Technical Data
FLIR A310

Part number:
48201-1101

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Customer support

http://support.flir.com

General description

The FLIR A310 camera offers an affordable and accurate temperature measurement solution for anyone who needs to solve problems that need built in “smartness” such as analysis, alarm functionality and autonomous communication using standard protocols. The FLIR A310 camera also has all the necessary features and functions to build distributed single- or multi-camera solutions utilizing standard Ethernet hardware and software protocols.
The FLIR A310 camera also has built in support to connect to industrial control equipment such as PLCs, and allows for sharing of analysis and alarm results and simple control using the Ethernet/IP and Modbus TCP field bus protocol.

Key features:

- Support for EthernetIP field bus protocol (analyse, alarm, and simple camera control)
- Support for Modbus TCP field bus protocol (analyse, alarm, and simple camera control)
- Built-in extensive analysis functionality
- Extensive alarm functionality, as a function of analysis and more
- On schedule: file sending (FTP) or email (SMTP) of analysis results or images
- On alarms: file sending (FTP) or email (SMTP) of analysis results or images
- MPEG-4 streaming
- PoE (Power over Ethernet)
- Built-in web server
- General purpose I/O
- 100 Mbps Ethernet (100 m cable, wireless, fiber, etc.)
- Synchronization through SNTP
- Composite video output
- Multi-camera utility software: FLIR IP Config and FLIR IR Monitor included
- Open and well-described TCP/IP protocol for control and set-up
- 16-bit 320 × 240 images @ 7–8 Hz, radiometric
- Lenses: 25° included, 15° and 45° optional

Typical applications:

- Safety with temperature alarms (multi-camera applications), fire prevention, critical vessel monitoring, and power utility asset management
- Volume-oriented industrial control (multi-camera installation is possible)

Imaging and optical data

IR resolution	320 × 240 pixels
Thermal sensitivity/NETD	< 0.05°C @ +30°C (+86°F) / 50 mK
Field of view (FOV)	25° × 18.8°
Minimum focus distance	0.4 m (1.31 ft.)
Focal length	18 mm (0.7 in.)
Spatial resolution (IFOV)	1.36 mrad
Lens identification	Automatic
F-number	1.3
Image frequency	30 Hz
Focus	Automatic or manual (built in motor)
Zoom	1–8× continuous, digital, interpolating zooming on images

Detector data

Detector type	Focal Plane Array (FPA), uncooled microbolometer
Spectral range	7.5–13 µm
Detector pitch	25 µm
Detector time constant	Typical 12 ms

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Measurement	
Object temperature range	–20 to +120°C (–4 to +248°F) 0 to +350°C (+32 to +662°F)
Accuracy	±2°C (±3.6°F) or ±2% of reading
Measurement analysis	
Spotmeter	10
Area	10 boxes with max./min./average/position
Isotherm	1 with above/below/interval
Measurement option	Measurement Mask Filter Schedule response: File sending (ftp), email (SMTP)
Difference temperature	Delta temperature between measurement functions or reference temperature
Reference temperature	Manually set or captured from any measurement function
Atmospheric transmission correction	Automatic, based on inputs for distance, atmospheric temperature and relative humidity
Optics transmission correction	Automatic, based on signals from internal sensors
Emissivity correction	Variable from 0.01 to 1.0
Reflected apparent temperature correction	Automatic, based on input of reflected temperature
External optics/windows correction	Automatic, based on input of optics/window transmission and temperature
Measurement corrections	Global and individual object parameters
Alarm	
Alarm functions	6 automatic alarms on any selected measurement function, Digital In, Camera temperature, timer
Alarm output	Digital Out, log, store image, file sending (ftp), email (SMTP), notification
Set-up	
Color palettes	Color palettes (BW, BW inv, Iron, Rain)
Set-up commands	Date/time, Temperature°C/°F
Storage of images	
Storage media	Built-in memory for image storage
File formats	Standard JPEG, 16-bit measurement data included
Ethernet	
Ethernet	Control, result and image
Ethernet, type	100 Mbps
Ethernet, standard	IEEE 802.3
Ethernet, connector type	RJ-45
Ethernet, communication	TCP/IP socket-based FLIR proprietary
Ethernet, video streaming	MPEG-4, ISO/IEC 14496-1 MPEG-4 ASP@L5
Ethernet, image streaming	16-bit 320 × 240 pixels @ 7-8 Hz - Radiometric
Ethernet, power	Power over Ethernet, PoE IEEE 802.3af class 0
Ethernet, protocols	Ethernet/IP, Modbus TCP, TCP, UDP, SNTP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP
Digital input/output	
Digital input, purpose	Image tag (start/stop/general), Input ext. device (programmatically read)
Digital input	2 opto-isolated, 10–30 VDC
Digital output, purpose	As function of ALARM, Output to ext. device (programmatically set)
Digital output	2 opto-isolated, 10–30 VDC, max 100 mA
Digital I/O, isolation voltage	500 VRMS

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Digital input/output	
Digital I/O, supply voltage	12/24 VDC, max 200 mA
Digital I/O, connector type	6-pole jackable screw terminal

Composite video	
Video out	Composite video output, PAL and NTSC compatible
Video, standard	CVBS (ITU-R-BT.470 PAL/SMPTE 170M NTSC)
Video, connector type	Standard BNC connector

Power system	
External power operation	12/24 VDC, 24 W absolute max
External power, connector type	2-pole jackable screw terminal
Voltage	Allowed range 10–30 VDC

Environmental data	
Operating temperature range	–15°C to +50°C (+5°F to +122°F)
Storage temperature range	–40°C to +70°C (–40°F to +158°F)
Humidity (operating and storage)	IEC 60068-2-30/24 h 95% relative humidity +25°C to +40°C (+77°F to +104°F)
EMC	• EN 61000-6-2:2001 (Immunity) • EN 61000-6-3:2001 (Emission) • FCC 47 CFR Part 15 Class B (Emission)
Encapsulation	IP 40 (IEC 60529)
Bump	25 g (IEC 60068-2-29)
Vibration	2 g (IEC 60068-2-6)

Physical data	
Weight	0.7 kg (1.54 lb.)
Camera size (L × W × H)	170 × 70 × 70 mm (6.7 × 2.8 × 2.8 in.)
Tripod mounting	UNC ¼"-20 (on three sides)
Base mounting	2 × M4 thread mounting holes (on three sides)
Housing material	Aluminum

Scope of delivery

- Cardboard box
- Infrared camera with lens
- Calibration certificate
- Downloads brochure
- Ethernet™ cable
- Mains cable
- Power cable, pig-tailed
- Power supply
- Printed Getting Started Guide
- Printed Important Information Guide
- Service & training brochure
- User documentation CD-ROM
- Utility CD-ROM
- Warranty extension card or Registration card

Optional Accessories

- 1196961 IR lens, f = 30 mm, 15° incl. case
- 1196960 IR lens, f = 10 mm, 45° incl. case
- T197215 Close-up 4× (100 µm) incl. case
- T197214 Close-up 2× (50 µm) incl. case
- T197407 IR lens, 76 mm (6°) with case and mounting support for A/SC3xx
- T197411 IR lens, 4 mm (90°) with case and mounting support for A/SC3xx
- T197415 Close-up 1× (25 µm) incl. case and mounting support for A/SC3xx
- T197000 High temp. option +1200°C/+2192°F for FLIR T/B2xx to T/B4xx and A/SC3xx Series
- 1910400 Power cord EU
- 1910401 Power cord US
- 1910402 Power cord UK
- T910922 Power supply, incl. multi plugs, for A/SC3xx and A/SC6xx
- 908929 Video cable, 3.0 m/9.8 ft.
- T951004 Ethernet cable CAT-6, 2m/6.6 ft.
- 1910586 Power cable, pigtailed
- T197871 Hard transport case for A/SC3xx and A/SC6x5 series
- T197870 Cardboard box for A/SC3xx and A/SC6x5 series

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Optional Software

- T197038 ThermoVision™ System Developers Kit Ver. 2.6
- T197039 ThermoVision™ LabVIEW® Digital Toolkit Ver. 3.3
- DSW-10000 FLIR IR Camera Player

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1196961; IR lens, f = 30 mm, 15° incl. case

General description

The 15° lens is a popular lens accessory and provides 1.7× magnification compared to the standard lens. Ideal for small or distant targets such as overhead power lines.

Technical data

Field of view (FOV)	15° × 11.25°
Minimum focus distance	1.2 m (3.93 ft.)
Focal length	30.38 mm (1.2 in.)
Spatial resolution (IFOV)	1.31 mrad/0.82 mrad
F-number	1.3
Lens note	When two pieces of data are separated by "/" the first piece of data is for T/B200 and T/B250 and the second piece of data is for T/B360, T/B400 and A320/A325
Weight	0.092 kg (0.203 lb.), incl. two lens caps
Size (L × D)	24 × 58 mm (1.0 × 2.3 in.)

Scope of delivery

- Lens
- Lens case

v1.02

1196960; IR lens, f = 10 mm, 45° incl. case

General description

This wide angle lens has a field of view almost double that of the standard lens. Perfect for wide or tall targets or when working in crowded spaces.

Technical data

Field of view (FOV)	45° × 33.8°
Minimum focus distance	0.20 m (0.66 ft.)
Focal length	9.66 mm (0.38 in.)
Spatial resolution (IFOV)	3.93 mrad/2.45 mrad
F-number	1.3
Lens note	When two pieces of data are separated by "/" the first piece of data is for T/B200 and T/B250 and the second piece of data is for T/B360, T/B400 and A320/A325
Weight	0.105 kg (0.231 lb.), incl. two lens caps

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Technical data

Size (L × D)	38 × 47 mm (1.5 × 1.9 in.)

Scope of delivery

- Lens
- Lens case

v1.01

T197215; Close-up 4× (100 µm) incl. case

General description

For R&D usage or development purposes. As an example looking at PCB's or small electronic components.

Technical data

Field of view (FOV)	32 × 24 mm
Magnifying factor	4×
Working distance	79 mm
Depth of field	±2.0 mm
Focal length	73 mm (2.9 in.)
Spatial resolution (IFOV)	160 µm/100 µm
F-number	1.3
Number of lenses	2 (2 asph)
MTF @ 70% of FOV	Normal requirements (52%)
Distortion	3%
Lens note	When two pieces of data are separated by "/" the first piece of data is for T/B200 and T/B250 and the second piece of data is for T/B360, T/B400 and A320/A325
Weight	0.11 kg (0.24 lb.)
Size (L × D)	35.2 × 55 mm

Scope of delivery

- Lens
- Lens case

v1.02

P/N: 48201-1101

T197214; Close-up 2× (50 µm) incl. case

General description

For R&D usage or development purposes. As an example looking at PCB's or small electronic components.

Technical data

Field of view (FOV)	16 × 12 mm
Magnifying factor	2×
Working distance	33 mm
Depth of field	±0.4 mm
Focal length	37 mm (1.5 in.)
Spatial resolution (IFOV)	80 µm/50 µm
F-number	1.3
Number of lenses	2 (2 asph)
MTF @ 70% of FOV	Normal requirements (52%)
Distortion	3%
Lens note	When two pieces of data are separated by "/" the first piece of data is for T/B200 and T/B250 and the second piece of data is for T/B360, T/B400 and A320/A325
Weight	0.11 kg (0.24 lb.)
Size (L × D)	35.2 × 55 mm

Scope of delivery

- Lens
- Lens case

v1.03

T197407; IR lens, 76 mm (6°) with case and mounting support for A/SC3xx

General description

A narrow FOV is used in applications where the object that is going to be monitored is remote from the Camera or when the Camera needs to be far away from the object due to for an example high temperatures.

Technical data

Field of view (FOV)	6° × 4.5°
Minimum focus distance	4 m (13.11 ft.)
Focal length	76 mm (3.0 in.)

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Technical data

Spatial resolution (IFOV)	0.33 mrad
F-number	1.3
Number of lenses	3 (3 asph)
MTF @ 70% of FOV	Normal requirements (52%)
Distortion	3%
Weight	Lens: 0.328 kg (0.723 lb.) Support: 0.15 kg (0.331 lb.)
Size (L × D)	106 × 89 mm (4.17 × 3.48 in.)

Scope of delivery

- Lens
- Lens case
- Mounting support

v1.03

T197411; IR lens, 4 mm (90°) with case and mounting support for A/SC3xx

General description

A wide angle lens is used when working in confined areas or when a large object area needs to be covered. This lens is also designed for to look in to electrical cabinets down to 1/2” windows.

Technical data

Field of view (FOV)	90° × 73°
Minimum focus distance	20 mm (0.79 in.)
Focal length	4 mm (0.157 in.)
Spatial resolution (IFOV)	6.3 mrad
F-number	1.3
Number of lenses	3 (3asph)
MTF @ 70% of FOV	Normal requirements (52%)
Distortion	5%
Weight	Lens: 0.262 kg (0.578 lb.) Support: 0.048 kg (0.106 lb.)
Size (L × D)	90 × 60 mm (3.54 × 2.36 in.), excluding support

Scope of delivery

- Lens
- Lens case
- Mounting support

v1.04

P/N: 48201-1101

T197415; Close-up 1× (25 µm) incl. case and mounting support for A/SC3xx

General description

For R&D usage or development purposes. As an example looking at PCB's or small electronic components.

Technical data

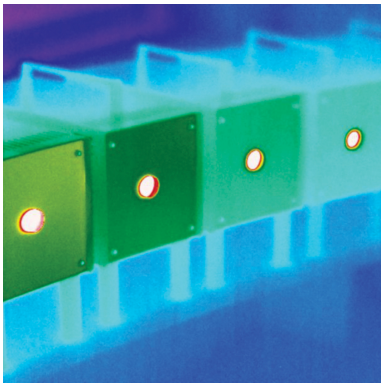
Field of view (FOV)	8 × 6 mm
Magnifying factor	1×
Working distance	20 mm
Depth of field	±0.15 mm
Focal length	18.2 mm (0.72 in.)
Spatial resolution (IFOV)	25 µm
F-number	1.3
Number of lenses	3 (3 asph)
MTF @ 70% of FOV	Normal requirements (52%)
Distortion	3%
Lens note	The lens and mounting support does not mechanically fit the FLIR T/Bxxx series.
Weight	0.38 kg (0.83 lb.)
Size (L × D)	167 × 60 mm

Scope of delivery

- Lens
- Lens case
- Mounting support

v1.04

T197000; High temp. option +1200°C/+2192°F for FLIR T/B2xx to T/B4xx and A/SC3xx Series



General description

For high temperature applications the camera can be calibrated for high temperature ranges.

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Technical data	
Optional object temperature range	Up to +1200°C (+2192°F)

v1.0

1910400; Power cord EU

General description

Power cord (EU) for the power supply (1910585) used together with the FLIR A/SC3xx and A/SC6xx series.
The power supply (1910585) itself is discontinued and replaced by a new power supply (which includes muliplugs and another power cable).

Technical data	
AC operation	250 V 16 A
Cable length	2.0 m (6.6 ft.)
Color	Black

v1.02

1910401; Power cord US

General description

Power cord (US) for the power supply (1910585) used together with the FLIR A/SC3xx and A/SC6xx series.
The power supply (1910585) itself is discontinued and replaced by a new power supply (which includes muliplugs and another power cable).

Technical data	
AC operation	125 V 15 A
Cable length	2.0 m (6.6 ft.)
Color	Black

v1.01

P/N: 48201-1101

1910402; Power cord UK

General description

Power cord (UK) for the power supply (1910585) used together with the FLIR A/SC3xx and A/SC6xx series.
The power supply (1910585) itself is discontinued and replaced by a new power supply (which includes muliplugs and another power cable).

Technical data

AC operation	250 V 13 A
Cable length	2.0 m (6.6 ft.)
Color	Black

v1.01

T910922; Power supply, incl. multi plugs, for A/SC3xx and A/SC6xx

General description

Power supply, incl. multi plugs

Technical data

AC operation	100–240 VAC, 50/60 Hz, 12 VDC out
Power	2000 mA at 12 VDC
Size (L × W × H)	81 x 47 x 34 mm (3.2 x 1.9 x 1.3 in.)
Cable length	1.5 m (4.9 ft.)
Color	Black

Scope of delivery

- Power supply including cable
- EU plug
- UK plug
- US plug
- AU plug

v1.0

P/N: 48201-1101

908929; Video cable, 3.0 m/9.8 ft.

General description

This cable is used to transfer video signals from the infrared camera to an external monitor, or to a computer featuring an internal video card.

Technical data

Weight	163 g (5.7 oz.)
Cable length	3.0 m (9.8 ft.)
Connector	BNC

v1.01

T951004; Ethernet cable CAT-6, 2m/6.6 ft.

General description

This cable is used to connect the infrared camera to Ethernet.

Technical data

Weight	80 g (2.8 oz.)
Cable length	2.0 m (6.6 ft.)
Connector	RJ-45 to RJ-45
Cable type	CAT-6

v1.01

1910586; Power cable, pigtailed

General description

This cable is used, when a separate power supply is used (not the one supplied with the camera)

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Technical data	
Weight	75 g (2.6 oz.)
Cable length	2.0 m (6.6 ft.)
Connector	Pigtailed
Color	Black

v1.02

T197871; Hard transport case for A/SC3xx and A/SC6x5 series

General description

Rugged, watertight plastic case for FLIR A/SC3XX and A/SC65X series. Holds all items neatly and securely. The case can be locked with padlocks and features a breather valve to prevent pressure build-up in airplane cargo holds.

Technical data	
Weight	3.1 kg (6.8 lb.)
Size (L × W × H)	463 × 346 × 172 mm (18.2 × 13.6 × 6.8 in.)
Color	Black

Scope of delivery

- Hard transport case

v1.02

T197870; Cardboard box for A/SC3xx and A/SC6x5 series

General description

Cardboard box with plastic handle for the FLIR A/SC3XX and A/SC65X series. Holds all items neatly.

Technical data	
Weight	0.86 kg (1.9 lb.)
Size (L × W × H)	455 × 300 × 165 mm (17.9 × 11.8 × 6.5 in.)
Material	Cardboard

v1.02

Optional Software

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T197038; ThermoVision™ System Developers Kit Ver. 2.6

General description

ThermoVision™ System Developers Kit

Key features:

- Supports communication and broadcasting via FireWire™, Ethernet, and USB interfaces.
- Gives the user full control of the camera.
- Allows the user to set alarm conditions and measurement functions in the camera
- Allows the user to define I/O functionality (FLIR A series).
- Based on ActiveX technology.
- Supports acquisition of images through FireWire™, Ethernet, and USB interfaces.
- Reads from and writes to file in FLIR Systems' proprietary file format and writes to files in FLIR Systems' open floating point format (*.fpf).
- Converts 16-bit absolute pixels into temperature pixels and several intermediate types of pixels formats, for maximum user flexibility. Applies to all camera models with temperature measurement capabilities.
- Allows 16-bit temperature linear outputs from FLIR A series cameras.
- Includes method that allows using individual emissivity value correction on any single pixel or condensed measuring value – e.g. average, minimum etc.
- Supports conditional recording to file through FireWire™, Ethernet, and USB interfaces.

Users with licenses for the previous version can download a free upgrade via the following link:
http://support.flir.com/SwDownload/app/RssSWDownload.aspx?ID=62

Release notes

Version	ThermoVision 2.6 SP2
New features	• --- News in SP2: • Support for FLIR GF3XX series • Support for windowing in FLIR A615 and FLIR SC6x5 • Support for windowing in FLIR SC6x0 • Various bug fixes
	v1.04

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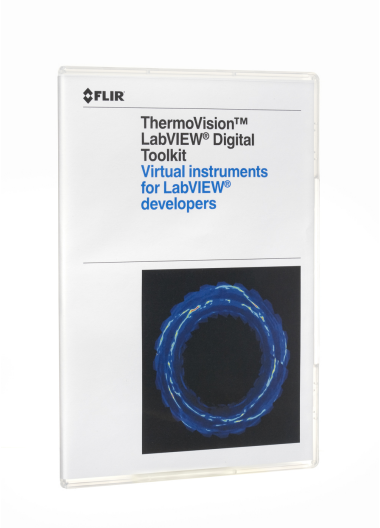
T197039; ThermoVision™ LabVIEW® Digital Toolkit Ver. 3.3



General description

The ThermoVision LabVIEW Toolkit is a set of VIs (virtual instruments) for cameras that support alarms, measurement functions, and I/O functionality.
Through LabVIEW, you can use these VIs as sub-VIs to manage communications with a FLIR IR camera in digital mode. You can also generate true temperature images from images acquired through LabVIEW, and can use the LabVIEW IR Measurement and Display tools to analyze the temperatures of imaged objects.

Key features:

- Set up communications between LabVIEW VI and a FLIR IR camera
- Capture and collect images via FireWire or Ethernet interfaces
- Adjust the camera configuration parameters and focus as you view a live image
- Control the camera calibration
- Send any other camera command to the camera
- Generate a true temperature image from a 16-bit image acquired using the camera's
- FireWire or Ethernet interfaces
- Close communications to the IR camera

Users with licenses for the previous version can download a free upgrade via the following link:
http://support.flir.com/SwDownload/app/RssSWDownload.aspx?ID=63

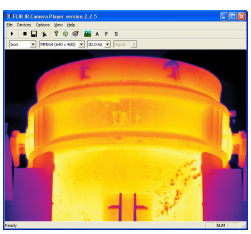
Note: Only supports National Instrumenst 32-bit Labview

Release notes

Version	3.3
New features	• Windows 7 32- and 64-bit support • Support for FLIR A615 and FLIR SC6X5 (including windowing) • Support for windowing in FLIR SC660 • Various bug fixes • New example VIs

v1.01

DSW-10000; FLIR IR Camera Player



General description

FLIR IR Camera Player is a PC-based remote control and viewer that you can use with cameras from FLIR Systems.

Optional Software

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General description

You can perform one or more of the following with FLIR IR Camera Player:

- Record a video stream from the camera.
- Save a frame from the video stream as a snapshot image (*.bmp).
- Autofocus, focus far, and focus near.
- Autoadjust the camera image.
- Freeze the camera image.
- Save a camera image in the camera.
- Change Color palette.
- Add an image description and a text comment to an image.

You connect a camera in one of the following ways:

- Ethernet
- FireWire
- USB

Download

This software is a freeware. To download, click the following link:

http://support.flir.com/SwDownload/app/RssSWDownload.aspx?ID=89

Release notes

Version	2.2.6
New features	• --- News in 2.2.6 • Various bug fixes. • --- News in 2.2.5 • Color palette menu. • Option to record AVI video clips from cameras that deliver MPEG or H264 image streams. • Option to compress the FLIR Researcher formats F7M0 and F7M2 to AVI. • Support for FLIR Exx series cameras. • Support for FLIR T6xx series cameras.

System requirements

Operating system	• Windows XP, 32-bit • Windows Vista, 32-bit/64-bit • Windows 7, 32-bit/64-bit

v1.02