DESCRIPTION de SPECTROMETRE COMPACT

en configuration « de Czerny-Turner croisée »

Les pages suivantes sont extraites des manuels décrivant le fonctionnement des **spectromètres USB4000** (p 27/28), **HR4000** (p 27/28) **et QE65000** (p 25/26) produits par la société Ocean Optics.

Ces documents sont disponibles sur le site : <u>http://www.oceanoptics.com/technical.asp</u>)



Ils exploitent tous trois la **configuration dites de** « **de Czerny-Turner croisée** » qui est aussi celle du spectromètre utilisé dans ce TP, soit le B&WTEK BRC112E V-03 diffusé en Europe par la société Edmund.

La note décrivant notre spectromètre est disponible sur le site B&WTEK (bouton « pdf Datasheet » de la page : <u>http://www.bwtek.com/Spectrometers/BRC112E-V.php</u>). Il n'y a pas de description graphique actuellement disponible pour ce produit.



Appendix C

Specifications

Overview

This appendix contains information on spectrometer operation, specifications, and system compatibility. It also includes accessory connector pinout diagrams and pin-specific information.

How the USB4000 Works

Below is a diagram of how light moves through the optical bench of an USB4000 Spectrometer. The optical bench has no moving parts that can wear or break; all the components are fixed in place at the time of manufacture. Items with an asterisk (*) are user-specified.



USB4000 Spectrometer with Components

See <u>USB4000 Components Table</u> on the following page for an explanation of the function of each numbered component in the USB4000 Spectrometer in this diagram.



USB4000 Components Table

Ocean Optics permanently secures all components in the USB4000 at the time of manufacture. Only Ocean Optics technicians can replace interchangeable components, where noted.

ltem	Name	Description
1	SMA 905 Connector	Secures the input fiber to the spectrometer. Light from the input fiber enters the optical bench through this connector.
2	Slit	A dark piece of material containing a rectangular aperture, which is mounted directly behind the SMA Connector. The size of the aperture (from 5 μ m to 200 μ m) regulates the amount of light that enters the optical bench and controls spectral resolution.
		You can also use the USB4000 without a Slit. In this configuration, the diameter of the fiber connected to the USB4000 determines the size of the entrance aperture.
		Only Ocean Optics technicians can change the Slit.
3	Filter	Restricts optical radiation to pre-determined wavelength regions. Light passes through the Filter before entering the optical bench. Both bandpass and longpass filters are available to restrict radiation to certain wavelength regions.
		Only Ocean Optics technicians can change the Filter.
4	Collimating Mirror	Focuses light entering the optical bench towards the Grating of the spectrometer. Specify standard or SAG+.
		Light enters the spectrometer, passes through the SMA Connector, Slit, and Filter, and then reflects off the Collimating Mirror onto the Grating.
5	Grating	Diffracts light from the Collimating Mirror and directs the diffracted light onto the Focusing Mirror. Gratings are available in different groove densities, allowing you to specify wavelength coverage and resolution in the spectrometer.
		Only Ocean Optics technicians can change the Grating.
6	Focusing Mirror	Receives light reflected from the Grating and focuses first-order spectra onto the detector plane.
7	L4 Detector Collection Lens	An optional component that attaches to the Detector to increase light-collection efficiency. It focuses light from a tall slit onto the shorter Detector elements.
		The L4 Detector Collection Lens should be used with large diameter slits or in applications with low light levels. It also improves efficiency by reducing the effects of stray light.
		Only Ocean Optics technicians can add or remove the L4 Detection Collection Lens.
8	Detector (UV or VIS)	Collects the light received from the Focusing Mirror or L4 Detector Collection Lens and converts the optical signal to a digital signal. Each pixel on the Detector responds to the wavelength of light that strikes it, creating a digital response. The spectrometer then transmits the digital signal to the SpectraSuite application.

Appendix B

Specifications

Overview

This appendix contains information on spectrometer operation, specifications, and system compatibility. It also includes accessory connector pinout diagrams and pin-specific information.

How the HR4000 Works

Below is a diagram of how light moves through the optical bench of an HR4000 Spectrometer. The optical bench has no moving parts that can wear or break; all the components are fixed in place at the time of manufacture. Items with an asterisk (*) are user-specified.



HR4000 Spectrometer with Components

See <u>*HR4000 Components Table*</u> on the following page for an explanation of the function of each numbered component in the HR4000 Spectrometer in this diagram.



HR4000 Components Table

Ocean Optics permanently secures all components in the HR4000 at the time of manufacture. Only Ocean Optics technicians can replace interchangeable components, where noted.

ltem	Name	Description
1	SMA Connector	Secures the input fiber to the spectrometer. Light from the input fiber enters the optical bench through this connector.
2	Slit	A dark piece of material containing a rectangular aperture, which is mounted directly behind the SMA Connector. The size of the aperture regulates the amount of light that enters the optical bench and controls spectral resolution. You can also use the HR4000 without a Slit. In this configuration, the diameter of the fiber connected to the HR4000 determines the size of the entrance aperture. Only Ocean Optics technicians can change the Slit.
3	Filter	Restricts optical radiation to pre-determined wavelength regions. Light passes through the Filter before entering the optical bench. Both bandpass and longpass filters are available to restrict radiation to certain wavelength regions. Only Ocean Optics technicians can change the Filter.
4	Collimating Mirror	Focuses light entering the optical bench towards the Grating of the spectrometer. Light enters the spectrometer, passes through the SMA Connector, Slit, and Filter, and then reflects off the Collimating Mirror onto the Grating.
5	Grating	Diffracts light from the Collimating Mirror and directs the diffracted light onto the Focusing Mirror. Gratings are available in different groove densities, allowing you to specify wavelength coverage and resolution in the spectrometer. Only Ocean Optics technicians can change the Grating.
6	Focusing Mirror	Receives light reflected from the Grating and focuses the light onto the CCD Detector or L2 Detector Collection Lens (depending on the spectrometer configuration).
7	L2 Detector Collection Lens	An optional component that attaches to the CCD Detector. It focuses light from a tall slit onto the shorter CCD Detector elements. The L2 Detector Collection Lens should be used with large diameter slits or in applications with low light levels. It also improves efficiency by reducing the effects of stray light. Only Ocean Optics technicians can add or remove the L2 Detection Collection Lens.
8	CCD Detector (UV or VIS)	Collects the light received from the Focusing Mirror or L2 Detector Collection Lens and converts the optical signal to a digital signal. Each pixel on the CCD Detector responds to the wavelength of light that strikes it, creating a digital response. The spectrometer then transmits the digital signal to the OOIBase32 application.

Appendix B

Specifications

Overview

This appendix contains information on spectrometer operation, specifications, and system compatibility. It also includes accessory connector pinout diagrams and pin-specific information.

How the QE65000 Works

Below is a diagram of how light moves through the optical bench of a QE65000 Spectrometer. The optical bench has no moving parts that can wear or break; all the components are fixed in place at the time of manufacture.



QE65000 Spectrometer with Components



QE65000 Components Table

Ocean Optics permanently secures all components in the QE65000 at the time of manufacture. Only Ocean Optics technicians can replace interchangeable components, where noted.

ltem	Name	Description
1	SMA Connector	Secures the input fiber to the spectrometer. Light from the input fiber enters the optical bench through this connector.
2	Slit	A dark piece of material containing a rectangular aperture, which is mounted directly behind the SMA Connector. The size of the aperture regulates the amount of light that enters the optical bench and controls spectral resolution.
		You can also use the QE65000 without a Slit. In this configuration, the diameter of the fiber connected to the QE65000 determines the size of the entrance aperture.
		Only Ocean Optics technicians can change the Slit.
3	Filter	Restricts optical radiation to pre-determined wavelength regions. Light passes through the Filter before entering the optical bench. Both bandpass and longpass filters are available to restrict radiation to certain wavelength regions.
		Only Ocean Optics technicians can change the Filter.
	Collimating Mirror	Focuses light entering the optical bench towards the Grating of the spectrometer.
4		Light enters the spectrometer, passes through the SMA Connector, Slit, and Filter, and then reflects off the Collimating Mirror onto the Grating.
5	Grating	Diffracts light from the Collimating Mirror and directs the diffracted light onto the Focusing Mirror. Gratings are available in different groove densities, allowing you to specify wavelength coverage and resolution in the spectrometer.
		Only Ocean Optics technicians can change the Grating.
6	Focusing Mirror	Receives light reflected from the Grating and focuses the light onto the CCD Detector or L2 Detector Collection Lens (depending on the spectrometer configuration).
7	Back- thinned Area Detector with TE	Provides 90% quantum efficiency and bins pixels in a vertical column to acquire light form the entire height of the spectrometer's slit image. This improves light collection and signal-to-noise significantly. This 2D area detector is back-thinned (back-illuminated) and does not require the detector upgrade that is normally applied to other detectors.
	Cooling	Only Ocean Optics technicians can add or remove the Detector.
8	Detector with OFLV Filter	Eliminates second-order effects and is used with an HC-1 Grating in a 200-950 nm wavelength system in a QE65000.