EE 330 Signal Express
Quick Guide and Troubleshoot

Spring 2013
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