



Princeton Instruments

## Spec-10:400B

XTE Cooling Platform  
1340 x 400 imaging array  
20 x 20- $\mu$ m pixels

The Princeton Instruments Spec-10:400B with “XTE” cooling utilizes a high-performance, back-illuminated, spectroscopic-format CCD designed exclusively for Roper Scientific®. These special devices are the only spectroscopy CCDs that can be TE/air-cooled down to -95°C in order to provide the lowest dark charge available. The 1340 x 400 imaging array with an 8-mm chip height is ideal for single- and multistripe spectroscopy applications. This detector delivers much higher resolution and sensitivity than industry-standard “1024 pixel” sensors. Another exclusive feature is the integration of software-selectable amplifiers that offer an easy choice of high sensitivity or high signal-to-noise ratio (SNR).

Features	Benefits
XTE cooling platform	Extended cooling down to -95°C provides the lowest dark noise for any thermoelectrically cooled system 100% electrical cooling eliminates the need for chilled water or liquid nitrogen
Back-illuminated CCD	High quantum efficiency
1340 x 400 imaging array	Exclusive feature that provides superior resolution over industry-standard “1024 pixel” format
Exclusive CCD architecture	Provides industry’s lowest-noise CCD system
20 x 20- $\mu$ m pixels	Optimum pixel size for full well and high resolution
8-mm chip height	Ideal for rapid, multistripe spectroscopy
Software-selectable amplifiers	Exclusive feature provides choice of superior sensitivity or superior SNR
Standard spectrometer interface	Will interface with most spectrometers
Optional dual digitizers	High speed provides fast data acquisition and easy focusing Slow scan provides lowest noise
“USB 2.0 interface” configuration	Seamless, plug-and-play connection to PC notebooks and desktops Easy OEM integration
“PCI interface” configuration	Industry standard for fast data transfer over long distances
WinSpec and PVCAM®	Offers easy-yet-sophisticated Windows® GUI controls Automates data acquisition, analysis, and display
Linux® drivers and SITK™ plug-in for National Instruments’ LabVIEW™	Extends system utility

<b>Specifications</b>					
CCD image sensor	Princeton Instruments exclusive; scientific grade 1; MPP; back illumination				
CCD format	1340 x 400 imaging pixels; 20 x 20- $\mu$ m pixels; 100% fill factor; 26.8 x 8.0-mm imaging area				
	Minimum		Typical		Maximum
System read noise @ 50-kHz digitization @ 100-kHz digitization @ 1-MHz digitization			2.5 e- rms 3.5 e- rms 8 e- rms		3 e- rms 5 e- rms 10 e- rms
Spectrometric well capacity	high sensitivity	high capacity	high sensitivity	high capacity	
	230 ke-	800 ke-	260 ke-	1 Me-	
Deepest cooling temperature	-90°C		-95°C		
Dark current @ -95°C operation			0.0008 e-/p/s		0.0033 e-/p/s
Software-selectable gains	1 e-/ct, 2 e-/ct, 4 e-/ct (high-sensitivity mode) 4 e-/ct, 8 e-/ct, 16 e-/ct (high-capacity mode)				
Dynamic range	16 bits				
Nonlinearity	<2%				
Scan rates	"100 kHz / 1 MHz" or "50 kHz / 1 MHz"				
Vertical shift time	30 $\mu$ s				
Spectral rates* @ 100-kHz digitization @ 1-MHz digitization	60 Hz 230 Hz				
Operating temperature	+20 to -95°C				
Thermostating precision	$\pm$ 0.05°C across entire temperature range				

**SPEC-10**  
PRINCETON INSTRUMENTS



Note: Specifications are subject to change.

\*Spectral rates have been measured with 100 rows vertically binned.

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Spec-10:400B (XTE) Rev B2

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