

*The standard for spectroscopic applications with small slit-heights*

## Synapse® 1024 × 128 Front-Illuminated CCD Detector

The HORIBA Scientific Front-Illuminated 1024 × 128 CCD detector is ideal for low-noise acquisitions required in applications such as emission, fluorescence, or Raman spectroscopy. Its 26 µm × 26 µm pixel format offers a high full well capacity, a large dynamic range and an excellent signal-to-noise ratio. The quality of this chip is comparable to the 1024 × 256 FIVS in a smaller format and lower cost. This detector is the best choice for fast acquisitions with a maximum spectral rate of 450 Hz.



ELEMENTAL ANALYSIS

FLUORESCENCE

GRATINGS &  
OEM SPECTROMETERS

OPTICAL COMPONENTS

PARTICLE CHARACTERIZATION

RAMAN

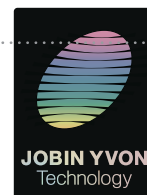
SPECTROSCOPIC ELLIPSOMETRY

SPR IMAGING

### Feature

### Spectroscopy Benefits

|                                       |   |
|---------------------------------------|---|
| Deep Thermoelectric Cooling           | Low dark signal with no need for liquid nitrogen  |
| Lifetime Vacuum Warranty              | All-metal sealed technology allows a permanent vacuum, letting us offer a lifetime warranty                 |
| Excellent Linearity                   | Increased accuracy of data over the full dynamic range  |
| USB 2.0 Interface                     | Standard connection to PC notebooks and desktops with 100% data integrity                                   |
| Auxiliary Signal Input                | Provides automatic reference corrections or extends wavelength scanning ranges with near-IR detectors       |
| Front-Illuminated CCD                 | Good spectral response from 400–1000 nm with no etaloning   |
| Scientific Grade 1 CCD                | Ideally suited for low light level detection in a variety of spectroscopic applications                     |
| HORIBA Scientific's SynerJY® Software | Complete control of a Synapse CCD and HORIBA Scientific Spectrograph system with full analysis capabilities |
| LabVIEW VIs and SDK Available         | Flexible software to integrate a Synapse CCD into existing apparatus or as an OEM component                 |

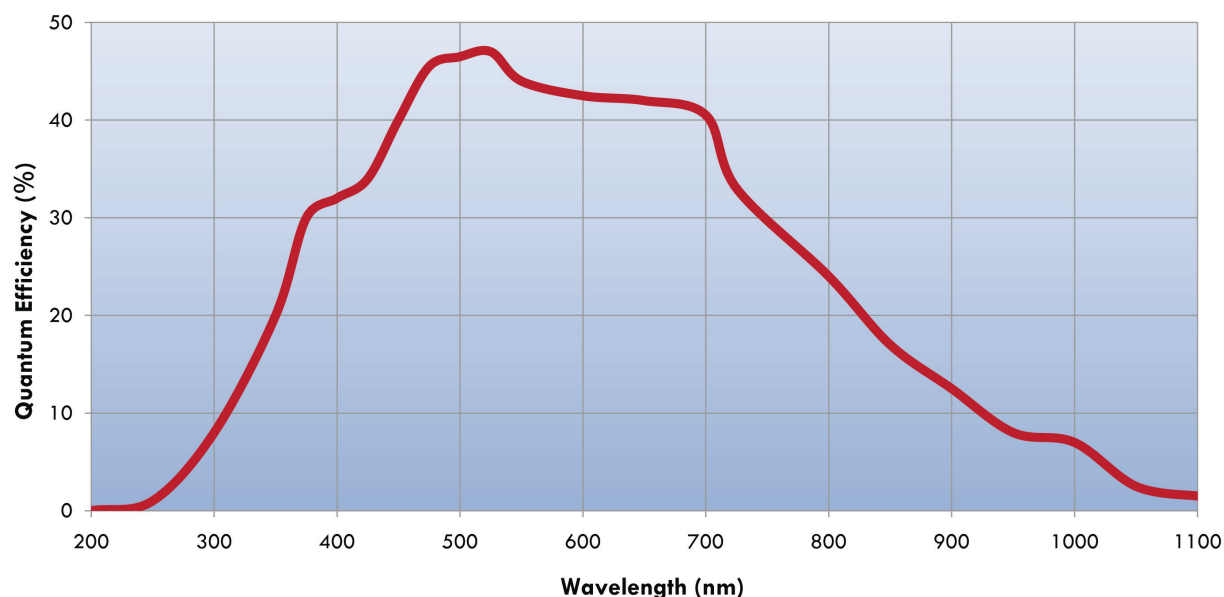


## Specifications\*

|                           |        |  |                               |                       |
|---------------------------|--------|--|-------------------------------|-----------------------|
| CCD Format                |        | 1024 × 128, front-illuminated,<br>Scientific Grade 1   |                               |                       |
| Pixel Size                |        | 26 μm × 26 μm  |                               |                       |
| Image Area                |        | 26.6 mm × 3.3 mm, 100% fill factor   |                               |                       |
| Cooling System            |        | Four-stage thermoelectric cooling, guaranteed to<br>−75°C; optional −100°C (typical) external cool-<br>ing available |                               |                       |
|                           |        | Minimum  | Typical                       | Maximum               |
| Readout Noise             | 20 kHz |  | 3.4 e <sup>−</sup> rms        | 6 e <sup>−</sup> rms  |
|                           | 1 MHz  |  | 20 e <sup>−</sup> rms         | 25 e <sup>−</sup> rms |
| Pixel Well Capacity       |        | 350 ke <sup>−</sup>  | 650 ke <sup>−</sup>           |                       |
| Register Well Capacity    |        |  | 1000 ke <sup>−</sup>          |                       |
| Dark Current              |        |  | 0.002 e <sup>−</sup> /pixel/s |                       |
| Nonlinearity              |        | < 0.4% at 20 kHz<br>< 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 <sup>1</sup>   |                               |                       |
| Maximum                   | 20 kHz | 17 Hz  |                               |                       |
| Spectral Rate             | 1 MHz  | 450 Hz <sup>1,2</sup>  |                               |                       |

\*Specifications subject to change without notice.

Typical Spectral Response



### Ordering Information:

### CCD-1024x128-FIVS-SYN Synapse Thermoelectric Cooled CCD System

Our CCD packages include a CCD shutter for clean CCD charge transfer and background subtraction.

### Notes:

<sup>1</sup>CCDs are guaranteed to have full charge transfer efficiency (CTE) at our standard shift rate of 36  $\mu$ s. At faster shift rates, a decrease in CTE may be observed.

<sup>2</sup>Highest spectral rates are achieved when using the 1 MHz ADC, a vertical transfer time of 9  $\mu$ s, with no mechanical shutter.

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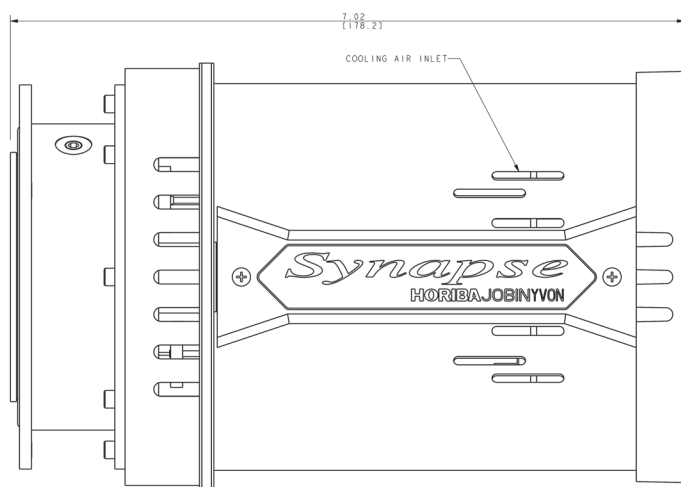
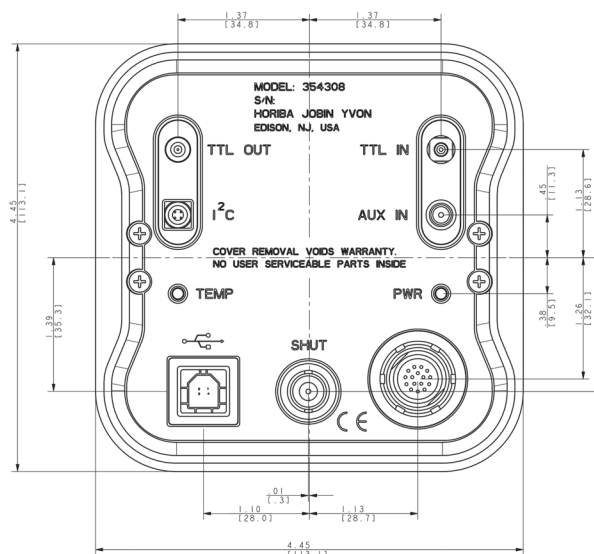
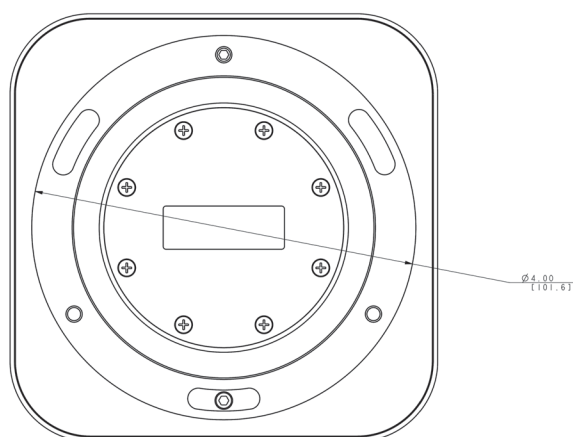
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## Mechanical Dimensions



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[www.horiba.com/scientific](http://www.horiba.com/scientific)