

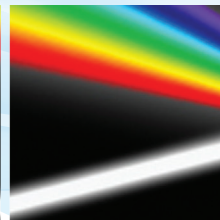


## Synapse FIVS

Scientific CCD Camera

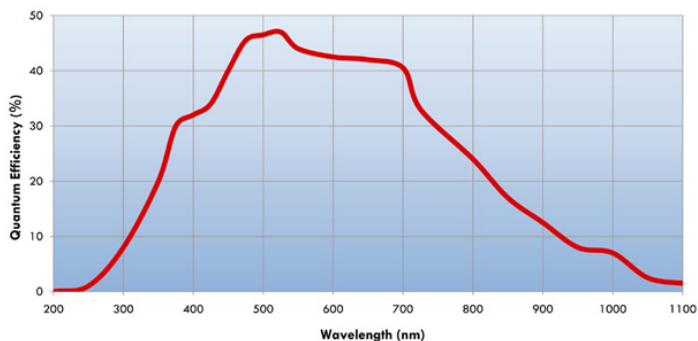
|                              |
|------------------------------|
| ELEMENTAL ANALYSIS           |
| FLUORESCENCE                 |
| GRATINGS & OEM SPECTROMETERS |
| OPTICAL COMPONENTS           |
| FORENSICS                    |
| PARTICLE CHARACTERIZATION    |
| RAMAN                        |
| SPECTROSCOPIC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

Front illuminated visible sensor,  $-80^{\circ}\text{C}$   
Three chip formats to choose from:  
512x512, 2048x512, 1024x256



The Synapse FIVS scientific CCD camera is the ideal camera for a variety of spectroscopy applications. This series of cameras offers three different chip array formats to choose from with a peak quantum efficiency of 56%.

### QE Curve, Synapse FIVS CCD



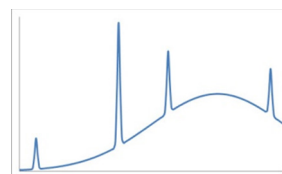
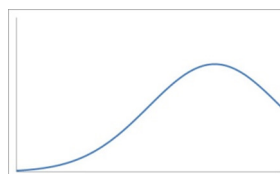
### Features and Benefits

- Deep thermoelectric cooling
- Ideal for low light level detection without etaloning
- Excellent linearity
- Single channel detector port extends wavelength range
- E2V Scientific Grade 1 CCD
- Lifetime vacuum warranty
- USB 2.0 Interface
- HORIBA SynerJY acquisition and analysis software
- LabVIEW VI's and SDK available

### Primary Applications

Primarily chosen for broad spectrum analysis such as photoluminescence, it is also well suited for studying fine spectral features on a broad spectral background.

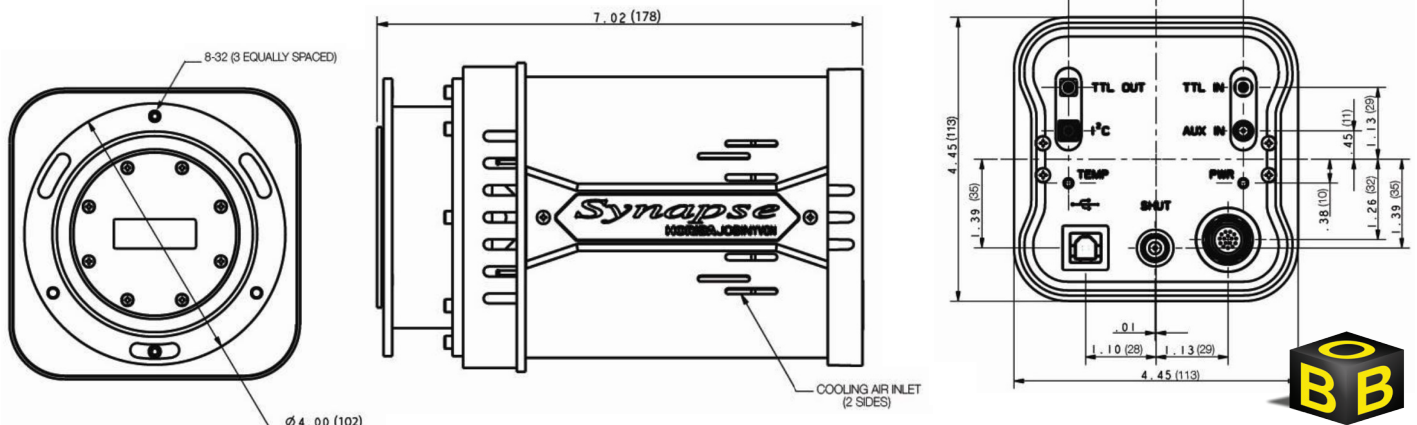
- Fluorescence
- Photoluminescence
- Absorption
- Transmission
- Reflectance
- Raman



## Specifications

|                                        |               |                                                                                                                                                 |                                                   |                                                   |
|----------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| <b>CCD format</b>                      |               | 512 x 512, front-illuminated, Scientific Grade 1                                                                                                | 2048 x 512, front-illuminated, Scientific Grade 1 | 1024 x 256, front-illuminated, Scientific Grade 1 |
| <b>Pixel size</b>                      |               | 24 µm x 24 µm                                                                                                                                   | 13.5 µm x 13.5 µm                                 | 26 µm x 26 µm                                     |
| <b>Image area</b>                      |               | 12.3 mm x 12.3 mm, 100% fill factor                                                                                                             | 27.6 mm x 6.9 mm, 100% fill factor                | 26.6 mm x 6.7 mm, 100% fill factor                |
| <b>Cooling system</b>                  |               | Four-stage thermoelectric cooling. Typical operating temperature -80°C, guaranteed to -75°C. External cooling option available (-95°C typical.) |                                                   |                                                   |
| <b>Typical readout noise</b>           | <b>20 kHz</b> | 3.5 e- rms                                                                                                                                      | 3 e- rms                                          | 3.4 e- rms                                        |
|                                        | <b>1 MHz</b>  | 20 e- rms                                                                                                                                       | 9 e- rms                                          | 15 e- rms                                         |
| <b>Maximum readout noise</b>           | <b>20 kHz</b> | 6 e- rms                                                                                                                                        | 4 e- rms                                          | 5 e- rms                                          |
|                                        | <b>1 MHz</b>  | 25 e- rms                                                                                                                                       | 15 e- rms                                         | 20 e- rms                                         |
| <b>Minimum pixel well capacity</b>     |               | 300 ke-                                                                                                                                         | 150 ke-                                           | 350 ke-                                           |
| <b>Typical pixel well capacity</b>     |               | 350 ke-                                                                                                                                         | 250 ke-                                           | 500 ke-                                           |
| <b>Typical register well capacity</b>  |               | 1000 ke-                                                                                                                                        |                                                   |                                                   |
| <b>Typical dark current</b>            |               | 0.002 e-/pixel/s                                                                                                                                | 0.001 e-/pixel/s                                  | 0.002 e-/pixel/s                                  |
| <b>Nonlinearity</b>                    | <b>20 kHz</b> | <0.4%                                                                                                                                           |                                                   |                                                   |
|                                        | <b>1 MHz</b>  | <1%                                                                                                                                             |                                                   |                                                   |
| <b>Scan rates</b>                      |               | 20 kHz and 1 MHz, software-selectable                                                                                                           |                                                   |                                                   |
| <b>Software-selectable gains</b>       |               | 3 software-selectable gains                                                                                                                     |                                                   |                                                   |
| <b>Dynamic range</b>                   |               | 16 bits                                                                                                                                         |                                                   |                                                   |
| <b>Vertical shift rates</b>            |               | 36 µs, 9 µs                                                                                                                                     |                                                   |                                                   |
| <b>Maximum spectral rate</b>           | <b>20 kHz</b> | 18 Hz                                                                                                                                           | 6 Hz                                              | 13 Hz                                             |
|                                        | <b>1 MHz</b>  | 49 Hz                                                                                                                                           | 140 Hz                                            | 278 Hz                                            |
| <b>Physical dimensions (L x W x H)</b> |               | 7 x 4.5 x 4.5 inches                                                                                                                            |                                                   |                                                   |
| <b>Physical weight</b>                 |               | 5.8 lbs                                                                                                                                         |                                                   |                                                   |

## Mechanical Dimensions



## OPTICAL BUILDING BLOCKS



**HORIBA**  
Scientific

[info.sci@horiba.com](mailto:info.sci@horiba.com) [www.horiba.com/opticalbuildingblocks](http://www.horiba.com/opticalbuildingblocks)

**USA:** +1 732 494 8660  
**UK:** +44 (0)20 8204 8142  
**China:** +86 (0)21 6289 6060

**France:** +33 (0)1 69 74 72 00  
**Italy:** +39 2 5760 3050  
**Brazil:** +55 (0)11 5545 1500

**Germany:** +49 (0)89 4623 17-0  
**Japan:** +81 (0)3 6206 4721  
**Other:** +1 732 494 8660