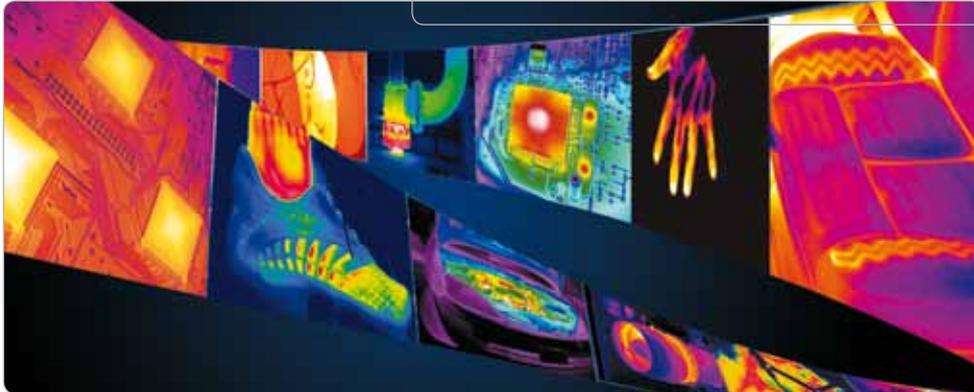


Thermal imaging cameras for Research and Development



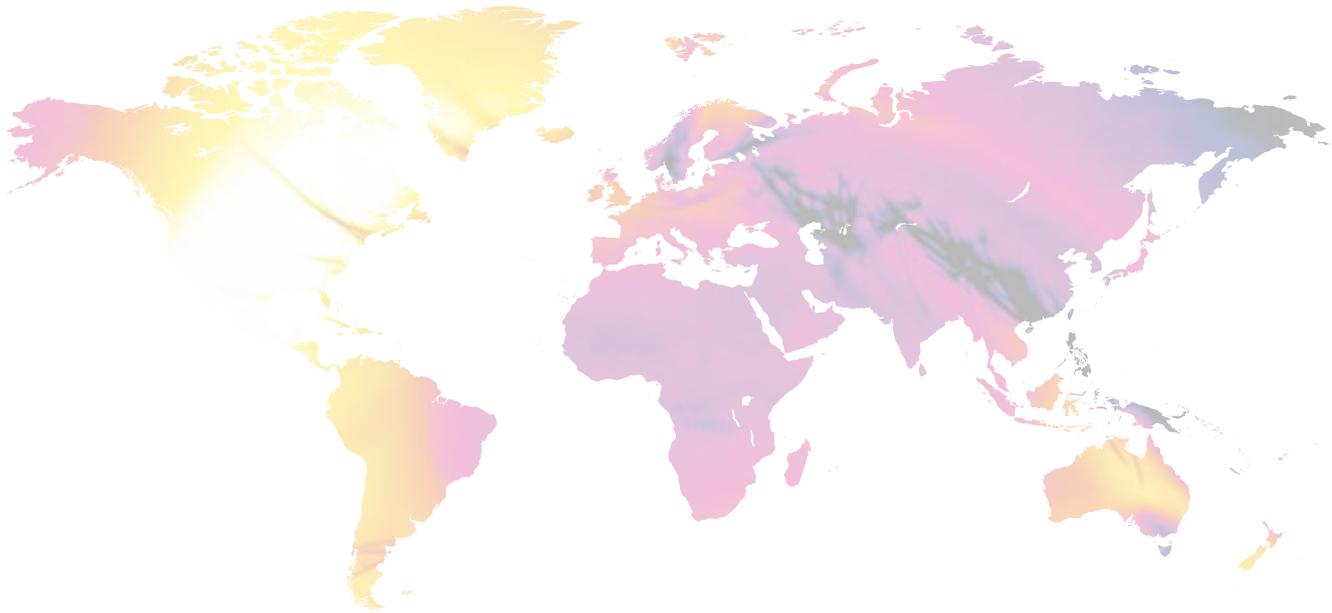
R&D Departments

Universities

Medical

Veterinary





FLIR Systems: the world leader for thermal imaging cameras

FLIR Systems is the world leader in the design, manufacturing and marketing of thermal imaging systems for a wide variety of commercial, industrial and government applications.

FLIR Systems' thermal imaging systems use state-of-the-art infrared imaging technology that detects infrared radiation - or heat. Based on detected temperature differences, thermal imaging cameras can create a crisp image. Complicated algorithms make it also possible to read correct temperature values from this image. We design and manufacture all of the critical technologies inside our products, including detectors, electronics, and special lenses ourselves.



FLIR Systems, Stockholm



FLIR Systems, Portland



FLIR Systems, Boston



FLIR Systems Santa Barbara

Rapidly emerging markets and organization

Interest for thermal imaging has grown considerably over the last few years in a large variety of markets.

To face this increased demand, FLIR Systems has expanded its organization drastically. Today we employ more than 1,900 people. Together, these infrared specialists realize a consolidated annual turnover of more than 1 billion US dollars. This makes FLIR Systems the largest manufacturer of commercial thermal imaging cameras in the world.

Manufacturing capabilities

FLIR Systems currently operates 6 manufacturing plants: three in the USA (Portland, Boston and Santa Barbara, California) one in Stockholm, Sweden, one in Estonia and one in Paris, France.

Thermal imaging: more than building a camera

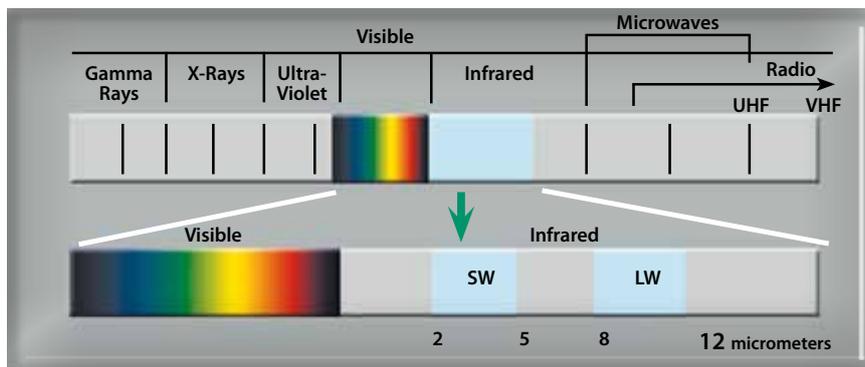
There is more to the world of thermal imaging than building a camera. FLIR Systems is not only committed to providing you with the best camera, we are also able to offer you the best software, service and training to suit your thermal imaging needs.

INFRARED: more than meets the eye

Infrared - part of the electromagnetic spectrum

Our eyes are detectors that are designed to detect visible light (or visible radiation). There are other forms of light (or radiation) that we cannot see. The human eye can only see a very small part of the electromagnetic spectrum. At one end of the spectrum we cannot see ultraviolet light, while at the other end our eyes cannot see infrared. Infrared radiation lies between the visible and microwave portions of the electromagnetic spectrum. The primary source of infrared radiation is heat or thermal radiation.

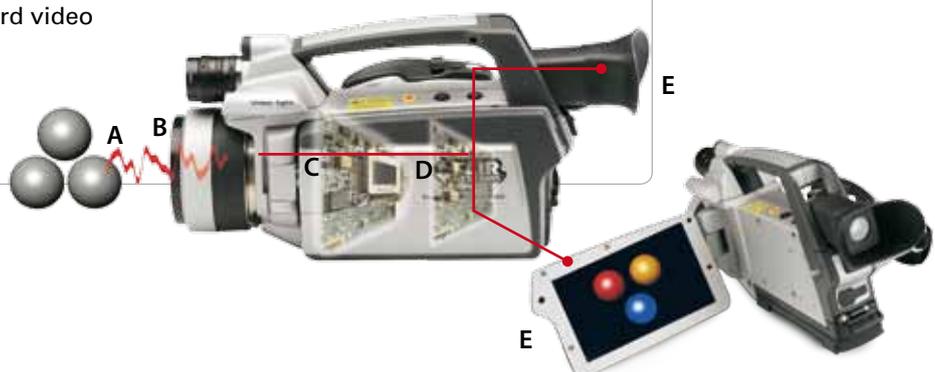
Any object that has a temperature above absolute zero (-273.15 degrees Celsius or 0 Kelvin) emits radiation in the infrared region. Even objects that we think of as being very cold, such as ice cubes, emit infrared radiation. We experience infrared radiation every day. The heat that we feel from sunlight, a fire or a radiator is all infrared. Although our eyes cannot see it, the nerves in our skin can feel it as heat. The warmer the object, the more infrared radiation it emits.



The infrared camera

Infrared energy (A) coming from an object is focused by the optics (B) onto an infrared detector (C). The detector sends the information to sensor electronics (D) for image processing. The electronics translate the data coming from the detector into an image (E) that can be viewed in the viewfinder or on a standard video monitor or LCD screen.

Infrared thermography is the art of transforming an infrared image into a radiometric one, which allows temperature values to be read from the image. In order to do this, complex algorithms are incorporated into the infrared camera.



Why use thermal imaging cameras?

Why would you choose a FLIR thermal imaging camera? There are other technologies available to help you measure temperatures in a non-contact mode. Infrared thermometers for example.

Infrared thermometers vs thermal imaging cameras

Infrared (IR) thermometers are reliable and very useful for single-spot temperature readings, but, for scanning large areas or components, it's easy to miss critical components that may be near failure and need repair.

A FLIR thermal imaging camera can scan entire motors, components, or panels at once - never missing any overheating hazards, no matter how small.

Use thousands of infrared thermometers at the same time

With an infrared thermometer you are able to measure the temperature at one single spot. FLIR thermal imaging cameras can measure temperatures on the entire image.

If we look at the FLIR SC660, our top model, which has an image resolution of 640 x 480 pixels, this means 307,200 pixels or using 307,200 infrared thermometers at the same time.



IR thermometer, temperature measurement in one spot



FLIR i5, temperature in 6,400 spots

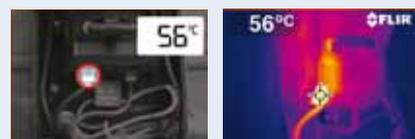
Find problems faster and easier with extreme accuracy.

It's easy to miss critical problems with a spot IR thermometer. A FLIR thermal imaging camera scans entire components giving you instant diagnostic insights showing the full extent of problems.



What an IR Thermometer sees.

What a thermal imaging camera sees.



What an IR Thermometer sees.

What a thermal imaging camera sees.

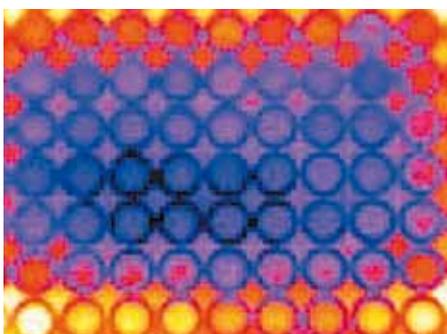


What an IR Thermometer sees.

What a thermal imaging camera sees.

Thermal imaging cameras for R&D applications

In Research and Development applications, accuracy and reliability are vitally important. That's why FLIR infrared cameras are widely used around the world for applications as diverse as microelectronics, paper processing, automotive, plastics, assessment of materials, target heat signatures, mechanical testing, R&D and much more.



Pharmaceutical industry

New drugs are being developed with the help of infrared. Scientists look at temperature changes in chemical reactions and study what is happening in microtiter plates.



Universities

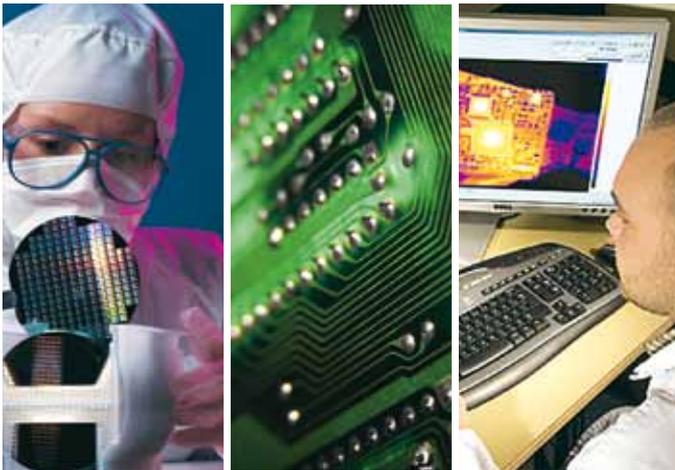
Fundamental or applied research, thermodynamical studies and many more applications. Infrared technology has become more and more affordable and universities are using infrared thermography for the most diverse applications.

FLIR's infrared cameras are used for capturing and recording thermal distribution and variations in real-time, allowing engineers and researchers to see and accurately measure heat patterns, dissipation, leakage, and other temperature factors in equipment, products and processes.

These cameras can distinguish temperature changes as subtle as 0.02°C. They feature state-of-the-art detector technology and advanced mathematical algorithms for high performance and precise measurements from -15°C to 3000°C. The R&D camera ranges combine extremely high imaging performance and precise temperature measurements, with powerful tools and software for analysing and reporting.

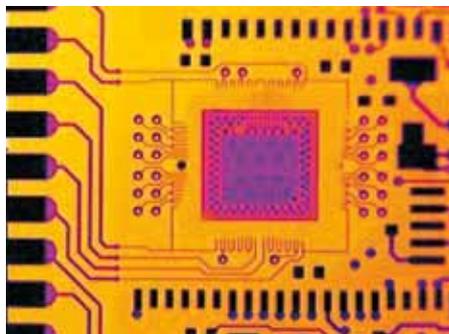
This combination makes them ideal for a wide range of research, thermal testing and product validation applications. With a vast choice of camera models, the FLIR R&D range can meet a wide variety of targets, applications and budget needs. They can be used as hand-held, portable devices, fix-mounted or tripod-mounted for continuous testing and operation.

Infrared thermography has proven to be an invaluable tool to solve a wide range of scientific questions and problems.

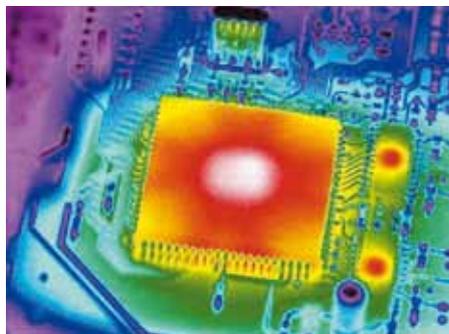


The advantages of infrared thermography for R&D applications

- Gives a full, real-time thermal pattern of the situation
- Is contactless, non-destructive and non-intrusive
- Identifies and locates thermal anomalies
- Stores thermal information
- Allows for detailed analysis
- Addresses numerous applications



Heat patterns are very difficult to predict. This means that it is not always possible to know where to attach the thermocouples necessary to make accurate measurements and effectively evaluate heat dissipation. Furthermore, since the thermocouple needs to be in contact with the component to be tested, it can influence the results of the measurement. Infrared has the advantage that it produces very comprehensive images without contact or intrusion.



A wide range of thermal imaging cameras for R&D applications

FLIR Systems markets a full product range of thermal imaging cameras for R&D applications. Whether you are just discovering the benefits that thermal imaging cameras have to offer or if you are an expert thermographer, FLIR Systems offers you the correct tool for the job.

Printed Circuit Boards

Scientists designing printed circuit boards are challenged with managing the heat dissipation without sacrificing performance or cost. Until recently, accurately understanding heat has been extremely difficult. However, thanks to thermography, engineers are able to easily visualize and quantify heat patterns in the devices that they create.

Discover our full product range and find out why FLIR Systems is the world leader for thermal imaging cameras.



FLIR SC305/SC325/SC645/SC655

Speed up your design cycle with infrared

The FLIR SC305 / SC325 / SC645 / SC655 infrared cameras are designed to keep the thermal efficiency of your development project under constant control. It prevents design faults in the making, ensures quality and cuts time-to-market.



Perfect your design, improve your design process

In the design process it is rarely possible to see a thermal problem with the naked eye or to measure temperature over surfaces accurately. Often, theoretical calculations and simulations do not give a satisfactory result without practical tests. And these are time consuming, requiring the precise connection of multiple thermocouples to prove the design.

Infrared speeds up the development process and makes it more efficient. It shows the complete picture so that nothing is left to chance.

An infrared camera gives you a sixth sense, allowing you to measure, monitor and analyze what you can't see, providing data and evidence in the fastest and easiest way possible. It is the perfect tool for verifying and validating design to ensure that the product fulfills specifications. Infrared also adds another dimension to non-destructive testing.

640
x
480

640x480 pixels

Some models of the SC-Series have a resolution pixel detector of 640x480 pixels that allows more accuracy and shows more details at a longer distance.



High speed infrared windowing

The FLIR SC655 model has a high speed infrared windowing function. It allows you to record thermal images at a frame rate of 100 Hz in a 640 x 240 infrared window or at a frame rate of 200 Hz in a 640 x 120 window.



Conditional start/stop

Control start/stop recording in FLIR R&D software. Let an external signal control the image streaming.



High sensitivity < 50 mK

< 50 mK thermal sensitivity captures the finest image details and temperature difference information.



Compact & lightweight design

Compact thermal imaging cameras for fixed R&D installations from FLIR.



GigE Vision™ standard compatibility

An industry first. GigE Vision is a new camera interface standard developed using the Gigabit Ethernet communication protocol. GigE Vision is the first standard to allow for fast image transfer using low cost standard cables even over long distances. With GigE Vision, hardware and software from different vendors can interoperate seamlessly over GigE connections.



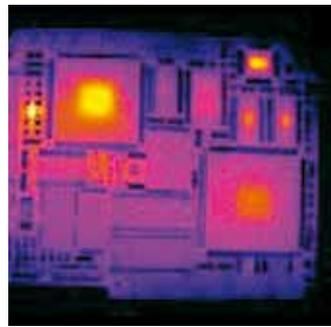
GenICam™ protocol support

An industry first. The goal of GenICam is to provide a generic programming interface for all kinds of cameras. Regardless of interface technology (GigE Vision, Camera Link, 1394 DCAM, etc.) or features implemented, the application programming interface (API) will always be the same. The GenICam protocol also makes third party software being possible to use with the camera.

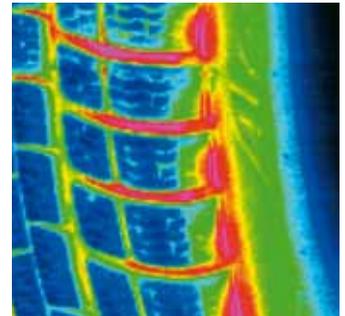


Built-in Gigabit Ethernet connection

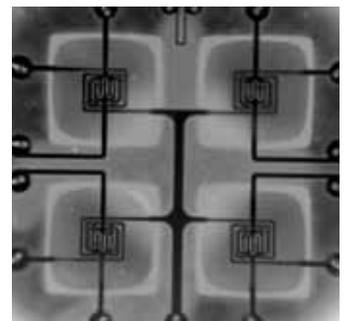
Real time 16 bit image streaming.



Verification of PCB



Tire evaluation at 200 km/h.



LED IC Evaluation

GIGAVISION™ GEN*i*CAM

Gigabit Ethernet connection

Power connection

USB 2 HS

Digital input/output connection

	 FLIR SC305	 FLIR SC325	 FLIR SC645	 FLIR SC655
Image size	320 x 240 pixels	320 x 240 pixels	640 x 480 pixels	640 x 480 pixels
Image frequency	9 Hz	60 Hz	25 Hz	50 Hz Windowing option: 100/200 Hz
Temperature range	-20°C to +350°C	-20°C to +350°C	-20°C to +2,000°C	-20°C to +2,000°C
Ethernet image streaming	16-bit 320 x 240 pixels at 9 Hz	16-bit 320 x 240 pixels at 60 Hz	16-bit 640 x 480 pixels at 25 Hz	16-bit 640 x 480 pixels at 50 Hz 16-bit 640 x 240 pixels at 100 Hz 16-bit 640 x 120 pixels at 200 Hz
USB	N/A	N/A	Control and image	Control and image
USB communication	N/A	N/A	TCP/IP socket-based FLIR proprietary and GenICam	TCP/IP socket-based FLIR proprietary and GenICam
USB image streaming	N/A	N/A	16-bit 640 x 480 pixels at 25 Hz	16-bit 640 x 480 pixels at 25 Hz 16-bit 640 x 240 pixels at 50 Hz 16-bit 640 x 120 pixels at 100 Hz

FLIR SC620/FLIR SC660



The FLIR SC620 and FLIR SC660 state-of-the-art infrared cameras are designed for demanding R&D specialists.

Highest sensitivity and most advanced feature set available. Supplies a combination of infrared and visible spectrum images of superior quality and temperature measurement accuracy – plus GPS, voice annotation, and a host of other advanced features.

640
x
480

640x480 pixel resolution

The FLIR SC620/SC660 have a high resolution pixel detector of 640 x 480 pixels that allows more accuracy and shows more details at a longer distance.

HIGH ACCURACY
2%

High sensitivity (FLIR SC660)

< 30 mK thermal sensitivity captures the finest image details and temperature difference information.



High quality visual camera

An integrated 3.2 megapixel visual camera for generating crisp visual images in all conditions.



Contrast Optimizer (FLIR SC660)

Automatic optimization of brightness and contrast adjustments to make it easier to make thermal analyzes of detailed objects.



Multifunction Video Capture

The SC660's 5.6" widescreen LCD allows on-camera viewing of images. Its FireWire interface can transfer 14-bit radiometric or RAW data directly into a PC for real-time analysis of captured images. Furthermore, radiometric sequences can be stored on high capacity SD-cards. MPEG-4 non-radiometric video sequences can also be streamed to a PC via USB, FireWire or WLAN (optional).

GPS

Built-in GPS (SC660)

GPS allows to georeference infrared images to determine their geographic location.



Laser Pointer

Helps you associate the hot or cold spot in the IR image with the real physical target in the field.



Flexible interfaces

Easy access to composite video connection, USB, FireWire, IrDA, and a direct connection to charge the battery inside the camera.



FLIR Thermal Fusion

Merges visual and infrared images to offer better analysis.



Picture-in-picture

Create an infrared overlay on your visual image. Scalable, moveable and resizable (depending on model).



Thumbnail image gallery

An easy-to-access thumbnail image gallery helps you to quickly review and find your infrared images.



Radiometric JPEG

FLIR uses a non proprietary radiometric JPEG image format that allows for post processing and report writing with Microsoft Word® based FLIR software.



Text and voice annotations

Text comments can be uploaded to the camera through a wireless IrDA interface. A headset can be connected to make voice annotations.



Automatic- and Manual focus, Digital zoom

Focus possibilities include; single shot auto focus, continuous auto focus, laser based (660-models) or manual focus. Digital zoom 1-2x continuous (SC620), 1-8x continuous (SC660).



Large LCD screen

Super size 5.6" foldable high-quality LCD screen allows you to see the smallest details and temperature differences.



Multi-angle handle with integrated direct access buttons

A turnable control grip allows you to use the camera in the most comfortable position. The buttons and joystick to control the camera are integrated in this handle and always stay right underneath your fingertips.



Programmable direct access buttons

For increased flexibility the operator can program buttons located on the top of the camera for direct access to favourite functions.

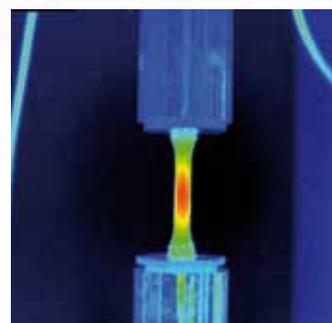
Contrast optimizer



Basic thermal image.



Thermal image enhanced with the Contrast Optimizer function.



Stress analysis



Steel bloom

FLIR SC620



<40 mK sensitivity, accuracy +/- 2% of reading

Standard 24° lens

2x digital zoom

Standard measurement functions

Laser Pointer

USB, FireWire, composite video, IrDA and headset connection

FLIR SC660



<30 mK sensitivity, accuracy +/- 1% of reading for limited temperature range

Wide range of lenses

8x digital zoom

Extended measurement functions

Advanced Laser Pointer

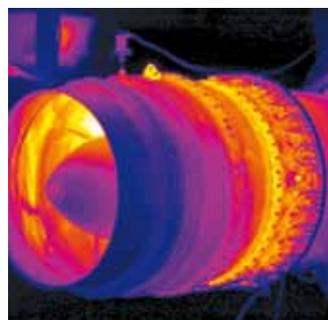
Set temperature alarms

USB, FireWire, composite video, IrDA and headset connection

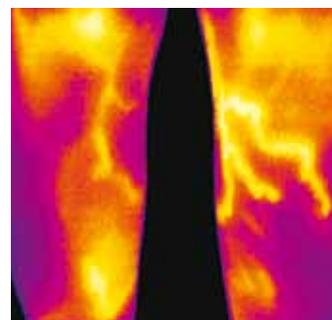
Sequence recording in camera

Built-in GPS

Contrast Optimizer



High transient analysis



Veins cartography

Software

Turning tools into solutions

At FLIR Systems, we recognize that our job is to go beyond just producing the best possible infrared camera systems. We are committed to enabling all users of our thermal imaging camera systems to work more efficiently and productively by providing them with the most professional camera-software combination.

Our team of committed specialists are constantly developing new, better and more user-friendly software packages to satisfy the most demanding thermal imaging professionals. All software is Windows-based, allows fast, detailed and accurate analysis and evaluation of thermal inspections.



- Visualise thermal patterns in real time
- Non-invasive, non-contact
- Visualise multiple measurements in one image
- Export plots, profiles and images in standard picture and data formats (*.csv, *.bmp, *.jpg)

FLIR QuickPlot and FLIR ResearchIR are aimed at R&D users of uncooled infrared cameras wanting to get an understanding on thermal events for design, product or process.

FLIR QuickPlot

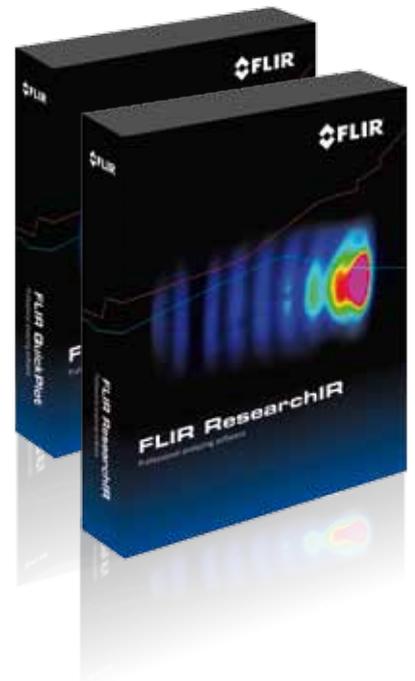
FLIR QuickPlot, for entry- and mid-level R&D users, allows the user to visualise thermal patterns, to record and store thermal image sequences, and to create time-temperature plots for further analysis.

- Acts as a multiple spot pyrometer
- Possible to record and store image sequences for later retrieval
- Possible to generate time-temperature plots
- File organiser with Quick Collection and preview of sequences
- Zoom & Pan allows you to get a closer look at your problem and analyse functions
- Multiple user-configurable tabs for live images, recorded images or plot

FLIR ResearchIR

FLIR ResearchIR, aimed for more advanced users, visualises thermal patterns and enables viewing, pre- & post-recording and storing images at high speed.

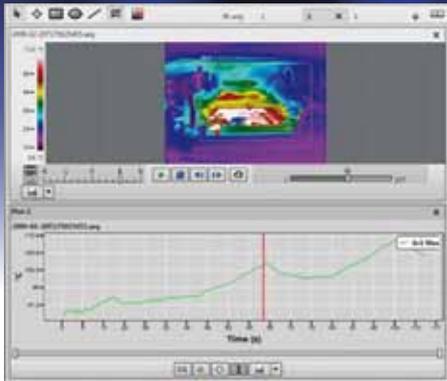
- Possible to view, record and store images at high speed
- Allows for post-processing of fast thermal events
- Possibility to generate time-temperature plots from live images or recorded sequences
- Advanced Start/Stop recording conditions incl. conditional on analysis value
- Pre- and Post-recording
- Unlimited number of Analysis functions (Spot, Line, Area)
- File organiser with Quick Collection and preview of sequences
- Zoom & Pan allows you to get a closer look at your problem and analyse functions
- Multiple user-configurable tabs for live images, recorded images or plot



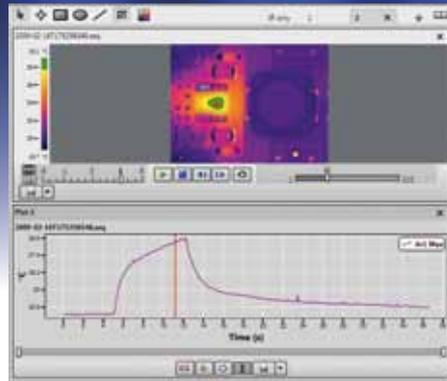
Choice of software

For research and development applications the advanced software FLIR ResearchIR is recommended. FLIR ResearchIR has been developed for use in scientific environments where detailed thermal analysis of dynamic events is required. It offers powerful tools for fast and extensive analysis. An optional Systems Development Kit (SDK) for Visual Studio users and a LabVIEW™ toolkit are also available enabling the functionality of the camera to be optimized for specific needs.

Application examples



Recorded sequence of a car engine



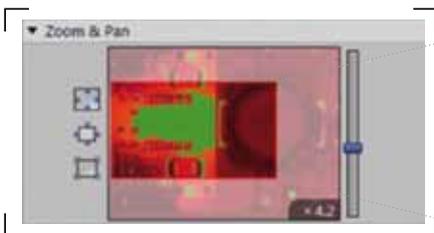
Recorded sequence of a PCB

FLIR QuickPlot

- Monitoring of a car's exterior temperature pattern in a climate test chamber.
- Monitoring of surface temperature on devices when loading conditions are changed, for example power supplies, cooling devices and moving mechanics.

FLIR ResearchIR

- Monitoring the transient behaviour of power supplies or components when altering the load or any other parameter during power up.
- Evaluating the transient behaviour of a car brake when braking and monitor the changed pattern when altering the brake material.



The Zoom & Pan pane allows you to zoom in interesting areas or to more accurately position analysis functions.



The Quick Collection shows images and sequences currently active.



FLIR QuickReport Software

FLIR QuickReport, allows users to organize and analyze the radiometric images from their infrared cameras and present them in a report in just three easy steps.

The software allows the user to adjust the level, span, zoom and pan of the camera. FLIR QuickReport features a choice of ten different color palettes.



FLIR IR Camera Player

Free online PC-based remote control and viewer

FLIR IR Camera Player is an intuitive and easy-to-use online PC-based remote control and viewer – FREE to use.

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

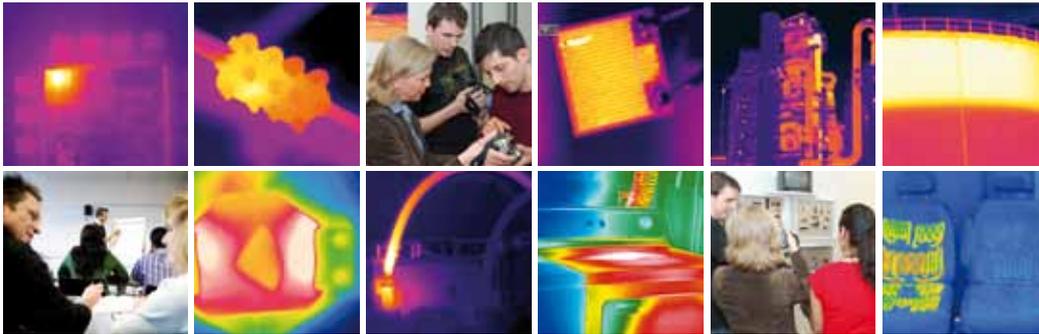
- Record a video stream from the camera (applies only to FireWire and USBvideo)
- Save a frame from the video stream as a snapshot image (*.bmp)
- Autofocus, focus far, and focus near
- Autoadjust the camera image
- Freeze the camera image
- Save a camera image in the camera



FLIR Infrared Training Center



The Infrared Training Center (ITC) offers the world's leading infrared training and thermographer certification programs.



Although all our cameras are designed for easy installation and operation, there is a lot more to thermal imaging than just knowing how to handle the camera. As the leading company for thermal imaging technology, we like to share our knowledge with our customers and other interested parties.

We therefore organize regular courses and seminars. We also organize in-company training on request, so that you, or your staff, can gain familiarity with thermal imaging and its applications.

The ITC not only welcomes FLIR Systems customers but also users of other brands of cameras. In fact, anyone who wants to learn more about thermal imaging for any applications, before deciding to purchase a camera, is also invited.

The mission of the ITC is to make our customers and partners successful by enhancing their knowledge of IR technology, thermal imaging products, and relevant applications. The ITC offers a portfolio of courses that presents the right mix of theoretical and practical content to help professionals quickly apply thermal imaging technology to real life applications.

All our instructors are experienced thermal imaging specialists. Not only do they have a profound theoretical knowledge but they also have practical experience with numerous applications. For our customers, this means that attending one of the ITC's courses will give them a real hands-on learning experience.

Follow one of our courses and become a thermal imaging expert.



Each ITC course is a perfect combination of theoretical fundamentals and practical exercises. It guarantees participants a real hands-on learning experience.

After Sales

FLIR After Sales

At FLIR Systems, building a relationship with a customer takes more than just selling a thermal imaging camera. After the camera has been delivered, FLIR Systems is there to help meet your needs.



Once purchased, thermal imaging cameras are vital pieces of equipment. To keep them running at all times, we operate a worldwide service network with subsidiaries in Belgium, China, France, Germany, Hong Kong, Italy, the Netherlands, Sweden, United Arab Emirates, the United Kingdom and the USA.

If there should be a problem with one of our camera systems, these local service centers have all the know-how and equipment to solve it within the shortest possible time. Local camera service gives you the assurance that your system will be ready for use again within an extremely short timeframe.

Buying a thermal imaging camera is a long-term investment. You need a reliable supplier who can provide you with support over a long period of time.

Our service personnel regularly follows training programs at our production facilities in Sweden or the USA. Not only to learn about the technical aspects of the products, but also to familiarize themselves with your individual customer requirements and the latest applications.

Different types of maintenance contracts can be offered to make sure that, whatever happens, your thermal imaging camera is always available for use.

**CUSTOMER CARE is not just a slogan.
We write it in capital letters at FLIR.**



FLIR SC305/SC325/SC645/SC655

Technical specifications

Camera specific



	FLIR SC305	FLIR SC325	FLIR SC645	FLIR SC655
Imaging and optical data				
Focal length	18 mm (0.7 in.)	18 mm (0.7 in.)	24.5 mm (0.96 in.)	24.5 mm (0.96 in.)
Spatial resolution (IFOV)	1.36 mrad	1.36 mrad	0.69 mrad	0.69 mrad
F-number	1.3	1.3	1.0	1.0
Image frequency	9 Hz	60 Hz	25 Hz	50 Hz (100/200 Hz with windowing)
Detector data				
IR resolution	320 × 240 pixels	320 × 240 pixels	640 × 480 pixels	640 × 480 pixels
Detector pitch	25 µm	25 µm	17 µm	17 µm
Detector time constant	Typical 12 ms	Typical 12 ms	Typical 8 ms	Typical 8 ms
Measurement				
Object temperature range	-20 to +120°C 0 to +350°C	-20 to +120°C 0 to +350°C	-20 to +150°C 0 to +650°C +300 to +2000°C	-20 to +150°C 0 to +650°C +300 to +2000°C
USB				
USB	N/A	N/A	Control and image USB, standard USB 2 HS	Control and image USB, standard USB 2 HS
USB, connector type	N/A	N/A	USB Mini-B	USB Mini-B
USB, communication	N/A	N/A	TCP/IP socket-based FLIR proprietary and GenICam protocol	TCP/IP socket-based FLIR proprietary and GenICam protocol
USB, image streaming	N/A	N/A	16-bit 640 × 480 pixels at 25 Hz - Signal linear - Temperature linear - Radiometric	16-bit 640 × 480 pixels at 25 Hz 16-bit 640 × 240 pixels at 50 Hz 16-bit 640 × 120 pixels at 100 Hz - Signal linear - Temperature linear - Radiometric
USB, protocols	N/A	N/A	TCP, UDP, SNMP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP	TCP, UDP, SNMP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP
Ethernet				
Ethernet, image streaming	16-bit 320 × 240 pixels at 9 Hz - Signal linear - Temperature linear - Radiometric GigE Vision and GenICam compatible	16-bit 320 × 240 pixels at 60 Hz - Signal linear - Temperature linear - Radiometric GigE Vision and GenICam compatible	16-bit 640 × 480 pixels at 25 Hz - Signal linear - Temperature linear - Radiometric GigE Vision and GenICam compatible	16-bit 640 × 480 pixels at 50 Hz 16-bit 640 × 240 pixels at 100 Hz 16-bit 640 × 120 pixels at 200 Hz - Signal linear - Temperature linear - Radiometric GigE Vision and GenICam compatible



General

Imaging and optical data

Field of view (FOV) / Minimum focus distance	25° × 18.8° / 0.4 m (1.31 ft.)
Lens identification	Automatic
Thermal sensitivity/NETD	< 0.05°C at +30°C (+86°F) / 50 mK
Focus	Automatic or manual (built in motor)

Imaging performance

Focal Plane Array (FPA) / Spectral range	Uncooled microbolometer / 7.5–13 µm
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Measurement

Accuracy	±2°C (±3.6°F) or ±2% of reading
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Measurement analysis

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 object parameters

Ethernet

Ethernet	Control and image
Ethernet, type	Gigabit Ethernet
Ethernet, standard	IEEE 802.3
Ethernet, connector type	RJ-45
Ethernet, communication	TCP/IP socket-based FLIR proprietary and GenICam protocol
Ethernet, protocols	TCP, UDP, SNMP, RTSP, RTP, HTTP, ICMP, IGMP, ftp, SMTP, SMB (CIFS), DHCP, MDNS (Bonjour), uPnP

Digital input/output

Digital input, purpose	Image tag (start, stop, general), Image flow ctrl. (Stream on/off), Input ext. device (programmatically read)
Digital input	2 opto-isolated, 10–30 VDC
Digital output, purpose	Output to ext. device (programmatically set)
Digital output	2 opto-isolated, 10–30 VDC, max 100 mA
Digital I/O, isolation voltage	500 VRMS
Digital I/O, supply voltage	12/24 VDC, max 200 mA
Digital I/O, connector type	6-pole jackable screw terminal

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	<ul style="list-style-type: none"> • 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	Aluminium

Scope of delivery

- Hard transport case or cardboard box
- Infrared camera with lens
- Application CD-ROM
- Calibration certificate
- Ethernet™ cable
- USB cable (FLIR SC645 and FLIR SC655 only)
- Mains cable
- Power cable, pig-tailed
- Power supply
- Printed Getting Started Guide
- Printed Important Information Guide
- User documentation CD-ROM
- Warranty extension card or Registration card
- 6-pole screw terminal (mounted on camera)

FLIR SC620/FLIR SC660

Technical specifications

Camera specific



	FLIR SC620	FLIR SC660
Imaging performance		
Field of View (FOV) / minimum focus distance	24° x 18° / 0.3 m	24° x 18° / 0.3 m 12° x 9° / 1.2 m 45° x 34° / 0.2 m lens needs to be specified when ordering
Spatial resolution	0.65 mrad for 24° lens	0.65 mrad for 24° lens 0.33 mrad for 12° lens 1.3 mrad for 45° lens
Thermal sensitivity	40 mK at 30°C	30 mK at 30°C
Electronic zoom	1-2x continuous including pan function	1-8x continuous including pan function
Electric and manual focus with USM technology	Auto and manual	Auto (follows laser spot) and manual
Image presentation		
Automatic contrast optimization	N/A	Adjustable DDE
Thermal Fusion	IR image shown above, below or within temperature interval on the visual image (with 24° lens only)	IR image shown above, below or within temperature interval on the visual image (with 24° lens only)
Picture in Picture	Resizeable and moveable IR area on visual image (with 24° lens only)	Resizeable and moveable IR area on visual image (with 24° lens only)
Measurement		
Accuracy	± 2 °C or ± 2% of reading	± 1°C or ± 1% of reading (restricted range) ± 2°C or ± 2% of reading
Measurement analysis		
Spotmeter	3	10
Area	3 boxes or circles with Max./Min./Average	5 boxes or circles with Max./Min./Average
Measurement function alarm	N/A	Audible/visual alarms (above/below) on any selected measurement function
Profile	N/A	1 live line, horizontal or vertical
Image storage		
In-camera storage	N/A	Built-in RAM for burst recording
Laser pointer		
Laser alignment	N/A	Position is automatically displayed on IR image
Laser mode	N/A	Auto-focus / level / spotmeter
Video recording		
Radiometric IR video recording	N/A	Real-time to built-in RAM, transferrable to memory card
Non-radiometric IR video recording	N/A	MPEG-4 to memory card
Geographic Information System		
Built-in GPS	N/A	Location data automatically added to every image for referencing on WEB maps



General

Imaging Performance	
IR resolution	640 x 480 pixels
Spectral range	7.5 - 13 μ m
Image frequency	30 Hz
Focus	Automatic or manual
Focal Plane Array (FPA)	Uncooled microbolometer
Image presentation	
Display	Built-in Widescreen, 5.6" color LCD, 1024 x 600 pixels
Viewfinder	Built-in, tiltable LCD, 800 x 600 pixels
Automatic image adjustments	Continuous/manual; linear or histogram based
Manual image adjustments	Level/span/max./min.
Image modes	IR image, Visual image, Thumbnail gallery, Thermal Fusion, Picture in Picture
Reference image	Shown together with live IR image
Measurement	
Temperature range	SC620: -40°C to +500°C (optional up to +2000°C) SC660: -40°C to +1500°C (optional up to +2000°C)
Measurement analysis	
Isotherm	2 with above/below interval
Difference temperature	Delta temperature between measurement functions or reference temperature
Automatic hot / cold detection	Max./Min. temp. value and position shown within box, circle or on a line
Reference temperature	Manually set or captured from any measurement function
Emissivity correction	Variable from 0.01 to 1.0 or selected from list of materials
Measurement corrections	Reflected temperature, optics transmission, atmospheric transmission and external optics
External optics/windows correction	Automatic, based on inputs of optics/window transmission and temperature
Setup	
Set-up controls	Local adaptation of units, language, date and time formats
Programmable buttons	2
Image storage	
Type	SD memory card
Format	Standard JPEG - including measurement data
Modes	IR/visual images, simultaneous storage of IR and visual images, visual image is automatically associated with corresponding IR image
Periodic image storage	Every 10 seconds up to 24 hours
Panorama	For creating panorama images in FLIR BuildIR software
Image annotations	
Voice	60 seconds stored and the image
Text	Predefined text or free text from PDA (via IrDA) stored with the image
Image marker	4 on IR or visual image
Digital camera	
Built-in digital camera	3.2 Mpixel auto-focus and video lamp
Laser Pointer	
Laser	Semiconductor AlGaInP diode laser, Class 2
Power System	
Battery type	Rechargeable Lithium-ion battery
Battery operating time	3 hours at 25 °C
Charging system	In camera, AC adaptor, 2-bay charger or 12 V from a vehicle
Power management	Automatic shutdown and sleep mode (user selectable)
AC operation	AC adaptor, 100–240 V AC, 50/60 Hz
Adaptor voltage	12 VDC out
Environmental specifications	
Operating temperature range	-15 °C to +50 °C
Storage temperature range	-40 °C to +70 °C
Humidity (operating and storage)	IEC 68-2-30/24 h 95% relative humidity +25 °C to +40 °C
Shock	25 g (IEC 60068-2-29)
Vibration	2 g (IEC 60068-2-6)
Encapsulation	IP 54 (IEC 60529)
Interfaces	
USB-A	Connect external USB device (copy to memory stick)
USB-Mini-B	Data transfer to and from PC / streaming MPEG-4
Composite video	PAL or NTSC
IrDA	For sending text comment files from PDA to camera,
WLAN	Optional
Headset connection	Yes
Physical characteristics	
Camera weight, incl. battery	1.9 kg
Camera size (L x W x H)	282 x 144 x 147 mm
Shipping size	520 x 400 x 200 mm
Shipping weight	8.2 kg
Standard package	
FLIR SC620 and FLIR SC660: Hard transport case, Infrared camera with lens, Battery (2 ea., one inserted in camera, one outside camera), Battery charger, Calibration certificate, FLIR QuickReport™ PC software CD-ROM, FireWire cable, 4/6 (FLIR SC620 and FLIR SC660), FireWire cable, 6/6 (FLIR SC620 and FLIR SC660), Headset, Lens cap (mounted on lens), Lens cap (2 ea.), Mains cable, Memory card-to-USB adaptor, Memory card with adaptor, Power supply, Printed Getting Started Guide, Shoulder strap, USB cable, User documentation CD-ROM, Video cable, Warranty extension card or Registration card	

FLIR SC305/SC325/SC645/SC655

Accessories



FLIR SC305 / SC325:

Lenses

**IR lens f = 30 mm, 15° incl. case**[\[1196961\]](#)

When the target in question is a distance away it may be useful to use a telescope lens. The 15° lens is a popular lens accessory and provides almost 2X magnification compared to the 25° lens. Ideal for small or distant targets.

**IR lens f = 10 mm, 45° incl. case**[\[1196960\]](#)

Sometimes there isn't enough room to step back and see the whole picture. This wide angle lens has a field of view almost double than the one of the standard 25° lens. Perfect for wide or tall targets.

**Close-up lens 2x, 50 μ m, incl. case**[\[T197214\]](#)

This macro lens provides resolution of extremely small targets.

**Close-up lens 4x, 100 μ m, incl. case**[\[T197215\]](#)

This macro lens provides resolution of extremely small targets.

**Lens 76 mm (6°) with case and mounting**[\[T197407\]](#)

For maximum magnification, the 6° lens is the only choice. This optic provides almost 3.5X magnification compared to the 25° lens and is ideally suited for inspection of overhead power lines. Due to the weight of this lens, a tripod is recommended.

**Lens 4 mm (90°) with case and mounting support**[\[T197411\]](#)

Sometimes there isn't enough room to step back and see the whole picture. This wide angle lens has a field of view almost four times the one of the standard 25° lens. This wide angle lens is perfect for wide or tall targets.

**Close-up 1x (25 μ m) incl. case and mounting support**[\[T197415\]](#)

This macro lens provides resolution of extremely small targets.

Extended measurement ranges

High temperature option to +1,200°C[\[T197000\]](#)

Allow to measure temperatures of up to +1,200°C with the camera.

Power

**Power supply**[\[1910585\]](#)

Power supply to charge the camera.

**Power cord EU**[\[1910400\]](#)

Power cord with EU plugs for the power supply.

**Power cord US**[\[1910401\]](#)

Power cord with US plugs for the power supply.

Optional lenses are scheduled to be launched in the end of 2010.



Power cord UK
Power cord with UK plugs for the power supply.

[1910402]



Ethernet cable CAT-6, 2m/6.6 ft.
This cable is used to connect the infrared camera to Ethernet.

[T951004]



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

[1910586]

Transport



Hard transport case
Rugged watertight plastic shipping case. Holds all items securely. The case can be locked with padlocks and features a breather valve to prevent pressure build-up in airplane cargo holds.

[1196940]



Delivery Box
Cardboard delivery box with plastic handle. Holds all items neatly.

[1196962]

FLIR SC645 & SC655

Power



Power supply for A/SC3XX and A/SC6XX
Power supply to charge the camera.

[1910585]



Power cord EU
Power cord (EU) for the power supply.

[1910400]



Power cord US
Power cord with US plugs for the power supply.

[1910401]



Power cord UK
Power cord (UK) for the power supply.

[1910402]



Ethernet cable CAT-6, 2m/6.6 ft.
This cable is used to connect the infrared camera to Ethernet.

[T951004]



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

[1910586]



Hard transport case
Rugged watertight plastic shipping case. Holds all items securely.

[1196940]



USB cable
USB cable to connect the camera with a computer, using the USB protocol.

[1910423]

FLIR SC620/FLIR SC660



Accessories

Power



Battery

[1196209]

Extra battery that will allow you to spend extra time in the field doing inspections.



Battery charger

[T197563]

This 2 bay battery charger is used for charging FLIR Systems' camera batteries.



Cigarette lighter adaptor kit, 12 V DC, 1.2 m

[1910490]

Can be used to power the camera from the cigarette lighter socket in a car.



Power supply incl. Multi-plugs

[T910814]

This power supply is used when powering the camera from the mains supply or to charge the batteries. It comes with different types of plugs.

Storage



Adaptor, SD memory card to USB

[1910475]

Allows to transfer the images from the SD card to a PC.



Memory card micro-SD with adaptors

[T910737]

Capture images on the go with your camera. These small cards are easy to use and can hold a great amount of data.

Accessories



Hard transport case

[T197262]

Rugged, watertight plastic shipping case. Holds all items securely. The case can be locked with padlocks and features a breather valve to prevent pressure build-up in airplane cargo holds.

Extended measurement ranges

High temperature option to +1,500°C

[1196744]

Allow to measure temperatures of up to +1,500°C with the camera.

High temperature option to +2,000°C

[1196745]

Allow to measure temperatures of up to +2,000°C with the camera.

Miscellaneous



Headset, 3.5 mm plug

[1910489]

This head-set is used when annotating thermal images with voice messages. It features an adjustable microphone that can be on the right or on the left side of the head-set. It connects to the head-set connector on the camera.



Remote control unit

[T197230]

Can be used to control the camera safely from a remote distance. Extremely useful when the camera needs to look at dangerous processes.

Lenses



Close-up lens 0.5x, f=75mm (fits 24° lens) incl case

[1196683]

This close-up optic attaches to the standard 24° lens and provides resolution of very small targets.



Lens 38 mm, 24° field of view, incl. case

[T197187]

The 24° lens can be used for daily inspections. Suitable for the majority of applications.



Lens 76 mm, 12° field of view, incl. case

[T197188]

When the target in question is a distance away it may be useful to use a telescope lens. The 12° lens is a popular lens accessory and provides 2X magnification compared to the 24° lens. Ideal for small or distant targets such as overhead power lines.



Lens 131 mm, 7° field of view, incl. case

[T197190]

For maximum magnification, the 7° lens is the only choice. This optic provides almost 3.5X magnification compared to the 24° lens and is ideally suited for inspection of overhead power lines. Due to the weight of this lens, a tripod is recommended.

Macro lens 1X (25um) with case

[T197341]

Provides resolution of extremely small targets. For R&D usage or development purposes.



Protective window (fits 24° lens) with case

[T197343]

A protective plastic window: suitable when the camera is used in a dusty environment or when there is a risk of liquids splashing on the lens. The window is made of monocrySTALLINE fluoride.



Lens 19 mm, 45° field of view

[T197189]

Sometimes there isn't enough room to step back and see the whole picture. This wide angle lens has a field of view almost double than the one of the standard 24° lens. Perfect for wide or tall targets such as electrical panels or paper machinery.

Cables



FireWire cable 4/6, 2 m

[1910483]

This cable is used to connect a thermal imaging camera to a computer using the FireWire protocol.



FireWire cable 6/6, 2 m

[1910482]

This cable is used to connect a thermal imaging camera to a computer using the FireWire protocol.



HDMI to DVI cable, 1.5 m

[T910816]

Can be used to show the high resolution images of the camera on a screen with DVI input.



HDMI to HDMI cable, 1.5 m

[T910815]

Can be used to show the high resolution images of the camera on a screen with HDMI input.



USB cable Std-A to Mini-B, 2 m

[1910423]

Can be used to transfer images from the camera to a computer using the USB protocol.



Video Cable RCA to RCA

[1910484]

This cable can be used to transfer the images of the SC-Series thermal imaging cameras to a monitor.

FLIR Systems

Export Licensing

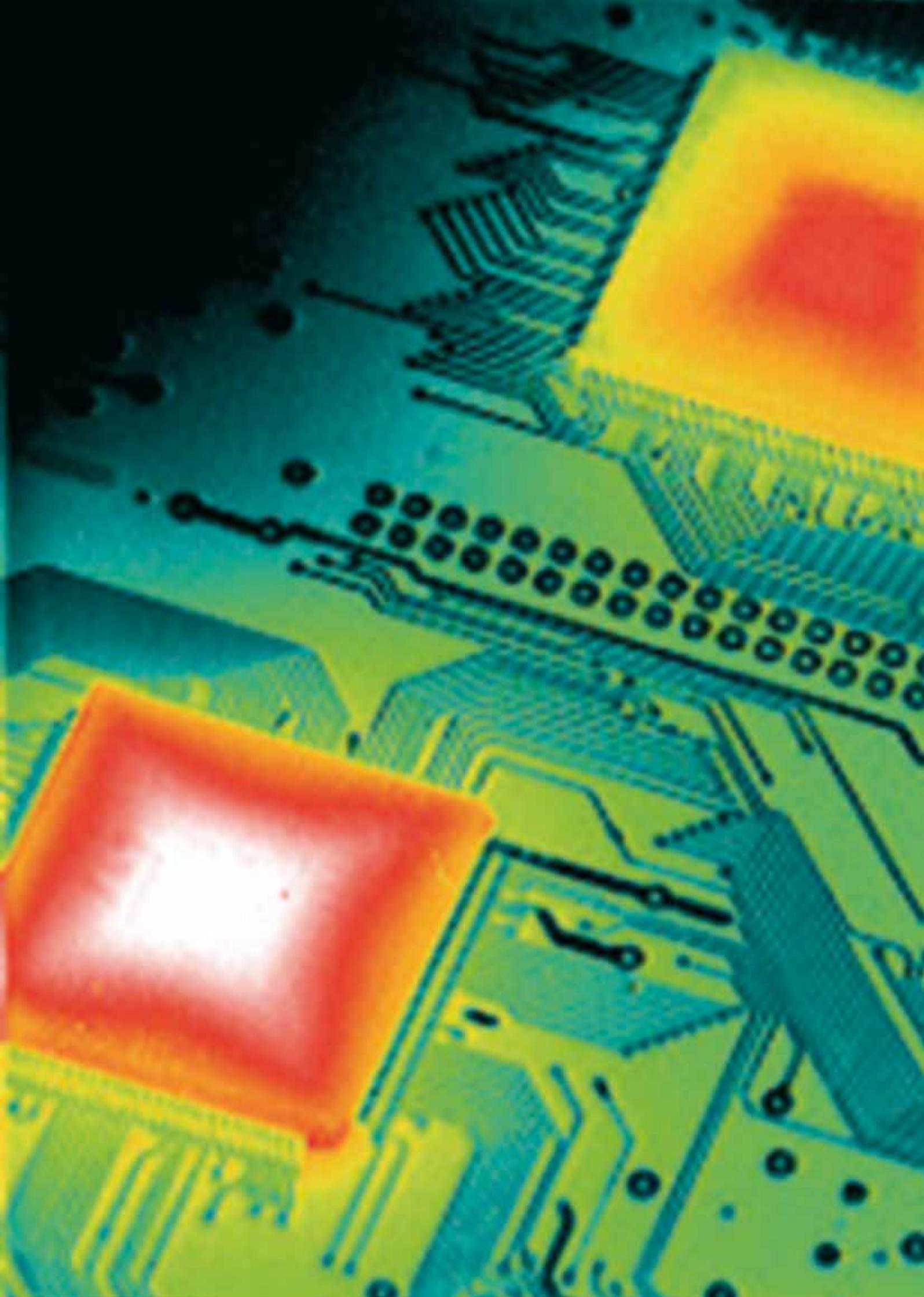


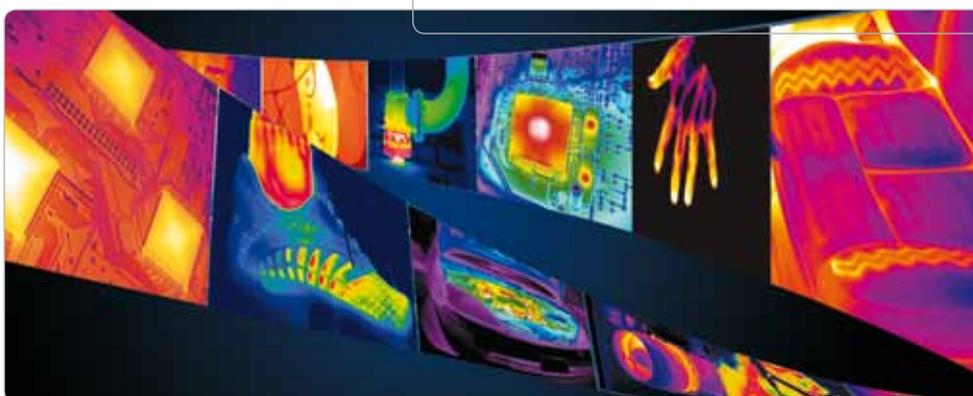
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*Specifications are subject to change without notice.
Weights and dimensions are indicative.*

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