

Glacier™ X

Spectrometer

Compact High Performance TE Cooled CCD Spectrometer



The Glacier™ X is a TE Cooled linear CCD array spectrometer. It features a 2048 element detector, built-in 16-bit digitizer, and USB 2.0 interface. Compared to non-cooled CCD spectrometers, the Glacier™ X offers higher dynamic range, significantly reduced dark counts, and superior long-term operation stability, making it ideal for low light level detection and long-term monitoring applications.

The Glacier™ X is ideal for most UV, Vis, and NIR applications with spectral configurations from 200nm to 1050nm and resolutions between 0.2nm and 4.5nm. Custom configurations and application support are available for OEM applications.

Applications:

- UV, Vis, and NIR: Spectroscopy / Spectroradiometry / Spectrophotometry
- Wavelength Identification
- Absorbance
- Reflectance
- OEM Optical Instrumentation Component

Features:

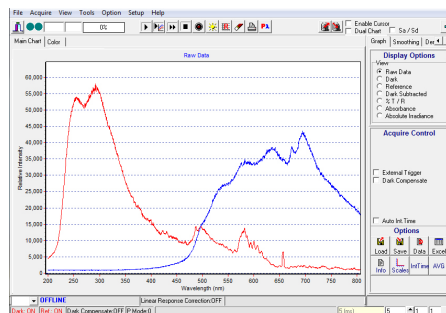
- UV - NIR Ranges
- <0.2nm Resolution
- TE Cooled / Regulated
- 16-bit Digitizer
- 500 kHz Readout Speed
- Plug-and-play USB 2.0
- OEM Version Available

Accessories:

- Fiber Patch Cords
- Light Sources
- Cuvette Holders
- Inline Filter Holders
- Fiber Optic Probes

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.



Specifications:

| | |
|-------------------------------|---|
| DC Power Input | 5V DC @ < 1.5 Amps |
| AC Adapter Input | 100 - 240VAC 50/60 Hz, 0.5A @ 120VAC |
| Detector Type | Response Enhanced Linear CCD Array |
| Pixels | 2048 x 1 Elements @ 14µm x 200µm Per Element |
| Spectrograph f/# | 3.2 |
| Spectrograph Optical Layout | Crossed Czerny-Turner |
| Dynamic Range | 300 (Typical) |
| Digitizer Resolution | 16-bit or 65,535:1 |
| Readout Speed | 500 kHz |
| Data Transfer Speed | Up to 180 Spectra Per Second Via USB 2.0 |
| Integration Time | 5 ~ 65,535ms x Multiplier |
| External Trigger | Aux Port |
| Operating Temperature | 15°C - 35°C |
| Operational Relative Humidity | 85% Noncondensing |
| TE Cooling | 14°C |
| Weight | ~ 1.32 lbs (0.60 kg) |
| Dimensions | 5in x 1.5in x 3.6in (127.0mm x 39.0mm x 90.7mm) |
| Computer Interface | USB 2.0 / 1.1 |
| Operating Systems | Windows: XP, Vista, 7 |

Technical Details **Glacier™ X**

Standard

Fiber Coupler

1 Secures Fiber to Ensure Repeatable Results

By coupling a fiber optic to the SMA 905 adaptor, light will be guided to the slit and optically matched, ensuring reproducibility. For free space sampling, a diffuser or lens assembly can be connected directly to the SMA 905 adaptor.

Configurable

Entrance Slit

2 Determines Photon Flux and Spectral Resolution

Light entering into a spectrometer's optical bench is vignetted by a pre-mounted and aligned slit. This ultimately determines the spectral resolution and throughput of the spectrometer after grating selection. We offer a variety of slit widths to match your specific application needs: from 10µm - 200µm wide, with custom slits available.

| Slit Option | Dimensions | Approximate Resolution 350 - 1050nm |
|------------------------------|-----------------------|-------------------------------------|
| 10µm | 10µm wide x 1mm high | ~1.1nm |
| 25µm | 25µm wide x 1mm high | ~1.4nm |
| 50µm | 50µm wide x 1mm high | ~2.2nm |
| 100µm | 100µm wide x 1mm high | ~4.3nm |
| 200µm | 200µm wide x 1mm high | Call |
| Custom Slit Widths Available | | |

Standard

Collimating Mirror

3 Collimates and Redirects Light Towards Grating

Both mirrors are *f/#* matched focusing mirrors coated with AlMg₂, which produces approximately 95% reflectance when working in the UV-Vis spectrum. Aluminum (Al) provides reflectance and magnesium (Mg₂) protects the aluminum from oxidation.

Configurable

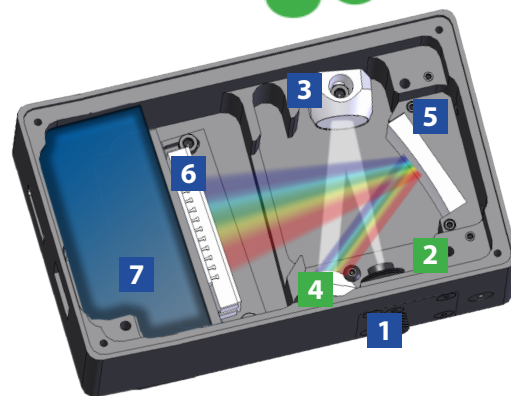
Diffraction Grating

4 Diffracts Light, Separating Spectral Components

The groove frequency of the grating determines two key aspects of the spectrometer's performance: the wavelength coverage and the spectral resolution. When the groove frequency is increased, the instrument will achieve higher resolution, but the wavelength coverage will decrease. Inversely, decreasing the groove frequency increases wavelength coverage at the cost of spectral resolution.

The blaze angle or blaze wavelength of the grating is also a key parameter in optimizing the spectrometer's performance. The blaze angle determines the maximum efficiency that the grating will have in a specific wavelength region.

| Best Efficiency | Spectral Coverage (nm) | Grating |
|---------------------------------|------------------------|----------|
| UV / Vis | 200-400 | 1800/250 |
| UV / NIR | 200-800 | 716/222 |
| UV / Vis | 250-600 | 1200/250 |
| UV | 280-370 | 3600/240 |
| UV / NIR | 300-900 | 600/400 |
| UV / NIR | 350-1050 | 700/530 |
| Vis | 380-750 | 900/500 |
| Vis / NIR | 400-800 | 1200/500 |
| Vis / NIR | 450-1050 | 830/800 |
| Vis | 530-700 | 1800/500 |
| Vis / NIR | 600-800 | 1714/650 |
| Vis / NIR | 750-1050 | 1200/750 |
| Custom Configurations Available | | |



Standard

Focusing Mirror

5 Refocuses Dispersed Light onto Detector

Both mirrors are *f/#* matched focusing mirrors coated with AlMg₂, which produces approximately 95% reflectance when working in the UV-Vis spectrum. Aluminum (Al) provides reflectance and magnesium (Mg₂) protects the aluminum from oxidation.

Standard

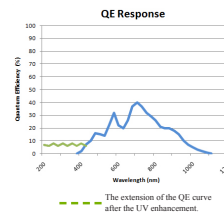
Array Detector

6 Measures Entire Spectrum Simultaneously

The Glacier™ X features a 2048 x 1 linear TE Cooled CCD array detector with a 14µm pixel width and > 2000 active pixels. As the incident light strikes the individual pixels across the CCD, each pixel represents a portion of the spectrum that the electronics can then translate and display with a given intensity using BWSpec™ software.

The quantum efficiency (QE) and noise level of the array detector greatly influences the spectrometer's sensitivity, dynamic range and signal-to-noise ratio. The spectral acquisition speed of the spectrometer is mainly determined by the detector response over a wavelength region.

| Specifications | |
|-------------------|----------------|
| Wavelength Range | 200nm - 1050nm |
| Pixels | 2048 |
| Pixel Size | 14µm x 200µm |
| Well Depth | ~90,000 e |
| Digitization Rate | 500 kHz |



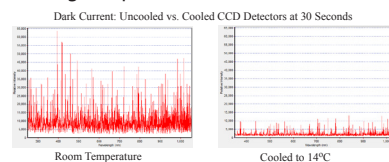
Standard

Thermoelectric Cooler

7 Reduces Dark Noise and Increases Detection Limits

Cooling an array detector with a built-in thermoelectric cooler (TEC) is an effective way to reduce dark current and noise, as well as to enhance the dynamic range and detection limit.

When the CCD detector array is cooled from a room temperature of 25°C down to 14°C by the TEC, the dark current is reduced by a factor of 4 and the dark noise is reduced by a factor of 2. This allows the spectrometer to operate at longer exposure times and to detect weaker optical signals.



19 Shea Way, Newark, DE 19713 • Tel: (302) 368-7824 • Fax: (302) 368-7830 • Web: www.bwtek.com