TM 11-5855-261-23

TECHNICAL MANUAL

ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

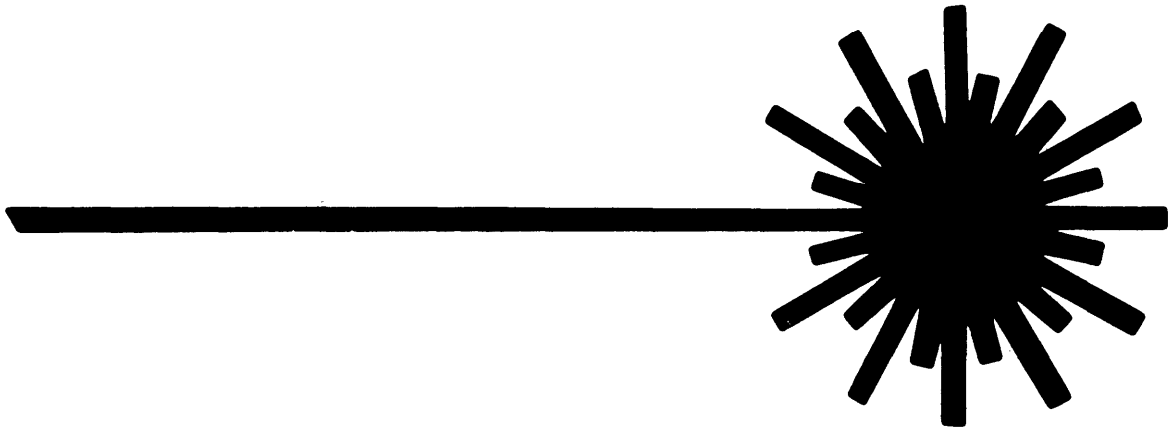
AIMING LIGHT, INFRARED

AN/PAQ-4

(NSN 5855-01-107-5925)

HEADQUARTERS, DEPARTMENT OF THE ARMY
21 OCTOBER 1981

WARNING



Although the laser light emitted by the aiming light is considered eye safe, suitable precautions must be taken to avoid overexposure to this radiated energy. Precautionary measures include the following:

- Avoid viewing the laser emitter at close range. Increasing the distance from the eye to the laser source greatly reduces the risks of overexposure.

- Avoid viewing the emitter directly along the optical axis of the radiated beam. Especially avoid viewing the emitter along the optical axis of the beam through stabilized optics such as binoculars or telescopes.

The battery contains mercury and should be handled in the following manner:

1. Do not dispose in fire.

2. Do not short circuit.

3. Return batteries to Property Disposal Officer for disposal in accordance with DLSC Handbook 41601.

Technical Manual
No. 11-5855-261-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *21 October 1981*

ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE MANUAL

AIMING LIGHT, INFRARED AN/PAQ-4

(NSN 5855-01-107-5925)

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, DAForm 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in back of this manual direct to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

In either case a reply will be furnished direct to you.

LIST OF ILLUSTRATIONS

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual described Infrared Aiming Light AN/PAQ-4, (aiming light) and covers organizational and direct support maintenance.

b. References are listed in Appendix A. The maintenance allocation chart (MAC) appears in Appendix B. The repair parts and special tools list appears in TM 11-5855-261-23P.

1-2. Maintenance Forms, Records, and Reports

a. Reporls 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 System.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-1l-2/DLAR 4140.55/ NAVMATINST 4355.73/AFR 400-54/MCO 4430.3E.

e. *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 4610.33B/AFR 75-18/MCO 4610.19C/ DLAR 4500.15.

1-3. Indexes of Publications

Refer to the latest issue of DA PAM 310-4 to determine whether there are new additions, changes, additional publications or modification work orders pertaining to the equipment.

1-4. Administrative Storage

a. Storagr Site.

(1) Select the best available site for administrative storage. Separate stored equipmet from equipment in use. Conspicuously mark the area "Administrative Storage. "

(2) Covered space is preferred. When sufficient covered space for all items to be stored is not available, priority should be given to items which are most susceptible to deterioration from the elements. Use SB 38-8-1 as a guide for what items are most likely to deterioration.

(3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well-drained, and kept free of excessive vegetation.

(4) Trucks, vans, CONEX containers, and other containers may be used if they provide the best available protection.

b. Storage Plan,

(1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.

(2) Take into account environmental conditions, such as extreme heat or cold; high humidity; blowing sand, dust, or loose debris; soft ground; mud; heavy snows; earthquakes; or combinations thereof, and take adequate precautions.

c. *Maintenance Services and inspection.*

(1) Maintenance services. Prior to storage, perform the next scheduled preventive maintenance service (para 2-3).

(2) *Inspection.* Inspect and approve equipment prior to storage. Do not place equipment in storage unless fully operational.

d. Auxiliary Equipment and Basic Issue Item. Process auxiliary and basic issue items simultaneously with the major item to which they are assigned. If possible, store auxiliary and basic issue items with the major item. If stored apart from their major item, note the registration or serial numbers and locations, and store in protective type closures. In addition, place a tag or list indicating the location of the removed items in a conspicuous place on the major item. Basic items are listed in Appendix B, Section III.

e. *Battery Storage.* Remove batteries from equipment prior to storage and turn in batteries to suppply.

f. *General Cleaning, Painting, and Preservation.* Clean the equipment of dirt, grease, and other contaminants by using TRICHLOROTRIFLUOROETHANE, but do not use vapor decreasing.

1-5. Destruction of Army Electronics Materiel

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

1-6. Reporting Equipment Improvement Recommendations (EIR)

If you Aiming Light, Infrared AN/PAQ-4 needs im-

provement, 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. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

Section II. DESCRIPTION AND DATA

1-7. Purpose and Use

The aiming light provides a small invisible light beam along the weapon line of fire. The light can be seen only with night vision equipment, such as Night Vision Goggles AN/PVS-5 and -5A. The aiming light can be attached to the M16A1 rifle, M60 machine gun, M67 recoilless rifle, or M72 rocket launcher. When properly aligned to these weapons and turned on, the aiming light beam can be placed on a target at night to provide an accurate aim point.

1-8 Description

The aiming light is a portable, battery-operated device which generates infrared light pulses. The aiming light consists of a laser diode, beam projecting optics, and electronic circuitry inclosed in an aluminum housing. As aiming light carrying bag attaches to the equipment belt. The bag has space for the aiming light, an M 16 rifle mounting bracket, a low temperature battery adapter, and essential spares. (See the operator's manual, TM 11–5855–261–10, for operation instructions.)

1-9. Major Components

The aiming light consists of nine major components (fig. l-l) packaged in an aluminum housing.

a. Scattershield. The scattershield prevents observation of the infrared light except from directly in front of the weapon.

b. Refractive Lens Assembly. The refractive lens assembly projects the invisible infrared light emitted by the laser diode in a narrow, well-defined beam.

c. *Laser Diode Assembly.* The laser diode assembly maintains the infrared light emitting diode at the focal point of the refractive lens. The carrier or forward section of the assembly permits up/down and left/right movements of the light beam for weapon boresighting. Adjusters are used to move the carrier. The rear section of the assembly contains the laser diode, The laser diode is a solid state device used with electronic circuits to generate infrared light pulses.

d. Azimuth/Elevation Adjuster Assemblies. The azimuth/elevation adjuster assemblies adjust the infrared light beam by moving the laser diode assembly when aligning the weapon and the aiming light.

e. *Laser Electronics Assembly.* The laser electronics assembly contains power conditioning and triggering circuits to cause the laser diode to emit infrared light in pulses.

f. *Batteries.* Two *2.7* volt batteries arranged in series provide power for the laser electronics.

g. *Housing Assembly.* The housing assembly is an aluminum tube with a weapon adapter foot, and access cavities for the azimuth/elevation adjusters and ON/OFF switch assembly.

h. ON/OFF Switch Assembly. The ON/OFF switch assembly turns the aiming light ON and OFF. The switch has a momentary ON feature for the M16 rifle.

1-10. Support Equipment

Support equipment consists of mounting brackets for the weapons, a low temperature adapter, carrying bag, and shipping and storage case.

a. Shipping and Storage Case. The shipping and storage case (fig. 1-2) protects the aiming light from damage during transportation, handling, and storage. The case has space for the carrying bag, aiming light, four spare batteries, M16 rifle mounting bracket, low temperature adapter, spare scattershield, operator's manual, and lens paper.

b. Other Support Equipment. The mounting brackets, low temperature adapter, alignment mandrels, and carrying bag are described in the operator's manual, TM 11-5855-261-10.

1-11. Technical Characteristics

Aiming light technical and performance characteristics are listed in TM 11-5855-261-10.

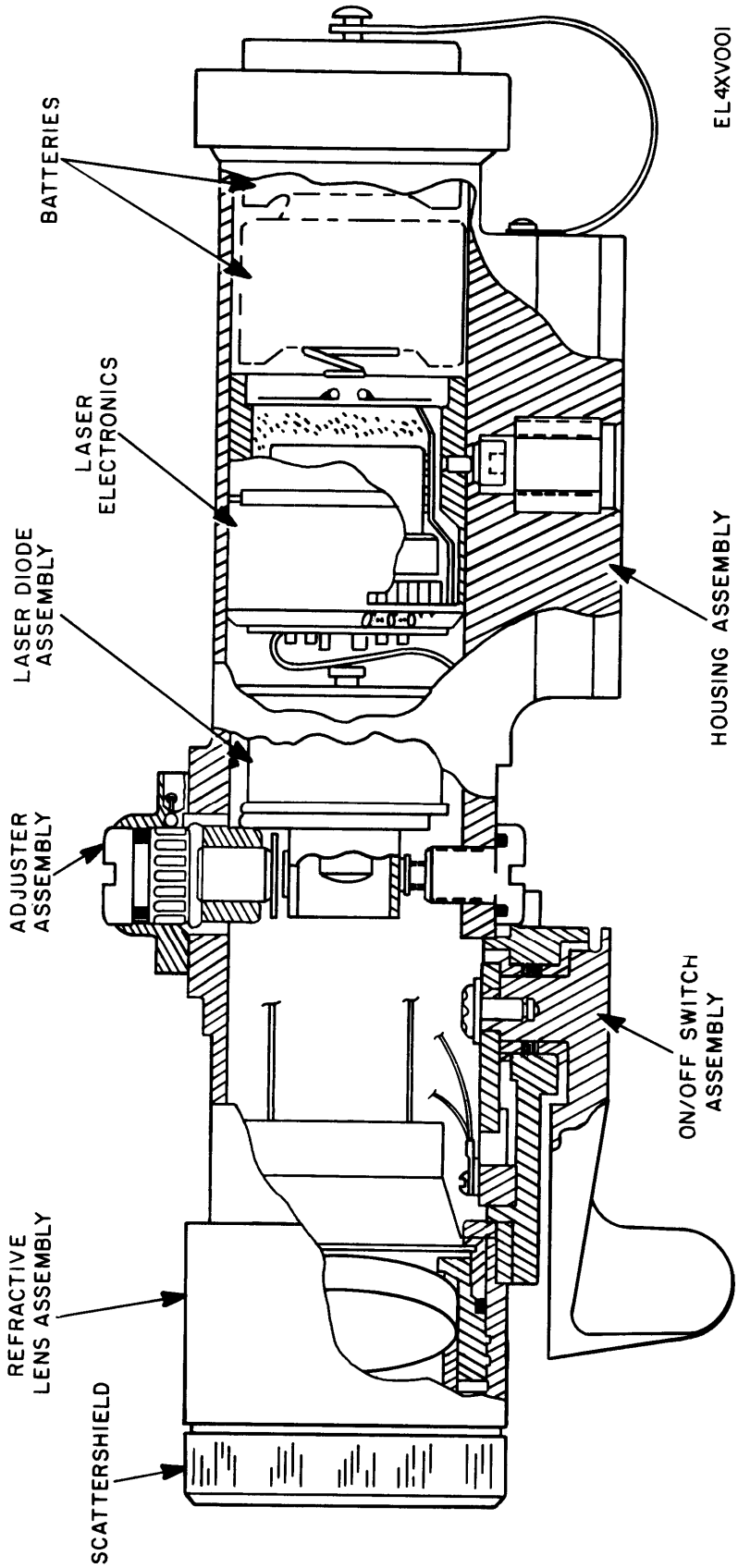


Figure 1-1. Sectional view, infrared aiming light AN/PAQ-4.

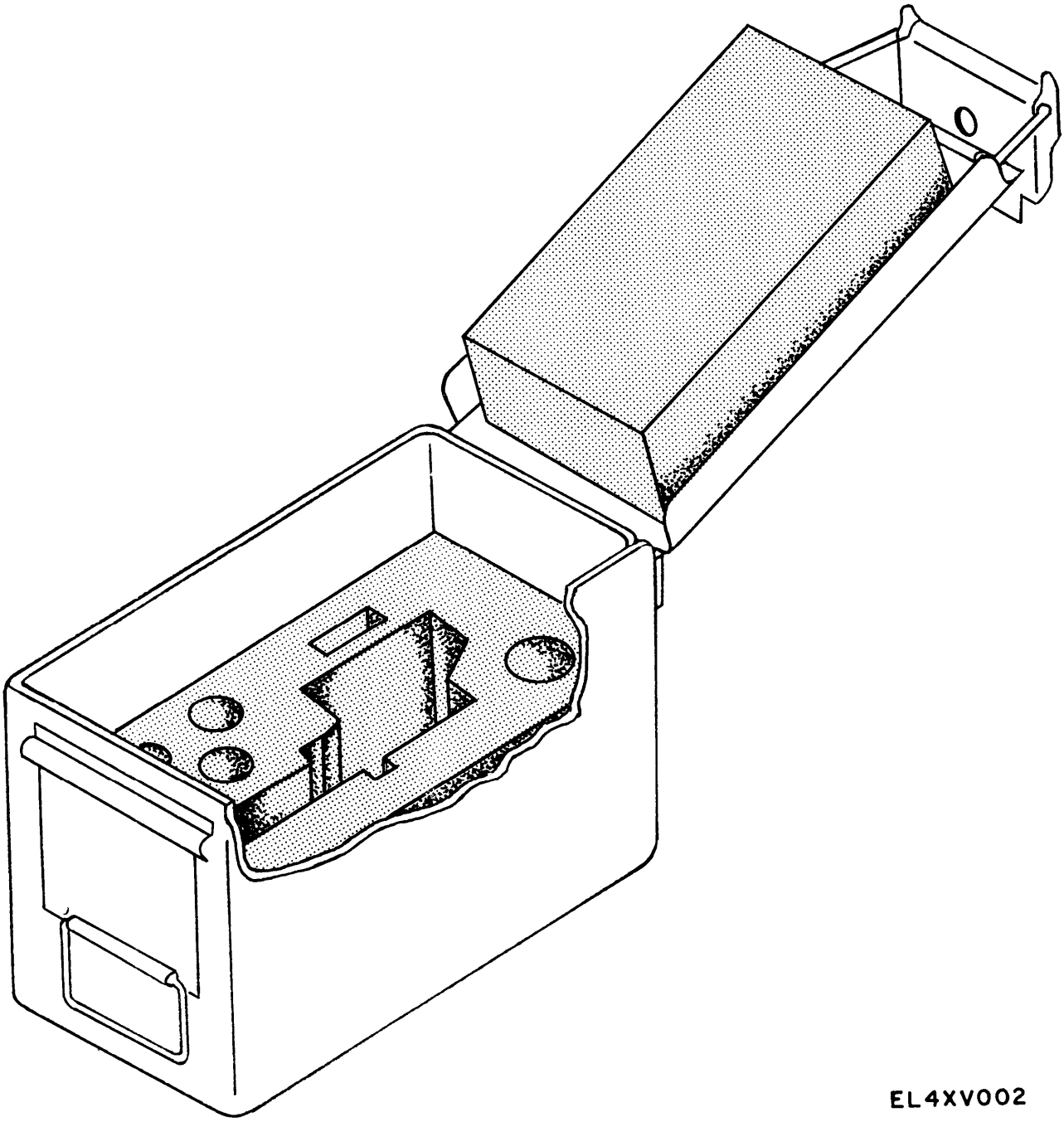


Figure 1-2. Shipping and storage case.

CHAPTER 2
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

2-1. Tools Required

No special tools are required for organizational maintenance.

Section I. MAINTENANCE CHECKS AND SERVICES

2-2. Maintenance

To ensure that the aiming light is always ready for operation, organizational maintenance personnel must perform inspect ions to discover and correct defects before they result in equipment failure. Normal TAMMS procedures, TM 38-750, will be used to gather maintenance date.

2-3. Organizational Maintenance Checks and Services

Organizational maintenance checks and services are outlined in table 2-1. If any part is defective or missing, other than those parts authorized for replacement or repair at organizational maintenance, refer the aiming light to direct support maintenance.

Table 2-1. Organizational Maintenance Checks and Services.

Sequence NO.	Item to be Inspected Procedure	For Readiness Reporting Equipment Is Not Available if:
1	Visual Mechanical lnspection Observe unit for obvious mechanical damage such as deformed mounting bracket, inoperative or broken switch actuator, scratched lens, broken adjusters, ,deformed battery cap, damaged battery cap gasket, parted battery strap, orcther evidcncc of damage or misuse which might indicate a need for repair	Aiming light is in need of repair
2	Batteries See operator preventive maintenance checks and services (TM 11-5855-261-10).	
3	Cleanliness Ovserve unit for cleanliness, especially dirt clogged scattershield. Clean as required.	

Section III. TROUBLESHOOTING

2-4. Purpose of Troubleshooting

The purpose of troubleshooting is to identify the most frequent equipment malfunctions, their probable causes, and corrective action required.

2-5. Organizational Troubleshooting Procedures

Information concerning equipment malfunctions and necessary corrective action which can be taken by organizational maintenance personnel is contained in table 2-2. Any malfunction that is beyond the scope of the operator shall be referred to organizational maintenance.

Table 2-2. Organizational Troubleshooting

Malfunction	Probable Cause	Corrective Action
1. Infrared light beam fails to come on.	Batteries dead or missing.	Replace batteries.
2. Infrared light appears weak.	*a.* Scattershield is plugged. *b.* Lens is dirty on the outside.	*a.* Inspect scattershield, clean as required. *b.* Clean outside of lens with lens paper.

Section IV. ORGANIZATIONAL MAINTENANCE

2-6. Scope of Organizational Maintenance

Organizational personnel are required to isolate and correct malfunctions of the scattershield and batteries.

2-7. Check, Replacement, and Inspection of Components

Aiming light check, replacement, and inspection functions at the organizational level area:

a. Functiona/ Check. In a dark room, turn the ON/OFF switch to the ON position, (fig. 4-l). Point the aiming light at a wall approximately 20 meters away from the light. Use night vision goggles, or equivalent, and observe the light beam. For proper operation, a sharp, well-defined circular spot of pulsing light should appear. The pulsing spot should be approximately 6.5 centimeters in diameter. The aiming light must emit a pulsing light beam to operate properly.

b. Battery Replacement. Remove the batteries from the aiming light. Replace them with new batteries known to be fully charged. (See TM 11-5855-261-10 for procedure.)

WARNING

The battery contains mercury and should be handled in the following manner:

1. Do not dispose in fire.
2. Do not short circuit.
3. Return batteries to Property Disposal Officer for disposal in accordance with DLSC Handbook 41601.

c, Scattershield Inspection. Remove the scattershield and hold it against a light or light-colored surface. Observe the honeycomb for evidence of dirt or other foreign substance in the honeycomb. (See TM 11-5855-261-10 for procedure.)

CHAPTER 3
FUNCTIONING OF EQUIPMENT

3-1. General

Figure 3-1 is a functional block diagram of the aiming light. It shows mechanical, optical, electronic, and control functions.

3-2. Mechanical Functions

Aiming light mechanical equipment consists of azimuth and elevation adjusters, a weapon adapter foot, and an aluminum housing assembly.

a. The purpose of the azimuth and elevation adjusters is to adjust the shot pattern to the center of the infrared light beam. For the M 16 rifle, these adjustments are identical to the M16 rifle daysight. After proper alignment, the round should impact in the center of the light beam as seen with night vision equipment.

b. The aiming light weapon adapter foot attaches firmly to the weapon mounting bracket. The weapon adapter foot and the mounting bracket are mated first. Then, the combination is attached to the weapon.

c. The aluminum housing assembly encloses the laser diode, optics, electronic circuitry, and batteries. Attachment points and accesses are provided for the scattershield, battery cap, azimuth and elevation adjusters, and the ON/OFF switch.

3-3. Optical Functions

The optical parts of the aiming light are the refractive lens and scattershield.

a. The refractive lens projects the infrared light in a narrow, well-defined beam.

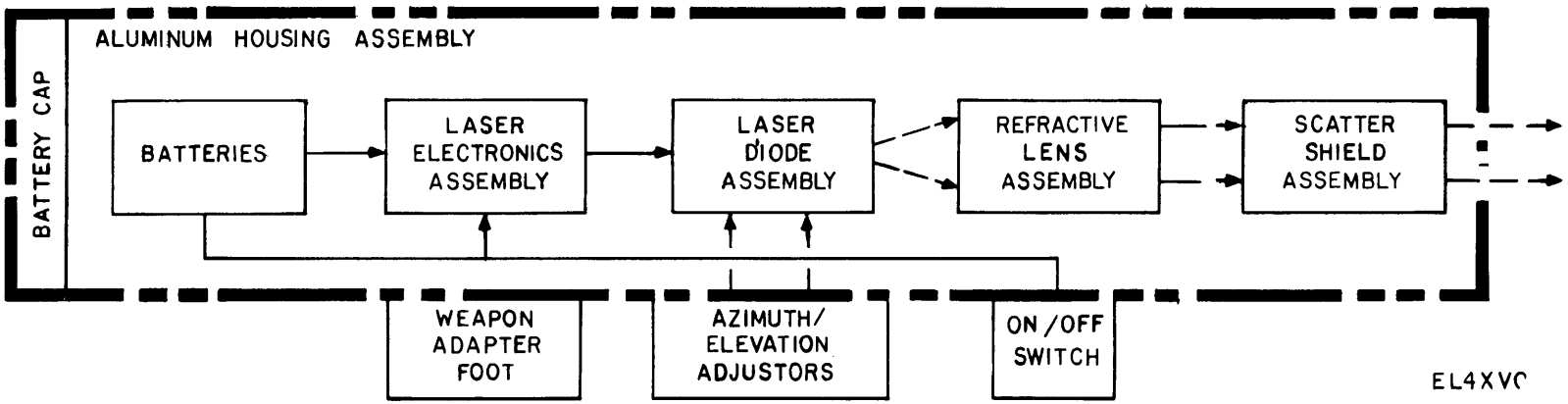
b. The scattershield confines the infrared light in a narrow beam after it passes through the lens. The scattershield prevents anyone from seeing light scattered from the front surface of the lens, unless they are directly in front of the aiming light.

3-4. Electronic Circuit Functions

Electronics circuits consist of the laser diode assembly, the laser electronics assembly, and wiring connected to the batteries and the ON/OFF switch. The laser electronics assembly drives the laser diode which emits infrared light pulses through the refractive lens.

3-5. Control Circuit Functions

The control circuit consists of the ON/OFF switch and wiring to the batteries. The laser electronics assembly and laser diode are powered by to batteries when the switch is on.



3-1. Aiming light functional block diagram.

CHAPTER 4
DIRECT SUPPORT MAINTENANCE INSTRUCTION

Section I. General

4-1. Scope

Direct support maintenance consists of tests, inspect ions, troubleshooting, and replacement of assemblies and parts. This category of maintenance does not require use of shop equipment or complex procedures. Authorized direct support maintenance is listed in the maintenance allocation chart (MAC), Appendix B. Direct support maintenance is done at a maintenance shop, or van, remote from field operations. At that Location, the failed assembly is replaced and the repaired unit is returned to service.

4-2. Tool Requirements

Tools and repair parts required for direct support maintenance are contained in Appendix B. Section I of the MAC, and the repair parts and special tools List (RPSTL), TM 11-5585-261-23P.

4-3. Lubrication

The O-rings for the electronics assembly and the refractive lens assembly required lubrication. Use O-ring lubricant (MIL-S-8660) or equivalent. (See Section III for removal and replacement procedures.)

4-4. Consumable Items

Table 4-1 contains a list of consumable items.

Table 4-1. Consumable Items

Item	Identifying Part No.	NSN	U/M
Lubricant	MIL-S-8600	6640-00-240-5851	cn
Lens paper	NNN-P-40		pk

Section Il. TROUBLESHOOTING

4-5. Tests and Inspections

NOTE

Step-by-step procedures for removing and replacing aiming light components are in Section III of this chapter.

a. *Visual/Mechanical Inspection.* Observe the unit for obvious mechanical damage such as deformed mounting bracket, inoperative switch, scratched lens, broken or jammed azimuth or elevation adjusters, parted battery cap strap, and other evidence of damage or misuse which might indicate a need for repair. Replace as required (para 4-7). Conduct checkout of replacement and check proper operation of the aiming light. If operable, return to service. If not operable, continue troubleshooting.

b. *Continuity Checks.*

(1) *Switch Assembly.* Remove the batteries (para 4-7b.). Remove the switch assembly from the housing (para 4-7c.). Test electrical circuitry as follows:

Use a multimeter and read resistance across the switch terminals with the switch in the ON, momentary, and OFF positions. Resistance should be zero with the switch in the ON and momentary positions, and infinite with the switch in the OFF position. If these readings are obtained, the switch asssembly circuitry is verified as continuous.

(2) *E/ectrica/ Circuit.* Reinstall the batteries (para 4-7b.). With the switch assembly removed, short the switch leads together.

CAUTION

Do not allow either lead terminal to touch the aiming light housing when batteries are installed.

Conduct a functional test (fig. 4-l). In a d2

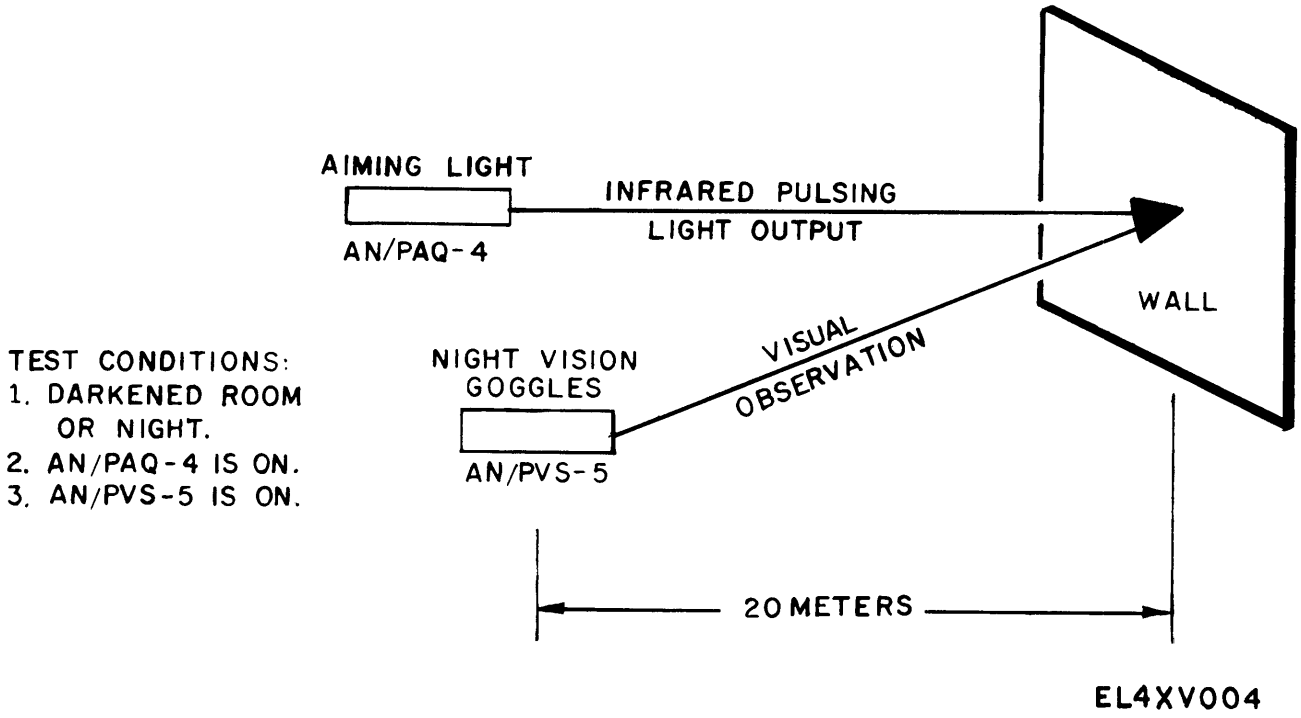


Figure 4-1. Infrared aiming light functional test set-up.

away from the light. Use Night Vision Goggles AN/PVS-5 or -5A and observe the light spot. For proper operation, a sharp, well-defined circular spot of pulsing light should appear. The pulsing spot should be approximately 6.5 centimeters (2.5 inches) in diameter. The aiming light must emit a pulsing light beam to operate properly. Also, proper operation can be observed by looking directly into the aiming light lens and seeing a dim, red, pulsing spot,

(3) If continuity is not verified in the switch assembly, replace it with a spare (para *4-7d.)*. After switch replacement, check the aiming light and, if operable, return to service. If continuity is verified, continue troubleshooting,

(4) If electrical circuit continuity is not verified, continue troubleshooting. If it is verified, reassemble the unit, check it out, and return to service.

c. *Low Temperature Adapter Test.* If the aiming light does not operate with the low temperature adapter, replace the batteries with pretested batteries and recheck pretested batteries in aiming light battery case and check the normal mode of operation. If the aiming light operates satisfactorily, the low temperature adapter is defective and must be replaced. If the adapter electrical cable is broken or electrical contacts are badly corroded, replace the adapter. Dirt may be removed from the electrical contacts with a clean, dry, lint-free cloth.

d. Battery Replacement. Remove the aiming light batteries and replace them with new batteries know to be fully charged (para *4-7b.)*. Perform functional test of *b.(2)* above. If the aiming light is operable, reinstall the switch assembly, check the unit, and return it to service. If the aiming light is not operable, continue troubleshooting.

4-6. Direct Support Troubleshooting Procedures

a. The laser diode assembly and laser electronics assembly are the only replaceable electronic assemblies in the aiming light. These units may be removed, or exposed for testing, by following procedures in Section III of this chapter.

b. The following pass (P), fail (F) procedures (fig.4-2) should be performed for fault isolation to these com-

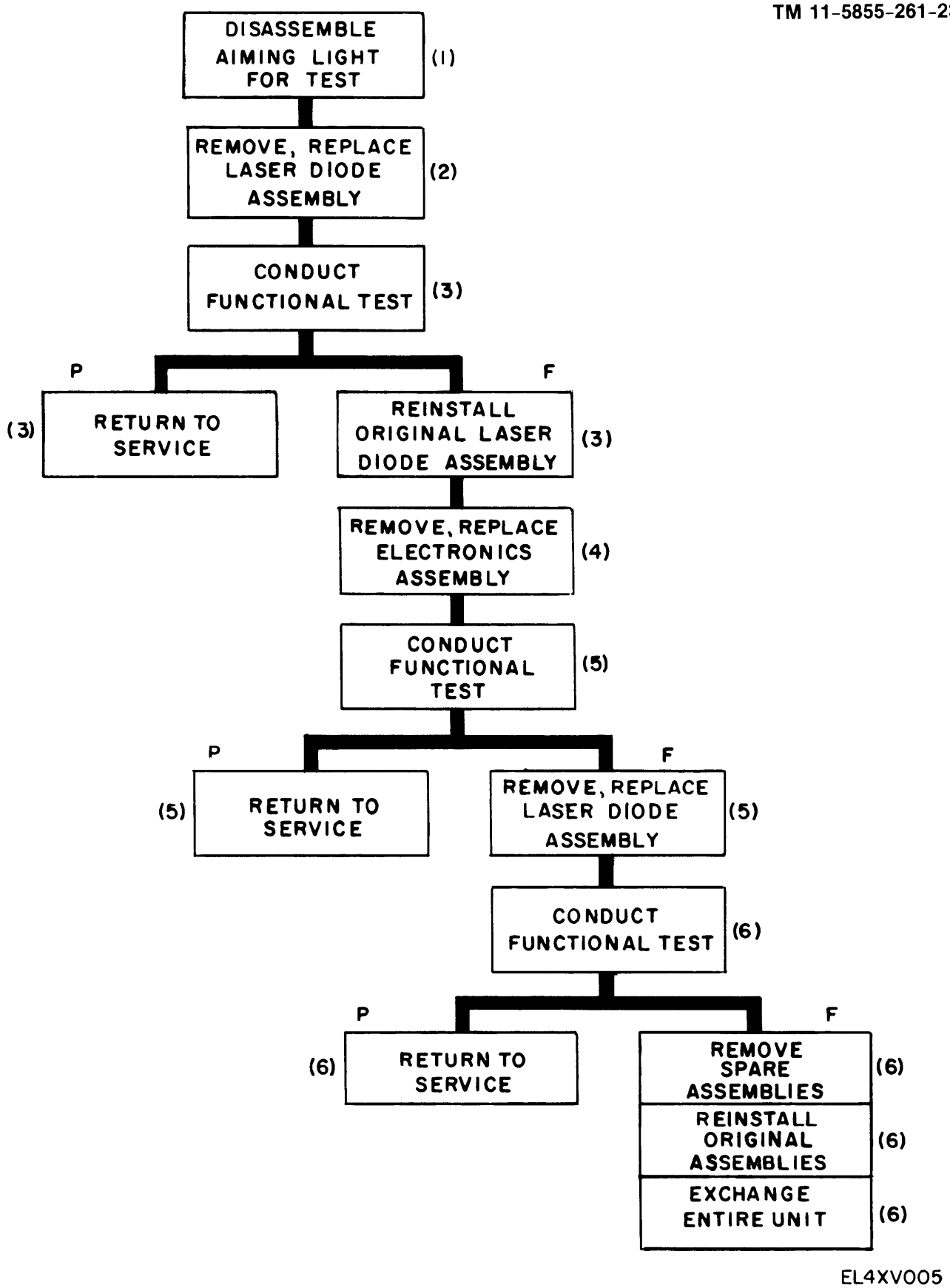


Figure 4-2. Laser diode and electronics assembly troubleshooting.

ponents.

(1) Remove the batteries. Disassemble the aiming light for test by performing the procedures of para *4-7i.,* steps (1) through (21). This action exposes the laser diode and electronic assemblies for further troubleshooting.

(2) Remove the laser diode assembly para *4-7i.,* steps (22) through (24)) and replace it with a spare (para 4-7j., step (l)). Retain the removed assembly.

(3) Conduct the following functional test.

(a) Install the allen head cap screw in the electronic assemblies.

(b) Put the batteries in series and make contact with the conical spring. (+)

(c) Attach one end of a clip lead to the allen head cap screw. (-)

(d) Darken the room and put on Night Vision Goggles AN/PVS-5 or -5A.

(e) Short the switch leads together between your fingers.

(f) Touch the free end of the clip lead to the exposed battery nipple and look for a pulsing light.

(g) Remove the allen head cap screw.

(4) If the pulsing light is present, reassemble (para 4-7j.) and, if operable, return the aiming light to service. Discard the removed laser diode assembly. If, at checkout, the aiming light is not operable, repeat step b.(1) above. If the pulsing light light is not observed, remove the spare laser diode assembly and retain it at hand. Continue troubleshooting.

(5) Replace the electronic assemblies with a spare and attach it to the original laser diode assembly (para 4-7j., step (l)). Retain the removed electronic assemblies at hand.

(6) Conduct the test described in (3) above. If the pulsing light is present, reassemble (para 4-7j.) and return the aiming light to service. Discard the removed electronic assemblies. Return the spare laser diode assembly to supply. If the pulsing light is not observed, remove and replace the original laser diode assembly with the spare.

(7) Conduct the test described in (3) above. If the pulsing light is present, reassemble (para 4-7j.) and return the aiming light to service. Discard the removed laser diode and electronic assemblies. If the pulsing light is not observed, remove the spare laser diode and electronic assemblies and return them to supply. Reinstall the original laser diode and electronic assemblies and return the entire aiming light to supply for exchange.

Section III. MAINTENANCE OF INFRARED AIMING LIGHT

4-7. Removal and Replacement of Parts

Direct support maintenance includes removal and replacement of assemblies.

a. Scattershield Removal and Replacement. See TM 11-5855-261-10, Chapter 3, Maintenance Instructions, for procedures.

b. Battery Removal and Replacement. See TM 11-5855-261-10, Chapter 3, Maintenance Instruction, for procedures.

c. *ON/OFF Switch Removal (fig. 4-3).*

(1) Remove batteries.

(2) Unscrew four screws that hold the switch assembly. Remove the screws and four flat washers.

(3) Lift the switch cover out and fold it over for access to the wire terminals.

(4) Remove two screws that hold the switch wiring and note which color wire goes to each terminal.

(5) Remove the switch.

d. ON/OFF Switch Replacement (fig. 4-3).

(1) Inspect the gasket for damage, and clean or replace if required.

(2) Place the gasket on the switch cover.

(3) Attach two switch leads to their respective switch terminals and secure the leads with two screws

(4) Place one switch lead on each side of the laser diode assembly.

(5) Direct a stream of nitrogen into the switch cavity while pressing the switch plate into place. Be sure the gasket is not pinched.

(6) Replace the four attaching screws and flat washers and tighten firmly.

e. *Azimuth and Elevation Adjuster Removal (fig. 4-4).*

NOTE

The same procedure is used to remove or replace either adjuster.

(1) Unscrew the backup cap spring screw opposite the adjuster to be removed exactly four and a half full turns using a standard 1/4-inch screwdriver.

CAUTION

Care must be taken to insure that the screw does not come out.

(2) Using an 8-inch adjustable wrench, loosen and unscrew the adjuster on the body.

(3) Lift the adjuster out of the body.

(f) Azimuth or Elevation Adjuster Replacement (fig. 4-3)

NOTE

The same procedure is used to replace either adjuster.

(1) Insert one adjuster into one of the adjuster cavities and screw it down finger tight.

(2) Using an 8-inch adjustable wrench tighten the adjuster in the adjuster cavity.

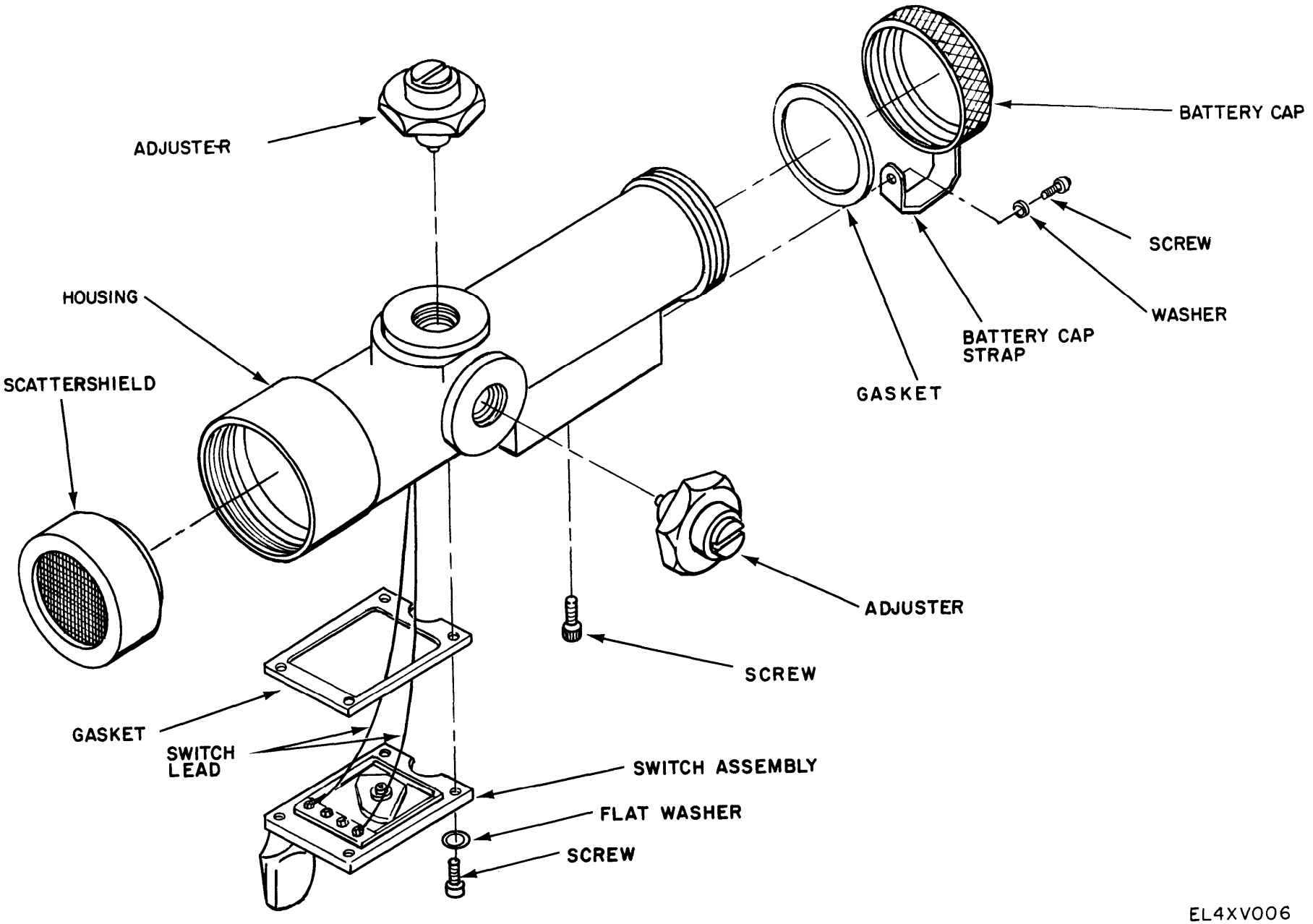


Figure 4-3. Aiming light housing with external components.

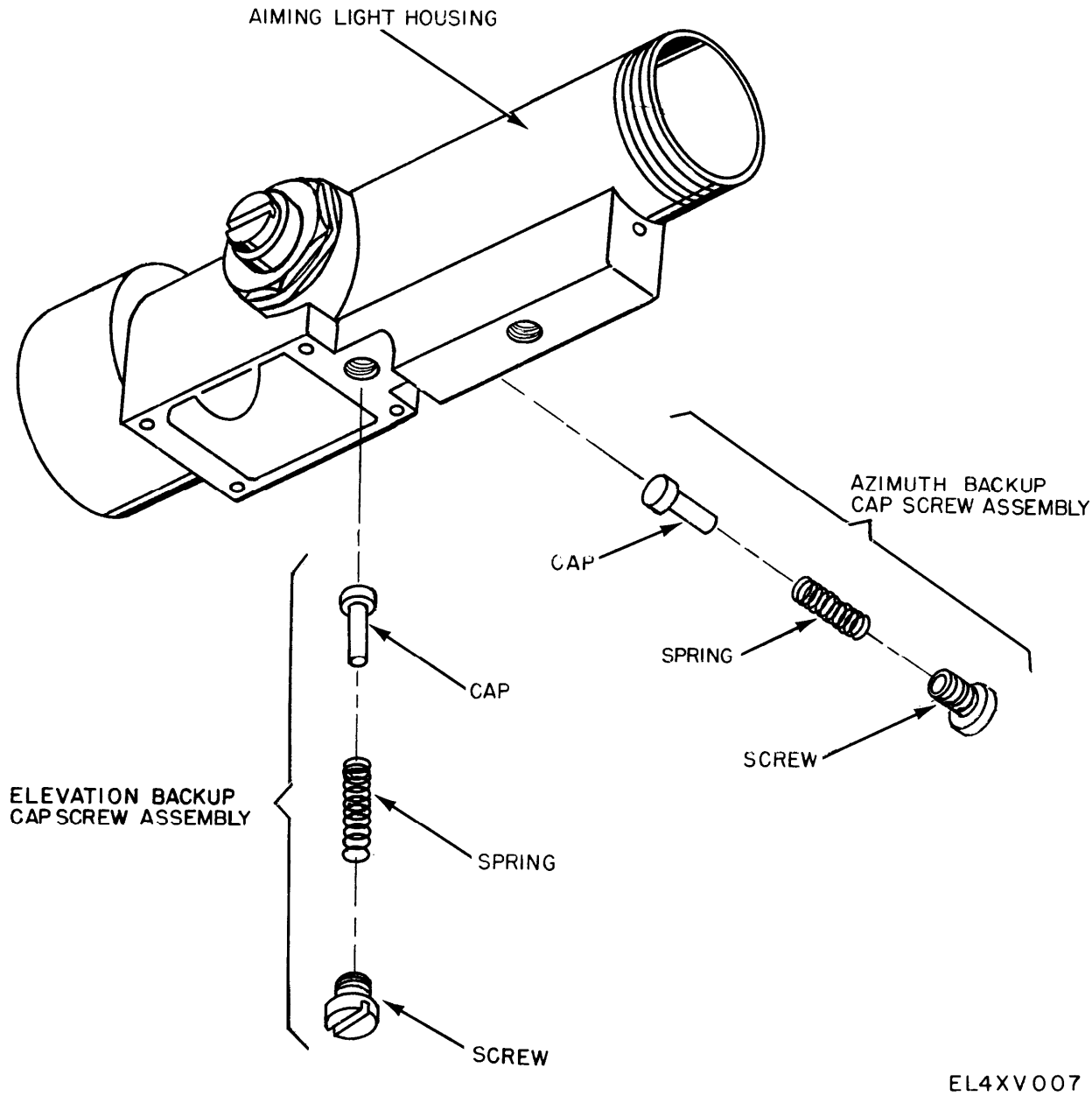


Figure 4-4. Azimuth and elevation adjusters backup cap screws.

(3) Tighten the backup cap screw with a standard 1/4-inch screwdriver.

g. Refractive Lens Removal.

(1) Unscrew and remove scattershield.

(2) Unscrew the lens assembly (fig. 4-5) using a special spanner wrench (table B-1, item 1).

(3) Remove the lens after the threaded portion clears the housing.

h. Refractive Lens Replacement.

(1) Lubricate (MIL-S-8660 or equivalent) the refractive lens O-ring (fig. 4-5)

(2) Clean both sides of the lens assembly with lens paper. Lens paper may be dampened with clean water if required.

(3) Insert the O-ring and lens assembly with the unthreaded portion first.

(4) Screw in the lens assembly and tighten with the special spanner wrench (table B- 1, item 1).

(5) Replace the scattershield (fig. 4-3).

CAUTION

To avoid cross-threading, insert and turn the scattershield counterclockwise a half turn, then screw it in turning clockwise.

i. Removal of Electronics and Laser Diode Assemblies.

(1) Remove batteries, if installed. Unscrew four screws that hold the switch (fig. 4-3), Remove screws and four flat washers.

(2) Lift the switch plate out and fold it over for access to two switch lead terminals.

(3) Remove two screws that hold the switch leads and note which color wire goes to each terminal.

(4) Remove the Switch.

(5) Unscrew two backup cap screws (fig. 4-4) using a standard 1/4-inch screwdriver.

(6) Remove the backup cap screw with O-rings, springs, and caps.

(7) Using an 8-inch adjustable wrench unscrew and remove the azimuth adjuster.

(8) Repeat step (7) with the elevation adjuster.

(9) Unscrew the allen head cap screw (fig. 4-6) that holds the electronics assembly using a 1/8-inch allen wrench.

(10) Unscrew and remove the scattershield.

(11) Unscrew the lens assembly (fig. 4-5) using the spanner wrench.

CAUTION

Be sure step (9) is completed before proceeding. Use extreme care when manipulating the assemblies to avoid crimping internal wiring.

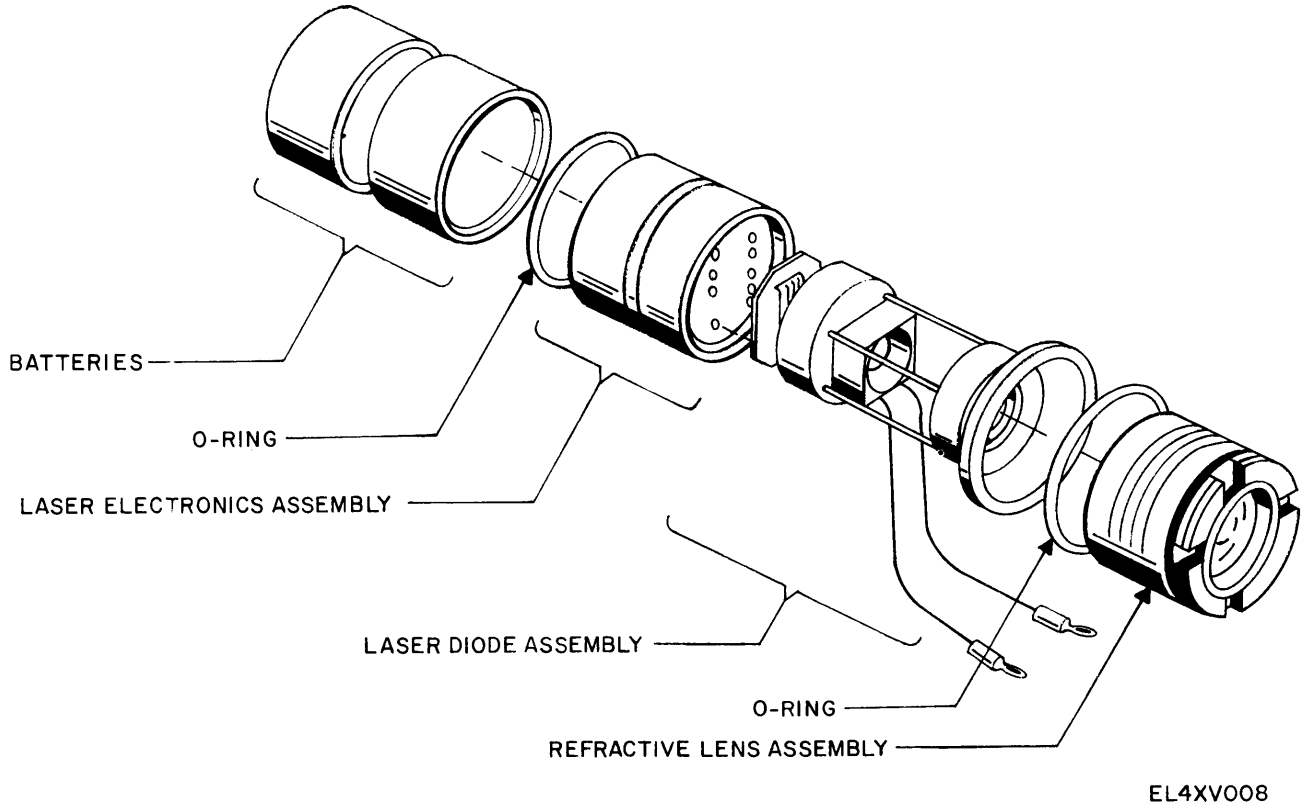


Figure 4-5. Aiming light internal components.

(13) Place the switch leads inside the laser diode cavity. Place the index finger of your left hand into the laser diode cavity (fig. 4-6) and the index finger of your right hand into the electronics assembly cavity. Pull with your left finger and push with your right finger to remove the combined assemblies.

CAUTION

Pull the combined laser diode and electronic assemblies from the housing.

NOTE

The butt end of a screwdriver may be used to assist in pushing the combined assemblies out if required.

NOTE

The flange on the forward (diode carrier) end of the laser diode assembly may catch in the lens O-ring groove or threads. It may be freed by gently wiggling the laser diode assembly.

(14) Separate the laser diode and electronic assemblies. A flat screwdriver may be used to carefully pry the connector plate loose.

CAUTION

Separate connector plate evenly to avoid bending pins.

j. Replacement of Electronics, Laser Diode, and Diode Carrier Assemblies.

(1) Assemble the laser diode and electronic assemblies (fig. 4-7). Insert the connector plate into the electronic assembly with care to avoid bending pins. Observe keying arrangement of pins and sockets. Gently fold the electronic assembly over in line with the laser diode assembly.

(2) Inspect the O-rings for the electronic assembly and refractive lens assembly and clean or replace as required. Lightly lubricate (MIL-S-8660, or equivalent) and seat the O-rings.

CAUTION

Place switch leads inside diode carrier cavity of the laser diode assembly before proceeding, to avoid crimping leads when inserting assemblies.

(3) Carefully insert the electronic assembly, with the laser diode assembly attached, into the scatter-

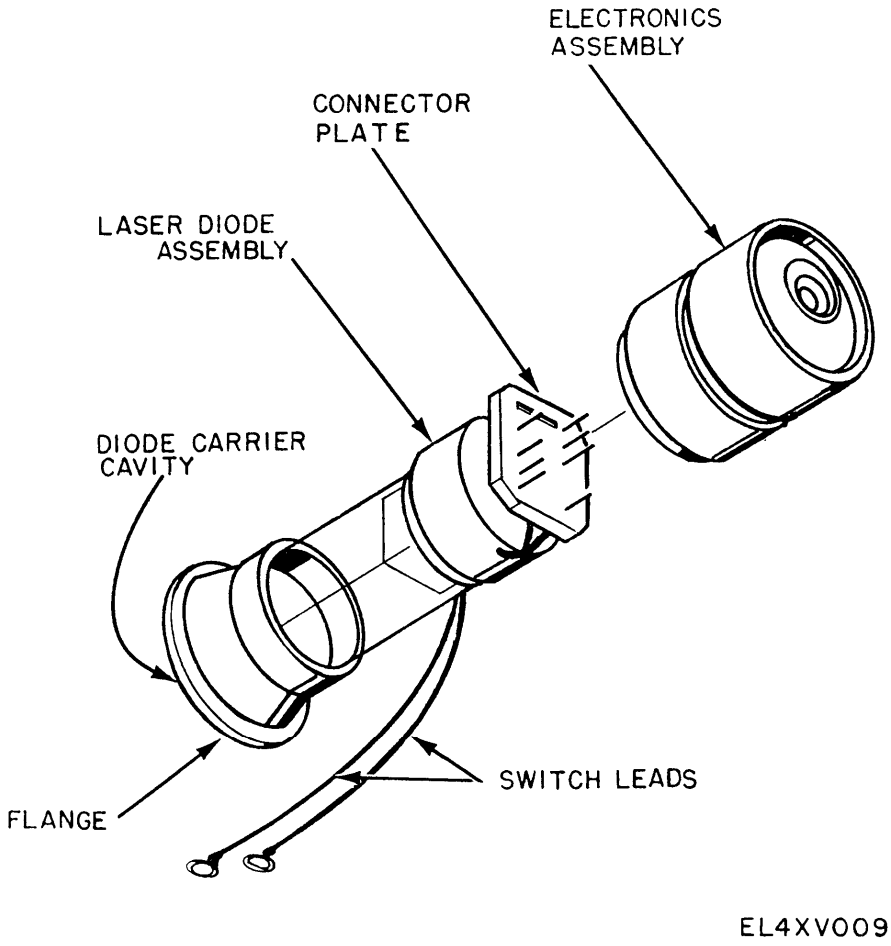


Figure 4-6. Electronic assembly, laser diode carrier assembly.

shield end of the housing (fig. 4-6). Rotate the electronic assembly to line up the allen head cap screw hole with the hole in the mounting foot.

CAUTION

Do not apply pressure on the diode carrier end of the laser diode assembly because it can be crushed.

(4) Apply gentle pressure to the electronic assembly to get the O-ring past the opening. Assure the laser diode assembly flange clears the edge of the housing and insure the flange is fully seated before proceeding.

(5) Screw in and tighten the allen head cap screw to retain the electronic assembly. Carefully pull the switch leads out through the switch cavity.

(6) Clean both sides of the lens assembly with lens paper. Lens paper may be dampened with clean water if required. Insert the lens assembly (fig. 4-5) with the unthreaded portion first.

(7) Screw in the lens assembly using a special spanner wrench (table B-1, item 1).

(8) Insert one of the adjusters into an adjuster cavity (fig. 4-3) and screw it in hand tight.

(9) Using an 8-inch adjustable wrench, tighten the adjuster in the cavity.

(10) Repeat steps (8) and (9) with the other adjuster and cavity

(11) Route the switch leads on either side of the backup cap screw cavity on the bottom of the housing. Look inside the switch cavity and ensure that the leads are not crossed.

(12) Carefully insert both backup cap screw assemblies, ensuring free movement of the caps and springs. Tighten the screws with a standard 1/4-inch screwdriver.

(13) Inspect the switch gasket (fig. 4-3) and clean or replace if required.

(14) Insert the gasket in place on the housing around the switch cavity.

(15) Attach the switch leads to their respective switch terminals and secure the leads with screws.

(16) Place one switch lead on each side of the laser diode assembly carrier section.

(17) Direct a stream of nitrogen into the switch cavity while pressing the switch plate into place. Be sure the gasket is not pinched.

(18) Replace the four screws and flat washers and tighten the switch assembly to the housing firmly.

(19) Screw in the scattershield.

CAUTION

To avoid cross-threading, insert and turn the scattershield counterclockwise a half turn, then screw it in by turning clockwise.

(20) Replace batteries with nipple end (-) out (para 4-7 b.)

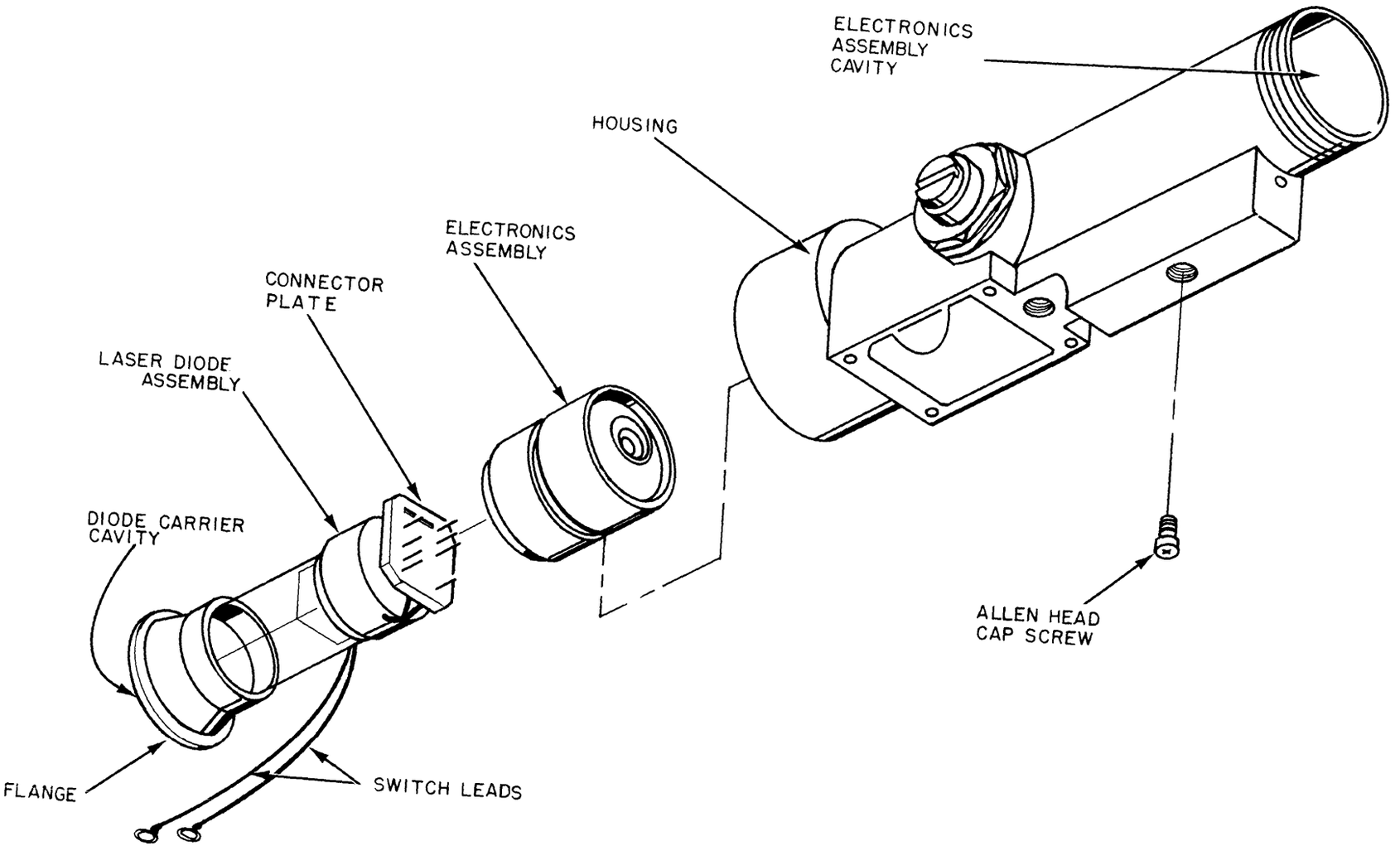


Figure 4-7. Removal and replacement of electronics and laser diode assemblies. EL4XV010

APPENDIX A
REFERENCES

DA Pam 310-4	Index of Technical Publications: Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, Modification Work Orders and Lubrication Orders.
TM 11-5855-261-10	Operator's Manual for Aiming Light, Infrared, AN/PAQ-4.
TM 11-5855-261-23P	Organizational and Direct Support Maintenance Repair Parts and Special Tools List for Aiming Light, Infrared AN/PAQ-4.
TM 38-750	The Army Maintenance System (TAMMS).
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command.)

APPENDIX B
MAINTENANCE ALLOCATION

Section L INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for the AN/PAQ-4. 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.

B-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 (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To 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 bring 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 equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of know 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 or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (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, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, mocule (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., 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 materiel 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 equipments/components.

B-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 Function. 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 "work time" 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 "work time" figures will be shown for each categories, appropriate "work time" figure will be shown for each category. The number of task-hours specified by the "work time" 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 in-

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 function 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.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (See Ill)

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.

B-5. Remarks (See IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

(Next printed page is B-3)

SECTION II MAINTENANCE ALLOCATION CHART
FOR
INFRARED AIMING LIGHT, AN/PAQ-4

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) REMARKS
00	INFRARED AIMING LIGHT, AN/PAQ-4	Inspect	0.1						
		Test		0.1	0.1			2,3	
		Service	0.1						
		Adjust		0.1					
		Replace							
		Repair		0.1					A
		Repair			0.3			1,4	
01	AIMING LIGHT	Inspect	0.1						
		Test		0.1	0.1			2,3	
		Service	0.1						
		Adjust		0.1					
		Repair		0.1					B
		Repair			0.3			1,4	C
02	CASE ASSEMBLY, SHIPPING & STORAGE	Inspect							
		Replace							
		Repair			0.2				D
03	MOUNTING BRACKET ASSEMBLY, M16	Inspect	0.1						
		Install	0.1						
		Replace		0.1					
		Repair		0.1					E
04	MOUNTING BRACKET ASSEMBLY, M60								F
05	MOUNTING BRACKET ASSEMBLY, M67								F
06	MOUNTING BRACKET ASSEMBLY, M72								F

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
INFRARED AIMING LIGHT, AN/PAQ-4

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO) STOCK NUMBER	TOOL NUMBER
1	F	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	
2	O,F	MULTIMETER AN/USM-223	6625-00-999-7465	
		OR		
3	O,F	TS-352B/U	6625-00-553-0142	
4	O,F	NIGHT VISION GOGGLES AN/PVS-5A	5855-00-150-1820	
5	F	TOOL KIT, FIRE CONTROL PURGING	4931-00-065-1110	
		NITROGEN TECHNICAL TANK	6830-00-264-9086	

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	BY REPLACEMENT OF LOW TEMPERATURE ADAPTER, CARRYING BAG, SCATTER SHIELD, 01, 02, 03.
B	BY REPLACEMENT OF BATTERIES, BATTERY CAP, BATTERY CAP GASKET, BATTERY CAP STRAP, PAN HEAD SCREW, FLAT WASHER.
C	BY REPLACEMENT OF REFRACTIVE LENS, LASER DIODE ASSEMBLY, LASER ELECTRONICS ASSEMBLY, DIODE CARRIER ASSEMBLY, MECH-UP AND MECH-L ADJUSTERS, SLOTTED HEAD SCREWS, ADJUSTER GASKETS, O-RINGS, SELF SEAL SCREWS, SPRING RETAIN CAPS, ADJUSTER SPRINGS, LENS RETAIN NUT, SOCKET HEAD CAP SCREW, SWITCH ASSEMBLY.
D	BY REPLACEMENT OF INSERTS.
E	BY REPLACEMENT OF BALL PLUNGER, MOUNTING SCREW, SPRING WASHER.
F	REFER TO TM 11-5855-213-24&p.

* U.S. GOVERNMENT PRINTING OFFICE: 1982.0.388-010

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General, United States Army
Chief of Staff

Official:

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TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2^{o} IFF antenna lag rather than 1^{o}. REASON: Experience has shown that with only a 1^{o} lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2^{o} without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

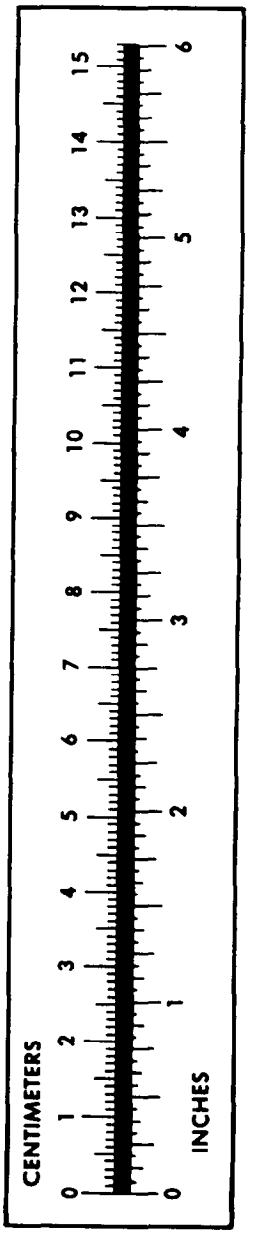
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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