

Ocean Optics R-2000 Raman Spectrometer

Setup and Operating Instructions

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References

Raman Systems R-2000 Operating Manual, Version 1.6, Ocean Optics, Inc.

Ocean Optics web site, URL <http://www.oceanoptics.com/productsheets/R2001.asp>

Kazuo Nakamoto, *Infrared and Raman Spectra of Inorganic and Coordination Compounds*, Part A and Part B. 5th ed. Wiley-Interscience, New York, NY, 1997.

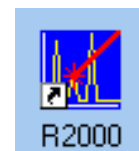
Joseph B. Lambert, Herbert F. Shurvell, David A. Lightner, and R. Graham Cooks. *Organic Structural Spectroscopy*. Prentice-Hall, Upper Saddle River, NJ, 1998, Chapter 7 and 8.

Getting Started

Laser Safety: wear laser safety goggles while working with the Raman spectrometer.

Start up the R-2000 software. An icon is on the desktop.

The PC is a Gateway 486, ID 1587, bucky.augie.edu, IP 192.103.41.90, under Windows 95.



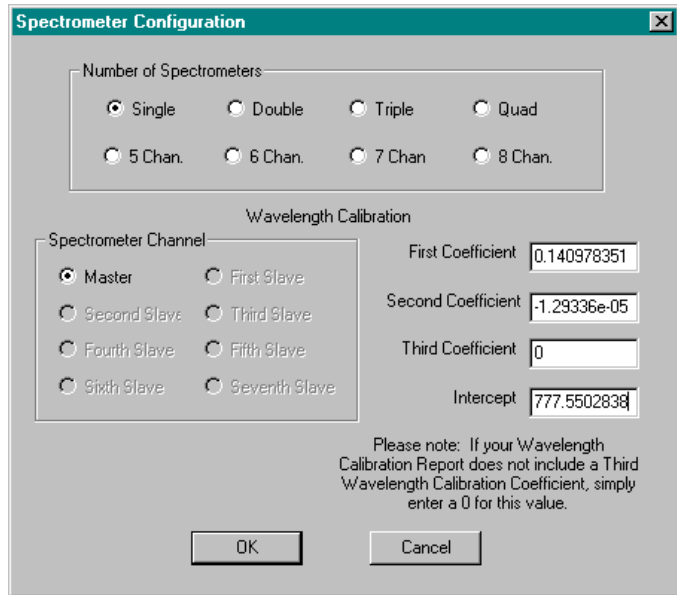
Setup|Configure Hardware

The Ocean Optics PC2000-UV-VIS-ISA fiber optic spectrometer is also installed on this PC. As a result, there is the possibility that hardware configurations for the two systems can interact. At the beginning of a session working with the Ocean Optics R-2000 Raman Spectrometer, make the menu choice **Setup|Configure Hardware** and verify or restore settings to those shown here. Then click on OK.

A screenshot of the 'Configure Hardware' dialog box. The title bar is green and contains the text 'Configure Hardware'. Below the title bar, the text 'Ocean Optics Windows Device Driver -- 32-bit' and 'Version: 3.01.00' are displayed. The dialog box contains several settings: 'Spectrometer Type' is set to 'S2000/PC2000' (dropdown), 'A/D Converter Type' is set to 'ADC500/PC1000' (dropdown), 'Base Address (I/O Range)' is set to '864 (0x0360)' (dropdown), 'Serial Port' is set to '1' (dropdown), 'SAD500 Pixel Resolution' is set to '1' (text input), 'S2000BT First Pixel' is set to '950' (text input), 'IRQ (Interrupt Request)' is set to '5' (dropdown), and 'Baud Rate' is set to '57600' (dropdown). There is an unchecked checkbox for 'Compress SAD500 Data'. At the bottom, there are 'OK' and 'Cancel' buttons.

Setup|Configure Spectrometer

Make this menu selection, and verify or restore settings to those shown here. Then click on OK.



The **Spectrometer Configuration** dialog box is shown. It has a title bar with a close button. The main area is divided into two sections: "Number of Spectrometers" and "Wavelength Calibration".

Number of Spectrometers: Radio buttons for Single (selected), Double, Triple, Quad, 5 Chan., 6 Chan., 7 Chan., and 8 Chan.

Wavelength Calibration: Radio buttons for Spectrometer Channel: Master (selected), First Slave, Second Slave, Third Slave, Fourth Slave, Fifth Slave, Sixth Slave, and Seventh Slave.

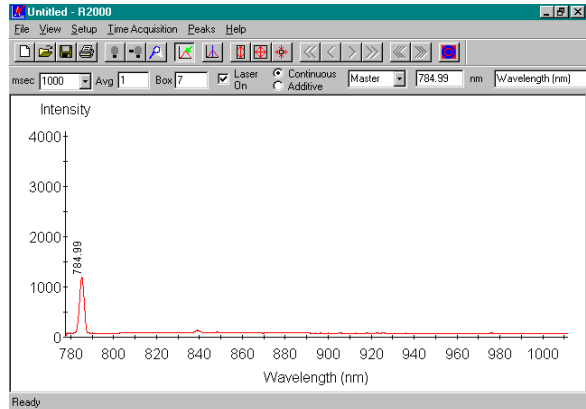
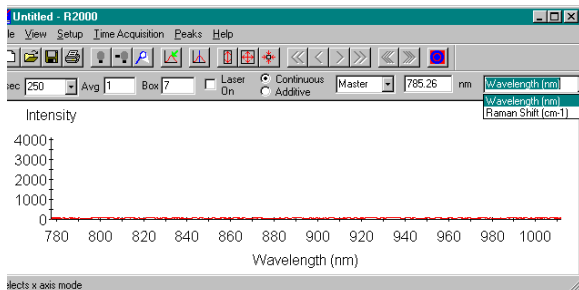
Calibration coefficients are entered in text boxes: First Coefficient (0.140978351), Second Coefficient (-1.29336e-05), Third Coefficient (0), and Intercept (777.5502838).

A note at the bottom right states: "Please note: If your Wavelength Calibration Report does not include a Third Wavelength Calibration Coefficient, simply enter a 0 for this value."

Buttons for OK and Cancel are at the bottom.

Setting the Laser Wavelength

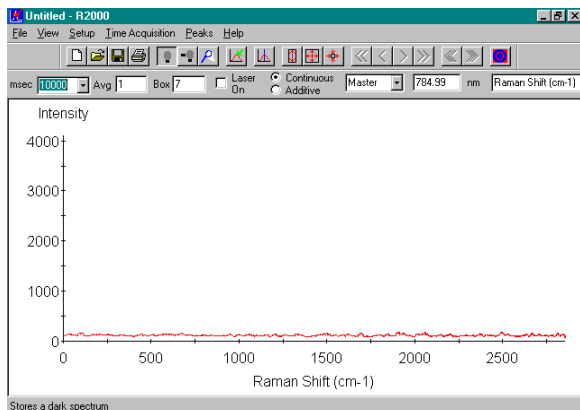
While wearing laser safety goggles, and with laser turned off, place the laser probe tip in 2-propanol in a brown bottle, inside the black can, and put on the black cover loosely. Menu select **Wavelength (nm)** as the Acquisition Mode.. Set other parameters as shown. Turn on the laser (key and interlock) and click **Laser On** Measure the laser peak position (approximately 785 nm), and set the laser wavelength to that value (784.99 nm in the sample screen shown.)



Turn off the laser (**deselect** Laser On). Restore the Acquisition Mode to **Raman Shift (cm-1)**.

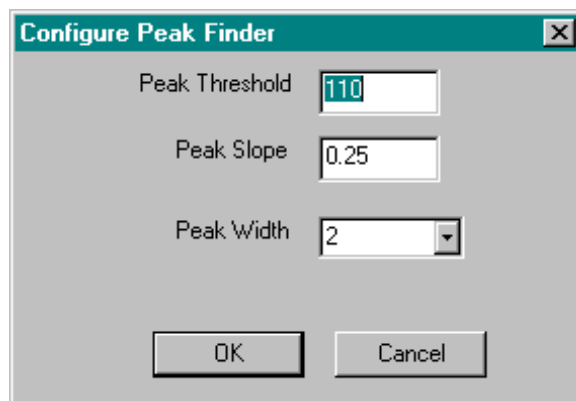
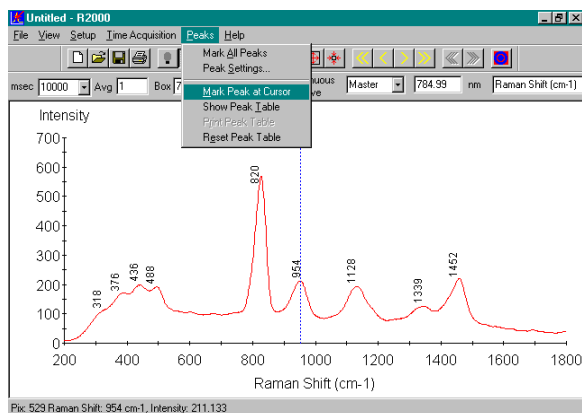
Dark Current

Be sure the laser is turned **off**. It is best to turn off the laser key (and **deselect** Laser On). Set integration time to 10000 msec. After 20 seconds or so, a smoothed dark current will be on screen. Save it with the **Store Dark** menu icon. Click on the **Subtract Dark** menu icon.



Sample Raman Spectrum

With the laser off and your laser goggles on, rinse off the laser probe tip and gently dry it with tissue. Place the laser probe tip in your liquid sample in a brown bottle, inside the black can, and put on the black cover loosely. Turn on the laser with the key and click **Laser On**. After 20 seconds or so the Raman spectrum will appear on screen. The Raman spectrum of 2-propanol is illustrated.



Peak selection can be done automatically with menu choice **Peaks|Mark All Peaks**, which is sensitive to the settings in **Peaks|Peak Settings**. Sample settings are shown in the Configure Peak Finder box. It is also possible to move a cursor to a peak manually, and then menu select **Peaks|Mark Peak at Cursor**, as shown.

Solid Samples

An extra line filter is necessary. See Arlen Viste for assistance.

Shutdown and Cleanup

Turn off the laser with key, and return key and interlock to Arlen Viste. Rinse off the laser probe tip, and wipe gently with tissue. Replace plastic cover on laser tip.