

# Exemplar® Plus LS

Spectrometer

## High Performance Smart Spectrometer



The Exemplar® Plus LS is a high-performance smart spectrometer utilizing an aberration-corrected concave holographic grating to effectively eliminate stray light. It features a highly sensitive TE-cooled back-thinned (BT) CCD detector which is linearly summed for high dynamic range. Its long focal length, coupled with a high quantum efficiency detector, provides superior data quality over the entire 180-1100nm spectral range. The Exemplar Plus LS features a high signal-to-noise ratio, making it ideal for low light level applications especially in the UV range. It also features a built-in shutter allowing for dark scan measurements even while illuminated. As a member of the Exemplar product line, it features onboard data processing and USB 3.0 communication. The Exemplar product line is optimized for multi-channel operation, featuring ultra-low trigger delay and gate jitter.

| SIGNAL TO NOISE RATIO: |       |
|------------------------|-------|
| On-board Averaging 1   | ~540  |
| On-board Averaging 10  | ~1900 |
| On-board Averaging 100 | ~4800 |

Standard spectral configurations range from 180nm-1100nm with resolutions between 0.6nm and 6.0nm. Custom configurations are available for OEM applications.

### SMART:

On-board processing including averaging, smoothing, and dark compensation

### SPEED:

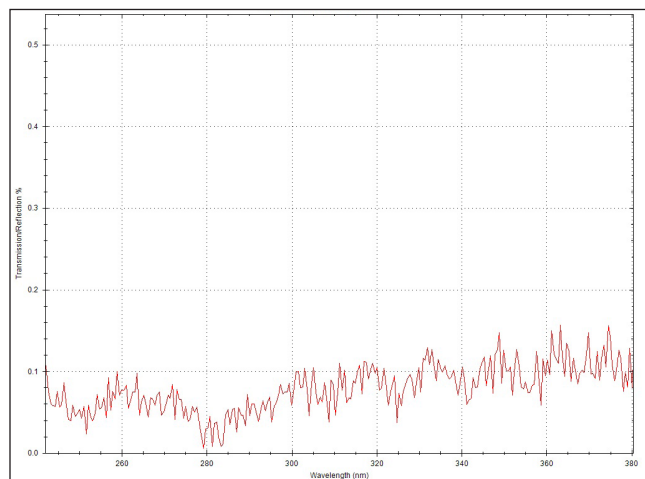
Acquires and transfers more than 140 spectra per second at an integration time of 6.3ms

### SYNCHRONOUS:

Supports up to 32 devices with ultra-low trigger delay (95ns) & gate jitter (+/- 20ns)

### Applications:

- **Low light level UV to NIR spectroscopy**
- **Fluorescence spectroscopy**
- **On-line process monitoring**
- **LCD display measurement**
- **Biomedical spectroscopy**
- **Solar simulation characterization**
- **Absorbance spectroscopy**
- **Irradiance measurements**



ASTM® stray light test using 50 g/L sodium nitride (NaNO<sub>2</sub>) showing stray light to be less than 0.1% without applying any software corrections.

## Specifications:

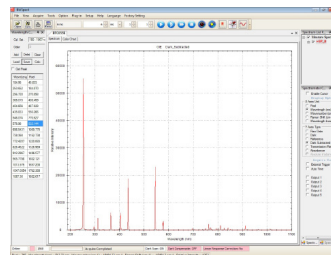
|                               |  |
|-------------------------------|--|
| Power Input                   | 5V DC @ 3.0A (maximum at startup)  |
| Detector Type                 | Back-thinned CCD array   |
| Wavelength Range              | 180nm - 1100nm   |
| Detector Pixel Format         | 2048 effective detector elements   |
| Effective Pixel Size          | 14µm x ~ 0.9mm   |
| Spectrograph f/#              | 3.0  |
| Spectrograph Optical Layout   | Concave holographic, aberration corrected, flat field  |
| Dynamic Range                 | 50,000 (Typical)   |
| Digitizer Resolution          | 16-bit or 65,535:1   |
| Data Transfer Speed           | >140 spectra per second at integration time of 6.3ms in burst mode   |
| Trigger Delay                 | 95ns +/- 20ns (call for timing diagram)  |
| Readout Speed                 | > 400kHz   |
| Integration Time              | 6.3ms, adjustable in 1µs increments  |
| Aux Port                      | External trigger, 4 digital outputs (2 with shutter control), 2 digital inputs, analog input, analog output and system reset |
| Operating Temperature         | 5°C - 35°C   |
| Operational Relative Humidity | 85% noncondensing  |
| CCD Cooling                   | Default: 0°C at ambient of 25°C.   |
| Weight                        | 2.6 lbs  |
| Dimensions                    | 7.0in x 4.25in x 2.68in (178mm x 108mm x 67mm)   |
| Computer Interface            | USB 3.0 / 2.0  |
| Operating Systems             | Windows: 7, 8 (32-bit & 64-bit)  |

## Additional Features:

- High UV, Vis, and NIR response
- 2048 detector elements
- Over 60% QE at 200nm
- Configurable cooling temperature (0° default)
- 80% peak QE
- Built-in shutter
- Ultra low stray light

## Software:

BWSpec® is a spectral data acquisition software with a wide range of tools that are designed to perform complex measurements and calculations at the click of a button. It allows the user to choose between multiple data formats and offers optimization of scanning parameters, such as integration time. In addition to powerful data acquisition and data processing, other features include automatic dark removal, spectrum smoothing, and manual/auto baseline correction.



## Entrance Slit

| Slit Option                     | Dimensions            | Approx. Resolution<br>190-1100nm |
|---------------------------------|-----------------------|----------------------------------|
| 10µm                            | 10µm wide x 1mm high  | ~2.0nm                           |
| 25µm                            | 25µm wide x 1mm high  | ~2.5nm                           |
| 50µm                            | 50µm wide x 1mm high  | ~3.2nm                           |
| 100µm                           | 100µm wide x 1mm high | ~6.0nm                           |
| Custom configurations available |                       |                                  |

## Diffraction Grating

| Best Efficiency                 | Spectral Coverage (nm) |
|---------------------------------|------------------------|
| UV                              | 180-450                |
| UV-Vis                          | 190-800                |
| Vis                             | 400-800                |
| UV-Vis-NIR                      | 190-1100               |
| Vis-NIR                         | 350-1050               |
| Custom configurations available |                        |

## Accessories:

- Fiber sampling probes
- Fiber sample holders
- Fiber patch cords
- Light sources

## Spectrograph

