

# Magnavox

## SERVICE BULLETIN • No. 1253

### CR-190

### RADIO CHASSIS

---

#### SPECIFICATIONS

Power supply .....	117 volts 50/60 cycles AC
Power consumption .....	93 watts
Power output .....	12 watts
Intermediate frequency .....	455 kc.
Tuning frequency range:	
Broadcast band .....	545-1620 kc.
Short wave band .....	5.5-18.3 mc.

#### Tubes:

Converter .....	6SA7
I-F Amplifier .....	6SK7
Detector and AVC .....	6J5
First Audio .....	6J5
Inverter .....	6SN7GT
Power output (push-pull stage) .....	(2) 6V6GT
Rectifier .....	5Y3GT
Tuning Indicator .....	6U5
Dial lamps .....	Mazda No. 51

#### Speaker:

Field coil resistance .....	1000 ohms
Voice coil impedance (400 cycles) .....	3.0 ohms
Output transformer .....	8000/3 ohms

#### GENERAL

Models CR-190A and CR-190B are alike electrically—the difference is in the dial drive mechanism. The CR-190A drive pulley is belt driven and a string

drive arrangement is provided on all CR-190B models. The method for restringing these two assemblies is shown on Figures 1 and 2 of this Service Bulletin.

## METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-190 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service. To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back.

Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced.

In replacing the chassis, slide it so that the small

hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hooks should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

## ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 5. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

### I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.
2. Turn the condenser gang until it is completely meshed (low-frequency end of dial calibration). and set the band selector switch to BDCST as for broadcast band reception.
3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

On early models of CR-190 chassis, the two i-f trimmers are located in the top of the respective i-f transformers as shown in the layout diagram, Figure

5. In later production, one trimmer is accessible from the top and the other from the bottom of each transformer.

### Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The ANT-LOOP switch (70) must be in the ANT setting.
2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.
3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.
4. Set the signal generator and the radio receiver to 1400 kc.; adjust the 1400 kc. oscillator trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

# CR-190 RADIO CHASSIS

## Short Wave Band Alignment

1. Set the band selector switch to SW as for Short Wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer and the 15 mc. antenna trimmer for maximum output.

While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

## 10 KC Filter Adjustment

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer (7) for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, con-

nect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

## Special Service Information

The following information is provided for the serviceman who has a vacuum tube voltmeter or a similar measuring instrument available.

### STAGE GAINS\*

Antenna Post to Converter Grid at:	
600 kc. ....	5.5
6 mc. ....	2.0
R-F on Converter Grid to I-F Grid at:	
600 kc. ....	28
6 mc. ....	22
I-F on Converter Grid to I-F Grid at:	
455 kc. ....	34
I-F Grid to Detector Plate at:	
455 kc. ....	67

### AUDIO GAIN

Voltage required across Volume Control to produce .05 watt speaker output\*\* at 400 cycles is .010 volt with Band Selector Switch in BDCST setting.

### OSCILLATOR OUTPUT VOLTAGE

The DC voltage developed across Oscillator Grid Resistor (48) at:

600 kc. ....	9.7
6 mc. ....	5.3

\* Variations of  $\pm 20\%$  are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

\*\* .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the speaker voice coil.

## DIAL CORD REPLACEMENT

As mentioned previously in this Service Bulletin, two types of drive mechanisms are used to transmit the motion from the dial tuning knob to the large pulley that is coupled to the condenser gang. These two arrangements are shown on Figures 1 and 2. The cable used to drive the dial pointer is strung the same on all CR-190A and CR-190B receivers. Separate instructions for installing a replacement belt or string on the CR-190A or CR-190B chassis are given below.

CR-190A Condenser Drive Belt Replacement—Hook one end of the belt on the right-hand edge of the

slot in pulley "C" so that the smooth side contacts the pulley surface. Keeping the belt near the back of the groove in pulley "C" wrap it in a clockwise direction around that pulley (as indicated by the arrows on Figure 1) over the idler pulley and under the tuning control shaft; then around the opposite side of pulley "C". One end of the belt tension spring is hooked on the free end of the belt and the other end on the left-hand edge of the slot in pulley "C" completing the operation.

CR-190B Condenser Drive Cable Replacement—Slide a short length (approximately 1/2-inch) of sleeving

over one end of a 19-inch length of dial cable, form a small loop and tie a knot in the manner shown on Figure 2. Hook this loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counter-clockwise direction when viewed from the rear of the panel, keeping the cable to the rear of the pulley groove. Lace the cable in the direction indicated by the arrow on Figure 2 wrapping 2½ turns around the smaller diameter portion of the tuning control shaft from front to back; then around the opposite side of pulley "C." Loop one end of tension spring "D" on the right-hand edge of the slot in pulley "C"; thread the free end of the drive cable through the opposite end of spring "D" and pull back on the cable until the spring coils are stretched to approximately one inch. Tie a double knot in the cable while maintaining tension on the spring, completing the operation.

then around pulley "B" and straight across the back of the dial frame; over pulley "A" and in a counter-clockwise direction around pulley "C." This last wrap around pulley "C" must be at the front of the pulley groove or nearest the panel. *This is important!* Lace the free end of the cable through the slot in pulley "C" and remove the other end of the cable from the hook. Fasten one end of tension spring "E" over the pulley hook and lace the two free ends of the drive cable through the other end of the spring. Now pull back on the cable until the tension spring coils are stretched to approximately 1½ inches. Tie a double knot in the cable while maintaining tension on the spring.

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short

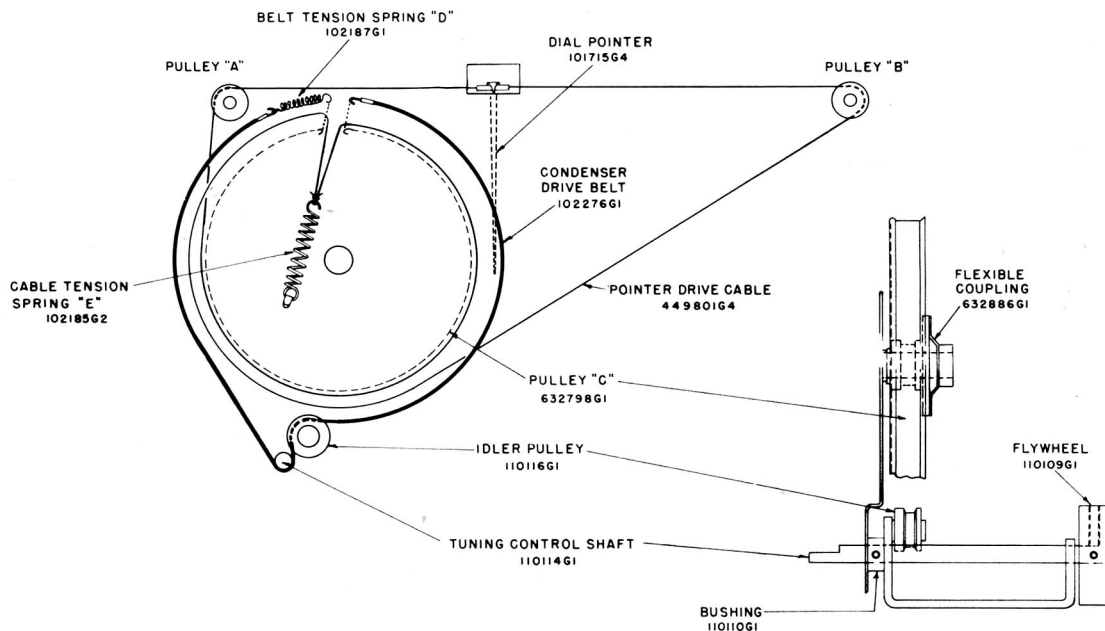


FIGURE 1

CR-190A and CR-190B Dial Pointer Drive Cable Replacement—Rotate the tuning control shaft until the slot in the groove of pulley "C" is up. Cut a piece of dial cable approximately 40 inches long and slide a short piece of sleeving over the cable. Tie a small loop in one end of the cable and temporarily hook it over the metal hook in pulley "C." Lace the other end through the slot in the pulley groove and in a counter-clockwise direction around the large pulley,

piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lugs on the dial pointer pressed together over the sleeving. After checking to see that the condenser gang is still completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

# CR-190 RADIO CHASSIS

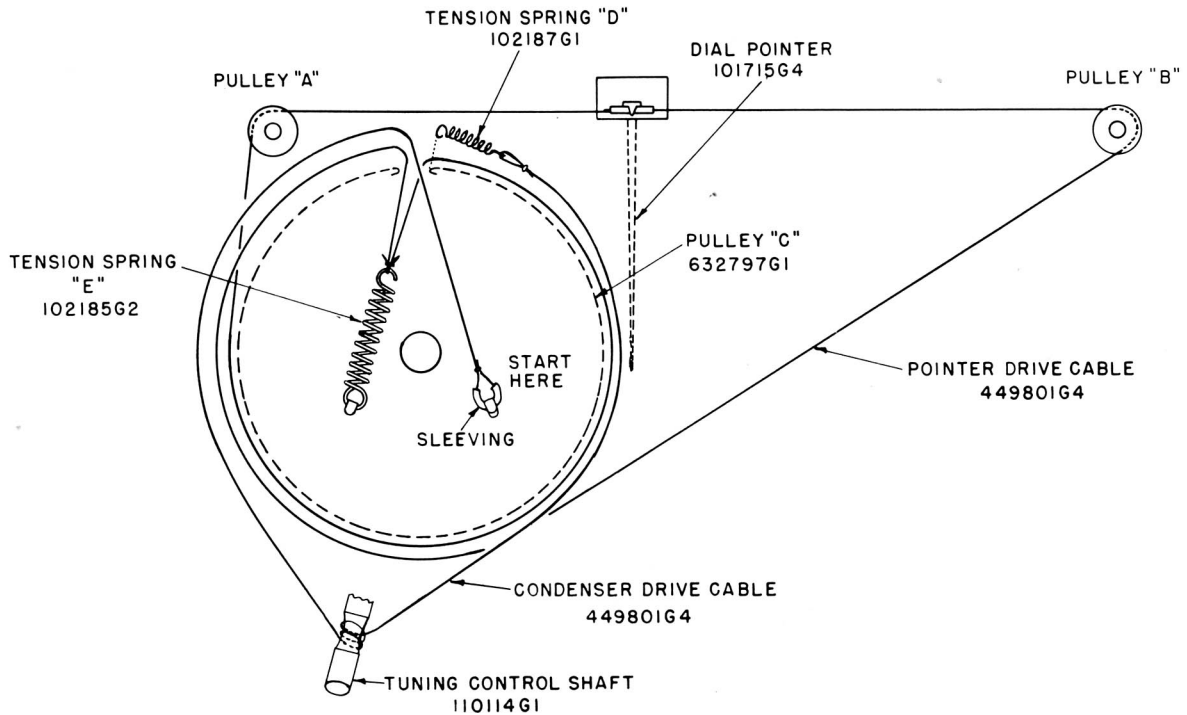


FIGURE 2

## PUSH BUTTON ADJUSTMENTS

There are six push buttons on the panel of the receiver, five of which may be pre-set to any station whose frequency is within the range covered by the respective buttons. See Figure 3. The right-hand button must be pressed for dial tuning.

**Set-up Procedure**—Turn on the receiver and allow it to operate for at least five minutes to permit tubes to reach normal operating conditions. Remove the push button escutcheon plate and proceed in the following manner.

1. Turn the Band Control Switch knob to BDCST and press the push button at the right end of the assembly to permit dial tuning.
2. Using the Dial Tuning Control, carefully tune in the station to which the No. 1 push button is to be set and note the program. Be sure that the frequency of the station selected is within the frequency range covered by the No. 1 button.
3. Press the No. 1 button and carefully turn the oscillator screw for that button until the station that was tuned manually is heard. Carefully adjust the screw until the tuning indicator tube shows maximum deflection.

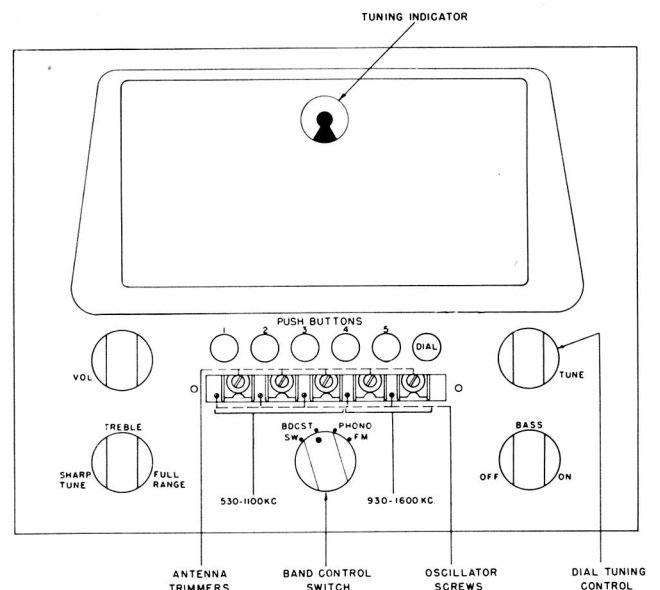


FIGURE 3

4. Adjust the No. 1 antenna trimmer for maximum speaker volume (tuning indicator tube shows maximum deflection).

5. Press the DIAL button to verify that the same station that was tuned manually was set up on the No. 1 button.

6. This completes the set-up of the No. 1 button. Follow the same procedure in setting up the remain-

ing four buttons always adjusting the oscillator screw first, then the antenna trimmer screw.

7. After all five buttons have been set up, replace the escutcheon plate and insert the correct call letter tab in the space provided under each push button.

## **SERVICE NOTES**

# CR-190 RADIO CHASSIS

## PARTS LIST

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
1	Coil assembly, r-f, two band	360256G1
2	Coil assembly, oscillator, two band	360255G1
3	Coil assembly, 10 kc filter	360240G1
4	Transformer, first i-f	360266G1
5	Transformer, second i-f	360267G1
6	Capacitor, variable, two-gang tuning	260056G1
7	Capacitor, variable, 10 kc trimmer	250008G1
8	Capacitor, variable, 2 gang trimmer	260021G1
9	Capacitor, variable, oscillator trimmer	260042G2
10	Capacitor, ceramic, 50 mmf.	250088G24
11	Capacitor, molded mica, 100 mmf. $\pm 20\%$	250159G98
12	Capacitor, molded mica, 100 mmf. $\pm 10\%$	250159G82
13	Capacitor, molded mica, 220 mmf. $\pm 20\%$	250159G100
14	Capacitor, molded mica, 330 mmf. $\pm 10\%$	250159G88
15	Capacitor, molded mica, 270 mmf. $\pm 10\%$	250159G87
16	Capacitor, silvered mica, 529 mmf. $\pm 1\%$	250085G34
17	Capacitor, molded mica, 470 mmf. $\pm 10\%$	260159G102
18	Capacitor, molded mica, 1000 mmf. $\pm 20\%$	250160G82
19	Capacitor, molded mica, 1800 mmf. $\pm 10\%$	250160G67
20	Capacitor, molded mica, 5600 mmf. $\pm 2\%$	250161G7
21	Capacitor, paper, .003 mfd. 600 V.	250152G43
22	Capacitor, paper, .01 mfd. 600 V.	250152G38
23	Capacitor, paper, .01 mfd. 200 V.	250152G18
24	Capacitor, paper, .02 mfd. 400 V.	250152G26
25	Capacitor, molded paper, .02 mfd.	250129G3
26	Capacitor, paper, .05 mfd. 200 V.	250152G15
27	Capacitor, paper, .1 mfd. 400 V.	250152G22
28	Capacitor, paper, .1 mfd. 200 V.	250152G13
29	Capacitor, electrolytic, 10 mfd. 450 V.-20 mfd. 25 V.	270023G6
30	Capacitor, electrolytic, 10-30 mfd. 450 V.	270023G2
31	Capacitor, electrolytic, 20 mfd. 25 V.	270027G2
40	Resistor, composition, 150 ohm $\frac{1}{2}$ W.	230084G8
41	Resistor, composition, 220 ohm $\frac{1}{2}$ W.	230084G9
42	Resistor, composition, 220 ohm 2 W.	230064G54
43	Resistor, composition, 470 ohm $\frac{1}{2}$ W.	230084G11
44	Resistor, composition, 1500 ohm $\frac{1}{2}$ W.	230084G14
45	Resistor, composition, 4700 ohm $\frac{1}{2}$ W.	230084G17
46	Resistor, composition, 15,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G187
47	Resistor, composition, 15,000 ohm 1 W.	230085G20
48	Resistor, composition, 22,000 ohm $\frac{1}{2}$ W.	230084G21
49	Resistor, composition, 47,000 ohm $\frac{1}{2}$ W.	230084G23
50	Resistor, composition, 100,000 ohm $\frac{1}{2}$ W.	230084G25
51	Resistor, composition, 150,000 ohm $\frac{1}{2}$ W.	230084G26
52	Resistor, composition, 220,000 ohm $\pm 5\%$ $\frac{1}{2}$ W.	230084G215
53	Resistor, composition, 270,000 $\pm 10\%$ $\frac{1}{2}$ W.	230084G91
54	Resistor, composition, 470,000 ohm $\frac{1}{2}$ W.	230084G29
55	Resistor, composition, 1 megohm $\frac{1}{2}$ W.	230084G31

## SERVICE BULLETIN • 1253

REFERENCE NO.	DESCRIPTION	MAGNAVOX PART NO.
56	Resistor, composition, 4.7 megohm ½ W.	230084G35
57	Resistor, wire wound, 10,000 ohm	240035G2
58	Resistor, composition, 15,000 ohm ½ W.	230084G20
65	Control, volume, 1 megohm	220044G15
66	Control, bass, 1 megohm, with power switch	220045G2
67	Control, treble, 1 megohm, with band expander sw.	220071G2
68	Transformer, power, 117 V. 50/60 cycle	300025G1
69	Switch, rotary, band selector	160156G1
70	Switch, rotary, loop to outdoor antenna	160157G1
71	Switch assembly, muting	160158G1
72	Antenna, loop assembly	*
73	Socket, external input	180060G1
74	Socket, phonograph input	189741G1
75	Socket, phonograph motor	180501G5
76	Socket, speaker	180393G3
77	Socket, FM power	180422G1
78	Socket and cable assembly, tuning indicator	180423G1

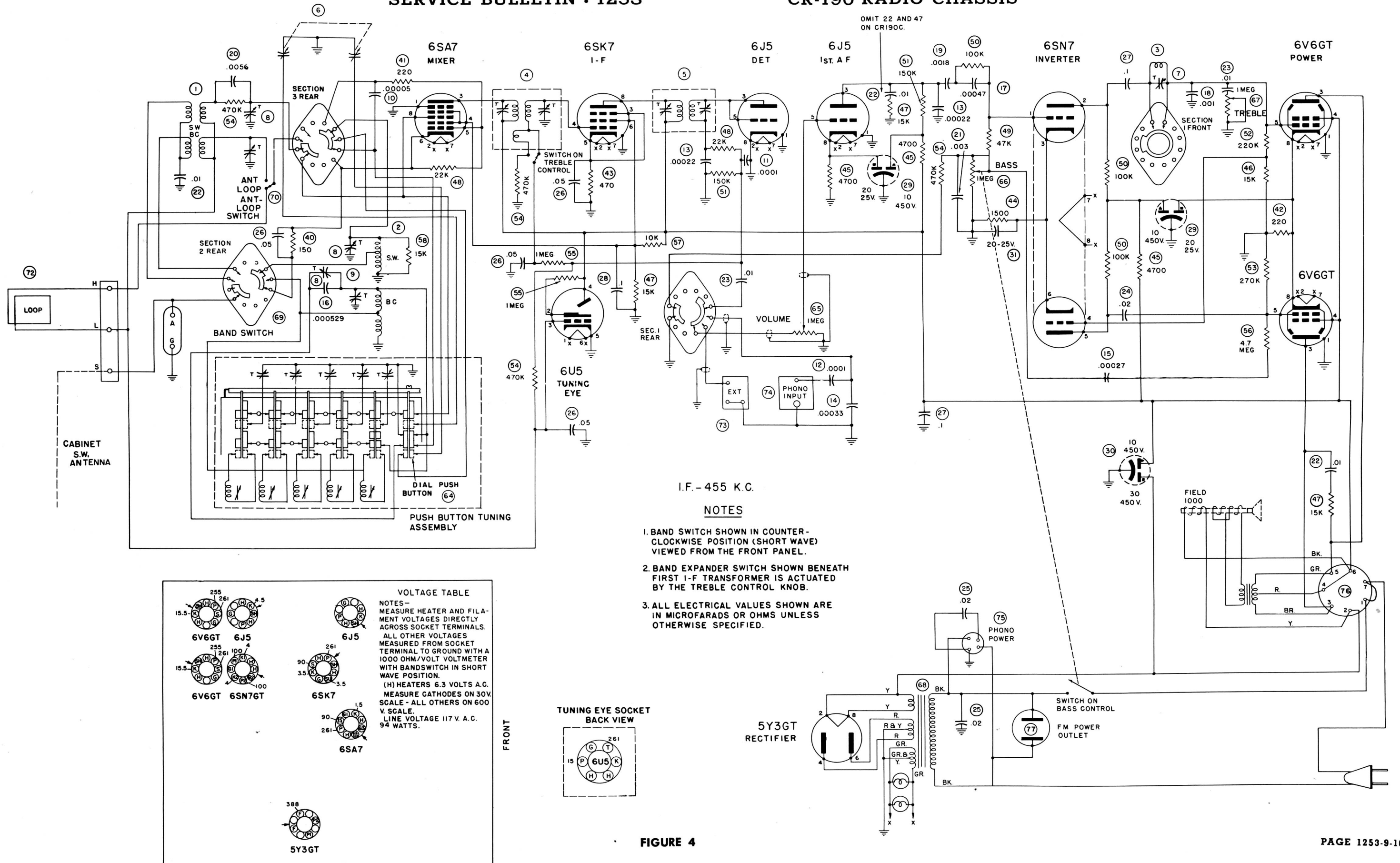
### IMPORTANT!

Due to the fact that a change was made in the mechanical construction of the dial assembly after the first CR-190 radio chassis production run, it is important that you follow the procedure outlined below in ordering replacement glass dials.

If the glass dial for which a replacement is required is marked 150269, order a 150278 dial glass assembly. If the glass is marked 150282, order a 150280 dial glass assembly. These assemblies include the rubber strips cemented in their correct positions.

\*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the Style Number of the instrument when ordering a replacement loop antenna assembly.





I.F. - 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION (SHORT WAVE) VIEWED FROM THE FRONT PANEL.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

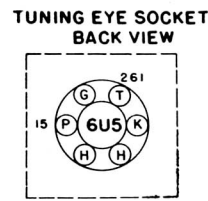
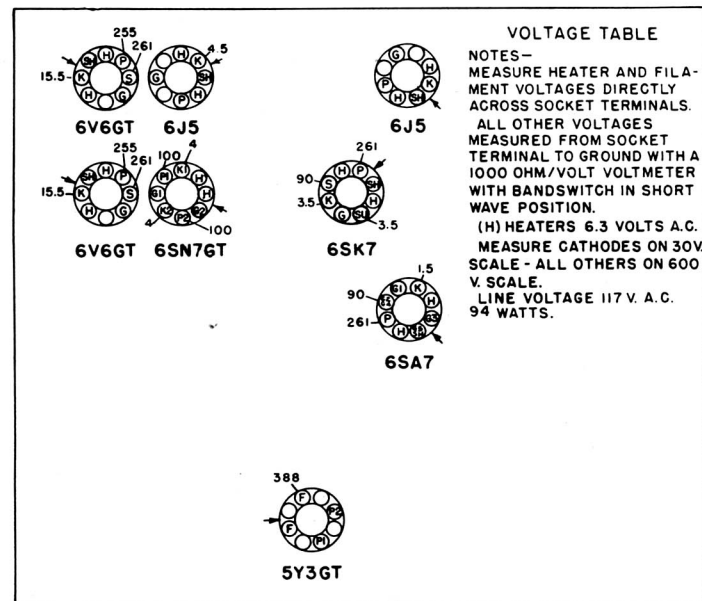
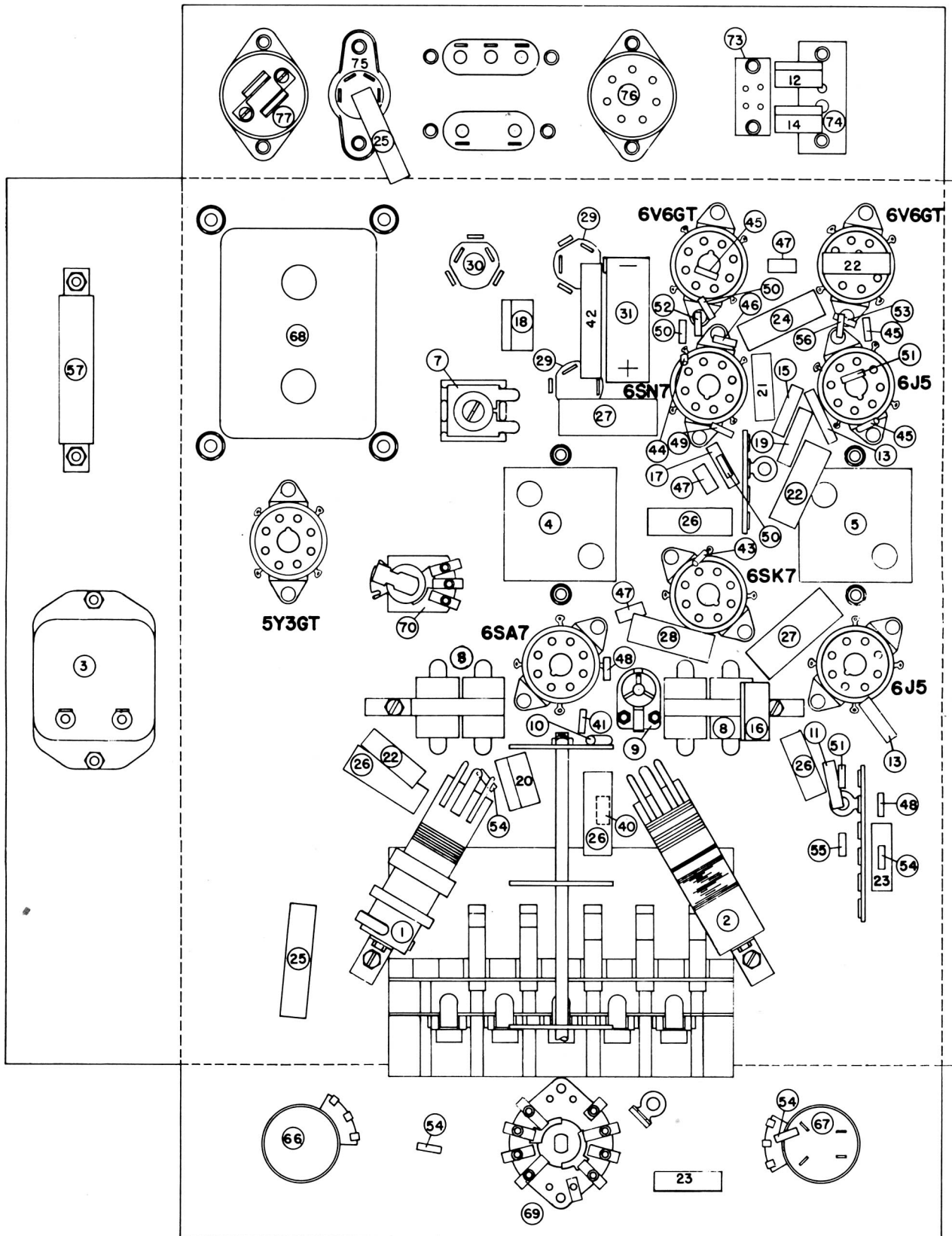


FIGURE 4

SERVICE BULLETIN • 1253



# CR-190 RADIO CHASSIS

