

# Quest™ X

Spectrometer

## Compact High Performance, CCD Spectrometer



The Quest™ X is a linear CCD array spectrometer optimized for UV and NIR performance using a low stray light optical bench. It features a 2048 element detector, built-in 16-bit digitizer, USB 2.0 interface with a >2.0 MHz readout speed, and external trigger. The Quest™ X is temperature compensated, which greatly reduces the thermal drift to ~15 counts/°C. This gives improved stability by decreasing baseline drift and sustaining the dynamic range.

The Quest™ X is ideal for most UV, Vis, and NIR applications with spectral configurations from 200nm to 1050nm and resolutions between 0.5nm and 4.0nm. Custom configurations and RS232 communication interface are available for OEM applications.

This spectrometer is an essential building block for total solutions. System development 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:

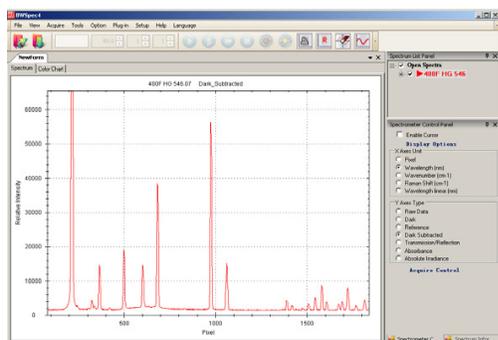
- UV - NIR (200nm - 1050nm)
- > 0.5nm Spectral Resolution
- 16-bit Digitizer
- 1ms Minimum Integration Time
- >2.0 MHz Readout Speed
- Plug-and-play USB 2.0

### Accessories:

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

### Software:

BWSpec® spectral data acquisition software is 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:

Power Input	USB @ < 0.35 Amps
Detector Type	Response-Enhanced Linear CCD Array
Detector Pixel Format	2048 x 1 Elements @ 14µm x 200µm Per Element
Spectrograph f/#	3.6
Spectrograph Optical Layout	Crossed Czerny-Turner
Dynamic Range	1300:1 Single Acquisition
Digitizer Resolution	16-bit or 65,535:1
Readout Speed	>2.0 MHz
Data Transfer Speed	Up to 480 Spectra Per Second Via USB 2.0
Integration Time	1 - 65,535ms
Thermal Drift	~15 Counts/°C (~29 Counts/°C Max)
Aux Port	External Trigger, Digital IOs
Operating Temperature	5°C - 35°C
Operational Relative Humidity	85% Noncondensing
Weight	~ 0.75 lbs (0.34 kg)
Dimensions	3.82 in x 2.64 in x 1.34 in (98mm x 67mm x 34mm)
Computer Interface	USB 2.0 / 1.1 and Enhanced RS232
Operating Systems	Windows: XP, 7, 8, 10 (32-bit & 64-bit)

# Technical Details Quest™ 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 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: with custom slits available.

Slit Option	Dimensions	Approx. Resolution 350-1050nm
10µm	10µm wide x 1mm high	~1.0nm
25µm	25µm wide x 1mm high	~1.5nm
50µm	50µm wide x 1mm high	~2.2nm
100µm	100µm wide x 1mm high	~4.0nm
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

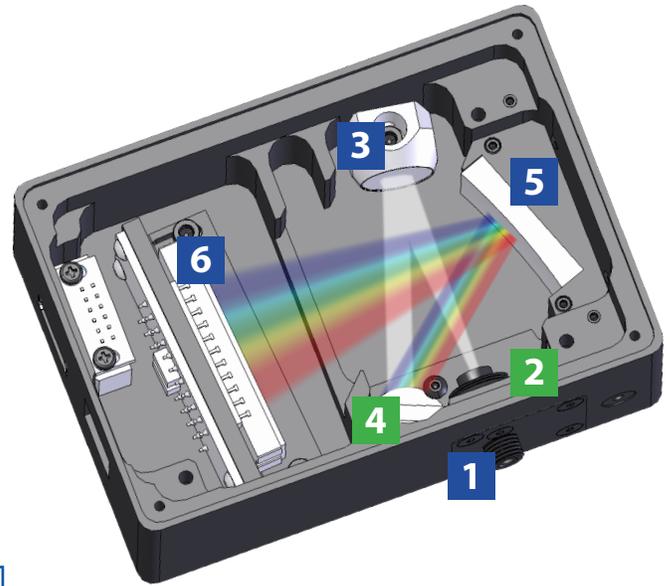
## Diffraction Grating

### 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 a key parameter in optimizing the spectrometer's performance. The blaze angle determines the maximum efficiency the grating will have in a specific wavelength region.

Best Efficiency	Spectral Coverage (nm)	Grating
UV / NIR	200 - 850	600/250
UV / NIR	350 - 1050	600/400
Vis	380 - 750	900/500
Vis / NIR	550 - 1050	830/800
NIR	750 - 1050	1200/750
Custom Configurations Available		



Standard

## Focusing Mirror

### 5 Refocuses Dispersed Light onto Detector

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## Array Detector

### 6 Measures Entire Spectrum Simultaneously

The Quest™ X features a 2048 x 1 linear 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 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	~65,000 e
Digitization Rate	>2.0 MHz

