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TECHNICAL MANUAL

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Operator's and Organizational Maintenance Manual

**RADAR SET
AN/PPS-4A**

(NSN 5840-00-168-1566)

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HEADQUARTERS, DEPARTMENT OF THE ARMY

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WARNING

MICROWAVE RADIATION HAZARD

Do not stand in front of the radome while the equipment is transmitting. The transmitted energy can cause severe radio frequency burns. Radiation levels extremely dangerous to personnel exist in the radar beam up to a distance of 8 feet from the radome. Exposure of personnel to the stationary beam from the antenna at this distance should be limited to 10 minutes.

WARNING

Do not open the trunk-type latches on the front or rear of Receiver-Transmitter, Radar RT-752/PPS-4A. Voltages and currents dangerous to life exist inside the receiver-transmitter.

Change }
No. 6 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 3 January 1984

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

RADAR SET AN/PPS-4A (NSN 5840-00-168-1566)

TM 11-5840-211-12, 30 April 1971, is changed as follows:

1. New or added material is indicated by a vertical bar in the margin of the page.
2. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.
3. Removal old pages and insert new pages as indicated below.

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4. File this change sheet in front of the publication for reference purposes.

*This change supersedes TM 11-5840-211 ESC dated 28 Apr 69.

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The Adjutant General

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HEADQUARTERS
 DEPARTMENT OF THE ARMY
 Washington, D.C., 30 April 1971

Operator's and Organizational Maintenance Manual

RADAR SET AN/PPS-4A
 (NSN 5840-00-168-1566)

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Figure 1-1. Radar Set AN/PPS-4A, components and auxiliary battery.

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Radar Set AN/PPS-4A (fig. 1-1) and covers its installation, operation, and operator's and organizational maintenance. It includes operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available for operator and organizational maintenance.

b. The basic issue items list (BIIL) appears in appendix B. The maintenance allocation chart (MAC) appears in appendix C.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

a. *Reports of Maintenance and Unsatisfactory Equipment.* Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

b. *Report of Packaging and Handling Deficiencies.* Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

c. *Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38, NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-3.1. Reporting Errors and Recommending Improvements

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. In either case, a reply will be furnished direct to you.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

If your Radar Set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

1-3.3. Administrative Storage

Administrative Storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in chapter 6.

1-3.4. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

Radar Set AN/PPS-4A (fig. 1-1) is a lightweight, portable, transistorized radar set. The AN/PPS-4A is capable of searching for and detecting moving targets, such as personnel or vehicles, only in the presence of fixed targets. The AN/PPS-4A can also

detect large fixed targets. The nominal maximum range at which large moving targets can be detected is 6,000 meters (19,685 feet). The nominal maximum range at which small moving targets, such as personnel, can be detected is 1,500 meters (4,921 feet). The AN/PPS-4A can be rotated through 6,400 mils (360°) in azimuth, and from

-800 mils (-45°) to +350 mils (+ 19.7°) in elevation with a tripod control handle. The functions of the AN/PPS-4A are as follows:

a. Terrestrial Surveillance. The AN/PPS-4A is designed primarily for use during periods of limited visibility. A range gate, whose position is determined by the operator, admits targets on a 30 meter portion of the radar beam. It can be used to search an area with range, azimuth, or elevation scans or with a combination of the three types of scan. The AN/PPS-4A can be used to continuously monitor preset selected points. Four azimuth detents on the tripod may be present to different points, and three elevation detents may be preset to any three points, thus enabling the operator to quickly position the receiver-transmitter to any one of these points. The AN/PPS-4A can also be used to monitor a single point of interest, such as a road intersection, by positioning the AN/PPS-4A so that the point of interest is sighted in the telescope, and can be maintained in this position as long as necessary.

b. Tracking. Once a moving target has been detected by the AN/PPS-4A, the AN/PPS-4A can be used to track the target. A target is tracked by adjusting the range handwheel and the azimuth and elevation of the AN/PPS-4A to maintain a maximum audio tone in the headset.

1-5. Technical Characteristics

a. General.

Range:
Maximum:
 Large targets 6,000 meters (19,685 feet)
 Small targets 1,500 meters (4,921 feet)
Minimum 40 meters (13¼ feet)
Accuracy ±25 meters (82 feet)
Resolution ±10 meters (33 feet)
Range gate 30 meters (830 feet)
Moving target detection By audio signal, 30 to 900 Hz
Azimuth:
Coverage 0 to 6,400 mils (0° to 360°)
Accuracy ±10 mils (0.563°)
Resolution ±10 mils (0.563°)
Determination By aligning the center of the beam from the AN/PPS-4A with the target.
Elevation:
Coverage -800 to + 350 mils (-45° to + 19.7°)
Accuracy ±10 mils (0.563°)
Determination By aligning the center of the beam from the AN/PPS-4A with the target
Radar density Less than 3.5 milli-watts/cm² at the radome.
Power requirements 24 watts (24 volts at 1 ampere).
System noise figure -12 decibels

b. Transmitting System.

Frequency 8,900 to 9,400 megahertz
 Wavelength 3 centimeters
 Peak power 0.5 kilowatt
 Average power 0.3 watt
 Pulse repetition rate 3,000 pulses per second
 Duty cycle 0.0006
 Pulse Width 0.2 microsecond
 Source of RF power Magnetron (tube type 7521)

c. RF System.

Transmission line Waveguide
 Radiating element Dipole
Reflector:
 Diameter 14.5 inches
 Focal length 4.5 inches
 Antenna gain 27.5 decibels
 Horizontal beam width 6.2±0.5 degrees
 Vertical beam width 6.2±0.5 degrees
 Attenuation of side lobes -19 decibels

d. Receiving System.

Type Crystal mixer, variable tuned IF preamplifier, transistor IF stages.
 Operating frequency 8,900 to 9,400 megahertz
 Local oscillator Klystron (tube type 2K25/723B)
 Local oscillator frequency 30 megahertz above transmitter frequency.
 Mixers Crystal (type 1N23E and 1N23ER)
 Intermediate frequency 30 megahertz
 Sensitivity -85.5 dbm (an input signal of 85.5 decibels below 1 milliwatt will give a signal plus noise-to-noise ratio of 2:1 at the frequency of maximum response in any pass band between 8,900 to 9,400 megahertz).
 Maximum gain 100 decibels

e. Power Unit

Type Battery, Storage, BB-422/U; nickel, cadmium, 24 volts, 1, ampere-hour rating.

NOTE

Battery, Storage BB-422/U is not supplied as part of the AN/PPS-4A, but is required for its operation. If the power source is other than a 24-volt battery, observe caution in paragraph 2-6.

1-6. Components and Dimensions

a. Components. The components of Radar Set AN/PPS-4A are listed in the basic issue items list (BIIL) in appendix B and in paragraph 1-6.1, the items comprising an operable equipment. A list of nomenclature and common name assignments is given below.

Nomenclature	Common name	Nomenclature	Common name
Radar Set AN/PPS-4A	Radar set	Case, Radar Set Components CY-2734/PPS-4.	Triod transit case
Receiver-Transmitter, Radar RT-752/PPS-4A.	Receiver-transmitter	Cable Assembly, Special Purpose, Electrical CX-4934/U (10 ft).	Power Cable
Headset, Electrical H-183/PPS-4	Headset.	Telescope, Azimuth M62A1C	Telescope
Cable Assembly, Special Purpose, Electrical CX-4935/U (13 in.)	Telescope light cable	Tripod, Receiver-Transmitter MT-1946/PPS-4.	Tripod
Case, Receiver-Transmitter CY-27733/PPS-4.	Receiver-transmitter transit case.	Battery, Storage BB-422/U	Battery

b. Dimensions of Major Components.

Item	Overall dimensions			Weight lbs	References (fig.)
	Height (in.)	Width (in.)	Depth (in.)		
Receiver-Transmitter, Radar RT-752/PPS-4A	14 1/2 (dia.)	.....	15 1/2	32	1-1
Headset, Electrical H-183/PPS-4	.....	.....	.....	7/8	1-1
Cable Assembly, Special Purpose, Electrical CX-4935/U (13 in.)	.....	13	.....	1/32	1-1
Case, Receiver-Transmitter CY-27733/PPS-4	20 1/8 (dia.)	.....	19 5/8	20	1-1
Case, Radar Set Components CY-2734/PPS-4	11 9/32	.....	40 19/32	13	1-1
Cable Assembly, Special Purpose, Electrical CX-4934/U (10 ft.)	.....	10 ft	.....	1/2	1-1
Telescope, Azimuth M62A1C	2 1/4	1	3	3/8	1-1
Tripod, Receiver-Transmitter MT-1946/PPS-4	12 to 60 adjustable).	.....	.....	17 1/2	1-1

1-6.1. Items Comprising an Operable Radar Set AN/PPS-4A

FSN	Qty	Nomenclature	Figure No.
5840-168-1566	.....	Radar Set AN/PPS-4A consisting of:	
6140-789-2118	2 (Note)	Battery, Storage BB-422/U	1-1
5995-682-3432	1	Cable Assembly, Special Purpose, Electrical CX-4934/U	1-6
5995-814-6058	1	Cable Assembly, Special Purpose, Electrical CX-4935/U	1-6
5965-682-2575	2	Headset, Electrical H-183/PPS-4	1-6
5840-082-3954	1	Receiver-Transmitter, Radar RT-752/PPS-4A	1-2
1240-823-5612		Telescope, Elbow M-62 (Government furnished Equipment)	
5840-691-1797	1	Tripod, Receiver-Transmitter MT-1964/PPS-4	1-2
		NOTE Operator/Crew Repair Parts, Accessories, Tools and Test Equipment "No Parts Authorized Operator/Crew" The Following Items and Their Quantities Are Mounted In Or On Equipment Listed For Storage Purposes.	
6115-957-3709		Cable Assembly Set, Electrical MX-4765/PPS-4 Consisting of: Cable Assembly, Power, Electrical CX-8797/U: 6 ft Cable Assembly, Power, Electrical CX-8798/U: 2 ft Cable Assembly, Power, Electrical CX-8799/U: 50 ft	
		NOTE Requisition in quantities necessary for the particular organization.	

1-7. Description of Major Components

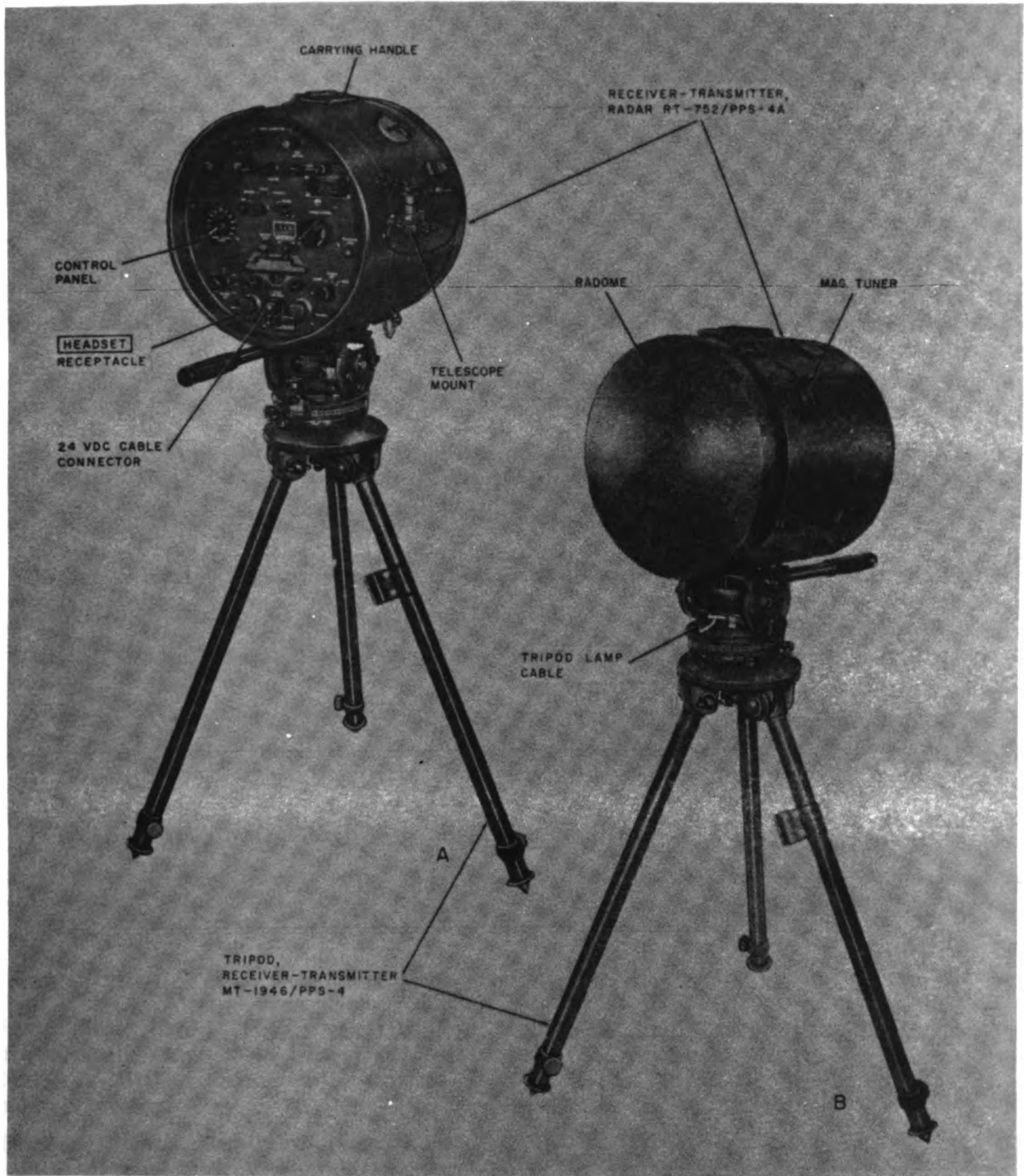
a. Receiver-Transmitter (fig. 1-2). The receiver-transmitter of Radar Set AN/PPS-4A is cylindrical shaped, 14.5 inches in diameter and 15.5 inches long, and mounts on an adjustable tri-od. The antenna and parabolic reflector, inclosed by the radome, are at the front end of the receiver-transmitter (B, fig. 1-2). The control panel and indicators are at the other end of the receiver-transmitter (A, fig. 1-2). Receptacles for the headsets and a receptacle for the 24-volt direct current (dc) cable connector are on the control panel. A mount for the telescope is located on one side of the receiver-transmitter and a magnetron tuning wheel (MAG, TUNER) is located on the other side. A carrying handle (fig. 1-2) is provided on top of the receiver-transmitter.

b. Tripod. The receiver-transmitter is supported by a

collapsible, metal tripod (fig. 1-3). The tripod can raise the receiver-transmitter between 1 and 5 feet above the ground. The tripod head is adjustable by means of a control handle to permit variation of the azimuth and elevation angle settings of the receiver-transmitter. The azimuth and elevation angles, in 100-mil steps, are indicated on the azimuth and elevation dials of the tripod head. The tripod head is also equipped with four azimuth and three elevation detents. These detents may be set at various azimuth and elevation headings to provide reference points when the radar set is searching an area.

1-6. Description of Minor Components

The following are minor components of Radar Set AN/PPS-4A.



EL5840-211-12-TM-2

Figure 1-2. Receiver-Transmitter, Radar RT-752/PPS-4A mounted on Tripod, Receiver-Transmitter MT-1946/PPS-4.

Change 1 1-4.1

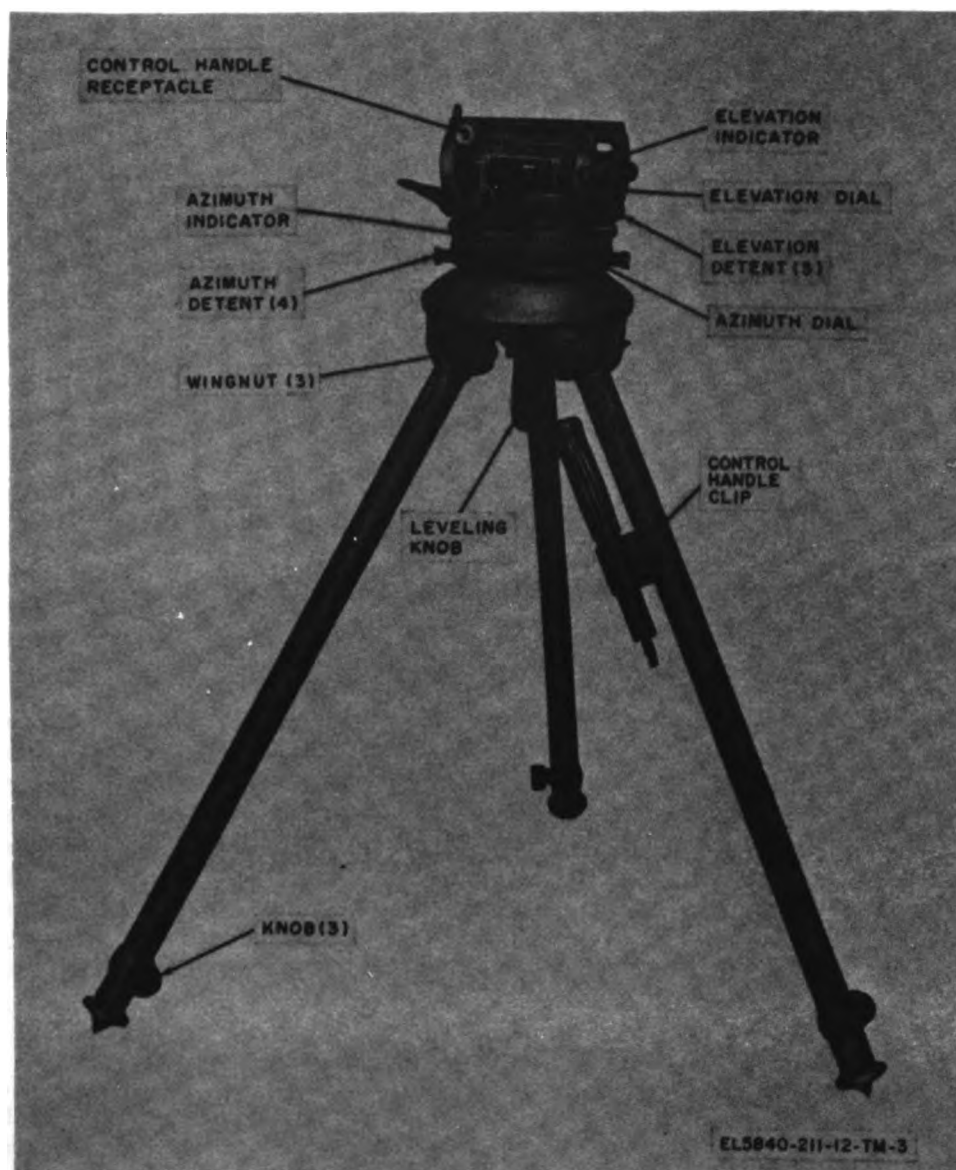


Figure 1-3. Tripod, Receiver-Transmitter MT-1946/PPS-4.

a. Power Cable (fig. 1-4). The power cable is 10 feet long and connects the battery and the 24 VDC BAT. ONLY receptacle on the receiver-transmitter control panel.

b. Telescope Light Cable. The telescope light cable (fig. 1-4) connects between the telescope and a connector on the receiver-transmitter. This cable carries power to the telescope lamp.

c. Tripod Light Cable. The tripod light cable (fig. 1-2) connects between the tripod and a connector on the receiver-transmitter. This cable carries power to the tripod lamps. The tripod

light cable is not a separate component but is a part of the tripod head.

d. Headset (fig. 1-5). Two double-earphone headsets are supplied with Radar Set AN/PPS-4A. Each headset has a flexible headband with two earphone adjusting brackets. The headset is connected to either of the two HEADSET receptacles on the control panel by a two-conductor retractable (spring coiled) cord. A clothes clip mounted on the cord is clipped to the operators shirt or jacket to prevent strain on the cord connected to the headset when the operator moves about and extends the retractable cord.

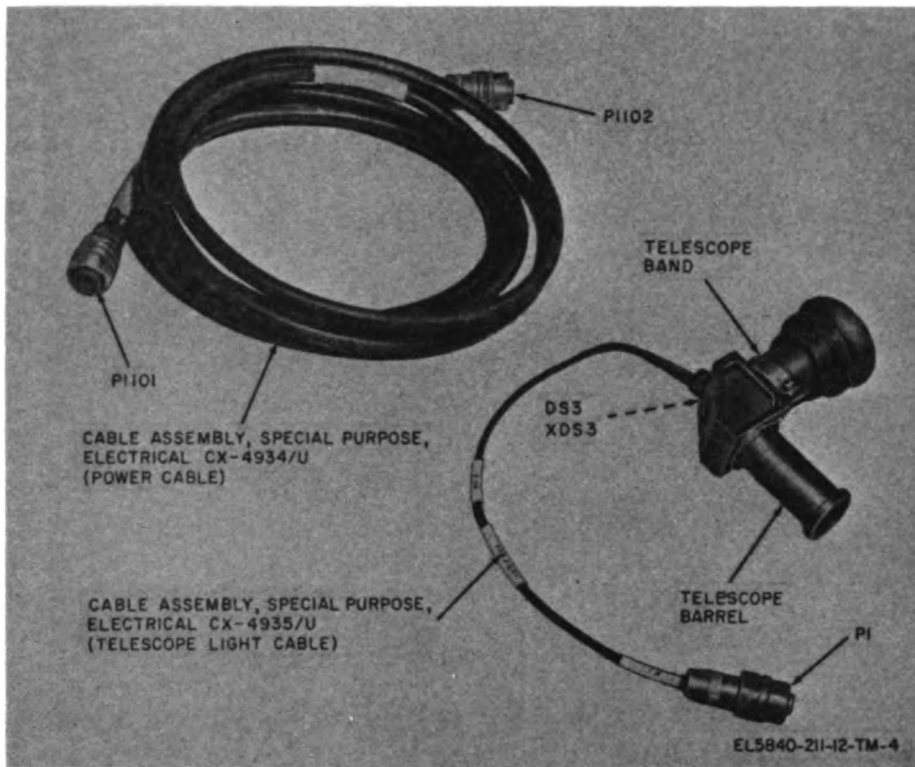


Figure 1-4. Cable Assembly, Special Purpose, Electrical CX-4934/U; Telescope, Azimuth M62A1C; and Cable Assembly, Special Purpose, Electrical CX-4935/U.

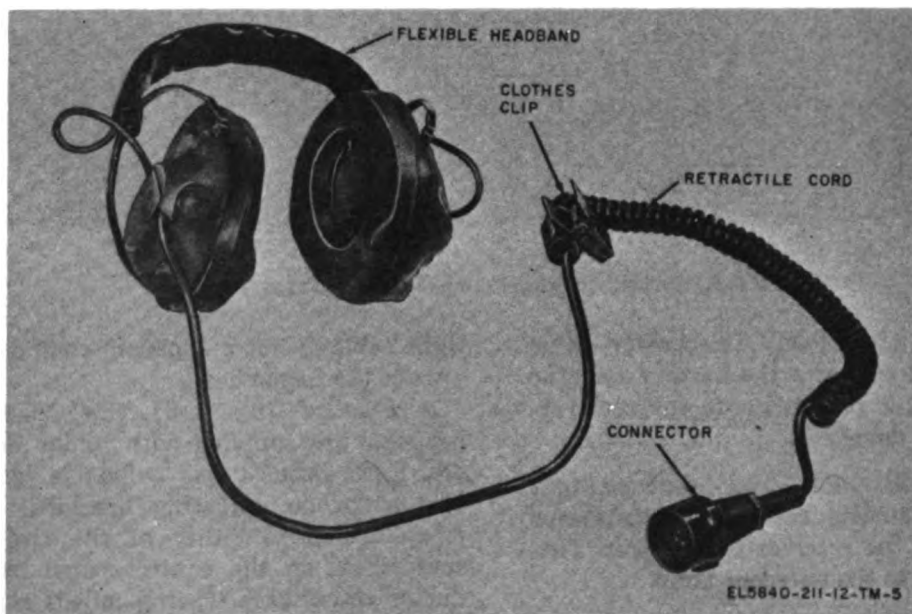


Figure 1-5. Headset, Electrical H-183/PPS-4.

One or both headsets may be used at any one time.

e. Receiver-Transmitter Transit Case (fig. 1-6). The receiver-transmitter transit case is a cylindrical metal case equipped with two carrying handles. The case has a base section and a cover section which are locked together by six trunk-type latches (A, fig. 1-6). The case section into which the receiver-transmitter is placed (B, fig. 1-6) contains a bracket and a clip to hold the telescope in place. In addition, there are two clips which secure the telescope light cable (C, fig. 1-6). The base section also contains the power cable, and a second bracket with clips to hold the running spares. The cover section contains four brackets and an elastic cord which hold the technical manual in place (D, fig. 1-6). Two rubber rings and four rubber bumpers are mounted in the base section. These rubber rings and bumpers cushion the receiver-transmitter to prevent damage while in transit. The receiver-transmitter transit case is watertight and it can float.

f. Tripod Transit Case (fig. 1-7). The tripod transit case is a cylindrical metal case, equipped with a carrying strap. A cover is attached to the case by six trunk-type latches (A, fig. 1-7). Two headsets are packed in the cover of the case (B, fig. 1-9). The tripod is packed head down in the base section of the tripod transit case. Rubber strips mounted in the base section of the case, cushion the tripod and prevent its damage while in transit. The transit case is watertight and it can float.

g. Telescope (fig. 1-4). The telescope provides an optical line-of-sight view by which the receiver-transmitter may be aimed in azimuth and elevation. The telescope is a three-power, fixed-focus type of instrument, with a field of view of 12 degrees, 10 minutes. The reticle pattern

consists of a horizontal and vertical line. The intersection of the lines indicates the center of the optical line-of-sight. A lamp, controlled by a front panel switch, can be used to illuminate the reticle for night operation.

h. Adjustment Chart. A plasticized adjustment chart is inclosed within the receiver-transmitter. The chart lists higher echelon adjustments required when similar units of Radar Set AN/PPS-4A are interchanged. The number column will list the identification number of the matching unit contained within the radar set.

1-9. Additional Equipment Required

Battery, Storage BB-422/U (fig. 1-1) is not supplied as a part of Radar Set AN/PPS-4A, but is needed for use with the set during operation and installation. The battery must be requisitioned separately. The battery is a portable, rechargeable, 24-volt, vented, nickel-cadmium battery. Nineteen individually replaceable cells are assembled in a waterproof battery case. Electrical connections to the storage battery are made through either one of two screw-type receptacles. These receptacles are mounted on the end of the battery case and polarized to prevent an improper connection.

NOTE

The radar set is not limited to the use of Battery, Storage BB-422/U; other 24-volt batteries or a 24-volt dc engine generator may also be used to power the radar set. Extreme caution must be exercised when using a power source other than a 24-volt battery. Make sure that the external power supply source does not generate electrical spikes that exceed 24 volts or damage to the radar set will result.



Figure 1-6. Case, Receiver-Transmitter CY-2733/PPS-4 with Receiver-Transmitter, Radar RT-752-PPS-4A.

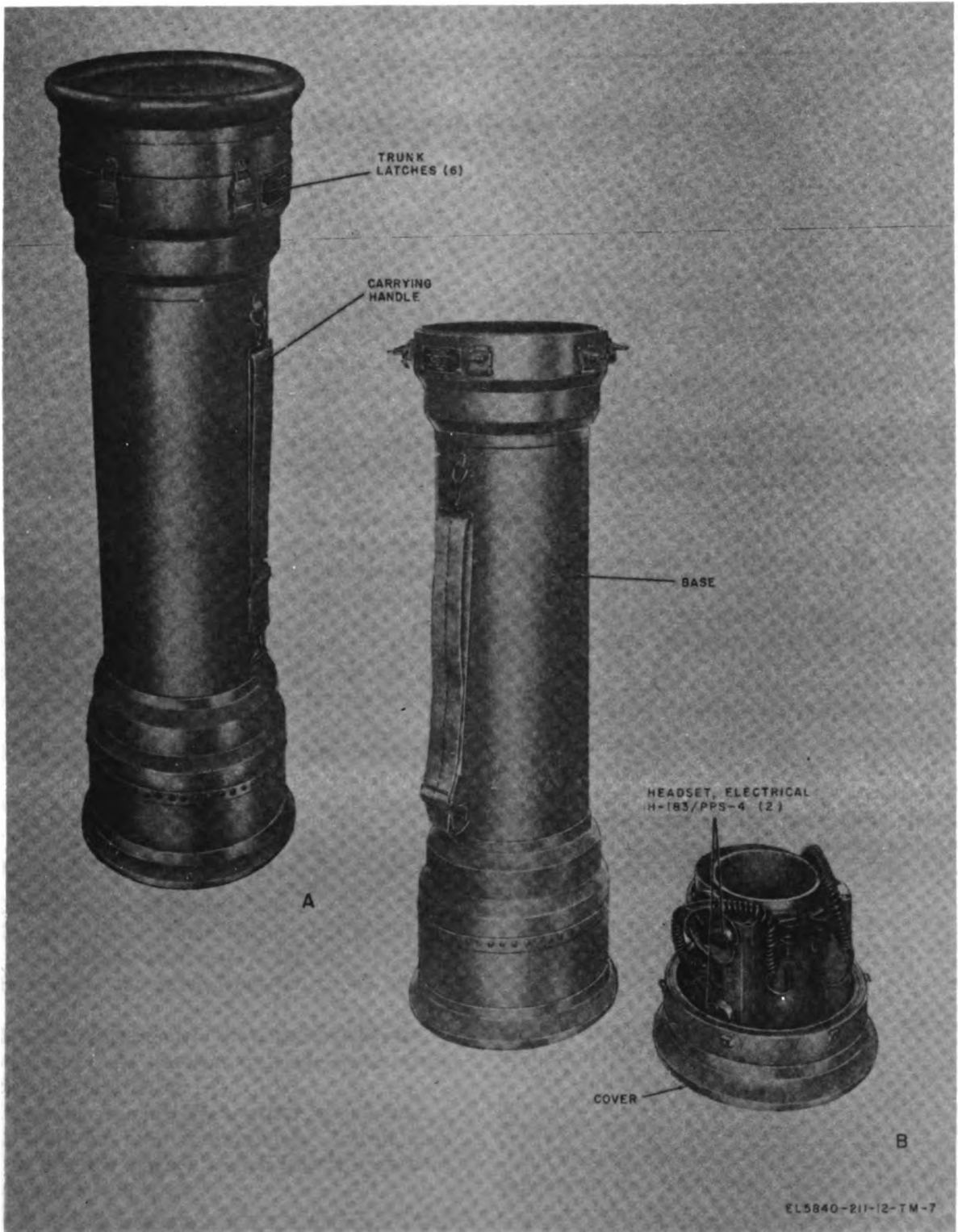


Figure 1-7. Case, Radar Set Components CY-2734/PPS-4.

CHAPTER 2 INSTALLATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unpacking

a. Packaging Data. When packed for shipment, the components of Radar Set AN/PPS-4A are placed in two transit cases. Each transit case is packed in a carton, and the two cartons are packed in a wooden crate 37 inches by 24 inches by 50 inches, with a volume of 25.1 cubic feet, and a weight of 148 pounds. A typical shipping box and its contents are shown in figure 2-1.

b. Removing Contents. Perform the steps in (1) through (4) below to remove the equipment transit cases from the wooden crate. Refer to paragraph 2-2 for instructions for removing the equipment from the transit cases.

(1) Cut and fold back the metal straps.

(2) Remove the nails from the top and one side of the box with a nailpuller. Remove the top and one side.

(3) Remove two cartons that are inside the crate.

(4) Open the cartons and remove the transit cases.

2-2. Unpacking Transit Cases

a. Unpacking Tripod Transit Case.

(1) Open the six trunk latches that fasten the cover on the tripod transit case (A, fig. 1-7).

(2) Remove the cover from the tripod transit case.

(3) Lift the tripod out of the tripod transit case.

(4) Remove the headsets from the cover of the tripod transit case (B, fig. 1-7).

b. Unpacking Receiver-Transmitter Transit Case.

(1) Set the receiver-transmitter transit case down so that the smaller section (the base section) rests on the ground.

(2) Open the six trunk-type latches on the receiver-transmitter transit case (A, fig. 1-6).

(3) Lift the receiver-transmitter transit case cover up and off.

(4) Lift the receiver-transmitter out of the base section (B, fig. 1-6).

(5) Remove the technical manual from the corner brackets and from under the elastic cord in the cover of the receiver-transmitter transit case (D, fig. 1-6).

(6) Unclamp the telescope light cable from the clips in the base section of the case (C, fig. 1-6).

(7) Unclamp the telescope from the clip and bracket in the base section of the case.

(8) Remove the power cable from the base section.

2-3. Checking Unpacked Equipment

a. Checking Equipment for Completeness. See that the equipment is complete as listed on the packing slip. If a packing slip is not available check the equipment against the basic issue items list (app B) and paragraph 1-6.1; components comprising an operable Radar Set AN/PPS-4A.

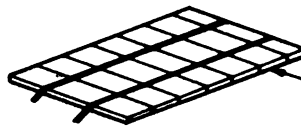
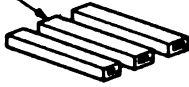
NOTE

Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the radar set.

b. Checking Equipment for Damage. Inspect the equipment for damage incurred during shipment. If the equipment was improperly packaged or damaged, report the difficulty on DD Form 6 or (DISREP) (SF 361), as pertinent.

c. Checking Equipment for Modifications. If the equipment has been used or reconditioned, see

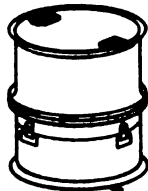
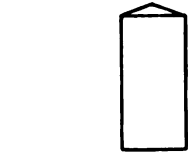
UPPER
CORRUGATED PAD



WOODEN COVER

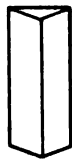


TECHNICAL MANUAL
IN FOIL BAG



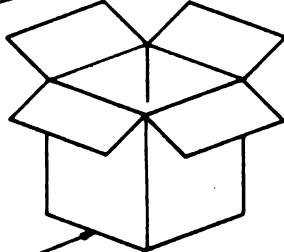
CORNER PADS

RECEIVER-TRANSMITTER
TRANSIT CASE

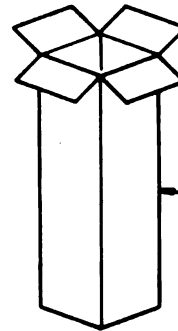


TRIPOD TRANSIT CASE

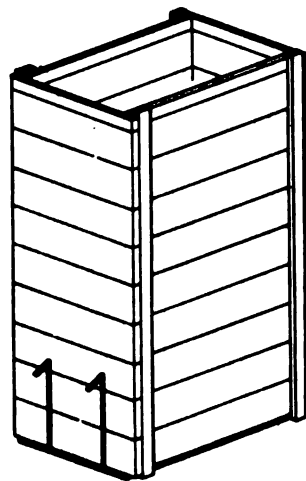
BOTTOM
CORRUGATED
PAD



RECEIVER-TRANSMITTER
INNER CARTON



TRIPOD
INNER
CARTON



WOODEN PACKING BOX

Figure 2-1. Typical packing.

whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number(s) will appear on the front panel near the nomenclature plate. Check to see whether the modified equipments are covered in the manual.

NOTE

This manual does not include MWO's for the radar set.

2-4. Siting

a. An ideal operating site is one that provides an unobstructed line-of-sight from the radar set to all areas of interest. In addition, adequate fixed ground clutter return, necessary for satisfactory performance of the radar set, should also be available.

b. The maximum range at which large targets can be detected depends on the condition of the radar set, proper siting of the radar set, and terrain and weather conditions. (Wet foliage or grass will increase ground clutter and extend the range of the radar set.) Adequate fixed clutter return in the region to be surveyed must be available. The nominal maximum range at which large moving targets, such as tanks or trucks, can be detected is 6,000 meters (19,685 feet). The nominal maximum range at which small moving targets, such as personnel, can be detected is 1,500 meters (4,921 feet).

c. Power and telephone lines or large surfaces of metal, such as bridges, buildings, or parked vehicles, should not be adjacent to the path of the transmitted beam when searching for long range targets. Distortion of the beam will occur and cause inaccurate range information. Therefore, the line-of-sight from the radar set to the area to be surveyed must be relatively free from obstructions.

d. To detect a moving target, the radar set must receive echoes from a fixed target together with echoes from a moving target. Echoes from a fixed target combine with echoes from a moving target and are detected by the radar set as an echo frequency difference which appears as an audio tone in the headset. A good location for the radar set is one where return from ground clutter (fixed targets) can be obtained and a clear line-of-sight can be maintained, such as on a mountain looking down at the area to be surveyed or in a valley looking up at the area to be surveyed.

e. The tripod mount should be located on a firm, relatively level site that has a minimum diameter of 3 feet; however, sufficient latitude of adjustment is provided by the tripod to level the radar set on moderate slopes or rocky terrain. The radar set can be camouflaged (at the expense of signal strength) by hanging a sheet of thin canvas in front of the set. Foliage used for camouflage should not be placed in the path of the radar beam.

Section II. INSTALLATION PROCEDURES

2-5. General

a. Two men are required to install the radar set and it can be assembled in approximately 5 minutes.

b. Install the radar set in the following sequence:

- (1) Tripod installation.
- (2) Receiver-transmitter installation.
- (3) Telescope installation.
- (4) Tripod leveling.
- (5) Power supply connection.
- (6) Headset connection.

2-6. Detailed Installation Procedures

a. *Tripod Installation* (fig. 1-3). Loosen the three wingnuts on the tripod legs. Extend the

three legs of the tripod and tighten the three wingnuts. Loosen the three knobs on the tripod legs. Lengthen the legs individually until the desired height is obtained and the radar set is approximately level. Tighten the three knobs. Remove the control handle from the clamp on the tripod leg. Screw the control handle into the control handle receptacle on the tripod head.

b. *Receiver-Transmitter Installation*. Mount the receiver-transmitter on the tripod so that the wedge-shaped casting on the base of the receiver-transmitter slides into the wedge-shaped opening in the tripod head (B, fig. 2-2). Secure the receiver-transmitter in place by turning the securing screw (B, fig. 2-2) into the wedge-shaped casting. Plug the tripod lamp cable connector (fig. 2-2) into the tripod lamp cable receptacle on the receiver-transmitter (fig. 2-4).

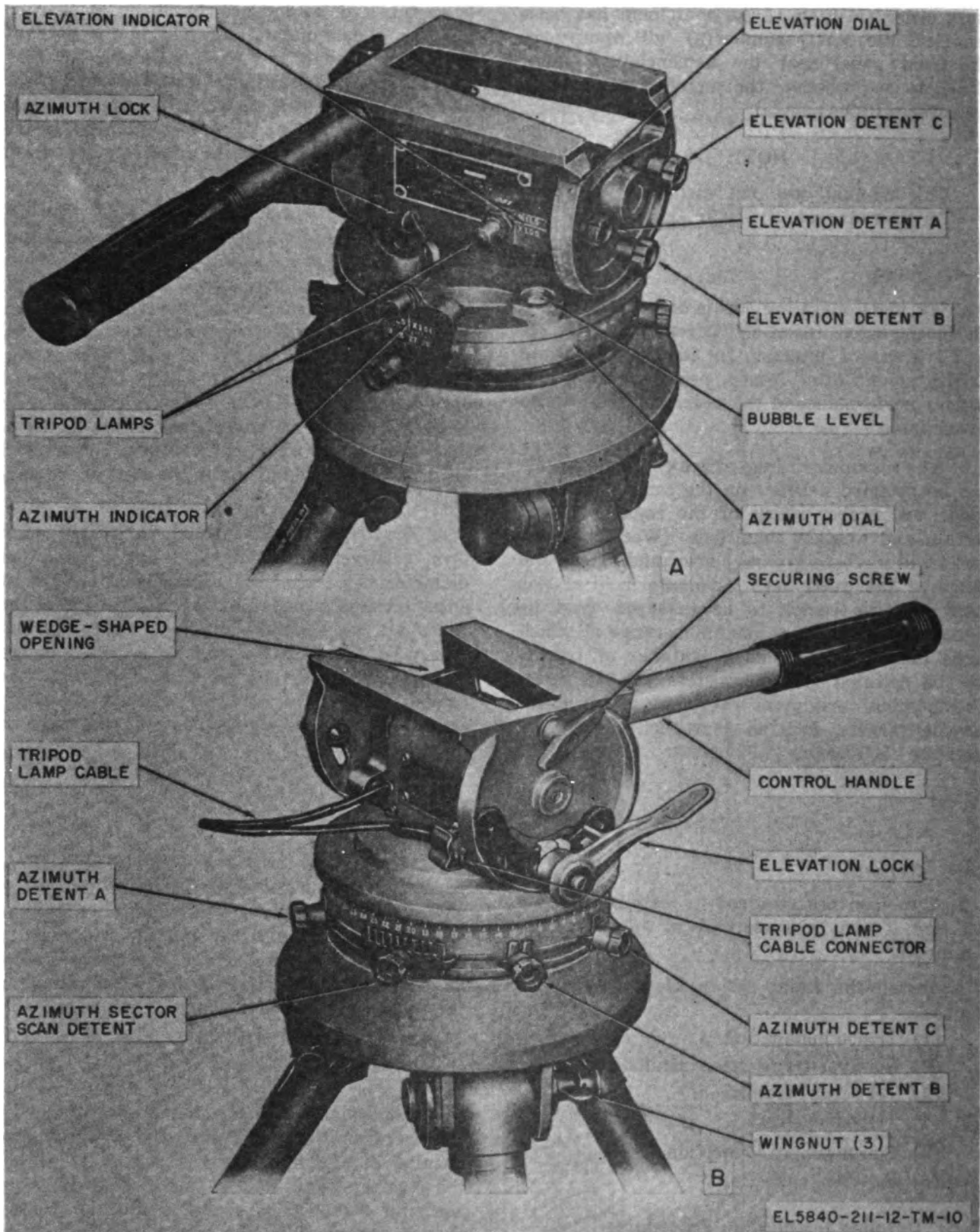


Figure 2-2. Tripod head.

c. Telescope Installation. Mount the telescope (fig. 2-3) on the side of the receiver-transmitter by placing the two sections on the telescope mount (fig. 2-4) around the barrel of the telescope and joining the two ends of the mount with the screw that is provided. Slide the telescope lamp (attached to one end of the telescope light cable) into its opening on the telescope. Plug the telescope light cable connector into the telescope light cable receptacle on the side of the receiver-transmitter (fig. 2-4).

NOTE

Telescope M84 may be used interchangeably with Telescope M62A1C.

d. Tripod Leveling. To level the radar set, loosen the leveling knob (fig. 1-3) under the tripod head. Adjust the tripod head until the bubble level (A, fig. 2-2) on the top of the tripod indicates that the tripod assembly is level. Tighten the leveling knob.

e. Battery or Power Supply Connections.

CAUTION

Before connecting the battery or power

supply to the receiver-transmitter, set the receiver-transmitter control panel POWER switch to OFF and the VOLTAGE ADJ switch to 1.

Connect the power cable between the 24 VDC BAT ONLY receptacle on the control panel (fig. 3-1) and the power outlet receptacle on the battery. When the power source is other than a 24-volt battery, make sure that the peak voltage input applied to the radar set does not exceed 24 volts. Damage to the radar set will result if higher voltage is applied. The radar set has a negative (—) input ground; the negative (—) terminal of the 24-volt input source must be connected to the radar set chassis ground or the radar set will not operate.

f. Headset Connection. Connect one (or both) of the headsets to the receiver-transmitter by plugging the connector of the headset cable into the HEADSET receptacle on the control panel (fig. 3-1) and twisting the connector clockwise.

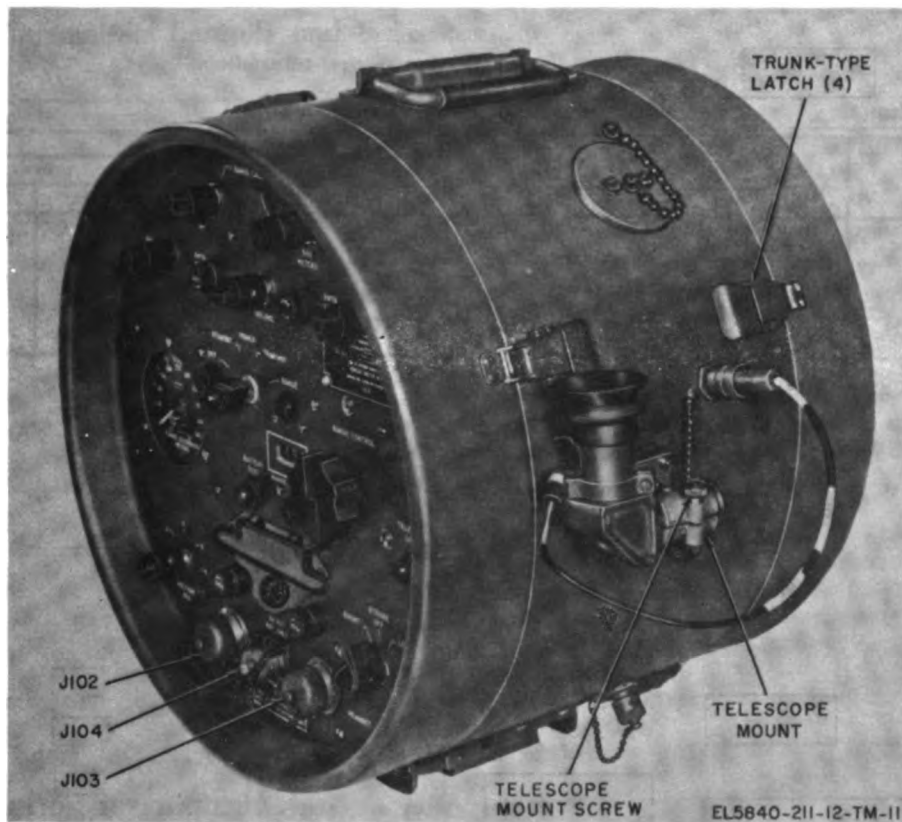


Figure 2-3. Telescope installed in mount on receiver transmitter.

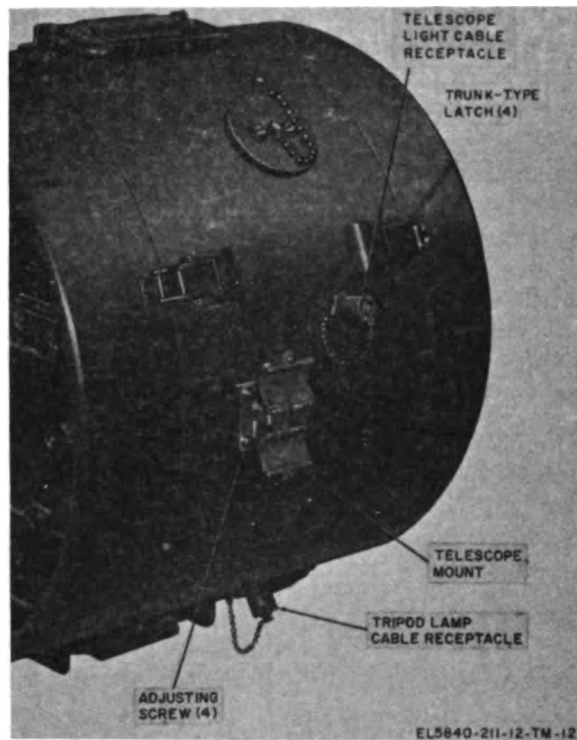


Figure 2-4. Telescope mount on receiver-transmitter.

g. Cable Connections.

Cable	Length	Connects			
		From —		To —	
		Component	Receptacle	Component	Receptacle
Power cable	10 ft	Receiver-transmitter	24 VDC BAT. ONLY	24-volt battery.	
Telescope light cable.....	13 in.	Telescope	.....	Receiver-transmitter	Telescope light cable.
Tripod lamp cable .....	.....	Tripod	.....	Receiver transmitter	Tripod lamp cable.

CHAPTER 3 OPERATING INSTRUCTIONS

Section i. OPERATOR'S CONTROLS AND INDICATORS

3-1. General

WARNING

Careless operation or improper setting of certain controls can cause damage to the radar set and injury to the operating personnel; therefore, it is important to know the function of every operational control of the radar set. During operation of the radar set, observe the following precautions.

WARNING

Refer to warning notice on inside of front cover of this manual before proceeding with the steps below.

- a. Make sure that the POWER switch is in the OFF position before connecting the battery.
- b. Make sure that the VOLTAGE ADJ switch is in position 1 before turning the POWER switch to STANDBY, TRANSMIT, or RANGE.

3-2. Receiver-Transmitter Controls and Indicators (fig. 3-1)

Control or Indicator	Function
POWER switch	Applies power to the radar set, selects standby or transmit condition, and permits range calibration. <i>See Page</i> STANDBY
	<i>Action</i> Connects power to radar set except klystron tube and transmitter trigger circuit.
	TRANSMIT ... Radar set is operable.
	RANGE
	Calibration of maximum and minimum range is possible.
	OFF
	Turns off power to radar set. <u>30 meter</u>
RANGE CONTROL handwheel	Controls the position of the range gate (in 10-meter increments) during normal operation and sets the minimum distance from the operator to be surveyed by the radar set during LONG and SHORT strobe range scan.
STROBE switch	Determines the type of range scan in use when the POWER switch is set to TRANSMIT. <i>See Page</i> SHORT
	<i>Action</i> A distance of 500 meters beyond the RANGE METERS indicator setting is scanned in approximately 5 seconds.
	LONG
	A distance of 500 meters beyond the RANGE METERS indicator setting is scanned in approximately 10 seconds.
	OFF
	Range scanning is controlled by manually moving the RANGE handwheel.
VOLTAGE ADJ switch	Compensates for drop in battery voltage. The higher numbered positions are used as the battery becomes weaker.
BATTERY TEST button	Permits an indication of battery voltage on the RANGE EXTENSION METERS meter.
RANGE CALIBRATION 1ST MARK knob.	Adjusts the range setting when POWER switch is set to RANGE, and RANGE METERS indicator is set to 500.
RANGE CALIBRATION 7TH MARK knob.	Adjusts the range setting when POWER switch is set to RANGE, and RANGE METERS indicator is set to the value specified on the RANGE CALIBRATION plate. (The value will vary depending on temperature and the individual radar set.)
PANEL LIGHTS switch	Turns control panel lamps on and off and determines their intensity. Operates when POWER switch is set to any position except OFF.

Control or indicator	Function
TRIPOD LIGHTS switch	Turns lamps of the tripod head on and off and determines their intensity. Operates when POWER switch is set to any position except OFF.
VOLUME knob	Controls loudness of sound in headsets and deflection of the RANGE EXTENSION METERS meter.
TELESCOPE LIGHT switch	Illuminates telescope reticule when depressed.
RANGE EXTENSION METERS meter.	Indicates the position of the range gate (in conjunction with the RANGE METERS indicator) when STROBE switch is set to LONG or SHORT. When the STROBE switch is set to OFF, a constant deflection is indicated, which decreases when a target echo is received. When the BATTERY TEST button is depressed, the meter operates as a voltmeter only within the red zone to indicate the condition of the battery.
RANGE METERS indicator	Indicates range in meters.
RANGE CALIBRATION plate	Specifies 1ST MARK and 7TH MARK range values of the individual radar set for range calibration adjustment.

3-3. Tripod Controls and Indicators
(fig. 2-2)

Control or indicator	Function
Asimuth lock	Extreme clockwise position of this lock prevents movement of tripod head in azimuth.
Asimuth detents A, B, and C	May be set to indicate any particular azimuth. Indicates previously set azimuth of the radar set by a small physical resistance encountered when receiver-transmitter passes through this position during manual movement. The physical resistance is accompanied by a clicking sound.
Asimuth sector scan detent	An azimuth sector scan detent (fig. 2-2) may be set and locked at any position on the azimuth dial. Nine individual detents make up the overall azimuth sector scan detent. Each individual detent allows overlapping coverage of 60-mil sectors. The overall azimuth sector detent is equivalent to an azimuth sector of 540 mils. Complete survey of the area in azimuth and range for which the azimuth sector scan detent is set can be accomplished by moving the receiver-transmitter step-by-step through each of the individual detents and range searching in either the long or short mode at each detent setting.
AZIMUTH indicator	The azimuth, in hundreds of mils, is read from the azimuth dial graduation indicated by the azimuth indicator hairline.
ELEVATION lock	Extreme clockwise position of this lock prevents movement of tripod head in elevation.
ELEVATION detents A, B, and C	May be set to indicate any particular elevation angle. Indicates previously set elevation angle of the radar set by a small physical resistance encountered when receiver-transmitter passes through this position during manual movement. The physical resistance is accompanied by a clicking sound.
Elevation indicator	The elevation, in hundreds of mils, is read from the elevation dial graduation indicated by the elevation indicator hairline.
Bubble level	Used in leveling and checking level condition of the tripod head.

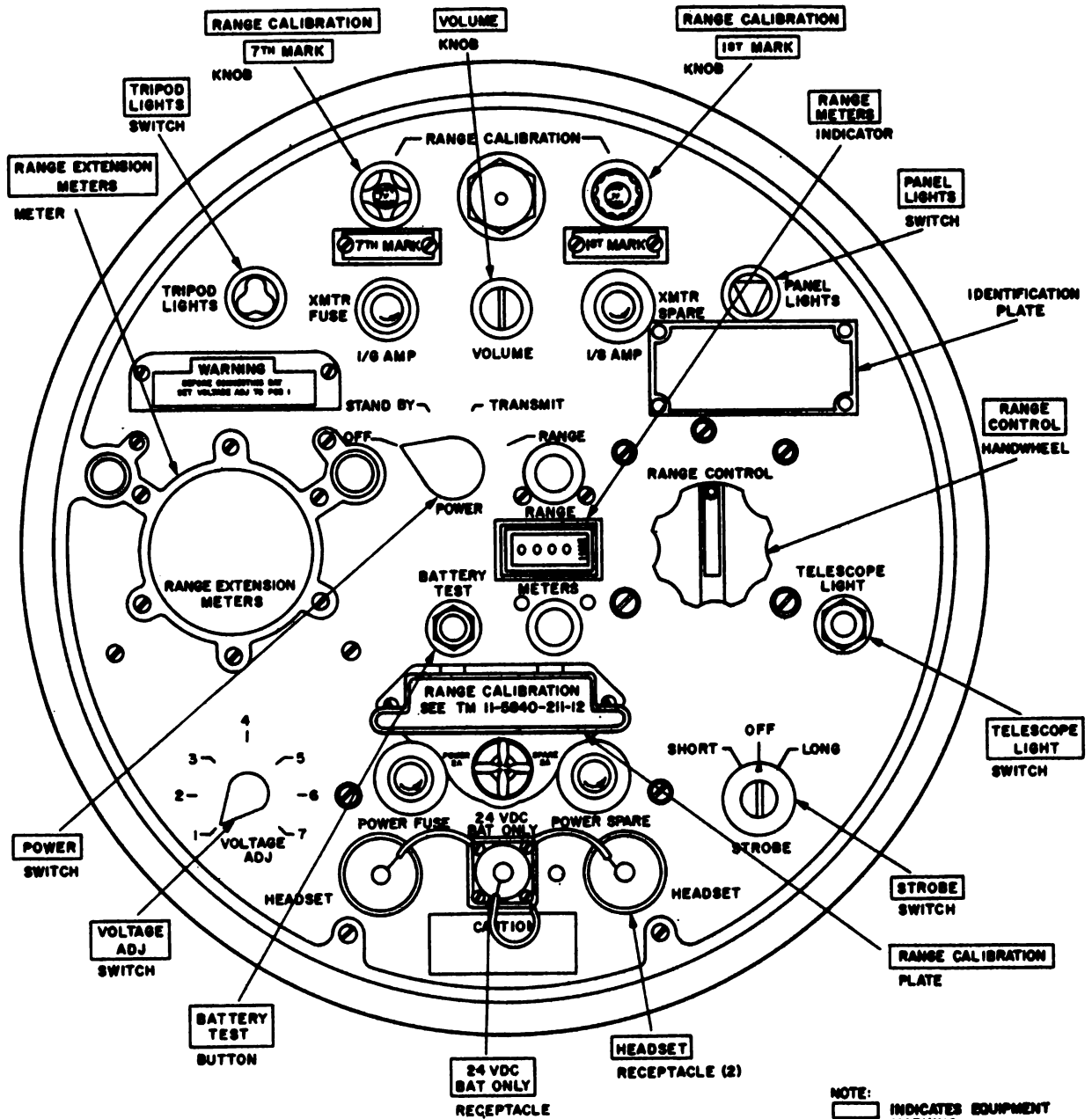


Figure 3-1. Control panel.

Section II. ALIGNMENT AND ADJUSTMENT PROCEDURES

3-4. General

This section covers the checks and operations that must be performed to make sure that installation of the radar set is complete and ac-

curate. Also included are the alignment and adjustment procedures that must be performed before the equipment can be used for routine operation.

3-5. Tools and Equipment Required

No tools are required for adjustment or alignment of the radar set. A metal corner reflector is the only equipment needed for alignment and adjustment (para 4-2b).

3-6. Initial Checks

a. *Cables.* Make sure that cables are not frayed. Check to see that the battery and headset cables have been correctly and securely connected.

b. *Fuses.* Check to see that the XMTR FUSE (fig. 3-1) and the XMTR SPARE fuses are rated at 0.125 ampere. Check to see that the POWER FUSE and the POWER SPARE fuses are rated at 2 amperes (para 4-10).

c. *Controls and Instruments.* Make sure that there is no physical damage to the controls and instruments on the control panel of the radar set (fig. 3-1).

d. *Leveling.* After the installation of the radar set has been completed, the tripod may no longer be level because of the positioning of the radar set for use. Check the bubble level on the tripod head. If the tripod is not level, perform the procedure given in paragraph 2-6d.

3-7. Telescope Alignment

To align the telescope, proceed as follows:

a. Set the power switch (fig. 3-1) to TRANSMIT. Set the STROBE switch to OFF. Aim the receiver-transmitter at a moving target 200 meters to 500 meters away from the radar (example: man waving his helmet or rotating corner reflector). Adjust range, and move the R/T unit in azimuth and elevation for maximum sound in the earphones.

b. With the radar set in operation as described in a above, loosen the four telescope mounting screws that fasten the telescope mount (fig. 2-4). Adjust the telescope mount until the moving target is centered in the crosshairs of the telescope in the elevation plane.

c. Loosen the two adjusting screws on the side of the telescope mount. Adjust the telescope mount until the moving target is centered in the crosshairs of the telescope.

d. Secure the telescope mount in the adjusted position by tightening the four mounting screws and two adjusting screws.

3-8. Azimuth Adjustment

To adjust the radar set in azimuth, perform the following procedures:

CAUTION

After adjustment of the azimuth dial, do not loosen all four azimuth detents at one time. At least one of the four azimuth detents must remain locked at all times to prevent the azimuth dial from turning.

- a. Sight the telescope on a point of known azimuth.
- b. Loosen the azimuth detents (B, fig. 2-2) that secure the azimuth dial to the tripod head and rotate the dial until the known azimuth reading is lined up with the azimuth hairline on the azimuth indicator.
- c. Tighten the azimuth detents.

3-9. VOLUME Knob Adjustment

Correct adjustment of the VOLUME knob is necessary for the detection of small targets. To adjust the VOLUME knob, perform the following procedures:

- a. Set the POWER switch (fig. 3-1) to TRANSMIT.
- b. Set the STROBE switch to OFF.
- c. Aim the radar set above the horizon by means of the tripod control handle.
- d. Turn the RANGE CONTROL handwheel until the RANGE METERS indicator reads approximately 2,000 meters.
- e. Adjust the VOLUME knob until the noise heard in the headset is at a comfortable listening level.

3-10. Range Calibration

Changes in the temperature of the area surrounding the radar set will affect the accuracy of the reading on the RANGE METERS indicator. To compensate for changes due to temperature, and to insure accuracy of the reading on the RANGE METERS indicator, perform the procedure in a through i below at the start of operation, after 25 minutes of operation, and after the first hour of operation. In addition, the 1ST MARK and 7TH MARK calibration accuracy should be checked after each hour of operation as indicated in i below. The radar set must be recalibrated if the range error of the 1ST MARK or 7TH MARK is greater than ± 10 meters.

NOTE

The value specified on the RANGE CALIBRATION plate (fig. 3-1) will vary for each individual radar set.

a. Set the POWER switch (fig. 3-1) to RANGE.

b. Set the STROBE switch to OFF.

c. Set the VOLUME knob to the full clockwise position.

d. Allow the radar set to warm up for approximately 90 seconds. Aim the radar set above the horizon by means of the tripod control handle.

e. Turn the RANGE CONTROL handwheel to set the RANGE METERS indicator to the value specified on the RANGE CALIBRATION plate for the 1ST MARK.

f. Depress and adjust the RANGE CALIBRATION 1ST MARK knob until the needle of the RANGE EXTENSION METERS meter deflects to a minimum value.

g. Release the RANGE CALIBRATION 1ST MARK knob.

h. Turn the RANGE CONTROL handwheel to set the RANGE METERS indicator at 3,500 meters.

i. Depress and adjust the RANGE CALIBRATION 7TH MARK knob until the needle of the RANGE EXTENSION METERS meter deflects to a minimum value.

j. Release the RANGE CALIBRATION 7TH MARK knob.

k. Estimate or measure the present air temperature.

l. Turn the RANGE CONTROL handwheel to set the RANGE METERS indicator to the value specified on the RANGE CALIBRATION plate for the 7TH MARK and the prevailing temperature.

m. Depress and slowly adjust the RANGE CALIBRATION 7TH MARK knob until the needle of the RANGE EXTENSION METERS meter deflects to a minimum value.

NOTE

The RANGE CALIBRATION 7TH MARK knob will require only a slight adjustment. It is possible to obtain two deflection points. The correct deflection point is the one closest to the setting obtained in *i* above. The performance of *n* below assures that the radar set is calibrated on the proper mark.

n. Turn the RANGE CONTROL handwheel until the RANGE METERS indicator reads 3,500 meters. The needle of the RANGE EXTENSION METERS meter should deflect to a minimum value within ± 10 meters of the 3,500-meter indication.

o. Recheck the calibration accuracy by slowly turning the RANGE CONTROL handwheel from the 7TH MARK to the 1ST MARK counting the dips. Include the 7TH MARK (approx. 6,500 meters) and the 1ST MARK (approx. 500 meters). There should be a dip at each 1,000 meters of range, therefore there should be 7 dips between the 1ST and 7TH rangemark. If there is more or less, the set is not calibrated correctly. Repeat the procedure.

3-11. Installation Performance Check (fig. 3-1)

NOTE

The operator should be familiar with the operating instructions (paras 3-1 through 3-10) before making the installation performance check.

a. Set VOLTAGE ADJ switch to position 1.

b. Set STROBE switch to OFF.

c. Set POWER switch to STANDBY.

d. Depress BATTERY TEST button. Observe RANGE EXTENSION METERS meter. Meter needle must register within the red zone.

e. If the meter needle does not register within the red zone, rotate VOLTAGE ADJ switch to next higher number until RANGE EXTENSION METERS meter registers in red zone when BATTERY TEST button is depressed. If the RANGE EXTENSION METERS meter will not register in red zone, refer to item 1, paragraph 4-13.

f. Turn PANEL LIGHTS switch to ON. RANGE EXTENSION METERS meter and RANGE METERS indicators must illuminate. If not, refer to item 2, paragraph 4-13.

g. Turn TRIPOD LIGHTS switch to ON. Tripod lights must illuminate. If not, refer to item 3, paragraph 4-13.

CAUTION

Wait approximately 90 seconds before proceeding to next step.

h. Turn the TELESCOPE LIGHT switch to

ON. The telescope lamp must illuminate; if not, refer to item 4, paragraph 4-13.

i. Set POWER switch to TRANSMIT. RANGE EXTENSION METERS meter indication must decrease. If not, refer to item 5, paragraph 4-13.

j. Connect headset to HEADSET receptacle.

Noise must be heard in headset. Adjust VOLUME knob (para 3-9). If noise cannot be adjusted to comfortable level, or if no noise is heard, refer to item 6, paragraph 4-13.

k. Perform range calibration (para 3-10).

l. Conduct radar performance test (para 4-11).

Section III. OPERATION UNDER USUAL CONDITIONS

3-12. Preliminary Control Settings (fig. 3-1)

The radar set is operated to provide radar surveillance of terrain areas within its range. The preliminary control settings and the starting procedure are the same for all modes of operation.

a. Before starting the equipment, check the setting of the operating controls and set the controls as follows:

Control	Position
POWER switch	OFF
VOLTAGE ADJ switch	1
STROBE switch	OFF

b. Turn the POWER switch to STANDBY. Rotate the PANEL LIGHTS switch in a clockwise direction until the desired panel light intensity is obtained. Allow approximately 90 seconds for the equipment to warm up.

NOTE

To conserve the battery, use the panel lamps, telescope lamp, and tripod lamps only when necessary.

c. Set the VOLTAGE ADJ switch as outlined in paragraph 3-11e.

3-13. Operating Procedure

a. The radar set may be used to detect either moving targets, such as trucks, tanks, or personnel, or fixed targets, such as parked trucks or tanks. A moving target in the scanned area is indicated by an audio signal in the earphones

of the headset and by a slight backward deflection of the needle on the RANGE EXTENSION METERS meter. Large fixed targets are indicated only by a slight backward deflection of the needle on the RANGE EXTENSION METERS meter. Fixed targets do not cause a tone to appear in the headset. The detected audio signal of a moving target differs from the general background noise; it is continuous or pulsating rather than random. The number of vehicles in a small convoy may be estimated by the number of different pitched sounds heard in the headset since it is practically impossible for two moving vehicles to produce the same pitched tone. The sound pitch in the headset is related to the velocity component of the target directed toward or away from the radar set. As the speed of the target increases, the sound pitch in the headset increases. For example, a truck traveling at 20 miles per hour will produce a higher pitched sound in the headset than the same truck traveling at 10 miles per hour. The velocity of a moving target can be approximated from the sound pitch in the headset. A target moving at a radial (directly toward or away from the radome) velocity of 1 mile per hour (mph) produces a 30-Hz tone; one moving at 2 mph produces a 60-Hz tone. Each 30-Hz increase in tone is equivalent to a target velocity increase of 1 mph. Targets having a radial velocity of more than 30 mph (900-Hz tone in the headset) cannot be detected by the radar set. The chart below indicates some of the types of sounds that may be heard and how they may be interpreted.

Sound	Interpretation
Rushing	Normal receiver tones. Indicates background noise.
No sound	A ground or fixed target within the range gate.
Random rumbling (low pitched)	Tree foliage moving in wind.
Even rumbling (varying pitch) with synchronized overtones.	Slowly moving vehicle. The even rumbling is produced by the body of the vehicle, with the wheels producing the overtones.
Even whine (varying pitch) with synchronized overtones.	Rapidly moving vehicle. The even whine is produced by the body of the vehicle, with the wheels producing the overtones.
Periodic rumbling (low-pitched sounds); resembles snoring).	A moving person. The periodic part of the sound is created by the intermittent motion of the person's legs or arms.
Even whine or rumble with synchronized overtones (changing pitch together).	Track vehicle such as a tank. The even, low tone is produced by the motion of the tank while the overtone is generated by the motion of the tank treads.

b. Aim the radar set approximately at the desired area by means of the tripod control handle. (The telescope may be used to center the radar set on the desired target area by moving the tripod handle to position the target to the center of the crosshairs on the telescope reticle.)

c. Set the RANGE CONTROL handwheel (fig. 3-1) so that the RANGE METERS indicator is set to the minimum distance at which a target can be detected (approximately 40 meters).

d. Turn the POWER switch to TRANSMIT and turn the STROBE switch to the desired strobe position. Manipulate the tripod control handle to position the receiver-transmitter and at the same time turn the RANGE CONTROL handwheel until a maximum return signal from the target is detected.

e. When a target is detected, the range of the target can be determined in several ways, depending on the type of strobe (OFF, SHORT, or LONG) used when detection is made. With the STROBE switch set to OFF, LONG, or SHORT ((1) and (2) below), a maximum loudness of the audio signal in the headset will provide the most accurate range information. Note that the only indication of fixed targets is indicated by a backward deflection on the RANGE EXTENSION METERS meter.

(1) With the STROBE switch set to OFF (normal mode) and with the receiver-transmitter and RANGE CONTROL handwheel positioned to produce a maximum loudness of the audio signal in the headset from a detected target, the indication on the RANGE METERS indicator will be the distance between the target and the radar set in meters.

(2) If the STROBE switch is set to LONG or SHORT, the approximate distance to the target will be the RANGE METERS indicator reading plus the indication on the RANGE EXTENSION METERS meter. As the meter pointer continues its 500-meter sweep, approximate the position of the target within the sweep by noting the position of the pointer when the detected sound is heard.

f. For limited tracking of detected moving targets, set the STROBE switch to OFF and loosen the tripod azimuth and elevation locks. Constantly manipulate the tripod control handle and adjust the RANGE CONTROL handwheel to maintain the audio signal at a maximum level. If the target is momentarily lost, adjust the RANGE CONTROL handwheel and, at the same time, manipulate the tripod control

handle to position the receiver-transmitter in azimuth and elevation until the target is again detected.

g. Moving targets may be detected with the STROBE switch in any position; however, large stationary targets may be detected more easily if the STROBE switch is in the OFF position. When the STROBE switch is in the OFF position, the pointer of the RANGE EXTENSION METERS meter remains at a fixed position. If a large stationary object is detected, the deflection of the meter pointer will be less than if no object were present. An audio signal will not accompany the decrease in deflection unless a moving object enters this range. If the STROBE switch is set to LONG or SHORT, large stationary objects are noted by a backward deflection or hesitation of the RANGE EXTENSION METERS meter pointer during the range scan action.

CAUTION

Do not loosen all four azimuth detents at one time (except for adjustment of the azimuth dial (para 3-8). At least one of the four azimuth detents must remain locked at all times to prevent the azimuth dial from turning.

h. The azimuth and elevation detents on the tripod head may be used to mark off positions where targets were previously detected. To do this, loosen the respective detent by turning it counterclockwise, move it to the respective azimuth and elevation position on the azimuth and elevation dial (fig. 2-2), and lock it in place. The azimuth and elevation of the target can be obtained from the respective dials on the tripod head.

3-14. Stopping Procedure

The entire equipment may be shut down completely or placed in a standby condition. Stop the equipment (a through e below) or place it in standby (f below) as follows:

- a. Set the POWER switch to STANDBY.
- b. Turn the VOLUME knob completely counterclockwise.
- c. Turn the STROBE switch to OFF.
- d. Set the VOLTAGE ADJ switch to position 1.
- e. Set the POWER switch to OFF.
- f. To place the equipment in a standby condition (receiver operative but power removed from the modulator), turn the POWER switch to STANDBY.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

3-15. Operation in Arctic Climates

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

a. Keep the equipment as warm and dry as possible.

CAUTION

The radome is made of plastic and covered with a special paint that does not interfere with the radiation of radio frequency energy. Be careful when removing ice and snow from the radome not to damage it.

b. Frequently inspect the exterior of exposed units and remove any accumulations of ice or snow. Heavy coatings of ice and frost may form on the control panel and radome. Such ice reduces the transmission efficiency. Clear the control panel and radome of ice frequently.

c. When starting the equipment, set the POWER switch to STANDBY, wait 5 to 10 minutes, depending on the temperature of the surrounding air, before turning the POWER switch to TRANSMIT.

d. The tripod head should be checked frequently and cleared of any ice accumulation. If ice is allowed to accumulate on the tripod head, damage may occur to the mechanism when rotation of the equipment is attempted.

3-16. Operations in Tropical Climates

In the tropics, moisture and humidity conditions are usually more acute than normal. These conditions are particularly severe when the radar set is set up in swampy areas or when the equipment is dug in. Condensation of moisture on the equipment occurs frequently. To minimize the possibility of damage by moisture, wipe the equipment dry whenever there is evidence of excessive moisture. Check all components frequently for evidence of corrosion and fungus formation.

3-17. Operation in Desert Climates

Heat, dust, and sand conditions are primary problems in desert areas. A greater amount of

attention must be given to the condition of the equipment operated in a desert.

a. Check security of equipment covers frequently.

b. Do not open the equipment and expose the interiors of the components unless it is absolutely necessary.

c. Be careful when handling equipment that has been exposed to the sun for any appreciable length of time. All the exterior surfaces of this equipment are metal. These metal surfaces may reach a temperature of 150 degrees F. The temperature inside the components may be as high as 175 degrees F. Always wear gloves and a jacket or shirt that covers the entire upper body or arms when handling equipment under such conditions.

3-18. Operation Through Electronic Countermeasures (ECM)

Procedures used by the radar operator to combat ECM are referred to as electronic countermeasures (ECCM) procedures. The operator must expect to receive countermeasures and must be ready at all times to employ all the ECCM techniques necessary to successfully accomplish his mission. With an equipment such as the radar set, the operator's best defense against ECM is a thorough knowledge of and familiarity with all the various target sounds he might encounter. As a general rule, any sound that cannot be identified as a normal target or clutter indication should be suspected of being an ECM signal. The procedures given in a through c below may be used by the operator in operation against countermeasures. Refer to TM 11-750 for a complete discussion of radar antijamming theory and procedures.

a. Against Deception.

(1) If multiple signals are received and appear to be transmission deception, use the normal mode of moving target indication. At the same time, watch the RANGE EXTENSION METERS meter for a deflection that might indicate a stationary source of the deception signals.

(2) If all of the multiple targets produce moving target indications, try to track the one target whose indication sounds most like a recognizable target sound. It should be possible to track the carrier of a mobile deception device

whereas the deception signal indications will probably produce movement indications too erratic to be traced.

(3) If a single target of unrecognizable characteristics is detected, study this target and see if it can be tracked as a normal target. If it cannot be so tracked, then search at the same azimuth for an indication of a possible stationary or moving source of the unusual target.

(4) If an attempt to track on a moving target shows that the indication originates at a point that does not change in range, azimuth, or elevation, the target probably is a stationary deception reflector.

(5) If a moving target indication gives evidence of normal target movement but does not sound familiar, it may be a mobile deception reflector. Listen carefully for an overtone that may be recognizable as a common target carrying a reflector.

(6) DO NOT concentrate all your efforts and attention on signals that you suspect of being deception signals. The purpose of deception is to confuse the existing situation. When deception is employed there is a strong probability that real targets are present in the vicinity of the deception signals or in another portion of the area being surveyed. Remember that the purpose of deception tactics are to deceive; cover your area of responsibility accordingly.

b. Against Jamming. Because it is doubtful that reflected jamming will be used to any appreciable extent against the radar set, the procedures in (1) through (6) below are applicable only to transmission jamming counter-operation.

(1) When an interference signal is recognized as being the result of jamming, sweep the area from which the signal originates to determine the extent of the azimuth and elevation area affected by the signal. The bearing at which the jamming is most intense within the affected area can be considered the bearing of the jammer. Report the jammer bearing and the area affected by the jamming signal.

(2) From the noise or variation of noise caused by the jamming signal, try to determine whether the signal is cw or modulated and if modulated, whether it is am or fm. Report your findings.

(3) In many cases, it may be possible to distinguish sounds within the jamming noise (above the jamming noise level or overtones) that may be recognized as target indications. Try

to pick out such sounds and pinpoint them with the range gate. Tracking may be possible once a target is set in the gate. Report the degree of difficulty encountered in locating and tracking targets in the jamming.

(4) If the jamming is so effective that targets cannot be distinguished or tracked, try to evade the jamming by changing the transmitter frequency as follows:

NOTE

Transmitting frequency should not be changed unless authorized to do so.

(a) Remove the MAG. TUNER cover from the MAG. TUNER (fig. 3-2). Note the setting of the MAG. TUNER.

(b) Turn the STROBE switch to OFF (fig. 3-1).

(c) Rotate the MAG. TUNER slowly to the maximum position in each direction, at the same time, listening to the sound indications in the headset. Turning the MAG. TUNER will change the frequency of the radar transmission and will decrease the jamming effectiveness unless the jammer covers a wide band of frequencies or can be rapidly tuned to follow a change of radar frequency.

(d) If changing frequency of the transmitter does not improve operation, set the MAG. TUNER back to its original position. Replace



Figure 3-2. MAG. TUNER adjustment location.

the cover on the MAG. TUNER, turn the locking screw on the cover until it matches the opening on the receiver-transmitter housing, and turn the locking screw one quarter revolution to lock the cover in place.

(5) DO NOT ignore the area that is outside of that affected by the jamming but still within your area of responsibility. The jamming may be intended to draw attention away from targets in addition to hiding targets.

(6) Report all changes in the jamming coverage, effectiveness, and type, and if the jamming ceases.

c. General Advice. KEEP CALM if you encounter ECM. The purpose of all ECM is to disrupt effective radar operation to the advantage of the enemy. With a short range battlefield surveillance radar set, such as Radar Set AN/PPS-

4A, a few seconds of lost operating time may give the enemy all the advantage he needs. Reaction to ECM must be quick and decisive and ECCM must be employed immediately and accurately. You cannot react properly if you panic. Any indecision on your part may be evident to the enemy. It is likely that the enemy is monitoring your signal and will detect any erratic operation. Use frequency changing as a last resort. Enemy monitoring will detect a change of your frequency and conclude that the ECM efforts are successful. DO NOT turn off the radar set when under ECM attack; this would be a definite indication to the enemy that his ECM is effective. To combat ECM effectively, take part in training exercises as often as possible, and above all concentrate on learning the characteristic sounds of every possible type target as indicated by the radar set.

CHAPTER 4

OPERATORS MAINTENANCE INSTRUCTIONS

Section I. SCOPE, TOOLS, AND EQUIPMENT

4-1. Scope of Maintenance

CAUTION

Do not open the trunk-type latches on the front or rear of the receiver-transmitter.

The maintenance duties assigned to the operator of Radar Set AN/PPS-4A are listed below together with references to the paragraphs covering specific maintenance functions.

- a. Preventive maintenance checks and services (para 4-4).
- b. Preventive checks and services chart (para 4-5).
- c. Cleaning (para 4-7).
- d. Repainting and refinishing (para 4-8).
- e. Cable repair (para 4-9).
- f. Troubleshooting (para 4-12).

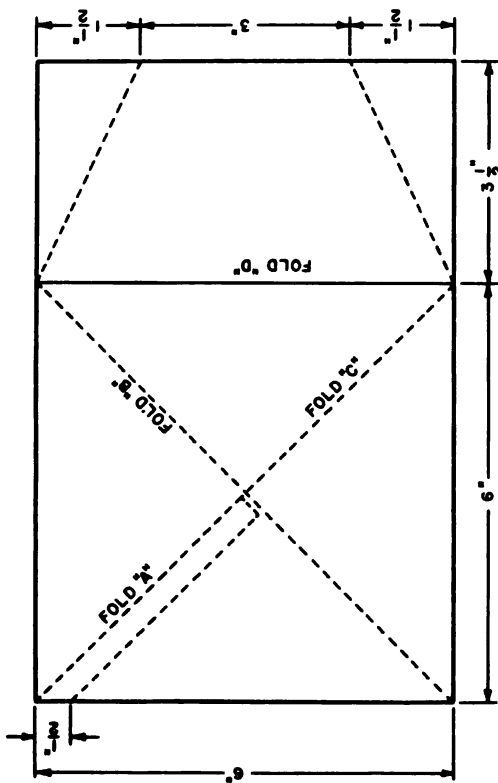
4-2. Tools, Test Equipment, and Materials Required

- a. *Tools.* None required.

b. Test Equipment. The only test equipment required is a corner reflector. The corner reflector is not supplied with the radar set. It must be fabricated. Refer to figure 4-1 for fabrication procedures. If fabrication of the corner reflector is beyond the capabilities of the operator, submit work order through normal maintenance channels for the item. As a field expedient, a messkit or metal helmet may be used as a corner reflector.

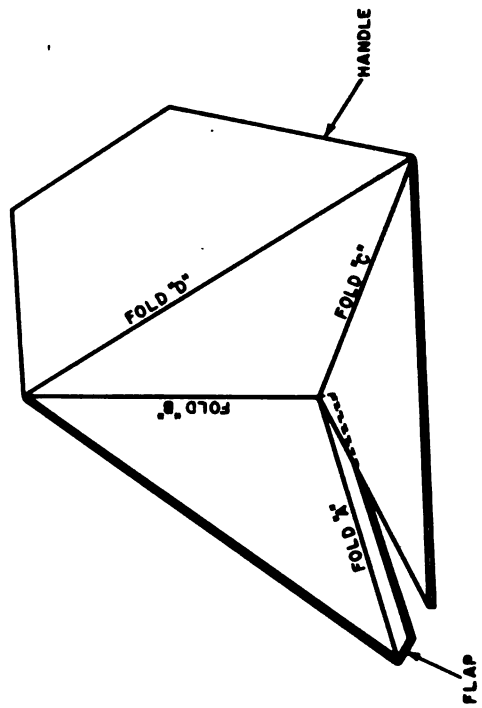
c. Materials.

- (1) Camel's-hair brush.
- (2) Lens cleaning soap, liquid.
- (3) Lens paper.
- (4) Talcum powder.
- (5) Cleaning cloth, lint free.
- (6) Fine sandpaper (#000).
- (7) Olive Drab paint.
- (8) Rubber tape.
- (9) Friction tape.
- (10) Trichlorotrifluoroethane (NSN 6850-00-105-3084)



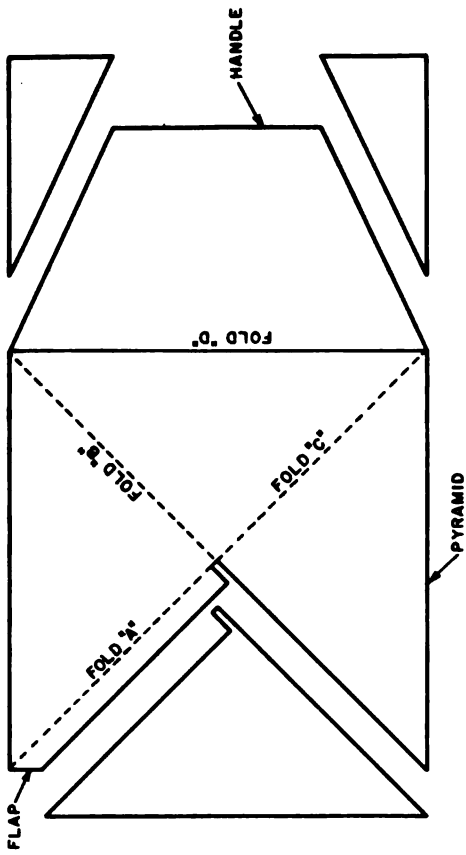
- NOTES:**
1. CUT A PIECE OF LIGHT GAGE SHEET ALUMINUM TO DIMENSIONS OF 6" X 9".
 2. SCRIBE ALL LINES EXCEPT FOLD "d" ON THE BOTTOM SURFACE OF THE ALUMINUM SHEET TO DIMENSIONS SHOWN ABOVE.
 3. SCRIBE LINE FOR FOLD "d" ON THE TOP SURFACE OF THE ALUMINUM SHEET TO THE DIMENSIONS SHOWN ABOVE.

A



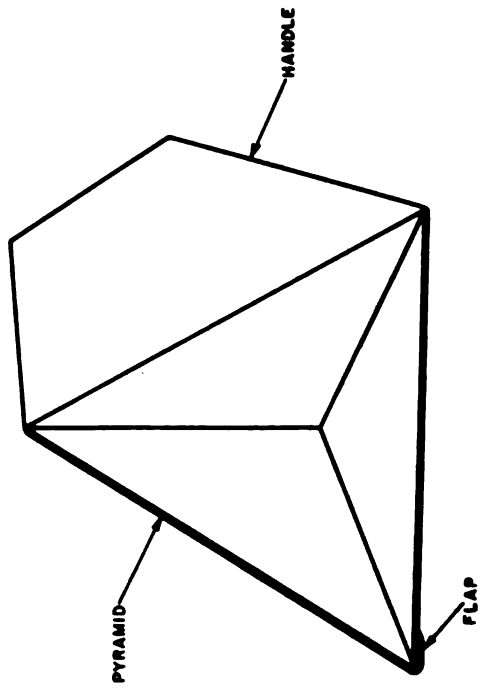
- NOTE:**
- BEND ALONG FOLD "c" AND THEN "b" TO FORM A PYRAMID.

C



- NOTES:**
1. CUT THE PIECES AS SHOWN ABOVE.
 2. BEND THE FLAP UP 120° ALONG FOLD "a".
 3. BEND THE HANDLE DOWN 135° ALONG FOLD "d".

B



- FABRICATED CORNER REFLECTOR**

EL 5840-211-12-TM-R

C

Figure 4-1. Corner reflector, fabrication.

Section II. OPERATORS PREVENTIVE MAINTENANCE

4-3. Preventive Maintenance

NOTE

Refer to TM 750-244-2 for proper procedures for destruction of this equipment to prevent enemy use.

a. Operator/Crew preventive maintenance is the systematic care, servicing and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain equipment in serviceable condition. To be sure that your Radar Set is always ready for your mission, you must do scheduled preventive maintenance checks and services (PMCS).

(1) BEFORE OPERATION, perform your B PMCS to be sure that your equipment is ready to go.

(2) DURING OPERATION, perform your D PMCS. This should help you to spot small troubles before they become big problems.

(3) WEEKLY PMCS are important checks to keep serious problems from suddenly happening. Perform WEEKLY as well as BEFORE OPERATION PMCS if:

(a) You are the assigned operator and have not operated the item since the last WEEKLY.

(b) You are operating the item for the first time.

(4) When an item of equipment is reinstalled after removal, for any reason, perform the necessary B PMCS to be sure the item meets the readiness reporting criteria.

(5) Use the ITEM NO. column in the PMCS table to get the number to be used in the TM ITEM NO. column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) when you fill out the form.

b. Routine checks like CLEANING, DUSTING, WASHING, CHECKING FOR FRAYED CABLES, STOWING ITEMS NOT IN USE, COVERING UNUSED RECEPTACLES, AND CHECKING FOR LOOSE NUTS AND BOLTS are not listed as PMCS checks. They are things that you should do any time you see they must be done. If you find a routine check like one of those listed in your PMCS, it is because other operators reported problems with this item.

NOTE

When you are doing any PMCS or routine checks, keep in mind the warnings and cautions.

WARNINGS

- Adequate ventilation should be provided

while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

- Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. Goggles must be worn at all times while cleaning with compressed air. Compressed air shall not be used for cleaning purposes except where reduced to less than 29 pounds per square inch gage (psig) and then only with effective chip guarding and personnel protective equipment. Do not use compressed air to dry parts when trichlorotrifluoroethane has been used.

NOTES

The PROCEDURES column in your PMCS charts instruct how to perform the required checks and services. Carefully follow these instructions and, if tools are needed or the chart so instructs, get organizational maintenance to do the necessary work.

If your equipment must be in operation all the time, check those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

- c. Deficiencies that cannot be corrected must be reported to higher category maintenance personnel. Records and reports of preventive maintenance must be made in accordance with procedures given in TM 38-750.

4-4. Operator/Crew Preventive Maintenance Checks and Services

Perform weekly as well as before operation PMCS if:

- a. You are the assigned operator and have not

operated the item since the last weekly.

b. You are operating the item for the first time.

NOTE

The checks in the interval column are to be performed in the order listed.

NOTE

If the equipment must be kept in con-

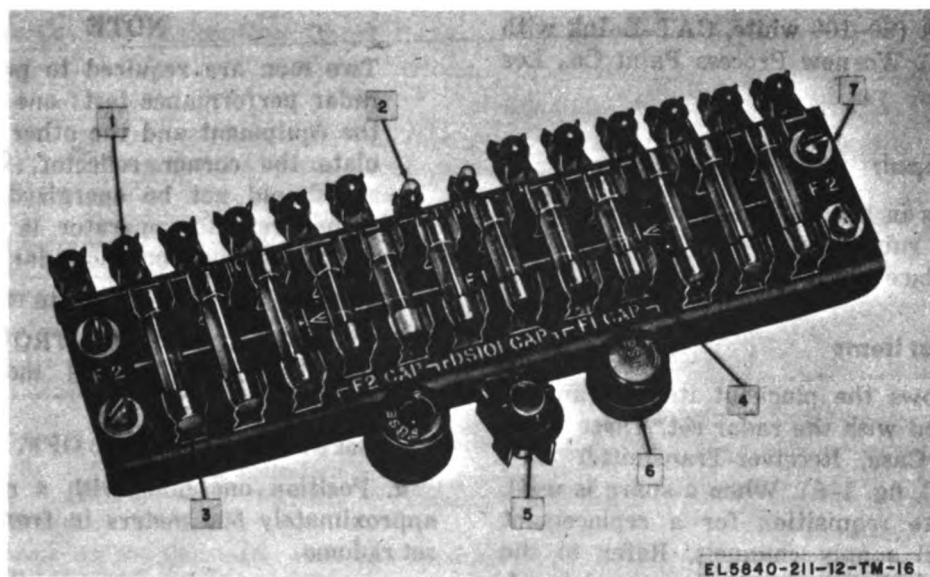
tinuous operation, check and service only those items that can be checked and serviced without disturbing operation; make the complete checks and services when the equipment may be shut down.

4-5. Operator/Crew Preventive Maintenance Checks and Services Chart

B - Before D - During W - Weekly

Item No.	Interval			Item to be Inspected	Procedures - Check for and have repaired or adjusted as necessary	Equipment is not Ready/Available If:
	B	D	W			
1	•			Mission Essential Equipment	Check for completeness and satisfactory condition of the equipment. Report missing items.	Available equipment is insufficient to support the combat mission.
2		•		Range Calibration	Check calibration accuracy as described in paragraph 3-10o.	If range error is exceeded.
3		•		1st MARK Calibration Accuracy	Check after each hour of operation as described in paragraph 3-10e.	If range error greater than ± 10 meters.
4		•		7th MARK Calibration Accuracy	Check after each hour of operation as described in paragraph 3-10i.	If range error greater than ± 10 meters.
5		•		Headset Noise	Perform VOLUME knob adjustment as described in paragraph 3-9.	
6		•		Radar Performance	Perform radar performance test as described in paragraph 4-11.	If performance is abnormal.
7			•	Telescope	Check the telescope alinement as described in paragraph 3-7.	
8			•	Azimuth Orientation	Check the azimuth adjustment as described in Paragraph 3-8.	

Paragraph 4-6 deleted.



- 1 Tripod and panel lamp (pilot, 2.7 volts, 60 ma)
- 2 Telescope lamp (pilot, 3 volts, 190 ma)
- 3 Power fuse (type 3AG, 2 amperes, 125 volts)
- 4 Transmitter fuse (type 3AG, 0.125 amp, 250 volts, long time lag)
- 5 Edge light cap
- 6 Fuse holder cap
- 7 Running spares receptacle

Figure 4-2. Radar Set AN/PPS-4A, running spares.

4-7. Cleaning

a. Telescopes. Remove dust from the lenses with a camel's-hair brush. Remove oil or grease by applying a small amount of liquid, lens cleaning soap; use a tuft of lens paper. Wipe dry with a clean piece of lens paper. Wash the rubber eyeshield in warm water, and dry and dust it with talcum powder. Do not use salt water.

b. Receiver-Transmitter. To wash the exterior of the receiver-transmitter, hose with water at low pressure or use water from buckets. Do not wash the exterior of the equipment with high-pressure hoses. Although the equipment is considered waterproof, it cannot be considered water-tight when subjected to a powerful stream of water, such as from a high-pressure hose. Do not use salt water.

c. Tripod Head. To operate effectively, the tripod head must be free from grit and corrosion. Clean the tripod head by wiping with a cloth or by using water (at low pressure) do not use salt water; dry the parts thoroughly. Remove corrosion, and paint the affected area.

d. Headset. Clean the headset with a clean dry cloth. Use a damp cloth with a mild detergent on stubborn areas; dry thoroughly. Do not poke sharp tools into the holes of the earphone grid or permit water to enter.

4-8. Repainting and Refinishing Instructions

CAUTION

Do not allow any paint to come in contact with the radome (fig. 1-2). The radome is made of plastic and covered with a special paint that does not interfere with the radiation of radio frequency energy. Paint should be applied to the radome only by higher category of maintenance personnel.

Chipped or otherwise damaged *exterior* painted *metallic* surfaces may be touched up as follows:

a. Refer to the applicable cleaning and refinishing practices specified in TB 746-10 and SB 11-573.

b. Use only paints and finishes listed in SB 11-573.

c. Remove rust and corrosion from metal surfaces by lightly sanding them with #000 sandpaper.

d. Apply pretreatment coating (Military Specification MIL-P-15328) to bare metal surfaces.

e. Brush two coats of Enamel, Lusterless, No. TT-E-527, FSN 8010-817-1213, Federal Standard 595 color No. 37038 on the bare metal to protect it from further corrosion.

f. Restore white engraved markings with

white epoxy ink (50-100 white, CAT-L-Ink with Catalyst No. 20, Wornow Process Paint Co., Los Angeles, Calif.).

4-9. Cable Repair

Repair any cuts in the cable insulation by covering them with rubber tape and then with friction tape. Replace all broken cords and cables.

4-10. Pluckout Items

Figure 4-2 shows the pluckout items (running spares) provided with the radar set. These items are stored in Case, Receiver-Transmitter CY-2733/PPS-4 (C, fig. 1-6). When a spare is used, make immediate requisition for a replacement through normal supply channels. Refer to the basic issue items list (app. B) for complete official nomenclature, Federal stock numbers, and authorized quantities.

4-11. Radar Performance Test

The following radar performance test should be performed at least once a day by the operator, unless orders to the contrary or the existing tactical situation prohibits it. During this test, determine if the radar set is operating properly. If the radar set fails to perform properly, have it checked by a higher category of maintenance radar repairman. A corner reflector is required for use in the radar performance test. Figure 4-1 outlines the steps necessary for fabricating a pyramid type of corner reflector suitable for use in the test. If material is not available for fabricating the corner reflector, a messkit or metal helmet may be used as a field expedient.

NOTE

Two men are required to perform the radar performance test: one to operate the equipment and the other to manipulate the corner reflector. The radar set should not be energized until the corner reflector operator is located at a safe distance from the radar set.

a. Set the POWER switch to TRANSMIT.

b. Turn the RANGE CONTROL handwheel to set the RANGE METERS indicator to 500 meters.

c. Set the strobe switch to OFF.

d. Position one man with a corner reflector approximately 500 meters in front of the radar set radome.

e. Have the man face the radar set and hold the corner reflector by its handle at arms length in front of him so that the inside of the pyramid faces the radar set.

f. Have the man maintain the corner reflector at arms length and, repeatedly in a brisk motion, move the corner reflector from its initial position to an overhead position and back to the initial position, constantly keeping the inside of the pyramid facing the radar set.

g. Have the man move the corner reflector at a slower rate of speed. A correspondingly lower frequency tone should be heard in the headset.

h. Have the man hold the corner reflector stationary and check the performance of the RANGE EXTENSION METERS meter.

i. Perform the installation performance check (para 3-11).

Section III. OPERATORS TROUBLESHOOTING

4-12. General Troubleshooting Information

Troubleshooting of this equipment by the operator is based primarily upon the installation performance check (para 3-11) the "during operations" checks contained in the daily and weekly preventive maintenance checks and services charts (paras 4-5 and 4-6) and trouble symptoms that may occur during normal operation. For tools and test equipment allowed the operator refer to appendix B. To troubleshoot the equip-

ment, perform all procedures set forth in paragraph 3-11. When an abnormal condition or result is observed, refer to the troubleshooting chart (para 4-13). Locate the description of the abnormal condition or result in the *Trouble symptom* column of the troubleshooting chart. Then perform the checks and corrective actions indicated in the troubleshooting chart. If the corrective measures indicated do not correct the trouble, higher category of maintenance is required.

4-13. Operator's Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Checks and corrective action
1	RANGE EXTENSION METERS meter indicates zero when the BATTERY TEST button is depressed. POWER switch is in any position but OFF. No noise is heard in the headset when the POWER switch is set to the TRANSMIT position.	a. Open POWER fuse b. Loose power cable connection ..	a. Check fuse. Replace if defective. b. Check power cable. Tighten power cable if loose. c. Refer to higher category of maintenance.
2	RANGE EXTENSION METERS meter will not register in red zone.	a. Open XMTR fuse b. Weak battery	a. Check fuse. Replace if defective (para 4-14). b. Replace battery (para 4-15).
3	RANGE EXTENSION METERS meter and/or RANGE METERS indicators do not illuminate when PANEL LIGHTS switch is set to ON.	a. Defective panel lamp(s) b. Defective panel wiring	a. Replace panel lamp(s) (para 4-16). b. Refer to higher category of maintenance.
4	Tripod lamps do not illuminate when TRIPOD LIGHTS switch is set to ON.	a. Defective tripod lamps b. Defective tripod wiring	a. Replace tripod lamps (para 4-17). b. Refer to higher category of maintenance.
5	Telescope lamp does not illuminate when TELESCOPE LIGHT switch is set to ON.	Defective telescope lamp	Replace telescope lamp (para 4-18).
6	RANGE EXTENSION METERS meter does not show decrease in indication when POWER switch is set to TRANSMIT.	Defective receiver-transmitter circuitry.	Refer to higher category of maintenance.
7	Noise cannot be heard in headsets when POWER switch is set to TRANSMIT.	a. Defective headset(s) b. Defective receiver-transmitter circuitry.	a. Replace headset(s) (para 4-20c). b. Refer to higher category of maintenance.
8	Noise level in headsets cannot be adjusted to comfortable level with VOLUME knob.	Defective receiver-transmitter circuitry.	Refer to higher category of maintenance.

4-14. Replacement of XMTR FUSE

WARNING

Turn the POWER switch to the OFF position before replacing fuse.

- a. Turn the XMTR FUSE fuse holder counterclockwise to unlock it.
- b. Remove the holder and fuse.
- c. Obtain a new fuse from the spares contained in the receiver-transmitter transit case. Replace the defective fuse with the good fuse.

CAUTION

Always replace a blown fuse with one that has the same rating. If a replacement fuse blows, do not install another fuse until the trouble has been remedied.

- d. Replace the fuse holder by pushing it in and turning it clockwise.

4-15. Replacement of Battery

- a. Shut down the radar set as instructed in paragraph 3-14.
- b. Disconnect the power cable from the battery, and replace the defective battery with a good battery.
- c. Connect the power cable to the good battery.

4-16. Replacement of Panel Lamps (fig. 4-1)

- a. Unscrew and remove the lampholder, together with its rubber gasket, to expose the defective lamp (fig. 4-1).
- b. Pull the defective lamp straight out and replace it with a new one.
- c. Screw the lampholder (together with its rubber gasket) back into place.

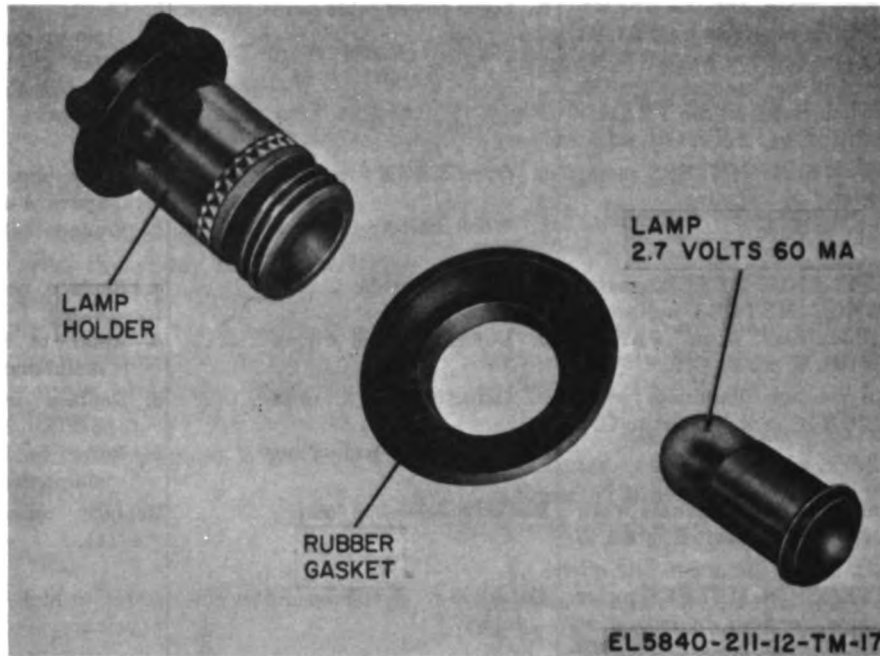


Figure 1-3. Panel lamp and associated components.

4-17. Replacement of Tripod Lamps

- a. Unscrew and remove the tripod lamp retainer (fig. 2-2).
- b. Remove the defective lamp from the retainer by carefully prying the lamp out.
- c. Press fit a new lamp into the retainer.
- d. Screw the retainer back into place until the retainer window is in a position to allow light from the lamp to illuminate the indicator.

4-18. Replacement of Telescope Lamp

- a. Slide the telescope light cable (fig. 1-4)

with attached lamp housing straight out and away from the telescope.

- b. Unscrew the lamp housing from the receptacle on the telescope cable.
- c. Unscrew the defective lamp from the receptacle and replace it with a new one.
- d. Screw the lamp housing back into place on the telescope cable receptacle.
- e. Slide the telescope cable with attached lamp housing back into the telescope.

Section IV. PREPARATION FOR TRAVEL

4-19. General

This section provides all the information required for preparation and disassembly of the equipment to the extent necessary to permit safe movement or travel over short distances.

4-20. Procedures

Shut down the equipment as instructed in paragraph 3-14 and proceed as follows:

- a. Disconnect the power cable from the 24 VDC BAT. ONLY panel receptacle by turning the plug counterclockwise.
- b. Disconnect the power cable from the battery.
- c. Disconnect the headsets from the HEAD-SET receptacles by turning each connector counterclockwise.

d. Wind the headset and power cables into coils and place them on your belt.

e. Carefully lay the radar set together with the tripod on the ground.

f. Collapse the tripod.

g. Remove the control handle from the tripod head by turning it counterclockwise.

h. Place the control handle in the clip (fig. 1-3) on the tripod leg.

i. Release the wingnut on each leg, by turning the nut counterclockwise.

j. Fold the legs of the tripod together and lock the wingnuts.

k. Loosen the three knobs used for adjusting the height of the tripod.

l. Adjust the legs of the tripod to a comfortable height for carrying on the shoulder.

m. Lock the tripod legs by turning the three knobs clockwise.

n. Place the tripod, with receiver-transmitter attached, on the right shoulder.

o. Carry the battery in the left hand by the handle.

p. Move the equipment to the new location.

q. Make a return trip for the transit cases.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. GENERAL

5-1. Scope

CAUTION

Do not open the trunk-type latches on the front and rear of the receiver-transmitter.

a. General. This chapter contains instructions covering organizational maintenance of Radar Set AN/PPS-4A. It includes instructions for performing preventive and periodic maintenance services, basic theory, and repair functions to be accomplished by the organizational repairman. Operating instructions are in chapter 3.

b. Responsibilities. Organizational maintenance of the radar set includes—

- (1) Preventive maintenance checks and services.
- (2) Deleted.
- (3) Troubleshooting (para 5-8).

5-2. Tool, Test Equipment, and Materials Required

Organizational maintenance repairmen requires a corner reflector, Tool Kit, Electrical Equipment, TK-105/G, and a Multimeter AN/URM-105. Refer to TM. 11-6625-203-12 for instructions on how to operate the multimeter.

Section II. ORGANIZATIONAL PREVENTIVE MAINTENANCE

5-3. Preventive Maintenance

Organizational preventive maintenance procedures are designed to help maintain equipment in serviceable condition. They include items to be checked and how to check them. These checks and services, described in paragraph 5-5, outline inspections that are to be made at specific monthly (M) and quarterly (Q) intervals.

5-4. Preventive Maintenance Checks and Services

Perform the maintenance functions indicated in the preventive maintenance checks and services chart (para 5-5). A month is defined as approxi-

mately 30-calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a standby (ready for immediate operation) condition must have preventive maintenance checks and services performed. Equipment in limited storage (requires service before operation) does not require preventive maintenance.

5-5. Organizational Preventive Maintenance Checks and Services Chart

M – Monthly

Q – Quarterly

Item No.	Interval		Item to be Inspected	Procedures
	M	Q		
1	•		Radome	Carefully check radome for evidence of damage or marred finish. Defective radomes require higher category of maintenance.
2		•	Radars Set AN/FPS-4A	Perform the installation performance checks as described in paragraph 3-11.

Paragraph 5-6 deleted.

Paragraph 5-7 deleted.

Section III. ORGANIZATIONAL TROUBLESHOOTING

5-8. General Troubleshooting Procedures
 Troubleshooting of this equipment is based upon the checks contained in the quarterly preventive maintenance checks and services chart (para 5-

7). A block diagram (fig. 5-1) and a brief discussion of radar set basic theory (para 5-9) is provided to help the organizational repairman to sectionalize trouble to a major component

(para 1-7). To troubleshoot the equipment, perform all functions in the quarterly preventive maintenance checks and services chart (para 5-7) and proceed through the items in sequence until an abnormal condition or result is observed. When an abnormal condition or result is observed, turn to the troubleshooting chart (para 5-10). Perform the checks and corrective actions indicated in the troubleshooting chart (para 5-10). If the corrective measures indicated do not result in correction of the trouble, higher category of maintenance is required.

5-9. Block Diagram Function

The block diagram (fig. 5-1) of the radar set can be used as a quick review of the basic functions of the equipment.

a. Tripod. The tripod supports the receiver-transmitter. The tripod head is adjustable by means of a control handle. Azimuth and elevation angles are indicated on the azimuth and elevation dials of the tripod head.

b. Receiver-Transmitter. The receiver-transmitter transmits a beam of radio frequency (RF) energy which will strike targets in its path. When this beam strikes a large fixed target or a moving target, some of the RF energy is reflected back to the antenna. This reflected RF energy is called the target echo.

c. Headset. Target echos are heard in the headset and/or indicated by a backward swing of the RANGE EXTENSION METERS meter needle (fig. 3-1). The operator manipulates the receiver-transmitter with the tripod control handle until he gets a maximum signal. This indicates that the transmitter-receiver is aimed at the target.

d. Battery. The battery (or its equivalent) supplies all of the power requirements for the radar set.

e. Telescope. The telescope is used to aim the transmitter-receiver.

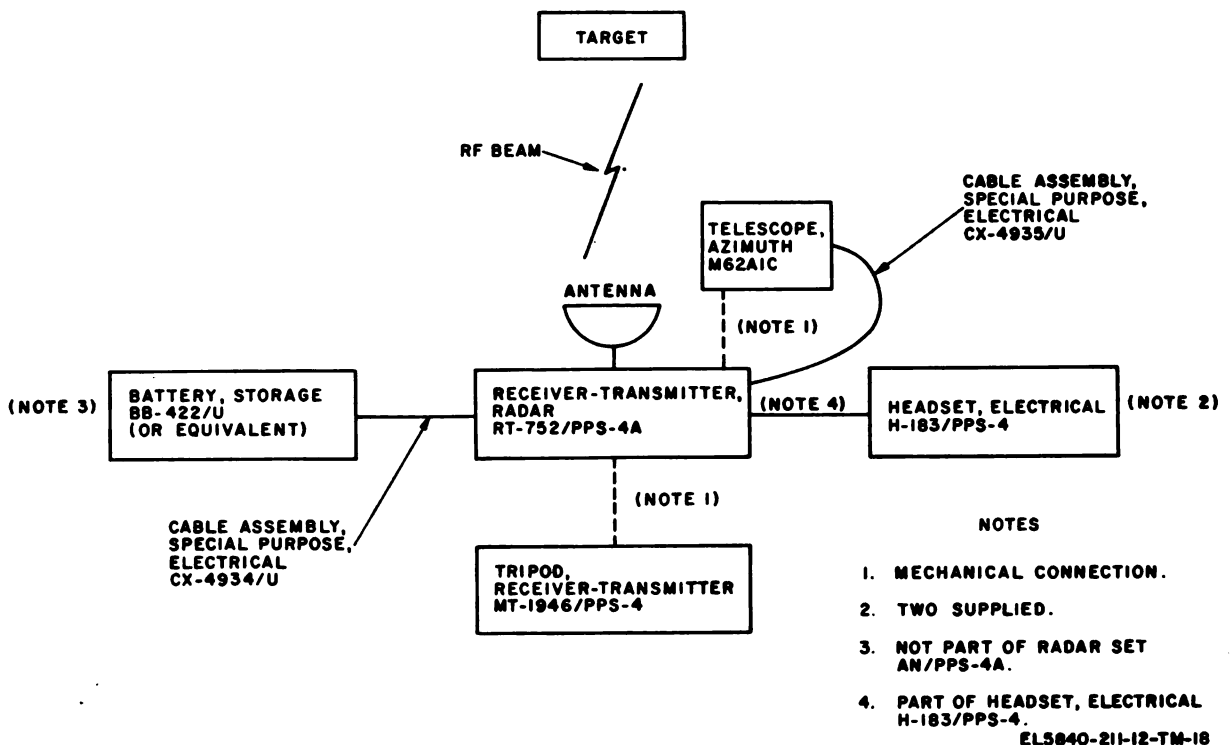


Figure 5-1. Radar Set AN/PPS-4A, block diagram.

5-10. Organizational Troubleshooting Chart

CAUTION

Do not open the trunk-type latches on the front or rear of the receiver-transmitter.

Item No.	Trouble symptom	Probable trouble; checks; and corrective measures
1	RANGE EXTENSION METERS meter needle does not indicate in center of red zone (half-scale deflection).	a. Weak or dead battery. Check battery. Replace battery if defective (para 5-11a). b. Defective POWER fuse. Replace POWER fuse (para 5-11b). c. Open power cable. Remove power cable. Check continuity of power cable with the multimeter (para 5-11c). If symptom persists, higher category of maintenance is required.
2	When RANGE METERS indicator is set at 8,000 meters and VOLUME control is turned to full clockwise position the RANGE EXTENSION METERS meter does not indicate between 100 and 400 meters and no rushing noise is heard in headsets.	Defective receiver-transmitter. Higher category of maintenance is required.
3	During range calibration procedures RANGE EXTENSION METERS meter does not deflect leftward each time RANGE CONTROL handwheel is adjusted for an increasing range.	a. Defective XMTR FUSE. Replace XMTR FUSE (para 5-15). b. Defective receiver-transmitter. Higher category of maintenance is required.
4	When radar performance test procedures (para 4-11) are performed, no moving target sounds are heard in headsets.	a. VOLUME control out of adjustment. Adjust VOLUME control (para 3-9). b. Defective receiver-transmitter. Higher category of maintenance is required.
5	RANGE EXTENSION METERS meter and RANGE METERS indicator lamps do not light or vary in brightness when PANEL LIGHTS switch is turned clockwise.	a. Defective lamp(s). Replace lamp(s) (para 4-16). b. Defective wiring. Higher category of maintenance is required.
6	Tripod lamps do not light or vary in brightness when TRIPOD LIGHTS switch is turned clockwise.	a. Defective lamp(s). Replace lamp(s) (para 4-17). b. Defective wiring. Higher category of maintenance required.
7	Reticle of telescope not illuminated when TELESCOPE LIGHT button is depressed.	a. Defective lamp. Replace lamp (para 4-18). b. Defective telescope light cable. Remove telescope light cable. Check continuity of telescope light cable with the multimeter (para 5-11c). If symptom persists, higher category of maintenance is required.

5-11. Supplementary Troubleshooting Information

a. *Battery.* Refer to TM 11-6140-203-15-1 for maintenance instructions for the battery.

b. *POWER Fuse.* Remove and replace in the same manner described in paragraph 4-14.

c. *Power Cable.* Using the multimeter, check the continuity of the power cable between pin A on one connector and pin A on the connector at the other end of the cable. Repeat the procedure for pin B. Replace power cable if continuity measurements are abnormal.

d. *Headset.* Using the multimeter, check for continuity between pin J and pin K on plug

P102 or plug P103. (The other eight pins are open.) If there is no continuity, the headset is defective. Defective headsets should be replaced and turned into higher category of maintenance for repair.

e. *Telescope Light Cable.* Place POWER switch in STANDBY position. Depress TELESCOPE LIGHT button. If the telescope lamp does not light, replace with a new lamp. Depress the TELESCOPE LIGHT button, if the lamp still does not light, higher category of maintenance is required.

f. *Telescope.* Refer defective telescope to ordnance maintenance through normal supply channels.

Section IV. REMOVAL AND REPLACEMENT

5-12. Tripod

a. Removal.

- (1) Remove the receiver-transmitter (para 5-18).
- (2) Unscrew the control handle from the control handle receptacle on the tripod head.
- (3) Place the control handle into the clip on the tripod leg.
- (4) Loosen the three tripod leg knobs.
- (5) Loosen the three wingnuts.
- (6) Retract the tripod legs and tighten the three wingnuts.

b. Replacement.

- (1) Loosen the three wingnuts on the tripod legs.
- (2) Extend the three legs of the tripod and tighten the three wingnuts.
- (3) Loosen the three knobs on the tripod legs.
- (4) Lengthen the legs individually until the desired height is obtained.
- (5) Tighten the three knobs.
- (6) Remove the control handle from the clip on the tripod leg.
- (7) Screw the control handle into the control handle receptacle on the tripod head.
- (8) Level the tripod (para 2-6d).
- (9) Replace the receiver-transmitter (para 5-18).

5-13. Telescope

a. Removal.

- (1) Unplug the telescope light cable connector from the telescope light cable receptacle (fig. 2-4).
- (2) Slide the telescope lamp (attached to one end of the telescope light cable) (fig. 1-4) out of its opening in the telescope.
- (3) Dismount the telescope (fig. 2-3) by loosening the telescope mount screw that secures the two sections of the telescope mount (fig. 2-4) around the barrel of the telescope.

b. Replacement.

- (1) Mount the telescope (fig. 2-3) on the

side of the receiver-transmitter by placing the two sections on the telescope mount (fig. 2-4) around the barrel of the telescope and joining the two ends of the mount with the telescope mount screw that is provided.

- (2) Slide the telescope lamp (attached to one end of the telescope lamp cable) (fig. 1-4) into its opening on the telescope.

- (3) Plug the telescope light cable connector (fig. 1-4) into the telescope light cable receptacle (fig. 2-4) on the side of the receiver-transmitter.

5-14. Receiver-Transmitter

a. Removal.

- (1) Remove the telescope (para 5-12).
- (2) Unplug the tripod lamp cable connector (fig. 2-2) from the tripod lamp cable receptacle on the receiver-transmitter.
- (3) Loosen the securing screw (B, fig. 2-2) and release the receiver-transmitter.
- (4) Slide the receiver-transmitter out of the wedge-shaped opening in the tripod head (B, fig. 2-2).

b. Replacement.

- (1) Mount the receiver-transmitter on the tripod so that the wedge-shaped casting of the base of the receiver-transmitter slides into the wedge-shaped opening in the tripod head (B, fig. 2-2).
- (2) Secure the receiver-transmitter in place by turning the securing screw (B, fig. 2-2) into the wedge-shaped casting.
- (3) Plug the tripod lamp connector (fig. 2-2) into the tripod lamp cable receptacle on the receiver-transmitter (fig. 2-4).

5-15. Headset

a. *Removal.* Remove the headset by twisting the connector counterclockwise and unplugging the connector of the headset cable from the HEADSET receptacle on the control panel (fig. 3-1).

b. *Replacement.* Connect the headset to the receiver-transmitter by plugging the connector of the headset cable into the HEADSET receptacle on the control panel (fig. 3-1) and twisting the connector clockwise.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE

Section I. SHIPMENT AND LIMITED STORAGE

6-1. Shipment

a. Disassembly.

- (1) Shut down the equipment (para 3-14).
- (2) Disconnect the power cable from the receptacle on the control panel and the receptacle on the battery.
- (3) Remove the telescope (para 5-13a).
- (4) Remove the receiver-transmitter (para 5-14a).
- (5) Remove the tripod (para 5-12a).

b. Repackaging.

- (1) Wrap the power cable around the brackets in the base of receiver-transmitter transit case (C, fig. 1-6). Place the connectors on the power cable into the clips.
- (2) Place the telescope into the clips in the base of the receiver-transmitter transit case; place the telescope light cable into the clips next to the telescope clips (C, fig. 1-6).
- (3) Set the receiver-transmitter, radome down, into the base of the transit case; make sure that it is securely in place (B, fig. 1-6).
- (4) Place the technical manual within the metal brackets in the receiver-transmitter transit case cover. Secure the manual in place with the elastic cord (D, fig. 1-6).
- (5) Place the headsets in the cover of the tripod transit case (B, fig. 1-7).
- (6) Place the tripod cable plug in the clip on the tripod head.
- (7) Place the collapsed tripod, head down, in the base of the tripod transit case (B, fig. 1-7).
 - (a) Place elevation locking lever in straight up and down position (fig. 1-3).
 - (b) Loosen tripod head by loosening leveling knob located under tripod head (fig. 1-3).
- (8) Place the covers on the transit cases securely to insure a watertight seal and fasten the trunk-type latches (A, fig. 1-6 and fig. 1-7).
- (9) Refer to figure 2-1. Place the bottom corrugated pad inside the receiver-transmitter inner carton.
- (10) Place the receiver-transmitter transit case inside the receiver-transmitter inner carton.
- (11) Place the four corner pads inside the receiver-

transmitter inner carton in such a manner as to cushion the receiver-transmitter transit case against any movement.

- (12) Place the upper corrugated pad on top of the receiver-transmitter transit case.
- (13) Close the top of the receiver-transmitter inner carton and seal with masking tape.
- (14) Place four corner pads in the bottom of the tripod inner carton.
- (15) Place the tripod transit case inside the tripod inner carton in such a manner that the tripod transit case will rest on the four corner pads in the bottom of the tripod inner carton.
- (16) Place four corner pads on top of the tripod transit case in such a manner as to cushion the tripod transit case against any movement.
- (17) Close the top of the tripod inner carton and seal with masking tape.
- (18) Place the receiver-transmitter inner carton in the wooden packing box.
- (19) Place the tripod inner carton in the wooden packing box.
- (20) Seal the technical manual in a foil bag and place in the wooden packing box.
- (21) Position the wooden cover on top of the wooden packing box and secure with nails.
- (22) Secure the complete package with metal straps.

6-2. Limited Storage

Generally, before the radar set is placed in administrative storage, current maintenance services should be completed, shortcomings and deficiencies should be corrected, and all modification work orders (MWO's) should be applied. Perform inspections and maintenance services in accordance with instructions given in chapter 5.

NOTE

Refer to TM 740-90-1 detailed instructions on administrative storage.

Section II deleted

APPENDIX A REFERENCES

Following are references applicable and available to the unit repairman of Radar Set AN/PPS-4A:

DA Pam 310-1 SB 11-573	Consolidated Index of Army Publications and Blank Forms. Painting and Preservation of Supplies Available for Field Use for Electronics Command Equipment.
TB 43-0118	Field Instructions for Painting and Preserving Electronic Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-6140-203-14-1	Operator's, Organizational, DS and GS Maintenance Manual for Aircraft and Nonaircraft Nickel-Cadmium Batteries (General).
TM 11-6140-203-14-3	Operator's, Organizational, DS and GS Maintenance Manual: Nonaircraft Nickel-Cadmium Batteries.
TM 11-6625-203-12	Operator and Organizational Maintenance Manual: Multimeter AN/URM-105, including Multimeter ME-77/U.
TM 38-750	The Army Maintenance Management Systems (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use.

APPENDIX B BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL)

Section I. INTRODUCTION

B-1. Scope

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Radar Set AN/PPS-4A.

B-2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

a. Basic Issue Items List—Section II. A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.

b. Items Troop Installed or Authorized List—Section III. Not applicable.

B-3. Explanation of Columns.

The following provides an explanation of columns found in the tabular listings:

a. Illustration. This column is divided as follows:

(1) *Figure Number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item Number.* Not applicable.

b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

e. Description. Indicates the Federal item name and a minimum description required to identify the item.

f. Unit of Measure (U/M). Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea, in., pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

g. Quantity Furnished With Equipment (Basic Issue Items Only). Indicates the quantity of the basic issue item furnished with the equipment.

Section II. BASIC ISSUE ITEMS LIST

(1) Illustration		(2) Federal stock number	(3) Part number	(4) FSCM	(5) Description	(6) Unit of meas Usable on code	(7) Qty furn with equip
(A) Fig. No.	(B) Item No.						
1-6	5840-682-2594	CY-2733/PPS-4	.....	CASE, RECEIVER TRANSMITTER	EA	1
1-7	5840-691-1792	CY-2734/PPS-4	.....	CASE, RADAR SET COMPONENTS	EA	1
			SCD170379		CANVAS BAG	EA	1
1-7	5840-778-2929		.....	HANDLE	EA	1

APPENDIX C MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations for AN/PPS-4A. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean, preserve, drain, paint, or to replenish fuel/lubricants/hydraulic fluids or compressed air supplies.

d. Adjust. Maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment used in precision measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

h. Replace. The act of substituting a serviceable like-type part, subassembly, model (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grind-

ing, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module/component/assembly, end item or system. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. That periodic maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

C-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures

will be shown for each category. The number of man-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

- C — Operator/Crew
- O — Organizational
- F — Direct Support
- H — General Support
- D — Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

C-4. Tool and Test Equipment Requirements (Table 1)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

SECTION II MAINTENANCE ALLOCATION CHART
FOR

RADAR SET AN/PPS-4A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
00	RADAR SET AN/PPS-4A	Inspect Test Test	0.2	0.2	1.0			12,23 1,2,3,5 thru 11,13 thru 18, 21 thru 24 1 thru 8,10,11, 13 thru 25
		Test				1.0		1 thru 8,10,11, 13 thru 25
		Test					2.0	1 thru 8,10,11, 13 thru 25
		Service Adjust Adjust Align		0.2 0.2	0.4 1.0			12,23 12,23 23 1,2,3,5 thru 11,13 thru 18, 21 thru 24
		Install Replace Repair		0.3 0.2		0.5		12,23 12,23 1,2,3,5 thru 11,13 thru 18, 21 thru 24
		Overhaul					64	1 thru 8,10,11 13 thru 22,24,25
		01	RECEIVED-TRANSMITTER, RADAR SET 752/PPS-4 (Unit 6)	Inspect Test	0.2		0.5			1,2,3,5 thru 11,13 thru 18, 22,23,24
Test						0.5		1 thru 8,10,11 13 thru 18,20 thru 25
Test							2.0	1 thru 8,10,11 13 thru 18,20 thru 25
Service Adjust Align				0.3	0.3	1.0		12,23 23 1 thru 8,10,11 13 thru 18,20 thru 25
Install Replace Repair				0.2 0.1	0.6			12,23 12,23 1,2,3,5 thru 11,13 thru 18, 22,23,25
Overhaul							32	1 thru 8,10,11 13 thru 18,20 thru 25
0101	CENTER SECTION 6A1			Inspect Test			0.2 1.0			1,2,3,5 thru 11,13 thru 18, 22,23,24
		Test				1.0		1 thru 8,10,11, 13 thru 18,22, 23,24
		Test					1.0	1 thru 8,10,11, 13 thru 18,22, 23,24
		Service Adjust			0.2 0.1			23 1,2,3,5 thru 11,13 thru 18,22 23,24

Change 5

C-3

SECTION II MAINTENANCE ALLOCATION CHART
FOR

RADAR SET AN/PPS-4A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
0101	CENTER SECTION 6A1 (cont)	Align			0.4			1,2,3,5 thru 11,13 thru 18, 22,23,24
		Install			0.2			1,2,3,5 thru 11,13 thru 18, 22,23,24
		Replace			0.2			1,2,3,5 thru 11,13 thru 18, 22,23,24
		Repair			0.5			1,2,3,5 thru 11,13 thru 18, 22,23,24
		Repair				0.5		1 thru 8,10,11 13 thru 18,20 thru 25
		Overhaul					0.8	1 thru 8,10,11 13 thru 18,20 thru 25
010101	AMPLIFIER, INTERMEDIATE FREQUENCY AN-4175/PPS-4 (6A1A1)	Inspect			0.2			1,2,3,5 thru 10, 14,23
		Test			1.0			1 thru 8,10,11, 13,14,22
		Test				1.0		1 thru 8,10,11, 13,14,22
		Service			0.2			23
		Adjust			0.1			23
		Align			0.4			1,2,3,5 thru 10, 14,23
		Install			0.2			1,2,3,5 thru 10, 14,23
		Replace			0.2			1,2,3,5 thru 10, 14,23
		Repair				0.5		1 thru 8,10,11, 13,14,22
		Overhaul					0.8	1 thru 8,10,11, 13,14,22
010102	AUDIO UNIT MC-2985/PPS-4 (6A1A2)	Inspect			0.2			9,11,14,23
		Test			0.5			10,11,14,22
		Test				0.5		10,11,14,22
		Service			0.2			23
		Adjust			0.1			23
		Install			0.2			23
		Replace			0.2			23
		Repair				0.6		10,11,14,22
		Overhaul					0.6	10,11,14,22
010103	AUTOMATIC FREQUENCY CONTROL UNIT C-3115/PPS-4 (6A1A3)	Inspect			0.2			1,2,3,5 thru 10, 14
		Test			0.4			1 thru 8,10,11, 14,22
		Test				0.4		1 thru 8,10,11, 14,22
		Service			0.2			23
		Adjust			0.2			23
		Align			0.4			1,2,3,5 thru 10, 14
		Install			0.2			23
		Replace			0.2			23
		Repair				0.8		1 thru 8,10,11, 13,14,22
		Overhaul					1.0	1 thru 8,10,11, 13,14,22

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SECTION II MAINTENANCE ALLOCATION CHART
FOR

RADAR SET AN/PPS-4A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
010104	MICROWAVE UNIT (6A1A4)	Service			0.2			1,2,3,5 thru 10, 14,23 1,2,3,5 thru 10, 14,23 1 thru 8,10,11, 13,14,22 1 thru 8,10,11 13,14,22 23 1,2,3,5 thru 10, 14,23 23 23 1 thru 8,10,11, 13,14,22 1 thru 8,10,11, 13,14,22
		Test			0.4			
		Test				0.4		
		Service			0.2		0.4	
		Adjust			0.1			
		Install			0.2			
		Replace			0.2			
		Repair			0.5			
		Repair				0.5		
		Overhaul					0.8	
010105	POWER CONVERTER CV-1803/PPS-4A (6A1A5)	Service			0.2			9,11,13,15,23, 24 10,11,13,15,22, 25 10,11,13,15,22, 25 23 23 23 10,11,13,15,22, 25 10,11,13,15,22, 25
		Test			0.4			
		Test				0.4		
		Service			0.2			
		Adjust			0.2			
		Install			0.2			
		Replace			0.2			
		Repair				0.5		
Overhaul					0.6			
010106	TRANSMITTER T-967/PPS-4A	Inspect			0.2			1,2,3,5 thru 10, 14,23 1 thru 8,10,11, 13,14,22 1 thru 8,10,11, 13,14,22 14,22 14,22 1,2,3,5 thru 10, 14,23 14,22 14,22 1 thru 8,10,11, 13,14,22 1 thru 8,10,11, 13,14,22
		Test			0.5			
		Test				0.5		
		Test					0.5	
		Service			0.2			
		Adjust			0.3			
		Align			0.4			
		Install			0.2			
		Replace			0.2			
		Repair				0.5		
Overhaul					1.0			

Change 5 C-5

SECTION II MAINTENANCE ALLOCATION CHART
FOR

RADAR SET AN/PPS-4A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
010107	RANGE UNIT ML-2984/PPS-4	Inspect			0.2			1,2,3,5 thru 10, 14,23 1 thru 8,10,11, 13,14,22 1 thru 8,10,11, 13,14,22 1,2,3,5 thru 10, 14,23 14,23 1 thru 8,10,11, 13,14,22 1 thru 8,10,11, 13,14,22
		Test			0.5			
		Test					0.5	
		Service			0.2			
		Adjust			0.4			
		Align			0.4			
		Install			0.2			
		Replace Repair			0.2	1.0		
010108	RADOME (6A1A6)	Inspect			0.2			21,23 21,22 21,23 21,23 21,23 21,22 21,22
		Test			0.4			
		Test				0.4		
		Service			0.2			
		Install			0.3			
		Replace			0.3			
		Repair				0.5		
		Overhaul					0.5	
0102	CONTROL PANEL (6A2)	Inspect			0.2			9,23 10,22 10,22 10,22 9,23 9,23 9,23 10,22 10,22
		Test			0.2			
		Test				0.2		
		Test					0.2	
		Service			0.2			
		Install			0.3			
		Replace			0.3			
		Repair Overhaul				0.3	0.6	
010201	STROBE UNIT (6A2A1)	Inspect			0.2			10,22 10,22 10,22 9,23 9,23 9,23 9,23 10,22 10,22
		Test				0.3		
		Test					0.3	
		Service			0.2			
		Adjust			0.2			
		Install			0.2			
		Replace			0.2			
		Repairs Overhaul			0.4		0.6	
02	CASE, RECEIVER-TRANSMITTER CY-2733/PPS-4 (UNIT 4)	Inspect						21 23 23 23 22 22 22
		Service			0.2			
		Install			0.2			
		Replace			0.3			
		Repair			0.3			
		Repair				0.5		
		Repair				0.5		
		Overhaul					1.0	
03	HEADSET, ELECTRICAL H-183/PPS-4 (UNIT 5)	Inspect		0.1				13,22,23 13,22,23 13,22,23 13,22,23 12,23 12,23 12,23 13,22,23 13,22,23
		Test			0.2			
		Test				0.2		
		Test					0.2	
		Service		0.2				
		Install		0.1				
		Replace		0.1				
		Repair Overhaul			0.5		1.0	

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SECTION II MAINTENANCE ALLOCATION CHART
FOR

RAWR SER NR/778-1A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
04	TRIPOD, RECEIVER-TRANSMITTER NR-1946/778-1 (UNIT 7)	Inspect		0.1				23
		Service		0.2				23
		Install		0.1				23
		Replace		0.1				23
		Repair				0.4		22
0401	INDICATOR ASSEMBLY, ELEVATION (7A1)	Overhaul					0.5	22
		Inspect			0.2			23
		Test			0.3			22
		Test				0.3		23
		Service			0.2			23
		Adjust			0.1			23
		Align			0.1			23
		Install			0.1			23
		Replace			0.1			23
		Repair				0.4		22
0402	TRIPOD LEG ASSEMBLY (7A2)	Overhaul					0.5	22
		Inspect			0.2			23
		Service			0.2			23
		Install			0.2			23
		Replace			0.2			23
0403	CASE, COMPONENT CY-2734/778-1 (7A3)	Repair				0.4		22
		Overhaul					0.5	23
		Inspect			0.1			23
		Service			0.2			23
		Replace			0.1			23
05	CABLE ASSEMBLY, SPECIAL PURPOSE CX-4934/U (2W1)	Repair				0.4		22
		Overhaul					0.5	23
		Inspect		0.1				23
		Test			0.2			11,13,22,23
		Test				0.2		11,13,22,23
		Test					0.2	11,13,22,23
		Service		0.2				12,23
		Install		0.2				12,23
		Replace		0.2				12,23
		Repair			0.4			11,13,22,23
06	CABLE ASSEMBLY, SPECIAL PURPOSE CX-4935/U (2W1)	Overhaul					1.0	11,13,22,23
		Inspect		0.1				23
		Test			0.2			11,13,22,23
		Test				0.2		11,13,22,23
		Test					0.2	11,13,22,23
		Service		0.2				12,23
		Install		0.2				12,23
		Replace		0.2				12,23
		Repair			0.4			11,13,22,23
		Overhaul					1.0	11,13,22,23
07	BATTERY ND-422/U (UNIT 1) (See TM 11-6140-203-15-3)							

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TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR

RADAR SET AN/PPS-4A

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F,H,D	ATTENUATOR, VARIABLE CH-533/U	9905-00-752-7408	
2	F,H,D	CABLE RG-98/U	6145-00-170-7837	
3	F,H,D	CONNECTOR U-79/U	9935-00-801-4323	
4	H,D	DETECTOR MOUNT MX-2569/U	9905-00-752-5311	
5	F,H,D	DUMMY LOAD DA-146/U	9905-00-538-7328	
6	F,H,D	GENERATOR, PULSE 80-366/U	6625-00-682-9496	
7	F,H,D	GENERATOR, SIGNAL AN/UHM-127	6625-00-783-9965	
8	F,H,D	GENERATOR, SIGNAL TS-452A/U	6625-00-828-6410	
9	F,H,D	MAINTENANCE KIT, ELEC. EQUIP. MK-541/PPS-4 DELETED	5840-00-893-1929	
10	F,H,D	MAINTENANCE KIT, ELEC. EQUIP. MK-541/PPS-4	5840-00-893-1929	
11	F,H,D	MULTIMETER ME-263/U	6625-00-846-9409	
12	O	MULTIMETER AN/UHM-105	6625-00-581-2036	
13	F,H,D	MULTIMETER TS-352B/U	6625-00-553-0142	
14	F,H,D	OSCILLOSCOPE AN/UHM-281C	6625-00-106-9682	
15	F,H,D	POWER SUPPLY FP-1104C/G	6130-00-542-6385	
16	F,H,D	RANGE CALIBRATOR AN/UPM-11A	6625-00-503-0692	
17	F,H,D	SPECTRUM ANALYZER TS-148/UP	6625-00-166-1040	
18	F,H,D	STOP WATCH	6645-00-250-4680	
19	H,D	TELEPHONE TEST SET AN/PTM-6	6625-00-249-1048	
20	H,D	TEST SET, TRANSISTOR TS-1836/U	6625-00-893-2688	
21	F,H,D	TEST SET, RADAR TS-147D/UP	6625-00-256-1377	
22	F,H,D	TOOL KIT, ELEC. EQUIP. TK-100/G	5180-00-605-0079	
23	O,F	TOOL KIT, ELEC. EQUIP. TK-105/G	5180-00-610-8177	
24	F,H,D	VOLTMETER ME-30/U	6625-00-643-1670	
25	H,D	VOLTMETER AN/UHM-98	6625-00-753-2115	

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By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

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VERNE L. BOWERS,
Major General, United States Army,
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 29-105
 29-134
 29-136
 29-138
 29-427
 57-100
 77-100

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

