Princeton Instruments

PIXIS-XO:2048B

2048 x 2048 imaging array | 13.5x 13.5 µm pixels | Soft X-ray detection

The PIXIS-XO series of fully integrated imaging cameras utilizes back-illuminated (BI) CCDs without AR coating, for direct detection of the widest range of X-rays between ~ 10 eV and 30 keV (AR coated devices are not useful for X-ray energies < 500eV). With a 2048 x 2048 imaging array, 13.5 µm pixels, 100% fill factor, low noise electronics and -50° C to -70° C thermoelectric cooling with either air or water, this system is ideal for worry-free operation in research and OEM environments. The rotatable conflat flange with high-vacuum-seal design, software selectable gains and readout speeds make these cameras well suited for ultra-high vacuum applications.

FEATURES	BENEFITS
Back-illuminated CCD, with no AR coating	Provides very low X-ray flux imaging, high sensitivity and high spatial resolution
2 Mhz / 16-bit readout 100 kHz / 16-bit readout	High speed readout for rapid image acquisition; Slow speed readout for high sensitivity with wide dynamic range, high signal-to-noise ratio (SNR) and excellent energy resolution
Software selectable gains for each digitization speed	Allows optimization of system performance for lowest noise to highest SNR
2048 x 2048 image area, 13.5 x 13.5 µm pixels	Wide field of view, highest resolution with 13.5 µm pixel
Ultra low noise electronics	Best possible system performance
Flexible user-selectable binning & readout	Total flexibility to optimize experiments and SNR
Kinetics	Custom readout mode offers microsecond resolution
Deep thermoelectric air cooling	Maintenance-free operation - No need for a liquid circulator or additional power supply
Deep thermoelectric water cooling	Vibration-free operation
Conflat vacuum interface	Industry-standard, high-vacuum compatibility
TTL input and output	External Trigger input with programmable polarity; TTL output with exposure or readout monitor
USB 2.0 interface	Seamless, plug-and-play connection to PC notebooks & desktops; Easy OEM integration
Optional: LightField® (for Windows 10/8/7, 64-bit) **Or WinView/Spec** (for Windows 8/7/XP, 32-bit)	Flexible software packages for data acquisition, display and analysis with built in math engine; LightField offers intuitive, cutting edge user interface and more.
PICAM (64-bit) / PVCAM (32-bit) software development kits (SDKs)	Compatible with Windows 10/8/7 (64-bit), and Linux (contact factory for an update) Universal programming interfaces for easy custom programming.
LabView® Scientific Imaging ToolKit (SITK™)	Predefined VIs for easy integration of camera controls into large experiment

Applications:

X-ray Imaging, X-ray Microscopy, EUV Lithography and X-ray Plasma Diagnostics

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	PIXIS-XO: 2048B	PIXIS-XO: 2048BUV/BR*
CCD Image Sensor	e2v CCD42-40; scientific grade 1; MPP; BI-basic process (B); no AR coating; for sensitivity between ~10 eV to 30 keV	e2v CCD42-40; scientific grade 1; NIMO; BI-enhanced process (BUV), BI-deep depletion (BR); no AR coating; for sensitivity between ~10 eV to 30 keV
Dark current @ -60° C (with ambient air @ +20° C)	0.002 e-/p/sec (typical) 0.006 e-/p/sec (max)	0.2 e-/p/sec (typical) 2 e-/p/sec (max)
CCD format	2048 x 2048 imaging pixels; 13.5 x 13.5 μm pixels; 100% fill factor; 27.6 x 27.6 mm (optically centered)	
Deepest cooling temperature, TE air cooling** (with ambient air @ +20° C)	-70° C (typical); -60° C (guaranteed) with CoolCUBE II liquid circulator -60° C (typical); -50° C (guaranteed) with air	
Thermostating precision	±0.05° C	
Cooling method	Thermoelectric air or liquid cooling (CoolCUBE II required)	
Full well	Single pixel: 100 ke- (typical), 80 ke- (minimum) High Sensitivity node: 250 ke- (typical), 220 ke- (minimum) High Capacity node: 1000 ke- (typical), 800 ke- (minimum)	
ADC speed/bits	100 kHz/16-bit and 2 MHz/16-bit	
System read noise @100 kHz @2 MHz	3.5 e- rms (typical), 5 e- rms (max) 12 e- rms (typical), 16 e- rms (max)	
Vertical shift speed	32.2 μsec/row (programmable)	
Non-linearity	<2% @ 100 kHz	
Software selectable gains	1, 2, 4 e-/ADU (low noise input); 3.5, 7, 14 e-/ADU (high capacity output)	
Operating systems supported	Windows XP/Vista/7; Linux	
Data interface	USB2.0 (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° C to +30° C non-condensing	
Bakeout temperature	70° C (maximum)	
Vacuum Compatibility	10^{-8} Torr	
Certification	CE	
Dimensions / Weight	15.1 cm (5.95“) x 15.24 cm (6.00“) x 15.24 cm (6.00“) (L x W x H) / 3.86 kg (8.5 lbs)†	

NOTES: All specifications subject to change

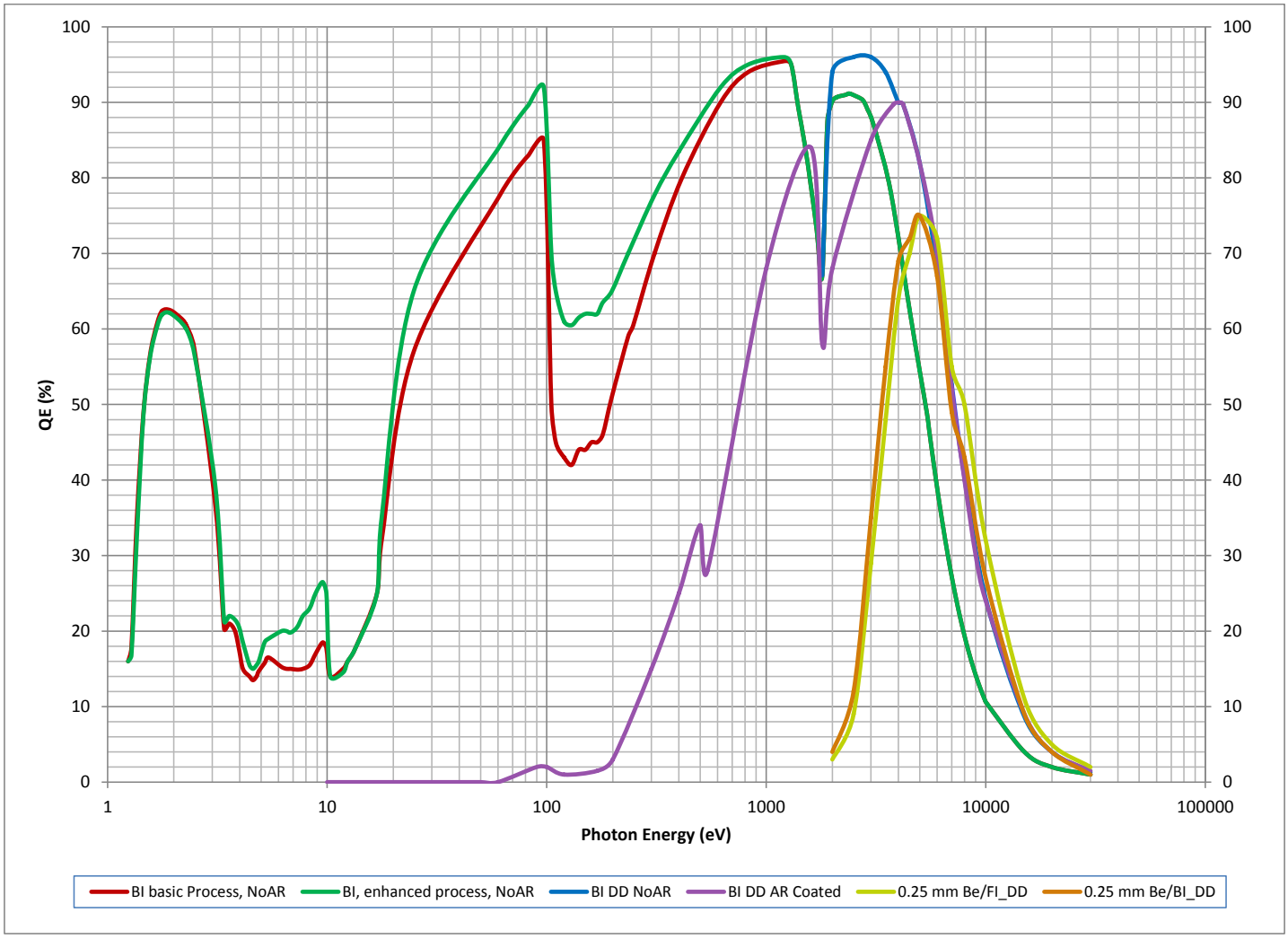
* Contact your local sales representative for information on the availability of the BUV / BR model.

** The minimum temperature attainable is dependent on the vacuum condition - temperature can be lowered w/lower vacuum.

† The weight of the camera is with 6.00“ Conflat flange and air cooling.

Readout Rates

Binning	@ 2 MHz	@100 kHz
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
8 x 8	0.249 sec	0.738 sec
16 x 16	0.154 sec	0.288 sec



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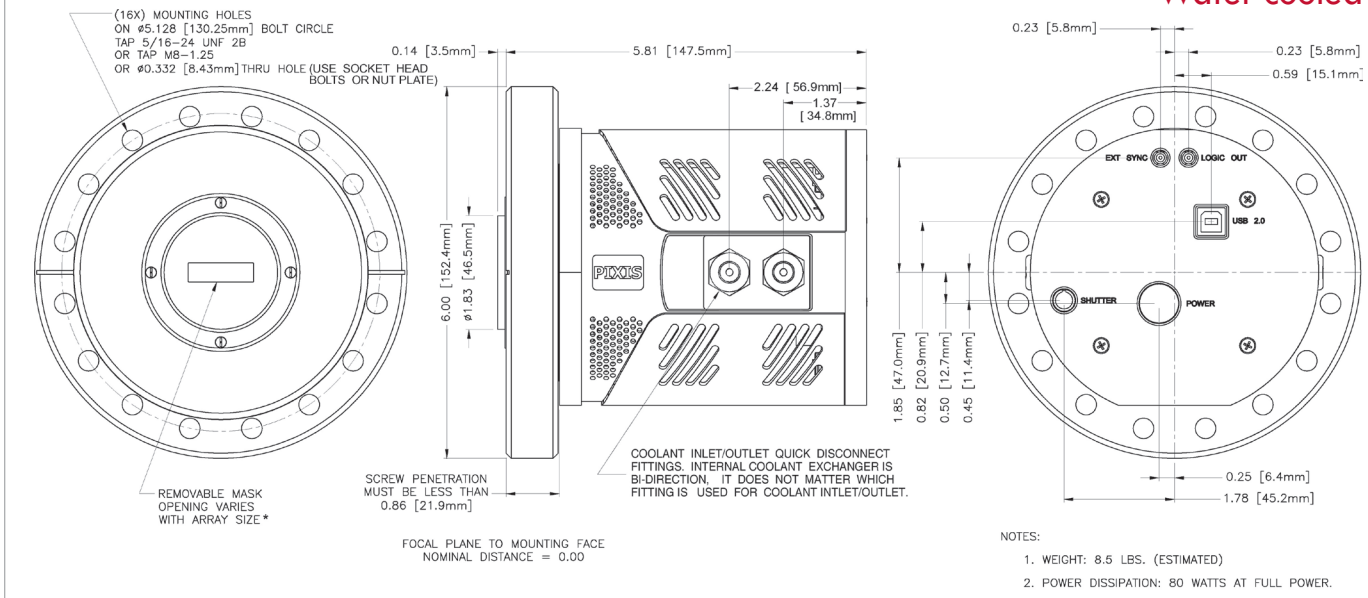
6" Conflat

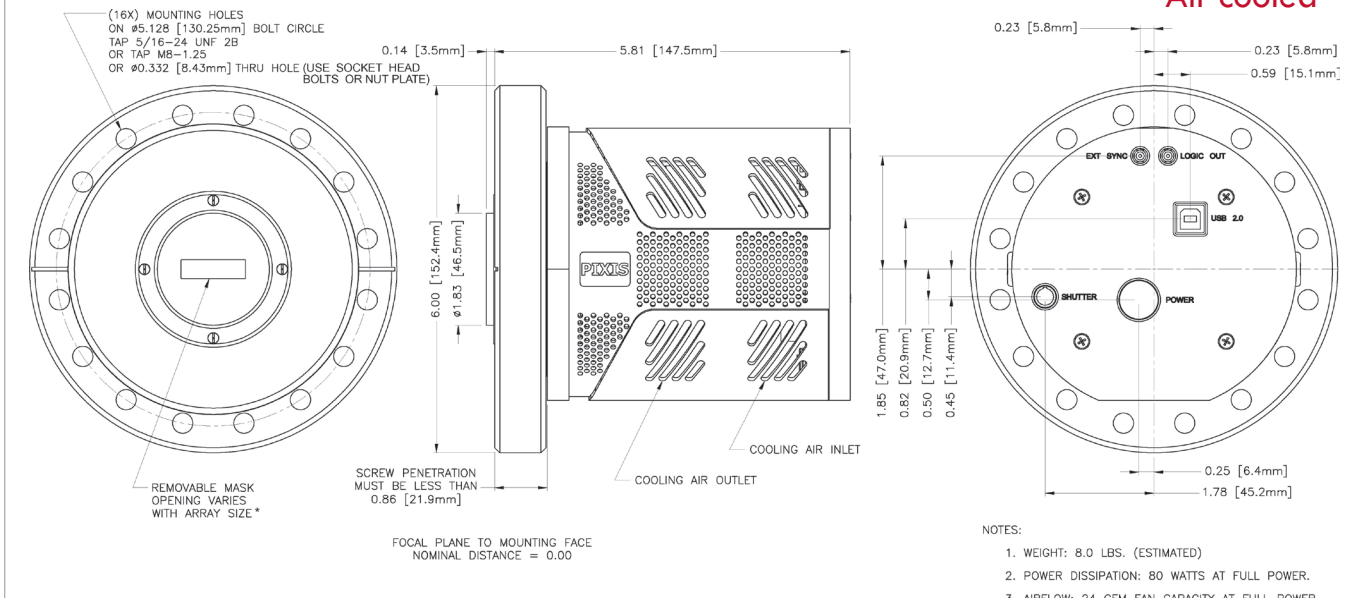
Water cooled



NOTES:

1. WEIGHT: 8.5 LBS. (ESTIMATED)
2. POWER DISSIPATION: 80 WATTS AT FULL POWER.

Air cooled



NOTES:

1. WEIGHT: 8.0 LBS. (ESTIMATED)
2. POWER DISSIPATION: 80 WATTS AT FULL POWER.
3. AIRFLOW: 24 CFM FAN CAPACITY AT FULL POWER.

CCD Array	CCD Image Area inches (mm)	Mask Opening ± .001 inches (± .0254 mm)
2048 x 2048	1.087 x 1.087 (27.6 x 27.6)	1.083 x 1.083 (27.508 x 27.508)