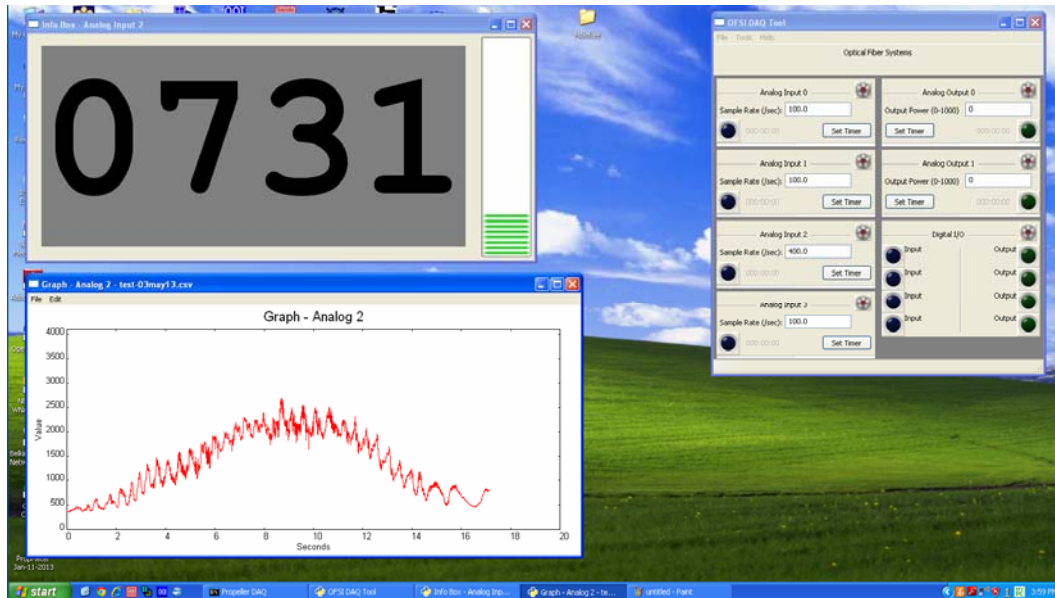


PropMeter

Data Acquisition Software



Description

The PropMeter application is used to acquire data from and control our PropDAQ Data Acquisition Module. It allows to control the analog and digital outputs of the PropDAQ, as well as acquire analog or digital data from the PropDAQ. The data can be directly saved in a comma-separated (.csv) file, or displayed on the screen.

PC requirements

Windows PC Pentium P3 minimum, 100MB of free hard disk space.
Windows XP, 7 or 8.

The code is written in Python, so it can easily be transported to almost any computing platform, including Windows, MacOS and Linux. However, the appropriate version of Python 2.7, wxPython, NumPy and ScyPy would need to be installed before the code can be executed. At the moment, we only provide installation files for the Windows systems.

Easily expandable: add your own tools or functions.

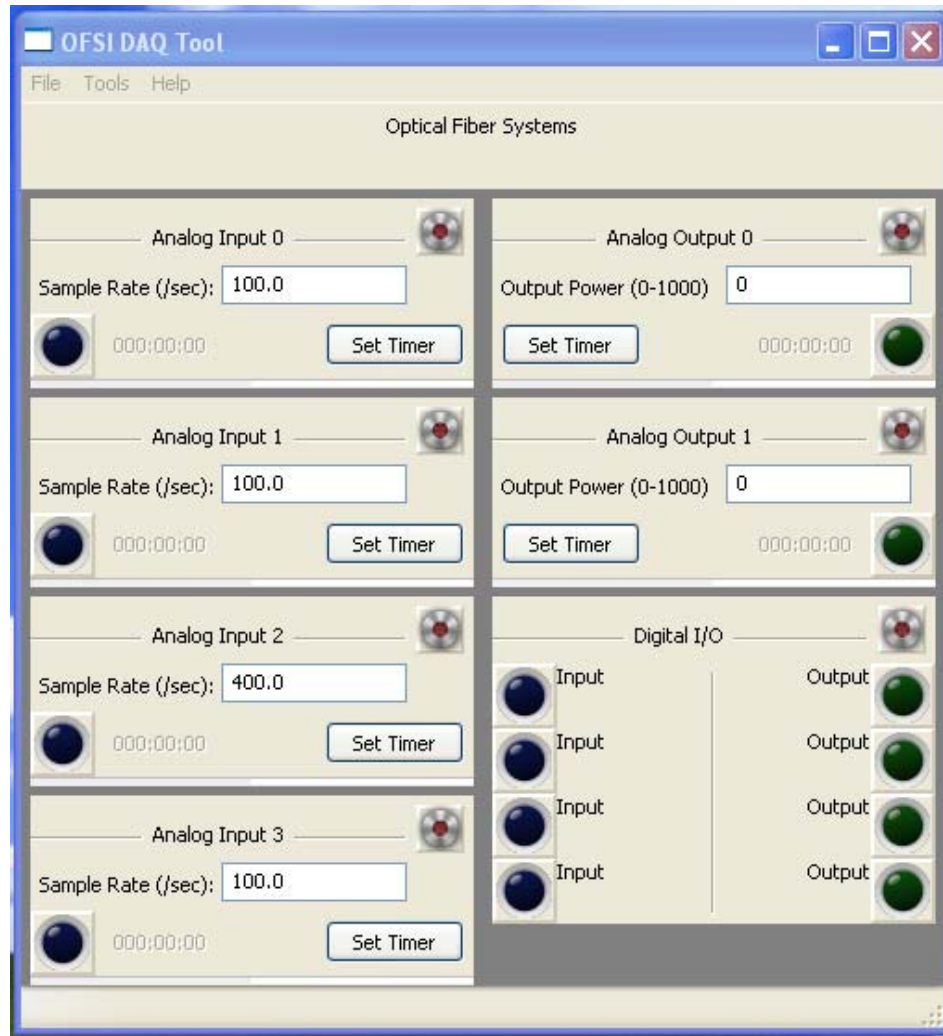
Operation

Before launching the application, a PropDAQ module needs to be connected on a USB port. To launch the application:

If you have the full source code, double-click (open) the file main.py.

If you have the built distribution code, double-click (open) the file propmeter*.exe.

In either case, the following window should appear.



This is the main control panel window. This lets you access all the functions for all the channels, including start/stop acquisition, file saving, channel selection, graph display, etc...

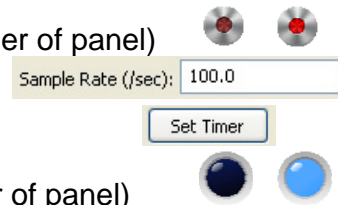
If you just want to acquire data and save it in a file, it is best to do this directly from this window. This window / control panel can be divided into 2 portions: one for the analog channels, and one for the digital channels.

Controlling the Analog Channels.

All analog channels, Analog Input 0 - 3 and Analog Output 0 - 1, have similar controls. Each analog channel has its own control panel, and all channels are controlled independently. Controls are implemented with “buttons” and input fields on the panels. All buttons are activated by clicking on them with your mouse. The control panels for the analog channels include the following:

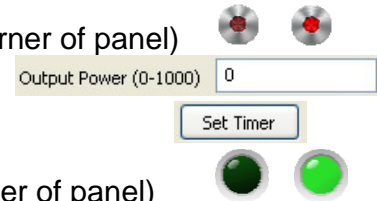
Analog Input Channels.

- Record button (grey and red circle at top right corner of panel)
- Sample rate input field
- “Set Timer” button
- Start/Stop button (blue circle at bottom right corner of panel)



Analog Output Channels.

- Record button (grey and red circle at top right corner of panel)
- Output Power input field
- “Set Timer” button
- Start/Stop button (green circle at bottom left corner of panel)



The “record” button activates the file saving feature. When activated, a new window will open to specify the location and name of the file that will be used to save the data. Once activated, the button will “light-up” with a bright red center. THIS DOES NOT START DATA ACQUISITION. Data is saved in cvs format, and includes a header with a data and time stamp, and the channel being recorded. The data is saved in 2 columns, one for the actual time (in decimal seconds) for each sample and one for the value.

The sample rate input field is self-explanatory. You can enter any positive value, however the maximum that can be implemented is approximately 200 samples per second for a single channel. Decimal values correspond to sampling rates less than 1 sample per second (0.1 corresponding to 1 sample every 10 sec).

The output power field is also self-explanatory. You can enter any positive integer value between 1 and 1000.

The “Set Timer” button enables an internal timer that will control the duration of the acquisition (for input channels) or activation (output channels). When activated, it will open a new window in which you can enter the desired duration in hr:min:sec format. If the timer is not activated, the data acquisition (or output activation) will last as long as the Stop/Start button is lit.

The Start/Stop button controls the data acquisition (or output activation). Data acquisition will start as soon as it is activated. When activated, the button will “light-up”. Clicking a second time will turn it off and stop the acquisition.

Controlling the Digital Channels.

All digital channels, Digital Input 0 - 3 and Digital Output 0 – 3 are controlled from a single panel. The controls are very simple, as there is no specific sampling rate nor any specific output level to be controlled. The channels are simply either ON (digital value of 1) or OFF (digital value of 0).

The status of each Digital Input channel is indicated by the blue buttons on the left side, and the status of each Digital Output channel is controlled by the green buttons on the right side.

The control panel includes a single “Set Timer” button that enables an internal timer that will control the duration of the acquisition (for input channels) and activation (output channels). When activated, it will open a new window in which you can enter the desired duration in hr:min:sec format. If the timer is not activated, the data acquisition (or output activation) will last as long as the Stop/Start button is lit.

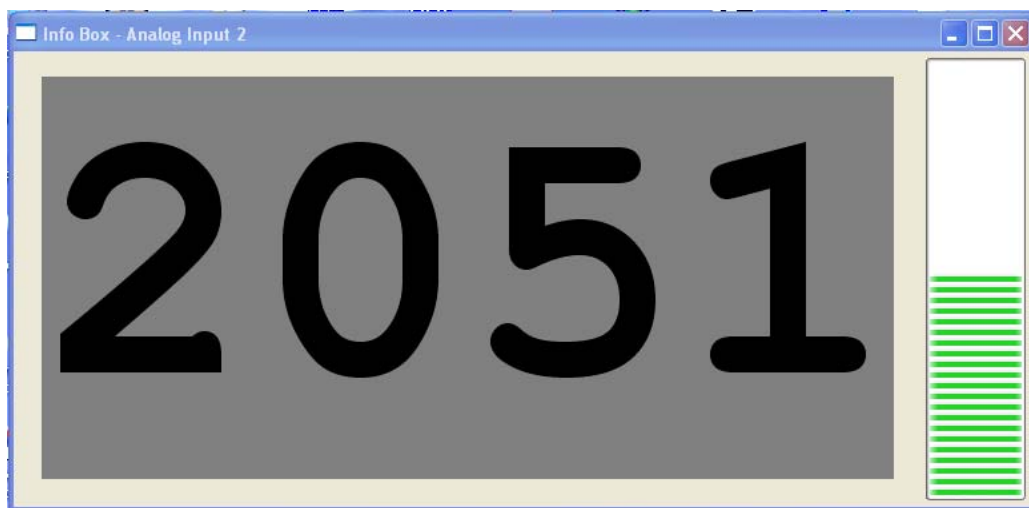
The control panel includes a single “Record” button (grey-red circle at top right corner of panel). When activated, the state of all 8 digital channels will be recorded and saved in a file. Data is recorded and saved only when the state of any digital channel changes.

Special tools.

Our PropMeter application also includes a set of additional functions or “tools”, which are accessed from the “tools” menu on the top left corner of the main window. These tools include:

- Billboard
- Graphing Tool
- Line Scan

The Bill board is a large display, illustrated below, that includes both digital and analog (side bar graph) value for any given analog input channel.

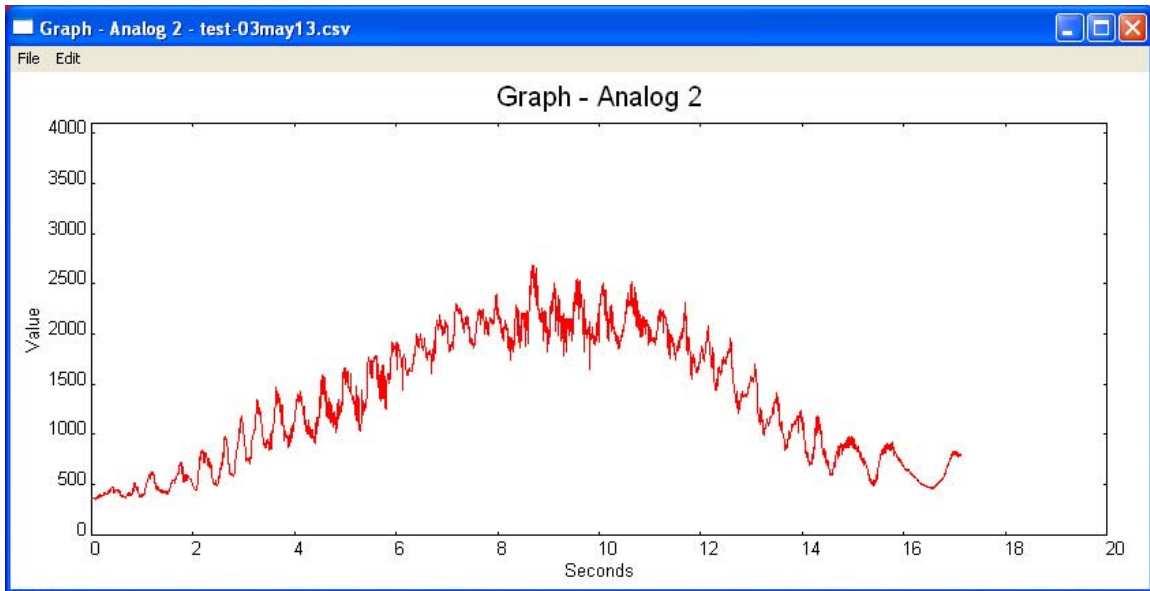


The Graphing Tool is a simple graph display of the analog input channel value being acquired. The actual acquisition can be controlled either from the main control panel or from the graphing window. This tool also allows to simultaneously acquire and save data from several input channels.

At any moment, the axis of the graph can be re-scaled using the “edit – dimensions” menu.

The graph displays a maximum of 4000 points (earlier points are dropped off the graph but are kept in memory).

When the acquisition is stopped, you will be asked if you want to save the data.



The Line Scan is a combination of a simple graph display with a triggered data sampling and acquisition. With this tool, one data point will be acquired each time a trigger signal is detected.

When the Line Scan is selected, a first window will open asking you to select which analog channels you want to acquire. Then a second window will open asking you to select which digital input channel you want to use as a trigger. One data point will be acquired each time the selected input digital channel receives a positive pulse (positive edge trigger).

This tool was designed to acquire data while one independent and external parameter is varied. We thus assumed that this parameter is “scanned” in an incremental fashion, and the program thus will ask you what the starting and incremental values are. These will become the values on the X co-ordinate (or X variable) of the graph. The X-value will start at the starting value, and will be incremented by the incremental value each time a trigger signal is detected.

This tool also has the option to take an average of several samples. The samples will be acquired at the rate selected on the control panel of each channel being acquired, and then the selected number of samples will be averaged before being acquired and displayed on the graph.

To stop the Line Scan, go to the “File” menu, and select “Save”. This will open a new window where you can select the location and name of the file in which you want to save your data.

