



Now Powered with LightField™


ProEM: 1024B

The ProEM: 1024B_eXcelon and the ProEM: 1024B EMCCD cameras from Princeton Instruments are the most advanced EMCCD cameras on the market, utilizing the latest low-noise readout electronics and a 1024 x 1024 EMCCD to deliver single photon sensitivity. These true 2-in-1 cameras feature a high speed EM mode to capture fast kinetics, a low speed normal CCD mode with very low read noise for precision photometry applications, and advanced features such as solid baseline stability and linear EM gain control. The ProEM: 1024B series of EMCCD cameras are cooled to below -75°C using either air or liquid, or a combination of both, while the all metal, hermetic vacuum seals are warranted for life – the only such guarantee in the industry. These cameras also feature, for the first time, the latest Gigabit Ethernet (GigE) interface to allow remote operation over a single cable without the need for custom framegrabbers. High QE and ultra low-noise electronics make the ProEM: 1024B series of EMCCD cameras ideal for demanding, low-light level applications such as astronomy and Bose-Einstein Condensate (BEC) imaging.

FEATURES	BENEFITS
eXcelon technology	Higher QE in the UV and near IR regions; extremely low etaloning
Electron multiplication (EM) gain	Low-noise, impact-ionization process for single-photon sensitivity
OptiCAL™	Linear, absolute EM gain calibration using built in precision light source; EM and Non-EM modes for the lowest noise and the best linearity.
BASE™	Baseline Active Stability Engine - stable reference for quantitative measurements
PINS™	Princeton Instruments Noise Suppression technology. Independently optimized EM and non-EM modes for the lowest noise and the best linearity.
Frame-transfer architecture	Allows 100% duty cycle imaging for tracking applications
Deep cooling	Thermoelectric cooling below -75°C minimizes dark current and allows long exposure times; Camera can be cooled with air or liquid, or a combination of both, and fan can be permanently turned off for vibration-sensitive environments
Single optical window	Vacuum window is the only optical surface between incident light and the CCD surface - No losses due to multiple optical surfaces
Built-in shutter	Conveniently capture dark reference frames and protect camera from dust when not in use
Dual amplifiers	Individually optimized signal chains for a true 2-in-1 camera configuration, for high speed (EM mode) or long integration (normal CCD mode) applications
16-bit digitization	Wide dynamic range to capture dim and bright signals in a single image
10 and 5 MHz readout	Video rates at full-frame resolution. Use ROI/binning for hundreds of frames per second
100 kHz readout	Noise performance of a slow scan camera for precise photometry applications
Kinetics readout mode	Powerful readout mode offers microsecond time resolution between sub-frames
Gigabit Ethernet (GigE)	Reliable data transmission over 50m for remote operation
Software interface	Universal interface for easy custom programming, real-time focus & image access via circular buffers
Available Mounts	C-mount (standard), Canon mount and adjustable C-to-Spectroscope mount - easily attaches to microscopes, standard lenses, telescopes or other optical instruments
LabView® Scientific Imaging Tool Kit (SITK™)	Predefined VIS for easy integration of camera controls into large experiment

Applications:

Single molecule detection, spectroscopy, chemiluminescence, astronomy, adaptive optics, hyperspectral imaging, phosphor imaging and tomography

	ProEM:1024B_eXcelon 	ProEM: 1024B
Features	Back-illuminated CCD. High sensitivity and extremely low etaloning, grade 1, AIMO	Back-illuminated CCD. High sensitivity in visible region
CCD sensor	Princeton Instruments proprietary CCD, grade 1, AIMO	e2v CCD 201, grade 1, AIMO
CCD format	1024 x 1024, 13 μm imaging pixels 13.3 x 13.3 mm imaging area (optically centered)	1024 x 1024, 13 μm imaging pixels 13.3 x 13.3 mm imaging area (optically centered)
Shutter	Electromechanical	Mechanical
	EM mode	Normal CCD mode
Read noise (typical)	20 e- rms @ 5 MHz 40 e- rms @ 10 MHz Read noise effectively reduced to <1 e- rms with on-chip multiplication gain enabled	2.5 - 3 e- rms @ 100 kHz 6 e- rms @ 1 MHz 10 e- rms @ 5 MHz
Full well (typical)	730 ke- (output node)	80 ke- (single pixel)
Non-Linearity	<2%	<1%
Analog gain (typical)	12, 6, 3 e-/ADU	3, 1.5, 0.8 e-/ADU
Deepest cooling temperature (@ +20°C ambient)	-55°C +/- 0.05°C (guaranteed) Maximum Cooling: -65°C (air), -70°C (+20°C liquid), -75°C (+10°C liquid)	
Dark current @ -55°C	0.002 e-/p/sec (typical) 0.04 e-/p/sec (maximum)	
Clock induced charge (CIC) (typical)	0.01 e-/pixel/frame measured at ~1000x multiplication gain	
Electron multiplication (EM) gain	1 to 1000x, controlled in linear, absolute steps	
Digitization	16 bits @ 10 MHz, 5 MHz, 1 MHz and 100kHz	
Vertical shift rate*	800 nsec/row - 5 μsec/row (variable)	
Binning	Flexible binning in vertical and 2x to 32x in horizontal	
Operating systems supported	Windows XP/Vista	
I/O signals	Exposure, Readout, Trigger In, Image Shift, Waiting for Trigger	
Operating environment	0 to 30°C ambient, 0 to 80% relative humidity, non-condensing	

NOTE: All specifications subject to change

FRAME RATE (fps)

ROI/Bin	1024 x 1024	512 x 512	256 x 256	128 x 128
1 x 1	8.9	17	33	62
2 x 2	17	33	62	108
4 x 4	33	61	106	168
8 x 8	61	104	162	225

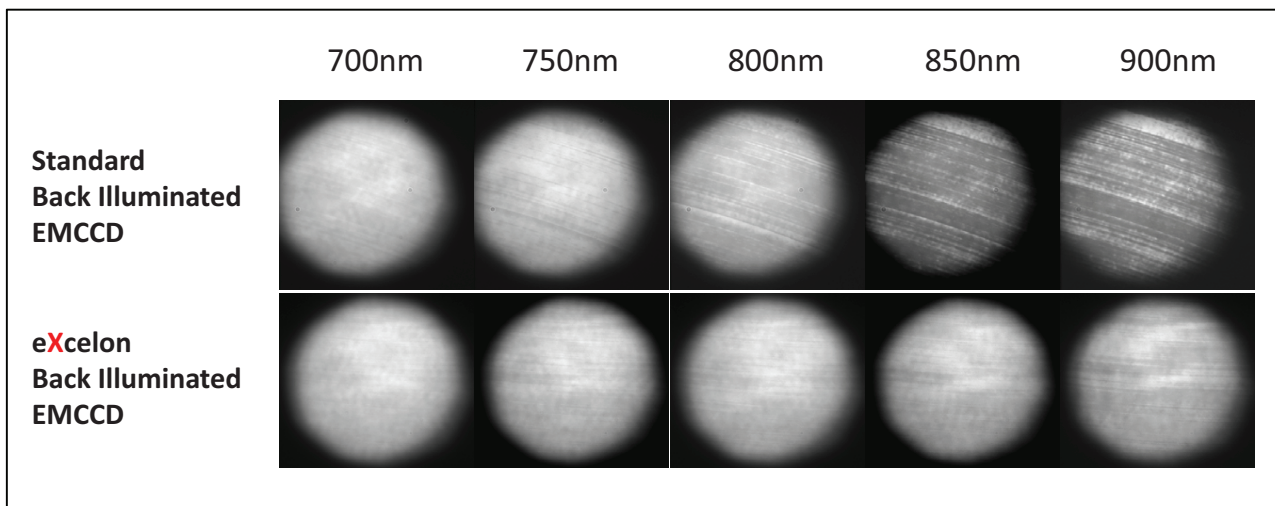
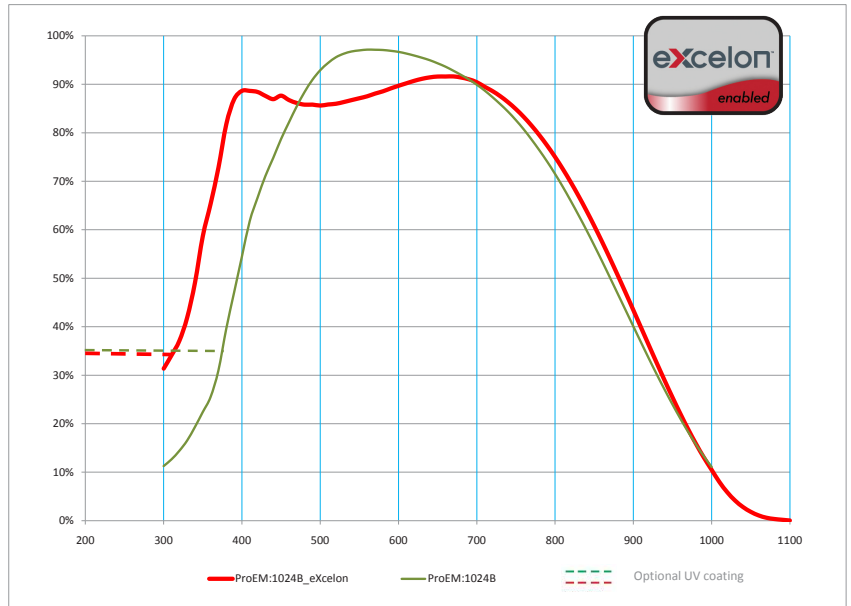
NOTE: Frame rate measured at 10 MHz digitization and 800 nsec/row vertical shift.
"Custom chip" mode increases frame rate at reduced ROI by 2x to 4x.

* CTE and image quality are optimized even at the fastest vertical shift rate.

Quantum Efficiency Curve

ProEM:1024B Ordering Information

Description	Part Number
ProEM:1024B	7561-0001
ProEM:1024B_eXcelon	7561-0002
Adjustable C-to-Spec mount adapter	7050-0104



Data taken with white light source through a monochromator comparing etaloning Performance of eXcelon vs back-illuminated EMCCDs

ProEM: 1024B OUTLINE DRAWING

