FLIR *LS-X/R*

Thermal Monocular

USER MANUAL

◆FLIR®

If you have questions that are not covered in this manual, or need service, contact FLIR OTS customer support for additional information prior to returning a camera.

Phone:1-888-959-2259

Email: OTS-support@flir.com

This documentation is subject to change without notice.

Proper Disposal of Electrical and Electronic Equipment (EEE)

The European Union (EU) has enacted Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE), which aims to prevent EEE waste from arising; to encourage reuse, recycling, and recovery of EEE waste; and to promote environmental responsibility.

In accordance with these regulations, all EEE products labeled with the "crossed out wheeled bin" either on the product itself or in the product literature must not be disposed of in regular rubbish bins, mixed with regular household or other commercial waste, or by other regular municipal waste collection means. Instead, and in order to prevent possible harm to the environment or human health, all EEE products (including any cables that came with the product) should be responsibly discarded or recycled.

To identify a responsible disposal method where you live, please contact your local waste collection or recycling service, your original place of purchase or product supplier, or the responsible government authority in your area.

Business users should contact their supplier or refer to their purchase contract.

Important Instructions and Notices to the User:

Modification of this device without the express authorization of FLIR Systems, Inc. may void the user's authority under FCC rules to operate this device.

Note 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver
- Consult the dealer or an experienced radio/television technician for help.

Industry Canada Notice:

This Class B digital apparatus complies with Canadian ICES-003.

Avis d'Industrie Canada:

Cet appareil numérique de la classe B est conforme à la norme
NMB-003 du Canada

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Export Information

Equipment described herein may require US Government authorization for export purposes. Diversion contrary to US law is prohibited.

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SECTION 1. INTRODUCTION

1.1 SCOPE

This manual covers the FLIR LS-X/R Series and all applicable components. It is recommended that you read and understand this manual to optimize the monocular's operation.

1.2 INTRODUCTION

FLIR's LS-X/R Series thermal handheld monoculars give hikers, law enforcement professionals and first responders the ability to see clearly in total darkness, providing a wealth of information during any nighttime mission.

1.3 FEATURES

- Rugged design – built to withstand the demands of outdoor use.
- Microbolometer sensor for excellent image quality and clarity
- Palm-sized portability and lightweight – only 12 ounces
- Red laser pointer
- Battery charging via USB cable
- USB/Video adapter cable for video out
- Rechargeable internal li-ion battery – provides up to 5 hours of camera operation on a single chargege

1.4 REGISTER YOUR LS-X/R

In order to validate the warranty on your product, FLIRI Systems Inc. must register the product on https://www.flir.com/support-center/support-hq/

1.5 INFRARED THERMAL VISION VERSUS IMAGE INTENSIFIED NIGHT VISION

The FLIR LS-X/R makes images from heat, not light, a feat impossible for the naked eye or image intensified (I^2) night vision devices. This allows you to see clearly without any visible light. People, animals, and objects all generate or reflect heat and are clearly seen by the FLIR LS-X/R in even the most adverse conditions.

FLIR LS-X/R ENABLES THE OUTDOOR ENTHUSIAST TO:

- See animals and difficult terrain in reduced visibility or total darkness
- See through smoke, dust, and light fog
- See camouflage and foliage in any lighting conditions
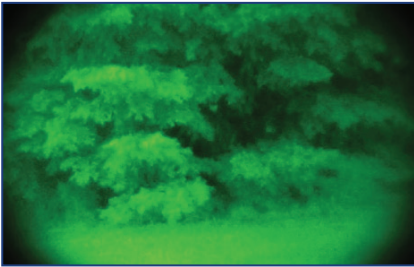- See more – and see farther – than with low-light night vision goggles

IMAGE INTENSIFIED I^2

THERMAL IMAGING

1.6 DETECTION, RECOGNITION, IDENTIFICATION

DETECTION
I see something.

RECOGNITION
It's a four-legged animal.

*IDENTIFICATION*
I can tell it is an Elk.

SECTION 2. GETTING STARTED

2.1 UNPACKING AND INSPECTING

The FLIR LS-X/R Series monocular is available with the features, options, and accessories described in this manual. Refer to the packing list enclosed with your product to determine the actual contents of your product package.

In addition to the product the following items are included in the product package:
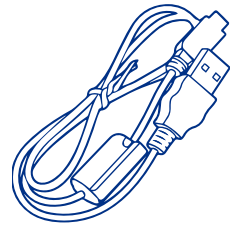
• FCC Declaration of Conformity
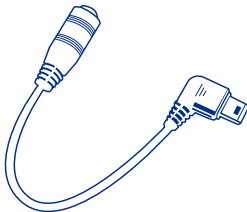
• CE Declaration of Conformity
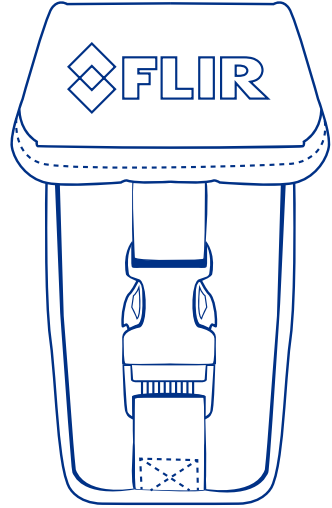
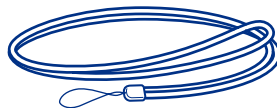*Molle-Compatible Belt Holster*
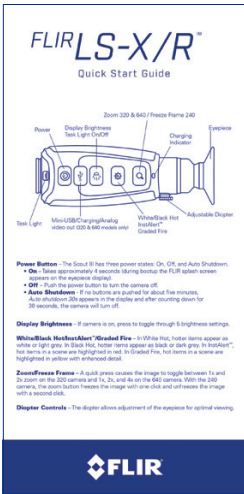
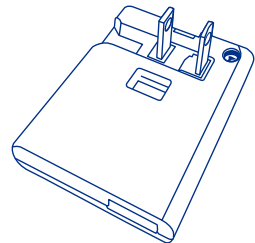*Quick Start Guide*

USB Cable

USB to RCA Cable (320 & 640 models only)


Lens Cap

Wrist Strap

USB Power Adapter

2.2 CHARGING THE SYSTEM

To assure proper charging, LS-X/R Series monoculars should be turned OFF throughout the charging cycle. Charging MUST only be done when the camera temperature is from 0 to 40°C (32 to 104°F), or battery damage may occur.

The monocular battery should be fully charged prior to use. To charge the monocular, lift the cover from the USB port, plug in the USB cable provided with the monocular, and plug other cable end into a USB power source.

USB Port

Charging Indicator
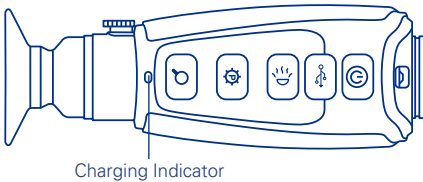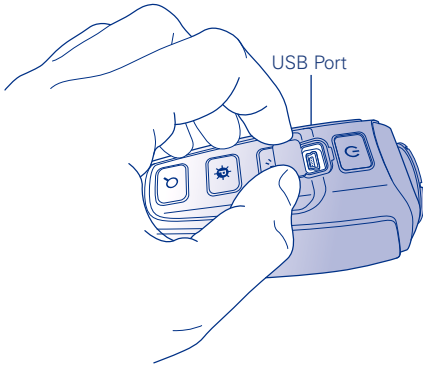
- When charging the charging indicator will be lit orange.
- When fully charged, the charging indicator will light solid green. The initial charge time is approximately 5 hours.

2.3 BATTERY

Your LS-X/R Series monocular is equipped with a sophisticated power system that uses a rechargeable internal Li-Ion battery.

BATTERY STATUS INDICATOR

While the monocular is ON, a battery status indicator is always shown in the corner of the display image. This indicator provides an estimation of the remaining battery charge.

Full Charge

Half Charge

Plugged In
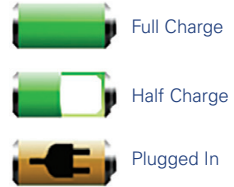
BATTERY SAFETY INFORMATION

The LS-X/R Series monocular is a sealed unit with sensitive electronics and contains no user-serviceable parts. Service or repair is to be performed only by the manufacturer. The monocular must never be opened or modified by the user. The monocular contains no user serviceable components. The battery used in this device may present a risk of fire or chemical burn if mistreated. Do not disassemble the monocular, store above 60°C, or incinerate. The battery is replaceable only in the factory. Return the product to the manufacturer for battery replacement.

SECTION 3. OPERATING THE SYSTEM

3.1 SYSTEM CONTROLS AND BUTTONS

Power

Display Brightness
Task Light On/Off

Zoom

Eyepiece

Charging
Indicator

Laser Pointer

Mini-USB/Charging/Analog
video out

Palette Selection

Adjustable Diopter
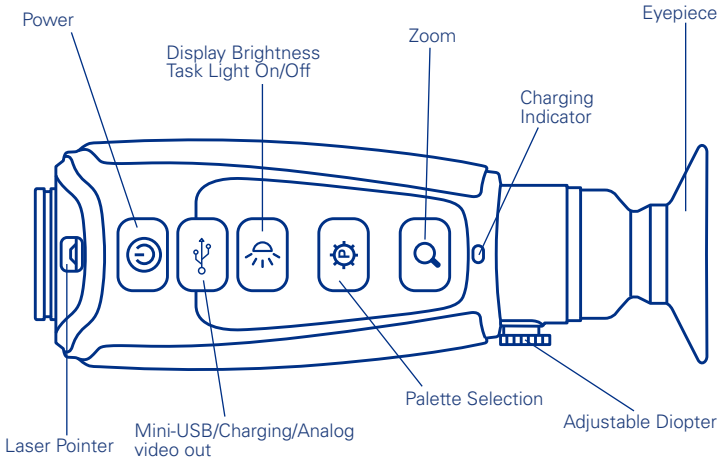
3.1.1 DIOPTER ADJUSTMENT

While looking through the eyepiece, adjust the position of the diopter lever to optimize the sharpness of the image in the viewfinder.
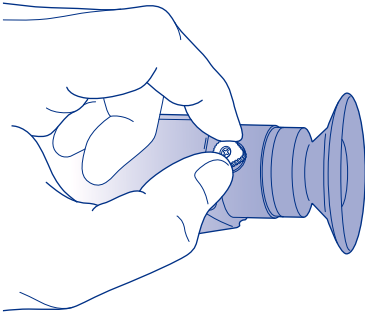

3.1.2 POWER BUTTON

The Power Button performs the following functions:

SYSTEM STATE	SHORT PRESS	LONG PRESS
System OFF	Turns Power ON	N/A
System ON	Access User Menu	Turns Power OFF

3.1.3 DISPLAY BRIGHTNESS BUTTON

Use this button to cycle through the five levels of display brightness. Each press of the button advances to the next level of brightness.

When the highest brightness level is reached, subsequent button presses advance to the next lower brightness levels. When the lowest brightness level is reached, subsequent button presses advance to the next higher brightness level. One of the following icons is displayed for approximately 3 seconds after the button is pressed indicating the current brightness level:

Dim   Bright
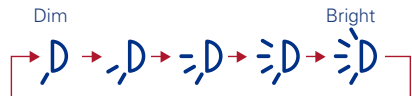
SYSTEM STATE	SHORT PRESS	LONG PRESS
System OFF	Flashes LED Task light	Turn on LED Task Light
System ON	Changes Current Display Brightness	N/A

3.1.4 COLOR PALETTES

Use this button to toggle between the available color palettes. Please see the following images for examples of LS-X/R's color palettes.

WHITE HOT

Most commonly used palette. Hot objects appear white. Good for scenes with either high or low contrast.

BLACK HOT

Hot objects appear black. Scenes appear more lifelike than White-Hot, especially at night.

INSTALERT™ LEVEL 1

The hottest 5% of things in the image are colored and everything else is greyscale.
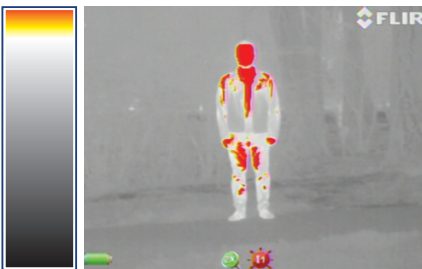
INSTALERT™ LEVEL 2

The hottest 10% of things in the image are colored and everything else is greyscale.

INSTALERT™ LEVEL 3

The hottest 15% of things in the image are colored and everything else is greyscale.

INSTALERT™ LEVEL 4

The hottest 20% of things in the image are colored and everything else is greyscale.

3.1.5 ZOOM BUTTON

Use this button to switch the monocular between no zoom (full resolution), 2X and 4X (LS-X), and 2X, 4X, and 8X (LS-XR). The central part of the image is magnified by the zoom level selected.

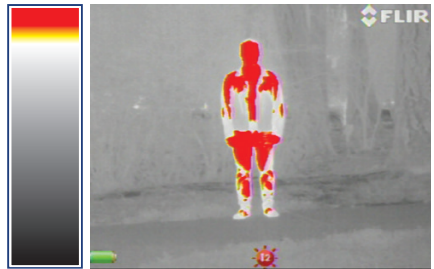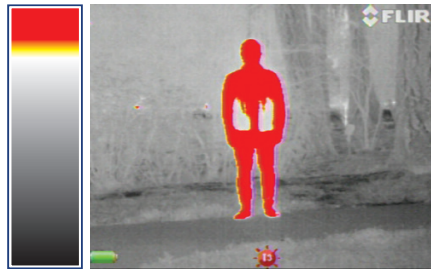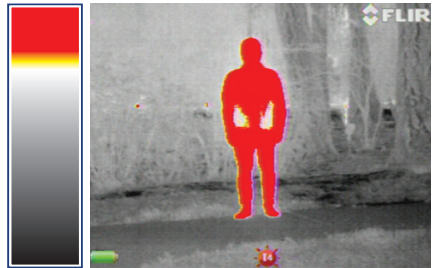When zoom has been selected, the icon appears continuously in the display. See user menu section for additional details

3.2 USING USB/ANALOG VIDEO ADAPTER CABLE

To obtain analog video out, insert the adapter cable into the USB connector. The monocular will detect the adapter cable and provide the video stream. Use an RCA cable to connect to a monitor or a video recorder.

USB to RCA Video Cable

Customer Supplied RCA Cable
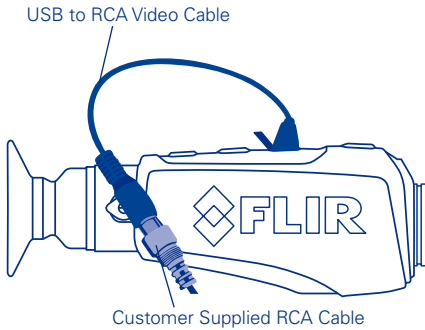
When using the USB/Analog Video Adapter cable to record video or supply video to a remote monitor, it may be useful to turn off the Auto Power Off feature of the monocular. Set the video format using the LS-X/R/LS-X/LS-XR End User Tool.

3.3 LS-X/R POWER MANAGEMENT

Your LS-X/R Series monocular is equipped with a power management system that provides up to five hours of continuous operation. When left in the Off state the battery will hold a charge for up to two months. To use the product it is important to understand the basic power states of the product.

- When the monocular is turned on from the Off state, it takes about five seconds to become operational. During the boot up process, the FLIR splash screen is shown. Pressing the Power button will toggle the monocular between On and Off.
- The camera shuts down after about five minutes if no buttons are pushed.

SYSTEM STATE	HOW DO YOU KNOW?
OFF	The display is off and the Task Light comes on when the Brightness button is pressed.
ON	The display is on and the LED Task Light is disabled. If the image appears blank, make sure the lens cover is removed.

3.4 AUTO POWER OFF OPERATION

Auto Power Off is a feature of the LS-X/R Series monocular that helps to guard against draining the battery prematurely by inadvertently leaving the camera on.

Auto Shutdown turns the camera off if the following conditions are met:

- The product is On
- No buttons have been pressed for five minutes

Once these conditions are met, you will see the following message in the display: "Auto Power Off 30s." After counting down for 30 seconds, the monocular will shutdown.

Press any button during this countdown to terminate Auto Power Off and resume normal operation.

3.5 AUTO FFC / CALIBRATION

By design, the camera will periodically initiate a Flat Field Correction (FFC) cycle, also known as a Non-Uniformity Correction (NUC). A shutter activates inside the camera and provides a target of uniform temperature, allowing the camera to correct for ambient temperature changes and provide the best possible image. Just prior to the FFC, a small green square will appear in the upper left corner of the screen for two seconds. When the FFC occurs, the video image temporarily freezes.

3.6 LS-X/R/LS-X/LS-XR END USER TOOL

The SCOUT III/LS-X/LS-XR end user tool is a graphical user interface (GUI) that is used with the following FLIR handheld thermal imaging monoculars:

• SCOUT III Series
• LS-X/R Series

To get detailed information,software downloads, or product support for your LS-X or LS-XR visit the product page at: www.flir.com/support-center/support-hq/

SECTION 4. SYMBOLOGY

The LS-X/R user interface has a clear and simple on-screen symbology that allows the user to easily navigate through the settings, and optimize the image quality based on certain variables. From the zoom function to palette choice the symbology on-screen matches the button symbology so the user becomes instantly familiar with how to manipulate and operate all of LS-X/R's functions.

See the reference points below to get a solid understanding of the onscreen functionality.

The brightness indicator appears on screen when adjusting the brightness level of the LCD screen.

The battery symbol clearly displays the battery status.

The magnifying glass clearly indicates the zoom functionality of the LS-X/R and the 2X inside the symbol indicates the magnification.

This symbol clearly identifies the current palette being used. In this example, InstAlert level 1 is displayed (I1).

SECTION 5. MAINTENANCE

5.1 SOFTWARE UPDATE

Software updates for your LS-X/R can be found at:
www.flir.com/support-center/support-hq/.

5.2 BATTERY SERVICE AND REPLACEMENT

If the battery will not hold a charge and requires replacement, please contact FLIR Systems for details on returning the unit for service.
For instructions on charging the battery refer to Section 2.3 Charging the system.

5.3 CLEANING THE LS-X/R

Wipe the housing with a damp cloth, as needed. Use a high quality lens wipe to remove dirt or smudges from the lens and display window.
Do not use abrasives or solvents to clean the housing, lens, or display window.

5.4 CAUTIONS

- Do not disassemble the monocular enclosure. Disassembly can cause permanent damage. The battery is not user-replaceable
- Do not point the monocular at high-intensity radiation sources, such as the sun, lasers, or arc welders
- Do not leave fingerprints on the monocular's infrared optics. Clean only with low pressure fresh water and a lens cloth
- All service must be provided by the manufacturer

SECTION 6. WARRANTY

6.1 GLOBAL LIMITED WARRANTY

Follow the link to https://www.flir.com/support-center/warranty/ retrieve FLIR's warranty document.

6.2 PRODUCT REGISTRATION

In order to validate the warranty on your product, FLIR Outdoor & Tactical Systems must register the product on https://www.flir.com/support-center/support-hq/.

6.3 OBTAINING WARRANTY SERVICE

9 Townsend West Nashua, NH 03063
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or (603) 324-7600
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E-mail: OTS-support@flir.com

www.flir.com

SECTION 7. SPECIFICATIONS

	LS-X	LS-XR
SENSOR SPECIFICATIONS		
Detector Type	336 × 256 VOx Microbolometer	640 × 512 VOx Microbolometer
Video Refresh Rate	60Hz NTSC	30Hz NTSC
Field of View (H x V)	17° × 13°	18° × 14°
Focal Length	19mm Fixed Focus	35mm Fixed Focus
Start up	< 1.5 seconds	
Image Processing	FLIR Proprietary Digital Detail Enhancement™	
USER INTERFACE		
Zoom Button	2X Zoom	2X, 4X Zoom
Video Detection Palettes	User Selectable: Black Hot, White Hot, InstAlert™ and Graded Fire	
Brightness	Multiple Brightness Levels	
Laser Pointer	LED (operational when imager power off)	
SYSTEM SPECIFICATIONS		
Display		
Video Output	NTSC / PAL composite video	NTSC composite video
POWER		
Battery Type	Internal Li-Ion Cell	
Battery Life (Operating)	>5 hours, Auto-off after 5 minutes of non-use	
Battery Power	3.7 V 2400mAh	
ENVIRONMENTAL		
Rating	IP-67, Submersible	
Operating Temp.	-4°F to 122°F (-20°C to 50°C)	
Storage Temp.	-40°F to 140°F (-40°C to 60°C)	
PHYSICAL		
Weight (incl. lens)	12 oz (340 g)	
Size (L × W × H)	6.70″ x 2.31″x 2.44″	
Color (housing)	Black	
Country Of Origin	USA	
RANGE PERFORMANCE		
Detect Man (1.8 m × 0.5 m)	600yd (550m)	1200yd (1140m)
PACKAGES INCLUDE		
Handheld Thermal Monocular, USB Power Adapter/Charger, Wrist Strap, Custom Video Out Cable, USB Cable, Quick Start Guide, Molle Bag		

FLIR SYSTEMS, INC.
9 Townsend West
Nashua, NH 03063
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Fax: 1-888-959-2260

FLIR PRODUCT REPAIR CENTER
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