

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 resolution 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 with 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, Back 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.

USA +1-732-494-8660 France: +33 (0) 1 64 54 13 00
 Germany: +49 (0) 89 4623 17- 0 UK: +44 (0) 20 8204 8142
 China: +86 (0)10 8 567 9966 Other: +33 (0) 1 64 54 13 00

Japan: +81 (0) 3 6206 4717
 Italy: +39 2 5760 3050
 Brazil: +55 (0)11 5545 1514

