...SEE the Future

Princeton Instruments ACTON

PI-MAX2: 1003

The PI-MAX2: 1003 from Princeton Instruments/Acton is the next generation intensified camera system featuring a high resolution interline CCD fiberoptically coupled to a variety of a variety of Gen II, Gen III and Gen III *filmless* intensifiers. The intensifiers offer the highest possible sensitivity from UV to NIR and offer resolution that is ideally matched to the CCD. Nano-second gating capability and integrated programmable timing generator (PTG) make these ICCD cameras ideal for time-resolved imaging and spectroscopy applications. The special, Dual Image Feature (DIF) enables two images to be captured in rapid succession for applications such as particle imaging velocimetry (PIV).

PI-MAX2: 1003 is the only ICCD camera in the market today to offer both high frame rate at 5MHz/16-bit digitization and exceptional sensitivity.

Applications: Fluorescence Life time Imaging Microscopy (FLIM), Time Resolved Imaging and Spectroscopy, Combustion, Planar Laser Induced Fluorescence (PLIF), Particle Imaging Velocimetry (PIV).

Features	Benefits
1024 x 1024 Imaging Array	High resolution imaging and spectroscopy
Interline CCD architecture	Capture two images in rapid succession
5MHz / 16-bit digitization	High frame rate required to match the repetition rate of the excitation laser sources.
Thermo-electric Cooling	Reduces dark current to negligible levels
A wide selection of Intensifiers	Best sensitivity and gate speed in the desired wavelength range.
Gen II	Best combination of UV-Blue sensitivity and fast gating (SB). RB provides wide spectral coverage.
Gen III	Ideal for Blue (350nm)-NIR (900nm) range. Unigen™ intensifier provides the widest wavelength coverage from UV to NIR.
Gen III *filmless*	Offers highest sensitivity and fastest gate speed. Best choice for operation between 280nm and 780nm.
Fiberoptic coupling	Highest optical throughput; No vignetting
Sub-nano second gating	Temporal resolution for effective background discrimination, kinetics imaging and spectroscopy
Built-in high voltage pulser	Rugged, integrated design for minimal insertion delay
Programmable Timing Generator™ (PTG)	Built-in, fully software controlled gate timing; Controls gate widths and delays in linear, or exponential increments; Low insertion delay (25nsec)
PCI interface	Industry standard for fast data transfer over long distances
WinSpec/WinView and PVCAM®	Offers powerful, easy-to use set of Windows GUI controls; Automatic data acquisition, analysis and display; PVCAM provides unified programming interface for custom programming
LabVIEW™ Scientific Imaging Tool Kit (SITK™)	Pre-defined LabView vis provide easy integration of the camera into complex experiment setup

PI-MAX2: 1003 Specifications

CCD

Image sensor	Kodak KAI-1003; scientific grade; interline CCD		
CCD format	1024 x 1024 imaging pixels 12.8 x 12.8-µm pixels 13.1 x 13.1 (18.5 mm diagonal)		
	Minimum	Typical	Maximum
System read noise @ 1-MHz digitization @ 5-MHz digitization		12e- rms 25 e- rms	15 e- rms 30 e- rms
Pixel Full Well	130 ke-	150 ke-	
Dark current (e-/p/sec) @ -20°C		0.5	1
Deepest cooling temperature	-20°C (air cooled)		
Vertical Shift Rate	4 µsec/row (variable via software)		

Intensifier

Intensifiers available	18mm - Gen II, Gen III , Gen III *filmless*							
Method of coupling to the CCD	1:1 fiber optic							
Intensifier type	Gen II			Gen III			Gen III *filmless*	
	UV	SB	RB	Unigen	HB	HQ	HB*f*	HQ*f*
Input Window	$MgFl_2$	BK7 glass		Fiber	BK7 Glass		BK7 Glass	
Wavelength Range	See QE Curves							
Minimum Gate Speed (optical FWHM) Fast Gate Slow Gate	< 2nsec(500 ps*) < 50 nsec (< 9 nsec with MCP gating**)			< 5nsec -NA-			<2 nsec (500ps*) -NA-	
Repetition Rate: sustained/burst (kHz)	50/500			5/50			50/500	
Resolution limit	54 to 64 lp/mm			64 to 72 lp/mm			57 to 64 lp/mm	
EBI (Photo e-/pixel/sec)	0.05 - 0.2			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

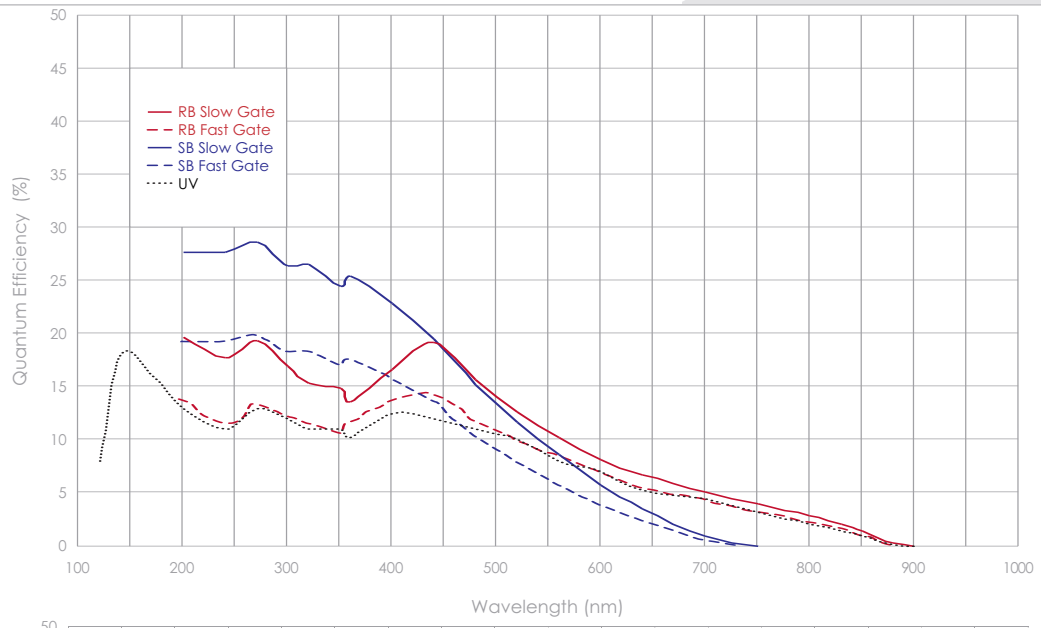
Frame Rates

Binning	1024 x 1024	400 x 400	200 x 200
1 x 1	4	10	17
2 x 2	8	17	27
4 x 4	15	27	37

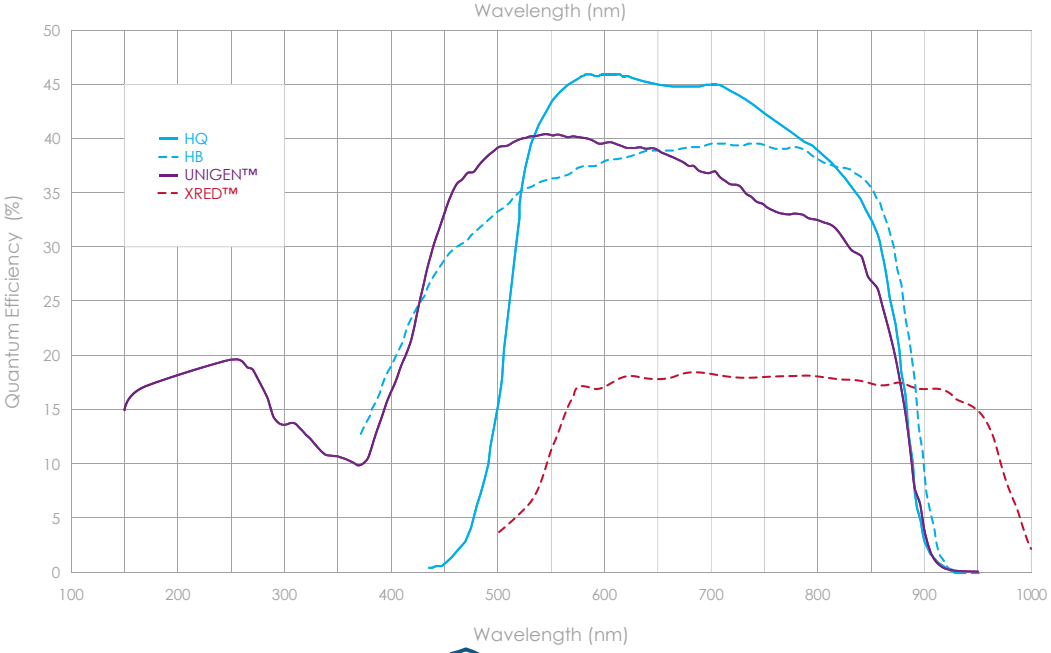
Notes: Frames per second at 5MHz digitization

Quantum Efficiency Curve

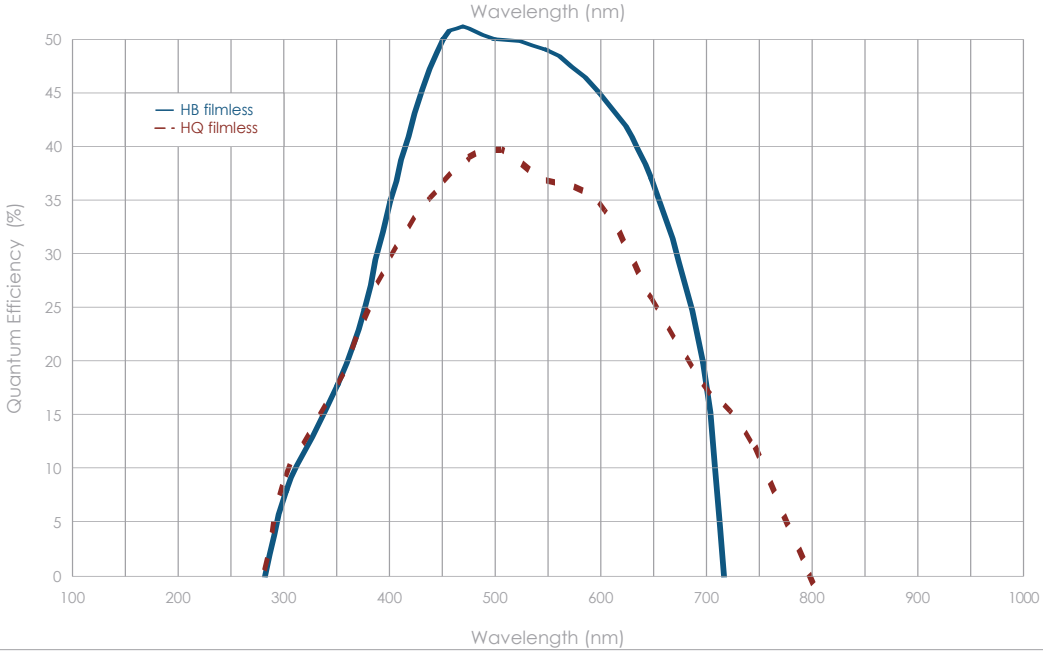
Gen II Intensifiers

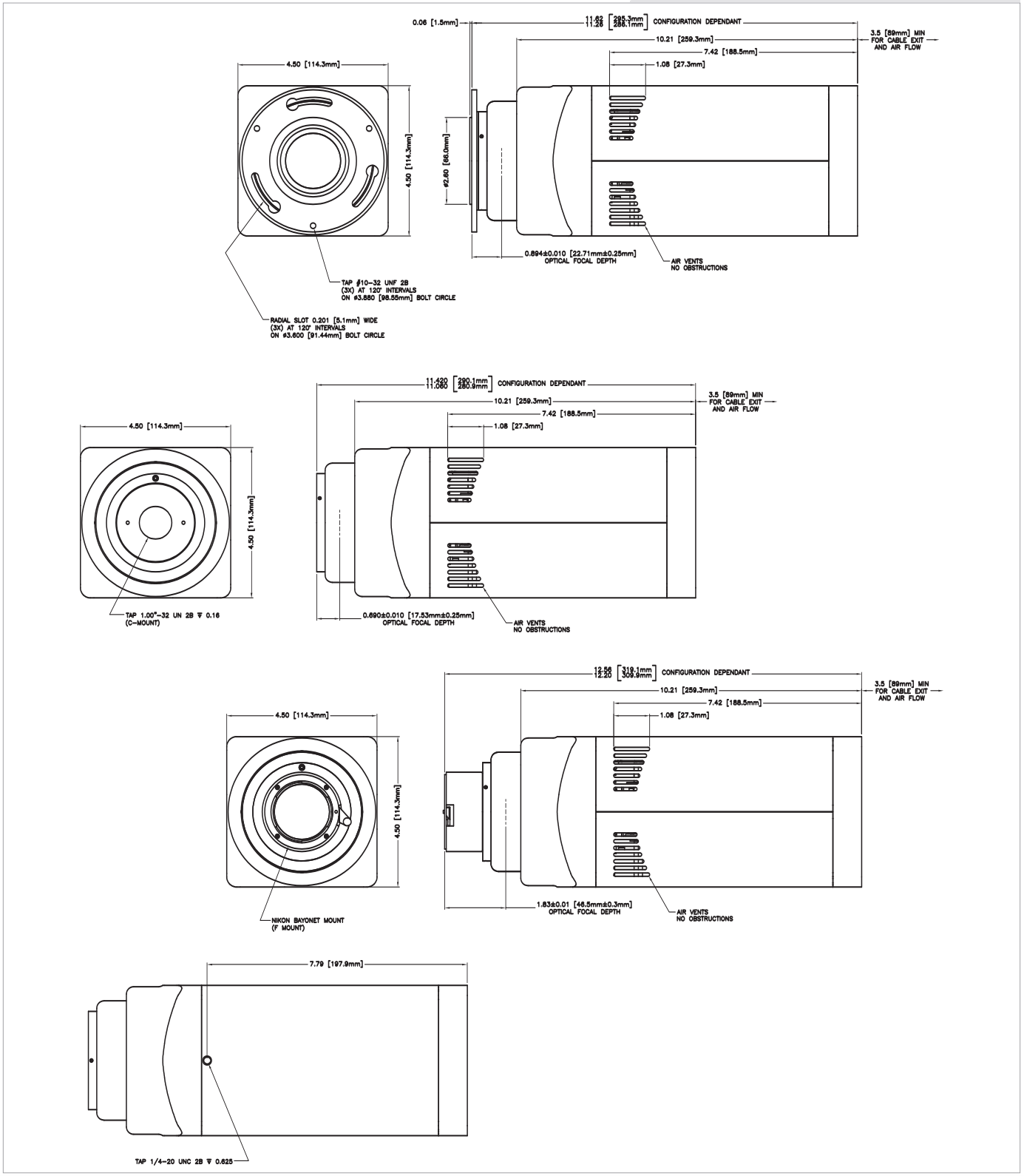


Gen III Intensifiers



Gen III *filmless* Intensifiers





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