Glacier® *X*

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**

Features:

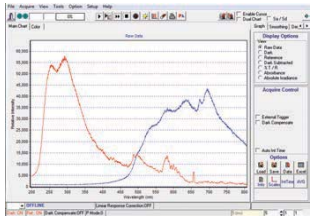
- UV - NIR Ranges
- <0.2nm Resolution
- TE Cooled / Regulated
- 16-bit Digitizer
- 500 kHz Readout Speed
- Plug-and-play USB 2.0
- OEM Version Available

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

Standard / Configurable

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 vinyetted 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 $AlMg_2$, which produces approximately 95% reflectance when working in the UV-Vis spectrum. Aluminum (Al) provides reflectance and magnesium (Mg_2) 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 $AlMg_2$, which produces approximately 95% reflectance when working in the UV-Vis spectrum. Aluminum (Al) provides reflectance and magnesium (Mg_2) protects the aluminum from oxidation.

Standard

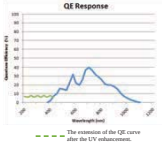
Array Detector

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.