1024 x 1024*i*

HORIBA Scientific

Synapse i-Series Cameras

Combining **HORIBA** Scientific's superior spectroscopic performance with the most sensitive quantitative imaging results in the most flexible cameras on the market.

The i-Series expands the already broad line of Synapse detectors to include cameras suitable for both spectroscopy and imaging. In addition to including all the features of standard Synapse detectors, the i-Series adds square format CCDs also suitable for imaging, a quick-change flange for mounting camera lenses, and full-function imaging software. CCD sensors feature 1024 x 1024 format, 13 µm pixels, and front- or back-illumination. The unique quick-change mounting flange system allows rapid switching between spectroscopy and imaging. For standard spectroscopy operation, the cameras utilize a flange compatible with any of HORIBA Scientific's spectrometers and spectrographs. This flange can easily be replaced with a standard adjustable F-mount lens adapter compatible with the widest line of Nikkor and Nikon compatible lenses, including a model for UV imaging.

Like all other Synapse cameras, the i-Series can be controlled for spectroscopic applications from SynerJY®, our powerful spectrometer control and spectral data acquisition software. New to the i-Series is V++, the leading software choice for high-performance scientific imaging featuring an intuitive user interface and hundreds of imaging functions. For the ultimate in flexibility in one software package, VSpecPro software combines the features of a full spectroscopy package with the power of V++ in one simple-to-use package. Both packages fully support all the features of i-Series cameras, including high speed and low noise acquisition modes, all gain settings, hardware binning and ROI control, temperature settings, and cleans.

The result is not a compromise imager that can also do some limited spectroscopy or a spectroscopy detector that can awkwardly do some imaging, but rather truly the best of both worlds in one cost effective camera.

Feature	Spectroscopy Benefits	Imaging Benefits
Deep Thermoelectric Cooling	Low dark signal operation without the need for liquid nitrogen or auxiliary power	
Excellent Linearity	Increased accuracy of data over the full dynamic range	14 bit linear range without binning 16 bit linear range with 2x2 binning
Scientific Grade 1 CCD	Ideally suited for low light level detection in a variety of spectroscopic applications	Fewer defects to skew image, scaling
Auxiliary Signal Input	Provides automatic reference corrections or extends wavelength scanning ranges with NIR detectors	Normalize images for source intensity variation
1024 x 1024 pixels, 13.3 x 13.3 mm	High spectral resolution while covering height of the spectrometer's focal plane to optimize signal levels and multi-track imaging	High reolution square pixels for no image distortion, square format for optimum display, math operations
USB 2.0 Interface	Standard connection interfaces to PC notebooks and desktops with 100% data integrity	
V++ Imaging Software[1]		Full image acquisition and processing software
HORIBA Scientific's SynerJY® Software	Complete control of a Synapse CCD and HORIBA Scientific Spectrograph system with full analysis capabilities	
VSpecPro	Complete control of hardware will full analysis capabilities	
LabVIEW VIs and SDK Available	Flexible software to integrate a Synapse CCD into existing apparatus or as an OEM component	

1 V++ and VSpecPro are products of Digital Optics, Limited and RCubed Software LLC. For more information, see www.digitaloptics.co.nz.

Specifications

CCD Format		1024 x 1024, Front Illuminated, Scientific Grade 1		
Pixel Size		13 µm x 13 µm		
Image Area		13.3 mm x 13.3 mm, 100% Fill Factor		
Cooling System		4 Stage Thermoelectric Cooling Guaranteed to -70 °C		
		Minimum	Typical	Maximum
System Read Noise	20 kHz		2 e- rms	5 e- rms
	1 MHz		8 e- rms	15 e- rms
Pixel Well Capacity		60 ke-	100 ke-	
Register Well Capacity			500 ke-	
Dark Current			0.001 e-/pixel/s	0.004 e-/pixel/s
Nonlinearity		< 0.4 % at 20 kHz < 1 % at 1 MHz		
Scan Rates		20 kHz and 1 MHz, Software Selectable		
Software Selectable Gains		3 Software Selectable Gains		
Dynamic Range		16 bits		
Vertical Shift Rates		36 µs, 9 µs[1]		
Maximum Spectral Rate	20 kHz	8 Hz		
	1 MHz	97 Hz[1,2]		
Minimum Image Readout Time	20 kHz	63 s		
	1 MHz	1.5 s		

Specifications subject to change without notice.

Notes:

1 CCDs are guaranteed to have full Charge Transfer Efficiency (CTE) at our standard shift rate of 36 µs. At faster shift rates, a decrease in CTE may be observed.

2 Highest Spectral Rates are achieved when using the 1 MHz ADC, a Vertical Transfer Time of 9 µs, with no mechanical shutter.

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