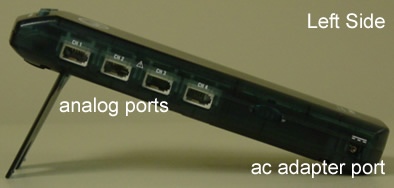
General Directions for using the Vernier Probes with a computer.

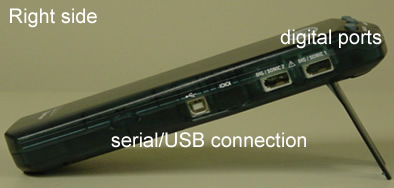
1. Get computer from cart, make sure it has a “+” on the cover. Plug in the power cord and turn on the computer.
2. Have teacher log in to local computer.
3. Once the computer logs in make sure it is connected to the internet (you’ll need it to send your data to yourself later). You should be logged in as srvhs-guest. (ask teacher for password). If not, look for the little computer icon in the lower right hand corner of the screen, launch and connect to wireless, you should see srvhs-guest as a choice.

From: <http://acad.depauw.edu/~harvey/Vernier/LabPro/index.html> from David Harvey ([harvey@depauw.edu](mailto:harvey@depauw.edu))

As shown below, the left side of the LabPro contains 4 ports for connecting analog sensors and a port for connecting the AC adapter (power supply).



Left side has four channels for using up to 4 probes at a time.



Connect the AC adapter to its port and to a power outlet on the lab bench. After a few seconds LabPro will perform a self-check and you will hear a series of six beeps and see red, yellow, and green blinking lights at the top of interface's case. This indicates that the interface is performing correctly. On the right side of the LabPro interface, shown above, you will find two digital ports and ports for making a serial or USB connection to a computer

Connect any digital sensors that you plan to use into one of the digital ports.

Step 4: Connect the LabPro interface to your computer using the USB connection.

Step 5: Launch LoggerPro and select the appropriate interface. Upon opening, LoggerPro will show a data table and graph that are suitable for all sensors that it can identify. Those sensors that do not have Auto ID capabilities will need to be identified for LoggerPro using the LabPro icon.

The three bu ttons on top of the LabPro interface are not used when using a computer to store data. The three lights provide information on the interface's status:

* red indicates an error condition
* yellow indicates that LabPro is ready to collect data
* green indicates that LabPro is collecting data

The internal speaker on the LabPro interface generates four kinds of sounds that provide additional information about the interface's status:

* good beep - medium tone followed by a high tone
* caution beep - medium tone followed by a medium tone
* bad beep - two high tones
* tick sound - key pressed on interface

Typical sound sequences are:

* successful initialize on start up - bad beep, caution beep, good beep (total of 6 beeps), otherwise, three bad beeps if the initial self-test fails
* overcurrent condition detected from sensor - five bad beeps
* when LabPro initiates a self-test there are three good beeps followed by a good beep if it passes the self-test and a bad beep if it does not
* if LabPro detects an error in the commands sent to it by LoggerPro, then there will be two bad beeps

<http://www.wellesley.edu/Chemistry/Chem105manual/Appendices/vernier_labpro.html> Created By: Adilia James '07 and Sarah Coutlee '07

**Instructions for Using Vernier LabPro Data Analysis Software**

1. Connect desired sensors to LabPro.
2. Connect LabPro to the cable from the USB port on the computer.
3. Open LoggerPro from the desktop.
4. When the **Connect to LabPro** window opens, select **Connection Port: LabPro-USB** and click OK.
5. Configure Logger Pro for your experiment. Use one of the following options.
   1. **Auto-ID Sensors**: With auto-ID sensors, such as the stainless steel thermometer, the Logger Pro software will identify your sensor when you start up.
   2. **Sensor Dialog**: Clicking the **LabPro** box shows your sensor information, the units, and current readings.  By clicking the **Auto-ID All Channels** button, Logger Pro will identify the sensors connected to your LabPro.  If your sensor is not auto-ID, you can simply drag the sensor to the appropriate channel and drop it.
   3. **Probes & Sensors Experiment Files**: Choose **Open** from the file menu, then **Probes & Sensors**.  This file contains a folder for each of the Vernier sensors.  Open a file with the sensor you want and your system will be configured for this sensor.
   4. **Vernier Lab Book Experiment Files**:  Choose **Open** from the file menu, then **Chemistry with Computers**.  Choose the experiment file that corresponds to your experiment and open it.  Your system will be configured to the appropriate sensor.
6. Set data collection mode from one of the following choices by going to **Experiment, Data Collection** on the Toolbar.
   1. **Time Based**: This is the method you will most commonly use.  The data is collected as a function of time.  Parameters that can be set include **Length** (length of time for data collection), and **Sampling rate** (data points per minute or per second).  This method is appropriate for kinetics experiments.
   2. **Events With Entry**:  This method is appropriate for titrations with a pH electrode and certain types of spectroscopy experiments.  A data point is recorded whenever the **Keep** button is clicked (e.g. pH) and the experimenter enters values in a second column (e.g. volume of titrant).
   3. **Selected Events**: A data point is recorded whenever the **Keep** button is clicked.
   4. **Digital Events**: You can set data collection to run continuously (until the **Stop** button is clicked) or at a pre-determined number of events.
7. Collect data.
   1. When ready to run your experiment, click the **Collect** button and Logger Pro will begin plotting data in the graph window.
   2. To stop data collection early, click on the **Stop** button.
   3. To add time, choose **Extend Collection** from the **Experiment** menu.
8. Store data.
   1. The run labeled "Latest" always contains the most recently collected data and is **overwritten** when you collect more data.  To prevent loss of data choose the **Save As** or the **Store Latest Run** option.
   2. To save data **permanently** so data will be preserved between sessions or when you turn off your computer, select **Save As** from the **File** menu.
   3. The **Store Latest Run** option in the **Experiment** menu saves the most recently collected data in memory, allowing you to do another collection without losing the first one. This option does not save data on disk nor preserve it between sessions.  It is a good option to use if you are running consecutive experiments and wish to plot both on the same graph.  Alternatively, you can open a saved experiment, use the **Store Latest Run** option, and plot new data on saved graph.
9. Manage your page and data; customize your presentation.
   1. **Moving objects**: Select the object by clicking on it once.  Move the cursor over the edge of the selected object until the cursor turns into a hand, then hold down the mouse button while grabbing and moving the object.
   2. **Resizing objects**: Single-click on an object to select it.  When an object is selected, its border becomes visible, along with eight resizing handles.  Clicking and dragging a resize handle will resize the object in the appropriate direction.
   3. **Graph axes**: Customize your graph by changing the columns that are displayed by positioning the mouse over the X-axis or Y-axis, clicking, and selecting the data you wish assigned to each axis.
   4. **Graph options**: Double-click on the graph or select **Graph Options** from the **Options** menu to call up the **Graph Options** dialog box.  This allows you to change the graph object appearance, adjust scaling, and select which columns are plotted.
10. Analyze your data with appropriate functions from the **Analyze** menu or the Toolbar.  Some of the more commonly used functions include:
    1. **Examine**: This function shows the x- and y-values of the data point closest to the mouse pointer.
    2. **Statistics**: This function calculates the minimum, maximum, mean, and standard deviation of selected data.  To select data, highlight the desired data by holding the left mouse button down and passing it over the desired data in the table or on the graph.
    3. **Linear Fit**: This function performs a linear regression on selected data and reports slope, intercept, and correlation.  Standard deviations and significant figure options are also available by double-clicking on the results box.
    4. **Curve Fit**: This function fits a user-defined function over the selected data.
11. Print your graphs and data.
    1. Arrange the objects on the screen as you want them to appear on the paper.
    2. Select **Print** from the **File** menu or click the **Print** button on the toolbar.  You can print the graphs and data tables individually by selecting **Print Data Table** or **Print Graph** from the **File** menu.