Dhyana 4040 V2 Large-Format FSI sCMOS Camera, 4096 × 4096, 70 ke⁻ Full Well

Model Dhyana 4040 V2 · waveqvanta.com/products/dhyana-4040-v2-scmos-camera

A large-format front-illuminated sCMOS camera with high full well for astronomy and physics imaging.



The Dhyana 4040 V2 uses the front-illuminated GSENSE4040 sensor with 4096 × 4096 pixels of 9 µm, giving a 36.9 mm square imaging area and a 52.1 mm diagonal. A typical full well of 70 ke⁻ and 86 dB dynamic range let it record bright and faint features in the same frame, at 16.5 fps over CameraLink or 9.7 fps over USB 3.0. Dark current is 0.15 e⁻/pixel/s with air cooling and 0.1 e⁻/pixel/s with liquid cooling.

Key features

- 36.9 mm × 36.9 mm imaging area (52.1 mm diagonal) with 16 MP of 9 µm pixels
- 70 ke⁻ typical full well and 86 dB dynamic range for high-contrast scenes
- 74% peak QE at 600 nm with 3.6 e⁻ typical read noise
- Factory calibration that reduces fixed-pattern noise in bias and low-signal frames; DSNU 0.5 e⁻, PRNU 0.2%
- Dark current 0.15 e⁻/pixel/s (air) or 0.1 e⁻/pixel/s (liquid); liquid cooling to 45 °C below ambient
- 16.5 fps via CameraLink or 9.7 fps via USB 3.0; exposures from 10 µs to 3600 s
- GPS timestamps with 8 ns accuracy; supported in MaxIm DL, LabVIEW and MATLAB

Specifications

Sensor Type	FSI sCMOS
Sensor	GSENSE4040
Color / Mono	Mono
Peak QE	74% @ 600 nm
Resolution	4096 × 4096
Pixel Size	9 µm × 9 µm
Effective Area	36.9 mm × 36.9 mm
Array Diagonal	52.1 mm
Full-Well Capacity	70 ke⁻ (typical)
Readout Noise	3.6 e⁻ (typical)
Dynamic Range	86 dB (typical)
Frame Rate	16.5 fps @ CameraLink; 9.7 fps @ USB 3.0
Shutter Type	Rolling
Exposure Time	10 µs – 3600 s
Binning	2 × 2, 4 × 4
ROI	Supported
Cooling Method	Air, liquid
Cooling Temperature	45 °C below ambient (liquid cooling)
Dark Current	Air: 0.15 e⁻/pixel/s; liquid: 0.1 e⁻/pixel/s

DSNU / PRNU	0.5 e^- / 0.2%
Bit Depth	12 bit, 16 bit
Data Interface	USB 3.0, CameraLink
Trigger	Hardware, software; SMA, CameraLink CC1
Trigger Output	Exposure Start, Global Exposure, Readout End, High, Low
Timestamp	1 µs accuracy; GPS timestamp 8 ns accuracy
Optical Interface	F-mount or custom
Power Supply	12 V / 8 A
Power Consumption	Below 45 W
Dimensions	105 mm × 95 mm × 123.5 mm (H × W × L)
Weight	2 kg
Operating Environment	Working −25 to 40 °C, 0–95% RH; storage −35 to 60 °C, 0–95% RH
Software / SDK Support	Acquisition and analysis software, MaxIm DL, LabVIEW, MATLAB; C/C++/C#/Python SDK

Typical applications

- Space debris detection
- Solar observation
- Soft X-ray imaging
- Quantum imaging and quantum optics
- FPD inspection