Dhyana 4040BSI Large-Format BSI sCMOS Camera, 4096 × 4096, 90% QE

Model Dhyana 4040BSI · waveqvanta.com/products/dhyana-4040bsi-scmos-camera

A large-format back-illuminated sCMOS camera for astronomy, space surveillance and physics imaging.



The Dhyana 4040BSI pairs a 52 mm-diagonal GSENSE4040BSI sensor (4096 × 4096, 9 µm pixels) with 90% peak QE and 2.3 e^- typical read noise. It reads out at 16.5 fps over CameraLink or 9.7 fps over USB 3.0, bringing sCMOS frame rates and dynamic range to large-format imaging that previously relied on CCD cameras. Exposures from 10 µs to 3600 s and liquid cooling to 45 °C below ambient cover both fast and long-integration observations.

Key features

- 36.9 mm × 36.9 mm imaging area (52.1 mm diagonal) with 16 MP of 9 µm pixels
- 90% peak QE at 550 nm with 2.3 e^- typical read noise
- Factory calibration that reduces fixed-pattern noise in bias and low-signal frames; DSNU 0.5 e^-, PRNU 0.2%
- 16.5 fps via CameraLink or 9.7 fps via USB 3.0, with 12-bit and 16-bit output
- Air or liquid cooling, down to 45 °C below ambient with liquid
- GPS timestamps with 8 ns accuracy (1 µs internal timestamp) for synchronized observations
- Supported in MaxIm DL, LabVIEW and MATLAB, with SDKs for C, C++, C# and Python

Specifications

Sensor Type	BSI sCMOS
Sensor	GSENSE4040BSI
Color / Mono	Mono
Peak QE	90% @ 550 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	39 ke^- (typical)
Readout Noise	2.3 e^- (typical)
Dynamic Range	85 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	1.2 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 astronomy
- Soft X-ray imaging
- Quantum optics
- FPD inspection