



The PI-MAX: 1K from Princeton Instruments is a high performance intensified camera system featuring a high resolution CCD fiberoptically coupled to a variety of Gen II, Gen III *filmless* and proprietary Unigen™ II intensifiers. The intensifiers offer the highest possible sensitivity from UV to NIR and offer resolution that is ideally matched to the CCD. Nanosecond gating capability and an integrated programmable timing generator (PTG) make these ICCD cameras ideal for time-resolved imaging and spectroscopy applications.

**Applications:** Fluorescence Lifetime Imaging Microscopy (FLIM), Time Resolved Imaging and Spectroscopy, Combustion, Planar Laser Induced Fluorescence (PLIF), Plasma Diagnostics.

Features	Benefits
<b>1024 x 1024 Imaging Array</b>	High resolution imaging and spectroscopy
<b>Dual speed, 16-bit digitization</b>	High speed provides rapid image acquisition for focusing; Low noise operation provides the best signal-to-noise ratio
<b>Thermoelectric Cooling</b>	Reduces dark current to negligible levels
<b>A wide selection of Intensifiers</b>	Best sensitivity and gate speed in the desired wavelength range.
<b>Gen II</b>	Best combination of UV-Blue sensitivity and fast gating (SB). RB provides wide spectral coverage.
<b>Gen III <i>filmless</i></b>	Offers highest sensitivity and fastest gate speed.
<b>Unigen™ II</b>	Proprietary Unigen™ II intensifier provides the best overall coverage from UV to NIR. Significant improvement over previous generation.
<b>Fiberoptic coupling</b>	Highest optical throughput possible; No vignetting
<b>Sub-nanosecond gating</b>	Temporal resolution for effective background discrimination, kinetics imaging and spectroscopy
<b>Built-in high voltage pulser</b>	Rugged, integrated design for minimal insertion delay
<b>Programmable Timing Generator™ (PTG)</b>	Built-in, fully software controlled gate timing; Controls gate widths and delays in linear, or exponential increments; Low insertion delay (25nsec)
<b>USB 2.0 Interface</b>	Seamless, plug-n-play connection to PC desktops and laptops
<b>PCI Interface</b>	Industry standard for fast data transfer over long distances
<b>WinSpec/WinView and PVCAM®</b>	Offers powerful, easy-to-use set of Windows GUI controls; Automatic data acquisition, analysis and display; PVCAM provides unified programming interface for custom programming
<b>LabVIEW™ Scientific Imaging Tool Kit (SITK™)</b>	Pre-defined LabView vis provide easy integration of the camera into complex experiment setup

## PI-MAX: 1K Specifications

### CCD

Image sensor	e2v CCD47-10 scientific grade, MPP front-illuminated CCD		
CCD format	1024 x 1024 imaging pixels 13 x 13- $\mu$ m pixels 13.3 x 13.3 (18.8 mm diagonal)		
	Minimum	Typical	Maximum
System read noise @ 100-kHz digitization @ 1-MHz digitization		6 e- rms 10 e- rms	8 e- rms 12 e- rms
Pixel Full Well	100 ke-	160 ke-	
Dark current (e-/p/sec) @ -20°C		0.75	1
Deepest cooling temperature	-20°C (air cooled); -35°C (with water circulation)		
Vertical Shift Rate	30 $\mu$ sec/row (variable via software)		
Spectral Rate	30 Hz, full vertical binning 280 Hz, 200 $\mu$ m tall spectrum		

### Intensifier

Intensifiers available	18mm - Gen II, Gen III <i>filmless</i> , Unigen™ II					
Method of coupling to the CCD	1:1 fiber optic					
Intensifier type	Gen II			Gen III <i>filmless</i>		Unigen™ II
	UV	SB	RB	HBf	HQf	Unigen™ II
Intensifier Input Window	MgF <sub>2</sub>	Quartz		Borosilicate Glass		Fiberoptic
Wavelength Range	See QE Curves					
Minimum Gate Speed (optical FWHM)	< 2nsec (500 ps*) < 50 nsec (< 9 nsec with MCP gating**)			<2 nsec -NA-		
Fast Gate						
Slow Gate						
Repetition Rate: sustained/burst (kHz)	50/500			50/500		
Resolution limit	54 to 64 lp/mm			57 to 64 lp/mm		64 lp/mm
EBI (Photo e-/pixel/sec)	0.05 - 0.2			0.02		
Phosphor	P43 (P46 optional)					

Notes: All specifications subject to change.

\* Enquire about the ultra-fast gating option for fast gate tubes

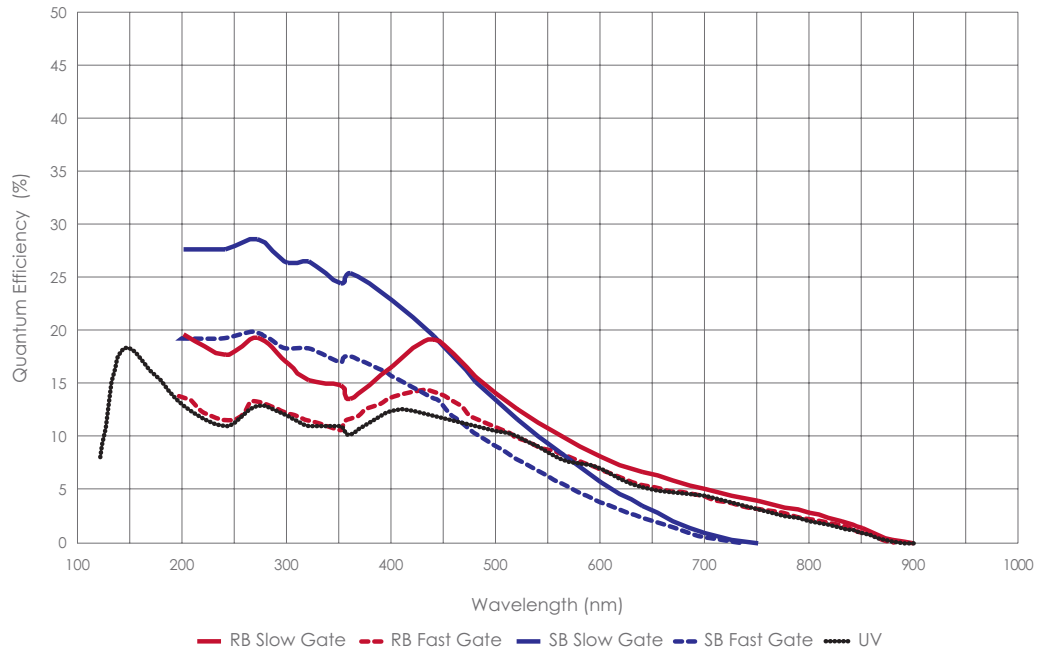
\*\* SB slow gate tubes are offered with special MCP Gating (MG) option to achieve < 9 nsec gating and at the same time offering >25% QE

## Frame Rates

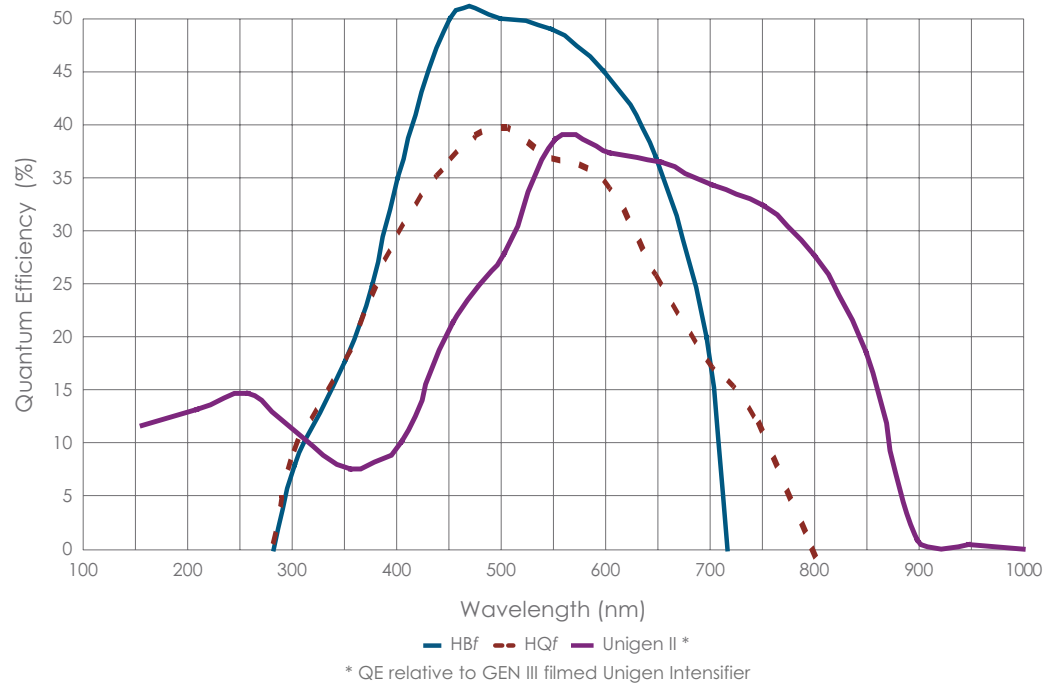
Binning	1024 x 1024	400 x 400	200 x 200
1 x 1	0.9	3.3	6.8
2 x 2	2.5	6.9	11.7
4 x 4	5.8	11.8	16.7

Notes: Frames per second at 1MHz digitization

Gen II Intensifiers

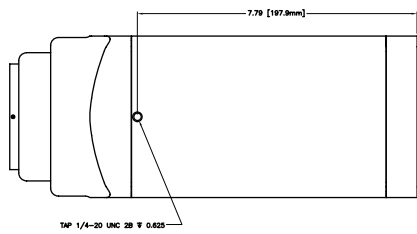
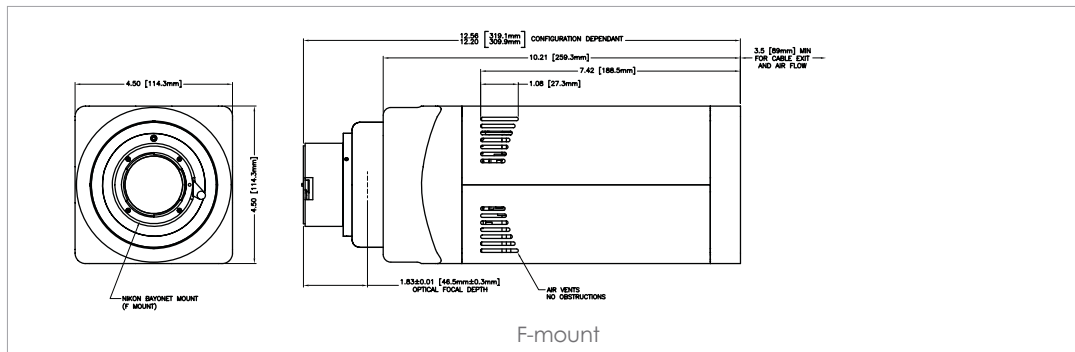
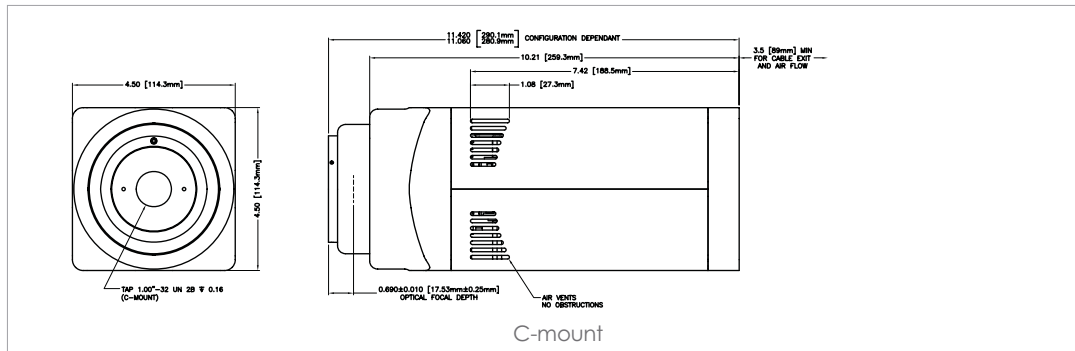
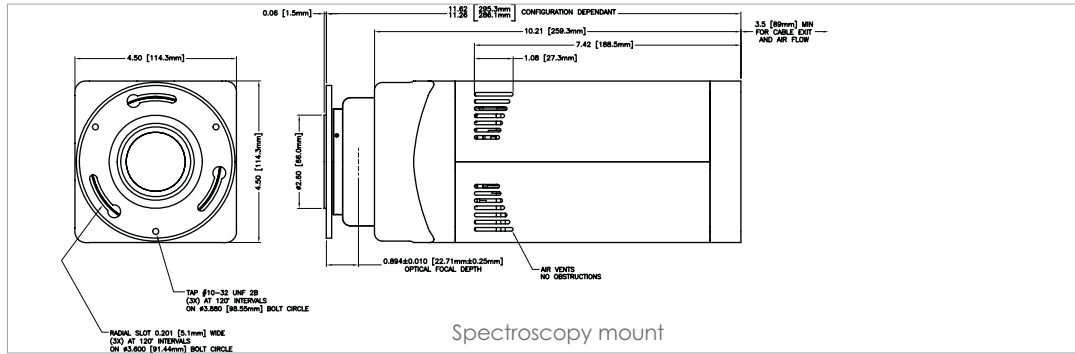


Gen III filmless Intensifiers



\* QE relative to GEN III filmed Unigen Intensifier

Notes: Specifications are subject to change.



Bottom View showing tapped hole for tripod mount



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