SENSORS UNLIMITED MICRO-SWIR™ 640CSX CAMERA

MIL RUGGED, HIGH SENSITIVITY AND SMALL SWaP INGaAs SWIR CAMERA

The compact Sensors Unlimited Micro-SWIR™ 640CSX is the next-generation SWIR video camera, designed for applications requiring small Size, Weight and Power (SWaP) applications and available without ITAR restriction.

It features a 640 x 512 pixel, high-sensitivity, stabilized InGaAs snapshot imager and uses our advanced image enhancement algorithms to produce the 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 a range of applications that include industrial process monitoring, enhanced vision and persistent surveillance. On-board Automatic Gain Control (AGC) optimizes the camera's dynamic response throughout day and night imaging scenarios. Camera Link® digital output provides for plug-and-play video with 12-bit images for digital image output.

The light weight, compact size and low power draw are ideally suited for integration into commercial systems and industrial process monitoring applications. Optional NIR/SWIR technology is available to extend the sensitivity of the 640CSX below 0.9 µm, offering the advantage of both Near Infrared (NIR) and Short Wave Infrared wavelength response.

KEY FEATURES AND BENEFITS

- 640 x 512 pixel format, 12.5 µm pitch
- 30 or 60 frames per second full frame rate
- 1.5 W power consumption (@ 20° C)
- High sensitivity 0.9 to 1.7 µm spectrum response imager; NIR/SWIR from 0.7 to 1.7 µm
- Low light to daytime imaging
- Compact size
- All solid-state InGaAs imager
- Snapshot exposure
- On-board, real-time non-uniformity corrections
- Digital 12-bit Camera Link base output (other output options available upon request)
- Automatic Gain Control (AGC)
- C-mount compatible; adapters available
- Selectable contrast enhancement modes
- User-defined Region of Interest (ROI) windowing mode
- Digital pixel binning
- FCC Part 15 and MIL-STD-461F certified
- Tested to MIL-STD-810G for functional shock, vibration, thermal shock, storage temperature and humidity
- Operation from -40° C to 70° C case temperature
**MECHANICAL SPECIFICATIONS**

| Model                  | SU640CSX-12.5B-ENC housed series  
SU640CSX-12.5B-OEM      |
|------------------------|----------------------------------|
| Dimensions (width x height x depth) (excludes connectors, excludes lens) | ENC Series: 1.25"W x 1.25"H x 1.10"D  
OEM Series: 1.25"W x 1.25"H x 1.10"D | 31.8 x 31.8 x 28 mm  
31.8 x 31.8 x 28 mm  |
| Weight                 | ENC Series: <45 grams  
OEM Series: <41 grams |
| Lens mount             | C-mount                        |
| Camera link connector  | 26-pin SDR standard connector  
Board-to-board connector option for OEM model |
| Power input connector  | 14-pin SDR standard connector |
| Pixel pitch            | 12.5 μm                        |
| Focal plane array format | 640 x 512 pixels               |
| Active area            | 8.0 mm x 6.4 mm (10.2 mm diagonal) |

**ENVIRONMENTAL AND POWER SPECIFICATIONS**

| Operating case temperature | -40° C to 70° C |
| Storage temperature        | -54° C to 85° C |
| Humidity                   | 95% RH non-condensing |
| Power requirements:        | DC voltage: +4.5-16V  
Power: 1.5 W at 20° C case temperature, max <4.25 W |
| Functional shock, random vibration, thermal shock | MIL-STD-810G compliant design |

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>30 fps</th>
<th>60 fps</th>
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<tr>
<td>Optical fill factor</td>
<td>100%</td>
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| Spectral response       | Standard, 0.9 μm to 1.7 μm  
NIR/SWIR, 0.7 μm to 1.7 μm  
|                         | Standard, 0.9 μm to 1.7 μm  
NIR/SWIR, 0.7 μm to 1.7 μm  |
| Quantum efficiency      | Standard, >65% from 1 μm to 1.6 μm  
NIR/SWIR, >65% from 0.9 μm to 1.6 μm  
|                         | Standard, >65% from 1 μm to 1.6 μm  
NIR/SWIR, >65% from 0.9 μm to 1.6 μm  |
| Mean detectivity, D* 1  | >2.5 x 10^13 cm/Hz/W (typical)  
|                         | >2.8 x 10^13 cm/Hz/W (typical)  |
| Noise equivalent irradiance 1 | <9.7 x 10^8 photons/cm²/s (typical)  
|                         | <1.2 x 10^8 photons/cm²/s (typical)  |
| Noise (RMS) 1           | <35 electrons (typical)  
|                         | <25 electrons (typical)  |
| Dynamic range 1         | >2500:1 at low gain  
>800:1 at high gain      | >2500:1 at low gain  
>1100:1 at high gain     |
| Operability 2           | >99%                   |
| Exposure times, preconfigured | 200 μs to 33 ms  
|                         | 200 μs to 33 ms       |
| Image correction        | 2-point (offset and gain) pixel by pixel, user selectable  
|                         | 2-point (offset and gain) pixel by pixel, user selectable |
| Output format           | 12-bit base Camera Link  
|                         | 12-bit base Camera Link |
| Digital output frame rate | 30 fps  
|                         | 60 fps                  |
| Scan mode               | Continuous              |

1 λ = 1.55 μm, exposure time = 33 ms (30fps), 16.67 ms (60 fps), case temperature = 20° C, highest sensitivity gain setting, no lens, x1 digital gain with enhancement, AGC and correction off
2 The fraction of pixels with responsivity deviation between +/- 35% from the mean.

Specifications subject to change without notice.
Front photo courtesy of www.marines.mil and Lance Cpl. Adam Montera.

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