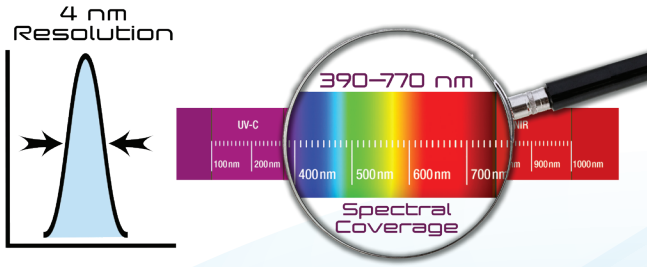
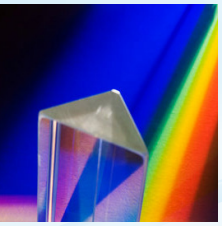
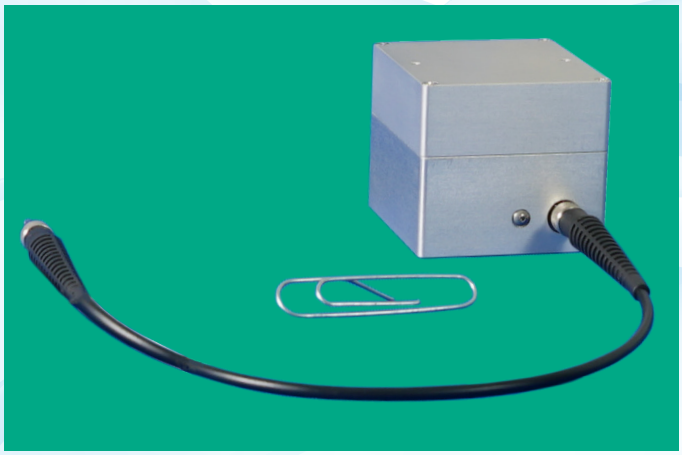
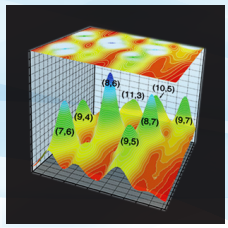
HORIBA
Scientific

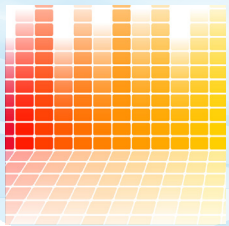


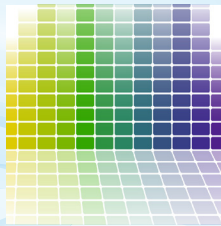
MiniVS20 VIS
High Throughput Spectrometer

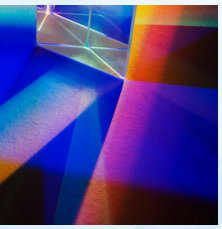












For OEM
Industrial Applications

JOBIN YVON
Technology

horiba.com/oem

MiniVS20 VIS Miniature High Throughput Spectrometer

Overview

HORIBA designs and manufactures miniature high-throughput OEM spectrometers from 190nm to 1700nm for various applications. Thanks to a low stray light aberrations corrected concave holographic grating, the VS20-SYS platform offers in a 1.68 x 1.87 x 2 inches footprint a very reliable and robust spectrometer.

VS20 OEM spectrometers can be fully customized in sensors, entrance, slit size, electronics board, interface, etc.

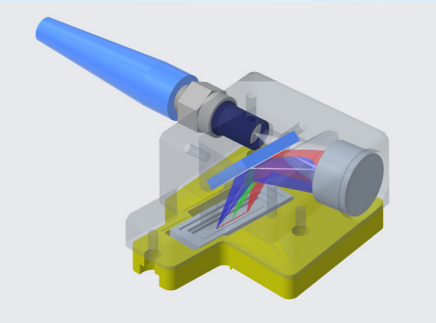
Applications

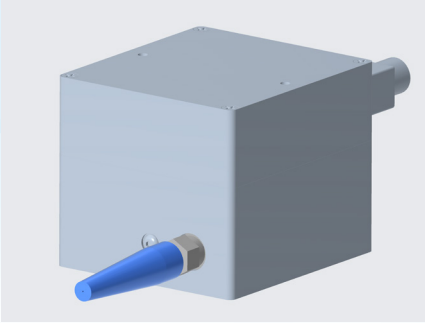
- Fluorescence
- Transmission and Reflectance

Examples:

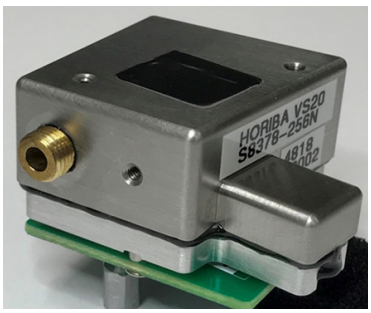
- Semiconductor Process Inspection
- LED Testing
- Color Measurement
- Environmental monitoring
- Food & Beverage Safety

Optical and Mechanical Layout





Spectrometer Housing



Spectrometer housing for S8378 sensor

Features

Very compact and robust

Cost effective OEM solution

Mass production capability

Various wavelength ranges UV/VIS/VNIR/NIR

Low stray light

Customizable to customers' requirement

General Spectrometer Specifications

Spectral Coverage	390 – 770 nm extending to UV or NIR range is possible upon request
Spectrometer Resolution	<4 nm with 50 µm slit width (Narrower slits available)
Spectral Dispersion	56.51 nm/mm (in average); 0.44 nm/pixel
Focal length	20 mm
Options	Selection of different high grade sensors : CMOS-APS*, CMOS-PPS** (PDA), optional CCD on request Input port: SMA, other options available upon request
F/#	~ F/2.7
Wavelength Accuracy	<0.4 nm (using multi-area wavelength calibration)
Stray Light	< 0.15%
Software	LabVIEW™ acquisition software for initial evaluation (DLLs provided for software integration)

Detector Options and Specifications

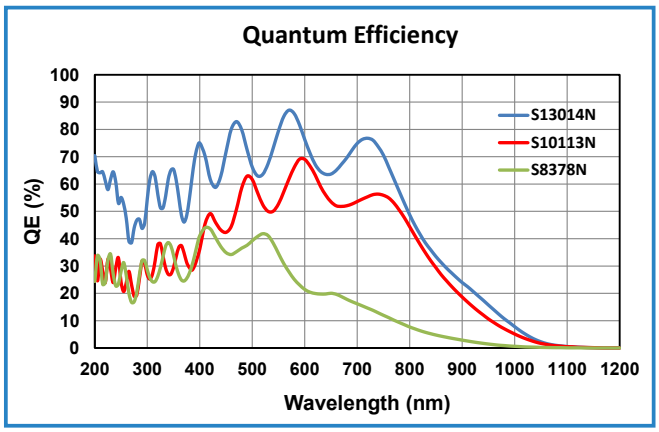
Detector type	Hamamatsu CMOS-APS linear image sensor S13014N with active pixel structure and global e-shutter	Other detector options such as CMOS-PPSs with passive pixel structure and full well up to several 100,000,000 e– and back illuminated CCDs available upon request. See some options in the table below.
Detector sensor format	512 x 1 pixels	
Detector pixel size	14 µm x 200 µm	
Detector QE	refer to graphs below	
Full Well Capacity	100,000 e^- (typical) 80,000 e^- (minimum)	
Readout Noise	16 e^- (typical) to 20 e^- (maximum)	
Maximum spectral rate	44 spectra/s	
ADC	16-bit	
Dynamic range (FW/RN)	7053:1	
Non-linearity	<1% (corrected)	
Dark current	375 e^-/pixel/s (typical) 500 e^-/pixel/s (maximum)	
Communication	USB 2	
Environmental Conditions	Operating temperature 0°C to 40°C ambient Relative humidity <70% (non-condensing) Storage temperature -25° C to 45° C	
Power Requirements AC/DC Power Supply (provided)	90-264 VAC, 47–63 Hz	

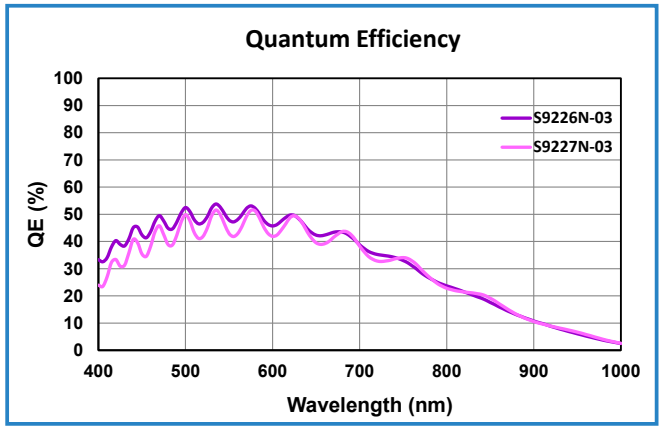
Some CMOS-PDA Options (other sensors available upon request)				
Sensor type	S10113-256N	S8378-256N	S9226N-03	S9227N-03
Pixel format (W	25µm (W) x 500µm (H) x 256 pixels	25µm (W) x 500µm (H) x 256 pixels	7.8µm (W) x 125µm (H) x 1024 pixels	12.5µm (W) x 250µm (H) x 512 pixels
Detector QE	refer to graphs below			
Linear Full Well (e-)	~94M e- (typical)	~43M e- (typical)	~1.9M e- (typical)	~3M e- (typical)
Readout Noise (e-)	5200 e^- (typical)	3370 e^- (typical)	390 e- (typical)	290 e- (typical)
Spectrometer housing will be slightly different depending on CMOS-PDA options (see figure, on previous page, as an example)				

*Specifications, form factor, and spectrometer cover subject to change without notice. No LabVIEW™ license is needed to run our acquisition software.

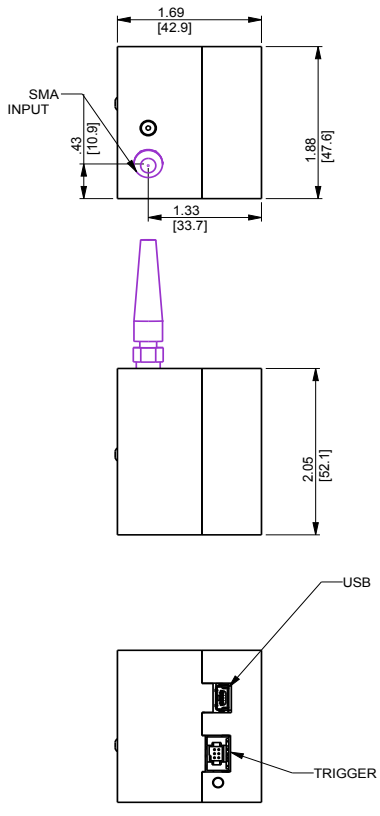
*APS stands for active pixel sensor CMOS (buried PD, high sensitivity similar to CCD)
**PPS stands for passive pixel sensor CMOS (surface PD, large full well capacity - replaces NMOS-PDAs)

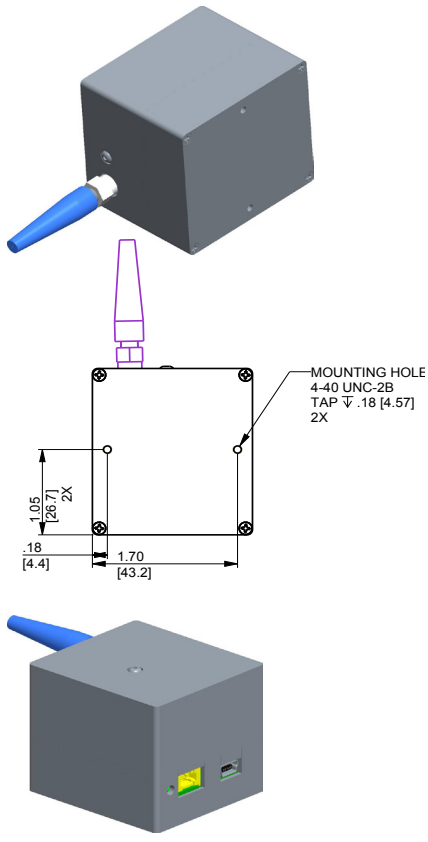
Quantum Efficiencies





System Mechanical Drawings





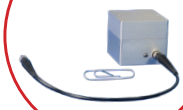
ALL UNITS IN INCHES [MM] UNLESS NOTED

Best Selling Miniature Spectrometers for OEM Industrial Applications

Fiber-coupled USB Spectrometers:

MiniVS20 Spectrometer with Linear UV-VIS CMOS or NIR InGaAs Sensor

5 nm resolution



OEM hand-held spectrometer covering 190 to 1,700 nm for various low stray light applications

- Aberration-corrected concave holographic grating options
- VIS configuration featuring a 1.7" x 1.9" x 2" size combined with full F/2.3 optics for high signal-to-noise
- High throughput, compactness and long term reliability

MiniVS70 VIS Spectrometer with FI CMOS or BI CCD

1 nm resolution

NEW miniaturized VS70 configuration

- Based on high performance aberration-corrected concave gratings fitted with a custom order-sorting filter to eliminate higher orders
- Low cost combined with high performance and low stray light
- Long term opto-mechanical stability and choice of front-illuminated linear CMOS or back-illuminated CCD sensors

VS70 UV-VIS-NIR Spectrometer with Uncooled / TE-cooled CCD

1-2 nm resolution

Compact, versatile most popular VS70 OEM spectrometer and OES configurations

- Based on high performance aberration-corrected concave gratings with full F/2.3 aperture
- Affordable, high throughput, robust and stable
- Electronics drivers ranging from **USB-2 to Ethernet and EtherCAT**

CiCi-Raman-NIR with Scientific Camera Optimized for 785 nm

6 cm^{-1} resolution

Most compact OEM Raman spectrometer with aberration-corrected holographic grating

- Covers 150-3,300 cm^{-1}
- High efficiency and low stray light
- Available in F/2.3 and in compact F/5 configurations
- -50° C deep-cooled scientific CCD camera with minimized etaloning and high NIR QE

PoliSpectra® Quad Spectrometer for Simultaneous Acquisition of 4 VIS Spectra

1 nm resolution

CCD spectrometer for simultaneous acquisition from 4 fiber inputs (470-730 nm)

- High-speed electronics (as fast as <1.5 msec readout time for 4 spectra)
- QUAD-channel high throughput system (f/2.3) and ultra-low stray light
- Industrial low-light applications from low light fluorescence to reflectance

PoliSpectra® M116 8-32 Channel MultiTrack UV-VIS-NIR CMOS Spectrometer

1 nm resolution

Fiber-coupled multi-spectra system with 8- to 32-channel simultaneous measurements

- Concentric optical design with UV extended spectral range provides minimized crosstalk
- High throughput USB-3 system featuring a fast 2D scientific BI CMOS running at 94 to 188 frames per second, acquiring 8, 16 or 32 simultaneous spectra (2048 pixels per spectrum)

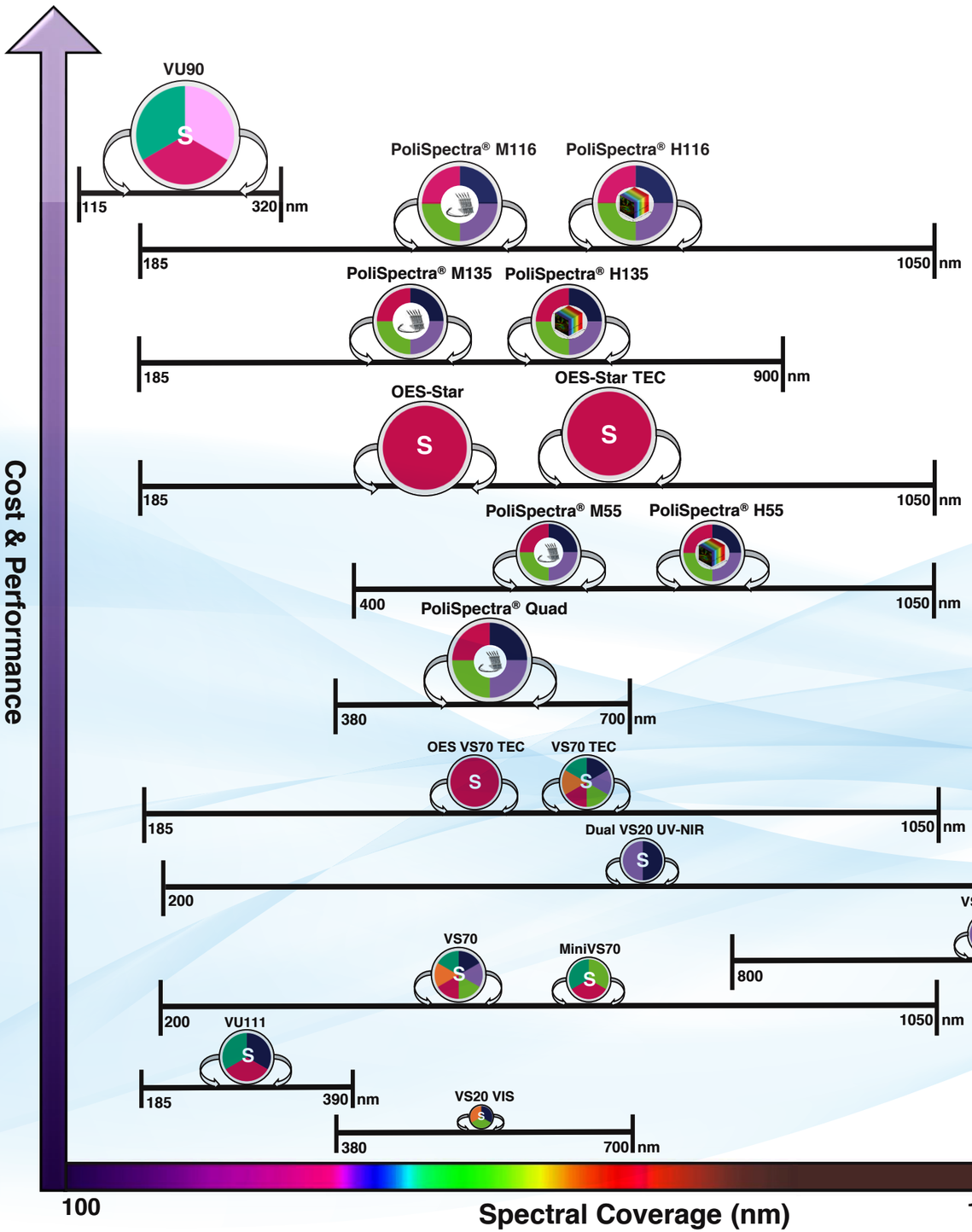
PoliSpectra® H116 Imaging Spectrometer for Hyperspectral Work from UV to NIR

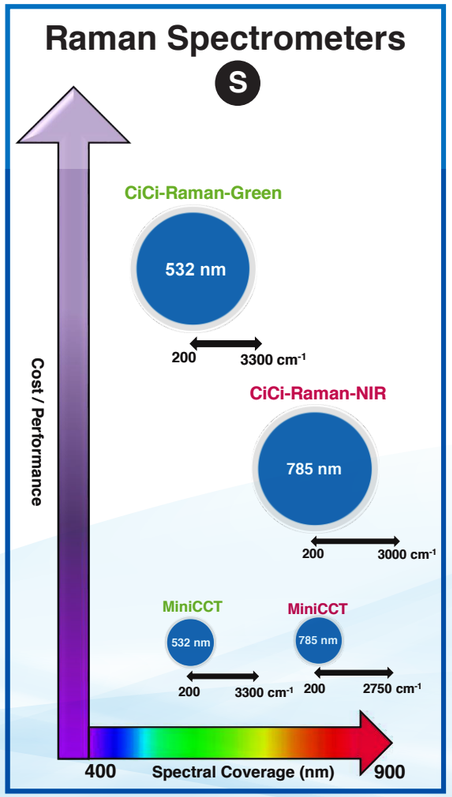
Free-space coupled
1 nm & 40 µm resolution

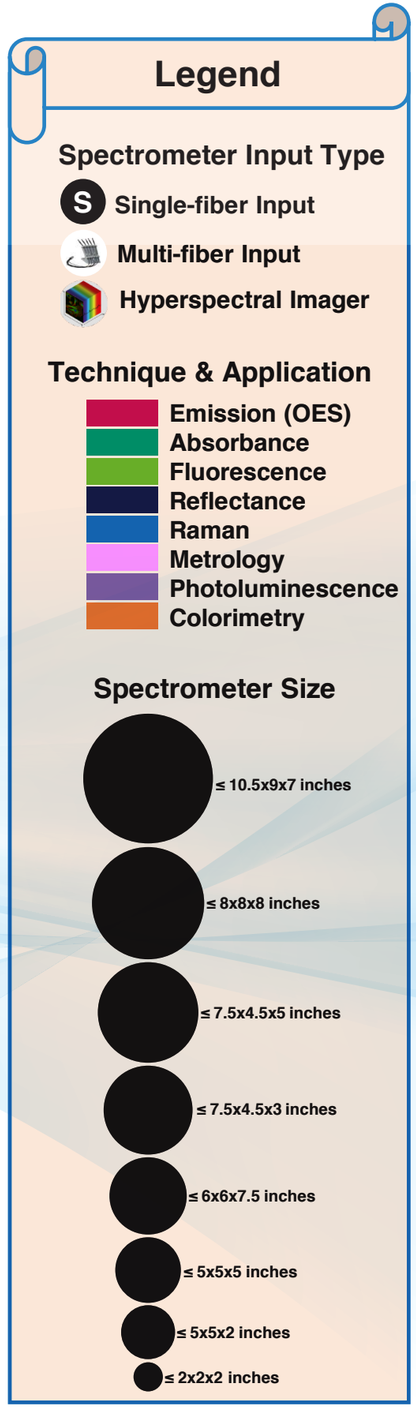
Ultra-high performance rugged spectrometer for hyperspectral imaging with a 2D sCMOS Camera

- For line-image scanning, in a push-broom hyperspectral configuration
- High throughput, USB-3 system featuring a fast 2D scientific BI CMOS with rolling shutter, running at 94 (HDR) to 188 (Standard Mode) frames per second (2048 pixels per spectrum)

OEM Spectrometer Selection Guide







OEM Philosophy and Mission

3 Centers of Excellence Dedicated to OEM Spectroscopy and Camera Solutions in US, EU, and Asia

Our mission is to provide a complete development and manufacturing experience, from optical simulations to opto-mechanical design and prototyping of spectroscopic and camera systems extending to and including electronics, firmware, software design and first articles.

Our products provide superior performance, reliability and stability combined with robust cost reduction. Capable of flexible high volume production capacity in quantities of hundreds to thousands per year, we offer full confidentiality providing "Black Boxes" or private labelling using your logo or graphics.

Unmatched customer service is provided by our exceptionally experienced workforce featuring on-time delivery and flexibility allowing scheduling modifications.

Adhering to Copy Exactly! Processes (CE!) our fully trained staff from engineering to manufacturing form a dedicated OEM engineering force that supports you over the lifetime of the product.

Scientific Segment - OEM Products and Capabilities:

- Custom master optical diffraction gratings
- Diffraction grating replicas (concave, convex and flat)
- Spectrometers, optical assemblies with pre-aligned sensors (CCD, PDA, CMOS, InGaAs) using either customers' or HORIBA's OEM electronics
- OES spectrometers
- Spectroscopy systems or modular engines such as mini fluorometers and mini Raman systems
- Single and double scanning monochromators
- Imaging spectrographs and spectrometers with CCD or CMOS cameras
- Multispectra spectrometers with multiple fiber input / MultiTrack spectroscopy
- Hyperspectral system with HORIBA camera or customer provided (Push-broom configurations)
- Cameras: Spectroscopic deep-cooled scientific cameras (1D and 2D CCD & InGaAS – FI and BI)
- OEM electronics for optosensors ranging from PD and PDA to CCD and CMOS sensors
- Imaging cameras: Uncooled and cooled with FI and BI high-end scientific CMOS
- VUV/FUV spectrometers and CCD vacuum and N2-purged cameras

Scientific Deep Cooled CCD, InGaAs and CMOS cameras

Syncerity®

Low Cost -50º C
Air-cooled OEM Camera

Synapse® Plus

Deep-cooled -80º C to -100º C
Air or Water-cooled Camera

Synapse® EM

EM CCD
Deep-cooled Camera

VUV Syncerity®

TE-cooled to -50˚ C (Vacuum)
or -30˚ C with N2 purge

Synapse® InGaAs

Deep Cooled NIR Camera
to -75˚ C (Water-cooled)

Contact us in one of our centers of excellence	USA & Canada	Japan	Europe & Asia
	OEM.US@horiba.com	OEM.JAPAN@horiba.com	OEMSALES.JYFR@horiba.com
	+1 732 494 8660 Ext. 7733	+81 (75) 313 8121	+33 (0) 1 69 74 72 00

HORIBA Scientific

Horiba.com/MiniVS20