Vernier Emissions Spectrometer
(Order Code: VSP-EM)

The Vernier Emissions Spectrometer is a portable spectrometer designed to measure emissions from a wide variety of light sources.

What is Included with the Vernier Emission Spectrometer?
- Spectrometer
- USB cable

Software Requirements
Logger *Pro*® 3 (version 3.8.6.2 or newer) software is required if you are using a computer. LabQuest App version 2.2.1, or newer, is required if you are using LabQuest 2. LabQuest App 1.7.1, or newer, is required if you are using the original LabQuest. Visit www.vernier.com/downloads to update your software.

NOTE: Vernier products are designed for educational use. Our products are not designed nor are they 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.

Safety
- No user-serviceable parts are in this device. Do not attempt to open or modify this device. Contact Vernier for all repairs and service.
- Handle the device with care. This instrument can be damaged if it is dropped.
- Do not use this instrument for clinical or diagnostic procedures.

Using the Vernier Emissions Spectrometer with Your Computer
Getting Started
1. Ensure Logger *Pro* software (version 3.8.6.2 or newer) is installed on your computer before using the Vernier Emissions Spectrometer.
2. Connect the Vernier Emissions Spectrometer to your computer with the supplied USB cable.
3. Start Logger *Pro* software on your computer.

Measuring Emission Spectra
You may use your spectrometer to measure the emission spectrum of a light source such as an LED or a gas discharge tube. To do so, you may wish to purchase an optical fiber assembly (www.vernier.com/VSP-EM) though this is not required.

Measure Intensity of Light Emissions
Intensity is reported in relative units with a range of 0–1. **Note:** The spectrometer is not calibrated for measuring absolute intensity.

Aim the sensor opening or the tip of the optical fiber cable at a light source. Click Collect. Click Stop to end data collection.

If the spectrum saturates, displaying flat and wide peaks near 1.0, increase the distance between the light source and the sensor or tip of the optical fiber cable. You can also adjust data-collection parameters by choosing Set Up Sensors ► Spectrometer from the Experiment menu. Reduce the Sample Time until peaks are less than 1.0

Under some circumstances, you may want to intentionally saturate some peaks in order to display weaker features. For example, in viewing a hydrogen spectrum, you may safely saturate the red 656 nm line in order to see the blue lines near 400 nm.

Changing the Settings in Logger *Pro* 3
Spectrometer Dialog Box
The Spectrometer dialog box lists all the settings for the device. To display this box choose Set Up Sensors ► Spectrometer from the Experiment menu.

For most experiments, the default settings work well.

There are four parameters listed in the dialog box.
- **Sample Time**: this is similar to the shutter speed of a camera. Logger *Pro* has a stored sample time. You may need to change the sample time manually.
- **Wavelength Smoothing**: the number of adjacent readings on either side of a given value that is used to calculate an average value. Large values will broaden sharp peaks.
- **Samples to Average**: the number of scans taken to calculate an average scan. Use a value more than 1 to reduce noise.
- **Wavelength Range**: the range is determined by the type of spectrometer in use.

By clicking on the picture of the spectrometer in this dialog box, you will gain access to four options: calibrate, configure data collection, go to the support web page, and units of measure. Click on an item to select it.

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. Using the example of testing the fluorescent lighting in a classroom for the presence of mercury, follow these steps in Logger *Pro*.

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* 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 select the check box next to Intensity. Click Done.

Measuring an Emission Spectrum with a LabQuest

You may use your spectrometer to measure the emission spectrum of a light source such as an LED or a gas discharge tube. To do so, you may wish to purchase an optical fiber assembly (www.vernier.com/VSP-EM) though this is not required.

Measure Intensity of Light Emissions

Intensity is reported in relative units with a range of 0–1. **Note:** The spectrometer is not calibrated for measuring absolute intensity.

Aim the sensor opening or the tip of the optical fiber cable at a light source. Start data collection. Tap the red Stop button to end data collection.

If the spectrum saturates, displaying flat and wide peaks near 1.0, increase the distance between the light source and the sensor or tip of the optical fiber cable. You can also adjust data-collection parameters by tapping Sensors and choosing Data Collection. Reduce the Sample Time until peaks are less than 1.0.

Sample Experiments

There are several experiments available for use with the Vernier Emissions Spectrometer. Visit our web site (www.vernier.com/vsp-em) for more information.

Specifications

Dimensions	10.1 cm × 7.0 cm × 4.5 cm
Power supply	USB powered
Detector	Linear CCD
Wavelength range	350 nm–900 nm
Wavelength reporting interval	1 nm
Optical resolution*	3 nm
Typical wavelength accuracy†	±2 nm

*as determined by the full width of half maximum of Hydrogen 434 nm peak

†as determined by Hydrogen peaks. For best accuracy use an optical fiber.

Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use.

Vernier

Measure. Analyze. Learn.™

Vernier Software & Technology

13979 S. W. Millikan Way • Beaverton, OR 97005-2886

Toll Free (888) 837-6437 • (503) 277-2299 • FAX (503) 277-2440

info@vernier.com • www.vernier.com

Rev. 1/2/2014

Logger *Pro*, Logger Lite, Vernier LabQuest, Vernier LabQuest Mini, Vernier LabPro, Go! Link, Vernier EasyLink and other marks shown are our trademarks or registered trademarks in the United States.

All other marks not owned by us that appear herein are the property of their respective owners, who may or may not be affiliated with, connected to, or sponsored by us.

Printed on recycled paper.