MRD-TM-ITI

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OPERATOR MANUAL

FOR THE

Miniature Red Dot Sight

(MRDS)

Rev. 3

2 March 2011

SAFETY SUMMARY

1. GENERAL SAFETY INSTRUCTIONS

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.

2. WARNINGS, CAUTIONS AND NOTES

Safety headings used in this manual and their respective definitions are as follows:

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.

3. SAFETY PRECAUTIONS

The following general safety precautions supplement the specific WARNINGs, CAUTIONs and NOTEs that appear elsewhere in this manual.

3.1 Weapons Safety. The Miniature Red Dot Sight (MRDS) is designed to be used with destructive weapon systems. Improper operation or misuse of the MRDS 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.

CAUTION

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

3.2 Batteries. The MRDS is powered by one lithium CR1632 battery. The following safety precautions apply when handling lithium batteries:

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

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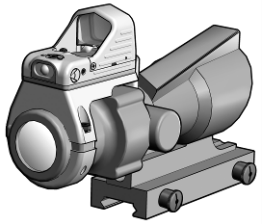

Figure 1-1 MRDS Mounted to ACOG®

1.1 SCOPE

This manual is intended for use by operators of the Miniature Red Dot Sight (MRDS). 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 MRDS.

1.2 MODEL NUMBER AND EQUIPMENT NAME
This manual applies to the following MRDS models:

MRD-002-A1, Miniature Red Dot Sight (MRDS), Black Housing, 3.5 MOA Red Dot
MRD-002-A2, Miniature Red Dot Sight (MRDS), Tan Housing, 3.5 MOA Red Dot
MRD-002-A3, Miniature Red Dot Sight (MRDS), Black Housing, 7.0 MOA Red Dot
MRD-002-A4, Miniature Red Dot Sight (MRDS), Tan Housing, 7.0 MOA Red Dot

Because this manual applies to several different MRDS models, pictures contained herein may not be representative of the exact model purchased or issued.

1.3 MANUFACTURER

L-3 Insight Technology Incorporated
9 Akira Way
Londonderry, NH 03053 USA

1.4 PURPOSE OF EQUIPMENT
The MRDS is a passive, red dot, reflex weapon sight designed for rapid target acquisition at ranges of less than 150 meters.

1.5 ABBREVIATIONS AND ACRONYMS

Abbreviations and acronyms used in this manual are listed as follows:

ACOG®	Advanced Combat Optical Gunsight
C	Celsius
F	Fahrenheit
m	Meter
mm	Millimeter
MOA	Minutes of Angle
mrad	Milliradians
MRDS	Miniature Red Dot Sight
NSN	National Stock Number
RMA	Return Material Authorization
TBD	To Be Determined
V	Volt

SECTION II
EQUIPMENT DESCRIPTION

1.6 SYSTEM DESCRIPTION

The MRDS is a passive, red dot, reflex weapon sight designed for rapid target acquisition at ranges of less than 150 meters. It may be used as a stand-alone primary sight or as a secondary sight when mounted on top of other optical sighting devices.

The MRDS utilizes a red aiming dot that can be automatically or manually adjusted in brightness to accommodate changes in ambient lighting conditions.

The MRDS attaches directly to a DOCTER® sight mount, which in turn allows it to be hosted on a wide variety of optical sighting devices and weapons.

The MRDS is a ruggedized device designed for operation in battlefield environments.

1.7 TECHNICAL SPECIFICATIONS

Table 1-1 provides technical specifications for the MRDS.

Table 1-1 Technical Specifications

WEIGHT AND DIMENSIONS	
Weight (with battery and DOCTER® sight mount interface)	0.9 ounces
Length	1.9 inches
Width	1.1 inches
Height	1.2 inches
POWER AND PERFORMANCE	
Power Source	1 3V CR1632 battery
Battery Operating Life	1 year continuous operation in photodiode mode
Field of View	12.5° horizontal at 4” eye relief
Magnification	1x
Operating Temperatures	-40°F (-40°C) to 120°F (49°C)
Storage Temperatures	-71°F (-57°C) to 160°F (71°C)
Immersion	66 feet for 2 hours

1.8 MAJOR COMPONENTS

The MRDS is available in several variants with a wide array of accessory items. Figure 1-2 and shows components and parts for the entire family of MRDS configurations. Therefore, some of the items shown may not be applicable to your specific configuration. 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.

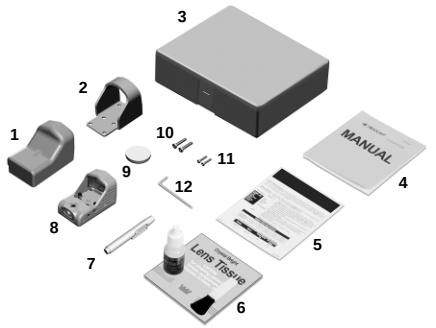

Figure 1-2 MRDS Major Components

Table 1-2 List of Major Components

Key	Major Component	Function
1	Soft Cover	When placed over the MRDS, protects the sight from sand and dust.
2	Protective Shield	When mounted in conjunction with the MRDS, provides additional protection against possible damage.
3	Shipping / Storage Case	Allows for shipping and/or storage of the MRDS and accessories.
4	Operator Manual	Provides detailed operating and maintenance instructions specific to the MRDS.
5	Quick Reference Guide	Provides at-a-glance operating procedures for the MRDS.
6	Lens Cleaning Kit	A lens brush, lens tissue, and cleaning solution used to clean the optical surfaces of the MRDS.
7	Lens Pen	A compact, dry alternative to the Lens Cleaning Kit used to clean the optical surfaces of the MRDS.

Table 1-2 List of Major Components (cont'd)

Key	Major Component	Function
8	MRDS Assembly	A passive, red dot, reflex weapon sight designed for rapid target acquisition at ranges of less than 150 meters.
9	Battery, CR1632	One 3V lithium battery used to power the MRDS.
10	Mounting Screws, 10mm	Used to secure the MRDS with the Protective Shield to a DOCTER® sight mount.
11	Mounting Screws, 8mm	Used to secure the MRDS (without the Protective Shield) to a DOCTER® sight mount.
12	Hex Head Wrench, M2	Used to tighten or loosen the mounting screws.

CHAPTER 2
OPERATING INSTRUCTIONS

SECTION I
PREPARATION FOR USE AND INSTALLATION

2.1 UNPACKING THE EQUIPMENT

Before unpacking the equipment, verify that all major components are present. If any of the major components are missing, seek guidance from the equipment issuing authority.

2.2 INSPECTION OF THE EQUIPMENT

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

2.3 BATTERY HANDLING

2.3.1 Battery Inspection. Before installation, inspect the battery for any cracks, dents, leakage, or bulging. Never install a defective battery in the MRDS.

CAUTION

The captive screws on the hinged lid of the battery compartment need only be tightened until snug in order to ensure proper seating of the o-rings. Using excessive force may result in permanent damage to the MRDS.

2.3.2 Battery Installation. With a small, slotted screwdriver, access the battery compartment by loosening the two captive screws and lifting the hinged lid as shown in Figure 2-1. Install one CR1632 lithium battery with positive side facing up. Proper battery orientation is marked on the lid. Reseat the hinged lid and tighten the captive screws until snug.

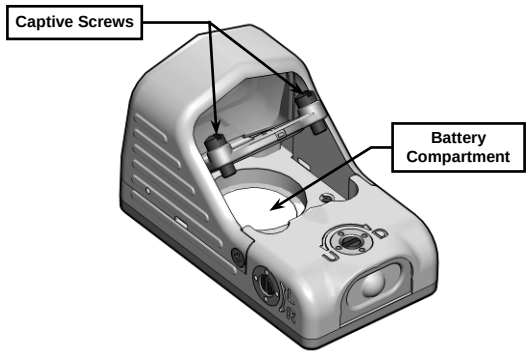

Figure 2-1 Battery Installation

2.4 MOUNTING PROCEDURES

Two 8mm screws are used to secure the MRDS to a DOCTER® sight mount as shown in Figure 2-2. Use the provided 10mm screws if also installing the Protective Shield.

a. Slide the MRDS in the Protective Shield (if being installed).

b. Place the MRDS (and Protective Shield) onto the mounting studs of the DOCTER® sight mounting plate.

c. With an M2 hex head wrench, secure the MRDS to the DOCTER® sight mounting plate by installing and then tightening the appropriate mounting screws.

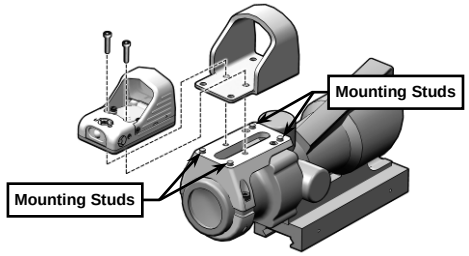

Figure 2-2 Mounting Procedures

2.5 BORESIGHTING / ZEROING PROCEDURES

2.5.1 Boresight Adjusters. The MRDS is equipped with boresight adjusters, shown in Figure 2-3, for independent movement of the red dot in both azimuth and elevation.

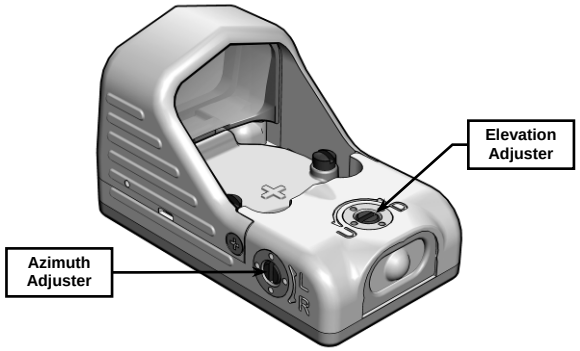

Figure 2-3 Boresight Adjusters

CAUTION

Forcing the boresight adjusters beyond their end of travel may result in permanent damage to the MRDS.

The adjusters have tactile detents that allow the operator to move the red dot in precise increments of .29 mrad (1 MOA) per click. The adjusters are turned clockwise or counterclockwise using a small slotted screwdriver. Markings on the MRDS housing correspond to shot group movement. In practice, each click translates to moving the point of impact of the round as follows:

Table 2-1 Red Dot Adjustments

Single Click Equivalents	
10m	.30 cm
25m	.73 cm
50m	1.5 cm
100m	2.9 cm

2.5.2 Alignment Procedure for Infinite Parallel. The procedure below explains how to align the MRDS to be parallel with the barrel of the host weapon on a 25-meter range. This “infinite parallel” configuration is appropriate for many mission profiles with engagement ranges out to approximately 50m. Zeroing the MRDS / weapon combination for greater distances should be accomplished at an extended range using the procedure described in section 2.5.3.

a. Use a ruler to measure the distance from the center of the weapon bore to the center of the MRDS lens (see Figure 2-4). This distance will vary depending on the MRDS mounting configuration being used. In this example, we will assume a measured distance of 6cm.

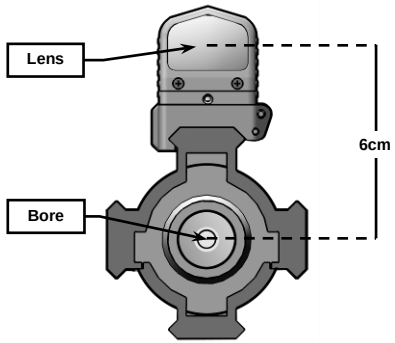

Figure 2-4 Strike Point Calculation

b. On a standard 25-meter zeroing target, mark the designated strike point. In this example, measure 6cm down from the center of the target.

NOTE

The designated strike point should be moved right or left if the MRDS is mounted off-centered from the horizontal axis of the weapon barrel. If the MRDS is mounted to the right of the barrel centerline, the strike point should be moved left an equal distance. If the MRDS is mounted to the left of the barrel centerline, the strike point should be moved right an equal distance.

c. Draw a designated strike zone around the strike point that corresponds in size to an acceptable degree of accuracy (see Figure 2-5).

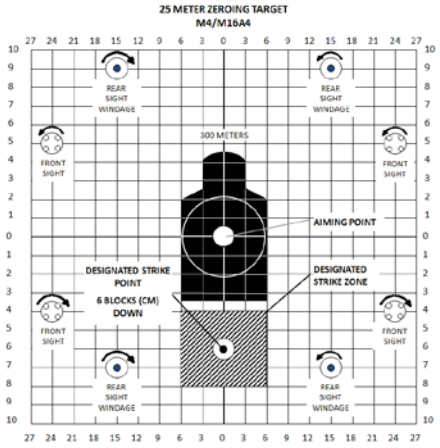

Figure 2-5 Designated Strike Zone

d. Mount the target on an “E” silhouette or other suitable surface at 25 meters.
e. Press the MRDS pushbutton and adjust intensity of the red dot to a comfortable level (see section 2.8).
f. Assume a good firing position and align the MRDS red dot with the center of the target.
g. Fire a 3-round shot group and note the center of the shot group relative to the designated strike point.
h. Rotate the boresight adjusters to move the center of the shot group to the designated strike point.
i. Fire another 3-round shot group and observe the center of the new shot group relative to the designated strike point.
j. When 2 out of 3 rounds are in the designated strike zone, the MRDS is aligned with the barrel of the host weapon.

2.5.3 Zeroing at an Extended Range. The MRDS may be zeroed for a specific point of aim / point of impact at an extended range. This is appropriate for mission profiles where the likely engagement range is known, or for engagement ranges in excess of 50m.

a. On a suitable target, draw a designated strike zone around the center of the target that corresponds in size to an acceptable degree of accuracy.
b. Place the target downrange at a known distance (e.g., 100m).
c. Press the MRDS pushbutton and adjust intensity of the red dot to a comfortable level (see section 2.8).

d. Assume a good firing position and align the MRDS red dot with the center of the target.
e. Fire a 3-round shot group and note the center of the shot group relative to the center of the target.
f. Rotate the boresight adjusters to move the center of the shot group to the center of the target.
g. Fire another 3-round shot group and observe the center of the new shot group relative to the designated strike zone.
h. When 2 out of 3 rounds are in the designated strike zone, the MRDS / weapon combination is zeroed for that specific range.

SECTION II
OPERATING PROCEDURES

2.6 FEATURES AND CONTROLS

Figure 2-6 shows the features and controls for the MRDS. This Section provides details regarding their function and operation.

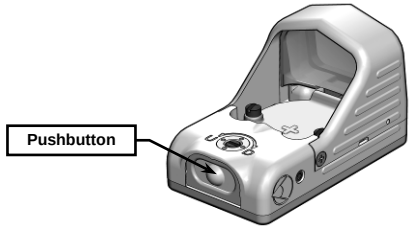

Figure 2-6 MRDS Features and Controls

2.7 POWER

If the MRDS is off, pressing (and holding) the pushbutton for less than one second will turn it on. If the MRDS is on, pressing (and holding) the pushbutton for at least two seconds will turn it off. Approximately two seconds must elapse between cycling the power on or off.

2.8 MODES OF OPERATION

With the MRDS turned on, each press of the pushbutton will sequentially step the device through discrete modes of operation as shown in Table 2-2.

Table 2-2 Modes of Operation

Mode	Remarks
Auto Gain	A photodiode mode where the intensity of the red dot automatically adjusts to changes in ambient lighting conditions. This is the default mode and is automatically selected when the MRDS is powered on.
High 1	Red dot is set to its highest intensity level.
High 2	Red dot is set to its second highest intensity level.
Low 1	Red dot is set to a low intensity level appropriate for dimly lit environments.
Low 2	Red dot is set to its lowest intensity level. This setting is appropriate for use with night vision devices. When in this mode, pressing the pushbutton again will “loop” the device back to Auto Gain mode.

NOTE

After 6 hours of continuous operation in High 1, High 2, Low 1, or Low 2 operating modes, the MRDS will automatically revert to the Auto Gain mode to conserve power until another mode is selected by the operator.

CHAPTER 3
MAINTENANCE AND SERVICING

SECTION I
MAINTENANCE INSTRUCTIONS

3.1 MAINTENANCE PROCEDURES

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

3.1.1 MRDS Housing. To clean the MRDS housing, rinse with water or mild soap and water and then wipe dry with a soft cloth. Clean around buttons and adjusters with a cotton swab.

3.1.2 Optical Surfaces. Optical surfaces should be inspected for foreign material. Remove any large particles or loose dirt using air or a lens brush. Fine cleaning should be performed using lens tissue and lens cleaning solution or the flexible cleaning tip of the lens pen. Avoid using excessive force as this may scratch the lens.

NOTE

To ensure proper functioning of the MRDS, particular attention must be paid to the cleanliness of the Red Dot Aperture shown in Figure 3-1.

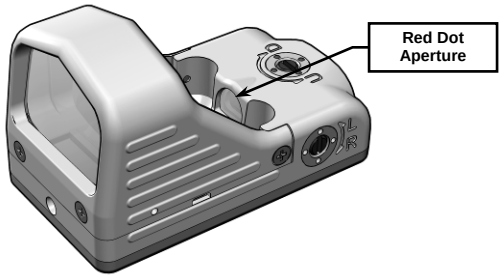

Figure 3-1 Red Dot Aperture

SECTION II
SERVICE / PACKING AND UNPACKING

3.2 SERVICE / REPAIR

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

3.2.2 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.

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

a. Be sure that the MRDS is free of all contaminants such as dirt or any other foreign material.

b. Remove the battery.

c. Place the MRDS in the plastic Shipping Case.

3.2.4 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 Insight Technology Incorporated, 9 Akira Way, Londonderry, NH 03053.

3.4 WARRANTY INFORMATION

The MRDS is issued with a Limited Lifetime Warranty as follows:

L-3 Insight Technology Incorporated warrants that this product will conform to contract specifications and will be free from defects in material and workmanship for the life of the product. This Limited Lifetime Warranty covers the entire product, excluding batteries and accessories.

At its sole discretion, L-3 Insight shall either repair or replace any warranted item, which is found to be defective under normal usage. This warranty does not cover product damaged due to battery leakage. L-3 Insight's liability under the warranty is limited to either repair or replacement, at L-3 Insight's sole discretion. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, or negligence. In addition, L-3 Insight is not liable for product that has been abused, altered, or repaired by the buyer or a third party. There are no other warranties, expressed or implied, other than as set forth herein, and all other warranties are hereby disclaimed. This disclaimer includes, but is not limited to, warranties of merchantability or fitness for a particular purpose. L-3 Insight shall not, in any event, be liable for incidental, consequential or special damages arising out of or in connection with product use or performance.

3.5 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
REPAIR PARTS / ACCESSORIES

A.1 Scope

This Appendix lists repair parts and accessories available for the MRDS.

Table A-1 Repair Parts / Accessories

NSN	Description	Part No.
N/A	Operator Manual	MRD-TM-ITI
N/A	Quick Reference Guide	MRD-QRG-ITI
6760-01-556-4306	Lens Tissue	7B-626
5855-01-561-8616	Lens Cleaning Brush	ITI-013
TBD	Lens Cleaning Solution	ITI-707
TBD	Lens Pen	ITI-678
TBD	Battery, 3VDC Lithium	CR1632-BATTERY
TBD	Mounting Screws, 8mm	MHW-312-001AB
TBD	Mounting Screws, 10mm	MHW-311-002AB
TBD	Mounting Screws, 18mm	MHW-311-003AB
TBD	Mounting Screws, 20mm	MHW-311-004AB
TBD	Hex Key, M2	MHW-312-001AB

Table A-1 Repair Parts / Accessories (cont'd)

NSN	Description	Part No.
Black		
TBD	Protective Shield	MRD-342-01
TBD	Soft Cover	MRD-343-01
TBD	1913 Rail Grabber	MRD-042-A1
TBD	Quick Release Rail Grabber	MRD-035-A1
TBD	Mounting Bracket, ACOG	MRD-701-A1
TBD	Mounting Bracket, ACOG, Flat Top	MRD-705-A1
Tan		
TBD	Protective Shield	MRD-342-02
TBD	Soft Cover	MRD-343-02
TBD	1913 Rail Grabber	MRD-042-A2
TBD	Quick Release Rail Grabber	MRD-035-A2
TBD	Mounting Bracket, ACOG	MRD-701-A2
TBD	Mounting Bracket, ACOG, Flat Top	MRD-705-A2

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

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www.insighttechnology.com