

RESTRICTED

TM 11-250

WAR DEPARTMENT

TECHNICAL MANUAL

RADIO SET SCR-288

October 28, 1942

RESTRICTEDTECHNICAL MANUAL }
No. 11-250 }WAR DEPARTMENT,
WASHINGTON, October 28, 1942.**RADIO SET SCR-288****DEMOLITION NOTICE**

Depending upon the time and materials available, when the capture of this equipment by the enemy is certain, completely destroy it by one or more of the following means:

1. Explosives such as grenades or TNT.
2. Incendiaries such as wood, oil, and gasoline.
3. Axes, hammers, large rocks, or other hard heavy instruments such as hand generators, dynamotors, etc.
4. Shots from rifles, carbines, or pistols may be used on such parts as generators and dynamotors.
5. Removal of the chassis from the cabinet and covers from generators will facilitate the above means of destruction. When this is done be sure to smash all variable capacitors, tubes, and tuning coils.

SAFETY NOTICE

The maximum voltage available in this equipment is less than 300 volts. Such voltages are not usually regarded as dangerous to human life, but may be the source of considerable discomfort or even injury to a person coming in contact with them. Care should be taken not to touch those components carrying transmitter plate potentials, especially the ungrounded side of the telegraph key, while the generator is being operated. It is to be noted that no interlocks are provided, as no high-potential parts are exposed or accessible during operation.

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*This manual supersedes TM 11-250, April 19, 1942.

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SECTION I

DESCRIPTION

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1. **General.**—Radio set SCR-288 (fig. 1) is a portable amplitude-modulated transmitting and receiving set. The transmitter is designed to operate within the frequency range of 3,500 to 6,300 kilocycles and to deliver 4 watts of power into the antenna for either voice-modulated (phone) or continuous-wave (c-w) operation. The receiver is designed to operate within the frequency range of 2,300 to 6,500 kilocycles on either voice-modulated, tone-modulated, or continuous-wave operation. The approximate reliable communication range is 15 miles for continuous-wave operation and 8 miles for voice-

modulated operation. The transmitter power is derived from a hand-operated generator and the receiver power may be obtained either from a dry cell battery pack or from the hand-operated gener-

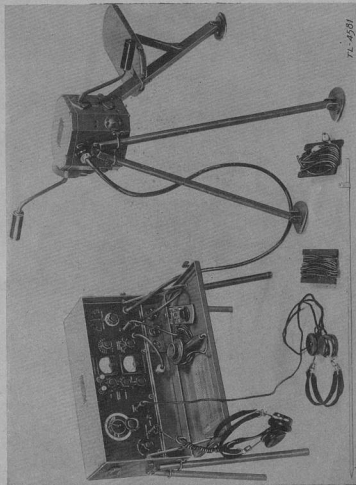


FIGURE 1.—Radio set SCR-288.

ator. The complete equipment weighs approximately 71 pounds. Three waterproof carrying cases are provided into which the equipment may be packed for transportation or storage. (See figs. 2 and 3.)

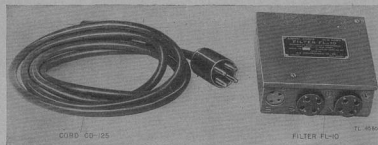


FIGURE 4.—Filter FL-10 and cord CD-25.

3. **Radio receiver and transmitter BC-474 A.**—This unit is housed in a spot-welded aluminum alloy cabinet. Four removable legs are provided so that when set up for operation the equipment is about 12 inches above the ground. The lid of the cabinet is hinged and opens downward, thus making a shelf which provides space for writing and for holding the telegraph key. The receiver and transmitter components are mounted on a single panel and on a chassis which is located in the upper part of the cabinet. The battery pack and filter are located directly under the receiver-transmitter chassis. The filter permits the receiver to be operated by power received from the hand-driven generator. (See fig. 1.)

4. **Generator GN-44 A.**—The generator is mounted on three legs so that when in operation it stands approximately 2 feet above the ground. These legs are easily detached for packing in a small space during transportation. One of the legs is fitted with a seat which permits the operator to sit astride while turning the generator cranks. The cranks may be snapped into place in the sockets at each end of the generator main drive gearshaft.

5. **Filter FL-10.**—The parts comprising the filter are mounted in a small aluminum box of such size and shape that when in use it may be placed in the lower compartment of the receiver-transmitter case adjacent to the battery pack. (See figs. 1 and 4.)

6. **Component parts.**—The following is a list of component parts used in radio set SCR-288 (see figs. 1, 2, 3, and 4):

Quantity	Article	Stock No.	Size (Inches)	Weight unit	Specification or drawing
1	Antenna. (Spool, strain insulators, antenna conductor, 35 feet; suspension wire, 15 feet.)		7 by 3½ by 2½ (spool).	0.75	71-1030.
1	Antenna strain post, galvanized.		31 by ½	0.7	71-1030.
1	Bag, canvas, carrying, for radio receiver and transmitter BC-474-A.		18 by 9½ by 7½ (minimum inside).	3.8	71-1030.
1	Bag, canvas, carrying, for generator GN-44-A.		6 by 6½ by 8 (minimum inside).	1.8	71-1030.
1	Bag, canvas, carrying, for accessories.		35½ by 7½	1.5	71-1030.
2	Battery pack, Burgess 6TA60 or equal, 1 in use, 1 spare.		4½ by 2½ by 9½	5.0	71-1030.
2 sets	Brushes, L. V., spare, for generator GN-44-A.		1½ by ¼ by ½		Commercial.
2 sets	Brushes, H. V., spare, for generator GN-44-A.		1½ by ¼ by ½		Commercial.
1	Cord, CD-125		84	0.9	SC-D-1339.
1	Counterpoise (35 feet of copper wire, consisting of 16 strands, 0.01 inch diameter wound on a plywood reel.		7½ by 3½ by 2½	0.5	71-1030.
2	Crank for generator GN-44-A.		1 by 6 by 7½	0.5	Per model.
1	Filter FL-10		1½ by 4½ by 4½	1.75	71-1049.
1	Generator GN-44-A		6 by 6½ by 8	19.5	71-1030.
2	Headset, RCA type MI-5803-5 or equal.			0.7	Commercial.
1	Key, telegraph, with cord and plug, RCA type MI-8136-2 or equal.			0.8	Commercial.
4	Leg, for radio receiver and transmitter BC-474-A.		15 by ¾	0.25	71-1030.
2	Legs for generator GN-44-A.		23 by ¾	0.5	71-1030.
1	Microphone with cord and plug, RCA type MI-7929-2.			0.7	71-1030.
1	Radio receiver and transmitter BC-474-A.		18 by 9½ by 7½	23.75	71-1030.
1	Seat and leg assembly for generator GN-44-A.		33½ by 6 by 2½	3.0	71-1030.

Quantity	Article	Stock No.	Size (inches)	Weight unit	Specification or drawing
2	Technical manuals for radio set SCR-288.			0.7	Per model.
9	Tube VT-107-A (6V6-GT) (3 in use; 6 spares).		3¼ by 1¼	0.1	71-1207.
3	Tube VT-146 (1N5-GT) (1 in use; 2 spares).		3¼ by 1¼	0.1	71-1246.
3	Tube VT-147 (1A7-GT) (1 in use; 2 spares).		3¼ by 1¼	0.1	71-1247.
3	Tube VT-148 (1D8-GT) (1 in use; 2 spares).		3¼ by 1¼	0.1	71-1248.
3	Tube VT-149 (3A8-GT) (1 in use; 2 spares).		3¼ by 1¼	0.1	71-1249.
1	Wrench, Allen type, for removing control knobs, RCA No. 14991 or equal.		1¼ by ¾		Commercial.

SECTION II

EMPLOYMENT

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7. Initial procedure.—Unstrap covers of carrying cases and remove all parts. (See figs. 2 and 3.) For the method of packing see paragraph 2.

8. Installation.—See figures 5 and 6 and see FM 24-5 as a guide in selection of a site. The exact location of the set must be such that the outer end of the 35-foot antenna can be suspended from some convenient object by the 15-foot suspension cord. Where there are no convenient objects the using personnel must improvise.

a. Insert generator legs in leg sockets, taking care to place the seat and leg in the special socket provided, and then set up the seat, snapping seat support into its socket. Insert cranks in proper sockets.

b. Insert the four legs of radio receiver-transmitter into their sockets, placing the legs so that flat surfaces on the lower ends are parallel to the ground.

c. Set the generator up about 4 feet from the transmitter, so that generator operator will be facing and to the right of the transmitter.

d. Open radio receiver-transmitter cover. Remove generator cable from its compartment and plug it into the generator socket. Plug microphone and key into their respective jacks, as marked on the panel, and attach the key to the cabinet lid by screwing thumbscrew (attached to key) into the nut provided near right-hand side of cover.

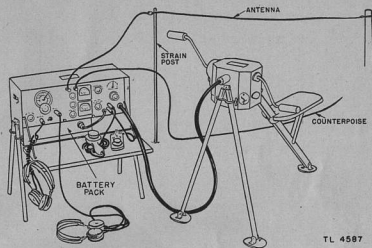


FIGURE 5.—Radio set SCR-288 set up for operation (receiver employing battery pack).

(The key, microphone, and phone jacks are protected by small hinged covers which open to the right.)

e. Drive antenna strain post into the ground about 1 foot from the transmitter. Attach antenna (identified by two strain insulators) to the strain post by means of the hook which is provided, and string the antenna to some object that will support the outer end 15 or 20 feet above the ground. (Short-range communication may be obtained with antenna only 5 or 6 feet above the ground.) Clamp lead-in end firmly in ANT binding post. The counterpoise should next be clamped in the GND binding post and laid out on the ground under the antenna.

9. Operation.—*a. Preliminary tests.*—After setting up the complete equipment as explained in paragraph 8, make sure that antenna and counterpoise are properly connected and that battery cable is plugged into receptacle of battery pack.

b. Receiver operation by means of batteries (see figs. 5 and 6).—(1) Turn switch marked REC-TRANS (located at bottom of panel underneath ANT and GND binding posts) to the REC position.

(2) Insert the phone plug in the jack marked PHONES. (This is a filament switching jack and the receiver is inoperative unless headphones are plugged into this jack.)

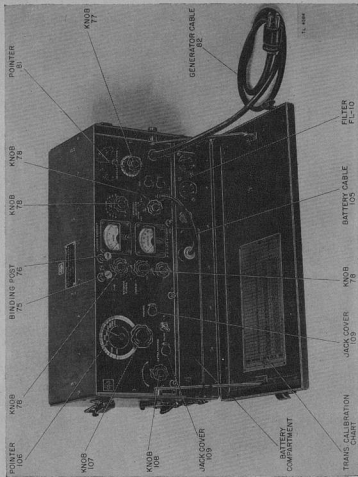


FIGURE 6.—Radio receiver and transmitter RC-47, A—front view.

(3) Turn the VOLUME control knob clockwise to about three quarters of maximum.

(4) Set the PHONE-C.W. switch to the C.W. position.

(5) Turn main tuning knob 107 slowly until pointer rests over scale graduation indicating approximate frequency of the desired signal.

If the latter is a c-w signal, it will be heard as a tone which should diminish in pitch as the receiver tuning approaches the frequency of the incoming signal. The correct setting of the tuning dial is obtained by approaching the desired signal from a lower frequency setting, passing through zero beat, and continuing until the beat note is of pleasing pitch. Adjust the VOLUME control knob for the most comfortable reception.

(6) If the desired signals are voice signals, they will be heard in somewhat distorted form, mixed with a varying tone. Push PHONE-C.W. switch to PHONE, and turn tuning knob 107 back and forth very slightly for maximum signal strength and clarity. Adjust the VOLUME control knob as desired.

(7) If the desired signals are modulated c-w signals, leave PHONE-C.W. switch in the C.W. position until they are heard. Then push the switch to the PHONE position and turn tuning dial slightly for best results. Adjust VOLUME control knob as desired.

(8) An extra pair of headphones may be plugged into the jack marked EXTRA PHONES. When only one pair of phones is used, it must be plugged into the right-hand jack (marked PHONES) as the filament circuit is open when there is no plug in this jack.

(9) To turn off the receiver, rotate VOLUME control knob to the extreme counterclockwise position. To avoid disturbing the sensitivity or audio output setting by turning the receiver off in the manner just described, it may be desirable to turn off the filaments by removing the plug from the PHONES jack. Monitoring of phone transmission will still be possible by plugging the phones into the EXTRA PHONES jack.

c. Receiver operation by means of generator GN-44-A and filter FL-10 (see fig. 7).—(1) When the receiver is to be operated from the power generated by the hand-driven generator a filter must be used. (See fig. 4.) The three sockets located on the filter case are connected to the receiver battery cable, to the transmitter power cable, and to the hand generator as indicated in (a), (b), and (c) below and in figure 7. Power from the hand generator is supplied to the filter unit by means of the extra cord CD-125. To install the filter, proceed as follows:

(a) Remove receiver battery plug from battery pack and insert it in left-hand socket of the filter.

(b) Remove transmitter power plug from generator and insert it in either one of the sockets which are located on the filter unit and marked SO-22.

(c) Use cord CD-125 to connect generator to filter, making use of remaining socket SO-22 in the filter unit.

(2) Operation of the equipment when using the filter is identical to that outlined in *b* above except that the generator must be operated when receiving as well as when transmitting. During long stand-by periods, when only the receiver is in use, the transmitter filaments should be turned off by turning the EMISSION SELECTOR switch to the OFF position. Less effort will then be needed to operate the generator.

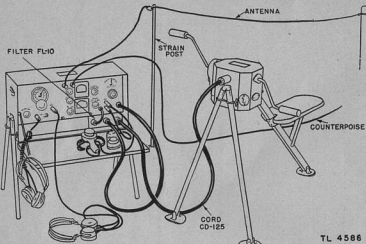


FIGURE 7.—Radio set SCR-288 (receiver operated by generator).

d. Transmitter operation (see fig. 6).—After the equipment is set up the transmitter is placed in operation as follows:

(1) Determine (directly or by interpolation) from calibration chart which is inside the lid of the receiver-transmitter the setting of the OSCILLATOR TUNING control. (The digits on the left of the hyphen refer to the setting of the pointer 81; those on the right refer to the setting of the dial attached to knob 77.) Adjust OSCILLATOR TUNING control to required setting by turning knob 77.

(2) Place EMISSION SELECTOR switch (marked OFF, PHONE, C. W., CAL.) to PHONE position, and REC-TRANS switch to TRANS position. Have an assistant operate the generator as described in *f* below.

(3) As soon as the tubes are warmed up (indicated by a deflection of the P. A. PLATE CURRENT meter), tune power amplifier plate

circuit to resonance by means of P. A. TUNING control. The correct adjustment will result in a minimum or dip in the power amplifier plate current as read on the P. A. PLATE CURRENT meter. The approximate setting of the power amplifier tuning control is shown on the calibration chart. If the oscillator is tuned to the lower frequencies, it is possible to obtain two dips in the power amplifier plate current. The dip that indicates the correct setting of the power amplifier tuning control may be determined by a check against the calibration chart. If no sharp dip can be found, detune antenna by changing setting of the COARSE antenna tuning control (A to G) or possibly the FINE antenna tuning control and again adjust the P. A. TUNING control; repeat the process until a resonance dip is obtained.

(4) The antenna circuit should now be adjusted as follows: With FINE antenna control set at approximately position 5, tune COARSE antenna control until maximum antenna current is indicated on ANTENNA CURRENT meter. Now retune the P. A. TUNING control to resonance (minimum plate current) and adjust FINE antenna tuning control for maximum antenna current. At resonance, a plate current of approximately 35 milliamperes is obtained. At this value, the power amplifier is correctly loaded for best modulation. The ANTENNA CURRENT meter will show a deflection of from 0.3 ampere to 0.7 ampere, depending on frequency and antenna height. The equipment is now ready for phone transmission which is accomplished by "talking into" the microphone.

(5) If c-w transmission is desired, place EMISSION SELECTOR switch to C. W. position and operate the key.

(6) To place transmitter in the stand-by position, turn REC-TRANS switch to REC position. To shut down the transmitter, turn EMISSION SELECTOR switch to OFF position.

e. Netting.—To set carrier frequency of transmitter to the frequency of a received signal, proceed as follows:

(1) Turn REC-TRANS switch to REC position.
 (2) With receiver PHONE-C. W. switch in the C. W. position, tune receiver for zero beat with the incoming signal.

(3) Now place EMISSION SELECTOR switch in the CAL position, crank generator, and tune transmitter oscillator (by means of OSCILLATOR TUNING control) for zero beat with the receiver.

f. Generator operation.—The generator operator will normally sit, astride the generator seat and operate the cranks at a speed of approximately 50 to 70 rpm in the direction indicated by arrow on the gear housing. Experience will soon permit the operator to "find"

the correct rotational speed. Due to action of the voltage regulator, the generator will turn noticeably easier when this speed is reached.

SECTION III

DETAILED FUNCTIONING OF PARTS

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Receiver unit.....	12
Filter FL-10.....	13
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10. Over-all equipment.—*a.* The top and bottom views of radio receiver and transmitter BC-474-A, removed from the case, are shown in figures 8 and 9.

b. The top and bottom views of generator GN-44-A are shown in figures 10 and 11.

c. The inside view of filter FL-10 is shown in figure 12.

11. Transmitter unit.—*a. Electrical characteristics.*—The transmitter unit is designed to operate within the frequency range of 3,500 to 6,300 kilocycles and to deliver into the antenna 4 watts of power for either voice-modulated emission or c-w emission. The schematic and wiring diagrams of the transmitter unit are given in figures 13 and 31, respectively.

b. Stages.—Electrically, the transmitter comprises a master oscillator stage, a power amplifier stage, and a modulator stage. Each stage employs one tube VT-107-A.

c. Master oscillator.—The master oscillator consists of a temperature compensated electron-coupled oscillator circuit which employs a tube VT-107-A. The frequency of oscillation is determined by the grid tank circuit consisting of inductor L1 tuning capacitor C18, and the compensating capacitor C2. The output of the oscillator is coupled to the power amplifier stage by capacitor C5 and is loaded by resistor R3. Screen-grid voltage is supplied through resistor R2 and plate voltage is supplied through R3.

d. Power amplifier.—The power amplifier stage is tuned to the oscillator frequency in its plate circuit by the tank circuit consisting of inductance coil L3 in parallel with tuning capacitor C17. R4 is the grid-biasing resistor. Plate voltage is supplied through choke coil L2 and plate current is indicated on meter M1. Screen-grid voltage is supplied through resistor R6. A jack J2 makes it possible to insert the telegraph key in series with the cathode circuit of this

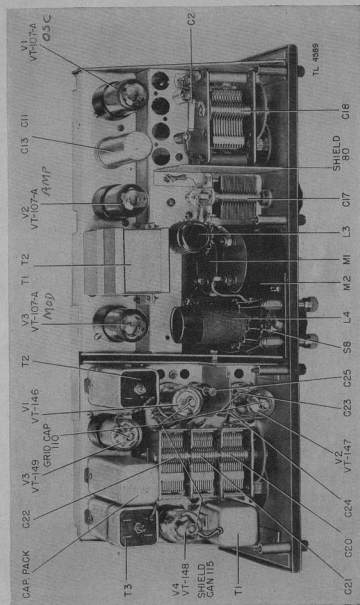


FIGURE 8.—Radio receiver and transmitter BC-474-A, chassis-top view.

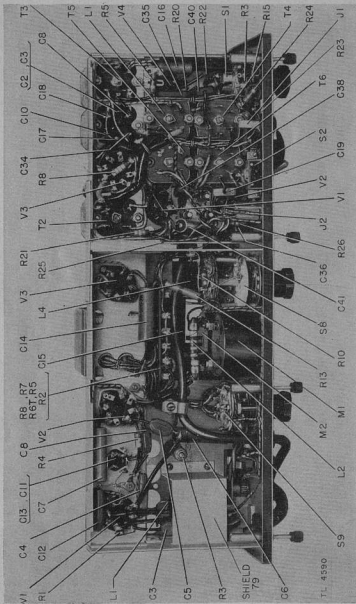


FIGURE 10.—Radio receiver and transmitter 11C-47-A, chassis—bottom view.

stage. The key is not at ground potential. Observe high-voltage precautions. When the key is closed, the power amplifier cathode

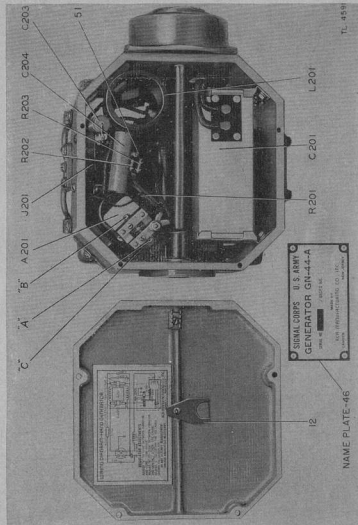


FIGURE 10.—Generator GN-44-A, cover removed—top view.

current is permitted to flow and thus permits the transmitter to operate.

e. Output coupling.—Output coupling is accomplished by tapping the tank coil L3 and connecting this tap through the antenna current meter M2 and switch S6 to multiple taps on coil L4. A second switch S7 connects the antenna to a second set of contacts on coil L4. Thus the antenna may be tuned by changing the setting of S6, called the FINE adjustment, or by changing the setting of S7, called the COARSE adjustment.

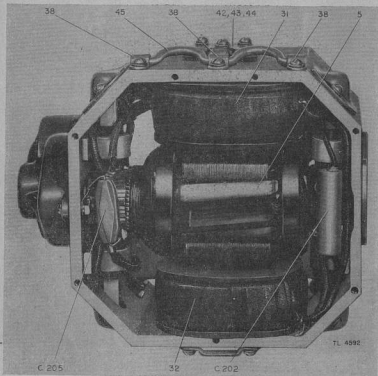


FIGURE 11.—Generator GN-44 A, bottom plate removed—bottom view.

f. Modulator.—The modulator stage consists of a single tube connected to the input transformer T1 on its grid side and to the modulation transformer T2 on its plate side. To voice-modulate the transmitter, a microphone must be inserted in jack J4 which is connected directly across the primary of transformer T1 and the cathode resistor R8. The drop across this resistor supplies energizing voltage to the microphone. The screen-grid voltage is supplied through resistor R5

and plate voltage is supplied through the primary winding of transformer T2. The audio-frequency output of the modulation transformer T2 is applied to the plate and screen grid of the power amplifier

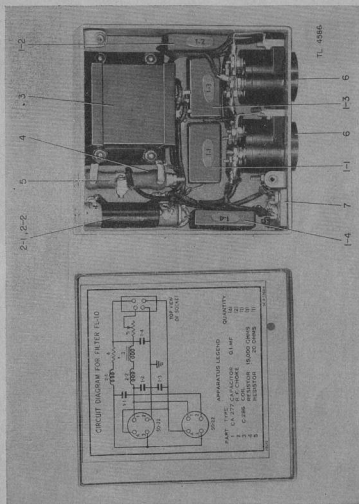


FIGURE 12.—Filter PJ-10, cover removed.

tube through a section of switch S9 when it is in the PHONE position. In all other positions the secondary of T2 is disconnected and the cathode circuit of the modulator tube is open and therefore the modu-

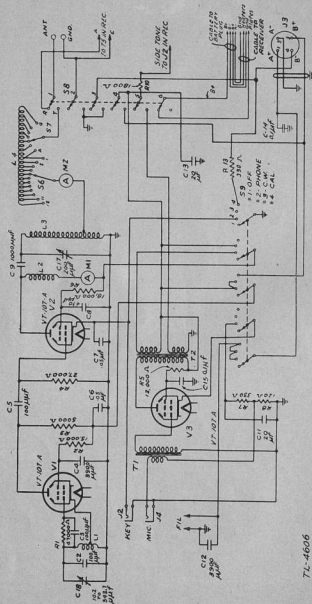


FIGURE 13.—Transmitter—schematic diagram.

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lator stage and microphone are then inoperative. Another small winding of transformer T2 supplies sidetone to the receiver headphones.

*g. Receive-transmit switch (fig. 14).—*The REC-TRANS switch S8 has six sections of two positions each. Switch S8 serves to switch the antenna and counterpoise from receiver to transmitter. In the transmit position, it opens the receiver plate circuit, completes the transmitter plate circuit, and connects the sidetone voltage to the receiver headphones.

*h. Emission selector switch (fig. 15).—*The EMISSION SELECTOR switch S9 has five sections of four positions each. Switch S9 serves

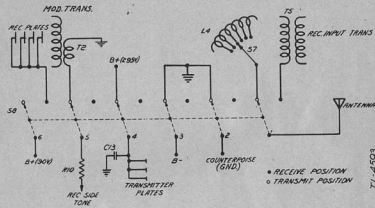


FIGURE 14.—REC-TRANS switch—functional diagram.

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to select the type of emission desired. In the first (counterclockwise) position, the heater circuits for all transmitter tubes are open, while in all other positions the heater circuits are closed. In the second (phone) position the secondary of the modulation transformer is connected in series with the power amplifier plate supply lead and the cathode circuit is completed to ground. In the third (c-w) position, the telegraph jack is inserted in series with the power amplifier cathode circuit, the modulator cathode circuit is opened, and the secondary of the modulation transformer is disconnected. In the fourth (calibrate) position switching is provided so that the transmitter oscillator may be operated at the same time as the receiver, thus enabling the operator to set the transmitter frequency to the frequency of a received signal.

*i. Operating power.—*Power to operate the transmitter is generated by a hand-driven generator. Power enters the transmitter circuits through a plug J3 which is connected by a cable to the generator.

Provision is also made to apply this same source of generator power through a filter to the receiver.

12. Receiver unit.—*a. Electrical characteristics.*—The receiver is designed for either battery or hand-driven generator operation. It is mounted on the same chassis and panel with the transmitter and is intended for reception of phone or continuous-wave reception within the frequency range of 2,300 to 6,500 kilocycles. Its superheterodyne circuit employs four tubes: a VT-146 as a radio-frequency amplifier, a VT-147 as a converter, a VT-149 as a combination intermediate frequency amplifier, c-w beat oscillator, and automatic volume control detector, and a VT-148 as a combination signal detector and first

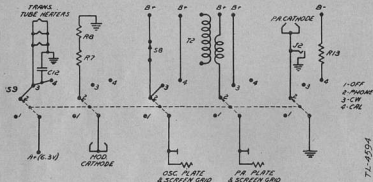


FIGURE 15.—EMISSION SELECTOR switch—functional diagram.

and second audio amplifiers. The receiver schematic diagram is shown in figure 16 and the wiring diagram in figure 32.

b. R-f amplifier.—The r-f (radio-frequency) amplifier stage is coupled to the antenna and counterpoise by input coil assembly T5, the secondary of which is in the tuned grid circuit of the radio-frequency stage which employs a VT-146. The tuned grid circuit consists of a fixed capacitor C26, a trimmer capacitor C25, one section C22, of the ganged tuning capacitor, and the coil assembly secondary. The output of this stage is coupled to the converter stage by a coil assembly T4.

c. Converter.—The converter stage combines in one VT-147 the functions of the heterodyne oscillator and mixer. The control grid circuit is tuned by section C21 of the ganged tuning capacitor and the trimmer capacitor C24. The grid circuit of the oscillator section of the tube is tuned by section C20 of the ganged tuning capacitor and the trimmer capacitor C23 which are connected across one winding of the oscillator feed-back coil assembly T6 through whose secondary

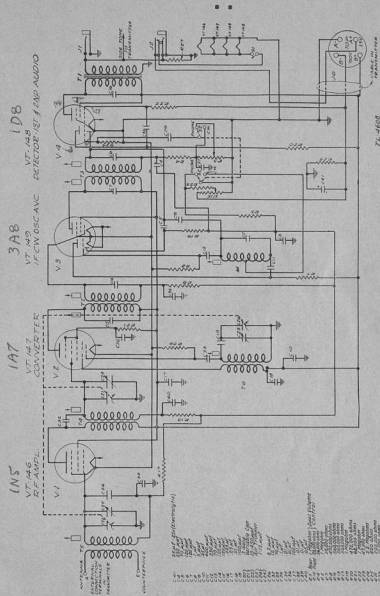


FIGURE 16.—Receiver—schematic diagram.

the 90-volt B+ potential is applied to the anode grid (grid No. 2 of the VT-147). This stage is coupled to the next stage by the i-f transformer T2.

d. I-f c-w osc-ave tube.—This tube combines in one VT-149 the functions of an intermediate-frequency (i-f) amplifier, a continuous-wave beat oscillator, and an automatic volume control (avc) detector. The intermediate-frequency amplifier is composed primarily of the pentode

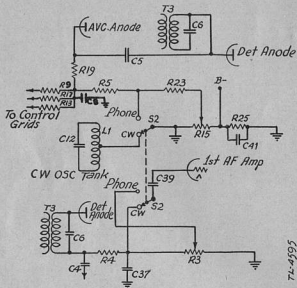


FIGURE 17.—Receiver volume control—functional diagram.

section of the tube and the primary circuit of the i-f transformer T3. The continuous-wave beat oscillator is composed primarily of the triode section of the tube and the tuned circuit L1-C12, and is coupled to the signal detector by C9. Intermediate-frequency signal voltage from T3 is fed through capacitor C5 to the diode section of the tube where it is rectified. Resistors R19 and R5 are the diode load. For PHONE operation an automatic volume control biasing voltage which is applied to the control-grid circuits of the radio and intermediate-frequency amplifiers and the converter is obtained from the voltage drop developed across the diode load resistor R5 and C8.

e. Detector—first and second audio tube.—Three functions are combined in one tube, VT-148. A detector section causes rectified current to flow through fixed resistor R4 and variable resistor R3. Volt-

age from R3 is applied to the first audio-amplifier grid. The amplified signal is next applied through the coupling capacitor C35 to the grid of the second amplifier section, the plate circuit of which is connected to the output transformer T1. Two jacks J1 and J2 are provided for plugging in headphones to the output of the receiver. Contacts on jack J2 are connected in series with the filaments of all the tubes so that a plug must be inserted in this jack before filament current will flow.

f. Sensitivity and volume.—When switch S2 is in the PHONE position, sensitivity of the receiver is controlled by the avc circuit and audio volume is controlled by section R3 of the volume control potentiometer. When switch S2 is in the c-w position, sensitivity is adjusted manually by means of the volume control potentiometer R15. This control permits adjustment of the negative bias on the grids of the r-f, i-f, and converter tubes.

g. Operating power.—Power to operate the receiver is ordinarily supplied by batteries through the power input plug J6. However, power may be supplied by the hand-driven generator. In this case, filter FL-10 must be inserted between the generator and the power input plug J6. (See pars. 9c and 13.)

h. I-f transformers and r-f and c-w coil assemblies.—See figures 18 and 19.

13. Filter FL-10.—The circuit of filter FL-10 (figs. 20 and 35) is essentially that of two low-pass filters which provide smoothing of the receiver filament and plate supply voltages so that objectionable hum and noise from the hand generator may be eliminated. R-f choke coils 2-1 and 2-2 tend to block the radio-frequency component of this noise from reaching the receiver plate and filament circuits, respectively. Capacitors 1-1, 1-2, 1-3, and 1-4 tend to further reduce this noise by bypassing it. Audio choke coil 3 is included to reduce the audio-frequency component of the generator ripple on the receiver filaments. Resistor 4 in series with the plate supply of the receiver drops the hand generator high voltage to approximately 90 volts. Another resistor, 5, in the filament circuit is used to reduce the voltage on the receiver filaments to 1½ volts.

14. Generator GN-44-A.—*a. Function.*—The hand-driven generator is designed to supply the required output of d-c power for the transmitter and the receiver. Its circuits are shown in figures 21 and 34.

b. Armature and drive (see figs. 28 and 29).—The armature has two windings and two commutators. One winding supplies the high-voltage power for the plates and the second supplies the low-voltage

power for the tube heaters and filaments. The armature shaft is supported by two bearings 19 and 20 and is connected through a train of gears (35 to 1 ratio) to the crankshaft. When this crankshaft is turned at a speed of 60 rpm the armature rotates between the two pole pieces 14 at a speed of 2,100 rpm.

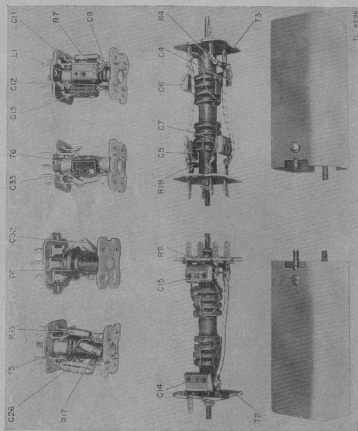


FIGURE 18.—I-f transformers and r-f and e-w coil assemblies.

c. *Field* (see figs. 21, 28, 29, and 30).—The two field windings 31 and 32 are in series and are connected across the low-voltage brushes. When the armature is rotated, a small residual flux in the pole pieces causes a voltage to be built up across the brushes. This voltage supplies current for the field winding which in turn adds to the flux in the pole pieces. *It is essential that the generator crank be turned in the*

correct direction, otherwise the flux resulting from the field coil will cancel the residual flux in the pole pieces and the voltage will not build up.

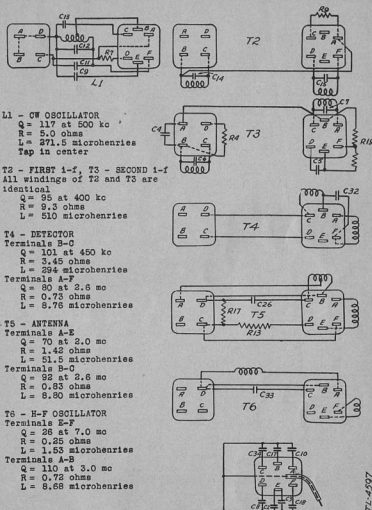


FIGURE 19.—I-f transformers and r-f and e-w coil assemblies—schematic diagrams.

d. *Voltage regulator*.—The voltage regulator is the vibrator type and its function is to keep the output voltages essentially constant

15. Characteristics of vacuum tubes.

Signal Corps type		VT-107-A	VT-146	VT-147	VT-148	VT-149
		(6V6-GT)	(IN6-GT)	(1A7-GT)	(1D8-GT)	(6A8-GT)
		Ampere	Amperes	Converter	Triode	Pen- tode
Filament voltage	Volts	6.3	1.4	1.4	1.4	*1.4
Filament current	Ampere	0.45	0.05	0.05	0.1	0.05 0.05
Plate voltage	Volts	315	90	90	90	90 90
Screen voltage	Volts	225	90	45	90	90 90
Control-grid voltage	Volts	-13	0	0	0	0 0
Plate res. (approx.)	Megohms	0.077	1.6	0.6	0.04	0.2 0.2 0.8
Transconductance	Umhos	3,750	750	—	575	925 750
Plate current	Ma.	35	1.2	0.55	1.1	0.2 1.5
Screen current	Ma.	6	0.3	.6	—	1.0 0.5
Anode-grid current	Ma.	—	—	1.2	—	—
Anode-grid voltage	Volts	—	—	50	—	—
OSC. grid resistor	Ohms	—	—	300,000	—	—
Conversion transcond.	Umhos	—	—	250	—	—
OSC. grid current	Ma.	—	—	0.035	—	—
Total cathode cur	Ma.	—	—	2.4	—	—
Amp factor	—	—	—	25	—	65
Load resistance	Ohms	8,500	—	—	12,000	—
Power output	MW.	5,500	—	—	200	—

*The heaters of VT-149 may be connected in series for 2.8-volt operation or in parallel for 1.4-volt operation.

SECTION IV
MAINTENANCE

	Paragraph
Transmitter unit	16
Receiver unit	17
Generator GN-44-A	18
Typical performance characteristics	19
Wiring diagrams	20

16. **Transmitter unit.**—*a. Preliminary check.*—The following checks and tests are recommended if the transmitter does not operate properly:

(1) See that antenna is properly connected and that REC-TRANS switch is placed in the TRANS position.

(2) See that EMISSION SELECTOR switch is set at either the C. W. or the PHONE position.

b. To remove receiver and transmitter from cabinet.—If the trouble is not located by the preliminary checks, remove receiver-transmitter from the cabinet as outlined in (1) to (4), inclusive, below, and then make the checks indicated in *c* and *d* below.

(1) Remove antenna and counterpoise; withdraw key, microphone, and battery cable plugs.

(2) Detach stay-joint from cabinet sides and lower the lid out of the way.

(3) Loosen the eight knurled-head panel screws until they clear their threaded seats in the cabinet. Do not withdraw screws completely.

(4) Slide panel forward, withdrawing chassis from the cabinet. Place chassis on top of the cabinet or on some other flat surface.

c. To check tubes.—Tubes VT-107-A are used in the transmitter. These tubes may be checked in any suitable tube checker. If no tube checker is available, a faulty tube may be located by substituting new tubes. Replace only one tube at a time then test to ascertain whether the transmitter operates properly. Repeat this procedure until the faulty tube is located.

d. Circuit checks.—Defective components can be located by voltage and continuity checks. For voltage checks refer to schematic diagram (fig. 13), wiring diagram (fig. 31), and (1) below. For continuity checks, refer to figures 13 and 31 and (2) below.

(1) *Transmitter tube socket pin-to-ground voltages.*—The pin-to-ground (chassis) voltages should be within plus or minus 10 percent of the values indicated in figure 22, when the conditions given below exist.

(a) Use either a model 666-SC volt-ohm tester, a model 564 volt-ohmmeter, or any other 1,000-ohms-per-volt meter which has corresponding volt ranges. Read all voltages on lowest suitable meter scale.

(b) REC-TRANS switch in TRANS position.

(c) EMISSION SELECTOR switch in PHONE position.

(d) Antenna and counterpoise disconnected.

(e) OSCILLATOR TUNING control set for 3,500 kc and P. A. TUNING control adjusted so that P. A. PLATE CURRENT meter indicates 35 ma (resonance).

(f) Generator voltage adjusted so that voltage between B+ and B- (fig. 13) is 295 volts when the conditions given above exist. For the method of adjusting the generator voltage see paragraph 18a.

(2) *Transmitter tube socket pin-to-ground resistances.*—The pin-to-ground (chassis) resistances should be as indicated in the following table when the conditions given below exist.

(a) Generator plug removed from generator.

(b) REC-TRANS switch in TRANS position.

(c) Emission selector switch as shown in second column of table.

(d) Tubes in sockets.

(e) Key plugged in (open except as indicated).

Tube	Position of emission selector switch	Pin-resistance								
		Pin	1	2	3	4	5	6	7	8
VT-107-A V1 (osc.)	Phone, o-w, or cal.	Resistance.	0	0	1 meg.	1 meg.	470,000	0	1	0.
		Resistance.	Inf.	0	1 meg.	1 meg.	27,000	Inf.	1	0.
VT-107-A V2 (P. A.)	Phone, o-w, or cal.	Resistance.	Inf.	0	1 meg.	1 meg.	27,000	Inf.	1	0 (Key closed).
		Resistance.	Inf.	0	1 meg.	1 meg.	27,000	Inf.	1	0 (Key open).
VT-107-A V3 (mod.)	Phone, o-w, or cal.	Resistance.	Inf.	0	1 meg.	1 meg.	3,000	Inf.	1	450.
		Resistance.	Inf.	0	1 meg.	1 meg.	3,000	Inf.	1	Inf.

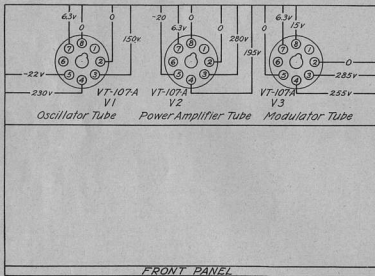


FIGURE 22.—Transmitter socket voltage diagram (transmitter viewed as in fig. 9.)

e. Filter resistances.—See figure 23.

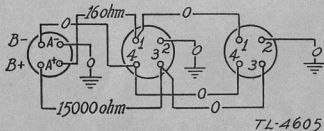


FIGURE 23.—Point-to-point resistance values, filter FL-10—outside view.

f. Generator cable plug-to-ground resistances.—See figure 24.

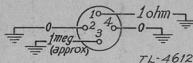


FIGURE 24.—Pin-to-ground resistances, generator cable plug. (REC-TRANS switch in TRANS position.)

17. Receiver unit.—a. Preliminary check.—If the receiver is inoperative, check to insure that—

- (1) Antenna is properly connected.
- (2) REC-TRANS switch is in REC position.
- (3) VOLUME control is sufficiently advanced.
- (4) Headphones are plugged into right-hand jack.
- (5) Receiver cable is plugged into battery receptacle.

b. To remove receiver chassis.—If the trouble is not located by following the series of checks outlined in a above, remove the chassis from the case (see par. 16b), then proceed as indicated in c to g, inclusive, below.

c. Receiver battery check.—The batteries should be checked at regular intervals, using a 1,000 ohms-per-volt voltmeter.

(1) The A battery and B battery readings should not be less than 1.1 volts and 66 volts, respectively, when the battery pack is connected to the receiver and the filaments are turned on. Recheck voltages at the end of 5 minutes of operation; they should be almost the same as the readings taken after about 1 minute of operation.

(2) The battery pack may also be checked by using a 5-ohm resistor as the A battery load and a 10,000-ohm resistor as the B battery load. Voltages across these loads should not be less than those indicated in (1) above for operation with the receiver.

(3) To replace the battery pack, remove battery cable plug and retainer clamp. Tip receiver-transmitter forward until the battery slides out of its compartment far enough to be removed. Insert a fresh battery pack and replace retainer clamp and battery cable plug.

d. To check tubes.—Remove tubes and test each in a suitable tube tester. Note that tubes VT-149 and VT-148 are of three-purpose type; therefore, an independent check of the triode, pentode, and diode sections will be necessary. If no satisfactory tube checker is available, insert a complete set of tubes that has been previously tested. If normal operation is restored on insertion of the new tubes, the old ones may now be reinserted, one at a time, until the defective tube or tubes are located, as indicated by failure of the receiver to operate satisfactorily.

e. *Instability.*—Several sets were supplied without resistor R27. If the receiver does not have resistor R27 and is found to be unstable, the receiver may require the addition of this resistor across jack J2 as indicated in figures 16 and 31. *R27-10,000 Ω IN 9-18-49*

f. *Circuit checks.*—Defective components can be located by voltage and continuity checks. For voltage checks, refer to schematic diagram (fig. 16), wiring diagram (fig. 32), and (1) below. For resistance checks, refer to figures 16 and 32 and (2) below.

(1) The pin-to-ground (chassis) voltages should be within plus or minus 5 to 10 percent of the values indicated in figure 25 when the conditions given below exist.

- (a) Volume control maximum clockwise direction.
- (b) PHONE-C. W. switch in either position.
- (c) Headset plug in jack marked PHONES.
- (d) Battery voltages (receiver turned on): A, 1.45 volts; B, 85 volts.

(e) No signal input (antenna and ground binding posts connected together) with receiver tuned to 2,300 kilocycles.

- (f) REC-TRANS switch in REC position.
- (g) Meter used is either a model 666-SC volt-ohm tester, a model 564 volt-ohmmeter, or any other 1,000 ohms-per-volt meter which has corresponding ranges. Read all voltages on lowest suitable meter scale.

Note.—There should be a potential drop of 8 volts across R25, measured from chassis (—A) to terminal board 1, terminal No. 1 (—B). (See fig. 32.)

- (2) To make a continuity check, proceed as follows:
 - (a) Remove the battery plug and check the continuity of all circuits containing inductances. (See fig. 19.)
 - (b) Check the resistance of R17, R13, and R9 and the resistance to chassis from the low potential side of each grid coil as indicated in figure 16 or 32.

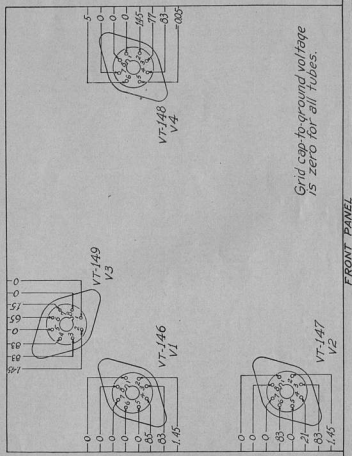
(c) Check all a-f coupling capacitors for leakage (with consequent loss of grid bias on amplifier tubes).

(d) Bypass capacitors can be checked by momentarily shunting a large capacitor (0.1 μf) across the unit in question while the receiver is in operation. A marked improvement in operation indicates an open or a defective capacitor. Any shorted capacitors will be discovered in the resistance-continuity checks.

(e) Tube socket pin-to-ground (chassis) resistances should be as indicated in the following table when the conditions given below exist.

1. Volume control maximum clockwise direction.
2. Phone plug in jack marked PHONES.

3. Tubes in sockets.
4. PHONE-C. W. switch in either position.
5. Receiver battery plug removed from battery.
6. REC-TRANS switch in REC position.



TL-4601

FRONT PANEL

FIGURE 25.—Receiver voltage diagram. (Receiver viewed as in fig. 9.)

Tube	Function	Pin								Grid capacity
		1	2	3	4	5	6	7	8	
V1 VT-146	R-f amp	0	3	Inf ¹	Inf	0	0	0	Inf	1 meg. + ²
V2 VT-147	Converter	0	3	Inf	Inf	220,000	Inf	0	Inf	1 meg. +
V4 VT-148	A-f 2d det.	Inf	3	Inf	Inf	1 meg.	Inf	0	1 meg. +	1 meg. +
V3 VT-149	I-f 6fo-ave.	0	3	Inf	Inf	470,000	Inf	3	1 meg. +	1 meg. +

¹ Inf. signifies no readings on models 666-8-C tester.
² 1 meg. + signifies resistance greater than 1 megohm.

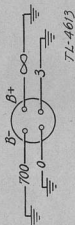


FIGURE 26.—Pins-to-ground resistances, battery cable plug (VOLUME switch on and headset plugged) in PHONES jack.

(f) For battery plug to ground resistances see figure 26.

g. *Alinement of receiver.*—Alinement should not be attempted until batteries and tubes have been tested and all necessary circuit checks have been completed. The complete alinement procedure should be adhered to and no attempt should be made to aline one or two circuits in a random manner.

- (1) *Equipment required.*—(a) Signal generator such as I-72-().
- (b) Output meter or an a-c voltmeter such as is part of test set I-56-().
- (c) Neutralizing screw driver and wrench such as are part of tool equipment TE-45.
- (d) RCA 12, 636 air trimmer wrench or a substitute such as shown in figure 27.
- (e) A 0.1- μ f capacitor and a 150- μ f capacitor.
- (f) Frequency meter SCR-211-(), if available.

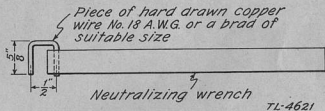


FIGURE 27.—Substitute air trimmer wrench.

- (2) *Preliminary set-up.*—(a) Turn on signal generator, frequency meter, and receiver and allow all to warm up for $\frac{1}{2}$ hour.
- (b) Plug output meter into the EXTRA PHONES jack.
- (c) Set VOLUME control knob to its maximum position.
- (d) Turn PHONE-C. W. switch to the PHONE position.
- (e) Using a 3-inch length of wire with small battery clips on both ends, ground terminal B of coil assembly T6.
- (f) Connect low output terminal of signal generator to radio set ground binding post, to chassis of the receiver, and to ground.
- (3) *Alinement procedure.*—After setting up the equipment as in (2) above, follow procedure in table below, connecting the high lead of signal generator through artificial antenna series capacitor indicated in the table to the point in the receiver indicated for each step of alinement. The following suggestions will be found helpful in performing the alinement procedure:
 - (a) Before proceeding with step 1 check signal generator frequency with frequency meter. Do likewise before performing steps 4, 6, and 8.

(b) Regulate signal generator output so that at all times the minimum signal necessary to produce an observable output is applied to the receiver.

(c) Use modulated signal generator output in all alinement steps except step 3. (See note ⁽¹⁾.)

(d) The i-f transformers T2 and T3 must be adjusted at both ends with the neutralizing screw driver. (See figs. 8, 9, and 18.)

(e) Coil assemblies L1, T4, T5, and T6 must be adjusted at only one end with the neutralizing screw driver. (See figs. 9 and 18.)

(f) Air trimmer capacitors C23, C24, and C25 are adjusted from under the chassis by loosening the friction sleeve with the neutralizing wrench. Loosen friction sleeve only enough to allow plunger to be moved in and out when rotating and pushing or pulling on the plunger with air trimmer wrench. In order to do this, the hook of the air trimmer wrench must be inserted in the eye of the plunger. In making this adjustment the plunger should be pulled out until it hits the stop and then gradually pushed in until a maximum output is obtained. Care must be exercised to keep the tool as far as possible from padding capacitor C19.

ALINEMENT PROCEDURE

Order of alinement	Connection to receiver	Artificial ant. series capacitor	Frequency setting	Tuning dial setting	Circuits to adjust	Adjustment symbols	Adjust to obtain—
1	VT-149 i-f grid capacitor.	0.1 μ f.	455 kc.	2,500 kc.	2d i-f trans.	T3.	Maximum output.
2	VT-147 converter grid capacitor.	0.1 μ f.	455 kc.	2,500 kc.	1st i-f trans.	T2.	Maximum output.
3	VT-147 converter grid capacitor.	0.1 μ f.	455 kc.	2,500 kc.	C-w osc.	L1.	1,000-cycle test note.
4	Ant. post.	150 μ af.	6,300 kc.	6,300 kc.	Osc.	C23 ¹ .	Maximum output.
5	Ant. post.	150 μ af.	6,300 kc.	6,300 kc.	Det.; r-f.	C24, C25.	Maximum output.
6	Ant. post.	150 μ af.	2,500 kc.	2,500 kc.	Osc.	T6.	Maximum output.
7	Ant. post.	150 μ af.	2,500 kc.	2,500 kc.	Det.; r-f.	T4; T5.	Maximum output.
8	Ant. post.	150 μ af.	6,300 kc.	6,300 kc.	Osc.	C23 ¹ .	Maximum output.
9	Ant. post.	150 μ af.	6,300 kc.	6,300 kc.	Det.; r-f.	C24, C25.	Maximum output.

¹ For this adjustment only, turn the PHONE-C.W. switch to C.W. position and use headphones instead of the output meter. Use unmodulated signal generator output.

² The c-w oscillator must be tuned to a frequency approximately 1,000 cycles below the intermediate frequency. To do this, tune the c-w oscillator to zero beat with the intermediate frequency. Then turn the adjustment on L1 in a clockwise direction until approximately a 1,000-cycle note is obtained in the headset.

³ Use minimum capacitor peak (adjustment plunger pulled out farthest) if two peaks can be obtained. Be sure to remove the ground from terminal B of T6 before proceeding with steps 4 to 9, inclusive.

18. Generator GN-44-A.—See figures 10, 11, 28, 29, and 30.

a. Regulator adjustment.—The generator output voltage should be maintained essentially constant at the value shown on the name plate (attached to the bottom cover) for cranking speeds of 50 to 70 rpm. The output voltage may be adjusted, and is maintained essentially constant by the regulator A201. To adjust the regulator, proceed as indicated below. (See figs. 10 and 21.)

(1) Remove top cover from generator.

(2) Loosen setscrew that holds B. Loosen B sufficiently to allow gage 12 to pass between vibrator contact and B.

(3) Loosen setscrew that holds A and adjust A until spacing (determined with gage) between vibrator and core is $\frac{1}{4}$ inch.

(4) Adjust B until spacing (determined with gage) between vibrator contact and B is 0.0006 inch.

(5) Tighten setscrew that holds A and B.

(6) Adjust C until the output voltage is 295, as shown on the name plate, when the generator is connected to the radio set and the conditions required in paragraph 16d (1) (b) to (e), inclusive, exist.

b. Lubrication.—Maintenance will consist of inspection and lubrication of the bearings at 6-month intervals. Use S-58 nonfluid oil from the New York and New Jersey Lubricant Company, New York City, or ANDOK C grease from the Standard Oil Company of New Jersey or an equivalent lubricant. Do not use petrolatum. There are six bearings requiring this service and just enough grease should be used to keep the ball bearings from rusting. To apply the grease, proceed as follows: Remove legs from generator and place generator so that it stands up on the gear case. Unscrew caps 9 and 10 (see figs. 28 and 29) and insert grease between the inner and outer ball races. Replace caps. Remove nut and washer which ground capacitor C205, and stand generator so that gear case is at the top. Remove gear case 4 and intermediate pinion 23. Apply grease to ball races in gear case and to ball races 21 in magnet frame and armature bearing 20. Add grease to the gears, filling up between the gear teeth. Replace gear case, making certain that screws retaining it to the frame are tightened evenly. Replace nut and washer which ground capacitor C205. Replace cover.

c. Brush replacement.—Prolonged usage will wear away the active surface of the brushes. (See figs. 29 and 30.) There are two types of brushes used and replacement should be made with Morganite Brush Company's brushes or equivalent. For the low-voltage side, the type link CM3 soft metallic copper brush should be used; for the high-voltage side, the type link B6 hard black carbon brush should be used. To replace the brushes, remove caps 25 on either side of gear

housing, thereby exposing screw 35 (fig. 30) holding brush spring block to the holder. Withdraw spring and block; if the brush does not come out easily, push block toward holder and pull again. If the brush

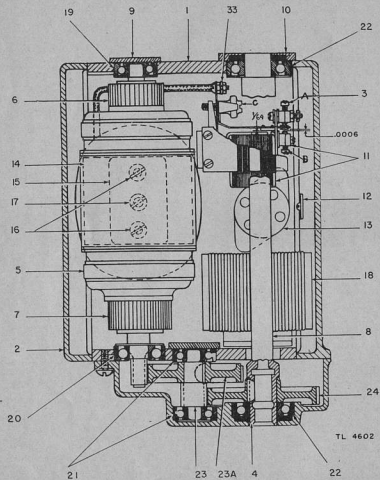


FIGURE 28.—Generator GN-44-A—section view.

does not then come out, it is due to a slight bur formed by the friction and pressure of the brush on the commutator. This particular condition is common where soft brushes are used and when encountered, it will be necessary to remove the brush holder from the frame. To

accomplish this, open lower cover, disconnect leads, and remove two screws fastening brush holders to magnet frame. Scrape bur and make certain that the brush slides easily in the holder. Then fasten brush holder to frame, reconnecting leads and inserting brushes. If new brushes are to be used, they must be scraped to fit the commutator.

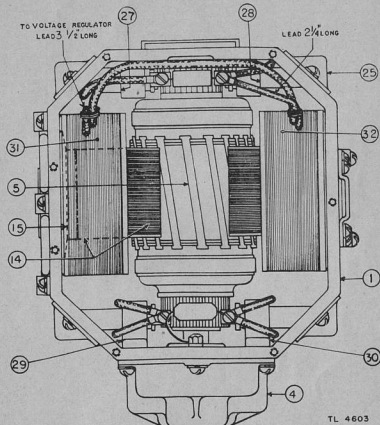


FIGURE 29.—Generator GN-44-A—bottom interior view.

At least two-thirds of the brush face should ride the commutator. Any drop of voltage after the installation of new brushes can generally be attributed to faulty fitting of the brushes. In replacing caps 25 be certain that they are put back as they were, that is, so that screw 35 cannot touch them.

d. *Armature and field coil replacements* (see figs. 28, 29, and 30).—The replacement procedure for armature and field coils is as follows:

(1) Because of the construction of the generator, the armature and the pole pieces must of necessity be handled together. The upper cover 3 of the generator frame must be opened and the regulator unfastened from the magnet frame in order to disconnect the lead of the

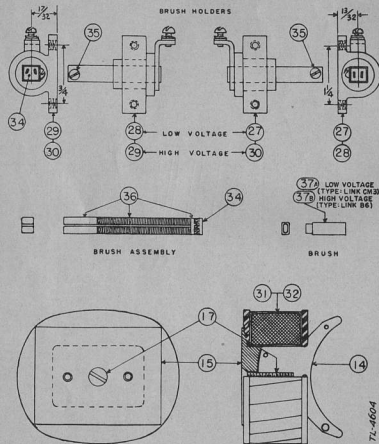


FIGURE 30.—Generator GN-44-A, field coil and brush assemblies.

field coil 31 at terminal 33. Replace upper cover, using only two screws to fasten it to the frame. Place generator on its upper cover, then remove lower cover 2 and disconnect leads to the four brush holders. Remove brush holder caps 25 and screws 35 which hold spring block 34 to the brush holders. Remove spring block and brushes. Remove brush holders 27 to 30. Remove screws 16 holding the pole pieces to

the frame and remove cap 9. Remove nut which grounds capacitor C205. Remove gear case 4. Keep intermediate gear 23 in the gear case, covering it to prevent infiltration of dirt. To remove the armature, slide armature first one way and then the other in order to push the outside ball races out of magnet frame. Now slide armature toward gear case end until ball bearing at the opposite end clears the magnet frame. Holding the pole pieces, take them out of the frame with the armature between.

(2) If necessary to replace the field windings, remove screw 17 which holds pad 15 to pole piece 14. Remove field coils and replace them with spare ones. Make certain that no foreign matter is between the pole piece and pad, and that the pad is screwed tight against the pole piece. Insert armature and pole pieces in magnet frame. Place outside ball races in the frame, being careful not to force the races. Screw on ball cap 9. Before tightening pole piece screws, insert between the armature and pole pieces the 0.010-inch card which is wrapped around the spare armature (a piece of good quality hard writing paper will do). This will insure proper clearance between armature and pole pieces. Then tighten screws 16. Remove 0.010-inch card and be certain that the armature does not drag before replacing brush holders. Replace gear housing.

(3) Reassemble remainder of generator by proceeding in the reverse order to that described for its disassembly.

19. Typical performance characteristics.—a. Transmitter.

Power output (20 ohms, 100 μ f dummy antenna):		
Continuous wave, watts.....	5.5 average	4 minimum.
Phone, watts.....	5.0 average	4 minimum.
Percent modulation (35 ma P. A. plate current).....	90 average	75 minimum.
Frequency drift (first 5 minutes), cycles.....	750 average	1,500 maximum.

b. Receiver (under standard test conditions).

Sensitivity, microvolts.....	10 average	25 minimum.
Selectivity (band width at 60 db down), kilocycles.....	42 average	48 maximum
Image ratio (at 6,300 kc).....	250 average	170 minimum.
Maximum power output, milliwatts.....	100 average	70 minimum.
Calibration error, percent.....	1.0 average	1.2 maximum.

c. Generator GN-44-A.

High-voltage output (0.1 amp. load), volts.....	290 average	280 to 201 range
Low-voltage output (1.65 amp. load), volts.....	6.6 average	5.9 to 7.1 range.

20. Wiring diagrams.

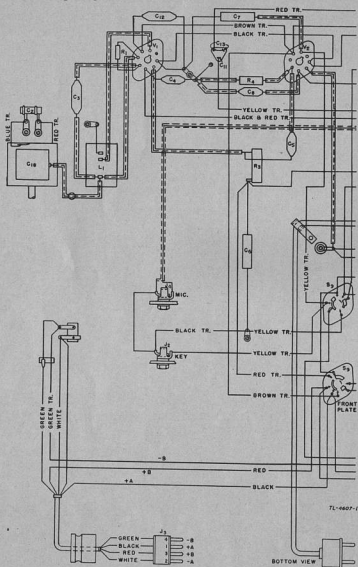
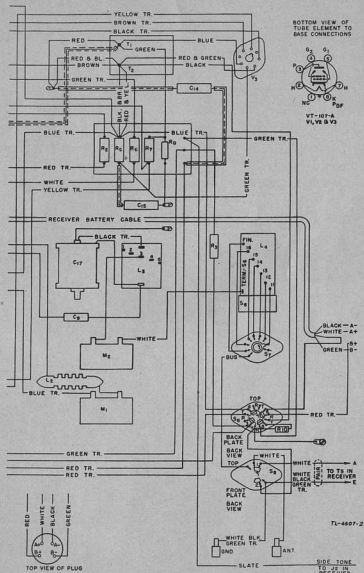


FIGURE 31.—Transmitter—



wiring diagram.

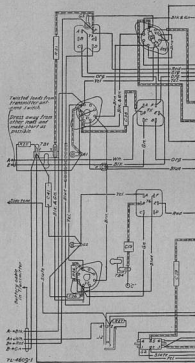
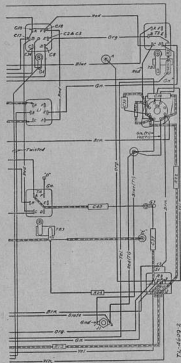


FIGURE 22.—Receiver—



wiring diagram.

BOTTOM VIEWS OF TUBE ELEMENT
TO BASE CONNECTIONS

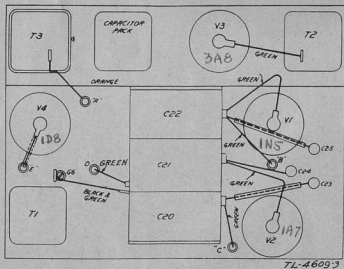
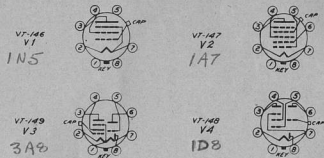


FIGURE 33.—Receiver lay-out.

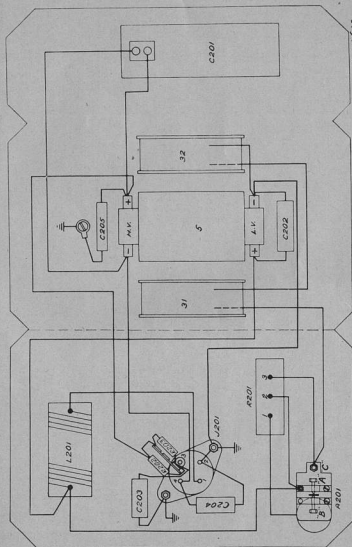


FIGURE 34.—Generator G5N-46-A—wiring diagram.

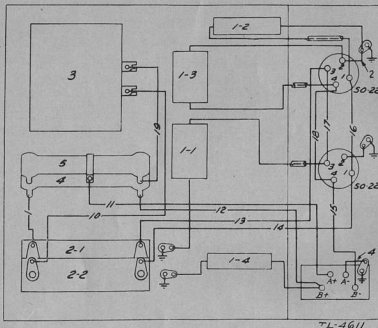


FIGURE 35.—Filter FL-10—wiring diagram.

SECTION V
REPLACEABLE PARTS

Paragraph

Tables of replaceable parts 21
List of manufacturers 22

21. Tables of replaceable parts.—For list of component parts see paragraph 6.

a. Generator G.N. 44-A.

Replaces cage No.	Stock No.	Name of part	Description	Function	Manufacturer's symbol	Drawing No.
1	31E294A/F1	Frame	Magnet frame	Holds generator	BE	RL-D-6204-D-1.
2	31E294A/C10	Cover	Lower cover	Cover for generator	BE	RL-D-6202-B-2.
3	31E294A/C11	Cover	Upper cover	Cover for generator	BE	RL-D-6202-B-4.
4	31E294A/C4	Case	Gear case	Cover for gears	BE	RL-D-6202-B-8.
5	31E294A/I1	Armature	Armature, double winding	Armature	BE	RL-D-6202-H-8.
6	31E294A/I2	Brush holder	Brush holder	Holder for brushes	BE	RL-D-6202-H-8.
7	31E294A/C12	Commutator	Part of rotor	Low voltage	BE	RL-D-6202-H-8.
8	31E294A/S1	Shaft	Crankshaft	Rotates armature	BE	RL-D-6202-H-7.
9	31E294A/C2	Cap.	Armature bearing cap	Cover for armature bearing	BE	RL-D-6202-F-12.
10	31E294A/C3	Cap.	Crankshaft bearing cap	Cover for crankshaft bearing	BE	RL-D-6202-F-28.
11	645827	Oil gland piece	Oil gland piece	Seals against oil	BE	RL-D-6202-F-28.
12	645827	Oil gland piece	Oil gland piece	Seals against oil	BE	RL-D-6202-F-28.
13	31E294A/F14	Pad	Shaft pad, laminated	Generator pad	BE	RL-D-6202-F-28.
14	31E294A/F15	Pad	Shaft pad, laminated	Generator pad	BE	RL-D-6202-F-28.
15	31E294A/F16	Pad	Shaft pad, laminated	Generator pad	BE	RL-D-6202-F-28.
16	617022-268	Screw	Flathead, No. 10-22, 1 1/4 inches long	Base for pole piece	BE	RL-D-6202-F-8.
17	617022-268	Screw	Flathead, No. 10-22, 1 inch long	Holds pole piece to magnet frame	BE	RL-D-6202-F-8.
18	31E294A/B5	Ball bearing	Norma F-8	Armature shaft bearing, low voltage	NH	RL-D-6202-F-8.
19	31E294A/B5	Ball bearing	Norma F-8	Armature shaft bearing, low voltage	NH	RL-D-6202-F-8.
20	31E294A/B6	Ball bearing	Norma F-10	Armature shaft bearing, high voltage, commutator end	NH	RL-D-6202-F-11.
21	31E294A/D7	Ball bearing	Norma E-8-7	Intermediate pinion and gear bearing	NH	RL-D-6202-F-40.
22	31E294A/B8	Ball bearing	Norma E-12	Crankshaft bearing	NH	RL-D-6202-F-30.
23	31E294A/F1	Pinion	Intermediate	Pinion for armature drive	BE	RL-D-6202-F-40.
24	31E294A/G1	Gear	Intermediate	Gear for armature drive	BE	RL-D-6202-F-40.
25	31E294A/H2	Commutator	Commutator	Commutator	BE	RL-D-6202-F-40.
26	31E294A/H1	Holder	Brush holder	Holder for low and high voltage brushes	BE	RL-D-6202-F-7.
27	31E294A/H3	Holder	Brush holder	Holder for low voltage brush	BE	RL-D-6202-F-7.
28	31E294A/H3	Holder	Brush holder	Holder for low voltage brush	BE	RL-D-6202-F-7.
29	31E294A/H2	Holder	Brush holder	Holder for high voltage brush	BE	RL-D-6202-F-7.
30	31E294A/H2	Holder	Brush holder	Holder for high voltage brush	BE	RL-D-6202-F-7.
31	31E294A/C6	Field coil	Field coil	Generator field winding	BE	RL-D-6202-F-8.
32	31E294A/C6	Field coil	Field coil	Generator field winding	BE	RL-D-6202-F-8.
33	321012	Terminal, TM-12	Chased	For regulator lead connections	BE	RL-D-6202-K-27.

a. Generator GN-14-A—Continued.

Reference No.	Stock No.	Name of part	Description	Function	Manufacturer's symbol	Drawing No.
31	3HE24A/104	Block	Brush spring block	Block for brush assembly	BE	RL-D-6002-F-30.
32	3GL40A-118	Assembly	Brush set, No. 4-40, 3/4 (inches long)	Subscrew for brush spring block	BE	RL-D-6002-F-13.
36	3HE24A/106	Brush and spring	Brush	For low-voltage commutator	MC	RL-D-6002-F-4.
37	3HE24A/110	Brush	Type Link CM3	For high-voltage commutator	MC	RL-D-6002-F-4.
38	3HE24A/110	Brush	Type Link B6	Support for links	BE	RL-D-6007-K-21.
39	3HE24A/110	Strip	Link strap	Secures leg with seat	BE	RL-D-6007-K-31.
40	3E20A/126	Link	Rectangular link	Stop for leg with seat	BE	RL-D-6007-K-31.
41	3HE24A/126	Link	Round link	Stop for leg with seat	BE	RL-D-6007-K-31.
42	3HE24A/141	Strip	Horizontal strip	For securing small leg	BE	RL-D-6007-K-22.
43	3HE24A/142	Spacer	Metal	For securing small leg	BE	RL-D-6007-K-21.
44	3HE24A/143	Bracket	Horizontal bracket	Secures small legs	BE	RL-D-6007-K-20.
45	3HE24A/144	Catch	Spring catch	To identify unit	RA	K-29015-2.
46	3HE24A/145	Link	Nonferrous links	For retaining armature of generator	BE	RL-D-6008-E.
47	3E20A/146	Link	Steel links	For retaining armature of generator	BE	RL-D-6008-E.
48	2Z603A	Leg, L4-2A	Leg with seat	Generator support	BE	RL-D-6023-F.
49	3E1867	Crank, GC-7	Hand crank	For rotating armature of generator	BE	M-48570-502. RCA Spec. AS-624-G4.
50	3HE24A/149	Wind generator unit, GN-44-A.	Rating: Low voltage, 6.6 v, 1.65 amp, high voltage, 256 v, 0.1 amp.	Power supply	BE	M-48570-502. RCA Spec. AS-624-G4.
51	3Z4526A-1	Terminal strip	5-pole terminal strip	For mounting R2005 and R2005	CM	M-5001-36.
52	3HE24A/152	Spring	Spring	For lubricating generator bearings	NLC	S-C-1-312-V-11.
53	6G1085	Lubricant	Paper, shell types, 0.05 μ l \pm 0.01 percent, 8-85 nonfluid oil	Regulates high and low voltage for speed variations.	BE	P-72017-527.
A30	3HE24A/151	Regulator	Variable type	High voltage, r-f filter	BE	P-72015-97.
C201	3D140-15	Capacitor	Value, 465, 500 v d-c, working	High-voltage filter	BE	K-78727-50.
C202	3D140-76	Capacitor	Paper, shell types, 0.10 μ l \pm 0.01 percent, 200 v d-c, working	Low voltage, r-f filter	RA	K-78727-50.
C203	3D140-28	Capacitor	Paper, shell types, 0.05 μ l \pm 0.01 percent, 300 v d-c, working	High voltage, r-f filter	RA	K-78727-50.
C204	3D140-76	Capacitor	Same as C202	High voltage, r-f filter	RA	K-78727-50.

b. Transmitter.

C205	3DA3-900	Capacitor	Molded type, 3,000 μ l \pm 50 percent, maximum operating temperature, 260 v, maximum operating temperature, 25° C.	High voltage, r-f filter.	RA	M-80013-516.
J201	Z8Z72	Socket, SO-22	4-contact bakelite	Power output connector	BE	RL-D-6212-F.
L201	C3C90	Coil	Choke, 26 turns on 3/4-inch bakelite form	Low voltage, r-f filter	BE	RL-D-6212-E.
R201	3Z600A1	Resistor	Wound with No. 32 advance wire 31.5 ohms, tapped at 28 ohms	Voltage divider	BE	RL-D-6002 (Modified) RCA Spec. 6267-04.
E202	3Z610-35	Resistor	Insulated carbon type, 1/2 w, 100 ohms \pm 10 percent, maximum q of 0.7 μ l, 6, 250 v p-p peak 300 v	High voltage, r-f filter.	IRC	K-78727-50.
R203	3Z610-35	Resistor	Same as R202	High voltage, r-f filter.	IRC	K-78727-50.
C2	3D1006-50	Capacitor	Ceramic, 200 v d-c 100 μ l \pm 5 percent, operating voltage 400 v d-c, 500 v peak, maximum operating temperature 25° C.	Temperature compensating	ER	K-85006-147.
C3	3D1006-52	Capacitor	Molded type, 1,000 μ l \pm 10 percent, maximum operating temperature 25° C.	Oscillator grid coupling	RA	M-80012-547.
C4	3DA3-900	Capacitor	Molded type, 400 v d-c, 500 μ l, maximum operating voltage 400 v d-c, 500 v peak, maximum operating temperature 25° C.	Oscillator screen bypass	RA	M-80013-516.
C5	3D1006-52	Capacitor	Same as C3	Power amplifier grid coupling	RA	M-80012-547.
C6	3DA30-27	Capacitor	Paper, shell type, 0.05 μ l \pm 50 percent, 400 v d-c, working	Oscillator plate supply filter	RA	P-72017-526.
C7	3DA30-27	Capacitor	Same as C6	Power amplifier cathode bypass	RA	P-72017-526.
C8	3D140-76	Capacitor	Molded type, 670 μ l \pm 20 percent, maximum operating voltage 400 v d-c, 500 v peak, maximum operating temperature 25° C.	Power amplifier screen bypass	RA	M-80012-525.
C9	3DA1-37	Capacitor	DPY electrolytic 20 μ l \pm 10-10 percent, operating voltage 25 v.	Power amplifier plate coupling	RA	M-80012-509.
C11	3D1E20	Capacitor	Dry electrolytic 20 μ l \pm 10-10 percent, operating voltage 150 v, part of C11.	Modulator cathode bypass	RA	M-80027-4.
C13	3D1E20	Capacitor	Same as C11	High-voltage filter	RA	M-80012-4.
C12	3DA3-900	Capacitor	Same as C1	Resistor bypass	RA	M-80013-516.

b. Transmitter.—Continued.

Refer- ence No.	Stock No.	Name of part	Description	Function	Manu- facture symbol	Drawing No.
C14	3DA100-77	Capacitor	Paper, shell type, 0.10 μ F, \pm 20 percent, 200 v d-c working.	Heater bypass	RA	P-7201-37.
C15	3DA100-75	Capacitor	Paper, shell type, 0.10 μ F, \pm 20 percent, 40 v d-c working.	Modulator screen bypass	RA	P-7201-31L
C17	3C190WV	Capacitor	Variable, 300 pfd M/C-2085, Midget type, semi-elliptical plates, maximum capacity constant 46.8 μ F.	Power amplifier tuning	HM	K-46229-9.
C18	3D143A	Capacitor	Variable, series No. 117, maximum effective capacity 363.7 μ F, \pm 1 percent, minimum capacity 10.2 μ F, \pm 1 percent <i>anf.</i>	Oscillator tuning	RC	M-48323-2.
J2	2Z53A	Jack, JK-31	Same as to this of Mohler Insulation Co.	Key lock	GR	K-81211-4.
J3	2Z53A	Jack, JK-31	Same as to this of Mohler Insulation Co.	Power amplifier plug	RA	K-80120-36.
J4	2Z53A	Jack, JK-31	Same as to this of Mohler Insulation Co.	Microphone jack	PRM	K-80954-3.
L1	3C196S	Coil	Single layer, close wound	Oscillator tank inductance	RA	M-48320-50L.
L2	3C196S	Coil	Type R-100, distributed capacity 1 μ F, d-c resistance 99 ohms, current 125 ma	Power amplifier plate choke	N	K-80120-51.
L3	3C196B-1	Coil	Single layer, close wound inductance 81 μ H, \pm 8 percent	Power amplifier tank coil	RA	M-48301-50L.
L4	3C196B-2	Coil	Single layer, close wound inductance 81 μ H, \pm 8 percent	Power amplifier tank coil	RA	M-48301-50L.
M1	3F3220	Motor	Model 127 S, scale 0-100 mm, d-c 2-1/2 inch type tangential ballrace case.	Power amplifier plate current motor	SC	M-48328-50L.
M2	3F322-1	Motor	Model 127 S, scale 0-1 amp μ F, 2-1/2 inch type tangential ballrace case.	Antenna current motor	SC	K-801225-2.
R1	3Z694-1	Resistor	Type BT-15, insulated carbon type, 1/2 w, 15,000 ohms, \pm 10 percent.	Oscillator grid resistor	IRO	K-78727-8L.
R2	3Z6915-2	Resistor	Type BT-15, insulated carbon type, 1 w, 15,000 ohms, \pm 10 percent.	Oscillator screen resistor	IRO	K-78728-7A.
R3	3Z6915-4	Resistor	Type AB, 5,000 ohms, 4 w, coating "C", type No. 2, terminals.	Oscillator plate resistor	IRC	K-80120-7B.
R4	3Z6927	Resistor	Type BT-15, insulated carbon type, 1/2 w, 27,000 ohms, \pm 10 percent.	Power amplifier grid resistor	IRC	K-78727-7B.
R5	3Z6915-3	Resistor	Type BT-1, insulated carbon type, 1 w, 12,000 ohms, \pm 10 percent.	Modulator screen resistor	IRC	K-78729-7A.
R6	3Z6915-2	Resistor	Type BT-1, insulated carbon type, 1 w, 15,000 ohms, \pm 10 percent.	Power amplifier screen resistor	IRC	K-78729-77.
E7	3Z6933-4	Resistor	Type BT-1, insulated carbon type, 1 w, 330 ohms, \pm 10 percent.	Modulator cathode resistor	IRC	K-78728-5A.
R8	3Z6913-1	Resistor	Type BT-15, insulated carbon type, 1/2 w, 120 ohms, \pm 10 percent.	Modulator cathode resistor	IRC	K-78727-3L.
R10	3Z6918-1	Resistor	Type BT-15, insulated carbon type, 1/2 w, 1,800 ohms, \pm 10 percent.	Slide tone resistor	IRC	K-78727-6A.
R15	3Z6933-3	Resistor	Same as R7	Bias equalizing resistor	IRC	K-78728-5A.
S7	3Z6811-2	Switch	Similar to Xandy type 3112B-1, 12 position	Antenna tuning (fine)	PRM	K-81013-4.
S8	3Z6811-7	Switch	Type H, 7 position, 1 ceramic section	Antenna tuning (course)	OM	M-48306-2.
S9	3Z6811-8	Switch	Type H, 2 position, 2 ceramic sections	Antenna and power toggle switch	OM	M-48306-2.
S9	3Z6811-9	Switch	Type H, 4 position, 1 ceramic section	Emission selector	OM	M-48306-2.
T1	2Z6971	Transformer pack	Microphone transformer (T2 and T1 term 1 unity)	Transformer to modulator grid coupling	OM	M-48306-2.
T2	2Z6971	Transformer pack	Modulator transformer	Modulator to power amplifier coupling transformer.	RA	K-40013-02.
V1	2Z576-1	Socket	Catalog No. 88-8, multi-in-plate, octal socket.	For oscillator tube	APH	K-81609-1.
V2	2Z576-1	Socket	Same as V1	For power amplifier tube	APH	K-81609-1.
V3	2Z576-1	Socket	Same as V1	For modulator tube	APH	K-81609-1.
V5	2C334-47A/B2	Binding post	Type "S" with "SS"	Antenna tuning	EC	K-86212-1.
V6	2C334-47A/B3	Binding Post	Type "S" with "SS"	Counterpoise connector	EC	K-86212-2.
V7	2Z2842	Knob	With graduated circumference	For oscillator tuning control	E.A.	K-86119-50L.
V8	2Z284	Knob	Octagonal knob with pointer	Antenna tuning	E.A.	K-86119-50L.
V9	2C334-47A/B1	Shield	Aluminum, 1/4-inch thick	Oscillator coil shield	RA	K-86107-1.
S8	2C334-47A/B2	Shield	Aluminum, 1/4-inch thick	Oscillator coil shield	RA	K-86107-1.
S8	2Z228	Plate	Dial plate, aluminum, 1/4-inch thick	Oscillator tuning indicator	RA	K-844268-50L.
K2	3G1284-6	Control	4 conductors, shielded, rubber covered	Transmitter power cable	RA	K-816925-4.
S3	3G1284-11	Insulator	Insulate or equivalent, 1/2 inch outside diameter by 1 1/2 inch long.	Mounting for L2 and C9	I	K-80200-18.
S4	2C334-47A/B1	Grounded	Rubber	Writing necessary	RT	K-86212-3L.
S4	2C334-47A/B1	Grounded	Rubber	Writing necessary	WR	K-86212-3L.

Refer- ence No.	Stock No.	Name of part	Description	Function	Main- tenance symbol	Drawing No.
C4	3D1020	Capacitor	Part of T ₃ , type 3W, 220 μ fd \pm 10 percent, 50 v d-c working.	Audio diode, r-f filter.	CD	K-84167-5.
C5	3D1070-2	Capacitor	Part of T ₃ , type 3W, 30 μ fd \pm 10 percent, 100 v d-c working.	Ave diode, coupling.	CD	K-84167-16.
O6	3D1091-1	Capacitor	Part of T ₃ , type 5H, 130 μ fd \pm 5 percent, 400 v d-c working.	2d-1-f secondary tuning.	CD	K-84167-4.
C7	3D1091-1	Capacitor	Part of T ₃ , same as C6.	2d-1-f primary tuning.	CD	K-84167-4.
C9	2C3364-47A/C8	Capacitor	Part of L ₁ , 5 μ fd \pm 10 percent, 45V. N20L.	C-w oscillator to diode coupling.	ER	K-84079-4.
C11	2C3364-47A/C9	Capacitor	Part of L ₁ , 40 μ fd \pm 5 percent, type 1H.	C-w oscillator (direct base-pipe coupling).	BA	M-80112-583.
C12	3D1090-1	Capacitor	Part of L ₁ , 20 μ fd \pm 5 percent, 40 v d-c, peak to peak, 500 v.	C-w oscillator tuning.	BA	M-80112-583.
C13	3D1070-2	Capacitor	Part of L ₁ , same as C5.	C-w oscillator grid coupling.	CD	K-84167-16.
C8	3D1E100	Capacitor	0.1 μ fd \pm 10 percent, 300 v d-c working.	Ave filter.	RA	K-83394-501.
C10	3D1E100	Capacitor	0.25 μ fd \pm 10 percent, 200 v d-c working.	+B bypass.	RA	K-83394-501.
C17	3D1E100	Capacitor	0.25 μ fd \pm 10 percent, 200 v d-c working.	+B bypass.	RA	K-83394-501.
C14	3D1E100	Capacitor	0.25 μ fd \pm 10 percent, 200 v d-c working.	+B bypass.	RA	K-83394-501.
C18	3D1E100	Capacitor	0.25 μ fd \pm 10 percent, 200 v d-c working.	+B bypass.	RA	K-83394-501.
C15	3D1091-1	Capacitor	Same as C8.	Ave filter.	CD	K-84167-4.
C16	3D1091-1	Capacitor	Part of T ₂ , same as C6.	1st 1-f secondary tuning.	CD	K-84167-4.
C19	3D1A3-21	Capacitor	Part of T ₂ , same as C6.	1st 1-f primary tuning.	RD	K-84167-4.
C16	3D1A3-21	Capacitor	Shell type, 0.03 μ fd \pm 20 percent, 70 v d-c working.	Output pentode (impedance limiting).	RD	F-7280-573.
C19	3D1A1100	Capacitor	Type 1B, molded, 1.100 μ fd \pm 25 percent, 500 v d-c working.	Oscillator screen tuning (padding).	CD	M-42304-3E.
C20	3D1091W	Capacitor	Variable, model N6, 33A, minimum capacity less than 13.0 μ fd, effective maximum capacity 441.7 μ fd.	Oscillator variable tuning.	RC	M-42304-2.
C21	3D1091W	Capacitor	Same as C20.	Detector variable tuning.	RC	M-42304-2.
C22	2C3364-47A/C10	Capacitor	Air trimmer, 1 to 12 μ fd.	Detector variable tuning.	RC	M-42304-2.
C24	2C3364-47A/C10	Capacitor	Air trimmer, 1 to 12 μ fd.	Detector adjustable trimming.	RA	M-80832-503.
C25	2C3364-47A/C10	Capacitor	Same as C23.	Detector adjustable trimming.	RA	M-80832-503.
C26	2C3364-47A/C10	Capacitor	Same as C23.	Antenna adjustable trimming.	RA	M-80832-503.

c. Receiver.

Refer- ence No.	Stock No.	Name of part	Description	Function	Main- tenance symbol	Drawing No.
C26	3D1068A2	Capacitor	Part of T ₃ , molded type, 8.2 μ fd \pm 10 percent, 400 v d-c working, 500 v peak, maximum working temperature 75° C.	Antenna (fixed).	RA	M-80112-584.
C27	3D1A12-1	Capacitor	Part of T ₃ , 2516 N981, 12 μ fd \pm 10 percent.	Detector coil coupling.	ER	K-84079-2.
C28	3D1A12-1	Capacitor	Part of T ₃ , 2516 N981, 12 μ fd \pm 10 percent.	Output pentode coupling.	CD	K-84162-16.
C29	3D1A12-1	Capacitor	Molded type, 0.01 μ fd \pm 10 percent, 600 v d-c working.	1st audio coupling.	MR or SM	KX-38190-1.
C36	3D1281	Capacitor	Same as C28.	Converter screen filter.	MR or SM	KX-38190-1.
C37	3D1286	Capacitor	Molded type, 10 μ fd \pm 14 percent, -6 percent, 260 v d-c working.	Audio diode, r-f filter.	RA	K-84020-4L.
C38	3D1281	Capacitor	Same as C28.	Ave filter.	MR or SM	KX-38190-1.
C39	3D1281	Capacitor	Same as C28.	Audio input coupling.	MR or SM	KX-38190-1.
C40	3D1284	Capacitor	Molded type, 0.05 μ fd \pm 10 percent, 400 v d-c working.	Ave filter.	MR or SM	KX-38190-1.
C41	3D1280	Capacitor	Part of T ₃ , type B, 11 μ fd \pm 10 percent, 400 v d-c working.	Ave filter.	MR or SM	KX-38190-2.
J1	2Z6505	Jack	Part of T ₃ , type B, 11 μ fd \pm 10 percent, 400 v d-c working.	Fixed bias bypass.	MR	K-85412-1.
J2	2Z6580	Jack	"Jury," No. 1.	"Extra phones"	CR	K-81871-4.
J3	2Z6580	Jack	"Junior Jack," type No. 700.	Phone	CR	K-81871-4.
P6	2Z7257-12	Plug	Part of T ₃ , shell No. 700.	Intercom cable plug	PRM	K-80198-1.
L1	2C3364-47A/C1	Coil assembly	Coil assembly in part No. 114 includes: C3, C11, C12, C13, C14, C15, coil assembly and terminal board assembly.	C-w oscillator coil.	RA	P-71267-503.
R3	3Z6801-17	Resistor	Variable, 1 megohm \pm 20 percent.	Audio volume control potentiometer.	CTS	M-421289-1.
R4	3Z6806-3	Resistor	Part of T ₃ , type EB, insulated, 60,000 ohms \pm 10 percent, 1/2 w.	Audio diode, r-f filter.	AB	K-82268-38.
R1	3Z6801-1	Resistor	Type B T- $\frac{1}{2}$, insulated, 1 megohm \pm 10 percent, $\frac{1}{2}$ w.	Ave diode load.	IRC	K-84091-88.
R7	3Z6806-1	Resistor	Type B T- $\frac{1}{2}$, insulated, 1 megohm \pm 10 percent, $\frac{1}{2}$ w.	C-w oscillator plate.	IRC	K-84091-88.
R8	3Z6747	Resistor	Type B T- $\frac{1}{2}$, insulated, 470,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	C-w oscillator grid.	IRC	K-84091-94.
R19	3Z6756	Resistor	Part of T ₂ , type BT- $\frac{1}{2}$, insulated, 60,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	Ave filter.	IRC	K-84091-96.
R15	3Z6756	Resistor	Part of T ₂ , same as R9.	Ave filter.	IRC	K-84091-96.
R16	3Z6720-33	Resistor	Variable, 20,000 ohms \pm 15 percent.	R-T sensitivity (bias) control potentiometer.	CTS	M-421289-1.

c. Receiver—Continued.

Refer- ence No.	Stock No.	Name of part	Description	F function	Manu- factur- er's symbol	Drawing No.
R17	325776	Resistor	Part of T3, same as R8.	Ave filter.	IRC	K-85091-105.
R19	325801-2	Resistor	Part of T3, type E-B, insulated, 1 megohm \pm 10 percent, $\frac{1}{2}$ w.	Ave choke load.	AB	K-82285-98.
R20	325747	Resistor	Same as R8.	1st audio plate load.	IRC	K-85091-94.
R21	325698	Resistor	Type BT-3 $\frac{1}{2}$, insulated, 8,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	Converter screen dropping.	IRC	K-85091-84.
R22	325801-1	Resistor	Same as R8.	2d audio grid.	IRC	K-85091-98.
R23	325642-1	Resistor	Type BT-3 $\frac{1}{2}$, insulated, 47,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	1st sensitivity filter.	IRC	K-85091-52.
R24	325682A2	Resistor	Type BT-3 $\frac{1}{2}$, insulated, 2.2 megohms \pm 10 percent, $\frac{1}{2}$ w.	1st audio grid.	IRC	K-85091-162.
R26	325682	Resistor	Type BT-3 $\frac{1}{2}$, insulated, 20,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	Fixed bias dropping.	IRC	K-85091-41.
R26	326752-1	Resistor	Type BT-3 $\frac{1}{2}$, insulated, 10,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	Output grid.	IRC	K-85091-91.
R27	325691-7	Resistor	Type BT-3 $\frac{1}{2}$, insulated, 10,000 ohms \pm 10 percent, $\frac{1}{2}$ w.	Output load.	IRC	K-85091-70.
S1	325948	Switch	S. P. T., 3 amp, 125 v, 250 v, (part of tuning control) 1A and 1B10.	"On" or "off."	CTS	M-421083-1.
S2	325848-2	Switch	Tuning control 1A and 1B10.	"On" or "off."	AHH	M-13732
T2	325699	Transformer	Ratio, primary to secondary 1.9 to 1.43 percent. Assembled in shield can, includes C14, C15, R9, coil assembly, and terminal board.	Primary "50 w"	AHH	M-13732
T2	325699-1	Transformer	Ratio, primary to secondary 1.9 to 1.43 percent. Assembled in shield can, includes C14, C15, R9, coil assembly, and terminal board.	Output (audio).	BA	P-714271-501.
T3	325699-2	Transformer	Assembled in shield can, includes C4, C5, C6, C7, R4, R19 coil assembly, and terminal board.	2d I-F.	RA	P-714271-502.
T4	325844-47A/C5	Coil assembly	Assembled in part 115, includes C32, coil assembly, and terminal board.	Detector coupling.	RA	P-714267-592.
T5	325844-47A/C6	Coil assembly	Assembled in part No. 115, includes C26, R18, R17, coil assembly, and terminal board.	Antenna coupling.	RA	P-714267-595.
T6	325844-47A/C7	Coil assembly	Assembled in part No. 115, includes C31, coil assembly, and terminal board.	Oscillator.	RA	P-714267-591.

V1	225763-1	Socket	Catalog No. 88-8, malleable-plate metal socket.	For 7-f amplifier tube.	APH	K-84600-1.
V1	225763-1	Socket	Same as V1.	For converter tube.	APH	K-84600-1.
V3	225820-1	Socket	Type MIP-3.	For 1-4 amplifier, 6-w oscillator, ave choke tube.	APH	K-85057-1.
V4	225763-1	Socket	Same as V1.	For 1st and 2d audio tube.	APH	K-84600-1.
V6	225844-47A/71	Terminal board	Terminal lug	Resistor mounting.	CM	M-8698-18.
V6	225844-47A/72	Terminal board	Terminal lug	Resistor mounting.	CM	M-8161-5.
V6	225844-47A/73	Terminal board	1 terminal lug mounting lug bent 90°	Resistor mounting.	CM	M-8161-4.
V6	225844-47A/74	Terminal board	1 terminal lug	Resistor mounting.	CM	M-28983-4.
V6	225844-47A/75	Terminal board	4-conductor Laxor T-Three, each conductor 21 strands No. 36 (equivalent to No. 28 AWO).	Battery connector.	RA	K-85052-591.
V6	227538	Pointer	Dial pointer assembly	Tuning control indicator.	RA	K-84608-502.
V6	225844-47A/76	Knob	Octagonal knob with white spot.	Tuning control.	KK	K-84608-4.
V6	225844-47A/77	Knob	Octagonal knob with white spot.	Volume control.	RA	K-83066-90A.
V6	225844-47A/78	Knob	Octagonal knob with white spot.	For Jack 11 and J2.	RA	K-83066-90B.
V6	225844-47A/79	Knob	Dust cover assembly	Connects to tube grid.	RA	K-77771-1.
V6	225844-47A/80	Knob	Cap.	Transmitter and receiver panel.	RA	K-77771-1.
V6	225844-47A/81	Knob	Front of transmitter and receiver	Writing accessory.	WR	K-86295-1.
V6	225844-47A/82	Knob	Rubber	Writing accessory.	WR	K-86295-1.
V6	225844-47A/83	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/84	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/85	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/86	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/87	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/88	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/89	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/90	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/91	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/92	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/93	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/94	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/95	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/96	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/97	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/98	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/99	Knob	Cap.	Writing accessory.	WR	K-86295-1.
V6	225844-47A/100	Knob	Cap.	Writing accessory.	WR	K-86295-1.

d. Miscellaneous.

116	225850	Spool	Waterproof plywood.	For carrying antenna and counterpoise wire.	RA	K-83132-1.
117	301285-163	Insulator	Catalog No. 474, ceramic, 1 1/2-inch long.	Insulates antenna.	BOC	K-85113-2.
118	225882-1	Conductor	Wire, 35 feet long, P. S. No. 45-5, black.	Antenna or counterpoise conductor.	RA	K-86154-1.
119	225745	Hook	Brass antenna hook.	Antenna or counterpoise conductor.	RA	K-86154-1.
120	225727-13	Plug	Type No. 109, 3-way plug, black bakelite shell.	Connector for key and headphones.	PRM	K-780252-2.
121	227146	Plug	Type No. 109.	Microphone connector.	WE	K-85297-1.
122	221584-7	Cable	2 conductors, unshielded, black rubber covered, outside diameter 0.295 to 0.310-inch, 15 inches long.	Telegraph key connector.	RA	K-81052-7.
123	225871	Thumb screw	Brass, 1 1/4 inches long, No. 8-32 threads.	Key mounting.	RA	K-84607-1.

d. Miscellaneous—Continued.

Reference No.	Stock No.	Name of part	Description	Function	Manufacturer's symbol	Drawing No.
138	ZZ500	Ribs.....	Waterproof plywood.....	Base for mounting key assembly.....	RA	K-80700-2.
139	ZS288/74	Chumberscrew.....	Bress. No. 8-32 threads, 1 1/4 inches long.....	Transmitter and receiver mounting.....	RA	K-80630-1.
140	ZS288/75	Washer.....	Bress.....	Part of miteaux strain post.....	RA	K-80113-1.
141	ZS288/76	Washer.....	Aluminum.....	For securing battery.....	RA	M-42371-501.

e. Type FL-10 filter and unit.

Reference No.	Stock No.	Name of part	Description	Function	Manufacturer's symbol	Drawing No.
1-1	3D277	Capacitor.....	Type No. 345, 0.1 μ \pm 10 percent, 400 v d-c.....	Receiver plate filter.....	MR	K-K-88104-1.
1-2	3D277	Capacitor.....	Same as 1-1.....	Receiver filament filter.....	MR	K-F-84164-1.
1-3	3D277	Capacitor.....	Same as 1-1.....	Receiver bias filter.....	MR	K-K-88104-1.
1-4	3D277	Capacitor.....	Same as 1-1.....	Receiver plate supply filter.....	MR	K-K-88104-1.
1-5	3C370	Coil.....	R of coils, continuous close wound over bakelite form 3/4 inch outside diameter, 2 inches long.....	Receiver plate supply filter.....	RA	K-88025-501.
2-2	8C270	Coil.....	Same as 1-5.....	Receiver filament filter.....	RA	K-88025-501.
3	4C370/81	Resistor.....	Iron core inductance at 30 v, 40 ohms \pm 10 percent.....	Receiver filament filter reactor.....	RA	K-90134-501.
4	5Z0615-20	Resistor.....	0.3 amp 4-75 ohms minimum, d-c resistances 2, terminals.....	Receiver plate drooping resistor.....	IRO	K-88032-1.
5	5Z0615-10	Resistor.....	Type AB, 15,000 ohms 10 w, wire wound, type 2, terminals.....	Receiver filament drooping resistor.....	IRO	K-88032-2.
6	ZZ6732	Socket.....	Type AB, 4 B's, variable, 30 ohms total 10 w, wire wound, 2 terminals, 1/2 inch diameter, 1/2 inch diameter slide, type 2 terminal.....	For generator and transmitter cable.....	RE	K-88031-1.
7	ZZ6731	Socket.....	4-pin type, bakelite.....	For battery cable.....	GM	K-88029-1.
8	3E1126	Cord and plug assembly.....	4-pin type, catalog No. F-121..... Includes CO-132 cord (conductor shielded cable, 38 inches long) and 2 type P L-36-A plugs.....	For connecting generator to filter unit.....	RA	M-42188-501.

22. List of manufacturers.

Manufacturer and address	Symbol
Allen Bradley Co., 600 S. Delaware Ave., Philadelphia, Pa.....	AB
Arrow-Hart-Hegeman, Hartford, Conn.....	AHH
American Phenolic Corp., 1250 W. Van Buren St., Chicago, Ill.....	APH
Birnbach Ceramics Co., 145 Hudson St., New York, N. Y.....	BCC
Burke Electric Co., Erie, Pa.....	BE
Cornell-Dubilier Corp., 1000 Hamilton Blvd., South Plainfield, N. J.....	CD
Cinch Mfg. Corp., 2335 W. Van Buren St., Chicago, Ill.....	CM
Utah Radio Products Co., 812 Orleans Ave., Chicago, Ill.....	CR
Chicago Telephone Supply Co., Elkhart, Ind.....	CTS
H. H. Eby Co., 4700 Stenton Ave., Philadelphia, Pa.....	EC
Erie Resistor Corp., Erie, Pa.....	ER
Hammarlund Mfg. Co., 424-38 West 33d St., New York, N. Y.....	HM
Isolantite, Inc., Belleville, N. J.....	I
International Resistor Co., 401 N. Broad St., Philadelphia, Pa.....	IRC
Kelley and Hueber, 4052 Haverford Ave., Philadelphia, Pa.....	KH
Kurz-Kasch Co., Dayton, Ohio.....	KK
Les Logan Co., 646 Jessie St., San Francisco, Calif.....	LLC
Morganite Brush Co., 3304 Forty-Eighth Ave., Long Island City, N. Y.....	MC
Molded Insulation Co., 335 East Price St., Philadelphia, Pa.....	MIC
Micamold Radio Corp., 1087 Flushing Ave., Brooklyn, N. Y.....	MR
National Co., Malden, Mass.....	N
Norma-Hoffman Bearings Corp., Stamford, Conn.....	NH
New York-New Jersey Lubricant Co., New York, N. Y.....	NLC
Oak Mfg. Co., 1260 Clybourn Ave., Chicago, Ill.....	OM
P. R. Mallory Co. (Yaxley Division), 3029 E. Washington St., Indianapolis, Ind.....	PRM
RCA Manufacturing Co., Inc., Front and Cooper Sts., Camden, N. J.....	RA
Radio Condenser Co., Copewood and Thorne Sts., Camden, N. J.....	RC
Pierce Roberts Co., Trenton, N. J.....	RT
Simpson Electric Co., 5216-18 W. Kinzie St., Chicago, Ill.....	SC
Solar Mfg. Corp., Bayonne, N. J.....	SM
Western Electric Co., 195 Broadway, New York, N. Y.....	WE
Western Rubber Co., Goshen, Ind.....	WR

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,

Chief of Staff.

OFFICIAL:

J. A. ULIO,

Major General,

The Adjutant General.

DISTRIBUTION:

R and H 6(3); IR 7(10); IBn 6(7) and 7(10); IC 3, 4, 6(2) and
11(10).

(For explanation of symbols see FM 21-6.)