Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of three years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use. Bulbs for the light source are covered by a one-year warranty. This product is manufactured by Ocean Optics, Inc.

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Red Tide Emission Spectrometer

(Order Code: ESRT-VIS)

The Ocean Optics Red Tide Emission Spectrometer is a portable spectrometer designed to measure emissions from a wide variety of light sources.

What is included with the emission spectrometer?

- One spectrometer
- One USB cable

Software Requirements

Logger *Pro*® 3 (version 3.8.5 or newer) software is required. If you own a previous version of Logger *Pro* 3, you may upgrade the software free of charge. You need the LabQuest® application version 1.1 or newer to use a LabQuest 2 or original LabQuest as a standalone device with a spectrometer. Visit http://www.vernier.com/LabQuest/updates

NOTE: Vernier products are designed for educational use. Our products are not designed nor recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

Optical Fiber Assembly

We recommend that you purchase an optical fiber assembly (order code: VIS-NIR). The optical fiber will make your data collection easier, and the fiber helps protect the spectrometer's entrance slit from contamination by airborne particulates.

Get Started

Using a Spectrometer with Your Computer

1. Install Logger *Pro* 3 software (version 3.8.5 or newer) on your computer before using an Ocean Optics spectrometer.
2. Connect the spectrometer to a powered USB port or a powered hub.
3. The first time you connect a spectrometer, your computer may ask you a few questions. **Note:** Do not go online for device drivers. The device drivers were installed when you installed Logger *Pro* 3.

- Windows computers (Windows XP or Vista) Follow the New Hardware Wizard instructions to download the drivers automatically.
- Macintosh computers (Mac OS 10.3 or newer) If it appears, follow the New Device instructions.

Measure an Emission Spectrum

1. Connect an optical fiber assembly to the spectrometer.
2. Use a USB cable to connect the spectrometer to your computer.
3. Start Logger *Pro* 3.
4. Choose Change Units ► Spectrometer ► Intensity from the Experiment menu. Intensity is a relative measure.
5. Aim the tip of the optical fiber cable at a light source. Click Collect. Click Stop to end data collection. If the spectrum maxes out (flat, wide peaks at 1.0), increase the distance between the light source and the tip of the optical fiber cable or reduce the sample time. To change the data collection parameters, choose Set Up Sensors ► Spectrometer from the Experiment menu. Set the Sample Time to a suitable value and decrease the Samples to Average to 1.

Getting Optimum Results

As previously stated, Logger *Pro* 3 measures the intensity of light emission as a relative, unitless, value scaled from 0 to 1. When you collect emission data, make sure that the maximum intensity measurement is less than 1.0. The easiest way to adjust the intensity readings is to move the tip of the optical fiber farther away, or closer to, the light source. You can also adjust the settings in Logger *Pro* 3 to optimize the intensity measurements. These options are described in the next section.

Changing the Settings in Logger *Pro* 3

The spectrometer dialog box lists all of the settings for the device. To display this box choose Set Up Sensors ► Show All Interfaces from the Experiment menu.

There are four parameters listed in the dialog box.

- Sample Time: think shutter speed of a camera. The maximum sample time is 100 milliseconds.
- Wavelength Smoothing: not necessary to change for emission readings.
- Samples to Average: the number of readings taken at a given wavelength to calculate an average reading. It can be set at 1 for emission measurements.
- Wavelength Range: the range is determined by the type of spectrometer in use.

Using the Stored Emissions Files in Logger *Pro* 3

Logger *Pro* 3 contains a folder of emissions graphs from selected discharge tubes, including: argon, helium, hydrogen, mercury, oxygen, sodium, and xenon. You can display and analyze these graphs without a spectrometer connected to your computer. Follow the steps below to view one of these graphs.

1. Choose Open from the File menu.
2. Open the Sample Data folder.
3. Inside the Sample Data folder, open the Physics folder.
4. Inside the Physics folder, open the Gas Discharge Spectra folder. Open the desired file.

Overlaying Data on the Same Graph

You may wish to bring data from another Logger *Pro* 3 file into a current file. This is easily done. Let's use the example of testing the fluorescent lighting in your classroom for the presence of mercury. Follow these steps in Logger *Pro* 3.

1. Measure the emission spectrum of a fluorescent lamp.
2. Open the File menu and choose Import From ► Logger Pro file.
3. From the Experiment folder, open Sample Data ► Physics ► Gas Discharge Spectra ► Mercury.
4. Place your cursor anywhere on the Logger *Pro* 3 graph screen and double click. In the Graph Options dialog box, click the Options tab.
5. In the Y-axis Columns box, open Run 1 and check the box next to Intensity. Click Done.

Measure an Emission Spectrum with a LabQuest 2 or Original LabQuest

1. Connect an optical fiber assembly to the spectrometer.
2. Use the USB cable to connect the spectrometer to a LabQuest 2 or LabQuest.
3. Turn on the LabQuest 2 or LabQuest. The LabQuest app will launch automatically and the meter screen will be displayed.
4. On the meter screen, tap Change Units ► USB:Spectrometer ► Intensity from the Sensors menu.
5. Aim the tip of the optical fiber cable at a light source. Start data collection. Tap the red Stop button to end the data collection.

If the spectrum maxes out (flat and wide peaks at 1.0), increase the distance between the light source and the tip of the optical fiber cable or reduce the sample time. To change the data collection parameters, tap Sensors and choose Data Collection. Set the Sample Time to a suitable value and decrease the Samples to Average to 1.

Sample Experiments

There are several experiments available for use with the Spectrometer. You may download the labs from our web site (www.vernier.com/spectroscopy).

Specifications

Ocean Optics Red Tide Emission Spectrometer (order code: ESRT-VIS)

Dimensions: 6.3 cm × 8.7 cm × 3 cm

Power: from computer via USB cable

Wavelength Range: 380 nm–950 nm

Resolution: 1 nm