

Operating Instructions for the Ocean Optics PC2000-UV-VIS-ISA
PC Plug-In Fiber Optic Spectrometer

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Start up the OOIBase 32 v 1.0 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.



Turning Instrument On:

1. Turn on rocker switch located in rear of the light source AIS Model DT 1000 (box to right of monitor). The green power light should light up.
2. Turn visible source on by pressing the “Vis. On” button (red led should light up).
3. Turn UV source on by pressing the “Heater On” button (yellow light should light up).
4. When the UV source is ready the red light will turn on.

Taking Spectra:

1. Obtain quartz 1cm cuvettes from room 258 (Dr. Lindbeck’s Office)
2.
 - a) Open OOIBase32 V 1.0 program
 - b) Obtain a dark spectrum by placing black block in the CUV sample holder(this should give you a flat baseline)
 - c) Clicking on store dark located in the Spectrum window.
 - d) Save the dark in the appropriate folder (see desktop for complete instructions).
3.
 - a) Remove block and place a sample of nanopure(or any reference) in the CUV sample holder using a quartz 1cm cuvette making sure the frosted edges are facing you so as not to block the signal. Also, make sure that all air bubbles are out of sample as well as fingerprints off of the cuvette.
 - b) Click on store reference in the Spectrum window.
 - c) Save the reference in the appropriate folder (see desktop for complete instructions).

***Caution:** Saving the dark and reference are essential to recalling the spectra.

4. a) Place sample in cuvette (this should be the same cuvette as used in Step 3 and should be thoroughly cleaned before the addition of the sample).
- b) Place cuvette in the CUV sample holder making sure the frosted edges are facing you. Make sure that all air bubbles are out of sample as well as fingerprints off of the cuvette.
- c) Subtract the dark by selecting the “Scope Mode Minus Dark” in the Spectrum menu.
- d) Change the mode to absorbance by selecting the toolbar “A” or “Absorbance in the Spectrum menu.
- e) Click on Save Sample in the File menu and save in appropriate manner (see desktop for complete instructions)..
- f) Remove cuvette, clean, and proceed to shutdown.

Shutdown:

1. Turn off UV and Vis sources on the light source.
2. Turn off rocker switch.
3. MAKE SURE THAT THE SOURCES ARE TURNED OFF.

Safety and Maintenance:

1. Always use appropriate lab precautions.
2. If working behind the instrument or with the light source wear UV protective goggles.
3. MAKE SURE THAT THE SOURCES ARE TURNED OFF.
4. Replace the black CUV cover to avoid dust accumulation in the instrument.

References

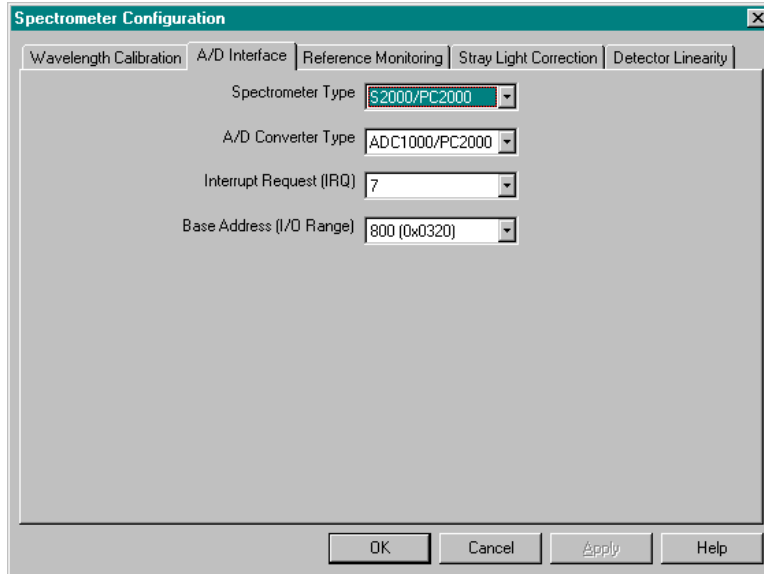
Operating Manual and User's Guide: S2000 Miniature fiber Optic Spectrometers and Accessories, Ocean Optics, Inc., 1999.

Ocean Optics web site, URL

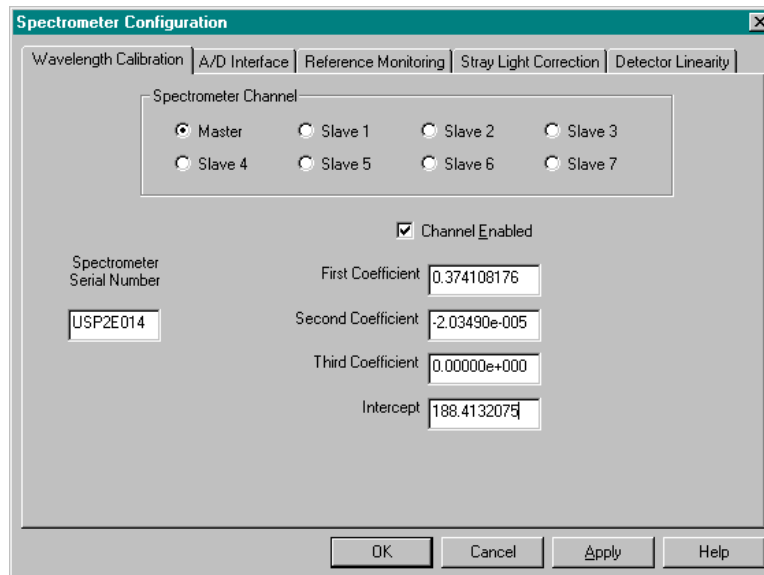
http://www.oceanoptics.com/productsheets/PC2000_UV_VIS.asp

Setup|Configure Hardware

The Ocean Optics PC2000-UV-VIS-ISA fiber optic spectrometer is also installed on this PC as the Ocean Optics R-2000 Raman Spectrometer. 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 PC2000-UV-VIS-ISA fiber optic spectrometer, it may be prudent to make the menu choice **Spectrometer|Configure|A/D Interface** and verify or restore settings to those shown here.



Menu choice Spectrometer|Configure|Wavelength Calibration

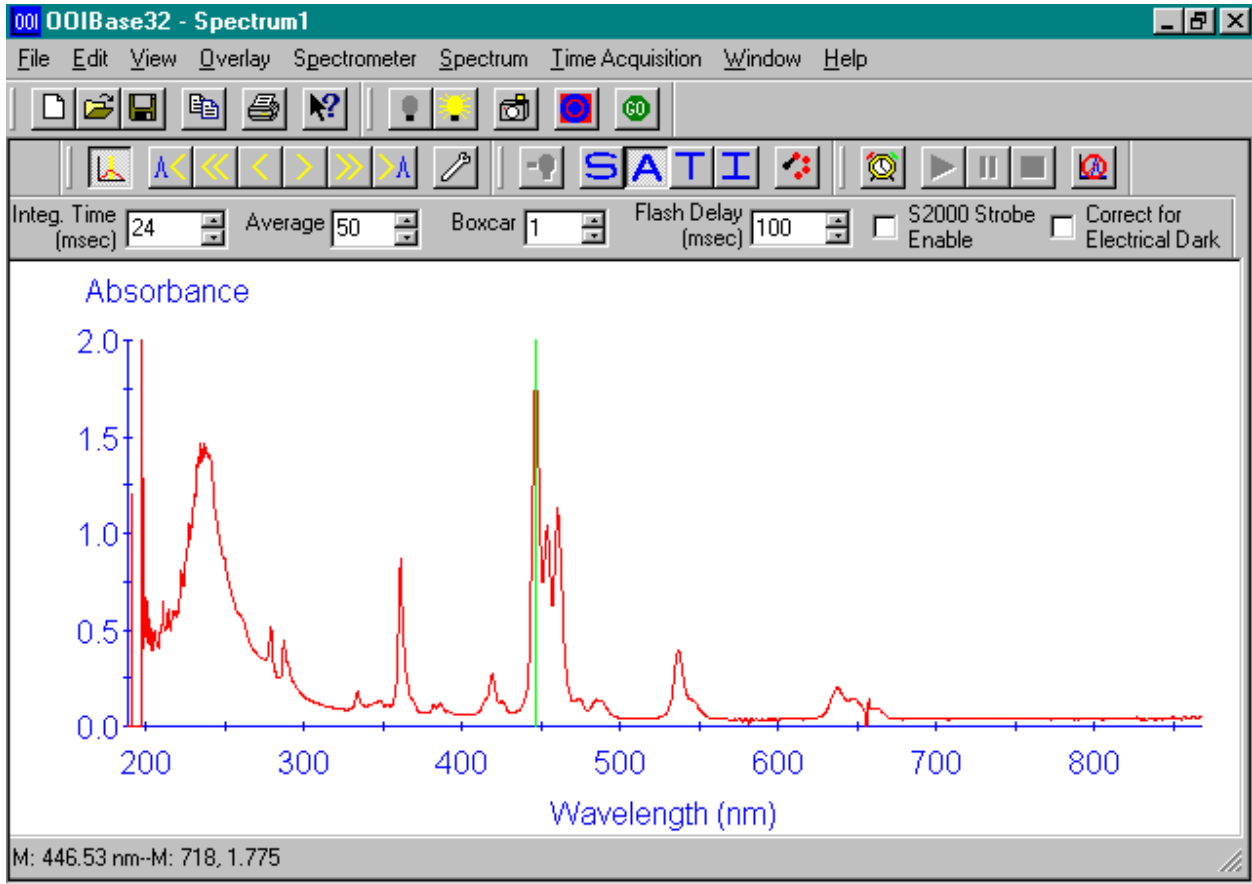


Again verify or restore settings to those shown here. Then click on OK. The default configuration file is currently stored as c:\OOIBase32\AVsetup\USP2E014.spec (however do not replace it without consulting Arlen Viste).

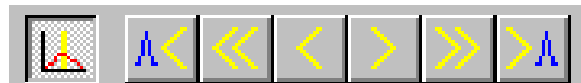
Wavelength calibration spectrum

The sample is holmium oxide glass, Ho_2O_3 , containing the Ho^{3+} ion with electron configuration $[\text{Xe}]4f^{11}$. The spectrum was taken as described above.

<http://www.cem.msu.edu/~cem333/HolmiumOxide.html>



Note particularly the cursor control menu buttons, which can be used to locate a peak and read its wavelength and absorbance. The cursor buttons which contain the letter A can search for the peak, with its maximum value of A, in the direction indicated.



The wavelength and absorbance of the selected peak are then displayed at the bottom of the screen. In this example the peak is read at wavelength $\lambda = 446.53$ nm, with absorbance $A = 1.775$ (at pixel 718).

M: 446.53 nm--M: 718, 1.775

One vendor source of calibration data indicates $\lambda = 445.8$ nm for this peak [Gilford]. The msu web site shows 445.5 nm. Ocean Optics calibration indicates that wavelength agreement is generally within a few tenths of a nanometer.

Wavelength calibration can also be done with Hg and Ar emission spectra.