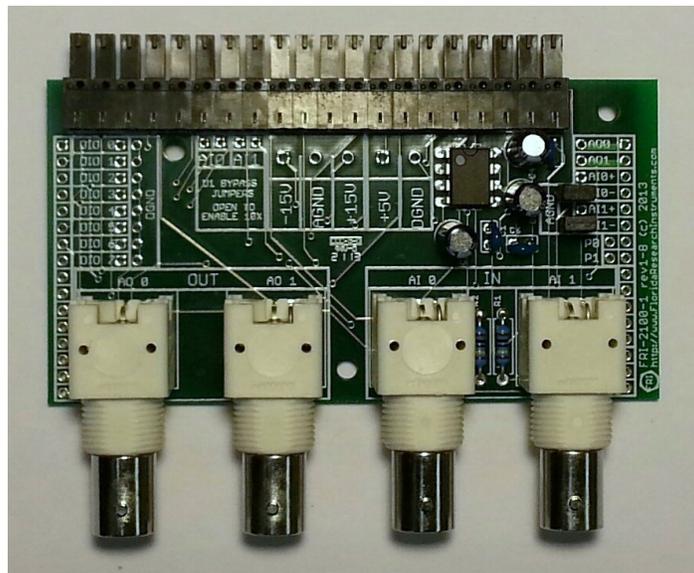# FRI-2100-1

BNC x10 OSCILLOSCOPE PROBE ADAPTER FOR NATIONAL INSTRUMENTS myDAQ

User's Guide

Use the myDAQ as an oscilloscope with the FRI-2100-1 (and appropriate software). BNC input jacks are provided, and a voltage-follower provides the buffer and impedance circuitry needed to convert input from standard x10 oscilloscope probes to the levels needed for the myDAQ.

In addition, the FRI-2100-1 can be used as a *breakout board* for the myDAQ. Analog output is connected to the marked BNC connectors. Convert the analog input BNC connectors from x10 to standard x1 input simply by moving a jumper. Access digital IO and power by soldering wires to the provided access points on the board. Alternately, Florida Research Instruments carries various header/screw terminal accessories, including Arduino/shield interface for the FRI-2100-1.   See the website for details.

http://www.floridaresearchinstruments.com

Board Connection

Analog:

Inputs: BNC AI 0, AI 1. Ground/Differential Reference ports. By default, analog input is factory-set (with removable jumpers) for 10x probes, and referenced to ground.

Outputs: BNC AO 0, AO 1.

Power: -15V, +15V, Analog Ground.

Digital:

Input/Output: 8 digital input/output ports, plus 8 digital grounds for convenience.

Power: +5V, Digital Ground

Usage notes

Analog Input:

--Remember that when you use x10 settings on your probes, the voltage you measure is 1/10 the actual voltage!

--To change analog input AI0 or AI1 from ground-reference to differential, disconnect AI0- or AI1- from ground. Depending on your board, this connection may be a jumper, or a soldered wire.

--Cross-talk observed between myDAQ channels. You may observe cross-talk between AI 0 and AI 1, if you have a cable connected to one channel and there is nothing attached to the unused channel. This is a common occurrence for DAQ devices. It is easily remedied by attaching a 75 ohm terminator to the empty channel. You may use a standard BNC terminator, or for your convenience, FRI has terminators available.

Analog Output:

--Only one output channel available for NI ELVISmx FGEN (Function Generator):
If you are using the NI ELVISmx Instrument Launcher to generate/measure signals, keep in mind that although the function generator VI only operates for a single analog output (AO 0), both channels are capable of generating output. If you want to generate a signal on channel AO 1, you will need to use an alternate method, such as writing your own VI using LabVIEW.

--"Steps" in the generated signal/unexpected high frequencies in the generated signal:
The myDAQ output simulates an analog signal by generating a rapid sequence of digital steps. You may observe these steps in your measured signal, if the number of steps is small and the frequency of the signal is high. It looks like a small staircase, and could produce extraneous high-frequencies on an FFT. The signal quality can be improved by increasing the number of samples generated for your signal. For example, increase the "Samples to Write" parameter in the DAQ wizard. Alternately, you could attach a low-pass filter to the outputa.

--Analog input: Grounded Vs. Differential.
The myDAQ can be used to read in either grounded or differential input modes. The FRI-2100-1 breakout board is factory-configured for grounded input. This means the negative terminal of the BNC connector is connected to the analog ground pin of the myDAQ. You can change this to a differential input by removing the AI- to AGND connection on the Ground Reference area of the board. This may require cutting a wire, or moving a jumper (depending on your board).