Josephson Junction Experiment Interface 1.0.exe ReadMe

The Josephson Junction experiment has been updated to interface with the computer instead of a digital oscilloscope.

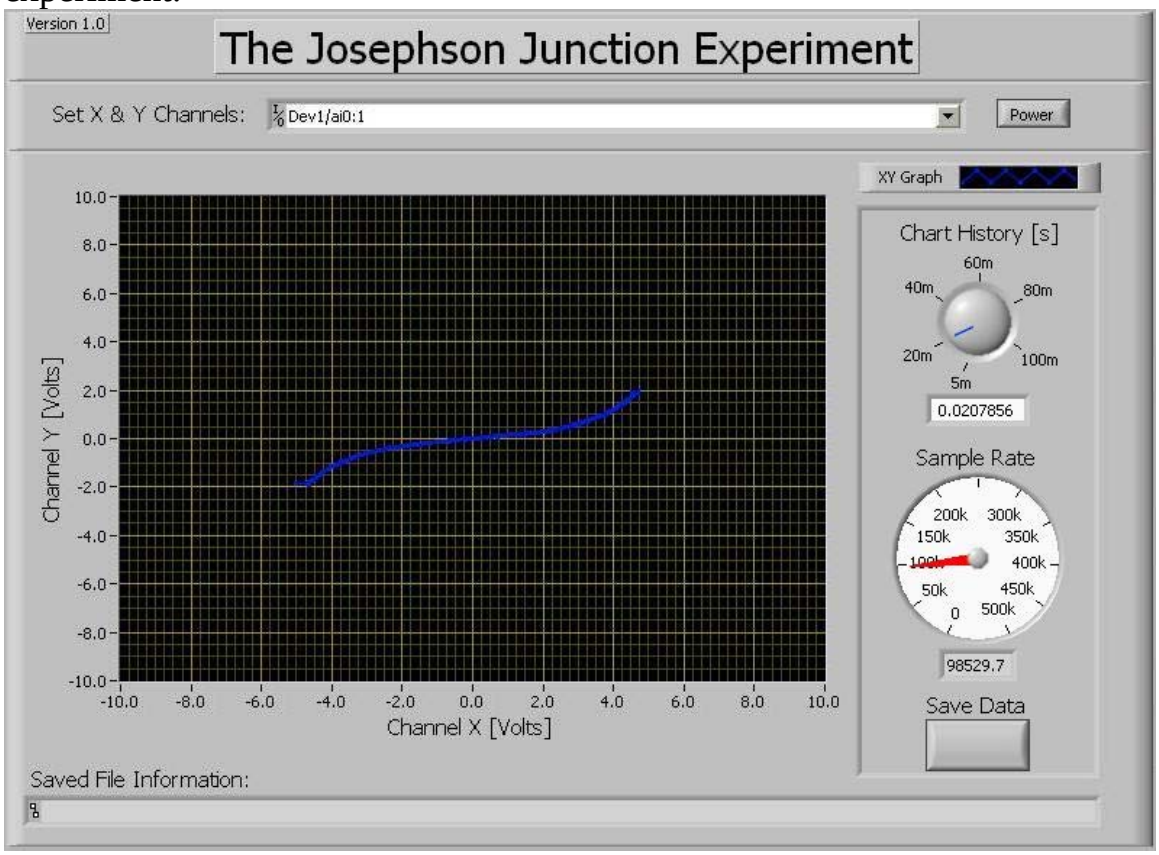
The new program is called the Josephson Junction Experiment Interface 1.0.exe

This is an executable program which will work very similarly to a digital oscilloscope. To use it, open the program by clicking on it in the start menu or locating the directory

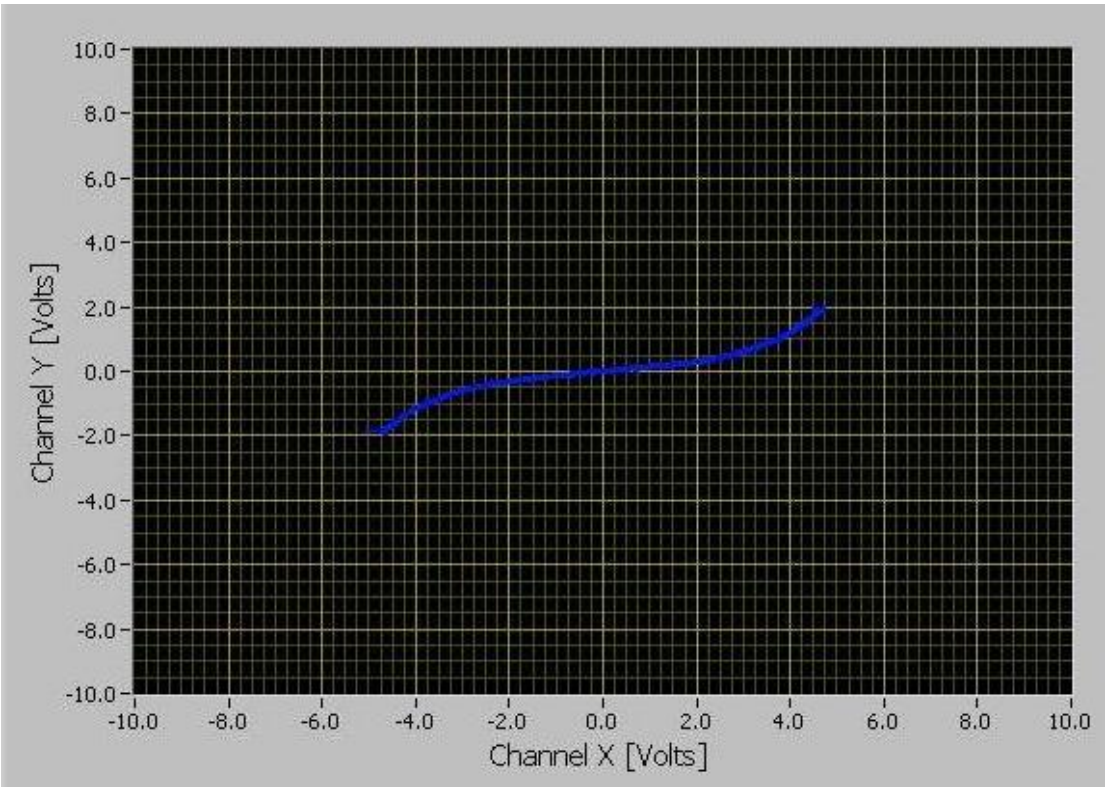
C:\Program Files\Josephson Junction Experiment Interface 1.0\

Then click on the executable.

Once the program is open, you will see the Front Panel Screen. There are a number of controls which may be used to view and gather data from the experiment.

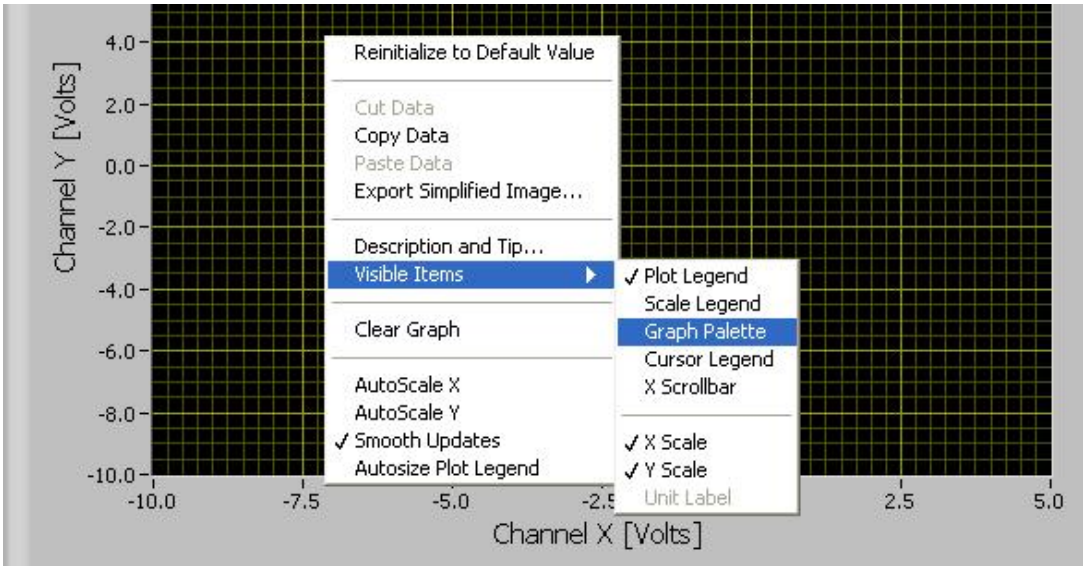


The main part of the program is the graphical display. This display shows graphical information about the experiment. The program will plot incoming voltage from Channel X on the X-axis against incoming voltage from Channel Y on the Y-axis.



The X and Y axes can be modified by clicking on the graduations and changing them. Simply highlight the number and the type in the new value.

Additionally, zooming and other features can be accessed by right clicking on the graph and selecting Visible Items



The channels may be selected by using the ``Select X & Y Channel'' control. This control will select which channels on the data acquisition break-out box will be designated as Channel X or Channel Y. There are two ways to select the appropriate channels with this control.

The first method is to enter text into the control box in the format: Dev1/ai<Channel X>:<Channel Y>

Where <Channel X> and <Channel Y> are the analogue input designators on the break-out box.

For example if one were to use ai0 for Channel X and ai1 for Channel Y, the control would have the following text:

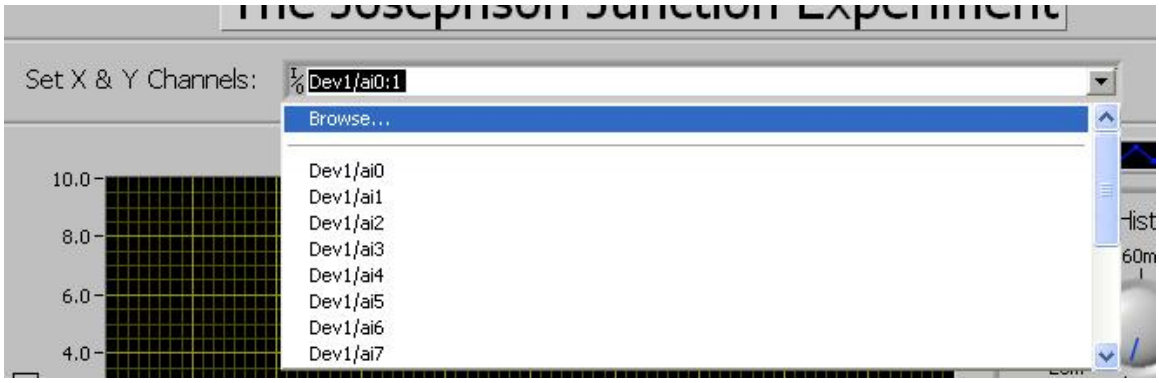
Dev1/ai0:1

The following text format is also acceptable:

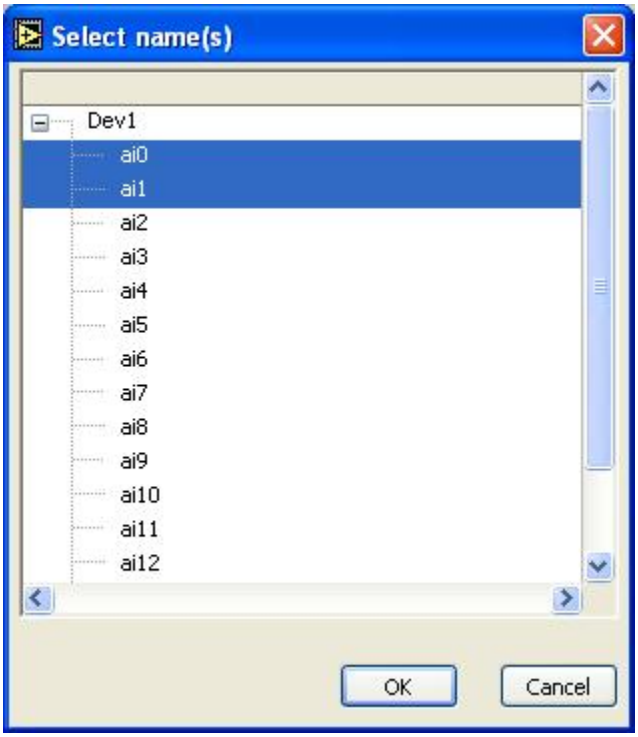
Dev1/ai<Channel X>, Dev1/ai<Channel Y>

Where again, <Channel X> and <Channel Y> are the analogue input designators on the break-out box.

The other method for selecting channels is to click on the drop-down box and select ``Browse...''



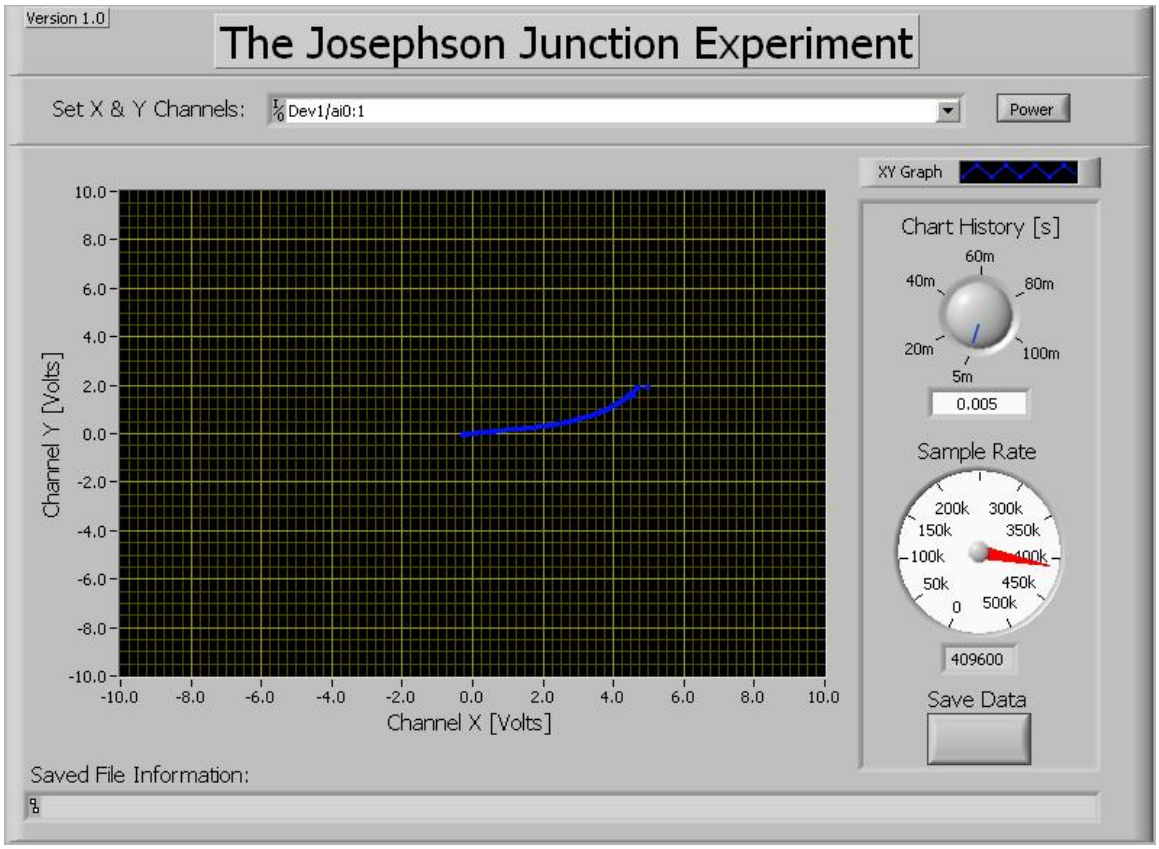
From here, select the first channel from the list. Then hold down the shift key and select the second channel from the list. Then select ``OK.''



It is important to note here not to select more than two channels. Doing so will result in the wrong channels being utilized and can sometimes result in unpredictable behavior.

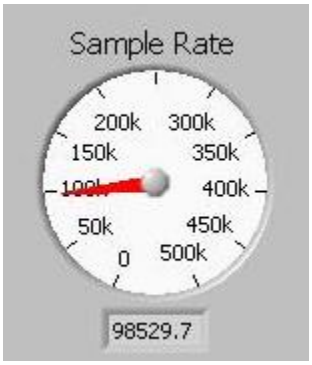
The next control is the ``Chart History Control.'' This is a dial which ranges from 5ms to 100ms. This dial controls the refresh rate of the display. For example if the dial is set to 5ms, then the graph refreshes every 5ms.

5ms is generally faster than the period of the data so a longer period is necessary in most cases. The picture below shows only half the period.



Below the dial is a text box. The Chart History can also be set by specifying a specific number rather than using the dial. Any number between .005 and .1 can be entered in this box. Any number outside of this range will be coerced to the closest value within the range.

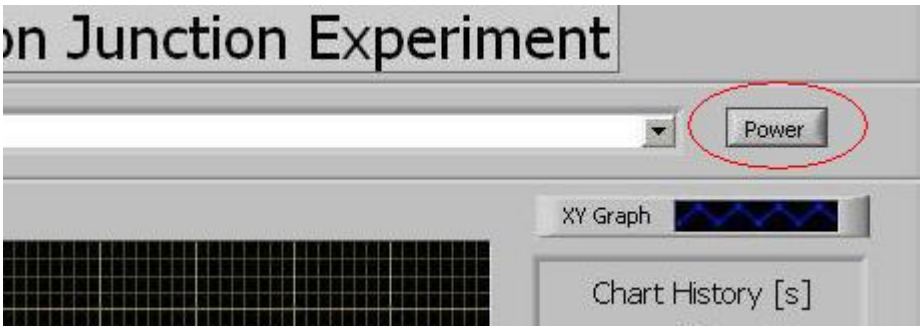
Below this dial, is an indicator which displays the sample rate. This is the rate at which the data acquisition card measures the voltage of each channel. The number of data points is set to 2048. Thus controlling the Chart History modifies the sample rate. The reason the number of data points is set to 2048 is to prevent errors in analysis programs. Microsoft Excel, for example, can only take 65000 data points in a spreadsheet. This means that it will truncate any data that is longer than this amount. Thus a number was chosen which would still contain as many data points as possible, but not too many that problems occur during analysis.



The final control is a save feature. Pressing this button will take all of the data in the current Chart History and save it into a tab separated spreadsheet file. The default filename for the file is ``JOS Data.dat'' and the default directory is the My Documents folder. Both of these can be changed to any name and any location desired.

Once a file has been saved, the file path of the new file will be displayed in the indicator just below the graphical display.

Once data acquisition is finished, the program may be stopped by pressing the power button. This will safely stop off of the data acquisition. Then the file may be closed by selecting file: exit, or by pressing the x in the top right hand corner of the screen. Alternately, one can select the icon located above and to the left of file, and select close.



Notes:

It is important to note that there are some limitations to the new program. The first limitation is that the voltage into the data acquisition card must be within the range of -10 volts to +10 Volts. This is the maximum that the card is able to handle. For this reason, any voltage outside this range will not show up on the screen, and may damage the card.

Additionally, there can at times be a delay in the refreshing of the screen. Thus if a delay is noticed, it is important to be patient. Otherwise, the behavior of the program may become unpredictable.