Acquiring Data with the USB-1608G and MATLAB

Author: Mike Robinson; edited by John M. Cimbala, Penn State University
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- We will use a device known as a USB-1608G to record data onto a computer. MATLAB is able to interface with this device, which makes it easy to record, save and plot data. This guide will show you the basic features of the code we will use.
- First, download the file "USB1608G_sample.m" from the class website.
- You can follow the comments if you are interested in understanding all of the functions of this code, but the lines shown below are the most important for acquiring data as they set up all of the parameters you will need. You can change any of these values within the limits specified in the comments:

```
samplingRate = 2000; %Set sampling rate (samples per second).
Maximum sampling rate for two channels = 125000
numberOfSamples = 100; %Set number of samples to acquire
inputRange = [-5 5]; %Set input range in volts ([-1 1],[-2 2],[-5,5], or
   [-10 10])
excelFileName = 'Sample data';%Name of excel file in which to save data
```

samplingRate: Tells MATLAB how many times per second to take a measurement

numberOfSamples: Tells MATLAB how many samples of each channel to take

inputRange: Sets the maximum and minimum voltage you can measure

excelFileName: File where data will be saved

- When you are ready to collect data click the run button in MATLAB, or press F5.
- The example code will run, which may take several seconds, depending on how long you are collecting data. Afterward, you will see a plot of the channel 0 data. Two files will also appear in the directory that contains USB1608G_sample.m. One will be an image of the channel 0 plot, and the other will be an Excel file with the data you recorded.
- You can add code at the end of this file to perform additional analysis, or plot and save the channel 1 data.
- ***Note*: Each time you run this code, it will save over the Excel file and plots that you generated the last time you ran your code. If you want to keep the previous versions of the files, you need to either rename the files you already created, or change the file names in the MATLAB code. Additionally, if you want MATLAB to save over the last version of the Excel file, that file must be closed before you run the code or MATLAB will generate an error.**
- You can also access a virtual oscilloscope by typing **softscope** into MATLAB. You will be prompted to set the parameters for your data acquisition. After setting the needed parameters, you can press the trigger button to start acquiring and viewing data. The various knobs on the virtual scope can be adjusted to change how the signal is displayed.
- Physical connections to the board are made to the pins labeled with the channel number (abbreviated CH) and H for high or L for low. For example, channel 0 connections are made on CH0H and CH0L as shown on the left side of figure 1. The DAQ will measure the voltage of the high pin relative to the voltage of the low pin. Typically, high will be connected to your signal and low will be connected to ground.

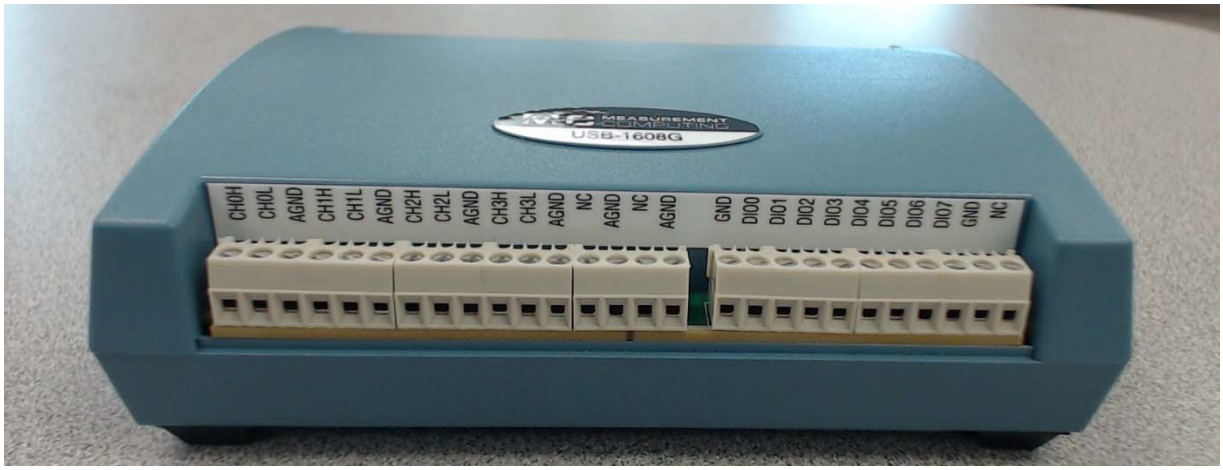

Figure 1: Connections on USB-1608G