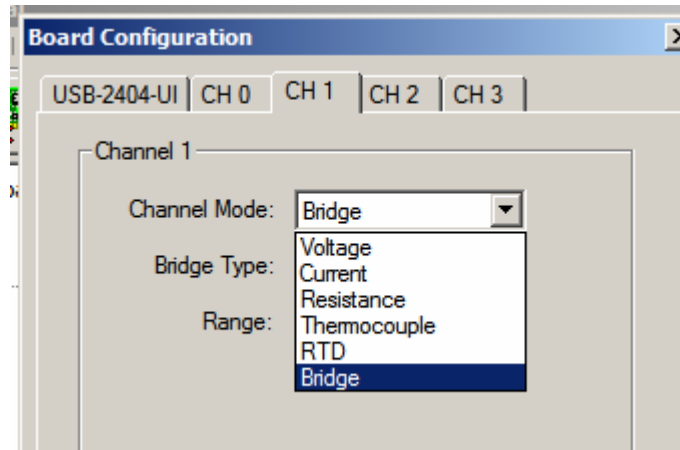


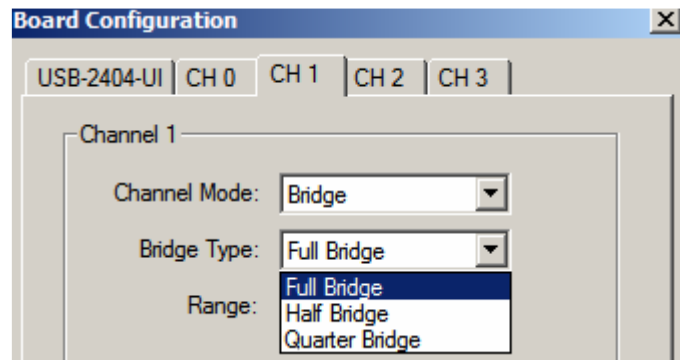
How to use the USB-2404-UI for strain gauge measurement and interpret results

Configuration

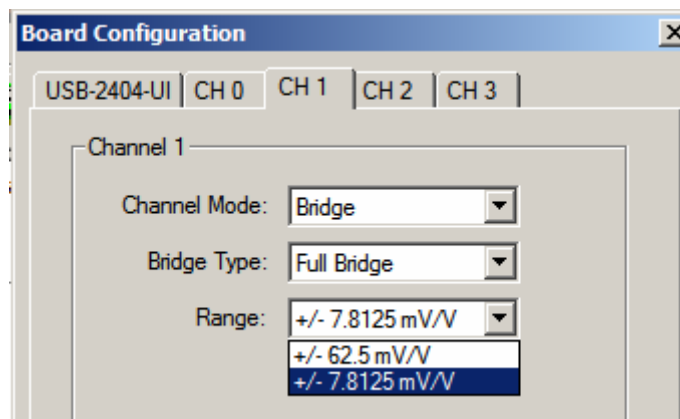
Connect the device and configure it in Instacal for bridge measurement (via the Configure menu item/icon)



Select bridge type (quarter, half, or full bridge)



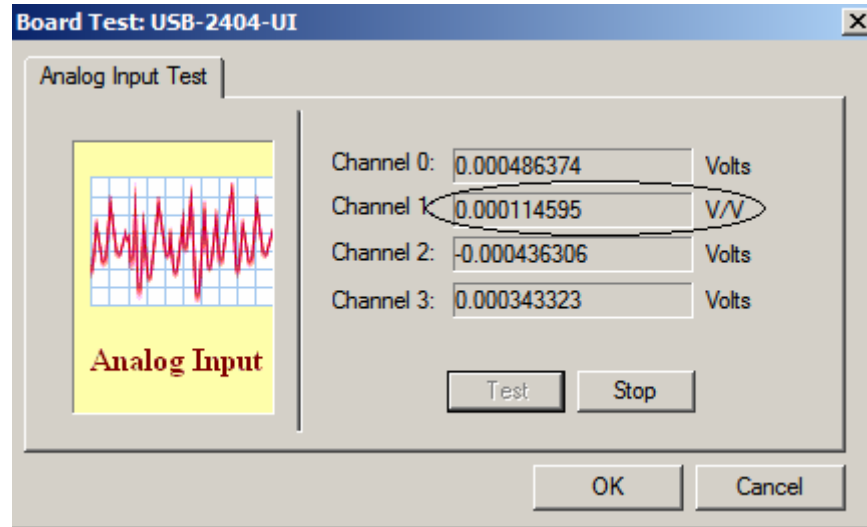
Select the range output by the sensor. To estimate the range, multiply the mV/V output of the sensor x 2.5 volts excitation estimate and select the higher range to it.



Now, the USB-2404-UI is configured to accept bridge sensors. You can click on the Show Connections button for detailed wiring connections for the device

To test the device, choose either the Test icon or the Test..Analog menu item.

Click Test to begin acquiring data. The results returned are a proportional V/V reading.



Most of the strain gauge/bridge sensors use a mV/V specification for output. Therefore, you will need to take the above value and multiply it by a factor of 1000 to attain mV/V, which will then coincide with manufacturer specifications.

Example of interpreting data

There are two specification values needed by the gauge manufacturer to properly measure load. One is the rated capacity of the gauge, the other is the output in mV/V.

In this example, a 110 lbs rated capacity full bridge gauge is used that has an output of 2.0255 mV/V (millivolts output per volt of excitation).

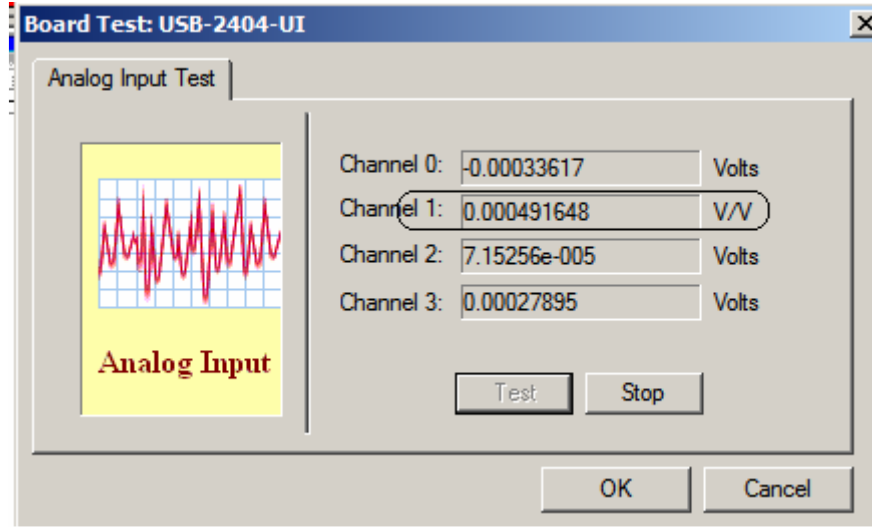
To determine lbs per mV/V output, take $110\text{lbs}/2.0255 \text{ mV/V}$, or $54.31 \text{ lbs}/(\text{mV/V})$

Using the above example, at static condition with no load applied, the bridge sensor was outputting a value of 0.114595 mV/V onto channel number 1. This again is a static no load condition.

Note that the reading in Instacal is in V/V, the value is multiplied by a factor of 1000 to obtain mV/V units.

Also note that the results are in proportional mV/V, and are not reported as the total output of the gauge itself.

By adding a weight to the device, a new reading of .491648 mV/V is obtained:



To determine the weight of the device, take the difference in load (.491648mV/V) versus no load conditions (0.114595 mV/V) and multiply by lbs/mV/V value (54.31)

$$(0.491648 - 0.114595) \text{ mV/V} \times 54.31 \text{ lbs/(mV/V)} = 20.478 \text{ lbs}$$

Using the USB-2404-UI, the excitation value is not needed (although it ranges from 2 to 2.7 volts depending on resistance/bridge type). The results are simply reported back in V/V.

Using the Universal Library with the USB-2404-UI for strain gauge measurement

In order to read the mV/V value output by the USB-2404-UI, you must use the AInScan() function call with ScaledWinBufAlloc() and ScaledWinBufToArray() calls to return the data. Refer to Universal Library example ULAI15 as a demonstration for proper use of these calls.

Note that the value returned in the above example is in V/V. you can multiply the returned value by 1000 to obtain mV/V.