

PI-MAX2: 512



The PI-MAX2: 512 from Princeton Instruments/Acton is the next generation intensified camera system featuring a wide dynamic range CCD fiberoptically coupled to 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 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.

PI-MAX2: 512 is the only high performance ICCD camera that can provide high frame rate, sensitivity and large dynamic range.

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

| Features | Benefits |
|--|---|
| 512 x 512 Imaging Array | High resolution imaging and spectroscopy |
| 5MHz / 16-bit digitization | High frame rate (>15 fps) 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: 512 Specifications

CCD

| | | | |
|---|--|-----------------------|------------------------|
| Image sensor | Thomson 7895 scientific grade, MPP front-illuminated CCD | | |
| CCD format | 512 x 512 imaging pixels 19 x 19- μ m pixels (effective size 24 x 24- μ m pixels) 12.4 x 12.4 (17.5 mm diagonal) | | |
| | Minimum | Typical | Maximum |
| System read noise @ 1-MHz digitization @ 5-MHz digitization | | 35e- rms 50 e- rms | 50 e- rms 65 e- rms |
| Pixel Full Well | 400 ke- | 450 ke- | |
| Dark current (e-/p/sec) @ -20°C | | 5 | 11 |
| Deepest cooling temperature | -20°C (air cooled); -35°C (with water circulation) | | |
| Vertical Shift Rate | 1.6 μ sec/row (variable via software) | | |
| Spectral Rate | 1350 Hz, full vertical binning | | |

Intensifier

| | | | | | | | | |
|---|--|--------|----|----------------|-----------|----|-------------------------|-----|
| Intensifiers available | 18mm - Gen II, Gen III , Gen III <i>filmless</i> | | | | | | | |
| Method of coupling to the CCD | 1:1.27 fiber optic reducer | | | | | | | |
| Intensifier type | Gen II | | | Gen III | | | Gen III <i>filmless</i> | |
| | UV | SB | RB | Unigen | HB | HQ | HBf | HQf |
| Intensifier Input Window | MgFl ₂ | Quartz | | Fiber | BK7 Glass | | Borosilicate Glass | |
| Wavelength Range | See QE Curves | | | | | | | |
| Minimum Gate Speed (optical FWHM) | | | | | | | | |
| Fast Gate | < 2nsec(500 ps*) | | | < 5nsec | | | <2 nsec (500ps*) | |
| Slow Gate | < 50 nsec (< 9 nsec with MCP gating**) | | | -NA- | | | -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

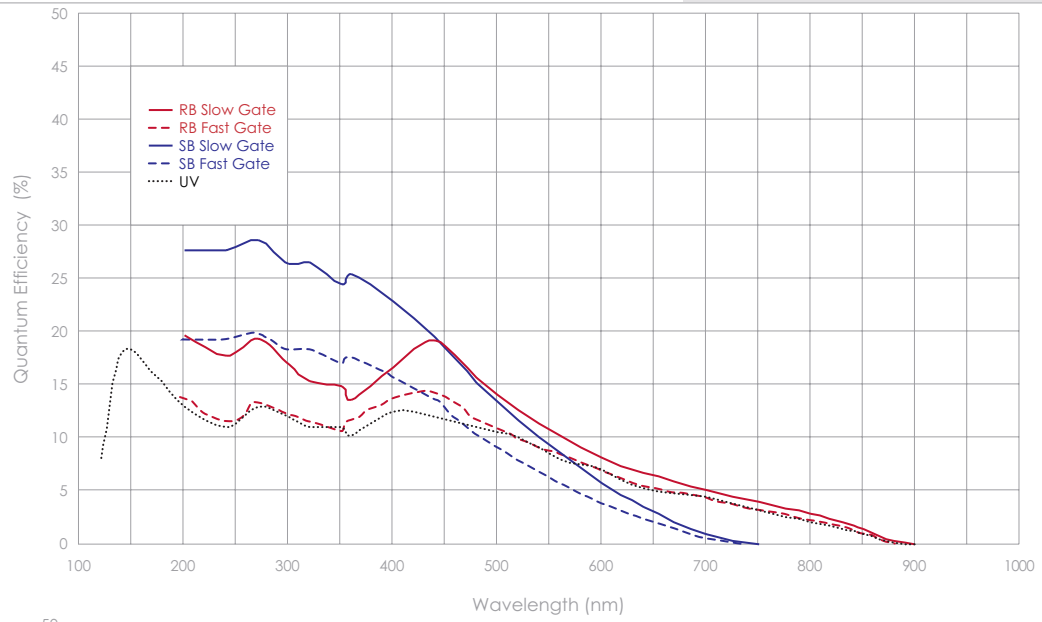
** SB slow gate tubes are offered with special MCP Gating (MG) option to achieve < 9 nsec gating and at the same time offering >25% QE

Frame Rates

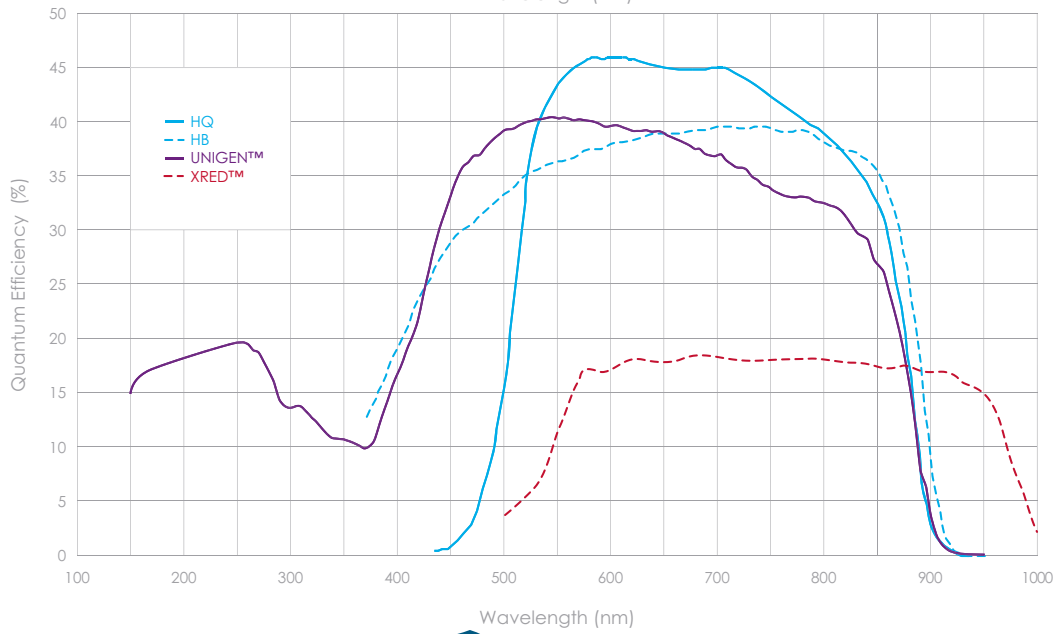
| Binning | 512 x 512 | 200 x 200 | 100 x 100 |
|---------|-----------|-----------|-----------|
| 1 x 1 | 17 | 42 | 77 |
| 2 x 2 | 35 | 77 | 143 |
| 4 x 4 | 65 | 143 | 200 |

Notes: Frames per second at 5MHz digitization

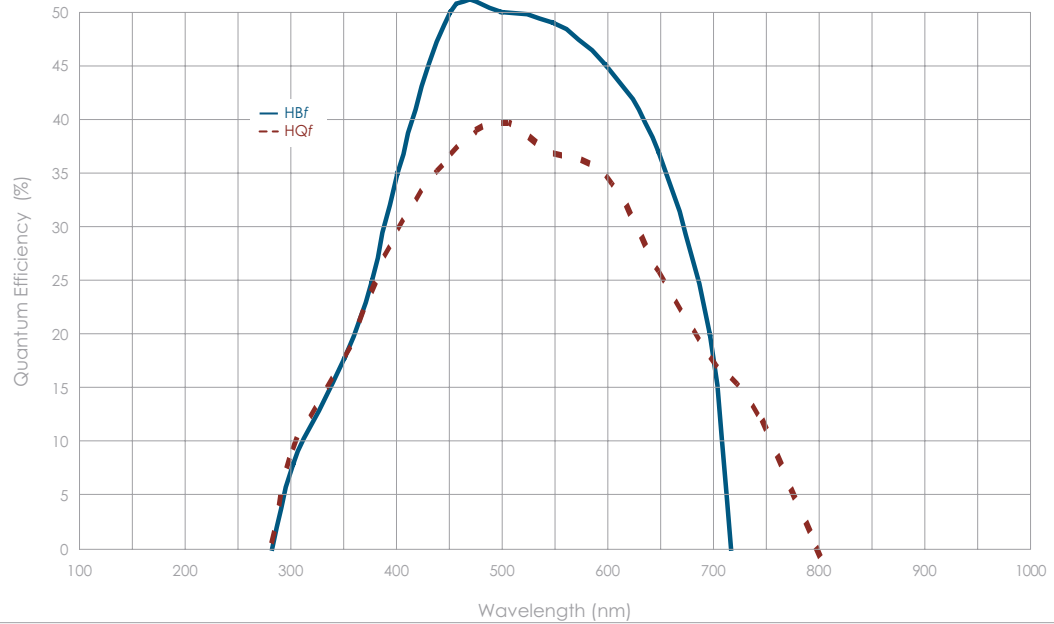
Gen II Intensifiers

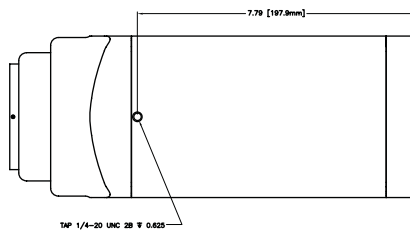
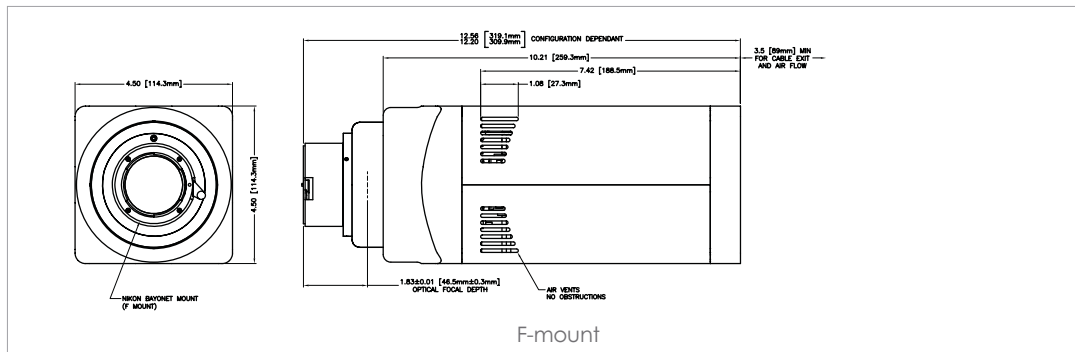
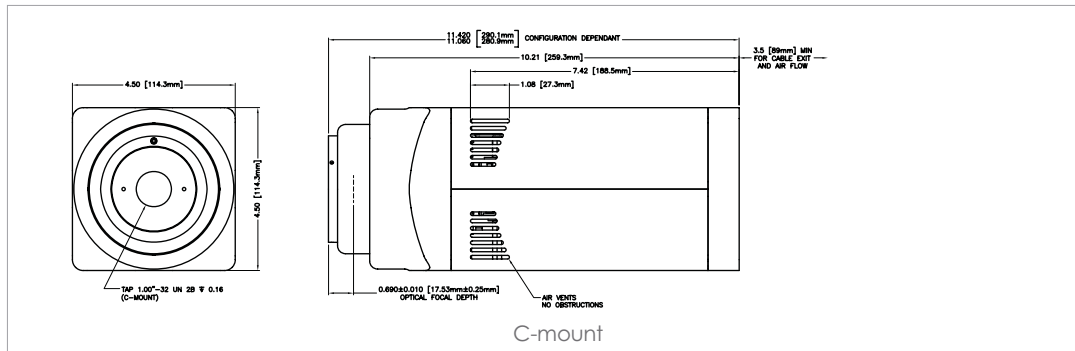
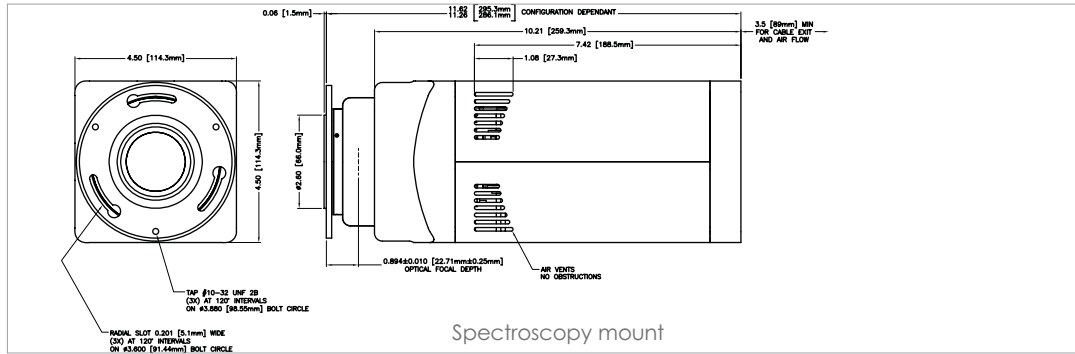


Gen III Intensifiers



Gen III filmless Intensifiers





Bottom View showing tapped hole for tripod mount

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