

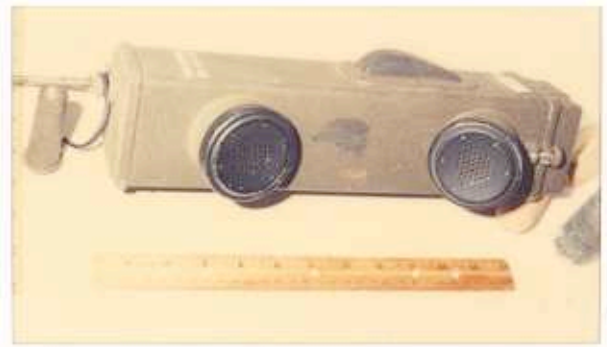
FOR SURPLUS HOUNDS: THE BC-611, SCR-536 HANDY-TALKIE

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Special thanks to Henry Engstrom

The first of the hand held transceivers appeared in World War Two as the BC-611 Handy-Talkie. It looks like a squared off and all too large telephone handset, with a 39" antenna sticking out. It weighs in at just over 5 pounds. Nearby are several contemporary illustrations. A near-mint example came up at the AWA auction in Rochester (it sold for \$110), and photographs of it also appear. These and similar sets sometimes show up at swap meets for as little as \$10 in rough shape.

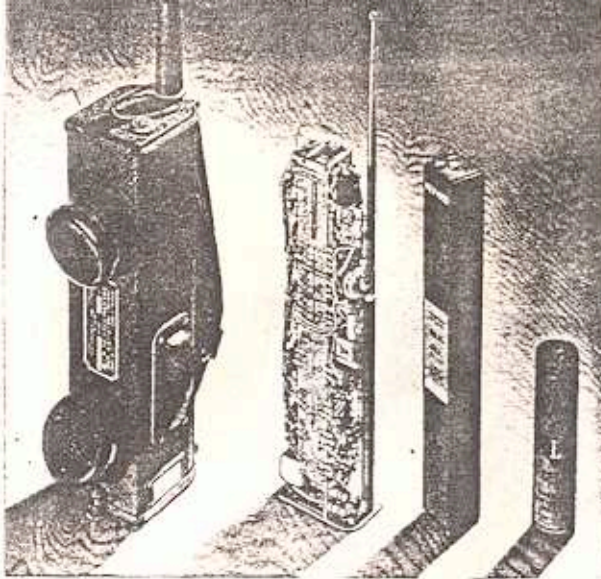
Motorola (then Galvin Mfg. Co.) designed and built the Handy-Talkie. They called it "the 'fightingest' radio set in the army!" because it was used primarily in the front lines. The set uses low filament voltage, miniature glass tubes of the sort developed for civilian portable radios just before the war, e.g., the 1R5 and the 1S5 and 1T4, announced in 1939, and the 3S4 of 1941. The circuit is a superheterodyne receiver, with the local oscillator and RF stage converted to a master oscillator-power amplifier for transmitting. It operated crystal controlled AM between 3.5 MHz and 6 MHz. The chassis is solidly constructed with spring clips for the tubes. Pulling the whip antenna out the top snaps an internal toggle switch to turn the set on. Range was of course limited to squad and platoon and maybe company uses, up to one mile. Nonetheless, it sure was an improvement over the BC-745 Horsey-Talkie on a stick (examined in this column last year), or a heavy back-pack radio.

The BC-611 implemented innovations beyond miniature tubes: "cups" of small parts placed together, powdered iron cores in the IF transformers, and miniaturized capacitors and resistors. The set is also watertight as well as rugged.



During the Second World War, CHRS member George Durfey had occasion to use this set on the front lines in Europe, when he wasn't firing his B.A.R. His comments to date on the set have been limited to: "It worked alright." Towards the end of the War, the Signal Corps developed a loop antenna accessory so that the set could be used as a direction finder. This would only have permitted American troops to locate an American beacon transmitter on the pre-set frequency, because the set did not tune. The last models of the Handy-Talkie, the BC-611F, had 50 available crystal channels, and a plug-in mike and headset. The Handy-Talkie was operational as early as 1942; by the end of the War, the Signal Corps had implemented its policy of FM line communications, with the so-called "Walkie-Talkie" manpack radios such as the SCR-195 (52 to 66 MHz, at 27 pounds). FM had about twice the useable range and improved clarity.

The BC-611 was followed, during the Korean conflict in 1952, by the banana-shaped AN/PRC-6 Handy-Talkie, an FM set operating on 47 to 55 MHz. This was, if anything, more awkward to use and heavier. It did have as an accessory a lightweight plug in handset. By Nam-time, the hand-held AN/PRC-68, the size of a pack of Camel-wides, and with a microphone and speaker, provided line-unit communications, along with later developed helmet radios. The BC-611 was the first of these workhorse radios, and a modern expert calls it "...one of the outstanding designs of all time." (Walt Hutchens, "The BC-611 Handy Talkie," *Electric Radio in Uniform*, *Electric Radio* (No. 24, April, 1991 at p. 4); see also Robert F. Scott, "Inside the Handy-Talkie," in *Radio Craft* (July, 1946 at p. 684)). ##



Inside and outside views of Motorola Handie-Talkie and batteries.



EXTENDING ANTENNA SECTION TURNS KEY ON
Antenna switch detail.



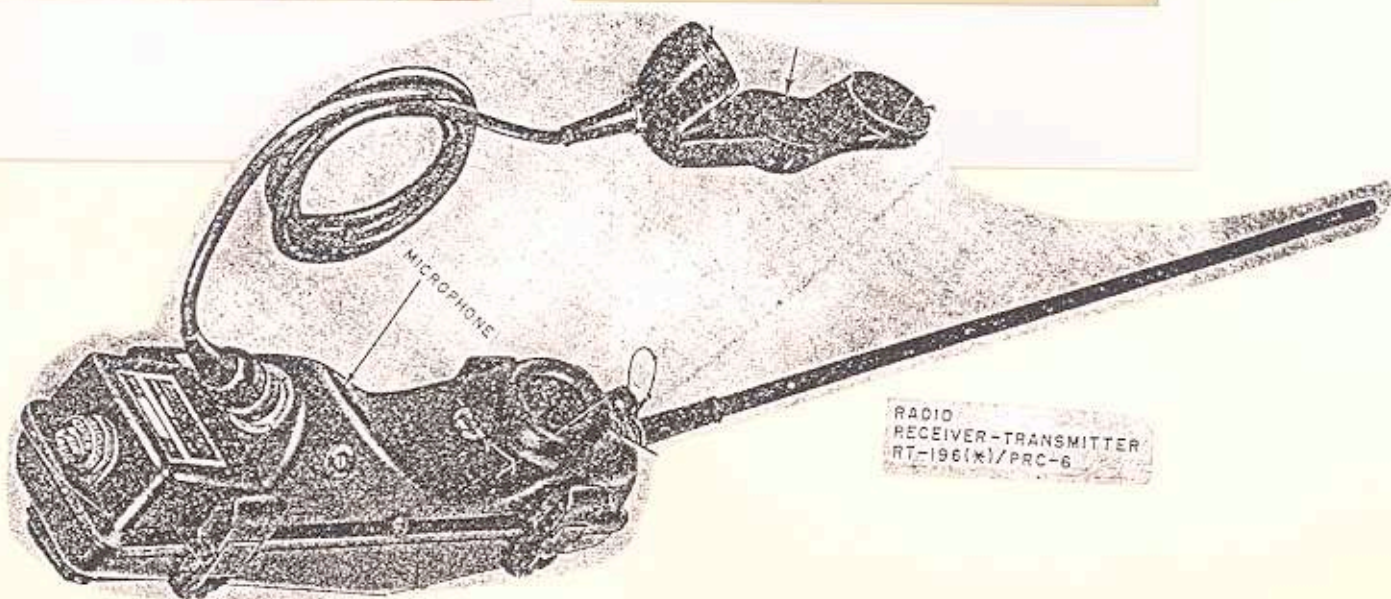
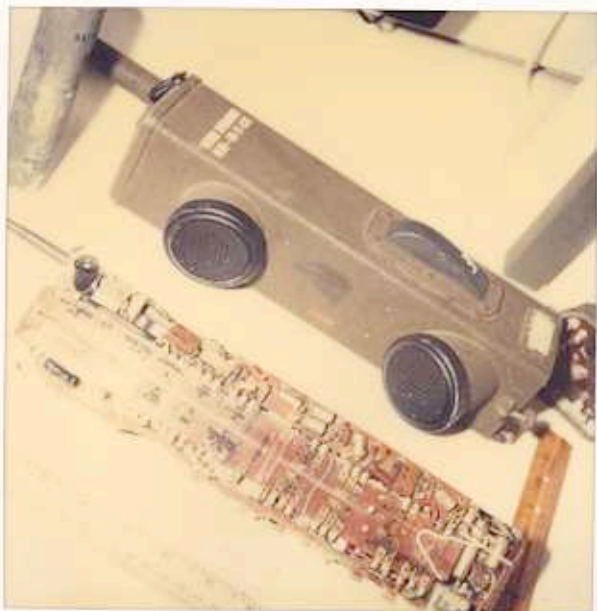
Handie-Talkie signals
the **attack!**

HANDIE-TALKIE IS
ANOTHER MOTOROLA RADIO FIRST!



The "FIGHTINGEST" Radio in the Armed Service.

BC-611, EXTERIOR VIEWS AND DETAIL OF ANTENNA SWITCH. The lower graphic is the BC-611's successor, the AN/PRC-6 (1952).



Daddy fought in the war.

The Motorola MicroTAC Ultra Lite™ comes from a long line of heroes. Like the original SCR 536 hand-held wireless radio, which cut our boys loose from the wires of war. Lives depended on us then. Busy lives depend on us now. Motorola. The best-selling, most-preferred cellular phones in the world.



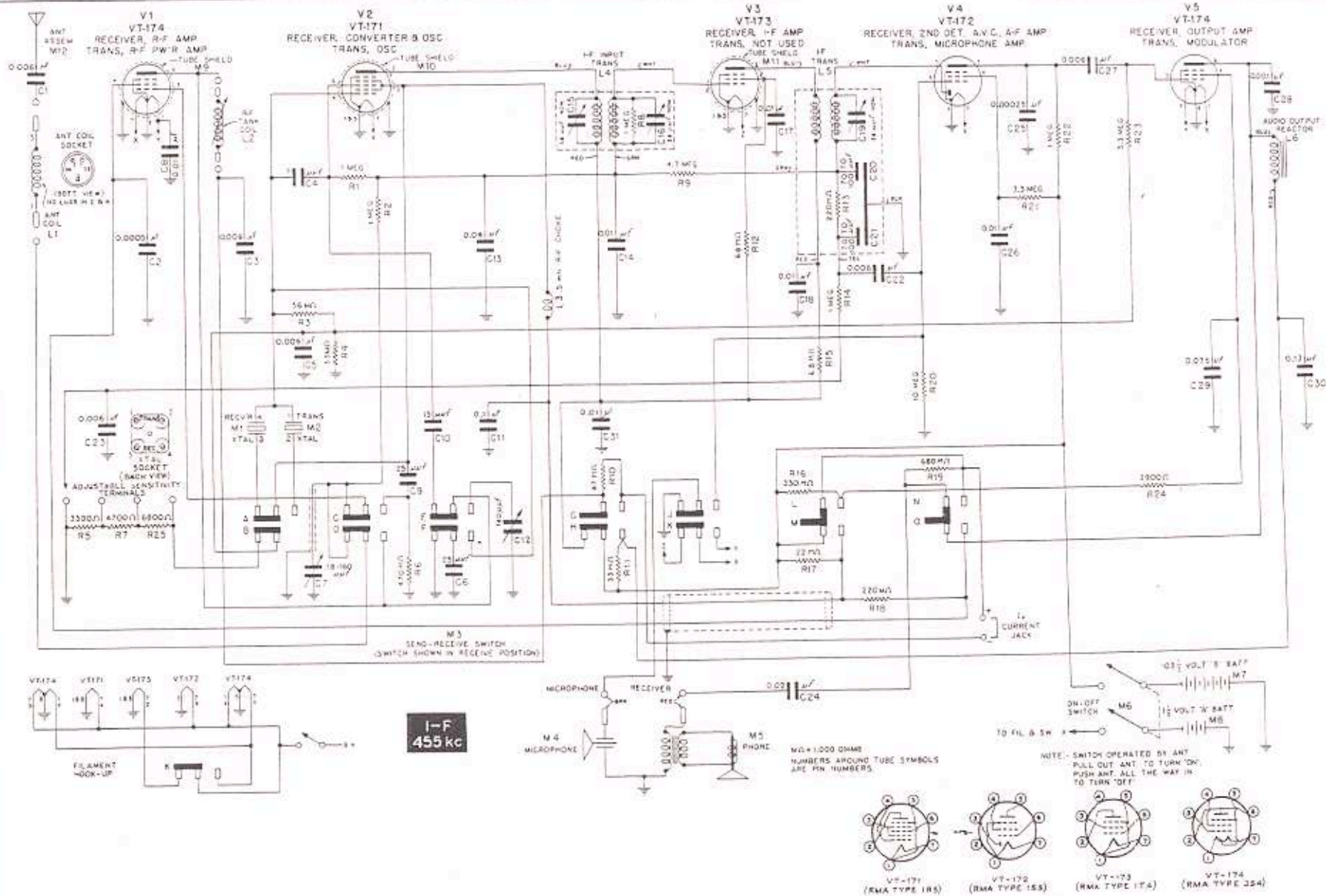


Fig. 7.—Schematic—BC-611—A.

SCHEMATIC DIAGRAMS FOR
MAINTENANCE OF GROUND RADIO
COMMUNICATION SET
RADIO RECEIVER & TRANSMITTER BC-611



RESTRICTED

DISSEMINATION OF RESTRICTED MATTER. The information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized Military public relations agencies. (See also par. 18b, AR 380-5, 28 Sep 1942.)

PRESETTING AND ALIGNMENT

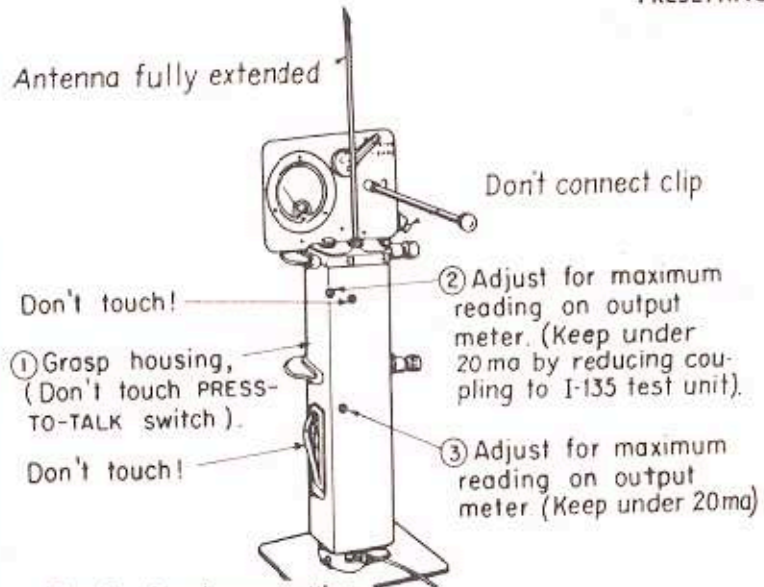


Fig. 3.—Receiver presetting.

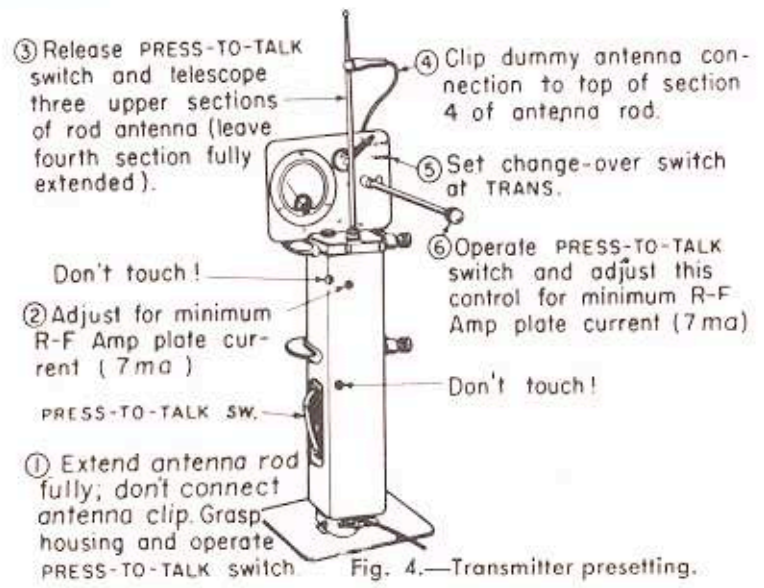


Fig. 4.—Transmitter presetting.

Using I-135-(*) test unit as shown in Fig. 2 (with external heavy duty batteries, if available).
Remove BC-611 plate current jumper before attaching harness, and REPLACE after tests.

TEST OR ADJUSTMENT	Trans Crystal in	Rec Crystal in	I-135 SWITCH POSITIONS			PRESS TO TALK SWITCH	I-135 METER READING	REMARKS
			Master Switch	Mod Tester	Mod Trans			
Crystal Activity Check	Tester	Tester	Crystal Activity	OFF			0.3 (min)	Test one at a time. Check that rec crystal is 455 kc higher than trans crystal.
Receiver Operation Check	Tester	Set	BA-37 0-3v BA-37 0-600ma BA-38 0-150v BA-38 0-60ma	OFF			1.35 (min) 250 85 (min) 5-11	
² Receiver Presetting	Tester	Set	OUTPUT	ON			Keep under 20	See Fig. 3 above for steps.
² I-F Alignment (if needed)	Tester	Set	OUTPUT	ON				See Fig. 2. Adjust in order for max. Repeat.
Transmitter Operation Check	Set	Tester	BA-37 0-3v BA-37 0-600ma BA-38 0-150v BA-38 0-60 ma	OFF		Press	1.35 (min) 275-300 75 (min) 26-30	Antenna fully extended. Test clip off.
Transmitter Presetting	Set	Tester	PWR AMP	OFF		Press	7	See Fig. 4 for steps. Ant current 15ma or more.
Modulation Check	Set	Tester	PWR AMP	ON	Press	Press	7	Ant current should increase at least 6 percent.
BA-37, BA-38 Battery Test	Set	Set	BA-37 0-3v BA-38 0-150v	OFF			³ 1.35-1.5 375-103.5	Disconnect internal batteries, install BA-37 and BA-38 in I-135. Ant fully extended. Test clip off.

IMPORTANT

¹Always turn to OFF when changing crystals, batteries, or connections, and when not in use.
²Crystal slide cover of I-135 open. Attach short wire for additional radiation if needed. DON'T FORGET TO REPLACE PLATE CURRENT JUMPER!
³Both batteries should be replaced if either is low. Lower limits - 1.25v and 70v.

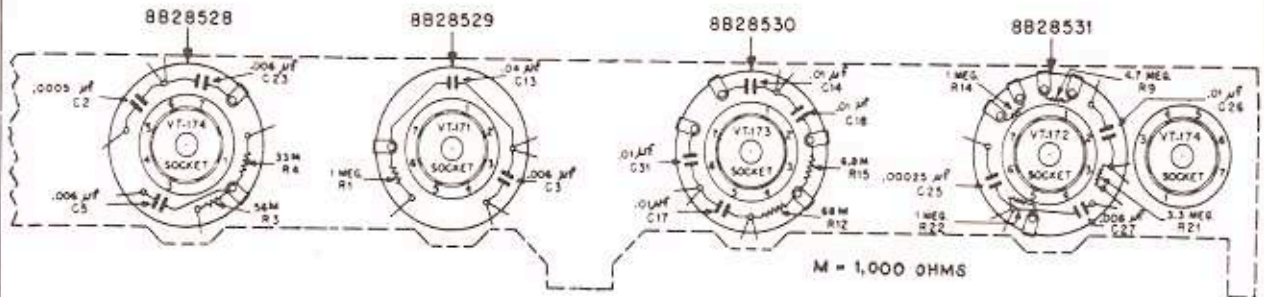
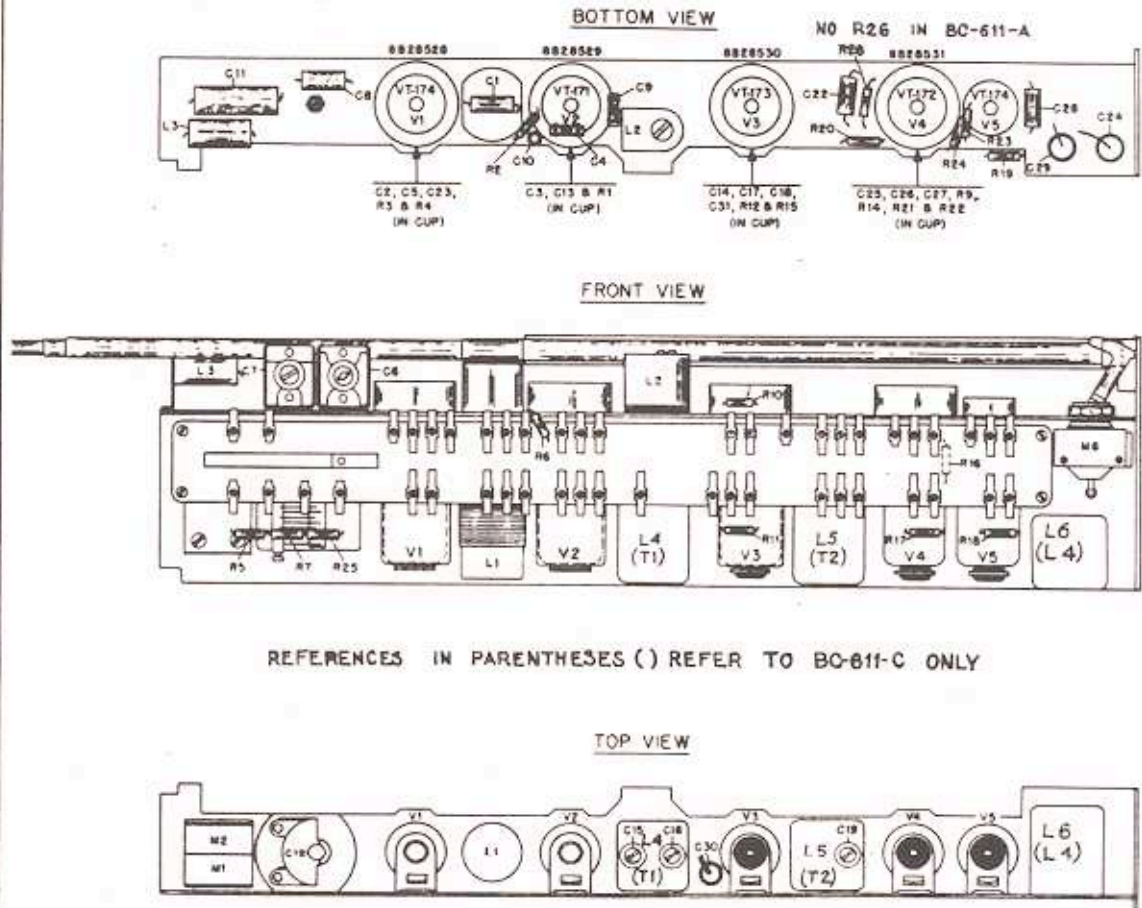


Fig. 5.—Resistor-capacitor cup schematic.



REFERENCES IN PARENTHESES () REFER TO BC-611-C ONLY

Fig. 6.—Parts layout.

COMMON FAULTS AND CORRECTIVE MEASURES

WATERPROOFING BC-611-(*)

1. The following method is recommended in cases where trouble is encountered due to moisture seepage.
 - a. Spread a small quantity of Permatex, aviation type, Permatex Co., N.Y., or equal, over the sealing rubber of both bottom and top covers.
 - b. Close bottom cover and press it firmly in place while tightening the hinged thumb screw. Be sure this screw is tight.
 - c. Insert a fiber washer under the screw which holds the top cover to the chassis. Close cover and tighten screw.
 - d. Remove cover of "Press to Talk" switch assembly. Spread a thin coating of Permatex over the rubber surface (side making contact with case) and replace the cover. Be sure the metal frame is snugly screwed down.
 - e. Remove bakelite cover from both mouth and ear pieces. Squeeze a small quantity of Duco cement, DuPont de Nemours Co., or equal, on the diaphragm of both pieces (dynamic type only) and spread out evenly with finger. Allow to dry several minutes and repeat with a second coat. Allow the cement to dry one-half ($\frac{1}{2}$) hour before replacing bakelite covers.
 - f. Remove the neoprene grommet from the antenna insulator. Fill the inside of the grommet with petroleum jelly, Chesebrough, or equal, and place back on the insulator.
2. Steps have been taken to procure and stock, at various Signal Corps Depots, kits comprised of the following materials suitable for the above outlined modification, which may be requisitioned through the regular channels:
 - 1 gross Washers, fiber, 5/16" O.D., 3/16" I.D., 1/16" thick, Pennsylvania Fiber & Specialty Co., or equal.
 - 8 ounce Permatex, aviation type, Permatex Co., N.Y., or equal.
 - 1 tube Cement, household, 5 $\frac{1}{4}$ fluid ounce, DuPont de Nemours Co., or equal.
 - 8 ounce Jelly, petroleum, Chesebrough Mfg. Co., or equal.
3. The above kit of materials is sufficient for maintenance of fifty (50) sets for one year.

OCSigO Maintenance Letter No. 13.

FAILURE OF C₂₉

Capacitor C₂₉ frequently short circuits. Remedy is replacement. If replacement is necessary, also check for damage to resistors R₁₆ and R₂₄. Replace them if necessary.