



## Syncerity™ VUV Camera

Back-illuminated Deep-cooled CCD

ELEMENTAL ANALYSIS  
FLUORESCENCE  
GRATINGS & OEM SPECTROMETERS  
OPTICAL COMPONENTS  
FORENSICS  
PARTICLE CHARACTERIZATION  
RAMAN  
SPECTROSCOPIC ELLIPSOMETRY  
SPR IMAGING

OEM  
Cameras

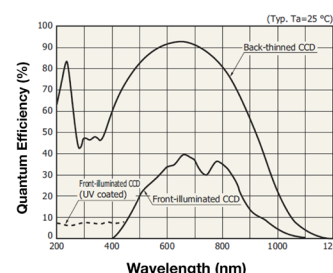
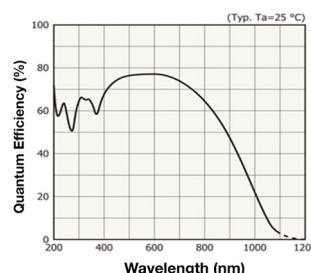
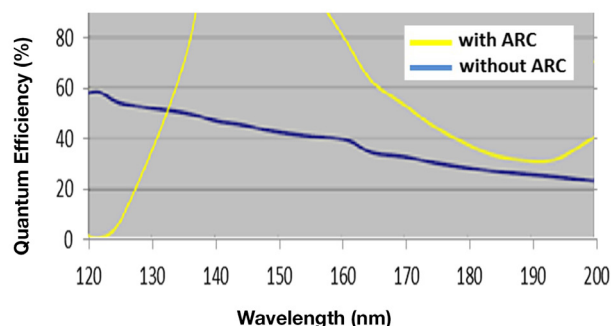


## VUV Optimized Scientific Camera



Up to  
2048 x 512  
Pixels

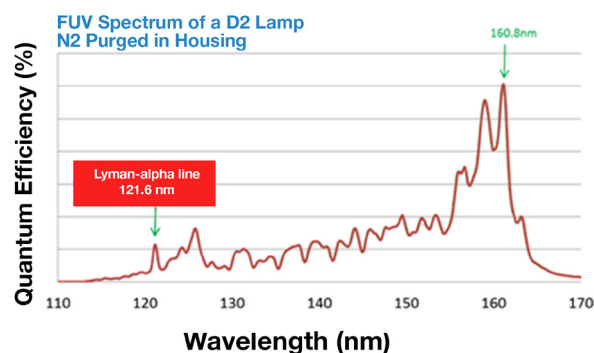
- High QE in VUV Range  
58% @120 nm (no ARC)
- Attachable to High Vacuum Chamber  
with Viton® O-Ring, down to  $< 10^{-6}$  Torr
- TE-cooled to  $-50^{\circ}\text{C}$  (Vacuum) or  $-30^{\circ}\text{C}$  with N2 Purge  
Low Dark Current, Low Noise



\*This data is reference data only and is not guaranteed.

\*Cameras provided without window have no warranty on CCD and need special handling under N2

| Q.E.             | Standard Type-A                                                                                                 | Special Type-B           | Special Type-B        |
|------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------|
| CCD pixel format | 2048 x 70                                                                                                       | 2048 x 256<br>2048 x 512 | 1024 x 128            |
| CCD pixel size   | 14 x 14 $\mu\text{m}$                                                                                           | 12 x 12 $\mu\text{m}$    | 24 x 24 $\mu\text{m}$ |
| CCD height       | 1 mm                                                                                                            | 3 mm / 6 mm              | 3 mm                  |
| CCD AR coating   | Without AR coating for 115 nm - 200 nm<br>With AR coating for 135 nm - 1100 nm                                  |                          |                       |
| Window           | No window or with MgF2 window                                                                                   |                          |                       |
| Flange           | Special flange for vacuum chamber with Viton O-ring<br>(Standard Syncerity cap + MgF2 window is also available) |                          |                       |



D2 Spectrum on a VUV Spectrograph

# Syncerity™ Specifications (Syncerity VUV 2048 x 70 Back-illuminated - Standard)

|                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CCD sensor format                                                                                             | 2048 × 70                                                                                                                                                                                                                                                                                                                                                                                               |
| Quantum efficiency at 20°C                                                                                    | See type A curve for VUV and UV-VIS QE responses                                                                                                                                                                                                                                                                                                                                                        |
| Pixel size                                                                                                    | 14 μm × 14 μm                                                                                                                                                                                                                                                                                                                                                                                           |
| Image area                                                                                                    | 28.7 mm × 0.98 mm; 100% fill factor                                                                                                                                                                                                                                                                                                                                                                     |
| Deep thermoelectric cooling                                                                                   | -50°C under vacuum (10 <sup>-6</sup> mbar) with +25°C ambient or -30°C under N2 purging                                                                                                                                                                                                                                                                                                                 |
| Single pixel well capacity                                                                                    | 50 000 e <sup>-</sup> /pixel (minimum); 60 000 e <sup>-</sup> /pixel (typical)                                                                                                                                                                                                                                                                                                                          |
| Serial register full well capacity                                                                            | 250 000 e <sup>-</sup> /pixel (minimum)<br>500 000 e <sup>-</sup> /pixel (typical output register saturation)                                                                                                                                                                                                                                                                                           |
| Scan rates                                                                                                    | 45 kHz and 500 kHz                                                                                                                                                                                                                                                                                                                                                                                      |
| Readout noise (at 45 kHz and at -50°C)* <sup>1</sup><br>Readout noise (at 500 kHz and at -50°C)* <sup>1</sup> | 9 e <sup>-</sup> (typical) to 12 e <sup>-</sup> (maximum)<br>20 e <sup>-</sup> (typical) to 25 e <sup>-</sup> (maximum)                                                                                                                                                                                                                                                                                 |
| Maximum spectral rate                                                                                         | 20 Hz at 45 kHz scan rate<br>189 Hz at 500 kHz scan rate                                                                                                                                                                                                                                                                                                                                                |
| Digitization                                                                                                  | 16-bit ADC                                                                                                                                                                                                                                                                                                                                                                                              |
| Dynamic range (typical for single pixel)* <sup>2</sup>                                                        | 55 500:1                                                                                                                                                                                                                                                                                                                                                                                                |
| Non-linearity (measured on each camera)                                                                       | <0.15% (typical) at 45 kHz (0.4% maximum)<br><0.20% (typical) at 500 kHz (1% maximum)                                                                                                                                                                                                                                                                                                                   |
| Dark current at -50°C* <sup>3</sup><br>(Note that pixel size = 14 μm)                                         | 0.05 e <sup>-</sup> /pixel/s (typical)                                                                                                                                                                                                                                                                                                                                                                  |
| Software-adjustable gains                                                                                     | 2, 4, and 10 e <sup>-</sup> /count at -50°C                                                                                                                                                                                                                                                                                                                                                             |
| Environmental conditions                                                                                      | <ul style="list-style-type: none"><li>• Operating temperature 0°C to 40°C ambient</li><li>• Relative humidity &lt;70% (non-condensing)</li><li>• Storage temperature -25°C to 50°C</li></ul>                                                                                                                                                                                                            |
| Weight                                                                                                        | 1.769 kg (3.90 lb)                                                                                                                                                                                                                                                                                                                                                                                      |
| Dimensions                                                                                                    | See mechanical drawings                                                                                                                                                                                                                                                                                                                                                                                 |
| Power requirements<br>AC/DC power supply (provided)                                                           | 90-264 VAC, 47–63 Hz                                                                                                                                                                                                                                                                                                                                                                                    |
| Recommendation for OEM supplying camera to power directly:                                                    | <ul style="list-style-type: none"><li>• Pin: +9 V, ± 5%, 6.44 A maximum</li><li>• Regulation: +8.55 V<sub>min</sub>, +9 V<sub>typ</sub>, +9.45 V<sub>max</sub></li><li>• Ripple &amp; noise: 200 mV<sub>pp</sub> maximum</li></ul>                                                                                                                                                                      |
| Minimum computer requirements                                                                                 | <ul style="list-style-type: none"><li>• 3.0 GHz single core or 2.4 GHz multi-core processor</li><li>• 2 GB RAM</li><li>• 32-bit or 64-bit compatible</li><li>• 500 MB free hard disk space<br/>(additional disk space may be required depending on data-storage needs)</li><li>• USB 2.0 high-speed host controller capable of sustained rate of 40 MB/s</li><li>• Windows® (XP, Vista and 7)</li></ul> |

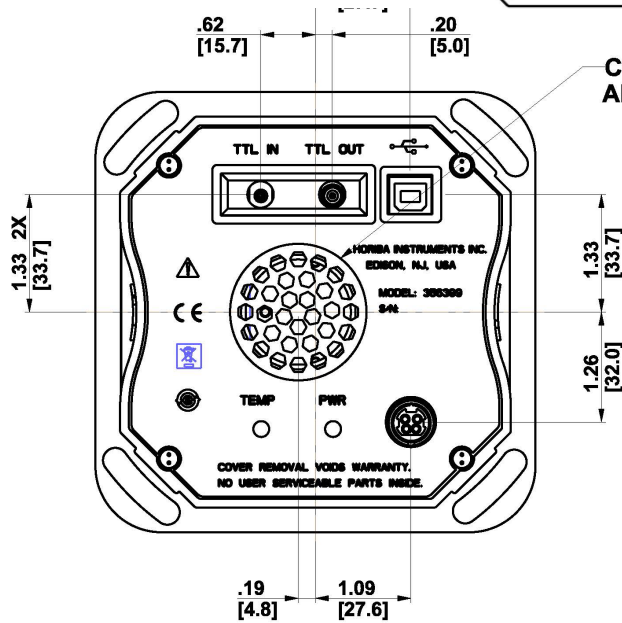
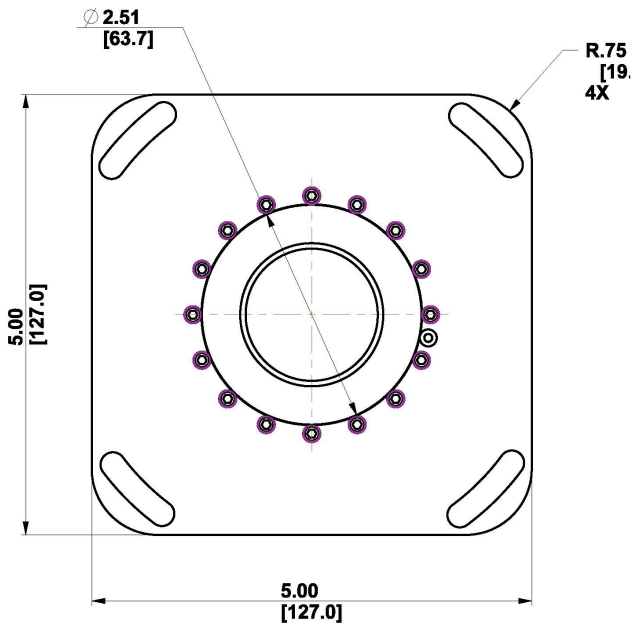
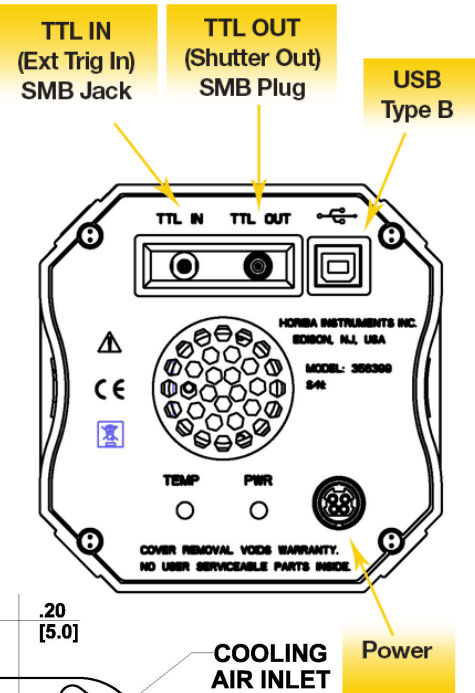
## Syncerity - Other CCD Format Specifications: Contact us

|            |            |            |
|------------|------------|------------|
| 2048 x 256 | 2048 x 512 | 1024 x 128 |
|------------|------------|------------|

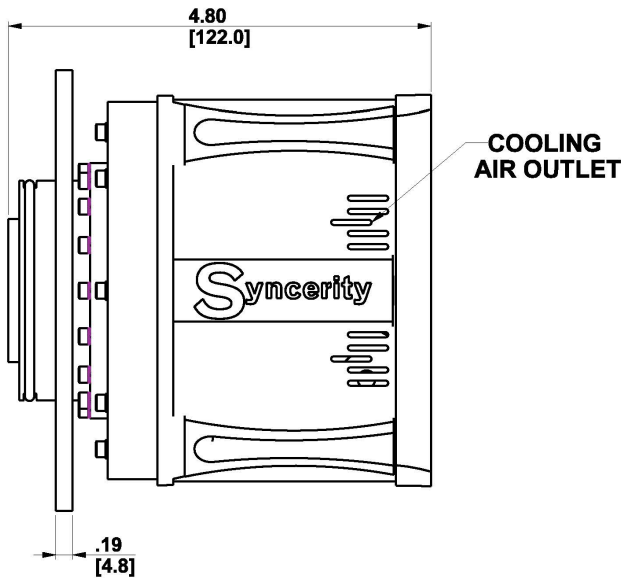
\*1. Entire system noise measured for a single pixel      \*2. Dynamic range is defined as Full Well/Readout Noise, measured at 45 kHz      \*3. Averaged over CCD area, but excluding any regions of blemishes      All specifications subject to change without notice.

# Connecting to Sincerity

|                             |                                            |
|-----------------------------|--------------------------------------------|
| <b>Power Interface:</b>     |                                            |
| Connector Type:             | PDP-40, Mini PWR DIN, 4-Position, STR Plug |
| <b>Camera Interface:</b>    |                                            |
| Connector Type:             | USB Standard Type B                        |
| <b>Sync I/O Connectors:</b> |                                            |
| Connector Type:             | SMB                                        |
| Input Jack:                 | TTL IN (EXT TRIG In)                       |
| Output Plug:                | TTL OUT (SHUTTER Out)                      |



DIMENSIONS IN INCHES [MM]



O-RING SIZE = #141  
ID X 2.506 [63.65] OD X .103 [2.62] CS

## Ordering Information

**SYNCER-2048x70-VUV**  
**Sincerity TE-cooled CCD Camera** includes:  
 USB 2.0 Camera Head  
 AC-DC Power Supply  
 USB Cable  
 CD Manual

- Specify:**
- With/without ARC
  - With/without Vacuum Flange
  - With/without MgF2 Window

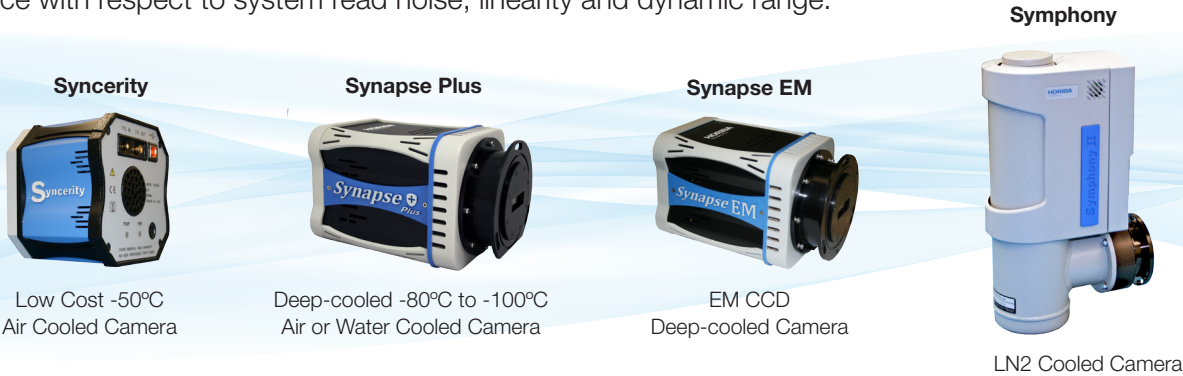
**Other CCD Formats up to 2048 x 512: Contact us**

**Optional:**  
 UV-VIS CCD or VIS-NIR CCD (See Q.E. Curve)  
 Shutter Driver (SDrive-500 Shutter Control Unit with Cable)  
 CCD Shutter  
 TTL IN Trigger Cable  
 Printed Manual

# VUV Sincerity

## Latest Addition to our Growing Family of Scientific Cameras

HORIBA Scientific provides a wide variety of deep-cooled CCD cameras...offering “Best-in-Class” performance with respect to system read noise, linearity and dynamic range.



## Family of Vacuum Monochromators and CCD Spectrometers

**Most popular models:** H20UVL, H30UVL and TGS300

**Typical applications:** High Harmonic Generation, Plasma Characterization

HORIBA Scientific provides a wide variety of vacuum monochromators, spectrographs and VUV cameras. We can customize these VUV designs for OEM volume applications.

We cover a large spectral range from few nanometers to a few hundred nanometers. Based on toroidal, spherical or plane diffraction gratings, our systems provide unequaled throughput with competitive spectral resolution for Soft X-Ray, EUV, FUV and DUV applications.



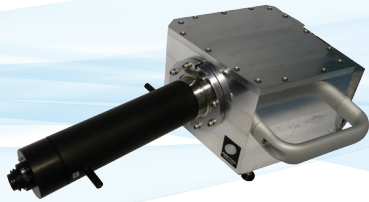
| Spectral range (nm) |     | Energy range (eV) |       | Model   | Focal length (mm) | Grating Rotation | Single channel detector | Array Detector | Replica Available | VLS grating correction |
|---------------------|-----|-------------------|-------|---------|-------------------|------------------|-------------------------|----------------|-------------------|------------------------|
| Min                 | Max | Min               | Max   |         |                   |                  |                         |                | x                 |                        |
| 9.5                 | 110 | 11.3              | 135.5 | TGS300  | 300               |                  |                         | x              | x                 | x                      |
| 50                  | 300 | 4.1               | 24.8  | H30-UVL | 300               | x                | x                       | x              | x                 | x                      |
| 100                 | 300 | 4.1               | 12.4  | H20-UVL | 200               | x                | x                       | x              | x                 | x                      |



VUV Monochromators



VUV Systems



VUV Accessories



**HORIBA**  
Scientific

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