SPECIFICATIONS

Primary voltage .......... 117 V. AC; Intermediate frequency .......... 455 KC;
Power consumption ......... 90 watts; Tuning frequency range: 535 - 1750 KC;
Power output ............. 6 watts; 5.7 - 18.1 MC;

Circuit: Superheterodyne with two tuning ranges, treble control, A.V.C.; bass compensa-
tion in volume control for phonograph pickup; push-button condenser-type tuner.

Speaker:
Field coil .............. 750 ohms;
Transformer ............. 3500 ohms;

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**Schematic, Voltage Alignment, Trimmers, Socket, Chassis**

**CHASSIS CR133**

**EXTERNAL CONNECTIONS**

FOR AERIAL OR GROUP ANTENNA

LOOP ANTENNA OSC COIL

IN5G IF

IH5G DET A.V.C.

IC5G POWER

THE MAGNAVOX CO., INC.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

**SPECIFICATIONS**

"A" Battery voltage .......... 1.5 volt;
"B" Battery voltage .......... 90 volt;
"A" Battery drain .......... 0.25 amp;
"B" Battery drain .......... 13.5 ma;
Power output ............. 0.2 watt;
Intermediate frequency .......... 455 K.C.;
Tuning frequency range:
540 -- 1650 K.C.;
Speaker transformer .......... 3000 ohms;
Type circuit: .......... Superheterodyne;

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Since the first production of this model was released, several circuit changes have been made to improve the fidelity and volume of phonograph reproduction. These changes were made at two different times and are shown in Figures B and C. Figure A shows the original circuit. It is possible to check the phonograph input circuit on this radio without removing the chassis from the cabinet by the use of an ohmmeter, according to instructions shown.

**TURN WAVE SWITCH TO PHONO POSITION, REMOVE PICKUP PLUG AND CONNECT OHMMETER TO PICKUP SOCKET—MEASURE RESISTANCE WITH VOLUME CONTROL OFF AND FULL ON.**

![Diagram](image)

**VOLUME CONTROL**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>1 MEG 157,000~</td>
</tr>
<tr>
<td>ON</td>
<td>1 MEG 157,000~</td>
</tr>
<tr>
<td>OFF</td>
<td>1 MEG 332,000~</td>
</tr>
<tr>
<td>ON</td>
<td>1 MEG 332,000~</td>
</tr>
<tr>
<td>OFF</td>
<td>1 MEG 200,000~</td>
</tr>
<tr>
<td>ON</td>
<td>1 MEG 200,000~</td>
</tr>
</tbody>
</table>

IF IT IS FOUND THAT CIRCUIT "A" OR "B" IS USED, CHANGE TO CIRCUIT "C".

**10 K.C. FILTER ADJUSTMENT**


With the tone control set for maximum treble response and the Band Expander set in the High Fidelity position (accomplished by rotating the treble control to the right as far as possible), tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis. In the absence of such a signal source in the daytime, an ACCURATE audio oscillator may be used to feed a 10 KC into the volume control.


With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis.

©John F. Rider, Publisher
Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F. band expansion, A.V.C., bass compensation control for phonograph pickup.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

SPECIFICATIONS
Primary voltage...117 V. AC;
Power consumption...134 watts;
Power output...... 20 watts;
Speaker (12C131):
Field Coil... 250 ohms;
Transformer... NONE
Speaker (302):
Field Coil... 250 ohms;
Transformer... 5M ohms;
(for dual speakers)
Intermediate frequency...455 KC;
Tuning range: 535 - 1730 KC;
1.65 - 5.2 MC;
5.6 - 16.2 MC;

ALIGNMENT NOTE:
KEEP BAND EXPANDER SWITCH IN "SHARP TONE" POSITION DURING ALL ADJUSTMENTS.
THE MAGNAVOX CO. INC.

CHASSIS CR140, CR150, CR151
Schematic, Voltage

MAGNAVOX PAGE 117-8

SPECIFICATIONS

Primary voltage...117 V. 50-60 cycle AC.
Power consumption............ 100 watts;
Power output................... 12 watts;
Speaker: Field coil.............. 1000 ohms;
Transformer.................. 8000 ohms;

Intermediate frequency...... 455 Kc.
Tuning frequency range:
599 - 1677 Kc;
5.7 - 18.1 Mc;

Circuit: Superheterodyne with two
tuning ranges, treble control, A/C,
base compensation in volume control
for phonograph pickup, push-button
condenser-type tuner, television
input receptacle.

NOTE
Measure heater and filament voltages
directly across socket terminals.
All other voltages measured from
socket terminals to ground with a 1000
ohm-volt voltmeter.

LINE VOLTAGE (FTV, A.C.)
All heaters: 6.3 volts A.C.

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PRIMARY VOLTAGES

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>800</td>
<td>Pilot light, pilot light condenser (A)</td>
</tr>
<tr>
<td>680</td>
<td>Transformer, primary voltage (A)</td>
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<tr>
<td>480</td>
<td>Transformer, secondary voltage (A)</td>
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<tr>
<td>400</td>
<td>Transformer, intermediate voltage (A)</td>
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<tr>
<td>300</td>
<td>Transformer, intermediate voltage (A)</td>
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<tr>
<td>200</td>
<td>Transformer, intermediate voltage (A)</td>
</tr>
<tr>
<td>100</td>
<td>Transformer, intermediate voltage (A)</td>
</tr>
<tr>
<td>50</td>
<td>Transformer, intermediate voltage (A)</td>
</tr>
</tbody>
</table>

SECONDARY VOLTAGES

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Push-button tuner, push-button tuner condenser (A)</td>
</tr>
<tr>
<td>75</td>
<td>Push-button tuner, push-button tuner condenser (A)</td>
</tr>
<tr>
<td>50</td>
<td>Push-button tuner, push-button tuner condenser (A)</td>
</tr>
</tbody>
</table>

GROUND TERMINALS

A.C. POWER SUPPLY (A)

SPEAKER SOCKET (A)

PHONO-MOTOR RECEPTACLE (A)

CHASSIS CR140, CR150, CR151

I.F. 455 K.C.

FILAMENT VOLTAGES

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>Filament voltage (A)</td>
</tr>
<tr>
<td>6.3</td>
<td>Filament voltage (A)</td>
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<td>6.3</td>
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FILAMENT TERMINALS (A)

SPEAKER TERMINALS (A)

RECEIVING LINE VOLTAGE (A)

SECONDARY VOLTAGE (A)

A.C. POWER SUPPLY (A)

PHONO-MOTOR RECEPTACLE (A)

CHASSIS CR140, CR150, CR151

I.F. 455 K.C.

FILAMENT VOLTAGES

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SPEAKER TERMINALS (A)

RECEIVING LINE VOLTAGE (A)

SECONDARY VOLTAGE (A)

A.C. POWER SUPPLY (A)

PHONO-MOTOR RECEPTACLE (A)

CHASSIS CR140, CR150, CR151

I.F. 455 K.C.

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FILAMENT TERMINALS (A)

SPEAKER TERMINALS (A)

RECEIVING LINE VOLTAGE (A)

SECONDARY VOLTAGE (A)

A.C. POWER SUPPLY (A)

PHONO-MOTOR RECEPTACLE (A)

CHASSIS CR140, CR150, CR151

I.F. 455 K.C.

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SPEAKER TERMINALS (A)

RECEIVING LINE VOLTAGE (A)

SECONDARY VOLTAGE (A)

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PHONO-MOTOR RECEPTACLE (A)

CHASSIS CR140, CR150, CR151

I.F. 455 K.C.

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SPEAKER TERMINALS (A)

RECEIVING LINE VOLTAGE (A)

SECONDARY VOLTAGE (A)

A.C. POWER SUPPLY (A)

PHONO-MOTOR RECEPTACLE (A)

CHASSIS CR140, CR150, CR151

I.F. 455 K.C.

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FILAMENT TERMINALS (A)

SPEAKER TERMINALS (A)

RECEIVING LINE VOLTAGE (A)

SECONDARY VOLTAGE (A)

A.C. POWER SUPPLY (A)

PHONO-MOTOR RECEPTACLE (A)
CONVENTIONAL ALIGNMENT AND SPECIAL SECTION VOLUME VIII

SPECIFICATIONS

Primary voltage...........117 V. AC; Intermediate frequency..........165 Kc;
Power consumption.........103 watts; Tuning frequency range 550 - 1750 Kc;
Power output................12 watts;

Speaker:

Circuit: Superheterodyne; three tuning ranges, treble and bass controls, bass and treble
Field Coil...........1000 ohms; compensation in volume control for phone.
Transformer...........9000 ohms; graph pickup, A.V.C., condenser type push-
button tuner, variable selectivity.

TO REMOVE THE CHASSIS FROM THE CABINET:

BERKELEY AND HEPPLEWHITE UNITS

1. Remove the four plugs from the lower side of the chassis and remove the antenna-ground terminal board from the side of the cabinet.

2. Pull the control knobs and the push button knobs from their shafts.

3. Remove the stay-hinge plate from the lid of the cabinet by removing the two upper wood screws holding it in place. Tilt the cabinet lid back and rest it on a support.

4. Remove the stay-hinge plate from the radio panel.

5. Remove the Phillips-head wood screws securing the radio panel, and the panel from the cabinet.

6. Unplug the four plugs securing the chassis to the cabinet clamps, and lift the chassis from the cabinet.

CAUTION: Do not remove the mounting brackets from the chassis at any time.
In the first production, Item 29 was .006 mfd. This should be replaced with a .003 mfd, 600 V, tubular condenser.
THE MAGNAVOX CO., INC.

CHASSIS CR141, CR142
Chassis, Alignment
Socket, Trimmers

Intermediate frequency: 455 KC;
Tuning frequency range: 555-1750 KC.

Circuit: Superheterodyne.
Volume control: Push-button condenser type.

Specifications:
Primary voltage: 117 V. 60 cycles.
Field coil: 1000 ohms.
Transformer: 6000 ohms.
Power output: 6 watts.

Used in Modern Table Combination
Television Input Receptacle.

CONVENTIONAL ALIGNMENT

NOTE: DIAGRAM OF INSTRUMENT IS NOT TO SCALE;
MAGNAVOX Tweenmark 1941-42 Series.

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CR-148 -- Used in Belvedere Combination

Speaker (120131):
Field Coil ........ 250 Ohms;
Transformer........ None

Speaker (302):
Field Coil ........ 250 Ohms;
Transformer........ 5M Ohms;

Primary voltage... 117 V. AC;
Power consumption. 160 watts;
Power output....... 20 watts;

Intermediate frequency........ 455 KC;
Tuning frequency range: 535 - 1730 KC;
1.65 - 5.8 KC;
5.6 - 18.2 KC;

Circuit: Superheterodyne with three tuning ranges, treble and bass controls, I.F., band expansion, A.V.C., bass compensation in volume control for phonograph pickup, variably selectivity.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

The tubes used are:

- 1-6A7 Frequency converter
- 1-6D6 Intermediate frequency amplifier
- 1-75 2nd Detector, A.V.C., and audio driver
- 1-80 Rectifier

Schematic Location Part No. Description

PUSH-BUTTONS: Unscrew the push-button on which you desire to receive a certain station. Tune in this station manually. Push the push button and screw it tightly while holding in. Repeat for other stations.

Insert station tabs in the schematic by snapping them in place. Pushing in any button will cause the desired station to be heard.

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www.americanradiohistory.com
The tubes used are: 1-6A7 Frequency converter 1-7S 2nd detector, AVC, and A. F. Amplifier 1-6D6 Intermediate frequency amplifier 1-2SL6G Power output 1-2SZ5 Rectifier 1-L49B Plug-in Ballast Resistor

The bands covered are:
(A) 538 to 1750 Kilocycles.
(B) 2.3 to 6.5 Megacycles.

<table>
<thead>
<tr>
<th>Schematic Location</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1, C7, C15</td>
<td>C-15754</td>
<td>Tubular cond. .01 mfd. 400 V</td>
</tr>
<tr>
<td>C1, C17, C30</td>
<td>C-15752</td>
<td>Tubular cond. .05 mfd. 200V</td>
</tr>
<tr>
<td>C17</td>
<td>C-15751</td>
<td>Tubular cond. .1 mfd. 400V</td>
</tr>
<tr>
<td>C1</td>
<td>C-15775</td>
<td>Mica cond. 50 mfd. 150V</td>
</tr>
<tr>
<td>C1, C12, C16</td>
<td>CM-29</td>
<td>Mica cond. 10 mfd. 300V</td>
</tr>
<tr>
<td>C2</td>
<td>CM-30</td>
<td>Mica cond. 250 mfd. 300V</td>
</tr>
<tr>
<td>C22</td>
<td>CM-32</td>
<td>Mica cond. 100 mfd. 50V</td>
</tr>
<tr>
<td>C23</td>
<td>CM-33</td>
<td>Mica cond. 250 mfd. 50V</td>
</tr>
<tr>
<td>R1, R1-15511</td>
<td>Carbon res. 5K ohm 1/4W 10%</td>
<td></td>
</tr>
<tr>
<td>R2, R-15500</td>
<td>Carbon res. 2 meg 1/4W 10%</td>
<td></td>
</tr>
<tr>
<td>R3</td>
<td>R-15516</td>
<td>Carbon res. 10K ohm 1/4W 20%</td>
</tr>
<tr>
<td>R4, R-15528</td>
<td>Carbon res. 1K ohm 1/4W 20%</td>
<td></td>
</tr>
<tr>
<td>R5, R-15601</td>
<td>Carbon res. 10K ohm 1/4W 20%</td>
<td></td>
</tr>
<tr>
<td>R7, R8, R9</td>
<td>R-1531</td>
<td>Carbon Resistor Y</td>
</tr>
</tbody>
</table>

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII.

IF PEAK 455 KC

ADJUSTMENTS OF PUSH BUTTONS

These push-buttons are adjusted so as to come within three (3) frequency ranges. The first button from the left is for stations lying between 1200 and 1600 kilocycles. The second (2) button is for stations lying between 800 and 1350 kilocycles. The third (3) and fourth (4) buttons are for stations lying between 540 and 1100 kilocycles. To set up these buttons, determine which four (4) stations you wish to receive most frequently. Ascertain their frequencies and determine on which button they should be set up. Push in the button on which a particular station is to be set up and, with a screwdriver, turn the screw at the rear of the chassis corresponding to this push-button, until the station you desire to hear is received with best quality and tone. Go to the top rear of the chassis and adjust the corresponding trimmer condenser until that station is heard with maximum volume. Repeat for the other push-buttons. The location of these adjustment points is shown in figure 1.
MODELS 3C80, 3C80P, 380; 3SC80, 3SC80B; 3C90, 390; 3SC90.

PUSH BUTTON TUNING

Six buttons on this set are provided to allow you to select your favorite station in the broadcast band instantaneously without any operation except that of pushing a button. These buttons start from the fourth from the left to the fourth from the right, inclusive, and numbering them from the left to the right, as 1, 2, 3, 4, 5, and 6.

The buttons numbered 1, 2, and 3 are designed to cover the frequency range from 1700 to 800 Kc. Buttons number 4, 5, and 6 are designed to cover the range from 1200 to 540 Kc. To set up these buttons it is only necessary to select one of the buttons which includes the frequency of the station which you wish to receive, and depress that button. Select the corresponding screw in the back of the receiver and with a small screw driver adjust it by turning the screw in or out until the station is being received as well as possible.

Then, using the same screw driver, adjust the corresponding trimmer from the top of the chassis until maximum volume is obtained on that station. The other buttons may be adjusted in exactly the same fashion to different stations. Every time a button is adjusted for a certain station, remove the call letter tab from the sheet of call letters furnished with the receiver, and insert it through the small slit in the side of the knob so that the call letters show through the top of the knob. After the buttons have been once adjusted in this fashion, it is only necessary to press the button marked with the call letters of the station you wish to receive, whereupon it will be heard instantaneously.

MODELS 5BDA, 5BEA

PUSH BUTTONS: Looking at the front of the set counting from left to right, the first four push buttons are for setting up stations.

- Button number 1 is for stations lying between 975 and 1550 Kilocycles
- Button number 2 is for stations lying between 850 and 1350 Kilocycles
- Button number 3 is for stations lying between 840 and 1100 Kilocycles
- Button number 4 is for stations lying between 840 and 1100 Kilocycles
- Button number A is for Broadcast Band
- Button number B is for Short Wave Band

Determine on which button a desired station is to be set up. Push that button in. Going to the rear of the receiver, adjust the coil corresponding to the chosen push button until the desired station is heard with maximum volume and best tone. Adjust the trimmer corresponding to the chosen button until that station is heard with maximum volume. Repeat for other push buttons.
**PUSH BUTTONS**

Looking at the front of the set counting from left to right, the first four push buttons are for setting up stations. Button number 1 is for stations lying between 975 and 1550 Kilocycles. Button number 2 is for stations lying between 850 and 1350 Kilocycles. Button number 3 is for stations lying between 510 and 1100 Kilocycles. Button number 4 is for stations lying between 100 and 200 Kilocycles. Button number A is for Broadcast Band. Button number B is for Short Wave Band.

Determine on which button a desired station is to be set up. Push that button in. Going to the rear of the receiver, adjust the coil corresponding to the chosen push button until the desired station is heard with maximum volume and best tone. Adjust the trimmer corresponding to the chosen button until that station is heard with maximum volume. Repeat for other push buttons.

---

**Schematic Diagram Models - 2A50F - 2A50FM**

- **R2** - R-15601
- **Location** - **Part Number** - **Description**
  - **Simplified** - **Location**
  - **Schematic** - **Part Number**
  - **LAYOUT** - **Model**
  - **R3** - R-15544 15K ohm 1 W 20% Carbon Resistor
  - **R4** - R-15500 2 megohm 1/4 W 20% Carbon Resistor
  - **R5** - R-15517 1 megohm 1/4 W 20% Carbon Resistor
  - **R6, R9** - Y-VC-33 Volume and Tone Control
  - **R7** - R-15512 250K ohm 1/4 W 20% Carbon Resistor
  - **R10** - R-2 5000 ohm 1/4 W 20% Carbon Resistor
  - **R11** - R-82 35 ohm 1/4 W 20% Carbon Resistor
  - **R12** - R-88 150 ohm 1/4 W 10% Carbon Resistor
  - **T1** - Y-CS-100 Loop Antenna
  - **T2** - Y-CS-102 Oscillator Coil
  - **T3** - Y-CS-102 Oscillator Transformer
  - **T4** - Y-CS-102 2nd I.F. Transformer
  - **C2, C14** - C-15754 .01 mfd 400 V Tubular Condenser
  - **C8, C25** - C-15756 .05 mfd 400 V Tubular Condenser
  - **C15** - C-30 .001 mfd 400 V Tubular Condenser
  - **C16, C17** - C-25 .006 mfd 400 V Tubular Condenser
  - **C18** - C-15752 .05 mfd 200 V Tubular Condenser
  - **C26** - C-18 .01 mfd 400 V 20% Tubular Ceramic
  - **C7** - CM-29 50 mfd 30% Mica Condenser
  - **C10** - CM-31 100 mfd 30% Mica Condenser
  - **C22** - CM-33 250 mfd 30% Mica Condenser
  - **C21** - CM-34 150 mfd 5% Mica Condenser
  - **C3, C4, C5, C6**
  - **C29, C24, C27**
  - **Y-CT-30B Trimmer Strip**
  - **Y-CD-43 Electrolytic Condenser**

---

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The receiver operates with the following tubes:

1-6SA7  Single ended frequency converter
1-6SK7  Single ended intermediate frequency amplifier
1-6Q7G  2nd detector, A. V. C. and A. F. driver
1-76    Output tube driver
1-6AC5G  Dynamically coupled output stage
1-5Y3G  Rectifier
1-6US  Tuning indicator (Model 3C70 only)

**SETTING UP OF PUSH-BUTTONS**

Button No. 1 is for stations lying between 1100 and 1550 KC's.
   " No. 2 is for stations lying between 950 and 1450 KC's.
   " No. 3 is for stations lying between 800 and 1200 KC's.
   " No. 4 is for stations lying between 620 and 950 KC's.
   " No. 5 is for stations lying between 620 and 950 KC's.
   " No. 6 is for stations lying between 540 and 800 KC's.

1. Select the stations that you wish to set up on the push-buttons,
2. Determine on which push-buttons these stations should be set up, according to above table.
3. Push the button on which you should set up a particular station.
4. Using a screw driver, adjust the coil corresponding to the proper push-button until the desired station is heard with maximum volume and best tone.
5. Adjust the trimmer condenser corresponding to the proper push-button until the desired station is heard with maximum volume.
6. Repeat for other push-buttons.

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For Chassis and Trimmers
See Index

Schematic

Location
C5, C8, C19
C9, C10, C11,
C12, C13, C14
C21
C43, C44
R7, R13
IFT-1
IFT-2
P1, P2
T1
T2
T3
T4
T5
C5, C36
C24, C38, C41,
C45, C46
C30
C34, C35, C39.
C40
C42
C1, C16, C32,
C33

Part No.
Y-CV-47
Y-CT-23
Y-CP-9
Y-CE-52
Y-VC-39
Y-IFA-5
Y-IFA-6
LB-51
Y-TP-5
Y-CS-120
Y-CS-116
Y-CS-115
Y-SPA-64
C-15752
C-15754
C-15756
C-21
C-15753
CM-31

Description
3 Gang Variable Condenser
Condenser Strip
Padder Condenser
16-8 mfd. Electrolytic Condenser
Combination Volume & Tone Control
1st I.F. Transformer
2nd I.F. Transformer
Pilot Lights Mazda No. 51
Power Transformer
Preselector Coil
Antenna Coil Assembly
Oscillator Coil Assembly
Output Transformer
.05 mfd. 200 Volts Tubular Condenser
.01 mfd. 400 Volts Tubular Condenser
.05 mfd. 400 Volts Tubular Condenser
.005 mfd. 400 Volts Tubular Condenser
.002 mfd. 600 Volts Tubular Condenser
100 mmfd. 30% Mica Condenser

These models are three band superheterodyne receivers and differ only in operating frequency. The 3SC80 is built for operation on 115 volts 60 cycles A.C. and the 3SC80B is for 115 volts 50-60 cycles A.C.

C22
CM-39
2300 mmfd.
5% Mica Condenser
C23
CM-38
4900 mmfd.
5% Mica Condenser
C25
CM-13
100 mmfd.
5% Mica Condenser
R1, R15
R-15542
1000 ohm 
W 20% Carbon Resistor
R2, R8, R21
R-15511
50K ohm 
W 20% Carbon Resistor
R3
R-15536
100 ohm 
W 20% Carbon Resistor
R4
R-43
1 megohm 
W 20% Carbon Resistor
R5
R-15501
25K ohm 
W 20% Carbon Resistor
R6, R10
R-15500
2 megohm 
W 20% Carbon Resistor
R9
R-109
5 megohm 
W 20% Carbon Resistor
R11, R19, R20
R-15520
500K ohm 
W 20% Carbon Resistor
R12
R-15515
100K ohm 
W 25% Carbon Resistor
R14
R-15529
25K ohm 
W 20% Carbon Resistor
R16
R-15524
50K ohm 
W 20% Carbon Resistor
R17
R-2
5K ohm 
W 20% Carbon Resistor
R18
R-15506
30K ohm 
W 20% Carbon Resistor
MODEL 4-PWO
Wireless Record Player
Schematic, Socket

The tubes used are
1-12Q7GT  Pre Amplifier
1-50L6GT  Beam power output
1-12SA7GT  Modulator oscillator
1-35Z5GT  Rectifier

Model 4-PWO operates on 105-130 volts, 60 cycles, AC. It can be made to operate on 50-cycles AC by changing a bushing on the motor shaft.

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MAJESTIC PAGE 11-11

MAJESTIC RADIO & TELEV. CORP.

This is a 5-tube, 2-band receiver, operating on alternating current of 100-125 Volts A.C., for Models 5BDA and 5BEA. The tuning range for the broadcast band is from 550 to 1550 kilocycles. The tuning range for the short wave band is from 2.1 to 6.5 Megacycles.

Schematic

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MAJESTIC RADIO & TELEV. CORP.

This is a 5-Tube superheterodyne receiver, operating on alternating current of 60 cycles only, at 105 to 130 volts. It tunes from 538 to 1750 kilocycles.

Schematic Location
R1 R-15331 Carbon res. 10K ohm W20% 200V
R2 R-15510 Carbon res. 20K ohm W20% 200V
R3 R-15560 Carbon resistor 2meg W20% 200V
R4 R-98 Volume Control
R5 R-95 Carbon resistor 3meg W20% 200V
R6 R-15512 Carbon res. 250K ohm W20% 200V
R7 R-15530 Carbon res. 500K ohm W20% 200V
R8 R-96 Carbon res. 110K ohm W20% 200V
R9 R-15515 Carbon res. 100K ohm W20% 200V
R10 R-92 Carbon res. 250K ohm W20% 200V
C1 C10 Carbon cond. .05 mid. 200V
C2 C11 Carbon cond. .002 mid. 600V
C3 C12 Carbon cond. .05 mid. 400V
C4 C13 Carbon resistor .01 mid. 400V
C5 C14, C15 Variable Condenser
C6 C16 Elect. Condenser
C7 C17 Carbon cond. 400V
C8 C18 250Kohm 2W 400V
C9, C10 Y-C3-111 Antenna Coil
C11 Y-C3-121 1st F. Transformer
C12 Y-C3-26 Electric Clock
C13 Y-C3-103 Oscillator Coil
C14 Y-C3-107 1st F. Transformer
C15 Y-C3-20 Pilot Light Mazda #47
C16 Y-C3-105 1st F. Transformer
C17 Y-C3-107 1st F. Transformer
C18 Y-C3-20 Pilot Light Mazda #47

IF PEAK 455 KC MODELS 140, 148

This set is a one band, 4-tube superheterodyne receiver equipped with a Majestic High Q loop. This set will operate on 105-125 volts AC or DC current, and will receive stations lying between 540 and 1720 Kc. This includes standard broadcast and most police stations.

The tubes used are:
- 1-12STA7GT Frequency Converter and Osc.
- 1-12K7GT 1. F. Amplifier
- 1-12Q7GT 2nd Detector, A.V.C., Driver
- 1-1056GT Beam Power Output
- 1-35Z4GT Rectifier

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MAJESTIC RADIO & TELEV. CORP.

CONVENTIONAL ALIGNMENT

The tubes used are:
1-12SA7-GT Frequency converter
1-12Q7-GT Intermediate frequency amplifier
1-12Q7-GT Second Detector, Automatic Volume, and Audio Driver
1-3S6L-GT Beam power output
1-3S54-GT Rectifier

IF PEAK 455 KC

MODEL 150-L

The tubes used are:
1-12SA7-GT Frequency converter
1-12K7-GT Intermediate frequency amplifier
1-12Q7-GT Second Detector, Automatic Volume, and Audio Driver
1-3S6L-GT Beam power output
1-3S54-GT Rectifier

IF PEAK 455 KC

MODEL 130, 130U

CONVENTIONAL ALIGNMENT

To change the "A" battery, remove the old one from its bracket. Remove the wrapping or tube from the new battery and snap it in position as shown in Figure 1, making certain that the small center contact of the battery makes a good connection to the spring contact as shown in Figure 1.

To change the "B" battery, slide the old one from underneath the chassis. Remove the plug from this battery. Insert the plug into the new battery and replace the new battery.

The tubes used are:
1-1A7-GT Combined oscillator and 1st detector.
1-INS-GT Intermediate frequency amplifier.
1-1D8-GT Combined second detector, Audio driver, and Power output.

MODEL 130

B1 No. 9 Majestic Battery No. 9 1.5V
B2 No. 3A40P Majestic Battery No. 3A40P 60V

MODEL 130U

1-P. 94A Majestic Battery No. P-94A 1.5V
2-P. 5303 Majestic Battery No. P-5303 45V

©John F. Rider, Publisher
Model 310UL

If Peak 455 KC

The tubes used are:
1—1A7GT  Combined oscillator and 1st detector.
1—1N5GT  Intermediate frequency amplifier.
1—1D8GT  Combined second detector, Audio driver, and Power output.

Schematic Location  Part No.  Description
C1  C-45  Tubular cond. .05 mfd. 200V  R1  R-105  Carbon res. 5K ohm
C2, C3  Y-CV-46  Variable Condenser  R2  R-102  Carbon res. 1 meg.
C4  CM-31  Mica cond. 100 mfd.  R3, R7  R-101  Carbon res. 2 meg.
C5, C11  C-48  Tubular cond. .01 mfd. 400V  R8  R-15515  Carbon res. 100K ohm
C6, C7  CT-1  Trimmer condenser  R9  R-103  Carbon res. 600 ohm
C8  CT-32  Trimmer condenser
C9, C14  CM-30  Mica cond. 250 mfd.
C10  CE-38  4 mfd. 100V Electrolytic  B1  P-94A Majestic Battery No. P-96 1.5V
C12, C13  C-47  Tubular cond. .004 mfd. 400V  B2  P-530 45V

Model 419-B
Model 420
Model 420-PL
Model 421
Model 421-PL

The tubes used are:
1—1A7G  Converter
1—1N5G  Intermediate frequency amplifier
1—1H5G  2nd detector, AVC, and first audio frequency amplifier
1—1C5G  Output tube

Schematic Location  Part No.  Description
C4, C5  C-15752  .05 mfd. 200V
C10, C12, C14  C-15763  .01 mfd. 200V
C15  C-25  006 mfd. 400V
C3, C11, C13  CM-15918  100 mfd Type "O" Mica
C1, C2  Y-CV-26  Variable Condenser
CE, C7, C8, C9, CT-2  1. F. Trimmer Condenser
C18  CE-35  8 mfd. 150V Electrolytic
R9  R-5520  5000 1/8W 20%
R10  R-5512  1 meg. 1/8W 20%
R11  R-552  3000 1/8W 20%
R12  R-15559  3 mfd. 1/8W 20%
R3  R-44  70K 1/8W 10%
R15  R-5500  2 meg. 1/8W 20%
R5  Y-CV-26  Volume Control

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

This receiver is designed to operate on the following dry batteries.
1. 1¼ volt A-battery — Eveready 742A — RAY-O-VAC P-94A or the equivalent.
2. 45 volt B-batteries — Eveready 762 — RAY-O-VAC P-5303 or the equivalent.
MAJESTIC RADIO & TELEV. CORP.

MODEL 699-P

Schematic

MAJESTIC PAGE 11-15

Models 511, 511A, 519P, 519PA

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www.americanradiohistory.com
MODEL 699-P

Model 699-P is a six tube radio phonograph combination operating on a 110 volt 60-60 cycles. The receiver tunes to three bands, these are:

A—Broadcast band 538 to 1750 kilocycles.
B—Police and airplane 1.75 to 5.8 M.C.
C—American and foreign short wave receptions 5.8 to 18.6 M.C.

The receiver is equipped with automatic volume control, inverse feedback, inverse feedback tone control, base compensation, and mechanical push button tuning.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII.

The tubes used are:

1—6A7 First detector
1—6J5 Oscillator
1—6D6 I. F. Amplifier
1—75 Second detector, automatic volume control and first audio amplifier
1—41 Power output
1—80 Rectifier

(3) Tune in your desired station manually until it is heard with best quality.

(4) Push in the button while holding the manual tuning knob fixed on the station.

(5) Tighten the button by turning it to the right while the button is pushed all the way in, as tightly as possible. Allow the button to come out and tighten still more. It is of the utmost importance that the buttons be logged as tightly as possible.

(6) Repeat this procedure to set up the other buttons.

IT IS IMPORTANT THAT ALL THE BUTTONS BE LOGGED ON STATIONS LYING BETWEEN 550 AND 1700 Kilocycles AND THAT THESE BUTTONS BE SCREWED TIGHTLY. IF THIS IS NOT DONE THE CAMS OPERATING THE PUSH BUTTON UNIT MAY WANDER AND IAM THE WHOLE UNIT.

If there are not enough stations in your locality to log all six buttons, the unused buttons should be logged somewhere between 550 and 1700 kilocycles.

To change any one setting at any time repeat the above procedure. After that, to get this station, push the desired button with an even firm push until it has reached the end of its travel. After the push buttons are adjusted to your desired station, cut out the proper station call letters from the enclosed station call letter sheet, and snap this tab into the rectangular opening above the push buttons. Cover them with the small transparent celluloid tabs supplied with the call letters. These openings are shown in Fig. 1 as No. 1, No. 2, No. 3, No. 4, No. 5 and No. 6.
MIDWEST MODEL 12-40
Schematic, Socket Voltage

Midwest Radio Corp.

Operating Voltages

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MIDWEST RADIO CORP.

MODEL 90
Schematic, Voltage
Socket, Trimmers

©John F. Rider, Publisher
MISSION-BELL RADIO MFG. CO., INC.

MISSION-BELL 407 Late

MODEL 411

Schematics, Socket Trimmers

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NOTE: Antennas must be in cabinet. Connect a loop approximately 1 foot from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

Sensitivity (For .05 Watt Output)

External Antenna...10 Microvolts Average
Selectivity 50 KC Broad at 1000 Times Signal

Power Consumption (At 117 volts AC Supply) 28 Watts

Input Voltages and Currents

-Battery Operation

"A" Battery 9 Volts—50 mA.
"B" Battery 90 Volts—11.5 mA.
Drive Cord Replacement

The one end of the new drive cord (approximately 70 inches in length) to tension spring. Turn gang condenser to full open position. Thread free end of drive cord up through hole in rim of condenser drive pulley and pull spring flush against pulley rim.

Wind one turn clockwise and then drive pulley (from condenser drive pulley side of chassis) around drive pulley. This turn should progress to the left (from front of chassis). Pass cord in back of guide arm—see illustration. Then wind drive cord 3½ turns counter-clockwise (from front of chassis) around pulley. Turn should progress away from the chassis.

Pass cord around pulleys C, B, and A as shown in illustration. Then wind cord 3½ turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. The turn should be at right side (from front of chassis) of pulley groove.

Thread cord through hole in pulley groove and knot securely to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—see illustration.

Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground. These voltages are read under the following conditions:

- Line Voltage—117 V
- Volume Control—Maximum

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale. 117 volts, 50 to 60 cycle AC.
### A.C. POWER SUPPLY

#### ALIGNMENT PROCEDURE

<table>
<thead>
<tr>
<th>Component</th>
<th>Value at Initial Setting</th>
<th>Value at Initial Setting</th>
<th>Value at Initial Setting</th>
<th>Value at Initial Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna</td>
<td>5000 Ω</td>
<td>5000 Ω</td>
<td>5000 Ω</td>
<td>5000 Ω</td>
</tr>
</tbody>
</table>

The following equipment is required for alignment:
- **Alignment Chart Generator**, which will provide an accurately calibrated signal at the test frequencies as listed.
- **Output Indicator Meter**, to check the power transformer output. During alignment, one end of the input leads, and 400 ohms.

#### VOLTAGES AT SOCKETS

Line Voltage: 117/120 Volts Control Maximum

### Montgomery Ward & Co.

Aligment, trimmers, voltage, notes

### Electric Drive Panel Assembly

Montgomery Ward & Co.

### Notes

- **Model 63-303, 63-309, 63-351**
- **Model 63-347, 63-347, 63-447**
- **Model 63-449, 63-461**

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General Adjustments

When the circuits only the motor is complete, magnetic action causes the armature shaft to ride up to the front of the pawls. The force is strong enough to overcome the resistance of the slider switch spring in preventing movement.

The small gear comes into close proximity with the amperage two plus and two extensions mounted above: magnetic chuck, the gear to rotate with the armature. The electric current passing through it sets the gear to rotate in a direction to mesh with the armature teeth. When the switch operating lever (offset metal piece) is not in position with the switch in the correct position, the armature teeth will be separated from the stationary teeth. This will cause the armature to rise up to the front of the pawls. The force is strong enough to overcome the resistance of the slider switch spring in preventing movement.

To change the switch, remove the fuse cover by taking out the screw which holds the brackets over the fuse cover. When the switch operating lever (offset metal piece) is not in position with the switch in the correct position, the armature teeth will be separated from the stationary teeth. This will cause the armature to rise up to the front of the pawls. The force is strong enough to overcome the resistance of the slider switch spring in preventing movement.

Replacing Compound Gear

In a few of the first sets incorporating the gear drive from the motor, the drive gear of compound gear 1 (see Fig. 6) may slip in its bush. There is a spring washer which drives this gear onto the bush and this washer may be worn out. If this occurs, the gear will not rotate smoothly and the switch will not operate correctly. Remove the metal bush and replace with a new one. The gear will be seen to rotate with the bush and the switch will operate smoothly.

Adjusting or Replacing the Motor On-Off Switch

If the switch does not operate in this manner, the armature gear which holds it in place may be worn or broken. Place the switch so that the switch operating lever is opposite the switch in the correct position. If this switch is not adjusted properly, the motor may not operate properly. If the switch is not adjusted properly, the motor may not operate properly. If the switch is not adjusted properly, the motor may not operate properly.
Take out the motor mounting screws and lift the motor out of place - See Fig. 8.

Lift up the new drive cable to clear the teeth at the top of gear 3 - take care not to nick the cable.

Remove gears 2 and 1.

Put the new fibre tooth gear on the shaft and replace the horseman washers.

Move to gear assembly - See Fig. 8. The top gear of this assembly is movable and the bottom gear is adjustable. Move the top gear to the right a little, then move the bottom gear to the left a little, and the new fiber tooth gear too. Replace the horseman washers.

Slide gear 3 on its shaft, pulling the new drive cable over the top of the teeth - again care must be taken not to nick the cable.

Pulse gear 2, all the way on the shaft, engaging gears 1 and 2. Replace the horseman washers.

Replacing Main Drive Cable

The main drive cable is the steel cable which the turnbuckle takes up. A change was made in this cable and the method of stringing it early in production.

Later models of the new cable can be identified by the numeral 2 stamped on the bracket over the motor on-off switch and also by the large drop of oiler adjacent to one of the set screws which hold the top pulley of this cable in place.

EARLY MODELS CABLE - Should cable breakage or any kind of major cable trouble be experienced which would require restringing of this cable in the early models, do not attempt to restring this cable. Instead, order a new electric drive cable assembly from Wall-Gardner and Co., except in case of early 4-tube set.

LATER MODELS CABLE - Should cable restringing be required in the case of the later type, this can readily be accomplished by ordering a new drive cable and replacing it on the assembly following the instructions.

Remove electric drive panel from chassis.

Remove the old drive cable. It will have to be unadapted at pulleys B and E. See Fig. 11. Turn electric manual lever to manual position.

Then from gear 3, bring the cable to a counter-clockwise direction 1/8 turn around pulley B, over to pulley C, 1/8 turn around pulley E, over to the bottom of pulley D, and then up to the shaft as the right of pulley E - be sure the cable is well down in slot H, pulley E.

Wind the cable looped over one end and the other turn around this shaft, progressing toward the left as shown in Fig. 8.

Rotate the setting disc until pulley E is approximately in the position shown in Fig. 9. Using a thin wooden prod, place the cable in slot L, with knut at hole 31 at point K, pulley E. Rotate the setting disc 1/8 to 1/4 turn to the right in this case, adjust the clearance, get the cable in the slot. Push the cable well down into slot L - see Fig. 9.

Rotate the setting disc 3/4 of a complete revolution in such a direction that the top of the disc moves toward the front of the panel. Bring the horn knurl out under the loop of the cable as shown in Fig. 10.
Remove weight and cord (or round nut) from screw and F of the cable. Put the lock washer against the hex nut on this cable. Screw round knurled nut into screw end of cable. While this is being done, the setting discs should be grasped by another person and rotated as far as they will go in such a direction that the top of the discs moves away from the front of the panel. The purpose of this is to take up all slack in the cable and to enable the two ends of the tumbuckles to be secured together. The cable must be firm and with all slack out. It should not be so tight, however, that the setting discs and pulleys do not turn freely. Tension of the cable is regulated by the position of the hex nut. The round knurled nut must be screwed tightly against the lock washer next to the hex nut.

25 Cycle Electric Drive Panel

The 25 cycle electric drive panel assembly is identical to the 60 cycle assembly except that a 25 cycle motor and a different gear No 1 (see Fig. 6) are used.

The pinion gear in the 25 and 60 cycle motors are not the same. If, therefore, one or these pinions is ordered, the type of motor must be specified. (Both 25- and 60-cycle motors are furnished with pinion included.)

Movie Dial Adjustments and Replacements

Replacing and Positioning the Dial Lamp

Caution: If a new lamp is required, use only a No. 81 lamp, Ward's Catalogue No. 61-209.

Turn the radio off and turn the band switch to the standard wave position.

Remove the lamp housing by unscreeving and removing the two screws which hold this housing in place—See Fig. 1.

Remove the old lamp from the housing. It will be necessary to depress the contact plug retaining spring which will be seen in the narrow slot near the upper end of the housing and pull the plug out a slight amount from the housing, in order to remove the lamp. Replace the lamp and push the plug down until the locking spring snaps into place.

Replace the lamp housing by means of the two screws, but do not tighten these screws yet.

Turn the radio on.

Then grasp the top of the lamp housing assembly and move it up or down until the image on the screen is centered and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in the illustration in the instruction book. Tighten the two screws.

Replacing Film

Turn the band switch to the standard wave position. Then remove the lamp housing (See article “Replacing and Positioning the Dial Lamp.”)

40 Cycle Power Supply

An electric drive chassis equipped with a 117-234 volt AC to 60 cycle power transformer can be used on a 60 cycle power supply only, unless changed as mentioned below. The electric drive panels of these sets are equipped with 60 cycle motors and these will function satisfactorily only at that frequency.

If one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 35 cycle model is used for this purpose.

Calibrating the Radio

To calibrate the electric drive movie dial radio, tune in a station of known frequency between 750 and 900 KC. In the early models loosen the two set screws in the hub of the film drum pulley. Turn the film drum until it is at the correct kilocycle mark on the dial scale and then tighten the pulley set screws.

In the case of later models, the film drum is held in position by a friction washer which will be seen under the drum. In these models, the film drum can be turned without loosening the set screws.
**Replacement Parts List**

There is a number on the On-Off switch bracket, which identifies the panel to major part changes. Be sure to mention this issue number when ordering parts for the Electric Drive Panel.

For names of parts shown in the Electric Drive Panel list refer to illustrations especially Figs. 3, 6, 7, 8, 9, 10 and 11.

### Electric Drive Panel Replacement Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
<th>Description</th>
<th>Setting Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>26A71</td>
<td>60 Electric Drive Panel Complete Lead Out Switch, Horn, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A72</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A73</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A74</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A75</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A76</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A77</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A78</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A79</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
<tr>
<td>26A80</td>
<td>60 Electric Drive Panel Complete With Tension, Block, Switch, Pumps, 100-Lb. Force, Upper, Lower, and Tension.</td>
<td>53.50</td>
<td></td>
</tr>
</tbody>
</table>

### Film Drum Cable

**Replacing Film Drum Cable**

Remove the electric drive panel from the chassis as explained in the article "Replacing Electric Drive Panel on Chassis" in Manual 124, and lay it face down in front of the chassis. It is unnecessary to unsocket motor or silencer switch connections or to disconnect tone and volume control cables.

Remove the old film drum cable, uncoiling it from pulley "F" at point "S" on early models, or from the pin on later models—see Fig. 2. Close the new condenser completely and arrange to hold it in this position while replacing the cable. Now insert one end of the new cable to hole "F" of condenser drive drum "A" which will be in the position shown in Fig. 2. Bring the cable down and around 1/4 turn to the lower side of the drum, progressing in a clockwise direction, passing it over pulley "C" and onto the cable horizontally toward the back of the chassis passing it through the groove on the left side of pulley "D" and through the groove on the right side of pulley "E"—(See Fig. 2, view from front.)

Place pulley "F" in the position shown in the back view in Fig. 2, turn the cable around 1/4 turn toward the "G" nearly parallel with the back of the chassis. Continue the cable from pulley "E" to the left side of the right side (from back) of pulley "F" keeping the cable in the upper part of the slot. The slot should rest on about 3/4 inch of the pulley surface before entering slot "G".

Insert the cable in slot "G" and continue down and out through slot "H" at point "K". If pulley "F" is the later type, wrap the cable once around the pin as shown in Fig. 2.

Wind the cable around pulley "F" keeping it below the cable on the right side and above the cable on the left side. Now extend the cable horizontally to pulley "L" and down to the groove in condenser drive drum "A". Insert end of cable in slot "M".

Now solder the cable to the pin on pulley "F" on late models, or solder the cable to the pulley at point "S" on early models.

Replace the electric drive panel on the chassis and calibrate the dial as explained in the article "Calibrating the Radio."**

**Adjusting Height of Image on Screen**

The image height should be adjusted so that the complete image for each band will appear on the screen.

If any portion of the image on any band is cut off, turn the radio on and turn the band selector to the second short wave (green) position. Loosen the two set screws of the lever arm on the band switch shaft. This lever arm is connected to the bakelite step which in turn moves the lamp assembly height mechanism.

Turn the tuning knob until the high frequency end (21.5 MCI) of the band is reached. Move the lever arm until the lamp blue line is lined up with the letter "W" of the word "West" at either side of the glass screen. Tighten the set screws.

The image height should then be correct for the other two bands.
Circuit

This model is a three-band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the output transformer assembly. The standard wave, 1st and 2nd band wave coils in each assembly are indicated by the letters L, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6J7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer to the tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6G7 tube is employed in the oscillator circuit. This circuit is always resonant at 450 Kc above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6G7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of I.F. transformer T4. When the selectivity control is in the sharp position, the coupling winding is open circuited and the noise coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound around the primary is connected in series with the secondary.

This produces overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6AS tube functions as a double 2nd detector. AVC voltage is applied to control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R15 is a filter composed of condensers C12 and C13 and resistor R14. At high volume settings, the filter is ineffective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

A 6F5 triode tube functions as the first audio amplifier while the output stage uses a 6G6 output pentode tube. A dynamic reproducer is employed.

The power unit uses a 395G full wave rectifier. A 6G5 tuning indicator tube is employed.

Phonograph Connections

Phonograph connections are made as shown in Fig. 2. On the front panel of the chassis base is a round knobout 1.5 inch in diameter. An octal base socket is mounted in this knobout opening and wired as illustrated.

A phone cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph radio switch and double tip jack.

Dial and Drive Assembly

See Index.

VOLTAGES AT SOCKETS

<table>
<thead>
<tr>
<th>Tube</th>
<th>Function</th>
<th>Prong No. 1</th>
<th>Prong No. 2</th>
<th>Prong No. 3</th>
<th>Prong No. 4</th>
<th>Prong No. 5</th>
<th>Prong No. 6</th>
<th>Prong No. 7</th>
<th>Prong No. 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6H7</td>
<td>R.F.</td>
<td>6.2 (1)</td>
<td>245</td>
<td>118</td>
<td>2.5</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6J7</td>
<td>1st Det.</td>
<td>6.2 (1)</td>
<td>246</td>
<td>116</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6G6</td>
<td>Out.</td>
<td>6.2 (1)</td>
<td>246</td>
<td>116</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6T7</td>
<td>I.F.</td>
<td>6.2 (1)</td>
<td>246</td>
<td>118</td>
<td>2.5</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6N7</td>
<td>2nd Det.</td>
<td>6.2 (1)</td>
<td>246</td>
<td>118</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6M5</td>
<td>I.F. A.F.</td>
<td>6.2 (1)</td>
<td>246</td>
<td>118</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6f6</td>
<td>Power</td>
<td>6.2 (1)</td>
<td>246</td>
<td>118</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6G6</td>
<td>Rectifier</td>
<td>5.0 (1)</td>
<td>246</td>
<td>118</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
<tr>
<td>6G5</td>
<td>Tuning Indicator</td>
<td>5.0 (1)</td>
<td>246</td>
<td>118</td>
<td>0</td>
<td>6.2 (1)</td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
</tr>
</tbody>
</table>

(1) A.C. voltage as read across resistor terminals 2 and 7.
(2) Base (14 volts) as read across resistor 202.
(3) Base (14 volts) as read across resistor 202 and 21.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across anode terminals 4 and 6.
**ALIGNMENT PROCEDURE**

**Volume Control—Maximum All Adjustments.**

**Selectivity Control—Sharp Position All Adjustments.**

Connect Radio Classic to Ground Post of Signal Generator with a Short Heavy Lead. analog and Signal Generator to “Heat Up” for several minutes.

<table>
<thead>
<tr>
<th>STEP</th>
<th>BAND SWITCH SETTING</th>
<th>DUMMY ANTENNA</th>
<th>SIGNAL GENERATOR FREQUENCY</th>
<th>TRIMMERS ADJUSTED</th>
<th>INITIAL STEPS</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>2nd I.F. Adj. Range B</td>
<td>1 mW</td>
<td>456 KC Grid of I.F. Tube</td>
<td>Turn Rotor to Full Open</td>
<td>Adjust to Maximum Output</td>
<td>Turn Rotor to Full Open</td>
</tr>
<tr>
<td>I.F.</td>
<td>1st I.F. Adj. Range B</td>
<td>1 mW</td>
<td>456 KC Grid of 1st I.F.</td>
<td>Turn Rotor to Full Open</td>
<td>Adjust to Maximum Output</td>
<td>Turn Rotor to Full Open</td>
</tr>
<tr>
<td>Range B</td>
<td>1800 KC</td>
<td>200 mW</td>
<td>1800 KC Antenna Lead Oscillator Range B (C61)</td>
<td>Turn Rotor to Full Open</td>
<td>Adjust to Maximum Output</td>
<td>Turn Rotor to Full Open</td>
</tr>
<tr>
<td>Range A</td>
<td>1500 KC</td>
<td>200 mW</td>
<td>1500 KC Antenna Lead Int. Range B (C8)</td>
<td>Turn Rotor to Max. Output</td>
<td>Set Indicator to 1500 KC—See Note A</td>
<td>Turn Rotor to Max. Output</td>
</tr>
<tr>
<td>Range B</td>
<td>600 KC</td>
<td>200 mW</td>
<td>600 KC Antenna Lead Int. Range B (C8)</td>
<td>Turn Rotor to Max. Output</td>
<td>Rock Rotor—See Note B</td>
<td>Turn Rotor to Max. Output</td>
</tr>
<tr>
<td>Range C</td>
<td>6500 KC</td>
<td>400 Ohm</td>
<td>6500 KC Antenna Lead Oscillator Range C (C13)</td>
<td>Turn Rotor to Max. Output</td>
<td>Rock Rotor—See Note B</td>
<td>Turn Rotor to Max. Output</td>
</tr>
<tr>
<td>Range D</td>
<td>22000 KC</td>
<td>400 Ohm</td>
<td>22000 KC Antenna Lead Oscillator Range D (C12)</td>
<td>Turn Rotor to Max. Output</td>
<td>Rock Rotor—See Note B</td>
<td>Turn Rotor to Max. Output</td>
</tr>
<tr>
<td>Range B</td>
<td>16000 KC</td>
<td>400 Ohm</td>
<td>16000 KC Antenna Lead Ant. Range B (C1)</td>
<td>Turn Rotor to Max. Output</td>
<td>Rock Rotor—See Note B</td>
<td>Turn Rotor to Max. Output</td>
</tr>
</tbody>
</table>

**ATTENTION**

- After each range is completed, repeat the procedure as a final check.
- Adjust the signal generator to prevent the leaking-off action of the AVC.

**NOTE**

- Adjust all the settings in the table except for the one marked with a dashed line. Only the setting marked with a dashed line is adjusted.
- After adjusting all the settings, check the following:
  1. The signal generator should be set to 1500 KC.
  2. The output from the signal generator should be 1500 KC.
  3. The signal generator should be set to 1500 KC.

**SPECIAL NOTE**

- Adjust the signal generator to 1500 KC.
- Adjust the signal generator to 1500 KC.
- Adjust the signal generator to 1500 KC.
- Adjust the signal generator to 1500 KC.

**ALIGNMENT DIAGRAM**

- The alignment diagram is provided to help visualize the alignment procedure.
- The diagram shows the connections and settings for each range, including the signal generator, I.F. stages, and dummy antennas.

**REFERENCE**

- The reference material is cited for further information on the alignment process.

---

**REFERENCES**

- **John F. Rider, Publisher**
- [www.americanradiohistory.com](http://www.americanradiohistory.com)
Circuit

When the selectivity control is in the broad position, the coupling winding which is wound on the core in the case of T4 is connected in series with the secondary. In the case of T3, the coupling winding which is wound on the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tube.

Across the volume control resistor R11 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the ordinary frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed through resistance coupling into the 6N6 output tube shown nearest to it in the schematic.

One stage of i.f. amplification is employed using a 6K7 tube. The primary and secondary of the transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers T4 and T3 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T3.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the low coupling which exists between the primary and secondary of these transformers results in high selectivity.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer and electric drive motor are used.

Ordinarily, a twenty-five cycle receiver may be operated from a sixty cycle power supply. However, the electric drive models cannot be operated in this manner because the twenty-five cycle motor will not operate properly on a sixty cycle power supply.

The sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

117-234 Volt Power Transformer

A 117-234 volt 60 cycle power transformer is also available for this model. It is important that these sets be operated on a 60 cycle power supply only.

Ordinarily, radios equipped with a 117-234 volt universal transformer may be operated on a 40 to 60 cycle power supply. However, the 60 cycle engine in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycles. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 25 cycle model is used for this purpose.

Connections for the 117-234 volt transformers are shown in Fig. 2. There is a .1μf inch round capacitor on the back panel of the chassis which may be removed to permit installation of a special octal socket.

Dial and Drive Assembly

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground: Standard Wave Position of Band Switch:

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
<th>PROG No. 1</th>
<th>PROG No. 2</th>
<th>PROG No. 3</th>
<th>PROG No. 4</th>
<th>PROG No. 5</th>
<th>PROG No. 6</th>
<th>PROG No. 7</th>
<th>PROG No. 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L7</td>
<td>R.F.</td>
<td>0</td>
<td>510</td>
<td>105</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6L7</td>
<td>1st A.F.</td>
<td>0</td>
<td>510</td>
<td>125</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6C5</td>
<td>Osc.</td>
<td>0</td>
<td>125</td>
<td>510</td>
<td>105</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6K7</td>
<td>S.F.</td>
<td>0</td>
<td>510</td>
<td>125</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6K7</td>
<td>2nd A.F.</td>
<td>0</td>
<td>119</td>
<td>125</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6C5</td>
<td>Balancing Capacitor</td>
<td>0</td>
<td>119</td>
<td>125</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6F6</td>
<td>Output</td>
<td>0</td>
<td>210</td>
<td>250</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>6Y6</td>
<td>Rectifier</td>
<td>0</td>
<td>310</td>
<td>250</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>665</td>
<td>Tuning Indicator</td>
<td>0</td>
<td>310</td>
<td>250</td>
<td>0</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
</tr>
</tbody>
</table>

(1) A.C. Voltage as read across a 0.1μf capacitor on 60 cycle power supply.
(2) B.A. (24 volts) as read across resistors R21, R22, & R23.
(3) B.A. (24 volts) as read across resistors R31, R32, & R33.
(4) A.C. Voltage as read across filament terminals 1 and 8.
(5) A.C. Voltage as read across terminals 1 and 8.

Fig. 4—Octal Tube Terminal Numbering (bottom of socket)

Fig. 5—Location of Tubes

A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

Phonograph Connections

Phonograph connections are made as shown in Fig. 2. On the front panel of the chassis base is a round 1 1/4 inch in diameter. An octal base socket is mounted in this knockout opening and wired as illustrated.

A phono cable assembly may then be purchased. On one end of this cable is an octal plug and the other end is a phonograph radio switch and double up jack.
Circuit

This model is a two band AC operated radio with a tuning range as shown in the specifications above. Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna coil assemblies and T3 is the oscillator coil assembly. The standard wave and short wave coils in each assembly are indicated by the letters B and D respectively.

The band switch completes connections to the coils in use. When it is in the Range B position, a double tuned antenna R.F. stage is used while for the D Range, a single tuned secondary is used.

A type 6Q7 tube functions as the 1st detector.

A separate type 6C7 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 450 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6SK7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to Fig. 2, it will be noted that there is a coupling winding connected in series with the secondary of the transformer T4. When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity.

When the selectivity control is in the broad position, the coupling winding is wound under the primary is connected to the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo diode triode function as the second detector and a one stage audio amplifier.

AC voltage is applied to the 1st detector and I.F. tetrodes.

Resonance coupling is used between the 1st audio stage and the output stage which employs a type 6F6 output pentode tube. A dynamic reproducer is used.

The power unit uses a 715G full wave rectifier. A 6GS tuning indicator tube is employed.

Ordinarily, radios equipped with a 117-234 volt universal transformer may be operated on a 40 to 60 cycle power supply. However, the 60 cycle motor in the electric drive panel of this model will not operate satisfactorily at any frequency other than 60 cycles. Consequently, if one of these radios is to be used on a 40 cycle power supply, it will be necessary to change the motor. The motor regularly supplied with the 35 cycle model is used for this purpose.

Connections for the 117-234 volt transformer are shown in Fig. 2. There is a ½ inch round knockout on the back panel of the chassis which may be used to permit installation of a special octal socket. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

Phonograph Connections

Phonograph connections are made as shown in Fig. 2. On the side panel of the chassis base is a round knockout ½ inch in diameter. An octal base socket is mounted in this knockout opening and wired as illustrated.

VOLTAGES AT SOCKETS

<table>
<thead>
<tr>
<th>TUBE</th>
<th>FUNCTION</th>
<th>Prog. No. 1</th>
<th>Prog. No. 2</th>
<th>Prog. No. 3</th>
<th>Prog. No. 4</th>
<th>Prog. No. 5</th>
<th>Prog. No. 6</th>
<th>Prog. No. 7</th>
<th>Prog. No. 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>6J7</td>
<td>1st Det.</td>
<td>0</td>
<td>6.21</td>
<td>3.30</td>
<td>1.15</td>
<td>1.58</td>
<td>9.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6E7</td>
<td>I.F.</td>
<td>0</td>
<td>6.21</td>
<td>3.30</td>
<td>1.15</td>
<td>1.58</td>
<td>9.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6C7</td>
<td>Osc.</td>
<td>0</td>
<td>6.21</td>
<td>3.30</td>
<td>1.15</td>
<td>1.58</td>
<td>9.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6Q7</td>
<td>1st Audio &amp; 2nd Det.</td>
<td>0</td>
<td>6.21</td>
<td>3.30</td>
<td>1.15</td>
<td>1.58</td>
<td>9.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6P6</td>
<td>Power Amp.</td>
<td>0</td>
<td>6.21</td>
<td>3.30</td>
<td>1.15</td>
<td>1.58</td>
<td>9.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>715G</td>
<td>Rectifier</td>
<td>0</td>
<td>5.0</td>
<td>6.20</td>
<td>6.21</td>
<td>9.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

117-234 Volt Power Transformer

A 117-234 volt 60 cycle power transformer is also available for this model. It is important that these sets be operated on a 60 cycle power supply only.

Did and Drive Assembly

See INDEX
**Model 93BR-714B Series A**

**Schematic, Voltage, Socket, Trimmers, Coils**

**Ref. No.** | **Part No.** | **Description**
--- | --- | ---
R1 | BE1309 | 400 ohm—10%—1/2 w.
R2 | BE1309 | 1 megohm—20%—1/2 w.
R3 | BE1305 | 20M ohm—20%—1/2 w.
R4 | BE1305 | 12M ohm—20%—2 watt
R6 | BE1306 | 100 ohm—10%—1/2 w.
R7 | BE1309 | 1 megohm—20%—1/2 w.
R8, R9 | BE1304 | 3 megohm—20%—1/2 w.
R10 | BE1304 | 15M ohm—20%—1 watt
R11 | BE1305 | 1 megohm—volume control
R12 | BE1303 | 500M ohm—20%—1/2 w.
R13 | BE1309 | 1 megohm—20%—1/2 w.
R14 | BE1303 | 1 pessim—tone control
R15 | BE1301 | 25M ohm—20%—1/2 w.
C | BE13122 | 2 gang variable condenser
C1 | BE1410 | B.C. Antenna Trimmer
C2 | BE1410 | S.W. Antenna Trimmer
C3 | BE1276 | S.W. Oscillator Trimmer
C4 | BE1214 | B.C. Oscillator Trimmer
C5 | BE1414 | B.C. Series Pad
C6 | BE1292 | .005 mica—20%
C8 | BE1290 | .0005 mica—20%
C9 | BE1009 | .05 x 200 v—25%
C10 | BE1094 | 5. mfd. x 300 v. lytic
C11 | BE1001 | .1 x 400 v—50 10%
C12 | BE1001 | .1 x 400 v—50 10%
C13 | BE1295 | .001 mica—20%
C14 | BE1001 | .004 x 600 v—25%
C15 | BE1292 | .005 mica—20%
C16 | BE1006 | .02 x 400 v—25%
C17 | BE1006 | .004 x 600v—25%
C18 | BE1094 | 15 mfd. x 350 v. lytic
C19 | BE1094 | 10 mfd. x 450 v. lytic
C20 | BE10019 | .006 x 600 v—25%
C21 | BE10011 | .02 x 600 v—20%
C3 and C4 in one unit
C10, C18 and C19 in one unit

**Model 93BR-714B Series A**

(Serial No. 936600 and UP)

- T1 BE11150 Loop Antenna Assembly
- T2 BE11151 S.W. Antenna Coil Complete
- T3 BE10131 B.C. S.W. Oscillator Coil Complete
- T4 BE10166 Input I.F. Coil—465 kc.
- T5 BE10132B Output I.F. Coil—465 kc.
- T6 BE10591 Output Transformer
- T7 BE114158 F Dynamic Speaker (1175 Ohm Field)
- T8 BE10139E Power Transformer
- T9 IR12 2 6-8 volt pilot light T4
- S1 BE1296 Band Switch
- S2 BE1257B AC Switch
- S3 BE1270 Phone or Television—Radio Switch
- L1 BE11153 Loop Adjusting Coil

**Bottom View of Chassis**

**Volts Measured**

<table>
<thead>
<tr>
<th>Pin A</th>
<th>Volt A.C. Across Pin B</th>
<th>Volt A.C. Between Pins C and D</th>
</tr>
</thead>
<tbody>
<tr>
<td>240</td>
<td>1/8 volt pilot light T4</td>
<td>6.4 A.C. (R) 240</td>
</tr>
<tr>
<td>6A6G</td>
<td>6.4 A.C.</td>
<td>6.4 A.C.</td>
</tr>
<tr>
<td>6AD6G</td>
<td>6.4 A.C.</td>
<td>6.4 A.C.</td>
</tr>
<tr>
<td>6AC5G</td>
<td>6.4 A.C.</td>
<td>6.4 A.C.</td>
</tr>
</tbody>
</table>

**Antenna and Ground Connections:**

When an outside antenna is used connect the antenna to the binding screw on the rear of the chassis, marked "Ant." Connect the ground to the binding screw marked "Gnd." Move the connector bar from the terminal marked "Loop" and connect it to terminal marked "Ext."

**Note:** Make certain that the connector bar is connected to the terminal marked "Loop" if no outside antenna is used.

**Index:**

- **Television or Radio Phonograph**
- **Phono Plug In**
- **Terminal Board**
- **Gnd Ant Ext Brown Loop Yellow Green White**

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MODEL 93BR-335A, Series A  
Schematic, Voltage Alignment, Trimmers 
Socket

MONTGOMERY WARD & CO.  
Second Detector, A.V.C.  
First Detector-Oscillator, I.F. Amplifier.  
First Audio.  
Output Amplifier.

R1 BE13011 290M ohm—55 w.  
R2 BE130194 35M ohm—55 w.  
R3 BE130499 10 ohm—55 w.  
R4 BE130239 250 ohm—55 w.  
R5 BE130042 12M ohm—1 watt  
R6 BE13024 3 megohm—55 w.  
R7 BE101208 1 megohm volume control  
R8 BE130233 10 megohm—55 w.  
R9 BE13011 250M ohm—55 w.  
R10 BE13009 1 megohm—55 w.  
R11 BE13000 500 ohm—55 w.  

C1 BE13012 206 x 200 v.  
C2 BE12142 606 x 1000 v.  
C3 BE124124 S. W. Antenna Trimmer  
C4 BE124124 B. C. Antenna Trimmer  
C5 BE124124 M. W. Antenna Trimmer  
C6 BE124124 M. W. Oscillator Trimmer  
C7 BE124124 6. W. Oscillator TrimmerP1  
C8 BE124124 B. C. Oscillator Trimmer  
C9 BE124124 B. C. Padder  
C10 BE124124 B. C. Oscillator Trimmer  
C11 BE124124 B. C. Padder  

MODEL 93BR-335A, SERIES A (SERIAL No. 9M259100 and Up)  

CONVENTIONAL ALIGNMENT  

SEE SPECIAL SECTION VOLUME VIII  

PARTS  

Antenna Coil  
Oscillator Coil  
Input I. F.  
Output Transformer  
Power Transformer 40-60 cycles  
-90-200 volts  

REAR OF CHASSIS  

600Kc—C  
S  

FRONT OF CHASSIS  

600Kc—C  
S  

TOP VIEW  

BOTTOM VIEW OF CHASSIS  

Consumption—55 Watts at 117 Volts  
Output—1.5 Watts Undistorted, 3 Watts Maximum  

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ALIGNMENT FREQUENCIES

IF 465 KC
SHORT WAVE BAND 23 MC
   Align S.W. Osc.(C15), Ant.(C2), RF (C12)
MEDIUM WAVE BAND 6.5 MC
   Align M Osc.(C16), Ant.(C3), RF (C13)
BROADCAST BAND
   Align Osc.(C19) at 2000 KC.
   Align Ant.(C4), RF (C11) at 1800 KC.
   Align Osc. Series Pad (C20) at 550 KC.

THE ALIGNMENT IS CONVENTIONAL
SEE SPECIAL SECTION VOLUME VIII.

BATTERY AND POWER SUPPLY:

This radio obtains its power entirely from a six volt storage battery—no other batteries are required.

1. For 6 volt storage battery operation:
   (a) Connect the lead (containing the fuse receptacle) marked A positive (+) to the positive (+) post of the storage battery.
   (b) Connect the lead marked A negative (−) to the negative (−) post of the storage battery.

2. For 100-250 volts, 40/60 cycle operation; see Fig. 2.

Installing the Model 62-381X Power Unit

(For 100-250 Volt 40/60 Cycle A. C. Operation)

To install the Model 62-381X A.C. power unit proceed as follows:

1. Remove the chassis from the cabinet, by removing the four chassis mounting bolts from the bottom of the cabinet.

2. Referring to Fig. 1, note that the 6-volt power unit is fastened to the top of the radio chassis with eight copper head screws, (six on top of chassis, and two on rear flange of chassis).

3. Remove the eight copper head screws.

4. Disconnect the four flexible leads of the power unit from the chassis connector strip. These leads clip into pin jacks. Note that the color of each flexible lead matches the color dot on the chassis pin jack connector strip.

5. Place the Model 62-381X A.C. power unit (see Fig. 2) on the top of the radio chassis and plug the four flexible leads into the pin jacks on the chassis connector strip.
   (a) The red lead should be plugged into the pin jack which is marked with a red dot.
   (b) The green lead connects to the pin jack which is marked with a green dot.
   (c) The yellow lead connects to the pin jack which is marked with a yellow dot.
   (d) The black lead connects to the pin jack which is marked with a black dot.

6. Mount the power unit to the chassis using the eight copper head screws.

IMPORTANT:

After the A.C. power unit has been installed check the connections again to make sure you have followed the instructions correctly. Set the switch on the top of the power transformer to the proper voltage.

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ADJUSTING THE ANTENNA:

IMPORTANT: MODEL 93BR-462A

After the batteries have been installed and the radio placed in operation, tune in a weak station around 1400 Kc. on the dial.

On the back of the cabinet a small adjustment screw is provided, (see C2, Fig. 2).

Very carefully turn this adjustment screw in or out until the station is as clear and loud as it can be made.

NOTE: The "A" battery should be placed in the cabinet so that the plug-in socket on the top of the battery is radio is used with an outside antenna and ground or whether nearer to the side of the cabinet which is facing down than only the built-in loop antenna is used.

This adjustment should be made in any case whether the "A" battery should be pushed all the way into the cabinet so that it fits between the left end of the radio chassis and ments are very important for best reception.

NEXT:—Tune in a station around 600 Kc. on the dial and adjust adjustment screw (See A, Fig. 2). Both these adjustments are very important for best reception.
1-1/2 volt "A" Battery.
2-45 volt "B" Batteries.

MODELS 93BR-561A and 93BR-563A (SERIAL No. 783300 and UP)
MODEL 93BR-715B Series A
Serial 105400 up
Schematic, Voltage, Socket

MODEL 93BR-715B SERIES A
(SERIAL No. 105400 and up)

Ref. No. Part No. Description
R1  BE13021 20M ohm  -20% - 5 w.
R2  BE1301 250M ohm  -20% - 5 w.
R3  BE13021 20M ohm  -20% - 5 w.
R4  BE13019 20 ohm  -10% - 5 w.
R5  BE13016 100 ohm  -10% - 5 w.
R6  BE13019 1 megohm  -10% - 5 w.
R7  BE1304 3 megohm  -20% - 5 w.
R8  BE1305 12M ohm  -20% - 2 watt
R9  BE13044 15M ohm  -20% - 1 watt
R10 BE13025 15 megohm  -30% - 5 w.
R11 BE130181  1 megohm(volume control
R12 BE1303  500M ohm -20% - 5 w.
R13 BE13019 1 megohm  -20% - 5 w.
R14 BE13026 1 megohm  -20% - 1 watt
R15 BE1301 125M ohm  -20% - 5 w.
C  BE102191 2 gang variable condenser
C  BE24109  B.C. Antenna Trimmer
C  BE1033 100 x 600 V  -25% Ohm
C  BE12954 0.003 mica  -3% Ohm
C  BE24109  B.C. Antenna Trimmer
C  BE12960 0.0015 mica  -20% Ohm
C  BE24120  B.C. Series Pad
C  BE12925  5.5, X 300 V  -10% Ohm
C  BE1296 0.001 mica  -20% Ohm
C  BE1292 0.005 mica  -20% Ohm
C  BE1096 0.02 x 600 V  -25% Ohm
C  BE1006 0.02 x 400 V  -25% Ohm
C  BE1298 0.015 x 350 V  -25% Ohm
C  BE1004 10 mfd  x 450 V  -25% Ohm
C  BE1009 0.0015 x 600 V  -25% Ohm
C  BE1008 0.001 x 600 V  -25% Ohm
C  CI1 and C19 in one unit
C10 C18 and C19 in one unit
T1 BE111466  B.C. Loop Assembly
T2 BE111467  S.W. Antenna Coil Complete
T3 BE111441  Oscillator Coil Complete
T4 BE106166  Input I.F. Coil 465 kc.
T5 BE105580  Output I.F. Coil 2665 kc.
T6 BE10590  Transformer
T7 BE111461  7" Dynamic Speaker
T8 BE1434  Power Transformer
P1 BE1094  2 6-volt pilot light T4
S1 BE12381  AC Switch
S2 BE12382  Head Switch
S3 BE12370  Phone or Television Radio Switch

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII
SEE ALSO NOTES

ALIGNMENT PROCEDURE MODEL 93BR-714B

Power Consumption . . . 65 Watts
Power Output - 2.5 Watts Undistorted
Sensitivity (for 0.5 Watts Output)
Broadcast Band  - 30 Microvolts Average
Shortwave Band - 50 Microvolts Average
Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC

When an outside antenna is used connect the antenna to the binding screw on the rear of the chassis, marked "Ant." Connect the ground to the binding screw marked "Gnd." Do not disconnect the loop antenna when an outside antenna and ground are used.

BOTTOM VIEW OF CHASSIS

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NOTE

Sensitivity adjustments.
The setting...
<table>
<thead>
<tr>
<th>BAND</th>
<th>SIGNAL GENERATOR Setting</th>
<th>Dummy Antenna</th>
<th>Connection to Radio</th>
<th>Position of Band Switch</th>
<th>Variable Condenser Setting</th>
<th>Trimmers Adjusted (in Order Shown)</th>
<th>Trimmer Function</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. F.</td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Grid of 6SK7 (2nd I.F.)</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Output I. F.</td>
<td>(See Note &quot;A&quot;) Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Grid of 6SK7 (1st I.F.)</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Three trimmers on top (See Fig. 1)</td>
<td>Interstage I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>465 Kc</td>
<td>.1 MFD.</td>
<td>Grid of 6K8</td>
<td>Broadcast</td>
<td>Rotor full open (Plates out of mesh)</td>
<td>Two trimmers on top (See Fig. 1)</td>
<td>Input I. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>SHORT WAVE BAND</td>
<td>21 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Set Dial at 21 Mc.</td>
<td>Trimmer (C13) (See Fig. 3)</td>
<td>Short Wave oscillator</td>
<td>(See Note &quot;B&quot;) Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>21 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Short Wave</td>
<td>Dial Set at 21 Mc.</td>
<td>Trimmers (C3 &amp; C8) (See Fig. 3)</td>
<td>Short Wave antenna &amp; R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td>MIDDLE WAVE BAND</td>
<td>6 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Middle Wave</td>
<td>Set Dial at 6 Mc.</td>
<td>Trimmer (C14) (See Fig. 3)</td>
<td>Middle Wave oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>6 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Middle Wave</td>
<td>Dial Set at 6 Mc.</td>
<td>Trimmers (C2 &amp; C3) (See Fig. 3)</td>
<td>Middle Wave antenna &amp; R. F.</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>2.3 Mc.</td>
<td>400 ohms</td>
<td>Antenna lead</td>
<td>Middle Wave</td>
<td>Set Dial at 2.3 Mc.</td>
<td>Trimmer (C12) (Bottom of Chassis)</td>
<td>Middle Wave oscillator series pad</td>
<td>Adjust to maximum rock dial. (See note &quot;C&quot;)</td>
</tr>
<tr>
<td>BROAD-CAST BAND</td>
<td>1500 Kc.</td>
<td>200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set Dial at 1500 Kc.</td>
<td>Trimmer (C15) (See Fig. 3)</td>
<td>Broadcast oscillator</td>
<td>Adjust to maximum output</td>
</tr>
<tr>
<td></td>
<td>600 Kc.</td>
<td>200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set Dial at 600 Kc.</td>
<td>Trimmers (C3 &amp; C15) (See Fig. 3)</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum rock dial. (See note &quot;D&quot;)</td>
</tr>
<tr>
<td></td>
<td>465 Kc.</td>
<td>200 mmf.</td>
<td>Antenna lead</td>
<td>Broadcast</td>
<td>Set Dial at 600 Kc.</td>
<td>Trimmer (C17) (See Fig. 3)</td>
<td>Broadcast oscillator series pad</td>
<td>Adjust to maximum rock dial. (See note &quot;D&quot;)</td>
</tr>
</tbody>
</table>

**NOTE "A"** I.F. Alignment as given is for use with output meter. For oscilloscope alignment; connect oscilloscope between ground and high side of 12SM ohm diode load resistor on output I.F. Make same adjustments as above except readjust input I.F. trimmers in broad position for uniform expansion.

**NOTE "B"** Make certain that the 21MC signal and not the image has been tuned in by noting that the image falls near 20MC. on the dial scale.

**NOTE "C"** The middle wave oscillator series paddler condenser is mounted on the bottom of the chassis at the rear of the bandswitch. When adjusting this trimmer turn the dial back and forth slightly (rock) and adjust until the peak of greatest intensity is obtained.

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

**NOTE "E"** After adjusting wavetrap trimmer (C1), go over 1730 Kc, 1500 Kc and 600 Kc adjustments again.

**Power Consumption** - - - - 165 Watts

**Power Output** - - 21 Watts Undistorted

**Sensitivity (for .5 Watts Output)** - -

- Broadcast Band—4 Microvolts Average
- Middle Band—6 Microvolts Average
- Shortwave Band—10 Microvolts Average

---

**FIG. 1—TOP VIEW**

**FIG. 3—TOP VIEW**

**FOR TUNER SEE INDEX**
Procedure for Setting the Automatic Pushbuttons

1. Press in all the way any one of the automatic turner pushbuttons. Holding it firmly, turn in by means of the Dial Tuning Control. Move the Etc. Tuning Control very slowly up and down while still holding the automatic turner push button firmly. Noting the width of the gap on the screen of the cathode-ray tuning eye. Minimum width on the tuning eye indicates the ideal tuning position (resonance). The station will then be cleanest and accurately tuned in.

2. Press in another push button. Holding it firmly, carefully tune in the station indicated on the call letter tab on this push button.

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

NOTE: If the dial mechanism works hard or has a tendency to slip when setting up a station for one of the push buttons, it is due to the automatic turner push buttons being unlocked all the way. Loosen the locking screw slowly and turn the dial tuning control until the turner mechanism is cleaned up.

LOCKING THE TUNER MECHANISM:
1. To lock the turner mechanism, insert a screwdriver through the hole in the control panel and turn the locking screw to the right until it cannot be turned any further without forcing it.

2. This will lock the turner mechanism and all the stations that have been set up on the push buttons will be locked in place for automatic tuning.

Press in any one of the push buttons and—YOUR FAVORITE STATION IS SELECTED.

Procedure for Setting the Automatic Pushbuttons

1. Make a list of six stations you tune in regularly. There are six push buttons on the front of the radio by means of which six stations may be tuned automatically. (See A.)

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

3. On the front of each automatic turner button an opening is provided for inserting the call letter tab, (See "A" Fig. 2.) Insert the call letter tabs in the rectangular openings of each of the automatic push buttons. One of the small called tabs supplied should be inserted into plate over each of the station call letter tabs.

4. Set the push buttons as follows:

- Press in the “Reset” button all the way out and rotate the button to the right (clockwise) until it cannot be turned any further.
- Place the station selected in the station call letter tab on the push button which is latched in. Turn the dial tuning knob very slowly to the right and the station will then be accurately tuned in.
- Push in the push button to the right (clockwise) until it cannot be turned any further. This will lock the automatic turner mechanism and the stations you have set up for automatic tuning will be locked in place.

CHANGING STATIONS:
If you desire to change any station selected to another, press in all the way out and rotate the button to the left (counter-clockwise) and unlock the turner mechanism. Select the new station as explained.

NOTE: If the dial mechanism works hard when setting up a new station for one of the automatic turner push buttons, it is due to the turner mechanism not being unlocked all the way. Press in all the way and rotate the button to the left (counter-clockwise) until it will turn no further. Then, unlock the dial mechanism and work freely with a turner push button latched in.

After you have selected the new station, press in all the way out and rotate the button to the right (clockwise) to lock the turner mechanism. Be sure the button is latched in until it will turn no further.

The automatic turner buttons are now set up for quick tuning.
**Procedure for Setting the Station Buttons**

**For Models 950G-162, 950G-725, 950G-725A, 950G-1000, 950G-1001 and 950G-1002-1001**

### Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next highest kilocycle number second, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

### Setting a Station Button

Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached.

At the right side of the excitation coil (from the front) will be seen a stop which covers a hole in the excitation coil.

See illustration. Pull off this stop.

At the end of the tube in back of the hole in the excitation coil is the locking screw. Using a small hand-screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several times.

To set stations accurately, do not jar the radio buttons while the mechanism is unlocked.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning control using the tuning eye as a guide.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning control so that the dial moves toward 1700 KC until the stop is reached. Then, with a SMALL HAND-SREW, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads.

Replace the cap on the letter tab with an enclosed tab describing this in terms you may use and put the cap on the dial face.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the cover.

Cover the call letter tab with an enclosed tab, describing this in terms you may use and put the cap on the dial face.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

---

**Caution**

The metal chassis is connected to one side of the line through a 25 ohm condenser. Both AC and DC power feeds are directly grounded on one side. The side of the line not connected to the metal chassis is the grounded side and the other side is the center wire. Be careful while working on the station, as a spark or static may damage the equipment.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

---

**Voltsages at Sockets**

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltages are read under the following conditions:

- Line Voltage = 117
- Volume Control = Maximum
- Antenna Shorted to Ground

---

**Model 950G-510 Drive Cord Replacement**

Remove dial lamp socket and bracket from dial mounting plate. Remove tension spring from pullay. Double drive cord and knot both ends to same loop on tension spring. There should be a distance of 3 inches between knot and looped end of cord. Secure other end of spring to hook on pulley. Pull cord through pulley, thread looped end of cord, starting from inside of drive pulley, through hole in rim of drive pulley. Use a large snapping tool to close position. Remove any twists in cord. Pass one portion of A and B as shown in illustration. Then wind 3½ turns counter-clockwise from rear of chassis around tuning control shaft. See illustration.

Loop 5½ turns around bottom half of drive pulley. Continue cord over pulley D. Pull remaining portion of cord and place over pulley C. See illustration.

---

**Data**

- ** Models 950G-1103 and 950G-1104**
  - **Alignment Procedure**
    - Volume Control: Maximum. All adjustments.
    - Connect radio chassis to ground post of signal generator, with a short heavy lead.
    - Allow chassis and signal generator to "Heat Up" for several minutes.
    - Follow-up procedure in order shown.

**Signal Generator**

<table>
<thead>
<tr>
<th>MODELS</th>
<th>Drive Model</th>
<th>9317G1103, 93WG1104</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.F.</td>
<td>45K C</td>
<td>Grid of Int. Det. J. m. B Range Turn To Full Open 3rd Lf. (C13) &amp; (C14) Int. Lf. (C13) &amp; (C14)</td>
</tr>
<tr>
<td>RANGE D</td>
<td>Antenna Lead 400 Ohm D Range Turn To Full Open Oscilator Range D (C16)</td>
<td></td>
</tr>
<tr>
<td>18.000 Kc</td>
<td>Antenna Lead 400 Ohm D Range Turn To Max. Output Int. Range D (C16)</td>
<td></td>
</tr>
<tr>
<td>5000 Kc</td>
<td>Antenna Lead 400 Ohm C Range Turn To Full Open Antenna Range C (C13) Int. Range C (C13)</td>
<td></td>
</tr>
<tr>
<td>RANGE B</td>
<td>Antenna Lead 200 Ohm B Range TURN TO MAX OUTPUT Oscilator Range B (C12)</td>
<td></td>
</tr>
<tr>
<td>400 Kc</td>
<td>Antenna Lead 200 Ohm B Range TURN TO MAX OUTPUT Ant. Range B (C4) Int. Range B (C4)</td>
<td></td>
</tr>
<tr>
<td>600 Kc</td>
<td>Antenna Lead 200 Ohm B Range TURN TO MAX OUTPUT 600 Ohm (C11) Ext. Range B=See Note A</td>
<td></td>
</tr>
</tbody>
</table>

---

**Typical Front View**

- **Spare Parts**
  - **Starter and Control**
  - **Cables**
  - **Pulleys**
  - **Button**
  - **Antenna**
  - **Cord**

---

**Models 950G-510**

- **Data**
  - **Model 950G-510**
  - **Drive Cord Data**
  - **Data**
  - **Models 950G-1103, 950G1104**
ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

SIGNAL GENERATOR

<table>
<thead>
<tr>
<th>FREQUENCY</th>
<th>CONNECTION DUMMY</th>
<th>CONDENSER SETTING</th>
<th>ADJUST TRIMMERS TO MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600 KC</td>
<td>Signal Grid at 1st Det.</td>
<td>.1 mf.</td>
<td>Turn rotor to full open Oscillator [C2]</td>
</tr>
<tr>
<td>1500 KC</td>
<td>None—See Note A</td>
<td>Turn rotor to max. output Antenna [C1]</td>
<td></td>
</tr>
</tbody>
</table>

NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION [For models with pointer in front of dial scale]—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial, loosen the pointer screw, set the pointer at the 800 KC mark, and retighten the pointer screw.
**Line Voltage Range**

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

**Power Consumption**

- Power Consumption: 1.60 Amperes at 36 Volts DC

**Power Output**

- Power Output: 0.7 Watt Undistorted

**Selectivity**

- Selectivity: 30 KC Broad at 1000 times Signal

**Sensitivity**

- Sensitivity (For 0.5 watt output): B Range 528 to 1730 KC 6.0 Microvolts Average
- D Range 5750 to 18300 KC 6.0 Microvolts Average

**Line Voltage Range**

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

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MODELS 93WG-754, 93WG-755
Schematic, Voltage, Coils
Sensitivity, Socket

**CAUTION**

The metal chassis is connected to one side of the line. See Schematic.

32 Volt Power Supply

The radio is designed for use on farms and in those places where the direct current generating plant. The power consumption of this radio may not be satisfactory in plants which do not use storage batteries. The power consumption is higher on the power consumption is higher for the few seconds until the tubes heat.
MODEL 93WG-2208 consists of receiver Model 93WG-565A and the record player shown here. See Index for data on receiver.

Most of the information given for 93WG-565A is correct for this phonograph combination. The information that is different is given on this page with changes and additions.

**BATTERY OPERATED PORTABLE RADIO WITH SPRING MOTOR RECORD PLAYER**

The following NEW PARTS not shown on MODEL 93WG-565A ARE USED:

<table>
<thead>
<tr>
<th>Bin No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Selling Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A161</td>
<td>4X351</td>
<td>Radio-Phono Switch</td>
<td>$0.16</td>
</tr>
<tr>
<td>17A131</td>
<td>C1</td>
<td>Escutcheon for Phono-Radio Switch</td>
<td>$0.12</td>
</tr>
<tr>
<td>14A115</td>
<td>R14</td>
<td>2 Section Gang Condenser complete with Tuning Control Shaft</td>
<td>$2.05</td>
</tr>
<tr>
<td>17A303</td>
<td>L1</td>
<td>100,000 Ohm 0.2 Watt Carbon Resistor</td>
<td>$0.06</td>
</tr>
<tr>
<td>28A47</td>
<td></td>
<td>Needle Cup</td>
<td>$0.06</td>
</tr>
<tr>
<td>9A1208</td>
<td></td>
<td>Loop Antenna Assembly</td>
<td>$0.54</td>
</tr>
<tr>
<td>4A139</td>
<td>C1</td>
<td>Loop Antenna Trimmer Condenser</td>
<td>$0.06</td>
</tr>
<tr>
<td>14A114</td>
<td></td>
<td>2 Section Gang Condenser complete with Tuning Control Shaft</td>
<td>$1.20</td>
</tr>
</tbody>
</table>

The following parts shown on MODEL 93WG-565A ARE NOT USED:

<table>
<thead>
<tr>
<th>Bin No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Selling Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A1191</td>
<td></td>
<td>Loop Antenna Assembly</td>
<td>$0.54</td>
</tr>
<tr>
<td>4A139</td>
<td>C1</td>
<td>Loop Antenna Trimmer Condenser</td>
<td>$0.06</td>
</tr>
<tr>
<td>17A1110</td>
<td>C1</td>
<td>2 Section Gang Condenser complete with Tuning Control Shaft</td>
<td>$1.20</td>
</tr>
</tbody>
</table>

Prices Subject to Change Without Notice.

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NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 71
Chassis RE-43
Schematic, Voltage Alignment, Sensitivity

BALANCING INSTRUCTIONS

1. "6A8 Grid 455 1, 2, 3 & 4 550 kc 75 mv.
2. Ant. Lead Through 200 uuf. 1720 5 1720 kc

* I.F. Sensitivity should be 150 microvolts minimum for 200 milliwatts output

RESISTORS

<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5</td>
<td>17-2070</td>
<td>500,000 ohms 1/4 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R7</td>
<td>17-2072</td>
<td>20,000 ohms 1/2 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R9</td>
<td>17-2080</td>
<td>1,000,000 ohms 1/2 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R27</td>
<td>17-4788</td>
<td>2,000,000 ohms 1/2 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R31</td>
<td>17-2066</td>
<td>600 ohms 1/2 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R39</td>
<td>17-14051</td>
<td>300,000 ohms 1/2 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R167</td>
<td>17-14281</td>
<td>60,000 ohms 1/4 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R168</td>
<td>17-14283</td>
<td>500,000 ohms volume control</td>
<td>.75</td>
</tr>
<tr>
<td>R169</td>
<td>17-14292</td>
<td>150,000 ohms 1/4 watt</td>
<td>.20</td>
</tr>
<tr>
<td>R26</td>
<td>17-4781</td>
<td>600 ohms 1/4 watt</td>
<td>.20</td>
</tr>
</tbody>
</table>

CONDENSERS

<table>
<thead>
<tr>
<th>Condenser No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 &amp; 2</td>
<td>17-14247</td>
<td>Tuning condenser</td>
<td>3.00</td>
</tr>
<tr>
<td>C190</td>
<td>17-14271</td>
<td>10-10 mfd. 300 v.d.c.</td>
<td>1.50</td>
</tr>
<tr>
<td>C191</td>
<td>17-14272</td>
<td>.01 mfd. 400 v.d.c.</td>
<td>.35</td>
</tr>
<tr>
<td>C192</td>
<td>17-14273</td>
<td>.00025 mfd. 600 v.d.c.</td>
<td>.35</td>
</tr>
<tr>
<td>C193</td>
<td>17-14274</td>
<td>.05 mfd. 200 v.d.c.</td>
<td>.30</td>
</tr>
<tr>
<td>C194</td>
<td>17-14275</td>
<td>.01 mfd. 400 v.d.c.</td>
<td>.35</td>
</tr>
<tr>
<td>C195</td>
<td>17-14276</td>
<td>.05 mfd. 400 v.d.c.</td>
<td>.30</td>
</tr>
<tr>
<td>C196</td>
<td>17-14277</td>
<td>.1 mfd. 200 v.d.c.</td>
<td>.35</td>
</tr>
<tr>
<td>C197</td>
<td>17-14278</td>
<td>.003 mfd. 600 v.d.c.</td>
<td>.25</td>
</tr>
<tr>
<td>C198</td>
<td>17-14279</td>
<td>.005 mfd. 400 v.d.c.</td>
<td>.30</td>
</tr>
</tbody>
</table>

MISCELLANEOUS

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dial light bulb (Mazda #44)</td>
<td>.15</td>
</tr>
<tr>
<td>Line cord and plug assembly</td>
<td>.40</td>
</tr>
<tr>
<td>Speaker Assembly</td>
<td>4.00</td>
</tr>
<tr>
<td>Volume control and switch</td>
<td>1.00</td>
</tr>
</tbody>
</table>

COILS AND TRANSFORMERS

<table>
<thead>
<tr>
<th>Transformer No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>00-1611</td>
<td>Oscillator coil</td>
<td>.50</td>
</tr>
<tr>
<td>T2</td>
<td>00-1612</td>
<td>First I.F. Transformer</td>
<td>1.50</td>
</tr>
<tr>
<td>T3</td>
<td>00-1613</td>
<td>Second I.F. Transformer</td>
<td>1.50</td>
</tr>
<tr>
<td>T4</td>
<td>00-1614</td>
<td>Output transformer</td>
<td>1.50</td>
</tr>
<tr>
<td>T5</td>
<td>00-1615</td>
<td>Power transformer</td>
<td>3.00</td>
</tr>
</tbody>
</table>

ELECTRICAL and MECHANICAL SPECIFICATIONS

TUBES:
- 6A8—1st Detector Oscillator
- 6L7-L.F. Amplifier
- 6Q7G—2nd Detector, A.V.C. Audio Amplifier
- 6K7—L.F. Amplifier
- 6A8—1st Detector Oscillator
- 5Y3G—Rectifier

Mechanical Push-button Tuning: 4 push-buttons

Price

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The receiver is designed for operation on 115 volts AC or DC. Power consumption is 25 watts.
D. C. Operation: If the set fails to function, REVERSE THE LINE PLUG.
It is designed for operation on 115 volts AC or DC. Power consumption is 30 watts.

**RESISTORS**

<table>
<thead>
<tr>
<th>Value</th>
<th>Type</th>
<th>Part No</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 kΩ</td>
<td>1/4</td>
<td>17-2070</td>
</tr>
<tr>
<td>30 kΩ</td>
<td>1/4</td>
<td>17-4728</td>
</tr>
<tr>
<td>100 kΩ</td>
<td>1/4</td>
<td>17-14291</td>
</tr>
<tr>
<td>1 MΩ</td>
<td>1/4</td>
<td>17-14303</td>
</tr>
<tr>
<td>1.5 MΩ</td>
<td>1/4</td>
<td>17-14315</td>
</tr>
<tr>
<td>10 MΩ</td>
<td>1/4</td>
<td>17-14316</td>
</tr>
</tbody>
</table>

**CONDENSERS**

<table>
<thead>
<tr>
<th>Value</th>
<th>Capacity</th>
<th>Part No</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 µF</td>
<td>25 VDC</td>
<td>17-14320</td>
</tr>
<tr>
<td>20 µF</td>
<td>30 VDC</td>
<td>17-14321</td>
</tr>
<tr>
<td>30 µF</td>
<td>40 VDC</td>
<td>17-14322</td>
</tr>
<tr>
<td>47 µF</td>
<td>60 VDC</td>
<td>17-14323</td>
</tr>
<tr>
<td>68 µF</td>
<td>80 VDC</td>
<td>17-14324</td>
</tr>
</tbody>
</table>

**TRANSFORMERS**

<table>
<thead>
<tr>
<th>Type</th>
<th>Part No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ANTENNA COIL</td>
<td>00-16320</td>
</tr>
<tr>
<td>2 OSCILLATOR COIL</td>
<td>00-16321</td>
</tr>
<tr>
<td>3 FIRST I.F. COIL</td>
<td>00-16322</td>
</tr>
<tr>
<td>4 SECOND I.F. COIL</td>
<td>00-16323</td>
</tr>
<tr>
<td>5 OUTPUT TRANS.</td>
<td>00-16324</td>
</tr>
</tbody>
</table>

**MISCELLANEOUS UNITS**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Part No</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>DIAL LIGHT BULB - MAZDA NO. 81</td>
<td>17-13924</td>
</tr>
<tr>
<td>P</td>
<td>LINE CORD &amp; PLUG ASSEMBLY</td>
<td>17-16371</td>
</tr>
<tr>
<td>SPK</td>
<td>SPEAKER ASSEMBLY</td>
<td>17-16344</td>
</tr>
<tr>
<td>SW</td>
<td>LINE SWITCH</td>
<td>17-16355</td>
</tr>
</tbody>
</table>

**Notes:** IF PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600 K.C.

NOBLITT-SPARKS INDUSTRIES, INC., COLUMBUS, INDIANA

Model 610 PUSH BUTTON ADJUSTMENT:
Any button may be set to any station desired. First, tune in the desired station by means of the thumb wheel. Second, turn the push button counter-clockwise two full turns. Then depress this button the full length of its stroke, and while depressed, tighten the button again by turning it clockwise. The button may now be released. To check the correct setting for this button, turn the thumb wheel to some other point and depress the push button. This will return the tuning mechanism to the station just set up. If it does not, repeat the foregoing sequence of operations more carefully. Each of the remaining buttons may be set to other stations in a like manner.

BALANCING INSTRUCTIONS:
All sensitivities given for 1/2 watt output = 1.4 V. across Voice Coil

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>455</td>
<td>1, 2, 3 &amp; 4</td>
<td>500 KC</td>
<td>50 uv</td>
</tr>
<tr>
<td>2</td>
<td>Ant. Coupler Through 20 uuf</td>
<td>1400</td>
<td>5</td>
<td>1400</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>1400</td>
<td>6</td>
<td>1000</td>
<td>10 uv</td>
</tr>
</tbody>
</table>
DESCRIPTION:

The Arvin Model 510 is a five-tube single unit Car Radio Receiver. This receiver is designed to mount under the lower edge of the instrument panel on all makes of cars.

Tuning is accomplished by rotating the calibrated thumb wheel on the lower front of the radio. Directly above the thumb wheel is located the volume control knob which also serves as the On-Off switch.

ANTENNA:

Arvin Antennas A25, A26, A27 and A28 are recommended for use with the Model 510 Arvin Car Radio. If either the A25 or A26 antenna is selected the installation of the Phantom Filter to the antenna should be made as illustrated in Figure 1. If a side cowl type (A27 or A28) is selected the installation should be made as shown in Figure 2. Each antenna package has included in it detailed information as to the size and location of mounting holes.

INSTALLATION:

This receiver may be installed by securing it to the instrument panel of the car with the screws supplied in the hardware package. The rear end of the radio is supported by a perforated mounting bracket which may be bent to fit any installation requirements.

Illustrations in Figure 3 are representative of an average installation. Procaution should be taken, however, that the radio, when installed, does not interfere with the operation of the brake, clutch, cowl vent or emergency brake lever, and ample room for future installation for an Arvin Hot Water Heater should be allowed.

Ford V8 automobiles built in 1938 and 1939 require a special installation which is illustrated in Figure 4. The necessary spacer for this installation is included in the packing list. In installations other than the Ford V8 this spacer may be found useful in spacing away from the lip of the instrument panel one side of the radio (where the lip of the instrument panel is not horizontal). In this case the spacer may be cut to the proper length with a hack saw. The spacer may also be cut into two equal lengths and reinf to space the entire front portion of the radio down from the lip of the instrument panel in order to avoid a projection of some sort such as a toggle switch.

The two front mounting bolts are 1/2 inch long to permit the Ford V8 installation shown in Figure 4. For other installations such as shown in Figure 3 the bolts may be cut down to 3/4 inch if desired to facilitate installation.

MOTOR INTERFERENCE ELIMINATION:

(See Fig. 5 & 6)

If after following the installation instructions in detail objectionable motor noise is encountered the following interference elimination procedure should be followed.

A standard distributor suppressor must be installed in series with the center high tension coil as close to the distributor as possible. This suppressor is not used with Ford V8 automobiles.

The generator condenser should be installed on the car generator as illustrated and the ammeter condenser should be connected between the ammeter or ignition switch terminal and the grounded metal instrument panel. This interference elimination material can be obtained from your local Arvin Jobber. The "A" lead from the receiver should be connected to the ammeter terminal of the car or to some other convenient point such as the ignition switch terminal in the Ford V8.

NOBLITT-SPARKS INDUSTRIES, INC. Noise Elimination

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MODEL 602,602A CHASSIS RE-53.

D. C. Operation:
If the set fails to function, REVERSE THE LINE PLUG.
It is designed for operation on 115 volts AC or DC.
Power consumption is 30 watts.

<table>
<thead>
<tr>
<th>RESISTORS</th>
<th>CONDENSERS</th>
<th>TRANSFORMERS &amp; CHOKES</th>
<th>MISCELLANEOUS UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 1 SHM R 1 PART NO.</td>
<td>C CAPACITY VOLT PART NO.</td>
<td>T TRANSFORMER PART NO.</td>
<td>SYMBOL MISCELLANEOUS PART NO.</td>
</tr>
<tr>
<td>1 500K 1% 17-2070</td>
<td>2 VARIABLE</td>
<td>1 ANTENNA LOOP 17-1824</td>
<td>P LINE CORD &amp; PLUG ASSEMBLY 17-1930</td>
</tr>
<tr>
<td>5 10K 1% 17-2061</td>
<td>100 0.01 400 17-14272</td>
<td>02 CHOKES</td>
<td>1 R14 0.005 400 17-14232</td>
</tr>
<tr>
<td>27 2M 1/4 17-8768</td>
<td>1.2 0.0025 400 17-14273</td>
<td>1 IRON CORE CHOKES 17-14524</td>
<td></td>
</tr>
<tr>
<td>110 55 1/4 17-8768</td>
<td>195 0.05 400 17-14274</td>
<td>1 R14 0.005 400 17-14232</td>
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</tr>
<tr>
<td>16 22K 1/4 17-8768</td>
<td>0.1 17-14274</td>
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<td></td>
</tr>
<tr>
<td>18 10K 1/4 17-14076</td>
<td>119 0.02 200 17-14283</td>
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<td></td>
</tr>
<tr>
<td>18 1K 1/4 17-858</td>
<td>220 0.001 800 17-14100</td>
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<td></td>
</tr>
<tr>
<td>40 1M 1/4 17-8139</td>
<td>222 2 400 17-14587</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61 100K 1/4 17-1334</td>
<td>224 0.025 125</td>
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<td>195 5 1/4 17-14337</td>
<td>1 02 MFD 17-14584</td>
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<td>220 0.001 400 17-14232</td>
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<td>222 0.1 200 17-14523</td>
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<td>432 2-20 UFD 17-14535</td>
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<tr>
<td>273 1000 400 17-14232</td>
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</table>

1F PEAK 455 K.C.
BALANCE 1400 K.C. - CHECK AT 600K.C.
NOBLITT-SPARKS INDUSTRIES, INC., COLUMBUS, INDIANA.

Part No. 29-3278
NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 702
Chassis RE-56
Schematic, Tuner Alignment

Chassis RE-56

115 volts AC or DC

Push Button Adjustment:
Any button may be set up for any station desired. First, turn in the desired station by means of the manual tuning control. Second, turn the push button counterclockwise, and while depressed, tighten the button again by turning it clockwise. Depress the push button once more and turn the manual control to some other point and depress the push button. This will return the tuning mechanism to the station just set up. If it does not, repeat the foregoing sequence of operations more carefully until the desired station is set up.

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ARVIN MODEL 810 CAR RADIO

All sensitivities given for 1 watt output equals 1.73 V. across speaker Voice Coil

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<tbody>
<tr>
<td>1</td>
<td>6A8 Grid</td>
<td>170 kc</td>
<td>1, 2, 3 &amp; 4</td>
<td>Closed</td>
<td>Condenser</td>
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<tr>
<td>2</td>
<td>Ant. Coupler</td>
<td>1570 kc</td>
<td>5</td>
<td>Closed</td>
<td>Condenser</td>
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<tr>
<td>3</td>
<td>Through 20 ufd</td>
<td>1400 kc</td>
<td>6 &amp; 7</td>
<td>Open</td>
<td>1400 kc</td>
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<tr>
<td>4</td>
<td>Through 20 ufd</td>
<td>600 kc</td>
<td>8</td>
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<td>600 kc</td>
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</table>

*Operation No. 4 adjust box on C4 to obtain 5 uv sensitivity; for metropolitan areas this sensitivity may be set as low as 10 uv. and in mountainous areas as high as 5 uv. to secure the most satisfactory reception.

ARVIN MODEL 710 CAR RADIO

BALANCING INSTRUCTIONS

All sensitivities given for 1/2 watt output equals 1.4 V. across Voice Coil

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<tbody>
<tr>
<td>1</td>
<td>6A8 Grid</td>
<td>455 kc</td>
<td>1, 2, 3 &amp; 4</td>
<td>550 kc</td>
<td>50 uv</td>
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<tr>
<td>2</td>
<td>Ant. Coupler</td>
<td>1400 kc</td>
<td>5</td>
<td>1400 kc</td>
<td>10 uv</td>
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<td>3</td>
<td>Through 20 ufd</td>
<td>1400 kc</td>
<td>6</td>
<td>1400 kc</td>
<td>10 uv</td>
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<tr>
<td>4</td>
<td>Through 20 ufd</td>
<td>600 kc</td>
<td>7</td>
<td>600 kc</td>
<td>10 uv</td>
</tr>
</tbody>
</table>

FOR ANTENNA DATA SEE INDEX
NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 803
Chassis RE-63
Schematic, Alignment
CIRCUIT ALIGNMENT
(a) Turn volume control to the maximum position.
(b) Connect the signal lead of the test oscillator to terminal X which is
the grid prong of the T77 tube through a .1 mfd. condenser.
(c) Connect the ground lead of the test oscillator to the chassis frame.
(d) Connect voice output meter across the speaker voice coil at the terminal
board mounted on the speaker.
(e) Connect the test oscillator to exactly 260 kilocycles.
(f) Adjust trimmers "A", "B", "C" and "D" on the I-F transformers for
maximum output.

2. 1520 Kc
(a) Leave the test oscillator leads connected as for aligning the I-F
circuits.
(b) Turn the rotor plates of the gang condenser all the way out and again
the high frequency stop.
(c) Set the test oscillator to 1520 kilocycles.
(d) Adjust the condenser "F" (Fig. 2) for maximum output.

3. 570 Kc
(a) Leave the test oscillator leads connected as before.
(b) Turn the rotor plates of the gang condenser all the way in to mesh so
that they rest against the low frequency stop.
(c) Set the test oscillator to 540 kilocycles.
(d) Adjust the oscillator padding condenser "G" (Fig. 2) for maximum output.
(Comment: sets the low frequency tuning range of the receiver to
540 Kc)."

4. 600 Kc
(a) Remove the signal lead of the test oscillator from the grid terminal
of the T77 tube (Terminal marked X, Fig. 2) and connect to the antenna
receptacle of the receiver THROUGH a .00007 mfd. MICA CONDENSER connect-
ed in place of the .0 mfd. mica condenser previously used. (It is very
important that a .00007 mfd. mica condenser be used when aligning the
antenna stage of this receiver in order that the circuit can be made
to work properly.)
(b) Set the test oscillator to 1400 kilocycles.
(c) Turn the condenser rotor plates until this frequency is tuned in with
maximum output.
(d) Adjust the R-A parallel trimmer "F" (Fig. 2) on the gang condenser and
the antenna compensating condenser "P".

5. 600 Kc
(a) Turn the condenser rotor plates until the signal from the test oscilla-
tor is tuned in with maximum output.
(b) Maintain a low output signal from the test oscillator and readjust the
oscillator tracking condenser "G" (Fig. 2) while rocking the variable
condenser gang tuning shaft back and forth through the signal.
(c) This operation should be continued until no further increase in output
can be obtained.

6. Adjusting Receiver to Car Antenna.

When the receiver leaves the factory the antenna circuit is closely aligned to
match the capacity of the car antenna. However, due to variations in antenna
capacity, it will be necessary with set installed in car, in order the antenna
trimmer to match the car antenna. This should be done as follows:
(a) Make sure antenna lead is connected properly.
(b) Be sure the antenna is fully extended (all the way out).
(c) Turn set on and tune in a very weak station between 120 and 150 (near
the center of the range). Adjust the antenna trimmer "F" for maximum volume. Do not
disturb the oscillator or the I-F trimmers in making this adjustment.

NOTE: If the entire alignment procedure has been accomplished accurately, the
receiver should be very nearly uniformly sensitive over the entire frequency
range.
CIRCUIT ALIGNMENT

An accurately calibrated test oscillator or signal generator and an output meter must be used to align the receiver circuitry correctly. To make all alignment adjustments, the back cover must be removed. All trimmers except the oscillator series trimmer are readily accessible (See "A", "B", "C", "D", "F", Fig. 2). The oscillator series trimmer ("J", Fig. 3) is adjusted through a hole in the side of the case.

1. I-F Alignment at 280 Kilocycles.
   (a) Connect an output meter across the speaker field coil, leaving speaker connected.
   (b) Connect the signal lead of the test oscillator to the gang condenser terminal to which condenser No. 15 is connected (Fig. 2).
   (c) With the test oscillator set at exactly 280 K.C., adjust the I-F trimmers "A", "D", "C", and "G" until a maximum output is obtained. Recheck alignment several times with oscillator output signal low as possible for suitable output readings.

2. Alignment at 1560 Kilocycles.
   (a) Connect the test lead of the test oscillator to the receiver antenna connection through a .0005 mfd. condenser.
   (b) Turn the rotor plates of the gang condenser all the way out against the high frequency stop.
   (c) Tune the set to this signal.
   (d) Adjust the I-F trimmer "E" (Fig. 2) until a maximum output is obtained.

3. Alignment at 1400 Kilocycles.
   (a) Leave the test oscillator leads connected the same as for alignment at 1560 Kilocycles. Set the test oscillator frequency at 1400 Kilocycles.
   (b) Tune the set to this signal.
   (c) Adjust the I-F trimmer "H" and the antenna trimmer "F" (Fig. 2) for maximum output.

4. Alignment at 600 Kilocycles.
   (a) Leave the test oscillator leads connected the same as for alignment at 1400 K.C. Set the test oscillator frequency at 600 K.C.
   (b) Tune set to this signal.
   (c) Adjust the oscillator series trimmer "J" (Fig. 3) through the side of the case for maximum output, while rocking the tuning dial back and forth through the signal.

5. Reselection at 1560 and 1400 Kilocycles.

Repeat alignment of B-F and antenna sections of the gang condenser as outlined under paragraphs 3 and 3.

6. Adjusting Receiver to Car Antenna.

When the receiver leaves the factory the antenna circuit is closely aligned to match the capacity of the car antenna. However, due to variations in antenna capacity, it will be necessary with set installed in car, to adjust the antenna trimmer to match the car antenna. This should be done as follows:

(a) Make sure antenna lead is connected properly.
(b) Be sure the antenna is fully extended (all the way out).
(c) Turn set on and tune in a very weak station between 120 and 150 (near 150). Adjust the antenna trimmer "F" for maximum volume. Do not disturb the oscillator or the I-F trimmers in making this adjustment.