

PRELIMINARY

INSTRUCTION BOOK

FOR

RADIO STATION

RS-6

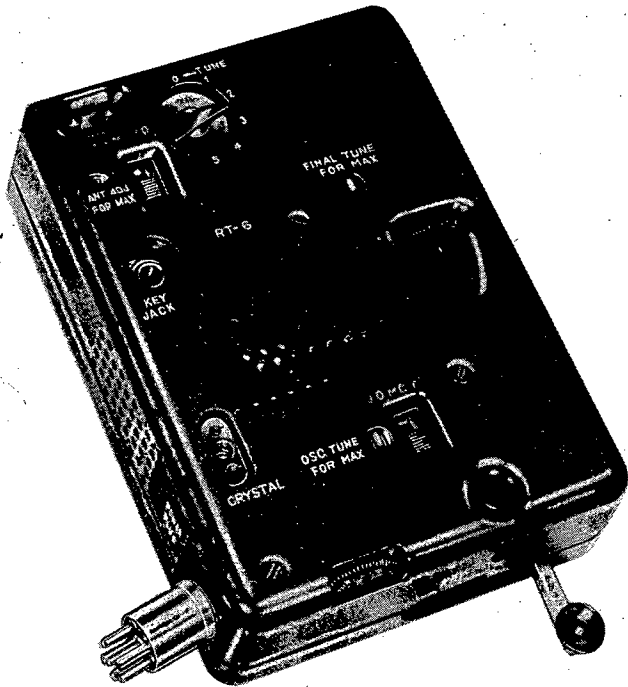
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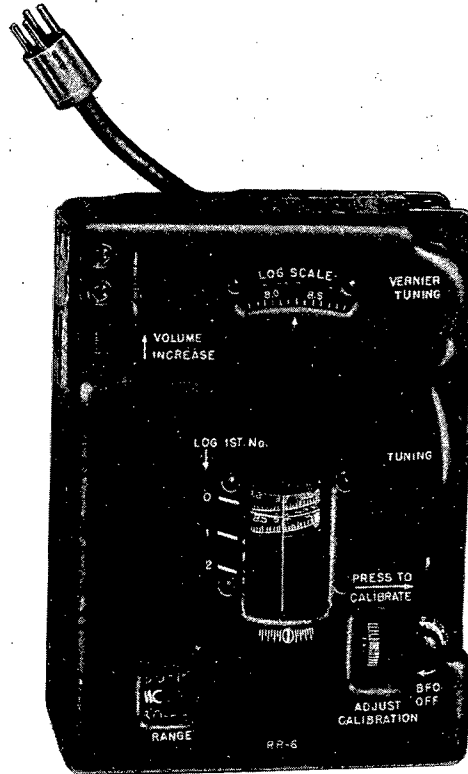
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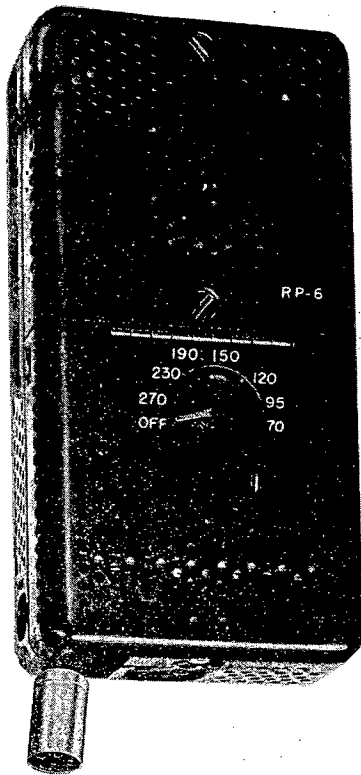
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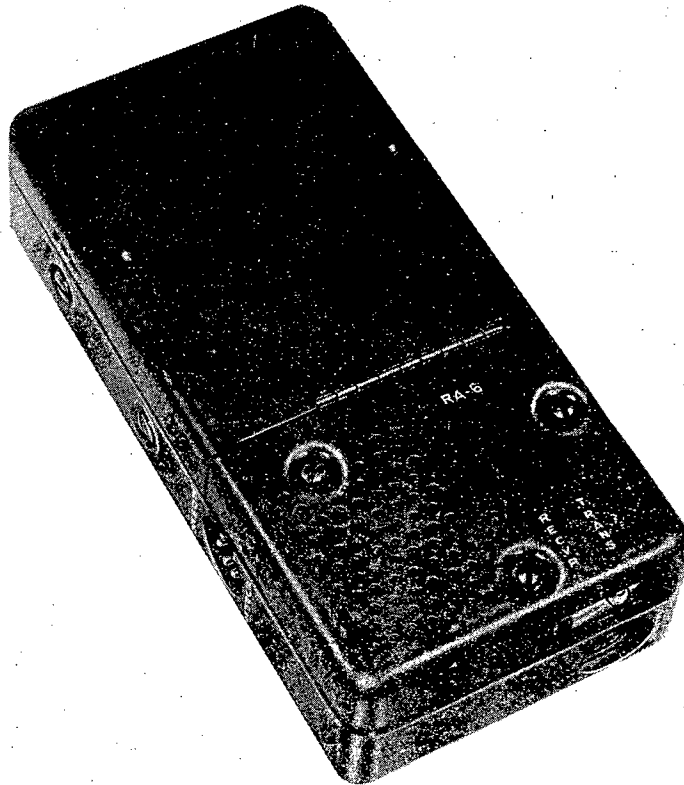
TRANSMITTER RT-6



RECEIVER RR-6



POWER SUPPLY RP-6



FILTER-ACCESSORY UNIT RA-6

Figure 1. Radio Station RS-6 Components

CHAPTER 1

INTRODUCTION

Section I. DESCRIPTION & DATA

1. GENERAL

Radio Station RS-6 is a compact four-unit set for transmitting CW and receiving CW or AM. It operates from AC, storage battery, or hand generator, and consists of a Transmitter RT-6, Receiver RR-6, Power Supply RP-6, and a Filter-Accessory Unit RA-6. See Figure 1.

2. TRANSMITTER RT-6.

- a. Type: 2-stage, crystal controlled
- b. Frequency range (two bands):
 - (1) 3 to 7 mc
 - (2) 7 to 16.5 mc
- c. Power Output: 9 watts (nominal)
- d. Power Input:
 - (1) 400V DC at 75 ma
 - (2) 6.3V AC-DC at 1.2 amp
- e. Weight: 2 lbs 14 oz
- f. Dimensions (inches): $6\text{-}3/4 \times 5 \times 2\text{-}3/32$

3. RECEIVER RR-6.

- a. Type: Superheterodyne, variable tuning or crystal controlled
- b. Frequency range (two bands):
 - (1) 3 to 6.5 mc
 - (2) 6.5 to 15 mc
- c. Power Input:
 - (1) 90V DC at 50 ma -regulated
 - (2) 6.3V AC-DC at 1.2 amp

- d. Weight: 3 lbs 2 oz
- e. Dimensions (inches): $6\text{-}3/4 \times 5 \times 2\text{-}1/4$

4. POWER SUPPLY RP-6.

- a. Power Input:
 - (1) AC 70 to 270V, 40 to 400 cycles
 - (2) DC 6.3V at 12 amp
- b. Power Source: AC line or 6 volt storage battery
- c. Power Output:
 - (1) 400V DC at 75 ma
 - (2) 90V DC at 25 ma regulated
 - (3) 90V DC at 25 ma regulated
 - (4) 6.3V AC at 2.4 amps
- d. Fuses:
 - (1) AC - 1.5 amp
 - (2) DC - 15 amp
- e. Power Factor:
 - (1) 40 cycles -
 - (2) 60 cycles -
 - (3) 400 cycles -
- f. Weight: 5 lbs 11 oz
- g. Dimensions (inches): $8\text{-}1/16 \times 4 \times 2\text{-}3/16$

5. FILTER-ACCESSORY UNIT RA-6.

- a. Function:
 - (1) Filters B+
 - (2) Regulates receiver B+
 - (3) Provides storage space for accessories and power cables. See Figure 2.
- b. Fuses:
 - (1) AC - 1.5 amp
 - (2) Battery - 15 amp

- c. Weight: 3 lbs 11 oz
- d. Dimensions (inches): 8-1/16 x 4 x 2
- e. Accessories:
 - 1 Earset & cord
 - 1 Hank Antenna (100 ft)
 - 2 Antenna insulators

- 1 AC cable assembly
- 1 Battery cable assembly
- 2 Battery clamps
- 1 Spare fuse - 1.5 amp
- 1 Spare fuse - 15 amp
- 1 Set Schematic Diagram & Parts List

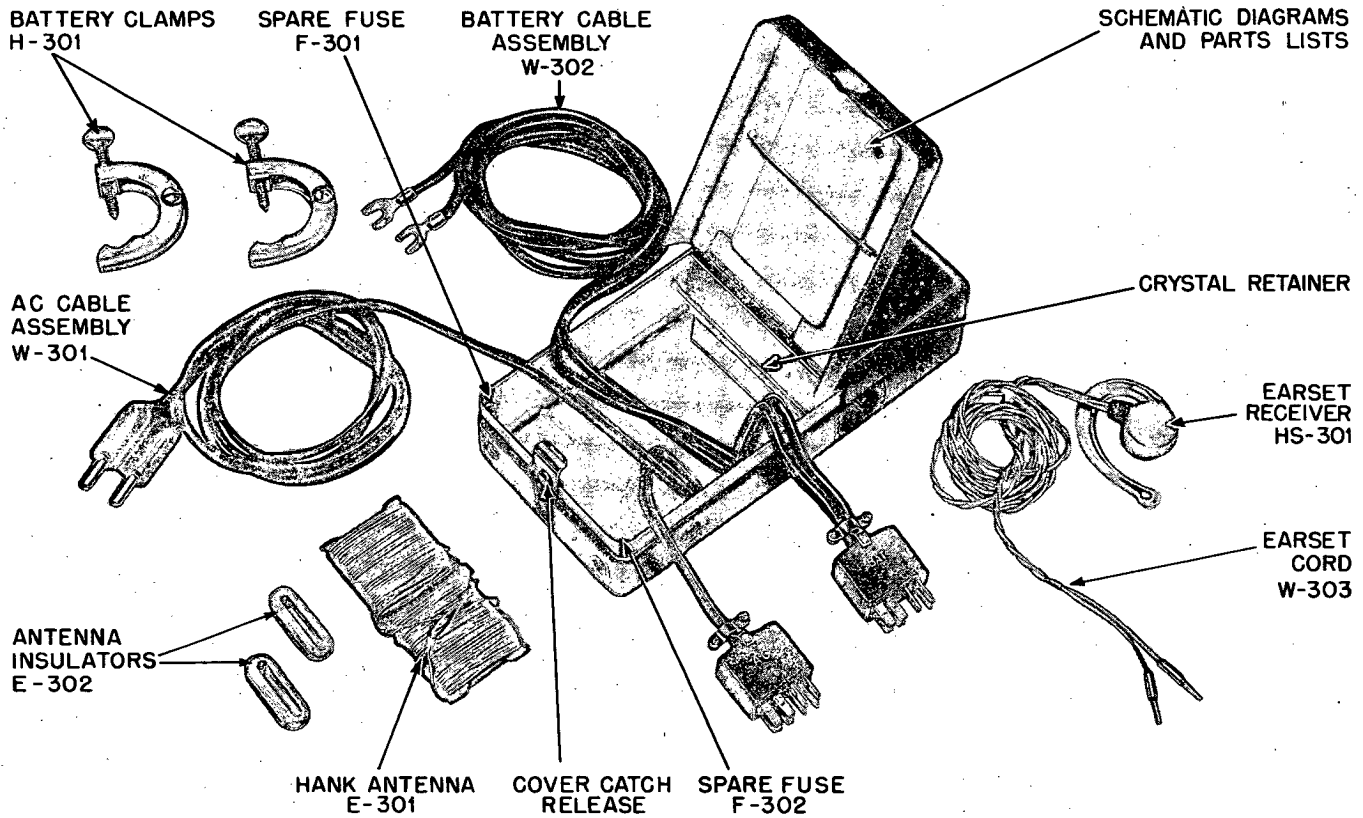


Figure 2. Filter-Accessory Unit RA-6 opened, showing accessories

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SETTING UP EQUIPMENT

1. AC OPERATION HOOK-UP.

a. Turn input voltage selector switch on Power Supply RP-6 (Figure 3) to OFF.

b. Pull sending key out of recess on Transmitter RT-6.

c. Connect equipment as shown in Figure 4. (Receiver crystal shown is optional).

(1) The Jones plug marked AC must be inserted in the OPERATE receptacle on Power Supply RP-6 before the power plug is connected to an AC power source otherwise "hot" terminals will be exposed and a fuse may be blown.

(2) Connect the two-prong plug of the AC cable assembly to any AC power source whose voltage is between 70 and 270 volts, and frequency between 40 and 400 cycles. The two-prong AC power plug can be adapted to various receptacles in the following ways:

(a) Vary the spacing between the prongs by compressing plug.

(b) Prongs can be unscrewed and reversed to provide any combination of small and large prongs as required to fit various power outlets.

d. Turn input voltage selector switch on Power Supply RP-6 clockwise to the first position at which the neon indicating light glows. The transmitter and receiver are now ready for operation.

e. Do not turn off the equipment by disconnecting Jones plug marked AC. This would expose "hot" terminals. Turn off equipment by pulling power plug from power source.

f. Refer to Sections II & III of this chapter for detailed transmitter and receiver operation.

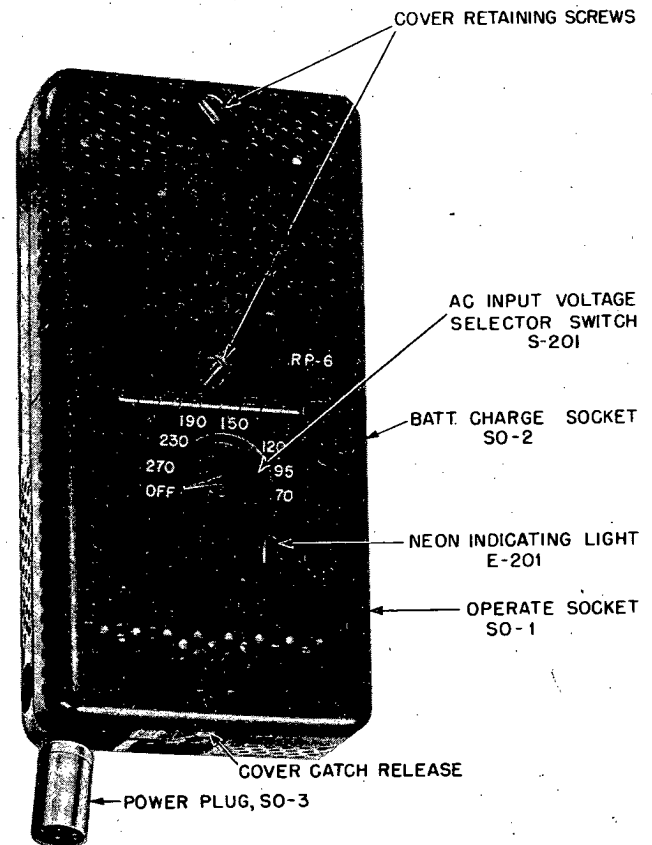


Figure 3. Power Supply RP-6 showing control switch and power plug

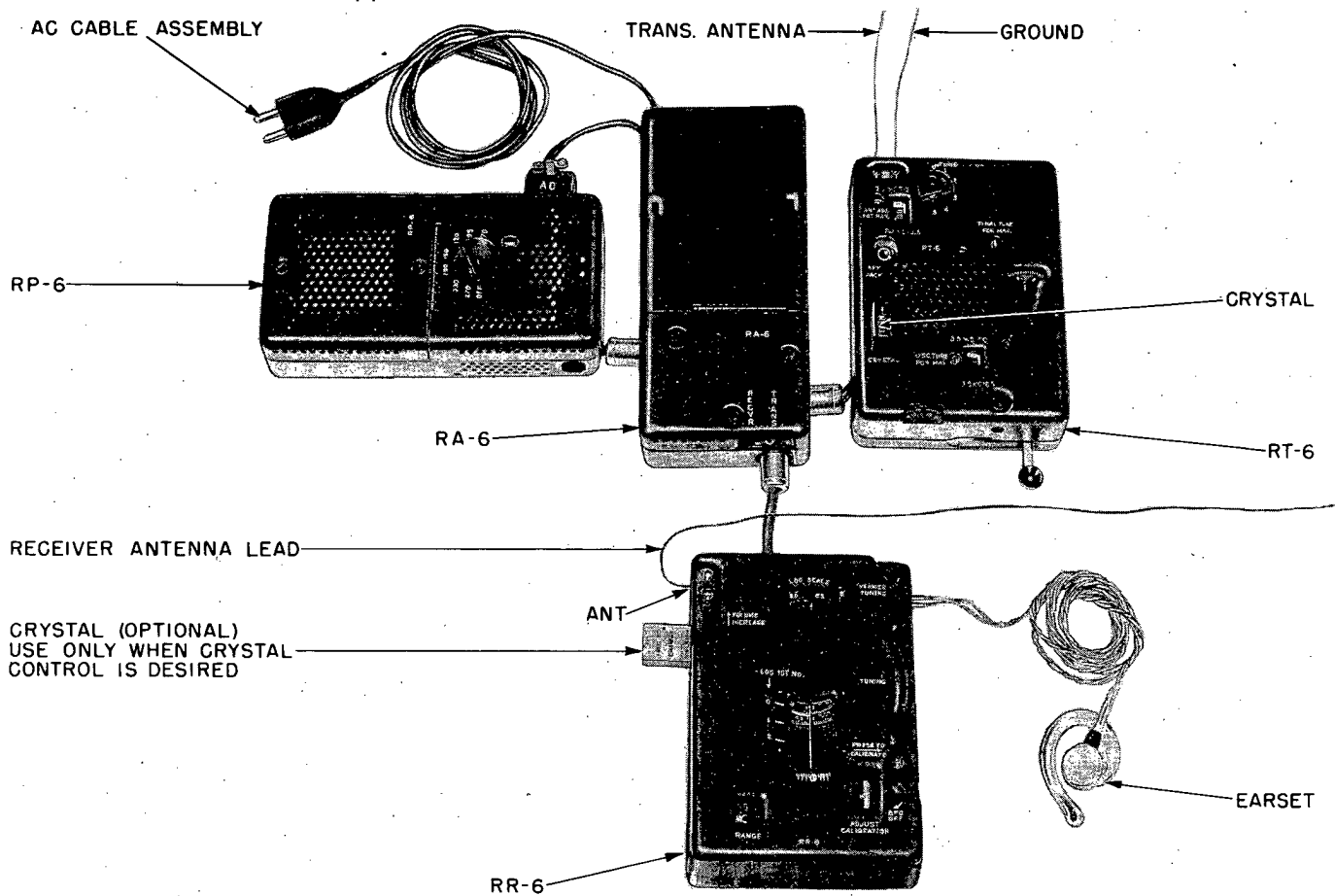


Figure 4. Radio Station RS-6 AC operation hook-up

2. BATTERY OPERATION HOOK-UP.

a. Turn input voltage selector switch on Power Supply RP-6 (Figure 3) to OFF.

b. Pull sending key out of recess on Transmitter RT-6.

c. Connect equipment as shown in Figure 5 (receiver crystal shown is optional).

(1) Use only 6V storage battery source. If only an 8 or 12 volt storage battery is available, connect only across 6 volts (3 cells) of the battery. See Figure 5.

(2) The Jones plug marked BATT must be inserted in the OPERATE receptacle on Power Supply RP-6 before the battery clamps are connected to storage battery, otherwise "hot" terminals will be exposed and equipment

may be damaged.

(3) Connect red battery lead to +6 volt side of the battery, and the black battery lead to the -6 volt side of the battery.

d. The transmitter and receiver are now ready for operation.

e. Do not turn equipment off by disconnecting Jones plug marked BATT. This would expose "hot" terminals. Turn off equipment by disconnecting clamp from either battery terminal.

f. Refer to Sections II & III of this chapter for detailed transmitter and receiver operation.

3. HAND GENERATOR OPERATION HOOK-UP.

a. Pull sending key out of recess on Transmitter RT-6.

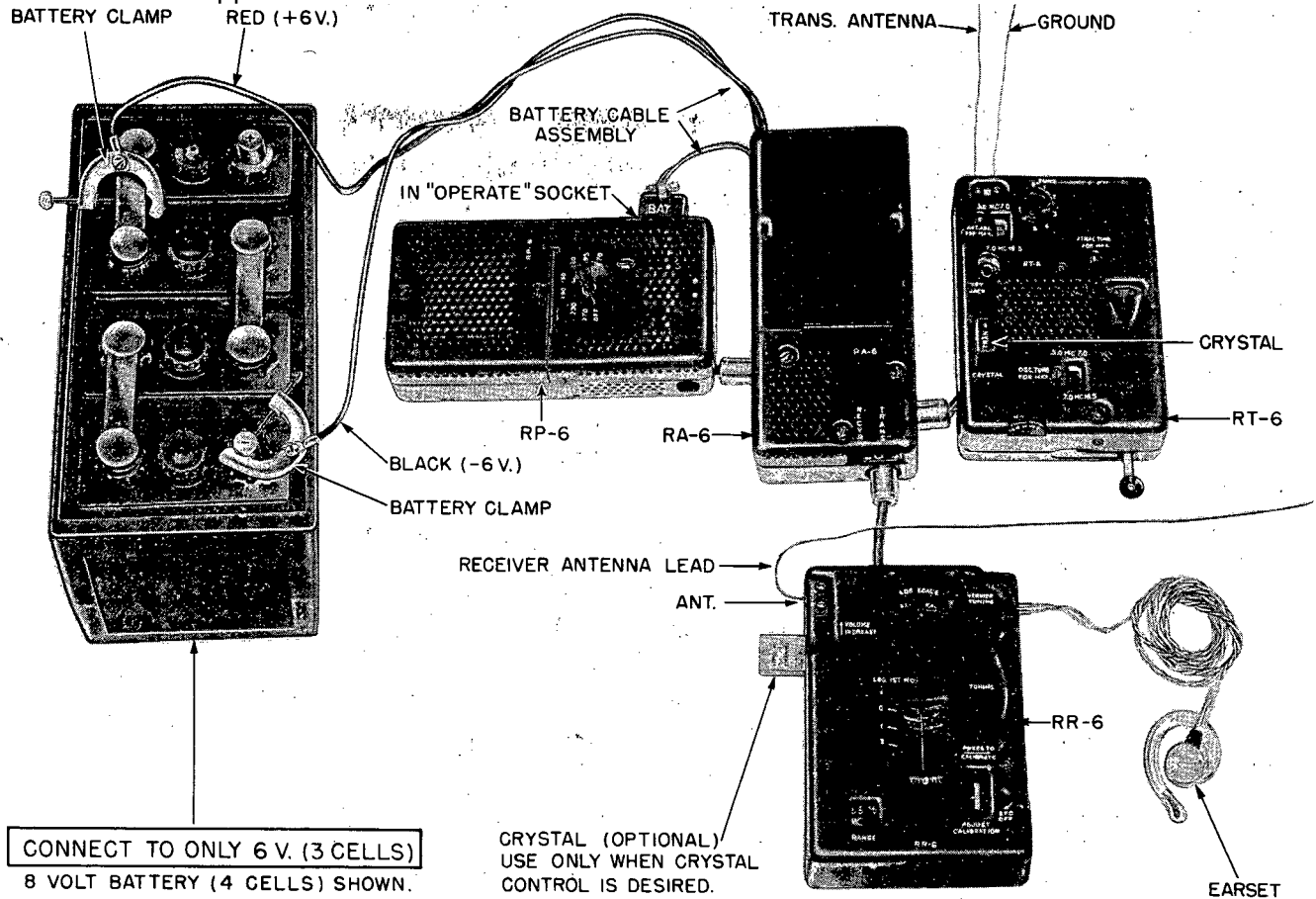


Figure 5. Radio Station RS-6 battery operation hook-up

b. Connect equipment as shown in Figure 6. (Receiver crystal shown is optional). Either Hand Generator GN-58 or SSP-11 may be used. NOTE: Power Supply RP-6 is not used in this method of operation. The transmitter and receiver are now ready for operation.

c. Refer to Sections II & III of this chapter for detailed transmitter and receiver operation.

HAND GENERATOR GN-58 (SSP-11 MAY ALSO BE USED)

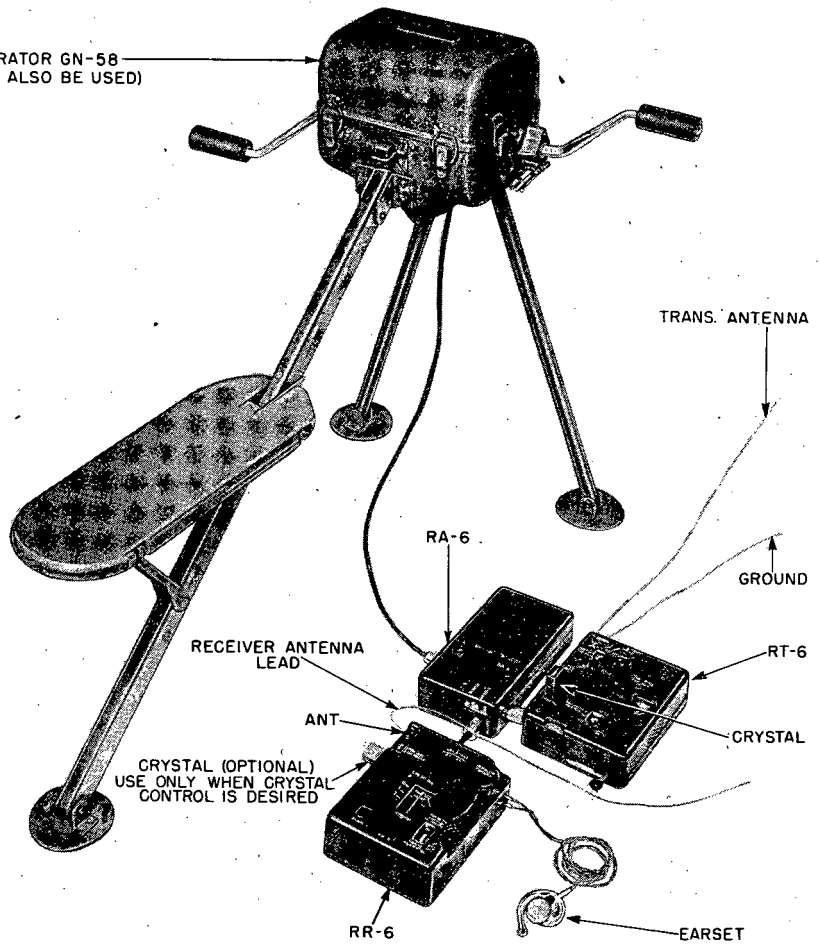


Figure 6. Radio Station RS-6 hand generator operation hook-up

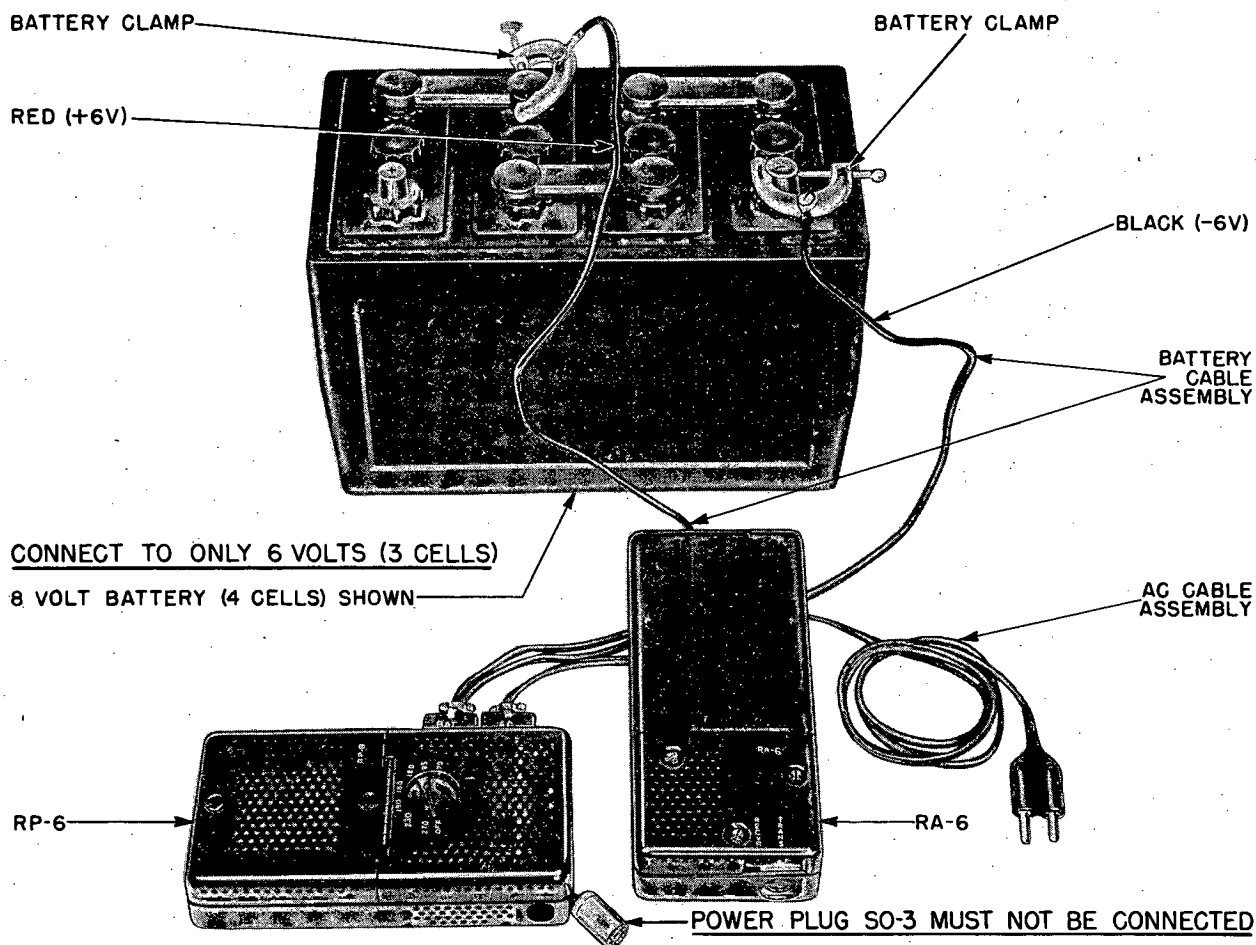


Figure 7. Radio Station RS-6 battery charging hook-up

4. BATTERY CHARGING HOOK-UP & OPERATION.

a. Only a 6V (3 cell) wet type storage battery can be charged.

(1) The charging rate is 3-1/2 amperes minimum.

(2) Battery should be charged only in a well ventilated room as dangerous gases are formed during charging process.

b. Connect equipment as follows: (See Figure 7).

(1) Turn the input voltage selector switch on Power Supply RP-6 to OFF. (Figure 3).

(2) Insert Jones plug marked BATT in receptacle marked BATT CHARGE.

(3) Connect red battery lead to +6 volt terminal of storage battery.

(4) Connect black battery lead to -6 volt terminal of storage battery.

(5) Insert Jones plug marked AC in receptacle marked OPERATE.

(6) Do not connect Power Supply RP-6 power plug to Filter-Accessory Unit RA-6 or fuse will be blown.

(7) Connect the two-prong plug of the AC cable assembly to any AC power source whose voltage is between 70 and 270 volts, and frequency between 40 and 400 cycles. The two-prong AC power plug can be adapted to various receptacles in the following ways:

(a) Vary the spacing between the prongs by compressing plug.

(b) Prongs can be unscrewed and reversed to provide any combination of small and large prongs as required to fit various power outlets.

c. Turn input voltage selector switch of Power Supply RP-6 clockwise to the first position at which the neon indicating light glows. Battery is now being charged.

d. To stop charging process proceed as follows:

(1) Turn the input voltage selector switch on Power Supply RP-6 to OFF.

(2) Disconnect two-prong AC plug from power source.

(3) Remove battery leads from battery.

Section II: TRANSMITTER RT-6

1. CONTROLS & FUNCTIONS (See Figure 8).

a. OSC BANDSWITCH - Selects desired band for oscillator.

(1) Blue position - 3 to 7 mc.

(2) Red position - 7 to 16.5 mc.

b. FINAL BANDSWITCH - Selects desired band for final amplifier.

(1) Blue position - 3 to 7 mc.

(2) Red position - 7 to 16.5 mc.

c. OSCILLATOR TUNING. Tunes oscillator tank to desired frequency.

(1) Blue scale - 3 to 7 mc.

(2) Red scale - 7 to 16.5 mc.

d. FINAL AMPLIFIER TUNING - Tunes final amplifier plate tank to desired frequency.

(1) Blue scale - 3 to 7 mc.

(2) Red scale - 7 to 16.5 mc.

e. ANTENNA IMPEDANCE MATCHING SWITCH - Matches the output impedance of the final amplifier to the antenna impedance.

f. SENDING KEY - Used for handkeying transmitter.

2. CRYSTAL SELECTION.

a. By using the fundamental (fre-

quency stamped on the crystal), second harmonic (two times fundamental), or third harmonic (three times fundamental) of crystals of from 3 to 7 mc, the entire frequency range (3 to 16.5 mc) of the transmitter can be covered.

b. DO NOT use overmode crystals, nor operate crystals on fourth or higher harmonics.

3. ANTENNA LENGTH & HEIGHT.

a. The length of the quarter wave "L" antenna for a given frequency can be calculated from the following formulas:

$$L \text{ (feet)} = \frac{234}{\text{freq (megacycles)}}$$

$$L \text{ (meters)} = 0.238 \times \text{wavelength}$$

b. The antenna should be as high as possible.

4. GROUND CONNECTION.

Connect the terminal marked GND to a metal member buried in moist earth (water pipe, gas pipe, or ground stake).

5. TUNING (Refer to Figure 8).

a. Plug a crystal into the socket marked CRYSTAL. Its fundamental operating frequency must be either:

(1) The same as the desired broadcast frequency (fundamental operation),

(2) One-half the desired broadcast frequency (2nd harmonic operation), or

(3) One-third the desired broadcast frequency (3rd harmonic operation).

b. Set the oscillator and final bandswitches to the desired broadcast frequency. Both switches must be set to the same color.

(1) Blue position covers frequencies from 3 to 7 mc.

(2) Red position covers frequencies from 7 to 16.5 mc.

c. Set oscillator and final amp tuning

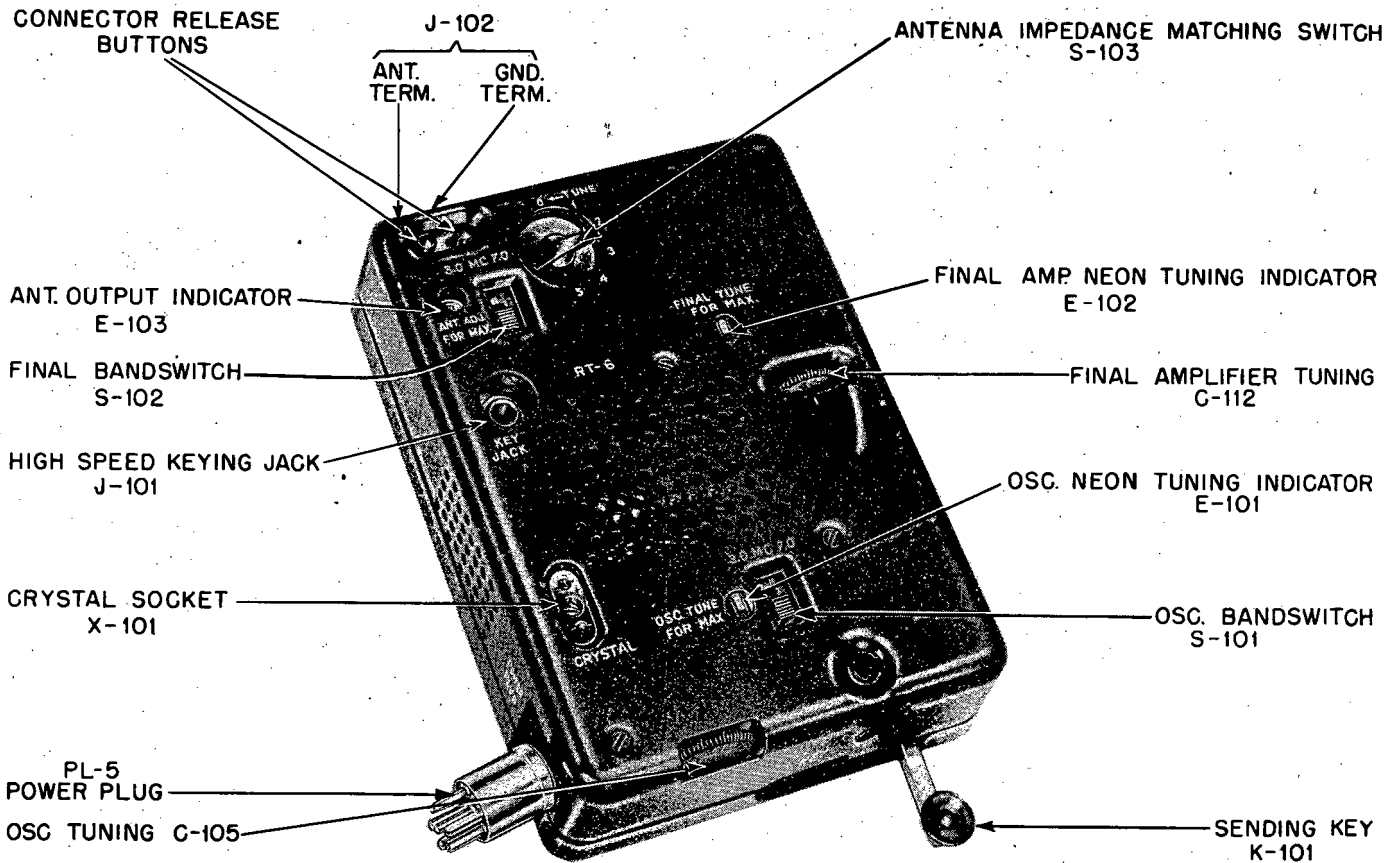


Figure 8. Transmitter RT-6 showing control locations

dials as closely as possible to the desired broadcast frequency. Both dials must be set to the same color scale.

(1) The dials are calibrated in megacycles.

(2) The 3 to 7 mc markings are in blue.

(3) The 7 to 16.5 mc markings are in red.

d. Set RECVR-TRANS switch on Filter Accessory Unit RA-6 to TRANS. (See Figure 9).

e. Turn antenna impedance matching switch to TUNE (zero). This disconnects the antenna and reduces radiation to a minimum while tuning up transmitter.

f. Press sending key and retune final amp tuning dial slightly to obtain distinct increase in brilliance of FINAL TUNE FOR MAX indicator. Release key.

g. Press sending key and retune osc tuning dial slightly to obtain distinct in-

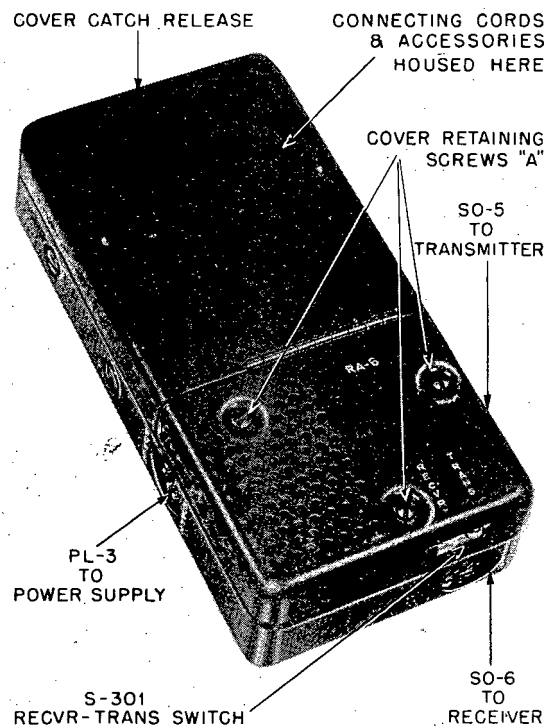


Figure 9. Filter-Accessory Unit RA-6 showing RECVR-TRANS switch

crease in brilliance of OSC TUNE FOR MAX indicator. If pronounced brilliance peak is not noted on indicator (as may be the case when using third harmonic of crystal) repeak oscillator tuning dial for peak brilliance of FINAL TUNE FOR MAX indicator.

h. Press sending key down and turn antenna impedance matching switch to position where ANT ADJ FOR MAX indicator glows brightest. Release key.

i. Press sending key down and retune final amp tuning dial slightly for peak brilliance of ANT ADJ FOR MAX indicator. Release key.

6. KEYING.

a. The transmitter is keyed:

(1) by the sending key (Figure 8),

(2) by plugging the automatic high-speed keyer in KEY JACK (Figure 8), or

(3) by inserting frequency shift unit in the crystal socket for frequency shift operation.

b. The transmitter is ON when the sending key is folded into the recess on the front panel. The key must be in this position for automatic keying through the KEY JACK or for frequency shift operation.

Section III. RECEIVER RR-6

1. CONTROLS & FUNCTIONS (See Figure 10).

a. VOLUME - Controls volume of received signals.

b. RANGE - Selects proper frequency band.

(1) Blue position - 3 to 6.5 mc.

(2) Red position - 6.5 to 15 mc.

c. TUNING - Quickly sets oscillator to any point within receiver frequency range.

d. VERNIER TUNING. A finer control of the large TUNING dial.

e. PRESS TO CALIBRATE - Provides crystal-controlled frequency for dial calibration every 0.5 megacycle (500 kc).

f. ADJUST CALIBRATION - Corrects error in dial calibration by moving indicator hairline with respect to dial scale.

g. BFO - Turns CW signal on & off and varies pitch of CW signals.

2. CALIBRATING THE TUNING DIAL

A signal generated by a crystal-controlled oscillator in the receiver offers a means of checking the accuracy of the frequency read on the dial. By means of harmonics, the 500 kc crystal provides signals in 500 kc steps throughout the dial. Thus, each megacycle mark and each half megacycle mark become a calibration point. To calibrate dial, proceed as follows:

a. Set RECVR-TRANS switch (Figure 9) on Filter-Accessory Unit RA-6 to RECVR.

b. Hold down button marked PRESS TO CALIBRATE

c. Turn the BFO dial until zero is aligned with the white mark on the housing.

d. Turn VERNIER TUNING until zero beat is heard. NOTE: Zero beat is the no sound point between the two sound peaks.

e. If the indicator hairline (Figure 10) is not exactly over a megacycle or half-megacycle calibration point, turn ADJUST CALIBRATION until the hairline coincides with the closest calibration point.

3. TUNING (Variable)

a. Set RANGE switch (Figure 10) for proper frequency band - "red" for high band (6.5 to 15 mc) and "blue" for low band (3 to 6.5 mc).

b. The dial scale is calibrated directly in megacycles. Use the red scale

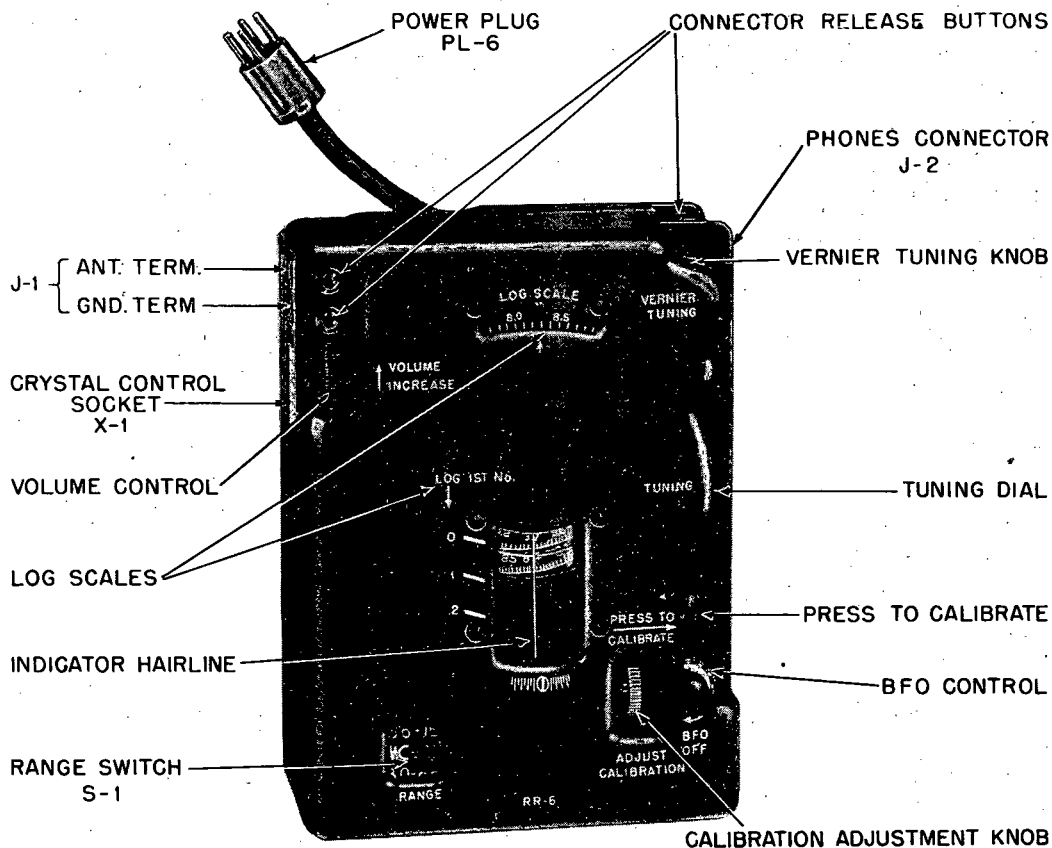


Figure 10. Receiver RR-6 showing control locations

for high band (6.5 to 15 mc) and blue scale for low band (3 to 6.5 mc).

c. Tune stations with the TUNING (coarse) control, or for more precise adjustment use VERNIER TUNING.

d. Calibrate dial on the nearest megacycle or half-megacycle calibration point as directed in previous paragraph. Turn BFO dial until zero is aligned with the white mark on the housing before calibrating dial. NOTE: For AM (voice) reception, turn BFO clockwise to OFF.

e. Set dial to desired frequency and then retune slightly, if necessary, for best reception.

4. TUNING (Crystal)

a. Plug specified crystal in CRYSTAL CONTROL socket (Figure 10). NOTE: Oscillator frequency is 455 kc higher than the received frequency.

b. Tune receiver to working frequency and proceed as above. The receiver

can be tuned to the fundamental, second, and third harmonics of the crystal if they fall within the receiver's tuning range.

5. LOG SCALE.

a. Signals may be accurately logged to three figures through the use of the LOG SCALE.

(1) After station is accurately tuned in, note the position of the white horizontal line with respect to the 0, 1, 2 numerals located to the left of the dial scale opening. These numerals represent the first digit of the log scale.

(2) Read and record the numeral located above the white line for the first digit. Read the other two digits on LOG SCALE.

(3) Once a station is logged in, the tuning dial may be re-set by these numbers for future location of that station.

Section IV. PACKAGING

1. HOW TO REPLACE UNITS IN PLASTIC POUCH (See Figure 11).

a. When not in use, or when transporting, the units should be kept in the plastic pouches provided, as shown in

Figure 11. The pouches are waterproof if folded in the prescribed manner.

b. There are two sizes of pouches - two large ones for Transmitter RT-6 & Receiver RR-6, and two small ones for the Power Supply RP-6 and Filter-Accessory Unit RA-6. All are used as shown in Figure 11.

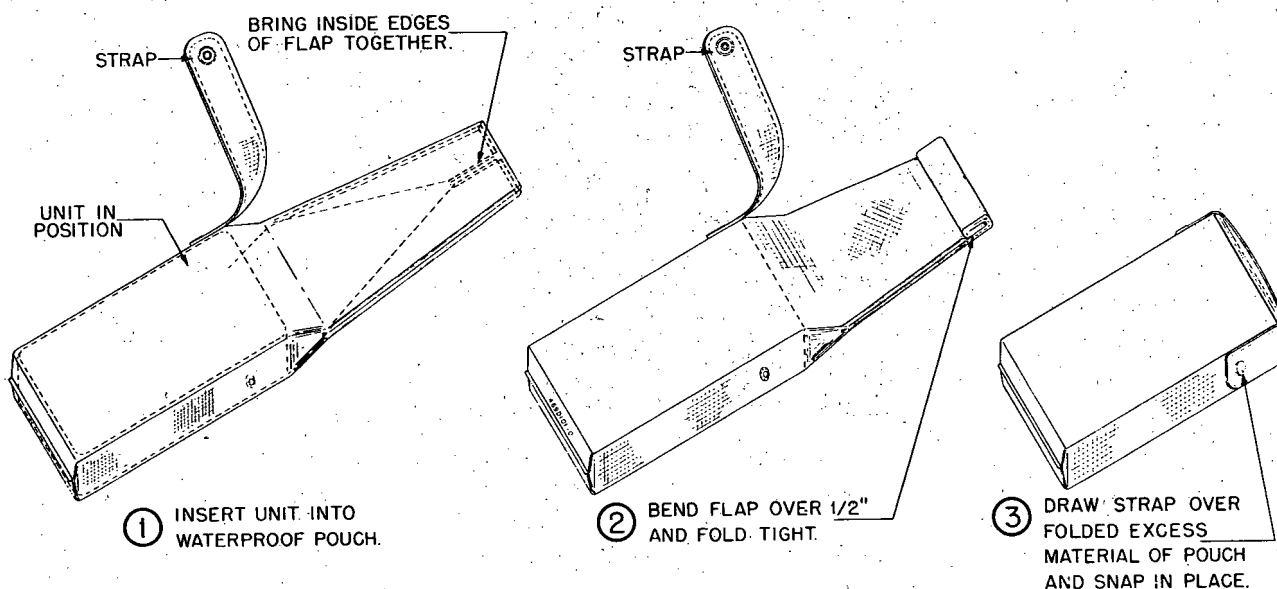
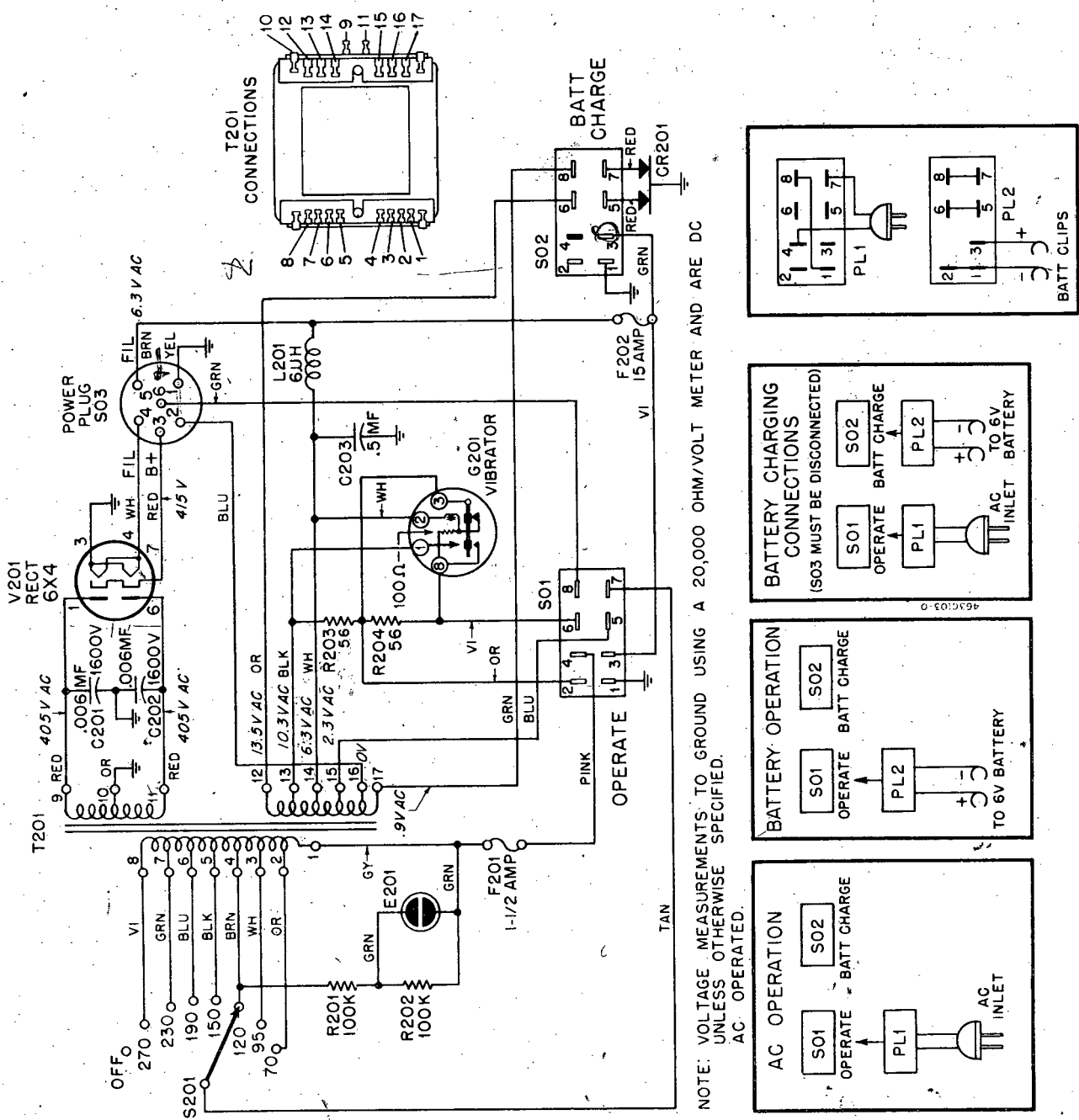


Figure 11. Packaging Detail

APPENDIX



NOTE: VOLTAGE MEASUREMENTS TO GROUND USING A 20,000 OHM/VOLT METER AND ARE DC UNLESS OTHERWISE SPECIFIED.
AC OPERATED.

Figure 12. Power Supply RP-6 Schematic Diagram

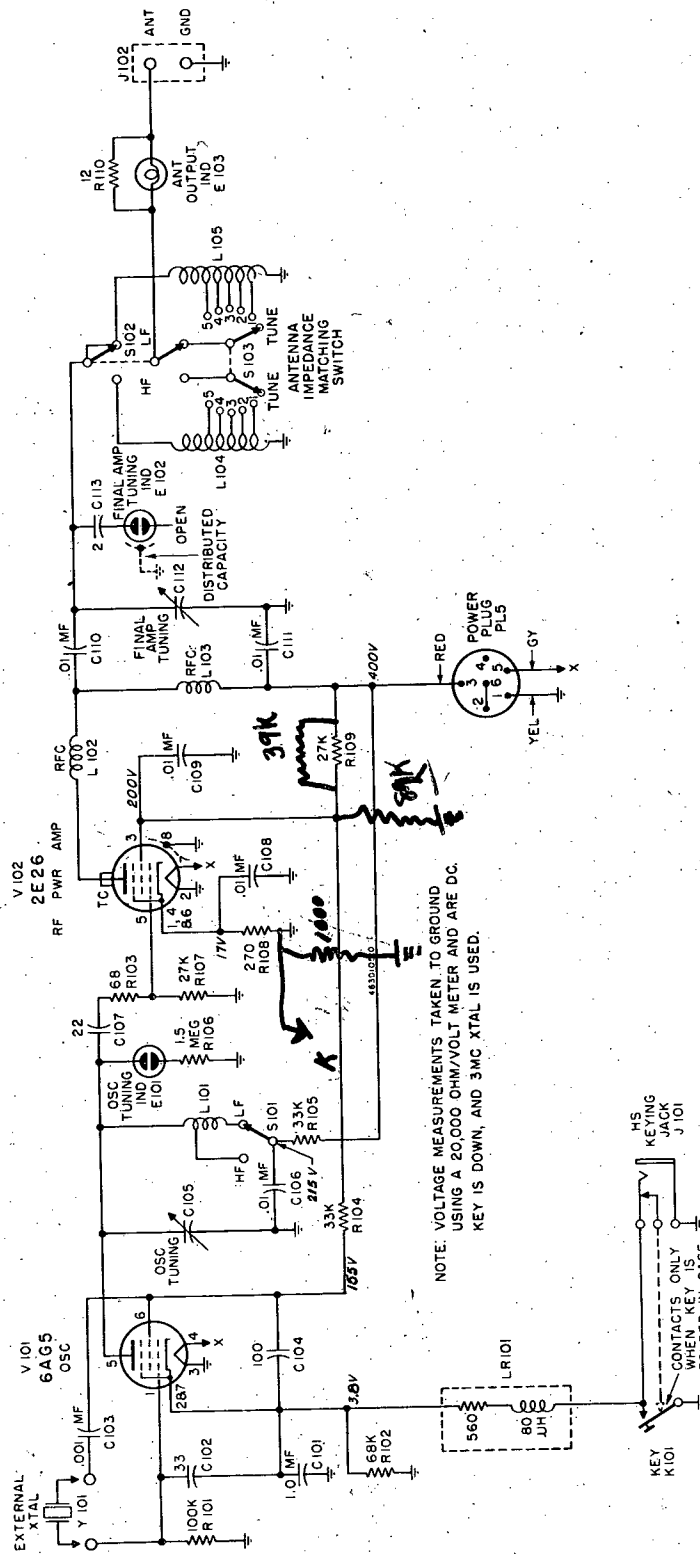
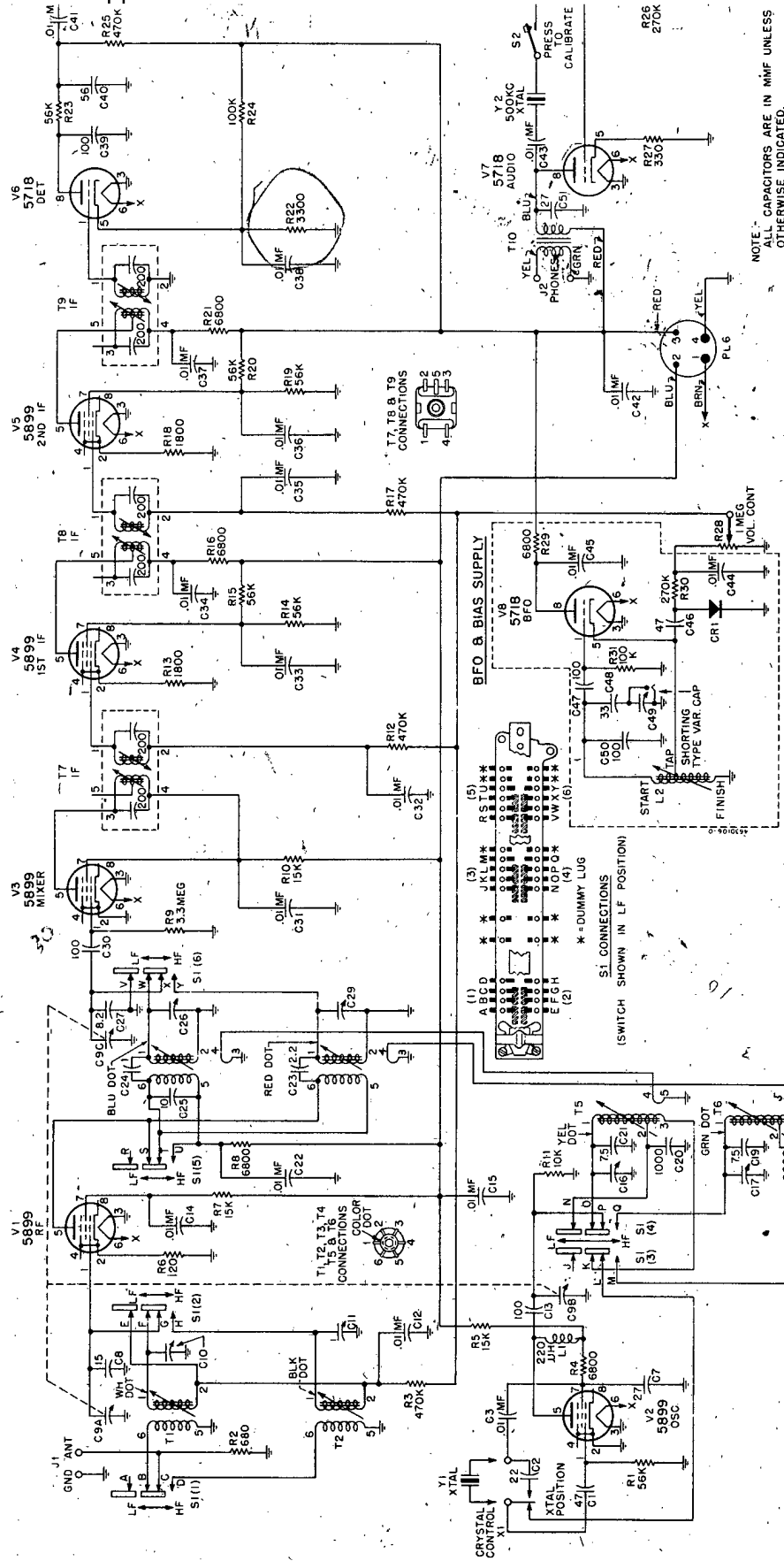


Figure 14. Transmitter RT-6 Schematic Diagram



NOTE: ALL CAPACITORS ARE IN MMF UNLESS OTHERWISE INDICATED.

Figure 15. Receiver RR-6 Schematic Diagram

