



## PIXIS-XF: 2048F

2048 x 2048 imaging array | 13.5 x 13.5  $\mu\text{m}$  pixels

The Princeton Instruments PIXIS-XF: 2048F is a fully integrated, low noise camera designed for lensless, direct imaging of phosphor screens and other lambertian sources. The unique camera design with a fiber optic faceplate extended outside the vacuum offers outstanding flexibility to optimize system performance at any X-ray energy. The ultra low-noise electronics and compact design makes this camera perfect for OEM applications. The dual speed operation at 100 kHz or 2 MHz means that the camera can be used for steady state as well as high speed applications. The 1:1 fiber optic ratio offers resolution of 38 lp/mm.

FEATURES	BENEFITS
1:1 fiber optic ratio *	Distortion and vignetting-free optical coupling
Deep cooling	Low dark noise allows detection of faint signals
Custom phosphors *	Gd <sub>2</sub> O <sub>2</sub> S:Tb Resolution of 60 to 80 $\mu\text{m}$ Available for 8 keV and 17 keV Emission wavelength $\sim$ 550 nm
2048 x 2048 imaging array 13.5 $\mu\text{m}$ x 13.5 $\mu\text{m}$ pixels	High spatial resolution
Scientific grade CCD	Low noise, few defects, linear response
Front illuminated CCD (2048F)	Affordable technology for moderate light level applications
Low noise electronics	Best performance for low light level applications
Dual digitizers	Dual-speed digitization allows complete freedom to select between "slow operation" for low noise and highest SNR or "fast operation" for rapid image acquisition
Software selectable system gains	Flexibility to optimize signal-to-noise ratio and dynamic range
Thermoelectric cooling	Worry-free operation
Flexible ROI/binning	Allows faster frame rate and/or sensitivity
USB 2.0 data interface	Plug-n-play operation. Use it with laptop. Easy OEM integration.
Optional fiber optic interface	Ideal for remote operation
Renowned WinView software	Powerful, yet easy to use software packages for acquisition, display and analysis
Linux driver and PVCAM interface	Universal programming interface for easy custom programming. Compatible with Windows 2000/XP and Linux
LabView® Scientific Imaging Toolkit (SITK™)	Predefined VIS for easy integration of camera controls into large experiment

\* Contact factory for information on custom fiber optics, fiber ratios and phosphors

### Applications:

X-ray Micro Computer Tomography ( $\mu\text{CT}$ ),  
Streak Tube and CRT readout, Industrial and  
Medical Imaging

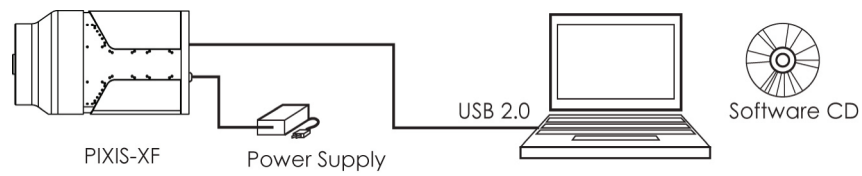
SPECIFICATIONS	
CCD image sensor	e2v CCD42-40; front-illuminated, grade 1, AIMO
CCD format	2048 x 2048 imaging pixels 13.5 x 13.5 $\mu\text{m}$ pixels 100% fill factor 27.6 x 27.6 mm imaging area (optically centered)
Deepest cooling temperature *	-35 °C guaranteed with room temperature water, -40 °C with +10 °C water
Thermostating precision	$\pm 0.05$ °C
Cooling method	Thermoelectric; Water cooling standard
Dark Current @ -35 °C	0.05 e-/p/sec (typical), 0.15 e-/p/sec (max)
Full well	
Single pixel	100 ke- (typical), 60 ke- (min)
Output mode	250 ke- (typical), 220 ke- (min) (Low Noise Amp.)      900ke- (typical) (High Capacity Amp.)
ADC speed/bits	100 kHz/16-bit and 2 MHz/16-bit
System read noise	
@100 kHz	Low Noise Amplifier      High Capacity Amplifier 4.0 e- rms (typical); 6.0 e- rms (max)      7.0 e- rms (typical); 9.0 e- rms (max)
@2 MHz	10.0 e- rms (typical); 16.0 e- rms (max)      33.0 e- rms (typical); 36.0 e- rms (max)
Vertical shift speed	32.2 $\mu\text{sec}/\text{row}$ ; variable via software
Non-linearity	< 2% @100 kHz
Software selectable gains	1, 2, 4 e-/ADU (Low Noise); 4, 8, 16 e-/ADU (High Cap); available at both speeds
Operating systems supported	Windows 2000/XP; Linux
Data interface	USB 2.0 (5m interface cable provided) Optional Fiberoptic interface is available for remote operation
I/O signals	Two MCX connectors for programmable frame readout, shutter trigger in
Operating environment	+5 to +30 °C non-condensing
Certification	CE
Dimensions	20.45 cm (8.05") x 11.81 cm (4.65") x 11.38 cm (4.48") (L x W x H)
Weight	2.75 kg (6 lbs)

**NOTE:** All specifications subject to change

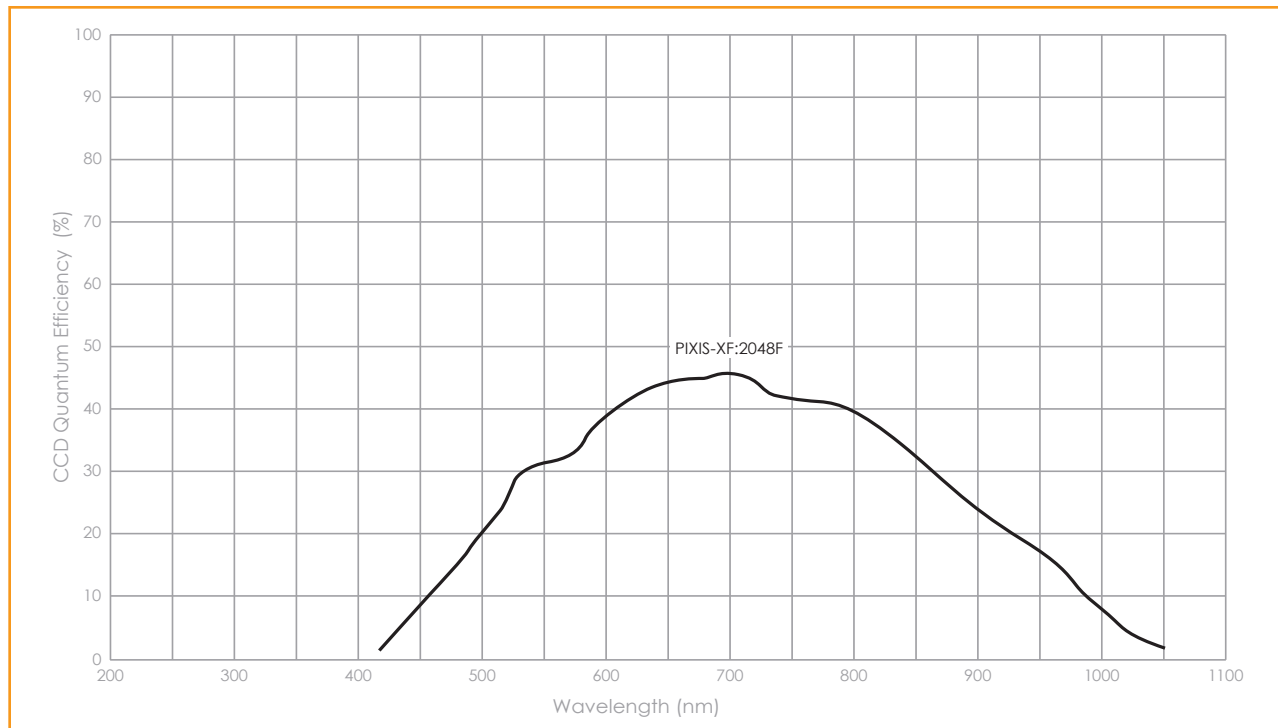
\* at +20 °C ambient temperature

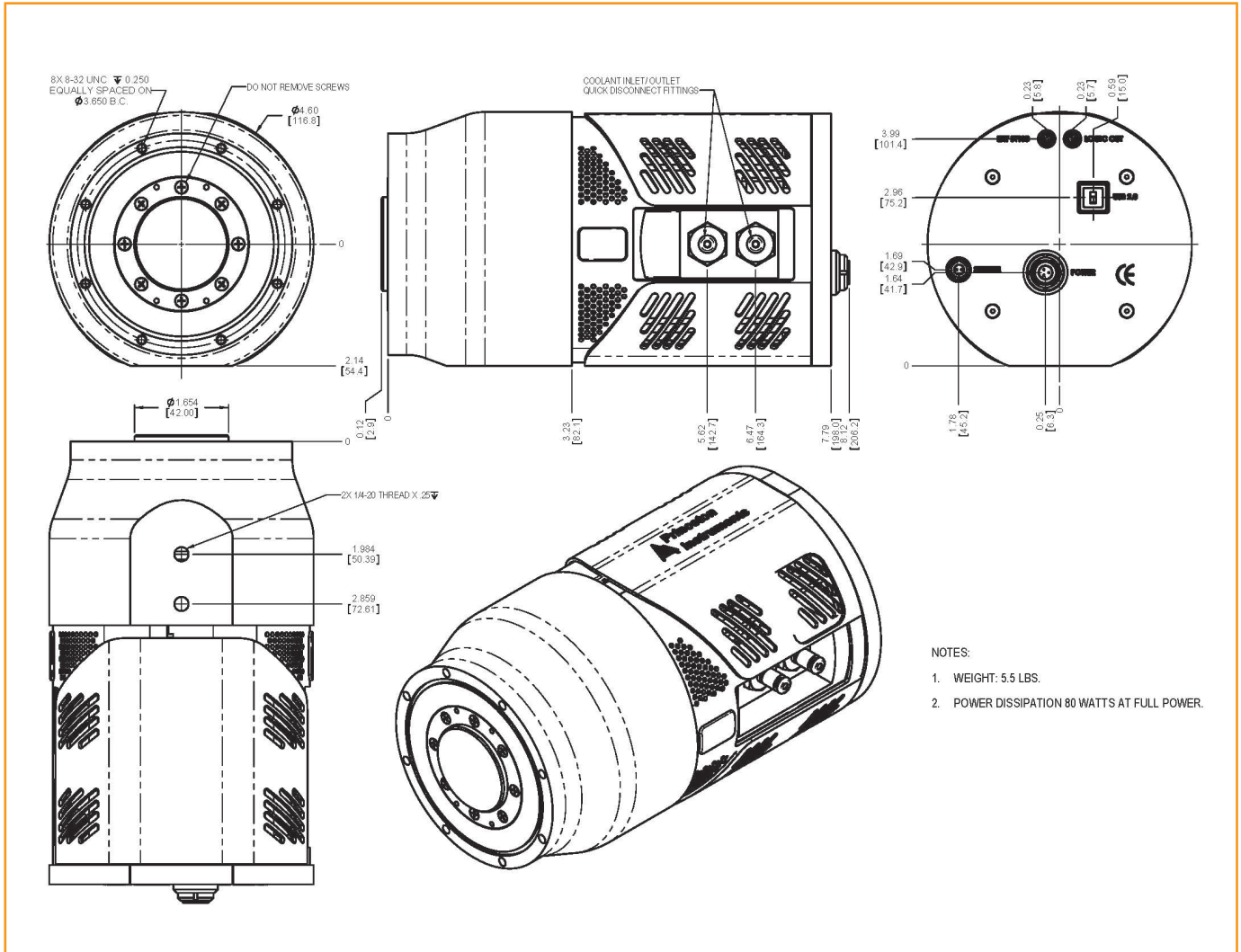
## Readout Rates

Binning	@ 2MHz	@ 100MHz
1 x 1	2.265 sec	36.45 sec
2 x 2	0.956 sec	9.521 sec
4 x 4	0.458 sec	2.595 sec

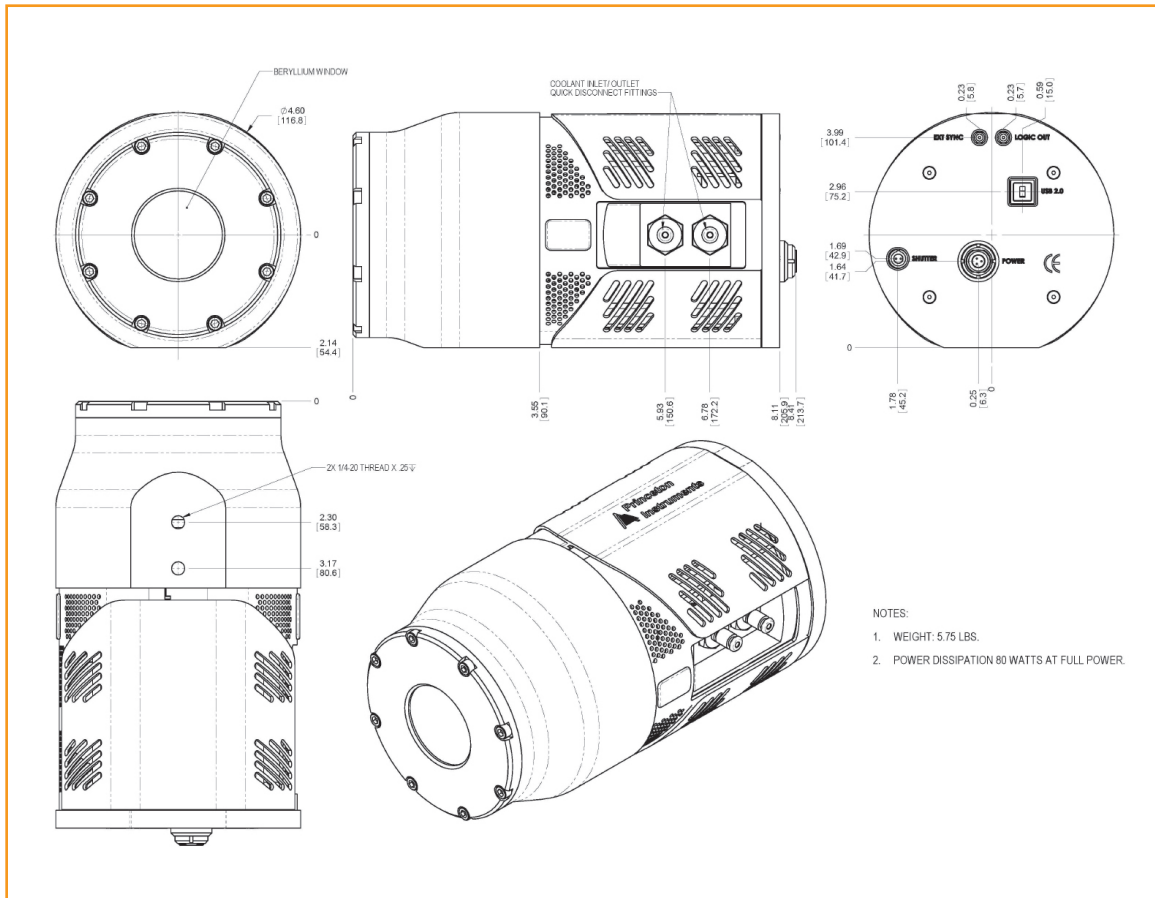


## Quantum Efficiency Curve





Water cooled without phosphor



Water cooled with phosphor