

Sensors Unlimited: 1024-LDM Linescan camera



Compact InGaAs Linescan camera for machine vision

The Sensors Unlimited 1024-LDM camera is a high-speed 1024-pixel linescan InGaAs camera for use in high-resolution imaging through silicon wafers, blocks or ingots.

BENEFITS

- High quantum efficiency and dynamic range
- Integrate-While-Read snapshot acquisition
- Predefined line rates from 80 to 45,956 lps user programmable
- Wavelength response over 0.8 μm to 1.7 μm
- 1024 x 25- μm pixel pitch with the aperture heights of 25 or 500 μm
- 14-bit base Camera Link[®] compatible
- Operating temperature range of -10°C to +50°C
- Light-tight mount for spectrometers
- Mounts easily to optics benches or MV systems with tripod, front or side fastener hole patterns

The 1024-LDM camera is a high-speed 1024-pixel linescan InGaAs camera designed for precise imaging. It detects issues such as misalignment, occlusions, inclusions or cracks early in the manufacturing process of Integrated Circuits or solar cells, reducing costly rework. Additionally, it excels in high-speed imaging of free-falling molten glass gobs and inspecting agricultural raw materials or pharmaceutical mixes. With flexible line rates up to 45,956 lines per second (lps) and a compact depth, the mechanical design gives system integrators the flexibility to fit the camera inside their inspection machines. A photoetch mask sharply defines the array's 25- μm aperture, ensuring high time and spatial resolution. The alternate 500- μm pixel height trades time resolution for increased sensitivity in photoluminescence imaging.

Applications

- Inspection through polished silicon wafers or blocks
- Machine vision (MV) for ultra-high-speed inspection, materials classification, sorting and/or monitoring of continuous processes, e.g., for food or agricultural product sorting
- Fast absorption or emission spectroscopy for combustion research, moisture, lipids, proteins or other molecular vibration bands in the 0.8 to 1.7 μm range

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Mechanical

Length x width x height:	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
Weight:	< 450 g or 1 lbs (no lens or adapter)
Threaded lens mount and optional lens mount adapters	M42x1-6H with 5.7 mm to image plane Fixed distance C-mount adapter (Optional) Adjustable distance F-mount adapter (Optional)
Spectrometer mount	4 tapped 8-32 holes in 2 in square pattern 4 tapped M4x0.7-6H holes spaced 5 cm x 4 cm (h x w) O-ring light seal, 1.9 inch diameter, 1/16th thickness
Camera tripod mount	Two tapped ¼-20 holes alternating on ¾" (19.05 mm) spacing with two tapped M6-6H holes
Side wall mounts	Four tapped M4x0.7-6H holes, 5 cm x 4.5 cm spacing (h x d)

Electro-optical performance

Sensor format ¹	1024 pixels on 25 µm pitch with eight readout ADCs
Optical aperture (pixel height) ¹	25 µm square pixel sharply defined by mask on the detector surface or 500 µm photodiode
Peak quantum efficiency ¹	> 70%
Exposure time ^{1,2}	0.018 ms to 12.8 ms in 20 preset steps or to > 1 s with user programmed or via the width of the external trigger
Trigger modes ²	Free run, single line per trigger, external variable exposure or gated burst
Pixel rate	50 Mpix/s max with 14-bit words transferred on each Camera Link® strobe clock cycle
Digital output format	14-bit base Camera Link®; recommend NI PCIe-1427 or equivalent frame grabber
Readout mode	Integrate-While-Read, differential double sampling

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

² User selectable by command over Camera Link® serial lines.

Interfaces

Control:	SDR 26-pin connector (base Camera Link®)
Image data:	SDR 26-pin connector (base Camera Link®)
Power:	Hirose HR10-7R-6PA receptacle Mates with HR10-7P-6S or SN4-8-6(P)
Sync output:	SMA: 5 V, 50 W series terminated, active high: integration active
Trigger input:	SMA, Low < 0.5, 3 V > high < 5 V
Status LED:	Green: TEC locked at setpoint Red: TEC unlocked Blinking: Timing or triggering error

Environmental and power

Operating temperature:	-10°C to +50°C case temperature
Storage temperature:	-20°C to 70°C
Humidity:	Non-condensing
Power requirements:	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



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