

OCEAN – OPTICS® Chem 2000 Spectrophotometer



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Introduction

The *Ocean–Optics® Chem 2000 Spectrophotometer* is a small and easy-to use spectrophotometer, which can be used in the quantitative analysis of metal solutions and even some organic compounds.. The unit is located on a wheeled cart in room 109 of the Chemistry Building ▶. The system consists of the light source/detector unit, the computer, and a printer.



The Chem2000 system

System Specs

- The *Ocean–Optics® Chem2000 Spectrophotometer* uses a tungsten–halogen lamp capable of producing wavelengths from **350 nm to 900 nm**.
- The system only uses 1-cm square cuvettes. Round cuvettes will not fit.
- The spectrophotometer is connected to a PC by a fiber optic cable 0.40 mm in diameter, and 2 meters long.

Safety Considerations

Remember:

- Because fiber optics are very fragile, do not bend the fiber optic cable at sharp angles. Doing so may damage the optics. As a general rule, a bending radius of one inch should be considered dangerous.
- As with any instrument, use extreme care not to spill samples! If an accidental spill does occur, promptly clean it up.
- The light source produces heat as well as light, so the casing will become hot if the lamp is left on for more than a few minutes.

Avoiding Methodological Errors

Remember:

- Always hold cuvettes by their frosted sides. Make sure the clear sides are completely free of dust and scratches before inserting the cuvette into the detector.
- You must take new reference and dark samples (explained in Operating Instructions) after changing *any* parameter.
- Let the lamp warm up for at least 5 minutes before you start.

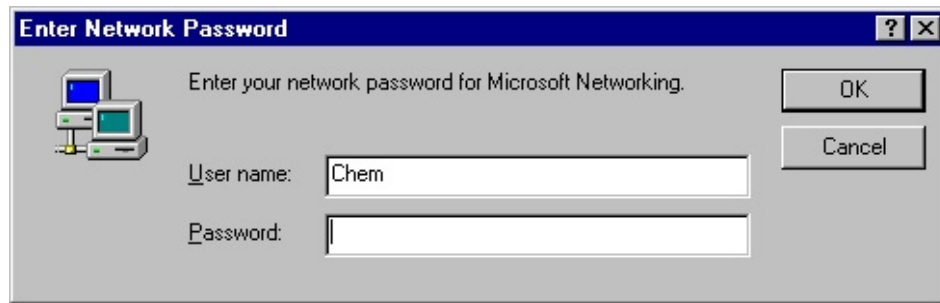
Basic Operation

1. Whether running an unknown sample or running standard solutions to make a standardization curve, the procedure is the same. Below is a detailed description of how a sample is run, from start to finish.
2. First the power strip on the cart needs to be plugged in to a wall outlet. The cord that needs to be plugged in is shown ▼.
3. Next, flip the switch on the power strip to “on” ▼.

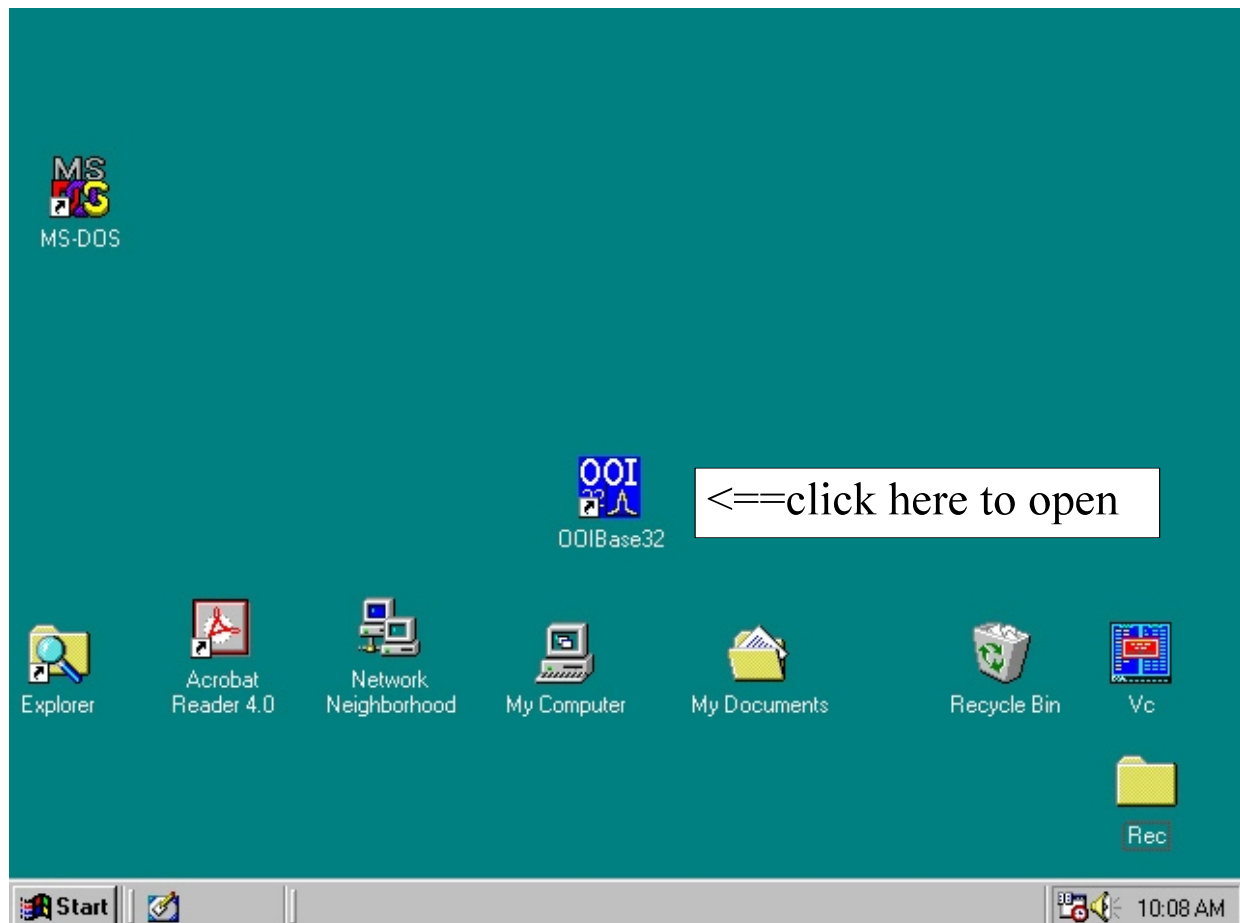


4. If the computer doesn't automatically turn on, press the on button (the blue button on the front of the computer).

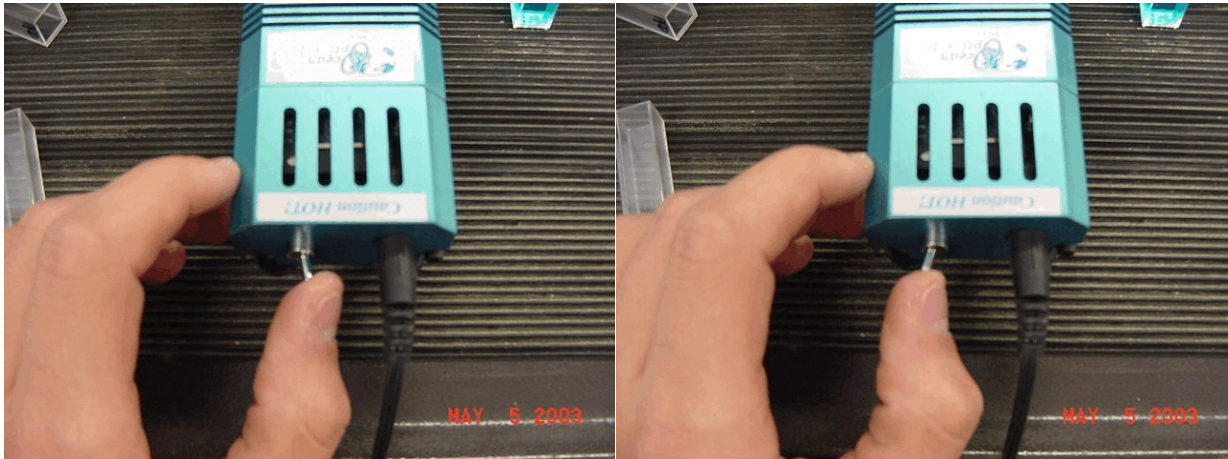
5. When the compute finishes booting up, you will see this screen ▼. Just click on *Cancel*.



6. Next, Open the software by clicking on the OOIBase icon ▼.



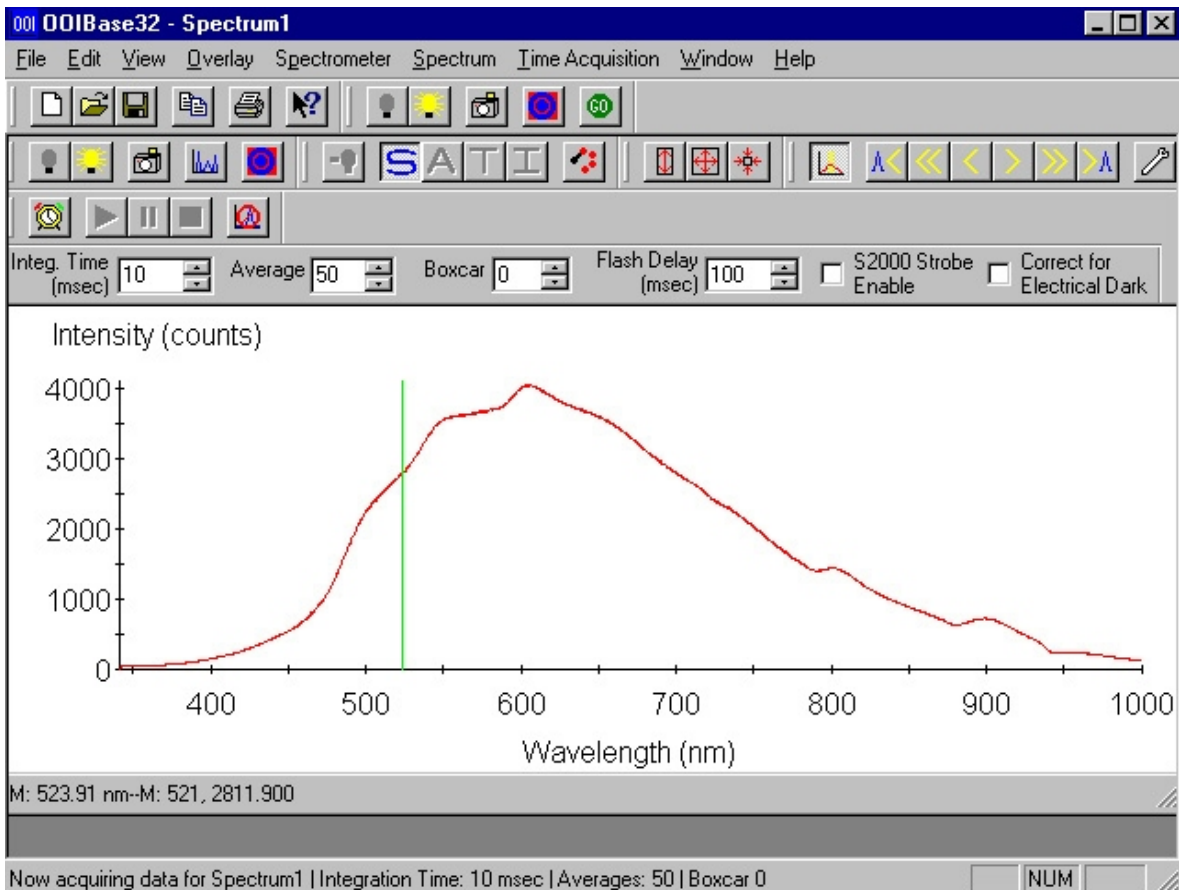
7. Now is a good time to turn on the light source. Flip the switch located on the back of the unit (the end that the blue cable is attached to) ▾.



OFF

ON

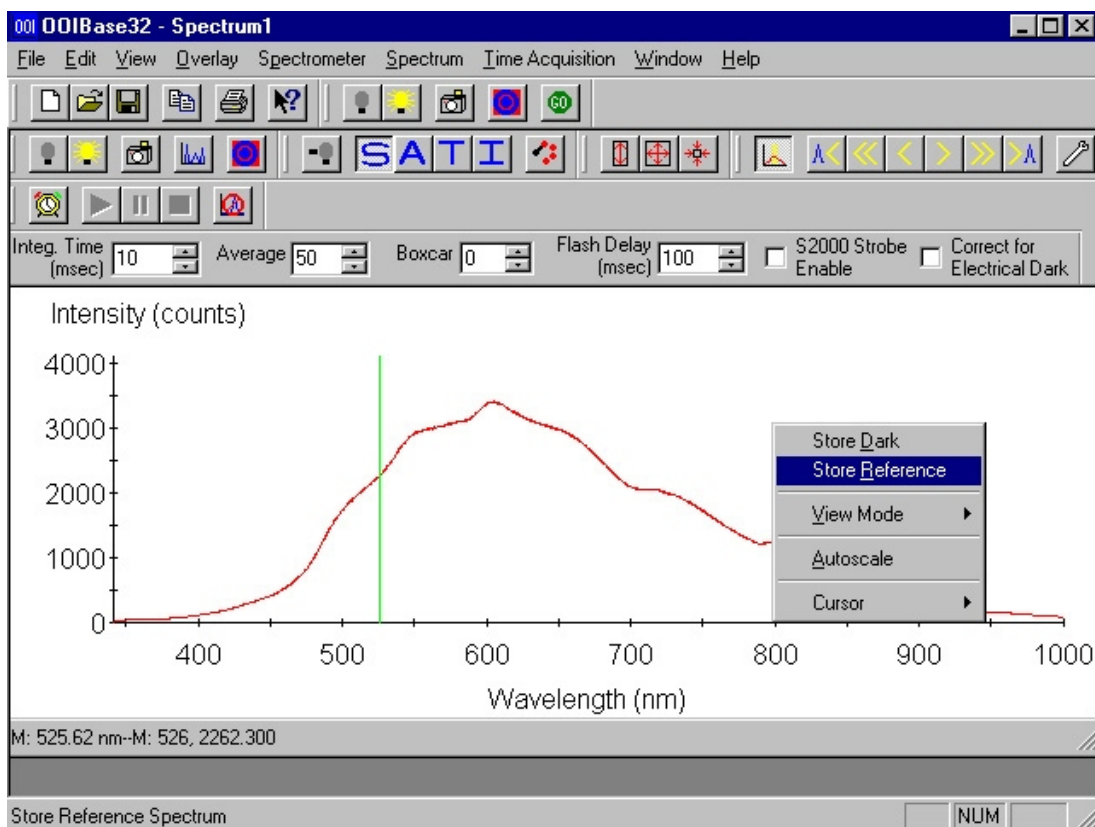
8. You should see something like this on the computer screen now:



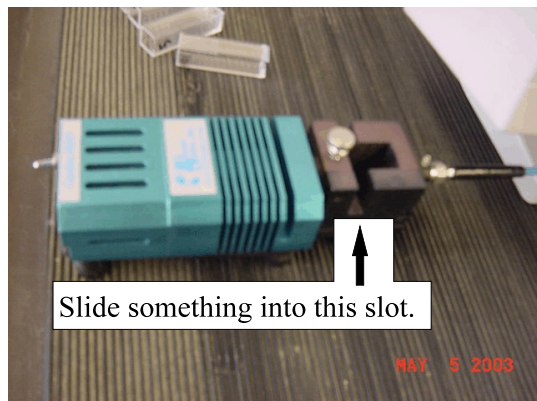
9. Insert a blank cuvette (a cuvette filled with the reference material— usually water). Make sure the lamp will shine through the *clear* faces of the cuvette, not the frosted faces. In the diagram below ▼, the cuvette would be inserted so that the clear sides are on the left and right, and the frosted sides are on the front and back.



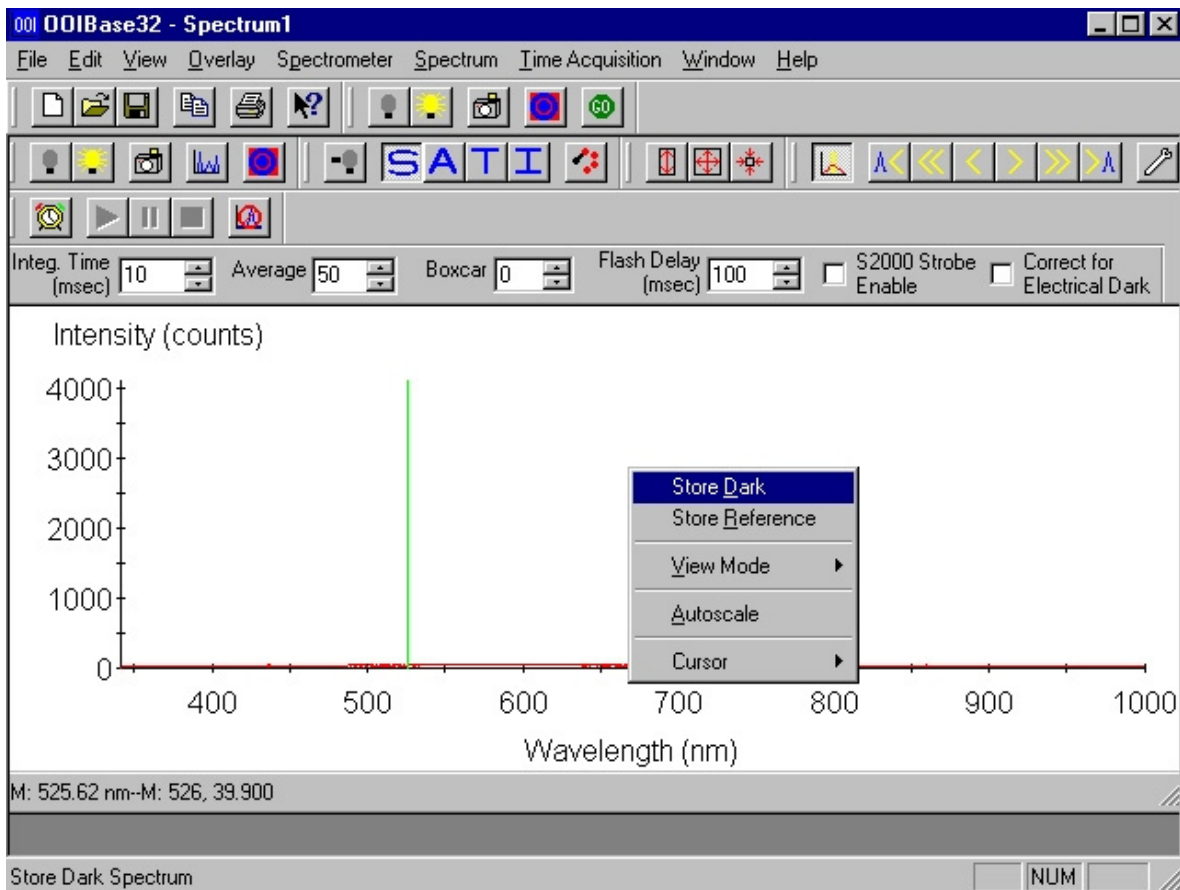
10. Now right-click on the graph, and select *Store Reference* ▼.



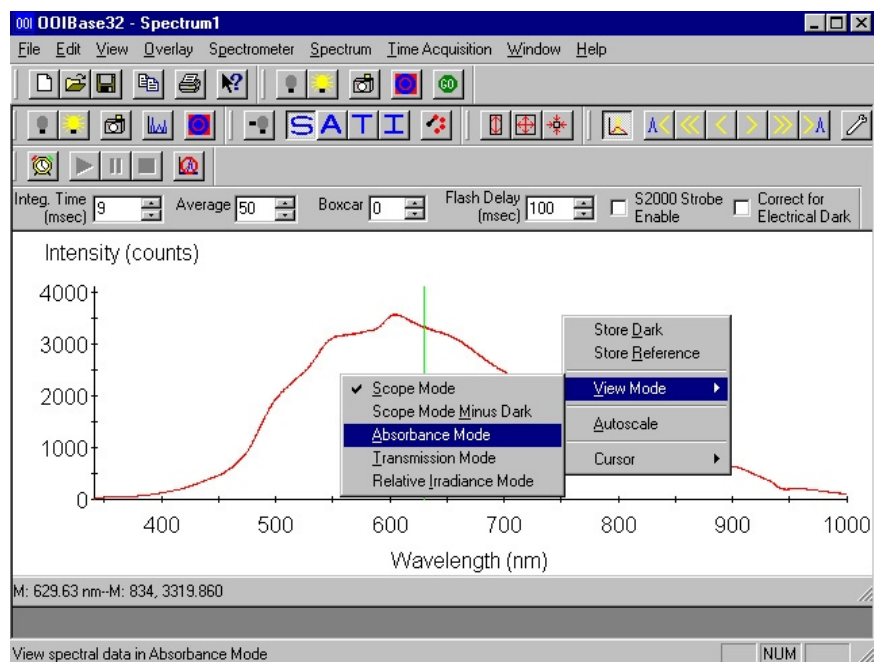
11. Block the light path by placing something into the slot ▼. A piece or two of paper is usually enough to completely block the light.



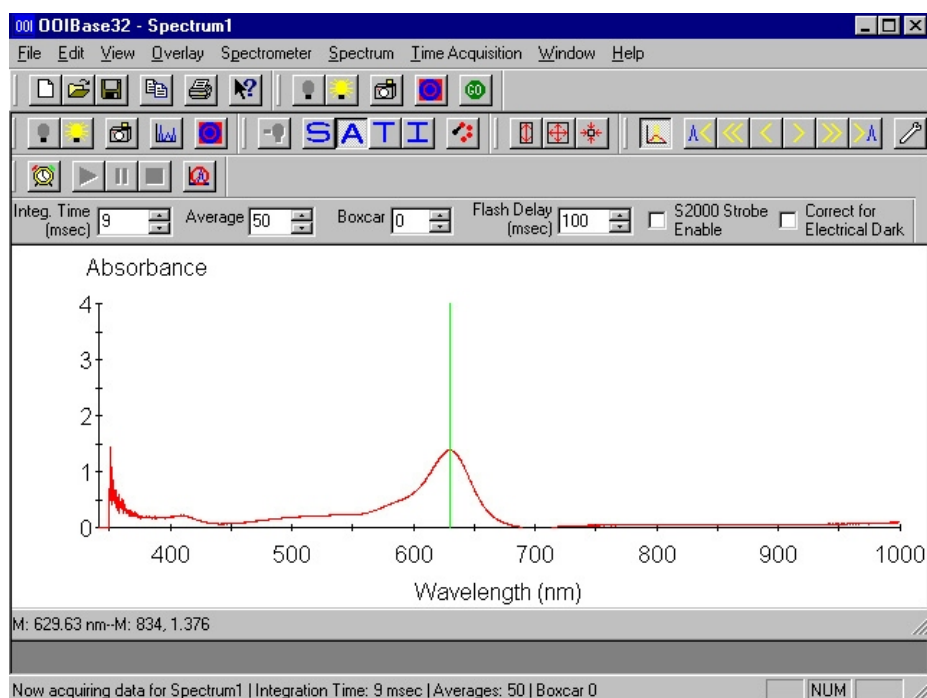
12. Now right click on the graph and click on *Store Dark* ▼.



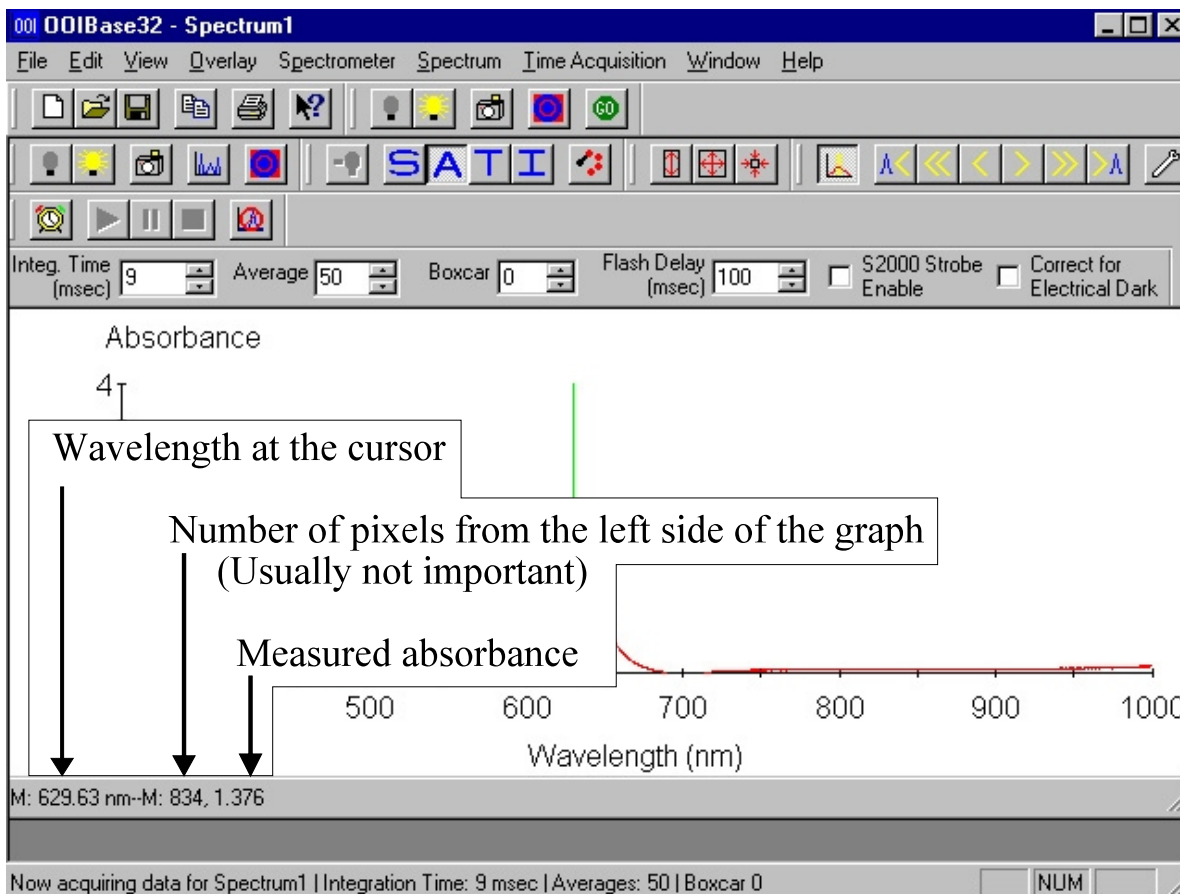
13. Right click on the graph, click on *View Mode*, and click on *Absorbance Mode* ▼.



14. Remove the blank cuvette if you have not already done so. Now place the sample cuvette into the slot in the same orientation as before, clear sides facing the detector and lamp. This is an example of what the screen should look like ▼:



15. If needed, move the green line so it lines up with the maximum peak. There are two ways to adjust the position of the green cursor: (1) left-click anywhere on the graph and the green cursor will jump to that spot, or (2) use the arrow keys on the keyboard to fine-tune the line. In the example shown, the peak is at 630 nm, and the photometer has read an absorbance of 1.376 ▾. Record the absorbance value!

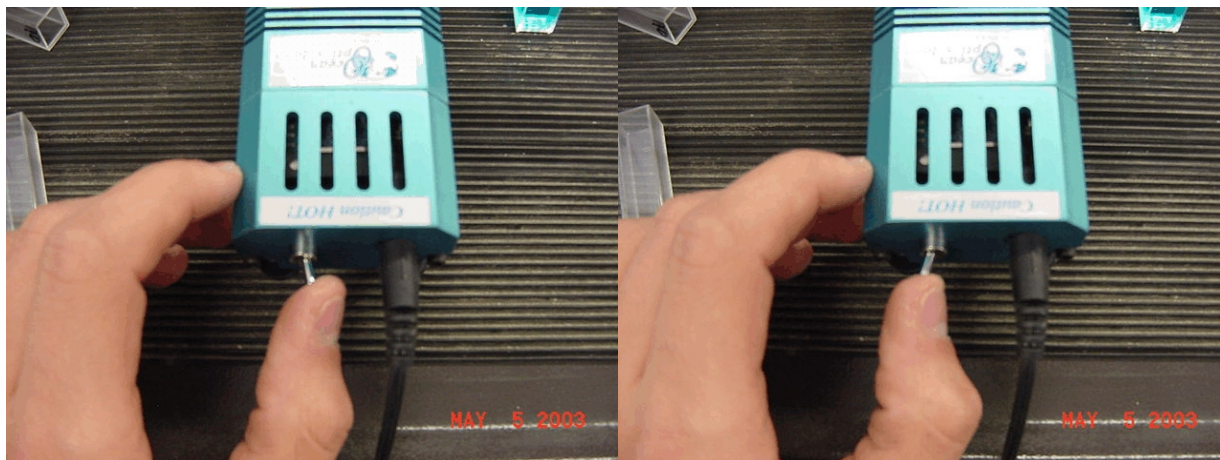


16. If you want to print the file, make sure the printer is on (if it's not, click on the round button on the front of the printer), click on *File*, click on *Print*, and click on *Ok*.
17. If you want to save the spectral file, put your disk in the drive, click on *File*, click on *Save...*, select A:/ from the pull-down list, name your file, and click *Save*.

Shutting Down the System

When you are finished, you need to turn off everything:

1. Close the program by clicking on the small '×' in the upper-right corner of the screen.
2. Turn off the lamp ▼.



OFF

ON

3. Click on the *Start Menu*, and Select *Shut Down*.
4. Select *Shut Down* from the list if it is not already selected. Click *Ok*.
5. When a screen appears saying, “It is OK to shut off your computer”, turn off the switch on the cart, not the computer ▼. Unplug the cord from the wall outlet.

Credits and Other Resources

Some of this information was taken from the following sources. For advanced operation, these sites will have additional details.

NMSU Teaching Laboratories Website

<http://www.chemistry.nmsu.edu/Instrumentation/Chem2000.html>

this site contains resources for many teaching laboratory instruments. It is maintained by Keith Burke.

Ocean-Optics® Website

<http://www.oceanoptics.com/Products/chem2000series.asp>

this is the manufacturer's website.