

NI ELVIS with virtual instrumentation Introduction

Course: Biomedical Engineering Laboratory

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The protoboard can be taken out to work for the circuit, and plugin in back to the ELVIS. The power of the ELVIS is on the right behind the label, if turned the power on, the red light will turn on, and the NI ELVIS instrument launcher will automatically start on the computer. To turn on the power to the protoboard and to the header, we should flip the switch on the top right corner, and the green light will turn on to remind user, and therefore, we will have $\pm 15\text{V}$ and $+5\text{V}$ on the header which can be connected to the circuit on the protoboard.

To measure voltage and current on the NI ELVIS instrument launcher, click Digital Multimeter. We can measure DC voltage, AC voltage, DC current, AC current, resistance, impedance, diode, continuity and so on. After select the quantity to measure, the banana jack will show the connection between label and ELVIS. After connect the alligator clips to the device, hit run on the Digital Multimeter, and the voltage/current value will display on the screen.

In the header, there are default 3 quantities of DC Power Supplies: $\pm 15\text{V}$ and $+5\text{V}$. The max output of the $\pm 15\text{V}$ is 500mA and 2A for the $+5\text{V}$. If we need more output current, we should connect external power supply. Besides, we can use variable power supply to output user define value to the circuit. Once finish the connection to the circuit, click Variable Power Supplies on the NI ELVIS instrument launcher, and then we can set the voltage we want to deliver to the circuit and run it.

We can also use function generator AC voltage as the input of the circuit. After connect the function generator to the circuit, click function generator on NI ELVIS instrument launcher. We can output sine wave, triangle wave or square wave. Furthermore, we can also perform AC sweep by specifying the start/stop frequency and step/step interval. Two kinds to output the signal, first is through the prototyping board, and second is through the BNC cable, so that you can connect to the external circuit. After finish all settings, click run.

We can connect the signal generated by function generator to the Analog Input Signals header, so that we can use Oscilloscope on NI ELVIS instrument launcher to observe the waveform. At first, we should select the correct source (AI X, analog input X) to the specified channel. Second, we can use auto-scale button to display the waveform more appropriately, or we can adjust the time-base or the voltage scale to the value for a better view. Right now, the signal is still bouncing in the screen, to stabilize the signal, we should change the trigger from immediate to digital.

We can also use SCOPE to display the signal waveform in the circuit. First, connect the probe BNC connector into CHX of the oscilloscope, and ground the alligator clip and connect the probe to the point we interest in the circuit. Back to ELVIS instrument launcher, change the source from analog input to SCOPE CHX, click run, and adjust the time-base and voltage scale, we can now observe the clear waveform in the screen.

If we need more current than the ELVIS can provide, we need to connect to the external power supply. First, make sure to close the power to the prototyping board, and connect external power supply to banana A and banana B. Next, move power and ground wires to connect to the banana A and banana B header on the protoboard. After turning on the external power supply, the circuit will be powered from the external power supply.

After taking Electronic Circuit Lab in last full semester, playing around with NI ELVIS should not be so difficult for me. The NI ELVIS instrument launcher on the computer is quite clear, and the user interface is really similar to the exact function generator and oscilloscope we used in Electronic Circuit Lab. I hope I can do well on this lab!