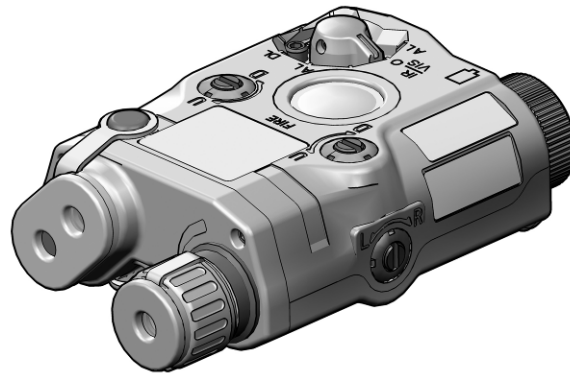


ATP-TM-SP



Warrior Systems

OPERATOR MANUAL
FOR THE
**ADVANCED TARGET POINTER ILLUMINATOR
AIMING LIGHT (ATPIAL)**



Rev. 3

26 February 2013

SAFETY SUMMARY

GENERAL

This manual contains operating instructions and maintenance procedures which may cause injury or death to personnel, or damage to equipment if not properly followed. Prior to performing any task, the WARNINGS, CAUTIONS and NOTES included in that task shall be reviewed and understood.

DEFINITIONS

WARNING

Highlights an essential operating or maintenance procedure, practice, condition or statement, which, if not strictly observed, could result in injury to, or death of, personnel or long term health hazards.

CAUTION

Highlights an essential operating or maintenance procedure, practice, condition or statement, which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

NOTE

Highlights an essential operating or maintenance procedure, condition or statement.

SAFETY PRECAUTIONS

The following general safety precautions supplement the specific WARNINGS, CAUTIONS and NOTES that appear elsewhere in this manual.

WARNING

The Advanced Target Pointer Illuminator Aiming Light (ATPIAL) emits both visible and invisible laser radiation. Nominal Skin Hazard Distances (NSHD) and Nominal Ocular Hazard Distances (NOHD) for safe operation are listed in Table i-1. Exposure to the ATPIAL's laser beams within these distances can cause irreversible damage to the human eye.

Table i-1. Laser Safety Parameters.

	Visible			Infrared		
	AL	AL	DL	AH	IH	DH
Class¹	3R	3R	3B	3B	3B	3B
NOHD²	91m	14m	27m	203m	52m	209m
OD (unaided)⁴	0.7	0.1	0.7	1.6	1.8	1.8
NOHDe³	613m	0	204m	1.2km	80m	1.5km
OD (aided)⁴	0.7	0	0.6	1.5	1.7	1.8
NSHD	0	0	0	0	0	0
OD (skin)	0	0	0	0	0	0

¹ Laser Safety Classification per IEC 60825-1, 2007

² Nominal Ocular Hazard Distance **without** magnifying optics (in meters)

³ Extended Nominal Ocular Hazard Distance **with standard 7x50** magnifying optics (in meters)

⁴ Optical Density (OD) expressed to the nearest tenth

WARNING

- Do not stare into the laser beams.
- Do not look into the laser beams through binoculars or telescopes.
- Do not point the laser beams at mirror-like surfaces.
- Do not shine the laser beams into other individuals' eyes.

WARNING

Laser eye protection should be provided to maintenance personnel, laser operators, and all personnel at risk from laser radiation. Provided protection should be appropriate for the Optical Densities (OD) specified in Table i-1.

WARNING

Laser modes designated as Safety Class 3R (low power) may be used for force-on-force training only if opposing forces are beyond the NOHD values shown in Table i-1.

WARNING

Laser modes designated as Safety Class 3B (high power) shall **NOT** be used for force-on-force training.

WARNING

The safety screw shall be installed in the lockout position when the ATPIAL is in storage, being returned to the armory, or distributed to field personnel.

WARNING

IR lasers are detectable by an enemy using night vision devices. Detection is easier in smoky, foggy, or rainy conditions. To reduce the risk of detection by an enemy using night vision devices, avoid prolonged activation of the IR lasers.

WARNING

Remove the ATPIAL from the weapon before inspecting, cleaning, or performing other maintenance functions.

WARNING

The ATPIAL is designed to be used with destructive weapon systems. Improper operation or misuse of the ATPIAL with these weapon systems could lead to personal injury or death of either the operator or other persons within weapons range. Safe firearms handling procedures must be practiced at all times.

WARNING

Ensure the Mode Selector is turned to the O (OFF) position before attempting to install, remove, or replace batteries.

WARNING

To prevent inadvertent activation of the laser(s), the Mode Selector should be in the O (OFF) position when not in use.

WARNING

- Do not short circuit, puncture, disassemble, crush, or incinerate battery.
- Do not attempt to recharge battery.
- Prior to use, inspect battery for cracks, dents, leakage, or bulging. Never install a defective battery in the ATPIAL.

WARNING

Lithium batteries can explode or cause burns if disassembled, shorted, recharged, or exposed to water, fire, or high temperatures (above 100°C or 212°F). Do not place loose batteries in a pocket or other container containing metal objects. Do not store batteries with hazardous or combustible materials. Store in a cool, dry, ventilated area.

WARNING

Use of incorrect batteries poses a risk of fire or explosion. Be aware that batteries do exist with similar physical characteristics to the DL123A battery, but with a different voltage and/or polarity path. Ensure that only 3V lithium batteries with a raised positive (+) terminal are installed in the ATPIAL.

WARNING

Use of off-brand batteries poses a risk of fire or explosion. Ensure that only 3V lithium batteries produced by a well-known battery manufacturer are installed in the ATPIAL. These batteries are specifically designed for use in high performance, high-drain devices, and contain built-in fault and heat protection features.

WARNING

Failure to properly secure the ATPIAL to the rail may lead to boresight repeatability and zeroing issues. In extreme cases, the ATPIAL could fall off the rail, thereby exposing the operator or other personnel to the ATPIAL laser(s).

WARNING

Prior to conducting routine or periodic maintenance on the ATPIAL, ensure the Mode Selector is turned to the O (OFF) position.

WARNING

Isopropyl alcohol is flammable and toxic. To avoid injury, keep away from open fire and use in a well ventilated area.

CAUTION

Use of acetone or gun cleaning agents containing perchloroethylene or methylene chloride may permanently damage the ATPIAL system.

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**CHAPTER 1
INTRODUCTION**

**SECTION I
GENERAL INFORMATION**

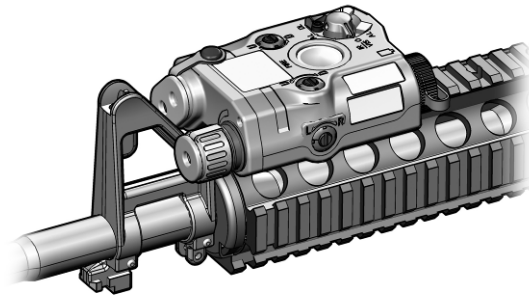


Figure 1-1. ATPIAL Mounted to M4/M4A1 (Top Mount).

1.1 SCOPE

This manual is intended for use by operators of the Advanced Target Pointer Illuminator Aiming Light (ATPIAL). It provides a system description, operational procedures, and maintenance responsibilities. Complete familiarization with this manual prior to using the equipment, will ensure safe operation and maximum effectiveness of the ATPIAL.

1.2 MODEL NUMBER AND EQUIPMENT NAME

This manual applies to the following ATPIAL models:

- a. ATP-000-A18, ATPIAL, Tan
- b. ATP-000-A22, ATPIAL, Black

1.3 MANUFACTURER

L-3 Communications Corporation
Warrior Systems Division
Insight Operations
9 Akira Way
Londonderry, NH 03053 USA

1.4 PURPOSE OF EQUIPMENT

The ATPIAL is a multifunction laser device that emits visible or infrared (IR) light used for precise weapon aiming and target / area illumination.

1.5 ABBREVIATIONS AND ACRONYMS

Abbreviations and acronyms used in this manual are as follows:

AH	(IR) Aim High (Mode Selector position)
AL	(IR) Aim Low (Mode Selector position)
ATPIAL	Advanced Target Pointer Illuminator Aiming Light
C	Celsius
CCW	Counterclockwise
CW	Clockwise
DBR	Dual Button Remote
DH	Dual High (IR) (Mode Selector position)

1.5 ABBREVIATIONS AND ACRONYMS (Continued)

DL	Dual Low (IR) (Mode Selector position)
F	Fahrenheit
IH	(IR) Illuminator High (Mode Selector position)
IR	Infrared
ITAR	International Traffic in Arms Regulations
km	Kilometer
LBS	Laser Borelight System
LED	Light Emitting Diode
m	Meter
MG	Machine Gun
mrاد	Milliradians
mW	Milliwatts
MWS	Modular Weapon System
nm	Nanometer
NOHD	Nominal Ocular Hazard Distance
NSHD	Nominal Skin Hazard Distance
NSN	National Stock Number
O	Off (Mode Selector position)
OD	Optical Density
P	Program (Mode Selector position)
RMA	Return Material Authorization
TBD	To Be Determined
μ W	Microwatts
V	Volt
VIS	Visible Aim Laser
VIS-AL	(Visible) Aim Low (Mode Selector position)

**SECTION II
EQUIPMENT DESCRIPTION**

1.6 SYSTEM DESCRIPTION

The ATPIAL is a multifunction laser device that emits visible or IR light used for precise weapon aiming and target / area illumination.

The Visible Aim Laser provides for active target acquisition in low-light and close quarters combat situations without the need for night vision devices.

The IR Aim and Illumination lasers provide for active, covert target acquisition in low light or complete darkness when used in conjunction with night vision devices.

The ATPIAL can be used as either a handheld illuminator / pointer or can be mounted to weapons equipped with a MIL-STD-1913 rail.

The ATPIAL is a ruggedized system designed for operation in battlefield environments.

1.7 TECHNICAL SPECIFICATIONS

Table 1-1. Technical Specifications.

WEIGHT AND DIMENSIONS	
Weight (with battery)	7.5 ounces
Length	4.6 inches
Width	2.8 inches
Height	1.6 inches
POWER / PERFORMANCE	
Batteries	One 3V DL123A
* Battery Life	>6 Hours in DH (DUAL HIGH)
Waterproof	6m for one hour
LASERS	
Visible Aim Laser	
Output Power	4.0 mW (\pm 1.0 mW)
Beam Divergence	0.5 mrad (+ 0.3 / -0.35 mrad)
Wavelength	605 – 665 nm
Range	>25m
IR Aim Laser	
Output Power LOW	600 μ W (\pm 100 μ W)
Output Power HIGH	25 mW (+ 10%)
Beam Divergence	0.5 mrad (\pm 0.3 mrad)
Wavelength	820 – 850 nm
Range	>600m (LOW), >2000m (HIGH)
IR Illuminator	
Output Power LOW	< 3.5 mW
Output Power HIGH	30 mW (+ 50 / -20%)
Beam Divergence	No less than 1 mrad to greater than 105 mrad
Wavelength	820 – 850 nm
Range	>2000m

* Performance will vary depending on actual environmental and atmospheric conditions.

1.8 MAJOR COMPONENTS

The ATPIAL system includes the components shown in Figure 1-2. Table 1-2 provides a brief functional description of each item. The "Key" column in Table 1-2 corresponds to the label numbers in Figure 1-2.

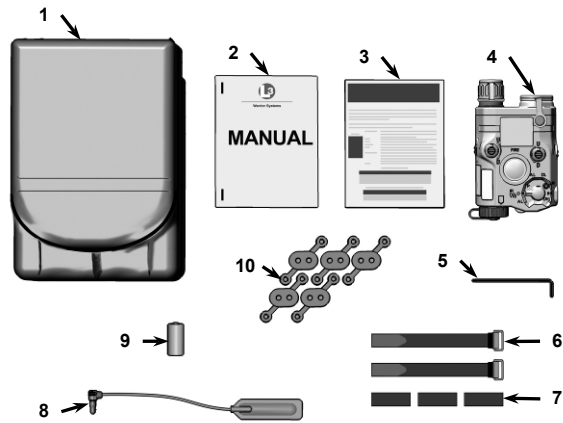


Figure 1-2. Major Components.

Table 1-2. List of Major Components.

Key	Major Component	Function
1	Soft Carrying Case	Protects the ATPIAL and accessories while in a field environment.
2	Operator Manual	Provides detailed operating and maintenance procedures specific to the ATPIAL.

1.8 MAJOR COMPONENTS (Continued)

Table 1-2. List of Major Components (Continued).

Key	Major Component	Function
3	Quick Reference Guide	Provides at-a-glance operating instructions for the ATPIAL.
4	ATPIAL Assembly	A handheld or weapon mounted multifunction laser device that emits visible or IR light for precise weapon aiming and target / area illumination.
5	3/32" Hex Head Wrench	Used to remove / install the ATPIAL safety screws.
6	Strap, Retaining (2)	May be used alone or in conjunction with hook and loop fastener tape as an alternate means of attaching the Remote Cable Switch to the weapon.
7	Fastener Tape, Loop (3)	Used to secure the Remote Cable Switch to the weapon.
8	Remote Cable Switch	Allows for fingertip activation of the ATPIAL without altering the operator's grip on the weapon.
9	Battery, DL123A	One 3V lithium battery used to power the ATPIAL.
10	Pattern Generators (set of 5)	Five pattern generators that, when individually installed over the aim lasers, project a specific holographic design (i.e., circle, square, triangle, T-shape, cross) over the aiming point of the laser.

1.9 FEATURES AND CONTROLS

Figures 1-3 and 1-4 show features and controls for the ATPIAL. Table 1-3 provides a brief functional description of each item. The “Key” column in Table 1-3 corresponds to the label numbers in Figures 1-3 and 1-4.

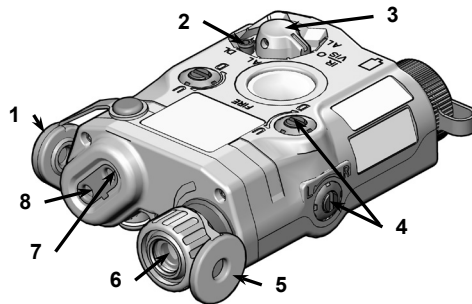


Figure 1-3. Features and Controls (Front View).

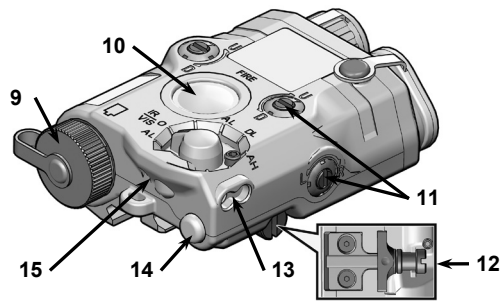


Figure 1-4. Features and Controls (Rear View).

1.9 FEATURES AND CONTROLS (Continued)

Table 1-3. List of Features and Controls.

Key	Control/ Indicator	Function
1	Aim Neutral Density / Opaque Lens Cap	When placed over the Aim Lasers, reduces scatter from the IR Aim Laser, and blocks emission of the Visible Aim Laser.
2	Safety Screw (shown in lockout position)	When installed in the lockout position, prevents the Mode Selector from being turned to the high power laser settings (i.e., AH, IH, DH). Removal of the safety screw allows for access to all modes of operation.
3	Mode Selector	Allows the user to select the desired mode of operation for the ATPIAL.
4	Illuminator Adjusters	Used to bring the illumination beam into azimuth and elevation alignment with the barrel of the weapon.
5	Illuminator Diffuser Lens Cap	When installed over the IR Illuminator, spreads the laser energy, allowing for illumination of a wider area. This is useful for illuminating a small room and is most effective when used with the Focus Ring adjusted to the widest beam (flood) setting.
6	Infrared Illuminator / Focus Ring	Used with night vision devices to provide IR illumination of the intended target area. The Focus Ring is rotated to vary the illumination beam spread from flood to spot, based on the range and size of the area to be illuminated.
7	Infrared Aim Laser	Used with night vision devices to provide a precision aim point or to mark targets.

1.9 FEATURES AND CONTROLS (Continued)

Table 1-3. List of Features and Controls (Continued).

Key	Control/ Indicator	Function
8	Visible Aim Laser	Used to provide a precision aim point or to mark targets at close range during the day or night, without the need of night vision devices. It may also be used for boresighting the ATPIAL during daylight hours.
9	Battery Cap / Compartment	Provides secure housing for the 3V lithium battery that powers the ATPIAL.
10	FIRE Button	Primarily used to activate the laser(s) that corresponds with the position of the Mode Selector.
11	Aim Laser Adjusters	Used to bring the Visible and IR Aim Lasers into azimuth and elevation alignment with the barrel of the weapon.
12	Rail Grabber Bracket	Secures the ATPIAL to a weapon equipped with a MIL-STD-1913 rail.
13	Safety Screw Storage Location	Allows for secure storage of the safety screw after it has been removed from the lockout position.
14	Remote Jack / Jack Plug	Provides an interface for the Remote Cable Switch. When installed, the jack plug protects the remote jack from debris and moisture.
15	LED Status Indicator	Indicates when the ATPIAL is emitting laser energy, when the battery power is low, and displays the pulse rate during programming of the IR Illuminator.

CHAPTER 2 OPERATING INSTRUCTIONS

SECTION I PREPARATION FOR USE AND INSTALLATION

2.1 PREPARATION FOR USE

Unpacking the Equipment

Open the soft carrying case and verify that all major components listed in Table 1-2 are present. Check the ATPIAL assembly to ensure the following additional items are installed:

- a. Battery Cap
- b. Safety Screw
- c. Remote Jack Plug
- d. Aim Neutral Density / Opaque Lens Cap
- e. Illuminator Diffuser Lens Cap

If any of the major components or items listed above are missing, seek guidance from the equipment issuing authority.

Inspection of the Equipment

Before use, inspect all pieces of equipment for any damage such as cracks, loose parts, faulty cables, or other visible defects. If any damage or defects are noted, seek guidance from the equipment issuing authority.

2.2 BATTERY HANDLING

Battery Inspection

Before installation, inspect the 3V lithium battery for any cracks, dents, leakage, or bulging. Never install a defective battery in the ATPIAL.

Battery Installation

WARNING

Ensure the Mode Selector is turned to the O (OFF) position before attempting to install, remove, or replace batteries.

CAUTION

Do not ship or store the ATPIAL with battery installed.

Unscrew the battery cap and install one battery with the positive terminal facing out as shown in Figure 2-1. Proper battery orientation is clearly marked on the ATPIAL housing. Replace and firmly tighten the battery cap.

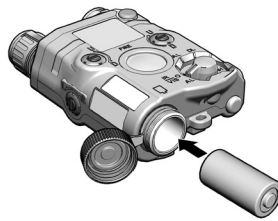


Figure 2-1. Battery Installation.

2.3 MOUNTING PROCEDURES

Rail Grabber Bracket

The ATPIAL is equipped with an integral rail grabber bracket (Figure 2-2) that is designed for direct attachment to weapons with a MIL-STD-1913 rail.

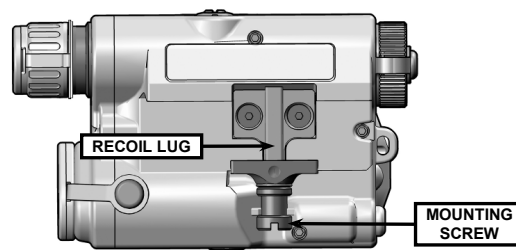


Figure 2-2. Rail Grabber Bracket.

Mounting Configurations

The ATPIAL can be mounted on either the top or side rails of the host weapon.

Mounting Instructions

WARNING

Failure to properly secure the ATPIAL to the rail may lead to boresight repeatability and zeroing issues. In extreme cases, the ATPIAL could fall off the rail, thereby exposing the operator or other personnel to the ATPIAL laser(s).

2.3 MOUNTING PROCEDURES (Continued)

WARNING

Be sure the weapon is CLEAR and SAFE before proceeding.

NOTE

The ATPIAL may be placed at any position (forward and aft) on the rail that is most convenient for the operator. However, the entire length of the mounting surface must be fully supported (in direct contact) by the MIL-STD-1913 rail. If the ATPIAL is removed from the rail, the operator must make note of the position at which it was boresighted or zeroed, and return it to that same position in order to ensure that zero is retained.

1. Loosen the mounting screw on the rail grabber bracket until the jaws have sufficient space to fit over the weapon rail.
2. Hold the ATPIAL with the laser apertures facing in the direction of the muzzle of the weapon.
3. Position the ATPIAL on the rail ensuring the recoil lug is seated in the desired recoil groove of the rail.
4. While pushing down and forward on the ATPIAL, turn the mounting screw clockwise as tightly as fingers allow. Use a screwdriver or similar tool in the slot of the mounting screw to turn it an additional 1/2 turn.

2.4 BORESIGHT ADJUSTERS

The ATPIAL is equipped with boresight adjusters for independent adjustment of the aiming and illumination beams in both elevation and windage (azimuth).

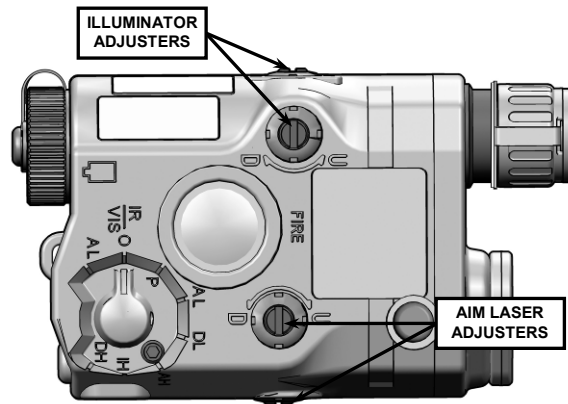


Figure 2-3. Boresight Adjusters.

Aim Laser Adjusters

The ATPIAL Visible and IR Aim Lasers are co-aligned. Therefore, a single set of adjusters moves both aiming beams, and boresighting / zeroing can be accomplished using either the Visible or IR Aim Laser.

Table 2-1 indicates the direction of adjuster rotation and resultant shot group movement when the ATPIAL is top mounted. Tables 2-2 and 2-3 indicate the direction of adjuster rotation and resultant shot group movement when the ATPIAL is side mounted (left / right).

2.4 BORESIGHT ADJUSTERS (Continued)

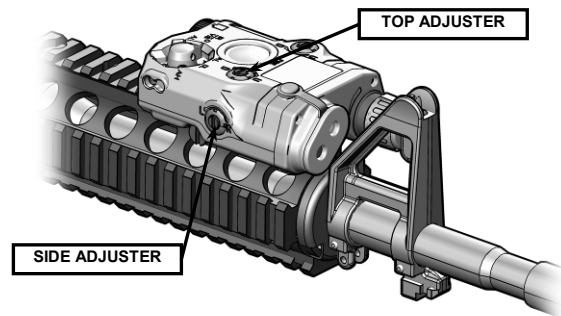


Figure 2-4. Aim Laser Adjusters (Top Mounted).

Table 2-1. Shot Group Movement for Aim Lasers (Top Mounted).

Adjuster	Rotation	Shot Group Movement
Top Adjuster Elevation	CW CCW	Up Down
Side Adjuster Windage	CW CCW	Right Left

2.4 BORESIGHT ADJUSTERS (Continued)

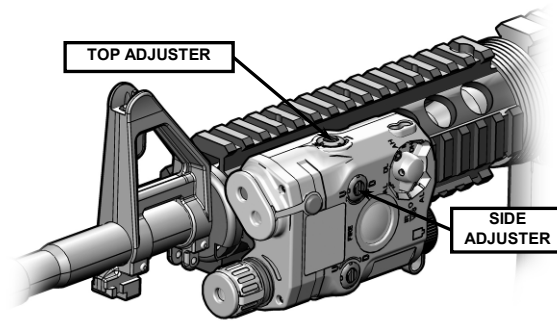


Figure 2-5. Aim Laser Adjusters (Left Side Mounted).

Table 2-2. Shot Group Movement for Aim Lasers (Left Side Mounted).

Adjuster	Rotation	Shot Group Movement
Top Adjuster	CW	Up
Elevation	CCW	Down
Side Adjuster	CW	Left
Windage	CCW	Right

2.4 BORESIGHT ADJUSTERS (Continued)

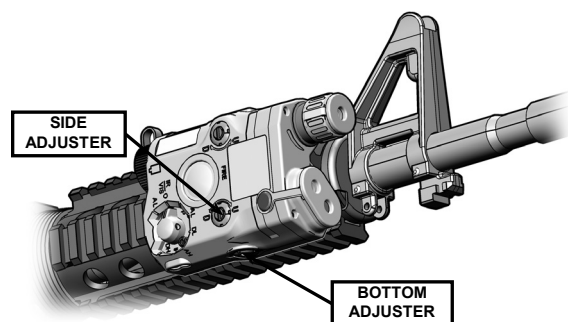


Figure 2-6. Aim Laser Adjusters (Right Side Mounted).

Table 2-3. Shot Group Movement for Aim Lasers (Right Side Mounted).

Adjuster	Rotation	Shot Group Movement
Bottom Adjuster	CW	Down
Elevation	CCW	Up
Side Adjuster	CW	Right
Windage	CCW	Left

2.4 BORESIGHT ADJUSTERS (Continued)

Illuminator Adjusters

Table 2-4 indicates the direction of adjuster rotation and resultant illumination beam movement when the ATPIAL is top mounted. Tables 2-5 and 2-6 indicate the direction of adjuster rotation and resultant illumination beam movement when the ATPIAL is side mounted (left / right).

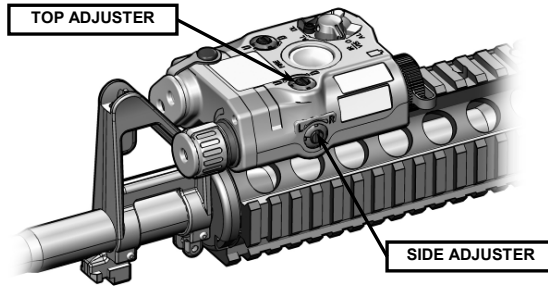


Figure 2-7. Illuminator Adjusters (Top Mounted).

Table 2-4. Beam Movement for the IR Illuminator (Top Mounted).

Adjuster	Rotation	Beam Movement
Top Adjuster	CW	Down
Elevation	CCW	Up
Side Adjuster	CW	Right
Windage	CCW	Left

2.4 BORESIGHT ADJUSTERS (Continued)

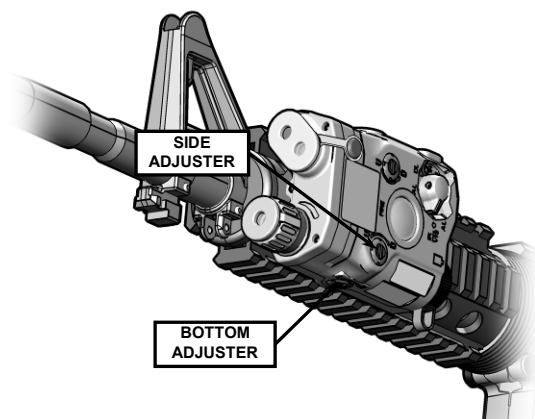


Figure 2-8. Illuminator Adjusters (Left Side Mounted).

Table 2-5. Beam Movement for the IR Illuminator (Left Side Mounted).

Adjuster	Rotation	Beam Movement
Bottom Adjuster	CW	Up
Elevation	CCW	Down
Side Adjuster	CW	Right
Windage	CCW	Left

2.4 BORESIGHT ADJUSTERS (Continued)

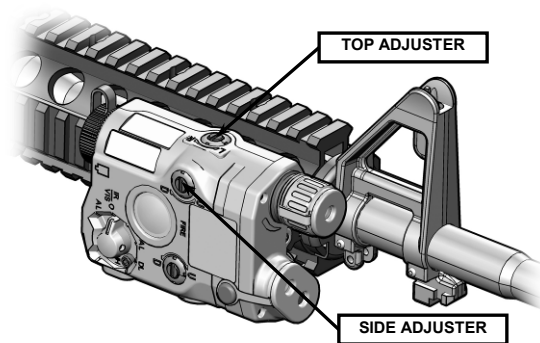


Figure 2-9. Illuminator Adjusters (Right Side Mounted).

Table 2-6. Beam Movement for the IR Illuminator (Right Side Mounted).

Adjuster	Rotation	Beam Movement
Top Adjuster	CW	Down
Elevation	CCW	Up
Side Adjuster	CW	Left
Windage	CCW	Right

2.5 BORESIGHTING PROCEDURES

The ATPIAL incorporates a factory preset feature that may be used to quickly bring the co-aligned Visible and IR Aim Lasers nearly parallel with the barrel of the host weapon.

CAUTION

Do not force the adjusters beyond their end of travel. Forcing them will damage the adjusters or internal components.

NOTE

To minimize laser travel as a result of weapon shock, it is good practice to place a positive load on the adjusters by ending all boresight adjuster rotations with an approximate 1/2 turn in a CCW direction.

To establish this preset, rotate both the Aim Laser boresight adjusters to the full CCW end of travel, then rotate them back CW three complete turns. Finally, place a positive load on the adjusters by turning each adjuster 1/2 turn CCW.

The ATPIAL may also be boresighted to the host weapon using a Laser Borelight System (LBS). Table 2-7 provides 10m Target Offsets for this purpose. Refer to the latest version of the LBS Operator Manual for boresighting procedures.

The following abbreviations and their definitions apply solely to the last two columns of Table 2-7:

L	Left	R	Right
U	Up	D	Down
VIS	Visible Aim Laser	IR	IR (Infrared) Aim Laser

2.5 BORESIGHTING PROCEDURES (Continued)

Table 2-7. Weapon Offsets.

Weapon	Mount	Range Zeroed To	10m Boresight Target Offset Squares	25m Target Zero Offset Squares
M4/M16A4 MWS	Top Rail	300m	VIS 2.0R / 1.5U IR 1.0R / 2.5U	VIS 2.5L / 1.5U IR 1.5L / 0.5U
M4/M16A4 MWS	Left Rail	300m	VIS 3.0L / 0.0 IR 4.0L / 1.0D	VIS 2.5R / 3.5U IR 3.5R / 4.5U
M4/M16A4 MWS	Right Rail	300m	VIS 3.0R / 4.5D IR 4.0R / 3.5D	VIS 3.0L / 7.0U IR 4.0L / 6.0U
M4/M16A4 MWS w/M203	Top Rail	300m	VIS 2.0R / 4.5U IR 1.0R / 5.5U	VIS 2.5L / 0.0 IR 1.5L / 0.5U
M4/M16A4 MWS w/M203	Left Rail	300m	VIS 3.5L / 0.5U IR 4.5L / 0.5D	VIS 2.5R / 2.5U IR 3.5R / 3.5U
M4/M16A4 MWS w/M203	Right Rail	300m	VIS 3.5R / 1.0D IR 4.5R / 1.5D	VIS 4.0L / 5.0U IR 5.0L / 6.0U
M249 Short Barrel	Feed Tray Cover	400m	VIS 0.0 / 4.0U IR 1.0L / 5.0U	VIS 3.0L / 4.0U IR 2.0L / 3.0U
M249 Short Barrel	Left Side Forward Rail	400m	VIS 6.0L / 3.5D IR 7.0L / 4.5D	VIS 1.5R / 11.0U IR 2.5R / 12.0U
M249 Short Barrel	Right Side Forward Rail	400m	VIS 2.5R / 7.5D IR 3.5R / 6.5D	VIS 3.5L / 14.5U IR 4.5L / 13.5U
M249 Standard Barrel	Feed Tray Cover	400m	VIS 2.0R / 2.0U IR 1.0R / 3.0U	VIS 1.5L / 4.0U IR 0.5L / 3.0U
M249 Standard Barrel	Left Side Forward Rail	400m	VIS 5.0L / 4.0D IR 6.0L / 5.0D	VIS 4.5R / 11.0U IR 5.5R / 12.0U
M249 Standard Barrel	Right Side Forward Rail	400m	VIS 4.7R / 9.5D IR 5.7R / 8.5D	VIS 3.0L / 15.0U IR 4.0L / 14.0U
M240B MG	Feed Tray Cover	500m	VIS 3.0R / 0.5U IR 2.0R / 1.5U	VIS 2.0L / 5.0U IR 1.0L / 6.0U
M240B MG	Left Side Forward Rail	500m	VIS 4.0L / 5.0D IR 5.0L / 6.0D	VIS 5.0R / 12.5U IR 6.0R / 13.5U
M240B MG	Right Side Forward Rail	500m	VIS 5.5R / 8.5D IR 6.5R / 7.5D	VIS 4.0L / 16.0U IR 5.0L / 17.0U

2.6 ZEROING PROCEDURES

NOTE

The boresight adjusters move the aiming beams at the rate of approximately 0.2 mrad per click. Two clicks = 1 box on a standard 25-meter zeroing target.

After establishing the factory preset or boresighting the ATPIAL / weapon combination, the ATPIAL may be zeroed to the weapon via live fire at a 25-meter range as described below. Table 2-7 provides target offsets that must be applied to the 25-meter zeroing target. Refer to Tables 2-1, 2-2, and 2-3 for adjuster rotation and resultant direction of shot group movement.

NOTE

Direct sunlight may hinder the ability of the user to effectively see the Visible Aim Laser on the target.

1. On a 25-meter zeroing target, mark the designated strike point and designated strike zone for the weapon being used (see Table 2-7).
2. Mount the target on an "E" silhouette or other suitable surface at 25 meters.
3. Mount the ATPIAL to the weapon.
4. Rotate the Mode Selector to Visible Aim Low (VIS-AL) position.
5. Activate the Visible Aim Laser in continuous mode by double-tapping the FIRE Button.
6. Direct the Visible Aim Laser at the center of the target.

2.6 ZEROING PROCEDURES (Continued)

7. Fire a 3-round shot group and note the center of the shot group relative to the designated strike point. Re-tighten the rail grabber bracket.
8. Rotate the Aim Laser adjusters to move the center of the shot group to the designated strike point.
9. Fire another 3-round shot group and again observe the center of the new shot group relative to the designated strike point.
10. When 5 out of 6 consecutive rounds are in the designated strike zone, the ATPIAL / weapon combination is zeroed.
11. Once the aiming beams are zeroed, rotate the Mode Selector to the DL (DUAL LOW) or DH (DUAL HIGH) position to observe both the IR aiming and illumination beams. Rotate the Illuminator adjusters to center the illumination beam over the IR aiming beam.

**SECTION II
OPERATING INSTRUCTIONS**

2.7 MODES OF OPERATION

Table 2-8 describes the modes of operation for the ATPIAL.

Table 2-8. Modes of Operation.

Position	Mode	Remarks
VIS AL	VISIBLE AIM Class 3R	Visible Aim Laser is selected.
O	OFF	The ATPIAL will not operate. Prevents inadvertent emission of laser energy.
P	PROGRAM	Programming mode is selected to set the desired IR Illuminator pulse rate.
AL	AIM LOW Class 3B	IR Aim Laser is selected at low power.
DL	DUAL LOW Class 3B	IR Aim Laser and IR Illuminator are both selected at low power.
AH	AIM HIGH Class 3B	IR Aim Laser is selected at high power.
IH	ILLUMINATOR HIGH Class 3B	IR Illuminator is selected at high power.
DH	DUAL HIGH Class 3B	IR Aim Laser and IR Illuminator are both selected at high power.

2.8 MODE SELECTION

WARNING

The Class 3R lasers (low power) described in Table 2-8 may be used in force-on-force training only if opposing forces are beyond the NOHD values shown in Table i-1.

WARNING

The Class 3B lasers (high power) described in Table 2-8 shall **NOT** be used in force-on-force training.

WARNING

To prevent inadvertent activation of the lasers, the ATPIAL should be in the O (OFF) position when not in use.

Modes of operation are accessed by turning the Mode Selector to the desired position. The P (PROGRAM) position allows for setting the desired IR Illuminator Pulse Rate (see section 2.11, IR Illuminator Pulse Rate).

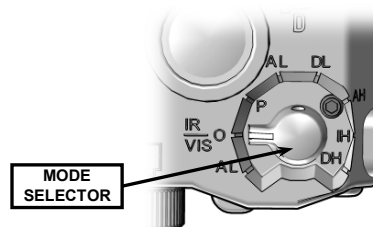


Figure 2-10. Mode Selector.

2.8 MODE SELECTION (Continued)

Safety Screw

WARNING

The safety screw shall be installed in the lockout position when the ATPIAL is in storage, being returned to the armory, or distributed to field personnel.

A removable safety screw installed in the lockout position prevents the Mode Selector from being turned to the high power laser settings (i.e., AH, IH, DH). A 3/32" hex head wrench is used to remove the safety screw when, for tactical reasons, access to the high power laser settings is desired (see section 3.3, Replacing Safety Screw). The safety screw storage location allows for secure storage of the safety screw after it has been removed from the lockout position.

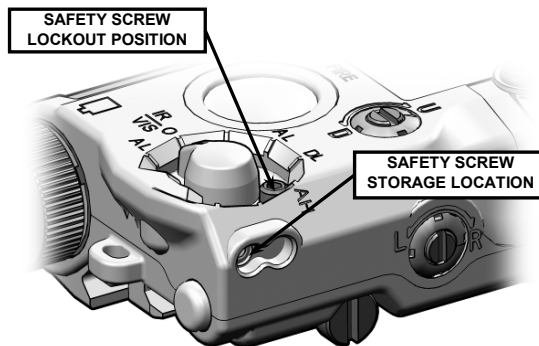


Figure 2-11. Safety Screw Shown Lockout Position.

2.9 MODE ACTIVATION

NOTE

The ATPIAL is equipped with a shut-down feature that will automatically turn off any laser that has been activated for five continuous minutes. To reactivate, press (single tap) the FIRE Button.

Once the mode of operation has been selected, the ATPIAL may be used in that mode by activating the system as follows:

Momentary Operation

Pressing and holding the FIRE Button operates the ATPIAL in the selected mode. The selected laser(s) will remain on until the FIRE Button is released, or after five minutes of continuous operation, whichever comes first.

Continuous Operation

Pressing the FIRE Button twice in rapid succession (double-tap) operates the ATPIAL in the selected mode. The selected laser(s) will remain on until the FIRE Button is pressed a third time (single tap), or after five minutes of continuous operation, whichever comes first.

Remote Cable Switch

When installed, the Remote Cable Switch may be used to provide the same functionality as the FIRE Button and is operated in the same manner. The Remote Cable Switch plugs into the remote jack as shown in Figure 2-12. It is then secured to the weapon to best suit the operator's firing preference using the retaining straps and / or hook and loop fastener tape.

2.9 MODE ACTIVATION (Continued)

CAUTION

When the Remote Cable Switch is plugged into the remote jack, it automatically locks in place. To remove it, pull back on the cable sleeve. Do not remove the Remote Cable Switch by pulling on the cable itself.

NOTE

The ATPIAL comes with a jack plug installed in the remote jack that must be removed and stored before installing the Remote Cable Switch.

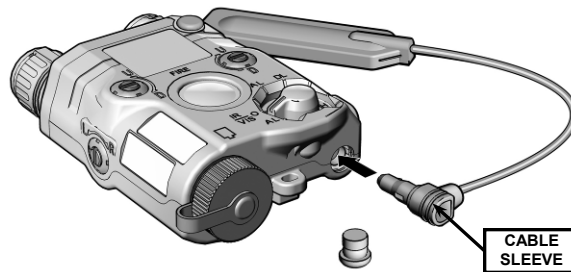


Figure 2-12. Installation of the Remote Cable Switch.

2.9 MODE ACTIVATION (Continued)

Dual Button Remote

The optionally available Dual Button Remote (DBR) is operated in the same manner as the standard Remote Cable Switch. However, in addition to remote activation of the ATPIAL, it also provides control over a second electro-optical device (e.g., M3X, etc.).

The DBR may be mounted on a MIL-STD-1913 rail as follows:

1. Position the DBR with the recoil lug aligned with the desired recoil groove of the weapon's rail.
2. Hook the moveable jaw of the DBR under the rail (see Figure 2-13).
3. Squeeze the DBR clamp to open the moveable jaw, and "roll" the fixed jaw onto the weapon rail until it clicks into place and is firmly secured.

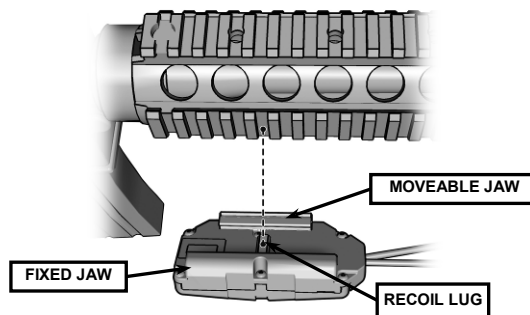


Figure 2-13. Mounting the DBR.

2.9 MODE ACTIVATION (Continued)

The cables may then be plugged into the remote jacks of two separate devices. The smooth Activation Button corresponds to the cable with the raised, black plug end. The embossed Activation Button corresponds to the cable with the recessed, gray plug end (see Figure 2-14).

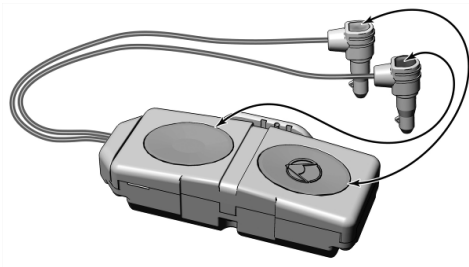


Figure 2-14. DBR Activation Buttons.

2.10 USING THE AIM LASERS

Modes of operation for the Visible and IR Aim Laser are selected and activated as described in sections 2.8 and 2.9, respectively.

Aim Neutral Density / Opaque Lens Cap

Under certain operating conditions, particularly at night, it may be desirable to prevent inadvertent emission of *visible* laser energy. The Aim Neutral Density / Opaque Lens Cap is provided for this purpose. It also reduces scatter from the IR Aim Laser. To use the lens cap, stretch it out and over the front of the Aim Laser exit ports so that it is snug and firmly in place. See Figures 2-15 and 2-16.

2.10 USING THE AIM LASERS (Continued)

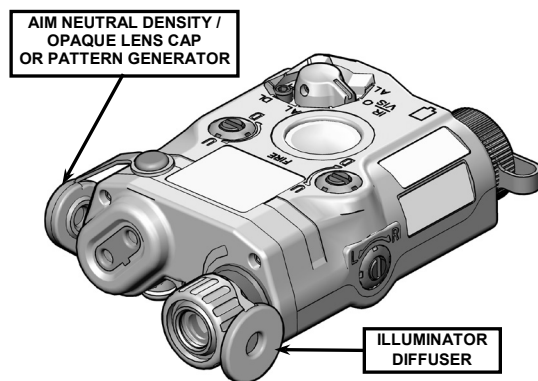


Figure 2-15. Lens Caps Uninstalled.

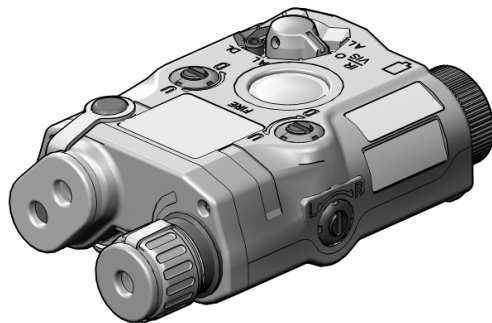


Figure 2-16. Lens Caps Installed.

2.10 USING THE AIM LASERS (Continued)

Pattern Generators

Five different Pattern Generators are supplied with the ATPIAL for command and control purposes. When individually installed over the Aim Lasers, they project a specific holographic design over the aim point of the laser. The shapes are visible with the naked eye if using the Visible Aim Laser, and with night vision devices if using the IR Aim Laser. The Pattern Generators may only be used one at a time and may not be used in conjunction with the Aim Neutral Density / Opaque Lens Cap. See Figures 2-15 and 2-16.



Figure 2-17. Pattern Generator Shapes.

2.11 USING THE IR ILLUMINATOR

Modes of operation for the IR Illuminator are selected and activated as described in sections 2.8 and 2.9, respectively.

Beam Size

To focus the beam of the IR Illuminator, rotate the Focus Ring until the desired beam size is obtained. Direction of rotation to achieve maximum divergence (flood) and minimum divergence (spot) is clearly labeled on the ATPIAL housing (see Figure 2-18).

2.11 USING THE IR ILLUMINATOR (Continued)

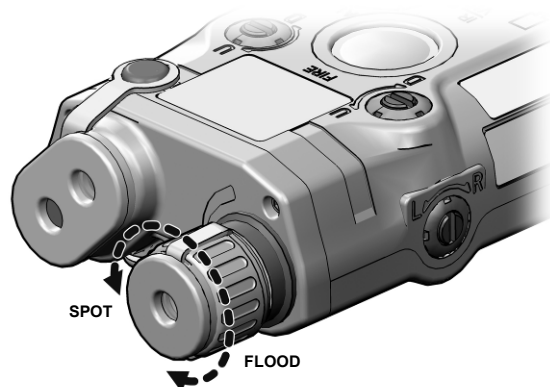


Figure 2-18. IR Illuminator Focus Ring.

Diffuser Lens Cap

When installed over the IR Illuminator, the Diffuser Lens Cap spreads the laser energy over an angle of at least 45 degrees, allowing for illumination of a wider area. It is most effective when used in conjunction with the Illuminator Focus Ring adjusted to the widest beam (flood) setting. To use the Diffuser Lens Cap, stretch it out and over the front of the IR Illuminator so that it is snug and firmly in place. See Figures 2-15 and 2-16.

2.11 USING THE IR ILLUMINATOR (Continued)

IR Illuminator Pulse Rate

In addition to momentary and continuous modes of operation, the IR Illuminator may be programmed to operate in pulse mode at either 1, 2, 4, or 8 pulses per second.

NOTE

To access the programming mode, the Mode Selector must be turned to the desired pulse rate within 5 seconds of pressing the FIRE Button.

1. With the Mode Selector turned to the P (PROGRAM) position, hold down the FIRE Button.
2. Turn the Mode Selector to the IR position that corresponds to the desired pulse rate as shown in Table 2-9. The LED Status Indicator will display a flashing green light that corresponds to the pulse rate (e.g., four green flashes indicate a pulse rate of four pulses per second).

Table 2-9. IR Illuminator Pulse Rates.

Pulse Rate	Mode Selector Position
Program	P
Continuous (no pulse)	AL
1 pulse per second	DL
2 pulses per second	AH*
4 pulses per second	IH*
8 pulses per second	DH*

* The safety screw must be removed to program these pulse rates.

3. Release the FIRE Button, and the pulse rate will be programmed. The set pulse rate will remain until it is programmed differently.

2.12 LED STATUS INDICATOR

An LED is incorporated into the body of the ATPIAL as shown in Figure 2-19. A list of possible LED indications is provided in Table 2-10.

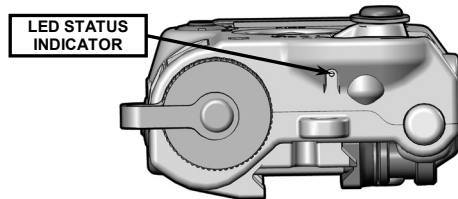


Figure 2-19. LED Status Indicator.

Table 2-10. LED Status Indicator.

Indicator Color	Indicator Rate	ATPIAL Status
GREEN	Steady	Laser(s) activated or continuous IR illumination
GREEN	1 flash per second	1 illuminator pulse per second
GREEN	2 flashes per second	2 illuminator pulses per second
GREEN	4 flashes per second	4 illuminator pulses per second
GREEN	8 flashes per second	8 illuminator pulses per second
RED	Steady	Laser(s) not activated, low battery power
GREEN/RED	Steady green with 1 red flash every 5 seconds	Laser(s) activated, low battery power
RED	Steady for 2 seconds	IR programming failed
ORANGE	3 orange flashes	IR programming successful

**CHAPTER 3
MAINTENANCE**

**SECTION I
MAINTENANCE AND TROUBLESHOOTING**

WARNING

Prior to conducting routine or periodic maintenance on the ATPIAL, ensure the Mode Selector is turned to the O (OFF) position.

3.1 TROUBLESHOOTING

The procedures below will help correct some of the basic problems that may arise with the ATPIAL. If the equipment malfunction is not listed, or the actions listed do not correct the fault, refer to section 3.4 for additional guidance.

Table 3-1. Troubleshooting Procedures.

Malfunction	Probable Cause	Corrective Action
1. Laser(s) appear weak or are not visible when activated.	a. Software overload.	a. Cycle power.
	b. Mode Selector is in O (OFF) or P (PROGRAM) position.	b. Turn Mode Selector to desired position. Activate by pressing the FIRE button.
	c. Aim Neutral Density / Opaque Lens Cap installed.	c. Uninstall the Aim Neutral Density / Opaque Lens Cap per Figure 2-15.
	d. Laser port(s) obscured by dirt, dust, or grime.	d. Clean laser port(s) (section 3.2).

3.1 TROUBLESHOOTING (Continued)

Table 3-1. Troubleshooting Procedures (Continued).

Malfunction	Probable Cause	Corrective Action
1 (cont). Laser(s) appear weak or are not visible when activated.	e. Battery improperly installed.	e. Verify battery is properly installed (section 2.2).
	f. Battery power is low.	f. Replace battery (section 2.2).
	g. Battery compartment / contacts corroded.	g. Clean battery compartment / contacts (section 3.2).
2. Laser(s) turn off unexpectedly.	a. Software overload.	a. Cycle power.
	b. Shut-down feature has been initiated.	b. "Wake" the system by pressing (single tap) the FIRE Button, Remote Cable Switch, or DBR.
	c. Battery power is low.	c. Replace battery (section 2.2).
	d. Battery compartment / contacts corroded.	d. Clean battery compartment / contacts (section 3.2).
3. ATPIAL does not retain zero.	a. Rail grabber assembly not properly secured to weapon rail.	a. Verify rail grabber is properly secured to weapon rail (section 2.3).

3.2 INSPECTION / CLEANING

The operator should inspect the ATPIAL before each use and after it has been in extreme conditions, such as prolonged exposure to intense temperatures. The following procedures will prolong the life of the ATPIAL and help ensure safe operation.

WARNING

Isopropyl alcohol is flammable and toxic. To avoid injury, keep away from open fire and use in a well ventilated area.

ATPIAL Housing

Inspect the ATPIAL housing for any signs of damage including cracks, missing parts, and any other visible defects. Rinse thoroughly with water or mild soap and water, then wipe clean with a soft cloth. If necessary, clean around buttons, switches, adjusters, and attachment points using fresh water and a cotton swab.

Battery Compartment / Cap

Inspect the battery compartment for dirt, dust, or corrosion. Dirt or debris that cannot be shaken loose from the battery compartment may be removed using a cotton swab. Clean the threaded portions of the battery cap and battery compartment using a cotton swab dipped in isopropyl alcohol. If necessary, clean battery contacts with a pencil eraser or cotton swab dipped in isopropyl alcohol. Periodically lubricate the battery compartment o-ring with fluorinated grease. Replace the o-ring if it becomes cut, nicked, or dried out (see section 3.3, Replacing Battery Compartment O-Ring).

3.2 INSPECTION / CLEANING (Continued)

Laser Ports

Inspect the laser ports for dirt, dust, and grime. Remove any large particles or loose dirt using air or a soft cloth. Fine cleaning should be performed using lens tissue and lens cleaning solution. Clean water, isopropyl alcohol, or general purpose window cleaner may be used to remove stubborn stains. Avoid using excessive force as this may scratch the lenses.

Remote Jack

Inspect the remote jack for corrosion, dirt, and damage. Gently remove any large particles of foreign matter and clean the contacts using a cotton swab dipped in isopropyl alcohol.

3.3 CORRECTIVE MAINTENANCE

The ATPIAL has no internal parts or assemblies replaceable by the operator or organizational level personnel. See section 3.4 for guidance regarding maintenance and/or repair actions beyond those described in this manual.

3.3 CORRECTIVE MAINTENANCE (Continued)

Replacing Battery Compartment O-Ring

1. Unscrew the battery cap until it comes free of the battery compartment threads.
2. Use the fingers of one hand to squeeze the battery compartment o-ring while simultaneously pushing it out of its retaining groove. Grasp the o-ring with fingers of the other hand and pull it off the battery compartment threads.
3. Use a cotton swab dipped in isopropyl alcohol to clean the o-ring retaining groove of any dirt, grease, or debris.
4. Apply a thin, even coat of fluorinated grease to the replacement o-ring.
5. Stretch the replacement o-ring over the battery compartment threads and slip it into its retaining groove.

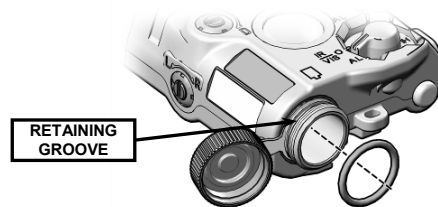


Figure 3-1. Battery Cap O-Ring.

6. Reinstall the battery cap and tighten.

3.3 CORRECTIVE MAINTENANCE (Continued)

Replacing Battery Cap / Battery Cap Lanyard

1. Unscrew the battery cap until it comes free of the battery compartment threads.
2. Use the fingers of one hand to squeeze the thin battery compartment o-ring while simultaneously pushing it out of its groove. Grasp the o-ring with fingers of the other hand and pull it off the battery compartment threads.
3. Simultaneously stretch and pull the larger eye of the battery cap lanyard off the battery compartment threads.
4. Pull the smaller eye of the battery cap lanyard off the battery cap post.



Figure 3-2. Battery Cap / Battery Cap Lanyard.

5. Replace the battery cap and/or battery cap lanyard as necessary.
6. Stretch smaller eye of the battery cap lanyard over the post on the battery cap.

3.3 CORRECTIVE MAINTENANCE (Continued)

7. Simultaneously stretch and pull the larger eye of the battery cap lanyard over the battery cap threads. Work the lanyard until it is seated neatly in the groove closest to the ATPIAL housing.
8. Stretch the o-ring over the battery compartment threads and slip it into its retaining groove (see Figure 3-1).
9. Reinstall the battery cap and tighten.

Replacing IR Illuminator Diffuser Lens Cap

1. If applicable, remove the old lens cap by pulling it off the ATPIAL housing.
2. Stretch the looped end of the replacement lens cap around the Illuminator Focus Ring.
3. Work the looped end down the Focus Ring toward the ATPIAL housing, until it is seated neatly in its retaining groove.
4. Flip the lens cap up and over the IR Illuminator.

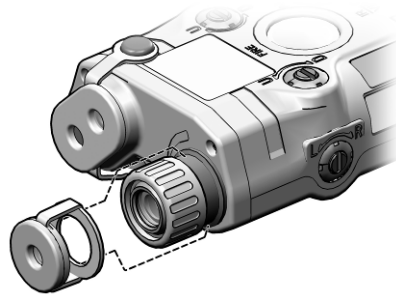


Figure 3-3. Replacing IR Illuminator Diffuser Lens Cap.

3.3 CORRECTIVE MAINTENANCE (Continued)

Replacing Aim Neutral Density / Opaque Lens Cap or Pattern Generator

1. If applicable, pull both retaining straps off the Lens Cap attachment points. Attachment points are located on both the top and bottom sides of the ATPIAL housing.

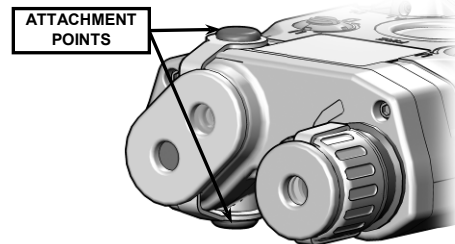


Figure 3-4. Lens Cap Attachment Points.

2. Examine the replacement lens cap. Note that one side is flat and the other side is contoured. Also note that one of the filters is glossy (Neutral Density) while the other is dull (opaque).
3. Ensuring the flat side of the new lens cap will face out, position the lens cap over the Aim Lasers as shown in Figure 3-5. The glossy, Neutral Density filter must be aligned with the IR Aim Laser.

3.3 CORRECTIVE MAINTENANCE (Continued)

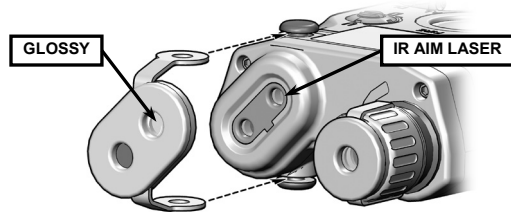


Figure 3-5. Positioning the Lens Cap.

4. Stretch the eyes of the lens cap lanyard over the attachment points.
5. Flip the lens cap over the IR Aim Lasers.

Replacing Safety Screw

1. Remove safety screw by using a 3/32 inch hex head wrench. Turn counterclockwise.
2. Install replacement safety screw in the lockout or storage location. Using a 3/32 inch hex head wrench, turn clockwise to tighten.

SECTION II
SERVICE / PACKING AND UNPACKING

3.4 RETURN INSTRUCTIONS

For service, repair, or replacement, first e-mail returns.insight@l-3com.com or call toll-free 1-877-744-4803.

To assist with determining if the item is repairable, the following information will be requested:

- a. Serial number of the defective item;
- b. Thorough description of the malfunction, defect, or damage; and
- c. If known, an explanation as to how the malfunction, defect or damage occurred.

If the item is determined to be Beyond Economical Repair, follow applicable replacement procedures through your Property Officer. If it is determined that the item is under warranty, or should be returned for repair, a Return Material Authorization (RMA) number will be provided.

When returning the ATPIAL for service / repair, the following procedures should be followed to prevent any additional damage:

1. Be sure that the ATPIAL is free of all contaminants such as dirt or any other foreign material.
2. Remove battery.
3. Place the ATPIAL in the soft carrying case.

3.4 RETURN INSTRUCTIONS (Continued)

Place the item and a copy of the test report or detailed description of the failure in a suitable packing container. Mark the package with "Field Return" and the RMA number. Ship via fastest, traceable, pre-paid means to:

L-3 Communications Corporation
Warrior Systems Division
Insight Operations
9 Akira Way
Londonderry, NH 03053

3.5 WARRANTY INFORMATION

The ATPIAL is under warranty from defects in material and workmanship for a minimum of one (1) year from the date of manufacture. This warranty does not protect against damage due to misuse, mishandling or battery leakage. Additional warranty coverage may have been provided through the contract or via subsequent contract extension. Specific warranty terms can be obtained from your procurement agent, Contracting Officer or L-3 Warrior Systems, Insight.

3.6 NON-WARRANTY INFORMATION

Non-warranty repairs are subject to an evaluation fee. The item will be tested and evaluated for failure, then customer permission and payment terms are obtained prior to any repairs being performed.

APPENDIX A
END ITEM COMPONENTS AND REPAIR PARTS

A.1 SCOPE

This Appendix lists end item components and repair parts available for the ATPIAL.

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A.2 END ITEM COMPONENTS

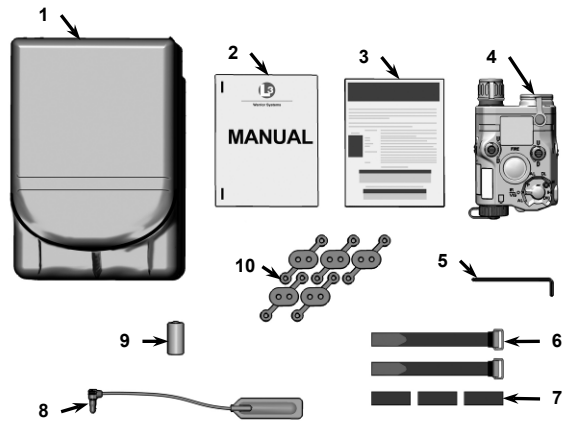


Figure A-1. End Item Components.

Table A-1. List of End Item Components.

ITEM NO.	NATIONAL STOCK NUMBER	PART NUMBER	DESCRIPTION	QTY
1	8105-01-368-6253	4B-949	Bag, Textile	1
2	N/A	ATP-TM-SP	Operator Manual	1
3	N/A	ATP-QRG-SP	Quick Reference Card	1
4	N/A	ATP-100-A17 ATP-100-A21	ATPIAL Assembly, Tan ATPIAL Assembly, Black (see Figure A-2 for parts breakdown)	1
5	5120-01-578-7433	3/32 HEX KEY	3/32" Hex Key	1
6	5340-01-455-0062	ITP-809	Retaining Straps	2
7	8315-01-497-8154	ITP-044	Loop Tape	3
8	5995-01-454-7124	ITP-053	Remote Cable Switch, 12"	1
9	6135-01-351-1131	DL123ABK	Battery, DL123A	1
10	1240-01-545-6071 1240-01-536-9662	ATP-610 ATP-609	Pattern Generator Kit, Tan Pattern Generator Kit, Black	1

A.3 REPAIR PARTS

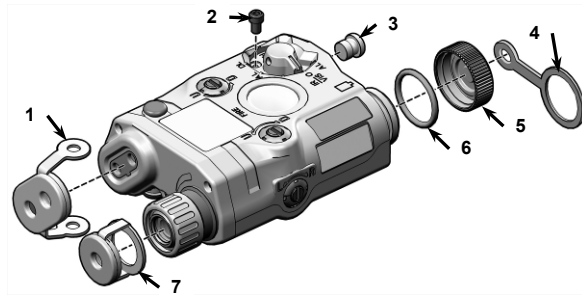


Figure A-2. ATPIAL Assembly.

Table A-2. List of Repair Parts.

ITEM NO.	NATIONAL STOCK NUMBER	PART NUMBER	DESCRIPTION	QTY
1	1240-01-536-9660	ATP-630	Aim ND / Opaque Lens Cap, Black	1
	1240-01-545-6070	ATP-630-A2	Aim ND / Opaque Lens Cap, Tan	
2	5305-01-537-1811	MHW003-042ALBL	Safety Screw	1
3	4730-01-454-9944	HKL-313	Remote Jack Plug, Black	1
	4730-01-547-7145	HKL-313-02	Remote Jack Plug, Tan	
4	1240-01-536-9661	MFL-173	Lanyard, Battery Cap	1
5	6160-01-538-1792	IPM-252	Battery Cap, Black	1
	6160-01-571-5425	IPM-252-02	Battery Cap, Tan	
6	5331-01-537-0498	AS-568A-018S70	O-Ring, Battery Compartment	1
7	1240-01-537-0486	ATP-420	Lens Cap, Illuminator Diffuser, Black	1
	1240-01-537-0486	ATP-420-A2	Lens Cap, Illuminator Diffuser, Tan	

**APPENDIX B
ACCESSORIES**

B.1 SCOPE

This Appendix lists additional items authorized for support of the ATPIAL.

Table B-1. List of Accessories.

NATIONAL STOCK NUMBER	DESCRIPTION, PART NUMBER	QTY RECM
6150-01-363-2798	Cable Switch, Remote, 20" A3259273	1
6150-01-481-6925	Cable Switch, Remote, 25" A3267746	1
6150-01-533-8235	Cable Switch, Remote, 28" ITP-053-28	1
5860-01-471-2091	Laser Borelight System LBS-300-A2	1
5995-01-588-4455	Dual Button Remote, 6", Black RMT-400-A7	1
5995-01-585-0496	Dual Button Remote, 6", Tan RMT-400-A8	1

The **ATPIAL**
is designed and produced by:



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