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 <u>SignalExpress</u> (NOT just LabView)

-Start an empty project

Betting Started	
New Image: Constraint of the state of t	Online Support Discussion Forums KnowledgeBase Request Support Getting Started Help with Tektronix Extensions for NI SignalExpress General Help Topics Interactive Tutorial Video LabVIEW SignalExpress Help Open Example Project for LabVIEW SignalExpress

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

- <u>IVI DMM Acquire</u> -> Digital multimeter allowing for measurement
- <u>IVI Power Supply</u>-> allowing to generate a voltage
- <u>Sweep</u> -> 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'

Project 🚽 🗸 🗸	Step Setup 🔳 Data View 🕄 Recording Options 🗋 Project Documentation
Monitor / Record	Lock To Step Preview Initialize Reset Output Protection Output Configuration Trigger Exect Device IVI session name <ho ivi="" selected="" session=""> Channel Configuration Voltage level (Output</ho>
🧔 Logs 🥁 Snapshots	

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**

Dutput	Configuration	Trigger Execution (Control	
Devic IVI se	ssion name MyIviDCPwr0	Resou	rce descriptor 80::15::INSTR	Instrument driver hpe363xa
Chan 1 2 3	nel Configuration	Vertage level (V) 0	Specify outp Range type Current	out range
Enab	r ole channel	OVP enabled OVP limit (V)	Current limit be Regulate Current limit (A)	havior
	ON		5	

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'

Configuration Trigger Execution Control	
IVI session name hp34401a ✓ hp34401a Create New Edit/Delete Session Range Auto Range ▼ -1 V Resolution 0.001	Presource descripto GPIB0::22::INSTR Instrument driver hp34401a Measurement Specific Parameters Auto zero On On
Sample period (s)	Powerline Frequency (Hz)

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

Configuration	Trigger	Execution Control		
-Device			1	
IVI session r	ame	F	Resource descriptor	Instrument driver
	hp34401a	•	GPIB0::22::INSTR	hp34401a
-Basic Parame	eters		Measurements	pecific Parameters
Measuremen	t function		Auto zero	
/ DC Volts	DC VOILS		On	
AC Volts	,			
DC Curr	, ent	v		
AC Curr	ent			
2 Wire F	esistance			
4 Wire F	lesistance			
AC + DO	C Volts		-Powerline Fred	uency (Hz)
AC + DO	Current			
Frequen	су		60	
Devied				
Period				

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

Sweepable parameters:				
Add Remove	Step Name	Affected Output	Alias	*
Configuration Type Linear	Sop begins Swee 1- 800m- 300m- 200m- 200m- 0- 1	p Points		-

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 'MylviDmm0'

Select the signal to be the result of the sweep operation.	Select the step output to be the x-scale/independent variable of the sweep.	
Output (Y-Axis)	Input (X-Axis)	
IVI DMM Acquire	I - Voltage level (V)	*
	Advanced	Ŧ
	OK Cancel Help]

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.'

	Sweep Configuration Sweep Output				
	Outputs of the sweep:				
	Y-Axis X-Axis Add MylviDmm0 1 - Voltage level (V) Edit				
	Output options Y-Axis Label (Range) MyIviDmm0 (V) V Use default X-Axis Label (Domin)				
	Export iteration index				
👕 Project	↓ # X / Participanti Step				
Mon Mon	itor / Record 💽 Lock 1				
Idle					
	Sweep				
	VI Power Supply				
	IVI DMM Acquire MylviDmm0 Cout of range?				
	MylviDmm0 vs. 1 - Voltag				

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)

<u>File Edit View T</u> ools Add <u>S</u> tep <u>O</u> perate	<u>W</u> indow <u>H</u> elp
🚯 Add Step 🗞 Run 🕶 🥌 Record 🐺 E	rror List
Te Project 🔶 🕂 🗙	😼 Step Setup 🔳 Data View 🕄 Record
Monitor / Record	👷 Lock To Step 🔎 Preview
Idle	
Sweep	
► TE Out of range?	
Send To	•
Show Value	
Export To	Clipboard (Text)
Rename	File (Text)
	Microsoft Excel

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