

SECTION 2

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

7. **General.**—Radio Sets AN/PRC-8, -9, and -10 are three portable, frequency-modulated radio sets intended to provide man-pack communications for tank, artillery, and infantry units, respectively. The other equipments with which these sets can communicate are indicated in the frequency spectrum chart, Appendix B.

8. **Technical Characteristics.**—a. The three sets 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 FM receiver and FM transmitter which use a common antenna. The receiver-transmitter used in each set and the frequency range of each is shown below:

Set	Radio Receiver-Transmitter	Frequency Range
AN/PRC-8	RT-174/PRC-8	20.0 to 27.9 mc
AN/PRC-9	RT-175/PRC-9	27.0 to 38.9 mc
AN/PRC-10	RT-176/PRC-10	38.0 to 54.9 mc

b. The sets are designed for voice transmission and have an operating range of three to five miles depending upon which type antenna is used. A de-mountable semi-rigid steel tape antenna, 36 inches long, is used in normal operations. This type antenna is used when the operator is moving about on foot and when the distance between stations is not excessive. The second type antenna used with each set is a 10 foot, multi-section, whip antenna. This antenna is used when maximum range is necessary, such as for two-way unattended relay service or stationary use.

c. Each of the three sets receives its power supply from Battery BA-279/U. The actual life of the battery depends on many conditions, such as age, climate, rate of use, etc. The approximate expected battery life will vary from 20 to 30 hours.

d. Each set, including battery, carrying straps, and handset, weighs 26 pounds. Although designed primarily for man-pack operation, the sets can be mounted for vehicular operation by using auxiliary equipment for a source of power supply.

e. Channel selection is accomplished by use of a single calibrated dial which tunes both transmitter and receiver simultaneously. A dial lock is provided so that once the proper channel is selected no further adjustments will be necessary.

9. **General Operating Rules and Procedures.**—a. Although the operating frequencies of each of these three sets differ, the method of operation for all three sets is the same. Wherever instructions are limited to a particular set, the specific nomenclature for that set is used.

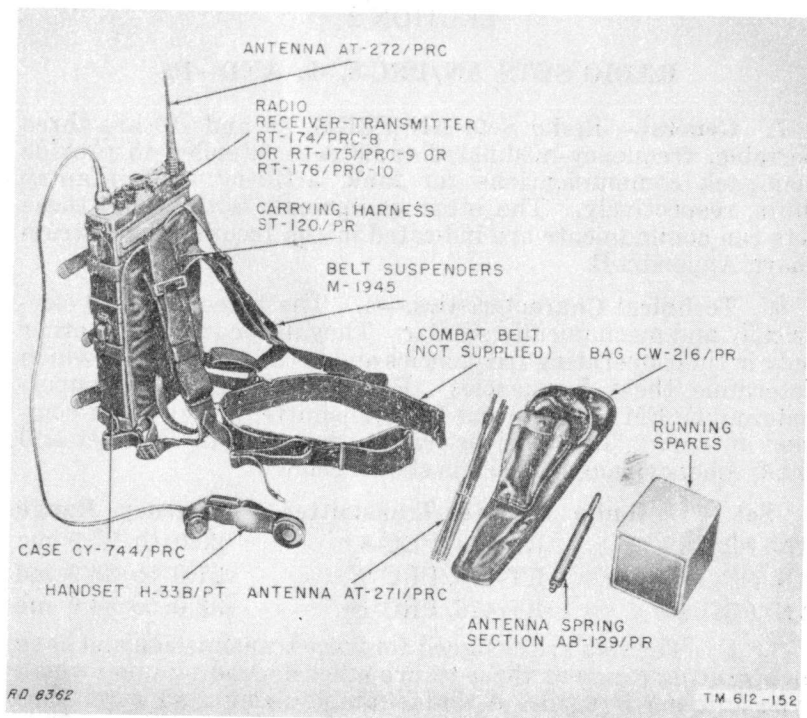


Figure 7.—Radio Set AN/PRC-8, -9, or -10, operating components.

b. 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. Valleys, depressions, densely wooded areas, and low places are poor sites for location of stations. Location on a hilltop 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.

c. The antennas supplied are designed for man-pack operation. For semi-permanent installations, the operating range may be increased and operation made more convenient by using auxiliary antenna equipment. Operation from a moving vehicle can be satisfactory only when the ignition system is shielded to prevent radio interference. When operating from a vehicle, stay away from bridges, large buildings, large trees, and heavily travelled roads, if possible.

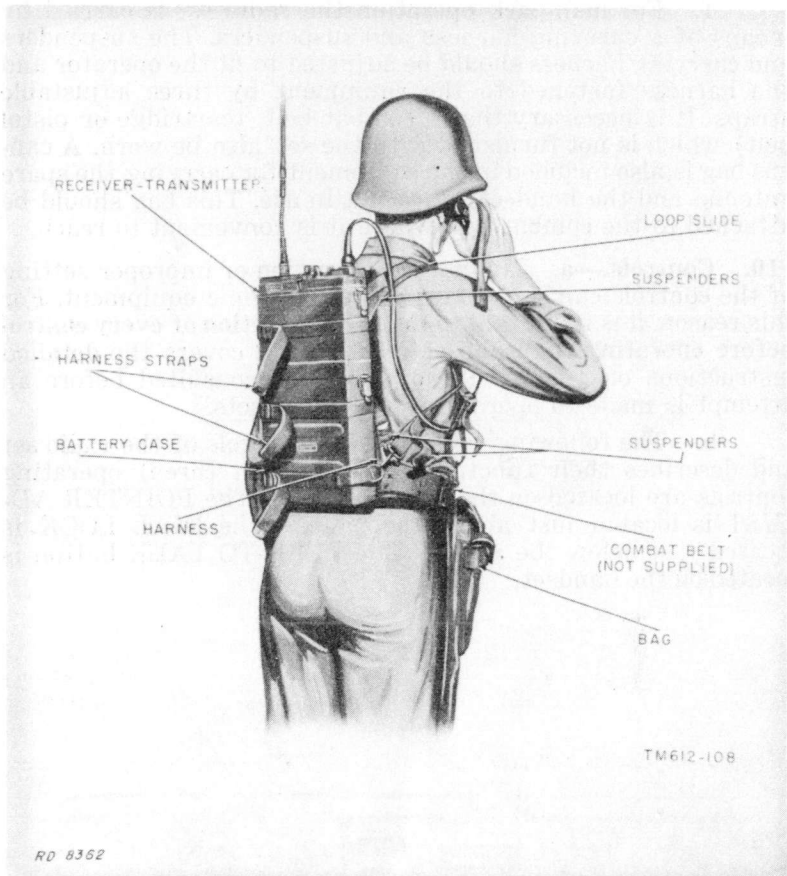


Figure 8.—Radio Set AN/PRC-8, -9, or -10, with carrying harness and suspender belt, rear view.

d. A battery may be installed in the set by separating the battery case from the receiver-transmitter. This is accomplished by releasing the lower clamps, one on each side of the case. The battery should be placed so that the battery-pack jack is on the same side on which the receiver-transmitter plug falls naturally. Insert the plug in the battery-pack jack, being careful to locate the key on the plug properly. Slide the battery case over the battery until it seats against the receiver-transmitter. Reengage the catches on each side of the case.

e. Handset H-33B/PT, used with each of the sets, consists of a microphone for transmitting, an earphone for receiving signals, and a push-to-talk switch.

f. For man-pack operation the radio set is carried by means of a carrying harness and suspenders. The suspenders and carrying harness should be adjusted to fit the operator and the harness fastened to the equipment by three adjustable straps. It is necessary that a combat belt, (cartridge or pistol belt) which is not furnished with the set, also be worn. A canvas bag is also included in the equipment for carrying the spare antenna and the handset, when not in use. This bag should be attached to the combat belt where it is convenient to reach.

10. **Controls.**—a. 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.** TM 11-612 covers the detailed instructions on operation and should be consulted before an attempt is made to operate any of these sets.

b. 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.

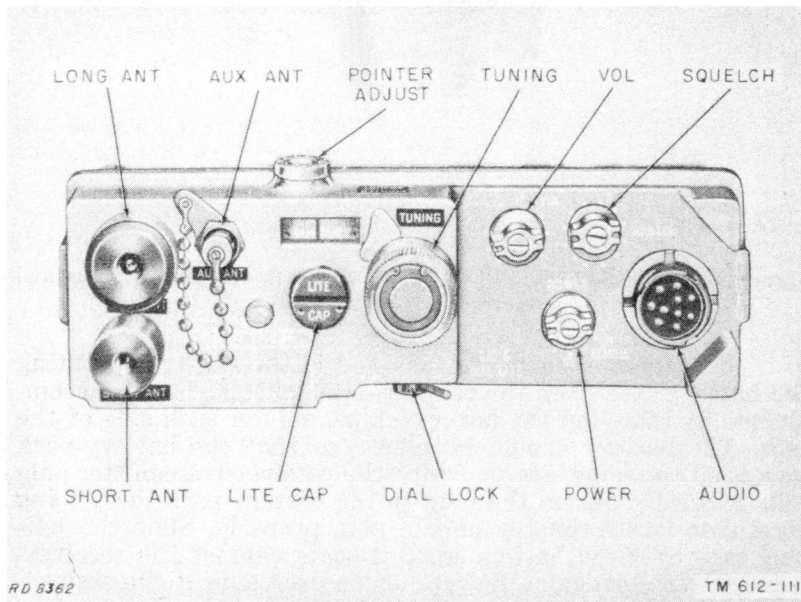


Figure 9.—Control panel, AN/PRC-8, -9, or -10.

CONTROLS AND THEIR USE

Control	Function
POWER	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. In CAL and DIAL LITE position, connects receiver-transmitter calibration oscillators, and dial lamp to power source (spring returned to ON when released).
TUNING	Tunes receiver and transmitter to desired frequency.
VOL	Adjusts the loudness of signals heard in the handset earphone.
SQUELCH	Sets the signal level below which noise is cut off when no signal is being received. Switch stops squelch operation when the knob is in the OFF position.
AUDIO	A 10-prong receptacle providing external connections for the handset, remote control, or relay cables.
LONG ANT	Screw type jack to mount and connect the long antenna to the radio set.
SHORT ANT	Screw type jack to mount and connect the short antenna to the radio set.
AUX ANT	Bayonet type jack to connect coaxial line from the homing or auxiliary antennas to the radio set.
LITE CAP	Cap holding dial lamp in place. Permits rapid change of dial lamp without removing receiver-transmitter from case.
POINTER ADJUST	Varies position of pointer on TUNING dial to provide accurate dial frequency calibration.
DIAL LOCK	Locks TUNING control.
PUSH-TO-TALK button	When pressed, puts radio set in transmit condition.

11. Adjusting Frequency.—a. After the battery, handset, and the proper type antenna have been connected, the radio set may be set on the desired frequency for operation.

b. 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.

c. 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.)

12. Receiving.—Once, the proper frequency has been set, when the POWER switch is at ON, the radio set is in the receive condition and voice signals transmitted on its frequency 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. No further adjustments are necessary to receive messages unless it becomes necessary to change the operating frequency.

13. Transmitting.—a. After the frequency has been set and the proper settings made for reception of traffic the operator may transmit by holding down the push-to-talk button on the side of the handset and talking into the microphone. The microphone should be held about 2 to 3 inches from the lips and the operator should 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.

b. When the PUSH-TO-TALK button is in the transmit position, the receiver is cut out and no signals can be received. The button should be released as soon as the transmission is completed. Holding the button in the transmit position causes a heavier drain on the battery and will reduce materially the life of the battery.

c. If the radio set is not to be used for a long period of time the POWER switch should be turned to the OFF position and the battery removed to prevent corrosion.

14. Types of Operation.—a. **Pack.**—For pack and temporary vehicle operation no additional equipment is needed. The internal battery is used as a source of power supply and either antenna may be used. Care should be taken to keep the antenna in a vertical position.

b. **Vehicular operation.**—(1) Either of the three radio sets may be mounted in a vehicle for permanent or semi-permanent operation by using Amplifier Power Supply AM-598/U (not issued as a part of these radio sets in the Marine Corps). The power supply operates **only** from a 24-volt DC source. It supplies the complete power requirements of the radio set and, in addition, contains an audio amplifier for operation of an external speaker.

(2) The power supply equipment is mounted in the vehicle and is connected to the 24-volt battery. The receiver-transmitter is fastened to the power supply unit in the same manner as to the battery case for pack operation.

(3) The panel of the power supply unit contains two audio connectors for connecting a speaker, headset, or Handset H-33B/PT, as desired. A microphone can be plugged into the other audio connector to be used in conjunction with the external speaker.

(4) No controls are provided on the power supply unit and the receiver-transmitter is operated in the same manner as for pack operation.

c. **Relay operation.**—(1) At times the distance between units will be beyond the operating range of these sets, or some terrain feature, such as a high hill, may be blocking the signals of the radio sets. These conditions can be overcome by installing a relay station, in the former case, at a point approximately half-way between the stations and in the latter case by establishing the relay station on the hill causing the interference. This relay station will then pick up the transmitted signal and retransmit it to the receiving station, enabling units operating over large areas or in mountainous terrain to maintain reliable radio communications.

(2) Two radio sets can be operated as a relay station when used with a special relay cable. The relay station, once placed in operation, will operate unattended or, if desired, can be controlled by means of remote control equipment.

(3) Figure 10 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 Nos. 1 and 2 must differ from the frequency of sets Nos. 3 and 4 by a few megacycles. 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.

(4) To place the station in operation attach the connectors on the ends of the relay cable to the AUDIO connectors on the two radio sets being used as the relay station. Attach two handsets to the connectors which are spliced to the relay cable. Mount the long antenna (AT-271/PRC) on each radio set.

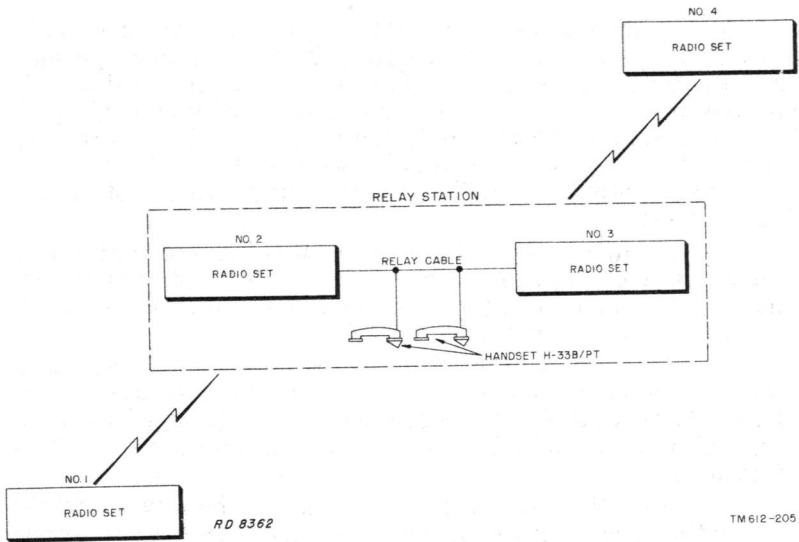


Figure 10.—Relay operation, system application.

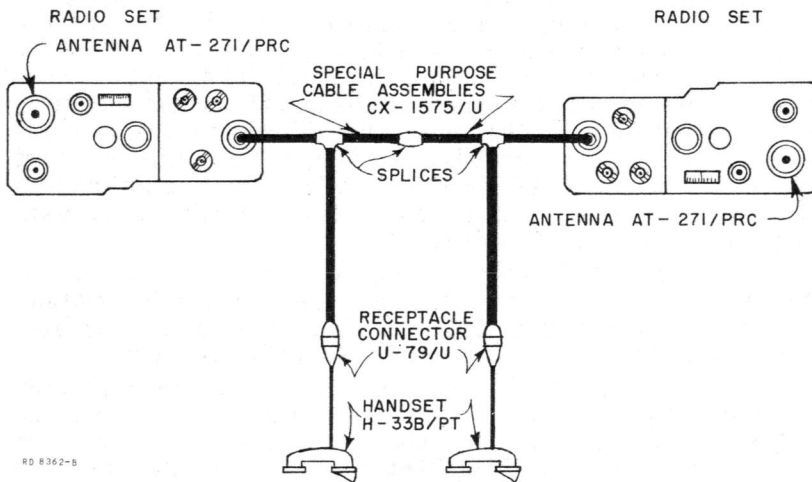


Figure 11.—Relay operation, connections.

(5) Place set No. 2 in operation, using the handset which is near it, and adjust to the desired frequency. Repeat this procedure with set No. 3, except that the frequency to which this set is tuned should be a few megacycles off that of set No. 2. The two sets can now operate unattended as a relay station.

(6) Before leaving the relay station, the operator should check whether the station is operating properly by listening on the handset 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.

(7) 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.

d. **Remote operation.**—(1) At times it will be necessary to establish a radio station at a distance from the area occupied by a unit. When the AN/PRC-8, -9, or -10 radio set is being used, it can be controlled from a position as far as 2 miles away by using Control Group AN/GRA-6. This equipment also provides for telephone communication (including ringing) between the local and remote control stations.

(2) The local control unit 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. The remote control unit 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. Handset H-33B/PT is used with each unit.

(3) A dustproof and waterproof carrying bag is provided for carrying the two control units and the handset when not in use.

(4) The two control units provide 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

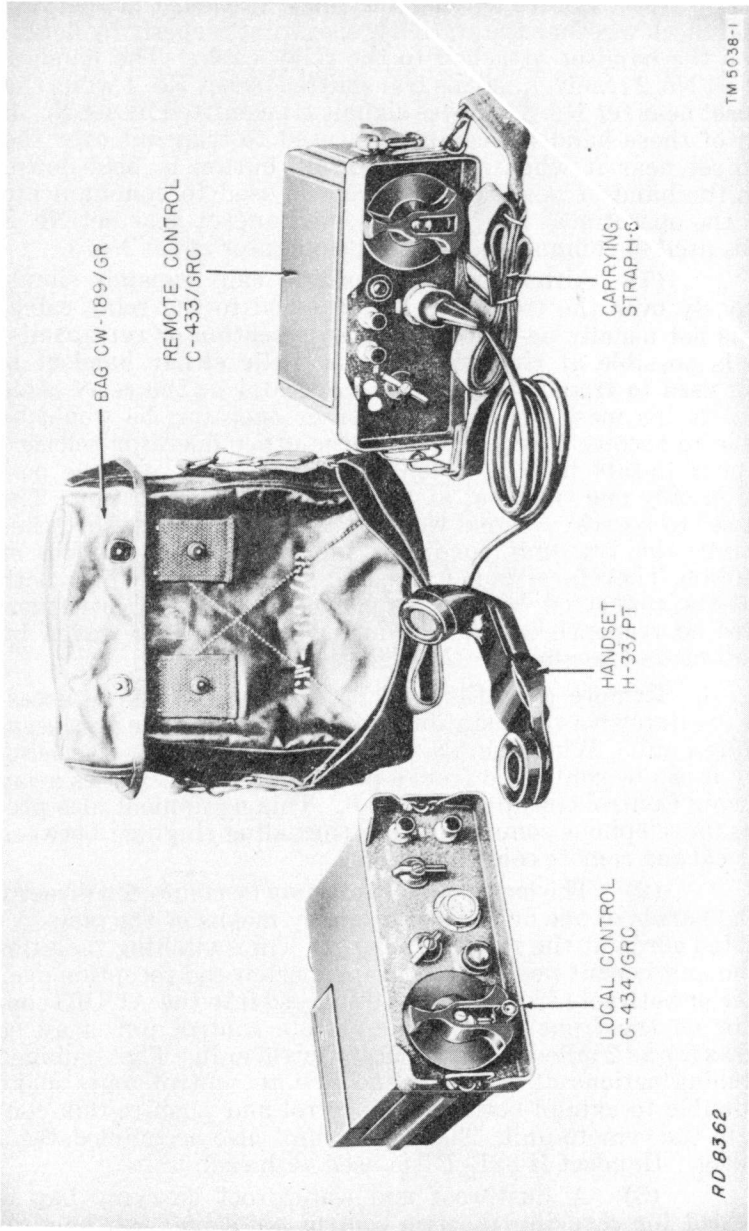


Figure 12.—Control Group AN/GRA-6.

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 these units are in certain specified positions. 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 necessary.

(5) Two 1½ volt Batteries BA-30 are necessary for operation of the local control unit. The remote control unit requires two Batteries BA-30 and a 45-volt Battery BA-414/U.

(6) The control units may be used in conjunction with a relay station when remote operation is desired. The power for the relay station may then 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. When used in this manner the local control unit is connected to the two connectors on the relay cable to which the handsets are normally connected. 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. Transmission and reception from the remote control unit, over both relay sets, is possible although this method requires the presence of an operator at the local control unit. Detailed instructions for the operation of the control units are given in TM 11-612.

e. **Homing operation.**—(1) 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 megacycles. 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 megacycles. 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.

(2) Detailed instructions on the use of this equipment should be received by the operator before attempting to use the set for homing purposes.

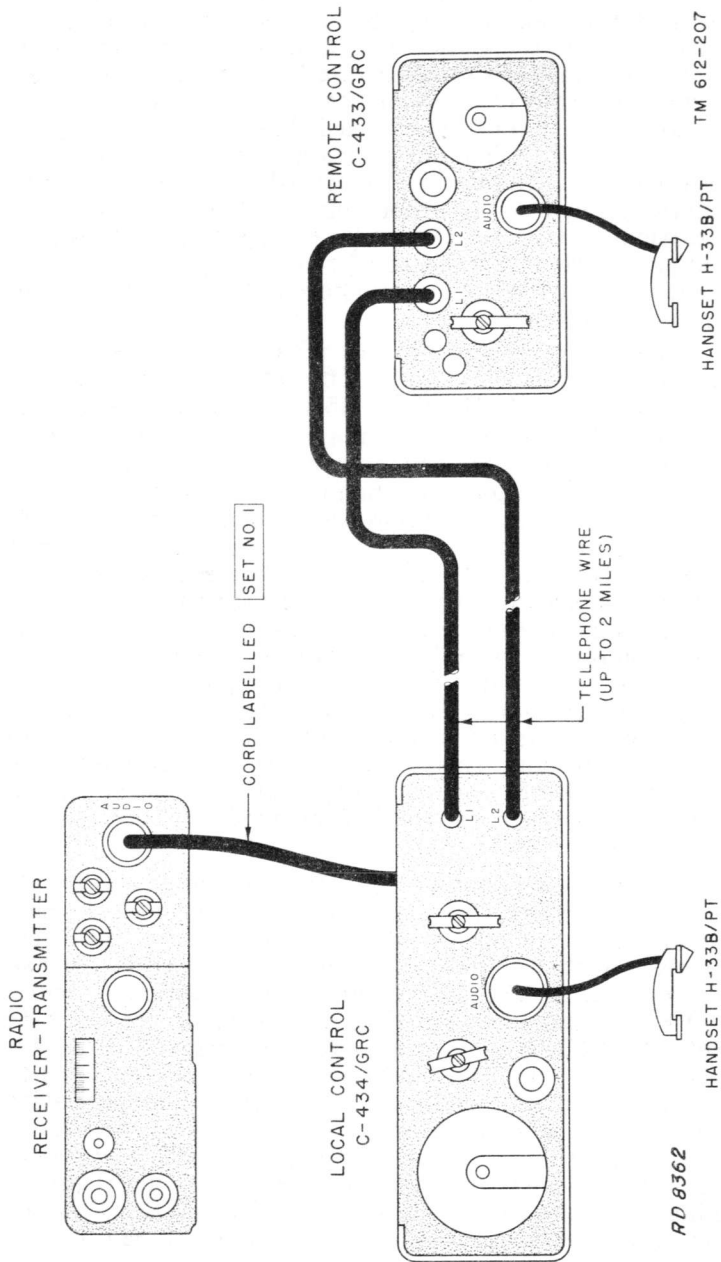


Figure 13.—Control Group AN/GRA-6, connections.

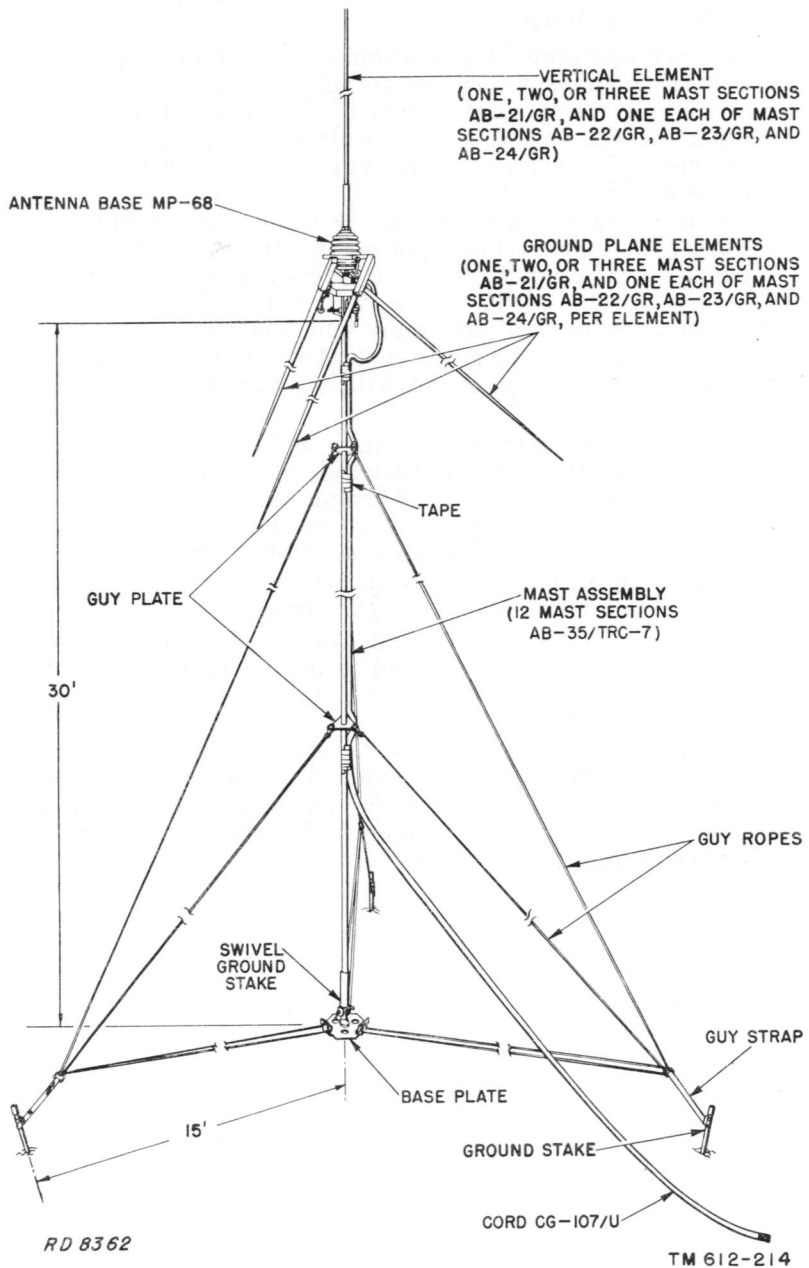


Figure 14.—Antenna Equipment RC-292.

(3) This equipment is not issued as a part of these radio sets in the Marine Corps.

f. **Semi-permanent operation.** — (1) When operating from a semi-permanent position an auxiliary antenna may be used to increase the operating range of the radio set. Antenna Equipment RC-292 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. The antenna consists of one vertical radiating element and three ground plane elements which make an angle of 142 degrees 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.

(2) 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.

(3) TM 11-612 contains a table to be used to determine the correct number of ground plane and vertical antenna elements required with each particular set. An inverse relationship exists between frequency and the number of ground plane and vertical antenna elements required. Generally, the lower the frequency, the more elements are required for maximum performance. Therefore Radio Set AN/PRC-8 requires a greater number of ground plane and vertical antenna elements than Radio Set AN/PRC-10.