IRE Cooled Infrared Cameras

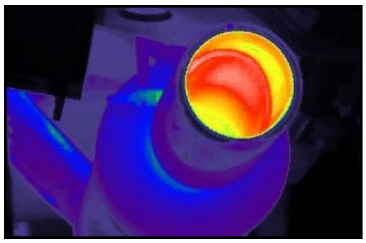
High Performance Cooled Infrared Cameras

MWIR/LWIR/VLWIR Spectral Range Options

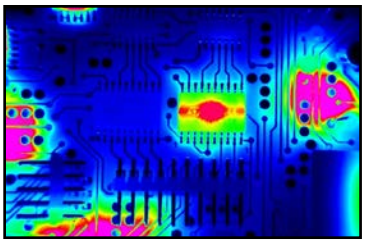
The Sofradir EC infrared camera family harnesses the full performance of the Sofradir Mars and Scorpio Mercury Cadmium Telluride (MCT) focal plane arrays while offering unique flexibility to meet the needs of any application or OEM requirement. The cameras are available in mid-format (320×256) and large-format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

The camera electronics include camera and cooler control 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.

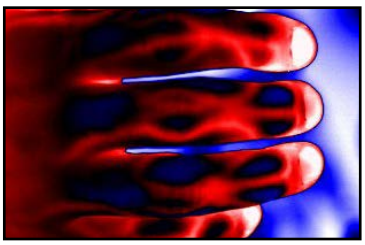
- High Frame Rates
- Multiple detector formats and spectral response configurations for ultimate flexibility
- High Sensitivity
- Customizable Engines
- 15-30 micron Pixel Technology



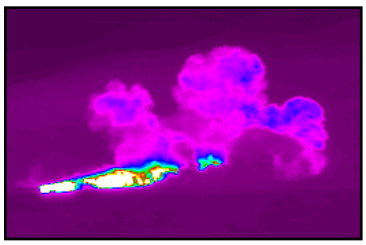
Design, Test and Manufacturing



Research and Development



Medical Imaging



Target Signature

FEATURES

High performance 320×256 imaging in MWIR/LWIR/VLWIR with the 30 µm 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
High frame rates for full frames (320 Hz for 320×256; 120 Hz for 640×512)	Plug and play OEM operation
Multiple cooler configurations (both linear and rotary options)	Multiple SDKs

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MWIR SPECIFICATIONS

	IRE-320M	IRE-640M	IRE-640BB
Infrared Focal Plane Array	Sofradir Mars MWIR	Sofradir Scorpio MWIR	
Detector size	320×256	640×512	
Pixel Pitch	30 µm	15 µm	
Spectral Response	3.7-4.8 µm	3.7-4.8 µm	1.5-5.1 µm
Readout	Snapshot Integration (ITR/IWR)		
Thermal Resolution (NETD)	< 10 mK	< 20 mK (15 mK typical)	
Gain Settings	2	1	
Well Capacity	12/37 Me-	6.5 Me-	
Quantum Efficiency	> 90%		
Operability	> 99.5%		
Subwindowing	Dynamic and user definable to 64×1	Dynamic and user definable to 132×1	
Pixel Clock	26.4 MHz	40 MHz	
A/D	14-bit		
Cold Shield	F2.0, F4.0	F2.0, F2.3, F4.0	F3.0
Frame Rate (full frame)	Variable 1 to 320 Hz	Variable 1 to 120 Hz	
Integration Time Control	3 µs to 20 ms		
Trigger/Sync	0-5 V TTL in/out with delay		
Digital Output	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.		
Analog Video Output	RS-170		
Video Symbology	User definable for video output overlay		
Non-uniformity Correction	On board (4 tables)		
Bad Pixel Replacement	On board (4 tables)		
Time Stamping	IRIG-B time stamp on each frame (IRIG-B signal not provided)		
Cooling	Closed-cycle Stirling cooler (linear or rotary; multiple options)		
Cool Down Time	< 5 minutes @ 20°C; < 7 minutes @ 55°C		
Weight w/o Lens	< 4 kg		
Dimensions (L × W × H)	10.7" × 7.3" × 6.7" (27.2 cm × 18.6 cm × 17.0 cm)		
Operational Temperature	-30°C to 55°C		
Shock	MIL-SPEC 810G		
Vibration	MIL-SPEC 810G		
Optical Mount Interface	Standard: Bayonet, Optional: M80		
User Interface Panel	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power		
Power Supply	Included		

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IRE Cooled Infrared Cameras

High Performance Cooled Infrared Cameras
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

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

CAMERA/LENS CALIBRATION (PER LENS)
Ambient range: (-10°C) to (+50°C)
Object range: (-20°C) to (+150°C)
Lens F-number < Detector F-number

MWIR LENS OPTIONS (3µm - 5µm)	
7mm F2.3 MW Lens 3-5µm; Bayonet Mount focuses 30mm to ∞	915139
13mm F2.3 MW Lens 3-5µm; Bayonet Mount focuses 50mm to ∞	915138
25mm F2.3 MW Lens 3-5µm; Bayonet Mount focuses 200mm to ∞	915057
50mm F2.3 MW Lens 3-5µm; Bayonet Mount focuses 500mm to ∞	915056
100mm F2.3 MW Lens 3-5µm; Bayonet Mount focuses 1.75m to ∞	915137
50/250mm F2.3 DFOV Lens Bayonet Mount	915136
1× Microscope Objective Lens Bayonet Mount, inverted image	915175
2.5× Microscope Objective Lens Bayonet Mount, inverted image	915176
4× Microscope Objective Lens Bayonet Mount, inverted image	915177
Bayonet Mount Extension Ring Kit	915178
Filter Capture Ring (<1mm)	915454

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

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IRE Cooled Infrared Cameras

High Performance Cooled Infrared Cameras

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	30 µm	15 µm	30 µm
Spectral Response	7.7-9.5 µm		7.7-11.5µm
Readout	Snapshot Integration (ITR/IWR)	Snapshot Integration (ITR)	Snapshot Integration (ITR/IWR)
Thermal Resolution (NETD)	< 20 mK (15 mK typical)		
Gain Settings	2	1	2
Well Capacity	12/37 Me	13.0 Me-	12/37 Me-
Quantum Efficiency	> 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		
Cold Shield	F2.0, F4.0	F2.0, F2.3	F2.0
Frame Rate (full frame)	Variable 1 to 320 Hz	Variable 1 to 120 Hz	Variable 1 to 320 Hz
Integration Time Control	480 ns to 20 ms		
Trigger/Sync	0-5 V TTL in/out with delay		
Digital Output	Standard: LVDS and Camera Link. Optional: Gigabit Ethernet.		
Analog Video Output	RS-170		
Video Symbology	User definable for video output overlay		
Non-uniformity correction	On board (4 tables)		
Bad Pixel Replacement	On board (4 tables)		
Time Stamping	IRIG-B time stamp on each frame (IRIG-B signal not provided)		
Cooling	Closed-cycle Stirling cooler (linear or rotary; multiple options)		
Cool Down Time	< 5 minutes @ 20°C; < 7 minutes @ 55°C		
Weight w/o Lens	< 4 kg		< 6 kg
Dimensions (L × W × H)	10.7" × 7.3" × 6.7" (27.2 cm × 18.6 cm × 17.0 cm)		
Operational Temperature	-30°C to 55°C		
Shock	MIL-SPEC 810G		
Vibration	MIL-SPEC 810G		
Optical Mount Interface	Standard: M80, Optional: Bayonet		
User Interface Panel	Optional. Standard connector interface for LVDS, Camera Link, GigE, Analog Video, Sync In/Out, IRIG, and power		
Power Supply	Included		

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IRE Cooled Infrared Cameras

High Performance Cooled Infrared Cameras
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

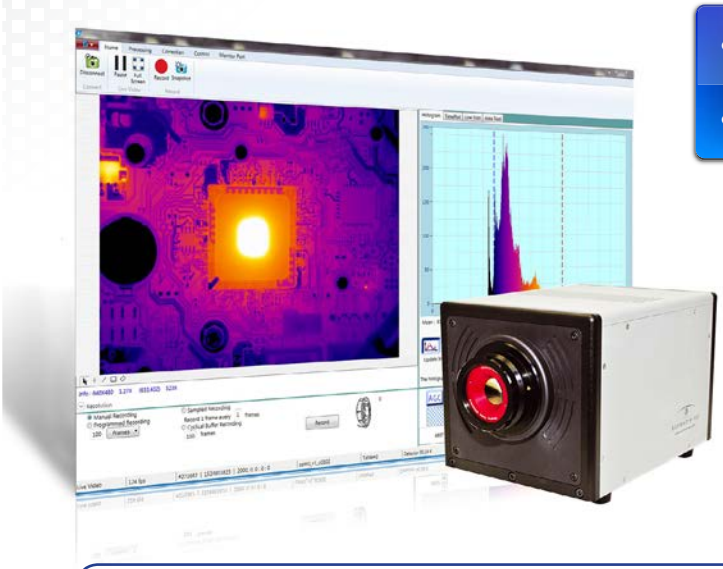
SOFTWARE / OTHER OPTIONS	
C++ Software Development Tool Kit	915189
IRIG-B Time Stamp (IRIG Signal Generator not provided)	915179

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

CAMERA/LENS CALIBRATION (PER LENS)
Ambient range: (-10°C) to (+50°C)
Object range: (-20°C) to (+150°C)
Lens F-number < Detector F-number

D*STAR Cooled

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



- Comprehensive camera control
- Real-time digital recording
- Power analysis tools
- 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.

- **Camera Control:** integration time control, sub-windowing, non-uniformity correction, pixel replacement, external triggering with delay, multiple integration time control
- Real-time image display, image storage (frames & sequences)
- Image playback, processing and analysis: display gain/offset correction, Auto gain control, colorization, digital data measurement via spots, regions of interest, line profiles, conversion to JPG, AVI
- User manuals and media
- D*STAR is supported on the Microsoft Windows 7 operating system only

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

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Edition: 10-14 rev 10