

Aries 6504 Pro

The Aries 6504 Pro is built on a next-generation back-illuminated sCMOS platform. In high-sensitivity readout mode, it achieves 0.43 e⁻ (RMS) readout noise for single-photon-level signal discrimination, complemented by 297 fps at 4.2 MP and ≤ 0.01 e⁻/pixel/s@-20°C, enabling precise measurement in demanding scientific and high-end industrial applications.



Key Features

Benefits

| | |
|---|---|
| High-Sensitivity Mode | 0.43 e ⁻ (RMS) readout noise at 99 fps @ 4.2 MP, enabling single-photon-level resolution. |
| High-Speed Mode | 297 fps@4.2 MP with 0.8 e ⁻ (RMS) readout noise, optimized for high-speed low-light imaging. |
| High-Dynamic Mode | 170 fps@4.2 MP with 16-bit depth; high-speed acquisition and wide dynamic range. |
| ≤ 0.01 e ⁻ /p/s@-20°C Dark Current | 5X gen-over-gen improvement, enabling high-precision quantitative long-exposure imaging. |
| USB 3.2 & CoaXPress Interfaces | Flexible connectivity at the same frame rate; adaptable to diverse applications. |
| Air & Liquid Cooling | Reduces dark current and signal fluctuation, supporting long-term system stability. |

Typical Applications

- Super-resolution imaging
- Single-molecule imaging
- Light sheet imaging
- SIM imaging
- Calcium / voltage imaging
- Bioluminescence
- High-content imaging
- Quantum physics
- Astronomical research

Noted Examples

[1] In high-sensitivity mode, The Aries 6504 Pro shows clearly separated histogram peaks at ultra-low illumination of 2 e⁻/pixel, delivering a significant SNR improvement over the previous-generation back-illuminated sCMOS camera.

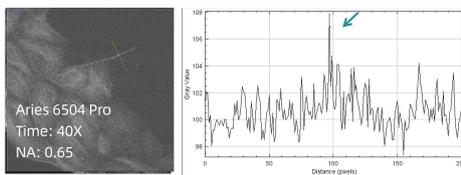


Fig. 1-1 Aries 6504 Pro Ultra-low-light image (2 e⁻/pixel)

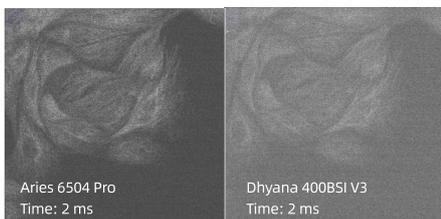
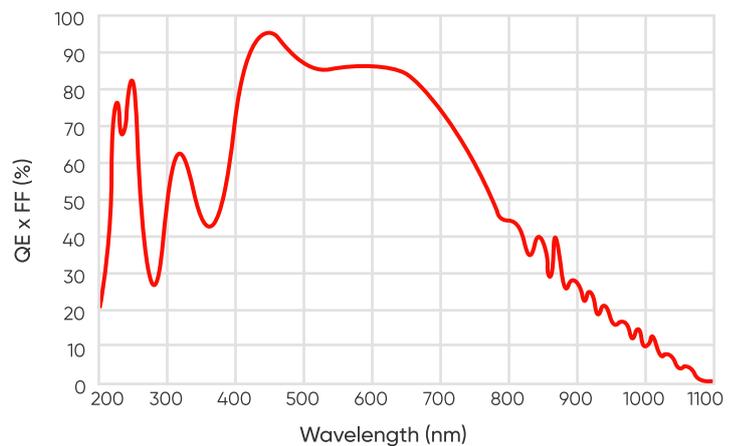
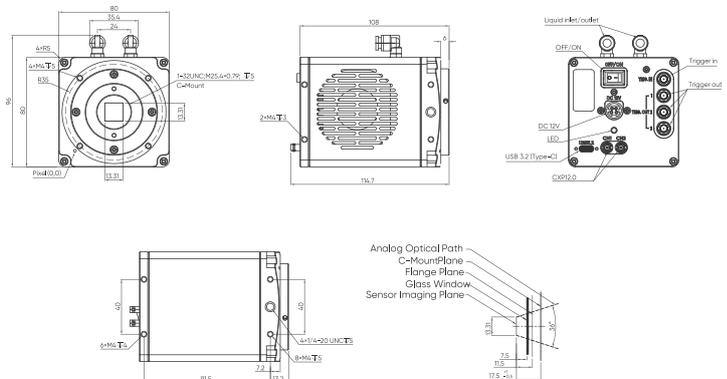


Fig. 1-2 Ultra-low-light comparison (2 e⁻/pixel)

Quantum Efficiency



Dimensions (Unit: mm)



Specifications

| | |
|--------------------|--|
| Model | Aries 6504 Pro |
| Sensor Type | BSI sCMOS |
| Sensor Model | GSENSE6504BSI |
| Chrome | Mono |
| Peak QE | 95%@450 nm |
| Spectral Range | 200 nm - 1100 nm |
| Resolution | 2048 (H) x 2048 (V) |
| Pixel Size | 6.5 μm x 6.5 μm |
| Effective Area | 13.3 mm x 13.3 mm |
| Frame Rate | 99 fps@Sensitive mode; 170 fps@HDR mode; 297 fps@Speed mode |
| Full-Well capacity | 15 Ke-@HDR mode |
| Dynamic Range | 91 dB@Sensitive mode |
| Readout Noise | RMS: 0.43 e-@Sensitive mode |
| Shutter Mode | Rolling, Global Reset |
| Dark Current | ≤ 0.01 e- /pixel/s@-20°C |
| DSNU | 0.3 e- |
| PRNU | 0.3% |
| Cooling Method | Liquid, Air |
| Cooling Temp. | Liquid: -20°C@Liquid Temperature 20°C; Air: -10°C@Ambient Temperature 25°C |
| Binning | 2 x 2, 4 x 4 |
| ROI | Support |
| Timestamp | Support |
| Trigger Mode | Hardware, Software |
| Trigger Output | Readout End, Global Exposure, Exposure Start, Trigger Ready, First Row, Any Row, High, Low |
| Trigger Interface | SMA*4 |
| Data Interface | USB3.2 Gen2, CXP 2.0 x 2 |
| Optical Interface | C Mount |
| Bit Depth | 12 bit, 16 bit |
| Power Supply | DC12 V |
| Power Cons. | 60 W |
| Dimensions* | 80 mm (H) x 80 mm (W) x 108 mm (L) |
| Weight | 950 g |
| Software | Sample Pro, Mosaic V3 |
| SDK | C, C++ |
| Operating System | Windows 10 / 11, Ubuntu 22.04 |
| Environment | Working: Temp. 0°C~40°C, HUM. 20%~80%, Altitude 0 m~3000 m; Storage: Temp. -20°C~60°C, HUM. 20%~80% |

*Dimensions shown refer to the bare camera body only, excluding water-cooling fittings, adapters, and data interfaces. See the mechanical drawing for details.

*Specifications in this manual are subject to changes without prior notice.

