EE 330 Signal Express
Quick Guide and Troubleshoot

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For questions /comments /additions
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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 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
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