IRE Cooled Infrared Cameras

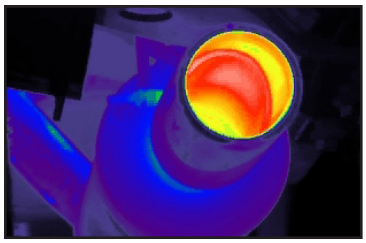
High Performance Cooled Infrared Cameras

MWIR/LWIR/VLWIR Spectral Range Options

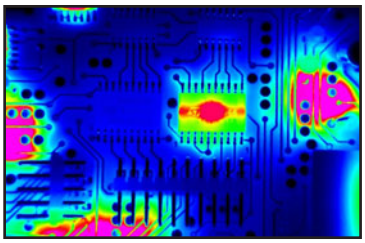
The Sofradir EC infrared camera family harnesses the full performance of the Sofradir Mars, Scorpio, and Jupiter Mercury Cadmium Telluride (MCT) focal plane arrays while offering unique flexibility to meet the needs of any application or OEM requirement. The cameras are available in mid-format (320×256), large-format (640×512), and megapixel (1280×1024). The mid-format Mars-based cameras have broad spectral response capabilities ranging from broadband MWIR (1.5-5µm), MWIR (3-5µm), LWIR (8-10µm), and VLWIR (8-12µm). The Scorpio MW and LW and Jupiter MW based cameras operate in the MWIR (3-5µm) and LWIR (8-10µm) regions. The engines have a common connectivity and interface logic. The Mars, Scorpio and Jupiter camera engines include an integrated detector/dewar/cooler assembly (IDDCA) and electronics.

The camera electronics include camera and cooler controls modules. The camera produces output signals that are uncorrected or corrected for non-uniformities in an RS-170 video and 14-bit digital data format. Camera communication is available over a serial (RS-232) interface. A 14-bit digital data stream is available via LVDS and Camera Link as well as optionally Gigabit Ethernet. With the optics options, the cameras can be customized to meet any requirement. D*STAR, a digital storage, retrieval and image processing Software Suite is available for infrared imaging research and development applications. In addition, software developer toolkits (SDKs) and command software modules are available for further flexibility.

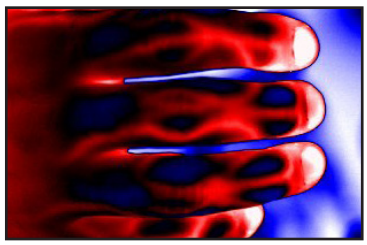
- High Frame Rates
- Multiple detector formats and spectral response configurations for ultimate flexibility
- High Sensitivity
- Customizable Engines
- 15-30 micron Pixel Technology



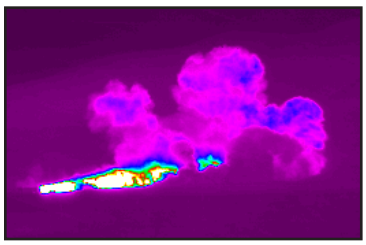
Design, Test and Manufacturing



Research and Development



Medical Imaging



Target Signature

FEATURES

High performance 320×256 imaging in MWIR/LWIR/VLWIR with the 30µm Mars MCT array	On-board non-uniformity correction and bad pixel replacement
High performance 640×512 MWIR and LWIR imaging with the 15µm Scorpio MCT array	14-bit digital output via LVDS and Camera Link, Gigabit Ethernet optional
Megapixel performance 1280×1024 MWIR imaging with the 15µm Jupiter MCT array	RS-170 analog video output with symbology overlay capabilities
High frame rates (320Hz for 320×256; 120Hz for 640×512; 30Hz for 1280×1024)	Plug and play OEM operation
Multiple cooler configurations (both linear and rotary options)	Multiple SDKs

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MWIR/LWIR/VLWIR Spectral Range Options

MWIR SPECIFICATIONS

	IRE-320M	IRE-640M, IRE-640BB	IRE-1280M
Infrared Focal Plane Array	Sofradir Mars MWIR	Sofradir Scorpio MWIR	Sofradir Jupiter MWIR
Detector size	320×256	640×512	1280×1024
Pixel Pitch	30µm	15µm	15µm
Spectral Response	3.7-4.8 µm	3.7-4.8µm (M); 1.5-5.1µm (BB)	3.7-4.8µm
Readout	Snapshot Integration (ITR/IWR)	Snapshot Integration (ITR/IWR)	Snapshot Integration (IWR)
Thermal Resolution (NETD)	< 10mK	< 20mK (15mK typical)	< 20mK (15mK typical)
Gain Settings	2	1	1
Well Capacity	12/37 Me-	6.5 Me-	4.2 Me-
Quantum Efficiency	> 90%	> 90%	> 90%
Operability	> 99.5%	> 99.5%	> 99%
Subwindowing	Dynamic and user definable to 64×1	Dynamic and user definable to 132×1	Dynamic and user definable to 256×1
Pixel Clock	26.4 MHz	40 MHz	80 MHz
A/D	14-bit	14-bit	14-bit
Cold Shield	F2.0 standard. Other apertures also available.	F2.24 standard (M), F3.0 standard (BB). Other apertures also available.	F2.0 standard. Other apertures also available.
Frame Rate (full frame)	Variable 1 to 320 Hz	Variable 1 to 120 Hz	Variable 1 to 30 Hz
Integration Time Control	480ns to 20ms	480ns to 20ms	480ns to 20ms
Trigger/Sync	0-5V TTL in/out with delay	0-5V TTL in/out with delay	0-5V TTL in/out with delay
Digital Output	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.
Analog Video Output	RS-170	RS-170	RS-170
Video Symbology	User definable for video output overlay	User definable for video output overlay	User definable for video output overlay
Non-uniformity Correction	On board (4 tables)	On board (4 tables)	On board (4 tables)
Bad Pixel Replacement	On board (4 tables)	On board (4 tables)	On board (4 tables)
Time Stamping	IRIG-B time stamp on each frame (IRIG-B signal not provided)	IRIG-B time stamp on each frame (IRIG-B signal not provided)	IRIG-B time stamp on each frame (IRIG-B signal not provided)
Cooling	Closed-cycle Stirling cooler (linear or rotary; multiple options)	Closed-cycle Stirling cooler (linear or rotary; multiple options)	Closed-cycle Stirling cooler (linear or rotary; multiple options)
Cool Down Time	< 5 minutes @ 20°C; < 7 minutes @ 55°C	< 5 minutes @ 20°C; < 7 minutes @ 55°C	< 5 minutes @ 20°C; < 7 minutes @ 55°C
Weight w/o Lens	< 4 kg	< 4 kg	< 6 kg
Operational Temperature	-30°C to 55°C	-30°C to 55°C	-30°C to 55°C
Shock	MIL-SPEC 810G	MIL-SPEC 810G	MIL-SPEC 810G
Vibration	MIL-SPEC 810G	MIL-SPEC 810G	MIL-SPEC 810G
Optical Mount Interface	Standard: Bayonet, Optional: M80	Standard: Bayonet, Optional: M80	Optional M80, bayonet or custom
User Interface Panel	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power
Power Supply	Included	Included	Included

SOFRADIR-EC

IRE Cooled Infrared Cameras

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MWIR/LWIR/VLWIR Spectral Range Options

ORDERING INFORMATION

MWIR CAMERAS	
IRE-320M MWIR Camera F2	915160
IRE-640M MWIR Camera F2.24	915164
IRE-640BB Broadband Camera F3	915165
IRE-1280M MWIR Camera F2	915167

DIGITAL INTERFACE OPTIONS	
Gigabit Ethernet	915173

SOFTWARE / OTHER OPTIONS	
C++ Software Development Tool Kit	915189
IRIG-B Time Stamp (IRIG Signal Generator not provided)	915179

MWIR LENS OPTIONS (3µm - 5µm)	
7mm F2.3 Bayonet Mount	915139
13mm F2.3 Bayonet Mount	915138
25mm F2.3 Bayonet Mount	915057
50mm F2.3 Bayonet Mount	915056
100mm F2.3 Bayonet Mount	915137
50/250mm DFOV F2.3 Bayonet Mount	915136
1× Microscope Bayonet Mount Objective	915175
2.5× Microscope Bayonet Mount Objective	915176
4× Microscope Bayonet Mount Objective	915177
Bayonet Mount Extension Ring Kit	915178
Filter Capture Ring (<1mm)	915454

MWIR BB Lens Options (1.5µm - 5µm)	
25mm F2.3 Broadband Bayonet Mount	915135
50mm F2.3 Broadband Bayonet Mount	915134
100mm F2.3 Broadband Bayonet Mount	915133
250mm F2.3 Broadband Bayonet Mount	915132

SOFRADIR-EC

IRE Cooled Infrared Cameras

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MWIR/LWIR/VLWIR Spectral Range Options

LWIR SPECIFICATIONS

	IRE-320L	IRE-640L	IRE-320VL
Infrared Focal Plane Array	Sofradir Mars LWIR	Sofradir Scorpio LWIR	Sofradir Mars VLWIR
Detector size	320×256	640×512	320×256
Pixel Pitch	30µm	15µm	30µm
Spectral Response	7.7-9.5µm	7.7-9.5µm	7.7-11.5µm
Readout	Snapshot Integration (ITR/IWR)	Snapshot Integration (ITR)	Snapshot Integration (ITR/IWR)
Thermal Resolution (NETD)	< 20mK (15mK typical)	< 20mK (15mK typical)	< 20mK (15mK typical)
Gain Settings	2	1	2
Well Capacity	12/37 Me	13.0 Me-	12/37 Me-
Quantum Efficiency	> 90%	> 90%	> 90%
Operability	> 99%	> 99.5%	> 99%
Subwindowing	Dynamic and user definable to 64×1	Dynamic and user definable to 132×1	Dynamic and user definable to 64×1
Pixel Clock	26.4 MHz	40 MHz	26.4 MHz
A/D	14-bit	14-bit	14-bit
Cold Shield	F2.0 standard. Other apertures also available.	F2.0 standard. Other apertures also available.	F2.0 standard. Other apertures also available.
Frame Rate (full frame)	Variable 1 to 320 Hz	Variable 1 to 120 Hz	Variable 1 to 320 Hz
Integration Time Control	480ns to 20ms	480ns-20ms	480ns to 20ms
Trigger/Sync	0-5V TTL in/out with delay	0-5V TTL in/out with delay	0-5V TTL in/out with delay
Digital Output	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.
Analog Video Output	RS-170	RS-170	RS-170
Video Symbology	User definable for video output overlay	User definable for video output overlay	User definable for video output overlay
Non-uniformity correction	On board (4 tables)	On board (4 tables)	On board (4 tables)
Bad Pixel Replacement	On board (4 tables)	On board (4 tables)	On board (4 tables)
Time Stamping	IRIG-B time stamp on each frame (IRIG-B signal not provided)	IRIG-B time stamp on each frame (IRIG-B signal not provided)	IRIG-B time stamp on each frame (IRIG-B signal not provided)
Cooling	Closed-cycle Stirling cooler (linear or rotary; multiple options)	Closed-cycle Stirling cooler (linear or rotary; multiple options)	Closed-cycle Stirling cooler (linear or rotary; multiple options)
Cool Down Time	< 5 minutes @ 20°C; < 7 minutes @ 55°C	< 5 minutes @ 20°C; < 7 minutes @ 55°C	< 5 minutes @ 20°C; < 7 minutes @ 55°C
Weight w/o Lens	< 4 kg	< 4kg	< 6 kg
Operational Temperature	-30°C to 55°C	-30°C to 55°C	-30°C to 55°C
Shock	MIL-SPEC 810G	MIL-SPEC 810G	MIL-SPEC 810G
Vibration	MIL-SPEC 810G	MIL-SPEC 810G	MIL-SPEC 810G
Optical Mount Interface	Standard: M80, Optional: Bayonet	Standard: M80, Optional: Bayonet	Standard: M80, Optional: Bayonet
User Interface Panel	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power
Power Supply	Included	Included	Included

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MWIR/LWIR/VLWIR Spectral Range Options

ORDERING INFORMATION

LWIR CAMERAS	
IRE-320L LWIR Camera F2	915162
IRE-640L LWIR Camera F2	915166
IRE-320VL VLWIR Camera F2	915163

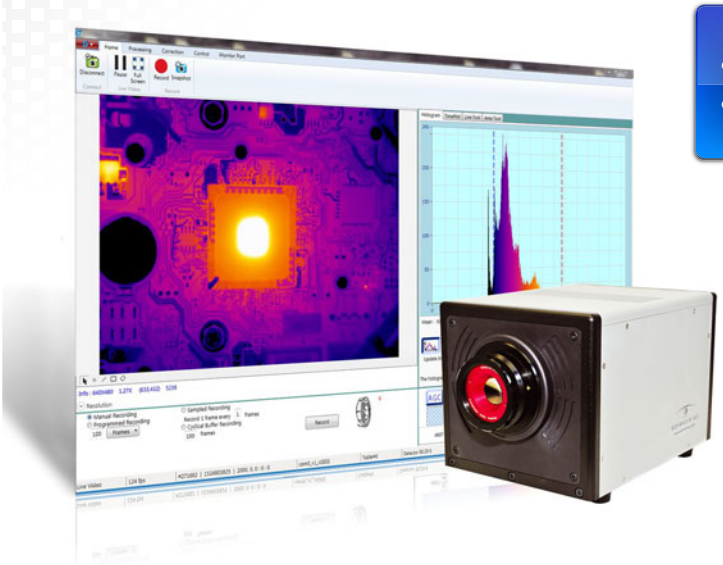
DIGITAL INTERFACE OPTIONS	
Gigabit Ethernet	915173

SOFTWARE / OTHER OPTIONS	
C++ Software Development Tool Kit	915189
IRIG-B Time Stamp (IRIG Signal Generator not provided)	915179

LWIR LENS OPTIONS (7µm - 14µm)	
10mm F2.0 M80 Mount	915131
25mm F2.0 M80 Mount	915130
50mm F2.0 M80 Mount	915129
100mm F2.0 M80 Mount	915128
200mm F2.0 M80 Mount	915145
200mm F2.0 Motorized M80 Lens with Controller	915146
200mm F2.0 Motorized M80 Lens with Controller	915146

D*STAR Cooled

Digital Storage and Retrieval and Image Processing Software Suite for Infrared Imaging Research and Development Applications



- Comprehensive camera control
- Power analysis tools
- Real-time digital recording
- Intuitive user interface

D*STAR™ is a real-time image capture software package for the IRE line of high performance infrared cameras. D*STAR features an easy-to-use user interface and a library of powerful tools that enable the sophisticated analysis of thermal behavior for a wide range of objects and materials.

- **Comprehensive Camera Control:** D*STAR provides intuitive camera controls to maximize the performance of the Sofradir EC IRE infrared cameras. A user-friendly wizard guides the user through integration time changes, cyclical integration times, non-uniformity correction (NUC)/bad pixel replacement calibration, sub-windowing, and advanced triggering.
- **Real-Time Digital Recording:** The IRE's digital output is displayed in real-time on your PC for live analysis or recording. Easily convert sequences to an AVI file suitable for Windows Media Player and frames to JPGs with the touch of a button.
- **Powerful Analysis Tools:** D*STAR features a large selection of real-time analysis tools including spot meter, line profile, region of interest analysis box.
- **Intuitive User Interface:** D*STAR features simple to understand controls that ensure you're up and running fast. Image recording and playback mimic standard DVD controls and camera control dialog boxes are easy to understand. Intuitive user controls allow simple image reduction, analysis, and archiving.

DESKTOP SOFTWARE

Description	Part No.
D*STAR Cooled Digital Storage and Retrieval Image Processing Software Suite for IRE cooled infrared cameras.	915283
Software Development Toolkit (SDK) for C++	915189
Software Development Toolkit (SDK) for LabView	915285

FEATURES

CAMERA CONTROL
- Integration time change
- Cyclical Integration Time Mode
- Non-uniformity correction
- Sub-windowing
- External trigger (in/out)
- IRIG B control/time stamp
- Analog video control

IMAGE MANAGEMENT
- Real-time recording and playback
- Single image capture and playback
- 14-bit image sequence conversion to AVI files
- Export of data to standard files

IMAGE PROCESSING
- Multiple color palette selections
- Image averaging (improves sensitivity)
- Span and level control
- Automatic Gain Correction

IMAGE ANALYSIS
- Spot meter
- Line Profile
- Region of Interest — User-defined rectangle
- Histogram Analysis (ROI)
- Time plot

SOFRADIR-EC

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