



FireFLIR FF131

Lightweight Thermal Imaging Camera

VO_x Microbolometer

State-of-the-art, High-Definition detector for excellent resolution, rapid update rate, and wide dynamic range.

Big Screen LCD

Large 5" display for easy simultaneous viewing by entire team.

Sacrificial Window

Field replaceable germanium window protects optics.

Diamond Plate Textured Handle

Provides secure grip even when wearing gloves. With optional head harness, provides 360 degree protection for the most abusive environments.

Angled Bezel Assembly

For comfortable holding position and allows non-obtrusive viewing when standing, walking, or crawling.

Radel Thermoplastic Material

Rugged design for high-temperature, high impact environments.

Display Cover

Polycarbonate cover protects LCD from impact and heat.

Large Buttons

Intuitive controls for easy operation with one hand or when wearing gloves.

Unique Arched Handle Design

Ancient architectural design supports 140 kg load when crawling or moving.

Quick Latch Battery Hatch

For fast deployment and quick battery changes when wearing gloves and in adverse conditions.



Features

- Large Display
- Superior Lifetime & Durability
- High-resolution VO_x Microbolometer
- Outstanding Readability even when crawling
- Resilient up to 140 kg
- Very light-weight & good Balance
- State-of-the-art Software-Features
- Easy Handling due to push buttons even when wearing gloves

The FF 131 combines state-of-the-art detector technology with innovative, task-oriented mechanical design. The FF 131 features a customized MicroIR microbolometer detector that has the best resolution, fastest update rate, and widest dynamic range available in the firefighting industry. The use of proprietary, fully upgradeable software gives the FF 131 thru-the-lens digital temperature measurement, exclusive color palettes, and InfoTherm, an exciting feature that enhances situational awareness by applying a color palette to temperatures around the combustion point of paper and wood products.

The ergonomic mechanical design of the FF 131 complements the firefighter's ensemble. A variety of holding positions give firefighters maximum flexibility, including the ability

to look under, over, and around obstacles. Whether standing, walking, crawling or kneeling, firefighters can comfortably rely on the FF 131 to see the scene in front of them. With the industry's largest display, the FF 131 also allows for shared viewing by an entire attack team. The controls are large and easy to reach with one hand, and battery change is fast and easy, even in dark or smoky atmospheres.

The FF 131 is designed to be carried low, near the waist, relieving strain on the shoulder and distributing the weight throughout the arm. Competitive cameras force the user to hold the camera high, putting all the pressure on the shoulder muscle, while blocking the natural field of view of the user.



Attics & Vents



Shafts & Holes



Standing & Walking



Corners & Obstacles



Kneeling & Crawling

Features & Advantages

Uncooled microbolometer detector

State-of-the-art infrared detector	Unsurpassed thermal imaging quality
True staring Focal Plane Array (FPA)	No blurring, halo-effects or other motion artifacts
1100°F (600°C) Dynamic Range	Wider range of viewable temperatures, no manual adjustment required
160 x120 Pixels	Photographic-quality imagery
<0.05°C sensitivity	

Advanced optics & display

55° Field of view	Wide angle viewing
Large 5"(13cm) LCD	Can be viewed simultaneously by multiple firefighters
Germanium Window	Durable protection for optics
Digital signal processing	View objects of extreme temperature differences

Internal colling system

Thermal Phase™ cooling technology	Ensures optimal performance in extreme heat
Redundant thermal protection	Applied to all electronics, display and optic

Mechanical

Meets IP67	Standard for water immersion
<10 Second battery change	Fast deployment
Usable when standing, walking or crawling	Supports standard operating procedure
No continuous moving parts	Mechanically reliable and robust

Optional accessories

The FF131 can be used in delivery status. Additional accessories are available as well. This includes replacement batteries, special

camera fasteners, adapter cables, protective equipment as well as the remote transfer facilities for live videos.



Gray Scale



Autumn



Full Color



Infotherm™



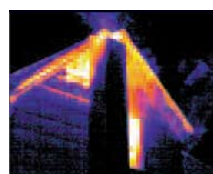
Radiometry



Attack



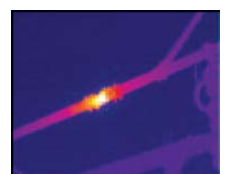
Overhaul



Size Up



Search & Rescue



Electrical Survey

General	Weight (with battery)	2.6 kg
	Weight (without battery)	2.2 kg
	Dimension	H 24cm x L 42cm x W 16 cm
Carrying Case	Weight	4.9 kg
	Dimensions	56cm x 38cm x 23cm
	Impact/Drop	MIL-STD-810
		26 drops from 1.21 meters
		1 drop on each corner, edge, and flat
	Foam Insert	Polyethylene & Polyurethane
Environmentals	Impact/Drop	6 consecutive drops from 1 meter
		1 drop per axis w/ no damage
	Water & Dust Immunity	IP 67 (submersion @ 1 meter for 30 minutes)
	Sealing	Modular Components
	EM Compliance	FCC Part 15 compliant CE Mark Compliant
	Heat Resistance	Tested to 343° C for 2 minutes
	Hi Temperature Operating	MIL-STD-810E
	Vibration	MIL-STD-810E
	Altitude	MIL-STD-810E
	Cold Temperature Storage	-40° C for 24 hours
Hi Temperature Storage	+71° C for 24 hours	
Product protection	Enclosure Material	High Impact Radel Thermoplastic
	External Shock Absorption System	Silicone Rubber
	Display Cover	Scratch Resistant Polycarbonate
	Optics Window Assembly	Field Replaceable Germanium
	Sealing	Modular
Detector module	Detector Technology	Proprietary MicroIR Uncooled Microbolometer
	Resolution	320 x 240 Focal Plane Array 76,800 pixels
	Sensing Material	Vanadium Oxide (VO _x)
	Spectral Response	8-14 Microns
	Temperature Sensitivity (NETD)	0.05 Nominal
	Update Rate	60 Hz (60 times / second)
	Dynamic Range	600 degrees C From -40° C to 600° C
	Detector MTBF	15,000 hours
Thermal management system	Enclosure	Radel High Temperature Plastic
	Detector Stabilization	Thermoelectric Cooler
	System Cooling	Patented Phase Change Technology

Optics	Material	Germanium
	Focal Length	18 mm
	Lens Speed	f/1.0
	Focus	3ft - Infinity
	Field Of View (FOV)	55 Degrees
Display	Display Technology	LCD (Liquid Crystal Display)
	Size	5 " Diagonal
	DisplayViewing Angle	110 degrees nominal
	Dot Pitch	320 mm (V) x 320mm (H)
	Dot Format	320 x 234 dots
	Pixels	74,880 pixels
	Pixel Configuration	R-G-B Stripe Configuration
	Display Method	TFT Active Matrix
	Input Signal Level	1.0 V P-P Positive 75 Ohm
Back Light	CCFL Backlight	
Elektrical system	Power Source	NiMH (Nikel Metal Hydride)
	Output	7.2 V
	Capacity	4000mAh
	Operating Time	2.5 Hours Nominal
	Battery Life	1000 Charge Cycles
	Battery Weight	0.34 kg
	Charger	Single Battery 120 VAC or 12 VDC
	Charger Input Power	120/240 VAC or 12VDC
	Battery Charge Time	< 4 hours
	Switch Cycle Test	1,000,000 cycles
	Video Out	NTSC/PAL
Software system	Design Language	Advanced C Code Programming
	Download Access	External Port
	Upgrade-ability	Upgradeable
	Color Palettes	
	Gray Scale Color	Standard (white-black scale)
	Autumn	Yellow-dark brown scale
	Full Color Palette	Full spectral
	Graphical User Interface (GUI)	On-Screen
	System Warnings	On-Screen
Infotherm (optional)	Technology	Colorized Surface Temperature Indicator
	Nominal Activation Temperature	200°C
	Displayed Color	Yellow-Brown

Video transmission system (optional)

Transmitter Mounting	Internal
Transmitter Power Supply	Internal (from camera)
Signal Type	Analog
Antenna Type	Dipole
Antenna Alignment	Vertical
Transmitter Frequency Selection	2.4 GHz
Power Output	350 mW
Power Consumption	2.8 W
Frequency Selection	4-Channel (2456, 2463, 2470, 2477 MHz)
Receiver Sensitivity	-82 dBm sensitivity
Receiver Antenna	High Gain Directional
Receiver Antenna Size	H 33cm x L 33cm x W 5 cm
FCC License	24 dBm (output power)

Radiometry (optional)

Technology	Thru-The-Lens FPA Temperature Measurement
Scale	Fahrenheit or Celsius (switchable)
Range	0°C - 650°C (32 F - 1202 F)

FAQs

Detector

1. What is the difference between detectors such as VOx-Microbolometers, BST, and ASi bolometers? Why do industry experts consider VOx microbolometers to be superior?

All of these terms simply refer to the sensing material utilized in specific detectors. Utilizing these different materials yields detectors with varying characteristics and performance levels. Both IR and firefighting experts regard VOx microbolometers as the best for firefighting applications. Microbolometers using Vanadium Oxide (VOx) eliminate annoying and

potentially dangerous image artifacts that distort and interfere with the image. Additionally, they have the widest dynamic range available. And, in most cases, VOx microbolometers have the fastest update rate available. All these things combine to produce a TV like image allowing firefighters to focus on the task at hand rather than image distractions.

2. What is Dynamic Range, and why is it important?

Dynamic range is the key differentiating factor between detectors. It is simply the detector's ability to image both relatively hot and relatively cold images at the same time. All detectors can image extreme temperatures; but only VOx microbolometers can produce clear images of hot and cold

subjects in the same scene. A wide dynamic range is a critically important specification for firefighting cameras because it determines how well the user will be able to see cooler objects such as furniture, doors and people when they are in the proximity of the heat from a fire.

3. What is an Update Rate or Refresh Rate? Why is it important?

The update rate or refresh rate is the number of times per second that the detector updates the image. It is measured in hertz. It is important for firefighting cameras to have a fast update rate because users are often moving

when using the camera. With a slow update rate, images from a moving camera, or of a moving target, appear choppy. A fast update rate will produce a more stable image.

4. Some microbolometer cameras have a manual calibration button. What is it used for, and why doesn't the FF 131 have this feature?

Microbolometer detectors must periodically perform a non-uniformity correction (NUC). This basically calibrates all of the pixels, which optimizes the image. Manual calibration buttons override automatic NUC's and manually generates a NUC operation. When users notice degradation of their image, they

can calibrate it by pressing the manual calibration button. The FireFLIR has advanced software and electronics that sense when a NUC is necessary and performs it automatically. Hence, manual calibrations are not necessary with the FF 131.

Mechanics

1. The FF 131 is larger than many "handy cam" style cameras. Is it as convenient and versatile to use as these small cameras?

The FF 131 is actually more ergonomic and versatile than its smaller competitors.

- The FF 131 is held low and has a tilted screen for easy viewing from standing or crawling position. The FF 131 isn't positioned in front of the eyes and NEVER blocks the user's normal field of vision.
- The FF 131 is held at waist height instead of in front of the face. This reduces muscle strain and fatigue to the shoulder.
- The FF 131 can be used with multiple holding positions, making it convenient to view under, over, and around obstacles easier than with "handy cam" style cameras.
- "Handy cam" style cameras force the user to rise up into the heat layer to view the scene, while the FF 131 allows the user to view the scene from a low crawling position.

2. Some manufacturers have movable heads/displays, why doesn't the FF 131's head or handle swivel?

The FF 131's display angle was carefully chosen for optimum viewing from multiple positions. In dark atmospheres, it may be difficult to see the orientation of a swivel head. Thus, the user may not be sure which way the optics are actually pointing. He could become disoriented and unsure of the exact height, distance

and direction of the objects he is viewing on the display. A stationary head/handle provides a consistent and predictable image.

Additionally, the fire service is an abusive industry. A movable part is a breakable component!

3. Why does the FF 131 use a 5" display, and is it really more valuable than smaller displays?

The FF 131 uses a 5" display in order to provide the maximum amount of visual information to the user, minimizing the likelihood that important details are missed.

Additionally, the FF 131's 5" display has excellent peripheral and upward field of view, making it easy for an entire attack team to view the image at the same time, and from various angles.

4. What is the value of the Germanium Window & Display Cover?

The germanium window and display cover are inexpensive components, which protects the expensive optics and display. They also complete the isolation circle, eliminating

a direct conductive connection from the environment to the detector engine. It is important to minimize the ability for heat to reach the detector module.

5. How is the FF 131 Shoulder Strap attachment used?

The FF 131's shoulder strap allows the user to position the camera on his side and in the ready position. The strap can be easily and

quickly removed so that the camera can be passed off.

6. How accessible are the controls of the FF 131?

The FF 131 was designed for one-handed operation. The user can hold the camera and operate all controls with one hand. This is

important in order to allow firefighters to carry other tools or assist victims with his free hand. Additionally, the controls are glove-friendly.

7. How quickly can the FF 131 battery be changed?

The FF 131 was designed such that a user wearing gloves can perform a "Toxic Battery Change" (change the battery in zero light conditions) in 10 seconds. The user can easily determine the front end by feel and the redun-

dant battery contact system allows the battery to be inserted with either contact orientation. The battery door has a quick latch which secures the battery quickly and securely.

Color palette

1. Why does the FF 131 come with multiple color palettes?

FLIR has utilized its industry leading research and development to incorporate application specific color palettes. The FF 131 comes

standard with three (3) color palettes, providing unmatched versatility.

2. What applications are best for using the Gray Scale palette?

The Gray Scale palette is an all-purpose color palette and best for image identification

needed for navigation and search & rescue.

3. What applications are best for using the Autumn Color Palette?

The Autumn palette provides a less obtrusive backlight when used in complete darkness,

and cuts thru the haze of "white out" smoke conditions. It is an alternative to Gray Scale.

4. What applications are best for using Full Color Palette?

The Full Color palette is less useful for image identification and more useful for highlighting small differences in temperatures. Full Color

applications include electrical survey operations, HAZMAT, and overhaul.

Transmitter (Telemetry)

1. Is the FF 131 transmitter analog or digital, and why?

The transmitter utilized in the FF 131 is a 2.4 GHz analog transmitter. Our research shows similar performance between analog and digital transmitters, but digital transmitters

are much more expensive. Digital transmitters only have the advantage of providing a more secure signal.

2. Is the FF 131's transmitter internal or external?

The FF 131's transmitter is mounted inside the handle of the camera. This allows it to be controlled using the camera's buttons, and it allows both the camera and the transmitter to

run from the camera battery. It also eliminates the possibility of an external transmitter being knocked off or damaged.

3. How many channels does the FF 131 transmitter utilize?

The FF 131's transmitter has four channels. Thus, four distinct signals can be picked up and viewed on the receiver end. This is important if the department will ever have more than two cameras, or will ever have mutual aide operations with other departments. If

multiple cameras are utilizing the same channel, they will interfere with each other, and the camera closest to the receiver will win the battle. Additionally, having four channels maximizes the user's ability to locate and select the best signal.

4. What is the power of the FF 131 transmitter?

The exact power of transmitters is somewhat variable, but the FF 131's transmitter operates at a nominal 350 mW power. This is very important to users because the power deter-

mines the distance that the transmitter can effectively transmit a signal. It is also directly related to the transmitter's ability to transmit thru obstacles such as walls.

5. Why do some manufacturers use low-powered transmitters?

Transmitters produce a strong electronic signal, which greatly interferes with the detector and the quality of image produced by the detector. Many manufacturers

packaged a "canned" detector and do not have the technical resources needed to design a system that minimizes the negative byproducts of high-powered transmitters.

Temperature measurement

1. What is the value of Radiometry (temperature measurement)?

Temperature measurement enhances situational awareness. IR cameras see relative temperature differences. Therefore, in one situation a human hand will appear white (hot) and in another it will appear dark (cold), depending on the surrounding temperatures in the scene.

The best way to get real information, such as the surface temperature of a door, is with a Radiometric, temperature-measuring device. Radiometry is also very useful during overhaul and when searching for bad ballasts.

2. How does the FF 131 measure and display temperature? Why is Radiometry more valuable than a relative scale?

The FF 131 measures temperature from the detector and displays it as a digital readout. Some manufacturers utilize a scale to display temperature. These scales have periodic increments and thus do not provide specific

temperatures to the end user. These scales do tell the user whether heat is present, but digital temperature measurement gives him solid information critical for decision making.

3. Can the Radiometry reading be turned off?

Yes, the FF 131's controls allow the user to change the temperature reading from Fahrenheit

to Celsius to off.

Temperature colorization

1. What is InfoTherm, and what is the benefit of colorizing temperatures?

InfoTherm is a FireFLIR exclusive feature that applies an autumn-like color to that portion of the image that is approximately 450 degrees F or 200°C. 450 degrees is the approximate combustion temperature of paper and wood products. Thus, this set point is perfect for

drawing attention to places where objects are burning or where dangerous conditions exist. The colorization employed with InfoTherm provides a somewhat translucent scene in which the user can continue to resolve scene detail.

2. How does InfoTherm compare with the (red) saturation palettes of other cameras?

Some microbolometer cameras utilize a saturation palette. When detectors see temperatures at or near their maximum, the pixels begin to saturate or show all white. This saturation typically occurs at or near 1200 degrees F. We believe that providing colorization at

such high temperatures is less beneficial than the 450 degree InfoTherm setting. Saturation palettes simply turn saturating pixels red instead of white. Typically, this red color is very opaque, making it difficult for users to continue to resolve much detail.

Software

1. Who designs the FF 131 software and electronics?

FLIR has its own group of software engineers and electrical engineers who develop product and application specific code. Additionally, FLIR engineers work closely with suppliers of major components to customize products

according to FLIR specifications. Thus, FLIR cameras usually include more advanced features and superior images than cameras that may use even the same detector engine.

2. Are FF 131 software features such as Radiometry & InfoTherm upgradeable?

Yes, any FF 130 (Scott Eagle Imager II) or FF 131 can be upgraded to include Radiometry/

InfoTherm.

FLIR Kamera

1. What is the difference between the FF 130 (Scott Eagle Imager II) and the FF 131?

FLIR designed, manufactured and private labeled its FF 130 as the Scott Eagle Imager II. This relationship has ended and the FF 130 has been improved and is now called the FF 131. Differences include:

- Resolution – the FF 131 uses a 160 x 120 VO_x microbolometer. Utilizing improved technology, the FF 131's detector provides a crisp, clean image, with an economical price tag.
- User Interface Software – The user interface software has been simplified in the FF 131. No more complicated menus.
- Improved Radiometry - Technology improvements regarding non uniformity correction provide more accurate digital temperature readouts.
- Power-On Sequence (Boot-Up) – The FF 131 powers up and displays an image faster.
- Battery life – The battery life of the FF 131 has been increased to 2.5 hours.
- Weight – The FF 131 is noticeably lighter than the FF 130.
- Durability – The VO_x detector and detector mounting system have been improved, making a very durable product even stronger.
- Shoulder Strap Kit – an innovative shoulder strap kit has been added to the standard offering of the FF 131.
- Manual Calibration Function – The FF 131 more accurately monitors focal plane changes and automatically calibrates the detector. Manual calibration is no longer needed.
- User Training & Orientation – The FF 131 comes with its operating manual on CD. The CD also contains an infrared training presentation, "Thermal Imaging in the Fire Service".
- Accessories – New accessories are now available, such as a 6-unit battery charger, and vehicle camera holder.
- Pricing – The list price of the FF 131 is more than 35% less than that of the FF 130 (Eagle Imager II).

info@mut-gmbh.de

www.mut-gmbh.de