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# **Ti200, Ti300, Ti400**

## Thermal imagers

## Users Manual

PN 4281773

September 2013

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## ***Introduction***

The Fluke Ti200, Ti300, and Ti400 Thermal Imagers (the Product or Imager) are handheld, infrared imaging cameras for use in many applications. These applications include equipment troubleshooting, preventive and predictive maintenance, building diagnostics, and research and development.

All Imagers display thermal images on a high-visibility, industrial-quality 640 x 480 LCD touch screen and can save images to a removable memory card. Saved images and data can be transferred through the memory card to a PC, a direct USB connection to the PC, or by wireless transfer to a PC or mobile device.

The Imager includes SmartView<sup>®</sup> software. This software is a high-performance, professional software suite that allows for quality analysis and reporting. SmartView<sup>®</sup> Mobile software is also available for use on mobile devices.

A rugged, rechargeable lithium-ion smart battery provides power to the Imager. Direct AC power is accessible with the included AC power adapter.

All Imagers have the Fluke LaserSharp<sup>™</sup> Auto Focus System, as well as advanced manual focus capabilities. They also include many useful features and functions associated with IR-Fusion<sup>®</sup> technology with Autoblend<sup>™</sup> mode, IR-PhotoNotes<sup>™</sup> photo annotation system, WiFi<sup>™</sup> connectivity, Bluetooth<sup>®</sup> connectivity, and HDMI<sup>®</sup> video connectivity.



## How to Contact Fluke

To contact Fluke, call one of the following telephone numbers:

- USA: 1-800-760-4523
- Canada: 1-800-36-FLUKE (1-800-363-5853)
- Europe: +31 402-675-200
- Japan: +81-3-6714-3114
- Singapore: +65-6799-5566
- Anywhere in the world: +1-425-446-5500

Or, visit Fluke's website at [www.fluke.com](http://www.fluke.com).

To register your Product, visit <http://register.fluke.com>.

To view, print, or download the latest manual supplement, visit <http://us.fluke.com/user/support/manuals>.

## Safety Information

A **Warning** identifies conditions and procedures that are dangerous to the user.

A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

### **Warning**

To prevent eye damage and personal injury:

- **Do not look into the laser. Do not point laser directly at persons or animals or indirectly off reflective surfaces.**
- **Do not open the Product. The laser beam is dangerous to eyes. Have the Product repaired only through an approved technical site.**

Additional laser warning information is on the inside of the Product lens cover, see Figure 1.



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**Figure 1. Lens Cover Laser Warning**

## **⚠ Warning**













To prevent personal injury:

- **Read all safety information before you use the Product.**
- **Carefully read all instructions.**
- **Use the Product only as specified, or the protection supplied by the Product can be compromised.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use the Product if it is damaged.**

- **See emissivity information for actual temperatures. Reflective objects result in lower than actual temperature measurements. These objects pose a burn hazard.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**

Table 1 is a list of symbols used on the Imager and in this manual.

**Table 1. Symbols**

Symbol	Description	Symbol	Description
	Important information. See manual.		Warning. Laser.
	Connected to ac power. Battery removed.		Battery status. Battery charging when animated.
	On/Off Symbol.		Conforms to requirements of European Union and European Free Trade Association.
	Conforms to relevant Australian standards.		Conforms to relevant North American Safety Standards.
	Conforms to relevant South Korean EMC standards.		Japan Quality Association
	This Product contains a lithium-ion battery. Do not mix with the solid waste stream. Spent batteries should be disposed of by a qualified recycler or hazardous materials handler per local regulations. Contact your authorized Fluke Service Center for recycling information.		
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 “Monitoring and Control Instrumentation” product. Do not dispose of this product as unsorted municipal waste. Go to Fluke's website for recycling information.		

## **Radio Frequency Data**

See page 39 for instructions on how to access digital copies of the radio licenses on the Imager.

## **Accessories**

Table 2 is a list of the accessories available for the Imager.

**Table 2. Accessories**

<b>Model</b>	<b>Description</b>	<b>PN</b>
FLK-TI-SBP3	Smart Battery Pack	3440365
FLK-TI-SBC3B	Charging Base/Power Supply with Adapters	4354922
TI-CAR CHARGER	12 V Vehicle Charger Adapter	3039779
FLK-TI-VISOR3	Sun Visor	4335377
FLK-TI-TRIPOD3	Tripod Mounting Accessory	4335389
BOOK-ITP	Introduction to Thermography Principles	3413459
FLK-LENS/TELE2	Infrared Telephoto Lens	4335377
FLK-LENS/WIDE2	Infrared Wide-Angle Lens	4335361

Optional telephoto and wide-angle lenses expand the flexibility and allow more applications for your infrared inspection work. See Figure 2 for information about how to install a lens.

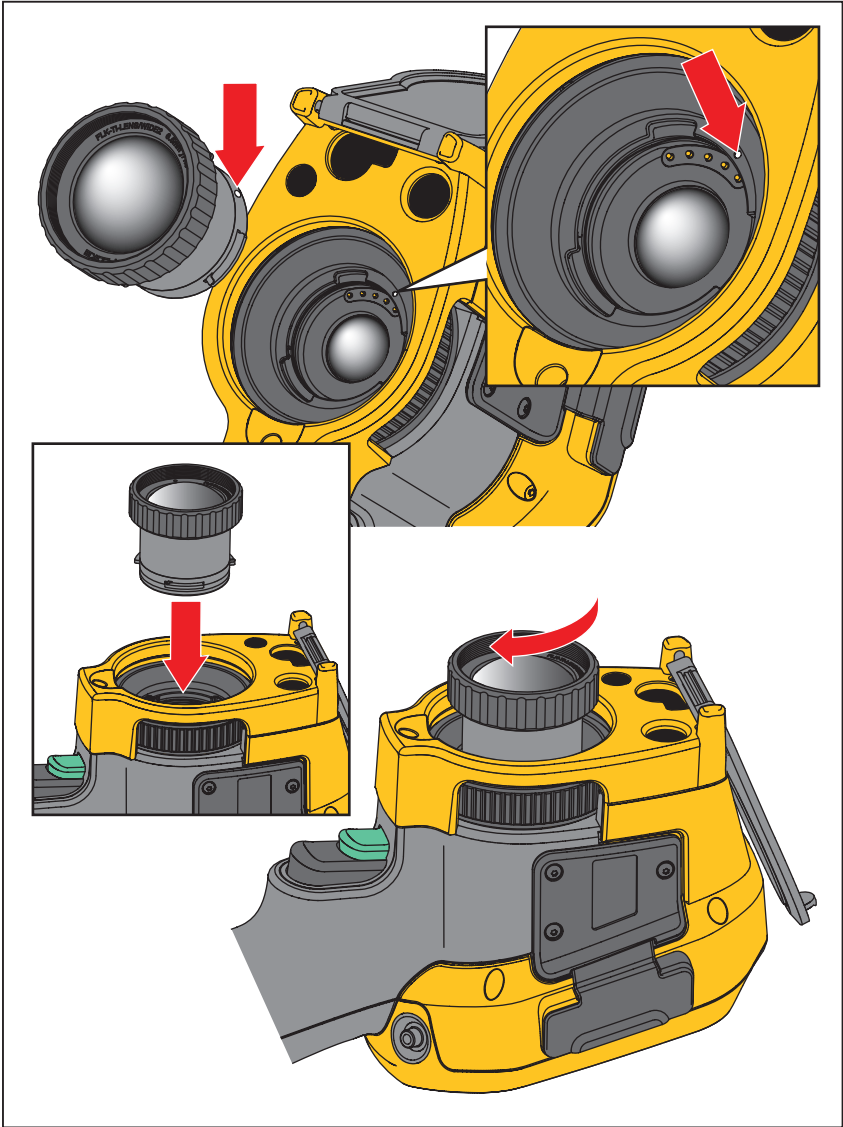


Figure 2. Add-On Lens Installation

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## **Before You Start**

Carefully unpack the items in the shipment box:

- Thermal Imager
- AC Power Supply with Mains Adapters
- Two-Bay Battery Charge Base
- 2 Lithium-ion Smart Batteries
- Hard Carrying Case
- USB Cable
- HDMI Cable
- Removable Memory Card<sup>[1]</sup>
- Soft Transport Bag
- Adjustable Hand Strap (Left-hand or Right-hand use)
- Users Manuals in print (English, Spanish, French, German, Chinese)<sup>[2]</sup>
- Users Manuals on CD<sup>[2]</sup>
- SmartView<sup>®</sup> Software
- Warranty Registration Card

### *Note*

*[1] Fluke recommends the memory card that is supplied with the Imager or available from Fluke. Fluke does not warrant the use or reliability of aftermarket memory cards of different brands or capacities.*

*[2] To request a printed manual of a language not supplied with your product, email Fluke at [TPubs@fluke.com](mailto:TPubs@fluke.com). Specify the product name and language preference in the subject line.*

## Battery

Before you use the Imager for the first time, charge the battery for a minimum of two and one-half hours. The battery status shows on the five-segment charge indicator.

### Warning

**To prevent personal injury, do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**

#### *Note*


*New batteries are not fully charged. Two to ten charge/discharge cycles are necessary before the battery charges to its maximum capacity.*

To charge the battery, use one of the options that follow:

### *Two-Bay Battery Charger Base*



1. Connect the ac power supply to the ac wall outlet and connect the dc output to the charger base.
2. Put one or two smart batteries into bays of charger base.
3. Charge batteries until charge indicators show "full."
4. Remove smart batteries and disconnect the power supply when batteries are fully charged.

## On-Imager AC Power Socket

1. Connect the ac power adapter into an AC wall outlet and connect the dc output to the Imager's ac power socket.  flashes on the display while the battery charges with the ac power adapter.
2. Charge until the charge indicator on the display does not flash.
3. Disconnect ac power adapter when the smart battery is fully charged.

### Note

*Make sure that the Imager is near room temperature before you connect it to the charger. See the charging temperature specification. Do not charge in hot or cold areas. When you charge in extreme temperatures, battery capacity may be decreased.*

 shows in the lower left-hand corner of the display when the Imager is connected to ac power and the battery is removed. When the Imager's power is off and the ac power adapter is connected,  flashes in the center of the display to show that the battery charge is in process.

Keep the Imager attached to the charger until the battery condition icon shows a full charge. If you remove the Imager from the charger before a full charge shows, it may have a reduced run-time.

### Note

*When the battery is connected to ac power or the unit is in video mode, the Sleep Mode/Auto Off feature is disabled automatically.*




## Optional 12 V Vehicle Charger

1. Connect the 12 V adapter into the 12 V accessory socket of the vehicle.
2. Connect the output to the ac power socket of the Imager.
3. Charge until the indicator shows *full* on the screen.
4. Disconnect the 12 V adapter and Imager when battery is fully charged.

### **Caution**

**To prevent damage to the Imager, remove it from the DC car charger before you start or jump start the vehicle.**

## Power On and Off

To turn on or turn off the Imager, push and hold  for two seconds, see Table . The Imager has Power Save and Auto Off features. See page 36 for more information about how to set these features.

### Note

*All thermal imagers need sufficient warm-up time for the most accurate temperature measurements and best image quality. This time can often vary by model and by environmental conditions. Although most imagers are fully warmed up in 3-5 minutes, it is always best to wait a minimum of 10 minutes if the most accurate temperature measurement is very important to your application. When you move an Imager between environments with large differences in ambient temperature, more adjustment time can be required.*

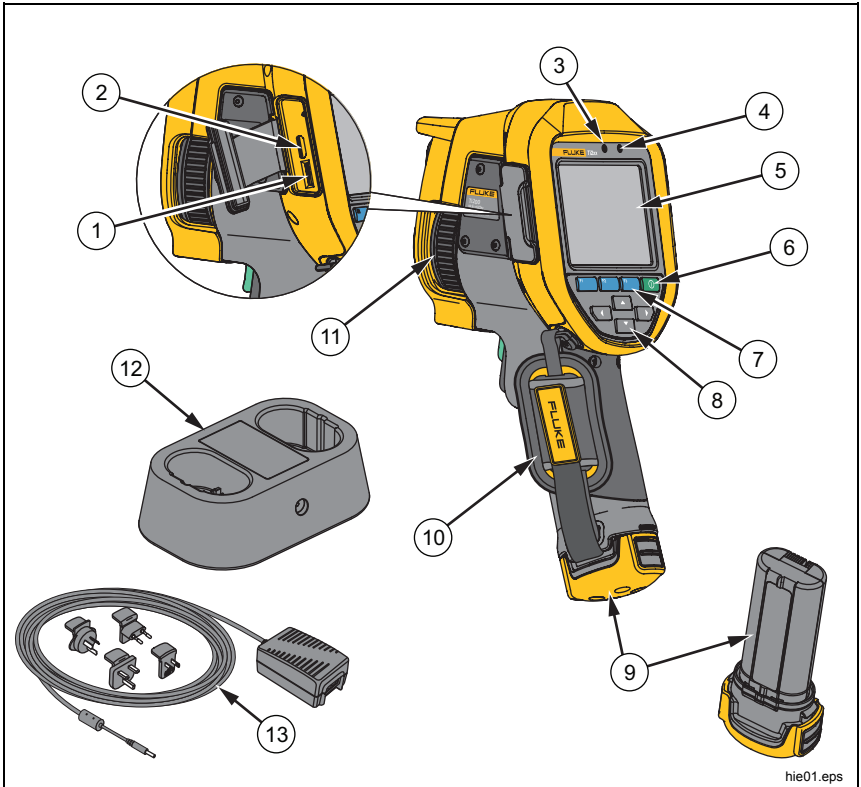
## Operation in Extreme Conditions

Storage and/or continual operation of the Imager in extreme ambient temperature conditions can result in temporary interruption of operation. If this occurs, let the Imager stabilize (cool down or warm up) before you resume operation.

## Features and Controls

Table 3 shows the Imager features and controls.

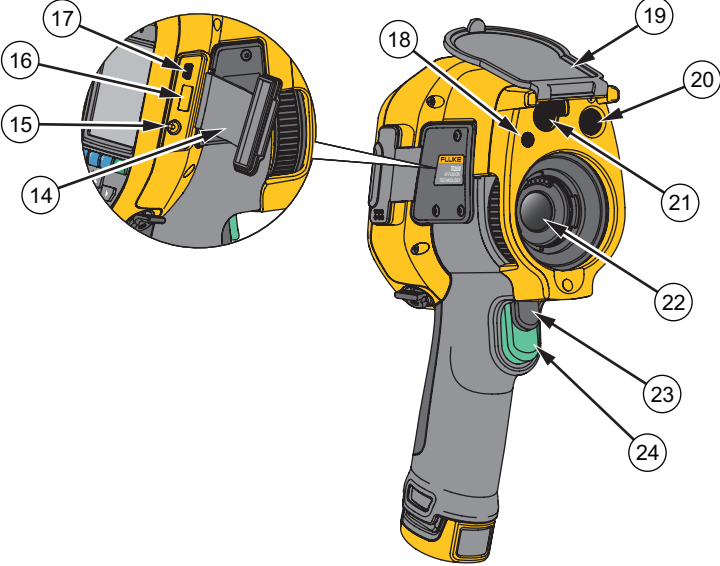
**Table 3. Features and Controls**



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Item	Description
①	HDMI Connection
②	USB Cable Connection
③	Microphone
④	Speaker
⑤	LCD Display
⑥	⏻ Power On/Off
⑦	Function Buttons (F1, F2, and F3)
⑧	Arrow Buttons
⑨	Lithium-ion Smart Battery

**Table 3. Features and Controls (cont.)**

Item	Description
⑩	Hand Strap
⑪	Manual Focus Control
⑫	2-Bay Battery Charging Base
⑬	AC Power Supply with Mains Adapters
	
⑭	Connector Cover
⑮	AC Adapter/Charger Input Terminal
⑯	Removable Micro SD Memory Card Slot
⑰	Micro USB Cable Connection
⑱	LED Torch/Flashlight
⑲	Retractable Lens Cover
⑳	Visual Light Camera Lens
㉑	Laser Pointer/Range Finder
㉒	Infrared Camera Lens
㉓	Secondary Trigger
㉔	Primary Trigger

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## **Primary and Secondary Triggers**

The two-part trigger is located in the standard trigger position for a pistol-grip device. The larger, green trigger is the primary trigger. The smaller, black trigger is the secondary trigger.

In normal operation, the function of the primary trigger is to capture a thermal image for possible storage to memory by the user.

The secondary trigger operates the LaserSharp™ Auto Focus System and laser pointer. See page 32 for information about how to enable and disable the LaserSharp™ Auto Focus System.

## **Focus**

The Imager uses the LaserSharp Auto Focus System and an advanced manual focus system. Correct focus is important in all imaging applications. Correct focus makes sure that the infrared energy is correctly directed onto the pixels of the detector. Without correct focus, the thermal image can be blurry and the radiometric data may be inaccurate. Out-of-focus infrared images are frequently unusable or of little value.

The LaserSharp Auto Focus System, only from Fluke, uses a precision-adjusted and aligned laser pointer to indicate the area of focus. To focus with the LaserSharp Auto Focus System, depress the secondary (black) trigger on the Imager handle. Aim the laser pointer at the target. When satisfied with the location of the laser pointer, release the trigger. The system automatically, rapidly, and reliably focuses on the precise point where the laser was aimed.

### *Note*

- *The user can enable and disable the LaserSharp Auto Focus System.*
- *The laser pointer is aligned parallel to the infrared lens. If using AutoBlend Mode, the laser pointer dot will always be positioned just above the center point marker on the LCD display. However, it is easier to use your eyes to locate the visible laser pointer on the object under inspection.*

To focus with the advanced manual focus system, place finger on the electronically-driven focus wheel control and rotate the control until the inspection object is in proper focus.

*Note*

The user is able to use the advanced manual focus as a manual override of the LaserSharp™ Auto Focus System.

## Control Buttons

Three function buttons (F1 F2 F3) and four arrow buttons (◀ ▶ ▲ ▼) are the primary controls. These buttons move the cursor through the menu structure to set the features.

Table 4 is an overview of the buttons and their actions. In live Manual Mode, the arrow buttons are always active to adjust Level and Span.

In general, push:

- F3 to set the change and go back to the live view.
- F2 to set the change and go back to the previous menu.
- F1 to cancel the change and go back to the live view.

**Table 4. Overview of Controls**

Button	Button Label / Action
F3 or Primary Trigger	Cancel
F1 or Primary Trigger	Done (exit from Menu structure)
F1	Select or OK
F2	Back
▲ ▼ ▶ ▶	Move cursor to highlight an option

## Touch Screen

The touch screen enables you to interact directly with what is displayed. To change parameters or select function and options, touch a target on the display with a finger. Touch targets are easy to recognize, such as arrows to indicate a drop-down list for a selection of options.

The touch screen has a backlight for work in dimly lit spaces. To change the backlight intensity, see page 33.

## **How to Use the Menus**

The menus, coupled with the three function buttons (F1, F2, F3) and arrow buttons, are the access for thermal image display, camera features, measurement, advanced functions, memory review, and settings for date, time, language, units, file format, and Imager information.

To open the primary menu, push F2. The primary menu shows five secondary menus for Measurement, Image, Camera, Memory, and Settings. The text above each function button (F1, F2, F3) applies to that button throughout all menu screens.

Push F2 to open the primary menu and push ▲ ▼ ▶ ◀ to cycle through the secondary menus. Each secondary menu lists an options menu. Push ▲ ▼ ▶ ◀ to cycle through the options.

The primary, secondary, and option menus close 10 seconds after the last push of a function button. The option selection menu stays open until you make the selection, go up a menu level, or cancel the action.

## **Image Capture**

Point the imager at the object or area of interest. Focus on the object using the LaserSharp™ Auto Focus System or advanced manual focus (See page 13 on how to focus). Pull and release the primary trigger. This will capture and freeze the image. The image is now in the memory buffer and you can choose to save or edit the image. Push F1 to save the image or pull the primary trigger again or F3 to cancel and return to the live view.

Depending on the selected file format settings, the Imager shows the captured image and a menu bar. The menu bar lets you save the image, edit some image settings, and add voice annotation or IR-PhotoNotes™ digital photos. To change the file format, see *File Format* on page 35.

## **IR-PhotoNotes™**

The IR-PhotoNotes™ photo annotation system allows the user to capture and add up to five visible (digital) images of various objects, text, or other information that is related to the analysis and reporting of an infrared image. Examples of possible annotations include motor name plates, printed information or warning signs, larger views of the environment or room, and related equipment or objects. Up to five images can be captured with the visible image that is stored in addition to the aligned infrared and visible images used in IR-Fusion® technology. These visible images are only available in the .is2 file format and are stored in the file so you do not need to collate multiple files at a later time.

To add photos using the IR-PhotoNotes annotation system:

1. With an infrared image in the buffer, push **F2** to open the **EDIT IMAGE** menu.
2. Push **▲/▼** to highlight **IR-PhotoNotes**.
3. Push **F1** to enter the Picture mode.
4. Focus the Imager on the object and pull the primary trigger.
5. Push **F2** when done.
6. Pull the primary trigger to capture additional pictures.
7. Push **F1** save the pictures with the image.



## **Voice Annotation (Recording)**

To add a voice (audio) recording:

1. With an infrared image in the buffer, push **F2** to open the **EDIT IMAGE** menu.
2. Push **▲**/**▼** to highlight **Add Audio**.
3. Push **F1** to record up to 60 seconds of audio. The display updates to show the recorded time.
4. Push **F1** to pause the recorder.
5. Push **F2** when done.
6. Push **F1** to review the audio file or **F2** to save the audio with the image.

Voice annotation is only available in the .is2 file format and is stored in the file so you do not need to collate multiple files at a later time.

## **Listen to a Voice Annotation (Recording)**

The voice (audio) recording replays through the speaker.

To play back:




1. Do the steps in the *Review Image Files* section on page 34 to see the image on the display.
2. Push **F1**.
3. Push **F1** to set **Audio**.
4. Push **F1** to listen to the audio.
5. Push **F1** again to pause the audio.



## ***Edit Captured Infrared Image***


Before saving a file, you can edit or modify the image.

To edit:

1. With an image in the buffer, go to **EDIT IMAGE > Edit Image**.
2. Push / to highlight an option.
3. Push  to save the changes with the file.

## ***Save Captured Infrared Image***

To save an image as a data file:

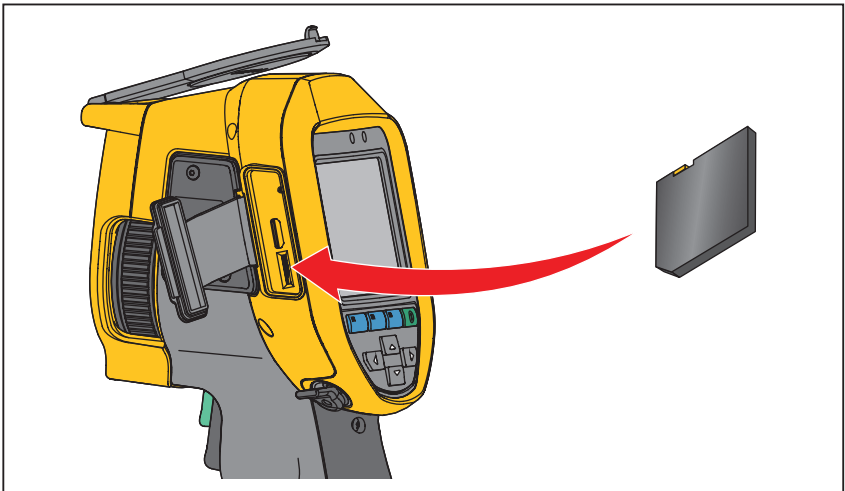
1. Focus on the object of interest or inspection area.
2. Pull the trigger to capture the image. The image is now in the buffer and you can save or edit.
3. Push  to save the image as a file and go back to the live view.

## **Micro SD Memory Card**

To eject a Micro SD memory card, push in on the exposed edge of the card and then release. The card should pop partially out after you release it. Carefully pull the card out of the slot.

To use the Micro SD memory card, make sure that the write-protect lock is open. See Figure 3. Push the card in until it catches.

The Micro SD memory card comes with an SD adapter for insertion into a PC or multi-function card reader if desired.



**Figure 3. Micro SD Memory Card Insertion and Removal**

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For information about how to save data, see page 18. For information about how to view or erase a stored image, see page 34.