DBAL-A4

Technical Manual

DUAL BEAM AIMING LASER

STEINER
Nothing Escapes You

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Safety Summary

This safety summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within this technical manual.

WARNING

VISIBLE AND INVISIBLE LASER RADIATION

- AVOID EXPOSURE TO THE BEAM
- DO NOT stare into the laser beam.
- DO NOT look into the laser beam through binoculars or telescopes.
- DO NOT point the laser beam at mirror-like surfaces.
- DO NOT shine the laser beam into other individual's eyes.

Notes:

- The time base for calculating maximum permissible exposure (MPE) limits for the green visible lasers is 0.25 seconds.
- The time base for calculating MPE limits for the infrared laser is 100 seconds.

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* Max Output: +/-10 nm

Table A-1 Safety Data

Conforms with IEC-60825-1

Model	Laser Type	Wavelength*	Max. Output Power (low/high)	Beam Divergence	MPE
9014 9016	Green Laser	520 +/-10 nm	1 mW / 5 mW	0.5 +0.5/-0.2 mrad	0.39 mW
	IR Laser	830 +25/-5 nm	0.2 mW / 0.7 mW	0.5 +0.5/-0.2 mrad	0.71 mW
10014 10016	Green Laser	520 +/-10 nm	1 mW / 50 mW	0.5 +0.5/-0.2 mrad	0.39 mW
	IR Laser	830 +25/-5 nm	0.7 mW / 50 mW	0.5 +0.5/-0.2 mrad	0.71 mW
9032 9033	Red Laser	635 +/-10 nm	1 mW / 5 mW	0.5 +0.5/-0.2 mrad	0.39 mW
	IR Laser	830 +25/-5 nm	0.2 mW / 0.7 mW	0.5 +0.5/-0.2 mrad	0.71 mW
10021 10022	Red Laser	642 +/-10 nm	1 mW / 80 mW	0.5 +0.5/-0.2 mrad	0.39 mW
	IR Laser	830 +25/-5 nm	0.7 mW / 50 mW	0.5 +0.5/-0.2 mrad	0.71 mW

* Wavelength may vary over temperature.

Table A-1 Safety Data, continued

Conforms with IEC-60825-1

Model	Laser Type	Laser Class* (low/high)	NOHD (low/high)	ENOHD ** (low/high)	OD*** (low/high)
9014 9016	Green Laser	Class 2 / Class 3R	24 m / 58 m	196 m / 443 m	0.5 / 1.2
	IR Laser	Class 1 / Class 1	0 m / 0 m	0 m /0 m	0 / 0
10014 10016	Green Laser	Class 2 / Class 3B	58 m / 194 m	443 m / 1411 m	1.2 / 2.2
	IR Laser	Class 1 / Class 3B	0 m / 142 m	0 m / 1045 m	0 / 1.9
9032 9033	Red Laser	Class 2 / Class 3R	24 m / 58 m	196 m / 443 m	0.5 / 1.2
	IR Laser	Class 1 / Class 1	0 m / 0 m	0 m / 0 m	0 / 0
10021 10022	Red Laser	Class 2 / Class 3B	58 m / 246 m	443 m / 1786 m	1.2 / 2.4
	IR Laser	Class 1 / Class 3B	0 m / 142 m	0 m / 1045 m	0 / 1.9

*The Low Power modes of operation are “training modes” for visible lasers and “eye-safe training modes” for IR lasers.

** The extended NOHD assumes the use of 7 x 5 binoculars with a 50 mm aperture or equivalent.

*** Laser safety glasses optical density (OD) is calculated for the ENOHD.

The use of proper eye protection is recommended. Laser safety glasses should have an optical density (OD) equal to or greater than the figures indicated in the safety data table for a wavelength range spanning 10 nm less than or greater than the nominal wavelength of the laser being used.

Explanation of Safety Alerts

WARNING
Identifies a clear danger to the person doing that procedure.

CAUTION
Identifies risk of damage to the equipment.

Note
Identifies essential procedures, conditions, statements, or convey important instructional data to the user.

WARNING

- Be sure the weapon is CLEAR and on SAFE before proceeding.
- RISK OF DETECTION BY ENEMY. To reduce the risk of detection by enemy using Night Vision Devices (NVD), avoid prolonged activation.
- The infrared beam is more detectable to an enemy using an NVD when used in smoke, fog and rain. Avoid prolonged activation of the DBAL-A^4 in these conditions.
- The High Power modes of operation yield significant eye-safety hazards and are blocked with a Blue Safety Screw. To operate the DBAL-A^4 in the High Power modes, the Blue Safety Screw must be removed from the Activation Mode Selector Switch location.
- The Low Power modes of operation are “training modes” for visible lasers and “eye-safe training modes” for IR lasers.

- Make sure the Activation Mode Selector Switch is in the OFF position and batteries removed before inspecting the Exit Port windows of the DBAL-A4.
- If the Activation Mode Selector Switch is not in the OFF position, depressing one of the FIRE buttons or the remote cable pressure pad switch can inadvertently activate the laser.
- If the Laser Borelight System (LBS) is used to boresight the DBAL-A4, be sure to remove the LBS from the weapon prior to firing.
- NEVER boresight in a High Power mode of operation.

BATTERY WARNING

The DBAL-A4 is powered by one 3-volt CR123A Lithium Manganese Dioxide (Li/MnO2) battery. The following safety precautions apply when handling lithium batteries.

- DO NOT store the DBAL-A4 with the battery installed.
- DO NOT short circuit, puncture, or disassemble.
- DO NOT attempt to recharge.
- NEVER dispose of lithium batteries in a fire, or in any way expose lithium batteries to excessive heat.
- Batteries may explode if disassembled, crushed, recharged, or exposed to high temperatures.
- Avoid mechanical or electrical abuse.
- Prior to use, inspect all batteries for cracks, leakage, or bulging.
- NEVER install a defective battery in the DBAL-A4.
- DO NOT install battery incorrectly.
- Store at room temperature.
- Refer to applicable federal, state, and local laws and regulations for proper disposal of the batteries.

CAUTION

- DO NOT store the DBAL-A4 with the battery installed.
- DO NOT over-adjust the laser adjusters by forcing them beyond their end of travel.
- DO NOT over-tighten the Blue Safety Screw when installing it into the DBAL-A4 housing as you may strip the housing threads.
- Use ONLY authorized cleaning supplies on the DBAL-A4 or permanent damage may occur.
- DO NOT remove the Remote Paddle Switch by pulling on the cable.
- DO NOT defocus the infrared illuminator by forcing it beyond its normal end of travel.
- Use ONLY authorized cleaning supplies on the DBAL-A4 or permanent damage may occur.

Note: All directions, such as clockwise (CW) and counterclockwise or anti-clockwise (CCW), are given from the shooter's point of view, as though the DBAL-A4 were weapon-mounted.

How to Use this Manual

Usage

You must familiarize yourself with the entire manual before operating the equipment. Read the complete maintenance task before performing maintenance and follow all WARNINGS, CAUTIONS and Notes.

Manual Overview

This manual contains information required for the safe operation the DBAL-A^4.

CHAPTER 1: General Information

1.1 General Information

1.1.a Type of Manual
Operator and Field Maintenance Manual

1.1.b Equipment Name
DBAL-A^4, Dual Beam Aiming Laser, Advanced, Generation 4.

1.1.c Purpose of Equipment
The DBAL-A^4 can be used to covertly illuminate and direct fire using an infrared laser pointer (IR PT), a spot / long range IR light emitting diode illuminator (IR ILL), a flood / short range IR light emitting diode illuminator (IR ILL), for users equipped with a Night Vision Device (NVD). The DBAL-A^4 can also be used to direct fire using a visible illuminator and or green laser pointer for daylight and low light operations.

1.2 Recommending Equipment Improvements
If you have a suggestion to improve the utility and performance of the DBAL-A^4, let us know. Mail your comments and suggestions to Steiner Optics, 331 East 8th St. Greeley, CO 80631, USA, or send an email to info@steiner-optics.com.

1.3 Warranty Information

If you require warranty or repair information on this product, refer to www.steiner-optics.com. This warranty does not protect against damage due to misuse or mishandling.

Table 1-1 Cross References

Common Name	Official Name
Batteries	2x CR123A Batteries
Blue Safety Screw	Switch Cover Safety Mode Retaining Screw
Cotton Swab	Disposable Applicator
FIRE button	Integrated Momentary Activation Switch
O-ring	Gasket
Paddle Switch	Remote Paddle Switch
Pointer	Aiming Laser
Tape Fastener Hook	Fastener, Hook Tape
Tape Fastener Loop	Fastener, Loop Tape
Technical Manual	Operator and Field Maintenance Manual
Shipping Case	Shipping Box
Window Covers	Exit Port Cover or Dust Cover

Table 1-2 List of Abbreviations

Abbreviation	Definition
ENOHD	Extended Nominal Ocular Hazard Distance
C	Celsius (Centigrade)
CCW	Counterclockwise (anti-clockwise)
cm	Centimeters
Cont'd	Continued
CTA	Common Table of Allowance
CW	Clockwise
EA	Each
F	Fahrenheit
HI	High
IEC	International Electrotechnical Commission
ILLUM	Illuminator
in.	Inches
IR	Infrared
LBS	Laser Borelight System

Abbreviation	Definition
LED	Light Emitting Diode
LO	Low
m	Meters
MPE	Maximum Permissible Exposure
Mfr	Manufacturer
Min	Minimum
MOM	Momentary
mrad	Milliradians
mW	Milliwatts
nm	Nanometers
No	Number
NOHD	Nominal Ocular Hazard Distance
NSN	National Stock Number
NVD	Night Vision Device
OD	Optical Density

Table 1-2 List of Abbreviations, continued

Abbreviation	Definition
Para	Paragraph
POINT	Target Designator
PWR	Power
QTY	Quantity
RAS	Rail Adapter System
R.F.	Remote Fire Switch Port
RMA	Return Material Authorization
SR	Service Representative
TM	Technical Manual
VIS	Visible
V.O.	Visible Override Switch Port

CHAPTER 2: Equipment Description

2.1 System Description

The DBAL-A^4 features a visible aiming laser (VIS PT) for daylight and low light operations, an infrared aiming laser (IR PT), a narrow divergence / long range IR light emitting diode illuminator (IR ILL), a flood / short range IR light emitting diode illuminator (IR ILL), and a visible white light emitting diode illuminator (VIS ILL). The DBAL-A^4 may be used to accurately direct fire as well as illuminate and identify targets.

The DBAL-A^4 features the following operational modes:

Visible

- Visible illuminator
- Green aiming laser – low power and visible illuminator
- Green aiming laser – high power and visible illuminator

Note: The Low Power modes of operation are "training modes" for visible lasers.

Infrared

- IR aiming laser – low power
- IR aiming laser – low power and IR illuminator
- IR aiming laser – high power
- IR aiming laser – high power and IR illuminator

Note: The Low Power modes of operation are "eye-safe training modes" for IR lasers.

The DBAL-A^4 emits a highly collimated beam of IR light for precise aiming of the weapon and a low speckle IR illumination beam to improve the visibility of targets viewed with Night Vision Devices (NVDs). The visible aiming laser may be used to boresight the device without the requirement of an NVD and will simultaneously boresight the IR aiming laser.

The DBAL-A^4 may be weapon mounted to the MIL-STD-1913 rail.

Note: The MIL-STD-1913 rail is also called the Picatinny rail. The MIL-STD-1913 rail is compatible with the STANAG-4694 rail.

Figure 2-1 identifies the distinguishing parts of the DBAL-A^4. Table 2-1 provides performance specifications.

Figure 2-1 DBAL-A^4 Features

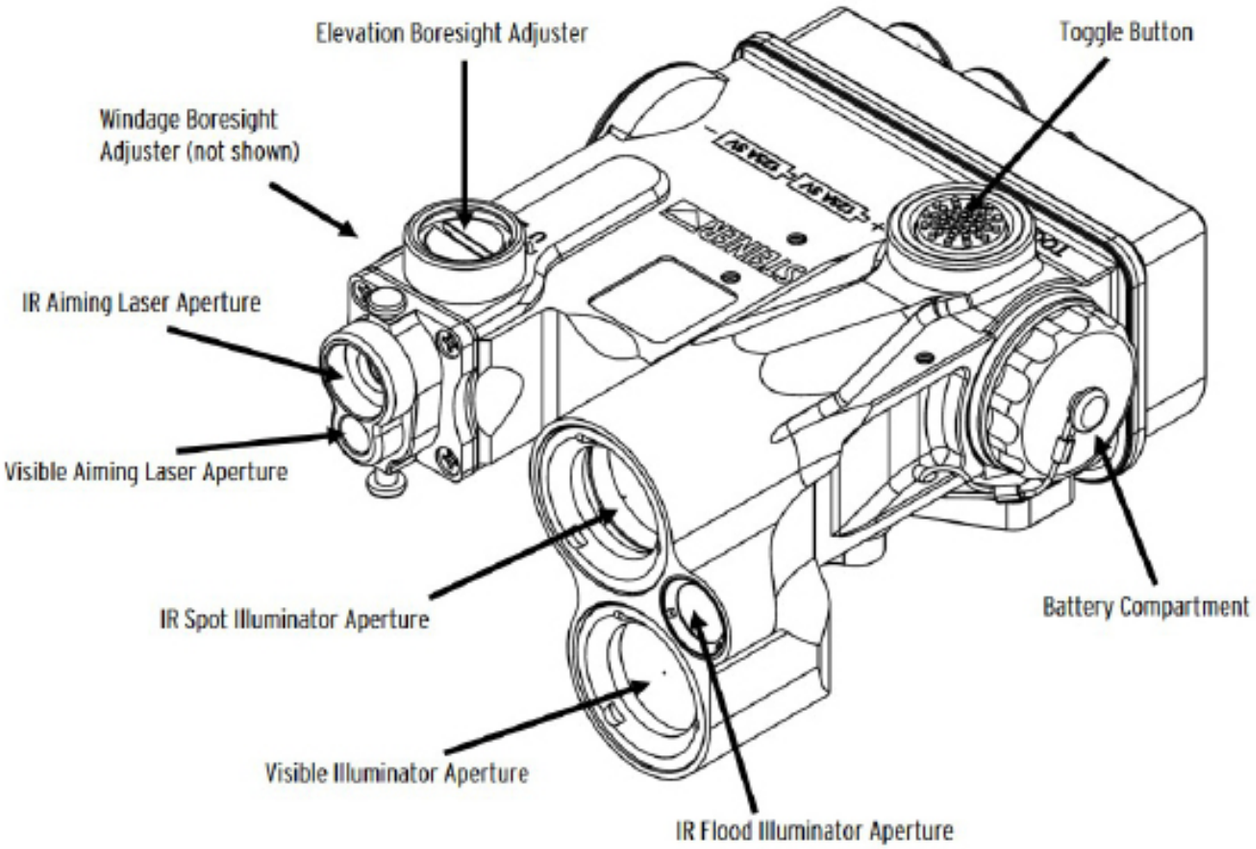
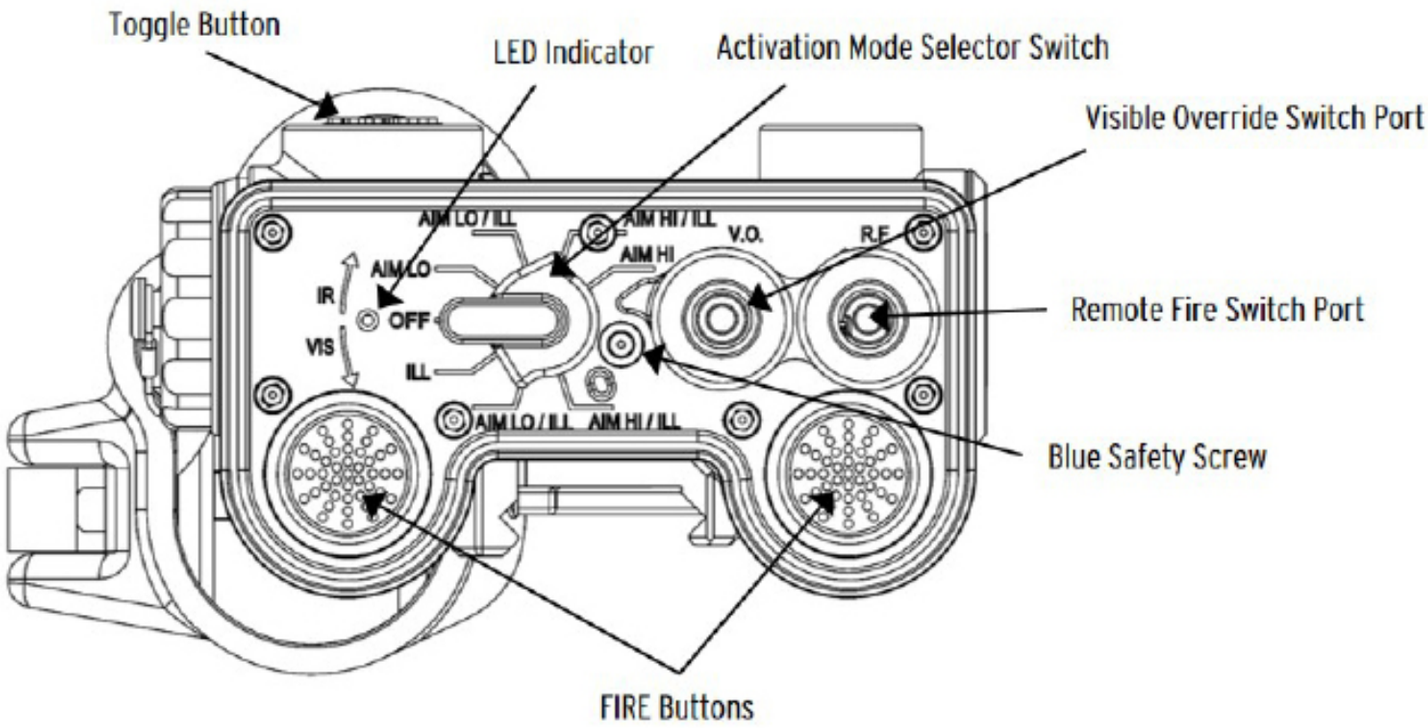


Figure 2-1 DBAL-A^4 Features, continued



2.2 General Characteristics

Table 2-1 Weight, Dimension and Performance

Weight	
(with two batteries, CR 123A)	13.9 ounces / 394 grams
Dimensions	
Length	4.5 inches / 11.43 cm
Width	3.4 inches / 8.63 cm
Height (including mounting bracket)	2.1 inches / 5.33 cm
Center Height Above Rail	1.2 in / 3.05 cm
Wavelength	
Green Visible Aiming Laser	520 +/- 10 nm
Visible Illuminator	500 lumens, cool white light
IR Aiming Laser	830 +25/-5 nm
IR Illuminator	830 +25/-5 nm
Red Visible Aiming Laser	635 or 642 +/- 10 nm
Visible Illuminator	500 lumens, cool white light
IR Aiming Laser	830 +25/-5 nm
IR Illuminator	830 +25/-5 nm

Table 2-1 Weight, Dimensions and Performance, continued

Model	Laser Type	Max. Output Power (Low/High)	Range (Low/High)
9014 9016	Green Visible Aiming Laser	1 mW / 5 mW	15 m / 750 m
	Visible Illuminator	500 lumens	>400 m
	IR Aiming Laser	0.2 mW / 0.7 mW	250 m / 1000 m
	IR Illuminator	Spot: 110 mW / Flood: 275 mW	Spot: 1000 m / Flood: 50 m
10014 10016	Green Visible Aiming Laser	1 mW / 50 mW	750 m / 2500 m
	Visible Illuminator	500 lumens	>400 m
	IR Aiming Laser	0.7 mW / 50 mW	1000 m / 2500 m
	IR Illuminator	Spot: 110 mW / Flood: 275 mW	Spot: 1000 m / Flood: 50 m
9032 9033	Red Visible Aiming Laser	1 mW / 5 mW	12 m / 600 m
	Visible Illuminator	500 lumens	>400 m
	IR Aiming Laser	0.2 mW / 0.7 mW	250 m / 1000 m
	IR Illuminator	Spot: 110 mW / Flood: 275 mW	Spot: 1000 m / Flood: 50 m
10021 10022	Red Visible Aiming Laser	1 mW / 80 mW	600 m / 2500 m
	Visible Illuminator	500 lumens	>400 m
	IR Aiming Laser	0.7 mW / 50 mW	1000 m / 2500 m
	IR Illuminator	Spot: 110 mW / Flood: 275 mW	Spot: 1000 m / Flood: 50 m

Table 2-1 Weight, Dimensions and Performance, continued

Beam Divergence	
Visible Laser Target Designator	0.5 +0.5/-0.2 mrad
IR Laser Target Designator	0.5 +0.5/-0.2 mrad
Operating Temperature	
Green Visible Aiming Laser	-20°C to +60°C
Batteries	**Performance**
CR123A x 2	Mode Dependent
Target Designator/Illuminator	7 Hours on Low
Waterproof	
Submersible	5 meters

Description of Major Components

Figure 2-2 shows the key components included in the DBAL-A^4 package.

Figure 2-2 DBAL-A^4 Major Components

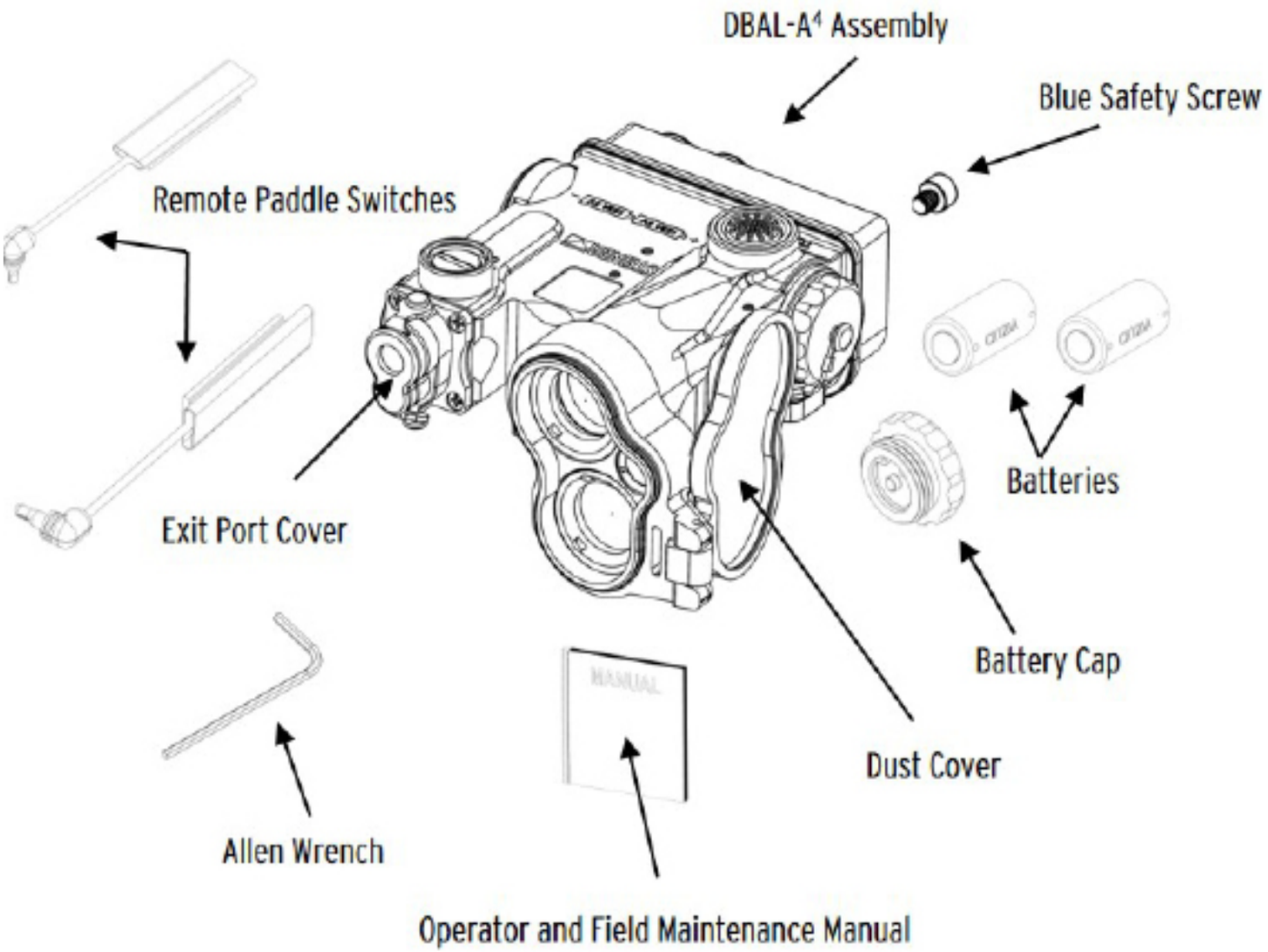


Table 2-2 DBAL-A^4 Major Components

Item	Description
1	DBAL-A^4 Assembly
2	CR123A Battery Cap
3	CR123A Batteries x 2
4	Remote Paddle Switch, HI Pressure MOM Remote, 7" (with pre-attached Tape Fastener Hook) x 2
5	Tape Fastener Loop 5/8" (Black) x 2 (not shown)
6	Allen Wrench (3/32") (for removal and replacement of Blue Safety Screw)
7	Operator and Field Maintenance Manual
8	Blue Safety Screw
9	Dust Cover
10	Exit Port Cover

2.2.a DBAL-A^4 Assembly

The DBAL-A^4 device provides a visible aiming laser, IR aiming laser, long range spot IR illuminator, short range flood IR illuminator, and a visible white light LED illuminator. The device is used for aiming, signaling, command and control, and for purposes of supplying supplemental IR illumination.

2.2.b Battery Cap

The Battery Cap secures the battery inside the battery compartment. It must be used with the associated battery type.

2.2.c Batteries

Two CR123A lithium batteries are the power source for the DBAL-A^4. The use of high-quality batteries is recommended.

2.2.d Remote Paddle Switch

- Pressing the Remote Paddle Switch's pressure pad once activates the DBAL-A^4 in a momentary (MOM) mode .
- Pressing pressure pad twice in rapid succession activates the device continuously for five minutes.
- Pressing the pressure pad again will return the device to momentary activation.

The pressure pad provides a tactile response that indicates when the switch has been activated. A Tape Fastener Hook is pre-attached by the manufacturer to the pressure pad switch. It is used to secure the Remote Paddle Switch to the weapon in a position convenient to the user.

2.2.e Tape Fastener Loop
The Tape Fastener Loop is provided to secure the Remote Paddle Switch to the weapon in a position convenient to the user.

2.2.f Allen Wrench
A 3/32" Allen Wrench is supplied for removal of the Blue Safety Screw.

2.2.g Operator and Field Maintenance Manual
You must read the entire Technical Manual before operating the DBAL-A^4 and follow all WARNINGS, CAUTIONS and Notes.

This Technical Manual provides safety and operating instructions to allow the user to safely and effectively operate the DBAL-A^4.

2.2.h Blue Safety Screw
The Blue Safety Screw, when installed, prevents access to the high power operating modes for both visible and IR.

2.2.i Dust Cover
The Dust Cover prevents energy emission when properly installed over the exit ports. It protects the IR Spot, IR Flood and Visible Illuminator Windows.

2.2.j Exit Port Cover
The Exit Port Cover is held in place by the retention studs located above and below each exit window. The Exit Port Cover prevents energy emission when properly installed over the Visible Aiming Laser Window.

CHAPTER 3: Section 1, Operating Instructions

3.1 General

This DBAL-A^4 can emit both visible and invisible laser radiation, both of which can cause temporary or permanent damage to vision as a result of direct exposure.

3.2 DBAL-A^4 Controls and Indicators

This section contains a description of the controls and adjustments for the DBAL-A^4.

3.2.a Battery Installation

WARNING

DO NOT store the DBAL-A^4 with the battery installed.

1. Open battery compartment cap.
2. Remove and properly discard the spent batteries.
3. Inspect the battery compartment for dirt, moisture and corrosion.
4. Clean the battery compartment as needed.
5. Inspect the o-ring seal on the top of the battery compartment to make sure it is free of sand and dirt particles and that it has not been damaged.
6. Install the batteries as indicated by the marking on the DBAL-A^4 housing (see Figure 3-1).
7. Close battery compartment lid and hand tighten battery compartment cap in a clockwise (CW) direction.

Loss or removal of the o-ring from the battery cap may cause water to enter the DBAL-A^4.

3.2.b Activation Mode Selector Switch

The Activation Mode Selector Switch is located on the rear of the DBAL-A^4 housing. The switch is used to select between the various modes of operation.

The Activation Mode Selector Switch has eight positions (see Table 3-1). When installed in the position indicated in Figure 3-1, a Blue Safety Screw prevents access to the High Power modes of operation for both visible and IR.

To use the High Power modes, use an Allen wrench to remove the Blue Safety Screw. Store the screw in the main housing near the toggle button.

In extremely cold temperatures, the switch may become more resistant to rotation.

The DBAL-A^4 will not operate if the Activation Mode Selector Switch is not precisely aligned with the marked mode position.

Figure 3-1 DBAL-A^4 Controls

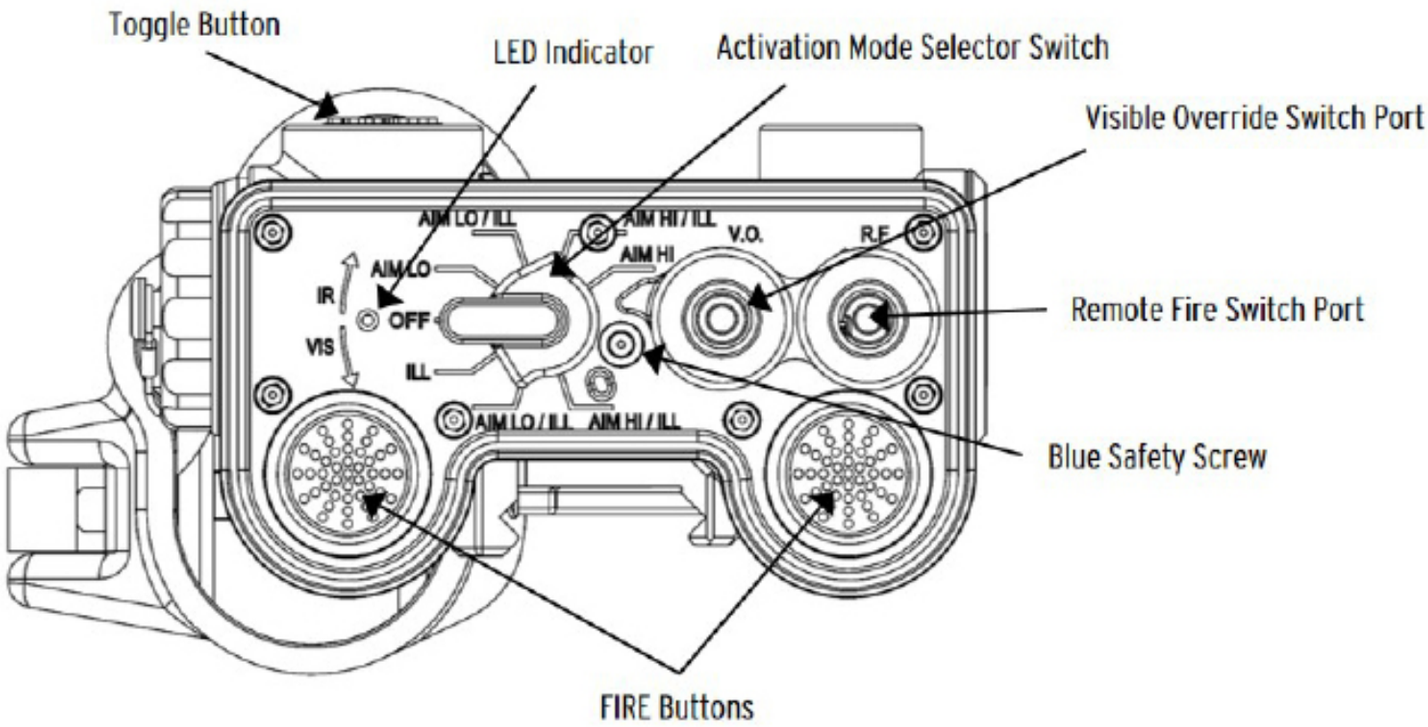


Table 3-1 Activation Mode Selector Switch Functions

Switch Position	Mode (full name)	Use
IR AIM HI	IR Aiming Laser (high power)	Target pointing at maximum ranges for NVDs.
IR AIM HI / ILL	IR Aiming Laser (high power) and IR Illuminator	Target pointing at maximum ranges plus IR illumination for NVDs.
IR AIM LO / ILL	IR Aiming Laser (low power) and IR Illuminator	Target pointing at "training mode" power output plus IR illumination for NVDs.
IR AIM LO	IR Aiming Laser (low power)	Target pointing for NVDs at "training mode" power output
OFF	Master Power Off	Storage / non-operation
VIS ILL	Visible Illuminator (white flashlight)	Visible white light illumination. Toggle turns Illuminator On/Off.
VIS AIM LO / ILL	Visible Aiming Laser (low power) and Visible Illuminator (white flashlight)	Visible target pointing at low power output plus visible white light illumination.
VIS AIM HI / ILL	Visible Aiming Laser (high power) and Visible Illuminator (white flashlight)	Visible target pointing at high power output plus visible white light illumination

3.2.c FIRE and TOGGLE Buttons

Two FIRE buttons are located on the rear of the DBAL-A4. These are labeled with the word "FIRE" and provide redundant and ambidextrous activation of the device (see Figure 3-1). Firmly pressing and holding either FIRE button activates the DBAL-A4 mode selected by the Activation Mode Selector Switch. When the switch is released, the selected mode is deactivated.

3.2.c FIRE and TOGGLE Buttons, continued

See Table 3-2 for the FIRE button and Toggle button functions.

- Pressing the FIRE buttons twice in rapid succession will activate the DBAL-A4 in a continuous ON mode for five minutes.
- Pressing either of the Integrated Momentary Activation Switches once again, while in active continuous mode, will return the device to the momentary mode.
- If the unit is locked in continuous ON mode, rotation of the Activation Mode Selector Switch to a different position will turn the laser and/or illuminator off.

Pressing the toggle button when in:

- Visible AIM LO/ILL or AIM HI/ILL toggles the visible illuminator on and off to enable visible laser only operation.
- Infrared AIM LO/ILL or AIM HI/ILL toggles between spot illuminator and flood illuminator.

3.2.d Laser and Illuminator Dimming

See Table 3-2 for FIRE button and Toggle button dimming functions.

- The DBAL-A4 offers the user the ability to dim each source. The intensity drops in four discrete steps.
- To dim, simultaneously press and hold either of the FIRE buttons and the Toggle button. The unit will step down through intensities. Release both buttons when the desired intensity is reached.
- The DBAL-A4 will activate in the last intensity that was set for each switch position and toggle state.

Table 3-2 Activation Mode Selector Switch FIRE and TOGGLE Functions

Switch Position	FIRE	TOGGLE	FIRE and TOGGLE
IR AIM HI	IR High Pointer	N/A	Dims Laser
IR AIM HI / ILL*	IR High Pointer and IR Flood or IR Spot	IR Flood or IR Spot	Dims Flood
IR AIM LO / ILL*	IR Low Pointer and IR Flood or IR Spot	IR Flood or IR Spot	Dims Spot
IR AIM LO**	IR Pointer	N/A	Dims Laser
VIS ILL	Illuminator	N/A	Illuminator Dims
VIS AIM LO / ILL	Visible Low Laser and Light	Turns Illuminator Off	Dims Laser
VIS AIM HI / ILL	Visible High Laser and Light	Turns Illuminator Off	Dims Laser

* The Toggle Button will turn on the IR Flood or IR Spot Illuminator depending on the last setting.
**For IR function, set the laser intensity at IR AIM LO. This is the setting that the unit will display at IR switch positions until it is changed.

3.2.e Blue Safety Screw

WARNING

To operate the DBAL-A4 in the High Power modes, remove the Blue Safety Screw from the back of the unit. The Armorer will remove and store the Blue Safety Screw.

CAUTION

DO NOT over tighten the Blue Safety Screw when installing it into the DBAL-A4 housing as you may strip the housing threads.

The Blue Safety Screw is a blue colored hex head that, when installed, prevents access to the High Power operating modes for both visible and IR. Unit procedures will provide direction on removing the Blue Safety Screw to enable the High Power modes. A 3/32 inch Hex Key from the Armorer's tool kit is used to remove the Blue Safety Screw. The Armorer will remove and store the safety screw.

3.2.f Activation Indicator/Low Battery LED Indicator

A green/red LED indicator is located on the rear housing just to the left of the OFF position of the Activation Mode Selector Switch (see Figure 3-1).

When continuously ON, the LED indicates that the DBAL-A^4 is in one of the eight active modes. If the LED is blinking, the battery is low and must be replaced. The LED will shine green in Low Power mode and red in High Power mode.

When the Activation Mode Selector Switch is turned to an operating position, the LED will light up if either the Remote Paddle Switch or the Integrated Momentary Activation Switches are depressed, indicating that the device is ON. The LED will remain lit while any of the eight operating modes are activated, via the remote switch or integrated FIRE buttons.

3.2.g Remote Fire Paddle Switch and Port

CAUTION

DO NOT remove the Remote Paddle Switch by pulling on the cable. The DBAL-A^4 Activation Mode Selector Switch must be turned to a laser setting to use the Remote Paddle Switch. The unit will not operate if the rotary switches are not precisely aligned with the marked switch position.

The DBAL-A^4 is equipped with two Remote Cable Ports.

- The right hand port is the Remote Fire Switch Port, marked "RF".
- Use the right remote cable port for all standard remote laser operation.
- The remote cable switch plugged into this port always activates the DBAL-A^4 in the operational mode selected by the Activation Mode Selector Switch.
- The Remote Paddle Switch plugs into the back of the DBAL-A^4 for weapon-mounted use. Depressing the Remote Paddle Switch activates the DBAL-A^4 in the operational mode selected by the Activation Mode Selector Switch. When the Remote Paddle Switch is released, the DBAL-A^4 turns off.
- In the Momentary Mode, when the Remote Paddle Switch has been pressed twice in rapid succession, the DBAL-A^4 will be activating in a constant ON mode for five minutes or until the Remote Paddle Switch is pressed once again to return the unit to momentary activation.
- When the Remote Paddle Switch is installed into the A^4, it automatically locks in place. To remove it, pull back on the plug's sleeve.

The left cable port is the Visible Override Switch Port. It ONLY operates the visible laser function when the paddle switch is depressed.

Table 3-3 Visible Override and Remote Fire Operations

Switch Position	VO	RF
IR AIM HI	High Visible Laser	Fires at switch position setting.
IR AIM HI / ILL*	High Visible Laser / Visible Illuminator	Fires at switch position setting.
IR AIM LO / ILL*	Low Visible Laser/ Visible Illuminator	Fires at switch position setting.
IR AIM LO**	Low Visible Laser	Fires at switch position setting.
VIS ILL	Visible Illuminator	Fires at switch position setting.
VIS AIM LO / ILL	Low Visible Laser / Visible Illuminator	Fires at switch position setting.
VIS AIM HI / ILL	High Visible Laser / Visible Illuminator	Fires at switch position setting.

3.2.h Visible Override Switch Port

CAUTION

DO NOT remove the Remote Paddle Switch by pulling on the cable. The DBAL-A4 Activation Mode Selector Switch must be turned to a laser setting to use the Paddle Switch. The unit will not operate if the rotary switches are not precisely aligned with the marked switch position.

The DBAL-A4 is equipped with two Remote Cable Ports.

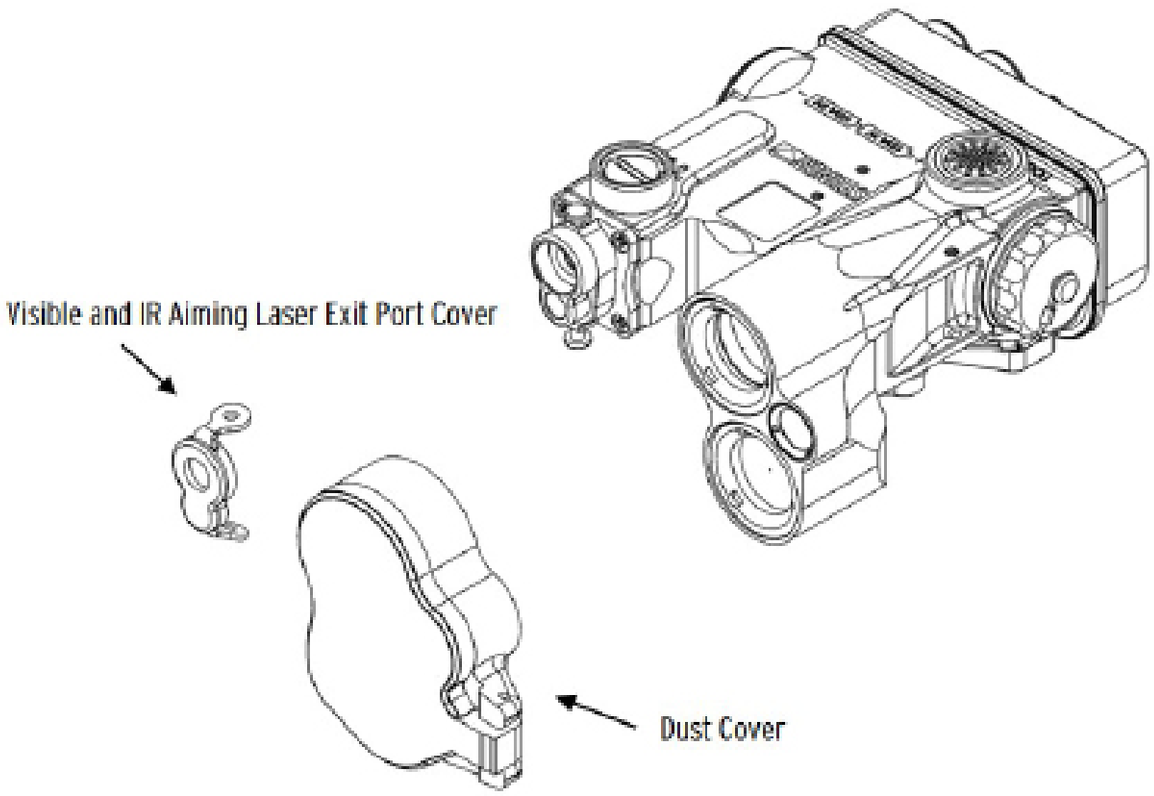
- The left hand port is the Visible Override Switch Port," marked "VO".
- The Visible Override Switch Port is used to override the Activation Mode Selector Switch setting and activate the visible laser pointer.
- If the Activation Mode Selector Switch is set to operate any of the infrared functions at a high-power setting, then the visible laser will be activated at its High setting.
- If the Activation Mode Selector Switch is set to operate any of the IR lasers at a low-power setting, then the visible laser will be activated at its Low setting.
- When a Remote Paddle Switch plugged into the Visible Override Port has been depressed twice in rapid succession, the visible laser will be activated in a constant ON mode for five minutes or until the Remote Paddle Switch is pressed once again to return the unit to momentary activation.

The right cable port is the Remote Fire Switch Port. It operates all standard lasers when the paddle switch is depressed.

3.2.i Exit Port Cover and Dust Cover

The DBAL-A4 is supplied with an Exit Port Cover and a Dust Cover. The Exit Port Cover and Dust Cover prevent energy emission when properly installed over the exit ports. The Exit Port Cover is held in place by the retention studs located above and below each exit window. Press fit the Dust Cover for a secure fit. Figure 3-2 illustrates the Exit Port Cover and Dust Cover.

Figure 3-2 Exit Port Cover Installation



3.2.j Windage and Elevation Adjusters

The DBAL-A4 is equipped with Windage and Elevation Adjusters for adjusting the visible and IR aiming lasers for elevation and windage (see Figure 3-3). Each Adjuster click will move the laser point by 1 cm at 25 meters.

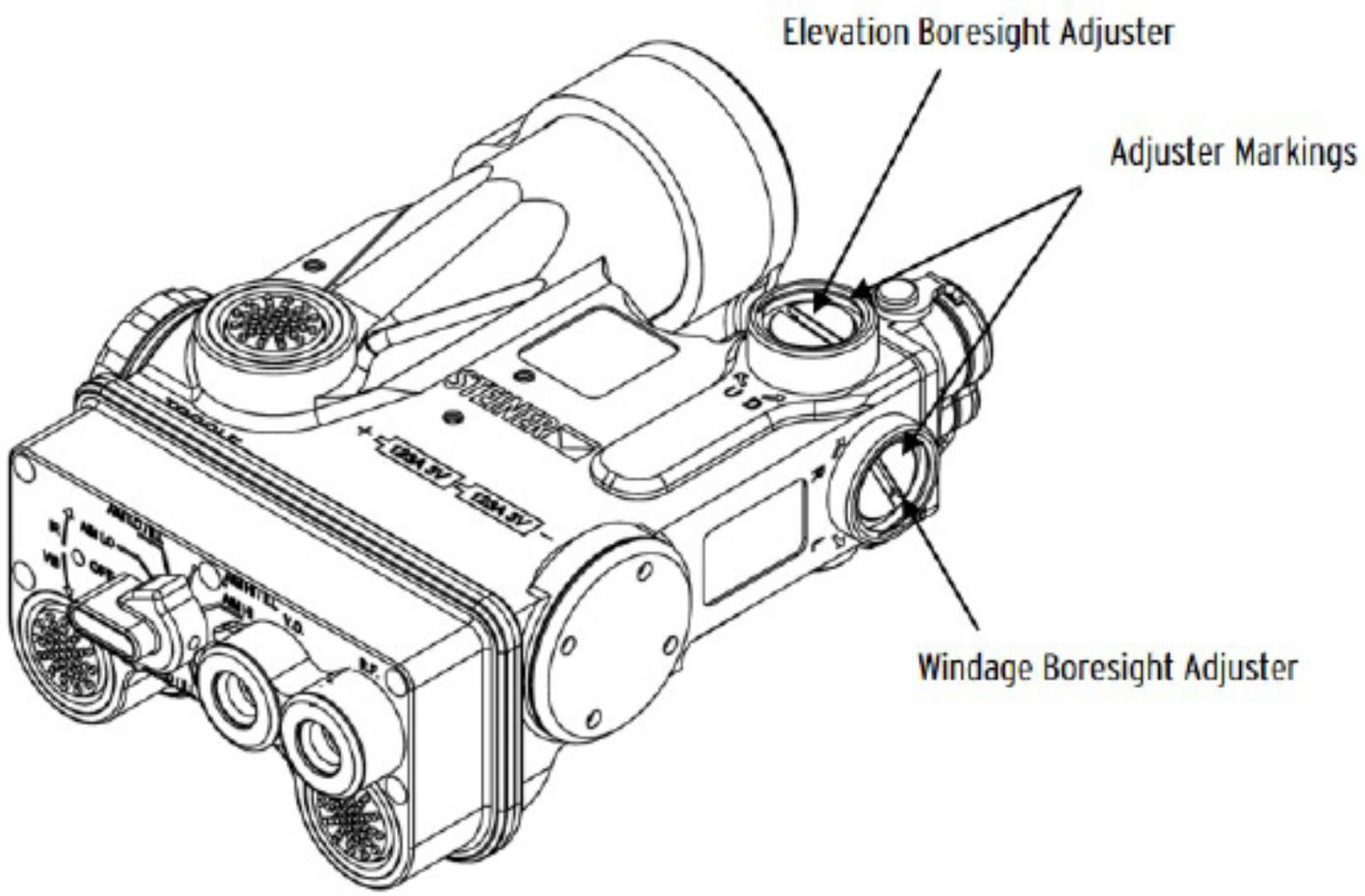
CAUTION

Do not force the Adjusters beyond their end of travel.

- The Adjuster may offer some resistance as you turn it in a CW direction from the factory neutral position. When the Adjuster is harder to turn, it has reached the maximum CW travel.
- When the Adjuster is at its maximum CW or CCW point of travel and turned in the opposite direction, the laser point may trace a small loop on the target. This is normal and does not indicate a failure condition.
- A positive load is required on the adjustment mechanism when boresighting the DBAL-A4 for purposes of retaining the set alignment. See 3.4 Moving Adjusters.
- The Adjuster knobs on the DBAL-A4 may vary slightly in the force required to turn the Adjusters. This is normal and does not indicate a failure condition.
- At the maximum CW or CCW travel, the DBAL-A4 lasers may not move a full 1 cm per click, or may jump squares on the target. If this happens the DBAL-A4 should be returned to its factory neutral preset as described in 3.5 Factory Neutral Preset.
- DBAL-A4 is for use on weapons where the MIL-STD-1913 rail is parallel with the bore of the weapon. In the factory neutral position, the visible and IR aiming lasers should project on the same side of the target as the laser is mounted and must fall within 10.2 cm of the bore at 25 meters. See 3.5 Factory Neutral Preset.

- The visible and IR aiming laser Adjuster Guards are marked with arrows and the letters U/D and R/L indicating the direction that the shot group will move if an adjuster is turned when the laser is mounted in the horizontal (top) position.
- The Adjusters will move the visible target designator/IR target designator approximately 10 inches or 25 cm in each direction from the factory neutral preset position at 25 meters. See 3.5 Factory Neutral Preset.
- The visible and IR aiming lasers are adjusted using the same Adjusters.
- Boresighting the visible aiming laser will align the IR aiming laser and vice versa. For optimum accuracy, always align the primary laser expected to be used on the mission.

Figure 3-3 Boresight Adjusters for Aiming and Illumination Beams



3.2.k Visible and IR Aiming Laser Adjustment

Table 3-4 indicates the direction of adjuster rotation and resulting shot group movement for boresighting the visible or IR aiming laser to the weapon when the DBAL-A^4 is side mounted.

Table 3-5 indicates the direction of adjuster rotation and resulting shot group movement for boresighting the visible or IR aiming laser to the weapon when the DBAL-A^4 is top mounted.

Table 3-4 Adjuster Rotation and Shot Group Movement for the Visible Target Designator and IR Target Designator (Side Mounted)

Boresighting the Aiming Lasers	Adjuster Movement	Shot Group Movement
Side Adjuster Elevation (guard marked U/D)	CW	Up
	CCW	Down
Top Adjuster Windage (guard marked R/L)	CW	Left
	CCW	Right

Always adjust in a CW direction. Pass and Come Back Adjustment (also called Positive Load): When adjusting in a CCW direction, turn the Adjuster an additional 1/4" turn (8 clicks) CCW, then make the final boresighting adjustments by turning the adjusters in a CW direction. Pass and Come Back not required when making a CW adjustment.

The Pass and Come Back adjustment process is the controlled compression of the spring within the adjuster mechanism to ensure that the highest level of accuracy is maintained after the weapon is boresighted.

Table 3-5 Adjuster Rotation and Shot Group Movement for the Visible Target Designator and IR Target Designator (Top Mounted)

Boresighting the Aiming Lasers	Adjuster Movement	Shot Group Movement
Side Adjuster Elevation (guard marked R/L)	CW	Left
	CCW	Right
Top Adjuster Windage (guard marked U/D)	CW	Up
	CCW	Down

Always adjust in a CW direction.

Pass and Come Back Adjustment: When adjusting in a CCW direction, turn the Adjuster an additional 1/4" turn (8 clicks) CCW, then make the final boresighting adjustments by turning the adjusters in a CW direction. Pass and Come Back not required when making a CW adjustment.

The Pass and Come Back adjustment process is the controlled compression of the spring within the adjuster mechanism to ensure that the highest level of accuracy is maintained after the weapon is boresighted.

3.2.I Submersion

Take the following precautions prior to submersing the DBAL-A[4]:

1. Remove the battery cap.
2. Gently remove the O-ring. Be careful not to stretch the O-ring.
3. Check the O-ring for hair, sand, lint or other debris. Wipe clean as necessary. If the O-ring is cut or cracked it must be removed and replaced with a new O-ring.
4. If replacing the O-ring, visually inspect the groove in the battery compartment for debris. Wipe clean as necessary.
5. Tighten down the battery cap.

CHAPTER 3: Section 2, Mounting Procedures

3.3 Mounting Procedures

WARNING
Be sure the weapon is CLEAR and on SAFE before proceeding.

CAUTION
The mount's clamp rides on two pins. These pins are NOT adjusters. DO NOT attempt to tighten/loosen the pins.

Notes:
- The DBAL-A^4 may be placed at any position (forward and aft) on the rail that is convenient for the user.
- If the DBAL-A^4 is removed from the rail, note of the position at which it was boresighted, and return it to the same position to ensure that position is retained.
- Tests have shown that accuracy is best when the DBAL-A^4 is mounted on the forward rails.

Failure to properly secure the Quick Release Mount will cause zero retention problems. Ensure that the base of the Quick Release Mount is fully seated on the MIL-STD-1913 rail with NO front or rear overhang.

DBAL-A^4 is for use on weapons where the MIL-STD-1913 rail is parallel with the bore of the weapon. In the factory neutral position, the visible and IR aiming lasers should project on the same side of the target as the laser is mounted and must fall within 10.2 cm of the bore at 25 meters.

An integrated Quick Release Mount is used to attach the DBAL-A^4 to weapons equipped with a MIL-STD-1913 rail. Place the device far enough back on the rail to allow for battery replacement without removal from the weapon. If removed, the DBAL-A^4 must be returned to the same position on the rail.

The DBAL-A^4 may be mounted on the TOP, LEFT, or RIGHT rail using the Quick Release Mount (see Figure 3-4).

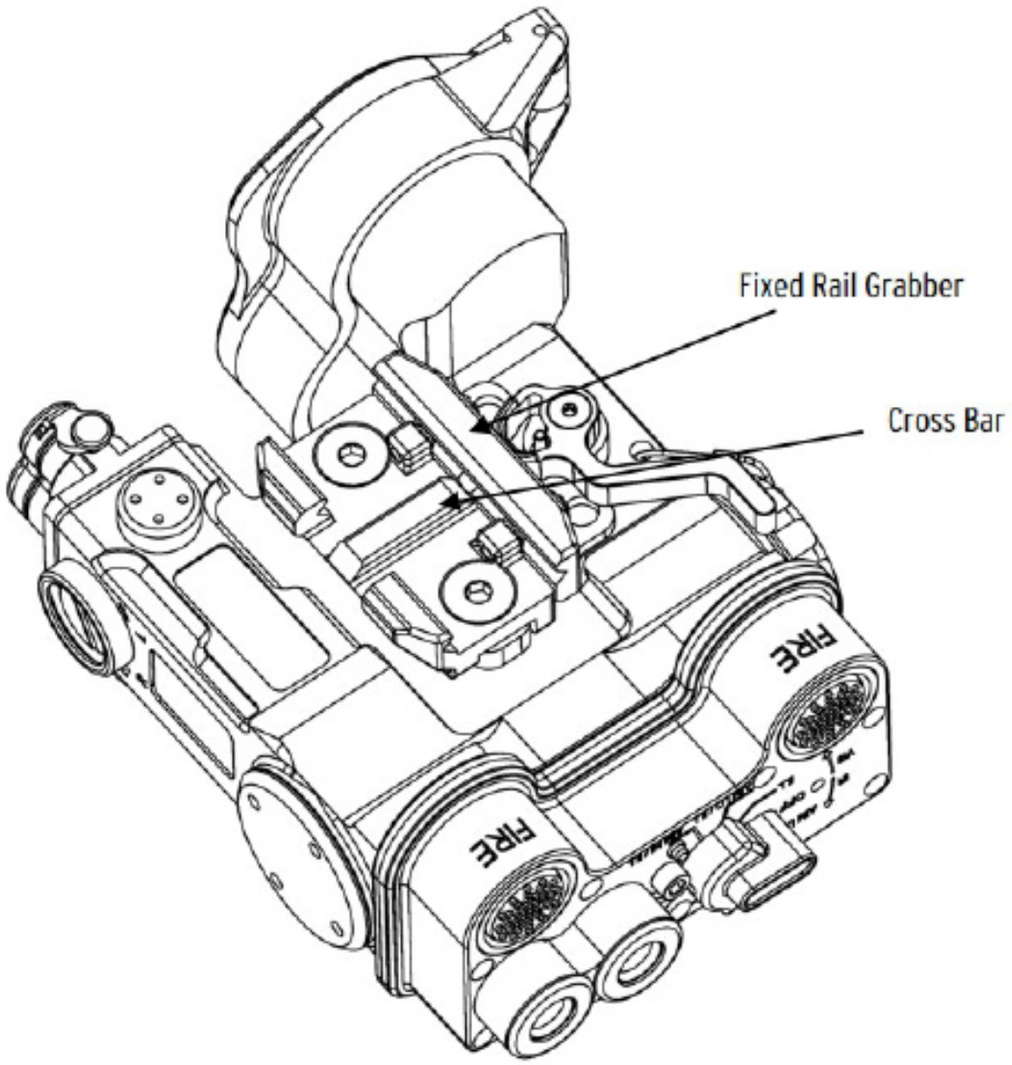
Rail Mount Configuration

Place the fixed rail grabber against the side of the MIL-STD-1913 rail and align the crossbar on the bottom with a slot on the rail.

Push forward on the DBAL-A^4 so that the crossbar contacts the front of the slot on the MIL-STD-1913 rail. Close the Quick Release Lever arm so that it is parallel with the body of the laser housing.

Install the Remote Paddle Switch in a convenient location.

Figure 3-4 Rail Mount Configuration



CHAPTER 3: Section 3, Boresighting Procedures

WARNING
Be sure the weapon is CLEAR and on SAFE before boresighting.

This section provides boresighting instructions using the MBS-1WE Laser Borelight System (LBS) or on a 25-meter range.

3.4 Moving Adjusters

CAUTION
DO NOT over-adjust the adjusters by forcing them beyond their end of travel.

Note: ALWAYS Boresight the DBAL-A^4 starting with the Adjuster marked U/D.

When moving the Adjusters, make sure that the adjustment mechanism has engaged a detent and has not stopped between detents. Failure to properly engage a detent may affect accuracy as the laser may move when the weapon is fired.

Pass and Come Back is required anytime an adjustment to visible target designator/IR target designator is made in a CCW direction. Pass and Come Back not required when making a CW adjustment. The Pass and Come Back adjustment process is the controlled compression of the spring within the adjuster mechanism to ensure that the highest level of accuracy is maintained after the weapon is boresighted.

When adjusting in a CCW direction, Pass and Come Back to the Adjuster by turning an additional 1/4" turn (8 clicks) CCW, then make the final boresight adjustment by turning the Adjuster CW. For example, to move the Adjuster one click CCW, turn the adjuster CCW 8 clicks and then turn it CW 7 clicks to the new position.

3.5 Factory Neutral Preset

CAUTION
DO NOT over-adjust the Adjusters by forcing them beyond their end of travel.

Note: ALWAYS boresight the DBAL-A^4 starting with the Adjuster marked U/D.

When moving the Adjusters, make sure that the adjustment mechanism had engaged a detent and has not stopped between detents. Failure to properly engage a detent may adversely affect accuracy as the laser may move to the next detent when the weapon is fired.

The Adjuster may offer some resistance as you turn it in a CW direction from the factory neutral position. When the Adjuster is harder to turn it has reached the maximum CW travel.

The DBAL-A^4 is preset at the factory to a neutral position. In the neutral position, the laser beam is parallel to the bore of the weapon. The visible and IR aiming lasers may be returned to the factory alignment (neutral position) using the following procedure:

1. Turn the Adjuster marked **U/D** CW to the natural stop.
2. Turn it CCW one and one-quarter (1 1/4") turn.
3. Turn it CW until the white dot on the Adjuster aligns with the white dot on the Adjuster Guard.
4. Turn the Adjuster marked **R/L** CW to the natural stop.
5. Turn it CCW one and one-quarter (1 1/4") turn.
6. Turn it CW until the white dot on the Adjuster aligns with the white dot on the Adjuster Guard.

Table 3-4 Factory Neutral Preset

Adjuster	Instruction
Adjuster Guard marked U/D for the visible target designator and IR target designator	1. Turn CW to end of travel. DO NOT force past mechanical stop. 2. Turn CCW 1 1/4" turn. 3. Turn CW to align the dot on the Adjuster with the dot on the Adjuster Guard.
Adjuster Guard marked R/L for the visible target designator and IR target designator	

3.6 Boresight Using the Laser Borelight System (LBS)

WARNING
NEVER boresight in the High Power mode of operation.

CAUTION
DO NOT over-adjust the adjusters by forcing them beyond their end of travel.

Note: The mission will dictate which aiming laser will be boresighted to achieve maximum accuracy.

- Always move the Adjusters slowly, one click at a time, to prevent the Adjuster from jumping detents.
- In extremely cold temperatures, the Adjusters may become difficult to adjust.
- The Adjuster may offer some resistance as you turn it in a CW direction from the factory neutral position. When the Adjuster is harder to turn, it has reach the maximum CW travel.
- When the Adjuster is at its maximum CW or CCW point of travel and is turned in the opposite direction, the laser point may trace a small loop on the target. This is normal and does not indicate a failure condition.

Note: The Adjusters on the DBAL-A^4 may vary slightly in the force required to turn the Adjusters. This is normal and does not indicate a failure condition.

- At the maximum CW or CCW travel, the DBAL-A^4 lasers may not move a full 1 cm per click, or may jump squares on the target. If this happens, the DBAL-A^4 should be returned to its factory neutral preset as described in 3.5 Factory Neutral Preset.

3.6.a Boresighting on a 10 Meter Range

DBAL-A^4 is for use on weapons where the MIL-STD-1913 rail is parallel with the bore of the weapon. In the factory neutral position, the visible and IR aiming lasers should project on the same side of the target as the laser is mounted and must fall within 10.2 cm of the bore at 10 meters. See 3.5 Factory Neutral Preset.

This procedure is used to boresight the DBAL-A^4 on its weapon for a distance of 300, 400, or 500 meters using the MBS-1WE Laser Borelight System (LBS). Boresight Targets may be locally manufactured using the offsets found in Table 3-6.

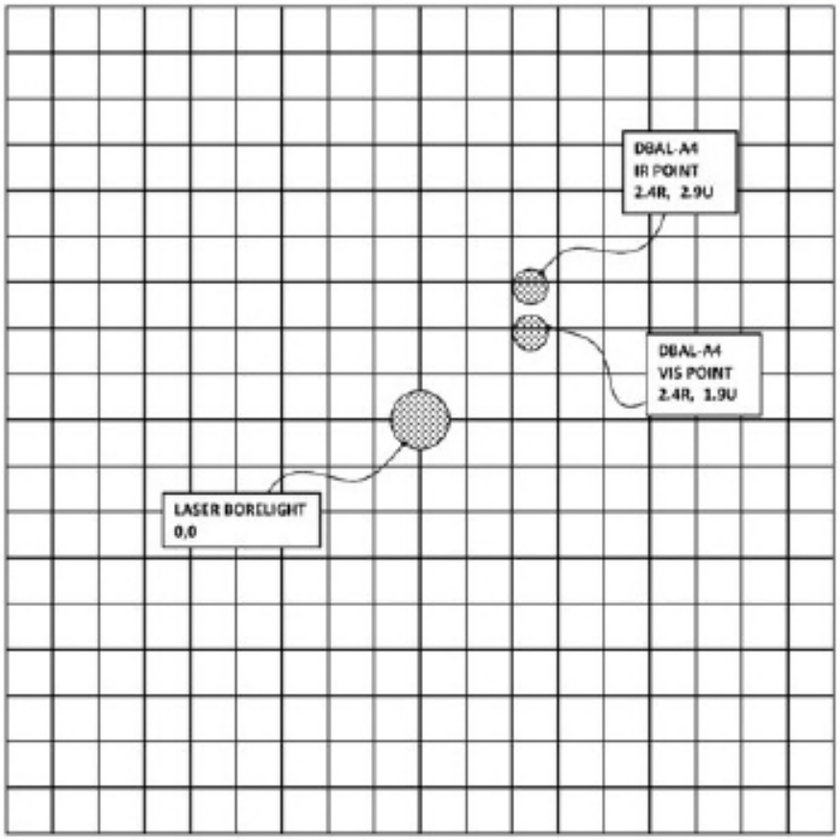
See Figure 3-5 for a sample 10 Meter Offset Target. Refer to the LBS Technical Manual for instructions on creating boresight targets. Each adjuster click moves the strike point 4 mm on the 10 meter boresight offset target.

3.6.a Boresighting on a 10 Meter Range, continued

1. Create the 10 Meter Boresight Target for the DBAL-A4 weapon combination for which boresighting is required.
2. Position the target at 10 meters oriented in a level, vertical position. Proper positioning of the target is critical for accurate boresighting results.
3. Stabilize the weapon so it does not move and insert the LBS Mandrel Interface assembly into the muzzle of the weapon.
4. Rotate the Activation Mode Selector Switch to the VIS AIM LO/ILL position and verify that the LBS is properly aligned. Refer to LBS Technical Manual for boresighting procedures.
5. Adjust the target as required to place the laser dot on the target location marked "Laser Borelight."
6. Activate the aiming laser to be boresighted by rotating the Activation Mode Selector Switch.
7. Rotate the Activation Mode Selector Switch to the VIS AIM LO/ILL position.
8. Press the toggle button to turn off the illuminator.
9. Adjust the Aiming Laser Windage and Elevation Adjusters until the point is centered on the corresponding offset location. The DBAL-A4 weapon combination is now boresighted.
10. Rotate the DBAL-A4 Activation Mode Selector Switch to OFF and remove the Borelight Mandrel Interface assembly from the weapon.

Figure 3-5 Sample 10m Boresight Target

10 m Boresight Target - DBAL-A4 Mounted on M4/M16A4 Top Rail



Zero Target Data for M4/M16A4

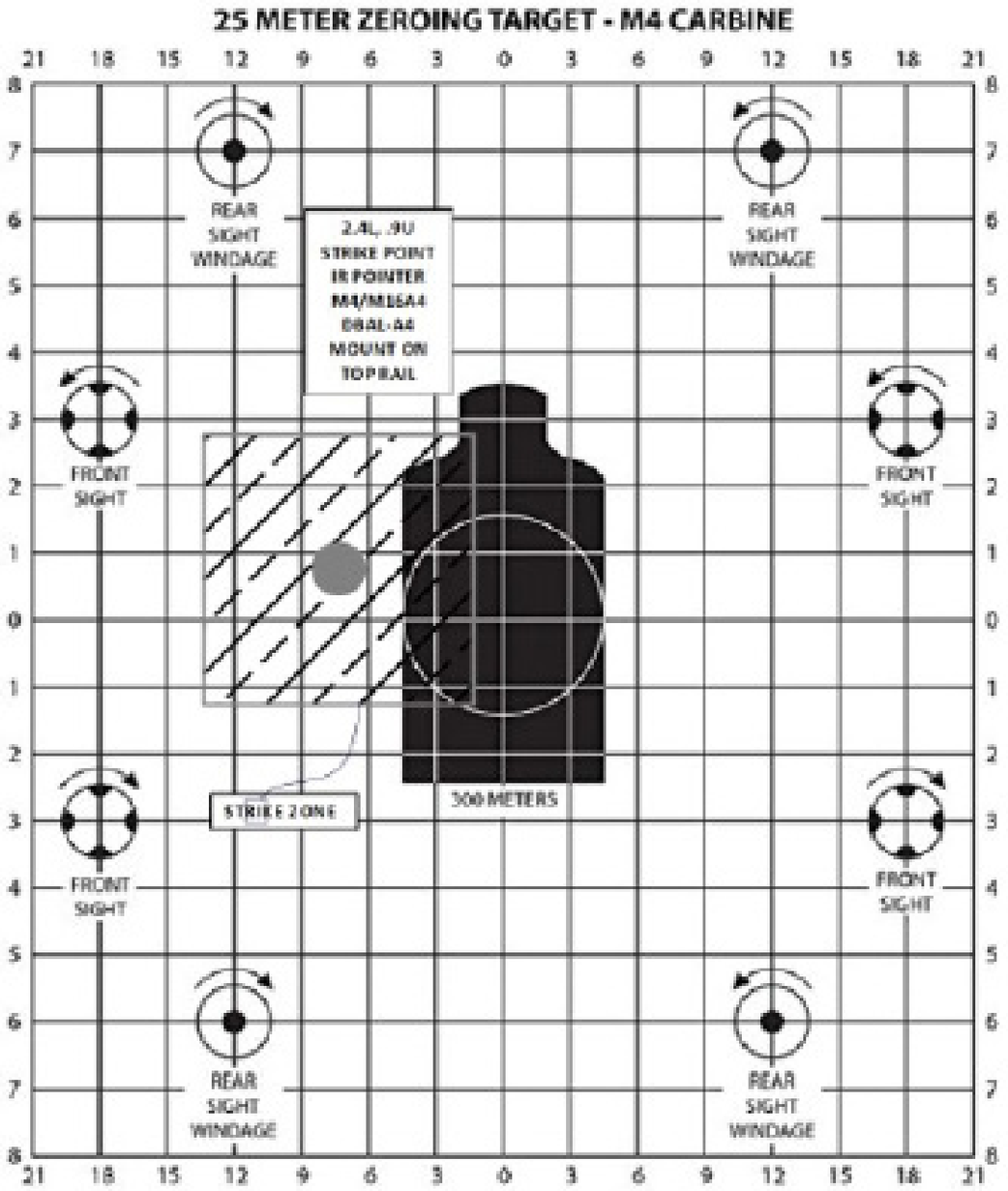
1. Stabilize Weapon
2. Align Laser Borelight on its dot.
3. Adjust the DBAL-A4 until aiming laser is centered on the dot-cross hair.
4. Apply a positive load to the adjusters.

3.6.b Boresighting on a 25 Meter Range

This procedure is used to boresight the DBAL-A4. Each Adjuster click moves the strike point by 1 cm on the M16A2/M16A4 25 meter boresighting target.

1. On a 25-meter boresighting target, mark the designated strike point and designated 4 cm / 6 cm strike zone based on the weapon you are using (see Figure 3-6).
2. Mount the target on an "E" silhouette or other suitable surface at 25m.
3. Set the Adjusters to their factory neutral position as described in 3.5 Factory Neutral Preset.
4. Activate the aiming laser (visible target designator or IR target designator) to be boresighted by rotating the Activation Mode Selector Switch to the desired position.
5. Press the Integrated Momentary Activation Switch or the Remote Paddle Switch twice in rapid succession to activate the laser continuously. When aligning the IR target designator, leave the IR/ILLUM Exit Port Cover in place. Aim center mass of the target until the aiming laser disappears through the 4 cm cut out.
6. Fire a 3-round shot group and note the center of the shot group relative to the designated strike zone.
7. Adjust the aiming beam Adjusters to move the center of the shot group to the designated strike zone.
8. Repeat Steps 5 and 6 until the shot group falls within the strike zone. When firing the M16, M4 series or M240 series of weapons, when five out of six consecutive rounds are in the designated 4 cm strike zone it is sighted. When firing the M249 series of weapons, when five out of 12 non-consecutive rounds are within a 6 cm square, the weapon is sighted.
9. Rotate the DBAL-A4 Activation Mode Selector Switch to OFF.

Figure 3-6 25m Boresight Target



CHAPTER 4: User Preventive Maintenance Checks

4.1 General

Table 4-1 Preventive Maintenance Checks, has been provided so that you may keep your equipment in good operating condition.

Note: Perform functional tests in the order listed in Table 4-1. Operating Procedures are detailed in Chapter 3, Section 1, Operating Instructions.

Functional testing of the DBAL-A^4 to ensure proper operation should be performed in a dark room or area away from light. Viewing of IR beams must be performed with an NVD.

4.1.a Warnings and Cautions

Always observe the WARNINGS and CAUTIONS appearing in the table.

Table 4-1 Explanation of Table Entries

Column	Explanation
Item Number	Numbers in this column are for reference. Item numbers also appear in the order that you must perform the checks and services listed.
Interval	This column tells you when you must do the procedure in the procedure column. BEFORE (B) PROCEDURES must be done before you operate or use the equipment. DURING (D) PROCEDURES must be done during the time you are operating or using the equipment. AFTER (A) PROCEDURES must be done immediately after you have operated or used the equipment.
Location Item to Check/Service	This column provides the location and the item to be checked or serviced.

Table 4-1 Explanation of Table Entries, continued

Column	Explanation
Procedure	This column provides the procedures you must perform.
Not Fully Mission Capable If	Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission.

Table 4 -2 Preventive Maintenance Checks

Item No.	Interval	Location of Item to Check/Service	Procedure	Not Fully Mission Capable If
1	B/D/A	Exterior	Check housing for separation between the front and the rear section of the housing, missing screws, switch knobs, and windage and elevation adjuster covers.	A gap appears between the front and the rear section of the housing, missing switch knobs, or adjuster covers.
WARNING: DO NOT STARE DIRECTLY INTO VISIBLE OR IR LIGHT BEAMS				
2	B/A	Exit Port Cover and Dust Cover	• Check for broken or missing covers, Exit Port Cover retention studs. • Move the Exit Port Covers to the open position. • Close Exit Port Cover and Dust Cover and press into place. • Activate visible laser and visibly check to make sure no light is being emitted from around the covers.	Not Applicable (N/A)

Table 4-2 Preventive Maintenance Checks, continued

Item No.	Interval	Location of Item to Check/Service	Procedure	Not Fully Mission Capable If
3	B/A	Exit Port Windows	Check for dirty, cracked, or broken windows.	If window is cracked or missing.
4	B/A	Adjusters	Check for broken, missing or stripped Adjusters.	Adjusters broken, missing, or stripped or laser fails to move.
5	B/D/A	Quick Release Mount	Check attachment to housing, broken, missing parts. Inspect rail clamp, crossbar, and mount base for dirt and corrosion. If laser is loose on the rail: • Move to a different position on the rail. • Move to a different rail on weapon. • Replace the rail on weapon.	Quick Release Mount loose, missing parts or broken.
6	B/D/A	Blue Safety Screw	Check if broken or missing	Broken or missing
7	B/D/A	Remote Cable Port	Check for mud or dirt and clean as needed.	N/A
8	B/A	Battery Compartment	Check for corrosion, presence of O-ring, spring, battery cap lanyard. Inspect threads for dirt or damage.	Contacts are corroded or broken.

Table 4-2 Preventive Maintenance Checks, continued

Item No.	Interval	Location of Item to Check/Service	Procedure	Not Fully Mission Capable If
9	B/A	Battery Compartment O-ring	Check O-ring for cuts, cracks. Lubricate as needed.	Cracked or cut; may cause leakage into unit.
10	A	Batteries	Remove batteries.	No, low or corroded battery.
11	B/A	Activation Mode Selector Switch and FIRE Buttons	Select Visible AIM LO using the Activation Mode Selector Switch. Press FIRE and observe the beam spot on wall. Repeat for each laser activation position.	Activation Mode Selector Switch inoperative with the visible aiming laser, IR aiming laser, IR illuminators, or visible illuminator.
12	B	Boresight Alignment	Confirm that the IR or visible aiming laser to be used on the mission is boresighted on the weapon on which it will be mounted. Check to make sure that the visible and IR aiming lasers project on the same side of the target as the laser is mounted and fall within 10.2 cm of the bore at 25 meters.	Cannot be boresighted to weapon.
13	B/D/A	LED Status Indicator	Observe green LED is lit and does not flash when lasing.	Indicator is flashing designating low battery.

CHAPTER 5: Section 1, Troubleshooting

5.1 General

The purpose of troubleshooting is to systematically search and identify the source of a problem. The most frequent equipment malfunctions, probable causes and corrective actions for the DBAL-A^4 are listed in Table 5-1. Perform the tests, inspections and corrective actions in the order they are listed. This manual does not list all malfunctions, tests, inspections, or corrective actions that may occur. The DBAL-A^4 will not operate if the Activation Mode Selector Switch is not precisely aligned.

Table 5-1 Troubleshooting

Item No.	Malfunction	Test/Inspection	Corrective Action	Ref. Para.
1	Target aiming laser beams fail to turn on or stay on	Ensure FIRE Button is depressed on and Activation Mode Selector Switch is in proper position.	Properly align switch.	3.2.b
		Verify Exit Port Cover is removed and that the Exit Port Window is not obscured by mud/dirt.	Remove Exit Port Covers and clean window as needed.	3.2.i
		Verify battery installation.	Install new batteries. Tighten battery cap.	3.2.a
		Inspect battery cap for damage or corrosion.	Contact Steiner Optics.	5.8
		Inspect battery contact spring in the battery compartment and the battery cap for damage or corrosion.	Contact Steiner Optics.	5.8

Table 5-1 Troubleshooting, continued

Item No.	Malfunction	Test/Inspection	Corrective Action	Ref. Para.
2	Target aiming laser beams have become weak (not as bright).	Verify Exit Port Cover is removed and that the Exit Port Window is not obscured by mud/dirt.	Remove Exit Port Cover. Clean aiming laser Exit Port Windows.	3.2.i
		Verify Exit Port Windows are not scratched or pitted.	Contact Steiner Optics.	5.8
		Verify battery installation.	Install new battery. Tighten battery cap.	3.2.a
3	Low Battery Indicator Light remains on when new battery is installed.	Inspect battery compartment for corrosion.	Clean battery compartment.	3.2.a
		Inspect Battery Cap contact for corrosion.	Clean battery cap.	3.2.a
		Inspect battery cap and housing threads for contamination.	Clean battery cap and housing threads.	3.2.a
4	Target aiming laser beams do NOT move	Verify adjuster function.	Clean as required.	N/A

Table 5-1 Troubleshooting, continued

Item No.	Malfunction	Test/Inspection	Corrective Action	Ref. Para.
5	Remote Paddle Switch inoperable, but FIRE Buttons function	Verify Remote Paddle Switch plug is fully seated.	Reconnect plug.	3.2.g
		Verify Remote Cable Port is free of mud/dirt.	Flush with water.	3.2.g
		Inspect Remote Cable Plug contacts.	Clean as needed.	3.2.g
		Verify function of Remote Paddle Switch.	Contact Steiner Optics.	5.8
6	Target aiming laser beam may not be boresighted to weapon	Verify Quick Release Mount is properly positioned/ secured to weapon.	Re-mount and properly position and secure.	3.3
		Laser is loose on rail.	Move laser to different position on rail or move to different rail on weapon or replace rail on weapon.	3.3
		Inspect mount base for corrosion or dirt.	Clean as required.	5.2
		Verify device is properly secured to Quick Release Mount.	Contact Steiner Optics.	5.8
		Verify Quick Release Mount is not damaged.	Contact Steiner Optics.	5.8

CHAPTER 5: Section 2, Maintenance

Figure 5-1 DBAL-A^4 Major Parts

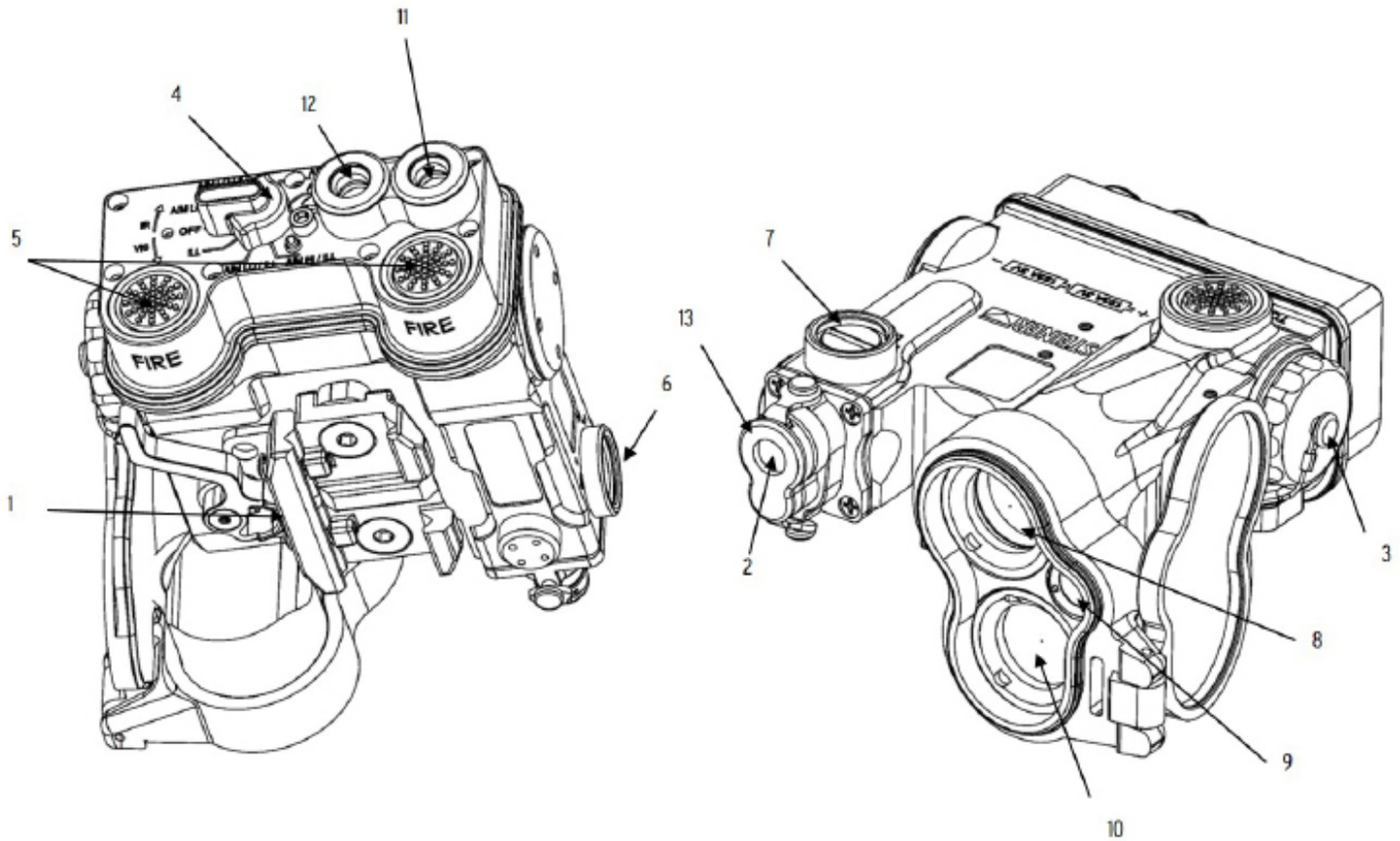


Table 5-2, Major Parts

Item	Description
1	MIL-STD (Picatinny) and STANAG-4694 Rails
2	Dual Laser Exit Port Window
3	Battery Compartment Cap
4	Activation Mode Selector Switch
5	FIRE Buttons
6	Windage Boresight Adjuster
7	Elevation Boresight Adjuster
8	Spot IR Illuminator Exit Port
9	Flood IR Illuminator Exit Port
10	White Light Exit Port
11	Remote FIRE Switch Port
12	Visible Override Switch Port
13	Aiming Laser Exit Port Cover
14	Toggle Button

5.2 Cleaning, Repair and Care

CAUTION

The use of gun cleaning agents that contain perchloroethylene or methylene chloride may permanently damage the DBAL-A^4 system.

The DBAL-A^4 is a rugged, compact laser device that is designed to operate in severe environments. The exterior housing is made of aircraft grade aluminum and the outer components are made of chemically resistant materials that will not be harmed by chemicals normally encountered during military operations. Operator maintenance is limited to the inspection and cleaning of the DBAL-A^4 external surfaces, replacement of the battery before each mission and removal of the battery after each mission.

5.2.a External Cleaning

Clean the exterior of the DBAL-A^4 by flushing with water and wiping with a clean, soft cloth. Cleaning should be done whenever the DBAL-A^4 becomes dirty or after exposure to salt water.

5.2.b Cleaning Mounting Hardware

Open quick disconnect rail mount lever fully. Use a moistened cloth or cotton swab to clean.

5.2.c Cleaning Exit Port Windows

To clean the POINT and ILLUM Exit Port Windows, wipe clean using a soft cloth or disposable applicator dampened with water.

5.2.d Care of Exit Port Covers

To remove or install the Exit Port Cover, stretch rubber strap loops on/off retention studs on exit port window housing. Clean studs with moistened cloth or cotton swab.

5.2.e Cleaning Battery Compartment

Before each use, inspect the battery and battery compartment and housing threads for dirt, dust, or corrosion. If dirty, clean using a soft cloth or disposable applicator.

5.3.f Care of Battery Compartment Gasket

Note: Never use a sharp or metal object to remove O-rings as they damage the O-ring or the O-ring groove contact surface.

Before each use:

1. Turn battery cap counterclockwise until it becomes disengaged from the housing.
2. Inspect the battery compartment O-ring for nicks, cuts or damage.
3. Gently remove the O-ring. Be careful not to stretch the O-ring.
4. Check the O-ring for hair, sand, lint or other debris. Wipe clean as necessary. If the O-ring is cut or cracked it must be removed and replaced with a new O-ring.
5. With clean hands, lubricate the O-ring as needed using silicone grease until there is a thin film covering the complete surface. DO NOT stretch the O-ring.
6. Before replacing the O-ring, visually inspect the groove in the battery compartment for debris. Wipe clean as necessary.
7. Install the O-ring in the groove at the base of the battery compartment cap making sure that it is seating uniformly, with no twists or loose areas.

5.3.g Care of Battery Cap

Before each use, inspect the battery cap for dirt, dust or corrosion. If dirty, clean using a soft cloth or disposable applicator. Prior to water operations or immersion, inspect the O-ring seals in the battery cap to make sure they are free of sand or dirt particles. If the O-ring becomes cut, nicked or dried out, it should be replaced. If the battery cap is bent or scratched in the O-ring seating area, it should be replaced.

5.3.h Cleaning Remote Cable Port

Before each use, inspect the Remote Cable Port for dirt, dust, or corrosion. Thoroughly clean the receptacle by flushing with water, then wipe with a soft cloth or disposable applicator.

5.3.i Care of Blue Safety Screw

WARNING

In order to make the DBAL-A^4 operate in the High Power modes of operation the Blue Safety Screw must be removed from the back of the unit.

DO NOT over tighten the Blue Safety Screw as it may strip the threads in the housing. The Armorer will remove (and install) using a 3/32" hex key and store the Blue Safety Screw

CHAPTER 5: Section 3, Service / Packing and Unpacking

5.4 Warranty Information

If you require warranty or repair information on this product, refer to www.steiner-optics.com.

5.5 Non-Warranty Information

Non-warranty repairs are subject to an evaluation fee. DBAL-A^4 devices that are not covered by the warranty will be tested and evaluated for failure. Customer permission and payment terms will be obtained prior to performing any repairs.

5.6 Return Instructions

5.6.a For service, repair or replacement, please call (888) 228-7747 or email info@steiner-optics.com and ask to speak with a Service Representative (SR).

5.6.b To assist the SR with determining if the item is repairable, please provide the following information:

1. Serial Number of the defective item
2. Thorough description of the malfunction, defect or damage
3. An explanation as to how the malfunction, defect or damage occurred, if known.

If the SR determines that the item is under warranty or should be returned for repair, a Return Material Authorization (RMA) number will be provided.

5.6.c When returning the DBAL-A^4 for service or repair, the following procedures should be followed to prevent any additional damage:

1. Be sure that the DBAL-A^4 is free of all contaminants such as dirt or any other foreign material.
2. Remove the batteries.
3. Place the Exit Port Cover and Dust Cover over the appropriate windows.
4. Place the DBAL-A^4 in the Shipping Case or Carrying Case if available. If the Shipping Case is not available, individually package each DBAL-A^4 device being returned in a suitable container.

5.6.d Place the DBAL-A^4 and a copy of the test report or detailed description of the failure in a suitable packing/shipping container. Mark the package with the RMA number. Ship the fastest, traceable, prepaid means to Steiner Optics, Inc.

APPENDIX A: Repair Parts

Figure B-1 Repair Parts

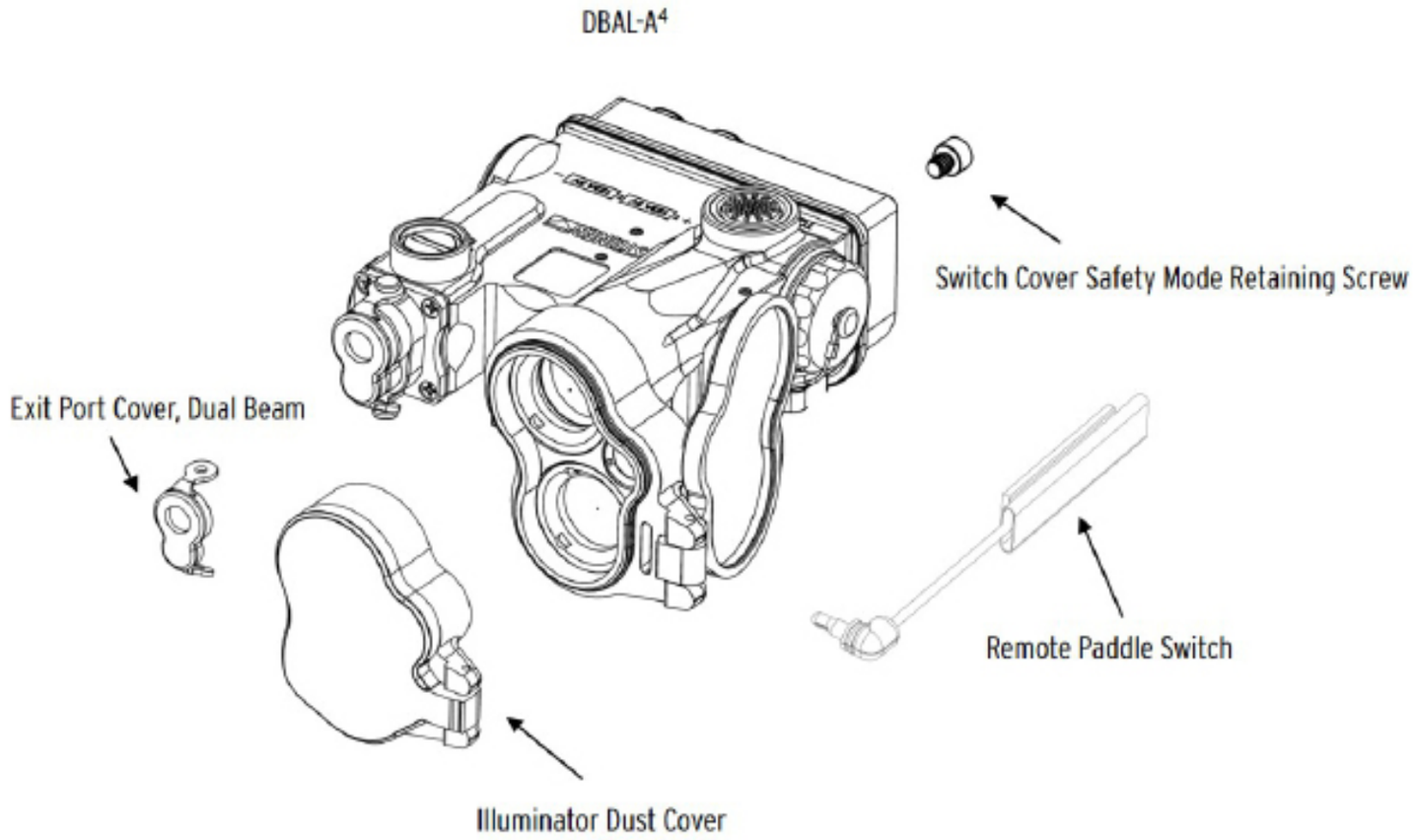


Table B-1 Repair Parts List

Item No.	Description	Quantity
1	DBAL-A[4]	1
2	Remote Paddle Switch, 7", Straight	2
3	Loop Tape (not shown)	1
4	Exit Port Cover, Dual Beam	1
5	Switch Cover Safety Mode Retaining Screw	1
6	Activation Mode Selector Switch (not shown)	1
7	Illuminator Dust Cover	1

STEINER

Nothing Escapes You

Steiner Optics, Inc.
331 East 8th St.
Greeley, CO 80631
Tel: (888) 228-7747
steiner-optics.com