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Dia. #</th>
<th>Description of Parts</th>
<th>Part No.</th>
<th>Dia. #</th>
<th>Description of Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C1)</td>
<td></td>
<td>Variable condenser with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>106815</td>
<td></td>
<td>trimmers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C2)</td>
<td></td>
<td>.05 mf - 200 V.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>106386</td>
<td>(C5)</td>
<td>60-250 muf</td>
<td>106829</td>
<td>(C6)</td>
<td>200-525 muf</td>
</tr>
<tr>
<td>(C4)</td>
<td></td>
<td></td>
<td>106270</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106382</td>
<td>(C7)</td>
<td></td>
<td>106274</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106386</td>
<td>(C8)</td>
<td>.05 mf - 200 V.</td>
<td>106278</td>
<td>(C9)</td>
<td>.0001 mica</td>
</tr>
<tr>
<td>106417</td>
<td>(C10)</td>
<td>.05 mf - 200 V.</td>
<td>106287</td>
<td>(C11)</td>
<td>.0001 mica</td>
</tr>
<tr>
<td>106417</td>
<td>(C12)</td>
<td>.05 mf - 200 V.</td>
<td>106288</td>
<td>(C13)</td>
<td>.0001 mica</td>
</tr>
<tr>
<td>103659</td>
<td>(C14)</td>
<td>.005 mf - 350 V.</td>
<td>106246</td>
<td>(C15)</td>
<td>4 mfd. 250 V.</td>
</tr>
<tr>
<td>107029</td>
<td>(C16)</td>
<td>2 mfd. 250 V.</td>
<td>106281</td>
<td>(C17)</td>
<td>2 mfd. 250 V.</td>
</tr>
<tr>
<td>(C18)</td>
<td></td>
<td></td>
<td>106281</td>
<td>(C19)</td>
<td>2 mfd. 250 V.</td>
</tr>
<tr>
<td>106386</td>
<td>(C20)</td>
<td>.05 mf - 200 V.</td>
<td>107029</td>
<td>(C21)</td>
<td>.006 mf - 350 V.</td>
</tr>
<tr>
<td>106720</td>
<td>(C22)</td>
<td>1 mfd - 200 V.</td>
<td>107043</td>
<td>(C23)</td>
<td>35-130 mmf - part of</td>
</tr>
<tr>
<td>103659</td>
<td>(C24)</td>
<td>.005 mf - 350 V.</td>
<td>107040</td>
<td>(C25)</td>
<td>106835</td>
</tr>
</tbody>
</table>

RESISTORS

100,000 ohms - 1/4 W
1,000 ohms - 1/4 W
10,000 var. vol. control
2500 ohms - 1/4 W
1000 ohms - 1/4 W
100,000 ohms - 1/4 W
1 meg. - 1/4 W
15,000 ohms - 1/4 W
1 meg. - 1/4 W
1/2 meg. - 1/4 W
1 meg. - 1/4 W
500,000 var. tone control

COILS

Antenna coil assembly
Osc. coil assembly
Choke coil assembly
Choke coil assembly
I.F. coil assembly

©John F. Rider, Publisher
The American-Bosch Model 376 is a five-tube battery operated superheterodyne receiver. Its circuit consists of a combined first detector oscillator, two stages of interstage amplifiers, a second detector and a power output amplifier.

The tuning range of this receiver extends from 540 to 1650 kilocycles.

To align the Model 376 chassis, it is essential to use a high grade modulated oscillator output of which can be continuously adjusted to remove freedom from tube vacuum as individual circuits are brought into alignment.

The Model 376 uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings of high impedance transformers are in the use of output circuits for a strong signal and minimizing the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is actuated and all frequencies of at least 2000 cycle per second are present.

ALUMINUM LUGS (486 R.C.)

1. Connect in series with high side of test oscillator leads a blanking condenser of at least 250 pf, to prevent short circuit of receiver batteries in subsequent aligning operations.

2. Set volume control in full.

3. Tone control should be in bass position.

4. Short circuit antenna and ground leads to prevent local stations from interfering with alignment and adjust volume control accordingly.

5. Connect output meter across loud speaker terminals (see note above).

6. Connect test oscillator to 220 pf, and adjust its output to produce measurable reading on input meter when test oscillator is connected between frame of chassis and the grid of r.f. tube.

7. Adjust #4 and #6 to maximum output, reducing signal oscillator output as stage is brought into resonance.

8. Connect test oscillator to grid of i.f. tube #10 and adjust #6 and #10 to maximum output.

ALUMINUM LUGS (486 R.C.)

An adjustable 1/4" lug is provided in series with the antenna circuit to prevent interference due to direct transmission of telephone signals at the intermediate frequencies.

1. With #1 oscillator still set at 456 kc, connect oscillator leads to the antenna and ground terminals through a 2000 pf condenser.

2. Set dial scale to 450 kc and adjust test oscillator output to obtain full scale reading on output meter.

3. Adjust wave trap trimmer #4 until a null or minimum reading of output meter is obtained.

ADJUSTING OSCILLATOR AND L.R.C.

1. Connect test oscillator to grid of i.f. first detector tube #10 and test oscillator to 1500 kc.

2. Set scale to maximum mark beyond 450 kc calibration point when gain is entirely closed.

3. Set scale at 1500 kc and adjust all to maximum output.

4. Connect test oscillator to antennas through a 2000 pf condenser and with scale still set at 1500 kc, adjust all to maximum output.

5. Set scale and test oscillator to 600 kc and adjust all simultaneously, change this adjustment and the station selector of chassis for maximum output.

6. With test oscillator and scale set at 1500 kc, readjust #4 and #6, since previous operations may have altered oscillator trimmer setting.

7. Check sensitivity across scale.

SPEAKER ADJUSTMENT

1. With speaker connected to the receiver, tune in a clear station and connect a voltmeter to the volume control and the speaker, adjusting the control until the speaker notes a tone of the desired pitch.

2. Uncover the two holes shown in Fig. #4 by placing the paper label.

3. This adjustment is in the speaker, and one screw must be loosened and the other tightened to correct the position of speaker for maximum output. Adjust second screw to obtain the desired pitch.

4. Adjust antenna and trimmer condenser in conjunction with the above steps until best reception of desired station is obtained.

ADJUSTMENT OF VARIOUS TYPES OF "A" BATTERY SUPPLY

The receiver is supplied without batteries. Any one of the following three types of "A" supply may be used:

1. Dry Cell Pack: A ballast tube (#30094) is provided with the receiver and used to accommodate the voltage drop of the dry cell pack. Battery voltage varies from slightly over 2 and 1/2 volts to a fresh battery to less than 2 volts for a battery near the end of its useful life.

2. Storage Battery Operation: When using a single cell of storage battery whose terminal voltage is 2 volts, it is important that the ballast tube be replaced by an accessory which serves to short circuit the diode (triode) socket terminal. Such an accessory is supplied as a separate part and should be used only when using the dry cell type of battery which has been specifically designed for radio receiver use.

3. Air Cell Operation: The air cell, unlike the dry cell pack, does not vary greatly in terminal voltage during its useful life, and while the ballast tube may be used, the receiver does not allow the total life of the air cell to be realized because its use results in low filament voltage.

A service accessory #10064 which consists of a low fixed resistance should be used to replace the ballast tube when using the air cell.

If the electrolytic condenser 2200 pf is of the polarized type (Ed. 1), it should be replaced by a non-polarized filter 30094 Ed. R.

IMPORTANT

The first production lot of the Model 376 was equipped with an F1 filter. We have found that if the owner does not follow our instructions in making correct battery connections serious damage may result to the receiver.
LINE-UP CAPACITOR ADJUSTMENTS

To align the chassis, it is essential to use a high grade modulated oscillator, the output of which can be continuously adjusted to assure freedom from tube overload as individual circuits are brought into alignment.

This model uses an improved type of magnetic speaker, the windings of which are directly in the plate circuit of the output tube. The windings are of high impedance and necessitate care in the use of the output meter when aligning the chassis.

When an output meter of low resistance is connected across the windings of this type of speaker, the power output is materially reduced. For this reason, it is necessary to use an output meter of high sensitivity and a resistance of at least 4000 ohms.

Before attempting to align a receiver, the service men should familiarize himself with the general layout of the chassis the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Figures 2 and #6, and should be carefully studied before the actual work is started.

L.F. ADJUSTMENT (465 K.C.)

1. Set volume control on full.
2. Short circuit the antennas and ground leads to prevent local stations from interfering with subsequent aligning operations.
3. Connect output meter across the loud speaker terminals (see note above).
4. Set test oscillator to 465 K.C. and apply test signal to grid of 34 second L.F. tube thru a 25 mfd. blocking condenser and adjust the two trimmers on top of L.F. coil #19 to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 1A6 detector-oscillator tube and adjust the two trimmers on top of L.F. coil #6 to maximum output.

OSCILLATOR AND R.F. ADJUSTMENT

1. Set test oscillator and dial scale to 1500 K.C.
2. With test signal still applied to the grid of 1A6 tube, adjust trimmer "A" to maximum output.
3. Apply test signal to antenna lead of chassis thru a .0002 mfd. condenser and with dial scale still set at 1500 K.C. adjust trimmer "B" to maximum output.
4. Check sensitivity and calibration at several points of dial scale.

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its alignment. However, if for any reason an adjustment is needed, it may be done as follows:

BLACK BROWN BLUE

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).
2. Uncover the two holes shown in Fig. #2 by piercing the paper label.
3. This adjustment is of the rotor type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turns steps until best position of armature is found. When this condition is obtained, both screws should be tight.

Type and Number of Tubes -- 1 #1A6, 2 #154, 1 #32, 1 #33 -- Total 5
Total "A" Battery Current -- 0.56 Amperes
Maximum "B" Battery Current -- 29.9 M.A.
Tuning Range -- 540 to 1620 K.C.
Maximum Undistorted Output -- 100 Watts
Maximum Output -- 0.7 Watts
Line-Up Frequencies -- 465 K.C., 600 K.C., and 1500 K.C.
MODEL 366

Alignment

ADJUSTMENT OF I.F.  (465 K.C.)
1. Set volume control on full.
2. Set tone control (center knob) at right
   hand or bass position.
3. Connect output meter across speaker
terminals through a.02 mfd. series condenser.
4. Connect in series with high side of test
   oscillator leads a .20 mfd. blocking condenser.
5. Set test oscillator at 465 K.C. and adjust
   its output to produce measureable reading on
   output meter when test oscillator leads are
   connected between frame of chassis and grid of 34 second I.F. tube.
6. Adjust trimmers on I.F. coil #20 to maxi-
   mum output.
7. Connect test oscillator to grid of 34
   first I.F. tube and adjust trimmers on
   I.F. coil #26 to maximum output.
8. Connect test oscillator to grid of 106
   first detector and adjust trimmers on
   first I.F. coil #21 to maximum output.
9. With test oscillator still connected to
   grid of 106, readjust trimmers on coils
   #26 and #20 for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND
1. With test oscillator on grid of 106 tube,
   set its output to 1500 K.C.
2. With gang condenser in maximum position,
   adjust dial pointer until either end is
   directly over the long horizontal lines on
   the dial scale.
3. Now set dial pointer to 1500 K.C. and ad-
   just #12 (Fig. #4) to maximum output.
4. Connect test oscillator to antenna through
   a .0002 mfd. condenser and with dial
   pointer still set at 1500 K.C., adjust
   #12 and #9 to maximum output.
5. Set dial pointer and test oscillator to
   550 K.C. and adjust #14 to maximum output.
   Reset dial pointer in either direction
   from the 550 K.C. mark and readjust #14
   until greatest sensitivity is obtained.
6. Return to 1500 K.C. setting and readjust
   #9 and #12 for maximum output. Check
   sensitivity and calibration across scale.

ADJUSTMENT OF POLICE BAND
1. Set combination tone-control-police switch
   (center knob) on first or left hand posi-
   tion.
2. Leave wave change switch in standard
   broadcast position.
3. Set test oscillator at 2400 K.C. and tune
   in station at approximately 1500 K.C. on
   dial scale.
4. Adjust trimmer on coil #63 to maximum
   output.

ADJUSTMENT OF SHORT-WAVE BAND
1. Set tone control to right-hand or bass
   position and set wave change switch (lower
   right-hand knob) to left hand position.
2. Set test oscillator and dial pointer to
   33 K.C.
3. Connect test oscillator to antenna through
   a .0002 mfd. condenser and a 400 ohm re-
   sistor in series (this condenser-resistor
   combination is the approximate equivalent
   of a short-wave antenna).
4. Adjust trimmer #20 until signal is tuned
   in.
5. Adjust trimmer #7 and station selector
   alternately until maximum sensitivity is
   obtained. (This is necessary as the ad-
  justment of #7 affects the oscillator
   frequency slightly.)
6. Set test oscillator and dial pointer to
   33 K.C. and adjust #3 to maximum output.
7. Check sensitivity across scale.

LINE-UP CAPACITOR ADJUSTMENTS
To align the chassis, it is essential to use a
high grade modulated oscillator, the out-
put of which can be continuously adjusted to
assure freedom from tube overload as individ-
ual circuits are brought into alignment.

This model uses an improved type of magnetic
speaker, the windings of which are directly
in the plate circuit of the output tube. The
windings are of high impedance and necessi-
tate care in the use of the output meter
when aligning the chassis.

When an output meter of low resistance is
connected across the windings of this type
of speaker, the power output is materially
reduced. For this reason, it is necessary
to use an output meter of high sensitivity
and a resistance of at least 4000 ohms.

Before attempting to align a receiver, the
service man should familiarize himself with
the general layout of the chassis, the lo-
cation of the tubes and various alignment
condensers. Top and bottom views of the
chassis are shown in Figures #3 and #4, and
should be carefully studied before the actual
work is started.
UNITED AMERICAN BOSCH CORP.

**LODEL 386**

**Speaker Data**

**Trimmers, Parts**

### Table of Parts

<table>
<thead>
<tr>
<th>Dia. #</th>
<th>Part #</th>
<th>Description of Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RC 9544</td>
<td>Antenna trap coil assy.</td>
</tr>
<tr>
<td>2</td>
<td>SW 9510</td>
<td>Wave switch</td>
</tr>
<tr>
<td>3</td>
<td>SG 958</td>
<td>Variable condenser</td>
</tr>
<tr>
<td>4</td>
<td>SA 101143</td>
<td>100 mf micro condenser</td>
</tr>
<tr>
<td>5</td>
<td>SA 105276</td>
<td>50,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>6</td>
<td>SA 105276</td>
<td>60 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>7</td>
<td>SA 108060</td>
<td>1.6 - 10 mmf. condenser</td>
</tr>
<tr>
<td>8</td>
<td>RC 9542</td>
<td>S.W. antenna coil</td>
</tr>
<tr>
<td>9</td>
<td>CS 9540</td>
<td>1.6 mmf. condenser</td>
</tr>
<tr>
<td>10</td>
<td>RC 9544</td>
<td>B.C. antenna coil</td>
</tr>
<tr>
<td>11</td>
<td>SA 105386</td>
<td>.05 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>12</td>
<td>SA 107503</td>
<td>3-25 mmf. condenser</td>
</tr>
<tr>
<td>13</td>
<td>RC 9541</td>
<td>3-25 mmf. condenser</td>
</tr>
<tr>
<td>14</td>
<td>SA 106001</td>
<td>300 - 600 mmf. condenser</td>
</tr>
<tr>
<td>15</td>
<td>SA 105276</td>
<td>1,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>16</td>
<td>SA 106386</td>
<td>100,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>17</td>
<td>IC 9514</td>
<td>1st L.F. transformer</td>
</tr>
<tr>
<td>18</td>
<td>SA 105276</td>
<td>100,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>19</td>
<td>IC 9515</td>
<td>End L.F. transformer</td>
</tr>
<tr>
<td>20</td>
<td>SA 105276</td>
<td>.05 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>21</td>
<td>SA 106386</td>
<td>.05 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>22</td>
<td>SA 106386</td>
<td>4,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>23</td>
<td>IC 9515</td>
<td>Diode transformer</td>
</tr>
<tr>
<td>24</td>
<td>SA 105276</td>
<td>1,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>25</td>
<td>SA 106386</td>
<td>10 mmf. 200 V. condenser</td>
</tr>
<tr>
<td>26</td>
<td>SA 105267</td>
<td>10 mmf. mica condenser</td>
</tr>
<tr>
<td>27</td>
<td>SA 105291</td>
<td>250,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>28</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>29</td>
<td>SA 105291</td>
<td>1.6 mmf. 200 V. resistor</td>
</tr>
<tr>
<td>30</td>
<td>SA 105291</td>
<td>.05 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>31</td>
<td>SA 105291</td>
<td>.05 mfd. 500 V. condenser</td>
</tr>
<tr>
<td>32</td>
<td>SA 105291</td>
<td>.05 mfd. mica condenser</td>
</tr>
<tr>
<td>33</td>
<td>SA 105291</td>
<td>.05 mfd. mica condenser</td>
</tr>
<tr>
<td>34</td>
<td>SA 105291</td>
<td>.05 mfd. mica condenser</td>
</tr>
<tr>
<td>35</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>36</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>37</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>38</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>39</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>40</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>41</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>42</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>43</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>44</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>45</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>46</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>47</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>48</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>49</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>50</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>51</td>
<td>VR 954</td>
<td>Volume control 500,000 ohms</td>
</tr>
<tr>
<td>52</td>
<td>Speaker</td>
<td>2 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>53</td>
<td>SA 106386</td>
<td>2 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>54</td>
<td>Adapter socket jumper</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>SA 106824</td>
<td>Battery switch</td>
</tr>
<tr>
<td>56</td>
<td>SA 105275</td>
<td>25,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>57</td>
<td>SA 105275</td>
<td>30,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>58</td>
<td>SA 105275</td>
<td>10,000 ohms 1/4 W. resistor</td>
</tr>
<tr>
<td>59</td>
<td>SW 955</td>
<td>Tone control</td>
</tr>
<tr>
<td>60</td>
<td>CM 905</td>
<td>500 mica condenser</td>
</tr>
<tr>
<td>61</td>
<td>CM 905</td>
<td>500 mica condenser</td>
</tr>
<tr>
<td>62</td>
<td>CM 905</td>
<td>500 mica condenser</td>
</tr>
<tr>
<td>63</td>
<td>CM 905</td>
<td>500 mica condenser</td>
</tr>
<tr>
<td>64</td>
<td>RC 9562</td>
<td>Police coil assembly</td>
</tr>
<tr>
<td>65</td>
<td>CE 950</td>
<td>2 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>66</td>
<td>CE 950</td>
<td>2 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>67</td>
<td>SA 106386</td>
<td>.05 mfd. 200 V. condenser</td>
</tr>
<tr>
<td>68</td>
<td>RE 9514</td>
<td>350,000 ohms 1/4 W. resistor</td>
</tr>
</tbody>
</table>

### Electrical Specifications

- **Type and Number of Tubes**: 1 #106, 2 #34, 1 #30, 1 #36, 1 #33 - Total 6
- **Total "A" Battery Current**: 620 mA
- **Max. "B" Battery Current**: 29 W.A.
- **Total Current Ranges**: 250 - 1720 K.C., 2200 to 2500 K.C., 5800 to 19000 K.C.
- **Max. Undistorted Output**: 7 Watts
- **Max. Output**: .9 Watts

---

**SPEAKER ADJUSTMENT**

The speaker has been carefully adjusted at the factory and should not require any further attention, as this design has been found to be very stable in maintaining its adjustment. However, if for any reason an adjustment is needed, it may be done as follows:

1. With speaker connected to the receiver, tune in a strong signal and advance the volume control until the speaker begins to rattle (armature striking pole pieces).

2. Uncover the two holes shown in Fig. #2 by piercing the paper label.

3. This adjustment is of the rocker type and one screw must be loosened and the other tightened to adjust the position of the armature. Adjustment should proceed in quarter turn steps until best position of armature is found. When this condition is obtained, both screws should be tight.

©John F. Rider, Publisher

[www.americanradiohistory.com](http://www.americanradiohistory.com)
UNITED AMERICAN BOSCH CORP.

SERVICE INSTRUCTIONS
for
AMERICAN-BOSCH MODEL 402 RECEIVER

SCHEMATIC WIRING DIAGRAM

In Model 402, Ed. 3
Pilot Light changed
to here.

R-16, 1000Ω, 2W. in
Ed. 3 only.

INTERMEDIATE FREQUENCY - 456 K.C.

© John F. Rider, Publisher
MODEL 402
Ed 1, 2, 3
Alignment, Voltage
Parts, Data

SERVICE NOTES

UNITED AMERICAN BOSCH CORP.

ELECTRICAL SPECIFICATIONS

| Type and Number of Tubes          | 1 #87, 1 #78, 1 #85, 1 #45, 1 #655 - Total 5 |
| Power Supply Characteristics      | 105 to 125 volt, 60 cycle A.C. or D.C. |
| Power Consumption                  | 45 Watts |
| Tuning Range                       | 550 to 1750 K.C. and Ed.2 and Ed.3 2400 to 2500 K.C. |
| Maximum Undistorted Output         | 456 K.C., 1500 K.C., 2400 K.C. |
| Line-Up Frequencies                | 2500 K.C. |

GENERAL DESCRIPTION

The Model 402 is a five tube, A.C. - D.C., superheterodyne receiver whose circuits consist of a combined first detector-oscillator, a stage of intermediate frequency amplification, a combined second detector - automatic volume control and audio amplifier, a power output stage and a rectifier-tube, respectively.

Model 402 Ed. 2 differs from Model 402 Ed. 1 in that it is equipped with a police band.

Model 402 Ed. 2.5 differs from Model 402 Ed. 2 in that the dial is lighted in the low audio circuits instead of the filament circuit. This will prevent high voltage on the dial light when the receiver is first turned on, for the dial light will not light until the tubes heat up and start to operate. Should any short occur in the plate circuit the dial light will act as a fuse and burn out thus protecting the rectifier tube.

The Model 402 Ed. 1 is designed to operate on frequencies from 260 to 1700 K.C.

The Models 402 Ed. 2 and 2.5 are designed to operate on the frequencies from 260 to 1700 K.C. and from 2400 to 2500 K.C.

LINEUP CAPACITOR ADJUSTMENTS

To align the Model 402 chassis, it is essential to have a high grade modulated oscillator and sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the A.V.C. to function, making correct alignment impossible. The sensitivity of the output meter must be sufficient to give satisfactory readings with a low signal.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the receiver are shown in Figures 1 and 2. Figures 3 and 4 should be carefully studied before starting alignment.

Service parts for Model 402 Ed. 2 are the same as for Model 402 except for the following parts:

<table>
<thead>
<tr>
<th>PARTS LIST MODEL 402</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 2500 - 1/4 watt</td>
</tr>
<tr>
<td>R2 100,000 - 1/4 watt</td>
</tr>
<tr>
<td>R3 200 - 1/4 watt</td>
</tr>
<tr>
<td>R4 500,000 - 1/4 watt</td>
</tr>
<tr>
<td>R5 1 meg. 1/4 watt</td>
</tr>
<tr>
<td>R6 100,000 - 1/4 watt</td>
</tr>
<tr>
<td>R7 1000 - 1/4 watt</td>
</tr>
<tr>
<td>R8 1000 - 1/4 watt</td>
</tr>
<tr>
<td>R9 500,000 - 1/4 watt</td>
</tr>
<tr>
<td>R10 1 meg. 1/4 watt</td>
</tr>
<tr>
<td>R11 500,000 - 1/4 watt</td>
</tr>
<tr>
<td>R12 500 - 1/2 watt</td>
</tr>
<tr>
<td>R13 500</td>
</tr>
<tr>
<td>R14 650</td>
</tr>
<tr>
<td>R15 4,000 - 1/4 watt</td>
</tr>
<tr>
<td>R16 0.05 - dual</td>
</tr>
<tr>
<td>C1 2500 - 2500 V</td>
</tr>
<tr>
<td>C2 2500 - 2500 V</td>
</tr>
<tr>
<td>C3 0.005 mfd.</td>
</tr>
<tr>
<td>C4 Mica I.F. trimmers</td>
</tr>
<tr>
<td>C5 Mica I.F. trimmers</td>
</tr>
<tr>
<td>C6 0.005 - dual</td>
</tr>
<tr>
<td>C7 0.001 mica</td>
</tr>
<tr>
<td>C8 0.005 - 500 V</td>
</tr>
<tr>
<td>C9 0.001 - 500 V</td>
</tr>
<tr>
<td>C16 01 - 470 V</td>
</tr>
<tr>
<td>C17 25 - 200</td>
</tr>
<tr>
<td>C18 105296</td>
</tr>
<tr>
<td>C19 M.F. 150 V</td>
</tr>
<tr>
<td>C20 12 M.F. 150 V</td>
</tr>
<tr>
<td>C21 8 M.F. 55 V</td>
</tr>
<tr>
<td>C22 5 M.F. 55 V</td>
</tr>
</tbody>
</table>

MODEL 402 Ed. 2

1. Set the oscillator to 2400 K.C. and turn the switch of receiver to police band.
2. Tune in a signal with receiver. (About 1500 K.C.)
3. Adjust alignment condenser "F" for maximum output.

VOLTAGE READINGS

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tube</th>
<th>Filament</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Detector</td>
<td>677</td>
<td>6.0</td>
<td>115</td>
<td>115</td>
<td>12</td>
</tr>
<tr>
<td>Oscillator</td>
<td>I.P.</td>
<td>75</td>
<td>6.0</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>2nd Detector</td>
<td>59</td>
<td>5.9</td>
<td>50</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Amplifier</td>
<td>Power</td>
<td>45</td>
<td>25</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Rectifier</td>
<td>2525</td>
<td>22</td>
<td>115</td>
<td>115</td>
<td>156</td>
</tr>
<tr>
<td>Line Voltage</td>
<td>120</td>
<td>Dynamic Field</td>
<td>108 Volts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power In Watts</td>
<td>47</td>
<td>Filter Choke Drop</td>
<td>6.8 Volts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.I.C. Voltage</td>
<td>6.0</td>
<td>Resistor Strip Voltage</td>
<td>47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WIRING DIAGRAM

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tube</th>
<th>Filament</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Detector</td>
<td>677</td>
<td>6.0</td>
<td>103</td>
<td>103</td>
<td>9.7</td>
</tr>
<tr>
<td>Oscillator</td>
<td>I.P.</td>
<td>75</td>
<td>5.9</td>
<td>75</td>
<td>2.6</td>
</tr>
<tr>
<td>2nd Detector</td>
<td>59</td>
<td>5.9</td>
<td>50</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Amplifier</td>
<td>Power</td>
<td>45</td>
<td>24</td>
<td>102</td>
<td>102</td>
</tr>
<tr>
<td>Rectifier</td>
<td>2525</td>
<td>27</td>
<td>110</td>
<td>110</td>
<td>116</td>
</tr>
<tr>
<td>Line Voltage</td>
<td>116</td>
<td>Dynamic Field</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.I.C. Voltage</td>
<td>6</td>
<td>Resistance Strip</td>
<td>116</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
The American-Bosch Model 420 is a five-tube dual wave superheterodyne receiver. This model is for 110 volt 60 cycle operation and the Model 421 is for 110 volt 25 cycle operation.

The tuning range of this receiver is from 540 to 1,600 kilocycles as indicated on the lower portion of the dial scale, and from 1600 to 3600 kilocycles as indicated on the upper portion of the scale.

**GENERAL DESCRIPTION**

**ELECTRICAL VALUES**

**NOMENCLATURE**

©John F. Rider, Publisher
CIRCUIT DESCRIPTION
The American-Bosch Model 450 is a five tube, three band superheterodyne receiver. The tuning range of this receiver covers a broadcast band extending from 540 to 1700 kc, which includes one band of an intermediate frequency of 460 kc, with the second detector, a.v.c., and audio stage of the "tone" of type 2C2, 32 & 38 #107928 and the 460 kc broadcast band extending from 1500 to 18,000 kc.

The circuit consists of a combined detector oscillator (type 467) an intermediate frequency amplifier (type 468) including four stages and l.f. stages of the "tone" of type 76 and also a power output oscillator (type 42)

---

**Figure 1**

1. Set combination tone control - police band - switch (center knob) on first or left hand position.
2. Leave wave change switch in standard broadcast position.
3. Set dial scale at 1500 kc. (This is reception point for 1500 kc. on range marked "police")
4. Adjust trimmer condenser #11 to minimum output. (Continued on page 1042.)

**ALUMINUM FUSIBLE WIRE**

1. Set wave change switch to short wave or lower dial scale position.
2. Connect test oscillator to antenna through 0002 mf. and 400 ohm resistor in series (this condenser and resistor is the approximate equivalent of a short wave antenna).
3. Set test oscillator and dial scale to 15 kc. (16000 kc. all bands) and adjust trimmers #14 and #18 to obtain reading on output meter.
4. Simultaneously adjust station selector and #18 in the same manner as described above with respect to #10. Alignment (like in necessary because sufficient coupling exists in the 4A2 tube to cause a serious shift in the frequency of the oscillator as #18 is adjusted.)
5. Set test oscillator and dial scale to 5 kc. (6000 kc.) and adjust "max./min." #16.
6. Repeat operation #4 as operation #5 may have disturbed oscillator adjustment.
7. Check sensitivity across band.

**ALUMINUM WIRE**

To align the Model 450 chassis, it is necessary to use a high grade calibrated test oscillator and a sensitive output meter. The R. F. signal fed into the receiver must be relatively weak to cause a tube to function, making correct alignment possible. The sensitivity of the output tube must be sufficient to give satisfactory reading with 0.01 volt.

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and other assembly details seen on the chassis. The top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before the actual work is started.

1. Set volume control on full.
2. Set tone control (lower center knob) at center position or treble.
3. Connect output meter across voice coil of loud speaker (speaker impedance is 3.5 ohms).
4. Connect in series with high side of the test oscillator output leads a blocking condenser of at least 25 n. Set test oscillator to 400 kilocycles and adjust its output until a measurable reading on output meter. Note test oscillator is connected between frame of chassis and grid of 468 I.F. amplifier tube #6.
5. Adjust #4 and #5 to maximum output, reducing test oscillator output as stage is brought into operation.
6. Connect test oscillator to grid of 467, A.T. detector tube and adjust #7 and #8 to maximum output.
7. Set wave change switch to broadcast scale position.
8. Set test oscillator to 1800 kc. and connect to grid of 1st detector tube EAT (#2).
9. Set dial scale to maximum mark beyond 460 kc. calibration point when the gap is entirely closed.
10. Set dial scale at 1500 kc. and adjust #13 to maximum output.
11. Connect test oscillator to antenna through a 0002 mf. condenser and with scale still set at 1500 kc. adjust condensers #15 and #17 to maximum output.
12. Set scale and test oscillator to 560 kc. and adjust #15 simultaneously changing scale and the station selector of the chassis for maximum output. This type of adjustment is known as "tuning" and is obtained in the following manner.

Remove receiver with left hand by means of tuning lugs and adjust #15 in either direction and then without changing it, turn the receiver through a maximum, noting the values of output meter readings. Change #15 further in same direction, return receiver and note reading. If output drops with second adjustment, reverse direction of the adjustment of #15, continue this type of trial and error adjustment to get maximum output. It is sometimes found that further tuning control or #15 are changed. While this procedure may appear difficult, facility in making it can be easily acquired by practice and the operation requires only a few moments.

With test oscillator and scale set at 1500 kc. resistors #10 and #17 since previous operations may have disturbed oscillator trimmer setting.
13. Check sensitivity across band.

---

**NOTE**: All values are in microfarads unless otherwise specified.
UNITED AMERICAN BOSCH CORP.

MODEL 440

I.F. 456 KC

MODEL 440

Schematic, Voltage

Socket Voltages

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tube</th>
<th>Fil.</th>
<th>Plate</th>
<th>Screen</th>
<th>Cathode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectifier</td>
<td>80</td>
<td>4.85</td>
<td>382</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Power output</td>
<td>42</td>
<td>6.1</td>
<td>284</td>
<td>245</td>
<td>0.97</td>
</tr>
<tr>
<td>2nd Detector</td>
<td>75</td>
<td>6.1</td>
<td>126</td>
<td></td>
<td>99</td>
</tr>
<tr>
<td>1st L.F.</td>
<td>6D6</td>
<td>6.1</td>
<td>245</td>
<td>96</td>
<td>5.6</td>
</tr>
<tr>
<td>2nd L.F.</td>
<td>6D6</td>
<td>6.1</td>
<td>245</td>
<td>96</td>
<td>5.6</td>
</tr>
<tr>
<td>Oscillator</td>
<td>6A7</td>
<td>6.1</td>
<td>256-136</td>
<td>87</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Note: These values are readings of a high resistance voltmeter from each socket terminal to ground, with the exception of the filament voltages. The values are only approximate and will vary with the line voltage and type of meter employed. Line voltage - 112.
CIRCUIT DESCRIPTION

The Model 440 is a six tube, dual wave band receiver, designed to operate over the frequency range from 1,050 to 3,400 kilocycles and 10,500 to 20,500 kilocycles. The circuit is arranged with a first detector, a combination first detector, a doubler stage, a combination of intermediate frequency amplification (446 A.C. G), and a second tuning stage, a power output stage and a rectifier tube.

The wave change switch serves to change the electrical circuits to the wave band desired and in addition serves to illuminate the particular dial with the signal band in use.

#2 I.F. trimmer condenser
#3 I.F. trimmer condenser
#4 I.F. trimmer condenser
#5 I.F. trimmer condenser
#6 I.F. trimmer condenser
#7 I.F. trimmer condenser
#8 I.F. trimmer condenser

To properly align the chassis, it is essential to use a high grade modulated oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be very weak or it will cause the a.r.d. to function under normal alignment impossible. The sensitivity of the output meter must be set low to give satisfactory reading with a low signal.

Before attempting to align the chassis, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment components. A top view of the chassis is shown in Fig. 1 and should be carefully studied before the actual work is started.

A.F. ADJUSTMENT

1. Set test oscillator to 456 K.C.
2. Connect A.C. voltmeter (output meter) across voice coil of speaker.
3. Connect test oscillator to grid of 2nd I.F. tube (468 in rear of condenser gang) and watch for oscillations.
4. Adjust #6 to maximum output.
5. Connect test oscillator to grid of 1st I.F. tube (468 - rear right hand tube). Adjust #7 (trimmer) for maximum output.
6. Connect test oscillator to grid of 1st detector (467). Adjust #8 (trimmer) for maximum output.
7. Check test oscillator to output meter and check for proper operation.
8. Adjust #6 and #8 to maximum output.

This completes the A.F. alignment.

B.F. ADJUSTMENT (Broadcast Band)

1. Connect test oscillator to antenna and ground leads. Set wave change switch to broadcast band position as indicated by the dial light. Set station selector to 440 K.C.
2. Align test oscillator still adjusted to 456 K.C., increase signal strength of test oscillator until signal is heard in loud speaker.
3. Adjust #8 (trimmer) for correct operation. If signal strength at 456 K.C. is not correct, adjust #7 (trimmer) for correct alignment.

Parts Alignment

Parts alignment, 440C, 440T

Parts alignment, 444C, 444T

Parts alignment, 4410, 441C

Parts alignment, 4410, 441C

Parts alignment, 4410, 441C

Parts alignment, 4410, 441C
CIRCUIT DESCRIPTION

The Model 450 is a six tube, three band superheterodyne receiver. The tuning range of this receiver covers a broadcast band extending from 540 to 1750 kilocycles, which includes one band of police frequencies, a higher frequency police band of 2200 to 2600 kilocycles and a short wave broadcast band extending from 5900 to 18000 kilocycles.

The circuits comprise a R. F. selector circuit, a combination first detector oscillator, two stages of intermediate frequency amplification (450 K.C.) with double tuned circuits coupling each stage, a combination second detector, A.V.C., and first audio stage, a power output stage and a rectifier tube.
Alignment Nomenclature

#8 Short wave preselector trimmer*
#10 Broadcast preselector trimmer*
#13 Police preselector trimmer*
#15 Short wave oscillator trimmer*
#17 Short wave osc. lag (bottom screw)
#20 Broadcast oscillator trimmer*
#21 Broadcast osc. lag (top screw)
#35 First I.F. trimmer
#37 First I.F. trimmer
#43 Second I.F. trimmer
#45 Second I.F. trimmer
#51 Third I.F. trimmer
#53 Third I.F. trimmer

* See Figure #2
ALIGNMENT PROCEDURE

To properly align the receiver, it is essential to use a high-grade modulated test oscillator and a sensitive output meter. The R.F. signal fed into the receiver must be relatively weak or it will cause the S.V.C. to function making correct alignment difficult. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the location of the tubes and the various alignment condensers. The top and bottom view of the chassis are shown in Figure 1 and 2 and should be carefully studied before the actual work is started.

A - T.F. ADJUSTMENT (460 K.C.)

1. Set test oscillator to 460 K.C.
2. Connect output meter across voice coil of speaker. (Impedance 3.5 ohm)
3. Connect in series with high side of test oscillator a leading a blocking condenser of at least 25 mfd.
4. Connect test oscillator to grid of last I. F. tube (606 in rear of condenser gang) and adjust #21 and #20 to maximum output reducing test oscillator as required.
5. Connect test oscillator to grid of last I. F. tube (606 rear right hand tube) and adjust #26 to maximum output.
6. Connect test oscillator to grid of last detector (617) and adjust #35 and #37 to maximum output. This completes the I. F. adjustment.

B - ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to broadcast scale position.
2. Set test oscillator to 1500 K.C. and connect to grid of last detector (#67).
3. Adjust dial scale to maximum band mark beyond 540 K.C. calibration point when the gang is entirely closed.
4. Set dial scale at 1500 K.C. and adjust #20 to maximum output.
5. Connect test oscillator to antenna and ground leads of the receiver (red and green) through a .0002 mfd. condenser and with scale still set at 1500 K.C. adjust #10 and #20 to maximum output.
6. Set dial scale and test oscillator to 600 K.C. and adjust #21 simultaneously changing this adjustment and the station selector for maximum output. This type of adjustment is known as "maxima" and is obtained in the following manner:

Tune the receiver with your left hand by means of tuning knob and adjust #21 in either direction and then without changing it, tune the receiver through a maximum noting the value of output meter reading. If output drops with second adjustment reverse direction of the adjustment of #21. Continue this type of trial and error adjustment until no further improvement can be made when either tuning control or #21 are changed. While this procedure may appear difficult, facility can be easily acquired and the operation requires only a few moments.
7. With test oscillator and scales set at 1500 K.C. adjust #10 and #20 since previous operations may have altered oscillator trimmer setting.
8. Check sensitivity across band.

C - ADJUSTMENT OF POLICE BAND

1. Set combination tune control - police band switch (lower center knob) on first or left-hand position.
2. Leave wave change switch on standard broadcast position.
3. Set dial scale at 1500 K.C. (this is the reception point for 2400 K.C. on range marked "police switch" on dial scale).
4. Set test oscillator to 2400 K.C. and tune in signal with station selector.
5. Adjust #18 to maximum output.

D - ADJUSTMENT OF SHORT-WAVE BAND

1. Set wave change switch to short wave or lower dial scale position.
2. Connect test oscillator to antenna thru a .0002 mfd. condenser and a 400 ohm re-
AMERICAN-BOSCH RADIO MODEL 05
Five-Tube, Two Band, AC-DC, Superheterodyne Receiver
The Model 460 is a seven tube superheterodyne receiver whose circuit comprises a first detector, an oscillator, two stages of I.F. amplification, a combined double diode second detector and first audio amplifier, a power amplifier and rectifier tube.

Selectivity is provided by a double tuned antenna selector and three double tuned I.F. transformers, comprising eight selective circuits in all. The double tuned antenna selector is important in the broadcast band for reasons well known, and is all the more important on the short wave band in order to prevent "repeat points", that is, reception of the same station at two points on the scale.

©John F. Rider, Publisher
To properly align the Model 450 chassis, it is essential to use a high-grade modulated tube oscillator and a sensitive demodulator. The R-F signal fed into the receiver must be unmodulated. The sensitivity of the output match must be increased to give proper signal. 

Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment points. A top view of the chassis is shown in Fig. 1, and should be carefully studied before the actual work is started.

### ALIGNING THE CHASSIS

1. Set test oscillator to 600 K.C. and connect to grid of first detector. All points of receiver should be at 455 K.C. and the receiver should be tuned in. Adjust #20 until signal is tuned in. Adjust #21 until the signal is tuned in. Tune receiver to 600 K.C. and check adjustment. 

2. Connect test oscillator to grid of first detector all and adjust #20 and #21 to maximum output.

3. Repeat above operations for accuracy.

### ALIGNING THE B.P.

1. Set test oscillator to 1500 K.C. and connect to grid of detector all. Adjust #20 until signal is tuned in. Tune receiver to 1500 K.C. and check adjustment. 

2. Connect test oscillator to antenna lead. All points should be at 250 K.C. and the receiver should be tuned in. Adjust #20 until signal is tuned in. Tune receiver to 250 K.C. and check adjustment. 

3. Connect test oscillator to antenna lead. All points should be at 455 K.C. and the receiver should be tuned in. Adjust #20 until signal is tuned in. Tune receiver to 455 K.C. and check adjustment. 

### ALIGNING THE INFRA RED

1. Set test oscillator to 100 K.C. and connect to grid of detector all. All points should be at 100 K.C. and the receiver should be tuned in. Adjust #20 until signal is tuned in. Tune receiver to 100 K.C. and check adjustment. 

2. Connect test oscillator to antenna lead. All points should be at 250 K.C. and the receiver should be tuned in. Adjust #20 until signal is tuned in. Tune receiver to 250 K.C. and check adjustment. 

3. Connect test oscillator to antenna lead. All points should be at 455 K.C. and the receiver should be tuned in. Adjust #20 until signal is tuned in. Tune receiver to 455 K.C. and check adjustment. 

### TO OPERATE

For correct operation, the receiver must be tuned in at the correct notes. The #20 and #21 adjustments should be made at the correct notes. The #20 and #21 adjustments should be made at the correct notes.

### TO OPERATE

For correct operation, the receiver must be tuned in at the correct notes. The #20 and #21 adjustments should be made at the correct notes. The #20 and #21 adjustments should be made at the correct notes.

### TO OPERATE

For correct operation, the receiver must be tuned in at the correct notes. The #20 and #21 adjustments should be made at the correct notes. The #20 and #21 adjustments should be made at the correct notes.
The Model 460 E. D. Z. receiver is a superhet, all-wave receiver whose circuit comprises an A. V. C. oscillator stage, two detector stages, two stages of I. F. amplification, a combination second detector, A. V. C. and first A. V. C. amplifier, a power output stage and a speaker. Sensitivity is provided by antenna tuning, R. F. stage tuning and fixed I. F. tuned circuits.

1. Set test oscillator to 30,000 K. C. or 30,000 K. C. or 30,000 K. C. of the dial scale. Adjust #12 (or right side of chassis) until signal is tuned in at 30 K. C. dial scale.

2. Now return both test oscillator and receiver to 18,000 K. C. and open the receiver in the two points 30 K. C. (11 and 11). Signal will not break through and signal as signal becomes better tuned. At correct adjustment it should be obtainable at 18 K. C. dial while a readable signal will be observed at 11. This is a practical illustration of the effectiveness of preselection.

The alignment instructions just given apply to the Model 460 E. D. Z. receiver which is to receive AM broadcast stations. If the reader has not been thrown out of adjustment, he must consult himself that defective tubes, injured parts, such as phosphor plated conductors, altered variable condensers, open resistors, dead or shorted high frequency coils, etc., are not such as to cause the set to be inoperable on one or more bands of frequency.
NOTE: SWITCH POSITION IS SHOWN IN HIGHEST FREQUENCY SCALE POSITION (PURPLE)

1. PURPLE - 10 - 22 MC
2. RED - 40 - 10 MC
3. GREEN - 1.0 - 8.0 MC
4. BLACK OR BROADCAST

1F = 456 KC.
**UNITED AMERICAN BOSCH CORP.**

Model 480 Edl and 2 American-Bosch Radio Receiver

---

**NOTER UNDERNEATH**

1. The Model 480 is a two-tube all-wave receiver capable of receiving radio stations transmitted in 1500 kilocycles or less having an output indicating test oscillator signal of 0.05 volt output. This receiver is designed to have four wave-lengths, namely, 480, AM, 620, 1230 and 1620 plus the long wave band from 4000 to 10,000, K.C. and the purple band, 10,000 to 20,000, K.C.

2. To properly align the Model 480, it is essential to use a high grade calibrated test oscillator and a sensitive output meter. The F. F. adjustment fed into the receiver must be such that the sensitivity of the output meter must be sufficient to give satisfactory reading with the input signal.

3. Before attempting to align a receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and the various alignment points shown in Fig. 3 and 4, and should be careful neither to feed the wrong signal to the final amplifier than to feed the signal through the selector circuits.

---

**ADJUSTMENT OF TUBE VOLTAGE**

1. Adjust wave change switch to purple band position.

2. Set test oscillator and station indicator to 20,000, K. C. and adjust #11 to maximum output.

3. Adjust #17 and #62 (or maximum output).

4. Set test oscillator and station indicator to 12,000, K. C. and adjust #12 until signal is heard in.

5. Return to 20,000 K. C. setting and check alignment.

---

**TUBE DATA**

1. Adjust wave change switch to purple band position.

2. Set test oscillator and station indicator to 20,000, K. C. and adjust #11 to maximum output.

3. Adjust #17 and #62 (or maximum output).

4. Set test oscillator and station indicator to 12,000, K. C. and adjust #12 until signal is heard in.

5. Return to 20,000 K. C. setting and check alignment.

---

**ADJUSTMENT OF VOLTAGE**

1. Adjust wave change switch to purple band position.

2. Set test oscillator and station indicator to 20,000, K. C. and adjust #11 to maximum output.

3. Adjust #17 and #62 (or maximum output).

4. Set test oscillator and station indicator to 12,000, K. C. and adjust #12 until signal is heard in.

5. Return to 20,000 K. C. setting and check alignment.
470 3Ω 105-125 V, 50-60 cy AC FOR OTHER PARTS LISTS
471 3Ω 105-125 V, 25 cy AC AND ALIGNMENT DATA
474 6Ω 90-250 V, 50 cy AC SEE MODEL 460 ED. 2

UNITED AMERICAN BOSCH CORP.

CABINETS

CH9513A Chassis assembly - 474G & U
CH9516A Chassis assembly - 471G & U
CH 959A Chassis assembly - 470G & U

KA 952 Cabinet - Mdls 470U, 471U, 474U
KA 953 Cabinet - Mdls 470G, 471G, 474G

107284 Speaker - Mdls 470U, 471U, 474U
107369 Speaker - Mdls 470G, 471G, 474G

107280 Line cable - Models 470 & U
107281 Power trans. - Models 470 & U
107282 Power trans. - Models 471 & U
107283 Power trans. - Models 474 & U
107875 Power trans. - Models 470, 471, 474

107876 Line cable - Models 470, 471, 474

107877 Power trans. - Models 470, 471, 474

Schematic Data

CABLES & CABLE ASSEMBLIES

MASTERS & CABLE ASSEMBLIES

MAIN ASSEMBLIES

CB9512 Line cable

CB9513A Chassis assembly - 474G & U
CB9516A Chassis assembly - 471G & U
CB959A Chassis assembly - 470G & U

107284 Speaker - Mdls 470U, 471U, 474U
107369 Speaker - Mdls 470G, 471G, 474G

107280 Line cable - Models 470 & U
107281 Power trans. - Models 470 & U
107282 Power trans. - Models 471 & U
107283 Power trans. - Models 474 & U
107875 Power trans. - Models 470, 471, 474

107876 Line cable - Models 470, 471, 474

107877 Power trans. - Models 470, 471, 474
AMERICAN-BOSCH RADIO MODEL 505

Five Tube, Two Band, Superhetodyne Receiver

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type and Number of Tubes</th>
<th>1 PEFT, 1 6F8A, 1 7F7, 1 6UG, 1 660 - Total 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply - 25 to 125 volts AC</td>
<td>60 to 60 cycles A.C.</td>
</tr>
<tr>
<td>Maximum Output - +400 to +5000 mW</td>
<td>-60 to -5000 mW</td>
</tr>
<tr>
<td>Line-up Frequency</td>
<td>I.F. 456 K.C. - 1400 K.C.</td>
</tr>
</tbody>
</table>

GENERAL DESCRIPTION

This is a five-tube, A.C. two-band superhetodyne receiver whose circuit consists of a first detector-oscillator and a second detector-oscillator stage. It is an intermediate frequency amplifier, a second detector stage, a first radio amplifier, a power stage and a receiver with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 500 to 1500 K.C. and a police band which extends from 1200 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade carbonated test oscillator, the output of which can be continuously varied with a small rheostat. When the individual circuits of the receiver are brought into alignment, a conventional output meter can be connected across the terminals of the speaker, voice coil, and antennas. The alignment of the speaker, voice coil, and antennas is then accomplished by adjusting the respective capacitor trimmers for the best sensitivity reading with no input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment capacitors. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

SERVICE PARTS LIST MODEL 505

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>120,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>44</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>43</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>42</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>41</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>40</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>39</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>38</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>37</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>36</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>35</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>34</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>33</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>32</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>31</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>30</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>29</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>28</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>27</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>26</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>25</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>24</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>23</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>22</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>21</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>20</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>19</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>18</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>17</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>16</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>15</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>14</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>13</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>12</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>11</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>10</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>9</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>8</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>7</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>6</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>5</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>4</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>3</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>2</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
<tr>
<td>1</td>
<td>150,000 ohm, 1200 M.C. condenser</td>
</tr>
</tbody>
</table>

UNITED AMERICAN BOSCH CORP.

Socket, Turret & Parts Alignment, Parts 505
**LINE-UP CAPACITOR ADJUSTMENTS**

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, the location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in figures #1 and #2 and should be carefully studied before the actual work is started.

**ADJUSTMENT OF I.F. (465 K.C.)**

1. Set volume control on full and turn tone control knob to the right hand position.
2. Connect output meter across voice coil.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test oscillator is applied to the grid of the 6Q6 I.F. tube thru a .2 mfd. blocking condenser.
4. Adjust #25 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #16 and #19 (see Fig. #1) to maximum output.
6. With test signal still on the grid of the 6F7 tube, repeat the above adjustments for greatest sensitivity.

**ADJUSTMENT OF BROADCAST BAND**

1. Leave test signal on grid of 6F7 tube and set test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. series condenser and adjust trimmer #7 to maximum output.

**ADJUSTMENT OF POLICE BAND**

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil has been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

---

**Type and Number of Tubes**

- 1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5

**Power Supply**

105 to 125 volts, 50 to 60 cycle A.C.

**Power Consumption**

- 46 Watts
- 2.8 Watts

**Tuning Ranges**

- 30 to 1500 K.C. and 1500 to 3300 K.C.

**Maximum Undistorted Output**


---

©John F. Rider, Publisher
**MODEL 585Y**

<table>
<thead>
<tr>
<th>PLN #</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>RC 9573</td>
<td>Oscillator coil assembly (Red Band)</td>
</tr>
<tr>
<td>42</td>
<td></td>
<td>800 to 1600 mfd, lag condenser-part of CS 9519 (Red Band)</td>
</tr>
<tr>
<td>43</td>
<td></td>
<td>800 to 1600 mfd, lag condenser-part of CS 9520 (Green Band)</td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>200 to 600 mfd, lag condenser-part of CS 9517 (Black Band)</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>200 to 600 mfd, lag condenser-part of CS 9518 (Purple Band)</td>
</tr>
</tbody>
</table>

**MODEL 585Z**

Service parts list for Model 585SZ same as for Model 585Y except for the following parts:

<table>
<thead>
<tr>
<th>PLAN #</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>SK 9512</td>
<td>Speaker complete</td>
</tr>
<tr>
<td>95</td>
<td>DM 556</td>
<td>Diaphragm and coil assembly</td>
</tr>
</tbody>
</table>

**MAIN ASSEMBLIES**

<table>
<thead>
<tr>
<th>PLAN #</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>84</td>
<td>TR 9519</td>
<td>Speaker output transformer</td>
</tr>
<tr>
<td>95</td>
<td>SK 9512</td>
<td>Speaker assembly</td>
</tr>
</tbody>
</table>

**SPEAKER PARTS**

<table>
<thead>
<tr>
<th>PLAN #</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>96</td>
<td>SK 9512</td>
<td>Diaphragm and coil assembly</td>
</tr>
<tr>
<td>97</td>
<td>SK 9512</td>
<td>Speaker assembly</td>
</tr>
</tbody>
</table>
UNITED AMERICAN BOSCH CORP.

D.C. RESISTANCE MEASURED WITH WAVE-CHANGE SWITCH IN CORRESPONDING BAND POSITION

<table>
<thead>
<tr>
<th>COIL</th>
<th>DIA</th>
<th>PRIM</th>
<th>SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-A</td>
<td>13</td>
<td>130</td>
<td>2.5</td>
</tr>
<tr>
<td>P-AP</td>
<td>24</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>P-O</td>
<td>36</td>
<td>80</td>
<td>13.5</td>
</tr>
<tr>
<td>B-A</td>
<td>22</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>B-O</td>
<td>30</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>G-A</td>
<td>11</td>
<td>22</td>
<td>1</td>
</tr>
<tr>
<td>G-O</td>
<td>23</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>R-A</td>
<td>10</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>R-O</td>
<td>41</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>IF-1ST</td>
<td>53</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>IF-2ND</td>
<td>62</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>IF-3RD</td>
<td>75</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>CHOKER</td>
<td>110</td>
<td>350</td>
<td></td>
</tr>
<tr>
<td>TRANS-1ST</td>
<td>64</td>
<td>3200</td>
<td>3800</td>
</tr>
<tr>
<td>TRANS-2ND</td>
<td>112</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>SPKR. F.I</td>
<td>1150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.O.I</td>
<td>114</td>
<td>2.6</td>
<td></td>
</tr>
</tbody>
</table>

SOME MODELS 595 M, 595 P

Schematic, Voltage Resistor Data

D.C. RESISTANCE MEASURED WITH A 1000 OHM PER VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION

<table>
<thead>
<tr>
<th>TUBE</th>
<th>BASE</th>
<th>PIN</th>
<th>BIAS</th>
<th>SCREEN</th>
<th>PIN</th>
<th>BIAS</th>
<th>SCREEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>6K7</td>
<td>RF</td>
<td>62</td>
<td>2-7</td>
<td>245</td>
<td>3-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6A8</td>
<td>1ST DET</td>
<td>62</td>
<td>2-7</td>
<td>240</td>
<td>3-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6G5</td>
<td>OSC</td>
<td>62</td>
<td>2-7</td>
<td>200</td>
<td>3-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6K7</td>
<td>1ST IF</td>
<td>62</td>
<td>2-7</td>
<td>240</td>
<td>3-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6K7</td>
<td>2ND IF</td>
<td>62</td>
<td>2-7</td>
<td>255</td>
<td>3-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6F8</td>
<td>2ND DET</td>
<td>62</td>
<td>2-7</td>
<td>250</td>
<td>4-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6F6</td>
<td>1ST AF</td>
<td>62</td>
<td>2-7</td>
<td>250</td>
<td>4-1</td>
<td>100</td>
<td>8-7</td>
</tr>
<tr>
<td>6F6</td>
<td>OUTPUT</td>
<td>62</td>
<td>2-7</td>
<td>350</td>
<td>3-1</td>
<td>250</td>
<td>4-1</td>
</tr>
<tr>
<td>6F6</td>
<td>OUTPUT</td>
<td>62</td>
<td>2-7</td>
<td>350</td>
<td>3-1</td>
<td>250</td>
<td>4-1</td>
</tr>
<tr>
<td>6F6</td>
<td>OUTPUT</td>
<td>62</td>
<td>2-7</td>
<td>350</td>
<td>3-1</td>
<td>250</td>
<td>4-1</td>
</tr>
<tr>
<td>5Z3</td>
<td>RECT</td>
<td>51</td>
<td>220</td>
<td>4-1</td>
<td>100</td>
<td>8-7</td>
<td></td>
</tr>
</tbody>
</table>

INT. FREQ. 465 K.C.

SOCKET VOLTAGES — LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS MEASUREMENTS MADE WITH A 1000 OHM PER VOLTMETER AND WITH WAVE-CHANGE SWITCH IN BROADCAST BAND POSITION

© John F. Rider, Publisher
Removing individual coil and switch sections of the center-dial type.

If a component part located underneath the switch and within the assembly of the "center-dial" type has been replaced or replaced by a section of the unit to be removed for replacement, each section can easily be removed with care as follows:

1. Remove the three coil shields.
2. Remove the two self-tapping screws which secure the mounting plate of the wave-guide switch to the chassis rear panel. Pull switch out straight out.
3. Unsolder the stator and rotor leads from the gage condenser.
4. The fastening screws for the switch and coil are located on top of the "center-dial" unit and are indicated by "X" in Figure 5. Remove the corresponding switch and coil.
5. Each individual section can then be pulled out straight.

Note: On the R.C. section, the plate lead from the 647 socket will have to be pulled out through the switch terminal before the section can be removed. On the oscillator section, the plate lead will have to be soldered from the 600 socket.

6. After repairs have been made, resolder the plate lead and mount and place the section being careful to observe all the soldered holes in the switch bracket line up with the round guide rods. Replace the base plate of the "center-dial" unit. This is important that the side can not be inserted if the switch brackets do not line up.
7. Replace and fastening screw.
8. Resolder the stator and rotor leads on the gage condenser.
9. Replace the switch and the mounting plate fastening screws. When inserting the switch shaft, be careful that the switch shaft and condenser are in the same position. Otherwise the switch will not be able to. NEVER force the shaft into the switch box. If shaft is not in place, examine the position of the slot in each switch box.
10. Before replacing the coil shields, it is advisable to bend the shield slightly to assure that positive contact is made with the coil shield. This can be done with your hands using the thumbs and fingers of each hand. Pull on the end of the shield slightly and apply a little pressure on the shield as indicated by the arrow in Figure 3. Then replace the shield and observe that they fit tightly. In addition, to assure positive contact, this will also prevent the shielding from rattling.

Figure No. 3: LINEUP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is necessary to use the high grade oscilloscope test oscillator. The output of which can be varied over a wide range of frequencies. When the individual circuits of the receiver are adjusted, the frequency of the test oscillator may be increased or decreased to obtain the best performance. If the interconnections of the coils and capacitors used in the receiver are not correct, the receiver will not work properly. The adjustments of the coil and capacitors used in the receiver are shown in Figures 5, 6, and 7. The following procedure should be carefully studied before the actual work is started:

**ADJUSTMENT OF I.F. (465 K.C.)**

**TEST OSCILLATOR AND COIL COMBINATION**

**Figure No. 3:**

2. Set test oscillator and dial indicator to 1700 K.C. and adjust #6, #10, and #12 for maximum output.
3. Set test oscillator and dial indicator to 6000 K.C. and adjust #46 for maximum output.
4. Return to 1700 K.C. setting and make final adjustment of #6, #10, and #12.

**Note:** A variation of the short-wavelength gage condensers (#40 and #41) is best made by the test-max. This is done as follows:

Tune the receiver with the left hand by means of the tuning knob and adjust the gage condenser in either direction and then without changing it, tune the receiver to a normal reading of the output meter. Change the tuning condenser further in the same direction, return receiver and note reading. If output drops with second adjustment, reverse direction of adjustment of tuning condenser. This type of trial and error adjustment until no further improvement can be made when both the tuning and condenser are changed. While this procedure may appear difficult, facility can be gained with practice and the operation requires only a few minutes.

**SUMMARY:** While testing or making repair adjustments on the receiver, it should not be turned upside down or on its side for any length of time. A period of 24 hours should be allowed for any condenser to become dry before adjusting or changing the receiver. All condensers are charged while the receiver is on, and it is advisable to replace the receiver in the same position, if a change is made on the receiver in this position, it will remain in the same position while the receiver is on.

**ADJUSTMENT OF CENTER-DIAL TYPE**

1. Set wave-change switch to Red Band position.
2. Set test oscillator and dial indicator to 1900 K.C. and adjust #10, #12, and #26 for maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #12 for maximum output.
4. Return to 3600 K.C. setting and make final adjustment of #35, #10, and #12.

**Note:** In adjusting the Green and Red Bands, a 6000 K.C. condenser and a 6000 K.C. resistor connected in series should be inserted in this high side of test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short wave antenna.

1. Set wave-change switch to the Green Band position.
2. Set test oscillator and dial indicator to 2500 K.C. and adjust #10, #12, and #26 for maximum output.
3. Set test oscillator and dial indicator to 1900 K.C. and adjust #12 for maximum output.
4. Return to 3600 K.C. setting and make final adjustment of #35, #10, and #12.
LINE-UP CAPACITOR ADJUSTMENTS

All the adjustable capacitors, commonly called trimmer condensers, are very accurately adjusted at the factory and will not need any further adjustment unless a coil or i.f. transformer is changed or the adjustment tampered with in the field. Therefore, DO NOT attempt to change the setting of any of the trimmer condensers unless it is definitely known that adjustment is necessary, and a high grade modulated test oscillator is available, then proceed as follows and refer to Fig. #2.

1. Set test oscillator to 175 K.C.
2. Set condenser gang to approximately 600 K.C. This will be at a point where the condenser plates are nearly all in mesh.
3. Connect output meter across voice coil of speaker. This may be done by connecting one lead of the output meter to the blue lead of the speaker terminal strip and the other lead to the frame of the chassis. The impedance of the voice coil is 3. ohms.
4. Apply test signal to grid of 78 I.P. tube thru .008 mfd. Capacitor and adjust trimmer "C" to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 77 first detector-oscillator and adjust trimmers "B" and "C" to maximum output.
6. Set test oscillator to 1500 K.C. and rotate condenser gang until the plates are wide open. Place a piece of paper (enough to cover the rotor and stator plates at the bottom of the gang) and close the rotor down to this spacing. This is the exact setting of the condenser gang for operation of the oscillator at 1500 K.C. and should be carefully set as the resultant alignment of the receiver is directly dependent upon it.
7. Adjust trimmer "B" to maximum output and then remove the paper gauge.
8. Set test oscillator and condenser gang to 1400 K.C.
9. Apply test signal to grid of 78 I.P. tube and adjust trimmer "B" to maximum output.
10. Apply test signal to antenna lead thru .005 mfd. capacitor and adjust trimmer "F" to maximum output.
11. Check sensitivity at several points.
UNITED MOTORS SERVICE

MODEL 626 Delco Alignment

Circuit Notes

1. Peaking F.P. Stages at 250 K.C. 
(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 0.05 mf. condenser in series with the other lead and connect this to the grid cap of the 6A7 pentode. Leave the tube's grid clip in place. (The 0.05 mf. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the F.P. adjustments.)
(b) Set the test oscillator on 250 kilocycles.
(c) Turn the volume control of the receiver on full.
(d) Adjust the parallel trimmer for the 6A7, middle section (shown on Fig. 3) for maximum output. Then adjust the trimmer for the first point of the chassis output where the 6A7 is tuned to 1400 K.C.

2. Peaking Oscillator Section of Gang Condenser at 1540 K.C. 
(a) Connect the output of the test oscillator to the antenna compensating condenser of the receiver and to the chassis ground. (Do not use the 0.05 mf. condenser that was required in assigning the F.P. stages.)
(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.
(c) Connect the test oscillator on exactly 1540 kilocycles.
(d) Adjust the parallel trimmers for the “Syncro-Tuning” circuit (shown on Fig. 3) for maximum output. Then adjust the trimmers for the second sections of the gang condenser. **NOTE:** In order to ensure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

3. Peaking “ANT.” and “R.F.” Sections of Gang Condenser at 1400 K.C. and Compensating Condensers at 600 K.C. 
(a) Set the test oscillator on 1400 kilocycles.
(b) Turn the condenser rotor plates until the 1400 K.C. signal from the test oscillator is tuned in with maximum output.
(c) Adjust the parallel trimmers for the “ANT.” and “R.F.” sections of the gang condenser and the associated circuit constants of the receiver to the chassis ground. The 0.05 mf. condenser should be placed in the grid terminal of the 6A7 pentode for maximum output. **DO NOT DISTURB** the setting of the oscillator trimmer as this is adjusted at 1400 K.C. only and any adjustment at this point will affect both the tuning range of the receiver and the tracking of its circuits. **NOTE:** In order to accurately set the “ANT.” trimmer of the gang condenser at 1400 K.C. it will be necessary to connect a tube-leafing feeding the 6A7 tube and tuned to the “R.F.” section of the gang condenser (The 9A7 tube is used as the conventional detector oscillator or pentagrid converter.) and the oscillator frequency which is produced due to the reaction between the oscillator grid, plate, and associated circuits constant is tuned by the “Syncro-Tuning” circuit (shown on Fig. 3) for maximum output. The oscillator frequency is the resultant frequency which is 262 kilocycles is the frequency coupled to the grid of the 6A7 tube and the output of this section of the tube is impressed on the “Syncro-Tuning” circuit of the receiver on a car.

4. Peaking Oscillator at 600 kilocycles.
(a) Connect the test oscillator to 600 kilocycles.
(b) Turn the condenser rotor plates until the 600 K.C. signal from the test oscillator is tuned in with maximum output.

5. Testing Antenna Compensating Condenser to Car Antenna 
(a) Set the test oscillator on 1400 kilocycles.
(b) Turn the “antenna compensating condenser” for maximum output, rotating the receiver dial back and forth and adjusting the compensating condenser alternately until no further improvement in output can be obtained.
(c) Use a spark noise filter and oscillator frequency of 1400 K.C. and any further adjustment unaaneous with this point will not be necessary. **CAUTION:** Do not touch the adjustment of the parallel trimmers for the “ANT.” section of the gang condenser after the receiver is installed on a car.

Delco Syncro-Tuning 
The outstanding circuit feature of this receiver is the specially designed antenna circuit which provides more than four times the stage gain of conventional circuits, making it particularly suitable for under car antenna systems required on several 1936 Model Delcos. Syncro-Tuning differs from other circuits in that the antenna system is actually tuned to resonance at all frequencies instead of just one point in the broadcast band as is the case in other circuits. This results in a greatly increased efficiency and a lower noise level. Syncro-Tuning is accomplished through the use of specially shaped stator plates in the “ANT.” section of the condenser gang in collaboration with a very carefully designed antenna circuit which in reality is very simple. The capacity of the antenna system with which the receiver is to be used is immaterial insofar as the antenna circuit is concerned. This is because of the use of an “antenna capacity compensating condenser” that can be varied by a spark noise coupling. Any deficiency or excess of antenna capacity can be made up through the use of this condenser. Also it is therefore important that this condenser be adjusted to the antenna antenna systems in the majority of cases without the use of spark noise suppressions.

The receiver may be connected for operation on a car battery with the positive side grounded by simply reversing the two wires connected to the terminal strip located on top of the power transformer.

A slight voltage delay is used on the detector circuit to assist materially in reducing background noise.

Circuit Operation 
Referring to the circuit diagram figure 1. The antenna is capacity coupled to the antenna coil, which is tuned by the “ANT.” section of the gang condenser, and feeds the grid of the 6D6 R.F. amplifier tube. The plate circuit of this tube is inductively coupled to the grid winding feeding the 6A7 tube and tuned to the “R.F.” section of the gang condenser. (The 9A7 tube is used as the conventional detector oscillator or pentagrid converter.)
| Part No. | Part Name | Description | Illus. No. | Connector assy. | Cap | Ferrule holder | Connector assy. | Ferrule | Spring | Washer | Antenna on chassis | Contact | Tension | Speaker | Chassis bottom | Chassis tube lid | Transformer bottom | Transformer top | Vibration filter shield | Speaker front (nickel ed) | Antenna trimmer cover |
|---------|-----------|-------------|------------|----------------|-----|---------------|----------------|---------|--------|--------|----------------------|---------|----------|---------|----------------|----------------|-------------------|--------------|----------------|------------------|---------------------|------------------|
| 120876 | Base | Tube shield grounding | 1209726 | Connector assy. | "A" power on chassis | Contact |
| 120933 | Bolt | Chassis cover retaining stud | 1209349 | Connector assy. | Antenna on chassis | Contact |
| 120935 | Bracket | Volume control mounting | 1836878 | Ferrule holder | Contact | Tension |
| 120936 | Case | Chassis (less covers) | 1845713 | Contact | Fiber |
| 120937 | Case | Transformer | 1836869 | Speaker | Chassis bottom |
| 120938 | Clamp | Vibration grounding | 1209342 | Chassis tube lid | Chassis bottom |
| 120939 | Clamp | Condenser mtg. (4 mfd.) | 1209348 | Transformer bottom | Transformer bottom |
| 120934 | Clamp | Elect. cond. mtg. | 1209350 | Transformer top | Transformer top |
| 120935 | Cloth | Speaker grille | 1209351 | Vibration filter shield | Vibration filter shield |
| 120936 | Coil | "A" supply filter choke | 1209352 | Speaker front (nickel ed) | Speaker front (nickel ed) |
| 120937 | Coil | Vibration "A" choke | 1209359 | Antenna trimmer cover | Antenna trimmer cover |
| 120938 | Coil | "B" power filter choke | 1209354 | Voltage divider "ohmite" | 15,000 ohms, 2 watt |
| 120939 | Coil | Antenna | 1209356 | 25,000 ohms, 2 watt | Carbon 150,000 ohms 1/3 watt |
| 120940 | Coi | Oscillator | 1209357 | Carbon 60,000 ohms 1/4 watt | Carbon 20,000 ohms 1/3 watt |
| 120941 | Coi assy. | 1st I.F. | 1208292 | Carbon 40,000 ohms 1/3 watt | Carbon 2 megohms, 1/3 watt |
| 120942 | Coi assy. | 2nd I.F. | 1208320 | Carbon 100,000 ohms 1/3 watt | Carbon 1 megohm 1/3 watt |
| 120963 | Condenser | Antenna compensating | 1208405 | Carbon 1 megohm 1/3 watt | Carbon 1 megohm 1/3 watt |
| 120944 | Condenser | 3 gang tuning | 1208296 | Carbon 1 megohm 1/3 watt | Carbon 1 megohm 1/3 watt |
| 120945 | Condenser | Antenna | 1208356 | Carbon 500,000 ohms 1/3 watt | Carbon 1 megohm 1/3 watt |
| 120946 | Condenser | R.F. | 1208654 | Carbon 1 megohm 1/3 watt | Flexible 1100 ohms 1/2 watt |
| 120947 | Condenser | Oscillator | 1208682 | Flexible 1100 ohms 1/2 watt | Flexible 450 ohms 1/2 watt |
| 120928 | Condenser | Electrolytic block | 1208610 | Flexible 450 ohms 1/2 watt | Flexible 450 ohms 1/2 watt |
| 120929 | Condenser | 8 mfd., 450 volt | 1208322 | Flexible 100 ohms 3 watt | Flexible 350 ohms 1/2 watt |
| 120930 | Condenser | 8 mfd., 450 volt | 1208323 | Flexible 350 ohms 1/2 watt | Complete unit 69" |
| 120931 | Condenser | 12 mfd., 25 volt | 1208418 | Polarity reversing | Single lug |
| 120932 | Condenser | .1 mfd., 200 volt | 1206232 | Fire lug | Fire lug |
| 120933 | Condenser | .1 mfd., 200 volt | 1206233 | Four lug-on speaker | Four lug-on speaker |
| 120934 | Condenser | .05 mfd., 400 volt | 1206234 | Res. 300,000 ohms | Res. 300,000 ohms |
| 120935 | Condenser | .05 mfd., 400 volt | 1206235 | Vibrator power | Vibrator power |
| 120936 | Condenser | Metal case .5 mfd. 160 volt | 1209217 | Output-speaker | Output-speaker |
| 120937 | Condenser | Metal case .5 mfd. 160 volt | 1209611 | Plug-in synchronous | Plug-in synchronous |
| 120938 | Condenser | Metal case .15 mfd. 400 volt | 1209747 | Res. 500,000 ohms | Res. 500,000 ohms |
| 120939 | Condenser | Tubular .02 mfd. 200 volt | 1209628 | Transformer | Transformer |
| 120940 | Condenser | Tubular .02 mfd. 200 volt | 1209611 | Transformer | Transformer |
| 120941 | Condenser | Tubular .015 mfd. 400 volt | 1209613 | Vibration | Vibration |
| 120942 | Condenser | Tubular .015 mfd. 400 volt | 1209861 | Volume control | Volume control |
MODEL 1101 Delco
United Motors Service, Inc.

The chassis employs a 5 tube AC-DC superheterodyne circuit, automatic volume control and an electro-dynamic speaker.

The frequency range is 530-1710 kilocycles, including the full broadcast range and 640 the first parallel channels. The intermediate frequency is 181.5 kilocycles.

Method of Design

Referring to the circuit diagram, it will be seen that the 6F7 tube obtains its bias from the cathode resistor 1100. the bypassed by condenser 150. .02 mfd.

The 78 I.F. amplifier obtains its bias from the cathode resistor 89. Bias for the 6B9 audio amplifier is obtained from cathode resistor 90. The effect of this circuit is that a slight bucking bias is applied to the diodes, and a weak signal does not overdrive this bias and the diode then acts as though there were no bias resistor. The pentode audio amplifier section, however, makes use of this initial bias in resistor 89 and after signal is applied, depending on the strength of the signal, a varying amount of bias will be supplied to the diodes. This is indicated by the line from the AVC circuit.

Bias for the type 43 output tube is obtained from the drop across the filter choke 6 and whatever hum component is remaining is filtered through resistor 29 and bypass condenser 13.

Automatic Volume Control Circuit

Automatic volume control voltage is developed in the diode circuit across resistor 32 in series with volume control 43. This voltage is fed back through filter resistor 53 to the control grid return of the 6F7 modulator. The automatic volume control is exerted on the intermediate frequency amplifier, type 7B7 tube.

Connecting Output Meter

Connect one signal of the output meter to the plate prong of the type 12B7 output tube and the other terminal to the radio chassis frame. Make sure that the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a .01 mfd. condenser in series with the leads to the chassis frame.

Peaking I.F. Stages at 101.5 KC

(a) Connect the antenna of the signal generator to the receiver antenna wire close to where it enters the chassis, through a series condenser, preferably a .02 mfd. The best way to make this connection is with a sharp, pointed tool so that the insulation on the antenna wire is not permanently damaged. The unused dead end of the antenna wire should be rolled up on its reel.

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the Signal Generator to exactly 101.5 KC.

(d) With the Signal Generator set to the lowest usable output level and the radio volume control on full, adjust the three I.F. coil, tuning condenser units for maximum signal output. These nuts are accessible through the front panel of the chassis. It may be necessary to move the tuning diad slightly for the best result. Normally, the rotor plate should be in mesh with the rotor plate of the IF. 

(e) Make sure that these adjustments are made with a sharp, pointed tool so that the insulation on the antenna wire is not permanently damaged. The unused dead end of the antenna wire should be rolled up on its reel.

(f) Connect the ground terminal of the signal generator to the radio chassis frame.

(g) Set the signal generator to exactly 1820 kilocycles and the lowest usable volume level, with radio set volume on full.

(h) Turn the tuning condenser on the radio chassis to 1820--

(i) Set signal generator to 1410 KC.

(j) Adjust the remaining two trimmers--antenna and I.F. section--on the tuning condenser to resonant frequency.

NOTE: It is necessary that these adjustments be made over several lines until no further improvement can be made.

Tube Compliance & Voltage Chart

The tube voltages shown below are average readings taken from minus "g" terminal to the plate. a value of 1 volt, with the brushes terminals in which case the voltage drop across the two H prongs is measured. This chart is made while using 115 volt. 60 cycle lines. Variations in line voltage will cause the readings to vary slightly.
UNITED MOTOR PAGE 6-7

1103 Delco  UNITED MOTORS SERVICE, INC.  MODELS 1102 Delco
Below Serial 805120  Below Serial 781400
Schematic

©John F. Rider, Publisher

www.americanradiohistory.com
MODELS 1102, 1103 Delco
Socket, Trimmers
Chassis Layout

TOP VIEW OF CHASSIS

76 AUDIO TUBE
56 IF & DET TUBE
32 IF & DET TUBE
10 IF & DET TRANS

42 OUTPUT TUBE
47 POWER TRANSFORMER
80 RECTIFIER TUBE

CONDENSER BRACKET 2

DIAL DRIVE 2
DIAL LIGHT 31
DIAL LIGHT

Model 1102 - Below Serial 78140C
Model 1103 - Below Serial 805120

Model 1102 - Above Serial 781400
Model 1103 - Above Serial 805120

©John F. Rider Publisher
Connecting Output Meter

Connect one terminal of the output meter to the plate terminal of the type output circuit and the other terminal to the radio chassis frame. Make sure that the output meter is protected with a series condenser to prevent the C.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd. condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 1500 Kilocycles

(a) Connect the antenna of the signal generator to the control grid connection on top of the 6AK7 valve. (Do not remove grid cap) through a series condenser (.02 mfd.).

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the signal generator to exactly 1400 kilocycles and to the lowest usable volume level, with the radio set on full volume.

(d) Turn band change switch to the right hand position (broadcast band).

(e) Set the tuning control of the receiver to 140 on the dial.

(f) Adjust the oscillator broadcast shunt trimmer, Illus. #1A-B, to resonant frequency (greatest swing on output meter).

(g) Adjust the antenna trimmer, Illus. #12-B, to resonant frequency.

(v) Adjust the radio frequency trimmer, Illus. #13-B, to resonant frequency.

NOTE: It is necessary that these adjustments be gone over several times until no further improvement can be made.

(j) Set the signal generator to 600 kilocycles.

(k) Tune the receiver to 60 and adjust the frequency setting of the signal generator until maximum response is obtained.

(l) Adjust the series oscillator trimmer 12-B and very selector dial slightly, not over an 1/8" simultaneously until maximum output is obtained.

(m) Repeat the adjustments at 1400 KC.

Tuning Condenser at 15 Megacycles (Short Wave Band)

(a) Connect the antenna terminal of the signal generator to a receiver antenna terminal through a series carbon resistor (approx. 760 ohms).

(b) Connect the ground terminal of the signal generator to the radio chassis frame.

(c) Set the signal generator to exactly 1500 KC (15 megacycles).

(d) Turn band change switch to the left hand position (short wave band).

(e) Cut the tuning control of the receiver at 10 on the dial.

(f) Adjust the oscillator parallel trimmer 14-S, to resonant frequency.

(g) Adjust the oscillator trimmer 12-G, to resonant frequency.

(h) Adjust the radio frequency trimmer 12-B, and very selector dial slightly (not over 1/8") simultaneously until maximum output is obtained.

NOTE: It is necessary that these adjustments be gone over very carefully several times until no further improvement can be made. Greater accuracy is required for making short wave adjustments than for the broadcast band.

1) Now set the signal generator to 6000 KC.

2) Set the receiver dial to 6.

3) Adjust the oscillator series trimmer, 16-B, and vary the dial slightly (not over 1/8") simultaneously until maximum output is obtained.

4) Repeat the adjustments at 15000 KC.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis to the tube grids. This chart was made while using a line voltage of 115 volts. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>H</th>
<th>G</th>
<th>Su</th>
<th>Gs</th>
<th>Go</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R.F. Amp</td>
<td>6.5</td>
<td>250</td>
<td>120</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6A7</td>
<td>G.E. Mod</td>
<td>6.5</td>
<td>250</td>
<td>110</td>
<td>0</td>
<td>0</td>
<td>4.0</td>
</tr>
<tr>
<td>6B7</td>
<td>I.F. Diode</td>
<td>6.5</td>
<td>250</td>
<td>120</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6C6</td>
<td>A.F. Amp</td>
<td>6.5</td>
<td>250</td>
<td>200</td>
<td>-18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>86</td>
<td>Rectifier</td>
<td>5.1</td>
<td>!</td>
<td>!</td>
<td>!</td>
<td>!</td>
<td>!</td>
</tr>
</tbody>
</table>

VOLTAGE CHART

(Use only for 110's above #381400 and 1103's above #400120)

The tube voltages shown below are average readings taken from chassis to the tube grids. This chart was made while using a line voltage of 115 volts. Variations in line voltage will cause the readings to vary slightly.

TUBE BASE DIAGRAM SYMBOLS

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>H</th>
<th>G</th>
<th>Su</th>
<th>Gs</th>
<th>Go</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D6</td>
<td>R.F. Amp</td>
<td>6.5</td>
<td>250</td>
<td>110</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6A7</td>
<td>G.E. Mod</td>
<td>6.5</td>
<td>250</td>
<td>110</td>
<td>0</td>
<td>0</td>
<td>4.0</td>
</tr>
<tr>
<td>6B7</td>
<td>I.F. Diode</td>
<td>6.5</td>
<td>250</td>
<td>120</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6C6</td>
<td>A.F. Amp</td>
<td>6.5</td>
<td>250</td>
<td>200</td>
<td>-18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>86</td>
<td>Rectifier</td>
<td>5.1</td>
<td>!</td>
<td>!</td>
<td>!</td>
<td>!</td>
<td>!</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
Connecting Output Meter

Connect the two terminals of the output meter to the plates of the two type 30 tubes. Make sure the output meter is protected with a series condenser to prevent the D.C. from flowing through the meter circuit. If the meter is not protected, connect a 0.1 mfd. condenser in series with the meter.

Peaking I.F. Stages at 450 KC

(a) Connect the antenna of the signal generator to the receiver control grid connection on top of the 6A7 tube, through a series condenser, (0.01 mfd.), leaving the grid cap in place.

(b) Connect the ground terminal of the signal generator to the receiver chassis frame.

(c) Turn volume control to full on position.

(d) Set the signal generator to exactly 450 KC and to the lowest usable output with the receiver volume on full.

(e) Set the receiver band switch to the right-(broadcast).

(f) Adjust I.F. trimmers 14A, 14B, 14C, 14D and 14E to maximum reading on output meter, in the sequence listed.

(g) Do over; the adjustments several times till no further improvements can be made.

Peaking Tuning Condenser at 1415 Hertz (Broadcast Band)

(a) Connect antenna of signal generator to the antenna terminal on chassis through a series condenser (0.0008 mfd.).

(b) Turn volume control full on, wave change switch to the right (Broadcast).

(c) Set the signal generator to 1415 Hertz.

(d) With receiver condenser blades fully engaged (300 KC) check pointer location. It should be exactly parallel with Horizontal line through dial. If it is not, loosen 6 screws in center of pointer and adjust pointer correctly.

(e) Set receiver dial pointer to 160.

(f) Adjust oscillator shunt trimmer #1-B for maximum reading on output meter.

(g) Now adjust trimmers #1A, B, C, D, E, and F for maximum output.

(h) Set receiver pointer to 60.

(i) Set signal generator to 600 KC.

(j) Adjust series oscillator trimmer #17-B for maximum reading on output meter.

(k) Repeat a, b, c, and f at 1400 KC.

Peaking Tuning Condenser at 15 Megacycles (Short Wave Band)

(a) Connect signal generator antenna to the +15000000 terminal through a series resistor (approx. 750 ohmsidget-carbon).

(b) Connect ground terminal of signal generator to the receiver chassis frame.

(c) Set signal generator to 15000000 KC with lowest usable output volume level.

(d) Set receiver dial to 10, and turn volume full on.

(e) Change band switch to left--short wave band.

(f) Adjust oscillator shunt trimmer #18-B to Maximum output.

(g) Adjust trimmers "ant. 165" and "7P05" to maximum output. Repeat these adjustments until no further improvements can be made.

(h) Set signal generator to 6000 KC and the receiver pointer to 6.

(i) Adjust oscillator series trimmer 17-B to maximum output.

(j) Repeat a, b, c, d and e.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis frame to the tube plate. This chart was made while using 115-volt. Variations in line voltage will cause the readings to vary slightly.

<table>
<thead>
<tr>
<th>TYPE FUNCTION</th>
<th>P</th>
<th>Q</th>
<th>S</th>
<th>G</th>
<th>K</th>
<th>F-base</th>
</tr>
</thead>
<tbody>
<tr>
<td>6DJ8 Rect.</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6AS7 Rect.</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6EL6 1st &amp; 2nd</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6BQ5 2nd IF</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6GT Diode &amp; AF</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6AS7 Output</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>6AS7 Rectifier</td>
<td>6.5</td>
<td>285</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

120 Volts across speaker field

TUBE BASE DIAGRAM SYMBOLS

- depicts a clip

<table>
<thead>
<tr>
<th>TUBE BASE DIAGRAM SYMBOL</th>
<th>K</th>
<th>P</th>
<th>Q</th>
<th>S</th>
<th>G</th>
<th>H</th>
<th>F-base</th>
</tr>
</thead>
<tbody>
<tr>
<td>K - Heater</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>P - Plate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>H - Control Grid</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>0</td>
</tr>
<tr>
<td>F-base - Screen Grid</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- denotes a wire connection

This tube voltages shown are average readings taken from chassis frame to the tube plate. This chart was made while using 115-volt. Variations in line voltage will cause the readings to vary slightly.

©John F. Rider, Publisher
NOTE: The types 6D6, 6A7 and 85 tubes have the heater elements connected in series. If any one of these tube heaters should burn out, the others will fail to light.
Connecting Output Meter

Connect one terminal of the output meter to the plate prong of one of the 6AY tubes (leave 6AY grid lead clip in place) and to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent D.C. from flowing through the meter circuit. If the meter is not protected, connect a .1 mfd condenser in series with the lead to the chassis frame.

Peaking I.F. Stages at 360 Kc

(a) Connect the output of the signal generator to the grid cap of the 6AY tube (leave 6AY grid lead clip in place) and to the chassis frame.
(b) Turn the tuning condenser until the plates are entirely out of mesh.
(c) Set the signal generator on 360 Kc and feed this signal through the I.F. stages of the set.
(d) Peak the I.F. trimmer located on the top of the 1st I.F. Coll. Fig. 2. Then peak the trimmer located on the bottom of the same coil. Due to the detuning effect the primary winding exerts over the secondary, it will then be necessary to reset the top trimmer for maximum output.
(e) Peak the I.F. trimmer located on the top of the 2nd I.F. coil. Fig. 2. Then peak the trimmer located on the bottom of the same coil. Then reset trimmer on top of the 2nd I.F. coil making all adjustments for maximum output.

NOTE: In the event that the I.F. stages are badly out of alignment at 360 Kc the operation outlined in paragraphs (d) and (e) should be repeated.

Peaking Gang Condenser at 1400 Kc

(a) With the condenser plates completely out of mesh, the 1400 Kc indicator line should be exactly in the upper vertical position. If it is not, loosen the two set screws in the selector dial hub and make the necessary adjustment. Then rotate the dial until the 1400 Kc indicator line is exactly in the upper vertical position.
(b) Coil up the antenna lead to within a foot of the chassis and set the oscillator at 1400 Kc. Feed the signal generator output into the antenna wire. This may be done by connecting the shielding on the signal generator output lead to the chassis ground wire (green) and by simply wrapping a few turns of the portion of the antenna wire nearest the chassis around the signal generator output lead. This will ordinarily provide sufficient coupling between the signal generator and the antenna circuit of the set. A direct connection with the antenna wire can be made by inserting a pin into the wire close to the chassis. Care should be taken, however, not to permanently damage the insulation.
(c) Peak the osc. trimmer condenser, Fig. 2, until the oscillator output can be heard in the speaker, then the "Ant." and "Det." trimmers located on the gang tuning condenser, making all adjustments for maximum deflection on the output meter scale. Repeat the adjustment several times until no further improvement can be made.

NOTE: To avoid AVG action and to insure sharp peaking of all trimmers, reduce the signal generator output to the lowest level that will give a reasonable deflection on the output meter scale.

![Diagram of connecting output meter and peaking I.F. stages at 360 Kc and peaking gang condenser at 1400 Kc]
"The filament voltages shown are measured across the filament prongs of each tube and not from filament to chassis frame.

©John F. Rider, Publisher
The Models 3201 and 3202 are both 38 volt 6 tube heterodyne receivers with A.V.C. The only difference between the two receivers is that the Model 3201 has a table type cabinet and a 6" speaker, while the Model 3202 has a console cabinet and an 8" speaker. The frequency ranges of these sets is from 540 to 1700 kilocycles.

**Power Supply System**

The unique feature of these receivers is that the maximum plate or screen voltage is in the bias section, as the positive lead of the power cord connects directly to the plates and screens of the tubes and the negative lead connects to the chassis. The filamentaries of the two type 6E6 tubes, the type 6AF and the type 460 are connected in series and are lighted by being connected directly across the 38 volt power supply in series with the 10 and 3 ohm sections of the resistor strip (illus. #30, Fig. 1a). The filamentaries of the two type 48 output tubes are each connected in parallel across the 38 volt power supply in series with the 6 ohm section of the resistor strip (illus. #30, Fig. 1a).

**METHOD OF DIAGNOSING**

The 6E6 R.F. and I.F. tubes obtain their residual bias from a common bias resistor of 100 ohms (illus. #28) and the control grids of both of these tubes receive a negative voltage from the A.V.C. circuit depending on the strength of the signal tuned in. The 6A7 tube has its cathode connected directly to ground and its control grid also receives a negative voltage for grid bias from the A.V.C. circuit when a signal is tuned in. The bias on the 6G6 tube is obtained by connecting the cathode to a point that is positive with respect to ground and returning the grid circuit to ground through the volume control. The bias on the two type 48 output tubes is also obtained by connecting their cathodes to a positive point with respect to ground and returning the center tap on the input transformer to ground.

**Circuit Ground**

Do not ground the chassis except through the use of the "GND" terminal of the terminal strip located on back of the chassis. This terminal connects to the chassis frame through a series condenser in order to prevent a short circuit when operating the receiver on a 38 volt system with the positive side grounded.

**Oscillation**

A few receivers below Serial No. 866170 may have a tendency to oscillate due to the lack of capacity by-passing the common bias resistor (illus. #28, Fig. 2a) for the two 6E6 tubes. The majority of these sets were corrected in the field through the use of an additional condenser of 0.25 mfd. capacity connected from the 6G6 R.F. tube cathode to the chassis. In cases where this condenser has not been included in the chassis and the receiver oscillates, it will be necessary to connect a 0.1 mfd. condenser from the 6E6 R.F. tube cathode to the chassis. This condenser has been included in production on all sets above Serial No. 866170 (illus. #17, Fig. 2a) and should eliminate all cases of oscillation from low capacity.

**Peaking Procedure**

All of the adjustable condensers, commonly called "trimmer" condensers, are very accurately adjusted at the factory and will not need any further adjustment unless they are tampered with in the field or a defective coil has been replaced. Do not attempt to make the setting of any trimmer condensers unless it is definitely known that the adjustment is necessary. If realignment is found necessary, the circuits can be properly adjusted only with the use of a test oscillator and an output meter.

**Connecting Output Meter**

Connect one terminal of the output meter to the plate prong of one of the 48 tubes and the other to the plate prong of the other 48 tube or to the chassis frame. Make sure that the output meter is protected with a series condenser to prevent D.C. from flowing through the meter circuit. If the meter is not protected, the meter may be damaged.

**Peaking I.F. Stages at 456 K.C.**

(a) Connect the output of the test oscillator to the grid cap of the 6A7 tube (leave 6A7 grid lead clip in place) and to the chassis ground.

(b) Turn the tuning condenser rotor plates until they are completely out of mesh.

(c) Set the test oscillator on 456 kilocycles.

(d) Peak the I.F. trimmers located on the top of the 6G6 I.F. coil (illus. #6, Fig. 3a) for maximum output.

(e) Then peak the I.F. trimmers located on the top of the last I.F. coil (illus. #6, Fig. 3a) for maximum output.

(f) In order to insure accurate setting of the I.F. trimmers the above adjustments should be repeated using the lowest test oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.

John P. Rider, Publisher
Schematic

Frequency Ranges
540 - 1725 KC.
5.8 - 16.5 KC.

©John F. Rider, Publisher
Connecting Output Meter

Connect one terminal of the output meter to the plate terminal of one type 43 output tube and the other to the plate of the other type 43 tube.

Peaking I.F. Stages at 456 KC

(a) Connect the antenna terminal of the signal generator to the control grid connection on top of the 6A7 tube. (DO NOT remove grid clip) through a series condenser .02 mfd.
(b) Connect the ground terminal of the signal generator to the radio chassis frame.
(c) Set the signal generator to exactly 456 kilocycles.
(d) With the signal generator set to the lowest usable output level, and the receiver volume control on full, adjust the I.F. trimmer condensers for maximum signal output.

NOTE: The I.F. trimmers are located on top of the I.F. coils and may be adjusted with an insulated screwdriver. Always make the adjustments very carefully, going over them several times to insure that the final setting is at resonant frequency.

Peaking Tuning Condenser at 1400 Kilocycles (Broadcast)

(a) Close the receiver tuning condenser plates (535 KC) and set the selector pointer on the horizontal line.
(b) Connect the antenna terminal of the signal generator to the receiver antenna terminal through a series condenser (.0002 mfd.).
(c) Connect the ground terminal of the signal generator to the radio chassis frame.
(d) Set the signal generator to exactly 1400 KC and to the lowest usable volume level, with the radio set volume on full.
(e) Turn the receiver band change switch to the right hand position (broadcast band).
(f) Set the receiver tuning control to 140.
(g) Adjust the oscillator broadcast shunt trimmer. Illus. 19-B to maximum output.
(h) Adjust the radio frequency trimmer, Illus. 17-B to maximum output.

NOTE: It is necessary that these adjustments be gone over very carefully several times until no further improvement can be made. Greater accuracy is required for making short wave adjustments.

(k) Set the receiver dial to 6.
(l) Adjust the oscillator series trimmer. Illus. 19-S to maximum output, simultaneously rotate station selector (slightly approx. 1/8 inch) until maximum signal is obtained.
(n) Repeat the adjustments at 15000 KC.

TUBE COMPLEMENT & VOLTAGE CHART

The tube voltages shown below are average readings taken from chassis to chassis prong. This chart was made while using 32 volt line. Variations in line voltage will cause the readings to vary slightly.

<table>
<thead>
<tr>
<th>TUBE BASE DIAGRAM SYMBOLS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>6D6</td>
</tr>
<tr>
<td>6A7</td>
</tr>
<tr>
<td>6B7</td>
</tr>
<tr>
<td>6F7</td>
</tr>
<tr>
<td>43 Output</td>
</tr>
<tr>
<td>43 Output</td>
</tr>
</tbody>
</table>

*TUBE BASE DIAGRAM SYMBOLS

H - Heater Su - Suppressor K - Cathode
P - Plate G - Control Grid P-Osc - Osc Plate
Gs - Screen Grid Ga - Anode Grid
Peaking I.F. Stages at 262 KC

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the type 89 output tubes.

(a) Connect the output of the oscillator to the grid cap of the type 36 Detector-Oscillator tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 KC and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. condenser (C-6) on Fig. 4) which is on the I.F. coil located on the bottom of the chassis. Then peak the two condensers (C-4 and C-5) on Fig. 3) located on front of the Oscillator I.F. coil, peaking the plate coil condenser C-4 first.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. It should be less than one third of the maximum output available.

(f) Make all trimmer condenser adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 KC

(a) Set the oscillator on 1400 KC and connect its output to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 KC can be properly determined a metal aligning strip (part #1206431) should be placed. This strip is placed over the top edge of the condenser gang as shown in figure 1. (f) To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale. In order to prevent the A.V.C. from leveling out the output.

(c) The condenser plates should be turned until they stop against the aligning strip.

(d) Place the tube shield (part #1205419) in position around the detector-oscillator tube.

(e) Peak the parallel trimmers on the top of the condenser gang. The oscillator section (C-1-C figure 3) located next to the volume control should be peaked first.

![Diagram of peaking stages and condenser gang](image-url)
OSCILLATOR CIRCUIT. If set fails to oscillate entirely or oscillates on
one end of the dial only, a new 36 tube should be tried in the oscillator
socket. If this does not remedy the trouble, check resistor R-1-A and
condensers C-3, located below section C-1-C of the gang condenser, and
C-10, located on the resistor strip. Due to the cap-
acity values of C-3 and C-10 being rather critical,
you should test them by replacement. If the above
does not remedy the trouble, it may be necessary to
replace the oscillator coil.

Voltage Chart

The voltage readings given herewith
are measured between the respective
tube contacts and the
chassis.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Screen</th>
<th>Plate</th>
<th>heater</th>
<th>Grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>120</td>
<td>150</td>
<td>8</td>
<td>1.2</td>
</tr>
<tr>
<td>T2</td>
<td>120</td>
<td>150</td>
<td>8</td>
<td>1.2</td>
</tr>
<tr>
<td>T3</td>
<td>120</td>
<td>150</td>
<td>8</td>
<td>1.2</td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
FIG. 1A CIRCUIT DIAGRAM--Above Serial #1748809
(For Buick, Pontiac Model 544245 and Olds Model 393884)

CIRCUIT CHANGES.--- The capacity of two sections of the part #1209050 condenser block (23A to F) were changed at serial #1748809 along with other changes. The "D" section, which was originally .04 mfd., was changed to .01 mfd. and the "E" section changed from .01 mfd. to .1 mfd. All the service replacement stock of the part #1209050 condenser blocks are of the new type, incorporating the above changes and should be used in the service replacement of all part #1209050 blocks used below serial #1748809.
FIG. 2 PARTS LAYOUT - Bottom View
For sets above serial #1748809

For sets below serial #1748809, the following changes should be noted:
Parts 34, 42 and 57 are omitted;
Part 41 used instead of 47.

FIG. 3 PARTS LAYOUT - Top View
This layout is the same for sets having serial numbers above and below #1748809.

CIRCUIT CHANGES.-- Several circuit changes were made starting at serial #1748809. See Figs. 1, 1A, 2 and 3. It will be noted on some sets that the .008-mf. section (21C) of part #1209048 condenser block has its lead cut off close to the block and a .008-mf. tubular condenser connected from the plate of the 42 tube to ground in its place. This change was made because it was found necessary to change the voltage rating of the .008-mf. section of the condenser block after production started and the tubular condenser used until a new block could be manufactured. The tubular condenser used is part #1209212 and is located beside the filter choke. All the service replacement stock of #1209048 condenser blocks have a .008-mf. section of a higher voltage rating and in installing these blocks in a set where the tubular condenser was used, it will be necessary either to remove the tubular condenser or clip the lead off the .008-mf. section of the block.
Connect one of the terminals of the output meter to the plate prong of the 6F7 tube. This is the first prong. The other prong is at the bottom of the tube with the filament prongs toward you. The plate prongs provide voltage for the output meter. The other lead should be clipped off at the grid of the filament. The other terminal of the output meter to receive chassis, making sure that the meter is protected with a series condenser.

Peaking I.F. Stages at 260 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame at 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6AV7 tube, leaving the 6AV7 tube in the circuit. This grid condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. stages.

(b) Set the test oscillator on 260 kilocycles.

(c) Turn the volume control of the receiver on full.

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

(e) Then peak trimmers P-2 and P-1 of the first I.F. coil also as shown on Figure B.

(f) In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output. It is not intended to reach resonating output meter scale deflection. Make all adjustments for maximum output.

Peaking Gang Condenser at 1530 and 1400 K.C.

(a) Connect the output of the test oscillator to the antenna connection point of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I.F. stages.

(b) Turn the rotor plate of the condenser gang until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the oscillator section (middle section) of the gang condenser for maximum output. Then adjust the trimmers for the "R.P." and "A.T." sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K.C. signal from the oscillator is the maximum output in the middle section. Then raise the calibration blocks should be used as the oscillator circuit is adjusted to 1400 K.C. on this set.

(g) Adjust the parallel trimmers for the "R.P." and "A.T." sections of the gang condenser (shown on Fig. 2) for maximum output. Do not disturb the oscillator trimmer (middle section) as this is being adjusted to 1530 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

CAUTION: Always use the lowest possible test oscillator output that will enable deflection of the output meter pointer, in order to prevent the A.V.C. from leveling out the output as the adjustments are made.

The AY supply to the receiver is filtered to prevent any spark interference from affecting the a.c. output. A relay and also makes possible the installation of this receiver without the use of spark plug suppressors.

A delayed automatic volume control is used so that it will not have any effect on the volume of weak stations. A slight adjustment is also used on the detector circuit to assist materially in reducing background noise.

The vibratory circuit is permanently connected to operate on a car battery with the negative side grounded, as is the case on Buicks, Olds and Pontiac automobiles.

The antenna of this receiver is capacity coupled to the grid winding of the antenna coil tuned by the 1500 mfd. condenser of the gang condenser and feeding into the grid of the pentode section of the 6AV7 tube, which in turn is used as an R.P. pentode and audio amplifier. The plate circuit of the pentode section of this tube is inductively coupled to the grid winding feeding the 6AV7 tube and tuned by the third section of the gang condenser. The 6AV7 tube is used as the conventional detector-oscillator. The oscillator frequency which is produced due to the reaction between the oscillator grid and plate and associated circuit constants is tuned by the middle section of the gang condenser. The incoming frequency and the oscillator frequency are mixed in the 6AV7 tube and the resultant frequency which appears on the grid is transmitted to the oscillator tube.

The 6AV7 tube is the result of two new condensers and B.F. pentode section of the 6AV7 tube and the output of this section of tube is impressed on one of the diode plates of this tube for detection. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias of the R.P. section of the 6AV7 and 6AT7 tubes. The audio output of the detector circuit is coupled to the grid of the tube and the grid voltage swing is controlled by the volume control. The output of this section of the tube is resistance coupled to the grid of the type 45 power output pentode. The plate circuit of this tube is coupled through the output transformer to the speaker valves set.
VOLTAGE CHART

Note: ALL readings are taken from indicated tube prong to chassis frame. Volume control on full.

<table>
<thead>
<tr>
<th>Tube</th>
<th>#1 Screen</th>
<th>#2 Plate</th>
<th>#3 Fil.</th>
<th>#4 Fil.</th>
<th>#5 Cathode</th>
<th>#6 Grid</th>
<th>#7 Triode Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>78 R.F.</td>
<td>88</td>
<td>215</td>
<td>6</td>
<td>0</td>
<td>3.4</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>6F7</td>
<td>(Det.)</td>
<td>(Osc.)</td>
<td>88</td>
<td>215</td>
<td>0</td>
<td>6</td>
<td>3.4</td>
</tr>
<tr>
<td>78 I.F.</td>
<td>88</td>
<td>215</td>
<td>6</td>
<td>0</td>
<td>3.4</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>75 (2nd Det.)</td>
<td>(AVC)</td>
<td>90</td>
<td>0</td>
<td>6</td>
<td>1.5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>41 A.F.</td>
<td>215</td>
<td>180</td>
<td>6</td>
<td>0</td>
<td>16.3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

©John F. Rider, Publisher
Peaking I.F. Stages at 260 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate prongs of the 41 output tube and to the chassis frame. Make sure that the output meter is protected with a series condenser internally; if not, connect a 1/10 mfd. condenser in series with the ground lead to the chassis. The Dayrad #879 Universal Test Meter and Series #61 Volt-Ohmmeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 262 K.C. and feed this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half of maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates for 1400 K.C. may be accurately determined, a wood calibration block (painted red, part number 1208073) should be used. This block may be used also in peaking all of the L.M.S., B-O-P, and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser, so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

NOTE: Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to determine the 1400 K.C. setting. When the aligning procedure is completed the logging of the dial may be slightly off and should be re-set.

SERVICE HINTS

The 6F7 tube is a two unit tube and the oscillator section may cease functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, operate the oscillator section first at 1400 K.C. for maximum deflection on the output meter.

To insure sharp peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable scale deflection on the output meter scale.

The point should be removed from the dash under the chassis mounting washers in order to provide a good ground for the receiver as no other ground is used. R.F. noise due to the vibrators will appear if good ground connections are not made at the dash.

CAUTION: Care should be taken to see that the set is turned off before attempting to replace the dial light because, if the dial light assembly is removed from the bottom of the control unit while the current to the receiver is left turned on, there is the possibility that a short circuit will occur which will blow out the fuse. If it is impossible to remove the dial light assembly it is being changed on the later sets to prevent this.

MOTOR NOISE

In order to totally eliminate spark noise picked up by the antenna when this model is installed, it is necessary that a certain procedure be followed. The engine block and the metal bulkhead must be at the same ground potential. It is suggested that a heavy piece of copper braid approximately 1" wide and 1/16" thick and about 3' long be secured. Insert one end in the braid under the rear cylinder head hold down bolt on the left side of the engine block. Attach the other end of this piece of bonding braid to the metal bulkhead of the car by means of two self-threading screws. The point should be removed from the metal bulkhead in order to secure a good ground connection. A slight amount of slack should be left in this lead to allow movement of the engine block with respect to the bulkhead.
MODEL Chevrolet 601038

Schematic, Voltage

Important: The speaker cable plug plate must be connected to the chassis to complete the circuit.

All voltage readings taken from chassis to indicated tube prongs, which usually requires 0.2 volts at ammeter lead clip.

©John F. Rider, Publisher
MODEL Chevrolet 601038
Parts Locations, Data

UNITED MOTORS SERVICE

Fig. 7. Location of Parts Under Chassis.

Fig. 4. Speaker Plug in Chassis.

Fig. 5. The Loudspeaker
UNITED MOTOR PAGE 6-31

UNITED MOTORS SERVICE

MODEL Chevrolet 691038

Alignment, Test Data

2. Set the test oscillator at 175 kHz and connect its output between the control grid of the 677 tube and the chassis. (See Fig. 7). Open the tube unit and connect the output meter to the grid. Adjust the two adjusting screws in 70 for maximum output meter deflection. The output of the test oscillator should be kept at as low a value as possible, in order to prevent the AFC action from becoming erratic.

3. Connect the test oscillator between the 687 control grid and the chassis. Adjust the two screws in 74 for maximum output meter deflection. The output of the test oscillator should be kept at as low a value as possible.

The RF Stages

(a) Adjusting the Calibration:

1. Leave the four set screws in the variable condenser coupling (1020600 in Fig. 7). Fully open the variable condenser plate. Adjust the two screws in 74 for maximum output meter deflection. The output of the test oscillator should be kept at as low a value as possible.

(b) Tuning the Trimmer:

1. Set the test oscillator to exactly 1500 kHz and connect its output between the antenna socket contact and the chassis. In service with a 0.0005-mfd. tuning capacitor. No other variable should be used.

2. With the Station Selector left at its high frequency limit, adjust the three trimpots on the variable condenser for maximum output meter deflection.

3. Readjust the test oscillator to 600 kHz and tune in its signal.

4. Adjust the oscillator coupling, C8, by slowly rotating the variable condenser bank and forth a degree or two, adjusting the coupling at the same time. With maximum output is obtained.

5. If the adjustments are inter-acting to an extent, it is advisable to repeat the entire operation.

CHASSIS UNIT TEST CHART

Note: Tests are to be made with the speaker plug removed from the chassis, the speaker and the control removed. Make sure the speaker plug and plate makes contact with the chassis.

TEST (see Fig. 2)  PROPER EFFECT TRIBLE IF IMPROPER EFFECT IS BAD

1. Open 10 ohms.

2. Open 60 ohms.

3. Open 40 ohms.

4. Open 100 ohms.

5. Open 100 ohms.

6. Open 100 ohms.

7. Open 100 ohms.

8. Open 100 ohms.

9. Open 100 ohms.

10. Open 100 ohms.

11. Open 100 ohms.

12. Open 100 ohms.

13. Open 100 ohms.

14. Open 100 ohms.

15. Open 100 ohms.

16. Open 100 ohms.

17. Open 100 ohms.

18. Open 100 ohms.

19. Open 100 ohms.

20. Open 100 ohms.

21. Open 100 ohms.

22. Open 100 ohms.

23. Open 100 ohms.

24. Open 100 ohms.

25. Open 100 ohms.

26. Open 100 ohms.

27. Open 100 ohms.

28. Open 100 ohms.

29. Open 100 ohms.

30. Open 100 ohms.

31. Open 100 ohms.

32. Open 100 ohms.

33. Open 100 ohms.

34. Open 100 ohms.

35. Open 100 ohms.

36. Open 100 ohms.

37. Open 100 ohms.

38. Open 100 ohms.

39. Open 100 ohms.

40. Open 100 ohms.

41. Open 100 ohms.

42. Open 100 ohms.

43. Open 100 ohms.

44. Open 100 ohms.

45. Open 100 ohms.

46. Open 100 ohms.

47. Open 100 ohms.

48. Open 100 ohms.

49. Open 100 ohms.

50. Open 100 ohms.

51. Open 100 ohms.

52. Open 100 ohms.

53. Open 100 ohms.

54. Open 100 ohms.

55. Open 100 ohms.

56. Open 100 ohms.

57. Open 100 ohms.

58. Open 100 ohms.

59. Open 100 ohms.

60. Open 100 ohms.

61. Open 100 ohms.

62. Open 100 ohms.

63. Open 100 ohms.

64. Open 100 ohms.

65. Open 100 ohms.

66. Open 100 ohms.

67. Open 100 ohms.

68. Open 100 ohms.

69. Open 100 ohms.

70. Open 100 ohms.

71. Open 100 ohms.

72. Open 100 ohms.

73. Open 100 ohms.

74. Open 100 ohms.

75. Open 100 ohms.

76. Open 100 ohms.

77. Open 100 ohms.

78. Open 100 ohms.

79. Open 100 ohms.

80. Open 100 ohms.
<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
<th>H</th>
<th>F</th>
<th>S</th>
<th>PT</th>
<th>GT</th>
<th>G1</th>
<th>G2</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>6F7</td>
<td>R.F.</td>
<td>6</td>
<td>245</td>
<td>100</td>
<td>70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2.5</td>
</tr>
<tr>
<td>6A7</td>
<td>Det-Osc.</td>
<td>6</td>
<td>245</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>170</td>
</tr>
<tr>
<td>6B7</td>
<td>I.F.,--2nd Det-AVC</td>
<td>6</td>
<td>245</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10.0</td>
</tr>
<tr>
<td>41</td>
<td>Output</td>
<td>6</td>
<td>230</td>
<td>245</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16.0</td>
</tr>
</tbody>
</table>

**NOTE:** Ampere drain of set at 6 volts is 6.0 amperes
Milliampere drain from "B" supply is approximately 55 M.A.

---

**Fig. 1—Chevrolet 601574 Circuit Diagram**

©John F. Rider, Publisher
FIG. 2 -- PARTS LAYOUT -- Top View

FIG. 3 -- PARTS LAYOUT -- Bottom View
The antenna circuit of this receiver is capacity coupled to the antenna system. This results in exceptionally high gain in the antenna stage and serves to make up for the relative inefficiency of the under-car antennas which are necessary on the all steel top cars. A separate adjustment is provided on the receiver to permit an accurate alignment to the car antenna.

The audio output of the detector circuit is coupled to the triode portion of the 6F7 tube for audio frequency amplification. The pentode section of the same tube is used as a radio frequency amplifier.

The "A" supply to the receiver is filtererd to prevent any spark interference from affecting the receiver circuits and makes possible the installation of this receiver without the use of spark plug suppressors.

A plug-in vibrator is used of the full wave self-rectifying type. Its circuit is permanently connected for operation on a car battery with the negative side grounded as is the case on Chevrolet automobiles.

Tone control action is obtained in a unique manner in that one of the voice coil leads present in the speaker cable is also used as a conductor for the tone control circuit. This is done to reduce the number of wires in the speaker cable and has no effect on the voice coil circuit because of the great differences in impedance between the voice coil circuit and the output tube plate circuit.

The output transformer of this receiver is an integral part of the chassis. This is necessary because of space limitations in a "header" speaker.

Circuit Operation

Referring to the Circuit Diagram Figure 1: The antenna system used with this receiver is capacity coupled to the antenna coil. The antenna capacity is accurately matched to the receiver antenna stage, greatest efficiency through the use of an adjustable padding condenser. The antenna coil is tuned by the "ANT" section of the condenser gang and feeds the pentode grid of the 6F7 tube. The output of the pentode portion of the 6F7 tube is capacity coupled to the grid coil tuned by the "R.F." section of the condenser gang feeding the control grid of the 6F7 detector-oscillator tube. The incoming station frequency is then mixed in this tube with the frequency produced by the receiver oscillator circuit which is tuned by the "OSC." section of the condenser gang. A resultant frequency is produced of 175 kilocycles and is inductively coupled to the pentode grid of the 6B7 tube. The output of the pentode section of the 6B7 tube is then impressed on one of the diode plates of this tube for detection purposes through the 2nd i.f. coil. A.V.C. voltage is produced in the other diode plate circuit and controls the grid bias on both the pentode section of the 6F7 tube and the control grid of the 6A7 tube. The audio output of the detector circuit is coupled to the grid of the triode portion of the 6F7 tube and the grid voltage swing is controlled by the volume control. The plate circuit of this section of the tube is resistance coupled to the grid of the 41 output tube. The output of the 41 tube is coupled to the speaker voice coil through the output transformer. Tone control action is obtained by feeding some of the higher frequencies to ground using the voice coil circuit as a conducting medium.
Model Chevrolet 601574
Alignment Parts List

UNITED MOTORS SERVICE

Converting Output Meter

Connect one of the output meter leads to the plate prongs of the type 41 output tube. The plate prong is the first prong to the left of the filament when looking at the bottom of the tube where the filament prongs are inserted. Connect the other output meter lead to the receiver chassis, making sure that the meter is connected with a D.C. blocking condenser connected in series to prevent cleaning damage to the meter.

IMPORTANT

Due to the high sensitivity of these receivers, the receiver chassis must be in its case before making any adjustments. This is necessary in order to obtain accurate adjustments and to prevent oscillation due to lack of the shielding effect of the receiver case.

Peaking I.F. Stages at 175 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6AF tube leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I.F. adjustments.

(b) Set the test oscillator on 175 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak each of the I.F. trimmers on the I.F. coil. Illustration #64 on Fig. 2.

(e) Then peak each of the trimmers on the last I.F. coil. Illustration #5 on Fig. 2.

NOTE: In order to insure accurate settings of the I.F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a readable output on meter scale deflection. Note all adjustments for maximum sensitivity.

Peaking Gang Condenser at 1550 K.C.

(a) Connect the output test oscillator to the antenna connection of the receiver and to the chassis ground. (Do not use a .5 mfd. condenser that was required in aligning the I.F. stages.)

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF WASH.

(c) Set the test oscillator on 1550 kilocycles.

(d) Adjust the trimmer for the trimmer section of the gang condenser (middle section CAREFULLY) for maximum output. Then adjust the trimmers for the "I.F." and "ANT." sections of the gang condenser also for maximum output.

(f) Repeat above adjustment procedure for each stage.

Tracking Oscillator at 540 K.C.

(a) Turn the condenser plates until they are COMPLETELY OUT OF WASH.

(b) Test oscillator leads connected to antenna and ground of receiver.

(c) Adjust the oscillator tracking condenser (Illus. #4 on Fig. 3) located on the bottom of the chassis until the 1550 K.C. signal is tuned in with maximum output.

Peaking Gang Condenser at 1400 K.C.

(a) Set the test oscillator on 1400 kilocycles.

(b) Turn the condenser rotor plates of the 1400 K.C. signal until the condenser rotor is tuned in with maximum output.

(c) Adjust the parallel trimmers for the "I.F." and "ANT." sections of the gang condenser (shown on Fig. 3) for maximum output. In the case of the condenser as it is adjusted at 1550 K.C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

Adjusting Receiver to Car Antenna

NOTE: An antenna compensating condenser is provided in the antenna circuit of this receiver that must be adjusted to the particular car antenna the receiver is to be used on. The test oscillator cannot be used for this adjustment due to the fact that capacity of the output circuit will not match the wide range of antenna capacities being used. Therefore, it is necessary that the adjustment be made after the receiver is installed on the car and is done in the following manner.

(a) Tune the receiver to a weak broadcast station on the low frequency end of the dial 550 to 700 K.C.

(b) Adjust the antenna compensating condenser for maximum response from the broadcast station. This condenser is shown as illustration #20 on Fig. 3 and is located immediately to the rear of the speaker plug on the side of the receiver case.

©John F. Rider, Publisher
Fig 2 MODEL 980455 CIRCUIT DIAGRAM
(BUICK, PONTIAC, OLDS)
In the event of prosecution, the use of suppressors was necessary in order to eliminate chassis pickup and had little effect on the interference picked up by the antenna. The suppressors used in the vehicles with the 1400 series were equipped with special filters for the elimination of residual power transformer defects. The suppressors were installed in the chassis frame and incorporated with the resonant antenna lead from the set which makes possible the installation of the set with the use of the standard plug suppressors. Care should be taken to keep all receiver loss away from high tension cables because the intensity of the interference field exists around them. This lead must be by-passed with a 1 mfd. condenser at the point where it connects to the antenna.

VIBRATORS

In some cases an amount of dirt will lodge between the contacts and result in such high contact resistance that the vibrator will not start. If such is apparently the case, remove the transformer-vibrator from the chassis case and try connecting the transformer inside the case only. Turn the "getter" on (there must be a connection between the transformer case and the chassis) and start the vibrator by applying 60-cycle 6 volt and forth with a pencil. If the vibrator starts in function, all is not "knot" out as indicated by the cessation of brilliant sparking. The vibrator should then come up under the same conditions and continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

Vibrator Noise

Examination of the mechanical construction of the transformer-vibrator assembly will show that the bottom plate of the vibrator case is in the transformer. The transformer magnetic flux is fed from the bottom plate of the transformer and travels to the bottom plate of this assembly. The current drain of the oscillator supply will make the transformer and the bottom plate of this assembly hot, causing excessive back pressure. All four sides of the bottom plate would have the servicing of the vibrator case. Switching the case, the excessive back pressure of the bottom plate must be depended upon to eliminate the transformer noise.

Do not change a vibrator that is noisy externally before checking the grounds of the transformer to assembly to the bottom plate. Use a pair of pliers to bend the large leads around the plug (it is just enough to insure a pressure contact with the transformer assembly at all points.

Parts Alignment, do wear ment such defects may be included in the case of an oscillator to make the alignment with the wire line of the case and the rotor, and the transformer may be reconnected from the rotor and forth with a pencil. If the vibrator starts in function, all is not "knot" out as indicated by the cessation of bright screws and forth with a pencil. If the vibrator starts in function, all is not "knot" out as indicated by the cessation of brilliant sparking. The vibrator should then come up under the same conditions and continue to function properly. If the vibrator still fails to start properly, replace the vibrator unit.

Vibrator Noise

Examination of the mechanical construction of the transformer-vibrator assembly will show that the bottom plate of the vibrator case is in the transformer. The transformer magnetic flux is fed from the bottom plate of the transformer and travels to the bottom plate of this assembly. The current drain of the oscillator supply will make the transformer and the bottom plate of this assembly hot, causing excessive back pressure. All four sides of the bottom plate would have the servicing of the vibrator case. Switching the case, the excessive back pressure of the bottom plate must be depended upon to eliminate the transformer noise.

Do not change a vibrator that is noisy externally before checking the grounds of the transformer to assembly to the bottom plate. Use a pair of pliers to bend the large leads around the plug (it is just enough to insure a pressure contact with the transformer assembly at all points.

Failed in Transformer-Vibrator Assembly

In addition to the actual failure of the vibrator, due to the arcing of the vibrator, condenser, or burn or poorly adjusted contacts, there are several other defects, which may occur in the transformer-vibrator assembly, which may seemingly point toward the vibrator as the seat of the trouble.

Defective Tubes. A tube, which has shorted internally, may draw an abnormal current from the oscillator circuit. This high current will make the vibrator operate irregularly, and may make it start, stop, and change its firing by the printing of the tubes.

Defective Condensers. .06 or .08 mfd. (C-0) condenser, connected between the power transformer side of the "B" and "F" chokes and ground, may break down. The current of the circuit will then charge the "B" side, thus, run the vibrator plates. High current drain causes irregular operation of the transformer.

Defective N.P. "B" Choke. The N.P. "B" choke may become grounded to the transformer case causing high current drain. Such a short circuit in a transformer-rectifier assembly may cause failure.

Less Apparent Defects. Some defects occur which point toward the vibrator and which may be cleared by changing the vibrator, although the vibrator may be working satisfactorily. These defects may be, for example, a cold spot in the transformer, which may cause a fault in the transformer, if the vibrator is irregular in operation, check the points for abnormal wear or break. Check for shorts in the "B" circuit if the pins do not show abnormal burning.

6 Volt Terminal screws on the transformer terminal board occasionally short against the oiling cover.

Broken strands in the vibrator leads sometimes open and the framing end of the wires in contact with ground or some other terminal causing irregular operation of the vibrator or blown fuses.

Testing I.F. Stages at 825 C.C.

The only way the I.F. stages can be checked properly is with the use of an oscilloscope and the output meter. Connect the plate probe of the I.F. stage to the chassis and connect the plate probe to the output meter. Insert the output meter into the plate lead of the I.F. stage. The plate lead is at 110 volts and can be checked in the chassis frame. Make sure that the output meter is protected with a series condenser internally. If not, connect a 1/5 mfd. condenser in series with the ground lead to the chassis. Some stages of the 76 I.F. transformer and chassis section and a Gutta Percha. The 825 C.C. is normally used as a test: 1000 C.C. or more is a satisfactory reading. The 825 C.C. is normally used as a test: 1000 C.C. or more is a satisfactory reading.

(a) Connect the outputs of the oscillator to the grid cap of the 825 C.C. (save grid cap in place) and the chassis ground. This is normally used as a test: 1000 C.C. or more is a satisfactory reading.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 825 C.C. and feed this signal of the oscillator..825 C.C. stage of the set.

(d) Tune the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then tune the two condensers of the 825 C.C. coil.

(c) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Testing Gang Condenser at 1400 C.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order to get the position of the condenser plates for 1400 C.C. may be accurately determined, a 1400 C.C. condenser block (pointed red, part number 150073) should be used. This block may be used also in place of a separate 300 C.C. and 1400 C.C. and 650 C.C. transformer which are used for "tubless rectifiers.

(c) Insert the red block under the middle section of the gang condenser, as shown in Figure 1. The oscillator section first at 1400 C.C. for maximum deflection on the output meter.

(f) To insure proper peaking of all trimmers reduce the oscillator output to the lowest level that will give a reasonable deflection on the output meter scale.

NOTE: Always use the red calibration blocks when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial in determining the 1400 C.C. setting. When the alignment procedure is completed the logging of the dial may be slightly off and should be re-set.

SERVICE HINTS

The point must be removed from the dial under the chassis mounting washer in order to provide a good ground for the grid cap when the grid is used. F. P. may be used to help the oscillator to appear if good ground connections are not made at the dash.

The 825 C.C. is a true tube type and the oscillator section may cease functioning without affecting the tube or its reading in a tube checker. If the set does drop out of function, opera- tion weakly or not at all at the dash, remove the grid cap of the 78 I.F. tube and make sure the grid control is not turned down. If very loud pops occur in the speaker the 825 C.C. is probably defective and should be replaced.

TRANSFORMER-OSCILLATOR VERSION

Model B-O-P 980455 Alignment, Service Notes

Parts

MOOD 3-0-3 980455

Alignment, Service Notes

UNITED MOTORS SERVICE

John P. Rider, Publisher
MODEL B-O-P 380469
Alignment, Voltage

PARTS

United Motors Service

Peaking I.F. Stages at 260 K.C.

The only way the I.F. stages can be peaked properly is with the use of an oscillator and output meter. Connect the output meter to the plate grid of the last or output tube. Make sure that the output meter is protected with a series condenser internally, if not, connect a 10,000 mfd. condenser in series with one of the meter leads. The Dayton #790 Universal Test Meter and series #8 Volt-Omimeter have this protective condenser included in them.

(a) Connect the output of the oscillator to the grid cap of the 6F7 tube (leave grid cap in place) and to the chassis ground.

(b) Turn the condenser gang until the plates are entirely out of mesh.

(c) Set the oscillator on 260 K.C. and read this signal through the I.F. stages of the set.

(d) Peak the I.F. trimmer which is on the I.F. coil having only one adjusting screw first. Then peak the two condensers of the 2nd I.F. coil.

(e) Set the oscillator output at the lowest level that will give a reasonable scale deflection on the output meter. This should be less than half the maximum output available.

(f) Make all trimmer adjustments for maximum deflection on the output meter scale.

Peaking Gang Condenser at 1400 K.C.

(a) Connect the output of the oscillator to the antenna connection of the set and to the chassis ground.

(b) In order that the position of the condenser plates 4100 K.C. may be accurately determined, a wood calibration block (printed red, part number 1208073) should be used. This block may be used also in testing all of the U.W.S., B.O.P., and Chevrolet radios that use the "tubeless rectifier."

(c) Insert the RED block under the middle section of the gang condenser so that the largest flat side rests on the chassis base and the square notch stops solidly against the stationary plate support bracket.

(d) Open the condenser plates until they are against the beveled edge of the plate as shown in Fig. (1).

(e) Peak the parallel trimmers on top of the condenser gang. The trimmer setting is critical at 1400 K.C. for maximum deflection on the output meter.

**Note:** Always use the red calibration block when aligning the parallel trimmers on the gang condenser. Do not rely on the logging of the dial to find the 1400 kc. setting. Then the aligning procedure is repeated the length of the dial may be slightly off and should be reset.

VOLTAGE CHART

Note: All readings are taken from indicated tube probes to chassis frame. Volume control on full. Battery voltage supply at exactly 6 volts.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Screen</th>
<th>Plate</th>
<th>Fil.</th>
<th>Fil.</th>
<th>Cathode</th>
<th>Cond.</th>
<th>Triode Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>85</td>
<td>210</td>
<td>5.9</td>
<td>3.2</td>
<td>3.2</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>6F7</td>
<td>85</td>
<td>120</td>
<td>5.9</td>
<td>3.3</td>
<td>3.2</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>85</td>
<td>120</td>
<td>5.9</td>
<td>3.3</td>
<td>3.2</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>85</td>
<td>120</td>
<td>5.9</td>
<td>8.0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>210</td>
<td>105</td>
<td>5.9</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>210</td>
<td>105</td>
<td>5.9</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SERVICE HINTS

The point must be removed from the dash under the chassis mounting screws in order to get a good ground for the receiver as no other ground is used. R.F. noise due to the vibrator may result if a good ground of the receiver to the car chassis is not provided.

The 6F7 tube is a two unit tube and the oscillator section may cause functioning without affecting the amplifier section of the tube or its reading in a tube checker. If the set does not function, vary the red and green pins of the dial until the 500 K.C. end of the dial is marked and then mark the grid cap of the 78 I.F. tube and make and break the grid contacts several times. If very loud pops occur in the speaker the 6F7 is probably defective and should be replaced.

1208044 Resistor (candela) (a) 170 ohms (b) 440 ohms R-1 A
1208044 Resistor 75,000 ohms R-2 5
1208465 Resistor 5,000 ohms R-3 5
1208464 Resistor 75,000 ohms R-4 5
1208130 Resistor 500,000 ohms R-5 5
1208383 Resistor 1,000,000 ohms R-6 5
1208426 Resistor (candela) (a) 75 ohms (b) 800 ohms R-7 5
1208438 Resistor 500,000 ohms R-9 5
1204138 Resistor 600,000 ohms R-10 5
1208416 Resistor 35,000 ohms R-11 5
1208425 Resistor 600,000 ohms R-12 5
1208544 Resistor 100,000 ohms R-14 5
1208636 TRANSFORMER-VIBRATOR ASS'Y.
1208189 Base (small) Cellophone (to cover vib.)
1208448 Large Cellophone (to cover vib.)
1208488 Case & bracket Vibrator
1208431 Coil (choke) R.F. "A"
1208566 Coj (choke) R.F. "B"
1208153 Transformer Vibrator power L-1 5
1208102 Vib. (large) Inc. C-21 & C-26
1208697 Tube (braze) Ant. shield (Buck) R-8
1208373 Volume control 200,000 ohms R-9
1208441 DRIVE ASSEMBLY Buck (complete)
1208442 DRIVE ASSEMBLY Buck (complete)
1208767 Drive cables, bra & shaft assembly..-Buck & Olds
1208647 Drive cables, bra & shaft assembly-Fontiac
1208646 Escutcheon plate Buck & Olds NOTE: These plates can be supplied only by Buck & Olds 5
1208446 Escutcheon plate Fontiac & Olds B-O-P dealers

Parts common to Buck, Fontiac & Olds drive assemblies

1208434 Drive case includes bracket
1208502 Drive case
1208704 Dial light 6-8 volt
1208201 Knob Black bakelite-Buck
1208280 Knob Black bakelite-Buck
1208148 Knob Black bakelite-Fontiac
1208564 Shield Am. coll
1208565 Shield Am. coll
1208566 Shield

*Used on sets above Serial No. 157700*
*Used on sets above Serial No. 157700*