

EE 330 Signal Express Quick Guide and Troubleshoot

Spring 2013

For questions /comments /additions

Luke Goetzke

Email Lgoetzke@iastate.edu

This guide shows...

- Setting up SignalExpress to sweep and record
 - Setting up the Power supply (sweep variable)
 - Setting up the DMM (record variable)
 - Setting up the Sweep parameters
- Oddities with the entire setup (just accept them)
- Brief troubleshooting guide (so you don't get as bad of a headache)

Open SignalExpress

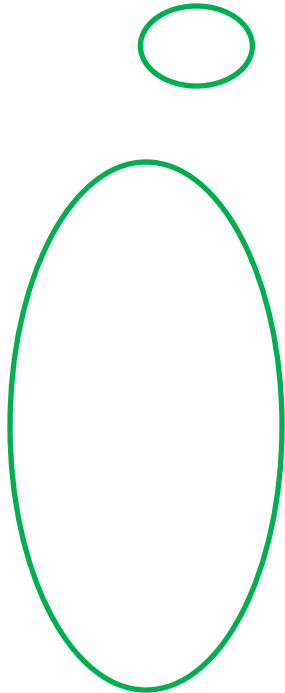
Open up LabView's
SignalExpress
(NOT just LabView)

-Start an empty project



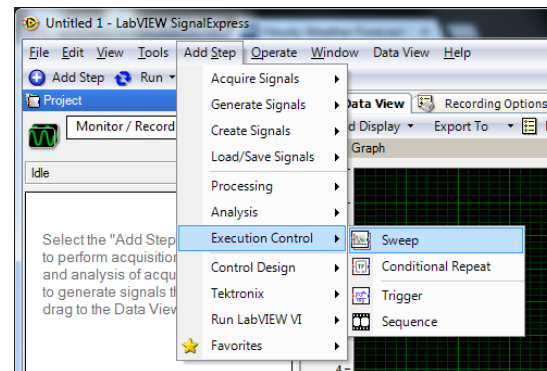
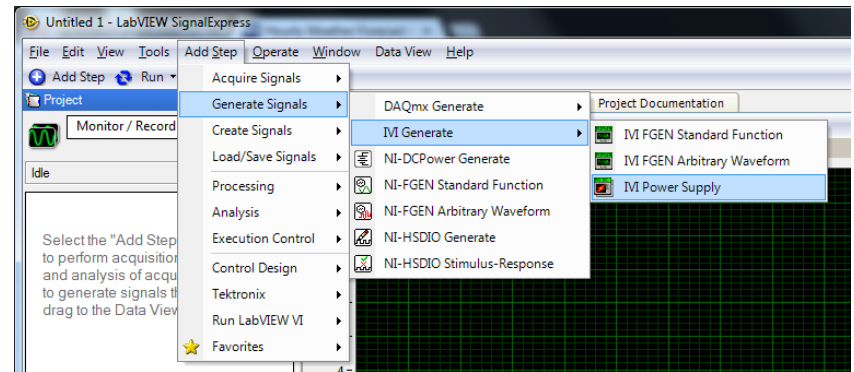
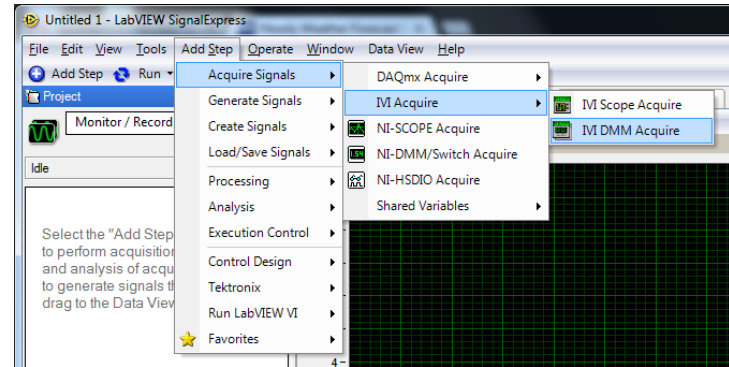
Front Panel/Window

- Note two things in the window
 - ‘Add Step’ Tab
 - Steps get added to the process window on the left side of the screen



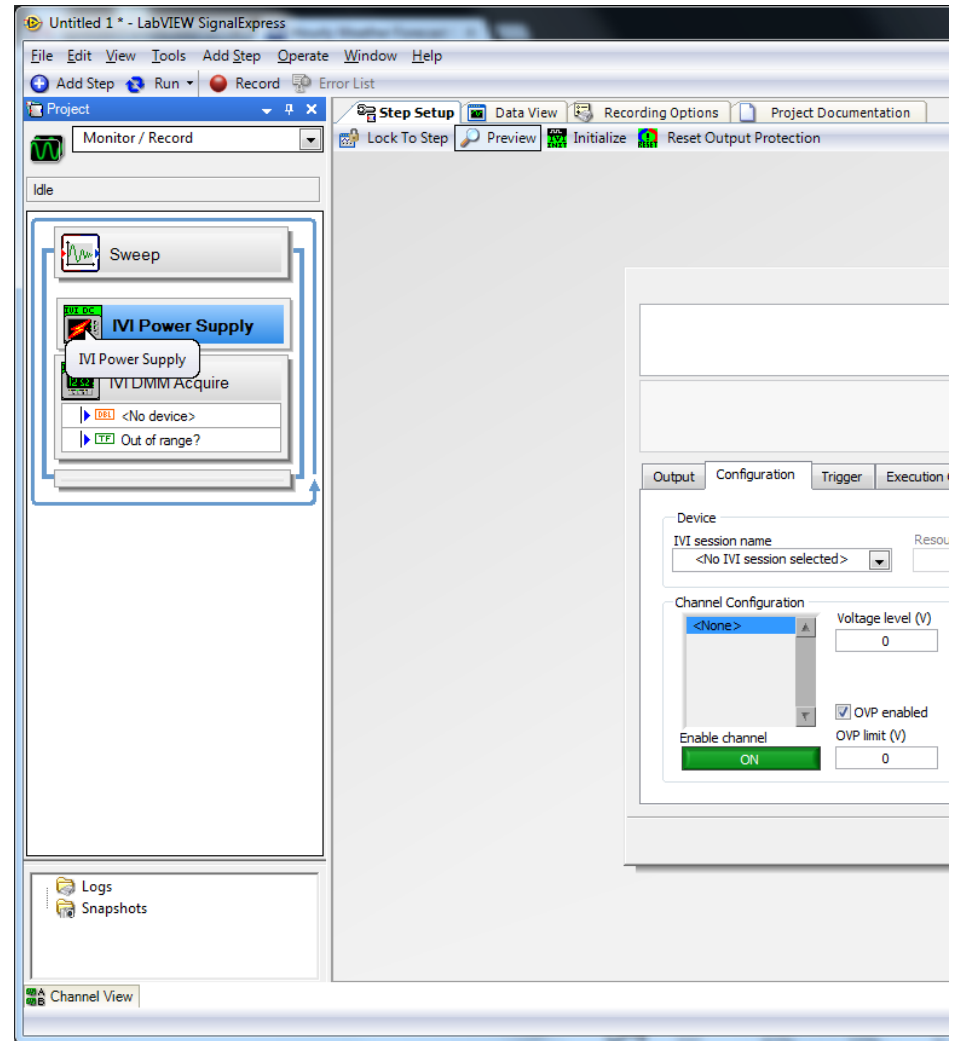
Typically 3 steps required

- IVI DMM Acquire -> Digital multimeter allowing for measurement
- IVI Power Supply -> allowing to generate a voltage
- Sweep -> Allowing to sweep (control) a voltage with any # of steps
- Add all three of these steps by clicking on each one



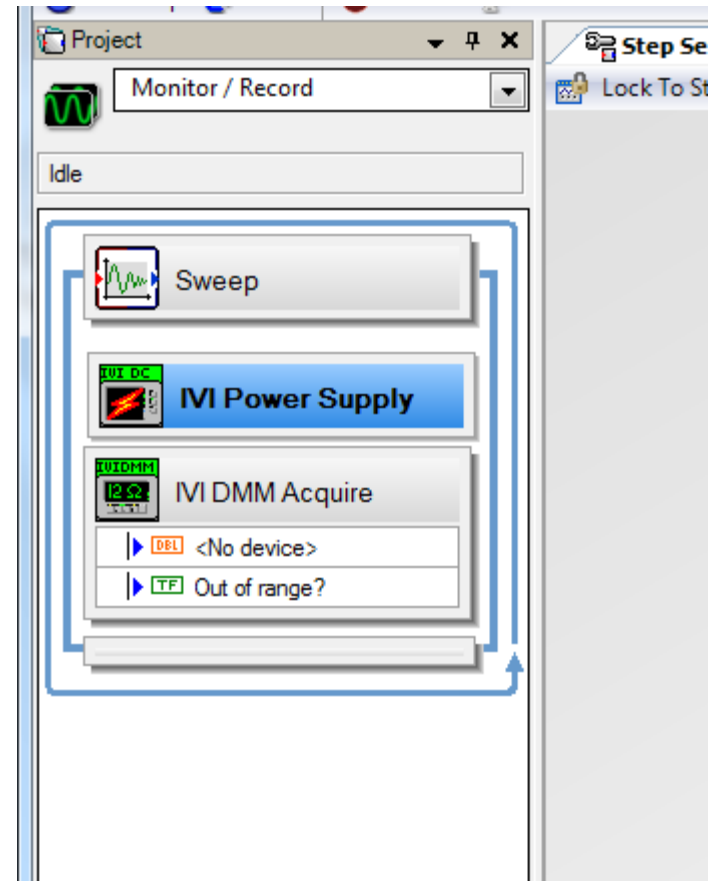
Flow configured as shown on the left panel

- 3 steps as described in previous slide
 - Sweep
 - Power supply
 - DMM acquire
- Just 'drag and drop'



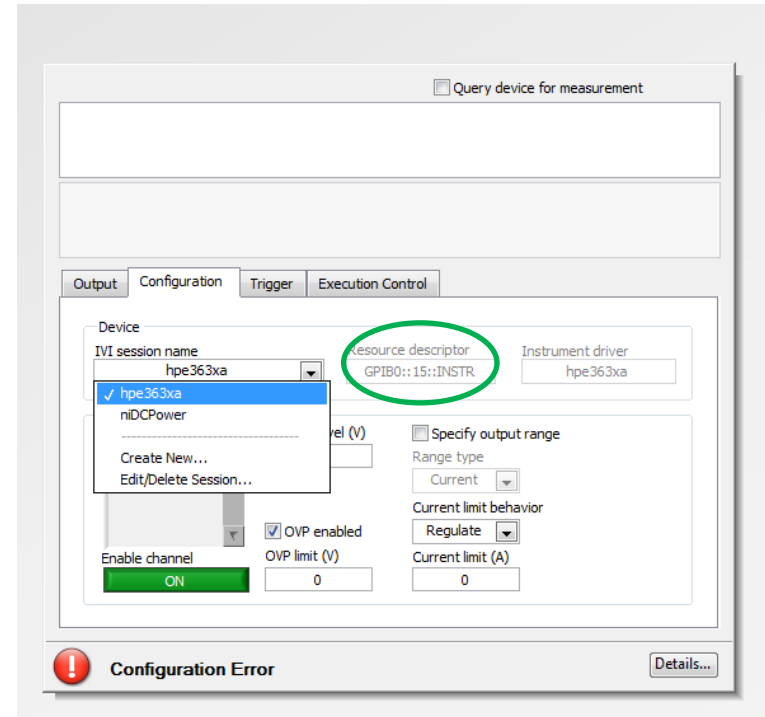
Connect Power Supply E3631A

- Power on the Power Supply (watch the screen)
 - Note the address title 'ADDR ##'
 - ## indicates the GPIB address that the device is on
- Quickly press 'output On/Off' to enable the outputs
 - If this is not done, an error may occur later



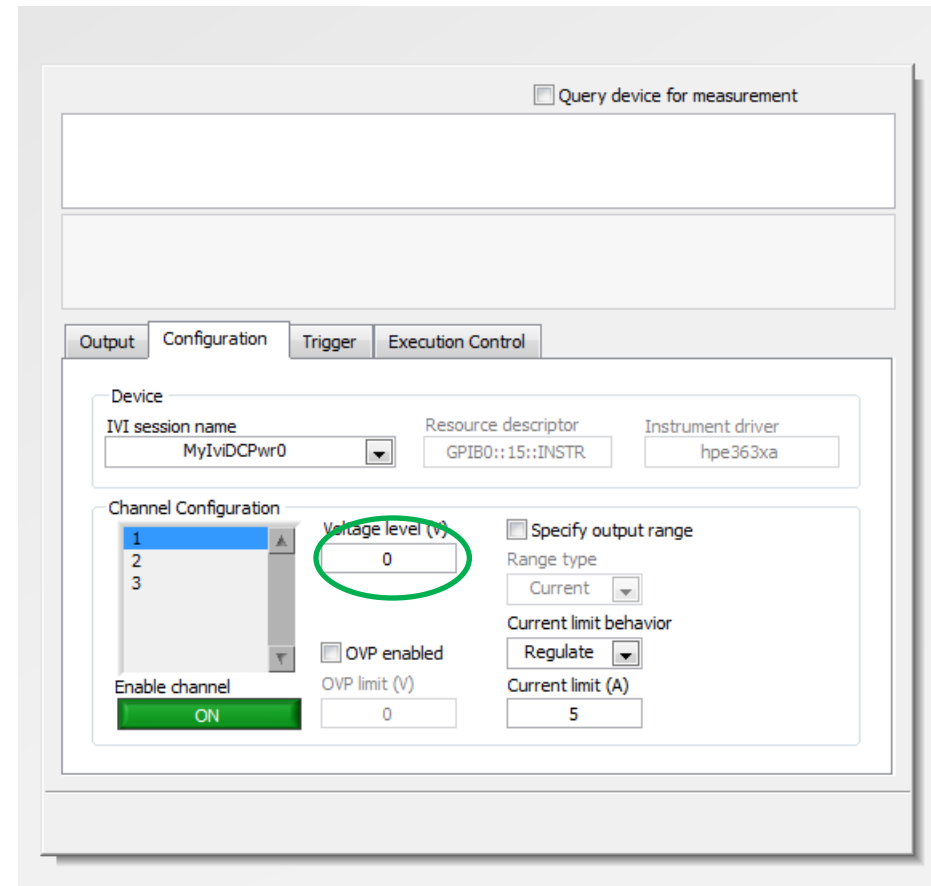
Connect Power Supply E3631A

- IVI session name should match the device name. For the Power supply – hpe363xa
- Note: the device GPIB address will appear here: this must match otherwise you will have a ‘configuration error’
- Also, if the device is not turned on there will be a ‘configuration error’
- Note that the benches have multiple power supplies (GPIB address matters)



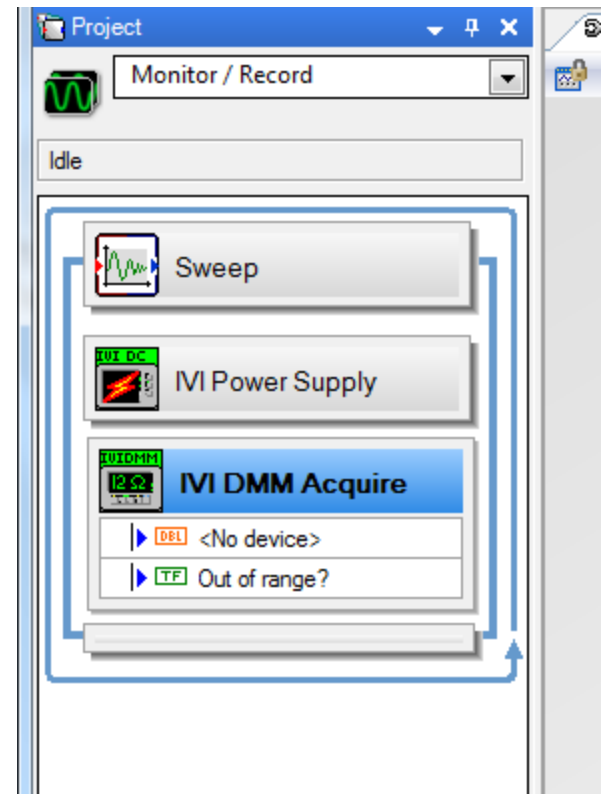
Connect Power Supply E3631A

- Note: 3 channels
 - 1: 6V
 - 2: +25V
 - 3: -25V
- Turn ALL channels ON
- Can explicitly set voltage of each channel here
 - Can also 'sweep' (shown later)
 - Unused channels set to **0v**



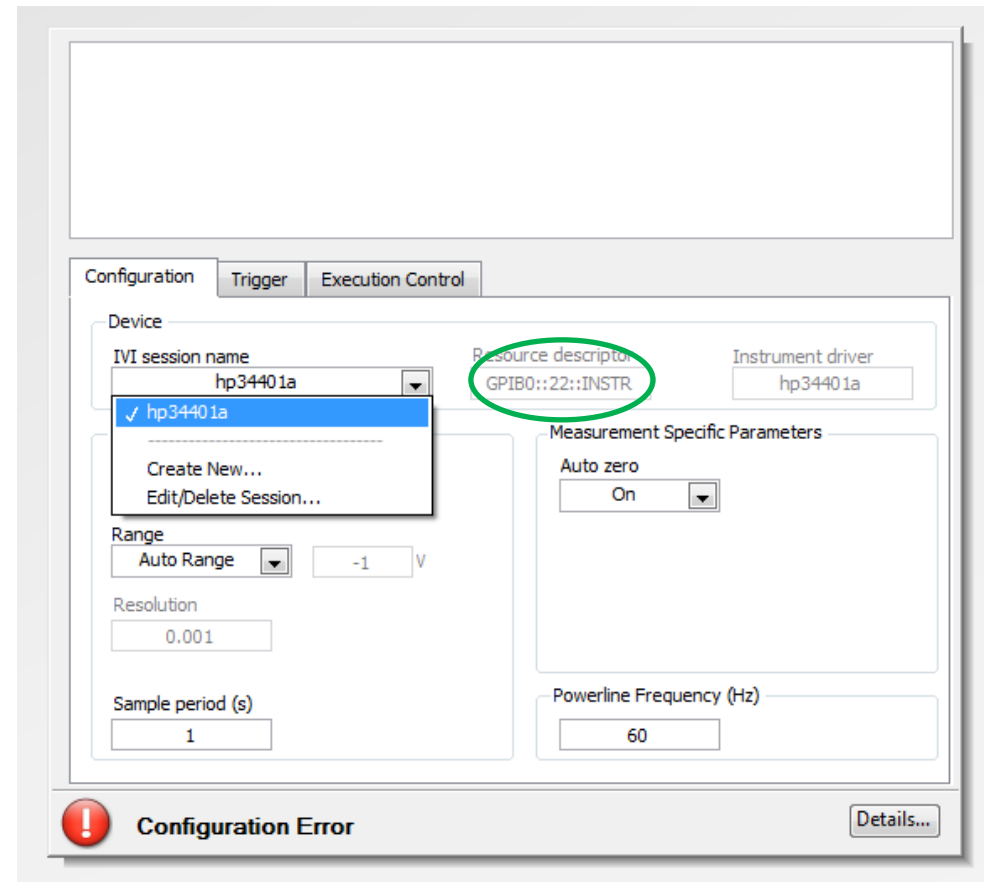
Connect DMM (digital multimeter) HP 34401A

- Power on the DMM
(watch the screen)
 - Note the address title
'ADDR ##'
 - ## indicates the GPIB
address that the device is
on



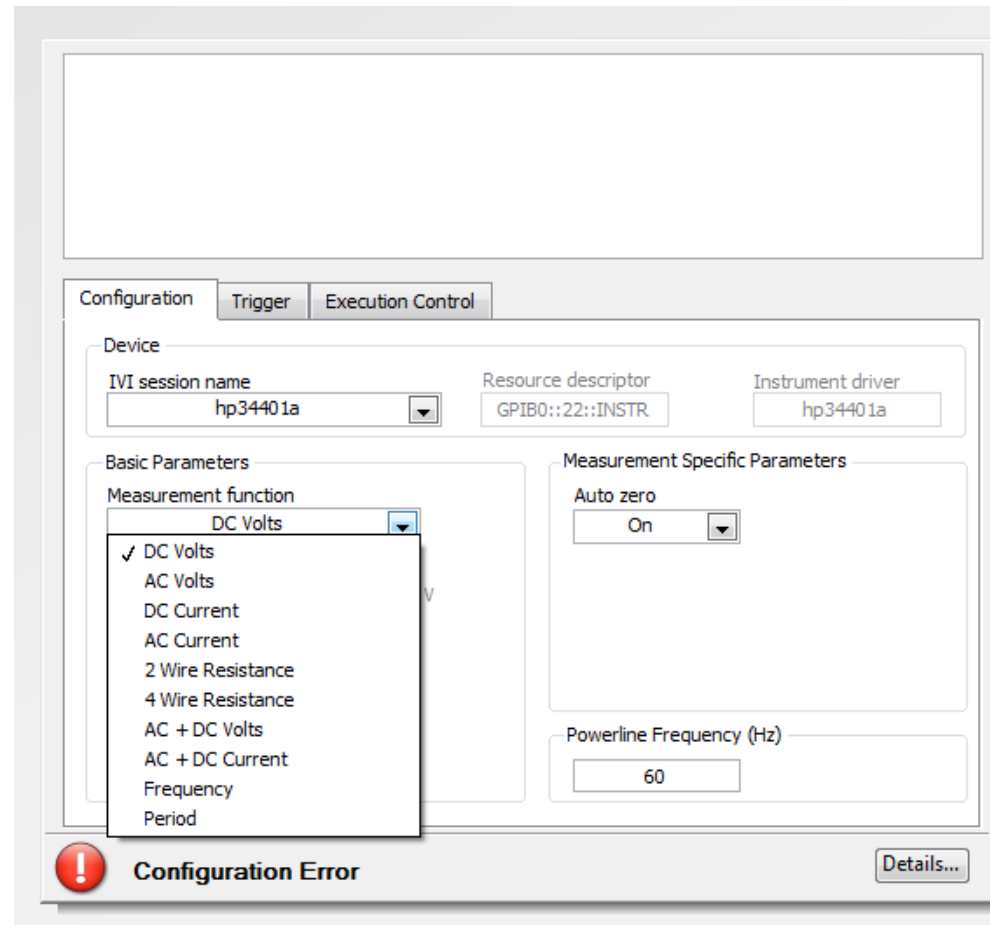
Connect DMM (digital multimeter) HP 34401A

- IVI session name should match the device name. For the DMM– hp34401a
- Note: the device address will appear here: these must match otherwise you will have a ‘configuration error’
- Also, if the device is not turned on there will be a ‘configuration error’



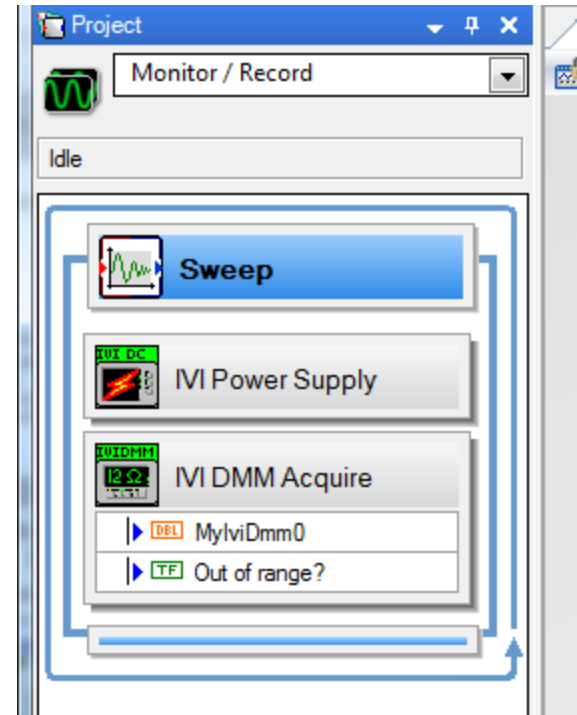
Connect DMM (digital multimeter) HP 34401A

- Note with the DMM there are many things we can measure.
- Typically fuses are blown in the DMM due to experimentation error. If this is the case, Current cannot be measured. Use $V=IR$ and measure DC volts



Set the Sweep values

- The sweep function is a glorified 'for()' loop
 - Sweep Power Supply voltage
 - Measure from the DMM
 - Store the data for analysis



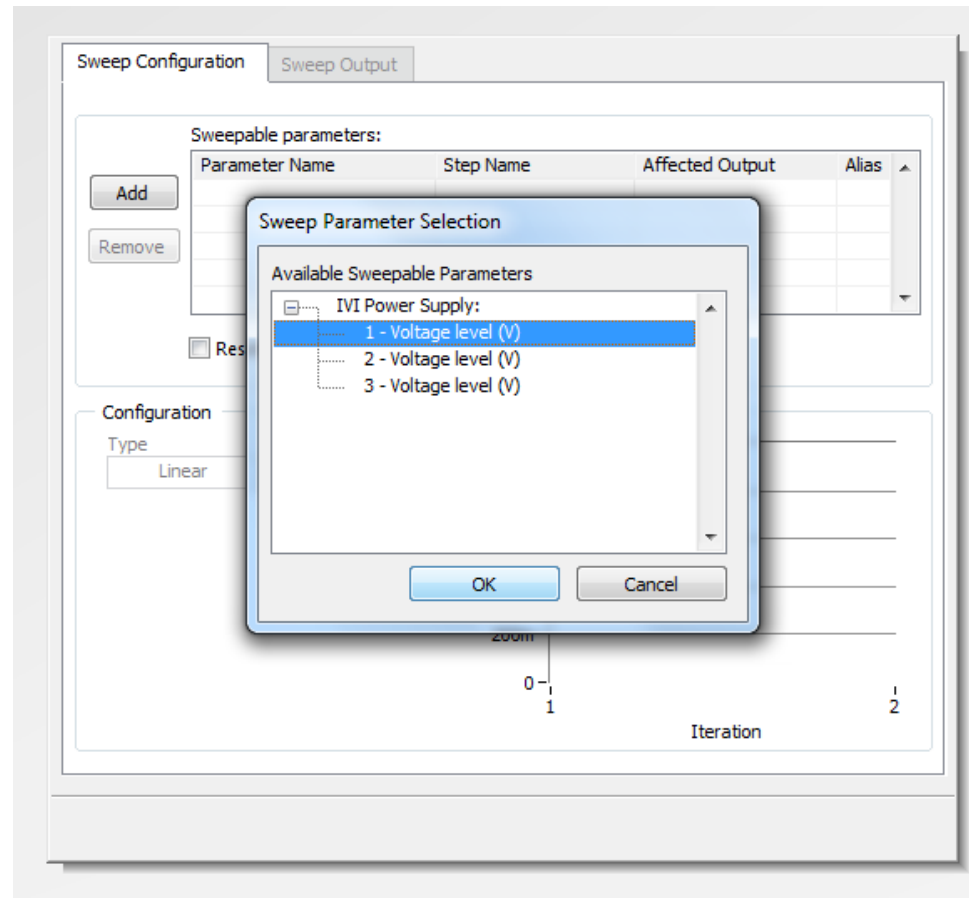
Add sweep parameter

- Click Add

The screenshot shows the 'Sweep Configuration' dialog box with two tabs: 'Sweep Configuration' and 'Sweep Output'. The 'Sweepable parameters' section contains a table with the following columns: 'Parameter Name', 'Step Name', 'Affected Output', and 'Alias'. The 'Add' button is circled in green. Below the table is a 'Remove' button and a checkbox labeled 'Reset steps when loop begins'. The 'Configuration' section has a 'Type' dropdown menu set to 'Linear'. The 'Sweep Points' section features a graph with 'Values' on the y-axis (0, 200m, 400m, 600m, 800m, 1) and 'Iteration' on the x-axis (1, 2).

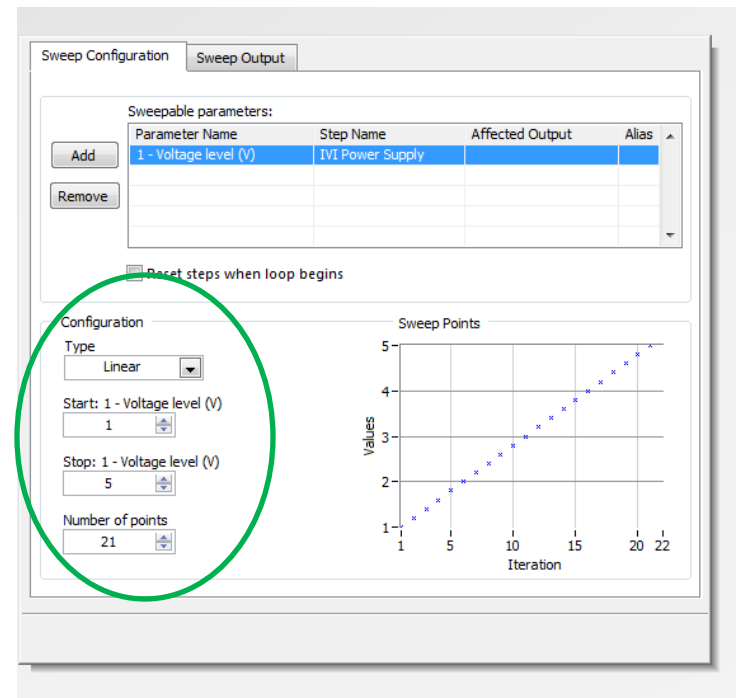
Add sweep parameter

- All available sweepable parameters will appear
 - In our case all 3 channels of our connected power supply.
- For this case I selected channel 1 (6V channel)
- Click OK



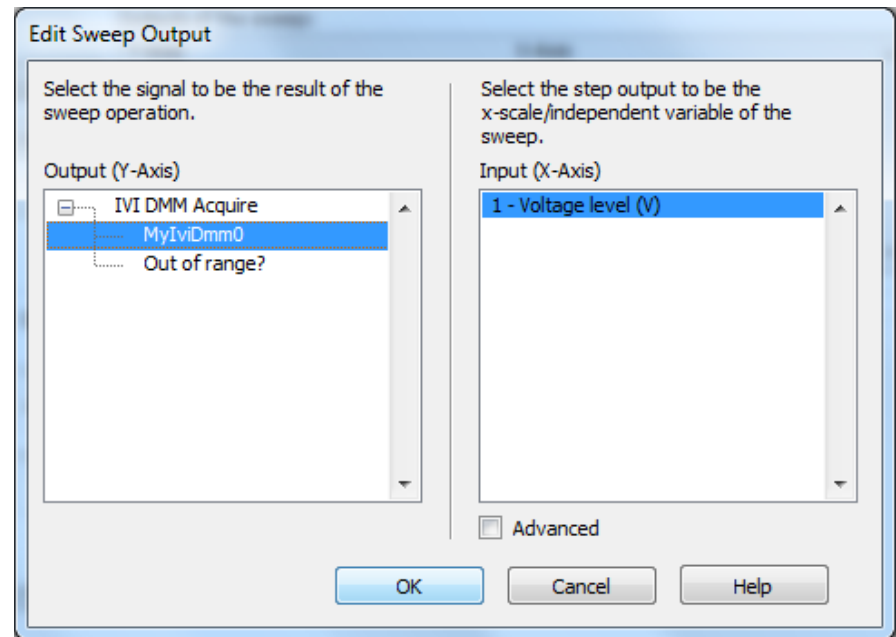
Sweep Parameter characteristics

- We now have the ability to specify the
 - Start voltage
 - Stop voltage
 - The number of data points
- Upon execution, this data will be stored and saved.



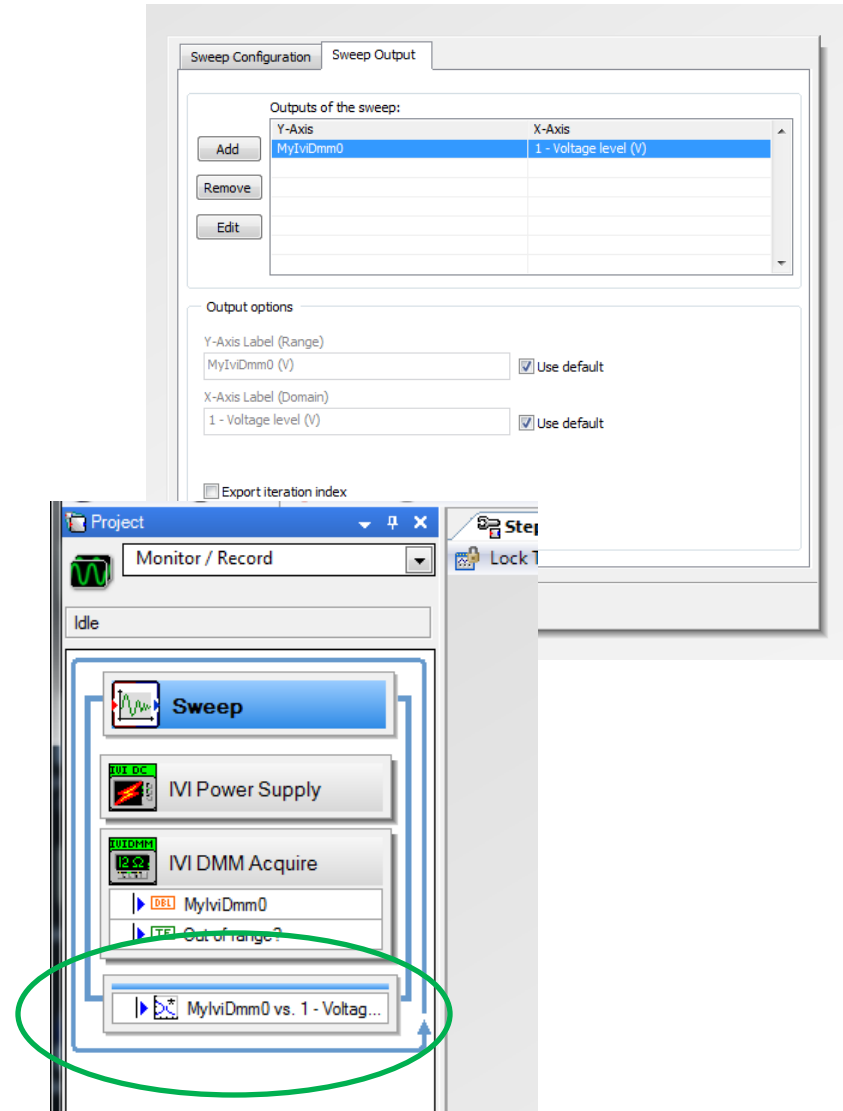
Sweep Output variable

- After adding a sweep parameter the 'sweep output' tab will become visible.
- Click on the tab and select 'add'
- Be sure to select the item that matches the name of the measuring device.
 - My DMM was named 'MyIviDmm0'



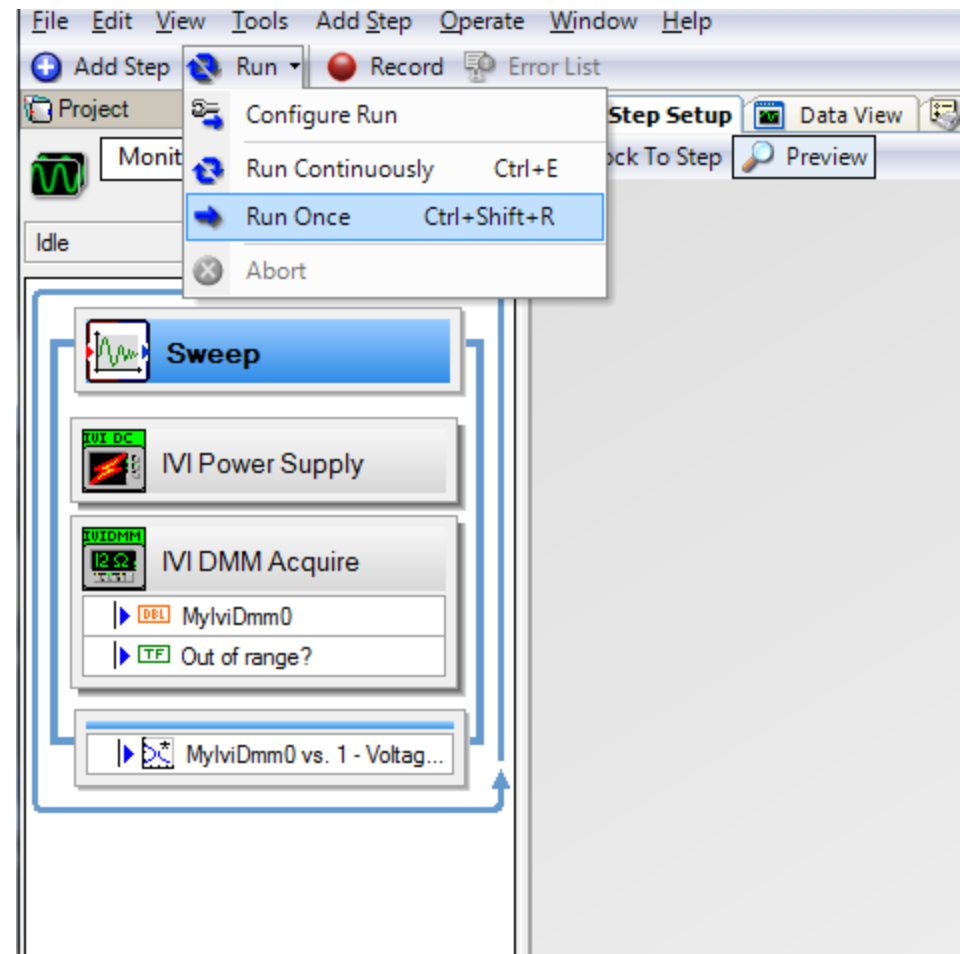
Sweep output variable

- The output will be displayed here.
- Also note that on the process flow, a node has been added at the bottom. This is where the output data will be 'stored.'



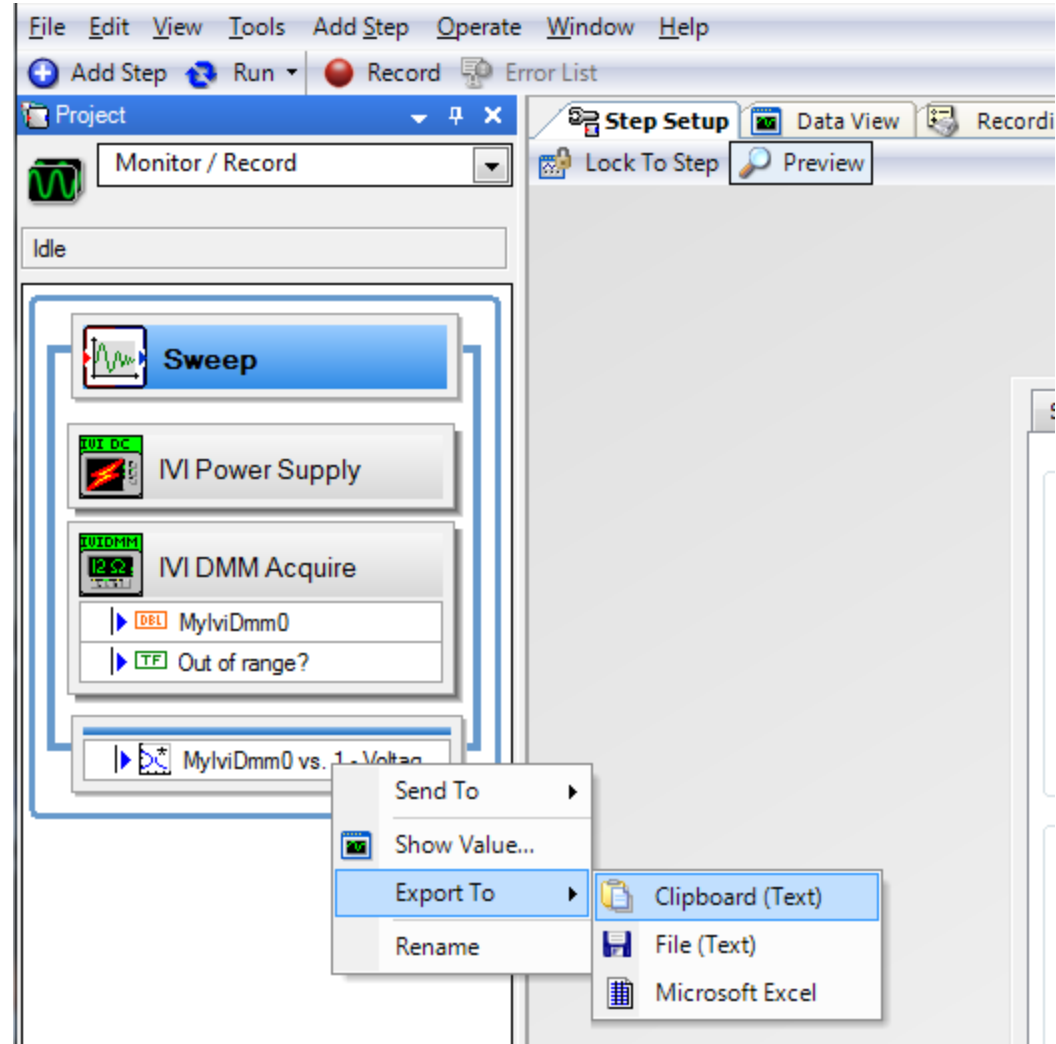
Run the Simulation

- To run the simulation
 - Click on 'Run'
 - Run Once
- You can now observe your power supplies change value, and the DMM measure it.
- This step may take a few seconds to a minute



Saving the data

- DONE!
- To save the data
 - Right click on the bottom node
 - Export To
 - Clipboard (text)
- Now Open MS Excel
- *NOTE the export to Microsoft Excel rarely works (don't use it)



MS Excel

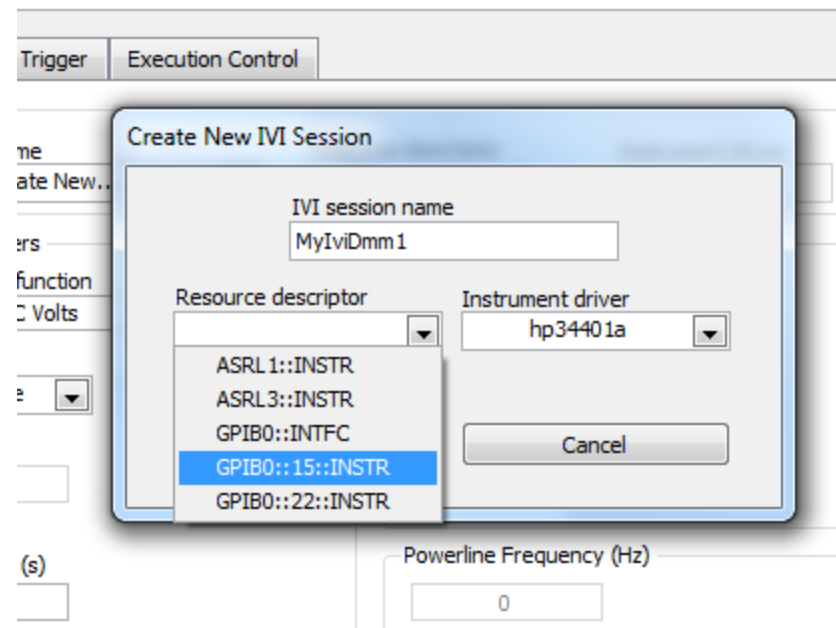
- Right click in excel and paste
- You can now analyze anything you need, and can easily manage your data and create plots as needed.

ODDITIES

- Power supply: when connected to Signal Express and sweeping a voltage
 - On the first data point the power supply window may not be updated (ex: it could say 0v, when it is actually outputting 1v)
 - The displayed current is the current limit!
 - Not the actual current
 - This may show 1A or 5A (example), this is only the current limit and not actually telling you how much current is flowing.

Troubleshoot

- Connection Error:
 - Double check device is ON
 - Double check 'output ON/OFF' set to ON
 - Double check GPIB address
 - If different: under 'IVI session name'
 - Click 'create new'
 - Resource descriptor to match the GPIB address of the connected device
 - Instrument Driver should already be there
 - Click OK



Troubleshoot

- Garbage data received
 - Upon execution observe the power supply window
 - Does a small icon come up with 'OFF'?
 - If so:
 - Go back to your power supply and be sure that ALL channels (1, 2, and 3) are turned ON.
 - Double check you are referencing and using the correct channels (i.e. plugged into channel 2 when you mean to and are sweeping channel 2)

Troubleshoot

- Always be sure to check your pinout and connections referencing the part datasheet