

P R E L I M I N A R Y

SENSORS  
UNLIMITED



1.25 x 1.25 x 1.10 inches  
31.8 x 31.8 x 28 mm

## Micro-SWIR™ 640CSX Legacy Camera

Mil-Rugged, High Sensitivity, Small SWaP, InGaAs SWIR Camera

The compact **640CSX** is Sensors Unlimited Inc.'s SWIR video camera designed for applications requiring small Size, Weight, and Power (SWaP) as well as high sensitivity. These cameras feature a 640x512 pixel, high-sensitivity, stabilized InGaAs snapshot imager and utilize Sensors Unlimited's image enhancement algorithms to produce highest quality imagery in all lighting conditions. The camera provides real-time daylight to low-light imaging in the Short Wave Infrared (SWIR) wavelength spectrum for persistent surveillance, laser detection, and penetration through fog, haze, and smoke.

On-board Automatic Gain Control (AGC) optimizes the camera's imagery throughout day and night imaging scenarios. Camera Link® digital output provides for plug-and-play video with 12-bit images for digital image processing or transmission. The light weight, compact size, and low power is ideally suited for integration into commercial systems and small UAS. Optional NIR/SWIR technology is available to extend the sensitivity of Sensors Unlimited cameras below 0.9  $\mu\text{m}$ , offering the advantage of both Near Infrared (NIR) and Short Wave Infrared wavelength response.

### FEATURES

- 640 x 512 pixel format, 12.5  $\mu\text{m}$  pitch
- 30 Hz full frame rate
- 1.7 W power consumption (@ 20° C)
- High sensitivity 0.9 to 1.7  $\mu\text{m}$  spectrum response imager; NIR/SWIR, from 0.7 to 1.7  $\mu\text{m}$
- Partial moonlight to day time imaging
- Compact size
- All solid-state InGaAs imager
- Snapshot exposure
- On-board, real time non-uniformity corrections
- Digital 12-bit base Camera Link® output
- Automatic Gain Control (AGC)
- C-mount base optic format; adapters available
- Available mounting accessories
- Digital Pixel Binning



## MECHANICAL SPECIFICATIONS

<b>Model</b>	SU640CSX-12.5B-ENC housed series SU640CSX-12.5B-OEM
<b>Dimensions (width x height x depth) (includes connectors, excludes lens)</b>	ENC Series: 1.25"W x 1.25"H x 1.21"D 31.8 x 31.8 x 30.7 mm OEM Series: 1.21"W x 1.21"H x 1.19"D 30.7 x 30.7 x 30.2 mm
<b>Weight</b>	ENC Series: ≤65 grams OEM Series: ≤57 grams
<b>Lens mount</b>	C-mount
<b>Camera Link Connector</b>	Airborn NK-2B2-025-228-TH00
<b>Power Input Connector</b>	Airborn NK-2B2-015-228-TH00
<b>Pixel Pitch</b>	12.5 μm
<b>Focal Plane Array Format</b>	640 x 512 pixels

## ENVIRONMENTAL & POWER SPECIFICATIONS

<b>Operating Case Temperature</b>	-40°C to 70°C
<b>Storage Temperature</b>	-54°C to 85°C
<b>Humidity</b>	5-95% relative humidity – non-condensing
<b>Power Requirements:</b>	
<b>DC Voltage</b>	+4.5-8 V
<b>Steady State Power</b>	1.7 W at 20°C case temperature
<b>Max Power</b>	<4.25 W
<b>Functional Shock, Random Vibration, Thermal Shock</b>	MIL-STD-810G compliant design

## ELECTRICAL SPECIFICATIONS

<b>Optical Fill Factor</b>	100 %
<b>Spectral Response</b>	Standard, 0.9 μm to 1.7 μm NIR/SWIR, 0.7 μm to 1.7 μm
<b>Quantum Efficiency</b>	Standard, > 65% from 1 μm to 1.6 μm NIR/SWIR, > 65% from 0.9 μm to 1.6 μm
<b>Mean Detectivity, <math>D^*</math> <sup>1</sup></b>	$2.8 \times 10^{13}$ cm <sup>2</sup> /Hz/W (typical)
<b>Noise Equivalent Irradiance <sup>1</sup></b>	$8.8 \times 10^3$ photons/cm <sup>2</sup> /s (typical)
<b>Noise (RMS) <sup>1</sup></b>	35 electrons (typical)
<b>Dynamic Range <sup>1</sup></b>	460:1 (high gain) 950:1 (low gain) (minimum)
<b>Non-Uniformity Corrections</b>	At least 16 pre-configured operational settings (OPRs)
<b>Operability <sup>2</sup></b>	> 99 %
<b>Exposure Times, preconfigured</b>	30 μs to 32 ms
<b>Image Correction</b>	non-uniformity corrections 2 point
<b>Output Format</b>	12 bit base Camera Link®
<b>Digital Output Frame Rate</b>	30 fps
<b>Scan Mode</b>	Continuous

<sup>1</sup>Wavelength = 1.55 μm, exposure time = 32 ms, case temperature = 20° C, highest sensitivity gain setting, no lens, x1 digital gain with enhancement, AGC, and correction off

<sup>2</sup> The fraction of pixels with responsivity deviation between +/- 35% from the mean.

