

# Sensors Unlimited: 1024-LDH2 92 KHz InGaAs Linescan camera



## High-speed SD-OCT imaging

The SUI 1024-LDH2 is a second-generation, high-speed 1024-pixel linescan InGaAs camera that increases the A-line rate to 91,911 lines per second (lps).

### BENEFITS

- 91,911 lps for 1024 pixels at 12 bits
- Integrate-While-Read snapshot acquisition
- Wavelength response over 0.8 to 1.7  $\mu\text{m}$  with flat QE for 1.05 and 1.31  $\mu\text{m}$  OCT
- 25  $\mu\text{m}$  pixel pitch with aperture heights of 25  $\mu\text{m}$  (defined by on-chip mask) or 500  $\mu\text{m}$
- 12-bit base Camera Link<sup>®</sup>-compatible output and control
- High quantum efficiency and dynamic range
- Operating temperature range of -10°C to +50°C
- Mounts easily to spectrometers due to 5.7 mm image plane depth and O-ring light seal
- Mounts easily to optics benches or MV systems with tripod, front or side fastener hole patterns

The high-speed SUI 1024-LDH2 InGaAs camera enables spectral-domain optical coherence tomography (SD-OCT) at 1.04  $\mu\text{m}$  wavelength, allowing rapid capture of detailed 3-D volumes of the retina, nerve head and choroid layer. For 1.31  $\mu\text{m}$  wavelength SD-OCT, the camera supports diode-array based systems, ensuring superior phase stability for Doppler or polarization-sensitive OCT (PS-OCT) applications. The camera features 12-bit digital capture via base-format Camera Link<sup>®</sup> interface cards, offering a maximum dynamic range exceeding 2300:1 at high line rates. Two pixels are available: 500- $\mu\text{m}$  tall pixels for alignment in SD-OCT setups and 25- $\mu\text{m}$  square pixels for ultra-fast machine vision (MV) or dual-camera PS-OCT configurations. This versatility makes the LDH2 suitable for a range of high-resolution imaging tasks in medical diagnostics and industrial applications.

### Applications

- Spectral-domain optical coherence tomography (OCT)
- Ultra-fast absorption or emission spectroscopy for combustion research, moisture, lipids, proteins or other molecular vibration bands in the 0.8 to 1.7  $\mu\text{m}$  range
- MV for ultra-high speed inspection, materials classification, sorting and/or monitoring of continuous processes, e.g., food or agricultural product sorting.

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Interfaces		Mechanical	
<b>Control:</b>	SDR 26-pin connector (base Camera Link®)	<b>Length x width x height:</b>	6.1 cm x 7.37 cm x 7.62 cm 2.4 in x 2.9 in x 3 in Length excludes I/O connectors and lens adapter
<b>Image data:</b>	SDR 26-pin connector (base Camera Link®)	<b>Weight:</b>	< 450 g or 1 lbs (no lens or adapter)
<b>Power:</b>	Hirose HR10-7R-6PA receptacle mates with HR10-7P-6S or SN4-8-6 (P)	<b>Threaded lens mount and optional lens mount adapters:</b>	M42x1-6H with 5.7 mm to image plane (standard) Fixed distance C-Mount adapter (optional) Adjustable distance F-Mount adapter (optional)
<b>Sync output:</b>	SMA: 5 V, 50 $\Omega$ series terminated, active high: integration active	<b>Spectrometer mount:</b>	Four tapped 8-32 holes in 2 in <sup>2</sup> pattern Four tapped M4x0.7-6H holes spaced 5 cm x 4 cm (h x w) O-ring light seal, 1.9 in diameter, 1/16th thickness
<b>Trigger: input</b>	SMA, low < 0.5, 3 V > high < 5 V	<b>Camera tripod mount:</b>	Two tapped ¼-20 holes alternating on ¾ in (19.05 mm) spacing with two tapped M6-6H holes
<b>Status LED:</b>	Green: TEC locked at setpoint Red: TEC unlocked Blinking: Timing or triggering error	<b>Side wall mounts:</b>	Four tapped M4x0.7-6H holes, 5 x 4.5 cm spacing (h x d)
Environmental and power			
<b>Operating temperature:</b>	-10°C to +50°C case temperature		
<b>Storage temperature:</b>	-20°C to 70°C		
<b>Humidity:</b>	Non-condensing		
<b>Power requirements:</b>	AC Adapter: 100-240 VAC, 47-63 Hz, < 1.0 A DC Voltage: 7-16 V, < 6 W at 25°C, < 9 W at 50°C In-rush Current: < 1.5 A peak		

Electro-optical performance	
<b>Sensor format</b> <sup>1</sup>	1024 pixels on 25 $\mu$ m pitch with eight readout ADCs
<b>Optical aperture (pixel height)</b>	500 $\mu$ m or 25 $\mu$ m (square pixel sharply defined by mask on detector surface)
<b>Peak quantum efficiency</b>	> 70%
<b>Exposure time</b> <sup>12</sup>	0.007 ms to 1 ms in preset modes or to > 1 s with user programmed or via the width of the external trigger
<b>Trigger modes</b> <sup>2</sup>	Free run, single line per trigger, variable exposure or gated burst
<b>Pixel rate</b>	100 Mpix/s max with 2 x 12-bit words transferred on each Camera Link® strobe clock at 50 MHz
<b>Digital output format</b>	12-bit base Camera Link®; recommend NI PCIe-1427 or equivalent frame grabber
<b>Readout mode</b>	Integrate-While-Read, differential double sampling

<sup>1</sup> Actual formats and performance governed by user-selected SUI linear array purchased with camera (dark current may limit longest usable ET).

<sup>2</sup> User selectable by command over Camera Link® serial lines.

Specifications subject to change without notice.



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