



LTO-QUEST & LTO-QUEST HD USER GUIDE



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INTRODUCTION

WARNING

It is your responsibility to use your Leupold LTO-Quest device in a safe manner. Leupold & Stevens, Inc. will not be responsible for any property damage, injuries, or deaths resulting from any use of this device in any activities.

This product contains a rechargeable polymer lithium-ion battery. To prevent the possibility of personal injury or product damage caused by battery exposure to extreme heat, store the device out of direct sunlight and away from other extreme heat sources. Dispose of battery and device in a proper manner.

Mac® is a trademark of Apple, Inc., registered in the USA and other countries.

microSD™ and the microSDXC™ logos are trademarks or registered trademarks of SD-3C, LLC in the United States, other countries, or both.

Windows® is a registered trademark of Microsoft Corporation in the USA and other countries. Other trademarks and trade names are those of their respective owners.

QUICK START GUIDE



Tips and Tricks

1. Fully recharge your device before use with the included (US only) power adapter for optimal performance. For optimal battery performance, charge your LTO-Quest device after prolonged periods of inactive use.
2. While recharging on the charging adapter, shut off thermal imaging to charge more quickly.
3. Menus can be navigated using the Prev / Up or Next / Down buttons. Within some Menu selections, like for example setting a date or time, the Menu buttons will become - and + to adjust a number value.
4. Accessing images via USB is recommended and faster than removal and replacement of the microSD card. The microSD card has a tight fit for purposes of sealing the rubber door to keep moisture out.
5. Be sure to fully close the bottom rubber door over the USB port to keep the product water- and dust-resistant.
6. Individual images can be easily renamed for quick identification once they have been transferred to your PC. All temperature readings stay affixed to the image on storage.
7. Organize your images on your PC by separating them into groups and creating descriptive folders to hold them.
8. Be gentle when inserting the USB cable connectors to prevent damage.
9. Always perform an on-screen eject or dismount on your computer before disconnecting the USB cable to physically ejecting the SD memory card from your computer to prevent corruption of the SD memory card.

QUICK START GUIDE

Charging the Battery



LTO-Quest showing the rear door open and the USB port (for charging) highlighted.

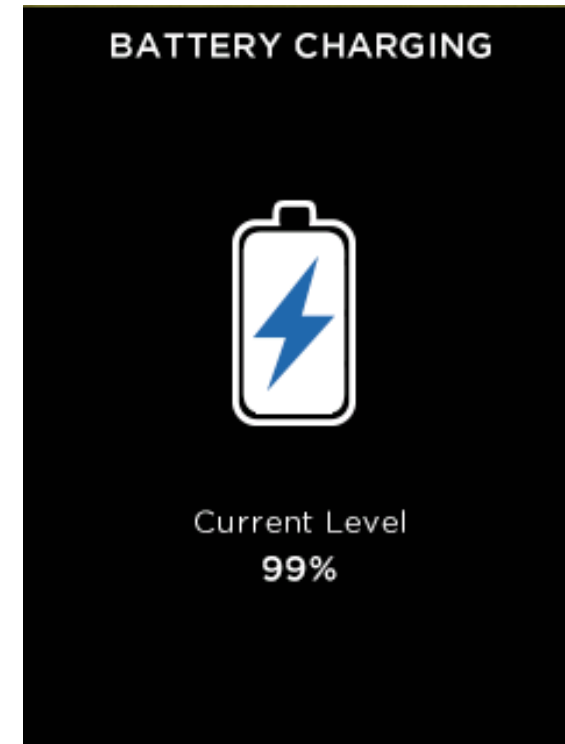
For best results, Leupold recommends charging your LTO-Quest using the included micro USB cable by connecting it to your computer or a USB enabled wall outlet. When the thermal camera is off, the Battery Charging screen will appear.

QUICK START GUIDE

Charging the Battery



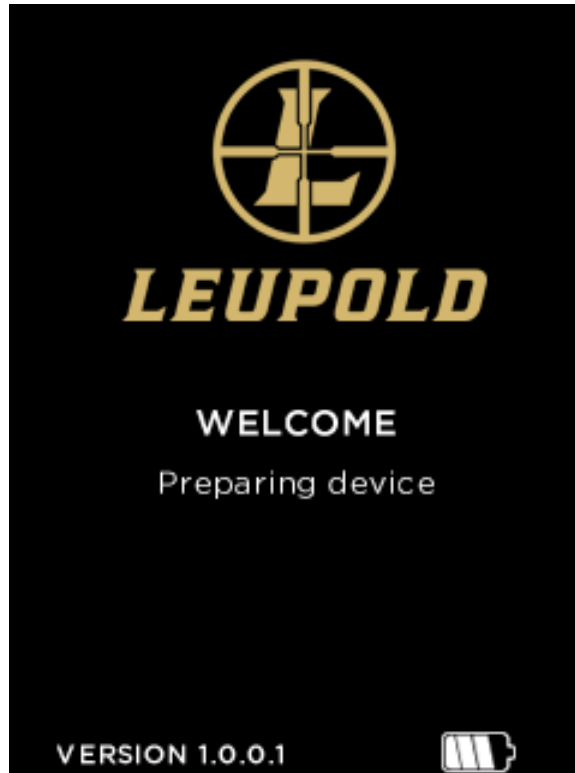
Supplied 5-pin cable between charger and LTO-Quest USB Port. Note: Not all OTG cables are built with the same specifications through all suppliers. The cable provided in the box is built to our specifications.




The Battery Charging screen

QUICK START GUIDE

Turning on your LTO-Quest

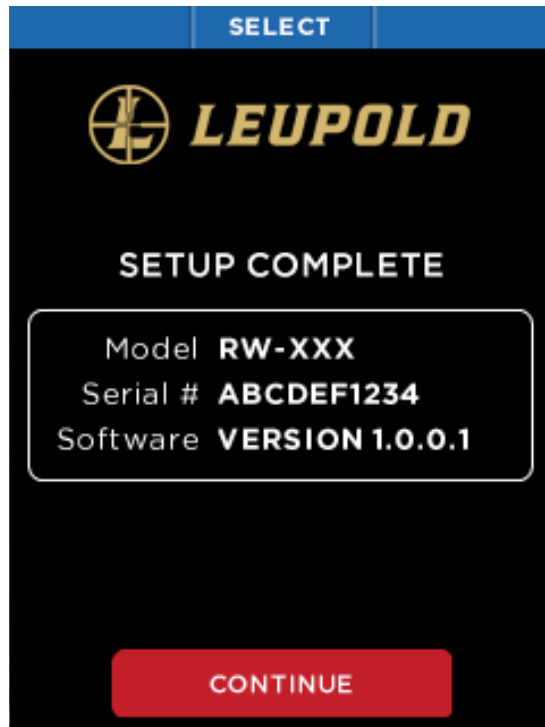


The Splash screen

A long press of the **CENTER** button  will cause the device to activate and start up the software. The splash screen will then display. Note that the version is also displayed. The startup sequence is shown on page 9.

QUICK START GUIDE

Setting up your LTO-Quest



Setup complete screen

When all of the setup screens have been completed, the Setup Complete screen is displayed.

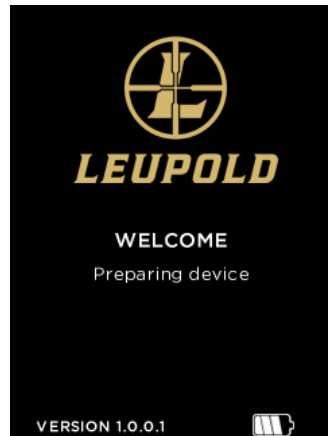
First-Time Use

To turn on your device, press the **CENTER** button and hold until the screen lights. The button-function ribbon at the top of the screen defines the meaning of the three buttons. For each of the setup screens, use the **LEFT** and **RIGHT** buttons to navigate, and the **CENTER** button as the selector. For numerical fields, the **LEFT** button subtracts from the displayed value, while the **RIGHT** button adds to it, as the button-function ribbon indicates.

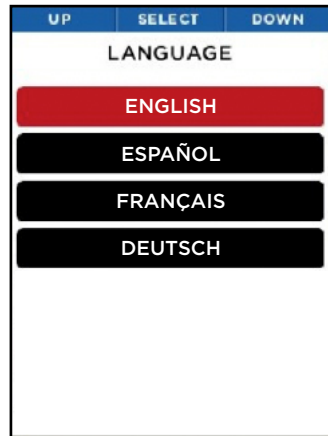
QUICK START GUIDE

Setting up your LTO-Quest

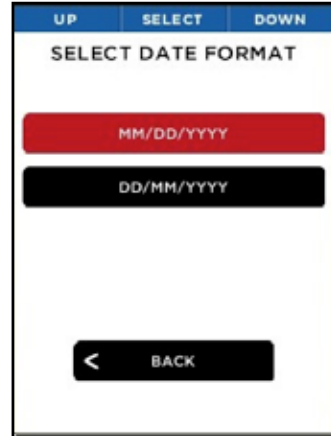
Press the **CENTER** button to power on the device



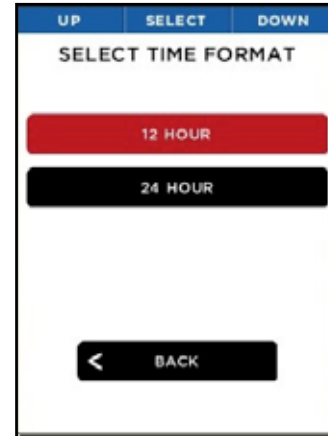
Splash screen



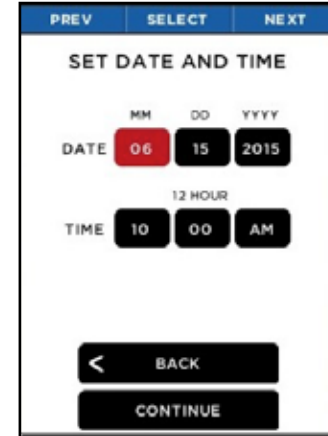
Select your language



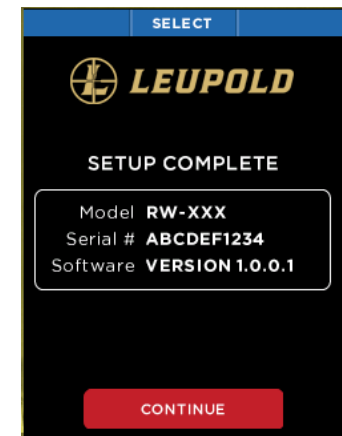
Select date format



Select time format



Enter date and time

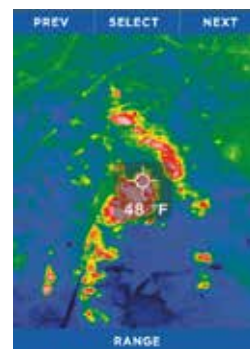
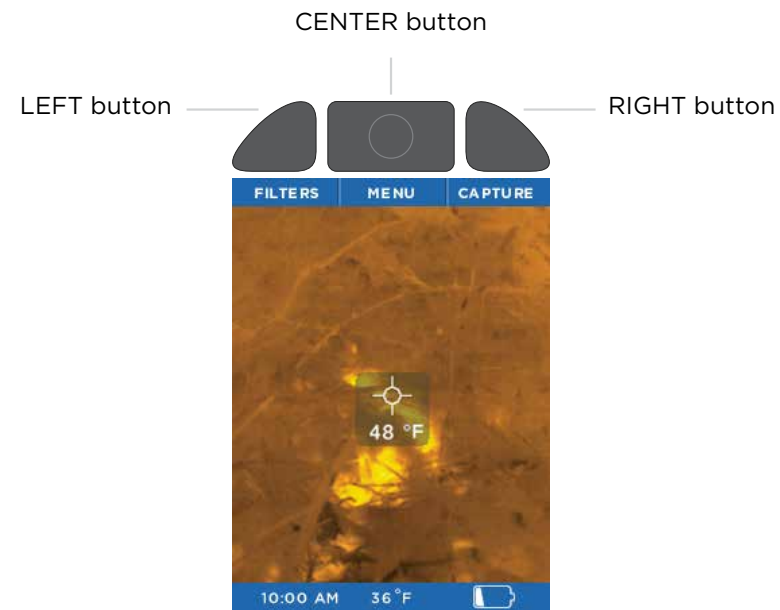


Setup complete screen

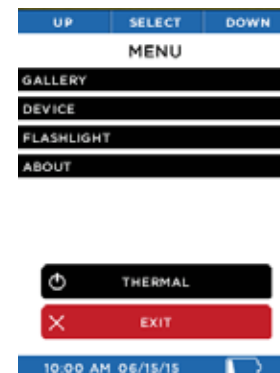
The startup sequence

QUICK START GUIDE

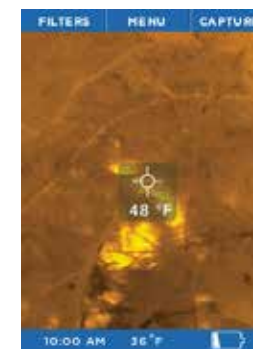
Thermal Imaging



FILTERS



MENU



CAPTURE

RETURN TO DEVICE

Imaging screen options

QUICK START GUIDE

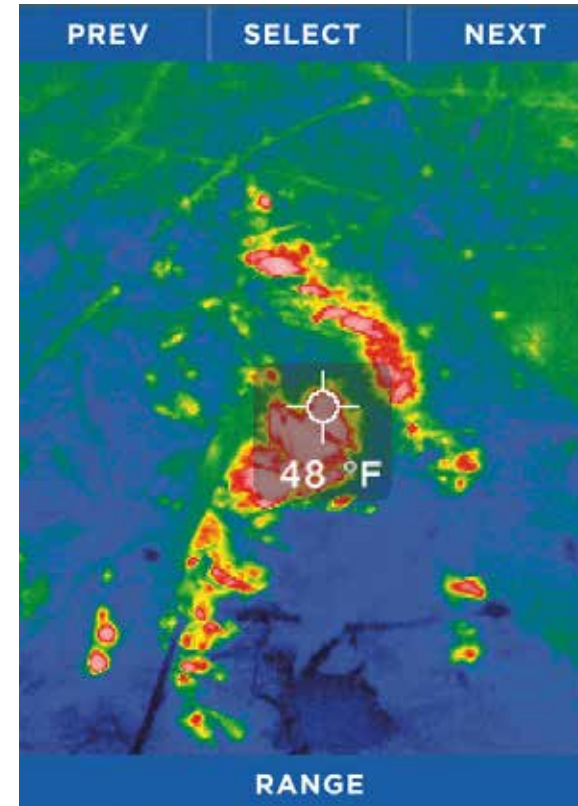
Filters Screen

On the FILTERS Screen, the button-function ribbon changes to:



Button-function ribbon on the Filters screen

By pressing the **LEFT** button for “previous” or the **RIGHT** button for “next”, the image is cycled through the available filters (technically known as look-up tables, or LUTs). The name of the filter currently applied is displayed at the bottom of the image. When you have reached your desired filter, press the **CENTER** button to select and remember the filter. The device then returns to the thermal imaging screen.



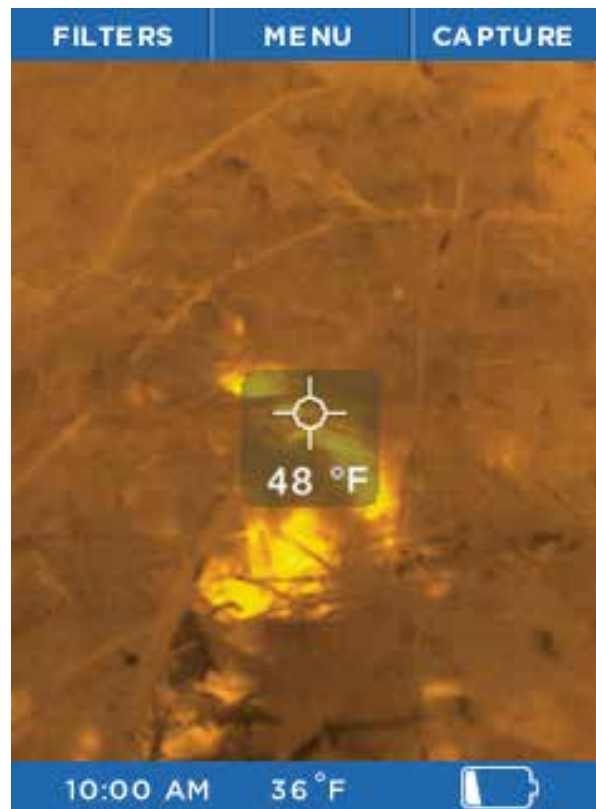
The Filters screen

QUICK START GUIDE

Image Capture Screen

While the thermal imaging screen is displayed, pressing the **RIGHT** button will capture and save an image to the microSD card. You can also enter the **GALLERY** from this screen. The date and time of the captured image are displayed at the bottom (center) of the screen, while the temperature (and units) for the area within the reticle (or target) are displayed just below the reticle.

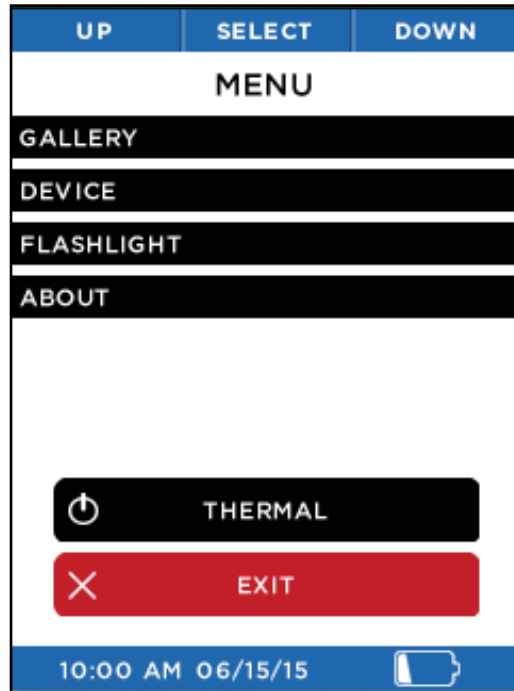
Every time the **CAPTURE** button is pressed, the image being captured is displayed along with a blue progress bar (left to right) at the bottom of the screen as it is being saved. Holding the **CAPTURE** button down will capture images in rapid succession as fast as they can be saved to the microSD card's memory.



The Image Capture screen

QUICK START GUIDE

Menu Screen



The Menu screen

See the following sections for descriptions of the categories of settings found on the Menu screen.

QUICK START GUIDE

Gallery



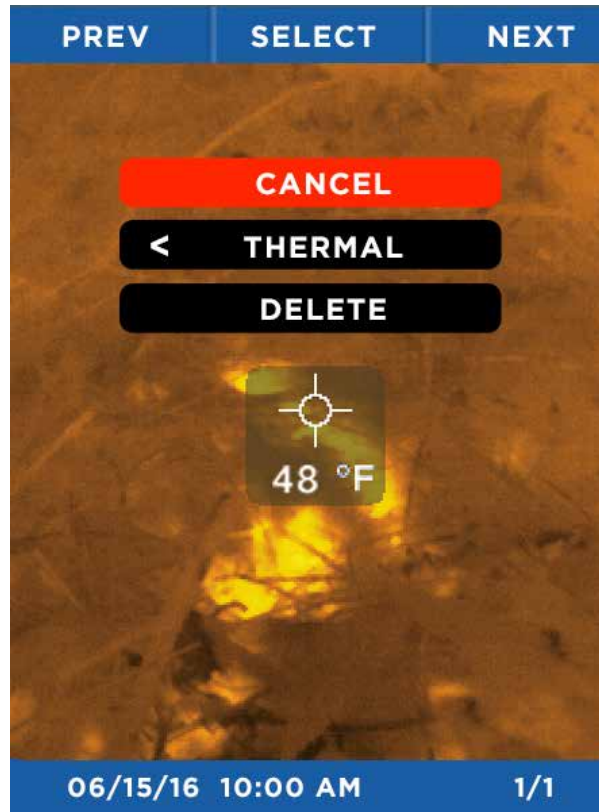
The button-function ribbon on the Gallery screen

When you enter the Gallery, the most recently captured image is displayed. Pressing the **LEFT** button repeatedly will cycle through all the images in reverse chronological order, while pressing the **RIGHT** button returns you to the oldest chronological image. The date and time of the captured images are displayed at the bottom (center) of the screen, while the temperature (and units) for the area within the reticle (or target) is displayed. Note that the current image number and the total number of images are also displayed at the bottom right. If the Gallery is empty, the empty screen is displayed (see Page 15).

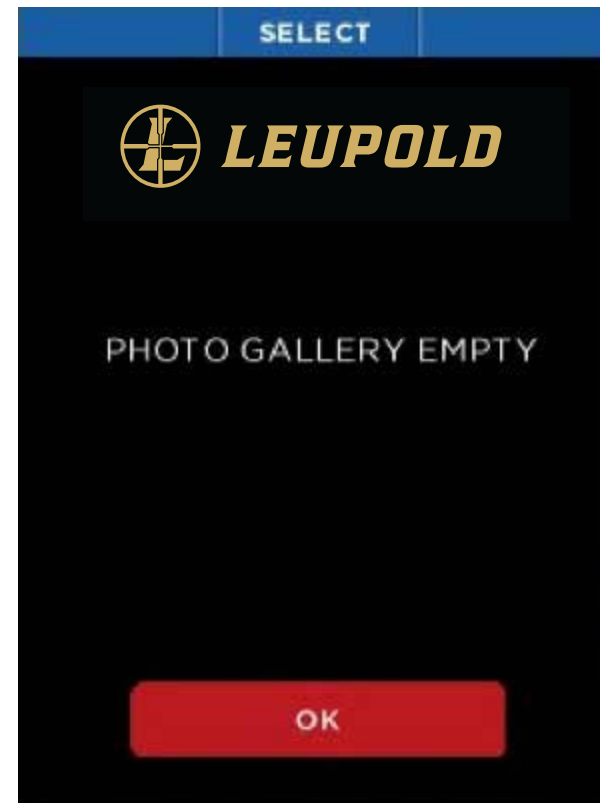
Pressing the **CENTER** button causes the **OPTIONS** Screen to be displayed. At this point, you can choose to **CANCEL** any operations concerning this image and return to the **GALLERY**, return **BACK TO THERMAL** imaging, or **DELETE** the currently displayed image. The choice is made by using the **LEFT** button for the previous menu item, or the **RIGHT** button for the next menu item, and then the **CENTER** button to make a selection.

QUICK START GUIDE

Gallery



The Gallery Options screen.



The Empty Gallery screen

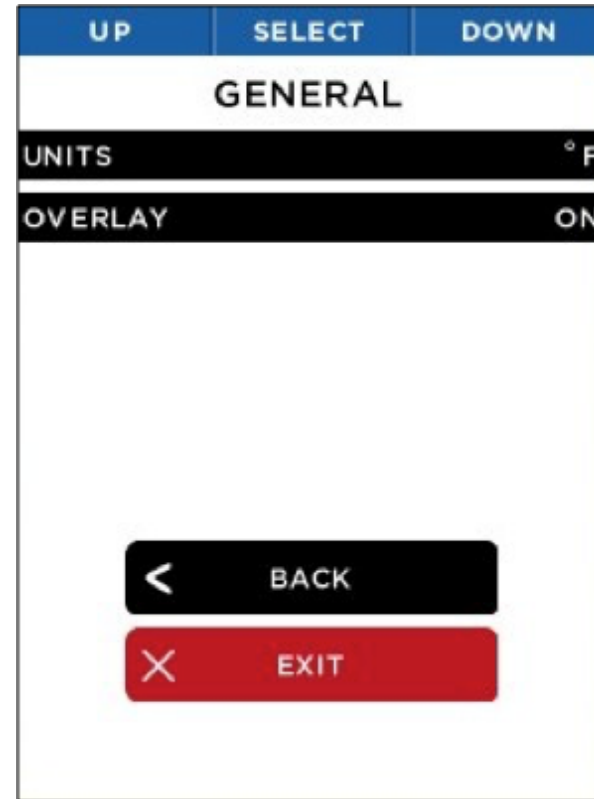
QUICK START GUIDE

Device Settings



The Device Settings screen

The Device Settings screen allows you to access general camera settings, date and time, language, power, as well as performing a factory restore.

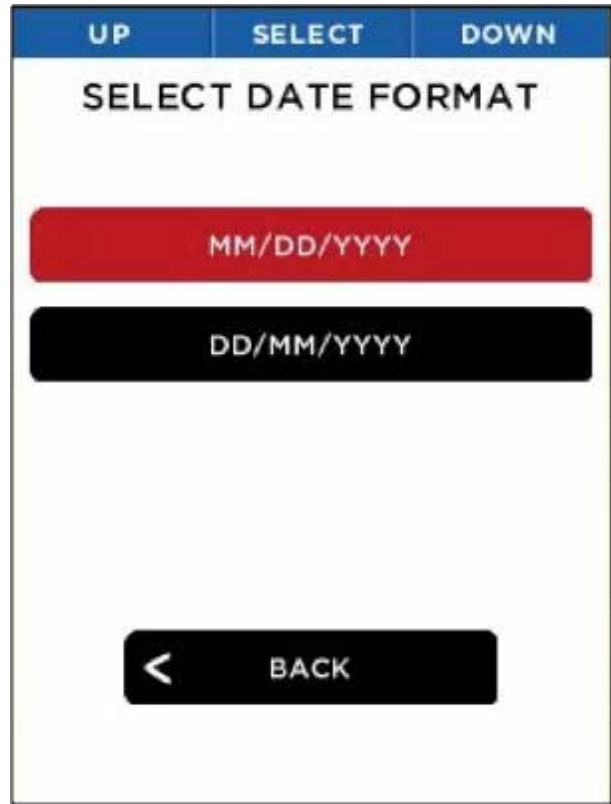


The General Settings screen

The General Settings screen allows you to specify the units for displayed temperature, either Celsius or Fahrenheit, and enable or disable the Overlays.

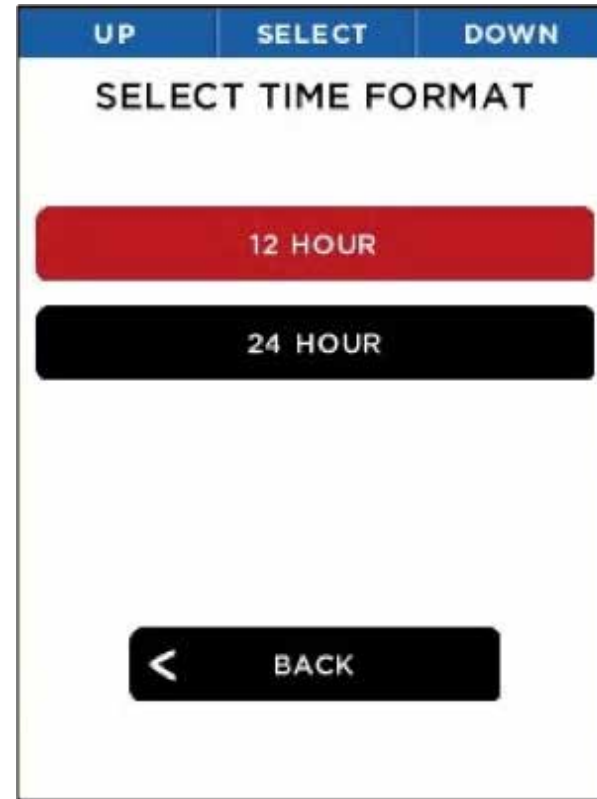
QUICK START GUIDE

Device Settings



Select Date Format screen

Choosing one of the two date formats causes LTO-Quest to immediately set all date displays and captures to the desired format.

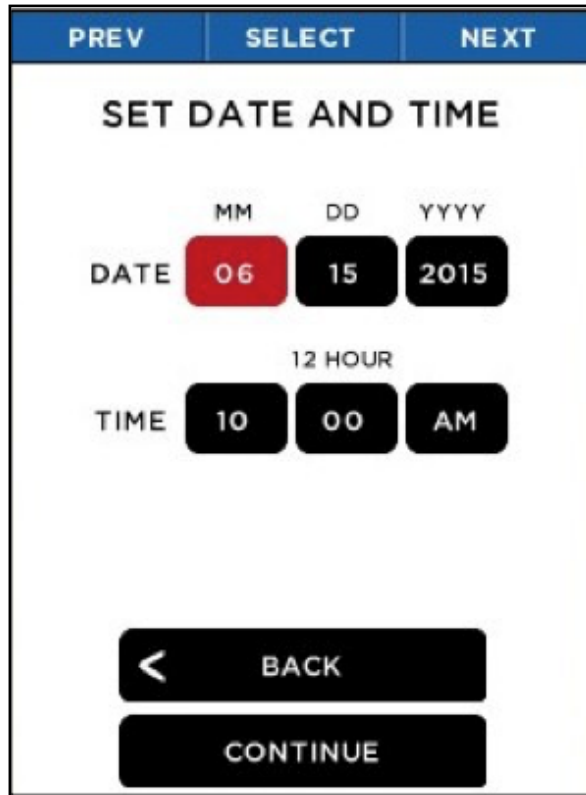


Select Time Format screen

Choosing one of the two time formats causes LTO-Quest to immediately set all time displays and captures to the desired format.

QUICK START GUIDE

Device Settings



Set Date and Time screen

Setting values for the date and time will cause LTO-Quest to update all displays and captures of date and time.

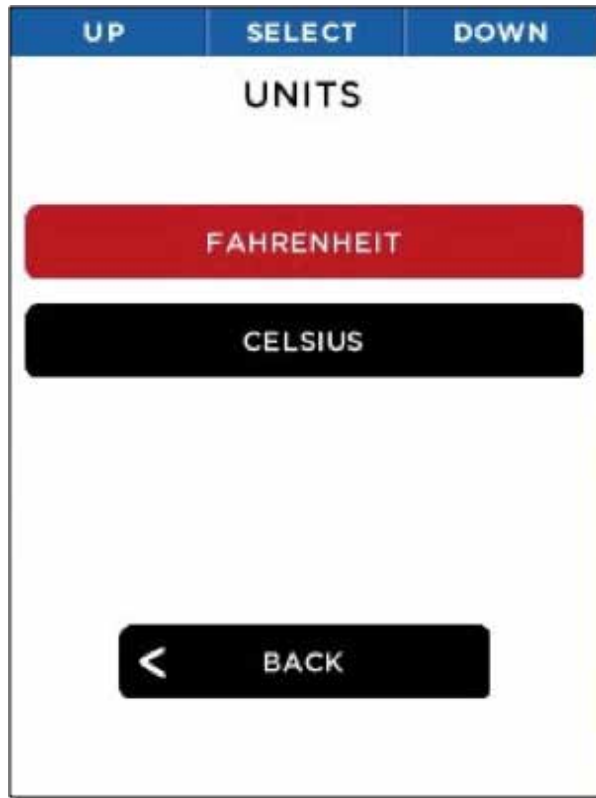


Language screen

Choosing a language causes LTO-Quest to immediately set all dialogs to the desired language.

QUICK START GUIDE

Temperature Units



The Units screen

The user can choose to display (and capture) temperatures in one of two available units, Fahrenheit or Celsius.

QUICK START GUIDE

Power Settings



The Power screen

The Power Settings screen allows you to choose settings for the auto-power management and the LCD display screen brightness.



Auto turn-off setting

Enabling the Auto Turn-Off setting will automatically turn off the thermal imager after the time specified, as long as there's no further interaction.

QUICK START GUIDE

Display Settings

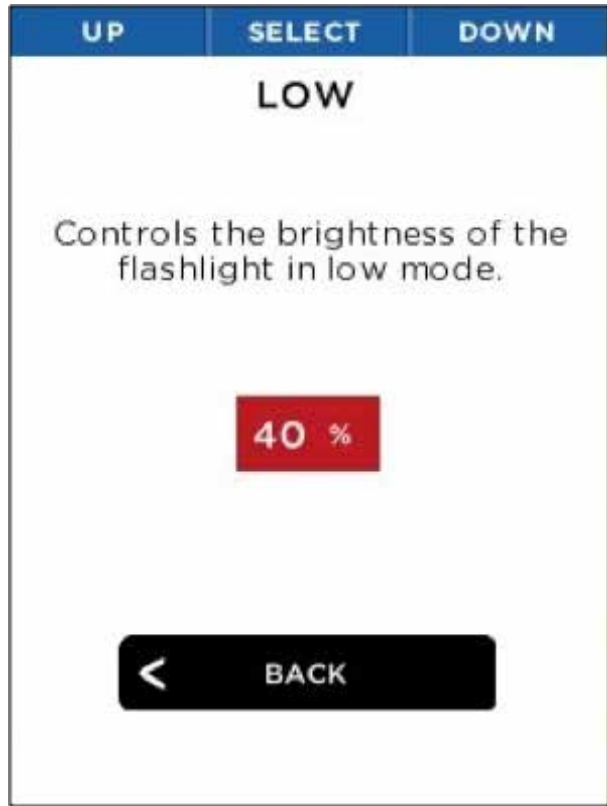


Display brightness setting

This setting allows you to control the amount of light generated by the LCD display. Managing this setting allows you to conserve battery power or limit the amount of light from the screen, depending on the situation.

QUICK START GUIDE

Flashlight Settings



Low-intensity setting

You can also adjust the flashlight's low-intensity setting, applied with the second button "click".

QUICK START GUIDE

About

This option displays your LTO-Quest's model number, serial number, and software version.



The About screen

QUICK START GUIDE

Power Off Thermal

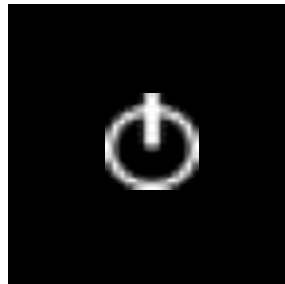
The Power Off Thermal option is an alternative to the long-hold of the **CENTER** button.



Power off thermal

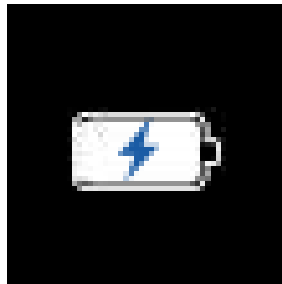
QUICK START GUIDE

Battery Level



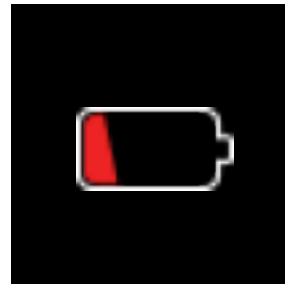
Power Off

Select this option to turn off the thermal imager.

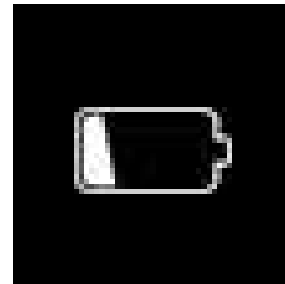


Battery Charge

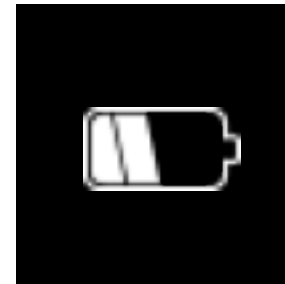
The device is connected to battery charger or USB port.



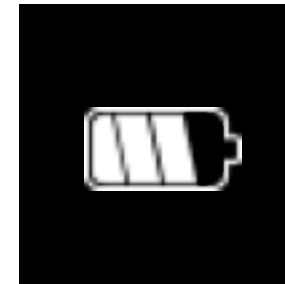
Less than 10% remaining



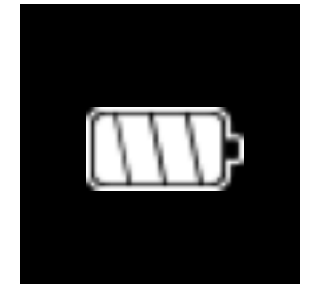
10% to 35% remaining



35% to 65% remaining



65% to 85% remaining



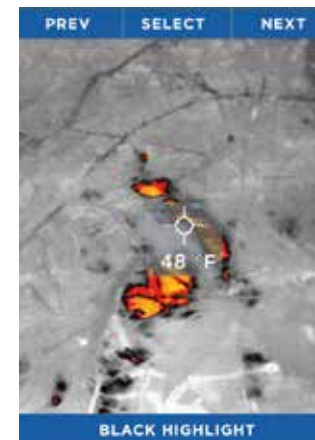
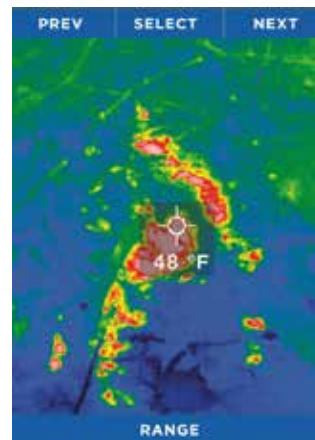
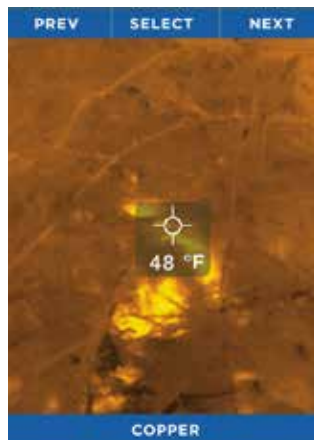
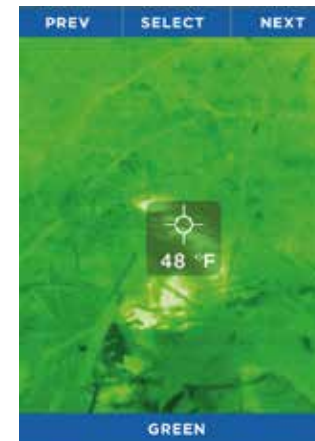
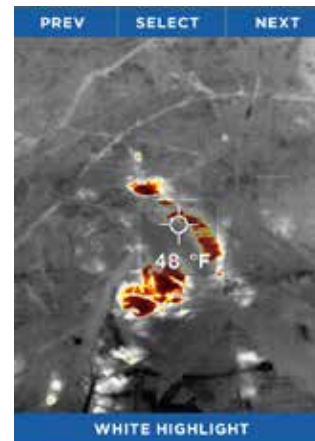
More than 85% remaining

Icon function and descriptions

QUICK START GUIDE

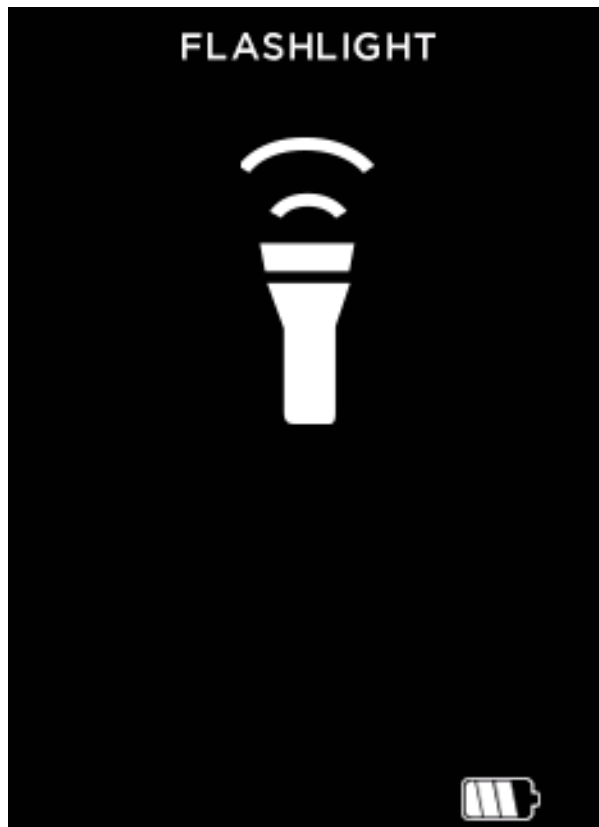
Filters

There are seven filters (also known as LUTs) you can apply to colorize the image. After selecting **FILTERS** via the **LEFT** button, press the **LEFT** or **RIGHT** button until the desired image filter is displayed, then select it via the **CENTER** button. Filters are subjective to the user and preferred based on objects emitting heat. Feel free to play around and adjust to your preference. Your LTO-Quest will remember your selected filter.

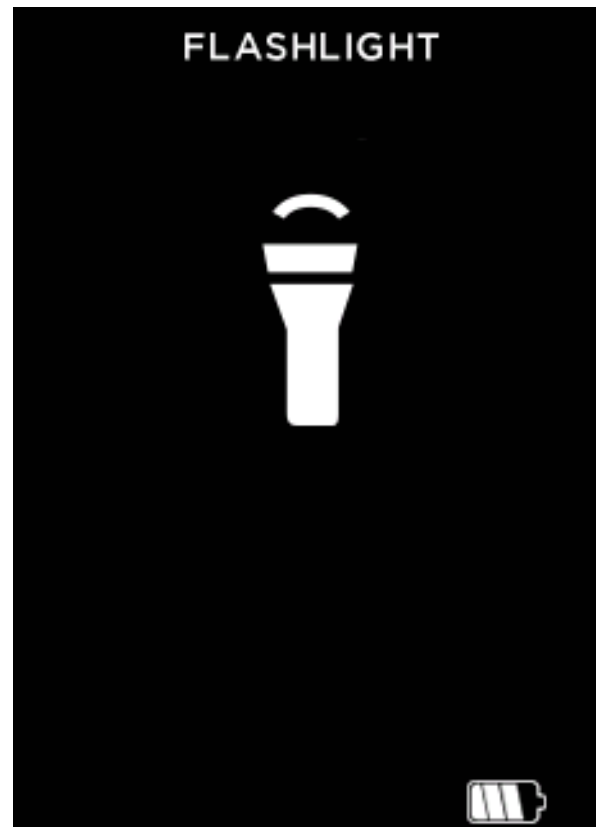


FLASHLIGHT OPERATION

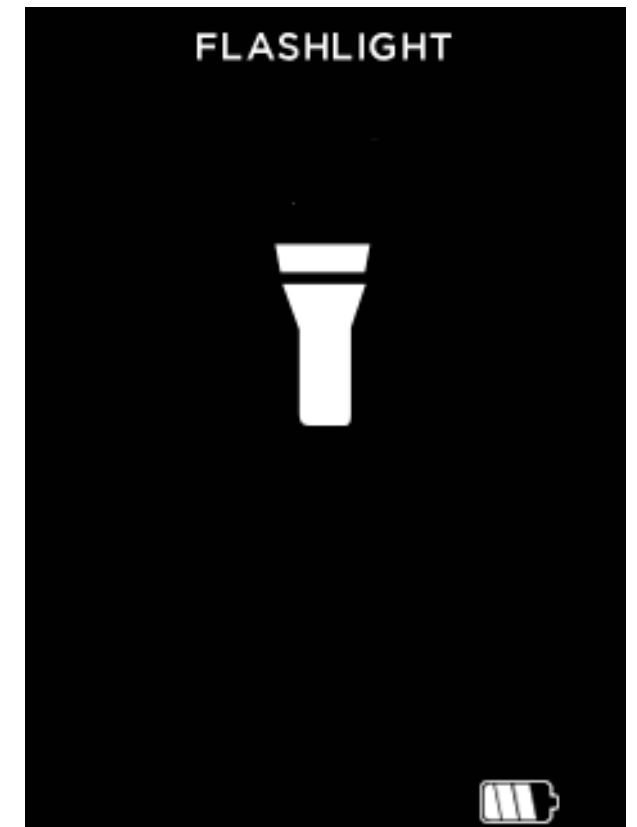
The right SIDE button on your LTO-Quest is dedicated to always be for the Flashlight. Pressing the SIDE button once powers the LED flashlight to its high-intensity setting. A second press of the SIDE button powers the flashlight to its low-intensity setting, and the third press causes the flashlight to turn off. When LTO-Quest is off, pressing the SIDE button will display the flashlight's setting on the screen. When LTO-Quest is powered on, the flashlight's setting will not be displayed on the screen.



Flashlight On, High Intensity screen



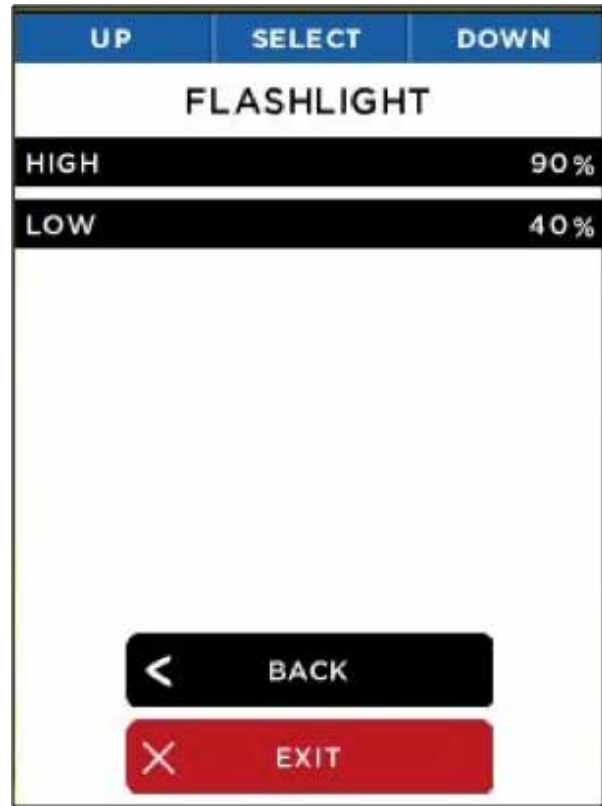
Flashlight On, Low Intensity screen



Flashlight Off screen

FLASHLIGHT OPERATION

Flashlight Settings



The Flashlight screen

The Flashlight screen allows you to adjust the intensity level of the two “click” levels of the LED flashlight.



High-intensity setting

You can adjust the flashlight’s high-intensity setting, applied with the first button “click”.

RESTORE FACTORY SETTINGS



Restore screen



Successful Restore screen

The Restore option allows the user to restore all of the settings to the default settings and options that reflect the state of the device when it left the factory. After power-cycling, the user will then be required to perform the setup process again. This set up should take less than 90 seconds or so.

DOWNLOADING IMAGES

microSD Card



LTO-Quest showing the rear door open and the microSD card slot highlighted.



microSD card



microSD card and adapter (adapter not included).

Insert your microSD card into the memory slot on LTO-Quest. You can then use the Leupold LTO-Quest as you normally would, capturing images, transferring them to your computer, etc. Your microSD card can also be erased and reused, whether on your PC via an adapter, in your LTO-Quest, or via a USB connection. The Leupold LTO-Quest is designed to hold a maximum 32GB card should you choose to use one.

The microSD card is designed to fit easily into the LTO-Quest one way only. With the LTO-Quest facing up, the microSD card should be easily installed with the notch on the right and the contacts facing downward. Do not bend the card or force it into the slot.

DOWNLOADING IMAGES

USB Port

Connect the USB cable to your computer and the microSD card should become visible as a storage device or removable drive. Once visible, open the DCIM folder to access the photos. You can copy or drag photos to your computer (Mac or PC or Tablet/Mobile) for storage. The photos are a standard .PNG format and can be edited, annotated, and inserted into documents easily. At this stage, RAW File layers are not saved.



LTO-Quest showing the rear door open and the USB port (for connectivity) highlighted.



USB Connection screen

CARE GUIDE

WARNING

Failure to follow these safety instructions could result in fire, electric shock, injury, or damage to the device or other property. Read all the safety information below before using the device.

Handling: Handle your LTO-Quest with care. It is made of metal, glass, and plastic and has sensitive electronic components inside. The device can be damaged if excessively dropped, burned, exposed to extreme temperatures, punctured, crushed, or otherwise exposed to conditions beyond the operating limitations outlined in this document. Do not use the device if damaged (such as if the screen or lens is cracked), as it may cause injury. Cables should also be handled with care. Always pull on the connector, not the cable, during disconnection. Frayed cables or cables with portions of their insulation missing should be replaced immediately and not used.

Repairing: Do not open the device and do not attempt to repair it yourself. Disassembling the device may damage it or may cause injury to you. Disassembling your device voids all warranty terms. If the device is damaged, malfunctions, or exhibits other detrimental characteristics, contact Leupold's support team. You can find more information about service and support at Leupold.com.

Leupold Electronics Limited 2-Year Warranty:

Anyone can offer you a lifetime warranty, but guaranteeing performance takes serious dedication and craftsmanship. From our Beaverton Oregon factory, to the wilderness, the battlefield, and everywhere in-between, we won't let you down.

Leupold electronic products are warrantied against defects in materials and workmanship for two-years from the date of purchase. If the product is found to be defective within those two-years, we will repair or replace it for free.

For complete details visit leupold.com/warranty

CARE GUIDE

Storage

To maximize battery longevity and life, if the device is going to be in storage for long periods of time (i.e., more than six months), it is best to recharge the battery to 75% capacity after six months.

Cleaning

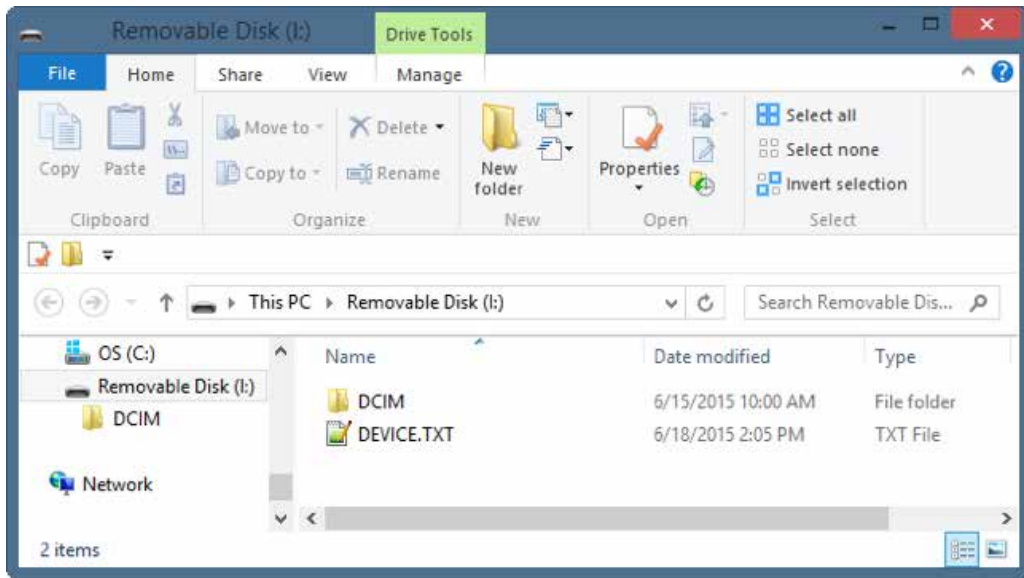
Keep the device free from mud, grime, grease, oil, etc. To clean the screen on your LTO-Quest, use a soft, lint-free cloth. We suggest you use a microfiber cloth. Never use a paper towel or other paper-based towels as they can leave scratches on the screen. For fingerprint smudges, dust, and lint, wipe the screen gently using a dry microfiber cloth. Never use window cleaners, harsh chemicals, or cleaning solvents on your LTO-Quest and never spray anything directly onto the screen. Lightly dampen a section of a microfiber cloth with water and gently wipe the screen, then go over it again with a dry section of the cloth to wipe away any moisture. Avoid getting moisture in any of the openings. Cables should be kept free from dirt and grease, as well. Connectors should be clean and dry at both ends of the cable, too.

microSD Card and USB Port

There are adapter cards that allow a microSD card to be used in an SD card slot or a USB port. This is a convenient way to use a microSD card with a card reader on a PC, to transfer files between a PC and LTO-Quest. Both the microSD Card and adapters should be kept clean and free of contaminants. When handling the card or adapter, avoid touching the exposed metal contacts. Follow the microSD card manufacturer's recommendations.

Do not dispose of your microSD card with unsorted household waste. Improper disposal may be harmful to the environment and human health. Please refer to your local waste authority for information on return and collection systems in your area.

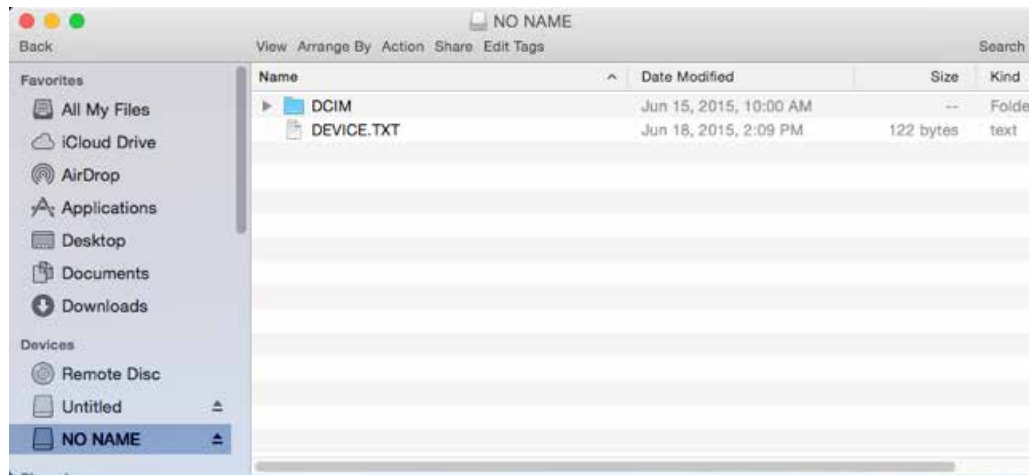
TROUBLESHOOTING



LTO-Quest connected to a Windows PC

1. The device will not power on.
 - a. Try plugging the device in with the supplied wall charger or another 1-amp-rated charger to ensure there is enough battery remaining.
 - b. Try performing a hard system reset by holding down the CENTER button for thirty seconds, release and wait.
2. The device will not save or recall images.
 - a. Check if there a microSD card installed. Remember that it must be less than or equal to 32GB in capacity.
 - b. Check if the microSD card is full. If card is full, delete images or insert a new microSD card.
 - c. Try accessing the microSD card on your PC or Mac through an adapter.
3. The thermal image appears blurry.
 - a. Check that the lens is clear and clean.
 - b. Check that the screen is clean.
4. The thermal image appears noisy.
 - a. Has your flashlight been on for a long time?
 - b. Have you suddenly cooled or heated the device quickly?
5. I cannot find the device on my computer when I plug it into my USB port.
 - a. Check your file system (Explorer in Windows, Finder in Mac OS) and check your external memory devices as shown here:

TROUBLESHOOTING



LTO-Quest connected to a Mac OS

6. The flashlight is dimmer than usual.
 - a. Is your battery charged? The flashlight is an extremely high-powered light consuming a considerable amount of power. When the battery voltage drops to near empty, the flashlight will begin to dim to preserve battery life and allow the thermal imager to work.
7. The microSD Card will not stay inserted.
 - a. Be sure that the microSD Card or the slot is not damaged.
 - b. Be sure there are no foreign objects (i.e. lint, sand, etc.) in the slot preventing the microSD Card from being seated correctly.
8. If the battery is completely discharged and thermal imaging won't start.
 - a. Charge battery and power on thermal camera. If screen displays all black, power-cycle your LTO-Quest.

If none of these suggestions work, please contact Leupold Product Service: 1 (800) 538-7653.

APPENDIX

Device Specifications

Environmental

Operating Temperature	14° to 149° F (-10° to 65° C)
Storage Temperature	-40° to 131° F (-40° to 55° C)
Battery Charge Temperature	32° to 113° F (0° to 45° C)
Ingress Protection	Water and dust resistant
Shock	Drop test per 1 meter onto pavement
Humidity	Operating and storing 10% to 95%, non-condensing

Thermal Camera

Thermal Sensor	
Technology	Uncooled Vanadium Oxide Micro-bolometer
Resolution	32,136 Total Pixels in a 206x156 Pixel Array
Frame Rate	>15 Hz
Spectral Response	7.5 - 14 Microns
Temperature Measurement Type	Passive
Sensitivity @ F/1	< 0.1°C (< 0.18°F)
Detection Range	-40° to 330°C (-40° to 626°F)
Accuracy @ 25°C	Greater of 5°C or 5% (9°F or 5%)

APPENDIX

Device Specifications

Thermal Camera (continued)

Optics

Technology	Chalcogenide Glass w/Anti-reflective Coating
Focal Length	4 mm
F/#	F/1.2
Focus Range	6 inches to infinity
Detection Distance	LTO-Quest HD: Up to 750 yards / LTO-Quest: Up to 300 yards

Flashlight

Type	LED
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Lumens

Default Hi	300 lm
Default Low	120 lm

Spot Field of View	7°
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Flood Field of View	70°
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APPENDIX

Device Specifications

Display

Type	2.4" TFT Color LCD
Resolution	LTO-Quest HD: 320x240 QVGA / LTO-Quest: 206x156 QVGA
Viewing Angle	> 70 Degrees
Contrast Ratio	500:1

Battery

Technology	Polymer Lithium Ion
Capacity	1900mAh
Voltage	3.7V nominal
Charge Current	
On included power adapter	< 1A
In live USB port	< 0.5A
Battery Life	
Thermal Camera Only	10 hours
Light (100%)	2 hours
In storage (from 100% charge)	60 Days

APPENDIX

Device Specifications

Others

Storage

SD Card	Removable microSD, up to 32GB
File System	FAT32
Photos/Images	Portable Network Graphics (PNG) format
Time & Date Stamp	Yes
# Images (512MB) @224KB each	> 2200
# Images (32GB) @224KB each	> 142000

USB Connection

USB Port	Micro-B
Mass Storage Class	Windows, MAC OS 9 & X, Linux

Accessories

	Refer to leupold.com for latest accessory list
Wrist Lanyard/Tripod Mount	Wrist lanyard and 1/4"-20 mount for tripods

Warranty

Device	Leupold 2-Year Electronics Warranty
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APPENDIX

Conformities

Standard

Description

EN 61326-1:2012

Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

EN 61326-2-2:2013

Electrical equipment for measurement, control and laboratory use. EMC requirements. Part 2-2 Particular requirements – Test Configurations, operational conditions and performance criteria for portable test measuring and monitoring equipment used in low-voltage distribution systems.

CISPR 11: 2009

Amendment 1:2010

Industrial, scientific and medical (ISM) radio-frequency Equipment. Electromagnetic disturbance characteristics. Limits and methods of measurement

IEC 61000-3-2: 2005

+Amendment 1:2008

+Amendment 2:2009

Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current = 16 A per phase)

IEC 61000-3-3:2008

Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current = 16 A per phase and not subject to conditional connection

IEC 61000-4-2:2008

Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test

IEC 61000-4-3:2006

Amendment 1:2007

Amendment 2:2010

Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test

APPENDIX

Conformities

Standard

Description

IEC 61000-4-4:2004

Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement

Amendment 1:2010

Techniques – Electrical fast transient/burst immunity test

IEC 61000-4-5:2005

Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test

IEC 61000-4-6:2008

Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields

IEC 61000-4-8:2009

Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test

IEC 61000-4-11:2004

Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests