



2.1 x 2.1 x 2.55 inches
(53.1 x 53.1 x 64.7 mm)

Sensors Unlimited 640HS SWIR Camera

Compact VGA Format InGaAs Camera

Sensors Unlimited, Inc.'s 640HS-1.7RT and 640HS-Vis-1.7RT SWIR video cameras bring InGaAs imaging advantages to inspection, sorting, microscopy, laser beam profile/alignment, machine vision and other non-military applications. The 640 x 512 pixel snapshot detector features high QE from 0.9 to 1.7 μm (VIS option: 0.5 to 1.7) without moving parts - no fans or shutters required. Preconfigured with user selectable modes, it operates at 30 frames per second full-frame full-motion video, or 7 fps for weaker signals, and offers windowing for higher frame rates. The camera is easy to use, with built-in non-uniformity corrections (NUCs), Automatic Gain Control (AGC), and image enhancement. Simultaneous output via EIA170 analog video and Camera Link[®] 12-bit digital video in either enclosed or OEM versions provide user flexibility. The camera includes a 25 mm f/1.4 lens and C-mount adapter, while the user has the flexibility to use the SUI SWIR optimized SOLO lenses with the integral M42 mount, or purchase an adjustable F-mount adapter for photographic lenses.

APPLICATIONS

- Silicon ingot, wafer or integrated circuit microscopy
- Pulsed or CW laser beam profiling
- Machine vision inspection and sorting
- Telecom laser and waveguide inspection/alignment
- Thermal imaging > 150°C through glass windows
- Hyper-spectral and multi-spectral imaging
- Full-field Optical Coherence Tomography at 1.04, 1.31 or 1.55 μm

FEATURES

- Standard InGaAs: 0.9 μm to 1.7 μm
- Optional Visible-InGaAs™: 0.5 to 1.7 μm
- Solid-state FPA with snapshot exposure ROIC
- 640 x 512 pixel array with 25 μm pitch
- Enclosed body $\leq 183 \text{ cm}^3$ ($\leq 11.25 \text{ in}^3$)
- Compact OEM module size $\leq 65 \text{ cm}^3$ ($\leq 3.8 \text{ in}^3$)
- Low power $\leq 3.5 \text{ W}$ at 20°C, +8-16 V
- On-board non-uniformity corrections
- Simultaneous Camera Link[®] 12-bit digital & VGA EIA170 analog outputs
- Room temperature stabilized FPA operation
- AGC algorithms with adjustable thresholds
- Adjustable automatic contrast enhancement
- Includes 25 mm f/1.4 lens (order separately)
- Standard M42 and C-mount lens interfaces, optional F-mount
- Meets FCC and CE requirements for radiated and conducted emissions, for immunity from such emissions and for ESD resistance



P R E L I M I N A R Y

MECHANICAL SPECIFICATIONS		
	Enclosed	OEM
Module dimensions	2.1 x 2.1 x 2.55 inches	1.64 x 1.50 x 1.63 inches
Width x Height x Depth	53.1 x 53.1 x 64.7 mm (with I/O connectors, no lens or mount)	41.5 x 38.1 x 41.4 mm
Weight (no lens)	≤ 270 g	≤ 90 g
Lens Mount	M42x1 mount; C-mount adapter	M42x1 mount bracket
Included Lens	f/1.4, 25 mm, C-mount	None
Camera Link Connector	3M SDR26 Connector	Via Samtec QSH-030-01-L-D-A
I/O Connector	3M SDR14 Connector	Via Samtec QSH-030-01-L-D-A
OEM Interface Connectors (analog video, serial and power)	not applicable	Harwin Datamate M80-5020805
Pixel Pitch	25 μm	25 μm
Focal Plane Array Format	640 x 512 pixels	640 x 512 pixels
Active Area	16 mm x 12.8 mm x 20.5 mm diagonal	16 mm x 12.8 mm x 20.5 mm diagonal

ENVIRONMENTAL & POWER SPECIFICATIONS	
Operating Case Temperature	-40°C to +40°C
Storage Temperature	-10°C to +60°C
Humidity	Up to 95% and non-condensing
Power Requirements:	
AC Adapter (Supplied)	100-240 VAC, 47-63 Hz
DC Voltage	+8 to 16 V
Typical Power	≤ 3.5W at 20°C ambient, ≤ 4.8 W @ 40°C
In-rush Power	≤ 18 W with 12 VDC power supply
Conducted and Radiated Emissions	FCC Part 15
CE Compliance	EN 61326-1:2006, Class A, EN 61000-3-3:2006 and EN 61000-3-3:1995 A1:2001, A2:2005

ELECTRICAL SPECIFICATIONS		
	Variable ET: OPRs 0 to 12	Variable Gain: OPRs 13 to 25
Gain (typical)	~250 e-/count	230 e- to 910 ke-/cnt in 13 steps
Noise Equivalent Irradiance (Typical)¹	3.6x10 ⁸ to 1.6x10 ¹² photons/cm ² in 13 steps	1.3x10 ⁹ to 4.8x10 ¹² photons/cm ² in 13 steps
Noise (RMS, Typical)¹	225 electrons	225 e- to 820 ke- in 13 steps
Full Well (Typical) In OPR^{1,3}	1x10 ⁶ electrons	9.6x10 ⁵ to 3.7x10 ⁹ electrons in 13 steps
Exposure Times³	31 μs to 128 ms in 13 steps	32.97 ms
Optical Fill Factor	100%	
Spectral Response	Visible-InGaAs™: 0.5 μm to 1.7 μm	
Quantum Efficiency	Standard InGaAs: > 65% 1 μm - 1.6 μm	
	Visible-InGaAs: >5% @ 0.4 μm; > 45%@ 0.8 μm; >70% for 1-1.6 μm	
Mean Detectivity, D* (Typical)¹	7.6 x 10 ¹² cm ² /Hz/W	
Dynamic Range (Typical)¹	> 3500:1	
Operability²	> 99.2%	
Image Correction	2-point (offset and gain) pixel by pixel, user selectable	
Digital Output Format	12 bit Camera Link® via SDR connector	
Analog Output Format	VGA Buffered EIA170 compatible interlaced video via SMA connector	
Digital Output Frame Rate	Full Frame: 30 fps, 15 fps and 7 fps; 32 x 32 window: > 4700 fps	
Scan Mode	Continuous or externally triggered with preset exposure, gated preset exposure or pulse-width controlled variable exposure	

¹ λ = 1.55 μm, highest sensitivity OPR settings of 12 or 25, no lens, x1 digital gain, with enhancement, AGC and corrections turned off.

² The fraction of pixels with responsivity deviation less than +/-35% from the mean.

³ The pre-configured exposure times include factory stored non-uniformity corrections.
Additional exposure times are programmable via RS-232 commands.

For additional information:
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