

Preliminary

# SU640SDWH-1.7RT High Resolution InGaAs SWIR Windowing Camera



This *high-speed* SU640SDV InGaAs room-temperature solid-state camera allows users to capture full-sized images at **109 frames per second** (fps) or smaller Regions of Interest (ROI) at **over 15,000 fps**. The camera features a Camera Link<sup>®</sup> compatible interface and internal non-uniformity corrections for the full-frame operational modes. The camera's 640 x 512 pixel focal plane array features 4 internal ports and wavelength response over the 900 nm to 1700 nm shortwave infrared spectrum.

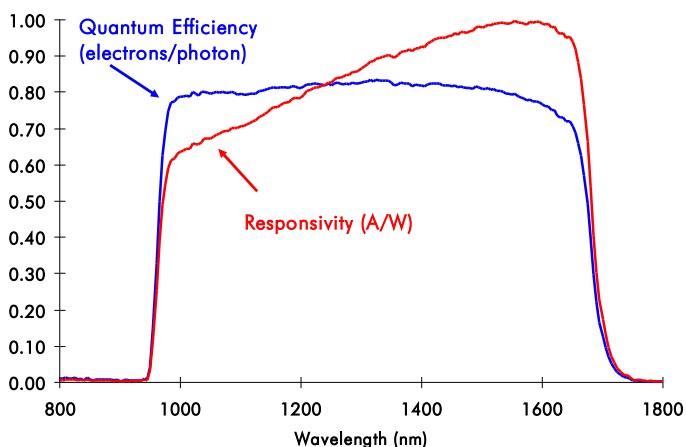


## APPLICATIONS

- Real-time tracking & aligning of free-space communications lasers or guide-stars
- Adaptive optics systems
- Machine vision & motion analysis of fast moving objects
- Pulsed or CW Laser beam profiling
- High speed semiconductor inspection
- Assembly & monitoring of optical switches
- Hyperspectral imaging

## FEATURES

- High-sensitivity solid-state InGaAs image sensor
- 640 x 512 pixel resolution on 25  $\mu\text{m}$  pitch, 100% fill factor
- 4 internal ports, single digital output
- Ultra-high frame rates with preset and user-programmable Regions of Interest (ROI)
- External trigger of full-frame or ROI acquisition
- User programmable exposure times  $> 10 \mu\text{s}$
- Room temperature operation of FPA
- Anti-blooming protection
- Extensive interactive command set enables setting or reading most parameters, start-up states, or user corrections
- 14-bit digital Camera Link<sup>®</sup> compatible output, base configuration
- Buffered EIA170 compatible analog output displays ROI images on standard monitors



Sensors *knows* IR<sup>™</sup>

3490 U.S. Route 1 • Princeton, New Jersey 08540  
Phone: (609) 520-0610 • Fax: (609) 520-0638  
www.oss.goodrich.com • su\_sales@goodrich.com

### ELECTRO-OPTICAL PERFORMANCE

Optical Fill Factor	100%
Spectral Response	900 nm to 1700 nm
Quantum Efficiency	> 65% from 1000 nm to 1600 nm
Mean Detectivity, $D^*^1$	> $6 \times 10^{12}$ cm $\sqrt{\text{Hz/W}}$
Noise Equivalent Irradiance <sup>1</sup>	< $2.5 \times 10^9$ photons/cm <sup>2</sup> ·s
Read Noise (rms)	< 300 electrons
Full Well (typical)	800k electrons
True Dynamic Range	> 2700:1 (< 6 counts rms of noise)
Operability <sup>2</sup>	> 99%

<sup>1</sup>  $\lambda = 1550$  nm, exposure time = 33.8 ms (no lens), corrections off

<sup>2</sup> The % of pixels with responsivity deviation less than 30% from the mean

### ENVIRONMENTAL & POWER

Operating Temperature	-10°C to 40°C
Storage Temperature	-10°C to 60°C
Humidity	Non-condensing
Power Requirements:	
AC Adapter Supplied	100-240 VAC, 47-63 Hz, < 1.0 A
DC (Voltage/Power)	7-28 V, < 7 W at 25°C, < 9 W at 40°C

### MECHANICAL

Length x Width x Height	18.1 cm x 7.62 cm x 7.62 cm 7.13 in x 3.00 in x 3.00 in Length includes lens mount and I/O connectors
Weight	< 1.1 kg (no lens)
Focal Plane Array Format	640 x 512 pixels
Pixel Pitch	25 $\mu\text{m}$
Active Area	16 x 12.8 mm
Lens Mount	Canon FD-mount
Sensor Alignment	42 mm behind lens mount flange

### INTERFACES

Control	MDR 26-pin connector (Camera Link <sup>®</sup> )
Image Data	MDR 26-pin connector (Camera Link <sup>®</sup> )
Power	Hirose HR25-7TR-8S connector
Analog Video	75 $\Omega$ BNC, 1 V max output
Trigger	75 $\Omega$ BNC, 5 V TTL max input
Camera Body Mount	1/4-20 and M6 tapped holes
Status LED	Power indicator, imager temperature control status

### SYSTEM PERFORMANCE & OPERATIONAL MODES

Scan Mode	Continuous or triggered		
Exposure Mode	Snapshot (all pixels exposed simultaneously)		
Frame Rate	109 frames/s full resolution maximum		
Exposure Times	Factory set from 257 $\mu\text{s}$ to 33.3 ms Programmable with external trigger > 10 $\mu\text{s}$		
Image Correction	2-point (offset and gain) pixel by pixel user selectable, 8 settings		
Digital Output Format	14 bit Camera Link <sup>®</sup> compatible (corrected and uncorrected modes available)		
Analog Output Format	Buffered EIA170 compatible video or Sync Out (active high during integration)		
Acquisition Modes	Full-frame window, preset ROI window, variable ROI window		
Preset Window Modes (region centered in array)	Window size in pixels	Integration Time	Frame Rate
	16 x 16	58 $\mu\text{s}$	15200 fps
	64 x 64	30 $\mu\text{s}$	3200 fps
	128 x 128	790 $\mu\text{s}$	1200 fps
	320 x 256	2.7 ms	360 fps
640 x 512	9.1 ms	109 fps	
Variable Window Mode (Arbitrary location)	Min. of 16 col. x 8 rows up to 640 x 512 in steps of 4 pixels		
External Trigger Modes Full-frame Mode	Pre-set exposure (set by integration time), Variable exposure (integrates while trigger high, min. of 10 $\mu\text{s}$ ), Burst with pre-set exposure (standby while trigger low, free-run while high)		
ROI Window Trigger Mode <sup>1</sup>	Single frame (short trigger pulse), or burst (pause while trigger low, free-run while high)		
External Trigger Delay	< 550 ns		

<sup>1</sup> Last two lines of triggered ROI windows will be blank.

### INCLUDED WITH CAMERA

1) Camera	2) Canon FD-mount lens
3) AC adapter	4) 2 x BNC to BNC cables, 6 feet
5) BNC to phono-plug adapter	6) Manual
7) Carrying case	8) Camera configuration file for National Instruments frame-grabber card