FM 4-144

WAR DEPARTMENT FIELD MANUAL

SERVICE OF RADIO SET SCR–584

ANTIAIRCRAFT ARTILLERY FIELD MANUAL

RESTRICTED. *DISSEMINATION OF RESTRICTED MATTER.*—The Information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 23b, AR 380–5, 15 Mar 1944.)

WAR DEPARTMENT • 10 NOVEMBER 1943

B-3

WAR DEPARTMENT FIELD MANUAL

FM 4-144

RESTRICTED

SERVICE OF RADIO SET SCR-584

ANTIAIRCRAFT ARTILLERY FIELD MANUAL

WAR DEPARTMENT • 10 NOVEMBER 1943

RESTRICTED. *DISSEMINATION OF RESTRICTED MATTER.*—The Information contained in restricted documents and the essential characteristics of restricted material may be given to any person known to be in the service of the United States and to persons of undoubted loyalty and discretion who are cooperating in Government work, but will not be communicated to the public or to the press except by authorized military public relations agencies. (See also par. 23b, AR 380-5, 15 Mar 1944.)

United States Government Printing Office
Washington : 1944

WAR DEPARTMENT,
WASHINGTON 25, D. C., 10 November 1943.

FM 4–144, Antiaircraft Artillery Field Manual, Service of Radio Set SCR–584, is published for the information and guidance of all concerned.

[A. G. 300.7 (9 Oct 43).]

Bn and H 44 (5); IC 44 (10).

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

DISTRIBUTION:

Bn and H 44 (5); IC 44 (10).

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

TABLE OF CONTENTS

	Paragraph	Page
CHAPTER 1. General description.		
SECTION I. Introduction	1–3	1
II. General operation	4–8	1
III. Description of electrical components	9–14	12
CHAPTER 2. Emplacement.		
SECTION I. Choice of site	15–16	18
II. Setting up	17–30	19
III. Cable connections	31–32	46
IV. Preliminary operation	33–35	48
CHAPTER 3. Operation.		
SECTION I. Personnel	36–37	60
II. Orientation and synchronization	38–42	60
III. Operating procedure	43–48	72
CHAPTER 4. Drill.		
SECTION I. Organization of section	49–50	81
II. Drill	51–62	82
III. Stop-start outline	63–65	91
CHAPTER 5. Preparation for movement	66–68	94
CHAPTER 6. Maintenance.		
SECTION I. Preventive maintenance	69	99
II. General maintenance	70–75	99
APPENDIX I. Electrical dangers and first-aid treatment		102
II. Destruction of matériel and decontamination		109
III. Data flow chart		114
IV. Range conversion chart		115
INDEX		117

RESTRICTED

ANTIAIRCRAFT ARTILLERY FIELD MANUAL

SERVICE OF RADIO SET SCR–584

CHAPTER 1

GENERAL DESCRIPTION

	Paragraphs
SECTION I. Introduction	1–3
II. General operation	4–8
III. Description of electrical components	9–14

SECTION I

INTRODUCTION

■ 1. PURPOSE.—The Radio Set SCR–584 is a mobile short and medium range, radar unit, designed primarily for use with an antiaircraft battery to supply present position data for antiaircraft fire control to the M4, M7, M9, or M10 directors and for medium range searching to provide advanced warning of the approach of enemy airplanes.

■ 2. REFERENCES.—*a.* Detailed information on maintenance and adjustments of the SCR–584 is covered in TM 11–1324, 11–1424, and 11–1524.

b. The description, use, and operation of the IFF equipment used with this equipment will be found in the manual supplied with the IFF unit.

■ 3. HIGH-VOLTAGE WARNING.—MUCH OF THE EQUIPMENT IN THE SCR–584 OPERATES AT VOLTAGES SUFFICIENTLY HIGH TO CAUSE DEATH ON CONTACT. EXTREME CAUTION SHOULD THEREFORE BE EXERCISED IN OPERATION OF THE EQUIPMENT. IN THE EVENT OF AN ACCIDENTAL CASE OF ELECTRIC SHOCK, REFER TO APPENDIX I FOR DETAILS REGARDING ARTIFICIAL RESPIRATION.

SECTION II

GENERAL OPERATION

■ 4. GENERAL OPERATION.—*a.* The SCR–584 is equipped to automatically follow moving targets within short radar ranges

and to simultaneously supply electrical and/or selsyn data to the gun director.

b. The unit will detect reasonably sized aircraft targets to medium radar ranges. For advanced aircraft target location, the radio set is equipped to automatically scan spirally 6400 mils in azimuth and any predetermined spread of 356 mils in elevation. The data collected by the radio set in this method appear on a PPI (plan position indicator) oscilloscope or "scope," which shows indications of all targets within the range of the equipment and within the predetermined 356-mil scan of elevation. The operator of the radio set can thus locate a target, and observe it for purposes of identification when it is well beyond the firing range of the antiaircraft battery.

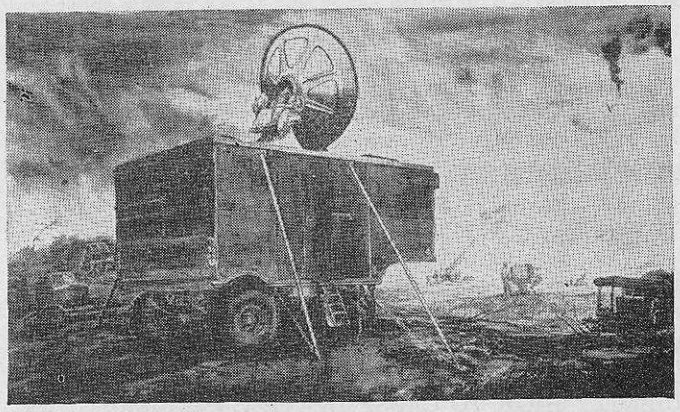


FIGURE 1.—Radio Set SCR–584. (This figure illustrates the SCR–584 in relation to other elements of a gun battery, but does not represent a combat position.)

c. The radio set is built in a semitrailer which is towed by a standard 4-ton prime mover truck. The generating unit M7 (or M12 or EG 30–3G1) supplies power for the SCR–584, the director, and the remote control system of the guns. The radio set may be set up, put into complete operation, and oriented with the director in approximately 30 minutes by its normal operating crew.

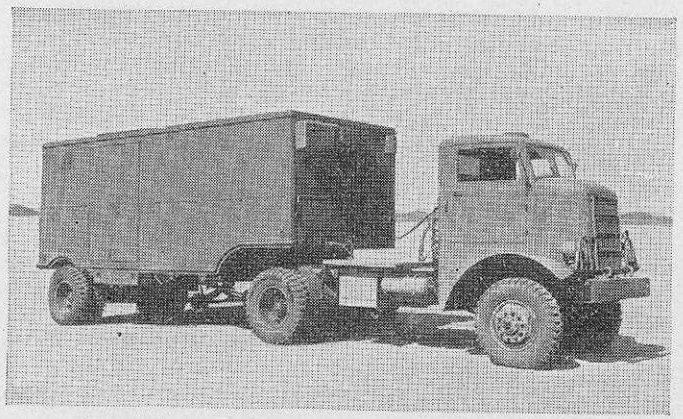


FIGURE 2.—Radio Set SCR–584 in traveling position.

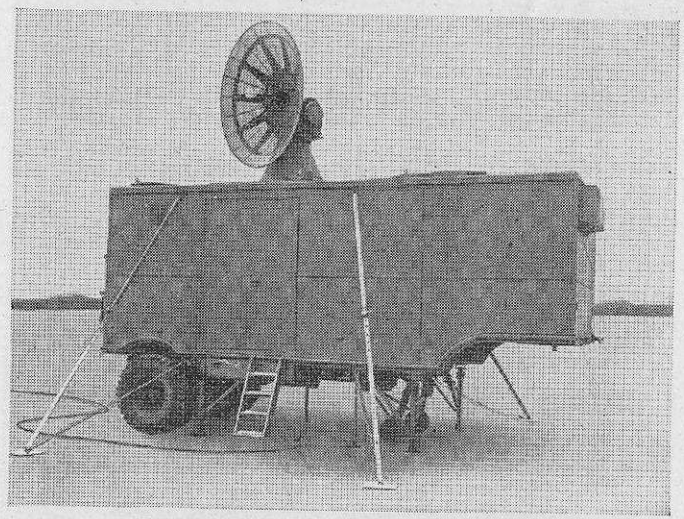


FIGURE 3.—Trailer in operating position.

■ 5. DESCRIPTION OF TRANSMITTING SYSTEM.—*a.* The radio set is a radio-echo-detection and direction-finding system for locating aircraft.

b. The radio-echo system operates by transmitting a short-duration pulse of radio energy which is reflected by the surfaces of aircraft and other objects within the range of the equipment.

c. The same directive antenna used for the transmission of these signals is also used to receive the reflected signals. The position of the object may be located in azimuth and elevation by means of the direction of the antenna, at the time the signal is being received at its maximum strength. The slant range (actual range between the antenna and the object) is indicated upon the faces of oscilloscopes visible to the operator of the equipment. By mechanical means, an indicator is positioned to coincide with the received signal on one of the oscilloscopes, and the rotation of this indicator positions the electrical slant range potentiometer or selsyn transmitters.

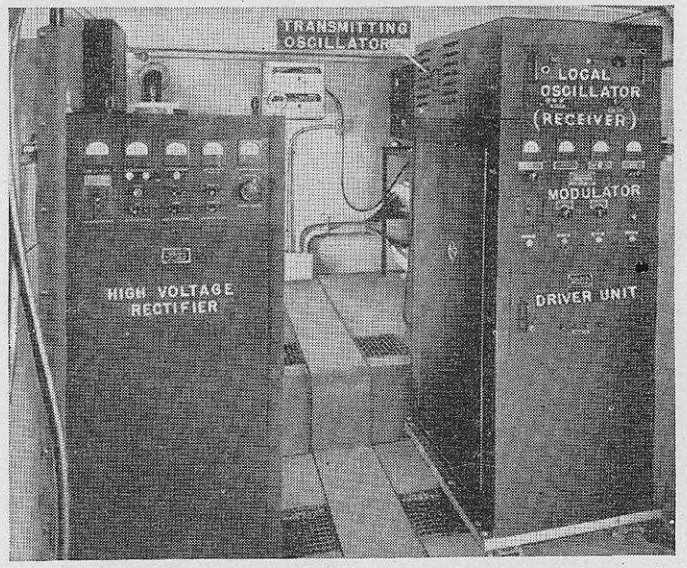


FIGURE 4.—Interior view of trailer looking forward.

d. The data transmission system of the radio set, which supplies the electrical data used by the director, consists of selsyn transmitters and data transmitting potentiometers. Selsyn and/or voltage present position data are provided by the SCR–584 in a form for use with the types of directors mentioned in paragraph 11.

■ 6. GENERAL DESCRIPTION.—*a.* The entire SCR–584 is built into the trailer K–78–A. (See fig. 3.) In outward appearance, it closely resembles a highway trailer of the conventional military type. It has a van type body equipped with double doors on the right side toward the rear of the body, horizontally divided rear doors, and a small exit door located on the left side near the front. In the roof of the trailer are located the split hinged hatch doors which are closed when the vehicle is in transport, and which are opened to permit elevation of the antenna pedestal, when the equipment is set up for operation.

b. A small step ladder is clamped into position on the inside of the single door when the trailer is in traveling position. When in operating position, the ladder can be placed at either the single door or the double door, or may be used at the front of the trailer, when necessary, to fill the heater fuel tank.

c. The trailer body is 19 feet 6 inches long, 10 feet 4 inches high, and 8 feet wide. With complete equipment, the trailer weighs approximately 10 tons. The combined weight of the trailer and prime mover is approximately 17 tons. Loading hooks are provided for hoisting the trailer when necessary. A pintle hook on the rear of the trailer chassis may be used for towing the generator trailer if necessary and the road conditions permit.

d. Two sets of brakes which operate common brake shoes are provided. The air brakes are connected to the tractor and are operated from the tractor in the same manner as the air brakes on any other Army type semitrailer. The parking brakes are applied by means of the brake handwheel, located at the rear of the trailer above the axle. The trailer has twin tail lights operating from the battery in the prime mover. The left tail light is a combination service stop and

tail light and the other is a blackout, stop, and tail light. A blackout switch is located near the front loading hook on the right side. This switch can be turned with any small, thin object which is available, such as a coin or a screw driver.

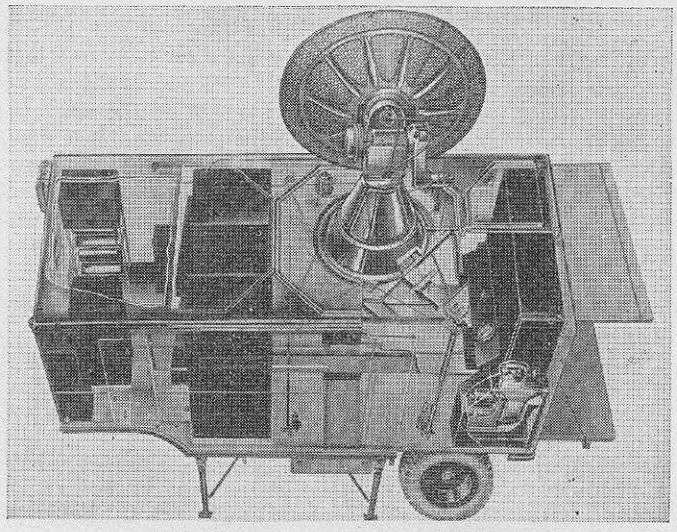


FIGURE 5.—Cut-away view of trailer.

e. The trailer is equipped with four leveling jacks at the corners of the main body section and four stabilizing devices, which solidly brace the vehicle when it is at rest and the equipment is in use. The use of these jacks is described in paragraph 18. The entire body can be sealed against the entrance of light, water, and dust, and is equipped with an efficient heating and ventilating system manually controlled by the occupants to regulate the temperature of the air.

f. Other equipment supplied consists of a vehicular heater, a power intake ventilator, two static exhaust ventilators, a control rack blower, a lighting system utilizing the 6–8-volt current supplied by the battery of the prime mover, and a 110–volt lighting system for use while the generator unit is connected and operating.

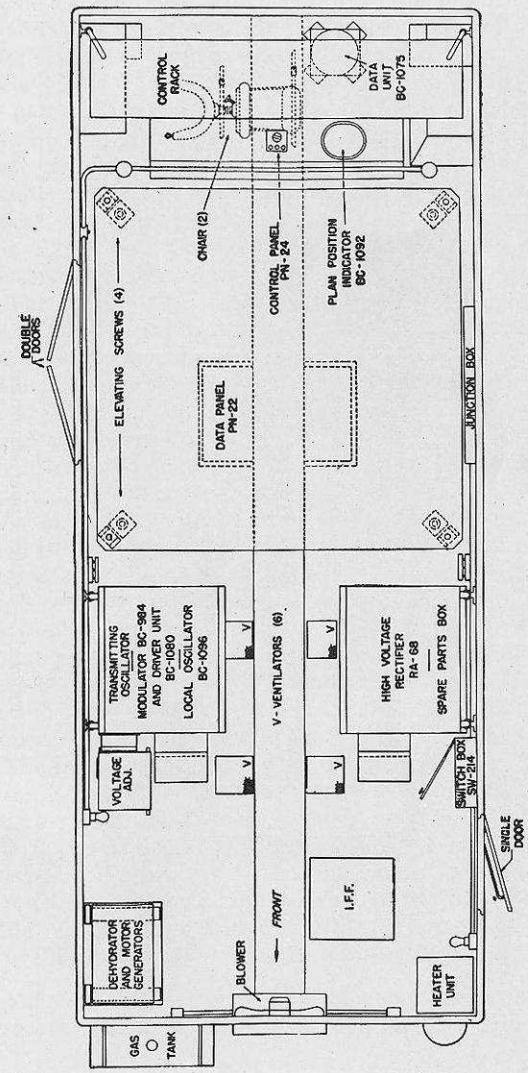


FIGURE 6.—Floor plan of trailer.

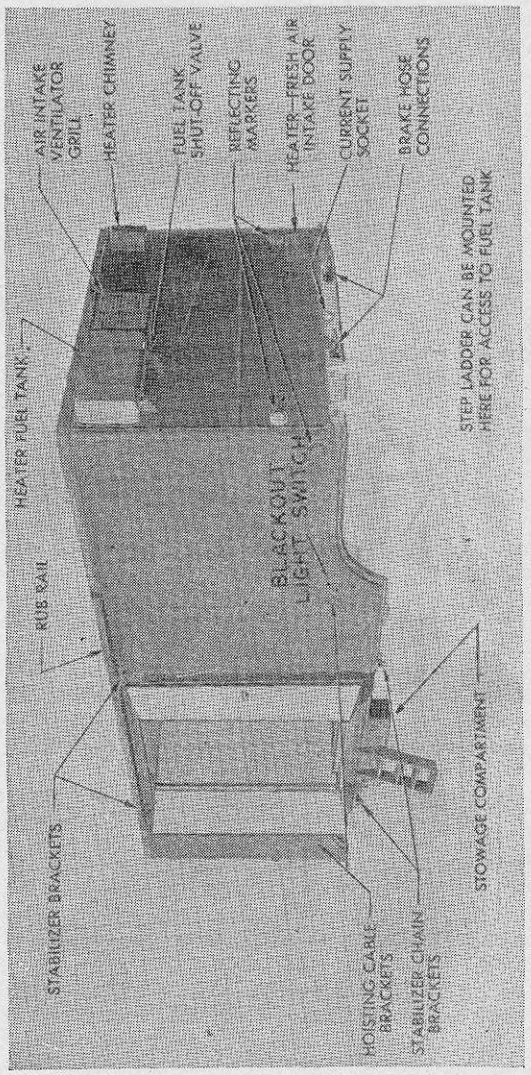


FIGURE 7.—Trailer upper structure.

g. The control rack which contains the majority of the components of the equipment, including the main operating and indicating controls used by the operators, is located in the rear of the trailer. This rack is shown in figure 8. Forward of the control rack is the high-voltage rectifier (RA–68), located approximately at the middle of the trailer on the left side. To the right of the high-voltage rectifier is the modulator (BC–784), and on top of the modulator is located the local oscillator (BC–1096). Here also are the transmitting oscillator, and the outlet to the blower which cools the oscillator tube. (See fig. 4.)

h. The voltage adjuster is located between the modulator and the front of the trailer on the right side. At the front of the trailer is located a rack containing the dehydrator and the azimuth and elevation motor generators. To the left front of the vehicle is found the trailer heater. (See fig. 5.)

i. Directly below the center of the floor of the trailer is located the data panel (PN–22) to which the data cables from the gun director, power cable, and the telephone lines are connected. On the floor, underneath the control rack, is located the data unit (BC–1075). The switch box (SW–214) is located on the left side wall of the trailer between the high-voltage rectifier and the single access door. This box contains the switches which control the motor generators, the pedestal elevator motor, and the antenna spinner motor. On top of the high-voltage rectifier are located certain small tools and units of test equipment. The IFF equipment and IFF operator will be located in the front part of the trailer.

j. The pedestal (MP–61), when in the lowered or traveling position, occupies the space between the control rack and the modulator and high-voltage rectifier. When the pedestal is in the raised or operating position, this space is cleared for the use of the operators of the equipment. Stowing clamps and brackets are located on the walls of the trailer for stowing the r. f. lines and antenna (AN–101) when the trailer is in traveling position.

■ 7. ANTENNA OPERATION—FOUR METHODS OF CONTROL.—*a. PPI scan.*—Parabola rotates six revolutions per minute.

While rotating in azimuth, the parabola elevates through a 356-mil sector.

NOTE.—Some units have a clutch which will enable the operator to engage or disengage this elevation scan.

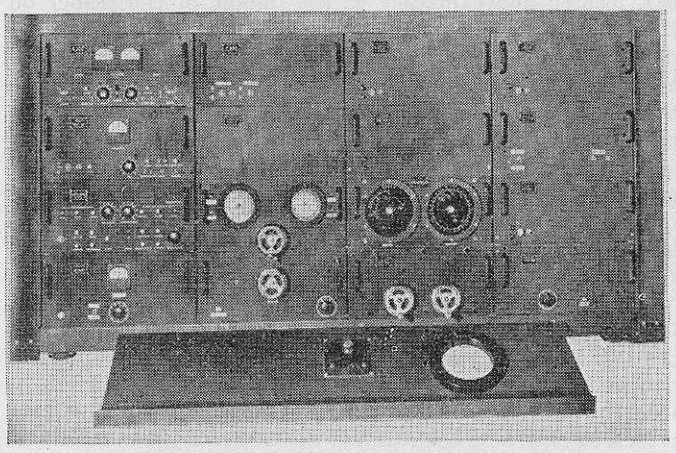


FIGURE 8.—Control rack and panel.

b. Manual operation.—Controlled entirely in azimuth and elevation by the operator.

c. Automatic tracking.—The parabola is positioned automatically and the range operator tracks the range manually or with aided tracking.

d. Remote.—Azimuth and elevation is completely controlled by selsyn data from the director. Parabola will position itself to coincide with the direction of the director scopes. Range operator tracks the range manually or with aided tracking.

■ 8. POWER REQUIREMENTS.

Voltage: 120 volts, 3-phase, 10 kw.
Frequency: 60 cycles plus or minus 2 cycles.
Voltage regulation: plus or minus 2 percent.

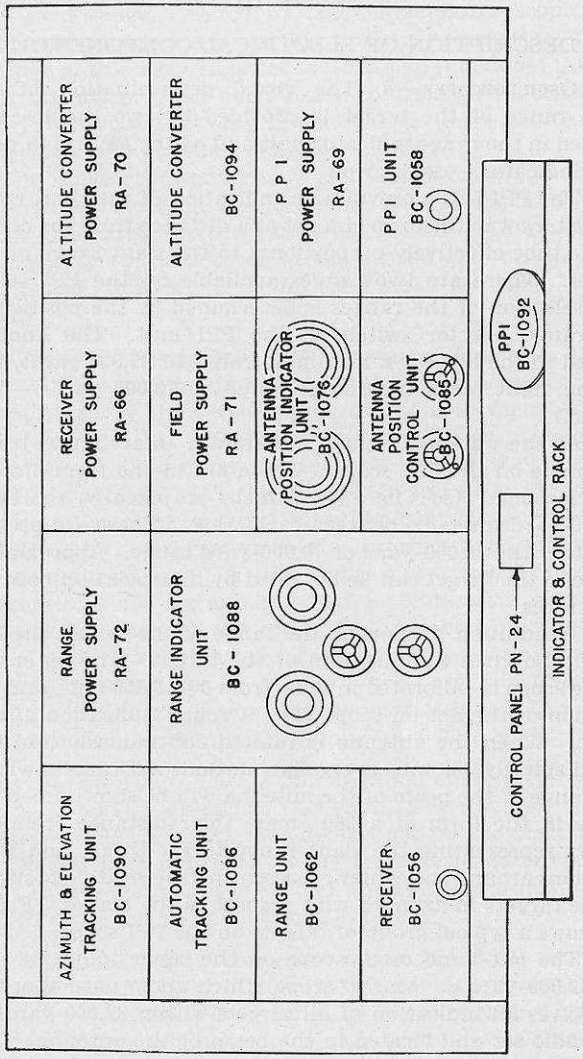


FIGURE 9.—Key to control rack and panel.

SECTION III

DESCRIPTION OF ELECTRICAL COMPONENTS

■ 9. OSCILLOSCOPES.—*a.* The visual determination of the slant range of the target is provided by two oscilloscopes located in the range indicator unit and by the PPI (plan position indicator) oscilloscope.

b. The PPI scope provides an indication of the slant range to the target in the form of a dot at a distance from the center of the tube effectively proportional to the slant range of the target. There are two ranges available on the PPI scope. The selection of the ranges is determined by the position of the range selector switch on the PPI unit. The knob is turned to the left for a maximum range of 35,000 yards, and to the right for a maximum range of 70,000 yards. (See fig. 45.)

c. As the antenna rotates in azimuth (searching), traces are made on the PPI scope. These are in the form of concentric rings (see fig. 44) which graphically represent 10,000-yard intervals between each trace. These are present on either the 35,000-yard or 70,000-yard range. Approximate range to the target can be obtained by interpolation between the traces.

d. In addition to showing the range of the target, the PPI scope also gives the direction of the target. The outer rim of the scope is calibrated in mils, from 0 to 6,400 mils, and the position of the dot on scope gives a rough indication of azimuth. When the antenna is rotated continuously and elevated spirally 356 mils every six rotations, all targets within the range of the beam of the antenna will be shown upon the scope in the form of a 360° map, their distance from the center representing the slant range to the target and their positions around the center representing the relative positions of the targets in azimuth with respect to the trailer. Figure 44 shows a typical group of targets on the PPI scope.

e. The left-hand oscilloscope on the range indicator unit is a 32,000-yard or "coarse" scope, which under normal operation gives an indication of all targets within 32,000 yards of the radio set and located in the beam of the antenna. The right-hand scope on the same unit is a 2,000-yard or "fine"

scope which repeats, and enlarges, a 2,000-yard sector of the 32,000-yard range, covered by the coarse range scope. A narrow electronic gate is applied to the fine scope to limit the range of this scope in order to isolate an individual target during operation. This narrow gate controls the functioning of the radio set so that only the individual target selected by the operator will be followed by the antenna.

f. The range operator has a visual indication of the width of the narrow gate on the fine scope in the length of the "trace" presented on the range scale. The PPI operator also can observe the position of the narrow gate on the PPI scope in the form of a trace on the face of the tube. (See fig. 44.)

■ 10. ANTENNA POSITIONING AND AUTOMATIC TRACKING SYSTEMS.—*a.* The positioning of the parabola on the pedestal is accomplished by the servo system of the equipment. This system provides four methods by which the parabola may be positioned. These are indicated on the control panel as the PPI SCAN, MANUAL, AUTOMATIC, and REMOTE positions of the control switch. When the control switch is set for PPI SCAN, the antenna rotates in azimuth at a rate of approximately 6 rpm. In the same time required for the parabola to make six and one-half revolutions in azimuth, it is elevated through 356 mils. The parabola is then depressed to the initial angle of elevation in approximately the time required for it to make one-half revolution in azimuth. This cycle is repeated automatically due to a cam in the antenna position control unit.

NOTE.—Later units have a clutch which enables the operator to engage or disengage this cam. The angle of elevation from which scan starts is determined by the position of the "elevation" handwheel on the antenna position control unit. In this method of operation, the PPI operator watches the PPI scope for an indication of a target.

b. When the control switch is set in MANUAL position, the parabola can be positioned by the operator in both azimuth and elevation. This operation is accomplished by the rotation of the azimuth and elevation handwheels on the

front of the antenna position control unit. The purpose of this type of operation is to permit the operator to position the parabola in any given direction. The azimuth and elevation of the parabola at all times are shown on the antenna position indicator dials. The rotation of the parabola in azimuth and elevation, under this method of operation, is proportional to the rotation on the azimuth and elevation positioning handwheels.

c. When the control switch is set for AUTOMATIC the parabola automatically follows, in azimuth and elevation, the target selected by the operator.

d. When the control switch is set for REMOTE, the parabola automatically follows the gun director in both azimuth and elevation. The purpose of this method of control is to keep the SCR–584 and the gun director on the same target when the radio set is providing only one element of data to the director (slant range or altitude). This is done when firing at visible targets and the director is providing the other elements of data by visual observation at the director.

■ 11. DATA COMPUTATION AND TRANSMISSION SYSTEMS.—*a.* The electrical data supplied by the SCR–584 for use by the gun director consists of:

(1) For M4 or M7 director—selsyn data—
Azimuth, fine and coarse (A_o).
Angular height, fine and coarse (E_o).
Altitude or slant range, coarse (H_o), (D_o).

(2) For M9 or M10 director—potentiometer data, tracker not used—
East-west component (X_o).
North-South component (Y_o).
Altitude (H_o).

(3) For M9 or M10 director—potentiometer and selsyn data, tracker used—
Azimuth fine and coarse (A_o) selsyn data.
Angular height, fine and coarse (E_o), selsyn data.
Slant range (D_o), potentiometer data.

b. The data transmission system of the SCR–584 consists of seven selsyn transmitters and three data transmitting potentiometers. The azimuth may be transmitted to the

director by means of coarse (6,400 mils per revolution) and fine (400 mils per revolution) selsyn transmitters. The data transmitted by the selsyn transmitters consist of present position data, which align the selsyn receivers in the director with the selsyn transmitters in the radio set. This selsyn alignment is in angular relationship to a predetermined fixed reference point. The azimuth transmitting potentiometer transmits the coordinates of the target's position (X_o and Y_o) to the director as voltages which fix the target position in a horizontal plane.

c. Data concerning the elevation angle of the target are transmitted to the director by three similar units. Elevation data are transmitted by the elevation selsyns which function similarly to those in the azimuth transmitting system. It should be noted that the coarse transmitter uses only one quadrant. The voltage data transmitted by the elevation potentiometer are proportional to the horizontal range of the target (R_o) and the altitude (H_o).

d. Slant range is furnished by a coarse (50,000 yards per revolution) and a fine (2,000 yards per revolution) selsyn transmitter or by a slant range data potentiometer. The functioning of the slant range transmitting selsyns is similar

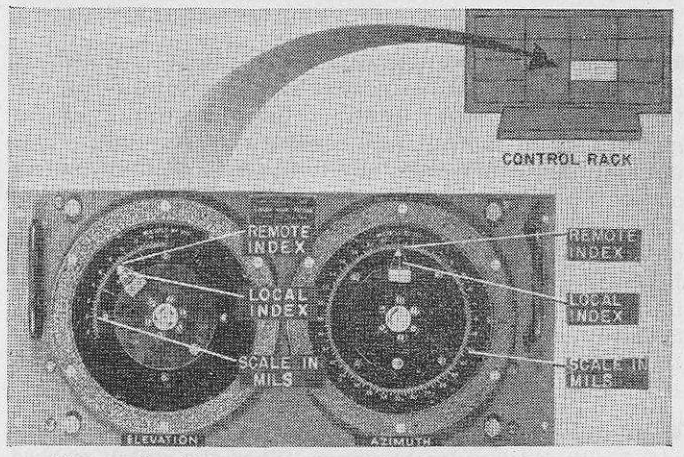


FIGURE 10.—Antenna position indicator unit (BC–1076).

to that of the other data transmission channels. Data voltage that varies directly as the slant range is transmitted by the slant range potentiometer.

e. A single 10,000-yard-per-revolution selsyn transmitter is used to transmit the absolute altitude as measured by the position of the parabola above true horizontal and as computed by the altitude data unit in the SCR–584.

f. These data are made available at various connectors located on the data panel underneath the center of the trailer body. This data panel contains four data connectors into which are plugged cables from the director. All of the data available from the radio set is available at this panel. The insertion of the proper cable in the proper connector together with the positioning of certain switches, makes possible the selection of the type of data required by the specific gun director in use.

g. The data available from SCR–584 is as follows:

A_o—Present position azimuth data.
E_o—Present position elevation data (angular height).
D_o—Present slant range data (distance).
H_o—Present altitude data.
R_o—Present horizontal range data.
X_o—E-W component of present horizontal range.
Y_o—N-S component of present horizontal range.

■ 12. TARGET DESIGNATION DIALS.—Two target designation dials are provided on the control rack of the SCR–584, one for azimuth and one for elevation (angular height). These are located on the antenna position indicator unit. This unit contains four selsyn receivers, which position indices on the azimuth and elevation antenna position indication dials on the front of the panel. The inner (remote) index of each dial indicates the azimuth and elevation transmitted from the director. The outer (local) index of each dial indicates the azimuth and elevation of the antenna of the SCR–584. The matching of the two indices indicates that the radio set and the director are tracking the same target. (See fig. 10.)

■ 13. AIDED TRACKING.—*a.* The range indicator unit is provided with aided range tracking. When the switch marked

RANGE MOTORS, which is located in the lower left-hand corner of the panel, is in the ON position, the aided range tracking becomes operative. The tracking handwheel controls the rate of movement of the range indicator in either direction. With the range motors OFF, this handwheel moves the indicator mechanically.

b. The amount of mechanical displacement of the range indicator (fine range hairline) compared to the increase in velocity of its rotation as the tracking handwheel is displaced is called the aided tracking ratio. When the selector switch labeled TRACKING RATIO on the lower right-hand corner of the range indicator unit is in the position marked "1/3," the change in velocity rotation of the hairline for a given displacement of the tracking handwheel is greater than the change in velocity when the selector switch is in the position marked "1." After becoming familiar with the control of the tracking handwheel as outlined, the choice of positions of the selector switch is a matter of preference of the operator. However, for training, use position marked "1."

■ 14. OUTPUT TEST UNIT.—On later models of the SCR–584 it is planned to provide an output test unit as regular equipment. This unit is used to tune the transmitting oscillator and the local oscillator. The use and description of this equipment is in TM 11–1524.

CHAPTER 2

EMPLACEMENT

		Paragraphs
SECTION I.	Choice of site	15–16
II.	Setting up	17–30
III.	Cable connections	31–32
IV.	Preliminary operation	33–35

SECTION I

CHOICE OF SITE

■ 15. GENERAL.—Broadly speaking, the location of the SCR–584 will be determined by the tactical mission of the gun battery with which the unit is to operate. However, it is the duty of the chief radar operator to advise the battery commander regarding the advantages and disadvantages of various sites for radar operation.

■ 16. CHOICE OF SITE.—*a.* The prime consideration in the choice of a site for the SCR–584 is good line of sight "visibility." The high frequency radio waves transmitted and received by this unit travel in straight lines. These waves are capable of penetrating darkness, haze, clouds, and fog which conceal the target from optical equipment, but no radar unit can "see" through cliffs, water, hills, buildings, trucks, and other dense objects with any degree of dependability. Therefore, it is essential that the unit be set up so that no solid mediums obstruct its visibility.

b. Where a gun battery has for its mission the protection of a particular sector, the line of sight visibility of the radar unit operated with that battery is required for that sector only. Tall buildings, hills, and other obstructions can be used to advantage where several radar sets are operating in the same locality. The obstructions will tend to shield one unit from another if the units are located on opposite sides of the hill or buildings, and will partially eliminate interference between adjacent radar sets. However, it is still desirable to have 360° visibility in order to take full advantage of the search ability of the radar.

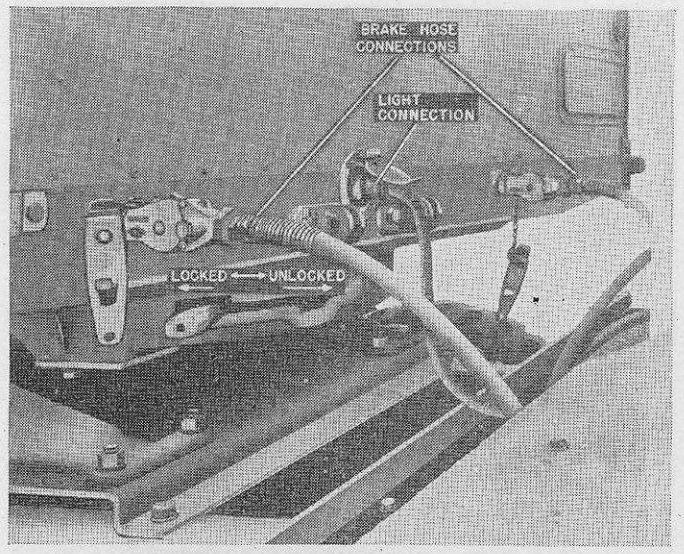


FIGURE 11.—Prime mover coupling.

c. To supply fire control data, the set must be leveled with the same accuracy as a director. The pedestal can be accurately leveled without the trailer being dug in if the unit can be located on a space 20 feet square and having a slope not greater than 10°. Leveling is discussed in detail in section II, chapter 2.

d. Except in those cases where spare power and data transmission cables are available, the trailer must be set up within 225 feet of the director and within 300 feet of the power unit. Details on cabling will be found in section II, chapter 3. (See note in par. 32*c*.)

SECTION II

SETTING UP

■ 17. UNCOUPLING.—*a.* After the SCR–584 has been pulled into position by the prime mover, set the parking brake on the trailer by turning the parking brake handwheel in a clockwise direction until the brakes are fully applied.

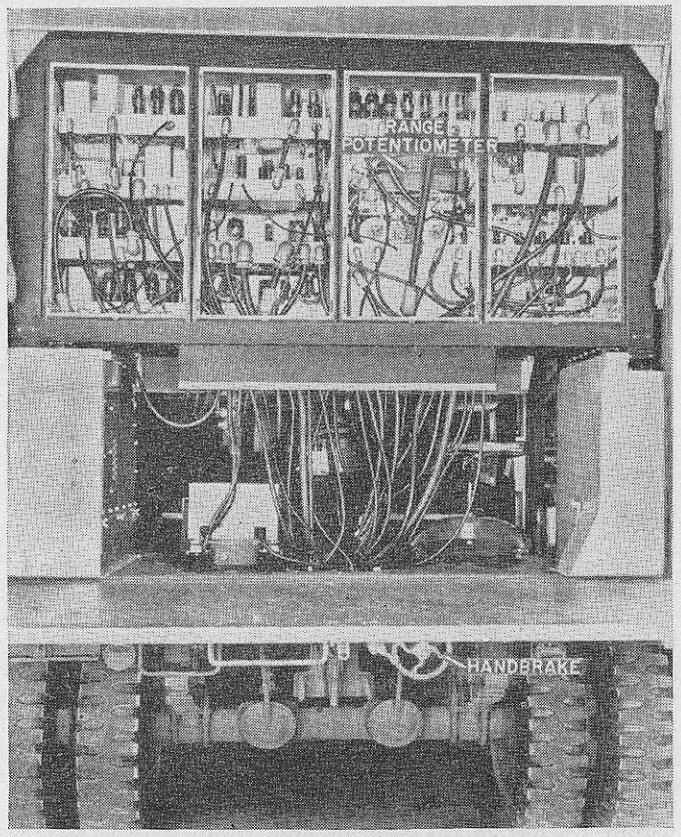


FIGURE 12.—Rear view of trailer with rear doors open (rear panels removed).

b. At least four short planks are carried with the unit as a part of its equipment. Remove these planks from the stowage compartment and place two of them under the dolly wheels. (See fig. 13.)

c. Pull out the dolly operating handle from its clips. Crank the dolly downward to a vertical position and place the handle back in its clips.

d. Shut off cut-out cocks on prime mover air hose.

e. Disconnect both air hoses from the trailer brake hose connections. This is accomplished by raising the hoses upward until the coupling frees itself. Removing the emergency air line automatically sets the trailer's air brakes. Install the dummy hose coupling on the trailer hose connec-

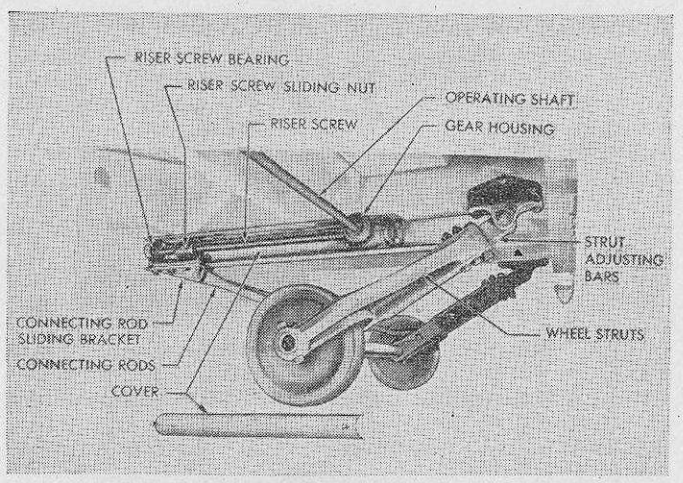


FIGURE 13.—Dolly of trailer.

tions and couple tractor air hoses together, thus eliminating the danger of dust or foreign matter entering the braking system of either the tractor or trailer.

f. Disconnect the electrical cable (center cable) from the trailer and push the hinged cover downward to prevent dust and water from entering the connector.

g. Release the coupler on the trailer by moving the coupler release handle forward. (See fig. 11.)

NOTE.—CHECK PARKING BRAKE AND MAKE CERTAIN THAT IT IS SET UP TIGHT. CHECK THE DOLLY AND MAKE CERTAIN THAT IT IS FULLY LOWERED TO THE VERTICAL POSITION AND THE OPERATING HANDLE HAS BEEN PLACED IN ITS RETAINING CLIPS. DAMAGE TO THE EQUIPMENT WILL RESULT FROM FAILURE TO OBSERVE THESE PRECAUTIONS.

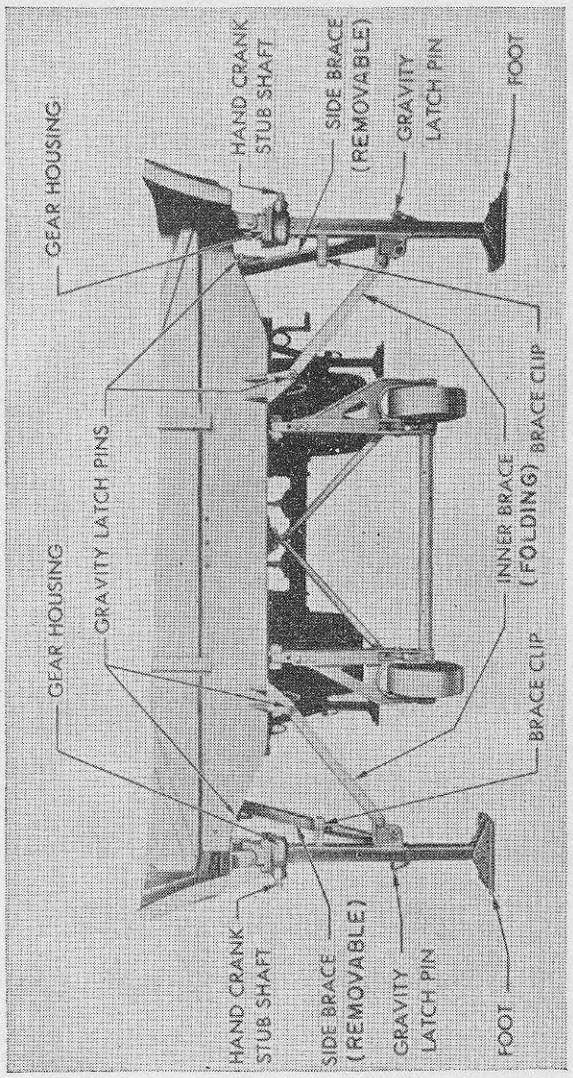


FIGURE 14.—Front view of undercarriage.

h. Pull the tractor ahead *slowly* until the two vehicles are separated. When uncoupling, never pull the tractor away from the trailer suddenly. Always pull ahead slowly to allow the trailer to slide down the ramp of the tractor "fifth wheel," minimizing the jar when the dolly takes on the full weight of the trailer.

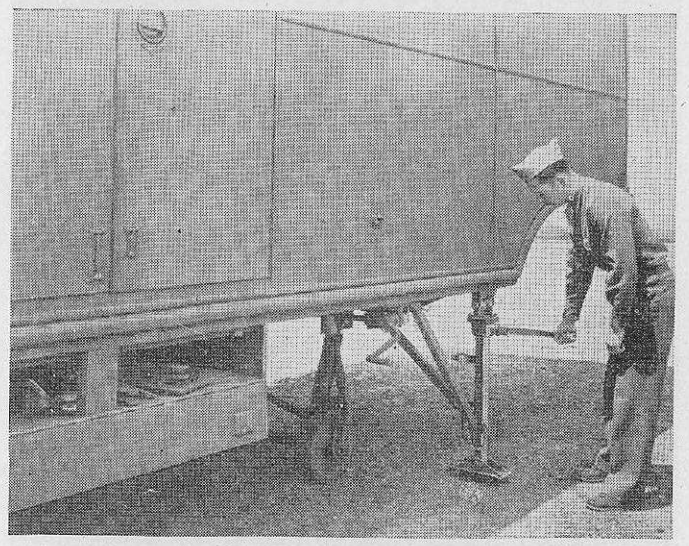


FIGURE 15.—Lowering the jacks on the trailer.

i. Swing the leveling jacks into the DOWN position and attach inner and side braces with the gravity latch pins. (See fig. 16.)

■ 18. ROUGH LEVELING.—*a.* Cooperation on the part of the operating crew is necessary to level the trailer quickly. When adjusting the leveling jacks, it is necessary to *have two men operating adjacent jacks simultaneously,* in order to avoid putting undue strain on the body of the trailer.

b. Place the two free planks under the front jacks. By means of the hand cranks found in the stowage compartment, raise the body of the trailer until the dolly wheels are 2 to

3 inches clear of the ground. These two jacks should be lowered by two men at the same time.

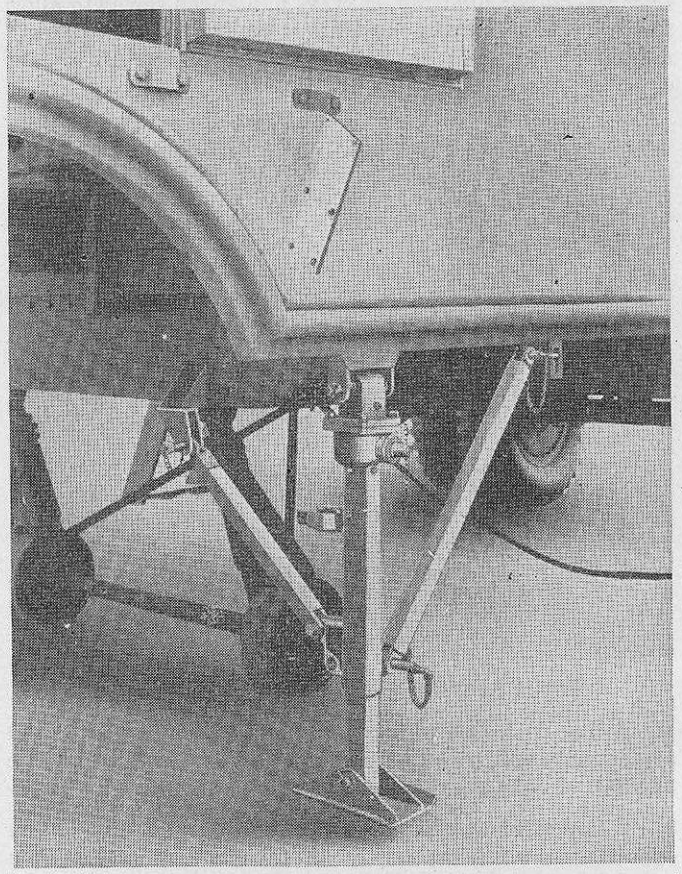


FIGURE 16.—Leveling jack.

c. Remove the two free planks that were under the dolly wheels and place them under the rear jacks. Lower the jacks until they rest solidly on the planks. With this operation completed, most of the weight of the trailer will be borne by the jacks.

d. Enter the trailer by the single door at the front of the trailer. The ladder found inside the front door is placed in the catches in the door sill for use of the personnel. Unlock

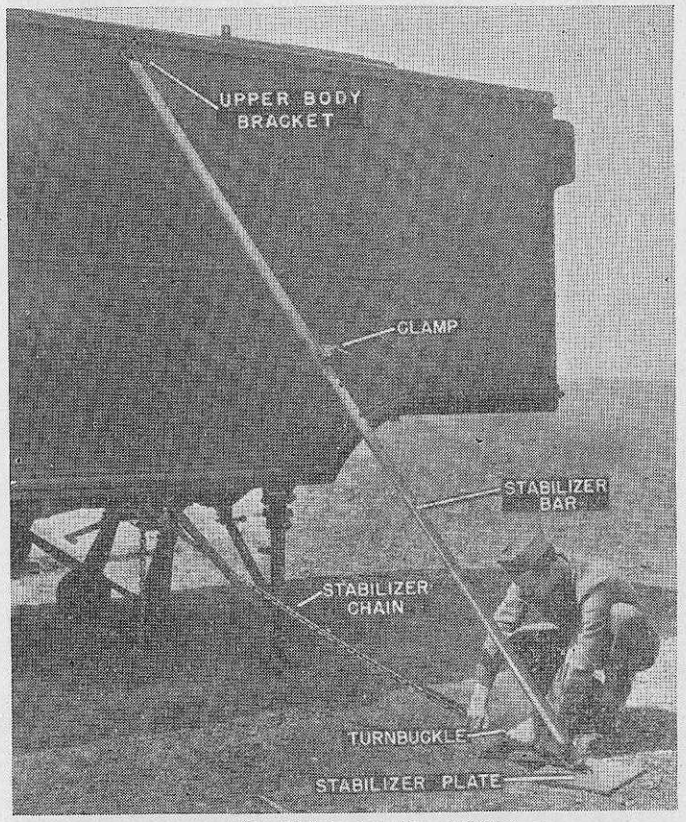


FIGURE 17.—Tightening the stabilizer.

and open the double doors. These doors are locked by a cylinder type lock, and may also be thumb-latched inside the trailer. Catches are also provided at the sill of the double doors for inserting the ladder, which may be used for entering these doors if desired.

e. The level of the trailer body can be checked by observing the two level bubbles on the pedestal. (See fig. 18.) Using the front jacks, level the trailer lengthwise, and then level the trailer crosswise using the two side jacks. Unless the leveling screws of the pedestal are adjusted so that approximately the same amount of the screw extends above the bushing in all four points, some inaccuracy in leveling the trailer results. However, since the pedestal is leveled after it has been elevated, this rough leveling is sufficiently accurate.

f. The exact distance the vehicle must be raised from the ground in order to level it depends upon the nature of the terrain. In general, to meet the required conditions of operation, the dolly must be clear of the ground and the loaded van resting solidly on all four leveling jacks. The rear wheels should be resting lightly on the ground in order to eliminate vibration. The trailer is now ready for stabilizing.

■ 19. STABILIZING.—The following procedure is used for setting up and stabilizing the equipment (see fig. 17):

a. Remove the four stabilizer bar assemblies from the stowage compartment underneath the center of the trailer. Each bar assembly consists of two sections, one section sliding inside another. Loosen the clamp handle and extend each bar assembly until the lock pin under the clamp handle on the outside bar falls into the *fifth* adjusting hole in the inside bar. The other holes on the lower bar are provided in order to lengthen or shorten the stabilizer bar assemblies when the ground around the trailer is not level. Clamp tightly in position.

b. Hook the eye of the outer bar over the prong in the upper body bracket, making certain that the stabilizer chain eye on the lower end of the inner bar is toward the trailer. Place the turnbuckle hook of the stabilizer chain in this eye and pull the other end of the chain through the hole in the stabilizer chain bracket to take up as much slack as possible.

c. Remove the four stabilizer plates from the stowage compartment and place one under each of the four stabilizer bars, with the prong of the lower stabilizer assembly bar going through the hole in the plate.

d. Dig the points of the stabilizers into the ground by jumping lightly on the stabilizer chains. Take up the slack

in the chains at the bracket on the side of the trailer. Adjust each stabilizer by means of the turnbuckle until a reasonable tension on the chain is obtained. Care must be exercised so that the level of the trailer body is not affected.

NOTE.—*Do not adjust the stabilizers so that they support the weight of the trailer. They are merely used to prevent side sway.*

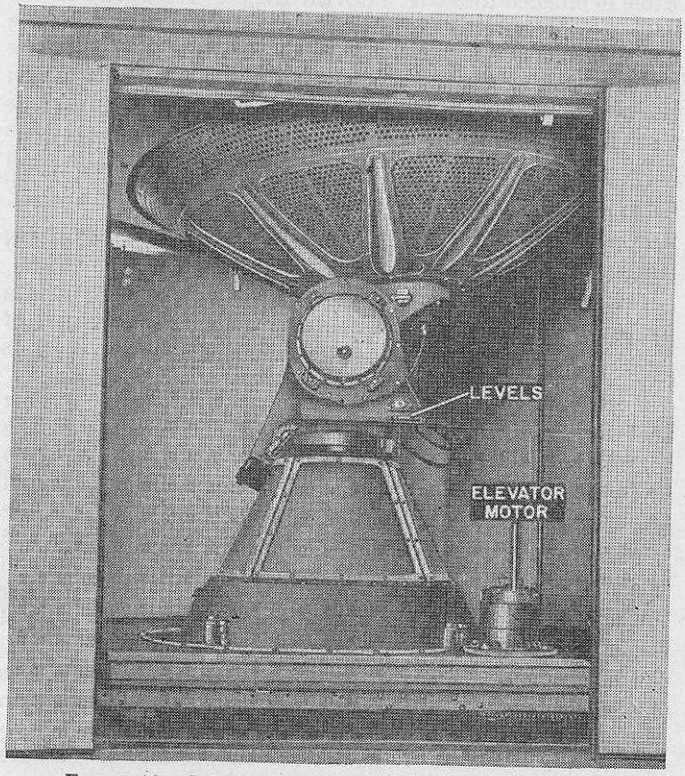


FIGURE 18.—Side view of pedestal in lowered position.

■ 20. GROUND STAKE.—Remove the ground stake and the attached cable from the stowage compartment. Fasten the

free end of the cable under the ground wing-nut on the data panel. Drive the stake deeply into the ground at some spot under the trailer where it will not interfere with the personnel.

■ 21. CONNECTING GENERATING UNIT M7.—*a.* Connect the three conductor power cables to the generator through the plug adapter (see figs. 28 and 29). The other end of this cable is plugged into the "POWER INPUT" receptacle on the data panel of the SCR–584. (See fig. 27.) Press the plug firmly into the receptacle and tighten the threaded clamping ring securely. The selsyn excitation jumper, a short length of cable supplied with the unit, should be connected at this time. One end is plugged into the A receptacle, and the other end into one of the "household" plugs on the data panel. *Before connecting director cables into plug A or plug B the jumper must be removed from the data panel.*

b. Throw the main switch on the generating unit to the ON position.

Caution: When the radio set is being set up at night in a blackout area, the switches controlling the interior lights of the trailer should be in the OFF position before power is supplied to the trailer.

c. Throw the main power switch to the ON position. Adjust the voltage to 115 volts by turning the handwheel on the voltage adjuster and observing the reading on the line voltmeter in the switch box above. Clockwise rotation of the control handwheel increases voltage; counterclockwise decreases. (On a few earlier units, the above switch and voltmeter do not appear, in which case the line switch and voltmeter on the high voltage rectifier must be used.) Power is now being supplied to the trailer, and some of the control units and ventilating fans will be in operation.

d. Check the phase rotation of the generating unit. This is accomplished inside the trailer by observing the direction of rotation of the three-phase cooling blower in the high voltage rectifier. When the side doors of the rectifier cabinet are open, this blower may be seen on the floor of the unit near the front. It should be running if the main power switch is on. Throw the main power switch off and observe the fan

wheel of this blower from the rear side of the rectifier. The fan wheel should rotate in a clockwise direction. If the direction of rotation is not clockwise, the main switch at the generating unit is thrown to the OFF position and two of the three power leads are interchanged. This can be accomplished either at the voltage adjuster shown in figure 30 or at the generating unit. Power is applied once more and the correct direction of rotation of blower is observed before proceeding. This check, when once made, need not be repeated as long as the *same* generator is used.

■ 22. ELEVATING PEDESTAL TO OPERATING POSITION.—*a.* Release the four roof hatch door latches inside the trailer. Two men climb to the roof of the trailer to open the hatch doors. Access to the roof of the trailer is obtained by ladder rungs located on the inside of the single door on the trailer, or by the ladder rungs located on the two rear doors.

b. Open the rear hatch door first by means of the handles. Open the larger hatch door (toward the front of the trailer) second. Use the two large handles fastened to this door to pull it upward to the vertical position. The handles are then replaced in their clips and the door lowered toward the front of the trailer until it rests upon the roof.

Warning: SO FAR AS POSSIBLE DURING THE OPERATIONS UPON THE ROOF OF THE TRAILER, THE MEN SHOULD STAND ON THE GRILLED CATWALKS PROVIDED.

c. Remove the four canvas covers from the elevation screws at each corner of the elevator platform inside the trailer.

d. Remove all four clamping screw nut assemblies at corners of elevator platform.

e. Remove all loose objects which may have been stored on the elevator platform.

f. Open the door on switch box and press button marked RAISE on the three-button switch indicated as ELEVATOR SWITCH.

g. The elevator platform will slowly rise. If it is necessary to stop the elevator during its ascent, this can be accomplished by pressing the red STOP button on the elevator

switch. When the elevator platform reaches its upper limit of travel, normally in about 5½ to 6 minutes, the upper travel limit switch shuts off the current to the elevator motor

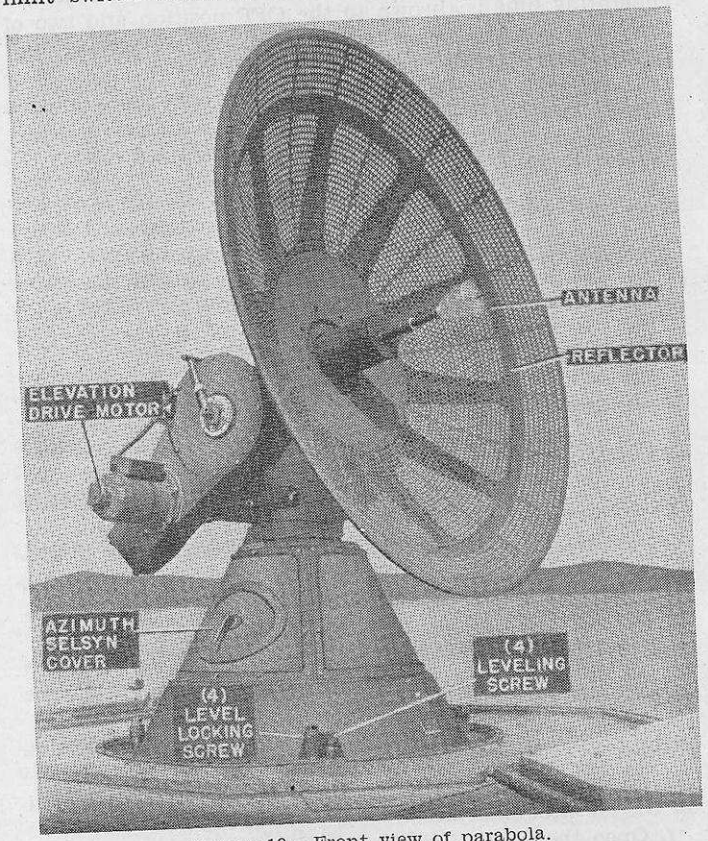


FIGURE 19.—Front view of parabola.

and the elevator stops. The platform must still be raised ¼ inch to complete the operation and seal the hatch cover. This is done with the four clamping screw nut assemblies which were removed when the elevator was in the lowered position.

Caution: WATCH ELEVATOR CLOSELY AS IT REACHES ITS UPPER POSITION AND BE PREPARED TO STOP THE ELEVATOR WITH THE RED STOP BUTTON IN CASE UPPER TRAVEL LIMIT SWITCH FAILS TO FUNCTION.

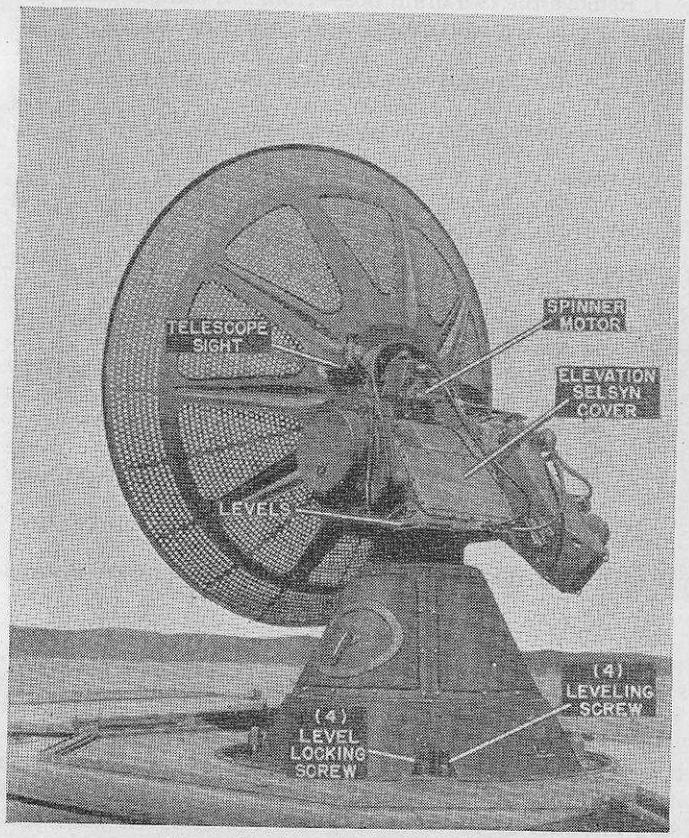


FIGURE 20.—Rear view of parabola.

h. Assemble the four clamping nut assemblies to the studs projecting through the platform at the four corners as shown in figure 21. Tighten the four assemblies successively by hand, approximately one turn at a time, until the

platform is firmly fastened to the roof. This operation is important as the operating screws are raised with the platform and are freed of the weight of the elevator assembly, which is now anchored firmly to the roof stretcher.

i. Remove the two drain hoses from the clamps under the elevator platform and assemble the two hoses on the nipples projecting down from the platform. Place the lower end of the hoses into the drain holes on the body side panel.

j. Replace the canvas screw covers on the elevating screws to prevent accumulation of foreign matter on the screw thread.

■ 23. LEVELING PEDESTAL.—*a.* Loosen the four pedestal level locking screws. (See fig. 20.)

b. Adjust the pedestal leveling screws in adjacent pairs until the two level bubbles are centered.

c. After the pedestal has been leveled, the locking screws are securely tightened.

d. The pedestal is checked again with the levels to make certain its position was not disturbed when the locking screws were tightened.

e. If it is not possible to level the pedestal within the range of the leveling screws, the leveling jacks under the trailer are adjusted as necessary. Stabilizers will not need adjustment in this case.

■ 24. INSTALLING R. F. LINES.—*a.* The r. f. lines are divided into two sections and stowed on the wall of the trailer near the front of the modulator.

b. Remove the lines from their rack and put them in place. (See fig. 21.)

c. Lock the lines in place by means of the three quick connectors.

d. Check to see that the rubber gaskets are in place at the end of each line section before installation. These gaskets are essential to the operation of the dehydrator and must be in good condition as the lines operate under air pressure. Adjust line clamp to support lines properly.

■ 25. UNLOCKING PEDESTAL.—When the radio set is in traveling position, the pedestal is securely locked in azimuth and

elevation by means of two pedestal stowing locks shown in figure 22. In order to release the pedestal and permit operation of the equipment, the following procedure is used:

a. Turn the azimuth locking handle counterclockwise as far as possible.

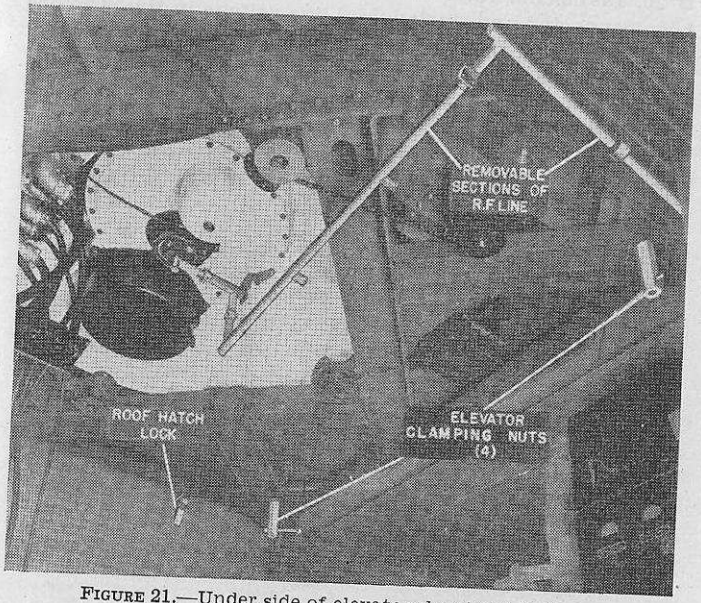


FIGURE 21.—Under side of elevator showing r. f. lines.

b. Loosen the elevation holding pin and turn the elevation locking handwheel counterclockwise until a distinct click is heard when the stowing lock holding pin drops into place. This pin is intended to prevent accidental tightening of the elevation stowing lock while the pedestal is in operation.

c. Check to make certain that all the electrical lines are plugged into the proper receptacles in the base of the pedestal as shown in figure 20.

NOTE.—WHEN THE STOWING LOCKS ARE RELEASED, THE STOWING SWITCHES CONTROLLING THE ELEVATION AND AZIMUTH ROTATION MOTORS CLOSE, TO

PERMIT OPERATION OF THESE MOTORS. THE SWITCHES CONTROLLING THE ELEVATOR MOTOR OPEN TO PREVENT OPERATION OF THE ELEVATOR WITH THE UNIT OUT OF THE STOWING POSITION.

■ 26. INSTALLING ANTENNA.—*a.* The generating unit having been connected and started, and line voltage in the SCR–584 having been adjusted to 115 volts, the following additional procedure is necessary:

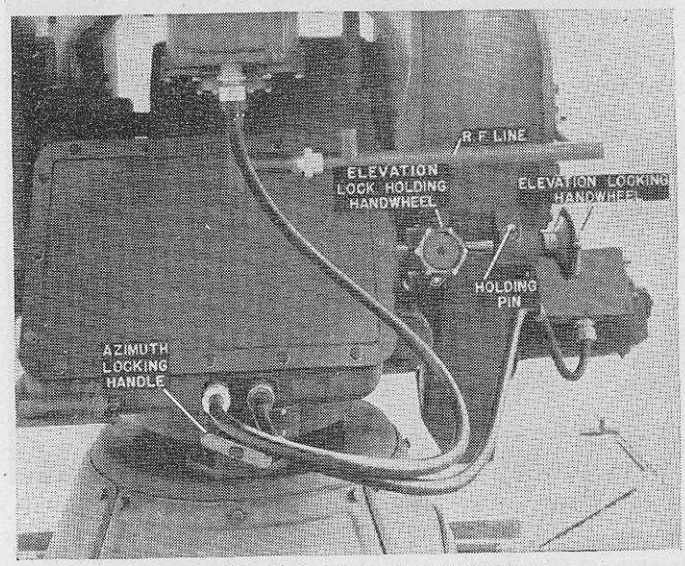


FIGURE 22.—Pedestal in stowed position.

(1) Check to see that the stowing locks have been released, in accordance with instructions in paragraph 25.

(2) Turn the automatic tracking unit switch on the control rack to the ON position. The red pilot adjacent to the switch should now light.

(3) Throw the azimuth and elevation motor generator switches in the switch box to the ON postion.

(4) Turn the control switch on the control panel to MANUAL.

Caution: Check to see that all personnel are clear of the path of the parabola. Tremendous torque controls the movement of the pedestal, and unless great care is exercised in this respect, serious and even fatal accidents may occur.

(5) Throw the safety switch on the control panel to the RUN position.

(6) Using the azimuth and elevation handwheels on the antenna position control unit, position the parabola so that it faces generally toward the front of the trailer at approximately zero mils elevation.

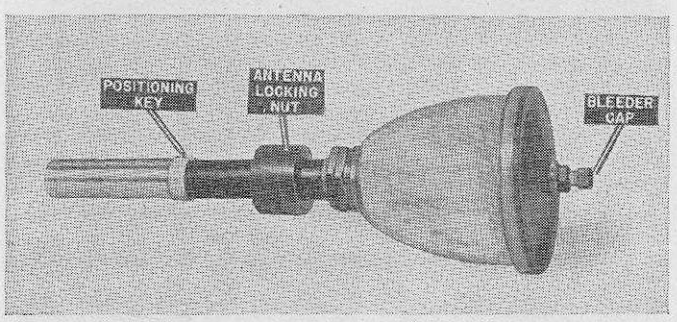


FIGURE 23.—Antenna.

(7) Throw the safety switch on the control panel to the STOP position, so that personnel will not be in danger of injury during the proeess of installing the antenna assembly.

b. Remove the antenna assembly, shown in figure 23, from its stowed position beneath the switch box, and install it in the center of the parabola. *Caution: Use extreme care in handling and installing the antenna, in order to avoid bending the tubing or breaking the plastic cover.*

(1) Remove the dust cap from the antenna and spinner shaft, and inspect the gasket to make certain that it is not twisted and is in good condition before installation.

(2) Insert the antenna shaft into the hollow tube projecting from the center of the spinner shaft.

(3) Rotate the antenna gently until the key shown in figure 23 falls into the corresponding slot on the antenna retaining tube. The antenna will seat properly in only one position

in the hollow rotating shaft. *If the antenna is forced or jammed, or the antenna locking nut is tightened with the antenna in the wrong position, the automatic tracking circuits will not function properly.*

(4) The antenna locking nut, shown in figure 23, is tightened firmly by hand, and the air bleeder cap removed, prior to blowing out the r. f. lines. (See par. 27.)

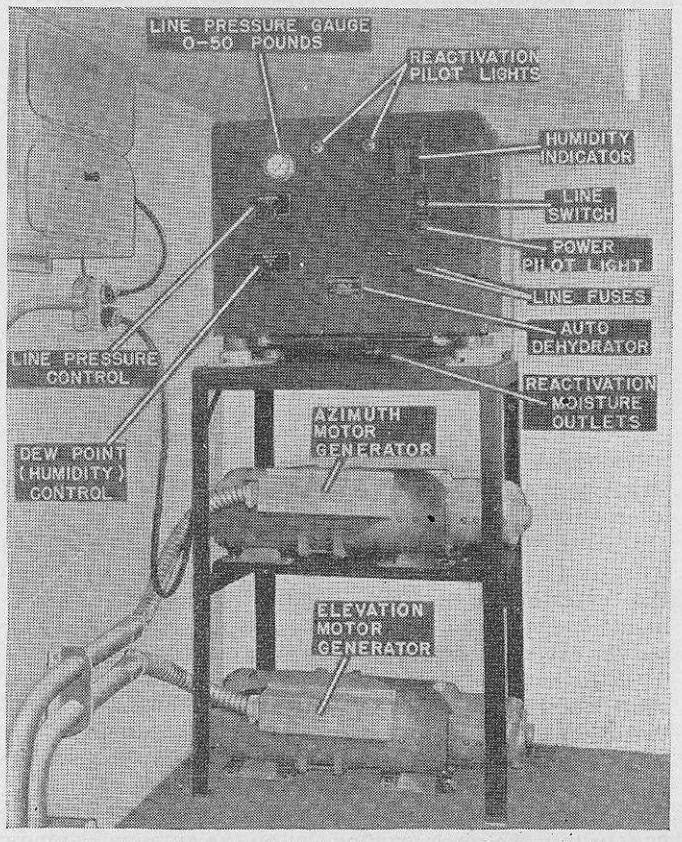


FIGURE 24.—View of right front corner of trailer showing dehydrator and motor generators.

(5) Place the dust cap on stowing rack so that it will not be lost.

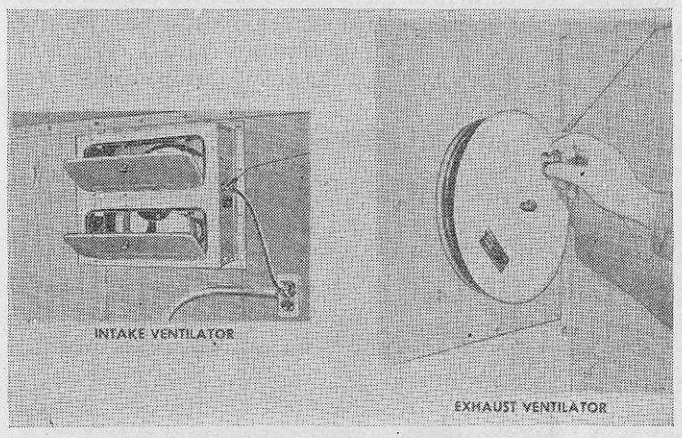


FIGURE 25.—Intake and exhaust ventilators.

■ 27. APPLYING PRESSURE TO R. F. LINES.—The coaxial r. f. lines of the SCR–584 are intended to operate under a slight positive pressure of dry air. This pressure is supplied by the dehydrator, located in the right front corner of the trailer, on the same rack as the motor generators. Proceed as follows:

a. The bleeder cap on the end of the antenna assembly having been removed (see par. 26), throw the switch on the front of the dehydrator to the ON position and allow the pump to operate for approximately 15 minutes to fill the lines with dry air.

b. At the end of this time, replace the bleeder cap at the end of the antenna assembly and tighten it securely by hand.

c. Check the pressure in the r. f. lines by observing the pressure gauge on the front of the dehydrator. It must register approximately 5 pounds per square inch.

d. If the pressure is not 5 pounds per square inch, the pressure regulator on the dehydrator is adjusted cautiously until such a reading is obtained. DO NOT OPERATE AT PRESSURES ABOVE THIS VALUE.

■ 28. VENTILATORS.—*a.* There are a total of nine ventilators in the trailer. Six inlets and outlets are located in the floor, two in the rear corners of the trailer beside the control rack, and one in the upper section of the front wall. During transit all are closed. When operation is started, certain of them are opened, depending on the outside temperature.

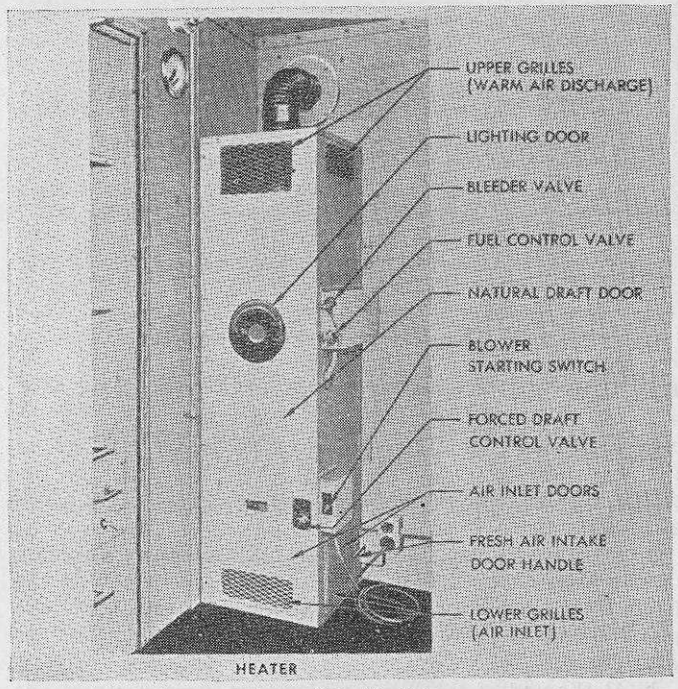


FIGURE 26.—Heater.

b. The three major units, the high voltage rectifier, the modulator, and the control rack, are all forced-air cooled. The rectifier and modulator each take in air from inside the trailer when the ventilator covers under the floor of the trailer *just ahead of the step* are closed. They exhaust air inside the trailer when the ventilator covers under the floor *just to the rear of the step* are closed. When desired, they

may be made to intake and exhaust outside of the trailer by opening these four ventilator covers. For cold weather operation these four covers should be left closed, thus recirculating the air through the units to keep the interior of the trailer warm. In warm weather they may be opened, or two opened and two closed, to give the desired temperature inside the trailer.

c. The two ventilators in the rear corners of the trailer under the control panel operate to circulate air in the rack and to exhaust it either inside or outside of the trailer. Set the operating handle toward the front of the trailer to exhaust the air outside and toward the rear to exhaust the air inside the trailer. (See fig. 6.)

■ 29. GASOLINE HEATER.—*a.* To operate the heating system of the trailer, the following procedure is followed:

(1) Turn forced draft control valve and fuel control valve to the OFF position. (See fig. 26.)

(2) Check to see if the 12-gallon fuel tank located on the outside of the trailer just below the front line of the roof contains sufficient gasoline for operation. If necessary, fill with gasoline (leaded gasoline may be used). The removable ladder stowed inside the small door may be attached to cleats on the front of the trailer in order to inspect and fill the gasoline tank.

(3) Open shut-off valve at tank. Valve handle is in a vertical position when open.

(4) Bleed air from fuel line by turning bleeder valve handle counterclockwise. Catch escaping gasoline in a rag or can. Tighten bleeder valve after gasoline flows steadily and all air bubbles have been removed. (This operation is only necessary when lighting heater for the first time or if the fuel tank has been allowed to run dry.)

(5) Check to be certain that natural draft door is closed (in the down position).

(6) If operating on recirculated air, be sure that the two air inlet doors on the lower grills are open (up position), and that the fresh air intake door on the outside of the vehicle is closed. (To close this door, lift the operating handle.) Reverse this procedure when operating on fresh air.

b. Operating on forced draft.—To operate the heating system on forced draft, it is necessary that the trailer be connected to the generating unit and that 115-volt power be supplied.

(1) Turn forced draft fan switch to ON position.

(2) Open lighting door and drop a small piece of lighted paper into the burner pilot. The long wire equipped with a wick supplied with the unit may be dipped in gasoline, lighted, and used in place of the paper. The flame must be applied to the bottom of the burner pot.

(3) *Make sure paper or wick is burning* and turn fuel control valve to HIGH position. When fuel starts to burn, turn fuel control valve to LOW position, and turn forced draft control valve to LOW position.

(4) Close lighting door and allow unit to warm up for about 10 minutes. Heater is now in operation.

(5) To increase heat, turn fuel control valve to MEDIUM or HIGH and set forced draft control to the corresponding position.

(6) When the heater is properly operated, the fire burns without soot or smoke and the flame is a clean yellow color, as observed through the mica window of the lighting door. If black smoke issues from the flue it is evidence that the fuel and air are not properly supplied. Adjust the fuel control valve to decrease the fuel supply or increase the forced draft supply until the smoke disappears. Any change in the amount of heat desired necessitates adjustment of both the fuel supply and the forced draft control for best operation of the heater.

(7) To shut off heater, turn fuel control valve to OFF position. When fire is out, turn forced draft fan switch to OFF position.

NOTE.—*If the ventilating system is readjusted, or shut off, check heater operation and adjust if necessary.*

c. Operation on natural draft.—With the gasoline tank containing sufficient gasoline for operation and the shut-off valve near the gasoline tank in the OPEN position, the following procedure is necessary for operating the heater on natural draft:

(1) Raise sliding natural draft door.

(2) Open lighting door and drop a small piece of lighted paper to the bottom of the burner pilot, or ignite with wick on the long wire, as described in *b* above.

(3) *Make sure paper or wick is burning* and turn fuel control valve to HIGH position. When fuel starts to burn, turn to LOW position.

(4) Close lighting door and allow unit to warm up for about 10 minutes.

(5) To increase heat, turn fuel control valve toward the MEDIUM or HIGH position. If heater shows black smoke from the fuel, turn valve in the opposite direction until smoke disappeals.

(6) Note that in operating on natural draft, the forced draft fan switch and the forced draft control valve should be in the OFF position.

(7) To shut off heater, turn fuel control valve to OFF position. When fire is out, close sliding natural draft door.

(8) When heater is not to be used, or when packing for transport, the shut-off valve on the gasoline line near the tank is placed in the OFF or horizontal position.

d. Precautions.—The following precautions are observed during operation of the heater:

(1) Do not light a fire in the heater if the burner is hot.

(2) Always operate burner just above the smoke point.

(3) Do not allow paper ash to accumulate on bottom of burner pot.

(4) Never open fuel control valve before inserting lighted paper into the burner. *Make certain that paper or wick is lighted* when turning on fuel.

(5) Be sure fuel control valve is closed while burner is not lighted. Otherwise, fuel is wasted through the overflow drain line.

(6) Do not allow soot to accumulate over ⅛ inch on combustion chamber wall, as its presence impairs operation and efficiency of the heater.

(7) Be sure to close lighting door tightly when burner is lit, otherwise, burner may smoke unduly.

■ 30. TRAILER STORM CURTAIN.—*a.* The large tarpaulin supplied as part of the trailer equipment is designed to act as

a storm curtain to cover the roof hatch opening while the mount is being raised into operation position during inclement weather, and to protect the equipment when it is necessary to have the rear doors open.

b. Installing curtain over hatch opening.—(1) Place the folded curtain over the hatch opening, so that it hangs equally on each side of the trailer. (The curtain is marked with the words "Side" and "End" to insure proper installation.)

(2) Pull the rear end of the curtain toward the rear of the trailer far enough to drape over the back edge of the open rear hatch door.

(3) Pull the front end of the curtain forward until it is even with the front edge of the roof rub rail.

(4) Fold all the surplus curtain into two pleats at the center of the hatch opening.

(5) Tie the rear corners of the curtain to the rear lifting brackets, making sure the curtain is securely anchored over the rear hatch door.

(6) Bring the front ropes around the front edges of the roof rub rails and tie to the front lifting brackets. (Leave these ropes slightly loose to allow for free movement of the curtain.)

(7) In case of high winds two men should hold the center ropes, one at each side, to prevent the curtain blowing out of position.

(8) The pedestal may now be raised, with the surplus of curtain folded into the center unfolding as the mount rises, keeping the pedestal entirely covered to its maximum limit of travel.

(9) After the pedestal has reached its maximum limit of upward travel and the four clamping screw nut assemblies have been installed and drawn up tight, the curtain must be removed before the equipment is operated.

c. Installing storm curtain over rear door opening.—(1) Drape the curtain evenly over the rear of the trailer, with the bottom of the curtain dragging slightly on the ground.

(2) Open the bottom rear door to the horizontal position.

(3) Fold up the surplus curtain on top of the trailer until the folds are in line with the rear stabilizer body brackets. leaving the end ropes out of the folds.

(4) Wrap the curtain end ropes securely around the stabilizer body bracket, and bring it down and across the fold of curtain hanging over the side of the trailer, to the rear lifting bracket, and tie.

(5) With two men pulling the curtain straight out from the rear of the trailer, and as high as possible, open the upper rear door and swing the supporting brackets in place. (This operation will prevent tearing the curtain on the corners of the upper rear door.)

(6) After the upper rear door is open the curtain is dropped into place. This brings the bottom edge of the curtain at the rear center approximately 20 inches from the ground.

(7) Lap the front folds at the side over the rear folds, and tie the rear folds to the rear lifting brackets with the short ropes at the corners of the curtain.

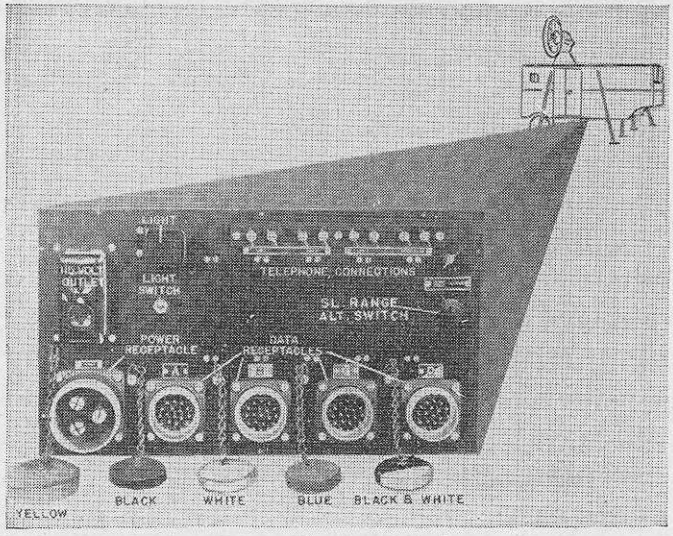


FIGURE 27.—Data panel.

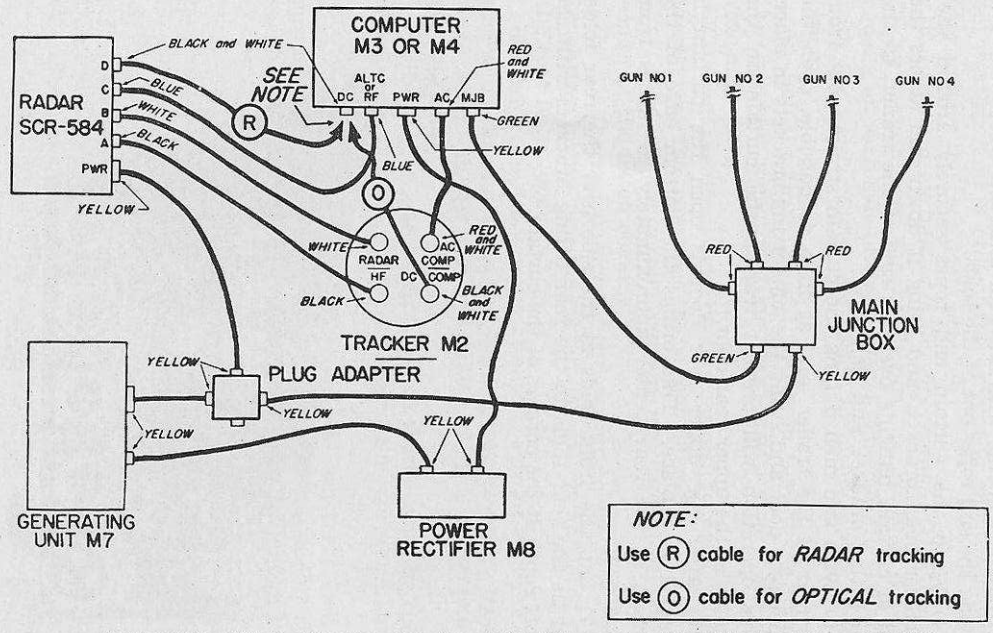


FIGURE 28.—Cable diagram for the SCR–584 used with director M9 and M10.

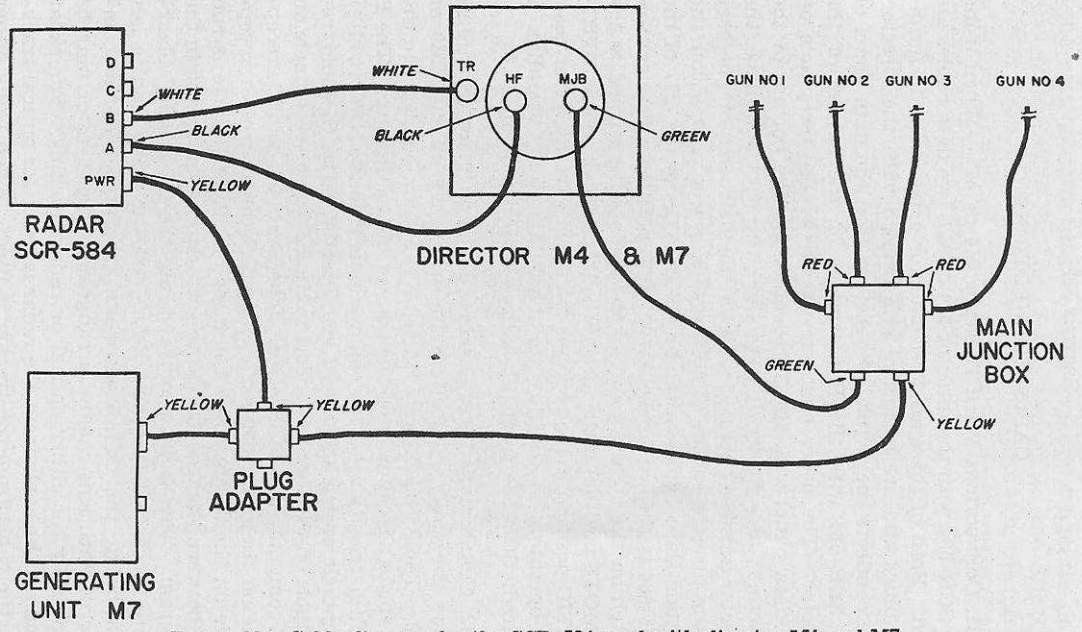


FIGURE 29.—Cable diagram for the SCR–584 used with director M4 and M7.

SECTION III

CABLE CONNECTIONS

■ 31. CONNECTIONS WITH DIRECTOR M4 OR M7.—When using the SCR–584 with the director M4 or M7, two data cables are used. Both of these are 20-conductor cables with 19 terminal plugs and are furnished and carried with the director. One connects the A (black) receptacle on the data panel of the SCR–584 with the H receptacle on the bottom of the director. The other connects the B (white) receptacle on the data panel with the T receptacle on the bottom of the director. (See fig. 29.) With these two cables in place, the director must be operated with the toggle switch on the base of the director in the T position. For this connection the altitude-slant-range switch on the data panel (fig. 27) of the SCR–584 is thrown to the ALTITUDE position. The control switch on the control panel of the radio set is turned to the REMOTE position if the director is tracking, or to the AUTOMATIC position if the radar is tracking. In the latter case, the operators at the director match pointers. Parallax is figured: SCR–584 from the battery directing point.

■ 32. CONNECTIONS WITH DIRECTOR M9 OR M10.—*a*. Figure 28 shows the cable connections for using the director M9 or M10. The A (black) receptacle on the radar connects to the HF (black) receptacle on the tracker of the director. The B (white) receptacle on the radar connects to the RAD (white) receptacle on the tracker of the director. The C (blue) receptacle on the radar connects to the RF (blue) receptacle on the computer of the director. The D (black-white) receptacle on the radar connects to the DC (black-white) receptacle on the computer of the director. A fifth cable is run out between the tracker and the computer as indicated in the diagram. This cable is plugged into the DC COMP (black-white) receptacle at the tracker and the other end is left loose beside the DC (black-white) receptacle at the computer. With this cabling arrangement the director may be used easily for either optical or radar tracking. For radar tracking, the cable from the radar is used; for optical tracking, the cable from the tracker is used. When using either

of these methods, the altitude-slant-range switch on the data panel of the SCR–584 (fig. 27) is thrown to the SLANT-RANGE position. The control switch is used as in the director M4 or M7 set-up. The toggle switch on the base of the tracker can be in either position.

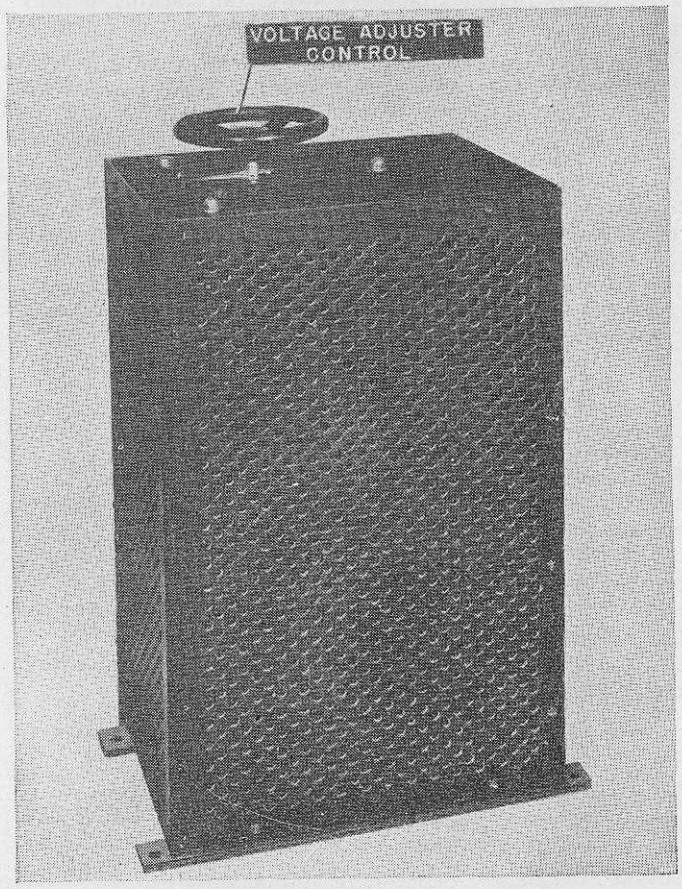


FIGURE 30.—Voltage adjuster.

b. It is possible to receive complete data at the director without setting up and connecting the tracker. This is accomplished by connecting only the D cable (black-white) from the data panel of the radar to the DC (black-white) receptacle on the computer.

c. When switching from optical to radar tracking, be sure to compensate for the parallax change. For optical tracking, parallax is figured: tracker from guns. For radar tracking, parallax is figured: SCR–584 from the guns.

NOTE.—*When using optical tracking at the director, the tracker must be placed 25 to 30 yards from the antenna of the SCR–584. If placed closer, it is not possible to depress the antenna to back sight on the tracker for orientation. If the tracker is placed farther, the uncompensated slant range parallax from the radar to the tracker introduces an error greater than the over-all probable error of the battery. If it is necessary to place the tracker farther away, the error can be eliminated if altitude data are transmitted.*

SECTION IV

PRELIMINARY OPERATION

■ **33.** STARTING PROCEDURE.—*a.* When the trailer has been emplaced and the pedestal is in operating position, the SCR–584 is ready to be put into operation.

b. With power being supplied from the generating unit, proceed as follows:

(1) Throw the main power switch (on the wall above the line voltage adjusting control) to the ON position.

(2) Adjust the voltage adjuster control until the switch meter reads 115 volts.

NOTE.—*For early models the following procedure is used:*

1. *Throw the LINE CIRCUIT BREAKER on the high voltage rectifier to the ON position.*

2. *Adjust the voltage adjuster until the LINE VOLTMETER on the HV rectifier reads 115 volts. When the PHASE BC and PHASE AC buttons are pressed, the meter should also indicate 115 volts.*

(3) Remove the bleeder cap from the antenna.

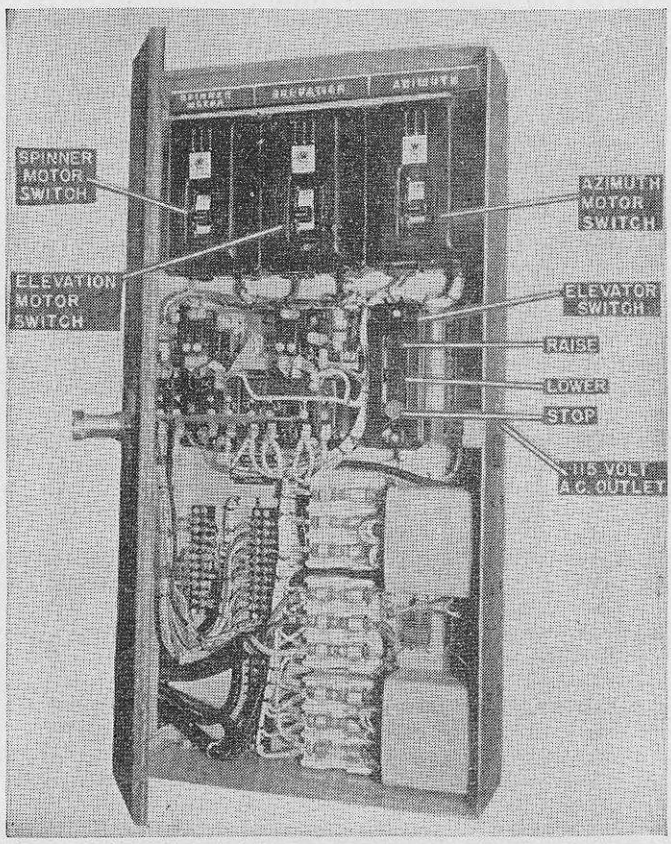


FIGURE 31.—Switch box.

(4) Throw the dehydrator power switch to the ON position. (When the bleeder cap is removed, allow dry air to flow through the transmission line for approximately 15 minutes to remove all moisture from the line. In the case of low temperatures or high humidity, this period must be increased to approximately 30 minutes. Replace the bleeder cap when the line bleeding period is over.) Adjust the line pressure to 5 pounds with the LINE PRESSURE CONTROL.

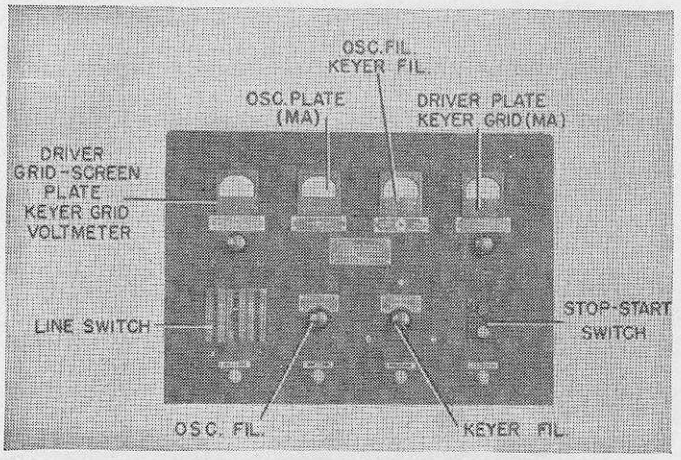


FIGURE 32.—Modulator panel.

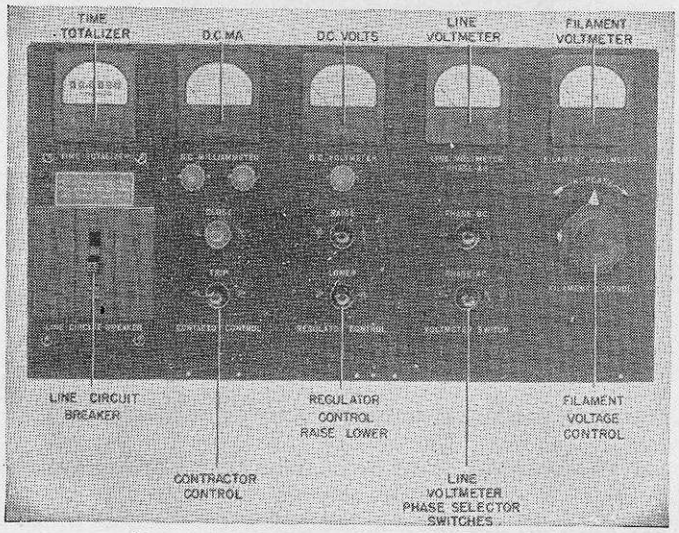


FIGURE 33.—High-voltage rectifier panel.

(5) Throw the LINE CIRCUIT BREAKER on the high voltage rectifier to the ON position (if not already set). The green pilot light should glow, indicating that the plate voltage is off. If the amber pilot light is not glowing, press and hold the LOWER button of the REGULATOR CONTROL until the light begins to glow, indicating that the high voltage is at a minimum.

(6) Set the rectifier filament voltage to 105 volts, as read on the FILAMENT VOLTMETER, by adjusting the FILAMENT CONTROL.

(7) Throw the FILAMENT switch of the local oscillator (located above the modulator) to the up position.

(8) Throw the line switch on the modulator to the ON position. The white POWER light should glow, indicating that the filaments are on.

(9) Throw the switch below the filament voltmeter of the modulator to the right to the KEYER FILAMENT position.

(10) Set the keyer filament voltage to 100 volts, as read on the filament voltmeter, by adjusting the KEYER FILAMENT control.

(11) Throw the switch below the filament voltmeter of the modulator to the left to the OSCILLATOR FILAMENT position.

(12) Set the oscillator filament voltage to 100 volts, as read on the filament voltmeter, by adjusting the OSCILLATOR FILAMENT control.

(13) Throw the following power switches at the control rack to the up (ON) position.

(*a*) *Automatic tracking unit.*—The red light on the unit should glow.

(*b*) *Range power supply.*—The red light both on the range power supply and the range unit should glow.

(*c*) *Receiver power supply.*—The red lights on the receiver power supply and the receiver should glow.

(*d*) *Altitude converter power supply.*—The red light should glow on the unit.

NOTE.—The power switch on the altitude converter power supply is raised when feeding gun director M4 or M7. It is not raised when the M9 or M10 gun director is used.

(*e*) *PPI power supply.*—The red light on the unit should glow.

(14) Throw the PLATE switch of the local oscillator (above the modulator) to the up (ON) position. The crystal current meter (on the receiver) should indicate between 0.15 and 0.5 ma.

(15) Thirty seconds must elapse since step (8) above and the green READY pilot light on the modulator must be glowing. Now press the START (black) button on the modulator. The amber BIAS light should glow, indicating the application of keyer bias voltage. Wait 5 seconds.

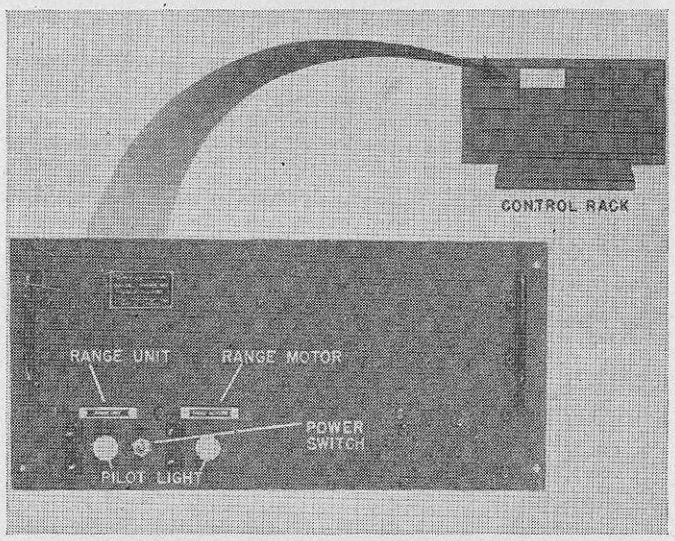


FIGURE 34.—Range power supply (RA-72).

(16) Press the CLOSE button of the CONTACTOR CONTROL on the high voltage rectifier. The green pilot light should stop glowing and the red pilot light should begin glowing, indicating that the high voltage may be raised.

(17) Press and hold the RAISE button of the REGULATOR CONTROL on the high voltage rectifier. The amber pilot light will go out. Continue holding the button until the DC VOLTMETER indicates 18 kilovolts. Check the reading of the OSCILLATOR PLATE meter on the modulator panel. This meter should indicate a current of approximately 20 ma. As the high voltage passes through approximately 10 kilovolts, the red DRIVER PLATE pilot light on the modulator will glow and the oscillator filament voltage will drop to zero.

(18) Throw the ELEVATION MOTOR, AZIMUTH MOTOR, and SPINNER MOTOR switches in the switch box to the ON position. The azimuth motor generator, the elevation motor generator, and spinner motor should run.

(19) Readjust the line voltage with the voltage adjuster control to 115 volts as indicated on the meter.

(20) Recheck the OSCILLATOR PLATE meter on the modulator panel. The meter should not indicate a current higher than 27 ma. If the indication is above 27 ma, press the LOWER button of the REGULATOR CONTROL on the high voltage rectifier until the current is below this limit and the rectifier DC VOLTMETER reads no higher than 22 kilovolts. If the reading is below 20 ma, press the RAISE button of the REGULATOR CONTROL, if the reading is above 27 ma, press the LOWER button. (The exact reading will be determined by the radar repairman and recorded in the Equipment Performance Log.)

(21) Recheck the keyer and rectifier filament voltages. Reset the voltages, if necessary. The oscillator filament voltmeter will not indicate any voltage.

c. Check the control system as follows:

(1) Turn the CONTROL switch on the control panel to the AUTOMATIC position. ***Caution:*** BE SURE NO ONE IS NEAR THE ANTENNA PEDESTAL. WARN ALL PERSONNEL THAT THE ANTENNA IS GOING TO BE OPERATED.

(2) Throw the SAFETY switch on the control panel to the RUN position.

(3) Allow 5 seconds for the positioning motors to operate, then turn the CONTROL switch to the MANUAL position.

(4) Check the operation of the servo system by turning the handwheels on the antenna position control unit and observing the PPI scope, and AZIMUTH and ELEVATION dials on the antenna position indicator unit.

(5) Advance VOLUME CONTROL on the receiver to number five position.

d. Check the operation of the aided range tracking circuits as follows:

(1) Place the RANGE MOTORS switch on the front panel of the range indicator unit in the ON position. The hair lines scribed on the 32,000- and 2,000-yard scopes may stand still or rotate in either direction.

(2) If the hair lines begin rotating, stop the motion by adjusting the TRACKING handwheel. To do this, turn the TRACKING handwheel in a direction opposite to the motion of the hair lines.

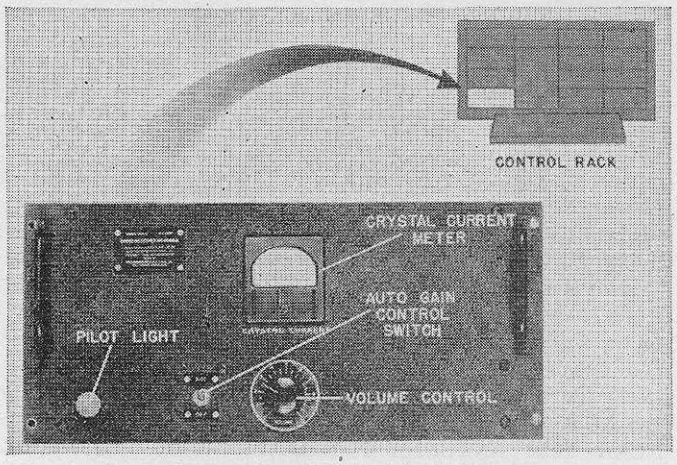


FIGURE 35.—Receiver (BC–1056).

(3) When the motion of the hair lines has been stopped, turn the handwheel slightly in a clockwise direction. Observe the 2,000-yard dial hair lines. They should have moved a proportional amount in a clockwise direction and should continue to rotate slowly in that direction. No further rotation of the TRACKING handwheel should be necessary.

(4) Stop the movement of the hair lines by turning the handwheel counterclockwise. Turning the handwheel beyond the position where the hair lines stop will cause the lines to rotate in a counterclockwise direction. No further displacement of the TRACKING handwheel should be necessary to allow continued rotation of the hair lines.

(5) Stop the rotation of the hair lines by throwing the RANGE MOTORS switch to the OFF position.

e. Zero set the range unit as follows:

(1) Check the zero setting of the hair lines on the 32,000- and 2,000-yard range scopes by placing the hair lines of both scopes at zero. To do this, rotate the SLEWING handwheel in the direction necessary as indicated by the movement of the hair lines. (See fig 47.)

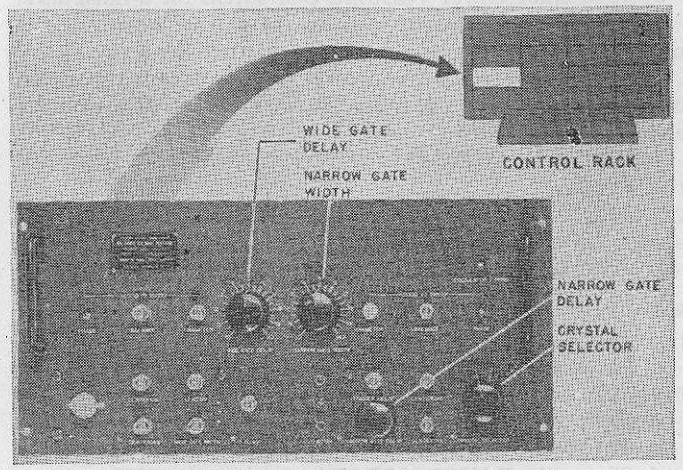


FIGURE 36.—Range unit (BC–1062).

(2) Note whether the left edge of the main pulse is on the fine range hair line of the 2,000-yard scope. If the main pulse is not in view, adjust the NARROW GATE DELAY control on the range indicator unit to bring the main pulse into view. Check to see if the leading edge of the main pulse is under the fine range hair line. If not, the radar repairman will align the indicator as described in TM 11–1524.

(3) The illuminated sector on the 2,000-yard scope should have near its center the fine range hair line. It should extend about one-quarter of the circumference of the screen. If the trace is not of the proper length, adjust the NARROW GATE WIDTH control on the range unit. If the fine range hair line is not near the middle of the illuminated section, adjust the NARROW GATE DELAY.

f. Check and adjust the local oscillator tuning as follows:

(1) Set the antenna to zero mils elevation angle by turning the left handwheel on the antenna position control unit and observing the ELEVATION dial on the antenna indicator unit.

(2) Set the receiver VOLUME CONTROL for a noise level (grass) between one-half and one-third the height of the main pulse indication on the 32,000-yard range scope.

(3) Using the right handwheel on the antenna position control unit, turn the antenna slowly and stop at a position showing several fixed echoes.

(4) Adjust the tuning control on the local oscillator until the echoes are at a maximum height with the VOLUME CONTROL on the receiver set so that the echo signal is always below saturation.

g. The radio set is now "on the air."

■ 34. STOPPING PROCEDURE.—The following procedure is used to shut down the SCR–584.

a. Set the CONTROL switch on the control panel to the MANUAL position.

b. Position the antenna at zero mils elevation angle.

c. Throw the SAFETY switch to the STOP position.

d. Throw the RANGE MOTORS switch to the OFF position.

e. Press and hold the LOWER button of the REGULATOR CONTROL on the high voltage rectifier. When the voltage drops through 10 kilovolts the red DRIVER PLATE pilot light on the modulator will go out, and when the voltage is at a minimum, the amber light will go on.

f. Throw the SPINNER MOTOR, AZIMUTH MOTOR, and ELEVATION MOTOR switches in switch box to the OFF position.

g. Press the TRIP button of the CONTACTOR CONTROL on the high voltage rectifier. The d-c voltmeter on the unit

will drop to zero and the red light will go out and green light will come on.

h. Throw the PLATE switch of the local oscillator to the down position. The crystal current meter will read zero.

i. Throw the FILAMENT switch of the local oscillator to the down position.

j. Press the STOP (red) button on the modulator. The amber light will go out and KEYER BIAS voltmeter will read zero.

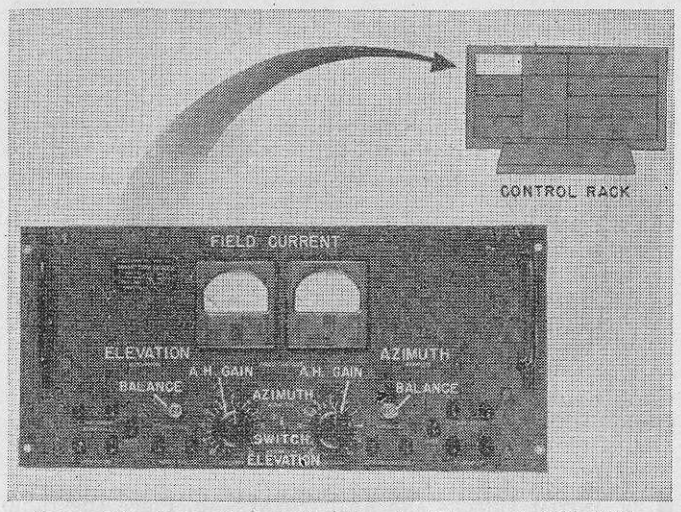


FIGURE 37.—Azimuth and elevation tracking unit (BC–1090).

k. Throw the line switch on the modulator to the OFF position. The white POWER light and the green READY light will go out.

l. Throw the LINE CIRCUIT BREAKER on the high voltage rectifier to the OFF position. The high voltage voltmeter will now read zero and the green light will go out.

m. Throw all power toggle switches on the control rack to the down position.

(1) *PPI power supply.*—The red light will go out.

(2) *Altitude converter power supply.*—The red light will go out.

(3) *Receiver power supply.*—The red light on the unit and the receiver will go out.

(4) *Range power supply.*—The red light on the unit and the range unit will go out.

(5) *Automatic tracking unit.*—The red light will go out.

n. Throw the dehydrator power switch to the OFF position. The red light will go out.

o. Throw the main switch to the OFF position.

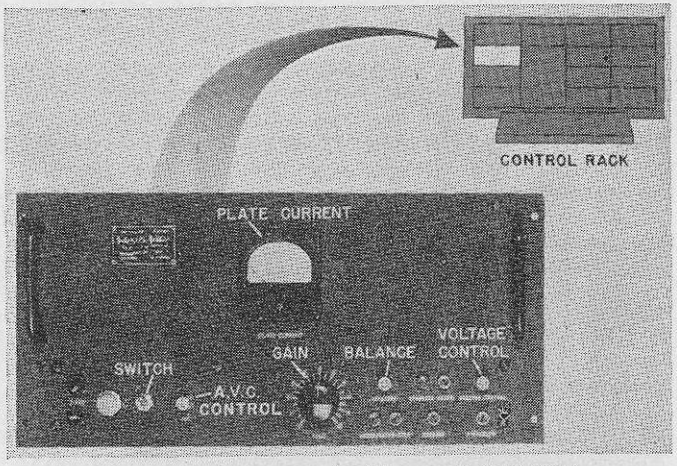


FIGURE 38.—Automatic tracking unit (BC–1086).

35. INITIAL CHECKS AND ADJUSTMENTS.—*a.* Place the radio set in operation as described in paragraph 33.

b. Check the antihunt circuit as follows:

(1) Turn the control switch on the control panel to MANUAL.

(2) Throw the safety switch on the control panel to RUN.

(3) Move quickly the azimuth handwheel on the antenna position control unit about one turn. The parabola should assume its new position quickly with not more than two or three "overshoots." There should be no sustained hunting or oscillation of the parabola. If the parabola hunts at a frequency of about two times per second, increase the setting of the azimuth A-H GAIN control on the azimuth and elevation tracking unit. If the hunting is a slow rate or about once every 5 seconds, decrease the setting of the A-H GAIN control. (See fig. 37.)

(4) Move quickly the elevation handwheel on the antenna position control unit about one turn. Observe the movement of the parabola in elevation. There should be no sustained hunting. If hunting is present, proceed as directed in (3) above, using the *elevation* A-H GAIN control.

c. The antihunt (A-H) gain controls should be set as low as possible consistent with the conditions outlined. The settings of the two controls should be recorded in the Equipment Performance Log when a stable operating condition has been attained. These values may be used for subsequent installations.

CHAPTER 3

OPERATION

		Paragraphs
SECTION I.	Personnel	36–37
II.	Orientation and synchronization	38–42
III.	Operating procedure	43–48

SECTION I

PERSONNEL

■ 36. PERSONNEL.—The SCR–584 crew is composed of the following personnel:

	SSN		SSN
Chief radar operator	774	Operator, radar	514
Radar repairman	952	Operator, radar	514
Operator, radar	514	Operator, radar	514
Operator, radar	514	Driver, truck, heavy	245
Operator, radar	514		

■ 37. TRAINING.—*a.* It is extremely important to the successful operation of the SCR–584 that all crew members understand the procedure for all operations and initial adjustments.

b. The chief radar operator and the radar repairman must have successfully completed a recognized course in the Radio Set SCR–584 at any authorized school in their respective duties.

SECTION II

ORIENTATION AND SYNCHRONIZATION

■ 38. GENERAL.—*a.* The operations of orienting and synchronizing the SCR–584 are most easily performed simultaneously and for purposes of clarity are discussed together.

b. The method of orientation discussed in this manual is known as "back sighting." The method is quick and easily performed in the field as it requires no special instruments or special terrain conditions.

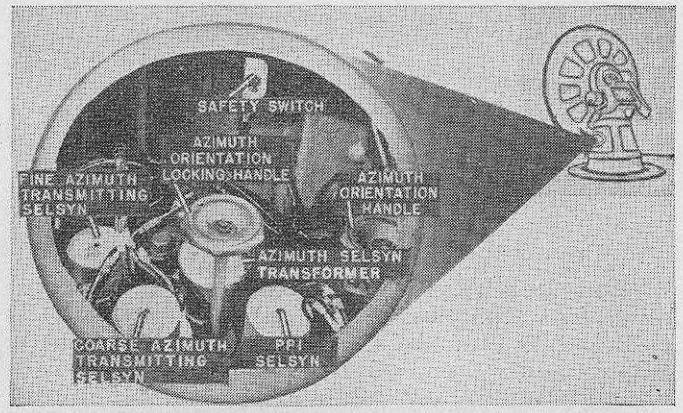


FIGURE 39.—Azimuth selsyn compartment in pedestal.

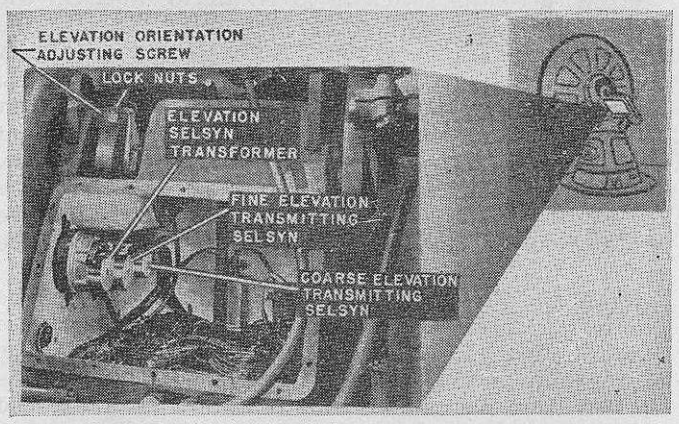


FIGURE 40.—Elevation selsyn compartment.

c. As noted in paragraph 32, the director cannot be located closer than 25 yards to the SCR–584 and the tracker of the director M9 or M10 should not be farther than 30 yards from the SCR–584 when tracking optically.

d. Orientation is greatly simplified if telephone connections between the radar and the director have been made.

When moving into a new position, a single line may be run between the two units until the regular communications are installed.

■ 39. ORIENTING AND SYNCHRONIZING WITH DIRECTOR M4 OR M7.—*a.* Perform the following checks:

(1) Check with chief of range section to see that the director has been properly oriented in azimuth and angular height.

(2) Connect the data cables as shown in figure 29.

NOTE.—The telescope on the parabola must be checked to see that its axis coincides with the electrical axis of the parabola. This can be done while tracking a plane or meteorological balloon. (See TM 11–1324.)

b. Place the SCR–584 in operation as described in paragraph 33. Proceed as follows:

(1) With control switch in AUTOMATIC, turn ON the azimuth and elevation motor generators by means of the azimuth and elevation switches in the switch box. Turn the safety switch to RUN and the control switch to MANUAL.

(2) By means of the handwheels on the antenna position control unit, point the parabola accurately in azimuth and elevation at the center of the azimuth telescope of director, as observed through the telescopic sight on the parabola on the SCR–584. When observing through the telescope, be sure to place the eye so that the cross hairs appear in the center of the field of view.

(3) At the same time, direct the azimuth telescope of the director at the center of the telescope on the parabola of the SCR–584. If the azimuth scope has no horizontal hair line, use the elevation scope to position the azimuth scope in elevation. Be sure the hair lines are in the center of the field of view.

(4) Turn OFF the azimuth and elevation motor generators. Wait until the motor generators stop, then throw the safety switch to STOP. Check the position of the parabola by looking through the telescope. If the parabola has moved, repeat the above steps to reposition it.

(5) Remove the azimuth selsyn cover plate from the pedestal. Loosen the azimuth orientation locking handle and

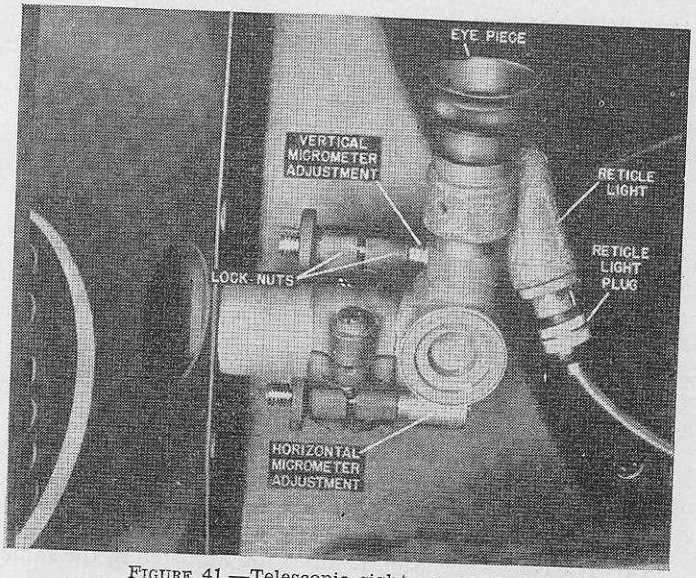


FIGURE 41.—Telescopic sight on parabola.

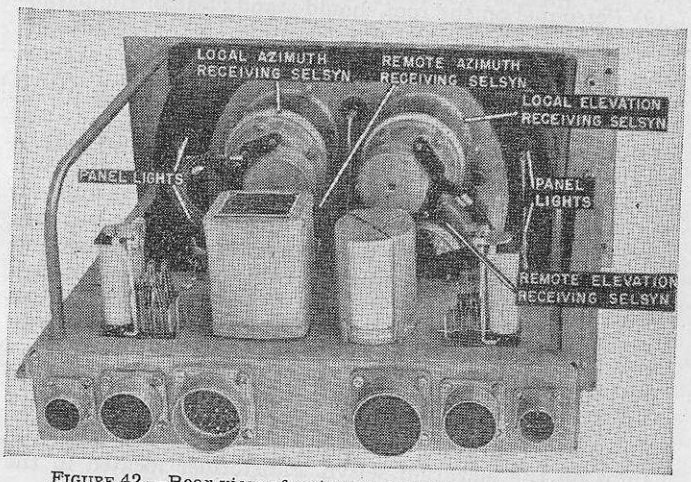


FIGURE 42.—Rear view of antenna position unit (BC–1085).

push down and turn the azimuth orientation handle until the inner and outer coarse azimuth pointers of the director differ by approximately 3,200 mils. Continue to rotate slowly until the director fine azimuth pointers are accurately matched. Tighten the azimuth orientation locking handle, keeping the fine azimuth pointers matched at the director. The coarse azimuth pointers at the director may be accurately positioned by loosening the clamps on the coarse azimuth transmitting selsyn at the SCR–584 and rotating its stator to obtain a difference of 3,200 mils between the inner and outer dials at the director. Tighten the clamps in this position.

(6) Remove the elevation selsyn cover plate on the rear of the pedestal yoke.

(7) Note that when the two sights are pointed at each other, one is depressed and the other elevated. If the SCR–584 is depressed, the angle of depression as indicated by the innermost dial at the M7 must be exactly the same reading as the angle of elevation indicated by the outermost dial. If not, loosen the clamps on the fine elevation transmitting selsyn and rotate the stator to obtain the desired reading.

(8) The coarse elevation pointers are adjusted in the same manner.

(9) Personnel on the roof should stand clear of the parabola. Start the azimuth and elevation motor generators. Turn the safety switch to RUN and rotate the parabola approximately 3,200 mils with the azimuth handwheel. Turn the control switch to REMOTE.

(10) Look at both the fine and coarse azimuth indicators of the director. If the inner and outer pointers of each are not matched, then match them by loosening the clamps on the azimuth selsyn transformer in the base of the pedestal of the SCR–584 and rotate its stator until both the fine and coarse azimuth pointers are matched. When the pointers are matched the parabola will be pointing in the same direction as the director instead of at the director. Tighten the clamps in this position.

(11) Look at both the fine and coarse elevation indicators of the director. If the innermost and outermost pointers of each are not matched, then match them by loosening the clamps on the elevation selsyn transformer located in the

pedestal of the SCR–584 and rotate its stator until both the fine and coarse pointers are matched. When the pointers are matched, the parabola will be pointing in the same elevation as the director. Replace the elevation selsyn cover plate.

(12) Traverse the director to 0 mils in azimuth and 0 mils in elevation. The parabola of the SCR–584 must follow and the azimuth and elevation pointers at the director must stay matched.

(13) Turn OFF the azimuth and elevation motor generators. Wait until the motor generators stop, then throw the safety switch to STOP.

(14) Loosen the clamp on the PPI selsyn located in the base of the pedestal and rotate its stator to cause the sweep direction on the PPI to agree with the azimuth read on the inner pointers of the director, which is 0 mils. Replace the azimuth selsyn cover plate.

(15) Place the control switch in AUTOMATIC and look at the pointers of the azimuth and elevation indicators on the antenna position indicator. If all of the pointers do not read zero, they require adjusting as indicated below.

(16) If any adjustments are necessary, pull the antenna position indicator halfway out of the control rack. (On some units it is more feasible to work from the rear of the antenna position indicator.)

(17) If the inner pointer of the azimuth dial does not read zero, loosen the clamp on the *local* azimuth receiving selsyn in the antenna position indicator, then rotate the stator until the *inner* pointer *does* read zero. Tighten the clamp in this position.

(18) If the outer pointer of the azimuth dial does not read zero, loosen the clamp on the *remote* azimuth receiving selsyn in the antenna position indicator, then rotate the stator unit until the *outer* pointer *does* read zero. Tighten the clamp in this position.

(19) If the inner pointer of the elevation dial does not read zero, loosen the clamp on the *local* elevation receiving selsyn in the antenna position indicator, then rotate the stator until the *inner* pointer *does* read zero. Tighten the clamp in this position.

(20) If the outer pointer of the elevation dial does not read zero, loosen the clamp on the *remote* elevation receiv-

ing selsyn in the antenna position indicator, then rotate the stator until the *outer* pointer *does* read zero. Tighten the clamp in this position.

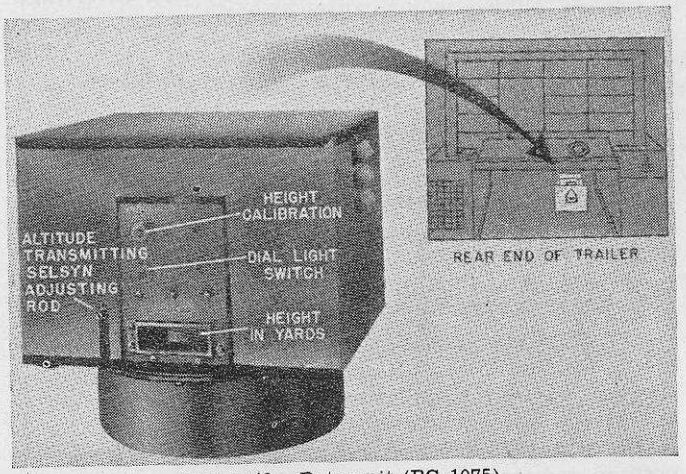


FIGURE 43.—Data unit (BC–1075).

c. Orient and synchronize in altitude as follows:

(1) Before the SCR–584 can be oriented and synchronized for transmitting either altitude or slant range selsyn data, the slant range potentiometer must be accurately calibrated as prescribed in TM 11–1324.

(2) Turn ON the elevation motor generator. Turn the control switch on the SCR–584 control panel to AUTOMATIC, then MANUAL position, and the safety switch to RUN.

(3) Set the hair line on the range indicator unit to 8,000 yards. Throw the altitude slant range switch on the altitude converter control unit to the ALTITUDE position. Throw the altitude slant range switch on the data panel to the ALTITUDE position. Elevate the parabola of the SCR–584 and the director until the pointers of the elevation dials at the director read 533 mils.

(4) With the pointers on the range dials of the SCR–584 set at 8,000 yards, the altitude read at the altitude converter data unit should be 4,000 yards.

(5) If the dial on the data unit does not indicate 4,000 yards, the height calibrate adjustment on the front of the altitude converter data unit should be turned until the indicated altitude is correct.

(6) Elevate the parabola to 1,067 mils as indicated at the director. Set the slant range hair lines to 10,000 yards. The altitude converter data dial should now indicate 8,660 yards altitude. If not, refer to TM 11–1324 for altitude converter adjustments. If it is necessary to move the elevation potentiometer located in the pedestal, recheck the elevation orientation and synchronization.

(7) The altitude at the director should be set to 8,660 yards and the AA pointers made to match by turning the selsyn adjustment rod on the altitude data unit. The SCR–584 is now oriented and synchronized with the director M4 or M7.

■ 40. SIMPLIFIED ORIENTATION.—The above procedure is necessary when orienting the SCR–584 for the first time with a specific director. As long as the same equipment (director and SCR–584) is used together, the selsyns in the antenna position indicator should not need adjusting, although they must be periodically checked and adjusted if necessary. Orientation and synchronization in azimuth may be accomplished by loosening the azimuth orientation locking handle, then pushing down on and turning the azimuth orientation handle until the inner and outer azimuth dials of the director show a difference of exactly 3,200 mils and the fine dials are matched. Elevation orientation and synchronization is correct when the SCR–584 and the M7 have been leveled, providing the adjustment of the telescope on the parabola has not been changed since the last orientation and synchronization. A check must always be made.

■ 41. ORIENTING AND SYNCHRONIZING WITH DIRECTOR M9 OR M10.—*a.* Present position information is transmitted to the computer of the M9 or M10 director by means of data transmitting potentiometers. Present position azimuth and elevation data may also be transmitted to the tracker of these directors by means of the coarse and fine selsyn transmitters in the pedestal of the SCR–584. Perform the following checks:

(1) Check with chief of range section to see that the director has been properly oriented in azimuth and angular height and that the power is off.

(2) Connect the data cable as shown in figure 28.

NOTE.—The telescope on the parabola must be checked to see that its axis coincides with the electrical axis of the parabola. This can be done while tracking a plane or meteorological balloon. (See TM 11–1324.)

b. Place the SCR–584 in operation as described in paragraph 33. Proceed as follows:

(1) With control switch in AUTOMATIC, turn ON the azimuth and elevation motor generators by means of the azimuth and elevation switches in the switch box. Turn the safety switch to RUN and the control switch to MANUAL.

(2) By means of the handwheels on the antenna position control unit, point the parabola accurately in azimuth and elevation at the center of the azimuth telescope of director, as observed through the telescopic sight on the parabola on the SCR–584. When observing through the telescope, be sure to place the eye so that the cross hairs appear in the center of the field of view.

(3) *At the same time,* direct the azimuth telescope of the tracker at the center of the telescope on the parabola of the SCR–584. If the azimuth scope has no horizontal hair line, use the elevation scope to position the azimuth scope in elevation. Be sure the hair lines are in the center of the field of view. The parallax caused by this method is negligible.

(4) Turn OFF the azimuth and elevation motor generators. Wait until the motor generators stop, then throw the safety switch to STOP. Check the position of the parabola by looking through the telescope. If the parabola has moved, repeat the above steps to reposition it.

(5) All dials on the correction panel of the computer must be set to their normal position (that is, no corrections set into the computer). Set the test switch on the adjustment panel of the computer to TRACKER TEST.

(6) Remove the azimuth selsyn cover plate from the pedestal. Loosen the azimuth orientation locking handle by turning counterclockwise. Push down the azimuth orientation handle and rotate it until the reading on the azimuth dials at the computer differs by 3,200 mils from the readings of the outer pointers on the azimuth dials of the tracker and the fine dials are matched. Tighten the azimuth orientation locking handle while holding the azimuth orientation handle to keep proper azimuth indication at the computer.

(7) Note that when the two sights are pointed at each other, one is depressed and the other elevated. If the SCR–584 is depressed, the angle of depression as indicated by the inner elevation dials at the tracker must be exactly the same reading as the angle of elevation indicated by the outer dials. The angle of *depression* as read at the *computer* must be the same as the angle of *elevation* as read at the *tracker.*

(8) Loosen lock nut on the elevation selsyn drive shaft. Loosen setscrew lock nuts on elevation selsyn adjusting arm; adjust setscrews until the angle of *depression* read at the dials of the computer is the same as the angle of *elevation* as read at the tracker. Tighten setscrew lock nuts and the lock nut on the elevation selsyn drive shaft. (See fig. 40.)

(9) Throw the radar height finder switch at the tracker to the RADAR position. Loosen the clamps on the SCR–584 coarse azimuth transmitting selsyn, and rotate its stator until the outer and inner pointers of the coarse azimuth dial at the tracker differ by 3,200 mils. Tighten the clamp in this position. Loosen the clamps on the SCR–584 fine azimuth transmitting selsyn and rotate its stator until the outer and inner pointers of the fine azimuth dial at the tracker are exactly matched.

(10) If the inner elevation pointers at the tracker do not read as indicated in (7) above, it will be necessary to remove the cover plate on the rear of the pedestal yoke. Loosen the clamps on the SCR–584 coarse elevation transmitting selsyn and rotate the stator until the angle of depression as indicated on the inner dial of the coarse selsyn of the tracker is the same as the angle of elevation as indicated on the outer dial of the same selsyn. Tighten the clamps in this position.

(11) The fine elevation pointers are adjusted in the same manner.

(12) Personnel on the roof must stand clear of the parabola. Start the azimuth and elevation motor generators. Turn the safety switch to RUN and rotate the parabola approximately 3,200 mils with the azimuth handwheel. Turn the control switch to REMOTE.

(13) Look at both the fine and coarse azimuth indicators of the tracker. If the inner and outer pointers of each are not matched, then match them by loosening the clamps on the azimuth selsyn transformer in the base of the pedestal of the SCR–584 and rotate its stator until both fine and coarse azimuth pointers are matched. When the pointers are matched the parabola is pointing in the same direction as the tracker instead of at the tracker. Tighten the clamps in the position.

(14) Look at both the fine and coarse elevation indicators of the tracker. If the inner and outer pointers of each are not matched, then match them by loosening the clamps on the elevation selsyn transformer located in the pedestal of the SCR–584 and rotate its stator until both the fine and coarse pointers are matched. When the pointers are matched, the parabola is pointing in the same elevation as the tracker. Replace the elevation selsyn cover plate.

(15) Traverse the director to 0 mils in azimuth and 0 mils in elevation. The parabola of the SCR–584 must follow and the azimuth and elevation pointers at the director must stay matched.

(16) Turn OFF the azimuth and elevation motor generators. Wait until the motor generators stop, then throw the safety switch to STOP.

(17) Loosen the clamp on the PPI selsyn located in the base of the pedestal and rotate its stator to cause the sweep direction on the PPI to agree with the azimuth read on the inner pointers of the tracker, which is 0 mils. Replace the azimuth selsyn cover plate.

(18) Place the control switch in AUTOMATIC and look at the pointers of the azimuth and elevation indicators on the antenna position indicator. If all of the pointers do not read zero, they require adjusting as indicated below.

(19) If any adjustments are necessary, pull the antenna position indicator halfway out of the control rack. (On some units it is more feasible to work from the rear of the antenna position indicator.)

(20) If the inner pointer of the azimuth dial does not read zero, loosen the clamp on the *local* azimuth receiving selsyn in the antenna position indicator, then rotate the stator until the inner pointer *does* read zero. Tighten the clamp in this position.

(21) If the outer pointer of the azimuth dial does not read zero, loosen the clamp on the *remote* azimuth receiving selsyn in the antenna position indicator, then rotate the stator until the outer pointer *does* read zero. Tighten the clamp in this position.

(22) If the inner pointer of the elevation dial does not read zero, loosen the clamp on the *local* elevation receiving selsyn in the antenna position indicator, then rotate the stator until the inner pointer *does* read zero. Tighten the clamp in this position.

(23) If the outer pointer of the elevation dial does not read zero, loosen the clamp on the *remote* elevation receiving selsyn in the antenna position indicator, then rotate the stator until the outer pointer *does* read zero. Tighten the clamp in this position.

c. Slant range.—Set the hair line pointers on the range indicator to 6,000 yards. Throw the altitude-slant-range switch on the data panel to the SLANT RANGE position. If the range meter at the computer does not read exactly 6,000 yards the potentiometer in the range indicator must be set according to procedure outlined in TM 11–1324 and 11–1524. The SCR–584 is now oriented and synchronized with the M9 director.

■ 42. SIMPLIFIED ORIENTATION.—The above procedure is necessary when orienting the SCR–584 for the first time with a specific director. As long as the same equipment (director and SCR–584) is used together, the selsyns in the antenna position indicator should not need adjusting, although they must be checked and adjusted if necessary. Orientation and synchronization in azimuth can be acomplished by loosening the azimuth orientation locking handle and push-

ing down on the azimuth orientation handle and rotating it until the reading on the azimuth dial at the computer differs by 3,200 mils from the readings of the outer pointers on the azimuth dials of the tracker. Elevation orientation and synchronization is correct when the SCR–584 and the M9 have been leveled, providing the adjustment of the telescope on the parabola has not been changed since the last orientation and synchronization. A check must always be made.

SECTION III

OPERATING PROCEDURE

■ 43. GENERAL.—*a.* The operating personnel consists of three persons, whose time is wholly available for operating duties during operation. They are the chief radar operator (CRO) the PPI operator, and the range operator.

b. The chief radar operator maintains watch over the various indicating meters in the equipment and makes adjustments of line voltage, high voltage, and other circuits not readily available to the two other operators. The CRO maintains the Equipment Performance Log, containing the meter readings, performance, etc., of the equipment while in operation. He establishes himself at a post within the trailer where the meters of the high voltage rectifier and modulator are visible to him, and also establishes an inspection routine by which he can, at the necessary intervals, inspect the balance of the equipment. He is equipped with a head and chest telephone set and during firing is in constant contact with the other units of the battery.

c. The PPI operator and the range operator maintain positions at the control rack at all times while the equipment is in operation. Two operating chairs are provided for these operators.

d. The IFF operator and his equipment are not covered by this manual.

e. When the SCR–584 is used for long periods of time for searching, operators are rotated frequently. Experience shows that best results are obtained with not more than 1-hour duty periods. Beyond this period, eyestrain and fatigue impair efficient operation. Only two men are necessary for search, the PPI operator and the CRO or his delegate.

■ 44. PPI OPERATION (SEARCHING).—*a.* The purpose of PPI operation is to provide the gun battery with information concerning the presence of all aircraft within medium radar range. When the SCR–584 is operated in conjunction with an IFF unit, it is also possible to identify the aircraft as friendly or enemy.

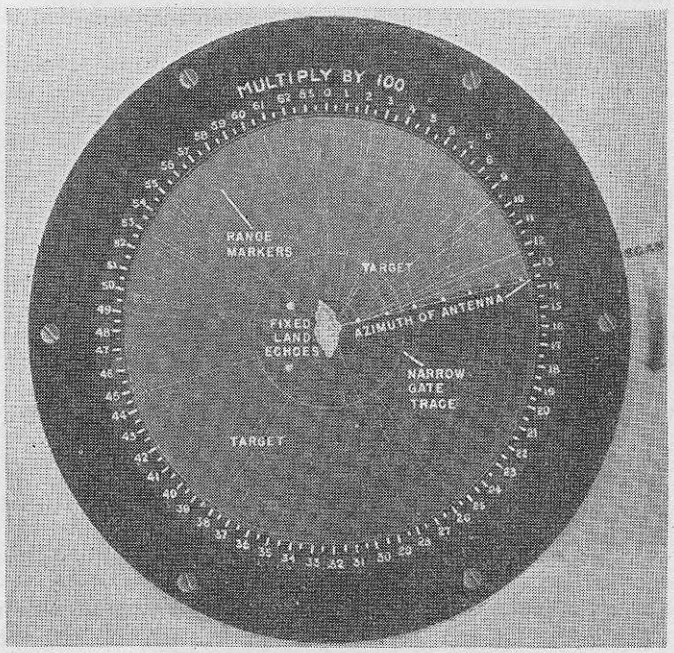


FIGURE 44.—Plan position indicator (PPI).

b. The control switch on the control panel is thrown to the PPI SCAN position. The antenna of the radio set continuously rotates 6,400 mils in azimuth, and automatically scans 356 mils in elevation.

c. To establish the elevation angle for PPI search, throw the control switch to MANUAL and the safety switch to RUN. The parabola is elevated by the elevation control handwheel on the antenna position control unit to approximately 350

mils. The control switch is then turned to the PPI SCAN position.

d. As the parabola begins to rotate in azimuth, and to elevate slowly or depress rapidly in elevation (depending upon what part of the scan cycle operation was started), carefully observe the elevation indicator. The parabola is allowed to rotate for six azimuth revolutions and the lowest elevation reading of the pedestal position indicator dial is noted.

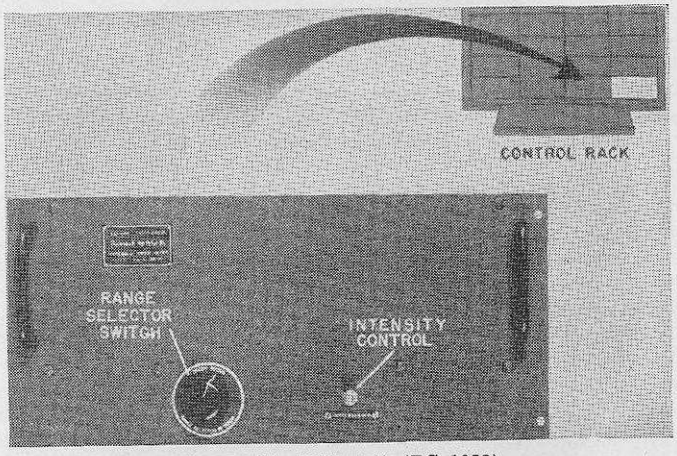


FIGURE 45.—PPI unit (BC–1058).

e. If the scan does not cover the region desired, the elevation handwheel is adjusted to bring the proper area within range of the scan. The handwheel may be moved while the pedestal is scanning, and the parabola will follow the resultant motions provided by the PPI scan mechanism and the handwheel adjustment. Adjust the handwheel until the proper area is covered.

f. As the parabola rotates in azimuth near zero elevation, a large number of signals are seen on the face of the PPI scope. On successive sweeps around the tube as the parabola elevates, these signals grow weaker and disappear. However, the "persistence" of the scope should make them visible for

quite a few seconds. These echoes are ground signals caused by reflections from buildings, hills, water towers, and other fixed ground targets. The pattern of these signals on the PPI scope should be very carefully observed because approaching aircraft at long range are detected by the appearance of new signals which appear in addition to the signals from the ground targets. Signals from aircraft at ranges greater than 30,000 yards usually appear at elevation angles of about 100 mils. As the aircraft approaches, the beam should strike it approximately once per minute. By observation of the elevation indicator dial and the direction of the sweep, it is possible to note that the position of the signal is changing either in azimuth, range, or elevation. The signal grows persistently stronger as the slant range decreases. Slant ranges are estimated on the PPI scope by reference to the range markers. (See fig. 44.)

g. The PPI operator maintains a continuous watch over the PPI scope and the elevation indicator. He also observes the position of the sweep scan on the face of the tube in azimuth. By the data obtained from these sources, the operator is able to differentiate between aircraft signals and fixed ground echoes and to provide early warning information of the approach of aircraft toward the gun battery. If there are many targets in the area, a plot is made of the various targets. This can be made on improvised "polar coordinate" paper.

h. When only a given sector is assigned to be searched, a control switch on the control panel may be placed in either the MANUAL or the PPI SCAN position. Using the MANUAL position, the PPI operator traverses the parabola in azimuth within the limits of the assigned sector, at the same time elevating the parabola in steps of approximately 60 mils, each time the parabola is swung through the angle of the assigned sector. Upon reaching the maximum elevation angle of the searched sector, the operator rapidly lowers the elevation of the parabola to the starting point and repeats the cycle. Using the PPI SCAN position, operation is as indicated in *a* to *g* above. In either case, plotting is done only in the assigned sector. The analysis of the signals on the PPI scope is handled in the same manner as when the radio set is searching a full 6,400 mils of azimuth.

■ 45. IDENTIFICATION.—The PPI operator estimates the position of new aircraft signals in range and azimuth from the PPI scope. This information is relayed to the IFF operator, or to the battery commander if the IFF system is not in use.

■ 46. RANGING.—*a.* The range operator is advised of any suspected aircraft before it approaches the 32,000-yard range of the scope on the range indicator unit. Both operators make preparation, if it is desired to line up on the target

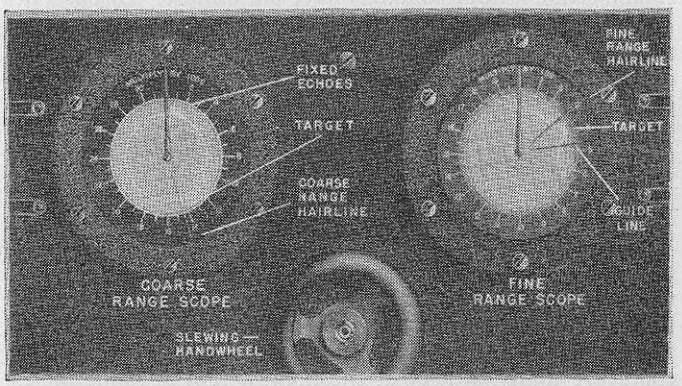


FIGURE 46.—Coarse and fine range scopes.

for possible firing, to transfer the control of the equipment from the PPI operator to the range operator.

b. When the suspected target is within 35,000 yards, the PPI operator throws the range selector switch on the front of the PPI unit to the 35,000-yard position. This gives the PPI operator an expanded scale on which he can judge more accurately the actual range and azimuth of the target.

c. When it has been decided to engage the target, the PPI operator throws the control switch to MANUAL and turns the azimuth and elevation handwheels on the antenna position control unit to maximize the intensity of the signal on the PPI scope. The target now appears on the 32,000-yard (coarse) range scope.

d. The range operator adjusts the hair line on this scope to cover the target by means of the slewing handwheel. The

signal also appears on the sweep sector visible on the 2,000-yard (fine) scope. The range operator then throws the range motor switch on the lower left-hand corner of the range indicator unit to the ON position. The slewing handwheel is turned right or left to keep the target on the intensified portion of the fine range scope.

e. The range operator adjusts the tracking handwheel to set the fine range hair line at the leading edge of the target echo. The guide line of the fine range scope appears near the following edge of the signal. The proper location of the signal in the V formed by the fine range hair line and the guide line on the fine range scope is shown in figure 46.

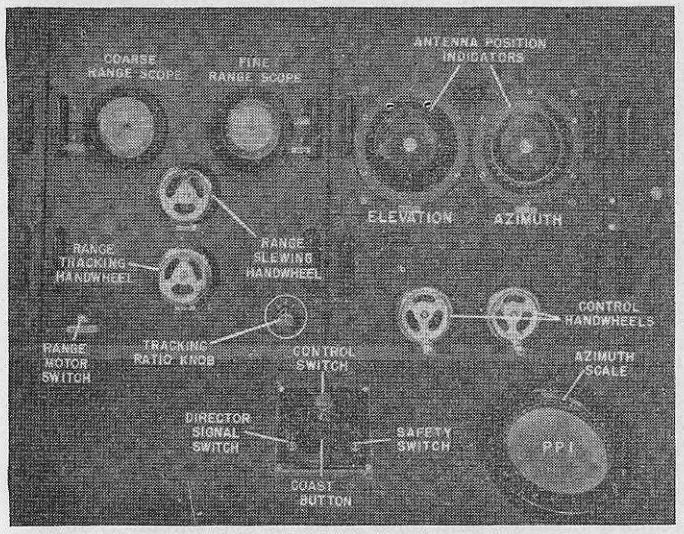


FIGURE 47.—Major operating controls on control rack.

The fine range hair line position indicates the slant range value being transmitted to the director. The guide line is merely a reference line to indicate that the signal must appear between the two lines. With the signal accurately positioned on the leading edge of the fine hair line, accurate range may then be read by adding the reading of the hair

line on the coarse range scope to that indicated by the fine range hair line of the fine range scope.

■ 47. AUTOMATIC TRACKING.—*a.* As soon as the range operator sees the signal on the intensified portion of the fine range scope, the control switch on the control panel must be thrown to the position marked AUTOMATIC. The parabola continues automatically to follow the position of the target in azimuth and elevation.

b. The following procedure for automatic tracking must be carefully adhered to by the range operator. The target echo must be maintained on the intensified portion (narrow gate) of the fine range scope. Only echoes appearing on this sweep will operate the automatic tracking circuit of the radio set. If no signal appears on the intensified portion of this sweep the parabola will stop tracking. If a second signal appears, the parabola may point at one or the other of these targets, or may point midway between the two, depending upon the intensity of each signal.

c. When the range operator has the hair line of the fine range scope properly adjusted, and is tracking in range at a smooth rate, the director signal switch on the control panel should be thrown to the ON position. This switch notifies the operators at the director that the radio set is on target and tracking smoothly.

d. During the time the radio set is tracking the target automatically, the range operator must keep the fine range hair line set *accurately* at the leading edge of the signal seen on the fine range scope, because its rate affects the slant range data being transmitted to the director. He must turn the tracking handwheel smoothly and slowly to keep the hair line exactly at the correct position. As the director requires accurate data for a period of approximately 15 seconds before firing can be started, the range operator must track very carefully from the time the target is turned over to him.

e. While the SCR–584 is tracking automatically, the PPI operator must note the readings of the antenna position indicator dials on the range indicator unit. He must check the local and remote indices to see if they are aligned, to insure that the director is on the same target.

f. The PPI operator also watches for a change in course of the target. This may be seen as the change in rate of rotation of the azimuth or elevation position indicator dial. He also watches for a change of azimuth course by observing the trace of the bright dot left by the target on the PPI scope.

g. The PPI operator watches for other targets which might appear in close proximity to the target being tracked, and warns the range operator in order that he can avoid an interlocking of targets. The range operator is advised of any data noticed by the PPI operator.

h. When there is a possibility of two targets appearing simultaneously on the automatic tracking sector of the fine range scope, the range operator presses the COAST button on the control panel. This eliminates the control of the automatic tracking unit by the target for approximately 4 seconds. During these 4 seconds the automatic tracking unit continues to move the parabola in the same direction and with the same angular velocity as it was moving before the COAST button was pressed. This 4-second interval usually is sufficient to permit the unwanted echo signal to cross and clear the sector of the narrow gate on the fine range scope. Upon releasing the COAST button, the target will probably still be found in its proper position on the fine range scope. The range operator continues tracking as before.

i. If the range operator loses the signal, he should immediately notify the gun director by throwing the toggle switch marked DIRECTOR SIGNAL to the OFF position. He attempts immediately to line up again on the target by adjustment of the azimuth and elevation handwheels. If the target cannot be located within about 15 seconds, the PPI operator takes over the control and searches the narrow sector of the last position of the target.

■ 48. REMOTE OPERATION.—*a.* Remote operation is the method of operation in which the SCR–584 is supplying only slant range or altitude, and the two other elements of data are being obtained at the director visually by operation of the tracking head. The duty of the PPI operator of the SCR–584 during this method of operation is to maintain a con-

556592°—43——6

tinuous watch on the operation of the equipment while the aircraft is being tracked from the director.

b. The range operator throws the control switch on the control panel to the REMOTE position.

c. The range operator tracks in range.

d. The operators will keep themselves on the alert in case the target is lost by the director, or in case the director chief wishes to return tracking control to the radio set.

CHAPTER 4

DRILL

		Paragraphs
SECTION I.	Organization of section	49–50
II.	Drill	51–62
III.	Stop-start outline	63–65

SECTION I

ORGANIZATION OF SECTION

■ 49. ORGANIZATION OF SECTION.—The section is organized as follows:

CRO, Chief radar operator.
No. 1, Range operator.
No. 2, PPI operator.
No. 3, IFF operator.
No. 4, Driver.
No. 5, Relief operator.
No. 6, Relief operator.
No. 7, Relief operator.
No. 8, Radar repairman.

■ 50. DUTIES OF PERSONNEL.—*a.* The chief radar operator (CRO) is in command of the unit. In general, he supervises all operations of a *tactical* nature.

(1) He gives all commands.

(2) He assists the battery commander and range officer in the selection of the site for the radar.

(3) He directs and is responsible for the orientation and synchronization of the radar with the other units of the battery.

(4) He supervises the drill and assigns duties to personnel and relief operators not on duty.

(5) He is responsible for the efficient operation of the radar unit and the training of the operators.

(6) During firing, he selects the target and is in constant telephone contact with the other units of the range section.

(7) He keeps the various log sheets on the equipment.

b. The radar repairman is responsible for the *technical* operation of the radar unit.

(1) He acts as the chief radar operator in his absence.

(2) He makes all adjustments of a technical nature and supervises the maintenance of the radio set.

(3) He is responsible for the correct operation of the unit at all times.

(4) He puts the unit "on the air" after moving to a new position, and makes all adjustments, and tunes the set.

c. The range operator is responsible for the range tracking. He acts as relief PPI operator when searching.

d. The PPI operator is responsible for picking up targets while searching and assisting the range operator while firing.

e. The IFF operator is responsible for the operation of the IFF equipment. If this equipment is not used, he acts as a relief operator.

f. The driver is responsible for driving the prime mover and its care and maintenance. He acts as a relief operator or other duties assigned by the CRO.

g. The relief operators relieve the range operator, PPI operator, or the IFF operator in their absence. They should be trained in all duties so as to be able to efficiently perform the duties of any operator.

SECTION II

DRILL

■ 51. COMMANDS EMPLOYED.—*a.* The following sequence of commands is employed to place the SCR–584 in operation at a new location:

FALL IN
COUNT OFF
CALL OFF
EMPLACE
ORIENT AND SYNCHRONIZE
PREPARE FOR ACTION
ACTION

b. At the completion of tracking the command sequence is:

CEASE OPERATION
CLOSE STATION
MARCH ORDER

c. From a condition of CLOSE STATION the command sequence to go into action is:

FALL IN
COUNT OFF
PREPARE FOR ACTION
ACTION

d. From a condition of CEASE OPERATION the command employed to go into action is:

ACTION

■ 52. SPECIAL DRILL EXCEPTIONS.—No sequence of duties can be outlined for the command ACTION because of the nature of the equipment. A general outline of duties performed by each man will be found in paragraphs 46, 47, and 48.

■ 53. FALL IN.—Command is given by CRO. The section takes the positions indicated in figure 48.

■ 54. COUNT OFF.—Command is given by CRO. Each man in the section calls his number in turn.

■ 55. CALL OFF.—Command is given by CRO. Each man in the section calls out his duty in turn.

Range operator.
PPI operator.
IFF operator.
Driver.
Relief operator.
Relief operator.
Relief operator.
Radar repairman.

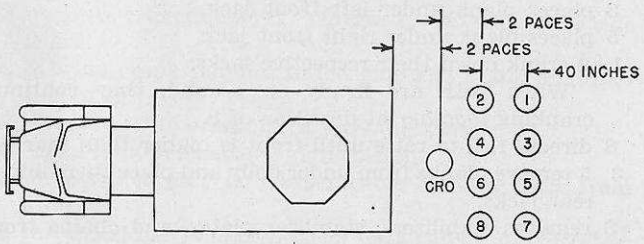


FIGURE 48.—Positions at command FALL IN.

■ 56. EMPLACE.—Command is given by CRO. The men move from the positions assumed at the command FALL IN to positions shown in figure 49 and work as follows:

1 climbs rear ladder to roof.
2 sets handbrake, then climbs rear ladder to roof.
3 opens left side stowage compartment and removes planks, removable braces, jack handle.
4 uncouples airbrake hose, disconnects light cable, unlocks "fifth wheel."
5 cranks down dolly from right side.
6, 7 remove power cable reel and lay power cable to plug adapter assembly.
8 opens left single door, hangs ladder, enters trailer and unlocks roof hatch, opens double doors.
1, 2 open rear half of roof hatch.
3 places planks under dolly.
4 takes driver's seat in prime mover.
1, 2 open front half of roof hatch.
5 completes cranking down dolly; removes jack handle, removes braces from stowage compartment.
8 inspects inside of trailer for any damage during transit.
1, 2 climb down from roof.
CRO checks handbrake, makes certain all personnel are clear of trailer, and directs 4 to pull prime mover away slowly.
4 pulls away from trailer. Drives to truck park and performs necessary maintenance or other duties assigned by CRO.
1, 3 swing down and assemble left front jack.
2, 5 swing down and assemble right front jack.
8 takes position at levels on pedestal.
3 places plank under left front jack.
5 places plank under right front jack.
1, 2 crank down their respective jacks.
When both are firmly on ground, they continue cranking *together* at direction of 8.
8 directs 1, 2 to raise until front is higher than rear.
3, 5 remove planks from under dolly and place them under rear jacks.
3 removes stabilizers, stabilizer plates, and chains from left stowage compartment.

5 removes stabilizers, stabilizer plates, and chains from right stowage compartment.
1, 3 swing down and assemble left rear jack.
2, 5 swing down and assemble right rear jack.
1, 2 crank down their respective jacks.
When both are firmly on ground, continue cranking *together* at direction of 8.
8 watches lengthwise level. Directs 1, 2 to crank until level lengthwise.

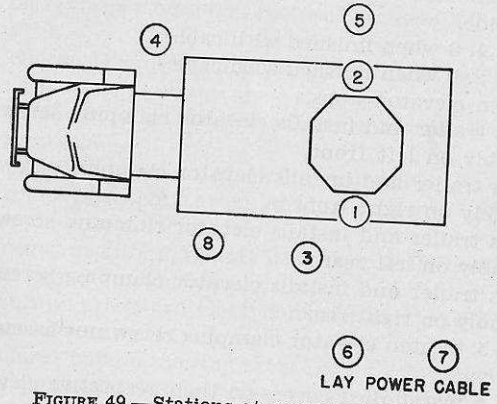


FIGURE 49.—Stations at command EMPLACE.

3 extends and hangs stabilizer bars on front and rear left side.
5 extends and hangs stabilizer bars on front and rear right side.
8 observes crosswise level. Directs 1, 2 to whichever side is low.
1, 2 bring crank handles to low side and crank at direction of 8.
8 directs 1, 2 to crank until level crosswise.
6 plugs in power cable to data panel.
8 directs 6 to plug in jumper cable or data cable from director.
6 installs either jumper cable or data cable from director.
7 installs ground stake.

8 removes the four elevation clamping screw nut assemblies and dust covers from elevating screws.
CRO calls for power ON at power plant.
8 takes position at switch box. When all personnel are clear of elevator, presses RAISE button to raise elevator. Stands by switch ready to push STOP (red) button in case of emergency.
1, 3 install stabilizers, stabilizer plates, and chains on left side.
2, 5 install stabilizers, stabilizer plates, and chains on right side.
6 assists 1, 3 when finished with cables.
7 assists 2, 5 when finished with cables.
When elevator stops,
1 enters trailer and installs elevator clamping screw nut assembly on left front.
2 enters trailer and installs elevator clamping screw nut assembly on right front.
3 enters trailer and installs elevator clamping screw nut assembly on left rear.
5 enters trailer and installs elevator clamping screw nut assembly on right rear.
1, 2, 3, 5 tighten elevator clamping screw nut assemblies *together*.
1, 2, 3, 5 install dust covers on their respective elevating screws.
8 installs the two drain hoses.
6 opens all ventilator doors underneath trailer.
7 enters trailer and opens two rear ventilators and front ventilator or starts gasoline heater at direction of CRO.
CRO directs 7 to adjust ventilating system in accordance with the weather.
1, 5 leave trailer as soon as they finish with dust covers.
1 climbs to roof taking leveling wrench. He unlocks parabola from its stowed position.
3 removes chairs from stowed position under control rack.
8 assembles and installs removable sections of r. f. line.
2 assists 8.
5, 6 perform duties as assigned by CRO.

CRO climbs to roof to direct fine leveling.
1 loosens four level locking screws and adjusts level screws at direction of CRO.
CRO observes levels and directs 1 to turn level screws in pairs, to bring level bubbles to center. When level, directs 1 to stand clear of parabola. Directs 8 to swing parabola slowly in azimuth to check level.
8 turns on azimuth and elevation motor generators in switch box and necessary switches on control rack, and swings parabola as directed by CRO.
2 observes personnel on roof and passes CRO's commands to 8.
3 checks IFF equipment or other duties as assigned by CRO.
CRO when satisfied trailer is level, directs 8 to depress parabola.
8 positions parabola at direction of CRO.
2 removes antenna from stowing rack and hands to 1 on roof.
1 removes antenna shaft cap from shaft and exchanges it with 2 for antenna.
8 throws safety switch on control panel to OFF.
1 installs antenna.
2 places cap on stowing rack.
8 inspects data cable connections from director, satisfying himself they are correctly made.

■ 57. ORIENT AND SYNCHRONIZE.—Command is given by CRO.
If telephone communication has not been established,
2, 3, 4, 5, perform duties as assigned by CRO.
6, 7 lay telephone wire to director.
1 climbs to roof taking telephone with him. Takes off azimuth selsyn cover.
8 operates necessary switches to position parabola.
CRO confers with CS (chief of section) to determine if director is oriented in azimuth and elevation. Climbs to roof of trailer.
6, 7 make telephone connection to data panel (marked INTER-PHONE).
8 installs telephone and plugs into junction box.

CRO directs8 to position parabola to point telescopic sight at azimuth telescope of director by looking through the sight.

8 positions parabola, as directed by CRO (at the same time the director crew will point their azimuth scope at the sight of the SCR–584).

CRO directs 1 to orient with director.

1 loosens the azimuth orientation locking handle, presses down on the azimuth orientation handle, and turns it until the inner and outer pointers of the director show a difference of 3,200 mils. If orienting with the directors M9, M10 using only the D receptacle (voltage data) he directs 8 to position parabola to align sight on orienting point. He turns azimuth orienting handle until the azimuth dials on the computer read the azimuth of the orienting point.

8 checks the local and remote indicators of the antenna position indicator, and the PPI. If not correct he proceeds as outlined in paragraphs 39 and 41.

CRO checks with director crew to make certain inner and outer dials of elevation read the same in elevation and depression. (See paragraphs 39 and 41.)

If orienting with directors M9, M10 the elevation dial should read the elevation of the orienting point. Climbs down from roof, enters trailer, and directs 8.

1 replaces azimuth selsyn cover. Disconnects phone and climbs down.

8 checks synchronization in range by setting range scope to range as directed by CRO.

CRO by telephone checks reading at director.

CRO directs 8 to set elevation dials to 533 mils and to set range on the range scope to 8,000 yards.

CRO checks altitude data unit to make certain it reads 4,000 yards. Checks with director crew to make certain this reading is correct at the director. If not, directs 8 to adjust the altitude selsyn adjusting rod to 4,000 yards. (Altitude will not normally be transmitted to directors M9, M10.)

■ 58. ACTION.—Command is given by CRO. (See par. 51 for sequence of commands.)

1 closes necessary switches to place equipment in full operation (par. 33) then takes position at range operator's seat in trailer.

2 takes PPI operator's seat in trailer.

3 takes IFF operator's position in trailer.

CRO designates duties of other men and directs operators as to the nature of the action. Takes position behind 1, 2 and establishes telephone contacts with the other units in the range section.

■ 59. CEASE OPERATION.—Command is given by CRO.

1 turns off range motor switch. He turns safety switch to STOP.

2 stands by.

CRO designates duties of other men.

■ 60. CLOSE STATION.—Command is given by CRO (this command must be preceded by CEASE OPERATION).

2 positions parabola to 0 mils elevation.

1 turns off all switches (see par. 34) except main power switch at direction of CRO.

3 turns off IFF equipment, or other duties designated by CRO.

CRO directs 1 whether to turn off main power switch, depending on length of shut down. Designates duties of other men.

■ 61. PREPARE FOR ACTION.—Command is given by CRO.

CRO climbs to roof and checks level of trailer. Directs 1 in leveling if necessary.

1 closes necessary switches (see par. 33) to place the unit in full operation. He takes range operator's seat and tests operation of range controls.

2 takes position at PPI and tests operation of azimuth and elevation controls.

3 takes position at IFF and tests operation of his equipment.

CRO designates duties of other men.

■ 62. MARCH ORDER.—Command is given by CRO. (This command must be preceded by CLOSE STATION.)

1 turns off high voltage rectifier and modulator, spinner motor, and dehydrator.
4 goes to truck park to get prime mover.
2 positions parabola to allow antenna to be removed.
1 climbs to roof and removes antenna. He exchanges the antenna with 2 for the antenna shaft cap and installs the cap.
2 removes antenna shaft cap and exchanges the cap with 1 for antenna. Stows antenna.
8 removes r. f. lines.
3 removes and telescopes the stabilizers on the left side.
5 removes and telescopes the stabilizers on the right side.
7 closes all ventilators under trailer.
6 removes and stows ground stake.
2 positions parabola for stowing. Turns off motor generators after r. f. lines have been removed.
1 tightens azimuth and elevation locking handles. Climbs down and removes elevator clamping screw nut assembly on left front, removes dust covers.
2 removes elevator clamping screw nut assembly on right front, removes dust covers.
6 removes elevator clamping screw nut assembly on left rear, removes dust covers.
7 removes elevator clamping screw nut assembly on right rear, removes dust covers. Closes ventilators inside trailer. Turns off gasoline heater if used.
6 stows chairs under control rack.
1 assists 3.
2 assists 5.
8 removes and stows drain hose. Checks to see if all personnel are clear, then presses LOWER button. Stands by to press STOP (red) button in case of emergency.
6 assists 3 at left side stabilizers.
7 assists 5 at right side stabilizers.
1 stows left stabilizer bars, plates, and chains.
2 stows right stabilizer bars, plates, and chains.
3 raises front left jack, works with 6.
5 raises front right jack, works with 7.

6 disassembles left front jack and folds in place.
7 disassembles right front jack and folds in place.
When elevator is down,
8 turns off main power switch.
CRO calls for power off at power plant.
6, 7 disconnect cables from data panel, stow jumper cable if used, and roll up power cable on reel.
8 installs the four elevator clamping screw nut assemblies and covers.
1, 3 raise and disassemble left rear jack.
2, 5 raise and disassemble right rear jack.
1 stows braces, jack handle, and planks in left stowage compartment.
2 stows braces, jack handle, and planks in right stowage compartment.
1, 2 climb to roof and close hatches.
8 locks hatches from inside, stows ladder, locks doors.
1, 2 climb down.
4 wipes the "fifth wheel" of the prime mover and the pintle of the trailer.
CRO checks that all cables and wires are disconnected and personnel are clear, then directs 4 to back prime mover to couple the trailer.
1 locks "fifth wheel" when coupled.
CRO directs 4 to try to pull ahead to make certain trailer is coupled.
4 as directed by CRO then dismounts and connects light cable and air hoses.
5 cranks up dolly.
1, 3 stow planks.
8 locks all doors and compartments.
2 releases handbrake.

SECTION III

STOP-START OUTLINE

■ 63. GENERAL.—*a.* The stop-start outline is presented for use by units in the theater of operations on the alert. It represents the quickest means of taking the unit "off the air" and returning it to operation.

b. The outline is not a substitute for the regular starting procedure as outlined in paragraph 33 but rather a "stand-by" measure. It is presupposed that the operator has full knowledge of the correct voltage readings and will check them at the earliest opportunity.

c. THE PROCEDURE WILL NOT BE USED BY UNITS WHILE IN EARLY STAGES OF TRAINING.

d. THE START PROCEDURE AS OUTLINED IN PARAGRAPH 65 CAN ONLY BE USED AFTER USING THE STOP PROCEDURE OUTLINED IN PARAGRAPH 64 AND NONE OF THE CONTROLS OR SWITCHES HAVE BEEN MOVED DURING SHUT-DOWN.

■ 64. STOP.—*a.* Press LOWER button on the high-voltage rectifier until the amber light on the panel glows.

b. Throw the LINE SWITCHES on the high voltage rectifier and modulator to the OFF position.

c. Throw the main power switch to the OFF position. (On early models this is done at the generating unit.)

NOTE.—*If light or power is needed in the trailer during shut-down, the main power switch is left ON, and the following steps are added:*

(1) Turn off all panel switches in the control rack.

(2) In the switch box, turn off the three switches marked SPINNER MOTOR, AZIMUTH MOTOR, and ELEVATION MOTOR.

(3) Throw the power switch on the dehydrator to the OFF position.

■ 65. START.—*a.* Throw the main power switch to the ON position.

b. Throw the LINE SWITCHES on the high voltage rectifier and modulator to the ON position.

c. Wait 30 seconds for the time delay or "green" READY light on the modulator panel to glow. During this time, check the line voltage, and all filament voltages.

d. Press START button on modulator. (The "amber" BIAS light should glow.)

e. Press CLOSE button on the modulator panel. (The "green" light should go off and the "red" light should glow.)

f. Press and hold the RAISE button on the high voltage rectifier until the voltmeter reads approximately 20 kv and the OSC current 27 ma.

NOTE.—*If steps c(1), (2), and (3) in paragraph 64 were taken, the following steps are necessary:*

(1) Turn on the power switches in the following units:
Automatic tracking unit.
Range power supply.
Receiver power supply.
PPI power supply.
Altitude converter power supply, if used.

(2) In the switch box, turn on the three switches marked SPINNER MOTOR, AZIMUTH MOTOR, and ELEVATION MOTOR.

(3) Throw the power switch on the dehydrator to the ON position.

CHAPTER 5

PREPARATION FOR MOVEMENT

66. GENERAL.—To change location and to pack the SCR–584 for transport to a new position, preparations begin with the same procedure outlined in paragraph 34, with the exception that the switches in the switch box and the switch on the automatic tracking unit are left in the ON position.

67. LOWERING PEDESTAL.—After the parabola has been positioned at zero mils elevation, the main power switch on the high-voltage rectifier and the power switch on the modulator have been placed in the OFF position, and the dehydrator has been shut off, proceed as follows:

a. Turn the spinner motor switch in the switch box to the OFF position.

b. Remove the r. f. lines, separate the sections, and stow them in the brackets provided on the wall of the trailer near the front of the modulator unit.

c. Check to see that the safety switch is in the STOP position.

d. Remove the antenna assembly from the rotating tube in the front of the parabola on the pedestal, replace the dust caps on the antenna shaft and the spinner shaft, and stow antenna in the brackets provided for it below the switch box.

NOTE.—*THE ANTENNA ASSEMBLY MUST BE REMOVED BEFORE LOWERING THE ELEVATOR. THE ELEVATOR HATCH DOORS IN THE ROOF OF THE TRAILER WILL NOT CLOSE WHILE THE ANTENNA IS IN THE PEDESTAL WITHOUT DAMAGING OR BREAKING THE ANTENNA.*

e. With the azimuth handwheel on the antenna position control unit, rotate the antenna in azimuth until the roller of the elevator interlock switch is seated in the center of the depression on the elevator interlock cam. (See fig. 50.)

f. With the elevation handwheel, elevate the parabola so that it is at an angle of *1,580 mils.*

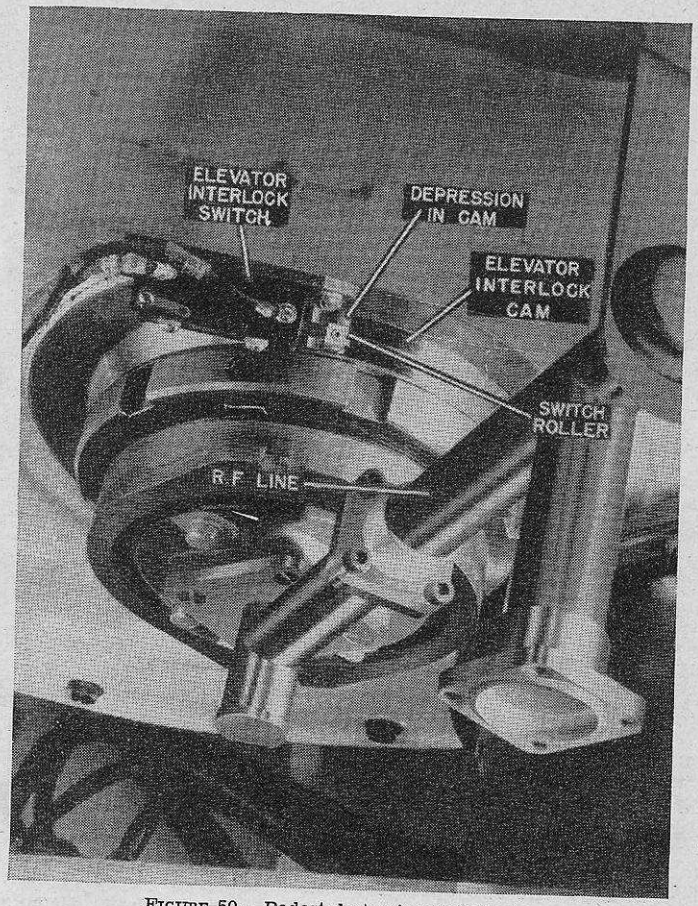


FIGURE 50.—Pedestal stowing interlock.

g. Turn off the power switch on the automatic tracking unit and the azimuth and elevation motor switches in the switch box.

h. Pull the holding pin and tighten the elevation locking handle on the pedestal. The holding pin may then be released, and should seat firmly. Turn the azimuth locking

556592°—43——7

handle on the pedestal in a clockwise direction until it is tight.

i. Remove the elevator clamping screw nut assemblies at the four corners of the elevator adjacent to the elevating screws.

j. Remove the four screw covers from the elevating screws. Remove the two drain hoses from the opposite corners of the elevator and place them in their clamps.

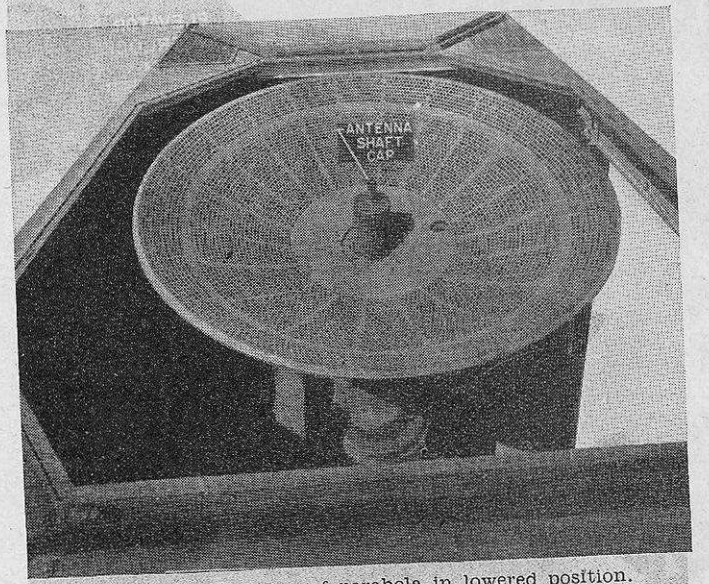


FIGURE 51.—Top view of parabola in lowered position.

k. Stow the two operators' chairs under the control rack and fasten securely by means of the straps provided for this purpose. (See fig. 6.)

l. Clear the space under the elevator and remove all objects from the elevator section on the roof.

m. Press the LOWER button of the elevator switch in the switch box. The elevator descends slowly to its stowing position, requiring about 5 minutes, and stops automatically

at its lower limit of travel. Watch the elevator to be sure limit switch works.

n. Replace the elevator clamping screw nut assemblies on the four threaded studs which now project up through the elevator platform. Tighten securely.

o. Replace the elevating screw covers.

p. Close the roof hatch doors. The front door should be closed first. The front door will require two men on the roof and one man inside the trailer to lower it gently into position. The men on the roof elevate the door to an upright position and "walk" it closed, similar to the manner in which it was opened. The elevator hatch doors are then locked from the inside.

q. Throw the main power switch to OFF. Turn off power at the generating unit.

■ 68. PACKING FOR TRANSPORT.—*a.* Remove the data and power cables, telephone lines, and ground connections from the data panel, underneath the trailer, and close the cover over the data panel, securing it firmly in place. Remove and stow the ground stake.

b. See that the six floor ventilators, the two sidewall ventilators, and the front wall ventilator are securely closed. If the gasoline heater has been used, shut off the gasoline supply at the shut-off valve near the base of the gasoline storage tank by adjusting the pet-cock handle to a horizontal position. Make certain that the heater unit fuel shut-off valve has been closed and the air intake shut.

c. Loosen the turnbuckles of the stabilizers and remove the stabilizers and chains. Telescope the bars, and place the bars, chains, and ground plates in the stowage compartment. Stow the ground stake.

d. Raise the rear jacks. Remove the planks on which they have rested and place the planks underneath the dolly wheels. Fold the jacks under the trailer and lock them in place, stowing the removable sections. Crank the dolly completely down to the vertical position, and place the operating handle in its clip at the side of the trailer.

e. Raise the front jacks, removing and stowing the removable section. Fold the jacks under the trailer and lock them in place by means of the gravity locking pins provided.

f. Stow the removable ladder on its brackets on the small door at the front of the trailer. Close and lock all stowage compartment and trailer doors.

g. Wipe the dirt from the two halves of the "fifth wheel," the one on the tractor and the other on the fore part of the trailer.

h. Check to make certain that the parking brake handwheel at the rear of the trailer is tight.

i. Back the tractor carefully under the front of the trailer, with the fifth wheel in the unlocked position. This operation will lift the dolly from the ground.

j. Remove the planks from under the dolly wheels, and stow all four planks in the stowage compartment or other designated place.

k. Lock the fifth wheel by operating the locking bar so that it is pointing toward the right side of the road.

l. Pull the truck ahead just enough to make certain that the coupling is secure. ***Caution:*** Do not attempt to tow the trailer at this time, because the brakes are still on.

m. Install the trailer light connection and couple the air hoses of the tractor to the couplings on the front of the trailer. The air brake hoses of the tractor should be crossed; that is, the right hose of the tractor connected to the left air brake connector of the trailer, and vice versa.

n. Open the air brake hose valves on the tractor.

o. Release the trailer parking brake by turning the brake handwheel counterclockwise as far as possible.

p. Raise the dolly by means of the dolly crank and replace the crank firmly in its retaining clips.

q. Check the running lights of the trailer, and throw the blackout light switch on the right of the trailer to the appropriate position. Lock all doors.

r. The unit is now in traveling position.

CHAPTER 6

MAINTENANCE

	Paragraphs
SECTION I. Preventive maintenance	69
II. General maintenance	70–75

SECTION I

PREVENTIVE MAINTENANCE

■ 69. GENERAL.—*a.* Preventive maintenance is comprised of specific operations to be performed by the battery personnel at regular intervals. The items include such details as checking for overheating of electrical parts and vacuum tubes, checking the condition of relays, switches, mountings, and connections, and cleaning and painting exposed surfaces. While these details may seem trivial, preventive maintenance will often prevent a major breakdown when the equipment is most needed.

b. Full instructions on the use of the "General Preventive Maintenance Schedule" are given in TM 11–1424. The schedule and the manual are supplied with the SCR–584. (In some early models, these may not be supplied.)

SECTION II

GENERAL MAINTENANCE

■ 70. LUBRICATION.—*a.* The lubrication of the SCR–584 has been reduced to a minimum by the use of sealed ball bearings, grease retainers, and gears inclosed in oil reservoirs. However, the greasing of exposed parts and keeping up the oil levels in the reservoirs must not be neglected.

b. In the pedestal, the azimuth and elevation main drive gears are lubricated while in operation by means of a plunger type oil pump mounted in an oil sump or reservoir. The oil used is standard SAE 10W motor oil. For cold temperatures this is diluted with kerosene in the following proportions:

Temperature (°F)	*Oil (percent)*	*Kerosene (percent)*
0 to —20	80	20
—20 to —30	70	30
—30 to —40	60	40

The drain plugs on the azimuth and elevation gears are equipped with a magnet for picking up loose metal particles that collect in the oil. A complete change of oil should be made periodically according to specifications contained in TM 11–1324.

■ 71. AZIMUTH RESERVOIR.—The capacity of the azimuth gear sump is 2½ quarts. The oil level must be even with the bottom of the filler plug hole on the under side of the pedestal base. *Do not fill above this line.*

■ 72. ELEVATION RESERVOIR.—When filling or draining the elevation gear sump, position the antenna in such a way that the drain plug is in the lowest position. Throw the safety switch to OFF to prevent accidental movement of the antenna.

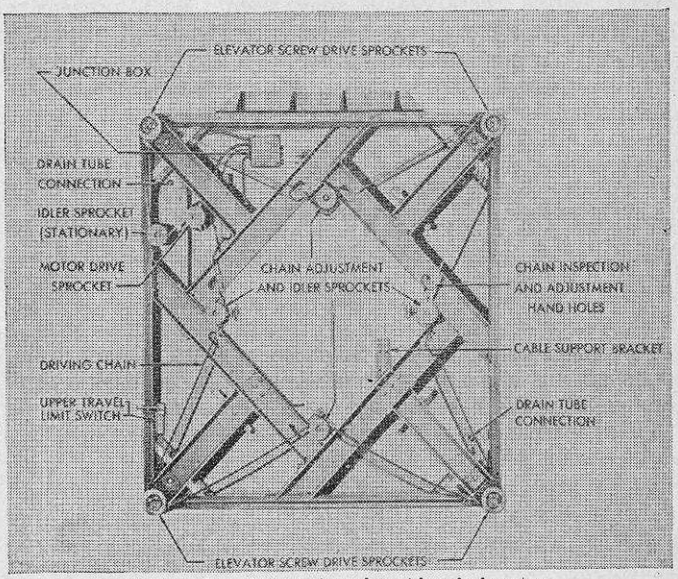


FIGURE 52.—View of under side of elevator.

■ 73. ELEVATOR.—*a.* The elevating screws must have grease on the threads at all times.

b. Thoroughly clean the threads with kerosene or other

solvent and spread the special black grease (supplied with the SCR–584) on the threads with a brush.

■ 74. TRAILER.—*a.* The trailer proper must be lubricated regularly as any other Army vehicle. The springs must not be sprayed or greased as this impairs the spring action of the trailer in absorbing road shock.

b. The jacks and stabilizers are lubricated at frequent intervals to prevent freezing from dirt, grime, and rust. This is done by completely disassembling the parts, cleaning with kerosene or solvent, and regreasing. The special black grease is used on all threads and gear grease on the gears of the jacks.

c. The elevator chain must be lubricated with the special black grease. The grease is applied by holding a brush at one point on the chain while the elevator is raising.

■ 75. POTENTIOMETERS.—Instruction for maintaining oil in potentiometers is given in TM 11–1324.

Caution: UNITS ARE SOMETIMES SHIPPED DRY.

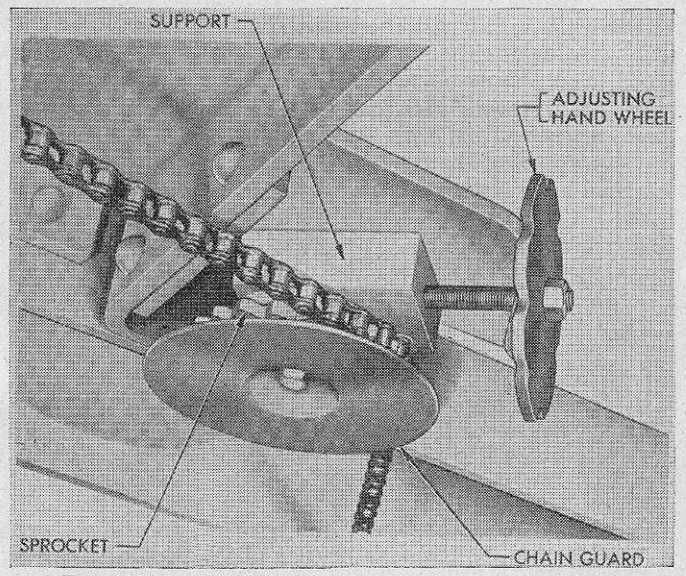


FIGURE 53.—Adjustment mechanism for elevator chain.

APPENDIX I

ELECTRICAL DANGERS AND FIRST-AID TREATMENT

■ 1. ELECTRIC SHOCK.—*a.* Most persons who have worked with electrical apparatus have experienced an electric shock. Some of these shocks may have been severe enough to cause pain, and occasionally they may have resulted in powerful muscular spasms sufficient to throw the victim off his balance. Persons often invite electric shock by feeling for the presence of electric current at various points of circuits under inspection. THIS IS UNSAFE AND MUST NOT BE DONE.

b. Electric shocks are never wholly without danger. Relatively small electric currents are likely to cause death if they pass through certain vital organs of the body. Alternating currents, at the usual commercial frequencies, are somewhat more dangerous than direct currents. Thus a 60-cycle alternating current, at about 1/10 ampere, in passing from head to foot, or from arm to leg, or between the two arms in such a manner as to include the lungs and heart in the circuit, will cause death in 1 or 2 seconds. Smaller currents may render a victim unable to release himself, since electric current always causes muscular contractions which at times forces victims to hang on to live circuits tighter than normally. A person caught on an electric circuit in this manner may find himself unable to get away except by going through strange contortions and using much strenuous effort. Such persons are fully aware of the almost hopeless situation in which they find themselves under such conditions.

■ 2. DANGEROUS VOLTAGES.—The amount of current which a person may receive from an electric circuit depends upon the voltage of the circuit and how good a contact there is between himself and the circuit. Normally, dry skin is a reasonably good insulator, offering a hand-to-hand resistance of 100,000 ohms or more. The opposite is true of wet skin, however, whether wet from applied moisture or from excessive perspiration. Persons in hot, damp locations have often been killed from the current resulting from 120-volt, 60-cycle circuits, since their body resistance under these

conditions is not more than a few thousand ohms at the most. On the other hand, it is well to know that if very dry hands are touched to such a circuit, the fact that the circuit is "alive" can often times hardly be determined.

■ 3. PRECAUTIONS.—*a.* The presence of high voltage in electric equipment using vacuum tubes creates a somewhat more serious hazard than it does in many other kinds of electric apparatus. Most amplifying equipment is quite compact and "live" wiring and terminals are common. These danger spots DO NOT LOOK DANGEROUS TO THE EYE, BUT MUCH OF THE EQUIPMENT IN THE SCR–584 OPERATES AT VOLTAGES SUFFICIENTLY HIGH TO BE DANGEROUS. Consequently, persons working around equipment of this sort must have the highest respect for the danger involved. The voltages, however, are not sufficiently high to "jump" at you through any appreciable air gap.

b. Protective switches have been provided in the SCR–584, which open and ground some of the electrical circuits when high-voltage wiring is exposed. These safety devices, as well as high-voltage components themselves, are conceivably subject to failure, either because of intentional tampering or because of mechanical break-down. The correct way to work on this apparatus is to ALWAYS DEENERGIZE AND GROUND THE HIGH VOLTAGE CIRCUITS BEFORE BEGINNING WORK AND BE SURE THAT CONDENSERS ARE THOROUGHLY DISCHARGED. Occasionally this is not practicable because of the necessity of testing under operating conditions. When it is necessary to work on live equipment, every precaution should be taken to follow well established safety practices and to use the greatest amount of care. BOTH SIDES OF A LIVE CIRCUIT MUST NEVER BE TOUCHED, AND IF FOR A GOOD REASON ONE SIDE IS TO BE TOUCHED, THE INDIVIDUAL MUST MAKE ABSOLUTELY SURE THAT HE IS WELL INSULATED FROM THE GROUND. Failure of these safety mechanisms or precautions, for any cause whatsoever, may result in electric shock to the personnel.

■ 4. RESCUE.—In all cases of electric shock, shut off the high voltage at once and ground the circuits. If for any reason the high voltage cannot be shut off, the victim must be freed

of contact with the live conductor as promptly as possible. The rescuer himself must exert great care to prevent direct contact with either the live conductor or the victim's body by using a dry stick, dry board, dry clothing, or other nonconductor.

■ 5. SYMPTOMS.—*a.* In electric shock, the current may pass through the breathing center at the base of the brain and cause this center to stop sending out the nervous impulses which act upon the muscles responsible for breathing. In consequence, breathing stops abruptly. If the shock has not been too severe, the breathing center recovers after a time and resumes the vitally necessary duty of sending impulses to the muscles of breathing, provided that a sufficient supply of air has been furnished the body meanwhile by artificial respiration. Cases are recorded where 8 hours' work was necessary before the breathing center recovered and the patient began to breathe of his own accord. Therefore, the ordinary and general tests for death should never be accepted.

b. The patient is usually blue, although occasionally he may be very white. The pulse is weak or entirely absent. Unconsciousness is complete. Burns may be present. Occasionally the body becomes rigid or stiff in a very few minutes. This is due to the action of the electricity and is not to be considered "rigor mortis." This stiffness is not a sign to stop artificial respiration, as a few of such cases are reported to have been revived.

■ 6. TREATMENT FOR ELECTRIC SHOCK.—*a.* Lay the patient face downward, one arm extended directly overhead, the other arm bent at the elbow and with the face turned outward and resting on hand or forearm so that the nose and mouth are free for breathing. (See fig. 1.)

b. Kneel straddling the patient's thighs, with your knees placed at such a distance from the hip bones as will allow you to assume the position shown in figure 1. In many cases (due to the size of the patient) it may be more convenient to straddle only one leg. Place the palms of the hands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers just out of sight. (See fig. 1.)

c. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. The shoulders should be directly over the heel of the hand at the end of the forward swing. (See fig. 2.) Do not bend your elbows. Do not apply more than 60 pounds of pressure. This operation should take about 2 seconds.

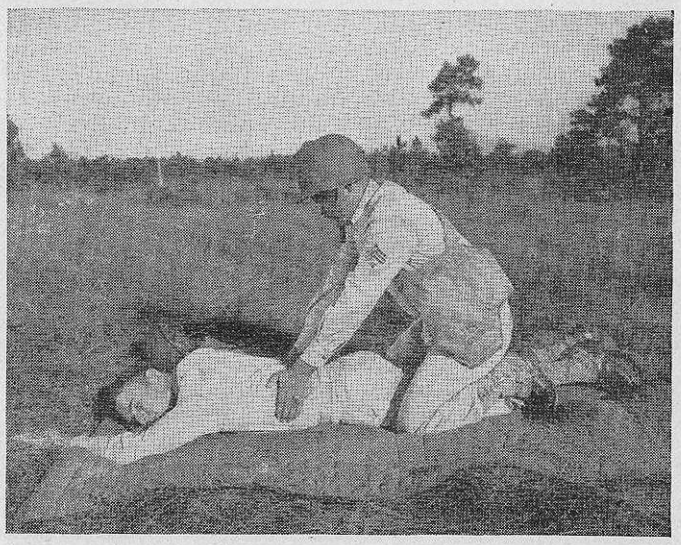


FIGURE 1.—First position of artificial respiration.

d. Now immediately swing backward so as to remove the pressure completely and suddenly. (See fig. 3.)

e. After 2 seconds, swing forward again. Repeat this double movement of compression and release. A complete respiration should take 4 or 5 seconds and should be repeated 12 to 15 times a minute.

f. Continue artificial respiration without interruption until natural breathing is restored; 4 hours or longer if necessary, or until proper medical personnel declare the patient dead.

g. As soon as artificial respiration has been started and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest, or waist. KEEP THE PATIENT WARM. If at all possible, the artificial

respiration should be performed while the patient is wrapped in a blanket. Do not give any liquids whatever by mouth until the patient is fully conscious.

h. To avoid strain on the heart when the patient revives, he should be kept lying down and not allowed to stand or



FIGURE 2.—Second position of artificial respiration.

sit up. If medical personnel have not arrived by the time the patient has revived, the patient should be given some stimulant, such as one teaspoonful of aromatic spirits of ammonia in a small glass of water, or a drink of hot coffee or tea. The patient should be kept warm.

i. Resuscitation should be carried on at the nearest possible point where the patient received his injuries. He should not be moved from this point until he is breathing normally, of his own volition, and then moved only in a lying position. Should it be necessary, due to extreme weather conditions, etc., to move the patient before he is breathing normally, resuscitation should be carried on during the time he is being moved.

j. A brief return of natural respiration is not a certain indication that the resuscitation should be stopped. Not infrequently the patient, after a temporary recovery of respiration, stops breathing again. The patient must be watched

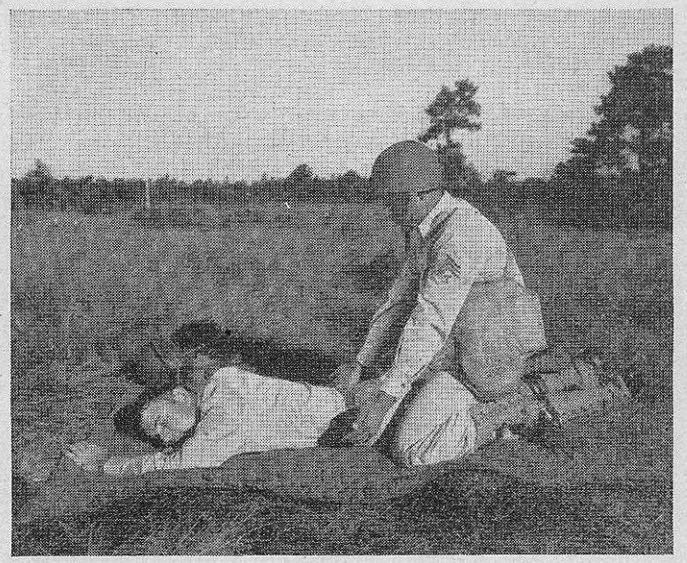


FIGURE 3.—Third position of artificial respiration.

and if natural breathing stops, artificial respiration should be resumed at once.

k. In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. By this procedure no confusion results at the time of change of operator and a regular rhythm is kept up.

■ 7. EXPLANATORY NOTES ON RESUSCITATION.—*a.* If it is evident that air is not being drawn into the patient's chest, examine the mouth for a possible obstruction, and remove any foreign body such as false teeth, chewing gum, or tobacco. An assistant should watch the patient's face and wipe

out from the mouth any frothy mucous or saliva that may collect and interfere with respiration.

b. If the operator is large and the patient small, then the operator will, of course, not swing forward until all the weight of his body is brought to bear on the patient, but only until firm resistance is met beneath his hands. Sixty pounds pressure is sufficient for even a large adult. Damage can be done by too great pressure.

■ 8. TREATMENT DURING RECOVERY.—*a.* The patient may show no sign of beginning recovery for some time and then may gradually begin to regain a more normal color, indicating that the blood is getting more oxygen and that the circulation is improving. Then he may show slight muscular effort, such as a slight twitching or a scratching or clutching motion of the fingers. The first attempt to breathe may be a catch of the breath or a faint sigh. The operator should watch very carefully at this point so as not to exert pressure as the patient attempts to take his first spontaneous breath.

b. Artificial respiration should be withheld when the first breathing begins. This breathing may be very slow—four to six times per minute—but should not be assisted by artificial respiration. Artificial respiration must be resumed at once if breathing does not continue.

c. As breathing is resumed, the patient may attempt to get up, or even become violent in his semiconscious efforts to help himself. He must be restrained and kept in the prone position.

d. A person who has been resuscitated has been through one of the most severe strains that can be experienced. His heart has been under extreme exertion, and the regulation of rhythm and the volume of heart action may not return to normal for some time.

e. The patient must be kept lying down. Permitting him to get up and walk may cause sudden heart failure and death. Shock treatment must be continued long after the patient begins to breathe. He must be carefully watched, as some cases, apparently breathing normally, suddenly stop breathing and need additional artificial respiration. Never leave a resuscitated person alone until he is normal again.

APPENDIX II

DESTRUCTION OF MATÉRIEL AND DECONTAMINATION

■ 1. GENERAL PRINCIPLES.—*a.* Tactical situations may arise when, due to limitations of time or transportation, it becomes impossible to evacuate all equipment. In such situation, it is imperative that all matériel which cannot be evacuated be destroyed to prevent—

(1) Its capture intact by the enemy, thereby disclosing information which may be unknown to the enemy.

(2) Its use by the enemy, if captured, against our own or allied troops.

b. The working principles to be followed are:

(1) Methods for destruction of matériel subject to capture or abandonment in the combat zone must be *adequate, uniform,* and *easily followed* in the field.

(2) Destruction must be as complete as the available time, equipment, and personnel permit. Since complete destruction takes some time, a priority must be set up so that the more important classified features are destroyed first. Then if the operation is interrupted before its completion, the requirements of paragraph *a*(1) above are met. Next in priority of destruction, are essential parts. While these parts are not necessarily secret, they are difficult to procure, and the lack of them will prevent the equipment from being operated. *All essential parts must be destroyed on all like units to prevent the enemy from constructing one complete unit from several damaged ones by "canibalization."* Next in priority is the complete destruction of the equipment including such features as chassis, structural members, and wiring.

(3) Spare parts and accessories must be given the same priorities as the parts installed on the equipment.

c. The destruction of matériel, subject to capture or abandonment in the combat zone, *will be undertaken only upon authority delegated by division or higher commander.*

d. To accomplish the adequate, uniform destruction of matériel, it is necessary that—

(1) All units know thoroughly the plans for destruction *including the priority of destruction.*

(2) All echelons be trained in the several procedures for destruction. *Training will not involve actual destruction of matériel.*

■ 2. METHODS.—*a.* The destruction procedures outlined below are arranged in the order of effectiveness. No. 1 method should be used whenever *time permits and the necessary equipment is available.* If method No. 1 cannot be used, switch to No. 2 or 3 in order given.

b. No matter which method is used, it is imperative that the order indicated be followed. This will result in uniformity of destruction regardless of whether the destruction is carried to completion or not.

c. Certain of the methods require special equipment which may not be items of issue normally, such as explosives and incendiary grenades. The issue of these items, the equipment for which issued, and the conditions under which destruction is effected *are command decisions in each case,* according to the tactical situation.

■ 3. DESTRUCTION OF MAGNETRON.—The dimensions of the magnetron are extremely important to the enemy, so its destruction must be absolutely complete. The destruction of the magnetron is performed under the supervision of a commissioned officer. Special care must be taken that this item is thoroughly destroyed. *Spare magnetrons must also be destroyed.* Proceed as follows after removing it from transmitter:

a. Method No. 1.—Burn the magnetron with an incendiary grenade. While still hot, smash it with a sledge until it has no recognizable features and the construction and internal dimensions can no longer be discerned. Hide the remains by throwing in deep water, or bury in a hole which in turn must be concealed.

b. Method No. 2.—In case no incendiary grenades are available *or time does not permit*—

(1) Break the glass seals of the filament leads and the output terminals.

(2) Smash the tube with a sledge so that the construction and internal dimensions cannot be discerned. Smash the cathode structure separately, if possible.

(3) Hide the remains in deep water or bury in a hole which in turn must be concealed.

■ 4. DESTRUCTION OF PRINTED MATTER.—All manuals, charts, or any written matter pertaining to the equipment is destroyed by burning. Pages are torn out of books before setting on fire.

■ 5. DESTRUCTION OF TRAILER CONTENTS.—*a. Method No. 1.*—(1) Remove and destroy the magnetron as directed in paragraph 3.

(2) Remove the antenna and smash it thoroughly.

(3) Place TNT charges as follows:

(*a*) One-pound charges are placed in each separate component of the radio and control equipment.

(*b*) A 2-pound charge is placed in the antenna pedestal through the handhole cover.

(*c*) A 1-pound charge is fastened against the center of the rear of the antenna.

(*d*) Two-pound charges are placed over the axle inside each wheel.

(4) Insert an electric cap and join all TNT charges with primacord (see FM 5–25).

(5) Remove and discharge portable fire extinguisher.

(6) Douse the interior of the cab with gasoline, oil, or distillate.

(7) Explode the charges simultaneously from cover.

(8) Destroy the tires in accordance with procedure in paragraph 7.

b. Method No. 2.—(1) Remove and destroy the magnetron as directed in paragraph 3.

(2) Pull out all sliding drawer type components, allowing them to fall. Smash the remains thoroughly, using a sledge or any other heavy instrument available.

(3) Remove the antenna and smash it thoroughly.

(4) Remove and smash the radio frequency transmission line.

(5) Smash the antenna driving motor at the center of the parabola and the reference generator at the rear of the parabola.

556592°—43——8

(6) Ignite an incendiary grenade in each of the components previously smashed, including the mechanisms in rear of antenna.

(7) Remove and discharge the portable fire extinguisher just before setting off the incendiary grenades.

(8) Destroy the tires in accordance with procedure in paragraph 7.

c. Method No. 3.—(1) Carry out steps in method No. 2 through *b*(5) above.

(2) Remove and discharge the portable fire extinguisher.

(3) Douse the interior of the cab with gasoline, oil, or distillate and ignite with a piece of burning waste or other material.

(4) Destroy the tires in accordance with procedure in paragraph 7.

NOTE.—1. If there is any doubt that Method No. 1 can be completed in time, it should not be attempted. Method No. 1 will give the complete results desired *only* if carried to completion.

2. The portable fire extinguisher is included only because it is possible fire fighting equipment which the enemy might use in attempts to salvage the equipment. Otherwise it has no greater importance than any other standard accessory in the trailer.

■ 6. DESTRUCTION OF PRIME MOVER.—*a. Method No. 1.*—(1) Place TNT charges as follows:

(*a*) Two-pound charge on top of clutch housing.

(*b*) Two-pound charge on left of prime mover engine as low as possible.

(2) Insert electric caps and join charges with primacord.

(3) Puncture gas tanks.

(4) Remove and discharge portable fire extinguisher.

(5) Pour gasoline, oil, or distillate over the prime mover.

(6) Explode the charges simultaneously from cover.

(7) Destroy the tires in accordance with procedure in paragraph 7.

b. Method No. 2.—(1) With a sledge or other heavy club, smash the vital elements on prime mover engine (such as

distributor, carburetor, radiator, engine block, crank case, and transmission).

(2) Puncture the gas tanks.

NOTE.—Generator can be burned out by shorting the terminals while it is operating.

(3) Pour gasoline, oil, or distillate over the vehicle (remove fire extinguisher and discharge) and set fire to the prime mover.

(4) Destroy the tires in accordance with procedure in paragraph 7.

■ 7. DESTRUCTION OF TIRES.—*a. General.*—(1) Rubber is such a critical item that attempts to destroy the tires should be made *even though it is not possible to completely destroy the remainder of the vehicle.*

(2) Tires can usually be destroyed at the same time that the remainder of the vehicle is destroyed by careful planning and training.

b. Method No. 1.—(1) Ignite an incendiary grenade under each tire.

(2) When explosives are used for the destruction of the vehicle and contents, allow the tires to become well ignited before exploding the charges.

c. Method No. 2.—Damage the tires with an ax, pick, or machine-gun fire (deflate first if possible). Pour gasoline over each tire and ignite.

d. Provided that the fire is permitted to get a good start, the tires will probably set the entire vehicle on fire.

■ 8. DESTRUCTION OF OTHER VEHICLES.—If a spare parts truck is included with the equipment, it also must be destroyed.

a. Spare parts truck.—(1) Spare parts destroyed as in paragraphs 3 and 4.

(2) Vehicle destroyed as in paragraphs 6 and 7.

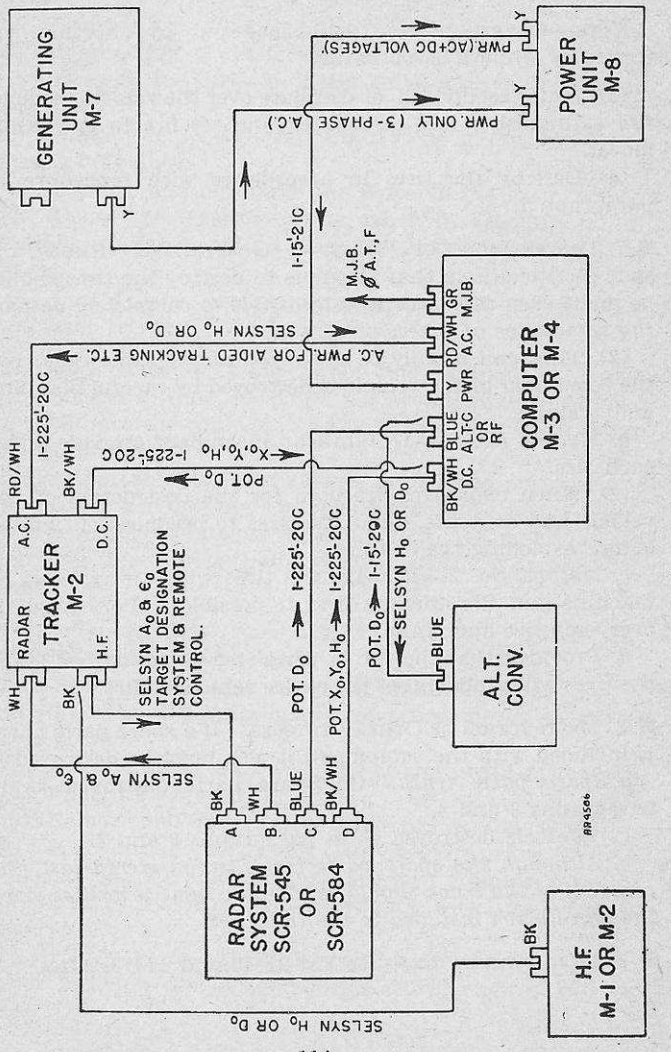
b. Although the spare parts truck is considered last, the contents of the truck should receive the same priorities given the parts when installed in the radio set.

■ 9. DECONTAMINATION.—See FM 21–40 and TM 3-series.

APPENDIX III

DATA FLOW CHART

The data flow chart for SCR–584 with director M9, M10 is shown below.



APPENDIX IV

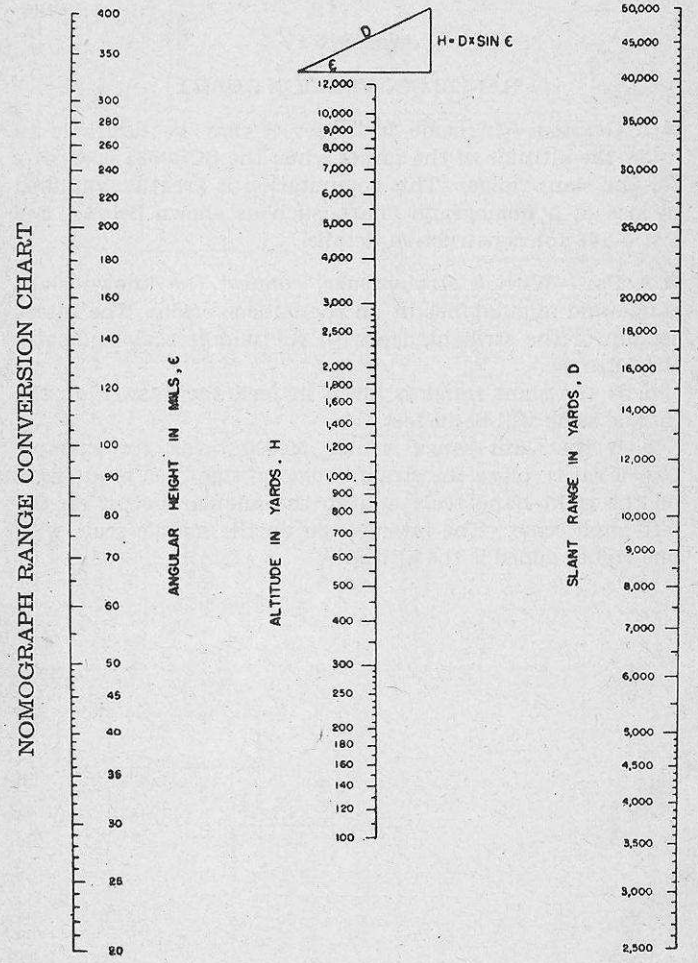
RANGE CONVERSION CHART

■ 1. GENERAL.—In some instances it may be desirable to know the altitude of the target when the SCR–584 is solving for the slant range. This computation is greatly simplified by use of a nomograph chart, such as shown below. See FM 4–146 for construction details.

■ 2. USE.—With a straightedge, connect the known slant range and angular height on the outside scale. The intersection of the straightedge with the middle scale indicates the altitude.

a. If the slant range is given in feet, the answer on the middle scale will be in feet.

b. If the slant range is over 50,000 yards, for example 60,000 yards, place the straightedge on the 6,000 graduation on the right-hand scale and on the angular height on the left-hand scale. The intersection on the middle scale with one cipher added is the altitude.



INDEX

	Paragraph	Page
Aided tracking	13	16
Antenna	26	34
Position indicator	12	16
Positioning	10	13
Antihunt control	35	58
Automatic tracking	47	78
Systems	10	13
Cable connections	31	46
Choice of site	16	18
Commands employed	51	82
Action	58	89
Call off	55	83
Cease operation	59	89
Close station	60	89
Count off	54	83
Emplace	56	84
Fall in	53	83
March order	62	90
Orient and synchronize	57	87
Prepare for action	61	89
Connecting power cables	21	28
Connections:		
Director M4, M7	31	46
Director M9, M10	32	46
Data transmission systems	11	14
Dehydrator	27	37
Description:		
General	6	5
Transmitting system	5	3
Drill commands	51	82
Exceptions	52	83
Duties of personnel	50	81
Elevating pedestal	22	29
Gasoline heater	29	39
Ground stake	20	27
Heater	29	39
Identification of target	45	76
Initial checks and adjustments	35	58
Installing—		
Antenna	26	34
R. f. lines	24	32
Storm curtain	30	41
Leveling pedestal	23	32
Limit switches	22, 25	29, 32
Lowering pedestal	67	94
Lubrication	70	99
Azimuth reservoir	71	100
Elevation reservoir	72	100
Elevator	73	100
Trailer	74	101

	Paragraph	Page
Maintenance	69, 70	99
Narrow gate—		
Delay	33	48
Width	33	48
Operating procedure	43	72
Organization of section	49	81
Orientation	38	60
Simplified, M4, M7	40	67
M9, M10	42	71
With director M4, M7	39	62
M9, M10	41	67
Oscilloscopes	9	12
Packing for transport	68	97
Parallax from SCR–584	32	46
Personnel	36	60
Duties of	50	81
Training	37	60
Power—		
Cables, connecting	21	28
Requirements	8	10
PPI operation	44	73
Scope	9	12
Preliminary operation	33	48
Preparation for movement	66	94
Pressurizing r. f. lines	27	37
Preventive maintenance	69	99
Prime mover	4	1
Range operation	46	76
Scope	9	12
Ranging	46	76
Remote operation	48	79
R. f. lines	24	32
Rough leveling	18	23
Searching	10, 44	18, 73
Setting up	17	19
Simplified orientation	40, 42	67, 71
Stabilizing	19	26
Start procedure	65	92
Starting procedure	33	48
Stop procedure	64	92
Stopping procedure	34	56
Stop-start outline	63	91
Storm curtain	30	41
Synchronization	38	60
Target designation dials	12	16
Identification of	45	76
Tarpaulin	30	41
Technical data	7	9
Trailer	6	5
Training, personnel	37	60
Uncoupling	17	19
Unlocking pedestal	25	32
Ventilators	28	38