

SECTION V ALIGNMENT

This receiver has been carefully aligned at the factory by specially-trained personnel using precision equipment. Alignment of the receiver should not be attempted until all other possible causes of faulty operation have been investigated. Alignment should not be required unless the receiver has been tampered with or component parts have been replaced in the RF or IF stages. Alignment should be performed only by persons familiar with communications receivers and experienced in their alignment. Refer to figures 8 and 9 for location of all alignment adjustments.

5-1. EQUIPMENT REQUIRED.

Signal generator covering 50 KC to 30 MC.
Vacuum tube voltmeter (VTVM) or other high-impedance DC voltmeter.

Output meter (or AC scale of VTVM). Connect output meter to appropriate speaker output terminals. If a VTVM is used, connect it to terminals 3.2 SPKR and GND and terminate the output with a dummy load.

5-2. INITIAL CONTROL SETTINGS.

Band Selector As indicated in chart.
RF and AUDIO GAIN 10 (maximum).
ANL - OFF OFF.
FUNCTION AM.
Selectivity As indicated in chart.
Tuning and Bandsread Gangs half meshed.

5-3. ALIGNMENT PROCEDURE.

STEP	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR FREQUENCY	BAND SELECTOR SETTING	OUTPUT CONNECTIONS	SELECTIVITY SETTING	REMARKS
50-KC IF ALIGNMENT						
1	High side to alignment point A (terminal 2 of T2). Low side to chassis.	50 KC (unmod)	0.540 to 1.60 MC	VTVM DC probe to alignment point B (junction of R55, R56, and C84). Common to chassis.	0.5 KC	Remove first conversion oscillator tube V3 from its socket to prevent signal interference. Adjust top slug of T6, T5, T4, and T3 (50-KC IF's) for maximum indication, maintaining approximately one volt reading on VTVM.
1650-KC IF ALIGNMENT						
2	High side to alignment point C (stator of section C3B of main tuning gang). Low side to frame of gang.	1650 KC (mod)	0.540 to 1.60 MC	Output meter across speaker terminals. (VTVM to alignment point B if it is desired to monitor detector voltage.)	5 KC	Replace tube removed in Step 1. Tune generator slowly through 1650 KC to determine IF passband. Then set generator to center of passband, using sufficient generator output to obtain approximately 1/2 watt receiver output and adjust the top and bottom slugs of T2 and T1 for maximum response. Tune through the passband and observe the shape of the response. If it is symmetrical, the adjustment is completed; if not, reset the generator frequency near the center of the passband and repeak T2 and T1.
IF SENSITIVITY CHECK						
3	With the generator modulated 30% at 400 cycles and connected through a 0.05 μ F capacitor to the grid (pin 1) of the first mixer tube V2, the IF input required for 1/2-watt receiver output should be approximately 15 microvolts (1650 KC).					

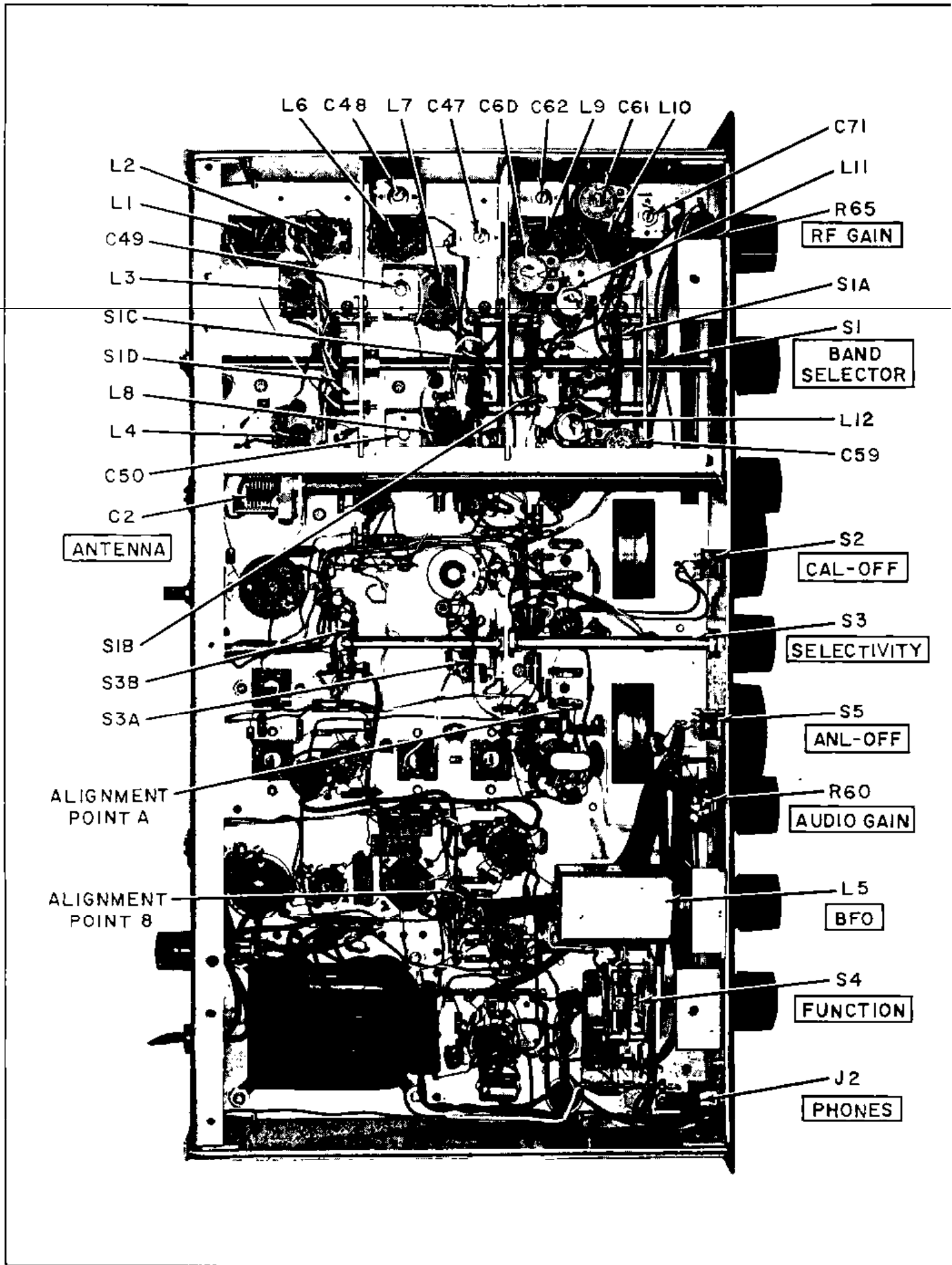


Figure 9. Bottom Chassis View.

RF ALIGNMENT

Before proceeding with the RF alignment, check the tuning dials for proper indexing. Both dials should index on the marks at the low-frequency end with the gang fully closed.

Use an amplitude-modulated signal.

Set the RF and AUDIO GAIN to 10 (maximum), ANL - OFF to OFF, SELECTIVITY to 2.5, FUNCTION to AM, and BANDSPREAD at *Bandspread Set*.

Connect the output meter across the speaker terminals. (Connect the VTVM to alignment point B if it is desired to monitor the detector voltage.) Maintain a 1/2-watt receiver output.

Connect high side of generator through a 330-ohm carbon resistor to antenna terminal A1, low side to A2. Connect jumper between A2 and GND.

The oscillator frequency is higher than the signal frequency on all bands.

STEP	BAND SELECTOR SETTING	GENERATOR AND RECEIVER FREQUENCY	ADJUST FOR MAXIMUM
4	12.5 to 34 MC	30.0 MC	C59 (oscillator trimmer), C50 (mixer trimmer), and C2 (antenna trimmer)
	12.5 to 34 MC	14.0 MC	L12 (oscillator slug), L8 (mixer slug), and L4 (antenna slug)
5	4.8 to 12.6 MC	11.5 MC	C60 (oscillator trimmer), C49 (mixer trimmer), and C2 (antenna trimmer)
	4.8 to 12.6 MC	5.0 MC	L11 (oscillator slug), L7 (mixer slug), and L3 (antenna slug)
6	1.75 to 4.9 MC	4.6 MC	C61 (oscillator trimmer), C48 (mixer trimmer), and C2 (antenna trimmer)
	1.75 to 4.9 MC	2.0 MC	L10 (oscillator slug)
7	0.54 to 1.60 MC	1.4 MC	C62 (oscillator trimmer), C47 (mixer trimmer), and C2 (antenna trimmer)
	0.54 to 1.60 MC	0.6 MC	C71 (oscillator padder)

5-4. S METER CALIBRATION.

1. To adjust the *Meter Zero* the antenna should be disconnected and the receiver antenna terminals shorted; RF GAIN full on.

Adjust the *Meter Zero* potentiometer (R16) on the rear apron of the chassis until the meter pointer is directly over the last calibration mark on the left side of the meter scale. With this adjustment made, if the RF GAIN is rotated counter-clockwise, the meter may read below zero. This is normal.

NOTE

Allow at least one-half hour warmup time before making any adjustments.

2. To adjust the meter calibration, it will be necessary to have a signal generator that is accurately calibrated in microvolts output.

- a. Set generator to 14.3 MC and 50 microvolts output.
- b. Place SELECTIVITY switch to the 2.5 position, FUNCTION to AM and carefully tune receiver for maximum *S meter* deflection at 14.3 MC.

- c. Peak ANTENNA trimmer (C2).
- d. If the meter does not read S9, adjust Meter Sensitivity potentiometer (R13) near top center of chassis for S9 reading.
- e. Recheck Meter Zero setting and repeat adjustments if necessary.

5.5. BFO CALIBRATION.

To check the BFO calibration, set the receiver controls for CW reception, SELECTIVITY to 0.5 and tune in an unmodulated signal for maximum S meter deflection. With the BFO control at mid rotation (CW position), the beat-note frequency should be between 700 and 1000 cycles and zero beat should occur with the control rotated approximately forty-five degrees clockwise from the center position.

If the control is far from its correct setting, it may be *roughed in* in the following manner.

1. Remove the BFO knob and the adapter bushing from the BFO tuning shaft.
2. Set receiver controls for CW reception, SELECTIVITY in the 2.5 position and tune receiver to clear frequency (no signal).
3. With screwdriver, run the BFO tuning shaft in or out as necessary to the point where the noise becomes lowest in audio pitch with a symmetrical rise in pitch in either direction from this point. With the shaft set at the point of lowest audio noise pitch, replace the shaft bushing with the long set screw straight up (vertical position).
4. Replace BFO knob with indicator line in CW position (mid rotation).

SECTION VI SERVICE DATA

6.1. TECHNICAL SPECIFICATIONS.

FREQUENCY COVERAGE

BAND	FREQUENCY RANGE	CALIBRATED BANDSPREAD
1	0.540 to 1.60 MC	—
2	1.75 to 4.9 MC	80M
3	4.8 to 12.6 MC	40M
4	12.5 to 34.0 MC	20, 15, 10M, Citizens Band

TUBES

Nine plus voltage regulator and rectifier.

SPEAKER OUTPUT

3.2 ohms

HEADPHONE IMPEDANCE

50 to 5000 ohms.

ANTENNA INPUT IMPEDANCE

50 to 600 ohms.

POWER SOURCE

105 to 125 volts, 50/60 cycles.

POWER CONSUMPTION

85 watts.

RECEPTION

AM, CW, and SSB.

INTERMEDIATE FREQUENCIES

(Double Conversion): 50 KC and 1650 KC.

DIMENSIONS (overall) (HWD)

8 by 18-3/4 by 9-13/16 inches (HWD).

SHIPPING WEIGHT

32-1/2 pounds.

NET WEIGHT

28-3/4 pounds.

6.2. 50-KC-IF SYSTEM.

Figure 10 shows the type of coupling used in the 50-KC IF system. Note that inductive coupling is avoided by careful shielding of the IF coils and signal transfer occurs only through capacity and resistance. By increasing the value of R (resistance) and decreasing C (capacity), the selectivity is made broader; while decreasing R and increasing C causes the selectivity to become sharper. The proper values of C and R are switched in the circuit by means of the SELECTIVITY control. R varies the Q of the tuned circuit and C varies the coupling. This R-C coupling arrangement affords a more accurate means of selectivity control than that readily obtainable by any other method.

6.3. CHASSIS REMOVAL.

Both the top and bottom covers can be removed for easy access to both sides of the chassis. To remove the chassis and panel assembly from the cabinet, remove the four outer bottom screws and slide chassis forward through front of cabinet.

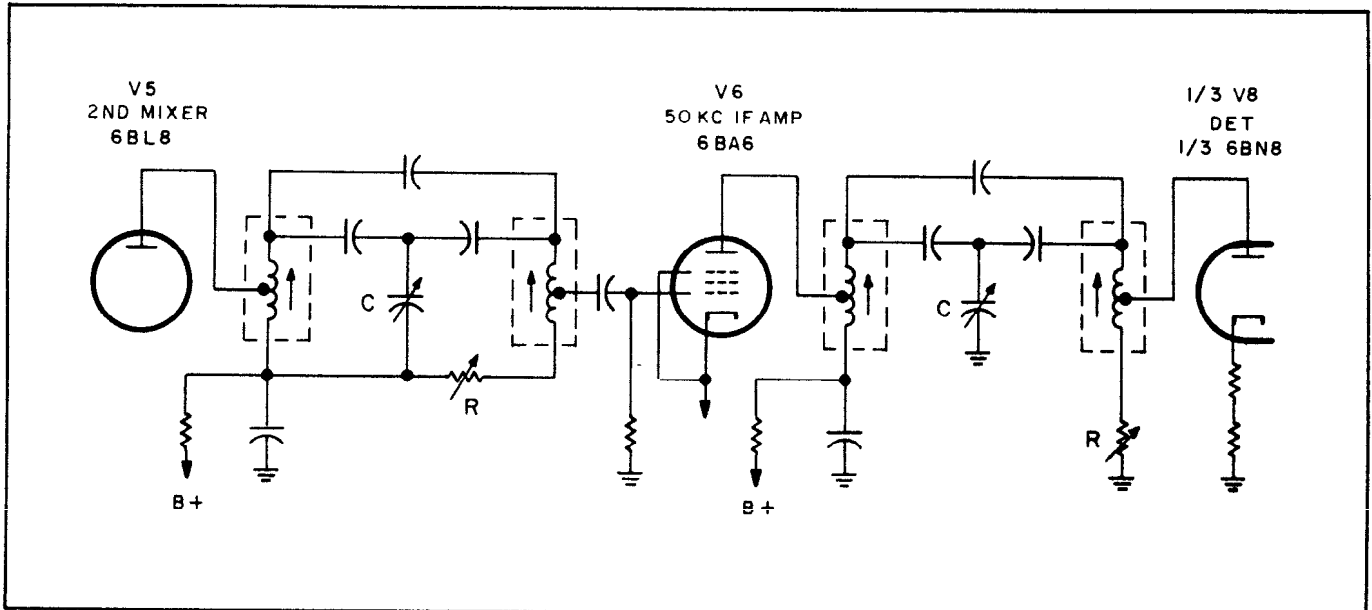


Figure 10. Equivalent Schematic Diagram of 50-KC IF System.

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IMPORTANT

To remove the top cover, turn the four screws counterclockwise one quarter turn and lift cover. Do not attempt to remove these screws.

To remove the bottom cover, remove the four inner bottom screws.

6-4. TUBE AND DIAL LAMP REPLACEMENT.

To gain access to the tubes and dial lamps, remove top cover (see IMPORTANT note above). See label on the inside rear of cabinet for tube location.

6-5. DIAL RESTRINGING.

The bandspread gang restringing (figure 11) may be accomplished without removing any parts. Before starting, attach the tension springs to the cable, rotate the BANDSPREAD control knob fully clockwise, and set the bandspread gang in its closed position. Attach the spring at one end of the cable to position 1 on the pulley as shown in figure 11 and follow the stringing sequence 1 through 9.

After stringing, check to see if the dial scale lines up with the pointer when the bandspread gang is in its closed position. If the index marks on the scale do not line up, loosen the set screws holding the dial to the shaft and rotate to proper position.

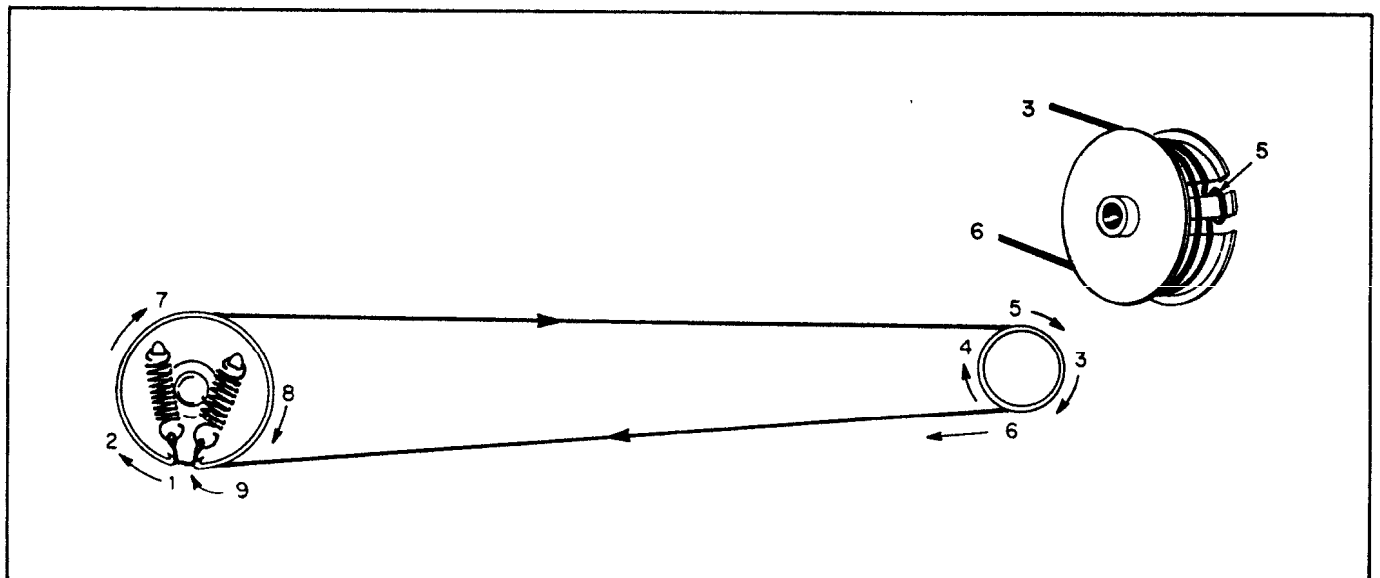


Figure 11. Restringing the Bandspread Gang.

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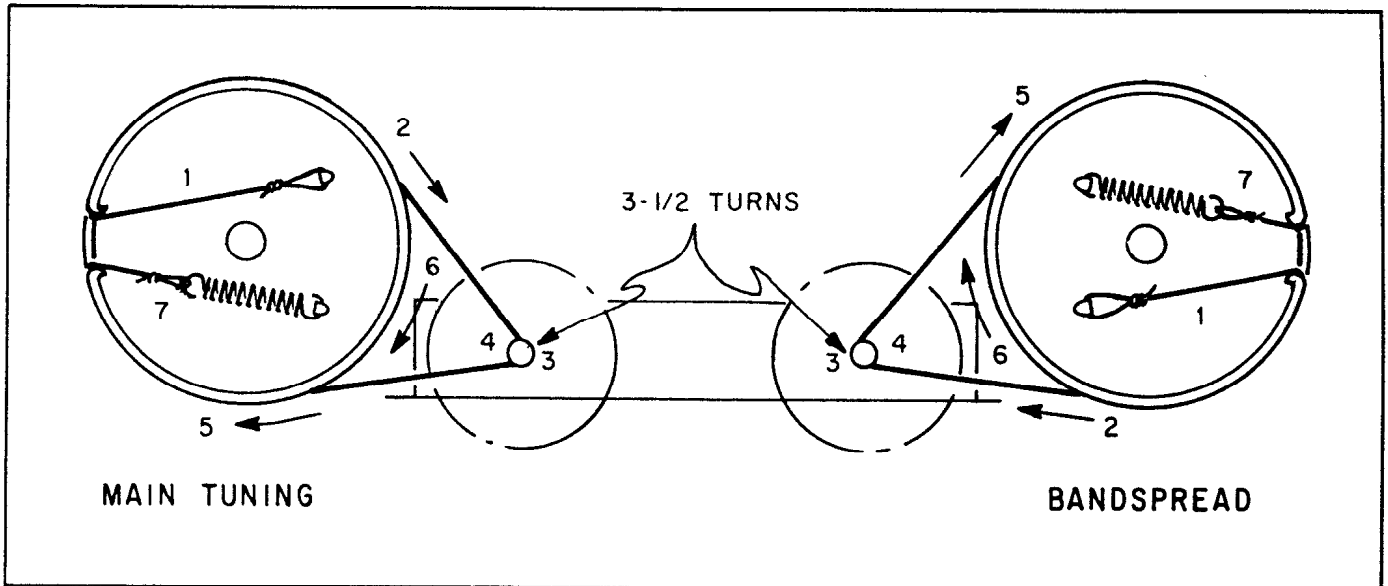


Figure 12. Restringing the Main Tuning and Bandspread Dials.

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In order to restring the dial drive of either the main tuning or bandspread dial, the front panel, pointer, and dial scale should be taken off for accessibility. In both drives the gang is set in its closed position. Attach the knotted end of the string to position 1 on the pulley as shown in figure 12 and follow the stringing sequence 1 through 7.

6-6. VOLTAGE AND RESISTANCE MEASUREMENTS.

The voltages normally present at the pins of the various tubes within this receiver are shown in figure 14. The resistances present at these same pins are shown in figure 15. To identify the tube elements by pin number, refer to figure 18, the schematic diagram.

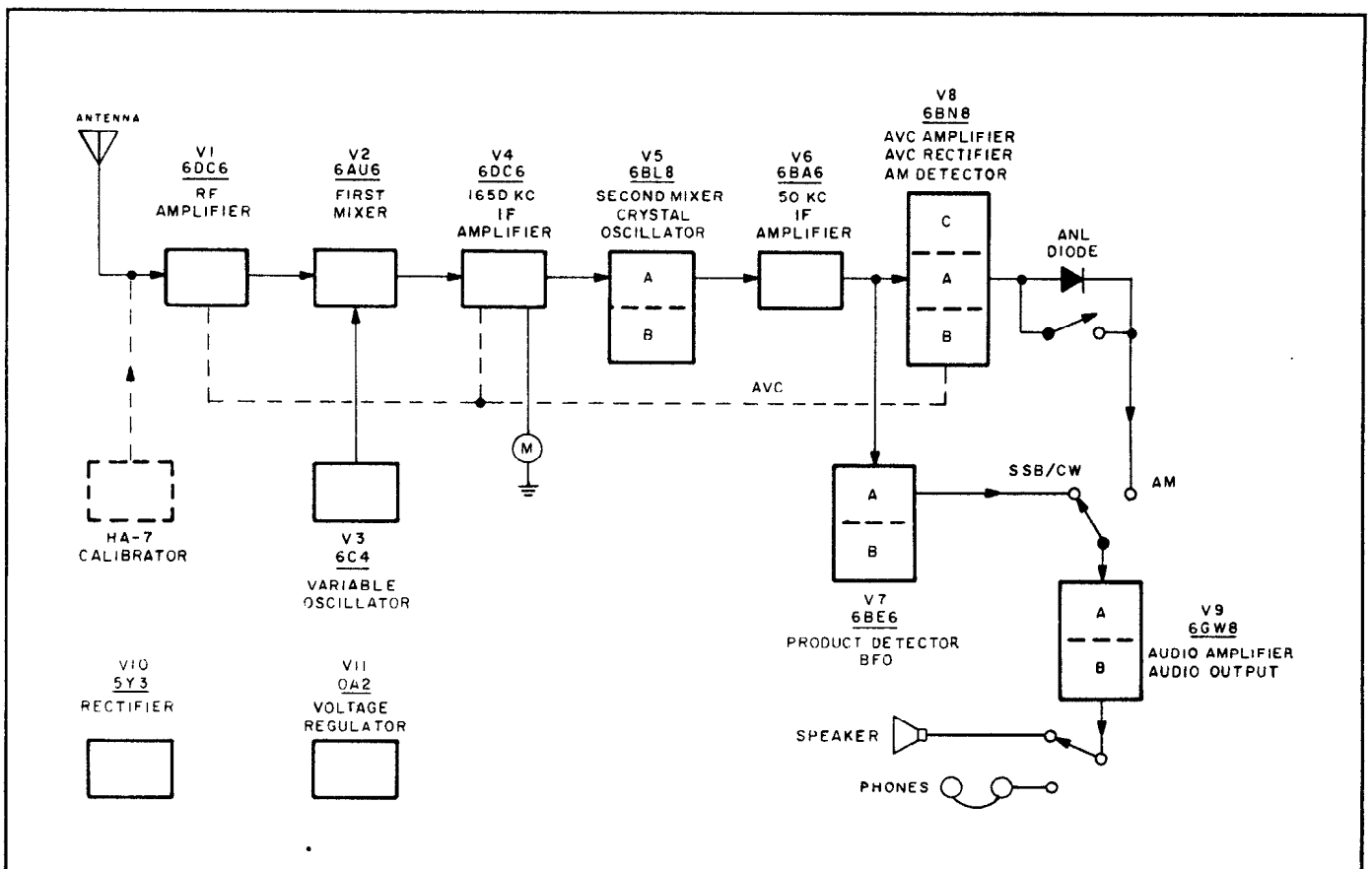


Figure 13. Block Diagram of the Model SX-122 Receiver.

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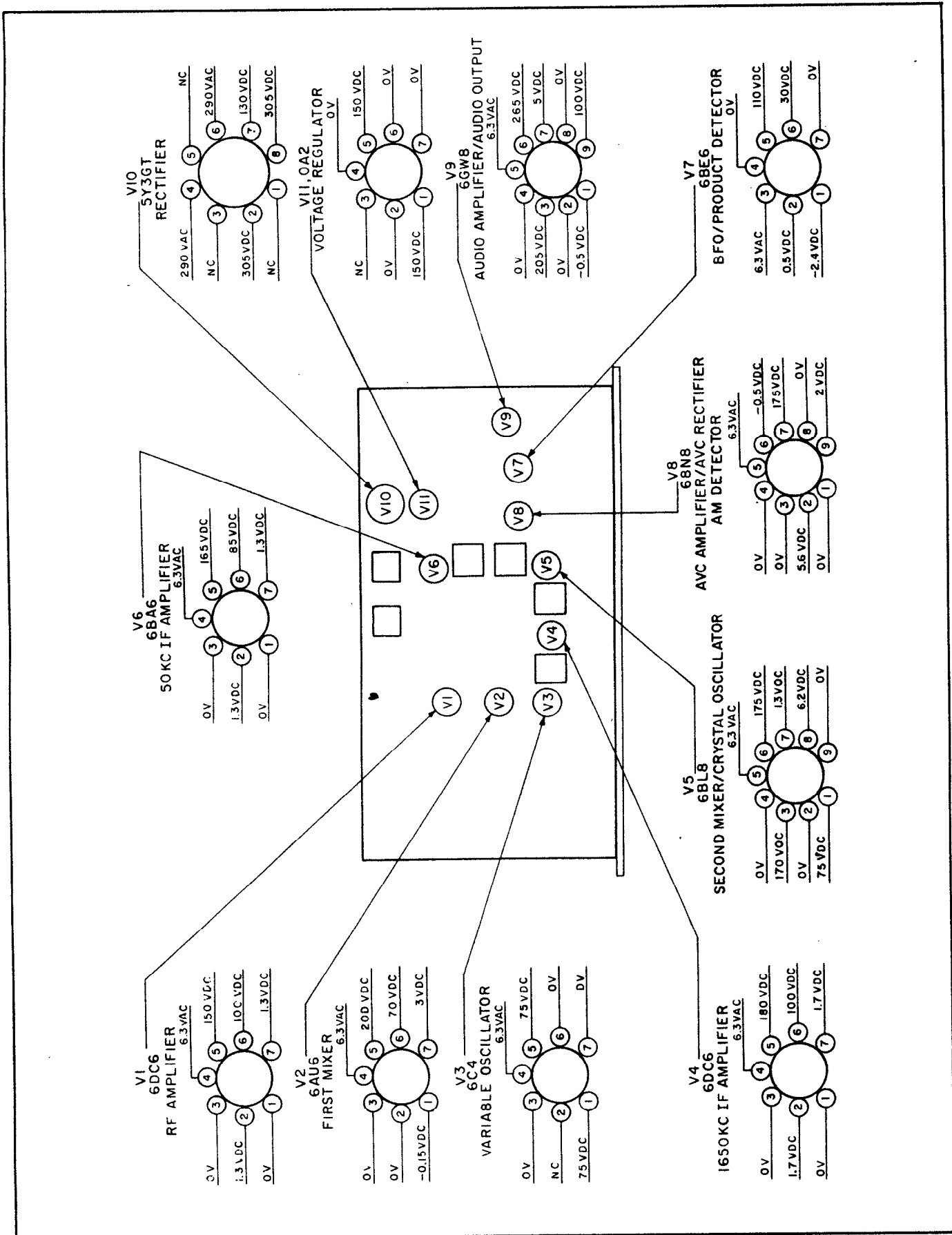


Figure 14. Voltage Chart of Receiver.

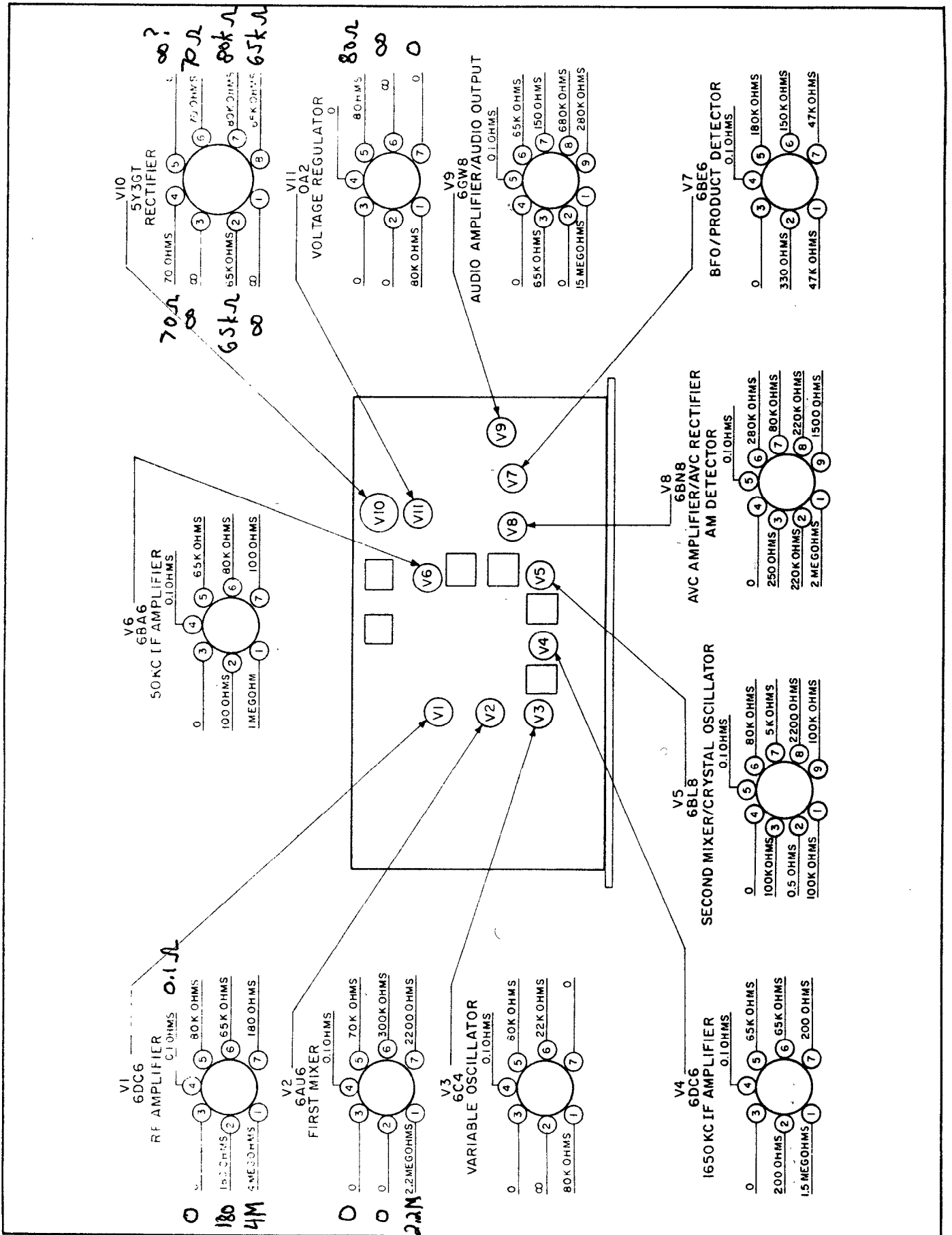


Figure 15. Resistance Chart of Receiver.

SECTION VII 100-KC CRYSTAL CALIBRATOR MODEL HA-7

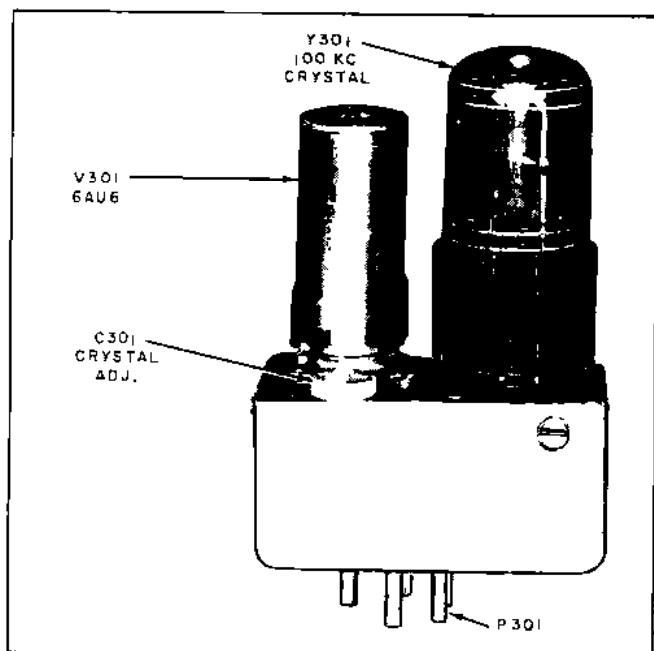


Figure 16 Model HA 7 100 KC Crystal Calibrator. 156 00 20 33

7.1. GENERAL

The Model HA-7 100-KC Crystal Calibrator is a precision-built accessory which provides marker signals at every 100 KC on the dial of the SX-122 enabling the operator to check calibration accuracy. The HA-7 is placed into operation by plugging it into the appropriate socket (J1) on the receiver chassis (see Figure 8) and placing the front panel (M OFF) switch in the (M) position (refer to paragraph 3-10).

IMPORTANT

The (M OFF) switch should be returned to the OFF position after calibration to prevent spurious signal generation.

7.2. ADJUSTMENT.

A trimmer capacitor, adjustable by the *Crystal Adj* control on the top of the calibrator unit, permits adjustment of the calibrating crystal to exactly 100 KC by comparison with the frequencies transmitted by station WWV. This capacitor has been set at the factory and normally should not require readjustment unless extreme calibration accuracy is required. If adjustment should be necessary, proceed as outlined in paragraph 4-7 of this document.

PARTS LIST

SCHEMATIC SYMBOL	DESCRIPTION	HALLICRAFTERS PART NUMBER
	100-KC Crystal Calibrator Assembly (Model HA-7)	001-004394
C301	Capacitor, Variable, 8 to 50 $\mu\mu$ F, Crystal Adj.	044-20043
C302,304	Capacitor, 0.01 μ F, 500V, Ceramic Disc	047-100224
C303	Capacitor, 82 $\mu\mu$ F, 10%, Mica	470-213820
CR301	Diode, Type 1N295	019-301980
P301	Plug, 5-Pin (Connects to J1 on SX-122)	035-100038
R301 304	Resistor, 220K Ohms, 10%, 1/2 watt, Carbon	451-252224
R302	Resistor, 4700 Ohms, 10%, 1/2 watt, Carbon	451-252472
R303	Resistor, 100K Ohms, 10%, 1/2 watt, Carbon	451-252104
V301	Electron Tube, Type 6AU6	090-90080F
Y301	Crystal, 100-KC Marker	019-202351
	Shield, Cover	069-001719
	Socket, Crystal (Y301)	006-200296
	Socket, Tube (V301)	006-100759