ARMASIGHT

Q14
Multifunctional Thermal Imaging Monocular

OPERATION AND MAINTENANCE MANUAL

SAFETY SUMMARY

Before operating this product, carefully study this Operation and Maintenance Manual.

The Armasight Q14 Multifunctional Thermal Imaging Monocular is a precision electro-optical instrument and requires careful handling. To avoid physical danger to the user and damage to the equipment, follow all WARNINGS, CAUTIONS, and NOTES.

Below are definitions of the alerts that will appear throughout this Manual:

WARNING – Identifies a clear danger to the person operating the equipment.

CAUTION – Identifies risk of damage to the equipment.

NOTE – Highlights essential procedures, conditions, statements, and important instructional information for the user.

⚠ **WARNING:**

This product contains natural rubber latex, which may cause allergic reactions! The FDA has reported an increase in the number of deaths associated with sensitivity to natural latex proteins. If you are allergic to latex, learn which products contain it and strictly avoid exposure to those products.

CAUTION:
- To prevent thermal damage to the equipment, never point it (whether ON or OFF) directly at the sun or any other source of high intensity light that the unprotected human eye cannot tolerate (such as a welding arc). To prevent accidental exposure to these types of sources, never leave the equipment around without the objective lens cap secured.
- DO NOT dismantle the equipment.
- Keep the equipment clean. Protect it from moisture, dramatic temperature changes, and electrical shocks.
- DO NOT force the equipment controls past their stopping points.
- DO NOT leave the equipment activated during periods of non-operation.
- DO NOT store the equipment without first removing the batteries.
- Thoroughly clean and dry all items before placing them into the storage case.

NOTES:
- To avoid losing unsaved data, DO NOT remove the batteries or disconnect the external power source while the Q14 is on.
- Inadvertent sun damage is not considered a defect in material or workmanship, and is therefore not covered in the product warranty.

The information provided in this manual is for familiarization purposes only. The contents may undergo further changes with no commitment by Armasight© to notify customers of any updates.

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The Q14 is powered by one CR123A (3V) battery, or CR123 rechargeable battery (3.6V max), or 16650 rechargeable battery (3.6V max) when used in conjunction with the battery adapter.

CAUTION:

• Use only the supplied battery, and do not install any other types.

• Use only the protected Li-Ion rechargeable battery.*

• Never use damaged, discolored or leaking batteries.

• Keep the Lithium batteries well away from flames or extreme heat or combustible materials. If handled or recharged incorrectly, Li-Ion batteries can cause fires, explosions, property damage, injuries, and death.

• Keep the batteries and charger well away from water or liquids of any kind. Exposure to water may cause shock hazards and fatal electrocution.

• Do not leave Li-Ion rechargeable batteries and chargers unattended while recharging.

• Do not operate the charger on wood, carpet, fabric, or any other soft or flammable surfaces.

• Do not leave battery in charger.

• Do not attempt to recharge disposable Lithium batteries.

• Never recharge Li-Ion batteries in any chargers other than those designed for the specific battery types being used.

• Battery should remain cold when charging, if battery gets hot, stop charging and take out the battery.

• When the battery can't supply power or impossible to be recharged, please don't try to repair it personally.

• Once the battery is full charged, it can be used at any time, if unused for a long time, it should be recharged for 4 hours every three months.

*** PCB Protection**

• *Lithium-Ion rechargeable battery with high quality protection circuit boards (PCB) fits for highest safety demand.*

• *Battery performance is monitored by the PCB and include protection from over-charge, over-discharge, short-circuit, and over-current.*

• *The batteries has passed quality tests for high/low temperature/ humidity/ vibration/ impact according to CE and UL standards.*

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USAGE

Familiarize yourself with the entire manual before operating the equipment. Read the entire mainte-nance checklist before performing maintenance. Follow all WARNINGS, CAUTIONS, and NOTES.

MANUAL OVERVIEW

The Manual contains sections on operating and maintaining the Q14 Multifunctional Thermal Imaging Monocular.

Throughout this Manual, the Q14 Multifunctional Thermal Imaging Monocular will be referred to as the Q14, "the monocular," or "the equipment."

A List of Spare Parts is in Appendix A.

The Product Warranty Registration Card is in Appendix B.

1

INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1 TYPE OF MANUAL

Operation and Maintenance (including a List of Spare Parts).

1.1.2 MODEL NUMBER AND EQUIPMENT NAME

The equipment is available in the following versions, which are structurally different in terms of thermal imaging cameras:

Q14 TIMM 336 (30Hz) – Thermal Imaging Multipurpose Monocular,
FLIR QUARK 2 - 336x256 (17µm) 30Hz Core, 13mm Lens, No Laser

Q14 TIMM 336 (60Hz) – Thermal Imaging Multipurpose Monocular,
FLIR QUARK 2 - 336x256 (17µm) 60Hz Core, 13mm Lens, No Laser

Q14 TIMM 336 VL (30Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 336x256 (17µm) 30Hz Core, 13mm Lens, with Visible Class II Red Laser Pointer

Q14 TIMM 336 VL (60Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 336x256 (17µm) 60Hz Core, 13mm Lens, with Visible Class II Red Laser Pointer

Q14 TIMM 336 IRL (30Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 336x256 (17µm) 30Hz Core, 13mm Lens, with Near-Infrared (IR) Class I Laser Pointer

Q14 TIMM 336 IRL (60Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 336x256 (17µm) 60Hz Core, 13mm Lens, with Near-Infrared (IR) Class I Laser Pointer

Q14 TIMM 640 (30Hz) – Thermal Imaging Multipurpose Monocular,
FLIR QUARK 2 - 640x512 (17µm) 30Hz Core, 19mm Lens, No Laser

Q14 TIMM 640 (60Hz) – Thermal Imaging Multipurpose Monocular,
FLIR QUARK 2 - 640x512 (17µm) 60Hz Core, 19mm Lens, No Laser

Q14 TIMM 640 VL (30Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 640x512 (17µm) 30Hz Core, 19mm Lens, with Visible Class II Red Laser Pointer

Q14 TIMM 640 VL (60Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 640x512 (17µm) 60Hz Core, 19mm Lens, with Visible Class II Red Laser Pointe

Q14 TIMM 640 IRL (30Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 640x512 (17µm) 30Hz Core, 19mm Lens, with Near-Infrared (IR) Class I Laser Pointer

Q14 TIMM 640 IRL (60Hz) – Thermal Imaging Multipurpose Monocular
FLIR QUARK 2 - 640x512 (17µm) 60Hz Core, 19mm Lens, with Near-Infrared (IR) Class I Laser Pointer

1.1.3 PURPOSE OF EQUIPMENT

The Q14 is a Long-Wave Infrared Multifunctional Thermal Imaging Monocular (LIMTIM). The LIMTIM's remarkably compact size ensures that it can be concealed in a shirt pocket, and its featherweight mass at 240g (with battery) makes it the lightest, fully multi-functional thermal imager currently on the market. The LIMTIM has a wide range of features incorporated into the unit that put it at the forefront of all other miniature thermal imagers in its class. It can be equipped with either a visible or near-IR laser pointer, intended for handing off targets of interest to non-thermal equipped assets in the field. It has two integral rail mounts so that it is not necessary to disengage the head/ helmet mount interface in order to mount the unit on a weapon as a stand-alone short-range weapon sight. The mini-rail design allows for mounting on a wide variety of in-service head mounts, helmet mounts, reflex cameras, digital video recorders, and MIL-STD-1913 weapon rail systems using the optional quick-release interfaces. The mini-rails are non-invasive, making handheld operation comfortable and ergonomically optimized for the operator's hands, whether or not they're wearing NOMEX gloves. Equipped with digital compass and inclinometer, the Q14 LIMTIM offers the operator the tools necessary to interpolate accurate distance to target and target orientation.

An additional Armasight proprietary hyper-image processing (HIP) code provides the LIMTIM with a robust library of software features to tailor the image to the optimum standards required by the operator. These features include direct button functions such as display brightness, palette selection, electronic zoom, and manual, non-uniformity correction (NUC) using a simple, intuitive three-button keypad. Menu driven features incorporate desirable operator-specific adjustments such as palette selection, reticule selection and color, weapon boresight, scene-related imaging corrections, stored rifle caliber profiles, format selection, compass calibration sequence, and a "factory settings" default option. The wireless remote capability and Bluetooth© features prevent the Q14 LIMTIM from becoming obsolete, even as new applications and software reach the market. The nine-pin connector on the Q14 reveals the dynamic nature of this bite-sized powerhouse. Through the multi-pin connector, the operator can record video using the Armasight Digital Video Recorder (DVR), augment the battery life by attaching to external battery options, inject target range data from an externally mounted Armasight laser range finder and update/ upload new software revision and applications from personal accounts associated with the Armasight customer access web sites.

The Q14 LIMTIM is designed to be waterproof up to 20 meters, and meet all the established environmental requirements of MIL-STD-810(G).

Operating on a variety of 123A format commercial expendable and rechargeable batteries, the Q14 LIMTIM offers a respectable 1.5 hours run time for the 640x512 focal plane array format. With a diopter range of -5 to +5 and a focus range of 20cm to infinity, the LIMTIM demonstrates its operational flexibility for all mission applications.

1.1.4 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS

User recommendations for improvements to the device are encouraged.

Mail your comments to:

Armasight Inc.
815 Dubuque Avenue
South San Francisco, CA 94080
USA
Or, send an email to info@armasight.com.

1.2 WARRANTY INFORMATION AND REGISTRATION

1.2.1 WARRANTY INFORMATION

This product is guaranteed to be free from manufacturing defects in material and workmanship under normal use for a period of three (3) years from the date of purchase. This warranty does not cover the

battery or damage caused by leaking batteries. Nor does it protect against damage due to loss, misuse or mishandling. The uncooled thermal camera sensor is warrantied for a period of ten (10) years from the date of purchase.

In the event a defect that is covered by the warranty occurs during the 3 year period stated above, Armasight, at its option, will either repair or replace the product, and such action on the part of Armasight shall be the full extent of Armasight's liability, and the Customer's sole and exclusive remedy. This warranty does not cover a product (a) used in other than its normal and customary manner; (b) subjected to misuse; (c) subjected to alterations, modifications or repairs by the Customer or by any party other than Armasight without prior written consent of Armasight; (d) special order or "close-out" merchandise or merchandise sold "as-is" by either Armasight or the Armasight dealer; or (e) merchandise that has been discontinued by the manufacturer and either parts or replacement units are not available due to reasons beyond the control of Armasight. Armasight shall not be responsible for any defects or damage that in, Armasight's opinion, is a result from the mishandling, abuse, misuse, improper storage or improper operation, including use in conjunction with equipment which is electrically or mechanically incompatible with or of inferior quality to the product, as well as failure to maintain the environmental conditions specified by the manufacturer.

This warranty is extended only to the original purchaser. Any breach of this warranty shall be waived unless the customer notifies Armasight at the address noted below within the applicable warranty period.

The customer understands and agrees that except for the foregoing warranty, no other warranties written or oral, statutory, expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose, shall apply to the product. All such implied warranties are hereby and expressly disclaimed.

1.2.2 LIMITATION OF LIABILITY

Armasight will not be liable for any claims, actions, suits, proceedings, costs, expenses, damages or liabilities arising out of the use of this product. Operation and use of the product are the sole responsibility of the Customer. Armasight's sole undertaking is limited to providing the products and services outlined herein in accordance with the terms and conditions of this Agreement. The provision of products sold and services performed by Armasight to the Customer shall not be interpreted, construed, or regarded, either expressly or implied, as being for the benefit of or creating any obligation toward any third party or legal entity outside Armasight and the Customer. Armasight's obligations under this Agreement extend solely to the Customer.

Armasight's liability hereunder for damages, regardless of the form or action, shall not exceed the fees or other charges paid to Armasight by the customer or customer's dealer. Armasight shall not, in any event, be liable for special, indirect, incidental, or consequential damages, including, but not limited to, lost income, lost revenue, or lost profit, whether such damages were foreseeable or not at the time of purchase, and whether or not such damages arise out of a breach of warranty, a breach of agreement, negligence, strict liability or any other theory of liability.

1.2.3 PRODUCT WARRANTY REGISTRATION

In order to validate the warranty on your product, Armasight must receive a completed Product Warranty Registration Card for each unit, or the Customer can complete a warranty registration on our website at www.armasight.com. Please complete the included form (Appendix B) and immediately mail it to our Service Center:

Armasight Inc.
815 Dubuque Avenue
South San Francisco, CA 94080
USA

1.2.4 OBTAINING WARRANTY SERVICE

To obtain warranty service on your unit, the End-user must notify the Armasight's service department in order to receive a Return Merchandise Authorization number (RMA#). The customer can do this by sending an email to service@armasight.com.

When returning any product, please take or send the product, postage paid, with a copy of your sales receipt, to our service center, Armasight Inc. at the address noted above. All merchandise must be fully insured with the correct postage; Armasight will not be responsible for improper postage, or missing or damaged merchandise during shipment.

When sending merchandise back, please write the RMA# clearly on the outside of the shipping box. Please include a letter that indicates your RMA#, Name, Return Address, reason for service return, Contact information (such as a valid telephone number and/or e-mail address), as well as proof of your purchases that will help us to establish the valid start date of the warranty. Product merchandise returns that do not have an RMA listed may be refused or be subject to a significant delay in processing.

Estimated Warranty service time is 10-20 business days. The End-user/Customer is responsible for postage to Armasight for any warranty service. Armasight will cover return postage/shipping to continental USA End-users/Customers after warranty repair only if product is covered by the aforementioned warranty. Armasight will return the product after warranty service via domestic ground service and/or domestic mail. The postage and shipping fees for any other requested, required or international shipping methods will be the responsibility of the End-User/Customer.

1.3 LIST OF ABBREVIATIONS

μm	micrometer	mrad	milliradian
AWREC	Advanced Wireless Remote Control	NO.	Number
		NTSC	National Television Standards Committee
C	Celsius (Centigrade)		
CCW	counterclockwise	NUC	Non-Uniformity Correction
CW	clockwise	OEM	Original Equipment Manufacturer
F	Fahrenheit		
FL	Focal Length	oz	ounce
g	gram	PAL	Phase Alternating Line
H	Height	PMCS	Preventive Maintenance Checks and Services
hr	hour		
in	inch	POI	Point Of Impact
inf.	infinity	RMA#	Return Merchandise Authorization number
kg	kilogram		
L	Length	sec	second
lbs	pounds	SEQ	sequence
m	meter	SOA	Second Of Angle
mA	milliampere	SR	Service Representative
mil	angular mil	UCMNUC/FFC	User-Controlled Manual Non-Uniformity Correction/ Flat-Field Correction
min	minute		
mm	millimeter	V	Volt
MOA	Minute Of Angle	W	Width

2

DESCRIPTION AND DATA

2.1 SYSTEM DESCRIPTION

The Q14 is a thermosensitive device. It can sense differences in heat emitted by objects in its field of view and converts the received temperature pattern into a viewable image that represents the scene in black & white or color, depending on the selected image palette.

FIGURE 2-1. Q14 MULTIFUNCTIONAL THERMAL IMAGING MONOCULAR

> **NOTE:**
>
> It is important that the Q14 sensor receive sufficient thermal contrast between the target and background area, or between the different parts of a target. For example, there would be a vast temperature contrast between the snow and any heat target (such as an animal), making it exceptionally easy to distinguish the target.

The main optical-electronic components of the Q14 include: an objective thermal lens, an eyepiece, a thermal-imaging camera, a display, a control card, and a button control panel. The Q14 is equipped with manual objective lens focusing.

To accommodate individual user needs, the Q14 has a variety of digitally controlled options, such as:

- Digital Compass
- Digital Inclinometer
- Display Brightness
- Digital Zoom
- Palette Color Selection
- User-Controlled, Manual Non-Uniformity Correction/ Flat-Field Correction (UCMNUC/ FFC)
- Imaging Enhancements
- Custom Settings

Q14 series monoculars are based on FLIR Quark cameras that offer improved overall image quality in a wide range of dynamic thermal environments. The Q14 includes special, user-adjustable imaging tools that include:

- **Active Contrast Enhancement (ACE)** – a digital "Contrast" correction for smart scene optimization based on dynamic adjustments, where a variety of contrast levels occur depending on relative scene temperatures.

- **Second Generation Digital Detail Enhancement (DDE)** – a "Sharpness" correction that digitally enhances the picture for clearer imagery. Significantly sharpens edges and further reduces image blurriness.

- **Smart Scene Optimization (SSO)** – a fine-tuning computational correction that significantly improves overall visual acuity for targets that have thermal signatures similar to the surrounding background.

- **Information-Based Histogram Equalization (IBHEQ)** – a "Sky/Sea" enhancement; information-based, environment dependent algorithm that automatically adjusts camera gain and excludes pixels determined to contain unimportant information. Specifically helpful in scenes with large expanses of visible sky or water.

- **User-Controlled Manual Non-Uniformity Correction/ Flat-Field Correction (UCMNUC/ FFC).** Non-uniformity correction (NUC) is also known as flat-field correction (FFC). During FFC, the unit presents a uniform temperature source for each detector element. While imaging the flat-field source, the camera updates the offset correction coefficients, resulting in a more uniform image. All Q14 models allow users to manually trigger or interrupt scheduled UCMNUC/ FFC.

- **Silent Shutterless NUC™ (SSN)** – In addition to user-controlled manual NUC/ FFC, all Q14 models offer digital flat-field correction that can be used to extend periods between manual shutter events, and to further reduce image blurriness. SSN is an always-ON enhancement.

Information on the current operating state (battery status, active function, reticle running coordinate in the display, etc.) is continuously shown, making field operation of the Q14 simple and convenient.

Manufactured for exceptional durability, the Q14 has a lightweight and robust body. It has two integral rail mounts so that it is not necessary to disengage the head/helmet mount interface in order to mount the unit on a weapon as a stand-alone short-range weapon sight. The mini-rail design allows for mounting on a wide variety of in-service head mounts, helmet mounts, reflex cameras, digital video recorders, and a MIL-STD-1913 weapon rail systems using the optional quick-release interfaces.

A standard NTSC/PAL video input/output connector enables an external video display (monitor/TV) or video recorder to be connected to the Q14. An external 6-12VDC/600mA power source can also be connected to the Q14.

The Q14 has a built-in IR laser-aiming pointer with push-button controls (VL and IRL models only).

The Q14 is powered by one CR123A (3V) battery or one 16650 type rechargeable battery when used in conjunction with the battery adapter.

The Q14 is shown in Figure 2-2. The ITEM NO. column of Table 2-1 indicates the number used to identify items in Figure 2-2.

FIGURE 2-2. SYSTEM DESCRIPTION

TABLE 2-1. SYSTEM DESCRIPTION

ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Body	7	Battery Compartment
2	Objective Lens Cap	8	Rail
3	Objective Focus Ring	9	Eyepiece Focus Ring
4	Aiming Laser (VL and IRL models only)	10	Eyecup
5	Battery Cap	11	Connector (closed with a Cap)
6	Button Control Panel	12	Laser Operation Button (VL/ IRL only)

2.2 SPECIFICATIONS

TABLE 2-2. SYSTEM DATA

ITEM	Q14 336	Q14 640
Optical Magnification	1×	
Digital Zoom	1×, 2×, 4×	1×, 2×, 4×, 8×
Objective Lens Type	Germanium	
Type of Focal Plane Array	FLIR Quark 2	
Frame Rate	30 Hz or 60 Hz	
Pixel Array Format	336×256	640×512
Pixel Size	17 µm	
Display Type	AMOLED SVGA 060	
Pixel Display Format	800×600	
Display Brightness	Discretely Adjustable to 8 Levels	
Turn-on Time, max	3 sec	
Temperature Imaging Modes (Image Palettes)	White Hot, Black Hot, Fusion, Rainbow, Sepia, Rain	
User-adjustable Image Enhancement Tools	•Active Contrast Enhancement (ACE) - "CONTRAST" •Second Generation Digital Detail Enhancement (DDE) – "SHARPNESS" •Smart Scene Optimization (SSO) – "SMART SCENE" •Information-Based Histogram Equalization (IBHEQ) – "SKY/SEA" •User-Controlled Manual Non-Uniformity Correction/ Flat-Field Correction (UCMNUC/ FFC) •Silent Shutterless NUC™ (SSN)	
Analog Input/Output Format	NTSC* (640×480 pixels) / PAL (768×574 pixels)	

*Default setting

TABLE 2-3. LASER POINTER DATA

ITEM	VL MODELS	IRL MODELS
Type	Visible Red Laser	Near IR Laser
Class	Class IIR	Class I
Wavelength	650 nm	850 nm
Output Power	1 mW	0.9 mW
Operating Distance	up to 200m	up to 800m
Aiming Dot Size (at 100m distance)	50mm	50mm

TABLE 2-4. OPTICAL DATA

ITEM	Q14 336	Q14 640
Field of View (ang. X x Y)	25° x 19°	33° x 26°
Objective Focal Length	13mm	19mm
Objective F-number	F/1.25	F/1.25
Focusing Range	0.2m to inf.	0.25m to inf.
Exit Pupil Diameter	5mm	
Eye Relief	16mm	
Diopter Adjustment	-5 to +5 diopters	

TABLE 2-5. ELECTRICAL DATA

ITEM	DATA
Battery	One CR123A 3V Lithium battery, CR123 rechargeable battery, or 16650 rechargeable battery with voltage from 3.0V to 3.6V
Current Consumption, maximum	320 mA
Battery Life at 20 °C (68 °F): - CR123A - CR123 Rechargeable (650mAh) - 16650 Rechargeable (2000mAh)	 up to 1.5 hr up to 1 hr up to 2.6 hr
Extended Battery Pack	Two 18650 rechargeable batteries (3.7V), four CR123 rechargeable batteries with voltage 3.7V max, or four standard CR123A 3V Lithium batteries (operational time up to 8 hr)
External Power Supply	6V-12V DC / 600 mA

TABLE 2-6. MECHANICAL DATA

ITEM	DATA
Overall Dimensions	100×63×40mm / 3.94"×2.48"×1.57"
Weight (w/o Batteries)	240 g / 0.53 lbs

TABLE 2-7. ENVIRONMENTAL DATA

ITEM	DATA
Operating Temperature	-40 to +50°C (-40 to +122°F)
Storage Temperature	-50 to +70°C (-58 to +158°F)
Recoil Resistance	700 g
Environmental Rating	Waterproof

TABLE 2-8. ADVANCED WIRELESS REMOTE CONTROL (AWREC) DATA

ITEM	DATA
Type	Wireless Remote Control
Working Range	up to 0.5m
Battery	Single CR2032 Lithium battery (3V)
Battery Life at 20 °C (68 °F)	Approx. 10,000 clicks
Overall Dimensions	48×39×18mm (1.9"×1.5"×0.7")
Weight (with Battery)	25 g (0.9 oz)
Operating Temperature	-30 to +50°C (-22 to 122°F)
Storage Temperature	-50 to +70°C (-58 to 158°F)
Environmental Rating	Water and Fog-Resistant

2.3 STANDARD COMPONENTS

The Q14 standard components are shown in Figure 2-3 and listed in Table 2-9.
The ITEM NO. column indicates the number used to identify items in Figure 2-3.

FIGURE 2-3. Q14 STANDARD COMPONENTS

TABLE 2-9. Q14 STANDARD COMPONENTS

ITEM NO.	DESCRIPTION	QUANTITY
1	Armasight Q14 Thermal Imaging Multipurpose Monocular	1
2	Battery Adapter for 16650 Battery	1
3	CR123 Battery	1
4	16650 Rechargeable Battery	1
5	Charger for 16650 Rechargeable Battery	1
6	Advanced Wireless 5-Button Remote with Picatinny Adapter	1
7	Picatinny Adapter for Advanced Wireless Remote	1
8	Video Cable	1
9	Lens Tissue	1
10	Operator Manual	1
11	Carrying Case	1

2.4 OPTIONAL EQUIPMENT

Optional items are shown and listed in Table 2-10.
The PART NO. column indicates the primary number used by the manufacturer, to identify an item.

TABLE 2-10. Q14 OPTIONAL EQUIPMENT

IMAGE	DESCRIPTION	PART NO.
	2x A-Focal Doubler Quickly converts the Q14 into a long-range thermal imaging device. Ideal for long-range observation.	ATAF2X0001
	Tactical Goggle Kit: Wilcox L4 G24 and 3 Hole Shroud, Crye Precision Nightcap, and Swing Arm #172	ANHGWX0G70
	Goggle Kit #2 Adjustable universal assembly that secures the Q14 to the operator's head providing hands-free operation.	ANHG000004
	Recorder DT Digital Video Recorder A compact digital system used for video recording, storage and playback. Can also serve as an external power source. Equipped with a remote control.	ATAM000004
	HD DVR Digital Video Recorder High Definition Digital Recorder for all Armasight High Performance Digital and Thermal Devices.	ATAM000005
	Extended Battery Pack The power source for extended operational time. Takes four CR123A Lithium batteries (3V), CR123 rechargeable batteries (3.2V or 3.7V) or two 18650 rechargeable batteries (3.7V).	ATAM000008
	AMRF2200 Advanced Modular Range Finder The modular range finder is designed to determine the exact distance between the observer and the target. Measurement results are shown on both the module display and in the field of view of the connected digital device.	IALA00AMRF22001
	Helmet Mount #4 Helps to mount the Q14 on a range of ballistic helmets.	ANHM000001
	Mil-Spec MICH Helmet Mount Kit USA #107 with Adapter/Swing Arm #37 Consists of MICH helmet mount and adapter that allows the user to attach the Q14 to this mount.	ANHM000007

TABLE 2-10. CONTINUED

IMAGE	DESCRIPTION	PART NO.
	Mil-Spec PASGT Helmet Mount Kit USA #108 with Adapter/Swing Arm #37 Consists of PASGT helmet mount and adapter that allows the user to attach the Q14 to this mount.	ANHM000008
	Swing Arm #37 Mounts Q14 to Standard US MIL Headset (PVS7/PVS14 type) and/or helmet.	ANHG000002
	Swing Arm #172 Mini Rail to Dovetail Adapter. Mounts Q14 to Dovetail Type Headsets and Helmet Mounts.	ANHM000172
	Quick Release Picatinny Mount Adapter (QRM) Small arms adapter that allows the Q14 to be mounted on a weapon using Picatinny MIL1913 rail.	ANAM000004
	Shutter Eyeguard Prevents light from being emitted by the Q14 eyepiece. If the user's face is illuminated, they become visible to others in the field, and their position becomes compromised.	ANEC000001
	Dovetail to Weaver Transfer Piece #21 Allows the accessories to be mounted on the Q14.	ANRA000001
	Extended Rail Adapter #85 Dovetail Weaver Picatinny Rail Adapter Extends 7.5" to 11.5" Tactical Scope Mount.	ANAM000045
	Hard Shipping/Storage Case #101 A protective case used for the shipping/ storage of the Q14 and its accessories.	ANHC000001

2.5 KEY FEATURES

- Weight 240 g
- MIL-810G rugged, waterproof glass fiber reinforced construction
- FLIR Quark 2 VOx microbolometer in 640 and 336 options
- Fast Germanium objective lens
- 800x600 Organic LED display
- Drop-down menu and icon based menu
- Simple, intuitive 3-button control
- Polarity control (Black Hot/ White Hot)
- Color & monochrome palettes
- Digital Zoom up to 8x
- Digital Detail Enhancement™
- Active Contrast Enhancement™
- Smart Scene Optimization™
- Silent Shutterless Non-Uniformity Correction™
- Integrated Digital Compass
- Integrated Laser Pointer
- Integrated Digital Inclinometer
- NTSC/PAL field switchable video output
- Easy adaptability to wide selection of head, helmet, and weapon mounts with Quick Rail/ Dove Tail/ Bayonet interfaces (i.e. Armasight, Wilcox, Norotos, or Cadex)
- Fast time to image (< 3 sec)
- One CR123A battery operation
- Made in the USA

3

OPERATING INSTRUCTIONS

3.1 INSTALLATION AND MOUNTING

3.1.1 BATTERY INSTALLATION

The Q14 operates on a single CR123A battery or 16650 rechargeable battery (with included adapter).

> **CAUTION:**
> The maximum voltage of battery is 3.6V. DO NOT install any other batteries or you could damage the unit!
> Verify that the equipment is off before installing a battery.

To install CR123A battery (refer to Figure 3-1):
1. Unscrew the battery cap (A).
2. Insert the CR123A battery (B), observing the polarity markings on the body of the device.
3. Screw the battery cap (A) back on securely.

Fully charge the 18650 rechargeable battery before installing. To install the 16650 battery:
1. Unscrew the battery cap (A).
2. Screw the battery adapter (C) onto the battery compartment.
3. Insert the 16650 rechargeable battery (D), observing the polarity markings as indicated on the body of the device.
4. Screw the battery cap (A) onto battery adapter.

FIGURE 3-1. BATTERY INSTALLATION

3.1.2 MOUNTING THE Q14 TO A TACTICAL GOGGLE KIT

To mount the Q14 to a Tactical Goggle Kit, use a Swing Arm adapter. Insert the Q14 rail into the guide (Figure 3-2, A) of the adapter. Push the lever down (B) and slide the unit until it is parallel with the alignment groove on the adapter. Push until you hear a clicking noise, indicating that the unit is locked into the transfer adapter.

To uninstall the Q14 from the transfer adapter, push the lever down (B) and remove the unit by sliding it out from the adapter guide.

Install the Q14 with the adapter to the L4 G24 mount (C) of Tactical Goggle Kit. Align the adapter with the mount socket. Slide and push the Q14 until the adapter locks into the mount.

To adjust the NightCap™ (D):

1. Loosen all adjustment buckles. Holding the rear adjustment straps, lean your head forward, place your forehead against the pad, and place the NightCap™ over your head.

2. Hold the rear of the NightCap™ in place and tighten the rear adjustment strap until snug.

3. Center the chin cup on your chin and secure the buckle (E).

4. Pull the front adjustment strap hardware (F) down until snug.

5. Pull the rear adjustment strap hardware (G) down until snug.

6. If the bottom edge of the NightCap™ headband is touching your ears, adjust the side-to-side top adjustment tabs.

7. The front-to-back adjustment strap (H) can be tightened to balance the Q14.

8. Use the slack retainer to secure any excess length from the rear adjustment strap.

Adjust the interpupillary distance so that the eyepiece of the monocular is aligned with your eye. Loosen the screw (I) of the adapter and move the Q14 left or right along the guide (J). The position of the end of the guide indicates the interpupillary distance on the scale (K). Tighten the screw (C) when the adjustment is complete.

The transfer adapter can be adjusted for either the right or left eye. The adapter adjusted for a left eye is shown on Figure 3-10. To readjust the adapter for the right eye:

1. Unscrew the two screws (Figure 3-2, L) and uninstall the plate (M).

2. Turn the plate (B) around.

3. Align the holes in the plate with the two threaded holes in the mount and tighten the two screws.

Use the L4 G24 mount as follows:

1. The lock Release Lever (N) allows the user to easily adjust the height of the Q14 up or down, and then secured.

2. A Breakaway Release Lever (O) allows the operator to easily set the desirable mode ("breakaway" or "locked"), depending upon operational needs.

3. An ergonomically placed Flip Release Button (P) allows the Mount to "flip up" to a stowed position when the goggle is attached.

4. A Tilt Adjustment Knob (Q) allows the operator to adjust the tilt angle of the Q14.

5. A Mount Release Lever allows for the attachment and removal of the mount.

6. A Fore/Aft Release Lever (R) allows for fore/aft travel of the Q14. Releasing the lever allows the operator to set the fore/aft position of the Q14.

7. An ergonomically placed Release Button (S) allows for one-handed release of the Q14.

FIGURE 3-2. MOUNTING THE Q14 TO A TACTICAL GOGGLE KIT

3.1.3 MOUNTING THE Q14 TO AN ARMASIGHT GOGGLE KIT

To mount the Q14 to the Armasight Goggle Kit:

1. Put on the goggle kit. Adjust the goggle kit strap pads until the goggles fit securely around your head. Remove the goggle kit.

2. Loosen the screw (A). While pushing down on the button (B), insert the Q14 rail into the guide (C) of the goggle kit bracket. Tighten the screw (A).

3. Put on the goggle kit, now mounted with the Q14.

4. To adjust the equipment for greater comfort, loosen the screw (A) and move the unit along the guide (C).

5. The goggle kit has a flip-up mechanism. Push the button (D) of the goggle kit bracket and lift the unit up until it reaches its topmost position.

6. Push the same button (D) to lower the unit into the correct viewing position.

Figure 3-3 shows the Q14 in the correct position for the right eye. To readjust the unit for the other eye, remove the unit from the goggle kit bracket. Turn the unit around (180º) and mount it on the bracket through the rail on the second side. While pushing down on the button (E), move the unit along the slide-rail (F) until the desired, most comfortable position is reached.

To remove the Q14 from the goggle kit, loosen the screw (A), push the button (B), and slide the unit out of the bracket guide (C).

FIGURE 3-3. MOUNTING THE Q14 TO AN ARMASIGHT GOGGLE KIT

3.1.4   MOUNTING THE Q14 TO A HELMET

An optional flip-up helmet mount can be used to attach the Q14 to a helmet. The helmet mount fits the Q14 securely onto a helmet using a rugged strapping device and grooved hooks. With the helmet mount, the Q14 can be positioned directly in front of the user's eyes, or flipped backwards, out of the field of view.

To mount the Q14 to a helmet:

1. Attach the mount to the helmet as shown in Figure 3-4.

2. Adjust and tighten the strap (A).

3. Loosen the screw (B). While pushing down on the button (C), insert the Q14 rail into the guide (D) of the helmet mount bracket. Tighten the screw (B).

4. Put on the helmet with the Q14 attached.

5. Push the button (F) and move the unit along the slide-rail (G) until the most comfortable position is reached.

6. Adjust the mount for comfort. Loosen the screw (B) and move the unit along the guide (D) until it is properly positioned for the eye. Turn the lever (H) and move the unit along the vertical slide-rail until the most comfortable vertical position is reached.

7. To remove the Q14 and turn it around, push the button down (E) and lift the unit up until it reaches the topmost position.

8. Push the same button (E) to lower the Q14 into the proper viewing position.

In Figure 3-4, the Q14 is shown in the correct position for the right eye. To readjust the Q14 for the left eye, reverse its positioning and reinstall it on the helmet mount bracket. Use the second unit rail located on the opposite side of the unit. Push the button (F) and move the unit along the slide-rail (G) until the most comfortable position is reached.

To remove the Q14 from the helmet mount, loosen the screw (B), push down on the button (C), and slide the unit out of the guide (D). To remove the flip-up mechanism from the helmet mount, loosen the lever (H), pull the knob out (I), and slide the flip-up mechanism out of the vertical rail.

FIGURE 3-4. MOUNTING THE Q14 TO A HELMET

3.1.5 MOUNTING THE Q14 TO A STANDARD US MIL HELMET/ HEADGEAR ASSEMBLY

To mount the Q14 to a Standard US MIL helmet or headgear assembly, use an optional transfer adapter, and perform the following steps:

FIGURE 3-5. MOUNTING THE Q14 TO STANDARD US MIL HELMET/HEADGEAR ASSEMBLY

1. Push down on the lever (C). Mount the adapter (A) to the Q14 rail (B).

2. Align the adapter prism (D) with the helmet/ headgear assembly mount (E). Slide the Q14 backwards until it's aligned with the groove on the helmet/ headgear assembly mount. Push down until the Q14 locks into the helmet/ headgear assembly mount.

To dismount the Q14 from the helmet/ headgear assembly, push down on the lever (F) and remove the unit.

Push down on the lever (C) and remove the adapter from the Q14 rail.

The transfer adapter can be adjusted for either the right or left eye. In Figure 3-5, the Q14 is shown in the proper position for the left eye. Readjust the adapter for the right eye as follows:

— Push down on the lever (C). Remove the adapter from the Q14 rail.

— Loosen the nut (G), and turn the adapter around between the two fixing devices. Retighten the nut (G).

— Mount the adapter to the other Q14 rail located on the opposite side of the unit.

3.1.6 MOUNTING THE Q14 TO A WEAPON WITH A QUICK-RELEASE PICATINNY MOUNT ADAPTER

> ⚠ **WARNING:**
>
> Always make sure your firearm is unloaded before you place the scope on the firearm. Always verify that the chamber is empty, especially if you stop the procedure and resume later. Safe handling rules should be followed at all times.

To mount the Q14 to a weapon using an optional quick-release Picatinny mount adapter (QRM):

1. While pushing down on the lever holder (C), turn the lever (B) backwards to loosen the QRM clamping device (A).

2. Install the QRM on the weapon rail by inserting the stop (not shown in Figure 3-6) into one of transverse slots of the weapon rail.

FIGURE 3-6. MOUNTING THE Q14 TO A WEAPON WITH A QUICK-RELEASE PICATINNY MOUNT ADAPTER

3. To secure the QRM onto the weapon rail, turn the lever (B) forward. Secure the clamping device (A) tightly to the weapon rail. To adjust the force of the lever clamp, loosen or tighten the nut (D) as necessary.

4. While pushing down on the lever holder (F), turn the lever (E) forward.

5. Install the Q14 on the QRM rail by inserting the stop (G) into the transverse slot of the rail.

6. Attach the Q14 to the QRM rail by turning the lever (E) backwards. Secure the QRM clamping device (H) to the Q14 rail. To adjust the force of the lever clamp, loosen or tighten the nut (I) as necessary.

3.1.7 FASTENING AN ADVANCED WIRELESS REMOTE CONTROL

Using Velcro tape (A, Figure 3-7), fasten the remote control (B) to an easily accessible place (e.g., on the front of the rifle stock).

If your rifle has a Picatinny or Weaver rail on the front end, you can use the Picatinny adapter for the Advanced Wireless Remote (C). Install the adapter onto the rail (D). Insert the remote control into the adapter.

FIGURE 3-7. ADVANCED WIRELESS REMOTE CONTROL

3.1.8 INSTALLING ADDITIONAL EQUIPMENT

Use the Dovetail to Weaver Transfer Piece to install any additional equipment, such as the Armasight DT Digital Video Recorder, a range finder, or the Extended Battery Pack. Perform the following steps:

1. Install the transfer piece (A) onto one of the Q14 rails.

2. Tighten the fixing screw (B) on the transfer piece.

FIGURE 3-8. DOVETAIL TO WEAVER TRANSFER PIECE INSTALLATION

3.1.9 CONNECTING ADDITIONAL EQUIPMENT

CAUTION:
Turn off the Q14 before removing the batteries or connecting/disconnecting any external equipment.

Remove the connector's protective cap.

Connect the cable from either the Armasight Digital Video Recorder or the Extended Battery Pack to the Q14 connector.

Use the video cable plug (A, Figure 3-10) to connect an external video recorder/ monitor/ TV to the Q14. Connect the video cable plug (C) to the Q14 connector.

Use the video cable plug (B) to connect an external power source (6VDC/ 600mA) to the Q14. Connect the video cable plug (C) to the Q14 connector.

FIGURE 3-9. ARMASIGHT DIGITAL RECORDER DT INSTALLATION

FIGURE 3-10. VIDEO CABLE

NOTE:
The external power supply must have a standard OD double-pole socket with a positive center contact.

CAUTION:
After removing the cable, replace the protective cap over the connector.

3.1.10 INSTALLING THE 2X MAGNIFIER

Figure 3-11 shows the Q14 with the 2x magnifier installed.

To install the 2x magnifier on the Q14, do the following:

1. Take off the lens cap.
2. Screw the 2x magnifier into the Q14's lens thread.

FIGURE 3-11. INSTALLING THE 2X MAGNIFIER

3.2 CONTROLS AND DISPLAY INDICATIONS

3.2.1 CONTROLS

CAUTION:
DO NOT force the equipment controls past their stopping points.

The Q14 controls are shown in Figures 3-12 and 3-13, and are defined in Tables 3-1 and 3-2. The ITEM NO. columns indicate the numbers used to identify items in the figures.

NOTE:
Various display symbols indicating the current operating state of the Q14 can be displayed permanently, may appear momentarily, or can be set to appear only when a certain function is activated.

FIGURE 3-12. CONTROLS

TABLE 3-1. CONTROLS AND INDICATORS

ITEM NO.	CONTROL/ INDICATOR	FUNCTION
1	Objective Focus Ring	Focuses the objective lens. Adjusts for sharpest view of the scene. The total focus range is covered within 3/4 turns of the focus ring.
2	Control Panel Buttons	Configures operational settings. See Table 3-2 for button functions.
3	Laser Operation Button	Activate the IR laser by pushing the button. The laser is activated while the button is on.
4	Eyepiece Ring	Adjusts the eyepiece diopter. The total diopter adjustment range is covered within 2 turns of the ring. The diopter range is 5 to +5 diopters.
5	Remote Control Button	Duplicates the functions of the control panel buttons. Only 3 buttons from the remote are independently functional.
—	Battery Status Indicator (Battery icon in the top right hand corner of the display)	The color fill (green/ yellow/ red) bar in the battery icon indicates the current power level of the internal battery, or the remaining battery life.
		A shaded battery icon indicates a fully charged battery.
		A flashing, transparent battery icon indicates a low battery.
—	Laser Status Indicator	A flashing red **X** on yellow background in the field of view indicates that the laser is operating.

The Q14 button control panel is shown in Figures 3-13.

Table 3-2 contains the button functions and their brief descriptions. The ITEM NO. column of the table indicates the number used to identify buttons in Figure 3-13.

FIGURE 3-13. BUTTON CONTROL PANEL

TABLE 3-2. BUTTON CONTROLS

ITEM NO.	FUNCTION	DESCRIPTION
1	DISPLAY BRIGHTNESS UP	Push the button (1) to increase screen brightness.
	DIGITAL ZOOM CONTROL	Push and hold the button (1) to change the zoom progressively.
	UP	Use the button (1) to scroll up through the items of menu.
2	ON/ OFF	Turns the Q14 ON when held down for 3 seconds.
		Turns the Q14 OFF when held down for more than 15 consecutive seconds.
	MAIN MENU	Holding down the button (2) for 3 seconds will bring up the Main Menu. The menu includes the following functions: Palette, Reticle, Boresight, Enhancement, Store Image, Settings, and Power Down.
	SELECTION	Push the button (2) to select an item from the Main Menu.
		To enable left and right action (when <> symbols are displayed in a sub-menu), press the button (2). To disable, press the button (2) again.
	UCMNUC/ FFC PROCESS INTERRUPTION	Pushing the button (2) when the countdown is on the screen will cancel the UCMNUC/ FFC.
3	DISPLAY BRIGHTNESS DOWN	Push the button (3) to decrease the screen brightness.
	IMAGE PALETTE CONTROL	Push and hold the button (3) to scroll up through the available palettes. There are 6 palettes available: White Hot, Black Hot, Sepia, Fusion, Rainbow, Rain.
	DOWN	Use the button (3) to scroll down through the items of menu.
1+3	USER-CONTROLLED MANUAL NON-UNIFORMITY CORREC-TION/ FLAT-FIELD CORRECTION (UCMNUC/ FFC)	Simultaneously holding down buttons (1) and (3) starts User-Controlled Manual Non-Uniformity Correction/ Flat-Field Cor-rection (UCMNUC/ FFC).

NOTE:

Each button is responsible for some functions selected by briefly pushing or holding down the button, or using the button in combination with a second one (as described in Table 3-2).

Pushing a button for 2+ seconds is considered "holding down."

3.2.2 MAIN MENU

Most setup options can be accessed from the MAIN MENU.

To display the MAIN MENU, push and hold down the button (2) on the control panel (Figure 3-14).

Once the MAIN MENU is displayed (Figure 3-15), use the UP and DOWN buttons (Figure 3-14) to navigate through the items on the menu.

Push the SELECTION button to view the settings available for the item selected.

NOTES:

Navigate through sub-menu items by pushing UP and DOWN, except where otherwise indicated.

After a menu item is selected, push the SELECTION button to activate the selected function. The function can be either activated or will show <> symbols.

When <> symbols are shown on the menu line the left and the right actions are enabled. Then use the UP button (1) for increasing (>) the value and DOWN button for decreasing (<) the value. To disable left and right action press button (2) again.

Select the EXIT item and then push the SELECTION button to return to the MAIN MENU.

FIGURE 3-14. MAIN MENU NAVIGATION BUTTONS

FIGURE 3-15. MAIN MENU

Palette Menu

The PALETTE menu (Figures 3-16) allows the user to select from a choice of temperature imaging modes: White Hot, Black Hot, Sepia, Fusion, Rainbow, and Rain.

The palettes act as color templates for visualizing temperature changes in the scene.

```
┌─────────────────────────────┐
│         PALETTE             │
│                             │
│  >  EXIT                    │
│     WHITE HOT               │
│     BLACK HOT               │
│     SEPIA                   │
│     FUSION                  │
│     RAINBOW                 │
│     RAIN                    │
│                             │
└─────────────────────────────┘
```

FIGURE 3-16. PALETTE MENU

Reticle Menu

The RETICLE menu (Figure 3-17) is available only in select products, and allows the user to choose from a selection of reticle patterns: "Dot 4 MOA," "Line Dot," "Cross Center Dot," "Cross," "Crosshair," and "No Reticle" (e.g., position with no aiming mark).

Navigate this menu using the UP (1) and DOWN (3) buttons.

```
┌─────────────────────────────┐
│         RETICLE            │
│  >  EXIT                    │
│                             │
│                             │
│              +              │
│                             │
│                             │
│  <> CROSS                   │
└─────────────────────────────┘
```

FIGURE 3-17. RETICLE MENU

Boresight Menu

The BORESIGHT function is available only in select products and allows the user to change the position of the reticle in the display.

Figure 3-18 shows the boresight screen.

Shift down to the WINDAGE or ELEVATION item that needs to be boresighted and press SELECT (2). Push UP or DOWN to shift the reticle on the display. Holding down UP or DOWN will cause accelerated movement of the reticle in 4 pixel increments.

Each time UP or DOWN is pushed, the reticle shifts a single pixel increment corresponding to the minimum boresight correction value, and the point of impact on the target moves according to the specified windage/elevation boresight increment, in the opposite direction to that of the shifting reticle.

Push the button (2) when finished making adjustments.

```
                    BORESIGHT
    >  EXIT


                       ┼


          WINDAGE    <> 40
          ELEVATION  <> -5
```

FIGURE 3-18. BORESIGHT MENU

NOTE:
Remember that **the center of impact on the target shifts in the opposite direction from the direction that the reticle shifts.** So, to bring the center of impact to the right/left and up/down, you must shift the reticle to the left/right and down/up, respectively.

To control the shift of the reticle, check the running reticle center coordinates, which are printed in the lower left hand corner of the display.

NOTE:
For display coordinates, the origin is the center of the display. The running coordinate of the reticle is the number of incremental shifts of the reticle from the center of the display. The negative (-) sign appears before the displayed number when the reticle shifts left or down. **The point of impact (POI) on the target shifts right or up, respectively**).

Hold UP and DOWN simultaneously to reset to zero azimuth and elevation. The reticle will shift to the display center.

Enhancement Menu

The ENHANCEMENT menu (Figure 3-19) allows the user to take advantage of advanced signal processing algorithms, in order to improve the quality of the image under various thermal environments.

```
                  ENHANCEMENT
    >  CONTRAST      <>   0
       SHARPNESS     <>   16
       SMARTSCENE    <>   100
       SKY/SEA       <>   OFF
```

FIGURE 3-19. ENHANCEMENT MENU

Choose a menu item by pushing SELECT (2). Use UP (1) or DOWN (3) to change the value. Press the button (2) to enter the value.

CONTRAST - Active Contrast Enhancement (ACE) – a digital contrast correction that allows for a smart scene optimization based on dynamic adjustments, where a variety of contrast levels occur depending on relative scene temperatures. The adjustment range is from -8 to +8 with a default value of 0. Lower

values will cause hotter objects to have greater contrast, while higher values will cause colder objects have greater contrast.

CONTRAST -8   CONTRAST +8
FIGURE 3-20. DIGITAL CONTRAST CORRECTION

SHARPNESS - Second Generation Digital Detail Enhancement (DDE) – a sharpness correction that digitally enhances the picture for clearer imagery, significantly sharper edges, and reduced image blurriness. The adjustment range is from -20 to +100 with a default value of 16. Lower volumes will soften the edges of the image. Higher values will sharpen objects, enhance details, and further increase the signal-to-noise ratio.

SHARPNESS -20   SHARPNESS +100
FIGURE 3-21. SHARPNESS CORRECTION

SMART SCENE - Smart Scene Optimization (SSO) – a fine-tuning computational correction that significantly improves overall visual acuity for targets that have thermal signatures similar to the surrounding background. Higher values provide more linear automatic gain control behavior. Objects with similar (but not identical) temperatures can be differentiated with greater accuracy. The adjustment range is from 0 to 100, with a default value of 100.

SMART SCENE 0   SMART SCENE 100
FIGURE 3-22. SMART SCENE OPTIMIZATION

SKY/SEA - Information-Based Histogram Equalization (IBHEQ) – a "Sky/Sea" enhancement – information-based, environment dependent algorithm that automatically adjusts camera gain and excludes pixels determined to contain unimportant information. This is specifically helpful in scenes with lots of sky or water. Turning the "Sky/Sea" enhancement ON will improve the contrast for the area of interest, but at the possible loss of some scene content.

SKY/SEE OFF - PLANE AND BANNER ARE MORE EVIDENT

SKY/SEE ON – MORE CONTRAST DEVOTED TO PEOPLE AND THE BOAT

FIGURE 3-23. "SKY/SEA" ENHANCEMENT

Store Image Menu

The STORE IMAGE menu (Figure 3-24) allows the operator to take, review, and delete all images in the camera. Select SAVE IMAGE and press SELECT to capture an image. To view the image, select VIEW IMAGE and press SELECT. When previewing images, the image counter will show the current number of still images versus the total number of images in the camera. To exit the preview, press SELECT. To delete images, press DELETE ALL. All images in the camera will be deleted.

FIGURE 3-24. STORE IMAGE MENU

Settings Menu

The SETTINGS menu (Figure 3-25) allows changes to profiles, video standards, compass calibrations, left and right screen margins, remote programming, and other setting items, as well restoration to factory defaults. The Firmware (FW) revision number is listed at the bottom of the menu display.

Choose menu items by pushing SELECT (2). If the <> signs appear, use UP (1) or DOWN (3) to change your selection. Press the button (2) to accept the selection.

RIFLE PROFILE
Supports 3 individual rifle profiles with individual boresight, reticle, and palette settings.

STANDARD
Changes the video output standard between NTSC and PAL.

CALIBRATE COMPASS
Select to calibrate the compass. When selected, rotate the camera in all directions for best calibration results.

LEFT MARGIN
Shifts the screen left to right.

TOP MARGIN
Shifts the screen up and down.

LEARN REMOTE
Learns the remote channel and encryption. Select this to pair a new remote with the camera. When pushed, the phrase PUSH ANY REMOTE KEY will appear. Push any button on the remote. When calibration is successful, the phrase LEARN SUCCESSFUL will appear.

FACTORY RESET
Resets the camera to factory defaults.

SOFTWARE VERSION
Software release versions are shown in alphanumeric format. To view, push SELECT.

```
            SETTINGS
  >  RIFLE PROFILE    <>  1
     STANDARD          NTSC
     CAL. COMPASS
     LEFT MARGIN      <>  85
     TOP MARGIN       <>  0
     LEARN REMOTE
     FACTORY RESET
     FW: XXXXXXXXXX
```

FIGURE 3-25. SETTINGS MENU

Power Down Menu

The POWER DOWN menu (Figure 3-26) allows the user to turn the camera off or to set it in standby mode, so it can be awakened from the wireless remote.

```
            POWER DOWN
  >  TURN OFF
     STANDBY 5 MIN
     STANDBY 30 MIN
     STANDBY 60 MIN
     STANDBY 8 HOURS
```

FIGURE 3-26. POWER DOWN MENU

> **NOTE:**
> After configuration is complete, select EXIT on the MAIN MENU. Choose SELECT to leave the MAIN MENU. All settings will be saved.

3.3 OPERATING PROCEDURES

3.3.1 OPERATING

> **CAUTION:**
> DO NOT force the equipment controls past their stopping points.

> **CAUTION:**
> To prevent thermal damage to the equipment, never point it (either ON or OFF) directly at the sun or any other source of high intensity light that the unprotected human eye cannot tolerate (such as a welding arc). To prevent accidental exposure to these sources, never leave the equipment without first securing the objective lens cap.

Operating procedures are as follows:

1. Remove the Q14 from the carrying case.
2. Activate the Q14 by pushing the button (2). Leave the objective lens cap in place while initializing the Q14, as it has a Shutterless NUC. After approximately 3 sec, video of the thermal scene should appear.
3. Remove the protective caps.
4. Point the equipment at an object.
5. Adjust the focus by turning the focus ring (CW for far focus, CCW for near focus).
6. Using the buttons on the control panel (Figure 3-14), configure the Q14 for your specific situation.

For more information on operational setting procedures, see Part 3.2 (Controls and Display Indications).

   A.   Adjust the brightness of the display to your preferred level.

   Push button (1) to increase display brightness. Push button (3) to decrease brightness.

   B.   Use the UCMNUC/ FFC (User-Controlled Manual Non-Uniformity Correction/ Flat-Field Correction) function to improve image quality. As the camera and the detector heat up during use, the detector pixels will drift. The pixels do not drift uniformly. The camera software compensates for the drift up to an accurate position point, but when the limit is reached, the UCMNUC/ FFC function is triggered.

   Hold down buttons (1 and 3) simultaneously to manually trigger the User-Controlled Manual Non-Uniformity Correction/ Flat-Field Correction. When performing the NUC, you must look at a uniform background or cover the objective lens with your hand.

   If necessary, interrupt the automatic UCMNUC/ FFC process by pushing button (2) on the control panel during the 5-second countdown, which will appear at the bottom of the display.

   C.   Adjust as necessary using the MAIN MENU. See Part 3.2.2 (Using the MAIN MENU).

> **CAUTION:**
> DO NOT leave the equipment activated when not in use.

3.3.2 LASER POINTER OPERATION

CAUTION:

When operating the device in extremely dark conditions, the light from the IR laser will be invisible to the naked eye. However, the light can be detected by other NVDs.

The Q14 is equipped with a built-in laser pointer for active target acquisition. The IR laser is intended for use at night (under moonlight, starlight conditions, etc.), in poor visibility, and in hanging light conditions for NVD target acquisition.

To activate the laser, hold down the IR laser button. Release the button to turn the laser off.

3.3.3 WEAPON SIGHT MODE

⚠️ **WARNING:**

If a scope is mounted too far to the rear of a weapon, the eyepiece can injure the shooter during recoil. Shooting at an uphill angle also increases this hazard, as it shortens the distance between the shooter and the rear of the scope. For this reason, Armasight scopes are engineered to provide generous eye relief. Therefore, when mounting your scope, we recommend positioning it as far forward in the mounts as possible to take full advantage of this generous eye relief. With hard-recoiling rifles, serious injury or even death can result if the eyepiece collides with the shooter during recoil. Be certain that your installation provides sufficient eye relief for the recoil generated by your rifle before shooting the firearm.

NOTE: Give special attention to this warning when shooting uphill and/or from a prone position. These shooting conditions can dramatically reduce eye relief. PLEASE maintain maximum eye relief when shooting heavy recoiling and/or magnum firearms. THE USER ASSUMES ALL RESPONSIBILITY AND LIABILITY FOR HAVING THE ARMASIGHT RIFLE SCOPE PROPERLY MOUNTED TO A FIREARM AND USING THE ARMASIGHT RIFLE SCOPE PROPERLY. ALWAYS CHECK THE CONDITION OF YOUR MOUNTING SYSTEM PRIOR TO USING YOUR FIREARM.

The Q14 with a QRM adapter can be used as a thermal imaging weapon sight. Use the Q14 in weapon sight mode as follows:

1. Install the QRM adapter to the Q14. For mounting procedures, see Part 3.1.11.
2. Install the Q14 on a weapon.
3. Turn on the Q14.
4. Activate the Q14 reticle by using the Reticle function in the Main Menu.
5. Adjust the brightness of the display.
6. Adjust the focus to sharpen the image of the target.
7. Select a reticle pattern using the Reticle Menu.
8. Use the digital zoom to magnify the central area of the scene. Hold down the zoom control button (1) to slowly magnify the displayed scene. The X1, X2, and X4 symbols will appear in the lower part of the display.

NOTE:

Digital zoom allows distant objects to appear larger; however, the resolution will be compromised.

NOTE:
Zooming does not affect the boresight.

NOTE:
Digital zoom helps target detection and discrimination.

NOTE:
The Q14 must be zeroed each time it is mounted to a **new** weapon.

Boresight the Q14 as follows:

1. Locate a target at the fire adjustment range (for example, 100yd or 100m).
2. Turn on the Q14.
3. Adjust the Q14, as shown above.
4. Take aim by centering the reticle on the target and firing a series of shots (3-4).
5. Find the point of impact and measure its vertical and horizontal deviations from the center of the target.
6. Work out the values of the boresight corrections required to compensate for the measured deviation of the point of impact from the center of the target. Table 3-3 contains examples of calculating boresight correction values.

TABLE 3-3. EXAMPLE OF CALCULATING CORRECTIONS (100YD AND 100M FIRING RANGES)

ITEM		DATA
Windage/Elevation Boresight Increment *		2.6MOA 0.75 mils 2.7in/100yd 7.5cm/100m
Windage/Elevation Adjustment Range		±208MOA /±156MOA
Measured Windage/ Elevation Deflection of the Point of Impact from the Target Center (EXAMPLE)		5in / 10in (13cm / 26cm)
Correction Value	Windage	5/2.7≈2 shifts (13/7.5≈2 shifts)
	Elevation	10/2.7≈4 shift (26/7.5≈4 shift)

* 1) To calculate boresight increment value for a fire range R different from 100 yards, use the coefficient R/100. So at a range R (in yards) the boresight increment is:
    2.7×R/100, in.
  2) To calculate boresight increment value in metric units for a fire range R different from 100m, use the coefficient R/100. So at a range R (in meters) the boresight increment is:
    7.5×R/100, cm.

7. Use the BORESIGHT MENU to apply corrections required to bring the point of impact as close as possible to the center of the target. See Part 3.2.2 (Using the MAIN MENU).

A. Moving the reticle in a positive (+) direction (to the right) will move the point of impact to the left. Moving the reticle in a negative (-) direction (to the left) will move the point of impact to the right.

B. Moving the reticle in a positive (+) direction (up) will move the point of impact down. Moving the reticle in a negative (-) direction (down) will move the point of impact up.

8. Fire a series of shots to check the boresight.

9. After completing the boresight adjustment procedure, you can use the RIFLE PROFILE function in the Settings menu to save the boresighted reticle position in the "Rifle Profile" tab. This can be done for the same scope with to up to 3 different rifles (Profile 1, Profile 2, and Profile 3).

NOTE:

Set the menu for Rifle Profile 1 for the first weapon when you use it. If you want to keep that boresight setting for that rifle, change to rifle Profile 2 for the next weapon, etc.

10. Turn the Q14 OFF and place the cap over the objective lens.

3.3.4   Q14 SHUT-DOWN

NOTE:

Shut down the Q14 to properly to avoid losing unsaved settings and data.

Shutdown the Q14 as follows:

1. Go to MAIN MANU then POWER DOWN menu and select TURN OFF.

2. Turn off the Q14.

3. Replace the cap on the objective lens.

4. Disconnect the cable (if applicable).

5. Place the cap on the connector.

6. Remove the battery.

CAUTION:

Do not store the Q14 with the battery still installed.

7. Store the Q14 and all accessories in the carrying case.

4

PREVENTIVE MAINTENANCE AND TROUBLESHOOTING

4.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4.1.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Table 4-1 Preventive Maintenance Checks and Services (PMCS), has been provided so that you can keep your equipment in good operating condition.

Perform functional tests in the order listed in Table 4-1.

Operating procedures are detailed in Chapter 3.

Explanation of Table Entries:

SEQ NO. column. Sequence numbers are for reference and appear in the order required to perform checks and services.

LOCATION OF ITEM TO CHECK/ SERVICE column. Indicates the location and the item to be checked or serviced.

PROCEDURE column. Details the check/ service procedure.

NOT FULLY MISSION CAPABLE IF... column. Indicates what faults will prevent your equipment from operating successfully.

TABLE 4-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

SEQ NO.	LOCATION OF ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF...
		PRE-OPERATIONAL CHECKS	
1	Completeness	Open storage/carrying case and inventory items by comparing them with information specified in this manual.	Missing items.
2	Soft Carrying Case	Shake out loose dirt or foreign material. Inspect for tears, cuts, excess wear or damage.	
3	Body	Inspect for cracks or damage. Scratches and gouges are OK if operation is not affected. Inspect for missing parts. Clean as required.	Cracked or damaged. Missing parts.
4	Objective Lens Cap	Inspect for cuts, tears, and dirt. Clean as required.	Cap is torn or cut. Cap is not secured to the housing of the lens.
5	Eyepiece Cup	Inspect for cuts, tears and dirt. Clean as required.	Cup is torn or cut. Cup is not secured to the eyepiece.
6	Battery Compartment and Cap	Inspect for corrosion, moisture, and corroded or defective contacts. Inspect for cap damage or retainer breaks. Inspect rubber gasket for damage.	Contacts are damaged or corroded. Retainer is broken. Cap or rubber gasket is damaged.
7	Lenses	Inspect for cleanliness, scratches, chips or cracks. Clean as required.	Chipped or cracked. Scratches hinder vision through the equipment.
8	Objective Focus Ring	Rotate objective focus ring to ensure it is not too tight or too loose. Range is approximately 3/4 turns.	Ring gets stuck, is too loose, or adversely affects the user's ability to properly focus the objective lens.
9	Eyepiece Ring	Rotate eyepiece ring to ensure it is not too tight or too loose.	Ring gets stuck, is too loose, or adversely affects the user's ability to properly focus the eyepiece.
10	Connector	Inspect for corrosion, moisture, corroded or defective contacts. Inspect for cap damaged or retainer breaks.	Contacts are damaged or corroded. Cap is damaged. Retainer is broken.
11	Remote Control Unit	Check for damage and missing parts. Check Velcro tape for wear.	Damaged. Missing parts.
12	Video Cable	Inspect for damage. Inspect the cable connector for corrosion, moisture, or corroded or defective contacts. Clean as required.	Damaged.
13	Standard Components and Optional Equipment	Inspect for damage, corrosion, or missing parts. Check for proper operation. Clean as required.	Damaged. Missing parts.
		OPERATIONAL CHECKS	

NOTE:
For a complete operational check, it is necessary to connect a video monitor to the Q14.

SEQ NO.	LOCATION OF ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF...
14	Control Board	Install the battery. Remove the objective lens cap. Point the equipment at an object. Turn the equipment on. Look for a thermal image on the display. Look for a flashing battery icon in the eyepiece viewing area. Ensure the scope is responsive to control buttons.	No thermal image. Battery icon is flashing (indicates a low battery). Unresponsive buttons.

TABLE 4-1. CONTINUED

SEQ NO.	LOCATION OF ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF...
15	Remote Control	Turn the equipment to standby. Point the equipment at an object. Push the remote control buttons. Ensure the scope is responsive to control buttons. Turn off the equipment.	No image.
16	Video Cable	Connect an external monitor to the scope. Point the equipment on an object. Turn the equipment on. Look for an image on the monitor. Turn off the equipment. Disconnect the monitor.	No image.

POST-CHECK PROCEDURES

Turn off the equipment.

Replace the objective lens cap.

Remove the battery.

Return the equipment and all accessories to the carrying case.

4.2 OPERATOR TROUBLESHOOTING

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

Table 4-2 lists the common malfunctions that may be found during the operation or maintenance of the Q14. Perform the tests/ inspections and corrective actions in the order listed.

This table does not list all of the malfunctions that may occur with your device, or all of the tests and corrective actions that may be necessary. If you experience an equipment malfunction that is not listed, or is not fixed by the corrective actions listed in the table, please contact Armasight's Customer Service center.

TABLE 4-2. OPERATOR TROUBLESHOOTING

MALFUNCTION	PROBABLE CAUSE/ TEST/ INSPECTION	CORRECTIVE ACTION
The Q14 fails to activate.	Battery is missing or improperly installed.	Insert battery or install correctly.
	Battery is dead.	Replace the battery.
	Battery, surfaces, or contacts are dirty or corroded.	Clean the contact surfaces with a pencil eraser and/or alcohol and cotton swabs.
	Remote control unit is damaged.	Please contact Customer Support.
	Remote control battery is dead.	Replace the battery as per Part 4.3.4.
	The equipment is damaged.	Please contact Customer Support.
The Q14 is not responsive to control buttons.	The equipment is damaged.	Please contact Customer Support.
Remote control does not work.	Battery is missing or improperly installed.	Insert battery or install correctly.
	Battery is dead.	Replace the battery.
	Battery surfaces or contacts are dirty or corroded.	Clean the contact surfaces with a pencil eraser and/or alcohol and cotton swabs.
	Remote control unit is damaged.	Please contact Customer Support.

TABLE 4-2. CONTINUED

MALFUNCTION	PROBABLE CAUSE/ TEST/ INSPECTION	CORRECTIVE ACTION
Poor image quality.	Check objective lens and eyepiece focus.	Refocus.
	Check for fogging or dirt on objective lens and eyepiece.	Clean the lenses as detailed in Part 4.3.2.
	The equipment is damaged.	Please contact Customer Support.
No image on external monitor.	Video cable is damaged.	Replace the video cable with a new one. Please contact Customer Support.
	The equipment is damaged.	Please contact Customer Support.
Hindered rotation of the battery cap.	Dirty cap thread.	Clean the thread.
	Damaged cap thread.	Replace the cap with a new one. Please contact Customer Support.
Light is visible around eyecup.	Check eyecup resilience.	If the eyecup is defective, please contact Customer Support.

4.3 MAINTENANCE

4.3.1 GENERAL

The Q14 operator maintenance consists of operational tests, inspections for unit serviceability, cleaning and mounting procedures, corrective actions (troubleshooting and replacement of a limited number of parts). Maintenance instructions covered elsewhere in this manual (PMCS, troubleshooting, etc.) are not repeated in this section.

> **CAUTION:**
> The Q14 is a precision electro-optical instrument and must be handled carefully at all times to prevent damage.

> **CAUTION:**
> DO NOT dismantle the equipment.

4.3.2 CLEANING PROCEDURES

Clean the Q14 and optional items as follows:
1. Gently brush off any dirt from the equipment using only a clean, soft cloth.
2. Moisten the cloth with fresh water and gently wipe the external surfaces (except for optical surfaces).
3. Dry any wet surfaces (except for optical surfaces) with another clean, dry soft cloth.
4. Using a lens brush, carefully remove all loose dirt from optical surfaces (objective lens and eyepiece).
5. Dampen a cotton swab with alcohol and gently wipe optical surface. Clean the optical surface using circular movements, starting from the center and moving out towards the edge. Do not touch the lens holder. Change the cotton swab after each circular stroke. Repeat until the optical surface is clean.
6. Clean the battery contact surfaces and contact springs with a pencil eraser and/or alcohol and cotton swabs.

4.3.3   BATTERY REMOVAL AND REPLACEMENT

Refer to Part 3.1.1 for battery installation procedures.

Replace the remote control battery as follows:

1. Using a screwdriver, unscrew the four screws (A, Figure 4-1) that secure the cover to the bottom of the unit. Remove the cover.
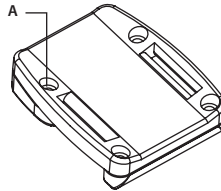
A ⎯

FIGURE 4-1. ADVANCED WIRELESS REMOTE CONTROL BATTERY INSTALLATION

2. Replace the battery with new one (CR2032, 3V). Install the battery, aligning their polarity markings (+/-) with those embossed on the compartment.

3. Replace the cover and tighten the screws (A).

4.4 RETURN INSTRUCTIONS

For service, repair or replacement, please email *service@armasight.com*.

To assist the Service Representative (SR) with determining if the item is repairable, please provide the following information:

1. Serial Number of the defective item (engraved on bottom of the equipment).

2. Thorough description of the malfunction, defect, or damage.

3. An explanation of 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 number (RMA#) will be provided.

When returning the Q14 for service or repair, the following procedures should be followed to prevent any additional damage:

1. Make sure the scope is free of all contaminants, such as dirt or any other foreign material.

2. Remove the batteries.

3. Place the cap over the objective lens.

4. Place the scope and accessories in the carrying case.

Place the scope, as well as a copy of the test report or detailed description of the failure, in a suitable packing/ shipping container. Mark the package with the RMA#. Ship using the fastest method (that is both traceable and prepaid) to:

Armasight Inc.
815 Dubuque Avenue
South San Francisco, CA 94080
USA

A. LIST OF SPARE PARTS

The parts authorized by this list of spare parts are required for the equipment operator maintenance. The list includes parts that must be removed in order to replace authorized parts.

The PART NO. column indicates the primary number used by the manufacturer to identify an item, which controls the design and characteristics of that item by means of its engineering drawings, specifications, standards, and inspection requirements.
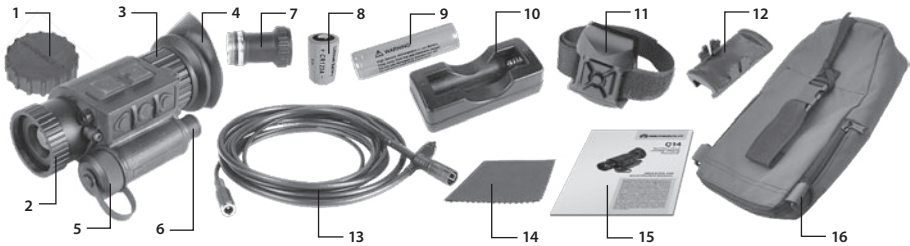

FIGURE A-1. Q14 SPARE PARTS LIST

TABLE A-1. Q14 SPARE PARTS LIST

ITEM NO.	DESCRIPTION	PART NO.
1	Objective Lens Cap	Q14OLC
2	Objective Lens Assembly	Q14OLA
3	Eyepiece Assembly	Q14EPA
4	Eyepiece Cup	Q14EPC
5	Battery Cap	Q14BTCP
6	Connector Cap	Q14LCNCP
7	Battery Adapter for 16650 Battery	Q14BTA16650
8	CR123A Lithium Battery	ALT
9	16650 Rechargeable Battery	ALT
10	Charger for 16650 Battery	ALT
11	Advanced Wireless Remote Control	Q14AWREC
12	Picatinny Adapter for Advanced Wireless Remote Control	ANRA000002
13	Video Cable	Q14VDCB
14	Lens Tissue	Q14LNTS
15	Operation and Maintenance Manual	Q14OMM
16	Carrying Case	Q14CRCS

B. PRODUCT WARRANTY REGISTRATION CARD

In order to validate the warranty on your product, Armasight must receive a completed Product Warranty Registration Card for each unit, or the user must complete warranty registration on our website (www.armasight.com). Please complete the included form and immediately mail it to our Service Center:

Armasight Inc.
815 Dubuque Avenue
South San Francisco, CA 94080
USA

ARMASIGHT PRODUCT WARRANTY REGISTRATION CARD

PRODUCT INFORMATION

Product Name _____   Purchased From _____

Purchase Date _____   Product Serial # _____

CUSTOMER INFORMATION

Name _____

Address _____

City _____   Country _____   Zip _____

Day Phone # _____   Home Phone # _____

E-mail address _____

ARMASIGHT

Armasight Inc.

815 Dubuque Avenue
South San Francisco
CA 94080, USA

Phone: (888)959-2259
Fax: (888)959-2260
Intl Phone/Fax: (650)492-7755

info@armasight.com

WARNING!

This product contains natural rubber latex which may cause allergic reactions! The FDA has reported an increase in the number of deaths that are associated with an apparent sensitivity to natural latex proteins. If you are allergic to latex, it is a good idea to learn which products contain it and strictly avoid exposure to those products.

www.armasight.com