

TNEL Neural Acquisition User Guide

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v1 - 10/27/15

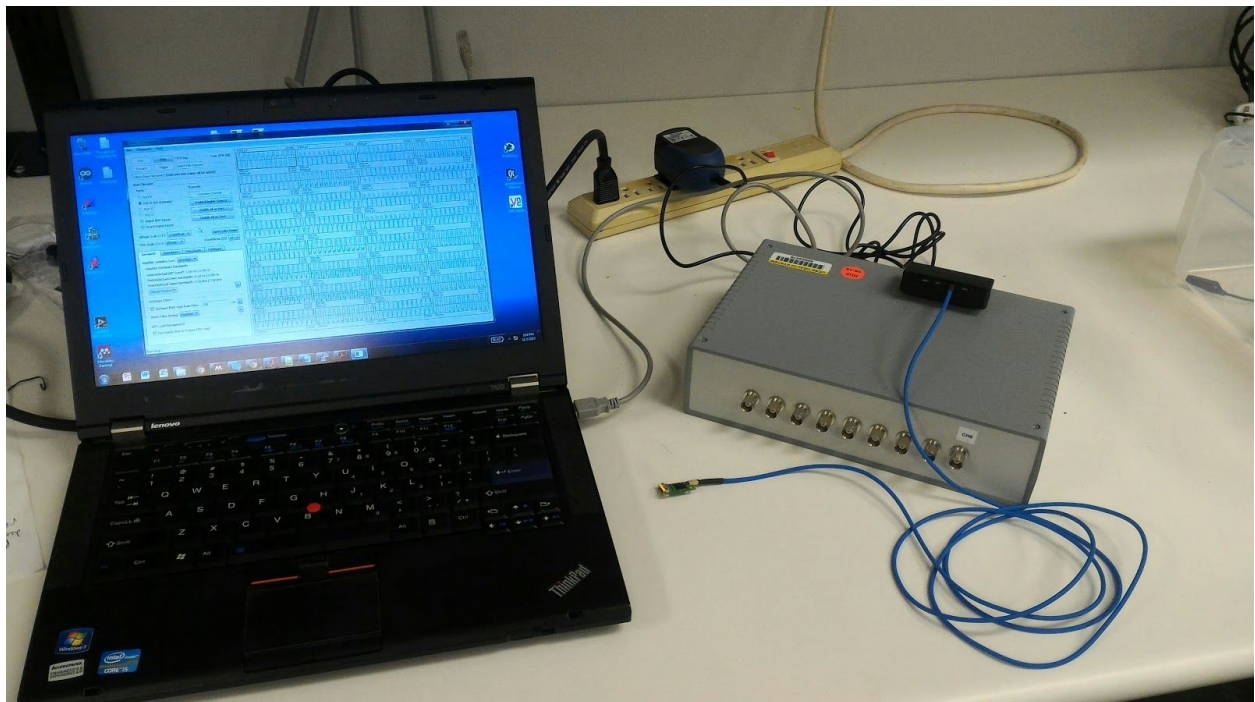
Changes

Version	Date	Description
v1	10/27/15	Original

This document describes the initial setup and how to use the TNEL Neural Acquisition system.

Setup

The system consists of several components illustrated below and outlined in this bullet point this:



Entire setup including computer, neural recording box, cables and headstage chip (excludes adtech connector)

- **Neural Recording Box** = Receives digital data, buffers and sends to host computer via USB. Also can receive several peripheral signals (via BNC connectors), which can be used to synchronize other devices to neural acquisition.
- **Adtech Connector / Headstage** = Adtech connector mates with pigtails, amplifies and digitizes signal. The digital signals are send over a blue cable
- **Blue Cable** = This cable connects with headstage embedded in Adtech Connector and Easy Board. It is 6 ft long and transmits digital data
- **Easy Connector** = Adapter that mates Blue Cable with a unifying cable that feeds into the Neural Recording Box
- **Power Cable** = Powers Neural Recording box.
- **USB Cable** = Connects to Neural Recording box and computer
- **Computer** = Stream data to
- **Battery Pack** = *Power Neural Recording box*

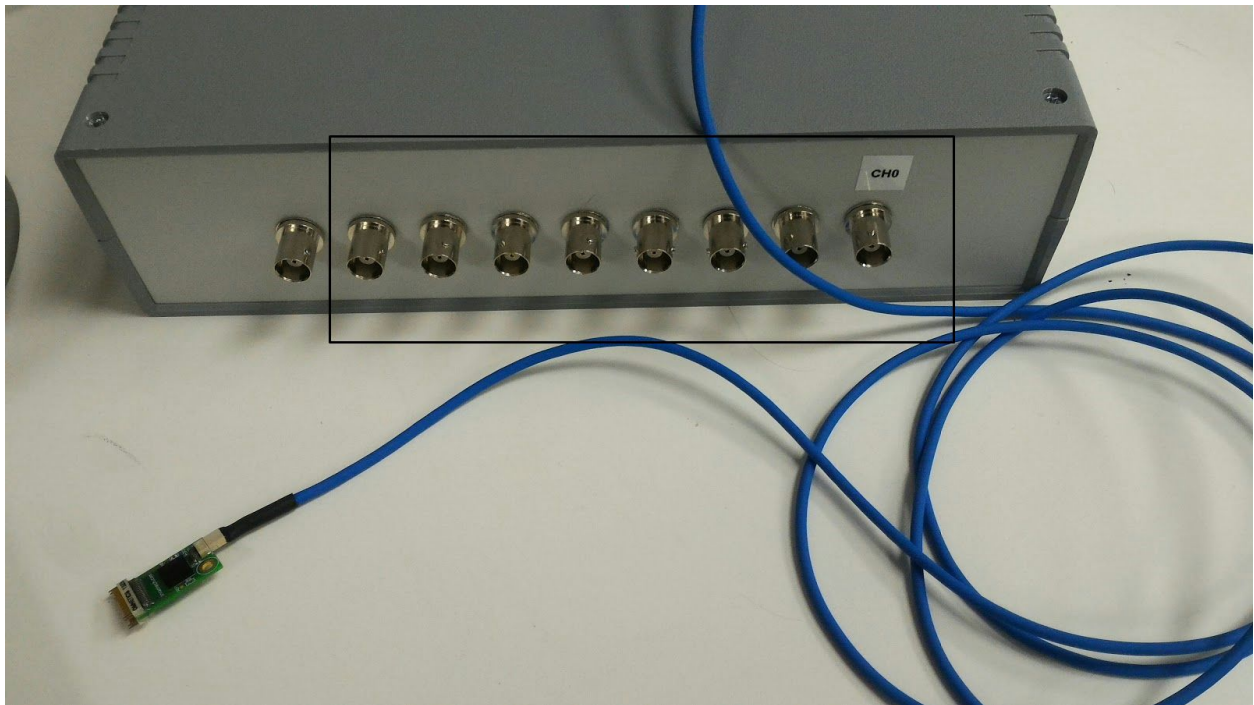
Setup

Hardware

Connect all hardware components as shown in the above picture. Then connect USB cable to Neural Recording box and computer.



Connect power and usb cables into the side panel. Plug in the blue cable into the black “Easy Connector” (this can be a little tricky and the pin on the cable are quite small)

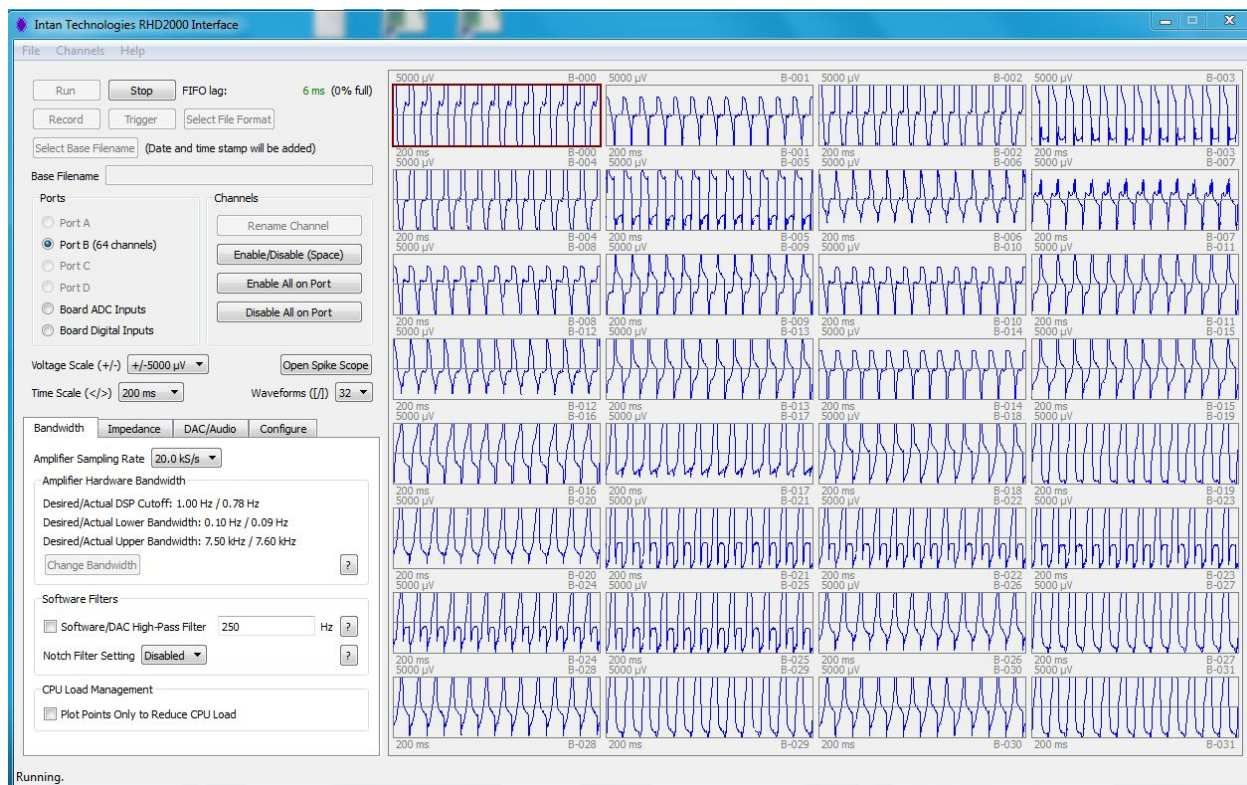


Connect the other end of the cable to the headstage chip. In your case, the headstage chip will be embedded into the adtech connectors. The other side panel of the neural recording box are analog inputs -- enclosed in the black rectangle. These inputs accept voltage between 0-3.3 V -- it's very important not to exceed this range so as not to damage the electronics. You can visualize the signal feed into it with the software. Please do not connect anything to the left most input.

Software

Note: Software has been tested on Windows 7 / 8 / 8.1 only

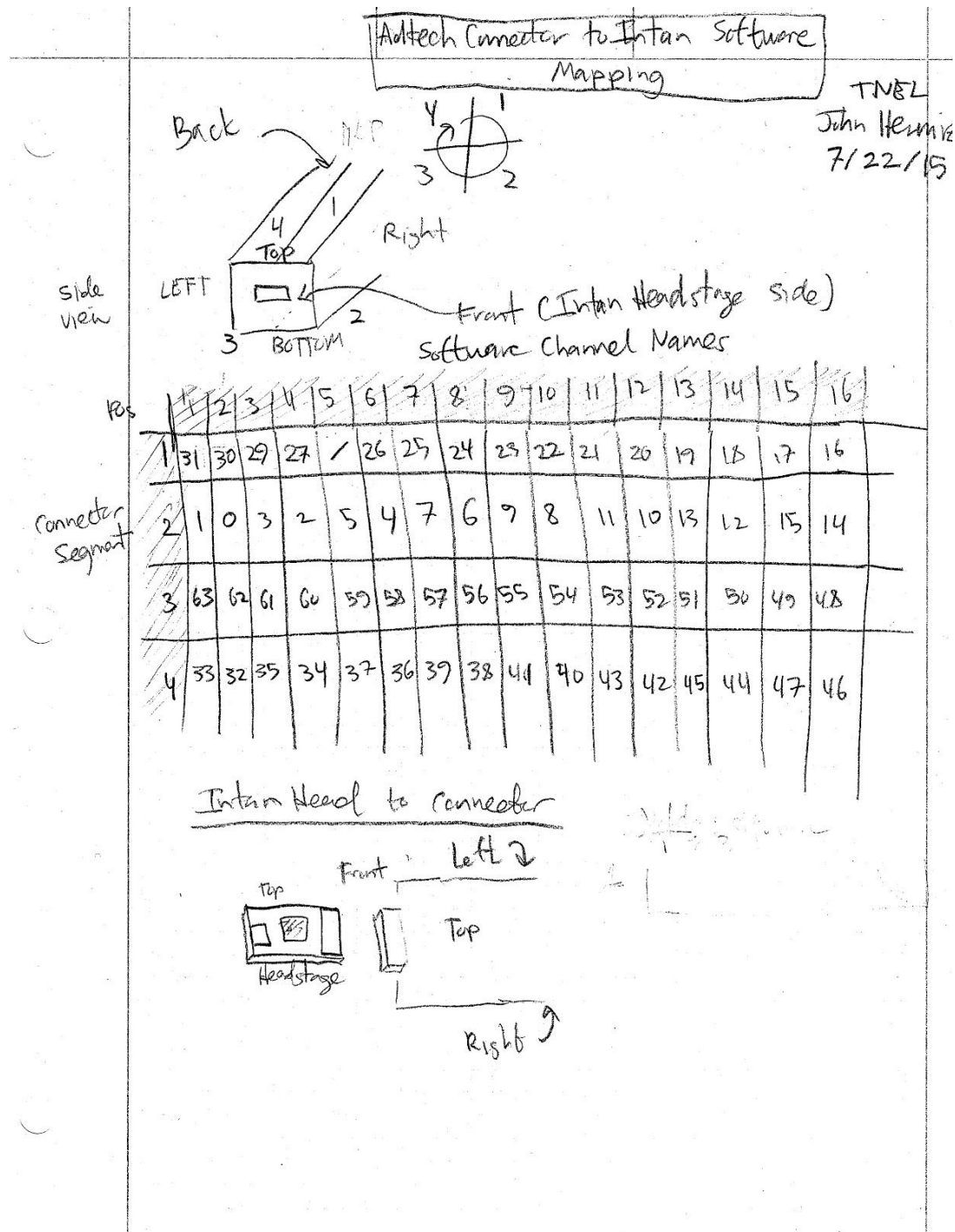
1. Install drivers on computer: [link](#)
2. Re-start computer
3. Download Deployment folder
4. Find “RHD2000interface.exe”, right click, click “Send-to”, then click “Desktop create short-cut”
5. Double check that hardware is connected properly
6. Click “RHD2000interface.exe” shortcut to run software
7. The software should detect the headstage and should look like the picture below



After installing the software and running it, the application should look similar to this. Ignore the actual waveforms shown in this picture. Familiarize yourself with the software by clicking various options and go through the various tabs.

User Guide

Hardware

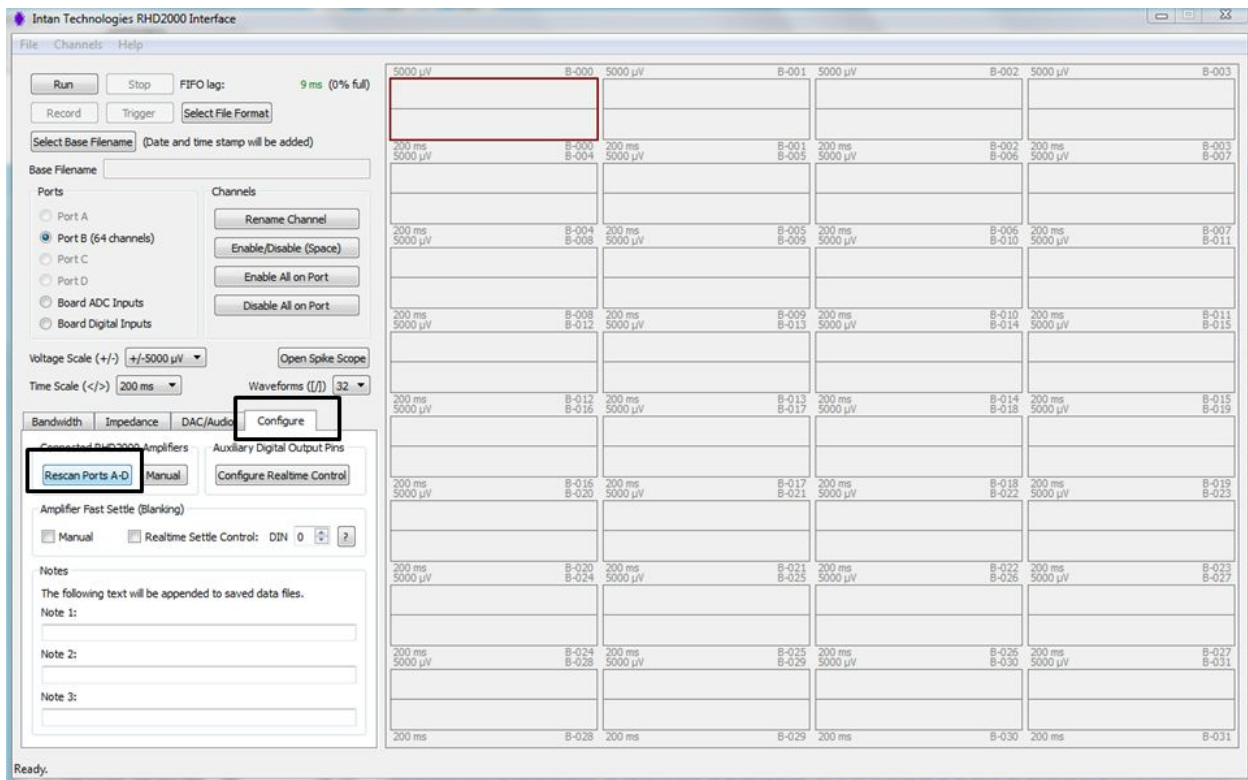


Get a photo of the adtech connector and write map to a table

Software

After starting the software you should first re-scan ports, indicated in the below picture

Rescan Ports

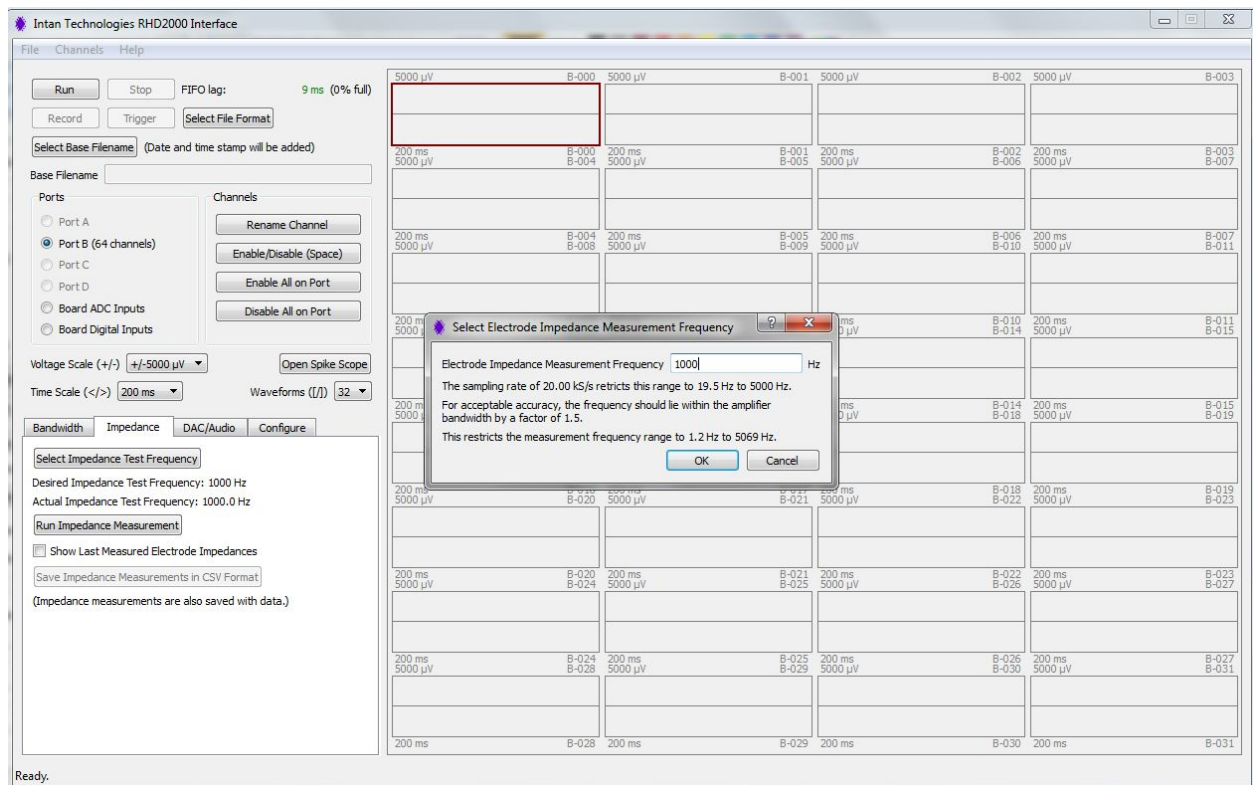


Go to the “Configure” tab, then click “Re-scan Ports A-D” after starting application

Impedance Test

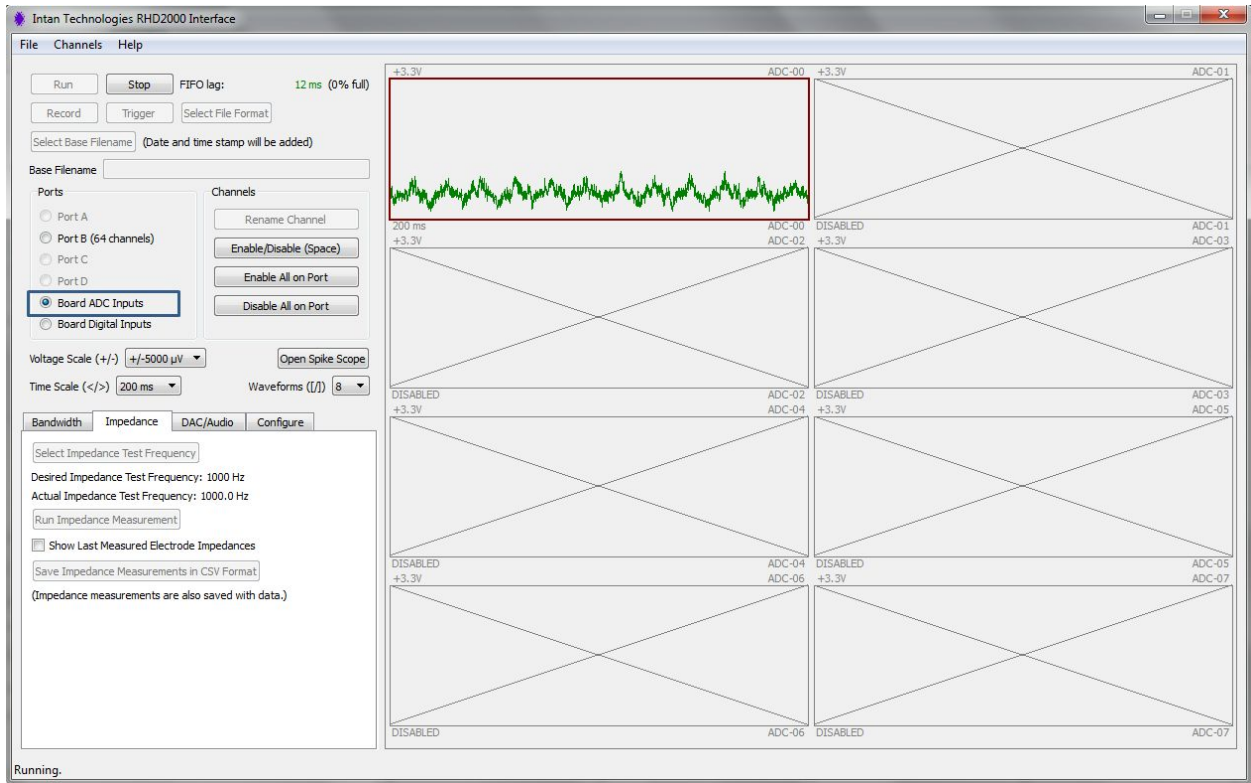
Running an impedance test will also you to test if your electrodes are working and making good contact. Although impedances will vary greatly for different electrodes, lower impedances magnitudes are better than higher one. The impedance magnitude have units of Ω (ohms) and are displayed below the recording waveform. Also reported are the impedance phase, which has used of degrees. Almost all electrodes have an impedance phase between 0 (more like a resistor) and - 90 degrees (more like a capacitor). You can save the impedance results to a

comma-separated-value file by clicking “Save Impedance Measurement in CSV format” in the “Impedance” tab



To run the impedance test, go to the “Impedance” tab, choose the frequency at which you would like to run the test at by clicking “Select Impedance Test Frequency”. The default value is 1000 Hz and this is generally used as a figure of merit for report impedance measurements. To actually run it, click “Run Impedance Measurement” and wait for it to complete.

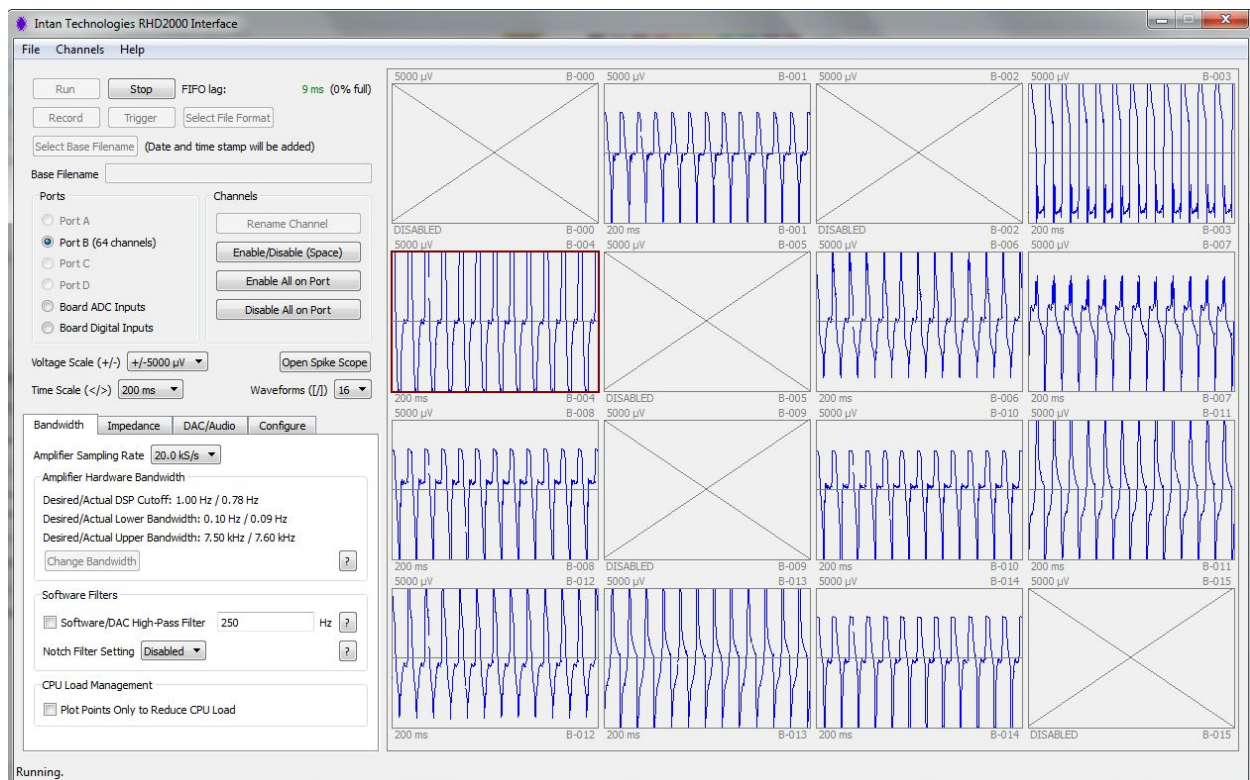
Analog Inputs



To visualize the analog inputs, click the “Board ADC Inputs” radio button, highlighted by the rectangle.

Disabling Channels

When you are not taking advantages of all recording channels, it is advantageous to disable them when recording data to reduce the file size being recorded. The easiest way to disable recording channels is to click them, then press the space bar. Below is an illustration of a subset of recording channels that are disabled.



The channels with the 'x' over them are disabled. In this view, 16 channels are displayed for recording. You can display 1, 2, 4, 8, 16, and 32 waveforms simultaneous with this software. It's important to note that channels NOT displayed are STILL being recorded.

Detailed Software Documentation

This software is open-source and is based on software provided by Intan Technologies. Detailed user documentation can be found at the below link at pages 11-22.

http://intantech.com/files/Intan_RHD2000_eval_system.pdf