

# TM 11-612

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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## RADIO SETS AN/PRC-8, AN/PRC-9 AND AN/PRC-10

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*DEPARTMENT OF THE ARMY • SEPTEMBER 1951*



RADIO SETS  
AN/PRC-8, AN/PRC-9  
AND AN/PRC-10

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DEPARTMENT OF THE ARMY

• SEPTEMBER 1951

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## **WARNING**

### **HIGH VOLTAGE**

is used in the operation of  
this equipment.

### **DEATH ON CONTACT**

may result if operating personnel  
fail to observe safety precautions.



#### RESCUE.

In case of electric shock, shut off the high voltage at once and ground the circuits. If the high voltage cannot be turned off without delay, free the victim from contact with the live conductor as promptly as possible. Avoid direct contact with either the live conductor or the victim's body. Use a dry board, dry clothing, or other nonconductor to free the victim. An ax may be used to cut the high-voltage wire. Use extreme caution to avoid the resulting electric flash.

#### SYMPTOMS.

a. Breathing stops abruptly in electric shock if the current passes through the breathing center at the base of the brain. If the shock has not been too severe, the breath center recovers after a while and normal breathing is resumed, provided that a sufficient supply of air has been furnished meanwhile by artificial respiration.

b. The victim is usually very white or blue. The pulse is very weak or entirely absent and unconsciousness is complete. Burns are usually present. The victim's body may become rigid or stiff in a very few minutes. This condition is due to the action of electricity and is not to be considered rigor mortis. Artificial respiration must still be given, as several such cases are reported to have recovered. The ordinary and general tests for death should never be accepted.

#### TREATMENT.

a. Start artificial respiration immediately. At the same time send for a medical officer, if assistance is available. Do not leave the victim unattended. Perform artificial respiration at the scene of the accident, unless the victim's or operator's life is endangered from such action. *In this case only*, remove the victim to another location, but no farther than is necessary for safety. If the new location is more

than a few feet away, artificial respiration should be given while the victim is being moved. If the method of transportation prohibits the use of the Shaeffer prone pressure method, other methods of resuscitation may be used. Pressure may be exerted on the front of the victim's diaphragm, or the direct mouth-to-mouth method may be used. Artificial respiration, once started, must be continued, without loss of rhythm.

b. Lay the victim in a prone position, one arm extended directly overhead, and the other arm bent at the elbow so that the back of the hand supports the head. The face should be turned away from the bent elbow so that the nose and mouth are free for breathing.

c. Open the victim's mouth and remove any foreign bodies, such as false teeth, chewing gum, or tobacco. The mouth should remain open, with the tongue extended. Do not permit the victim to draw his tongue back into his mouth or throat.

d. If an assistant is available during resuscitation, he should loosen any tight clothing to permit free circulation of blood and to prevent restriction of breathing. He should see that the victim is kept warm, by applying blankets or other covering, or by applying hot rocks or bricks wrapped in cloth or paper to prevent injury to the victim. The assistant should also be ever watchful to see that the victim does not swallow his tongue. He should continually wipe from the victim's mouth any frothy mucus or saliva that may collect and interfere with respiration.

e. The resuscitating operator should straddle the victim's thighs, or one leg, in such manner that:

(1) the operator's arms and thighs will be vertical while applying pressure on the small of the victim's back;

(2) the operator's fingers are in a natural position on the victim's back with the little finger lying on the last rib;

(3) the heels of the hands rest on either side of the spine as far apart as convenient without allowing the hands to slip off the victim;

(4) the operator's elbows are straight and locked.

f. The resuscitation procedure is as follows:

(1) Exert downward pressure, not exceeding 60 pounds, for 1 second.

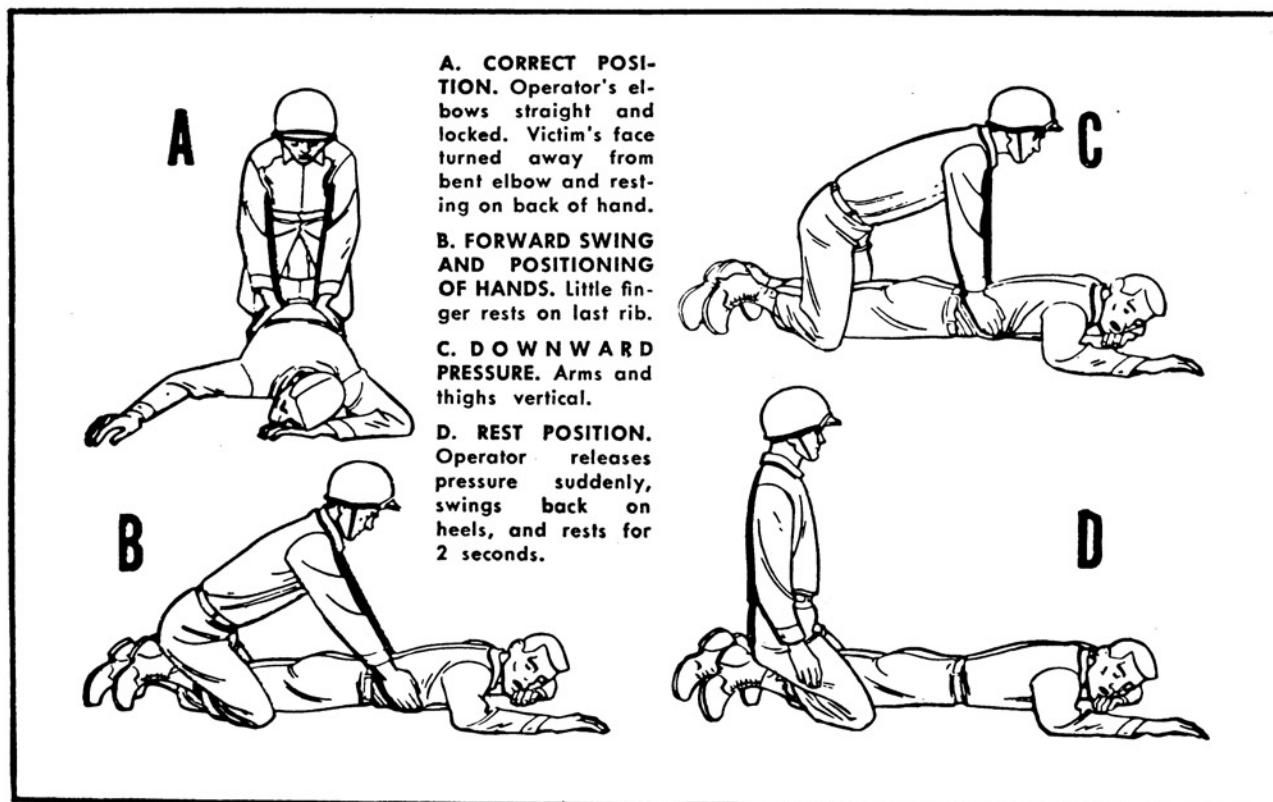
(2) Swing back, suddenly releasing pressure, and sit up on the heels.

(3) After 2 seconds rest, swing forward again, positioning the hands exactly as before, and apply pressure for another second.

g. The forward swing, positioning of the hands, and the downward pressure should be accomplished in one continuous motion, which requires 1 second. The release and backward swing require 1 second. The addition of the 2-second rest makes a total of 4

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seconds for a complete cycle. Until the operator is thoroughly familiar with the correct cadence of the cycle, he should count the seconds aloud, speaking distinctly and counting evenly in thousands. Example: one thousand and one, one thousand and two, etc.

h. Artificial respiration should be continued until the victim regains normal breathing or is pronounced dead by a medical officer. Since it may be necessary to continue resuscitation for several hours, relief operators should be used if available.

#### RELIEVING OPERATOR.

The relief operator kneels beside the operator and follows him through several complete cycles. When the relief operator is sure he has the correct rhythm, he places his hands on the operator's hands without applying pressure. This indicates that he is ready to take over. On the backward swing, the operator moves and the relief operator takes his position. The relieved operator follows through several complete cycles to be sure that the new operator has the correct rhythm. He remains alert to take over instantly if the new operator falters or hesitates on the cycle.

#### STIMULANTS.

a. If an inhalant stimulant is used, such as aro-

matic spirits of ammonia, the individual administering the stimulant should first test it himself to see how close he can hold the inhalant to his own nostril for comfortable breathing. Be sure that the inhalant is not held any closer to the victim's nostrils, and then for only 1 or 2 seconds every minute.

b. After the victim has regained consciousness, he may be given hot coffee, hot tea, or a glass of water containing  $\frac{1}{2}$  teaspoon of aromatic spirits of ammonia. *Do not give any liquids to an unconscious victim.*

#### CAUTIONS.

a. After the victim revives, keep him LYING QUIETLY. Any injury a person may have received may cause a condition of shock. Shock is present if the victim is pale and has a cold sweat, his pulse is weak and rapid, and his breathing is short and gasping.

b. keep the victim lying flat on his back, with his head lower than the rest of his body and his hips elevated. Be sure that there is no tight clothing to restrict the free circulation of blood or hinder natural breathing. Keep him warm and quiet.

c. A resuscitated victim must be watched carefully as he may suddenly stop breathing. *Never leave a resuscitated person alone until it is CERTAIN that he is fully conscious and breathing normally.*

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*Figure 1. Radio Set AN/PRC-8, -9, or -10.*

# CHAPTER 1

## INTRODUCTION

### Section I. GENERAL

#### 1. Scope

*a.* This technical manual contains instructions for the operation and organizational maintenance of Radio Sets AN/PRC-8, -9, and -10. An explanation of the theory and field maintenance of these equipments is contained in TM 11-4065.

*b.* The basic similarities of Radio Sets AN/PRC-8, -9, and -10 permit simultaneous treatment of these sets in most instances. Therefore, Radio Sets AN/PRC-8, -9, and -10 are referred to collectively as the *radio set* and Radio Receiver-Transmitters RT-174/PRC-8, RT-175/PRC-9, and RT-176/PRC-10 are referred to as the *receiver-transmitter*. Wherever instructions are limited to a particular set, the specific nomenclature for that set is used.

#### 2. Forms and Records

The following forms will be used for reporting unsatisfactory conditions of Army matériel and equipment.

*a.* DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5.

*b.* DA AGO Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office of the Chief Signal Officer as prescribed in SR 700-45-5.

*c.* WD AGO Form 419, Preventive Maintenance Checklist for Signal Corps Equipment, will be prepared in accordance with instructions on the back of the form.

*d.* Use other forms and records as authorized.

### Section II. DESCRIPTION AND DATA

#### 3. Purpose and Use

*a.* Radio Sets AN/PRC-8, -9, and -10 (fig. 1) are three portable, f-m (frequency-modulated) radio sets intended to provide man-pack communications for armored, artillery, and infantry units, respectively. The frequency ranges of these sets and of other equipment with which the sets can communicate are indicated in the frequency spectrum chart (fig. 2).

*b.* The radio sets are battery-powered; they can be operated in airplane and vehicle installations, in semipermanent ground installations, or while being carried by the operator. Provision is also made for homing use, remote operation, and unattended relay operation, using two sets.

#### 4. Technical Characteristics

##### *a.* GENERAL.

Frequency range:

Radio Set AN/PRC-8\_ 20.0 to 27.9 mc  
(megacycles).

Radio Set AN/PRC-9\_ 27.0 to 38.9 mc.

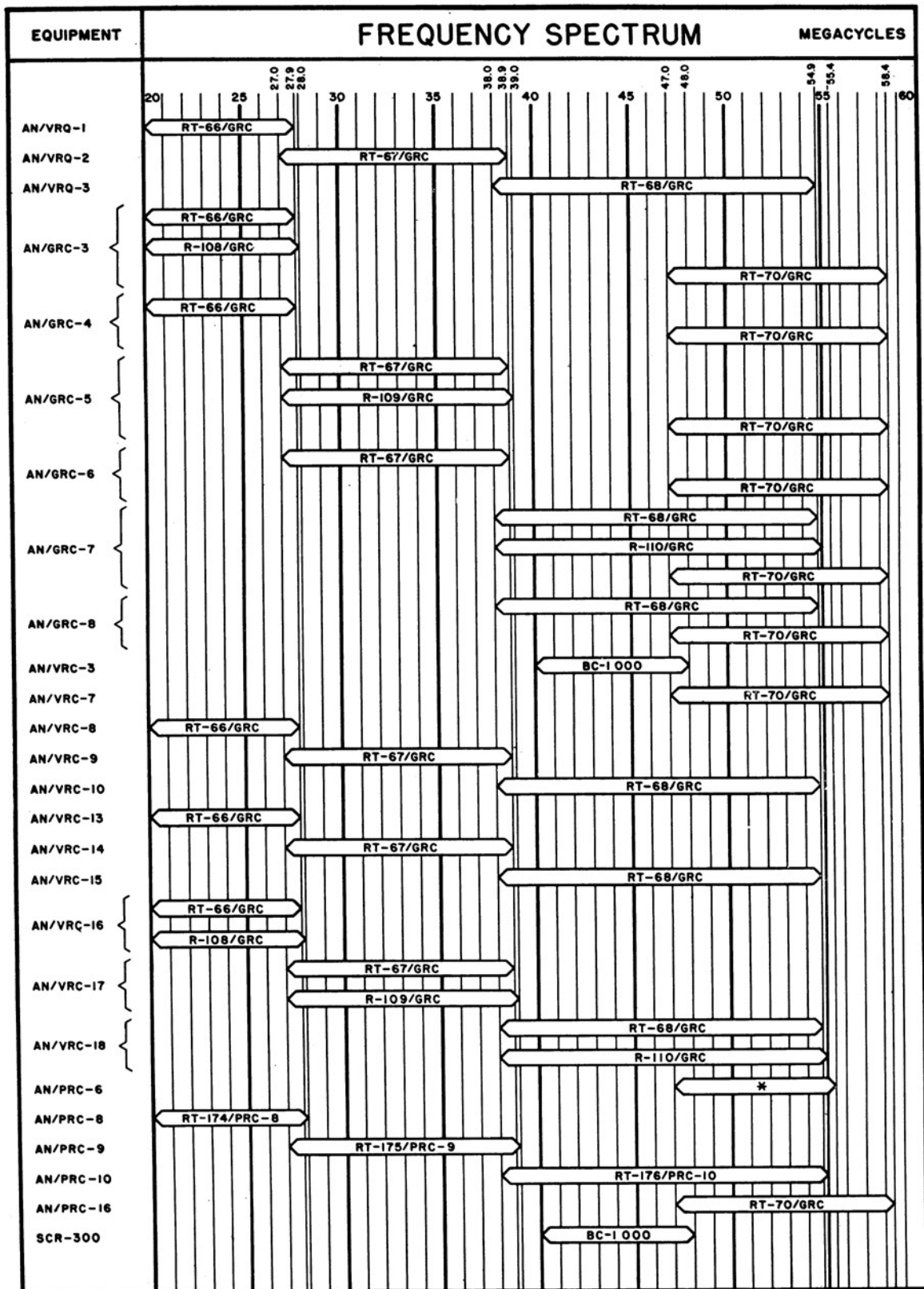
Radio Set AN/PRC-10\_ 38.0 to 54.9 mc.

Number of tubes\_ 16.

Type of modulation\_ Frequency.

Type of transmission\_ Voice.

Power source\_ Battery BA-279/U  
(not supplied)  
(par. 9i).



\* ONE FIXED FREQUENCY DEPENDING UPON CRYSTAL USED.

TM 611-17

Figure 2. Frequency spectrum chart.

Antenna AT-272/PRC\_ 36 inches long; demountable semi-rigid steel tape.

Antenna AT-271/PRC\_ 10 feet long; multi-section whip type.

Tuning----- Single calibrated dial continuously tunes both transmitter and receiver.

Calibration ----- Built-in calibrator provides 1 - mc calibration points throughout operating range.

Weight (including components and battery). 26 pounds.

**b. TRANSMITTER.**

Power output:

Radio Set AN/PRC-8\_ 1.2 watts.

Radio Set AN/PRC-9\_ 1.0 watt.

Radio Set AN/PRC-10. .9 watt.

Oscillator----- Electron coupled Hartley, afc (automatic frequency control) controlled by comparison to receiver oscillator.

Microphone input impedance. 150 ohms.

Distance range----- 5 miles. (May be 3 to 12 miles, depending on antenna used and siting conditions. See paragraph 11.)

**c. RECEIVER.**

Type ----- Superheterodyne, f-m.

Sensitivity----- .5 microvolt with 2.5 mw (milliwatts) output, 15-kc (kilocycles) deviation, and a 10-db (decibel) signal - to - noise ratio.

Selectivity ----- 80 kc at 6 db down.

Output impedance----- 600 ohms.

Type of reception----- F-m.

I. f. (intermediate frequency). 4.3 mc.

## 5. Packaging Data

The radio set is supplied complete (except for Battery BA-279/U) in one container. Domestic packaging consists of a corrugated cardboard carton, while export packaging is the same with an over-all moistureproof barrier and a wooden crate. The size, weight, and volume of each type of packaging are indicated in the following chart:

Type of packaging	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Unit weight (lb)
Domestic	15	25.5	15	3.33	30
Export	17.25	28	17.37	4.85	40

## 6. Table of Components

(figs. 3 and 10)

The table on following page lists the components of the radio set and gives pertinent data on these components.

## 7. Auxiliary Equipment

The following equipment is required but is *not* supplied as part of the radio set.

### a. FOR VEHICULAR INSTALLATION:

Amplifier Power Supply AM-598/U and miscellaneous components indicated in appropriate installation kit.

### b. FOR REMOTE OPERATION (figs. 25 and 28):

Two 1½-volt Batteries BA-30.  
 One 45-volt Battery BA-414/U.  
 Telephone wire (up to 2 miles).  
 Control Group AN/GRA-6.

### c. FOR RELAY OPERATION:

Two Special Purpose Cable Assemblies CX-1575/U.

Two Receptacle Connectors U-79/U.

### d. FOR HOMING (figs. 31 and 32):

Antenna AT-339/PRC (for use with Radio Set AN/PRC-10).  
 Antenna AT-340/PRC (for use with Radio Sets AN/PRC-8 and -9).

### e. FOR AUXILIARY ANTENNA (figs. 33 and 34):

Antenna Equipment RC-292.  
 Adapter UG-255/U.

Component	Required No.			Height (in.)	Depth (in.)	Length (in.)	Diam (in.)	Volume (cu. ft.)	Unit weight (lb.)
	AN/PRC-8	AN/PRC-9	AN/PRC-10						
Radio Receiver-Transmitter RT-174/PRC-8.	1			9.5	3	10.5		0.11	9
Radio Receiver-Transmitter RT-175/PRC-9.		1		9.5	3	10.5		.11	9
Radio Receiver-Transmitter RT-176/PRC-10.			1	9.5	3	10.5		.11	9
Case CY-744/PRC	1	1	1	9.5	3	9.5		.1	1.5
Battery BA-279/U (required but not supplied).	1	1	1	8.5	2.37	8.5		.099	8
Antenna AT-271/PRC	1	1	1			113	0.75	.098	.33
Antenna AT-272/PRC	1	1	1			36.5	.875	.126	.5
Antenna Spring Section AB-129/PR.	1	1	1	.625	.625	8		.014	2
Suspender, belt M-1945	1	1	1	3	3	36		.188	.5
Bag CW-216/PR	1	1	1	3	5.25	18		.164	.5
Carrying Harness ST-120/PR	1	1	1	2	9	14		.145	.75
Handset H-33B/PT	1	1	1	3.5	3.5	8		.057	.875
Set of running spares comprising:	1	1	1	5	5	5		.073	2
1 Discriminator Transformer TF-132/U									
1 Dial lamp									
2 IF Amplifiers AM-427/U									
1 tube type 5A6									
1 tube type 1AD4									
4 tubes type 5678									
3 tubes type 5676									
2 tubes type 5672									
Technical Manual (TM 11-612)	2	2	2						
Total (excluding Battery BA-279/U).								1.075	17.96

Note. This list is for general information only. See appropriate supply publications for information pertaining to requisition of spare parts.

## 8. Description of Receiver-transmitter

a. GENERAL. Radio Receiver-Transmitters RT-174/PRC-8, RT-175/PRC-9, and RT-176/PRC-10 are electrically and mechanically similar; they differ from each other only in their operating frequencies and in the components which determine these frequencies. Each set consists of a superheterodyne f-m receiver and f-m transmitter which use a common antenna. The receiver-transmitter consists of a single panel-chassis assembly which is mounted in a case (fig. 4).

b. CASE. The case is fabricated of case magnesium. When it is fastened to the panel, a water-

tight inclosure is formed. Each of the two sides has two spring clamps, one at the front to fasten the panel and one at the rear to fasten the battery case. A short eight-wire cable (fig. 5) with a connector on each end is mounted at the rear to connect the receiver-transmitter to the battery. One connector is a socket which is permanently mounted at the rear of the case for connection when the receiver-transmitter chassis is slid into the case. A guide web, cast as part of the case, assures alinement of the receiver-transmitter plug and the case socket. The other connector is a plug on the free end of the cable. This plugs into the socket on the battery.

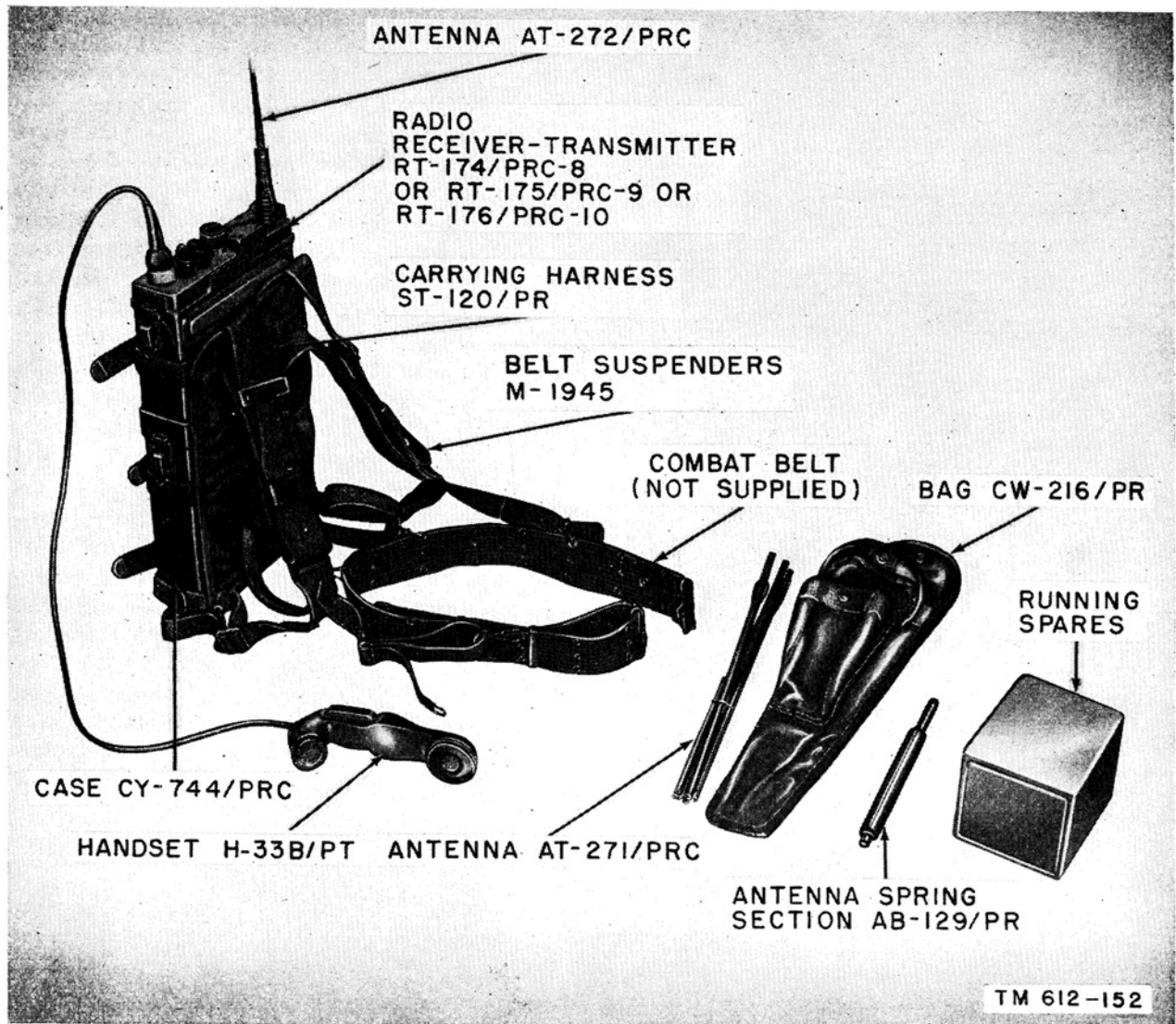


Figure 3. Radio Set AN/PRC-8, -9, or -10, operating components.

c. **PANEL.** The cast-aluminum panel is secured to the chassis by six screws. The controls are shown in figure 14. The dial-drive mechanism (fig. 6) is an antibacklash gear train, with the antenna tuning components mounted on and operated by the mechanism. The dial drum with its frequency markings and the pointer are visible through a lens on the panel.

d. **CHASSIS.** The chassis (figs. 6 and 7) is a spot-welded sheet-aluminum assembly on which are mounted all components of the unit except

those mounted on the control panel. The panel and chassis may be removed from the case by releasing the two spring clamps on the sides at the front of the case. The chassis includes the following items:

- (1) *Box subassemblies.* Six metal box subassemblies are mounted on the chassis. Viewing the chassis from the top and rear, these boxes are on the right-hand side of the chassis (fig. 7). Each box has a subminiature tube plugged into a socket

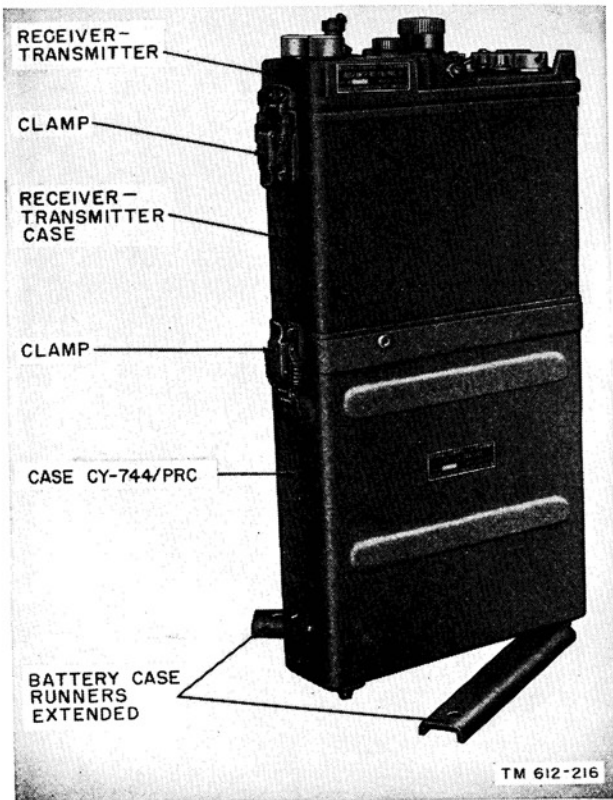


Figure 4. Receiver-transmitter and battery cases, connected.

on the left side of the box. These boxes house the circuits for the transmitter oscillator, the first r-f amplifier, the second r-f amplifier, the mixer, the receiver oscillator, and the afc driver. The names are printed on the tops of the respective boxes. The tube which is plugged into the socket on the transmitter oscillator box is *not* the transmitter oscillator tube but is the modulator tube, V2. Each of the other five boxes has the tube which corresponds to the name on the box plugged into it. The boxes contain coils, capacitors, and resistors which are shown included within dotted-line boxes on the main schematic diagrams (figs. 37, 38, and 39). Refer to TM 11-4065 (figs. 37, 38, and 39) for inside views of these boxes. Each box has a terminal board from which voltage and resistance measurements may be made. These terminal boards are just below tube V3 (fig. 6) and are accessible when that tube is removed from its socket. Voltages and resistances at these terminals are indicated in figure 27 of TM 11-4065. The reference symbols for these boxes as indicated

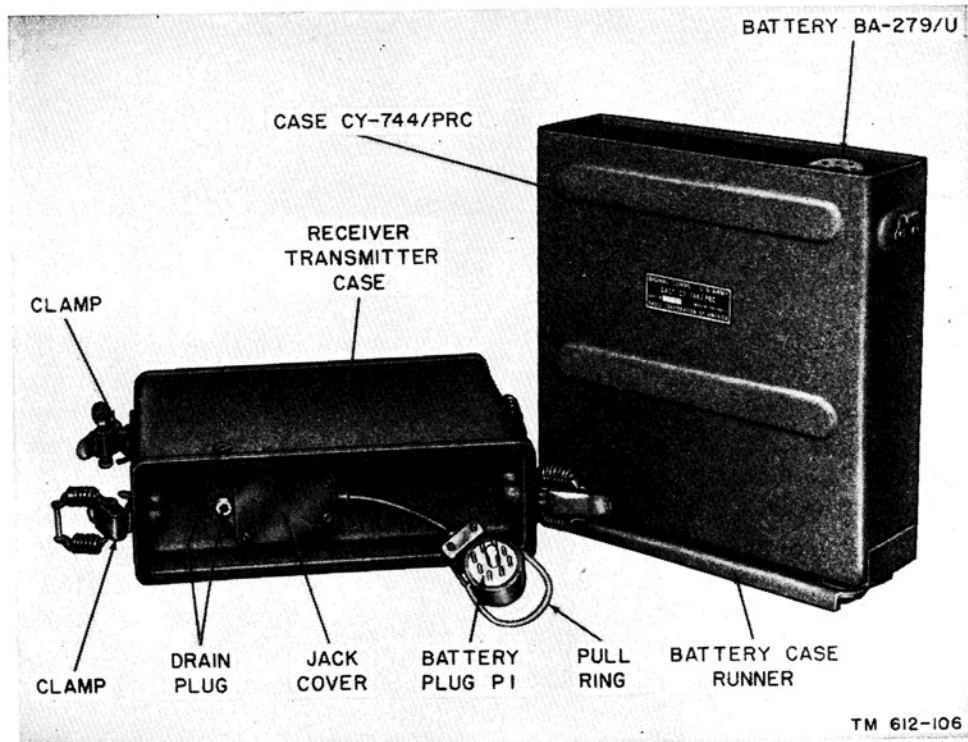


Figure 5. Receiver-transmitter and battery cases, disconnected.



on the main schematic diagrams and in the maintenance parts list are as follows:

Reference symbol	Name of box (fig. 7)
U1-----	A. F. C.
U2-----	TRANS. OSC.
U3-----	1ST RF
U4-----	2D RF
U5-----	MIXER
U6-----	REC. OSC.

- (2) *I-f amplifier and discriminator circuits.* The five IF Amplifier (AM-427/U) sub-assemblies are identical. Each contains a subminiature tube, coils, resistors, and capacitors hermetically sealed inside a 3/4-inch diameter by 2-inch can. These cans have seven-prong plugs similar to miniature tube bases and plug into sockets located on the i-f shelf at the left rear of the chassis. The discriminator can (TF-132/U) is similar to the i-f cans in outward appearance. It contains coils, resistors, capacitors, and two germanium crystals.
- (3) *Miscellaneous components.* The following items on the chassis of the receiver-transmitter may be located on figures 6 and 7:

Item	Reference symbol
Squelch relay-----	K2.
4.3-mc calibration oscillator crystal-----	Y2.
4.3-mc calibration oscillator tube (5678)-----	V10.
Audio amplifier tube (5672)-----	V7.
Squelch tube (5678)-----	V11.
1-mc calibration oscillator tube (5676)-----	V9.
1-mc calibration oscillator crystal-----	Y1.
Battery cable plug-----	J5.
Transmitter oscillator tube (5A6)-----	V3.
POWER switch-----	S1.
SQUELCH control and switch-----	R35 and S2.
AUDIO receptacle-----	J8.
Transmit-receive relay-----	K1.
Modulator tube (5676)-----	V2.
1st r-f amplifier tube (1AD4)-----	V4.
2d r-f amplifier tube (5678)-----	V5.
Mixer tube (5678)-----	V6.
Receiver oscillator tube (5676)-----	V8.
Afc driver tube (5672)-----	V1.
I-f cans (AM-427/U)-----	U101 through U105.
Discriminator can (TF-132/U)-----	T201.
Test socket-----	J7.

## 9. Description of Accessories

a. **BATTERY CASE CY-744/PRC** (fig. 4). Fastened to the bottom of the aluminum battery case are two U-shaped runners which prevent the equipment from tipping when operated on the ground. The battery case protects and supports the battery which is powering the equipment. A plug on a cable attached to the bottom of the receiver-transmitter makes the various battery connections. The receiver-transmitter has two spring clamps, one on each side, to hold the battery case in place.

b. **ANTENNA AT-271/PRC** (figs. 1 and 3). The long antenna (Antenna AT-271/PRC) is made up of seven sections, each one fitting into the ferrule of the previous one. A stainless steel cable, nylon covered, under spring tension and running through the sections keeps them together when in the extended position. When folded, the cable keeps the sections together as a group, thereby preventing the loss of individual sections. Spring tension is provided by a spiral spring in the base section. This antenna is used when maximum range is necessary, such as for two-way unattended relay service or stationary use, and is screwed into the spring section which is in turn screwed into LONG ANT jack J1 on the control panel.

c. **ANTENNA AT-272/PRC** (figs. 1 and 3). The short antenna (Antenna AT-272/PRC) consists of several lengths of flexible steel tape riveted together at the base and at points along their length, making a tapered antenna 3 feet long. An adjustable elbow is located just above the base. This antenna is used for general service and can be folded into a small space without damage. It is screwed into SHORT ANT jack J2 when used.

d. **ANTENNA SPRING SECTION AB-129/PR** (figs. 1 and 3). The spring section protects the long antenna from damage by bending when the long antenna strikes an object during operations while the radio set is being transported.

e. **HANDSET H-33B/PT**. The handset (fig. 8) consists of a microphone for transmitting, an earphone for receiving signals, and a push-to-talk switch. The handset is connected through a cable and 10-contact plug to AUDIO jack J8 on the control panel of the radio set.

f. **BAG CW-216/PR** (fig. 9). The bag hangs from the operator's combat belt. It carries all the minor components or those not in use during oper-

ation. The following items are stored in the compartments:

- Handset H-33B/PT
- Antenna AT-271/PRC
- Antenna AT-272/PRC
- Antenna Spring Section AB-129/PR

g. SUSPENDER, BELT M-1945. The suspenders (fig. 3) support the operator's combat belt and the equipment in a harness. The suspenders are padded at the shoulders and are adjustable to fit

the operator. At the top of the shoulders is a loop slide on each suspender to which the harness is fastened.

h. CARRYING HARNESS ST-120/PR. The harness (fig. 3) is fastened to the equipment by three adjustable straps. The bottom strap has two rings sewn into it for securing the bottom of the harness to the operator's combat belt. Two straps at the top support the entire pack and adjust its position when fastened in the two loop sides of the suspenders.

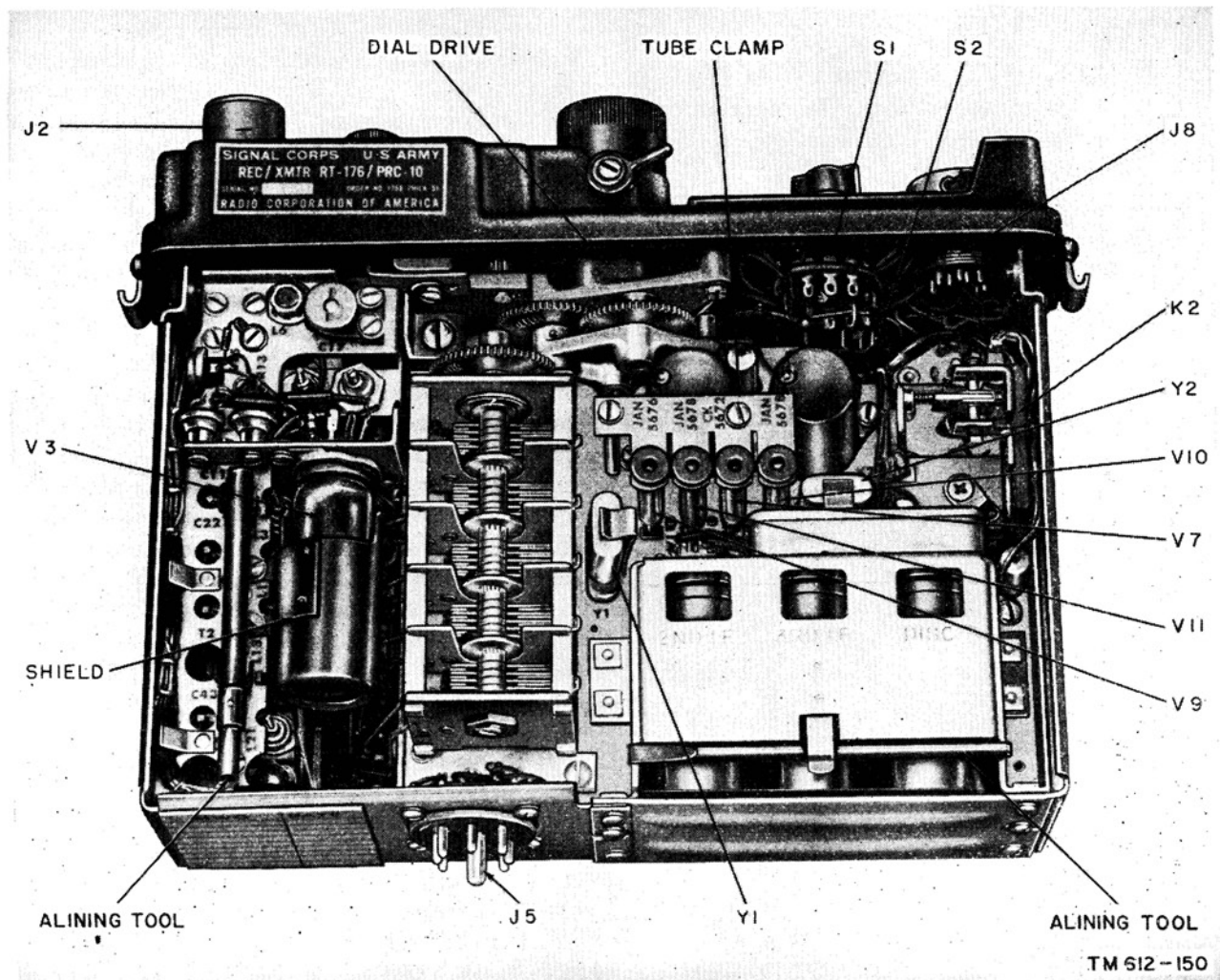


Figure 6. Receiver-transmitter chassis, bottom view.

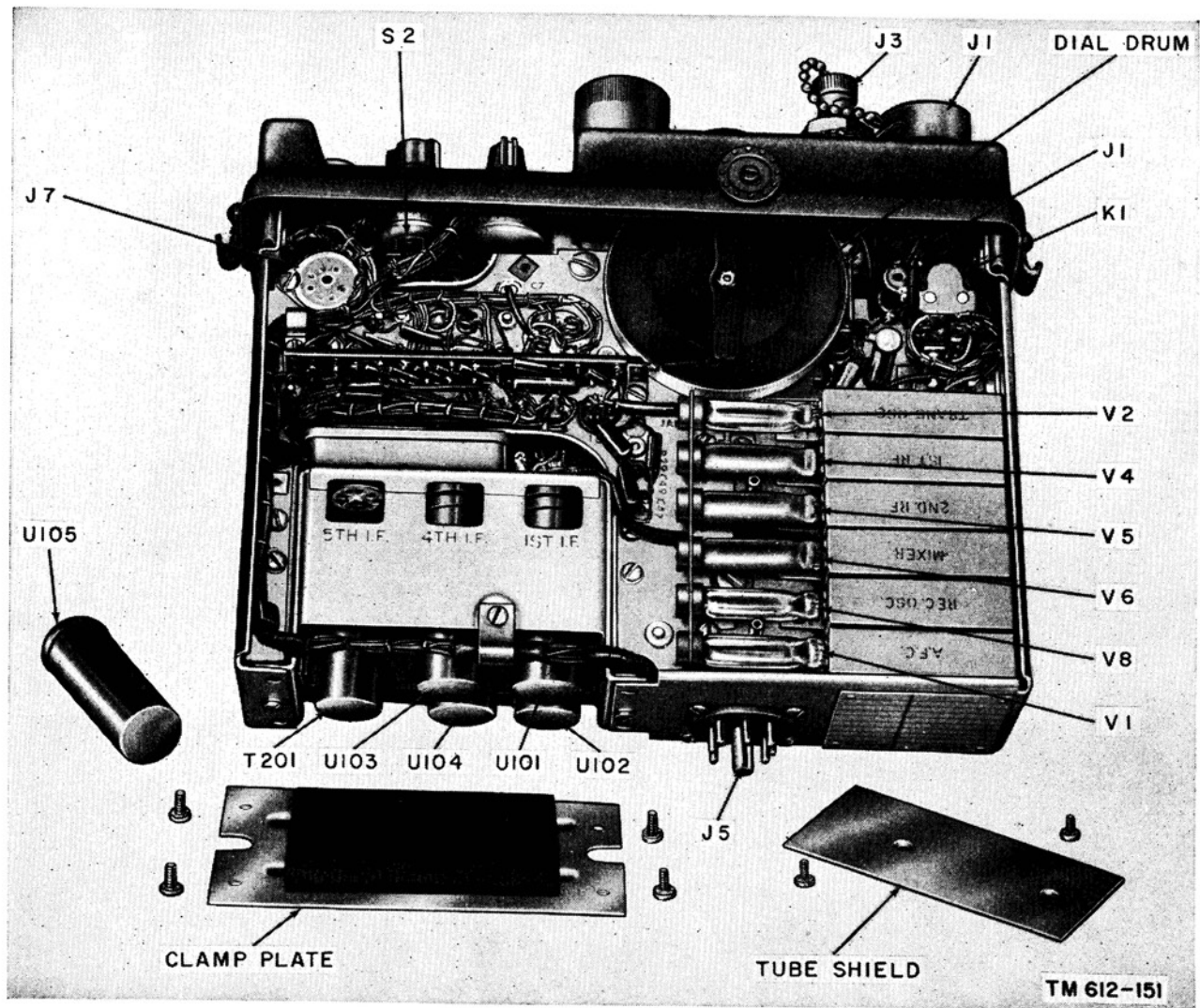


Figure 7. Receiver-transmitter chassis, top view.

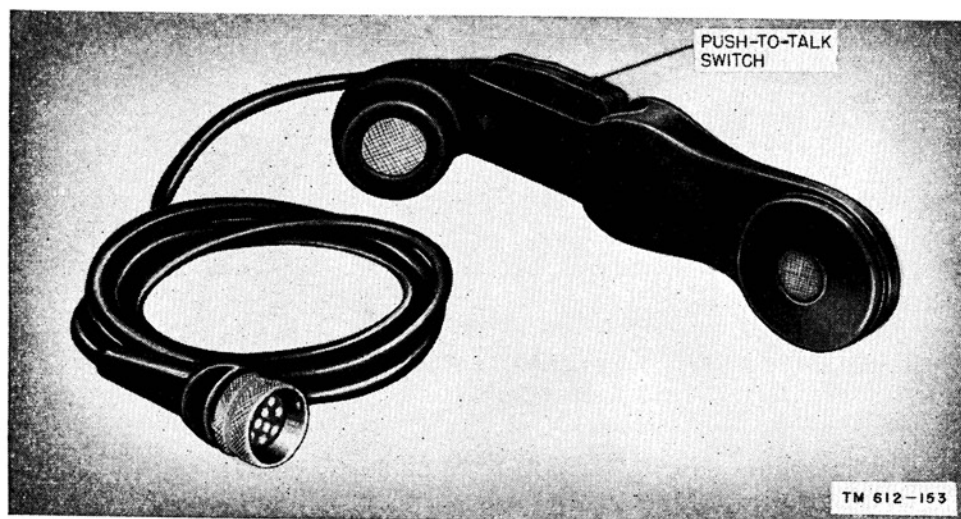


Figure 8. Handset H-33B/PT.

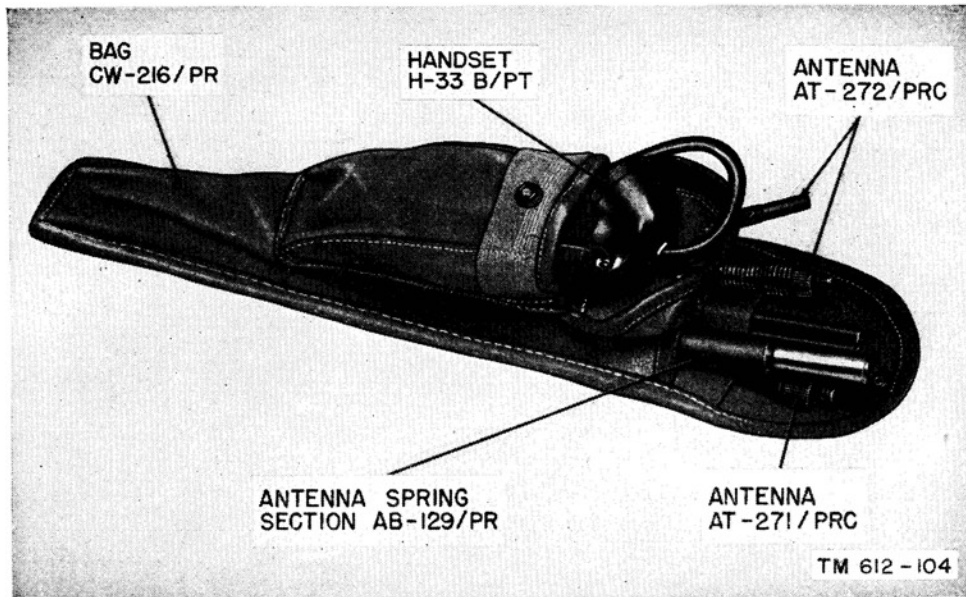


Figure 9. Bag CW-216/PR and accessories.

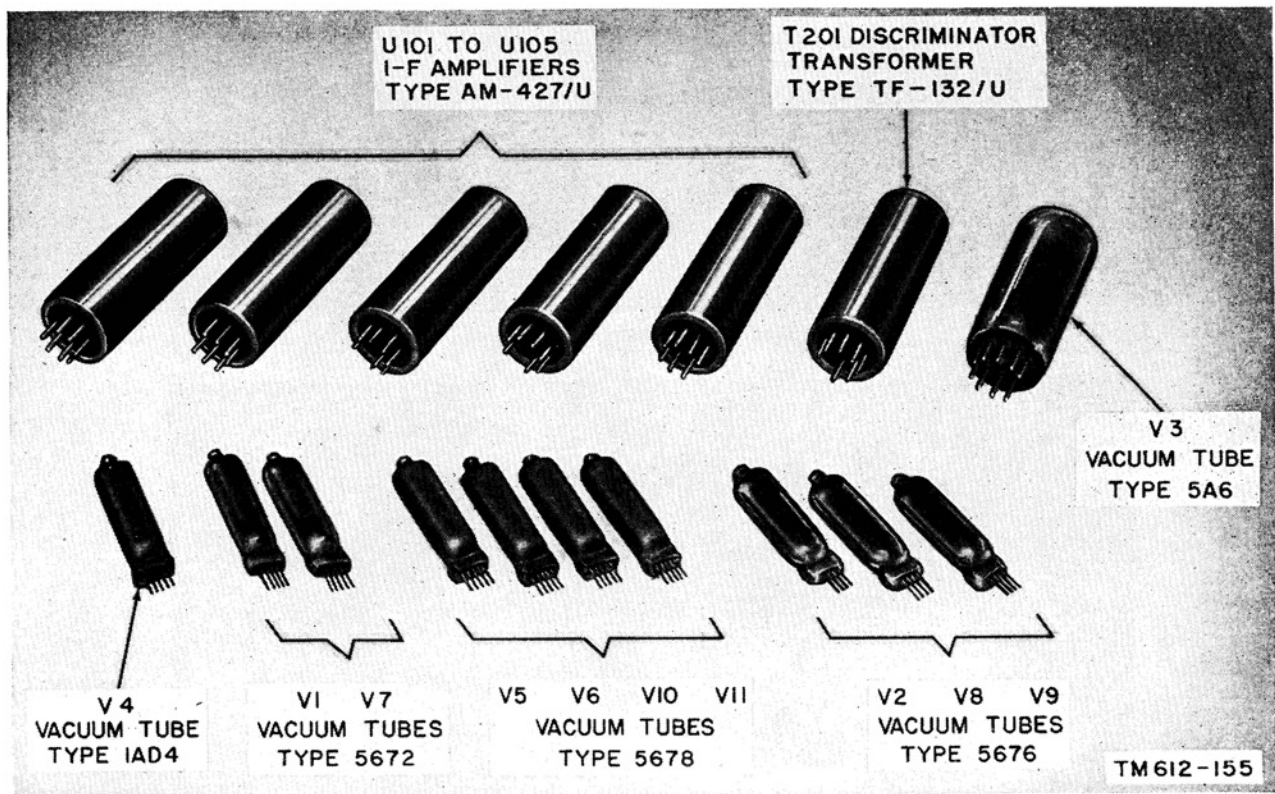


Figure 10. Spare parts.

i. BATTERY BA-279/U. Battery BA-279/U is not supplied as part of the radio sets and must be requisitioned separately. The schematic diagram is given in figure 23. The actual life of the battery depends on many conditions, such as age, environment, etc. The approximate expected battery life is given in the following table:

Rate of use (hrs/day)	Battery life	
	Days	Hours
2	15	30
4	7.2	28.8
8	2.6	20.8

## 10. Running Spares

(fig. 10)

A set of running spares is supplied which consists of two pretuned i-f transformers (U101 through U105) one pretuned discriminator (T201), one dial light, and a complete set of tubes. This set of spares permits complete replacement of items normally consumed in operation, with the exception of the battery. The following spare tubes are supplied:

- 1 type 5A6 tube (V3)
- 1 type 1AD4 tube (V4)
- 4 type 5678 tubes (V5, V6, V10, V11, V101)
- 3 type 5676 tubes (V2, V8, V9)
- 2 type 5672 tubes (V1, V7)

## CHAPTER 2

### OPERATING INSTRUCTIONS

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#### Section I. SERVICE ON RECEIPT OF MATÉRIEL

#### 11. Siting

*a.* Because of the low power and high frequency used, the location of the equipment greatly affects its operating range. Normally, a line-of-sight range can be expected. That is, if the other station can be seen, satisfactory operation is probable within the distance range of the equipment. However, an intervening hill or tall building may hamper or prevent contact with the other station (fig. 11). Valleys, depressions, densely wooded areas, and low places are poor sites. Location on a hill-top or tower increases the line-of-sight distance, thereby increasing the range. Locating the equipment under a tree or close to a building may result in unsatisfactory operation because of absorption. Flat terrain is good. As a general rule, transmission over water is better than over land.

*b.* Operation from a moving vehicle can be satisfactory only when the ignition system is shielded to prevent radio interference. Where shielding is not used or is faulty, the vehicle engine will have to be stopped to prevent interference while operating. This does not apply where Diesel engines are used. When operating from a vehicle, stay away from bridges, large buildings, large trees, and heavily traveled roads, if possible.

*c.* The antennas supplied are designed for man-pack operation. For semipermanent installations, the operating range may be increased and operation made more convenient by using Antenna Equipment RC-292/U (pars. 52 and 53). The range between two radio sets each of which uses Antenna Equipment RC-292 is approximately 12 miles. When one set uses Antenna Equipment RC-292 and the other set uses Antenna AT-271/PRC, the range is approximately 8 miles. A good antenna can be made by a vertical rod or wire connected to the equipment by a coaxial cable (see TM 11-314).

*d.* By using remote operation, the operator can choose an effective site for the equipment and, at the same time, operate from a foxhole or any other desired position within 2 miles of the equipment. The operator's presence at the radio set location would then be necessary only to change the battery, to change the frequency, or to move the radio set (pars. 44 through 47).

#### 12. Uncrating, Unpacking, and Checking New Equipment

*Note.* For used or reconditioned equipment, refer to paragraph 14.

*a. GENERAL.* Equipment may be shipped in oversea packing cases or in domestic packing cases. When new equipment is received, select a location where the equipment may be unpacked without exposure to the elements and which is convenient to the permanent or semipermanent installation of the equipment. The instructions in *b* below apply to equipment shipped in export packing cases, and the instructions in *e* below apply to equipment shipped in domestic packing cases.

**Caution:** Be careful in uncrating, unpacking, and handling the equipment; it is easily damaged. If it becomes damaged or exposed, a complete overhaul may be required or the equipment may be useless.

#### *b.* STEP-BY-STEP INSTRUCTIONS FOR UNCRATING AND UNPACKING EXPORT SHIPMENTS.

- (1) Cut and fold back the steel straps.
- (2) Remove the nails with a nail puller. Remove the top and one side of the packing case. Do not attempt to pry off the sides and top; the equipment may become damaged.
- (3) Remove the moistureproof barrier and any excelsior or corrugated paper covering the equipment inside the case.

**THESE PLACES ARE BAD FOR RADIO**



**VALLEYS**



**HIGH TENSION LINES**



**OVERHEAD STEEL BRIDGES**



**UNDERPASSES**

**BUT- THESE ARE GOOD**



**ON LEVEL GROUND**



**SLIGHT RISE**



**HIGH HILL**

TL13118

*Figure 11. Siting.*

- (4) Remove the equipment from its inner case.
- (5) Inspect the equipment for possible damage incurred during shipment.
- (6) Check the contents of the packing case against the master packing slip.

*c. OPENING CARDBOARD CARTON AND WATERPROOF BARRIER.* No special instructions are needed for opening the waterproof paper barrier and removing the equipment from the cardboard carton.

*d. CHECKING.* Check the contents against the master packing slip.

*e. UNPACKING DOMESTIC PACKING CASES.* Radio equipment may be received in domestic packing cases. The instructions given in *b* above apply also to unpacking domestic shipments. Cut the metal bands. Open the cartons that protect the equipment or, if heavy wrapping paper has been used, remove it carefully and take out the components. Check the contents of the packing case against the master packing slip.

### 13. Setting Up Radio Set for Operation

#### *a. CONNECTING BATTERY BA-279/U.*

- (1) Stand the radio set on a bench or on the ground with the control panel up. Make sure that the POWER switch is at OFF. Release the lower clamps (one on each side of the case) by pushing the topmost part of the clamp downward and outward at the same time.
- (2) Lift the receiver-transmitter off the battery case and set it down, with the battery plug on the bottom facing the operator (fig. 5). Set the battery on the same surface so that the battery-pack jack is on the side on which the receiver-transmitter plug falls naturally. Hold the pull ring to the rear of the plug and insert the plug in the battery-pack jack, being careful to locate the key on the plug properly. Move the pull ring to the cable side of the plug and slide the battery against the bottom of the receiver-transmitter.
- (3) Be careful to exclude foreign matter. Slide the battery case over the battery until it seats against the receiver-trans-

*Note.* Save the original packing cases and containers for both export and domestic shipments. They can be used again when the equipment is repacked for storage or shipment.

mitter. Fasten the catches by hooking the catch loops in the battery case hooks. Push the catches upward and toward the receiver-transmitter case until they snap against the sides. The battery installation is now complete.

**Warning:** Remove the battery when the equipment is not to be used for periods of 1 week or more.

*b. CONNECTING ANTENNA AT-272/PRC* (figs. 1 and 3). Use this antenna when maximum range is not required. Screw the threaded end of the short antenna into the jack marked SHORT ANT. If necessary, bend the base of the antenna so the main portion of the antenna will be vertical.

*c. CONNECTING ANTENNA AT-271/PRC* (figs. 1 and 3). Use this antenna when maximum range is required and a semipermanent installation is not feasible. Screw the antenna spring section into the LONG ANT jack on the panel. Extend the long antenna by holding the base section the heaviest section), and carefully whipping it outward. If all the sections of the antenna are not secure, repeat the above procedure or insert the

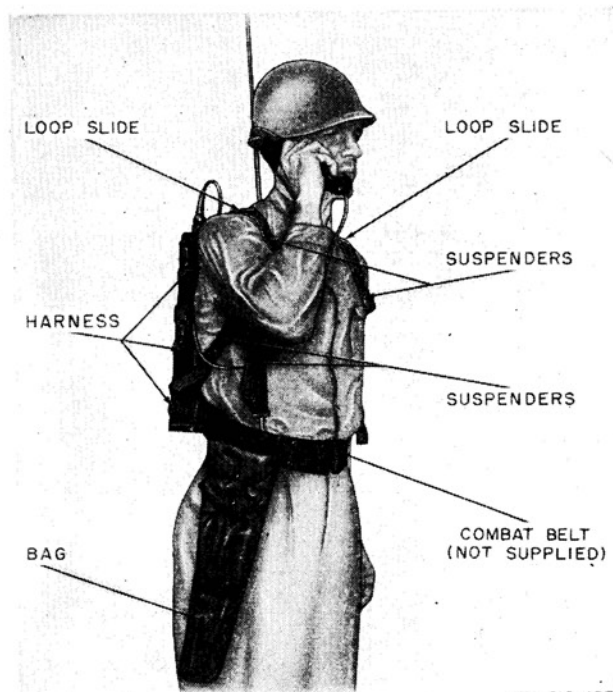


Figure 12. Radio Sets AN/PRC-8, -9, and -10, Carrying Harness ST-120/PR and Suspender Belt M-1945, side view.

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sections individually by hand. After extending the antenna, screw it into the spring section already installed.

d. **CONNECTING HANDSET H-33B/PT** (fig. 3). Insert the plug on the handset cable into the AUDIO jack on the panel. Apply light pressure and turn the plug until it drops in the guides. Push and turn in a clockwise direction as far as it will go.

e. **PLACING RADIO SET IN CARRYING HARNESS ST-120/PR** (figs. 3, 12, and 13). Spread out the harness with the stenciled side down, the wide straps to the right, and the three narrow straps untwisted. Place the radio set in the harness on its back with the panel toward the wide straps. Adjust the position so that the middle narrow strap will come just below the battery case clamps. Fasten the narrow straps by feeding the loose end, from below, through the buckle slot close to the center, and then through the slot away from the center. The strap should enter the buckle from

below and leave the buckle from below, making an untwisted fastening and returning over itself. The assembly now is ready to be fastened to the suspenders.

f. **ATTACHING CARRYING HARNESS TO SUSPENDER BELT M-1945** (figs. 12 and 13). Clip the suspenders to a combat belt (not supplied) and adjust them to fit comfortably. The single clip ends go to the rear and the double clip ends go to the front. On the front, clip the two center clips to the combat belt and adjust the suspenders to fit. Remove the assembled suspenders and combat belt and fasten the wide harness straps through the loop slides, one on each suspender, so that the radio set carries well up on the back of the operator. Cloth guides on each suspender permit folding up the excess length of the wide straps. Clip the remaining clips to the rings on each side of the bottom strap of the harness. Put on the completed assembly and adjust for maximum comfort. The radio set is now ready for pack operation.

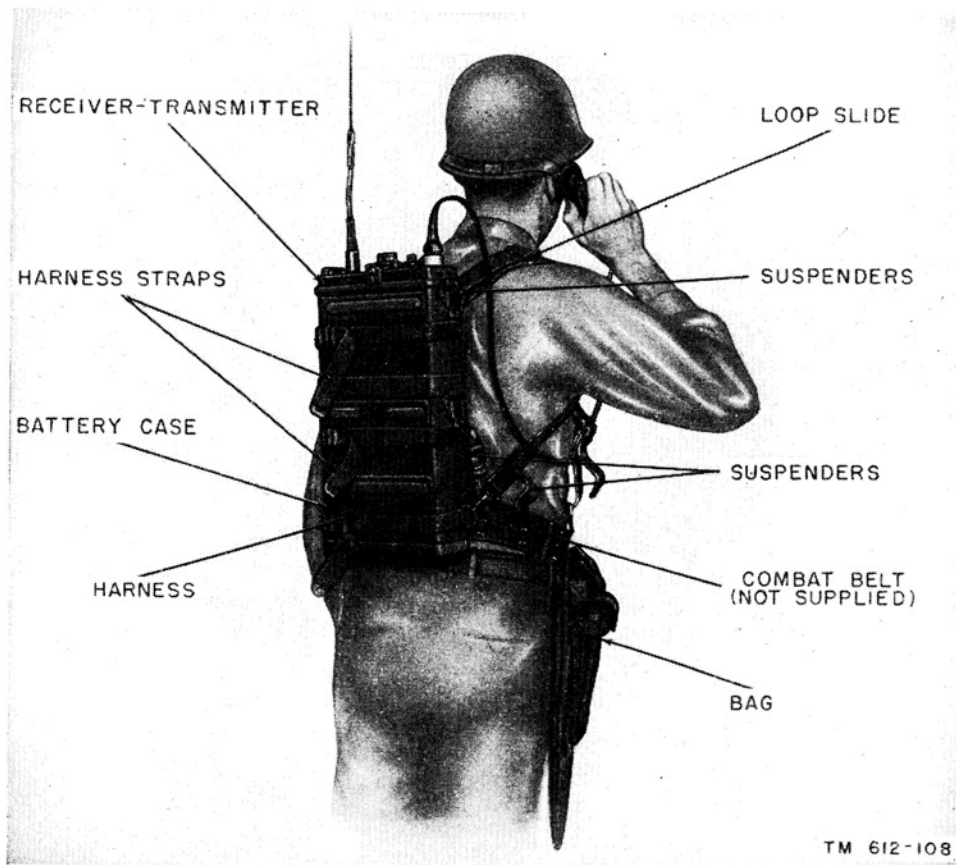


Figure 13. Radio Sets AN/PRC-8, -9, and -10, Carrying Harness ST-120/PR and Suspender Belt M-1945, rear view.

g. ATTACHING BAG CW-216/PR (figs. 12 and 13). Attach the bag to the combat belt where it is convenient to reach, since the handset and unused items of the equipment are carried inside.

#### 14. Service on Receipt of Used or Reconditioned Equipment

- a. Follow the instructions in paragraph 12 for uncrating, unpacking, and checking the equipment.
- b. Check the used or reconditioned equipment

for tags or other indications pertaining to changes in the wiring of the equipment. If any changes in wiring have been made, note the change in this manual, preferably on the schematic diagram (figs. 37, 38, and 39).

c. Check the operating controls for ease of rotation. If lubrication is required, refer to the lubrication instructions in chapter 3, section III.

d. Set up the radio set for operation as described in paragraph 13.

### Section II. CONTROLS

#### 15. General

Haphazard operation or improper setting of the controls can cause damage to electronic equipment.

For this reason, it is important to *know the function of every control before operating the radio set*. The actual operation of the radio set is discussed in paragraphs 17 through 20.

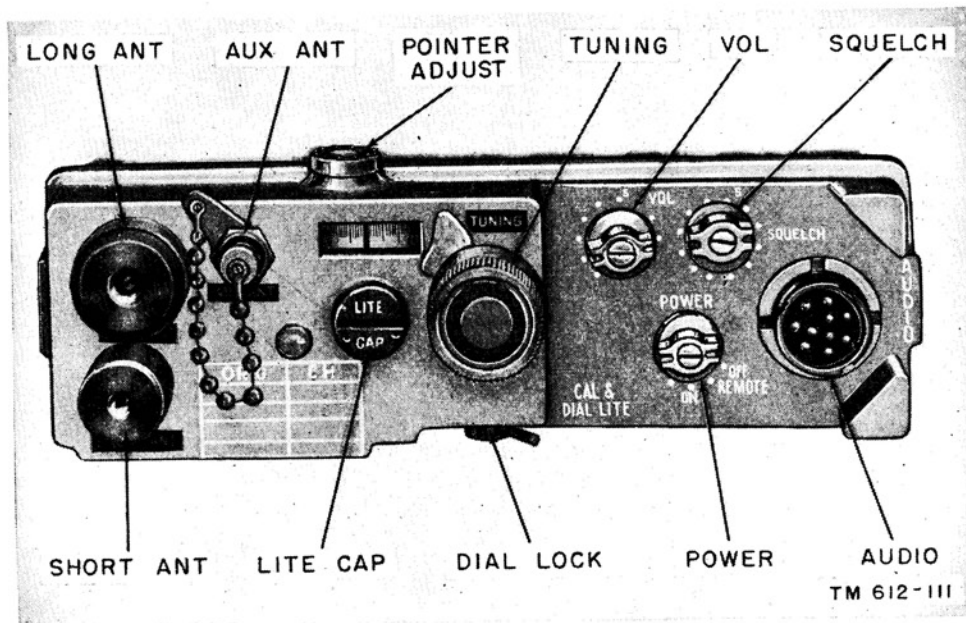


Figure 14. Control panel.

## 16. Controls and Their Use

(fig. 14)

The following table lists the controls of the radio set and describes their functions. All (except three) operating controls are located on the control panel. The **POINTER ADJUST** is located just above the panel. The **DIAL LOCK** is located just below the panel. The push-to-talk button is located on the handset.

Control	Function
POWER switch (S1)	In ON position, connects receiver-transmitter to power source. In REMOTE position, connects receiver-transmitter to power source through the AUDIO receptacle and Control Group AN/GRA-6. In CAL & DIAL LITE position, connects receiver-transmitter, calibration oscillators, and dial lamp to power source (spring-returned to ON when released).
TUNING (C9, C12, L7)	Tunes receiver and transmitter to desired frequency.
VOL (R24)	Adjusts the loudness of signals heard in the handset earphone.

Control	Function
SQUELCH (R35)	Sets the signal level below which noise is cut off when no signal is being received. Switch S2 stops squelch operation when the knob is in the OFF position.
AUDIO (J8)	A 10-prong receptacle providing external connections for the handset, remote control, or relay cables.
LONG ANT (J1)	Screw type jack to mount and connect the long antenna to the radio set.
SHORT ANT (J2)	Screw type jack to mount and connect the short antenna to the radio set.
AUX ANT (J3)	Bayonet type jack to connect coaxial line from the homing or auxiliary antennas (not supplied) to the radio set.
LITE CAP	Cap holding dial lamp in place. Permits rapid change of dial lamp without removing receiver-transmitter from ease.
POINTER ADJUST	Varies position of pointer on TUNING dial to provide accurate dial frequency calibration.
DIAL LOCK	Locks TUNING control so operating frequency cannot be changed accidentally.
PUSH-TO-TALK BUTTON.	When pressed, puts radio set in transmit condition.

### Section III. OPERATION UNDER USUAL CONDITIONS

#### 17. Operating Procedure

*a. STARTING PROCEDURE.* Turn the **SQUELCH** control to OFF, the **VOL** control to its extreme clockwise position, and the **POWER** switch to ON. Unlock the **TUNING** control by turning the **DIAL LOCK** counterclockwise. Turn the **TUNING** control until the dial is set at the desired operating frequency. Then lock the **TUNING** control by turning the **DIAL LOCK** clockwise.

*b. SQUELCH ADJUSTMENT.* With the **SQUELCH** control at OFF, background noise should be heard in the handset. Slowly turn the **SQUELCH** control clockwise until the background noise disappears. Do not turn the control beyond this point as this needlessly reduces the sensitivity of the radio set. (An audible click is heard in the radio set at this point, produced by the pulling in of the squelch relay.)

#### c. RECEPTION AND TRANSMISSION.

- Reception.* When the **POWER** switch is at ON, the radio set is in the receive condition and voice signals transmitted on its frequency (f-m signals) will be picked up in the handset. If the sound is too loud, reduce the volume by turning the **VOL** control counterclockwise until a desirable level of sound is obtained.

*Note.* If voice signals are being received from a similar radio set at the time that it is desired to adjust the **SQUELCH** control, release the **TUNING** control by turning the **DIAL LOCK** counterclockwise and detune by at least a full megacycle so that the voice signals are no longer heard. Then proceed with the **SQUELCH** adjustment. After completing the **SQUELCH** adjustment, return the dial to the desired operating frequency and lock the **TUNING** control by turning the **DIAL LOCK** clockwise.

- (2) *Transmission.* Hold down the push-to-talk button on the side of the handset and talk into the microphone. Hold the microphone about 2 to 3 inches from the lips and talk clearly, in a normal tone of voice, and at a moderate rate of speed. To determine how loud to talk, ask the receiving operator for a report on clarity of signal. After completing the transmission, release the button; this returns the radio set to the receive condition.

*d. STOPPING PROCEDURE.* To turn off the radio set, turn the **POWER** switch to **OFF**. If the radio set is not to be used for a week or longer, remove the battery to prevent corrosion.

## 18. Frequency Calibration

Both the receiver and the transmitter frequencies are calibrated against internal calibration oscillators to insure accuracy of the dial reading.

*a.* Unlock the **TUNING** control by turning the **DIAL LOCK** counterclockwise. Vary the **TUNING** control until the pointer on the dial is at the whole number mc point nearest the desired operating frequency. For example, if it is desired to operate at 43.6 mc, set the dial to read 44.0 mc.

*b.* Set the **VOL** control to 10, and the **SQUELCH** control to **OFF**, hold the **POWER** switch in the **CAL & DIAL LITE** position, and while listening on the handset, slowly turn the dial (by means of the **TUNING** control) past the whole number mc point at which the dial was set in *a* above. A high-pitched whistle should be heard with the pitch dropping until it is inaudible and then rising until it is again audible. Set the **TUNING** control at the point where lowest pitch (zero beat) is obtained. Release the **POWER** switch (which is spring-returned to the **ON** position).

*c.* Operate the **POINTER ADJUST** knob until the dial pointer coincides with the nearest whole number mc point. This calibrates the radio set at this frequency and at frequencies within one-half mc of this point.

*d.* Turn the **TUNING** control until the desired operating frequency appears opposite the pointer. This should not be greater than one-half mc from the calibration point. *Lock the TUNING control by turning the DIAL LOCK clockwise.*

## 19. Types of Operation

*a. PACK.* For pack and temporary vehicle operation, use Battery **BA-279/U** to power the equipment. Be certain to keep the antenna vertical.

*b. VEHICULAR OPERATION.* To operate the radio set in a vehicle which has a 24-volt battery, use Amplifier Power Supply **AM-598/U**. For detailed information, refer to paragraphs 40 through 43.

*c. REMOTE OPERATION.* To operate the equipment from a remote position, use Control Group **AN/GRA-6**. For detailed information refer to paragraphs 44 through 47.

*d. RELAY OPERATION.* Two radio sets can be operated as a relay station when used with a special relay cable which may be supplied, one to every six radio sets, or will have to be fabricated in the field. (Instructions for fabrication of this relay cable are given in **TM 11-4065**.) Detailed instructions for relay operation are given in the next paragraph.

*e. HOMING.* To use the radio set for homing, refer to paragraphs 48 through 51.

## 20. Relay Operation

Figure 15 shows how two radio sets are operated as a relay station. Set No. 2 is tuned to the same frequency as set No. 1, while set No. 3 is tuned to the same frequency as set No. 4. The frequency of sets No. 1 and 2 must differ from the frequency of sets No. 3 and 4 by a few mc. With this arrangement, signals transmitted by set No. 1 are received by set No. 2 and passed through the relay cable to set No. 3, which retransmits the signals to set No. 4. Similarly, signals transmitted by set No. 4 are retransmitted by the relay station to set No. 1.

*a.* Attach the connectors on the ends of the relay cable to the **AUDIO** connectors on the two radio sets which are being used as the relay station (fig. 16). Attach two handsets to the connectors which are spliced to the relay cable.

*b.* Place set No. 2 in operation (par. 17), using the handset which is near it (fig. 15), and calibrate as described in paragraph 18. Repeat this procedure with set No. 3, except that the frequency to which this set is tuned should be a few mc off that of set No. 2. The two sets can now operate unattended as a relay station.

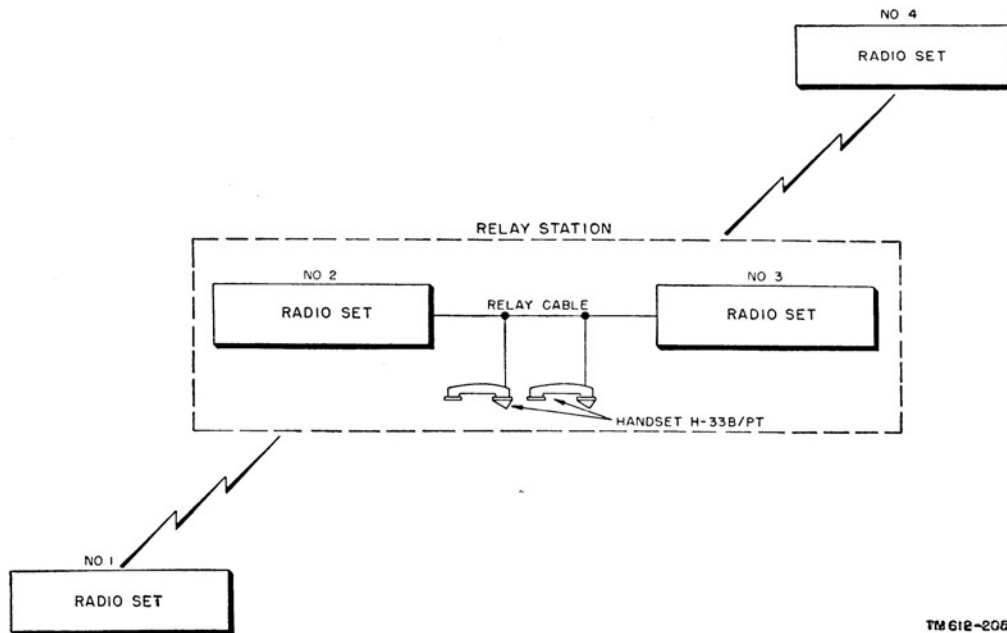


Figure 15. Relay operation, system application.

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c. Before leaving the relay station, check whether it is operating properly by listening on the handsets attached to the relay cable. The handset near set No. 2 receives signals transmitted by set No. 1 while the handset near set No. 3 receives signals transmitted by set No. 4. Each of these handsets can also be used to transmit over the radio set near it when its push-to-talk button is held down. Thus the handset near set No. 2 can be used to communicate with the operator at set No. 1 and the handset near set No. 3 can be used to communicate with the operator at set No. 4.

d. Although two operators can transmit simultaneously over the two handsets attached to the relay cable, this is not usually advisable, since no

reception or retransmission is possible at the relay station while either handset is being used to transmit. Should one operator at the relay cable complete his message before the other operator, he would be unable to receive a response until the other operator released his push-to-talk button. Even then, reception would be possible in only one radio set at a time at the relay station. The first set to receive a signal would immediately throw the other set into the transmit condition and render it incapable of reception. Therefore, do not transmit simultaneously over both handsets connected to the relay cable, except in situations where no response is required and where the time saved by simultaneous transmission is urgently needed.

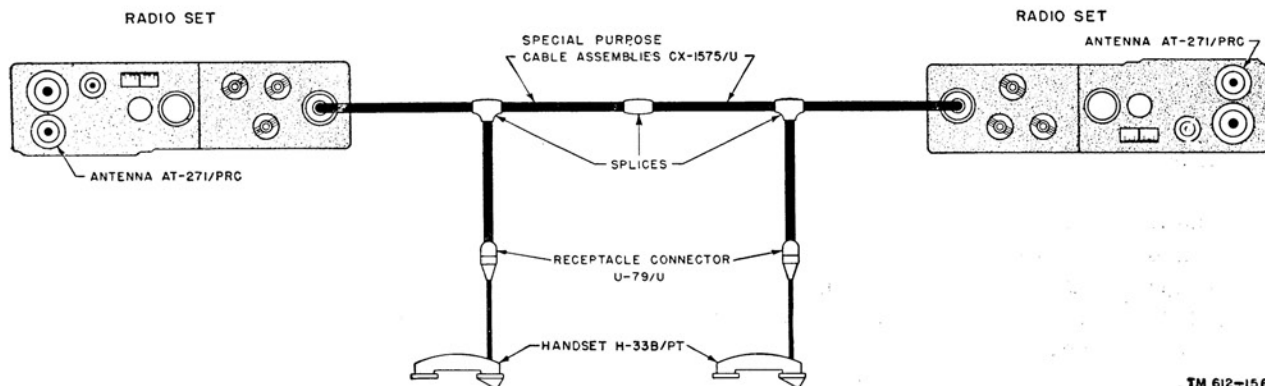


Figure 16. Relay operation, connections.

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*e.* Remote control of the relay station is possible when Control Group AN/GRA-6 is used. The connections and operating instructions for this

type of operation are described in paragraphs 44 through 47.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 21. General

The operation of Radio Sets AN/PRC-8, -9, and -10 may be difficult in regions where extreme cold, heat, humidity and moisture, sand conditions, etc., prevail. In the following paragraphs instructions are given on procedures for minimizing the effect of these unusual operating conditions.

### 22. Operation in Arctic Climates

Subzero temperatures and climatic conditions associated with cold weather affect the efficient operation of the equipment. Instructions and precautions for operation under such adverse conditions follow:

- a.* Handle the equipment carefully.
- b.* Keep the equipment warm and dry. If the set is not operated in a heated inclosure, construct an insulated box for the set.
- c.* Heavy coatings of frost gather on the microphone of the handset in extreme cold weather when used in the open air or in a cold room. In Handset H-33B/PT, a pliofilm membrane covers the microphone and minimizes the possibility of frost clogging the holes of the cap and affecting transmission. If this membrane should tear, replace it with a new one. If possible, have a spare handset ready in case the one in use fails to function properly.
- d.* Place a knitted woolen cap over the receiver of the handset if not equipped with a rubber earpiece. Frequently, when handsets without the rubber earpiece are used, the edges of the ears may freeze without the operator being conscious of this condition. Never flex the rubber earcap, since this action may render it useless. If water gets into the receiver, or if moisture condenses within it, the water may freeze and impede the actuation of the diaphragm. When this happens, remove the bakelite cap and remove the ice and moisture from the receiver.
- e.* When equipment which has been exposed to the cold is brought into a warm room, it will start

to sweat and continue to do so until it reaches room temperature. When the equipment has reached room temperature, dry it thoroughly. This condition also arises when equipment warms up during the day after exposure during a cold night.

*f.* Use any improvised means to protect dry batteries, since they will fail if they are not protected against the cold. Preheat the batteries. To prevent heat loss, place them in bags lined with kapok, spun glass, fiber materials, animal skins, or woolen clothing.

### 23. Operation in Tropical Climates

When operated in tropical climates, radio equipment may be installed in tents, huts, or when necessary, in underground dugouts. When equipment is installed below ground and when it is set up in swampy areas, moisture conditions are more acute than normal in the tropics. Ventilation is usually very poor, and the high relative humidity causes condensation of moisture on the equipment whenever the temperature of the equipment becomes lower than the ambient air. To minimize this condition, use any convenient method to keep the temperature of the equipment just above that of the air.

### 24. Operation in Desert Climates

- a.* Conditions similar to those in tropical climates often prevail in desert areas. Use the same measures to insure proper operation of the equipment.
- b.* The main problem which arises with equipment operation in desert areas is the large amount of sand or dust and dirt which enters the moving parts of radio equipment. The case of the receiver-transmitter is dustproof and should not be removed unless adequate shelter is available to prevent dust from entering the equipment. A dustproof shelter is ideal but is seldom available since it requires air conditioning. The next best precaution is to make the shelter as dustproof as

possible with available materials when the case must be opened or the equipment stored. Hang wet sacking over the windows and doors, cover the inside with heavy paper, and secure the side walls of the tents with sand to prevent their flapping in the wind.

*c.* Never tie signal cords, power cords, or other wiring connections to either the inside or the outside of tents. Desert areas are subject to sudden

squalls which may jerk the connection loose or break the lines.

*d.* Be careful to keep the equipment as free of dust as possible. Make frequent preventive maintenance checks. Pay particular attention to the condition of the lubrication of the equipment. Excessive amounts of dust, sand, or dirt that come into contact with oil and grease result in grit, which will damage the equipment.

## CHAPTER 3

### ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

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#### Section I. ORGANIZATIONAL TOOLS AND EQUIPMENT

##### 25. Tools and Material Supplied with Equipment

*a. TOOLS.* Only alinement tools are supplied with the equipment. However, these are to be used only when following instructions in TM 11-4065, and only at the third or higher echelons.

*b. MATERIALS.* A complete set of running spares is supplied with the equipment (par. 10). Organizational maintenance consists mainly of cleaning, changing tubes, and replacing i-f and

discriminator cans and the battery.

##### 26. Other Tools and Materials Required for Use with Equipment

*a. Tool Equipment TE-41.* (The tools and materials contained in Tool Equipment TE-41 are listed in the Department of the Army Supply Catalog SIG 6-TE-41.)

*b. Solvent, dry cleaning (SD)* (Fed spec No. P-S-661a).

#### Section II. PREVENTIVE MAINTENANCE

##### 27. General Preventive Maintenance Techniques

*a.* Preventive maintenance is work performed on equipment (usually when the equipment is not in use) to keep it in good working order so that breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from trouble shooting and repair, since its object is to prevent certain troubles from occurring. (See AR 750-5.)

*b.* To remove the receiver-transmitter from its case, release the top catches (one on each side) by placing the forefinger under the catch and pushing outward and upward. Flip the hook free from the panel extension and slide the receiver-transmitter out of the case, using the panel extensions for handles. Reverse the operation to lock the receiver-transmitter to the case. It is impossible to put the receiver-transmitter in the case upside down because of a guide piece inside the case.

*c.* Use No. 0000 sandpaper to remove corrosion.

*d.* Use a clean, dry, lint-free cloth or a dry brush for cleaning.

(1) If necessary, except for electrical contacts, moisten the cloth or brush with sol-

vent (SD); then wipe the parts dry with a cloth.

(2) Clean electrical contacts with a cloth moistened with carbon tetrachloride; then wipe them dry with a dry cloth.

**Caution:** Do not use carbon tetrachloride on coil windings and wire insulation.

*e.* If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch to remove dust from inaccessible places; be careful, however, or mechanical damage from the air blast may result.

*f.* For further information on preventive maintenance techniques, refer to TB SIG 178.

##### 28. Performing Preventive Maintenance

The following preventive maintenance operations should be performed by organizational personnel at the intervals indicated, unless these intervals are reduced by the local commander.

**Caution:** Screws, bolts, and nuts should not be tightened carelessly. Fittings tightened beyond the pressure for which they are designed will be damaged or broken. *Do not use gasoline for cleaning purposes.*



*a. DAILY.*

- (1) Check condition of Battery BA-279/U by position of SQUELCH control. The further clockwise the control must be turned for proper squelch control, the weaker the battery pack.
- (2) Check operation of dial light and calibration oscillators.
- (3) Examine jacks and plugs for looseness.
- (4) Clean the exterior of the cases with brush or air blast and damp cloth.
- (5) Check completeness and general conditions of carrying case, spare parts, and accessories.
- (6) Clean dirt and moisture from antennas, handset, jacks, plugs, and carrying bag.
- (7) Inspect controls for binding, scraping, excessive looseness, misalignment, and positive action.
- (8) Check knobs for looseness on shafts.

*b. WEEKLY.*

**Caution:** Disconnect all power before performing the following operations. Upon completion, reconnect power and check for satisfactory operation.

- (1) Clean interior of case and exterior of chassis.
- (2) Check capacitors and resistors for cracks, burned spots, and other signs of deterioration.
- (3) Check tube pins for dirt and corrosion. Remove each tube individually; check and replace. Clean pins with crocus cloth, if necessary, and wipe with a dry

cloth. Pull tubes straight out and, except for the transmitter tube, replace so that red dot will correspond to raised dot on socket.

- (4) Check and clean pins of i-f and discriminator cans in manner similar to tubes.
- (5) Touch up scratches on cases, first sanding surface clean and then painting.
- (6) Inspect cables and hook-up wire for cuts, breaks, fraying, deterioration, kinks, strains, and mildew.
- (7) Inspect antennas for bends, corrosion, loose fit, and damaged insulators.
- (8) Inspect for looseness all connectors, transformers, and relays that are readily accessible.
- (9) Clean nameplates and tuning dial windows.
- (10) Inspect variable tuning capacitor for dirt, moisture, misalignment of plates and loose mountings.
- (11) Inspect bushings and insulators for chips, cracks, and moisture.
- (12) Inspect terminal boards for loose connections, cracks, and breaks.
- (13) Check batteries for shorts or dead cells.
- (14) Check relay contacts and clean with crocus cloth if necessary.

*c. MONTHLY.*

- (1) Lubricate the dial-drive mechanism every 3 months as described in paragraph 29.
- (2) Check condition of moisture and fungi-proof coatings on all applicable items.

### Section III. LUBRICATION

#### 29. Lubrication Instructions

*Note.* This interval is prescribed for a normal 8-hour day operation. For abnormal conditions or activities, the interval should be changed accordingly.

*a. GENERAL.*

- (1) The dial-drive mechanism is the only assembly requiring lubrication, and this is lubricated every 3 months.
- (2) The lubricant and points to be lubricated (figs. 17, 18, 19, and 20) must be clean and free of sand, grit, and dirt. Gasoline

will not be used as a cleaning fluid for any purpose. Generally, parts should be cleaned with solvent (SD) before lubrication. Carbon tetrachloride will be used as a cleaning fluid only in the following cases: on electrical equipment where inflammable solvents cannot be used because of fire hazard, and for cleaning electrical contacts including switch contacts, plugs, sockets, etc.

*b. LUBRICANTS.* Where a light machine oil is indicated, use Oil, lubricating, preservative, special (PL-Special) in accordance with MIL-L-

644A specification. Where a grease is indicated, use Grease, instrument (for low and high temperatures) in accordance with MIL-G-3278 specification.

*Note.* Be careful to avoid contact between grease and materials such as rubber, paint, and certain plastics on which grease may have a solvent effect.

*c.* PROCEDURE.

- (1) Remove the receiver-transmitter from the case. With the receiver-transmitter chassis removed from its case (figs. 6 and 7), the dial-drive mechanism can be lubricated adequately without disassembling the drive mechanism from the panel. Accessibility to the assembly may be increased by rotating the TUNING knob until the two holes in the dial drum are positioned over the drive mechanism.
- (2) Using a small stick or bare wire, apply one drop of light machine oil to all bearings, dial shafts, and friction surfaces, except gears. Apply a coating of grease sparingly to the teeth of the scissors gears, meshing gears, pinions, and racks

as shown in figures 17 through 20. Work in and spread the lubricant by turning the dial knob from one end of travel to the other several times during the process. Wipe off excess lubricant on the sides of the gears, pinions, and racks.

*Note.* During the entire operation, keep the equipment free from dirt and moisture. After all major overhauls, remove the drive mechanism from the panel in accordance with procedures outlined in TM 11-4065.

### 30. Parts Lubricated by Manufacturer

The dial-drive mechanisms of Radio Sets AN/PRC-8, -9, and -10 are lubricated by the manufacturer prior to delivery of the equipment. The subsequent lubrication of these parts is covered in paragraph 29.

## Section IV. WEATHERPROOFING

### 31. Weatherproofing

*a.* GENERAL. Signal Corps equipment, when operated under severe climatic conditions such as

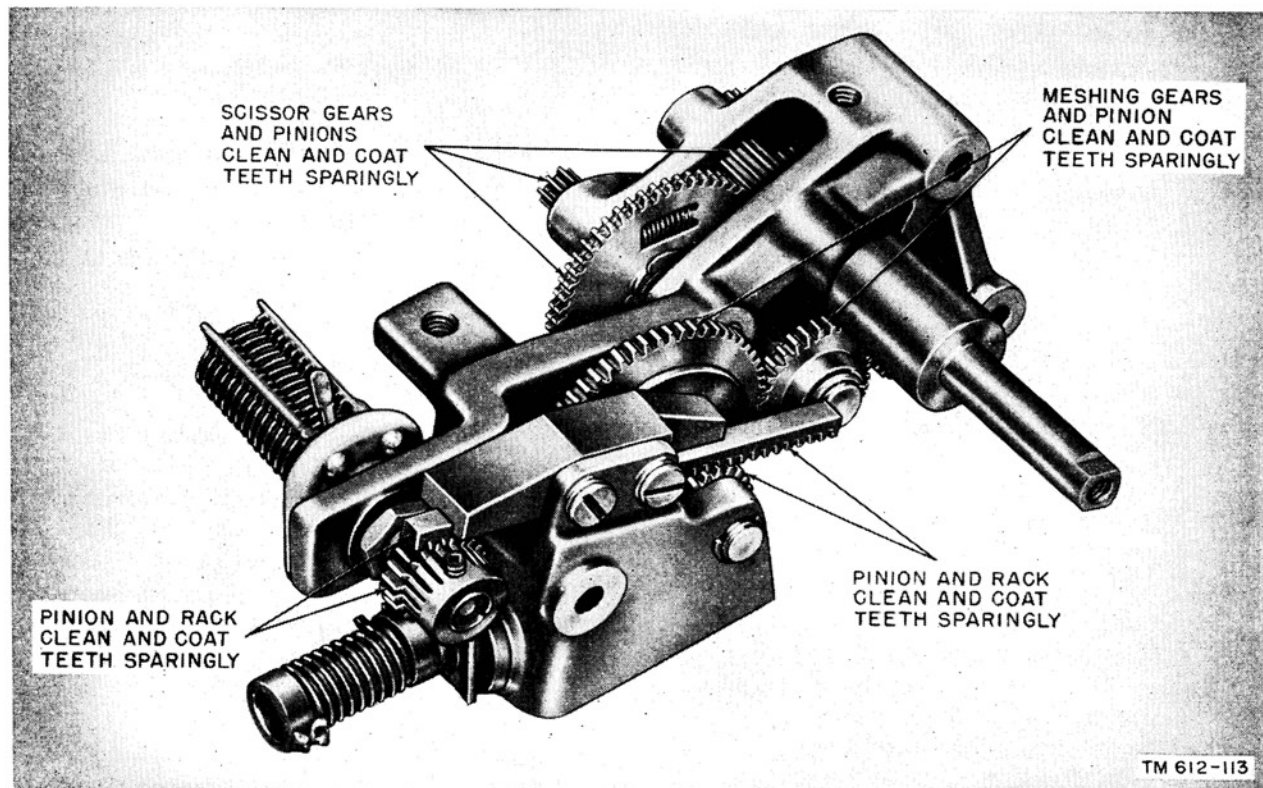


Figure 17. Radio Sets AN/PRC-9 and -10, lubrication points.

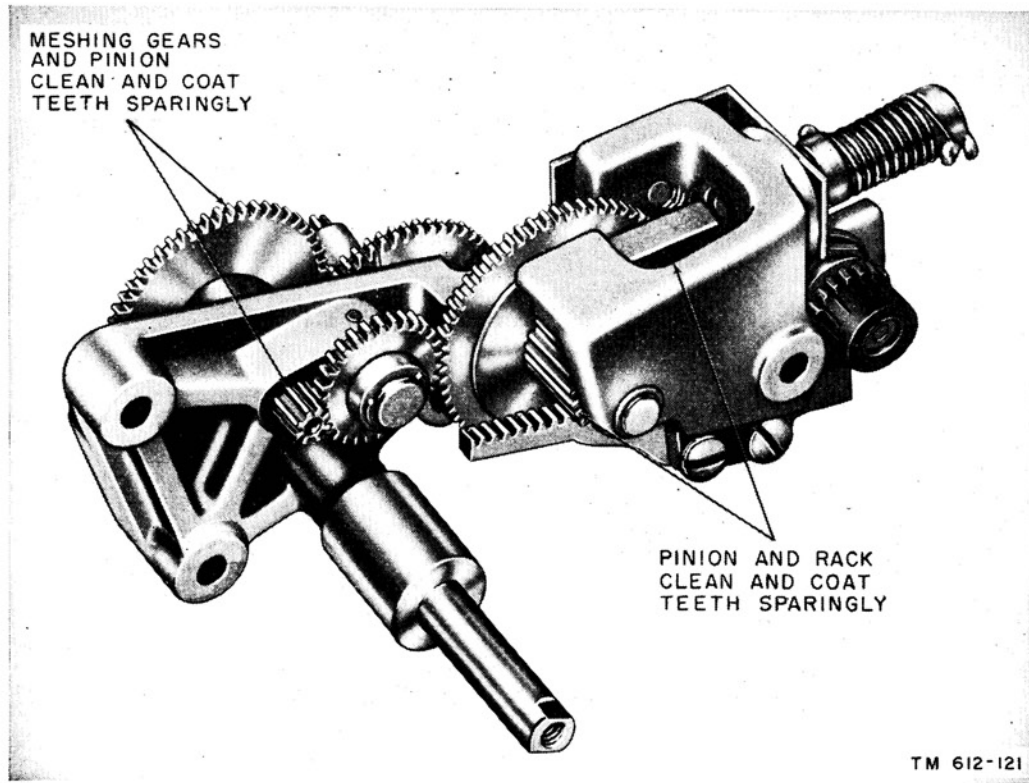


Figure 18. Radio Sets AN/PRC-9 and -10, lubrication points.

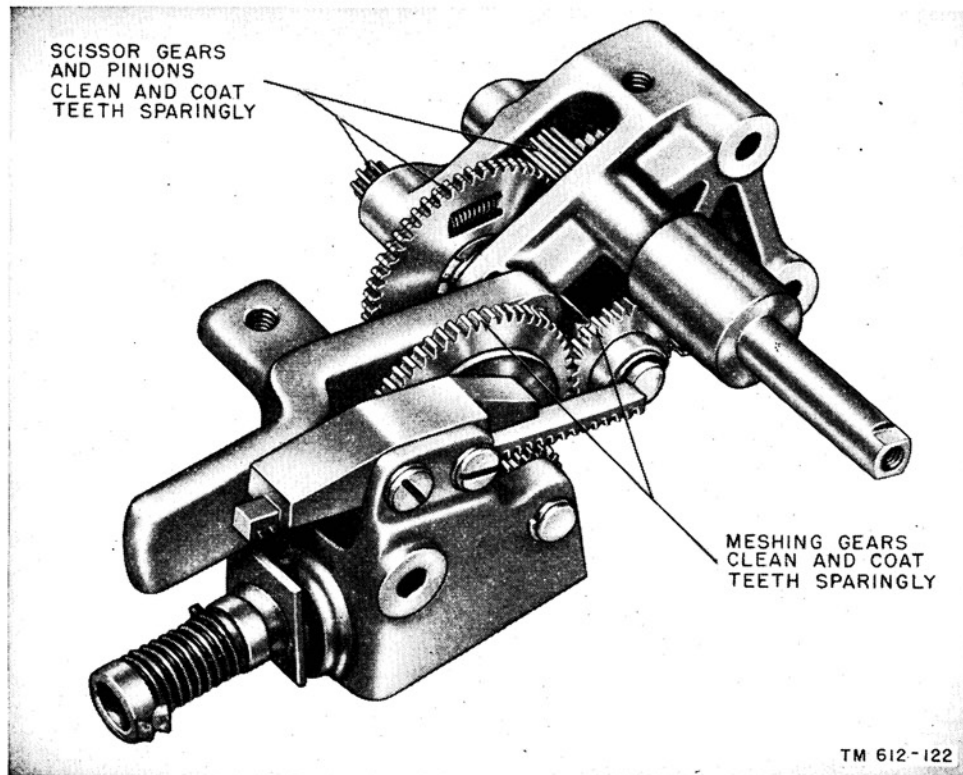


Figure 19. Radio Set AN/PRC-8, lubrication points.

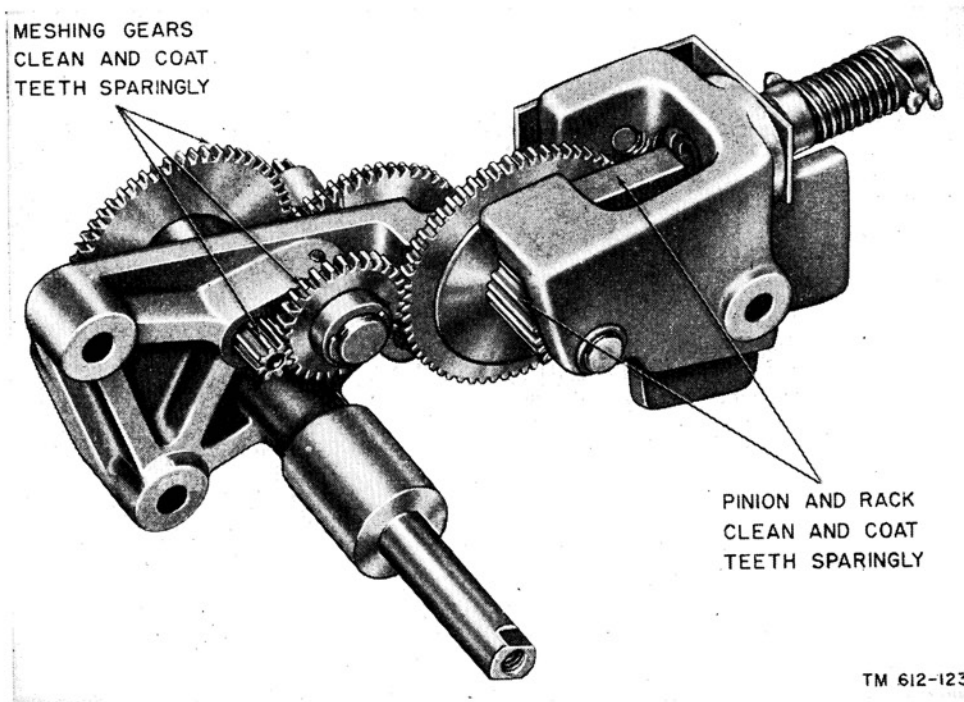


Figure 20. Radio Set AN/PRC-8, lubrication points.

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prevail in tropical, arctic, and desert regions, requires special treatment and maintenance. Fungus growth, insects, dust, corrosion, salt spray, excessive moisture, and extreme temperatures are harmful to most materials.

*b. TROPICAL MAINTENANCE.* A special moisture-proofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection. This treatment is explained in TB SIG 13 and TB SIG 72.

*c. WINTER MAINTENANCE.* Special precautions necessary to prevent poor performance or total operational failure of equipment in extremely low temperatures are explained in TB SIG 66 and TB SIG 219.

*d. DESERT MAINTENANCE.* Special precautions necessary to prevent equipment failure in areas subject to extremely high temperatures, low humidity, and excessive sand and dust are explained in TB SIG 75.

*e. LUBRICATION.* The effects of extreme cold and heat on materials and lubricants are explained in TB SIG 69. Observe all precautions outlined

in TB SIG 69 and pay strict attention to all lubrication instructions when operating equipment under conditions of extreme cold or heat. Refer to paragraphs 29 and 30 for detailed instructions.

### 32. Rustproofing and Painting

*a.* When the finish on the cases has been badly scarred or damaged, touch up the bared surfaces with No. 00 or No. 000 sandpaper to prevent rust and corrosion. Clean the surface down to the bare metal; obtain a bright smooth finish.

**Caution:** Do not use steel wool. Minute particles frequently enter the case and cause harmful internal shorting or grounding of circuits.

*b.* When a touch-up job is necessary, apply paint with a small brush. Remove corrosion from the case by cleaning corroded metal with solvent (SD). In severe cases it may be necessary to use solvent (SD) to soften corrosion and to use sandpaper to complete the preparation for painting. Paint used will be authorized and consistent with existing regulations.

## Section V. TROUBLE SHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

*Note.* Instructions for trouble shooting performed by field maintenance personnel for this equipment are contained in TM 11-4065.

### 33. General

*a.* The trouble shooting and repair work that can be performed at the organizational maintenance level (operators and repairmen) is necessarily limited in scope by the tools, test equipment, and replaceable parts issued, and by the existing tactical situation. Accordingly, trouble shooting is based on the performance of the equipment and the use of the senses in determining such troubles as burned-out tubes, burned or broken resistors, etc.

*b.* The paragraphs which follow in this section help in determining which of the components, such as the receiver section or transmitter section, is at fault, and in localizing the fault in that component to the defective stage or item, such as a tube or plug-in stage.

*c.* Some of the socket reference symbols are marked on the equipment. The following list gives the reference symbol of the item to be plugged into the corresponding socket:

Socket	Plug-in item	Socket	Plug-in item	Socket	Plug-in item	Socket	Plug-in item
X1...	V1	X6..	V6	X11..	U105	X16..	V9
X2...	V2	X7..	U101	X12..	T201	X17..	Y2
X3...	V3	X8..	U102	X13..	V7	X18..	V10
X5...	V4	X9..	U103	X14..	V8	X19..	V11
X5...	V5	X10..	U104	X15..	Y1		

### 34. Visual Inspection

*a.* Failure of this equipment to operate properly usually will be caused by one or more of the following faults:

- (1) Cable improperly plugged into power source.
- (2) Faulty power source.
- (3) Worn, broken, or disconnected cords and plugs.
- (4) Relay contacts burned because of overloads.
- (5) Wires or solder joints broken because of excessive vibration.
- (6) Defective tubes.
- (7) Inactive (cracked or broken) crystals.

*b.* When failure is encountered and the cause is not immediately apparent, check as many of the above items as practicable before starting a detailed examination of the component parts of the system. If possible, obtain information from the operator of the equipment regarding performance at the time trouble occurred.

*c.* Visually inspect the antenna system for obvious abnormalities.

### 35. System Sectionalization of Trouble to a Component

*a. GENERAL.* System sectionalization consists of determining whether the trouble is in the transmitter, receiver, antenna, or power source. The control circuit diagram (fig. 22) will assist in sectionalizing the trouble. This diagram is described in detail in paragraph 39.

- (1) Operate the radio set over its entire tuning range and observe its performance. See the equipment performance checklist (par. 37) for normal test indications, using a similar radio set which is known to be good.
- (2) If the entire radio set is dead, the trouble is probably in the power source or in the leads to the set. Replace the faulty battery or check the leads, as necessary. If Amplifier Power Supply AM-598/U is being used, check it as indicated in paragraph 43. Check the handset and replace it if necessary.
- (3) If only the transmitter or receiver is dead, the trouble is in that component and is probably a tube or a relay. If the simple remedies indicated in *b* and *c* below do not correct the trouble, higher echelon maintenance will be required.

#### *b.* TRANSMITTER TROUBLES.

- (1) To check the output, connect the spare dial light between the antenna output (center of AUX ANT jack J3) and case. Brilliance of the lamp indicates relative transmitter r-f output. Compare this with a radio set known to be good. If the light is dim, change transmitter tube V3 (5A6). Replace Battery BA-279/U if the battery voltages are below normal.

**Caution:** The transmitter output may be sufficient to burn out the lamp. At first, turn on the transmitter momentarily to determine the output. If the output is weak or nonexistent, the trouble is in the transmitter circuits (including receive-transmit relay K1).

- (2) If the transmitter frequency differs from the receiver frequency, check the afc circuits. Change afc tube V1 (5672).
- (3) If the transmitter frequency differs from the receiver frequency, and there is no modulation when speaking into the microphone (voice signals cannot be detected in another radio set), check the modulator circuits. Replace modulator tube V2 (5676).
- (4) If the transmitter is on the same frequency as the receiver but there is no modulation when speaking into the microphone, check the microphone and associated circuits. Replace the handset. Examine the radio set for broken leads.
- (5) If the transmitter frequency differs from the receiver frequency at some frequencies, the receiver oscillator is inoperative at these frequencies. Replace receiver oscillator tube V8 (5676). Replace the battery.
- (6) Operate receive-transmit relay K1 by hand to see if the armature operates freely and the contacts do not stick.

**c. RECEIVER TROUBLES.**

- (1) Noisy reception indicates a weak signal caused by loose connections or bad tubes in the r-f, i-f, or audio sections. Replace (one at a time) tubes V4 (1AD4), V5 (5678), V7 (5672), and the i-f cans with the spares provided.
- (2) If the SQUELCH control does not eliminate noise when no signal is being received, replace squelch tube V11 (5678). If the trouble persists, replace the battery.
- (3) If no signal can be received, but noise can be eliminated by the SQUELCH control, the antenna may be disconnected from the antenna coil, the r-f stages may be faulty, or the receiver oscillator may be faulty. Be certain that the antenna is connected properly. If trouble persists, replace (one at a time) tubes V4 (1AD4), V5 (5678), and V8 (5676).

- (4) Absence of both noise and signal may indicate trouble in the i-f, discriminator, or audio stages. Check the handset connections and the handset. Replace (one at a time) the i-f and discriminator cans and audio tube V7 (5672). Improper operation of the squelch stage may give no noise or signal if the tube always conducts or if relay K2 sticks. Replace tube V11 (5678) or operate with the SQUELCH control turned off. Clean relay contacts (par. 27).
- (5) If noise but no signal can be heard over a certain band of frequencies, the receiver oscillator may be faulty. Replace receiver oscillator tube V8 (5676). Replace Battery BA-279/U.

### 36. Trouble Shooting, Using Equipment Performance Checklist

*a. GENERAL.* The equipment performance checklist (par. 37) will help the operator to locate trouble in the equipment. The list contains the items to be checked, the conditions under which the item is checked, the normal indications and tolerances of correct operation, and the corrective measures the operator can take. *In using this list, perform the checks in the sequence indicated.*

*b. ACTION OR CONDITION.* For some items, the information given in the action or condition column consists of various switch and control settings under which the item is to be checked. For other items it represents an action that must be taken to check the normal indication given in the normal indication column.

*c. NORMAL INDICATION.* The normal indications listed include the visible and audible signs that the operator should perceive when he checks the items. If the indications are not normal, the operator should apply the recommended corrective measures.

*d. CORRECTIVE MEASURES.* The corrective measures listed are those the operator can make without returning the equipment for repairs. Trouble that cannot be corrected during operation should be referred to an experienced repairman for trouble shooting. If the set is completely inoperative or if the recommended corrective measures do not yield results, trouble shooting is necessary. However, if the tactical situation requires that communication be maintained, and if the set is not

### 37. Equipment Performance Checklist

	Item No.	Item	Action or condition	Normal indications	Corrective measures
P R E P A R A T O R Y	1	Battery BA-279/U----	Install in battery case (par. 13a).	-----	
	2	Antenna-----	Install in proper antenna jack (pars. 13b and 13c).	-----	
	3	Handset-----	Plug into AUDIO jack J8.	-----	
	4	SQUELCH control-----	Set to OFF-----	-----	
	5	VOL control-----	Set to 10-----	-----	
	6	TUNING control-----	Set to desired operating frequency.	-----	
S T A R T	7	POWER switch-----	Hold at CAL & DIAL LITE.	Dial light lights-----  Rushing noise is heard in handset receiver.	Replace lamp E8. Check handset and antenna connections. One at a time, replace receiver tubes V4, V5, V6, V7, and V8, i-f and discriminator cans U101, U102, U103, U104, U105, and T201. Remove squelch tube V11; if no noise is heard, replace V11. Check squelch relay K2 for sticking.
	8	DIAL LOCK-----	Turn counterclockwise---	Unlocks TUNING control.	
E Q U I P M E N T	9	TUNING control-----	Tune past whole number mc point. (POWER switch at CAL & DIAL LITE.)  Tune past all whole number mc points. (POWER switch at CAL & DIAL LITE.)	Whistle heard in phone of handset.  Whistle heard at all whole number mc points shows receiver operating over entire band.	Replace calibrator tubes V9 and V10, one at a time.  Change receiver oscillator tube V8.
	10	POWER switch-----	Release to ON-----	DIAL LITE out. Rushing noise can be heard in handset.	Check POWER switch S1.
	11	TUNING control-----	Tune in other equipment that is transmitting.	Voice signals are heard---	Check antenna and antenna connections to jacks J1, J2, and J3. Replace Battery BA-279/U.
	12	SQUELCH control-----	Turn DIAL LOCK clockwise to end of travel. With no signal being received, adjust to point where noise just disappears.	Locks TUNING-----  No noise in handset receiver when no signal is being received. Signal can be tuned in as in item 11.	Mechanically readjust DIAL LOCK. Change squelch tube V11. Check switch S2 on SQUELCH control.
S T O P	13	POWER switch-----	Turn to OFF----- (If off for extended period, remove battery.)	Set dead-----	If still on, check POWER switch S1.

completely inoperative, the operator must maintain the set in operation as long as it is possible to do so.

### 38. Block Diagram and Schematic Diagram

The block diagram (fig. 21) indicates the signal paths for the transmitter, the receiver, and the calibration circuits. Reference should also be made to the schematic diagrams (figs. 37, 38, and 39).

#### a. TRANSMITTER SIGNAL PATH.

- (1) Voice signals applied at the handset microphone are fed to modulator stage V2 where they are amplified and then applied to the transmitter oscillator circuit in such a way as to change its frequency. Since the transmitter oscillator frequency changes at a rate equal to the audio frequency and by an amount (deviation) proportional to the amplitude of the audio signals, its output is frequency-modulated. The transmitter oscillator output is applied through the antenna circuit to one of three antennas which can be used with the set.
- (2) The transmitter, a neutralized electron-coupled Hartley oscillator, is tuned from the control panel to operate at a frequency of 4.3 mc below that of the receiver oscillator. A portion of the transmitter oscillator (V3) output beats with receiver oscillator V8 in mixer V6. When the transmitter oscillator is on frequency, the mixer output frequency is exactly 4.3 mc. This beat frequency is fed back through an afc circuit which controls the transmitter oscillator frequency. When this afc signal is exactly at 4.3 mc, no change is produced in the transmitter oscillator frequency.
- (3) When the transmitter oscillator is off frequency, this signal is above or below 4.3 mc. This changes the bias of modulator tube V2. The plate current of the modulator tube changes and causes the transmitter oscillator frequency to change in a direction opposite to its drift. The transmitter oscillator frequency is thus controlled at a frequency of 4.3 mc less than that of the receiver oscillator by this afc circuit.

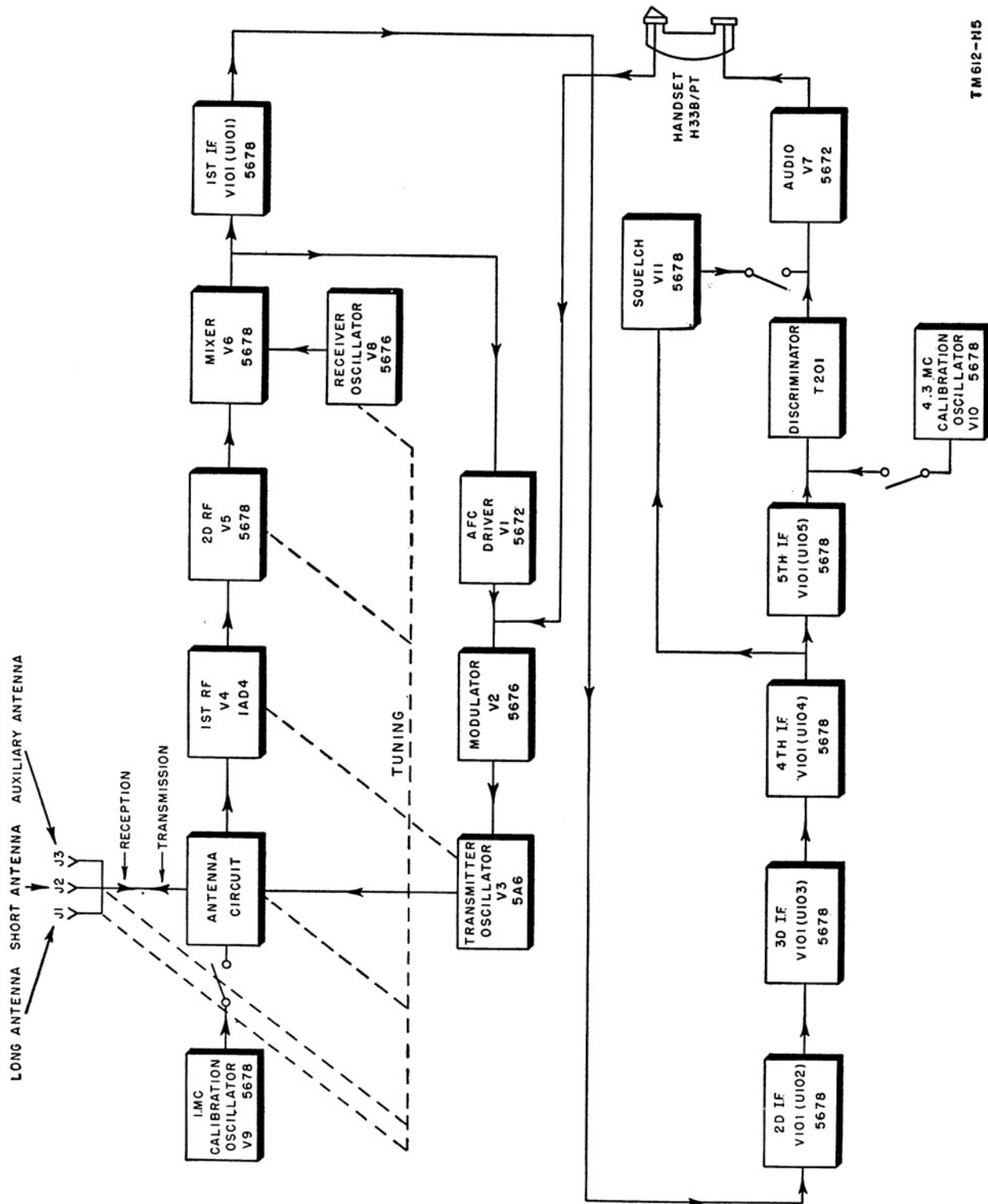
#### b. RECEIVER SIGNAL PATH.

- (1) An f-m signal, picked up at the antenna, is applied through the antenna circuit, and through two tuned r-f amplifier stages to mixer stage V6. The receiver oscillator is gang-tuned with the r-f stages to put out a frequency of 4.3 mc above the signal frequency passed by the r-f stages. Its frequency is calibrated accurately against two crystal-controlled oscillators which are described in *c* above.
- (2) The incoming r-f signal and the receiver oscillator signal beat against each other in the mixer stage to put out an i. f. of 4.3 mc. This i-f signal, whose frequency shifts above and below 4.3 mc at a rate and by an amount which are proportional to the frequency and amplitude of the original voice signals, is amplified by five i-f amplifier stages.
- (3) Each of these five i-f stages is a grid-limiter stage and the output of the fifth i. f. is at a constant amplitude. The amplified output from the fifth i-f stage is fed to a discriminator circuit which converts the f-m signals to audio signals. The audio signals are amplified by audio amplifier V7 and are applied to the handset receiver.
- (4) A squelch circuit which can be turned on or off is associated with the receiver. This circuit prevents tube and background noises from reaching the handset during receiving intervals when no signal is reaching the receiver.

#### c. CALIBRATION CIRCUITS.

- (1) The 1-mc calibration oscillator, V9, and the 4.3-mc calibration oscillator, V10, are crystal-controlled oscillators which are used jointly to align the receiver-transmitter. For example, if the calibration oscillators are operating and the receiver is tuned to some point on the dial which is a whole number, such as 35.0 mc, the thirty-fifth harmonic of the 1-mc oscillator is picked up in the antenna circuit of the receiver. This 35-mc signal, after amplification in the receiver r-f stages, beats with the receiver oscillator signal to produce an i-f output from the mixer tube which is at 4.3 mc, or slightly off this frequency if the receiver is not correctly





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Figure 21. Receiver-transmitter, block diagram.

alined. This signal is amplified through the five i-f stages and applied to discriminator T201.

- (2) The signal from the 4.3-mc calibration oscillator beats with this signal in the discriminator. This beat frequency is passed through audio amplifier V7 to the handset receiver. If the radio receiver is alined correctly, the i-f signal will be at exactly 4.3 mc. When this signal beats with the calibrated 4.3-mc signal, a zero beat results. If the receiver oscillator is not alined correctly, the i-f signal is slightly off 4.3 mc. When this signal beats with the crystal-controlled 4.3-mc signal, an audio beat is put out and is detected in the handset receiver.
- (3) If the r-f and receiver oscillator tuned circuits are then varied slightly by means of the TUNING control (fig. 14), a zero beat is obtained in the handset. The dial pointer of the receiver is now slightly off 35 mc because of the TUNING control adjustment. Alinement of the receiver is

accomplished by mechanically setting the dial pointer at exactly the 35-mc point on the dial. This calibration insures that the receiver oscillator frequency is exactly 4.3-mc above the frequency shown on the dial of the radio set, and that the dial reading is correct. It also insures the accuracy of the transmitter frequency which is controlled with reference to that of the receiver oscillator (*a* above).

*d.* SCHEMATIC DIAGRAMS. The schematic diagrams (figs. 37, 38, and 39) of the radio sets are located at the back of this manual. All circuits of the receiver-transmitter and connections to the battery are shown on these diagrams. A stage-by-stage description of these circuits is contained in TM 11-4065.

### 39. Control Circuits

(fig. 22)

Distribution of power from the battery to the receiver-transmitter is controlled by the POWER switch S1, and the push-to-talk button on the

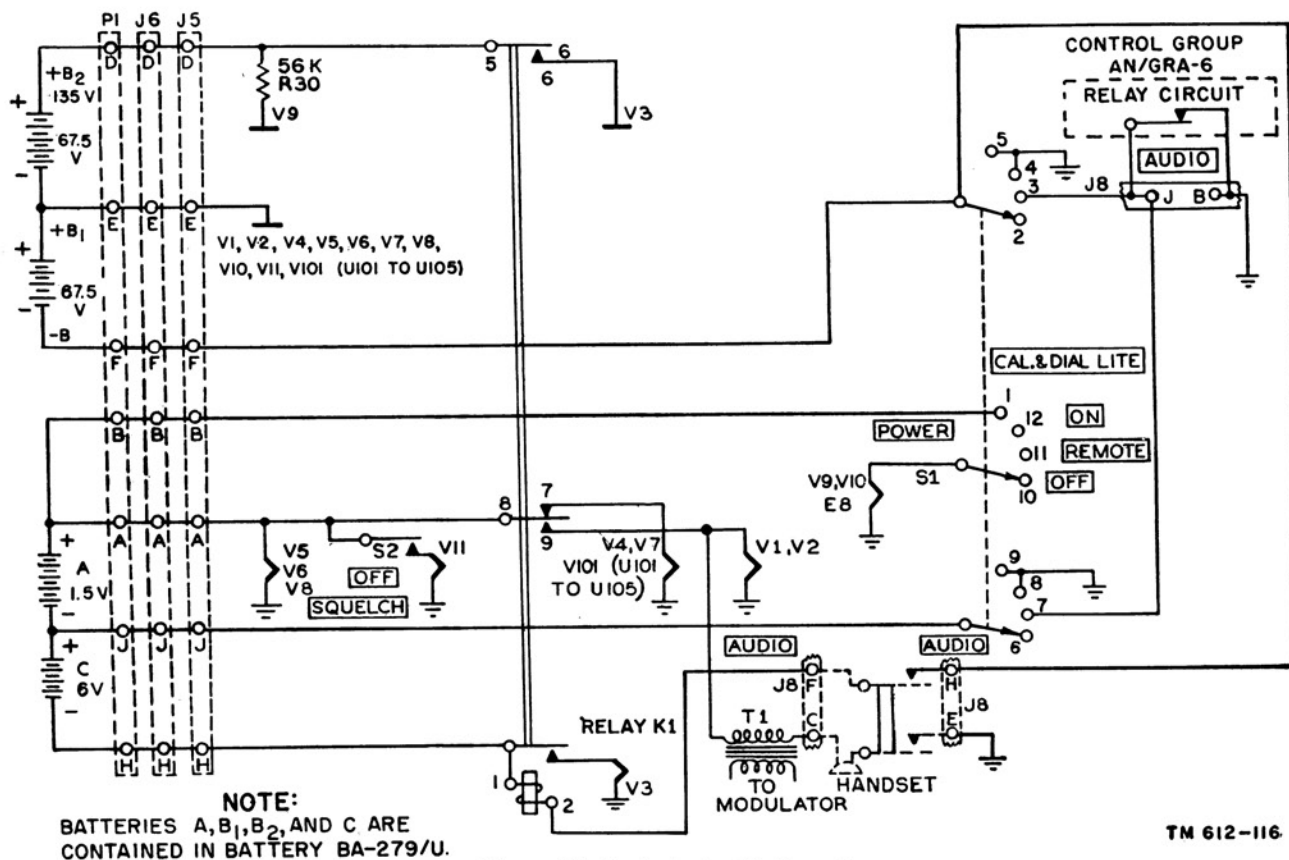


Figure 22. Control circuit diagram.

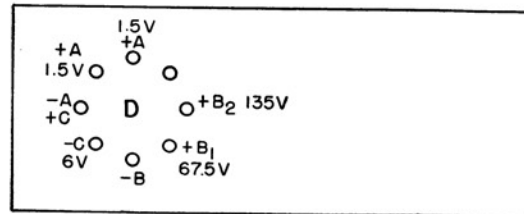
handset. Control Group AN/GRA-6 (pars. 44 through 47) may also be used to control power distribution in the radio set. The POWER switch is a three-pole four-position selector switch. When this switch is in the OFF position, there is no ground return for the A, B1, B2, and C voltage supplies, and no power is supplied to the set.

*a. POWER SWITCH AT ON.* All four voltage supplies are returned to ground. The filament circuits of all the receiver tubes are completed except that of the squelch tube which also requires that the switch on the SQUELCH control, S2, be closed. This switch is closed when the SQUELCH control knob is turned away from its extreme counterclockwise position. Plate and screen voltages are supplied to all receiver tubes. The set is now in the receive condition.

*Note.* B+ voltages are also supplied to the afc driver tube, V1, the modulator tube, V2, and the calibration oscillators, V9 and V10. However, these tubes are not operating, since their filament circuits are open.

*b. POWER SWITCH AT ON, AND PUSH-TO-TALK BUTTON DEPRESSED.* Pressing the push-to-talk button of the handset completes the microphone circuit in the handset and also the 6-volt circuit through the coil of relay K1. (The handset plugs into the AUDIO receptacle, J8, on the receiver-transmitter control panel.)

When relay K1 pulls in, contacts 3 and 4 close, contacts 7 and 8 open, contacts 8 and 9 close, and contacts 5 and 6 close. Contacts 3 and 4 complete the 6-volt filament circuit of the transmitter oscillator tube, V3. The opening of contacts 7 and 8 breaks the filament circuits of the first r-f amplifier, V4, the i-f amplifiers (U101 to U105) and the audio amplifier, V7. The closure of contacts 8 and 9 completes the 1.5-volt filament circuits of the afc driver tube, V1, and the modulator tube, V2. The closure of contacts 5 and 6 connects the 135-volt supply to the plate of the transmitter oscillator tube, V3. The transmitter oscillator, V3, the afc driver, V1, and the modulator, V2, are now operating. Also operating are the second r-f amplifier, V5, the mixer, V6, and the receiver oscillator, V8. (The operation of these three receiver tubes is necessary to help provide the afc signal which controls the transmitter frequency.) The radio set is now in the transmit condition. When the push-to-talk button is released, the radio set is returned to the receive condition described in *a* above.



TEST WITH TS-183/U		
TO TEST UNIT	USE JACK NO.	READ VOLTAGE
A	1	(MINIMUM) 1.40
B1	21	63.00
B TO B2	27	63.00
C	6	5.40

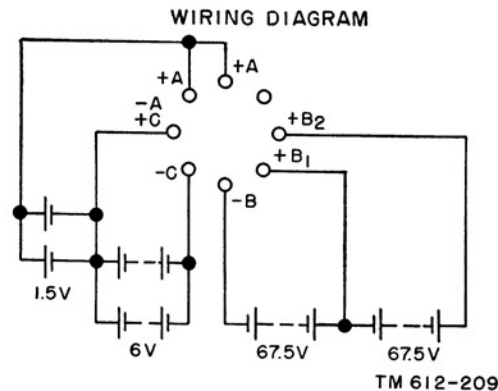


Figure 23. Battery BA-279/U, schematic diagram.

*c. POWER SWITCH AT CAL & DIAL LITE.* The set is in the receive condition when the POWER switch is in the CAL & DIAL LITE position. In addition, the filaments of the two calibration oscillators, V9 and V10, are heated, allowing these tubes to operate. The dial lamp, which is in parallel with these filaments, lights. The set is now ready for calibration (par. 18).

*d.* **POWER SWITCH AT REMOTE.**

- (1) In this position of the **POWER** switch, all four voltage supplies are connected to jack **J8-J** (**AUDIO** jack) instead of to ground. Power can now be applied to the set only when jack **J8-J** is connected to ground. This connection is made in Control Group **AN/GRA-6**. Control Group **AN/GRA-6** consists of Local Control **C-434/GRC** and Remote Control **C-433/GRC**.
- (2) The **SET 1** cable of Local Control **C-434/GRC** is plugged into the **AUDIO** jack, **J8**, of the receiver-transmitter. Remote Control **C-433/GRC** is connected to the local control by a two-wire telephone line whose maximum length is two miles (figs. 25 through 30). On the local control, the **LOCAL** switch is set at **TEL** and the **REMOTE** switch is set at **SET 1**. On the remote control, the **SELECTOR** switch is set at the left write-in position and the push-to-talk button on the handset is pressed and then released. With the above settings on the local control, jack **J8-J** in the radio set is grounded through a relay circuit in the local control and power is applied to the receiver circuits of the radio set.
- (3) When the push-to-talk button on the handset, which is plugged into the remote control, is pressed, relays are actuated in the local control which complete the circuits from jack **J8-F** to jack **J8-H**, and from jack **J8-C** to jack **J8-E** in the radio set. These circuits, respectively, energize the receive-transmit relay **K1** and complete the microphone input circuit. The set is then in the transmit condition. Releasing the push-to-talk button returns the set to the receive condition. Turning the **SELECTOR** switch on the remote control away from the left write-in position, breaks the connection from jack **J8-J** to ground and turns off all power in the set.

## CHAPTER 4

### AUXILIARY EQUIPMENT

#### Section I. AMPLIFIER POWER SUPPLY AM-598/U

#### 40. Description

*a.* Amplifier Power Supply AM-598/U is a vibrator type power supply which adapts Radio Sets AN/PRC-8, -9, and -10 for vehicular use. The power supply operates only from a 24-volt d-c source. It supplies the complete power requirements of the radio set and, in addition, contains an audio amplifier for operation of a 600-ohm speaker. A block diagram of the power supply installation is shown in figure 24. A detailed discussion of the power supply will be given in a separate instruction book, when published.

*b.* The panel is attached permanently to the chassis which contains the operating components. A receiver-transmitter is fastened to the power supply with spring-loaded catches. A battery cord is supplied to connect the power supply to the 24-volt battery.

*c.* The panel contains the 25-volt battery connector, two audio connectors, the audio connecting cable, and the fuseholder. The power output connector is located on the case; it is identical to the socket on Battery BA-279/U.

#### 41. Installation and Connections

*a.* Be certain that the power supply is fastened securely to the vehicle.

*b.* Insert the plug of the receiver-transmitter battery cable into the power output connector on the power supply. Fasten the receiver-transmitter to the power supply with the spring-loaded catches.

*c.* Insert the audio connecting cable into AUDIO jack J8 on the panel of the receiver-transmitter.

*d.* Plug a 600-ohm speaker, headset, or Handset H-33B/PT, as desired, into either of the two audio connectors on the power supply panel. A microphone can be plugged into the other audio connector.

*e.* Connect the battery cord between the 24-volt battery connector and the 24-volt battery.

*f.* Be certain that all connections are made firmly. The power supply and radio set are now ready for operation.

#### 42. Operation

No controls are provided on Amplifier Power Supply AM-598/U. Operation is controlled by operation of POWER switch S1 on the receiver-transmitter control panel. The receiver-transmitter is operated in exactly the same manner when Amplifier Power Supply AM-598/U is used as when Battery BA-279/U is used.

#### 43. Organizational Maintenance

*a.* Perform the applicable preventive maintenance procedures given in paragraphs 27 and 28. When published, the instruction book covering Amplifier Power Supply AM-598/U will furnish more specific information.

*b.* If the radio set is known to be good but does not operate when used with Amplifier Power Supply AM-598/U, check the fuse on the power supply panel; if it is burned out, replace it.

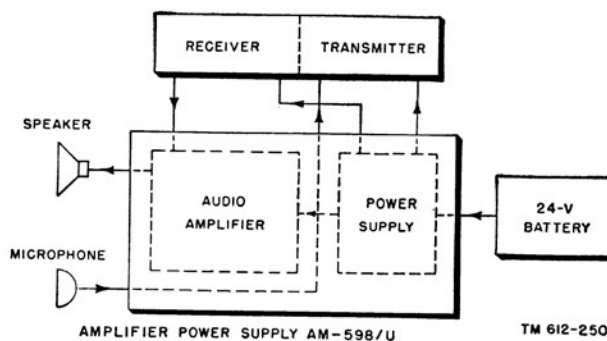


Figure 24. Amplifier Power Supply AM-598/U, system application.

## Section II. CONTROL GROUP AN/GRA-6

### 44. Description

*a.* Control Group AN/GRA-6 (figs. 25 and 26) may be used to control a radio set from a position as far as 2 miles away. It also provides for telephone communication (including ringing) between the local and remote control stations. Control Group AN/GRA-6 consists of Local Control C-434/GRC, Remote Control C-433/GRC, Handset H-33B/PT, and Bag CW-189/GR. The local and remote control units are connected by a pair of telephone wires (such as Wire WD-1/TT) which is supplied separately.

*b.* Local Control C-434/GRC may be connected directly to the panels of one or two radio sets by means of the plug-terminated cords at the rear of the unit. The switching facilities of the unit permit push-to-talk transmission and reception over either or both sets from a handset plugged into the AUDIO connector on the front panel.

*c.* Remote Control C-433/GRC may be used as far as 2 miles from the local control unit. The combined switching actions of the local and remote control units make it possible to extend both power control and push-to-talk control to the remote unit. The remote unit also accommodates a handset.

*d.* Handset H-33B/PT is used at the panel AUDIO connector of each control unit. The

hand set is equipped with a push-to-talk, nonlocking switch, which incorporates two electrically independent SPST (single-pole single-throw) switches. The handset cord is terminated in a 10-pin connector which mates with the receptacles on the panels of the local and remote control units.

*e.* Bag CW-189/GR is a dustproofed and waterproofed carrying bag which is large enough to hold the two control units and the handset when not in use. It is equipped with a carrying strap.

*f.* For detailed information on Control Group AN/GRA-6 refer to TM 11-5038.

### 45. Installation and Connections

(figs. 27 through 30)

*a.* Loosen the screw fasteners on the panel of Local Control C-434/GRC and remove the panel-chassis assembly from the case.

*b.* Insert two 1½-volt Batteries BA-30 in the battery compartment and set the chassis-mounted switch (S1) in the BELL position. Replace the panel-chassis assembly in the case.

*c.* Remove the protective cover plate from the plug at the rear of the local unit. Open the hinged door at the left of the plug and store the cover in the clamp provided within the compartment (fig. 27).



Figure 25. Control Group AN/GRA-6.

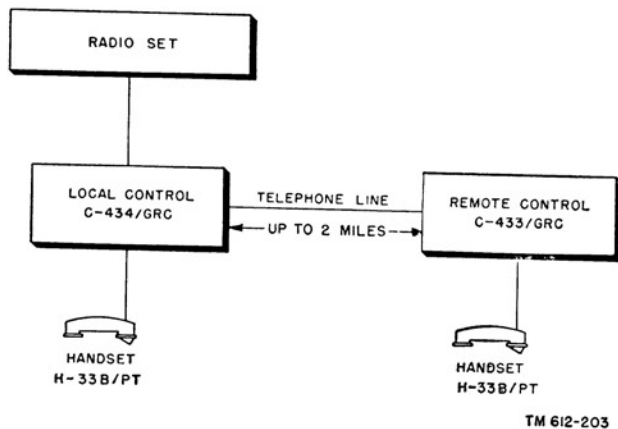


Figure 26. Control Group AN/GRA-6, system application.

d. Loosen the fasteners which secure the case on Remote Control C-433/GRC. Remove the panel-chassis assembly from the case.

e. Insert two 1½-volt Batteries BA-30 in the compartment provided, and connect a 45-volt Battery BA-414/U in its compartment. Set the chassis-mounted switch in the BELL position and replace the panel-chassis assembly in its case.

f. Insert the plug-terminated cord labeled SET NO. 1 of Local Control C-434/GRC into the AUDIO receptacle of the radio set.

g. Plug Handset H-33B/PT, supplied with the radio set, into the AUDIO receptacle of Local Control C-434/GRC.

h. Interconnect the local and remote control units with telephone wire over as great a distance (up to 2 miles) as desired. Strip the insulation off the wires approximately ¾ inch from the ends, and tin the bared wires before clamping them in the binding posts (designated LINE L1 and L2) on each of the units.

i. Plug Handset H-33B/PT, supplied with Control Group AN/GRA-6, into the AUDIO receptacle of Remote Control C-433/GRC.

## 46. Operation

a. TELEPHONE OPERATION. This mode of operation enables direct two-way communication over the telephone line between operators at the local and remote control units. This enables the operator at the remote control unit to advise the operator at the local control unit whether the remote control of radio reception and transmission is satisfactory, and if not, what adjustments to make on the control panel of the radio set. Telephone communication between the local and remote control units is possible only when the switches on

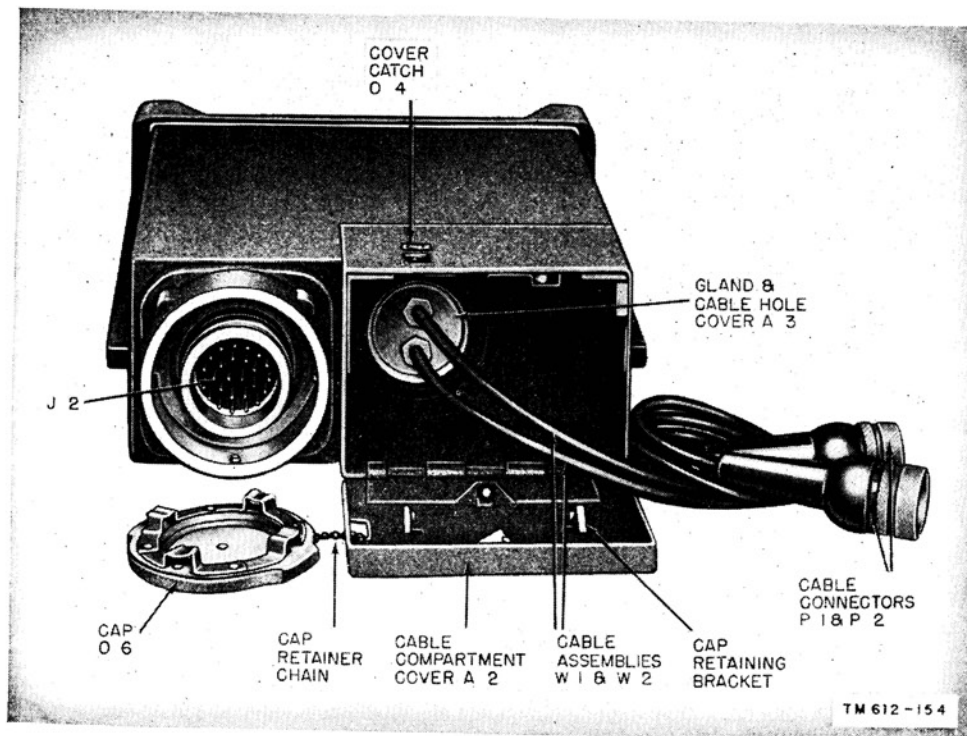


Figure 27. Local Control C-434/GRC, rear view.

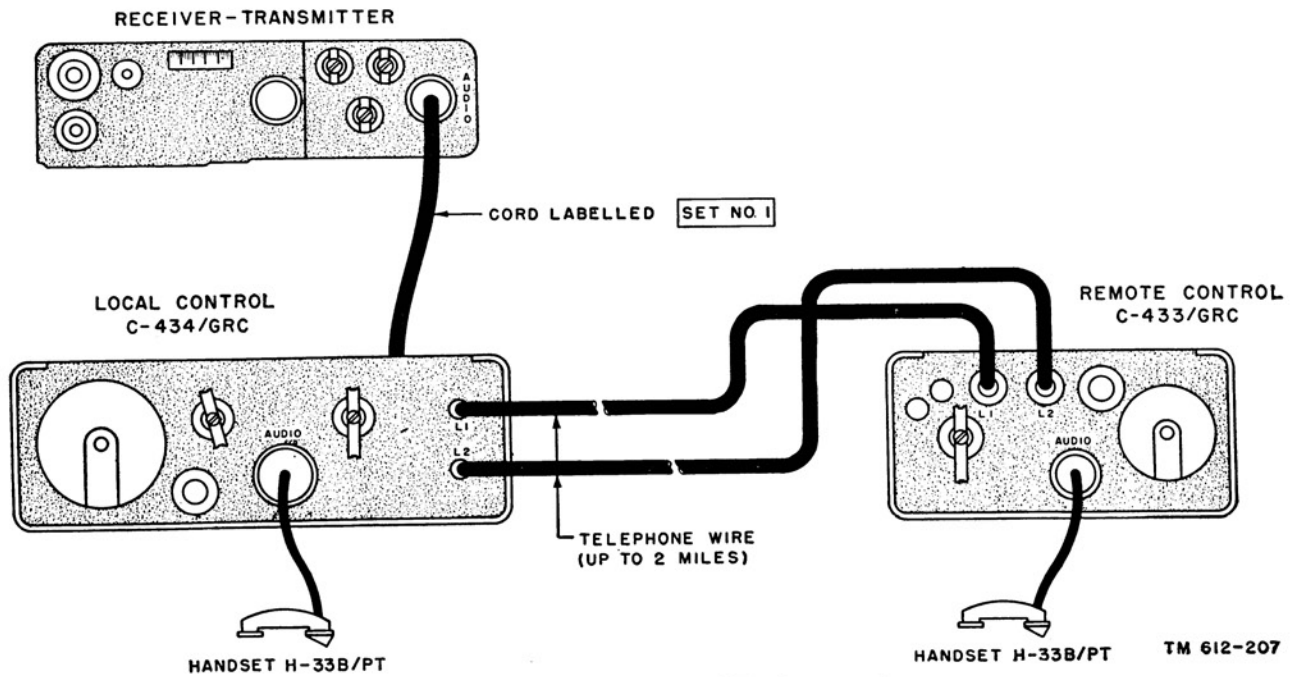


Figure 28. Control Group AN/GRA-6, connections.

these units are in certain specified positions as described below. The local and remote control unit each has a 20-cycle ringing generator and a bell. When an operator at either control unit cranks the ringing generator knob located on the panel of the control unit, the bell at the other unit rings regardless of the switch positions on the control panel. The operator at that unit is thus made aware of the desire of the first operator to communicate with him by telephone, and he sets the switches on the control panel as follows:

- (1) At the local control unit, set the REMOTE switch at the TEL ONLY position and the LOCAL switch at the TEL position.

- (2) At the remote control unit, set the SELECTOR switch at the TEL position.
- (3) Press the push-to-talk button on the handset (at either the local or remote position) and talk into the microphone. Release to listen.

**b. OPERATION OF RADIO SET FROM LOCAL CONTROL UNIT.**

- (1) Put the radio set in operation as described in paragraph 17.
- (2) Hold the LOCAL switch (spring-return) on the local control unit (fig. 30) at the SET 1 position and talk into the microphone of the handset when transmitting; release this switch to the TEL position when receiving.

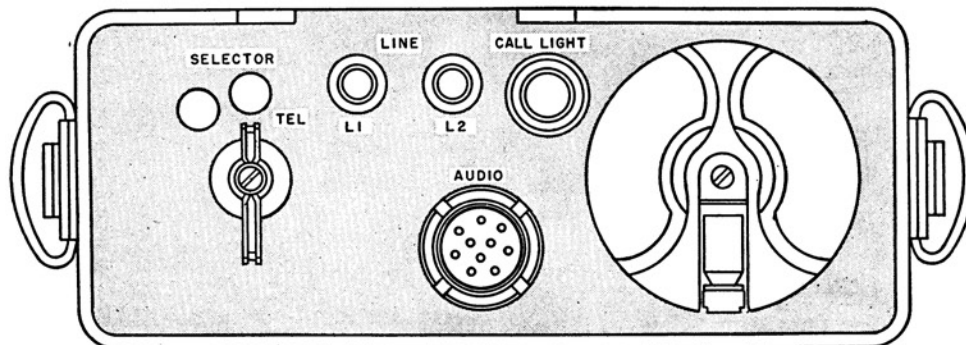


Figure 29. Remote Control C-433/GRC, controls.



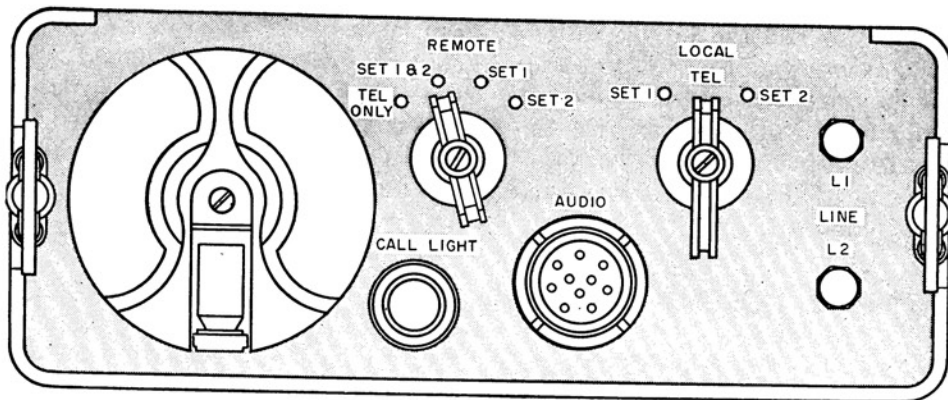


Figure 30. Local Control C-434/GRC, controls.

TM 284-61

- (3) Turn the **POWER** switch on the radio set to **OFF** when the set is not being used.

**Caution:** Do not crank the ringing generator handle at the remote or local units except for telephone operation as described in *a* above.

*c.* OPERATION OF RADIO SET FROM REMOTE CONTROL UNIT.

- (1) Put the radio set in operation as described in paragraph 17. Then set the **POWER** switch on the radio set at **REMOTE**.
- (2) At the local control unit, set the **LOCAL** switch at the **TEL ONLY** position and the **REMOTE** switch at the **SET 1** position.
- (3) At the remote control unit, set the **SELECTOR** switch at the left write-in position.
- (4) Momentarily press the push-to-talk button on the handset at the remote control unit. This turns power on in the radio set if the telephone wires connected to terminals **L1** and **L2** are not reversed.
- (5) Using the handset, press the push-to-talk button to talk and release to listen. If the radio set does not operate, reverse the leads at **L1** and **L2**.
- (6) To turn off the power at the radio set from the remote control unit, turn the **SELECTOR** switch to the right write-in position and momentarily press the push-to-talk button on the handset.

*Note.* The operators at the local and remote control units may communicate with each other over the telephone lines (*a* above) to check whether remote operation of the radio set is satisfactory.

*d.* REMOTE RELAY OPERATION. When Control Group **AN/GRA-6** is used with a relay station, power may be turned on or off at the remote control unit. Also, reception and transmission is possible in one direction through one of the relay sets by an operator at the remote control unit.

- (1) Put the relay station in operation as described in paragraph 20. Then set the **POWER** switch on each radio set at **REMOTE**.
- (2) Connect the local and remote units as described in paragraphs 45 and 46*c* except that *both* the Set 1 and Set 2 cables of the local control unit are to be connected to the two connectors on the relay cable to which the handsets are normally connected.
- (3) Voice signals picked up by one of the two relay sets can be heard in the handset of the remote control unit. Transmission is possible from this handset through the same relay set when the push-to-talk button is held down.
- (4) To turn off the power on both relay sets, turn the **SELECTOR** switch of the remote control unit to the right write-in position.

*Note.* When an operator is stationed at the local control unit, he may, by turning the **REMOTE** switch of the local control unit from **SET 1** to **SET 2** or back again, enable the operator at the remote control unit to receive and transmit through the relay station in either direction.

## 47. Organizational Maintenance

*a.* Perform the applicable preventive maintenance procedures given in paragraphs 27 and 28. For further information, refer to **TM 11-5038**.

b. Check the dry cells and the 45-volt battery for satisfactory operating condition. Discard the 45-volt battery if the terminal voltage is less than 30 volts. Discard the 1½-volt batteries if the terminal voltages are less than 1 volt.

c. Remove the batteries from the control units when they are not being used.

d. When Control Group AN/GRA-6 is not required for operation, it should be stored in Bag CW-189/CR. If the control group is in intermittent use, and is not being operated for an extended period of time, remove the batteries from the control units.

### Section III. HOMING ANTENNAS AT-339/PRC AND AT-340/PRC

#### 48. Description

a. Homing Antenna AT-340/PRC is a loop type antenna designed for use with Radio Sets AN/PRC-8 and -9 to enable the operator to determine the direction of a transmitted signal and to proceed toward it. It has a frequency range of 20 to 38.9 mc. Homing Antenna AT-339/PRC is similar except that it is designed for use with Radio Set AN/PRC-10 and has a frequency range of 38 to 54.9 mc. Either loop antenna, when properly connected to its respective radio set, comprises an effective homing device which permits the radio operator to find the direction of a radio transmitter tuned to his frequency, proceed toward it, and eventually reach it. Since highly accurate bearings are not required for homing, an azimuth scale is not provided. When desired, approximate azimuth readings can be obtained by sighting a pocket compass in the direction of the indicated bearing.

b. Homing Antenna AT-339/PRC or AT-340/PRC consists of an unshielded loop, a coupling transformer, a tuning capacitor, a sense switch, an attenuator, and 6 feet of transmission cable.

- (1) The loop consists of 3/8 inch outside diameter brass tubing, forming a diamond, with each leg being 9.5 inches long (fig. 31). The housing and handle of the loop are at the base of the loop frame. The housing above the handle contains a coupling transformer, an air-dielectric variable capacitor for tuning the loop, a sense switch, and a four-position attenuator switch. The tuning control, the sense switch, and the attenuator switch are mounted on the front panel of the housing (fig. 32).
- (2) A 6-foot length of shielded Radio Frequency Cable RG-58C/U extending through the bottom of the loop handle is terminated in Radio Frequency Plug UG-85/U, which is used to connect the

homing antenna to the AUX ANT jack of the radio set.

- (3) A carrying bag is provided to carry and stow the collapsed loop antenna. It is constructed of a cotton duck material which is moisture and fungus resistant.

#### 49. Installation

- a. Remove the equipment from the carrying bag.
- b. Erect the collapsed loop antenna by extending the two arms as far as they will go. Fit the two sections together to complete the *diamond* form.
- c. Connect the plug at the end of the transmission cable to the AUX ANT jack of the radio set.

#### 50. Operation

a. DEFINITIONS. It is necessary at this point to define the terms *maximum position* and *null position* as used in the following paragraphs:

- (1) *Maximum position* is the position in which the antenna is oriented when the greatest signal response is obtained. This occurs when *either* edge of the loop faces toward the target transmitter. When the sense switch on the back panel of the loop handle is in the *normal* position, signals of equal maximum intensity will be obtained when side A or B is pointed toward the transmitting source (figs. 31A and 31B). When the switch is thrown to the SENSE position, one of the sides will give a greater response than the other.
- (2) *Null position* is the position in which the antenna is oriented when minimum or no signal is obtained. This occurs when either side of the loop is located broadside to the transmitter (fig. 31c).

As indicated, there are two null positions. The *null* obtained when the side of the loop containing the tuning control faces the transmitting source is called a *direct null*; the null obtained when the opposite side faces the transmitting source is called the reciprocal null. Operation of the equipment depends on aural-null response. The null will be observed in Radio Sets AN/PRC-8, -9, and -10 by a sharp decrease in signal response accompanied by a strong background noise or rushing sound in the receiver handset.

#### b. TUNING.

- (1) Hold the loop antenna vertical, with the handle slightly above eye level.
- (2) Check to make sure the toggle switch is in the **NORMAL** position.
- (3) Set the tuning knob on the front panel of the loop housing to the desired operating frequency on the calibrated dial setting. (These settings are approximate.)
- (4) Rotate the antenna about a vertical axis until the signal is received and, with the tuning knob, tune the loop to maximum response.
- (5) Rotate the antenna from edge A to edge B and tune the signal until both edges are of equal intensity. *The signal response must be of equal intensity on both edges to establish initial balance of the loop.*

*Note.* Tuning for maximum signal response is very broad when the signal is strong, therefore, it is recommended that a weak signal be used whenever possible (reduce volume or increase attenuation) for initial tuning process.

**c. NULL LOCATION.** Rotate the antenna around a vertical axis by means of wrist motion. In the presence of a signal to which the loop antenna and receiver are tuned, two points will be found at which the output of the receiver handset falls off or disappears altogether. These points are the nulls. They occur when the plane of the loop faces broadside to the signal source. Thus, two nulls occur  $\frac{1}{2}$  revolution ( $180^\circ$ ) apart when turned to a null; a line drawn through the center of the loop perpendicular to its plane will be in line with the transmitting source.

**d. SENSING.** Since there are two null positions, it is evident that the transmitter may be either in

front or behind the loop. To determine from which side the signal is arriving proceed as follows:

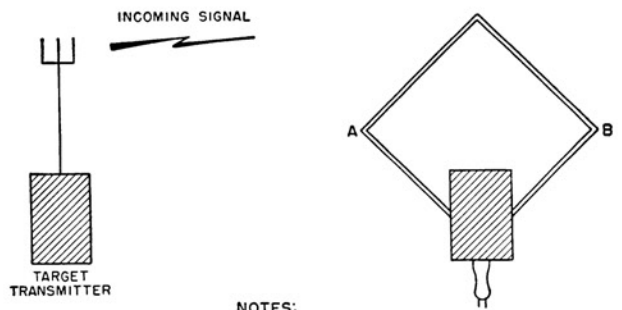
- (1) Throw the toggle switch on the panel to the **SENSE** position.
- (2) Rotate the loop about a vertical axis  $90^\circ$  clockwise or counterclockwise and note the signal response in the headset.
- (3) Rotate the loop  $180^\circ$  from position in (2) above, and again note the response in the headset.
- (4) Note the differences in the signal level between these two sides. Orient the loop in the position of greater response. The arrow on the loop housing and the marking on the loop frame then will indicate the direction of the transmitter.
- (5) Having determined the direction of the signal source, *throw the switch back to NORMAL* position and use the null for homing operation, since it gives a sharper and more accurate bearing indication. In the presence of a strong signal the null will be quite narrow and rotation of a few degrees will result in sharp signal variations in the handset. On a weaker signal, the width of the null may increase to  $30^\circ$  or  $40^\circ$ . The center of this null arc is the correct bearing.

**Caution:** The sense switch should be in the **SENSE** position only when sensing. As soon as sense has been determined, throw the switch to the **NORMAL** position and proceed toward the target transmitter by keeping the loop in the null position and following the null indication.

**e. HOMING.** Homing, as the word implies, is the act of proceeding toward a fixed point or station which discloses its location by means of a radio signal. The direction of this signal at some remote point can be determined and followed to its source. To *home* on a signal it is only necessary to do the following:

- (1) Find the null and take a bearing (*c* above).
- (2) Determine the sense (*d* above).
- (3) Proceed in the direction indicated by the arrows inscribed on the loop housing or markings on loop frame. Once the proper sense has been determined and

the toggle switch thrown to **NORMAL**, the loop must be turned back to the broadside position and the null again

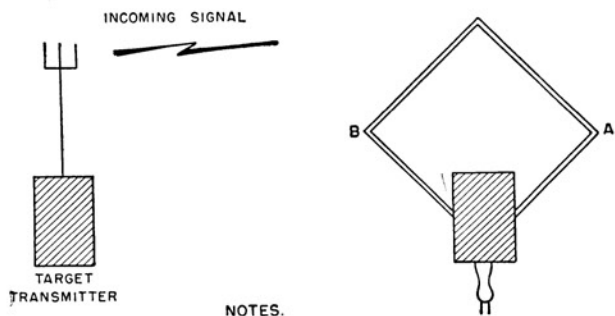


**NOTES:**

1. WITH SENSE SWITCH AT **NORMAL**, LOOP IS SHOWN IN MAXIMUM RECEPTION POSITION.
2. WITH SENSE SWITCH AT **SENSE**, ARROW ON HOUSING POINTS TOWARD TRANSMITTER.

STRONG SIGNAL EDGE OF LOOP TOWARD TRANSMITTER

A

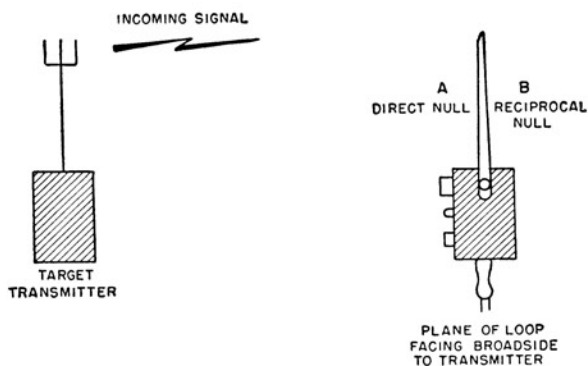


**NOTES:**

3. WITH LOOP ROTATED 180° AND WITH SENSE SWITCH AT **NORMAL**, BOTH SIDES GIVE A MAXIMUM RESPONSE.
4. WITH SENSE SWITCH AT **SENSE**, ARROW POINTS AWAY FROM THE TRANSMITTER.

WEAK SIGNAL EDGE OF LOOP TOWARD TRANSMITTER

B



POSITION OF ANTENNA FOR NULL RESPONSE

C

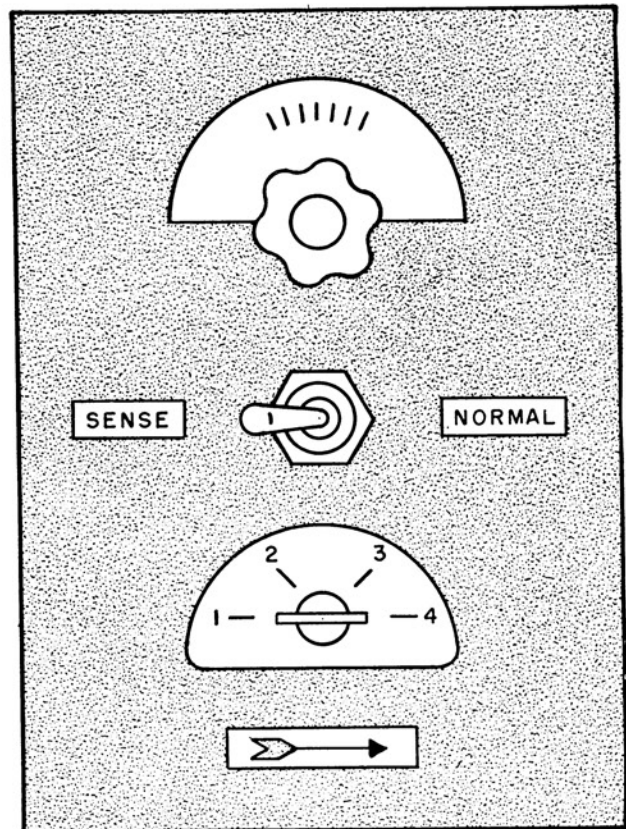
TM 612-212

Figure 31. Homing antennas, loop positions.

obtained. If the null is particularly broad, rotate the loop back and forth a few times. Select the center of the null. Proceed along a line through the center of this null until the home station is reached. As the transmitter is approached, successive bearings can be taken with increased accuracy because of the narrowing null area due to greater signal strength and consequent reduction in width of null arc.

f. **ATTENUATION.**

- (1) Very strong signals may have a tendency to obscure the null and sense indication. In general, signals of such strength will be found in the vicinity of the transmitter. However, if the transmitter cannot be seen, owing to concealment, and a very strong signal tends to obscure the bearings, rotate the attenuator switch to po-



**NOTE:**

IN HOMING ANTENNA AT-340/PRC, THE ARROW IS REVERSED.

TM 612-211

Figure 32. Homing antennas, controls.

sition 2, 3, or 4 to reduce the intensity of the signal sufficiently to make the null clear. When the attenuator is used, it is generally unnecessary to retune the antenna after switching to the various positions. However, if the nulls seem very broad or are not evident, retune the antenna while the attenuator switch is in the position in which it is to be used.

- (2) Positions 2, 3, and 4 provide increasing and marked differences in attenuation. *The position of least attenuation which will permit obtaining bearing and sense determination should be used.* Operation in attenuator position 4 will bring the operator within 100 feet of the target transmitter and the null bearing indication should be sufficient to permit locating the transmitter.

### 51. Operating Hints

a. Do not modify the components of homing Antenna AT-339/PRC or AT-340/PRC. The loop, transmission line, and attenuator have been designed to work together. Any change in length of transmission cable or redesign of the loop may render the equipment inoperative.

b. When seeking a null, hold the loop in a ver-

tical position with the handle at eye level. When sensing, hold the loop as high as possible. In both cases, the plane of the loop should be vertical. It is not necessary to hold the loop antenna high continuously, particularly when following a well-defined null, but frequent checks should be made to assure the correct path of travel.

c. It is possible that a signal has been bent or reflected, but using the loop as instructed will lead the operator to the source. In wooded areas there may be localities usually referred to as blind spots when the signal becomes very weak or fades out. When this occurs, follow the predetermined course for a short distance or seek any relatively open spot and take a bearing.

d. Avoid taking bearings near natural or man-made obstacles. Locations under power or telephone lines, or near fences, railroad tracks, cliffs, or buildings distort the wave path and usually cause false bearings.

e. Always tune for maximum signal on each operating frequency and recheck the tuning whenever in doubt or when using the attenuator unit.

f. To facilitate collapsing the loop, gently tap the loop arms at the hinge joints to loosen the tension on the apex connection.

g. Always check the connections for good, clean contacts.

## Section IV. ANTENNA EQUIPMENT RC-292

### 52. Description

a. Antenna Equipment RC-292 (fig. 33) is an elevated, wide-band, modified ground plane antenna which can be used as an auxiliary antenna with Radio Sets AN/PRC-8, -9, and -10 to increase the distance range. The antenna consists of one vertical radiating element and three ground plane elements which make an angle of  $142^\circ$  with the vertical element. The lengths of the elements can be preadjusted for best performance with each of the above radio sets. The antenna is elevated on a 30-foot sectional mast which is held erect by guy ropes and ground stakes. The equipment is

designed for hand or vehicular transportation and, when disassembled, it is packed in a canvas roll 35 inches long and 36 inches in circumference.

b. The antenna requires no tuning-in operation. However, the lengths of the antenna elements must be preadjusted for the different frequency ranges of the radio sets with which it is used. This is accomplished by changing the number of mast sections which make up the antenna elements. The swivel ground stake on which the mast is supported facilitates lowering of the antenna to make such changes. For additional information, refer to TM 11-5020.

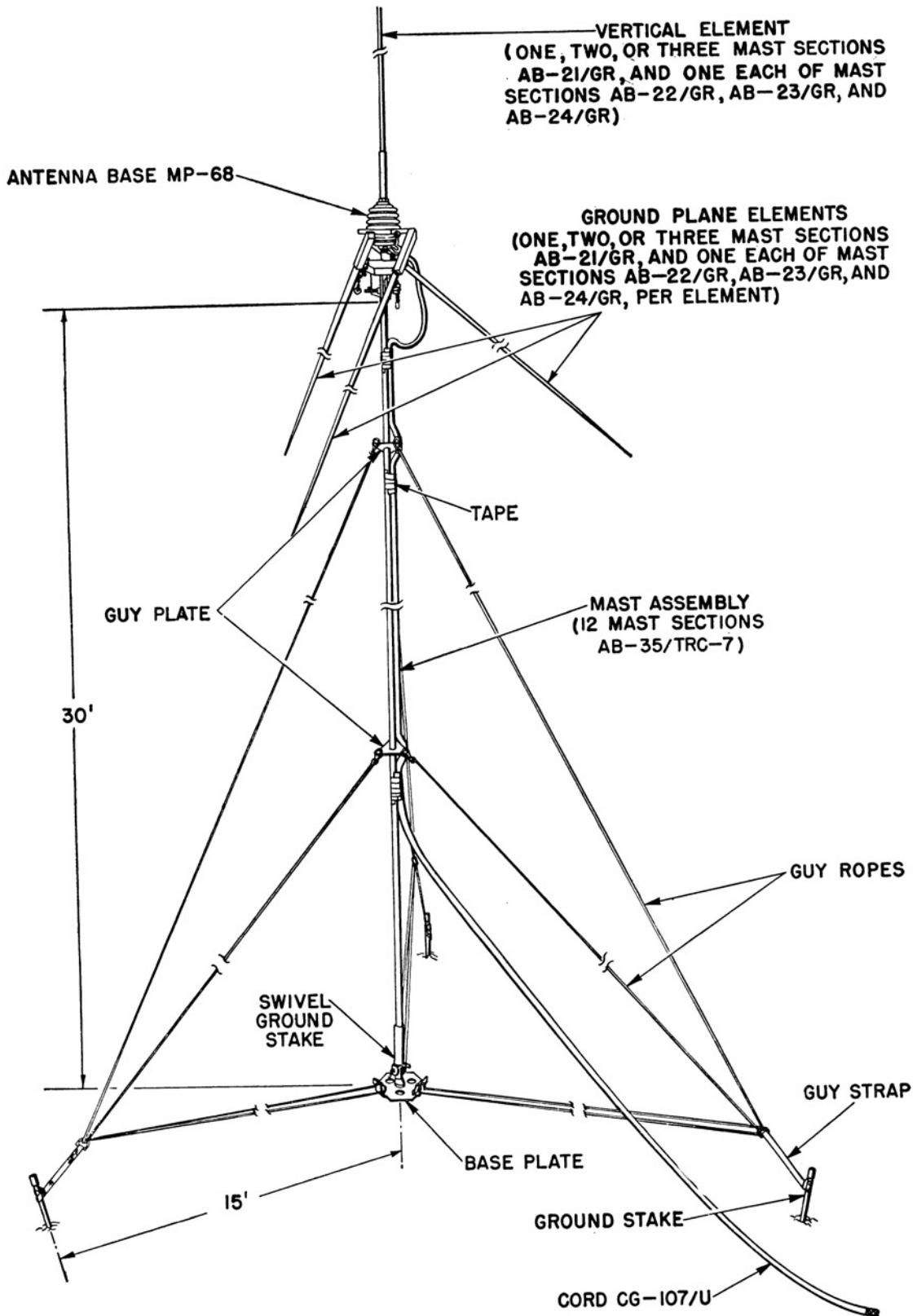


Figure 33. Antenna Equipment RC-292.

### 53. Installation and Connections

a. Erect the antenna as described in TM 11-5020. Use the following table to determine the correct number of ground plane and vertical antenna elements required.

b. Connect Adapter UG-255/U to Plug PL-259-A which terminates Cord CG-107/U. This adapter is not supplied with either the radio set or the antenna and must be requisitioned separately.

c. Connect the other end of the adapter to the AUX ANT jack of the radio set (fig. 34).

d. The radio set may now be operated as described in paragraph 17.

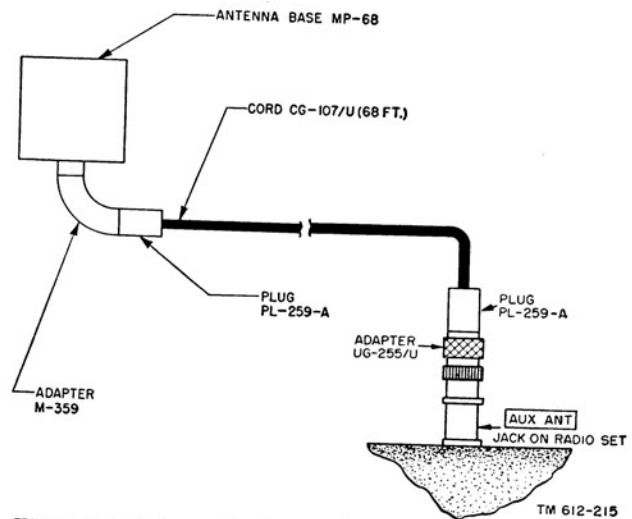


Figure 34. Antenna Equipment RC-292, connection to radio set.

Radio set	Frequency range (mc)	Total number of vertical antenna sections required	Types of sections				Total number of ground plane sections required	Types of sections per element (3 elements)			
			AB-21/GR	AB-22/GR	AB-23/GR	AB-24/GR		AB-21/GR	AB-22/GR	AB-23/GR	AB-24/GR
AN/PRC-8	20 to 27.9	6	3	1	1	1	18	3	1	1	1
AN/PRC-9	27 to 38.9	4	1	1	1	1	15	2	1	1	1
AN/PRC-10	36 to 54.9	3	1	1	1	0	12	1	1	1	1

## CHAPTER 5

# SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

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### Section I. SHIPMENT AND LIMITED STORAGE

#### 54. Disassembly

To disassemble the radio set, reverse the instructions given in paragraph 13. Pack the accessories in the pouch. Tie the rods of the long antenna. Wrap the handset cord around the handset handle. Pack the pouch to make as small a package as possible. Remove the battery pack from the battery case. Fasten the empty battery case to the receiver-transmitter case.

#### 55. Repacking for Shipment or Limited Storage

*a.* The exact procedure in repacking for ship-

ment or limited storage depends on the material available and the conditions under which the equipment is to be shipped or stored. Refer to paragraph 12 and reverse the instructions given in that paragraph.

*b.* Whenever practicable, place a dehydrating agent such as silica gel inside the chests. Protect the chests with a waterproof paper barrier. Seal the seams of the paper barrier with waterproof sealing compound or tape. Pack the protected chests in a padded wooden case, providing at least 3 inches of excelsior padding or some similar material between the paper barrier and the packing case.

### Section II. DEMOLITION OF MATÉRIEL TO PREVENT ENEMY USE

#### 56. General

The demolition procedures outlined in paragraph 57 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commander.

#### 57. Demolition Procedures

*a.* **SMASH.** Smash the crystals, handset, tubes, coils, switches, batteries, capacitors, cases, and transformers, using sledges, axes, handaxes, pickaxes, hammers, crowbars, or heavy tools.

*b.* **CUT.** Cut cords, pouch, suspenders, and wiring, using axes, handaxes, or machetes.

*c.* **BURN.** Burn cords, resistors, capacitors, coils, wiring, and technical manuals, using gasoline, kerosene, oil, flame throwers, or incendiary grenades.

*d.* **BEND.** Bend panels, cases, and chassis.

*e.* **EXPLOSIVES.** If explosives are necessary, use firearms, grenades, or TNT.

*f.* **DISPOSALS.** Bury or scatter the destroyed parts in slit trenches, fox holes, or other holes, or throw them into streams.

*g.* **DESTROY EVERYTHING.**



# APPENDIX

## REFERENCES AND ABBREVIATIONS

### Section I. REFERENCES

*Note.* For availability of items listed, check SR 310-20-3 and SR 310-20-4. Check Department of the Army Supply Catalog SIG 1 for Signal Corps supply catalogs.

#### 1. Army Regulations

- AR 380-5----- Safeguarding Military Information.  
AR 750-5----- Maintenance of Supplies and Equipment—Maintenance Responsibilities and Shop Operation.

#### 2. Supply Publications

- SIG 1----- Introduction and Index.  
SIG 3----- List of Items for Troop Issue.  
SB 11-6----- Dry Battery Supply Data.  
SB 11-47----- Preparation and Submission of Requisitions for Signal Corps Supplies.  
SB 11-76----- Signal Corps Kit and Materials for Moisture- and Fungi-Resistant Treatment.

#### 3. Publications on Auxiliary Equipment and Test Equipment

- TM 11-300----- Frequency Meter Sets SCR-211 (\*).  
TM 11-303----- Test Sets I-56-C, I-56-D, I-56-H, and I-56-J.  
TM 11-307----- Signal Generators I-72-G, H, J, K, and L.  
TM 11-321----- Technical Manual for Test Set I-56-E.  
TM 11-472----- Repair and Calibration of Electrical Measuring Instruments.  
TM 11-2524----- Oscillators I-151-A and I-151-E.

- TM 11-2613----- Voltohmmeter I-166.  
TM 11-2624B--- Voltohmmeters TS-294/U, TS-294B/U, and TS-294C/U.  
TM 11-2626----- Test Unit I-176, I-176-A, and I-176-B.  
TM 11-2627----- Tube Tester I-177 and I-177-A.  
TM 11-5527----- Multimeter TS-352/U.

#### 4. Painting, Preserving, and Lubrication

- TB SIG 13----- Moistureproofing and Fungiproofing Signal Corps Equipment.  
TB SIG 69----- Lubrication of Ground Signal Equipment.  
TB SIG 212----- Low-Temperature Lubricants for Meteorological Equipment.  
TM 9-2851----- Painting Instructions for Field Use.

#### 5. Camouflage

- FM 5-20----- Camouflage, Basic Principles.

#### 6. Decontamination

- TM 3-220----- Decontamination.

#### 7. Demolition

- FM 5-25----- Explosives and Demolitions.

#### 8. Other Publications

- FM 24-18----- Field Radio Techniques.  
FM 72-20----- Jungle Warfare.

- SR 310-20-3--- Index of Training Publications (Field Manuals, Training Circulars, Firing Tables and Charts, Army Training Programs, Mobilization Training Programs, Graphic Training Aids, Joint Army-Navy-Air Force Publications, and Combined Communications Board Publications).
- SR 310-20-4--- Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, Modification Work Orders, Tables of Organization and Equipment, Reduction Tables, Tables of Allowances, Tables of Organization, and Tables of Equipment.
- SR 700-45-5--- Unsatisfactory Equipment Report (Reports Control Symbol CSGLD-247).
- SR 745-45-5--- Report of Damaged or Improper Shipment (Reports Control Symbols CSGLD-66).
- TB SIG 4----- Methods for Improving the Effectiveness of Jungle Radio Communication.
- TB SIG 5----- Defense Against Radio Jamming.
- TB SIG 25----- Preventive Maintenance of Power Cords.
- TB SIG 54----- Working Through Jamming with Frequency Modulated Radio Sets. (Note. USE ON FM SETS ONLY.)
- TB SIG 66----- Winter Maintenance of Signal Equipment.
- TB SIG 72----- Tropical Maintenance of Ground Signal Equipment.
- TB SIG 75----- Desert Maintenance of Ground Signal Equipment.
- TB SIG 123----- Preventive Maintenance Practices for Ground Signal Equipment.
- TB SIG 178----- Preventive Maintenance Guide for Radio Communication Equipment.
- TB SIG 219----- Operation of Signal Equipment at Low Temperatures.
- TB SIG 223----- Field Expedients for Wire and Radio.
- TB 11-499-( )<sup>1</sup> (Preliminary) Basic Radio Propagation Predictions.
- TM 9-2857----- Storage Batteries Lead-Acid Type.
- TM 11-314----- Antennas and Antenna Systems.
- TM 11-415----- Dry Batteries.
- TM 11-430----- Batteries for Signal Communication. Except those pertaining to Aircraft.
- TM 11-453----- Shop Work.
- TM 11-455----- Radio Fundamentals.
- TM 11-466----- Radar Electronic Fundamentals.
- TM 11-476----- Radio Direction Finding.
- TM 11-483----- Suppression of Radio Noises.
- TM 11-486----- Electrical Communication Systems Engineering.
- TM 11-490----- Electrical Fundamentals.
- TM 11-496----- Training Text and Applicatory Exercises for Amplitude-Modulated Radio Sets.
- TM 11-499----- (Preliminary) Radio Propagation Handbook.
- TM 11-660----- Introduction to Electronics.
- TM 11-661----- Electrical Fundamentals (Direct Current).
- TM 11-4000----- Trouble Shooting and Repair of Radio Equipment.

<sup>1</sup> A new TB in this series is issued monthly which gives propagation predictions three months in advance.

## Section II. ABBREVIATIONS

### 9. Abbreviations

ac----- alternating current  
 afc----- automatic frequency control  
 a-m ----- amplitude-modulation  
 dc----- direct current

f-m ----- frequency-modulation  
 i. f. ----- intermediate frequency  
 kc----- kilocycle  
 mw----- milliwatt  
 SPST ----- single-pole single-throw

### RESISTOR COLOR CODES

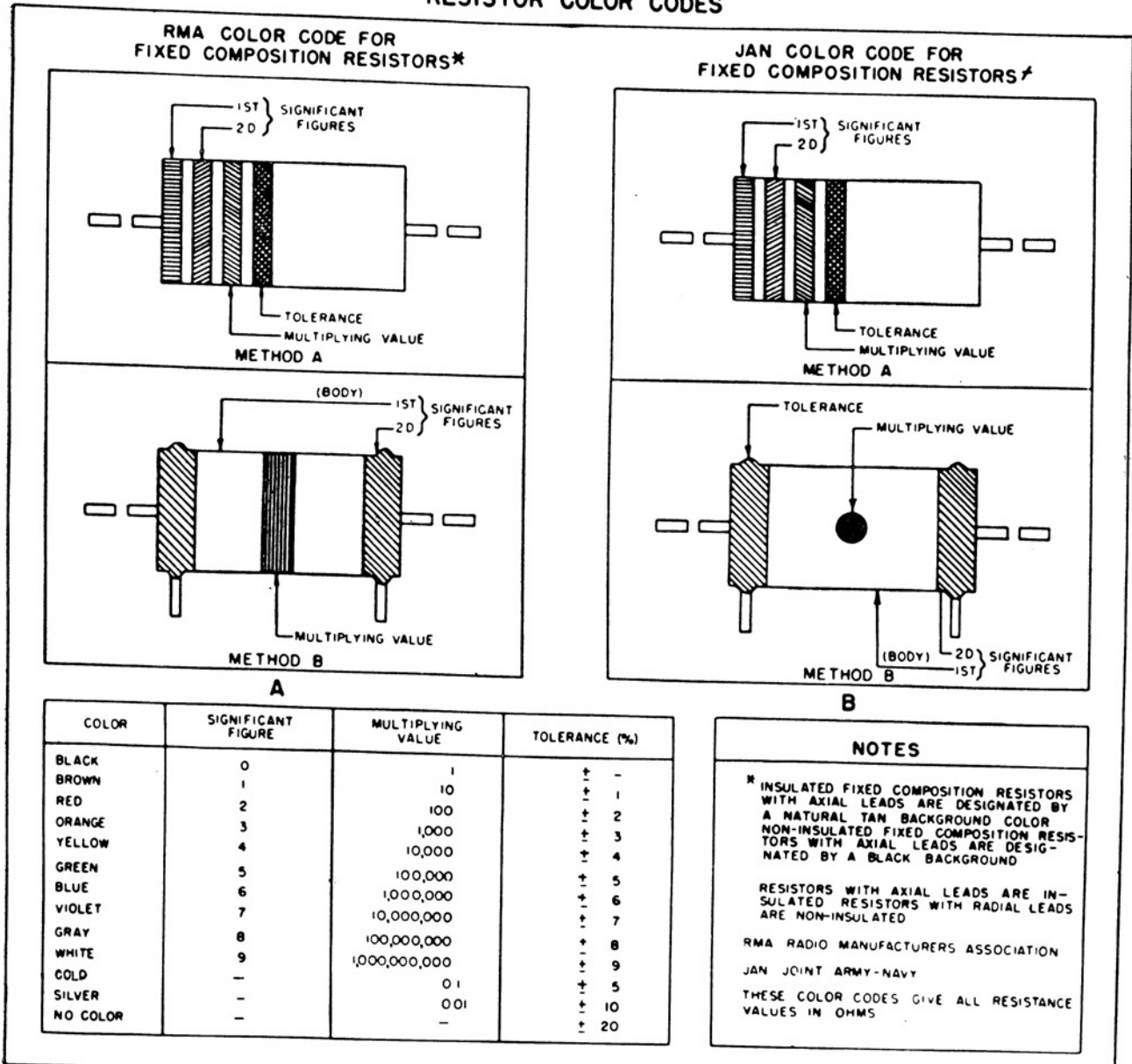
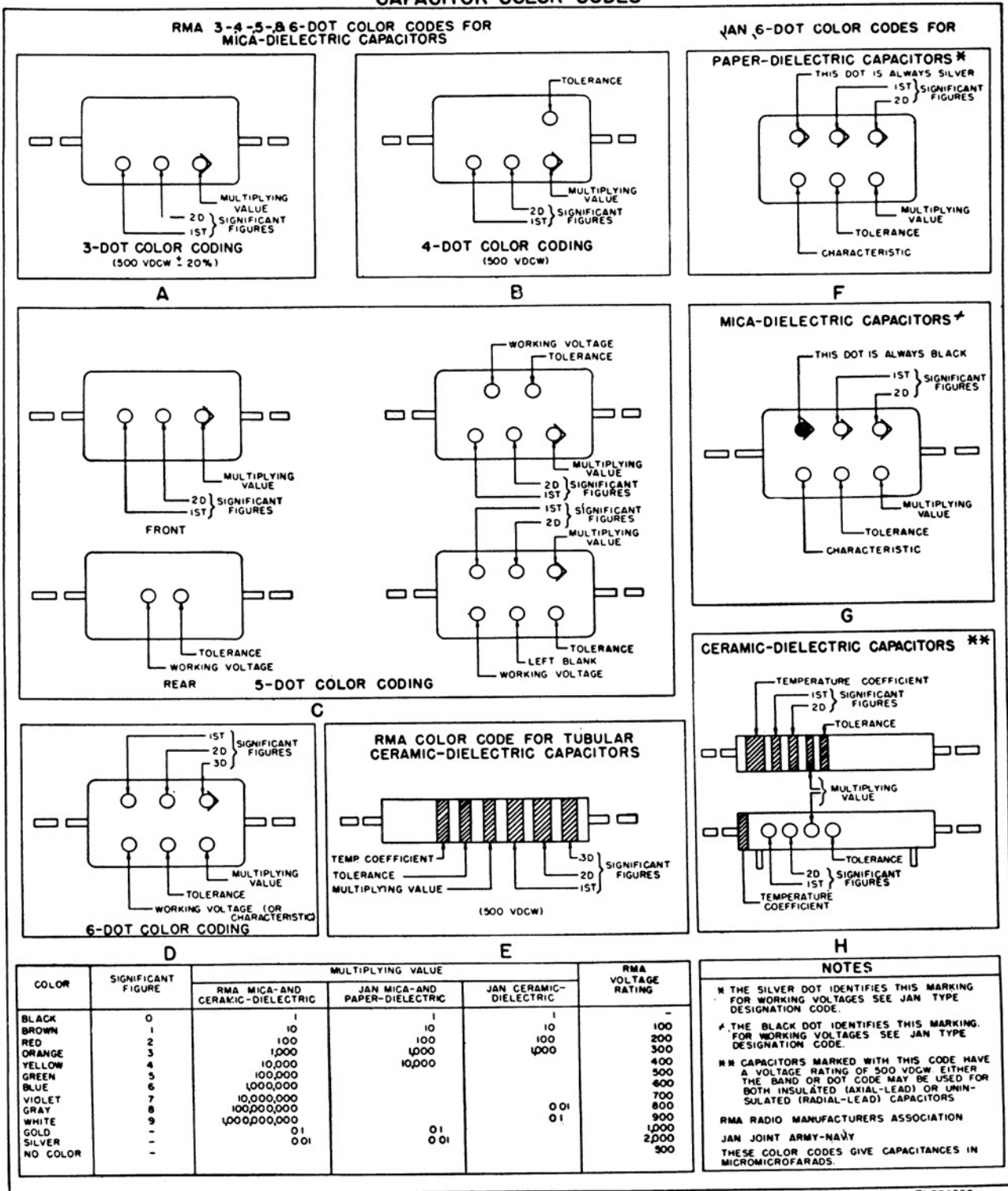


Figure 35. Resistor color codes.

TL 32454S

## CAPACITOR COLOR CODES



TL 32493S

Figure 36. Capacitor color codes.

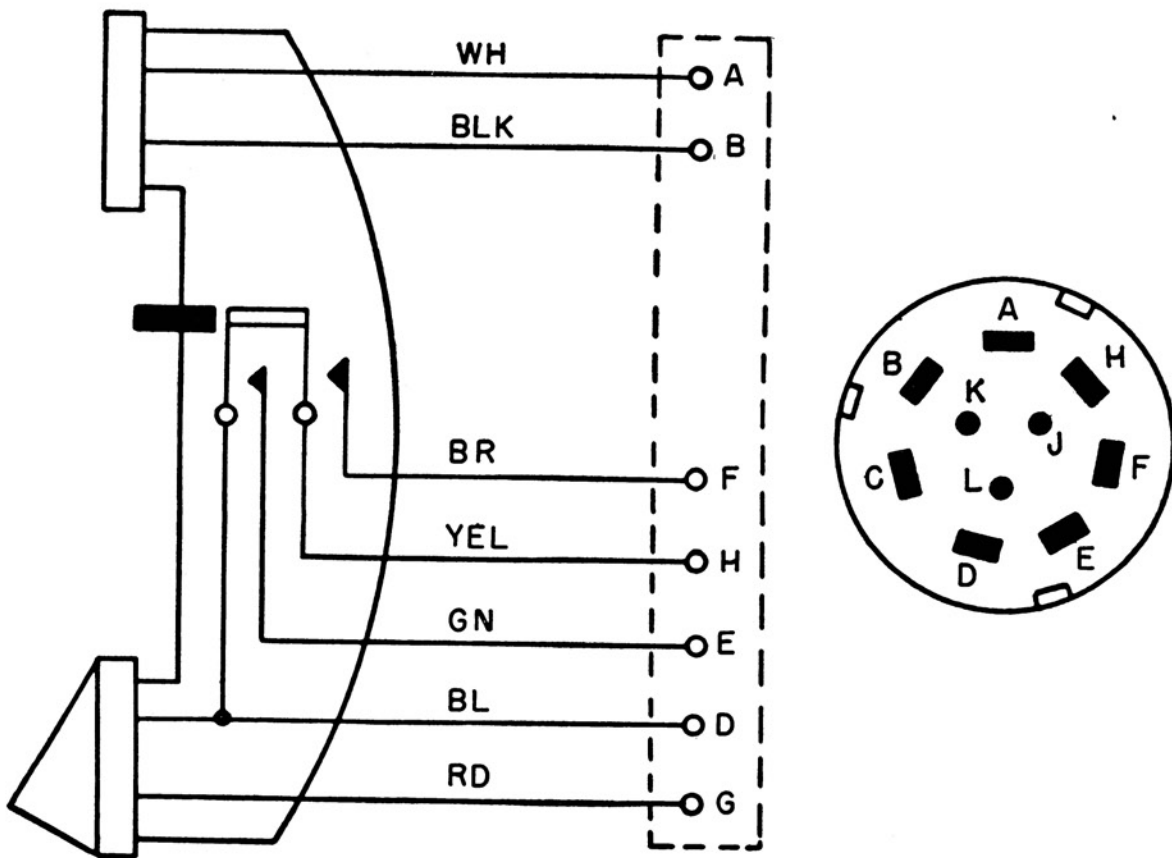


Figure 40. Handset H-33B/PT, schematic diagram.

TM 5038-29

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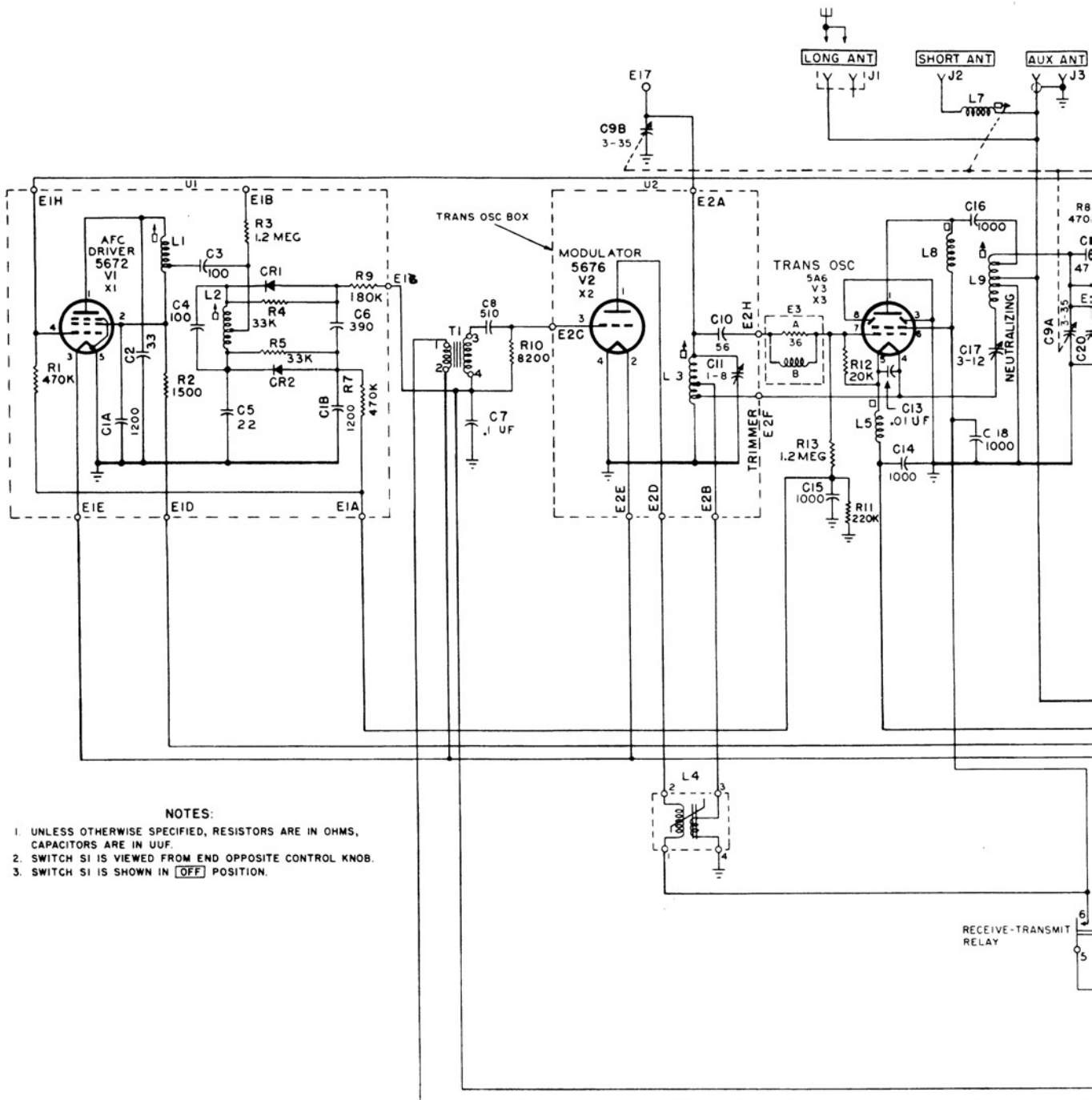
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**NOTES:**

1. UNLESS OTHERWISE SPECIFIED, RESISTORS ARE IN OHMS, CAPACITORS ARE IN UUF.
2. SWITCH S1 IS VIEWED FROM END OPPOSITE CONTROL KNOB.
3. SWITCH S1 IS SHOWN IN **OFF** POSITION.

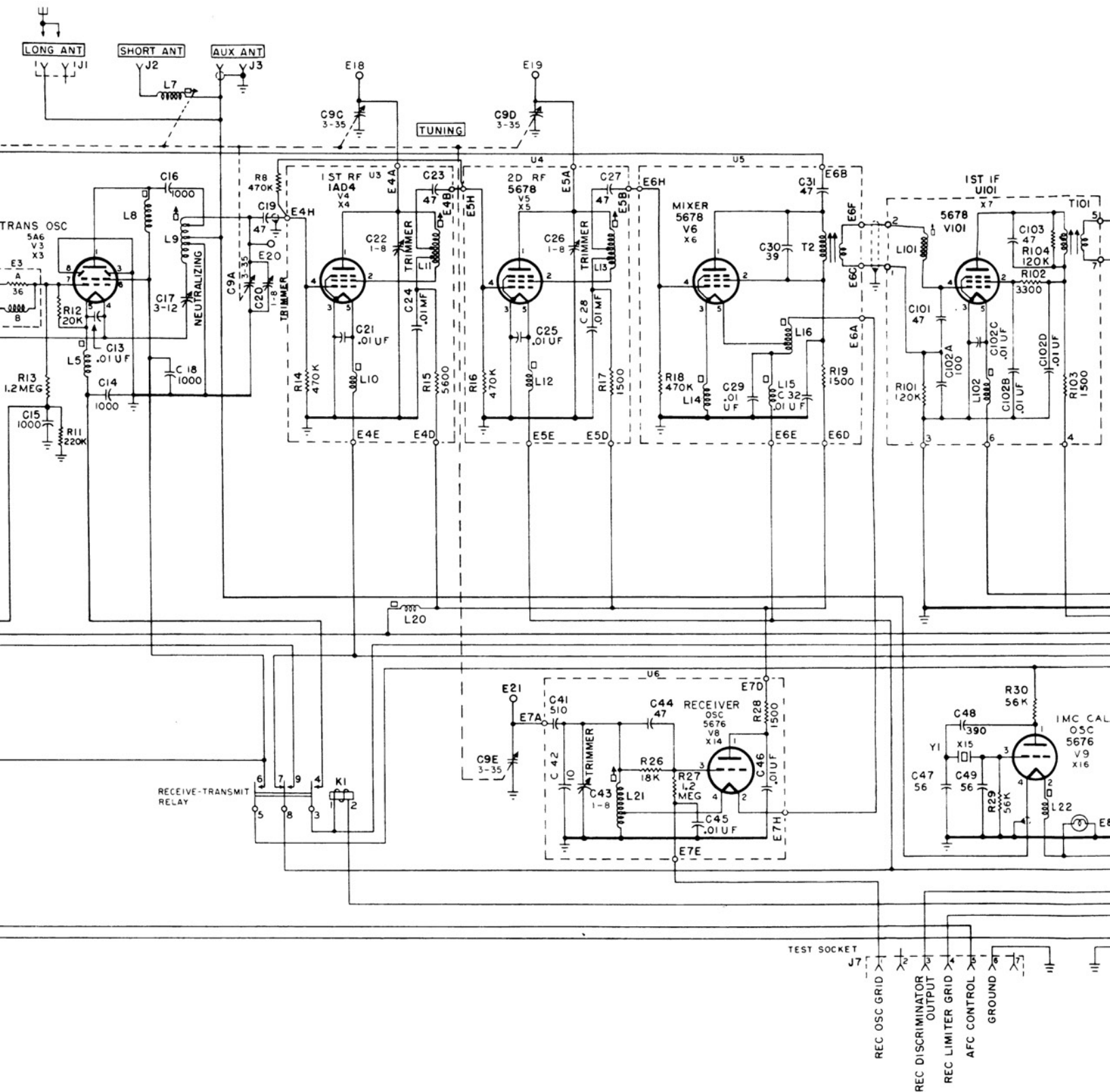
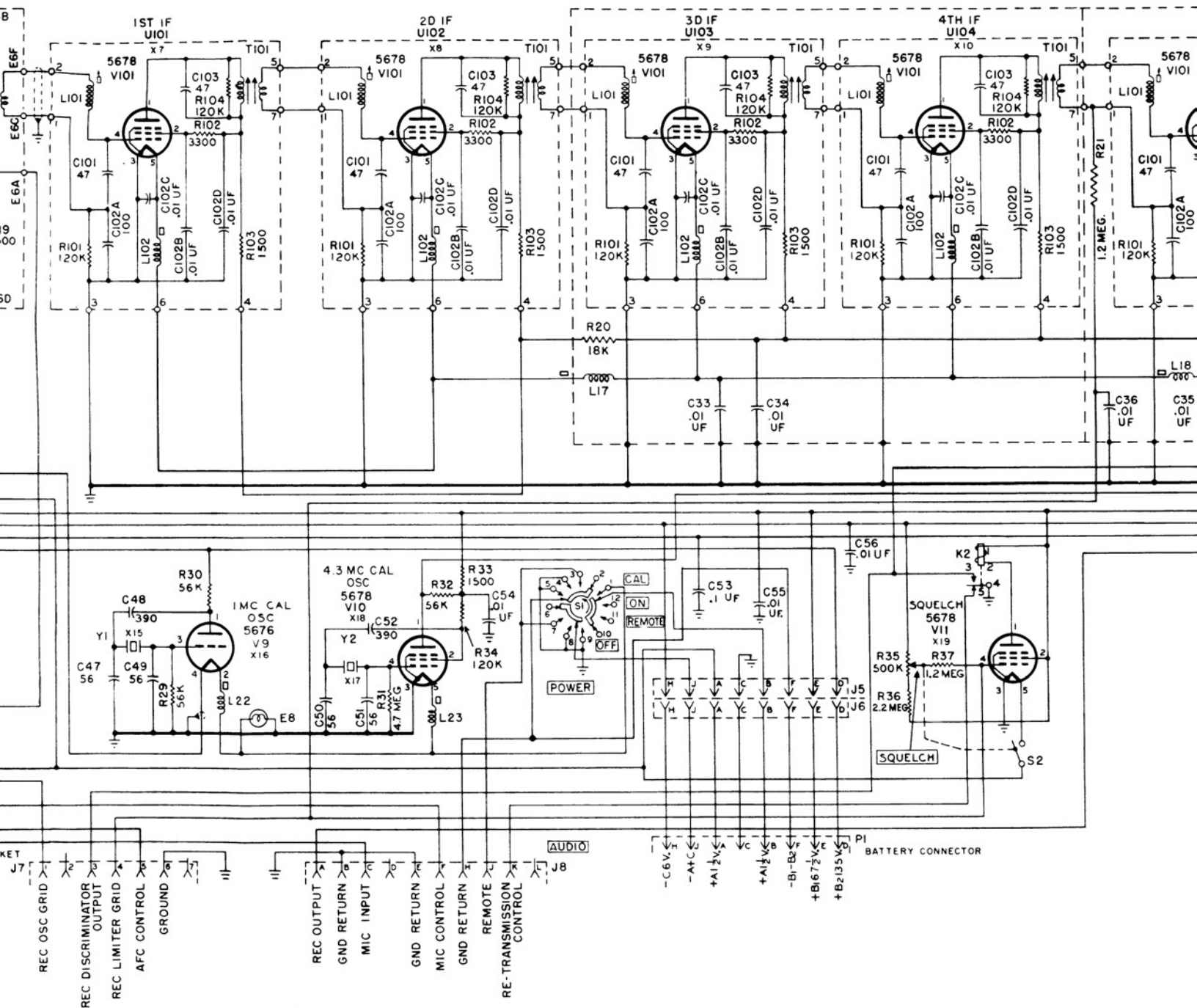
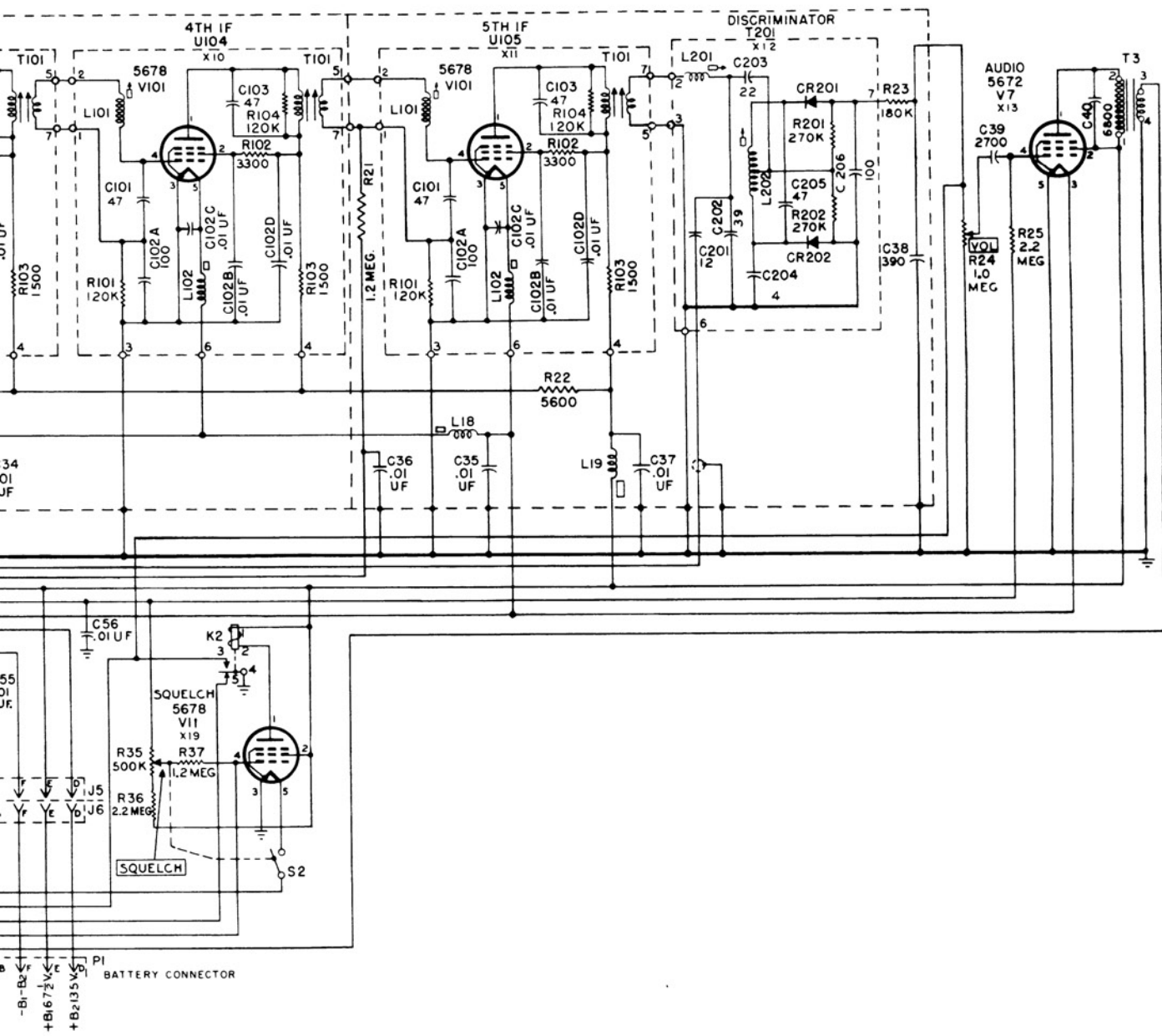
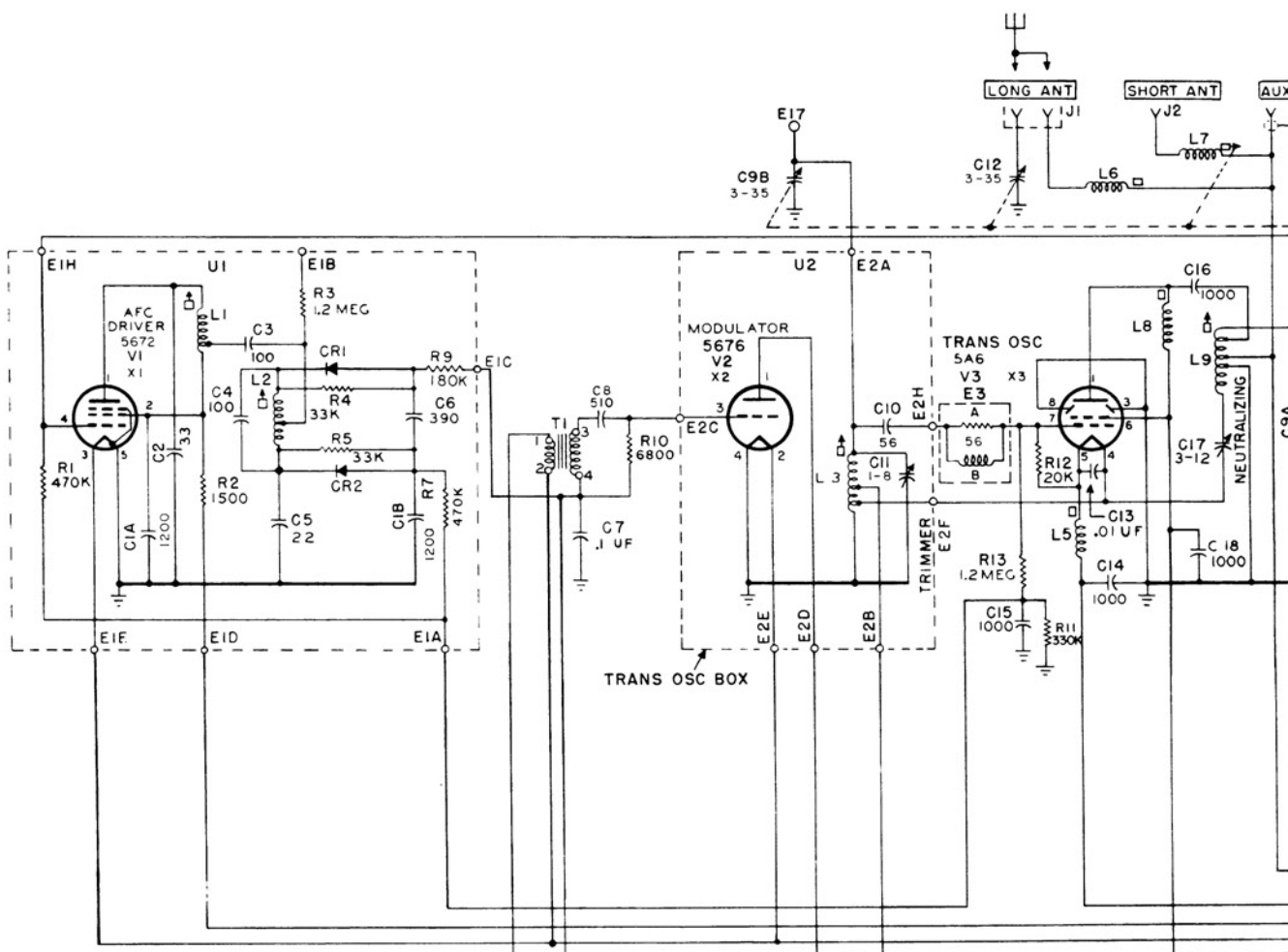


Figure 37. Radio Set AN/PRC-8, schematic diagram



Radio Set AN/PRC-8, schematic diagram.





**NOTES:**

- 1 UNLESS OTHERWISE SPECIFIED, RESISTORS ARE IN OHMS, CAPACITORS ARE IN UUF.
- 2 SWITCH S1 IS VIEWED FROM END OPPOSITE CONTROL KNOB.
- 3 SWITCH S1 IS SHOWN IN **OFF** POSITION.

RECEIVE-TRANSMIT RELAY

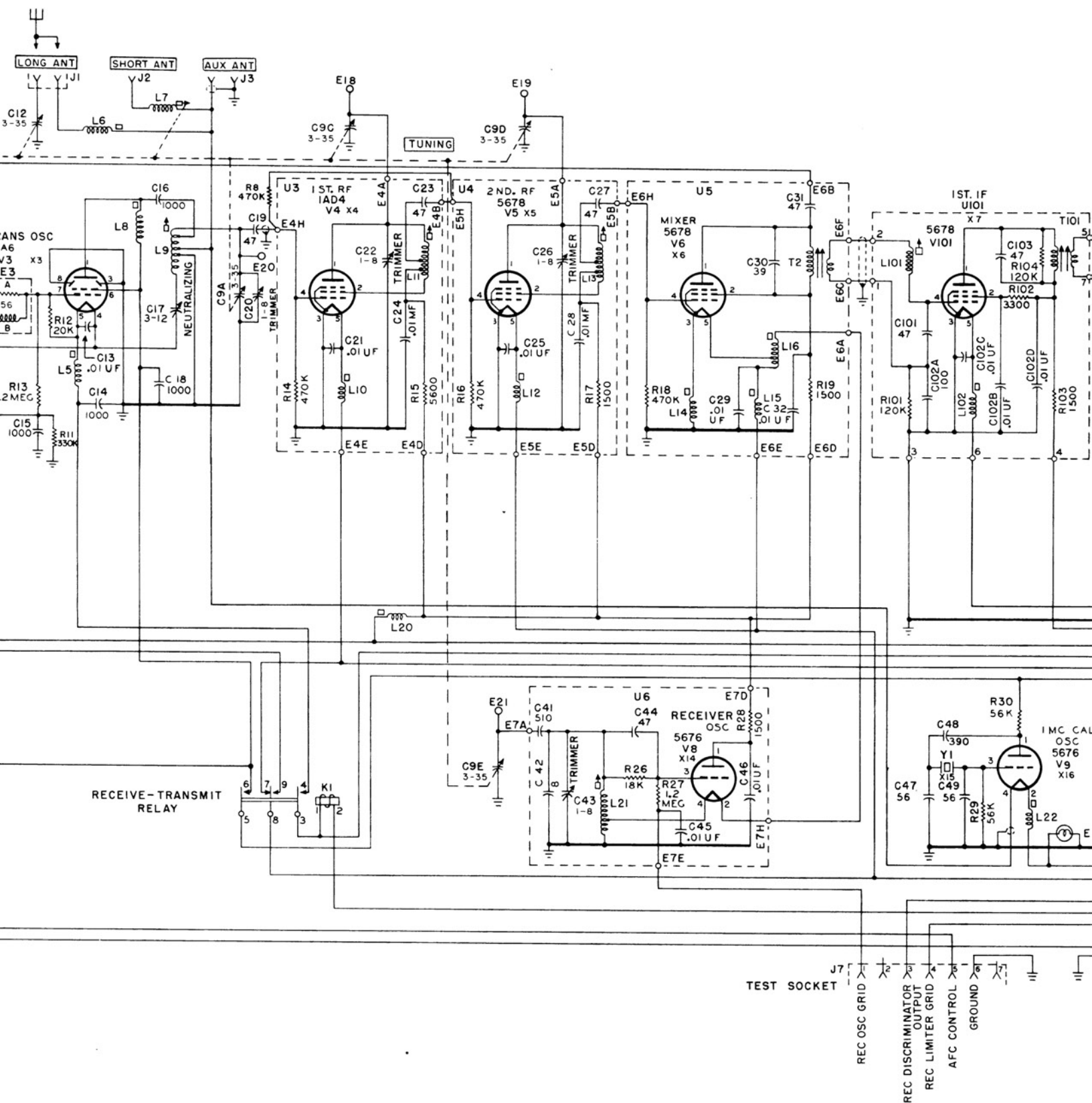
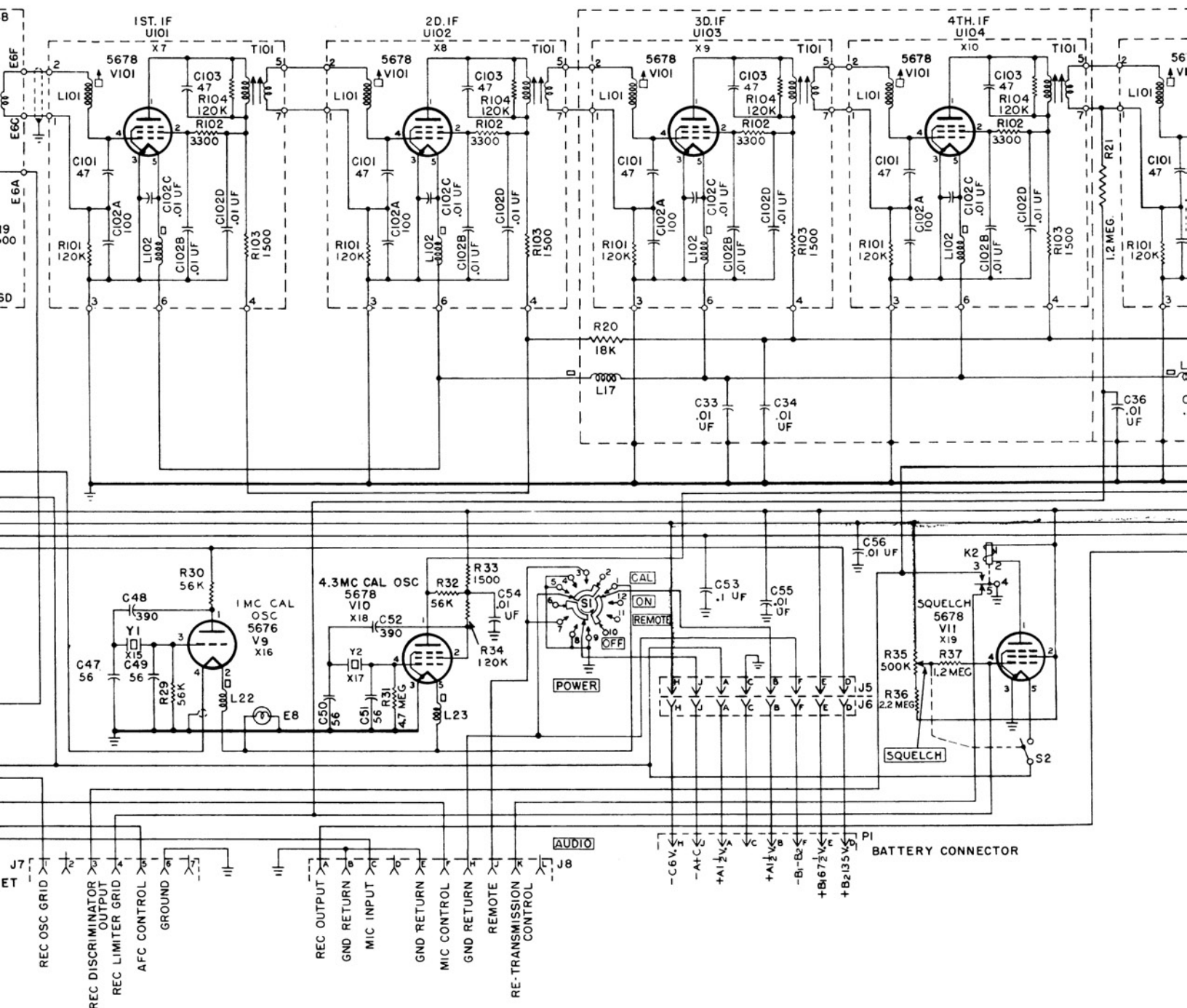
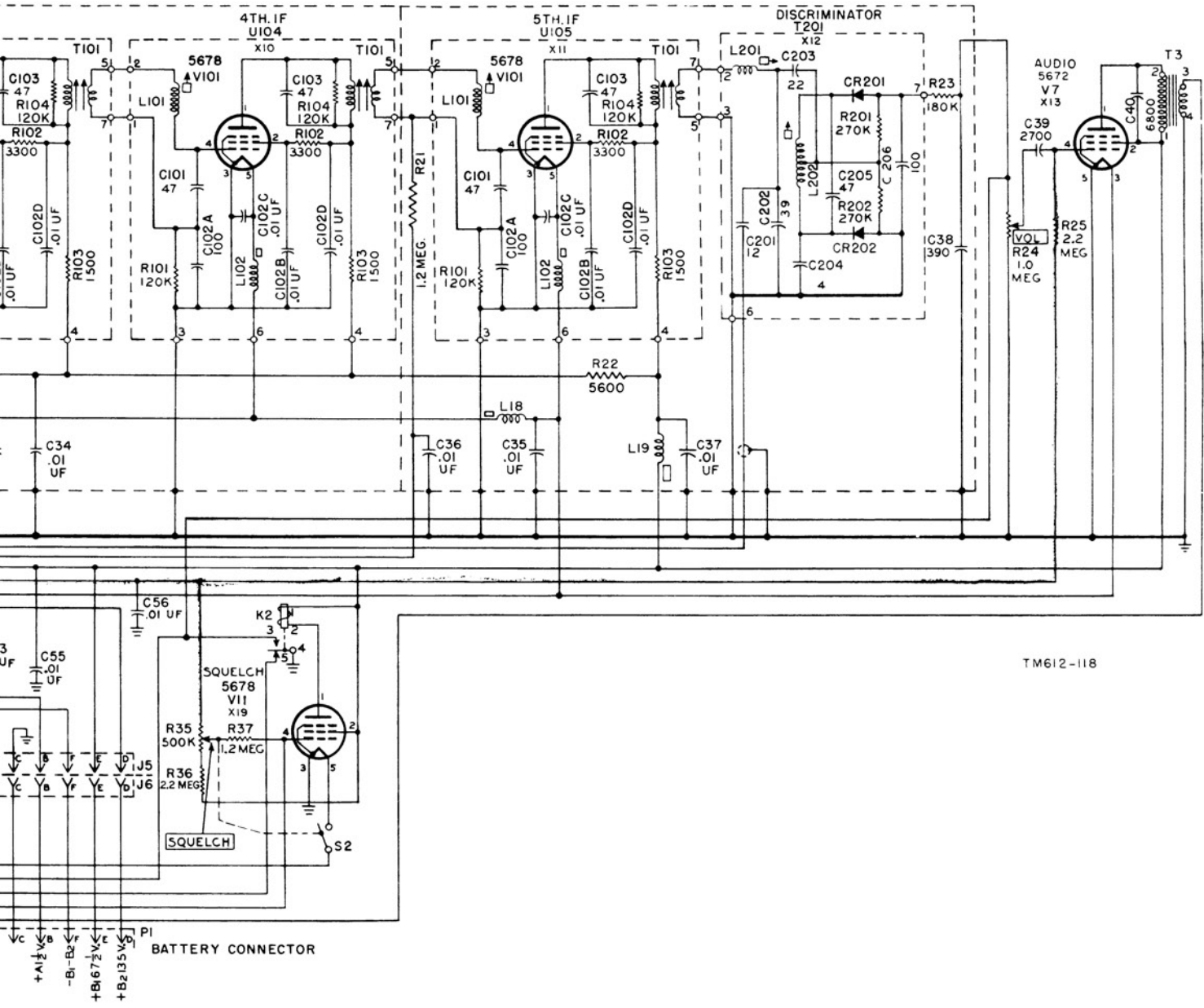


Figure 38. Radio Set AN/PRC-9, schematic diagram.

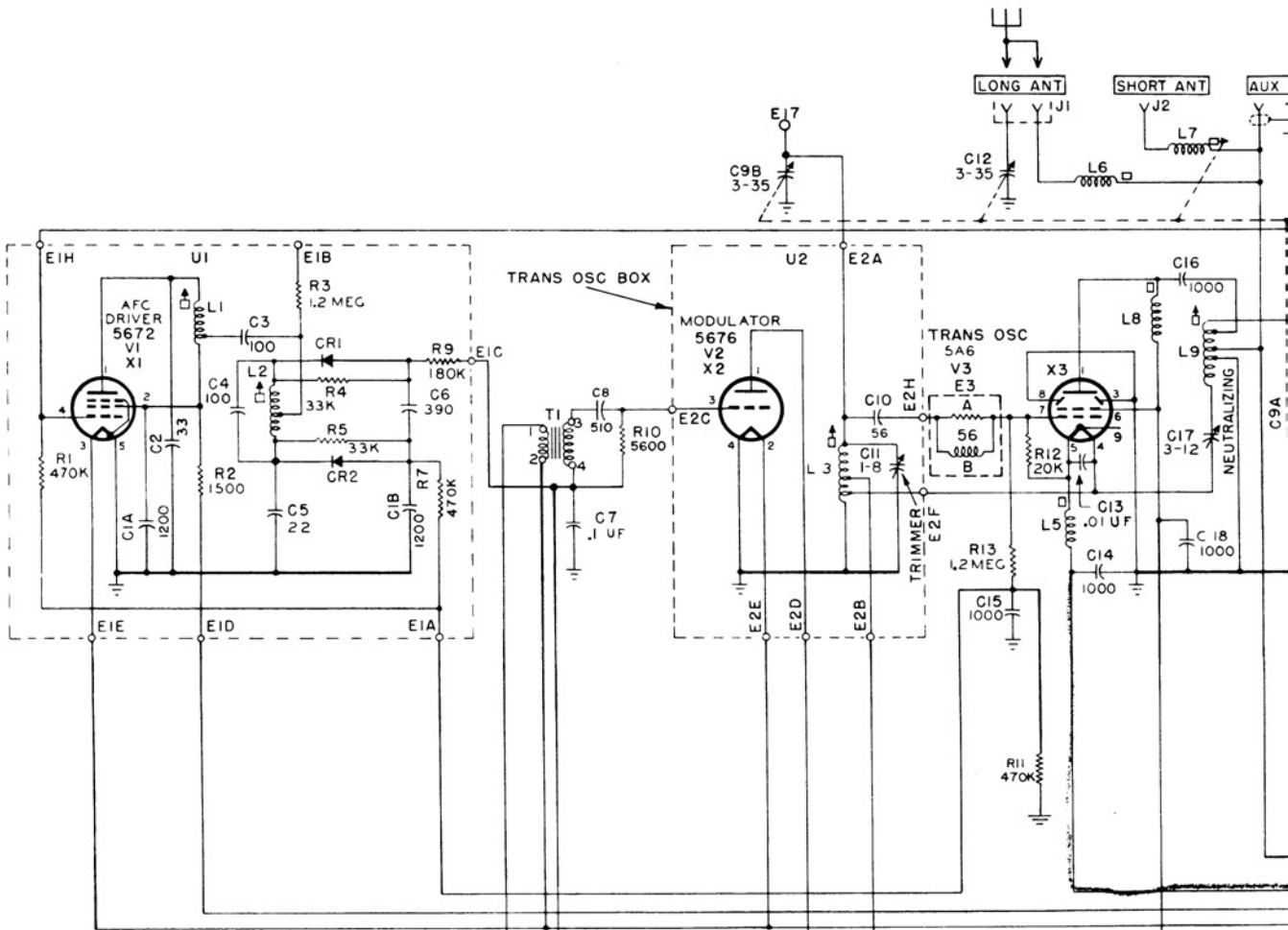


Radio set AN/PRC-9, schematic diagram.



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NOTES:

1. UNLESS OTHERWISE SPECIFIED, RESISTORS ARE IN OHMS, CAPACITORS ARE IN UUF.
2. SWITCH S1 IS VIEWED FROM END OPPOSITE CONTROL KNOB.
3. SWITCH S1 IS SHOWN IN **OFF** POSITION.

RECEIVE-TRANSMIT RELAY

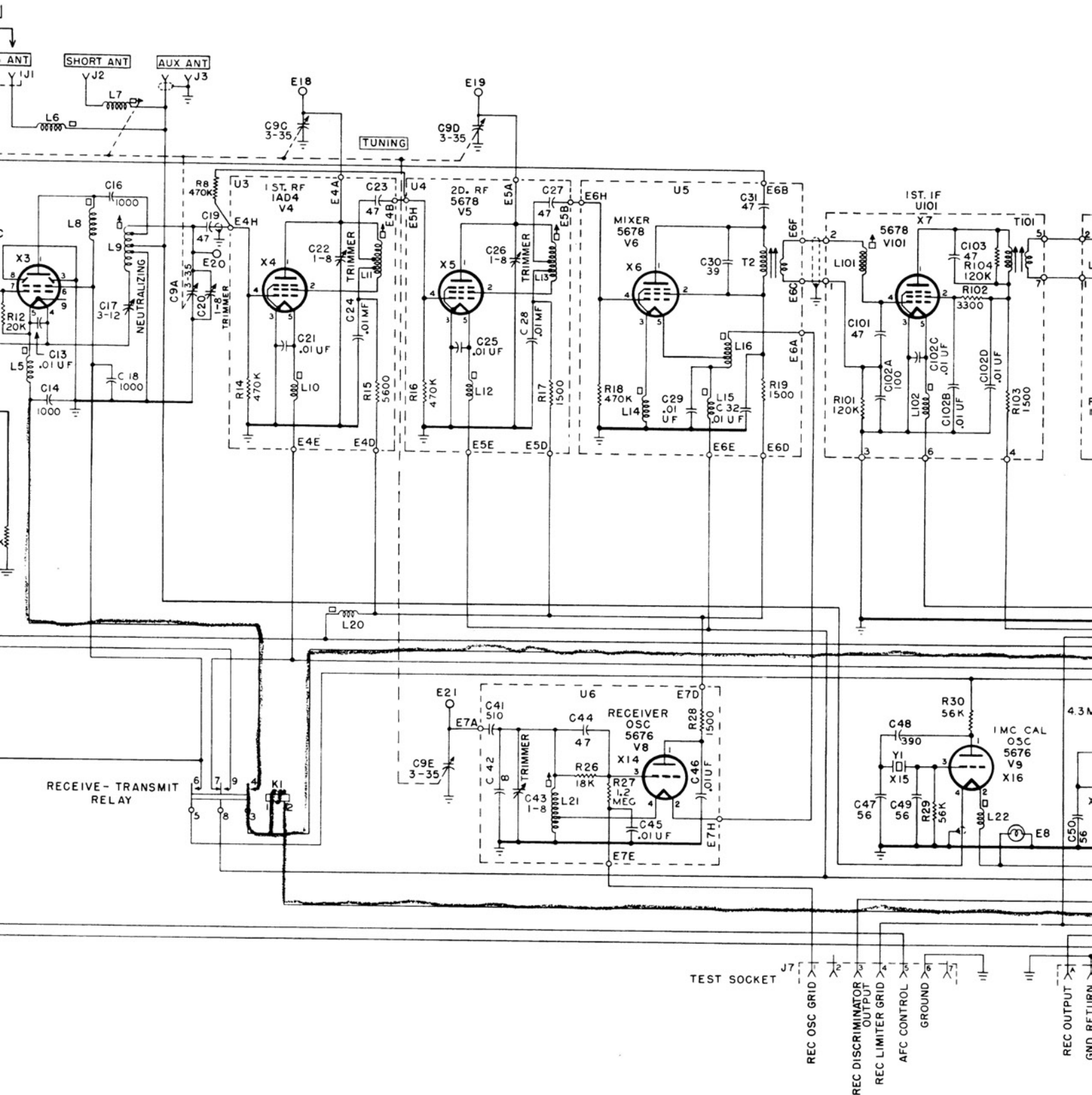
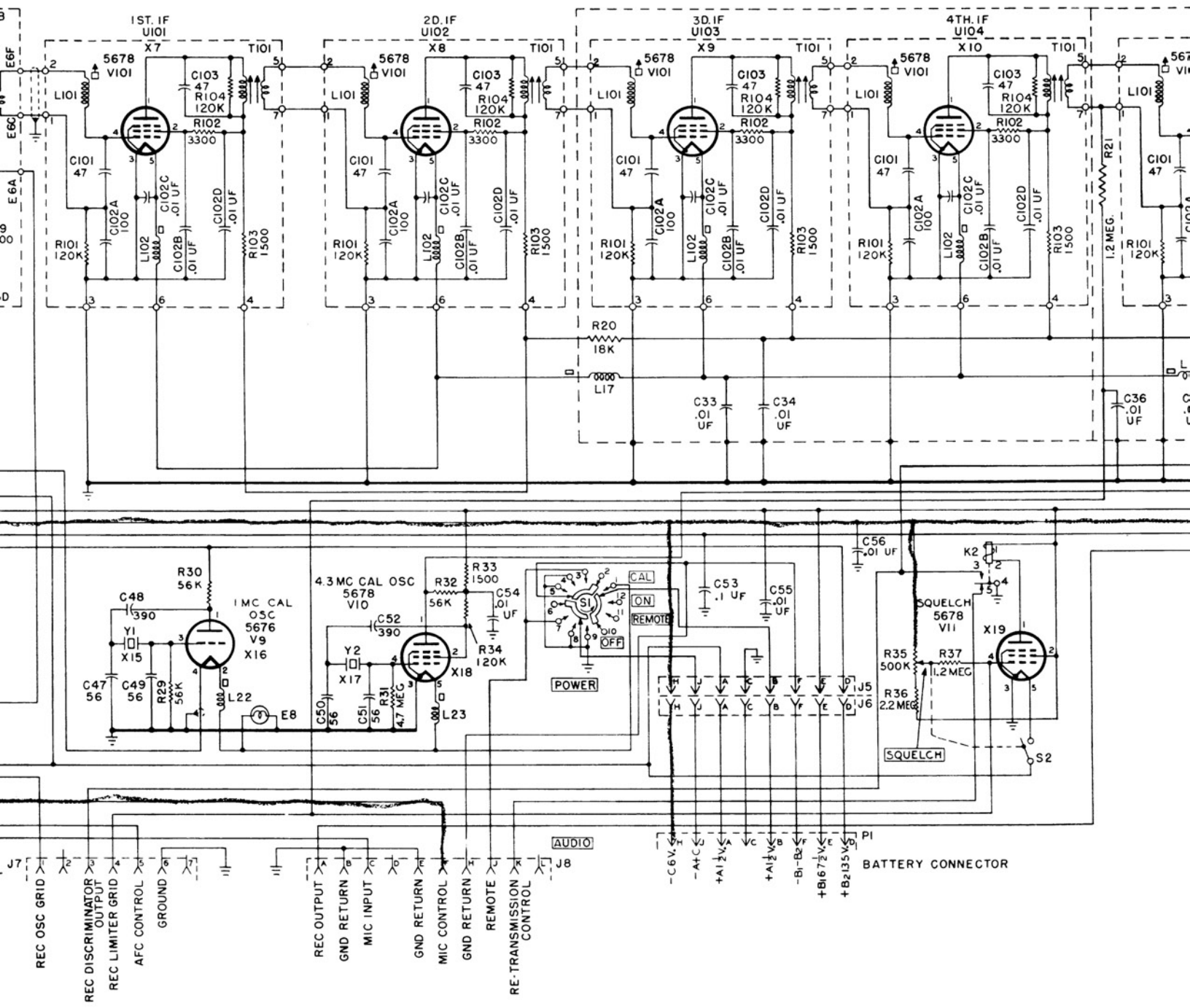
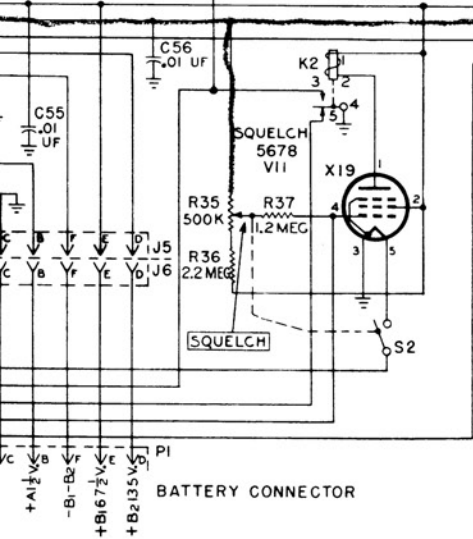
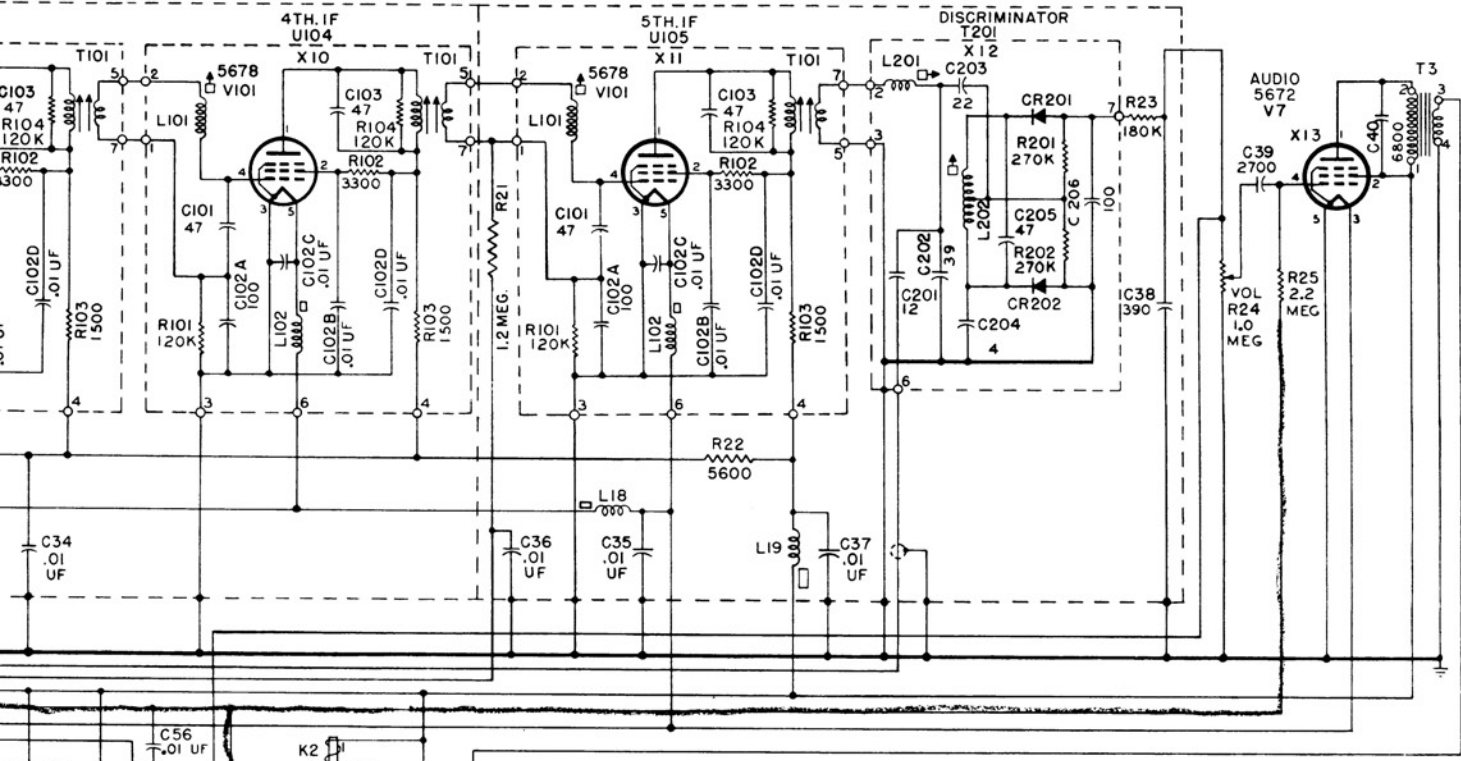


Figure 39. Radio Set AN/PRC-10, schematic diagram.



Radio Set AN/PRC-10, schematic diagram.



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