PRODUCT DATASHEET

ROLERA™ thunder

QImaging presents the **Rolera Thunder**: the most quantitative and sensitive camera ever offered on the QImaging product line. The Thunder contains a 16um pixel, 512x512 EMCCD sensor with >90% QE and read noise <1e-.

Combined with a linear EM gain and onboard EM calibration, the Rolera Thunder offers the ideal imaging solution for low light applications.
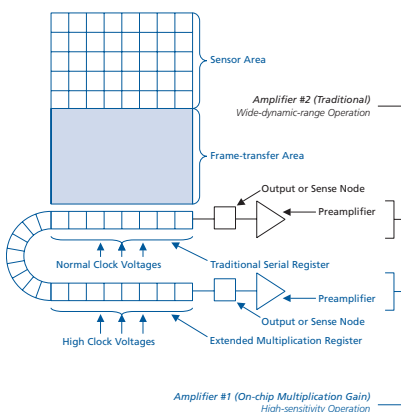
camera models

Includes: IEEE-1394 FireWire cable, IEEE-1394 PCIe card, power supply, and access to SDK

- **Monochrome Rolera Thunder**
  Model: 01-ROL-THUNDER-F-M-16-C

camera options

- Extended Warranty

emccd architecture

Sensor Area

Amplifier #2 (Traditional)
Wide-dynamic-range Operation

Frame-transfer Area

Output or Sense Node
Preamplifier

Normal Clock Voltages
Traditional Serial Register

Preamplifier
Output or Sense Node
High Clock Voltages
Extended Multiplication Register

Amplifier #1 (On-chip Multiplication Gain)
High-sensitivity Operation

High-Speed, Extremely Sensitive Digital EMCCD Camera

features	benefits
High Quantum Efficiency	■ Extremely high sensitivity for demanding low-light & fluorescence imaging; up to 90%+ between 500–650nm
High-Speed Readout	■ Previewing & focusing in real time ■ 385+fps with 6x6 binning and ROI ■ 30fps full resolution @ 16 bits ■ Ideal for automated imaging applications
Low-Noise Electronics	■ Quantitation & imaging of low light levels
Flexible Exposure Control	■ Optimal integration over a wide range of light levels
External Sync & Trigger	■ Tight synchronization with flashlamps, automated filters, shutters, & microscope stages
Three-Stage Peltier Cooling	■ Reduces thermal noise for low-light long exposures while providing temperature stability
Binning	■ Increases sensitivity for quantitation & imaging of very low light levels ■ Increases frame rate
IEEE-1394 FireWire Connection	■ Simple connectivity ■ Better noise performance ■ Ease of use & installation ■ Portability with laptop computer ■ Simultaneous use of multiple cameras through a single port

PVCam®
  Circular buffers
  Device sequencing
	■ Supported by numerous third-party software packages
	  ■ Real-time focus
	  ■ Precise integration with shutters, filter wheels, etc.

ROLERA THUNDER Specifications

emccd sensor	
Light-Sensitive Pixels	512 x 512
Binning Modes	1, 2, 3, 4, 5, 6 horizontally, arbitrary vertically
ROI (Region of Interest)	From 1x1 pixels up to full resolution, continuously variable in single-pixel increments
Sensor Type	e2v L3Vision CCD97, back-illuminated device
Pixel Size	16µm x 16µm
Linear Full Well	800,000e- (EM mode); 200,000e- (conventional)

Read Noise	"EM gain" amplifier	"Traditional" amplifier
	40 e- rms @ 5MHz 55 e- rms @ 10MHz *Read noise effectively reduced to <1 e- rms with EM gain enabled*	<8 e- rms @ 1.25MHz 15 e- rms @ 5MHz

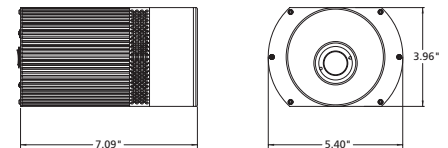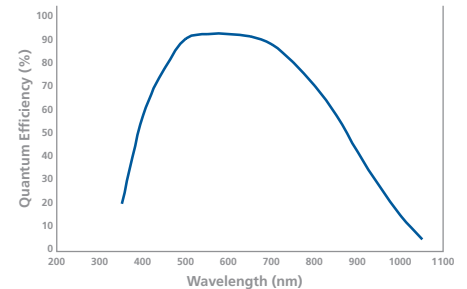|	
Dark Current	0.5 e-/pix/s
Cooling Technology	Three-stage Peltier cooling, chamber back-filled with nitrogen at atmosphere, assembled in a cleanroom environment
Cooling Type	Down to -25°C, regulated, with software control in 1°C increments
Digital Output	16 bits
Readout Frequency	10, 5MHz (EM mode); 5, 1.25MHz (normal mode)
Frame Rate	30fps full resolution @ 16 bits (385+ maximum with binning and ROI functions)

camera	
Computer Platforms/ Operating Systems*	Windows® XP, Vista, or Windows 7
Digital Interface	IEEE-1394 FireWire
External Trigger	TTL Input
Trigger Types	Internal, Software, External
External Sync	TTL Output
EM Gain Control	1 to 1000 times (typical) Self calibrating linearization
Optical Interface	2/3", C-mount optical format
Threadmount	1/4" – 20 mount
Weight	3.18kg (7lbs)
Warranty	2 years
Operating Environment	0 to 30°C, 0 to 80% relative humidity non-condensing
Storage Temperature	-20 to 60°C

applications

- **Spinning-Disk Confocal Microscopy**
- **Dynamic Ratio Imaging (e.g., pH, Low-Concentration Flux)**
- **FRAP (Fluorescence Recovery After Photobleaching)**
- **Live-Cell Fluorescent Protein Imaging**
- **Astronomy**
- **Bose-Einstein Condensate**

spectral response