

Measuring Voltage and Current (Simulation)

In this lab you will simulate a simple circuit and measure the voltage across a virtual lamp and the current flowing through the circuit.

Niagara College Photonics Engineering Technology

No sector of business or industry remains untouched by photonics, the science of generating and harnessing light. The Photonics Engineering Technology program at Niagara College encompasses optics, lasers, electro-optics, spectroscopy and electronics technology.

Document content developed by:

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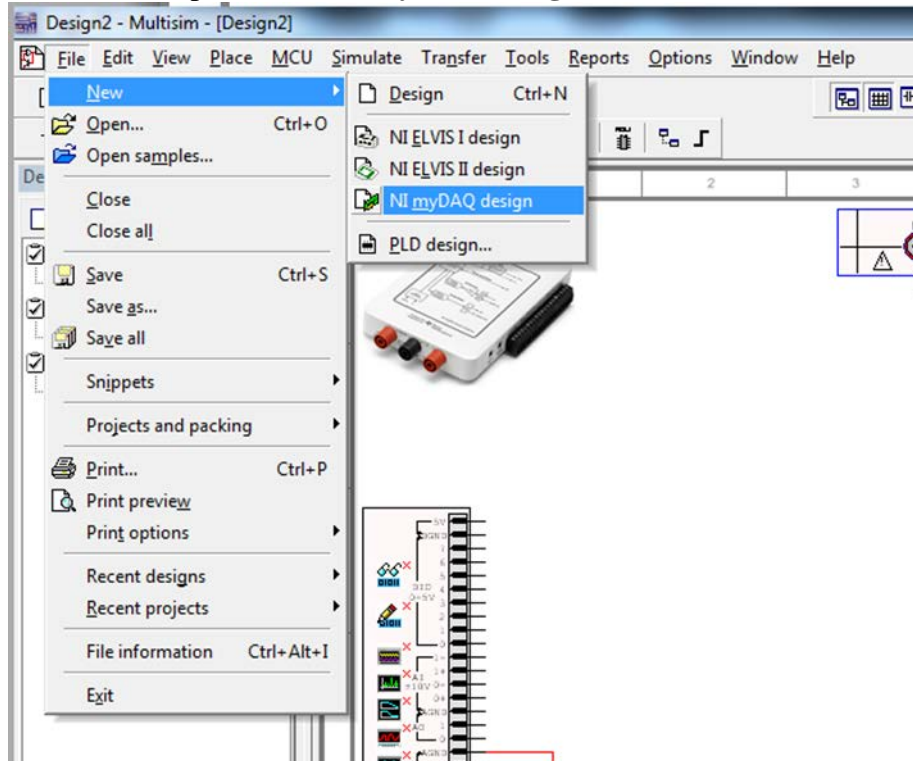
Niagara College of Applied Arts and Technology

School of Technology, Department of Photonics

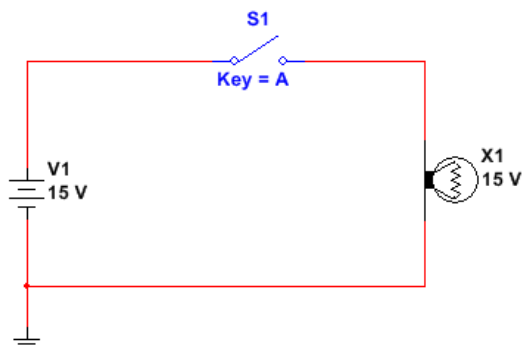
Purpose

In this lab you will simulate a simple circuit and measure the voltage across a virtual lamp and the current flowing through the circuit.

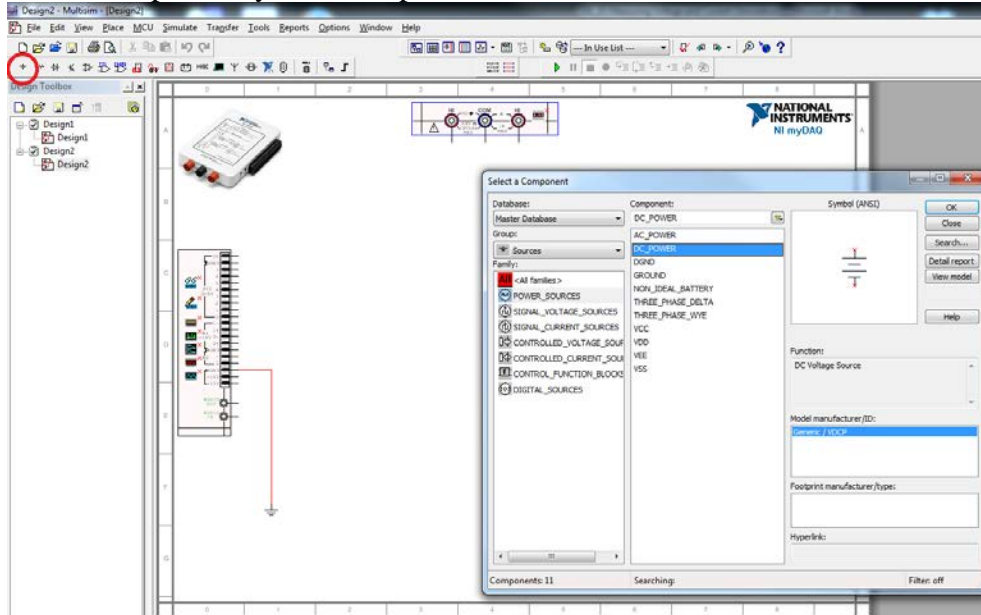
1. In **Multisim** open a new **NI myDAQ design**



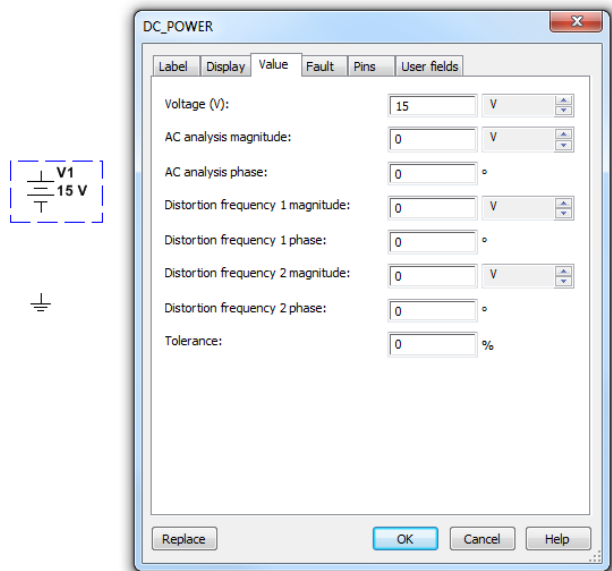
2. Use the guidelines below to create the following simple circuit:



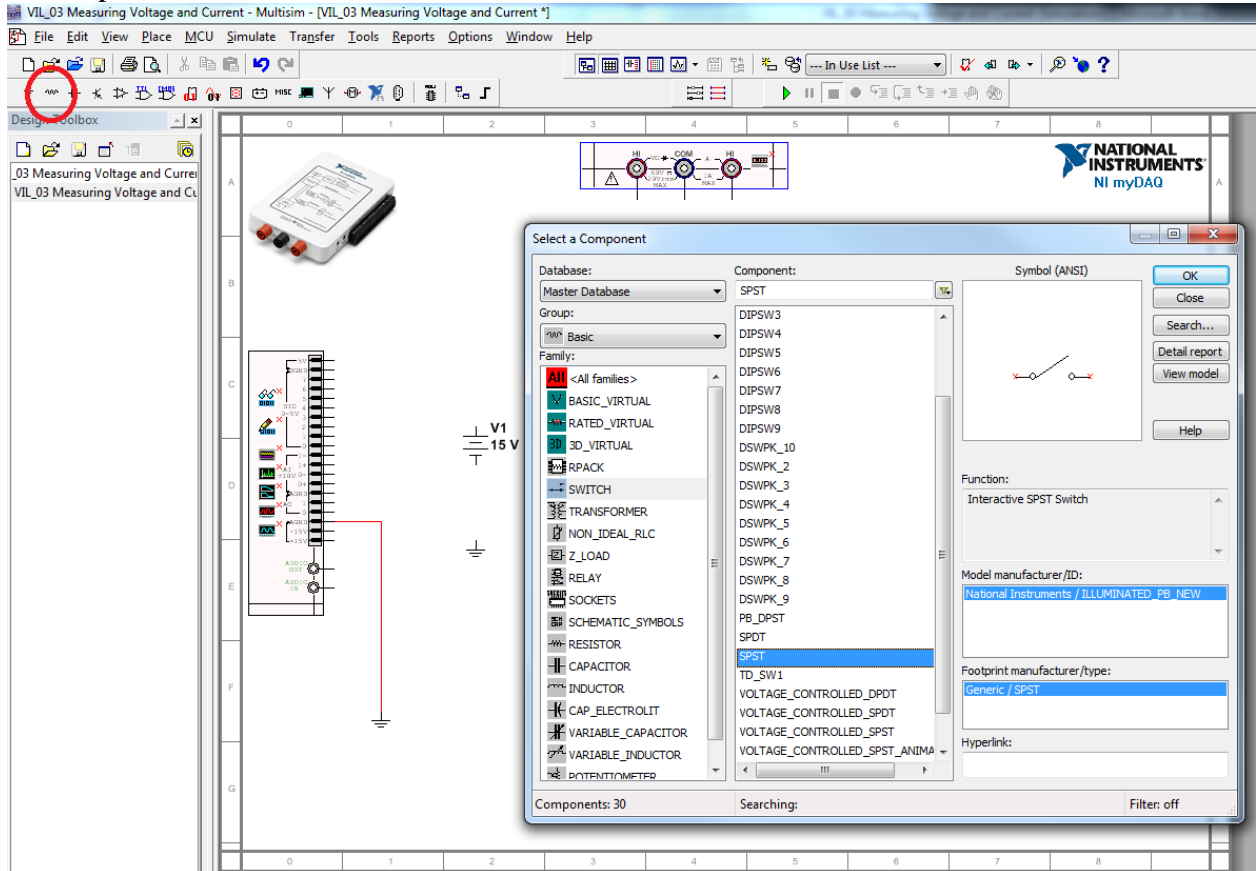
3. Click the **Place Source** icon in the top left corner and place the DC_POWER and GROUND parts in your workspace.



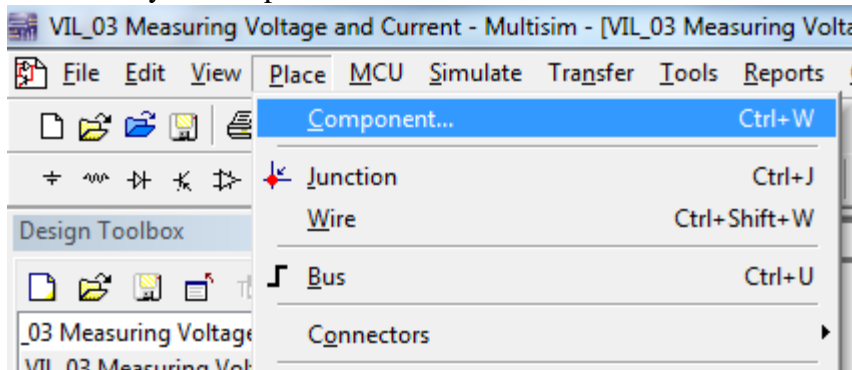
4. The properties menu for the part can be opened by double clicking on the DC_POWER part. Here you can change the voltage to 15V.



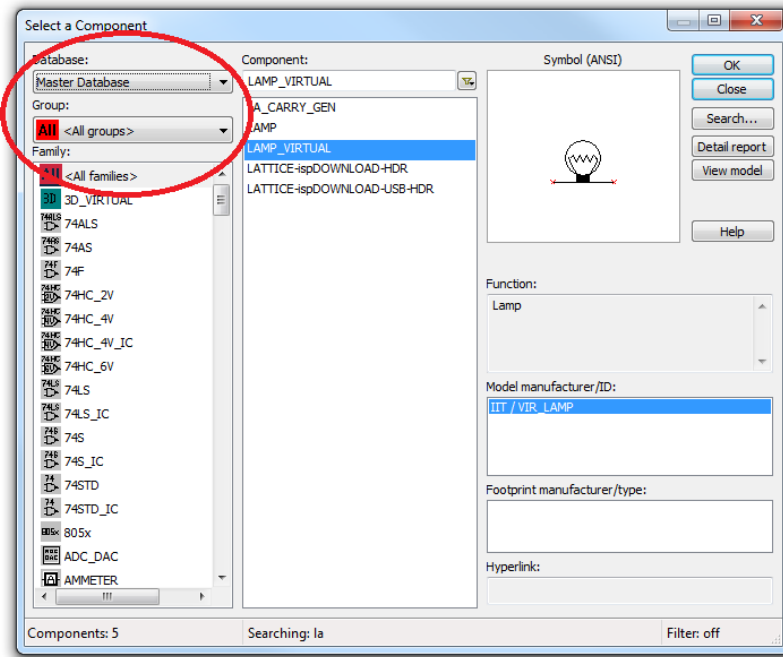
- Click on the **Place Basic** icon, select and place the SPST (Single Pole Single Throw) switch part on the worksheet.



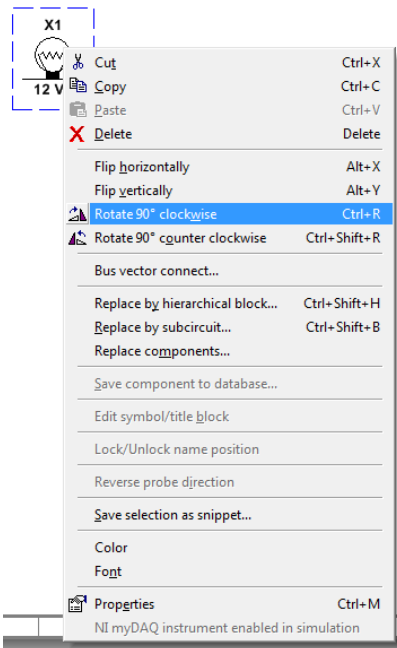
- Another way to find parts is to select the **Place** menu and then select **Component...**



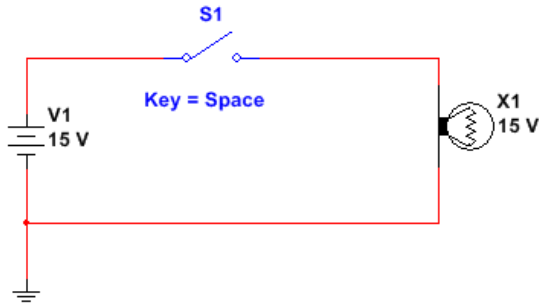
Under **Group** select **ALL <All groups>** and under **Component:** start typing the part you are interested in (in this case a lamp). Select and place the Virtual Lamp on your worksheet



- By right clicking on the part, you bring up a menu which will allow you to rotate the part. Also, double click on the lamp and change its voltage to 15V.



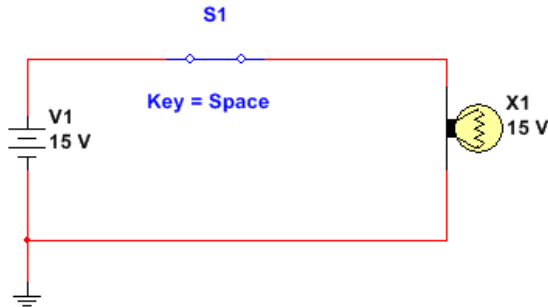
8. Wire all the components together by clicking on the terminals of each part and joining them together.



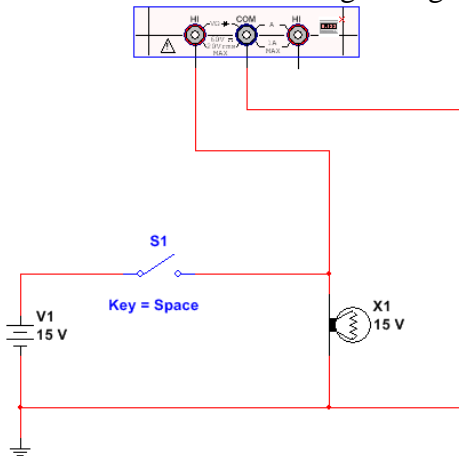
9. Draw a schematic of this circuit in your log book and create the following table:

	Switch Open	Switch Closed
Lamp Voltage (V)		
Lamp Current (A)		

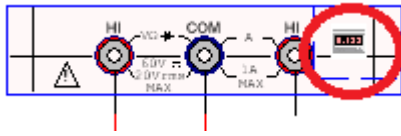
10. Run the simulation and note that the lamp should light up when the switch is closed, and turn off when the current is stopped by opening the switch.



11. Connect the myDAQ in your simulation to measure the voltage across the lamp. (Remember when measuring voltage we measure across the device).

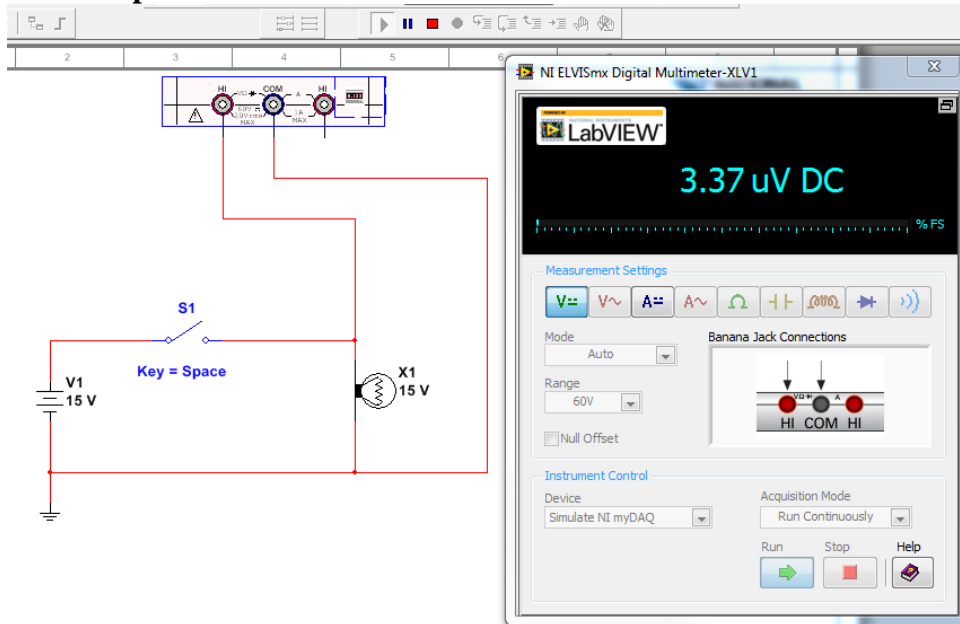


12. Double click on the myDAQ DMM to activate it

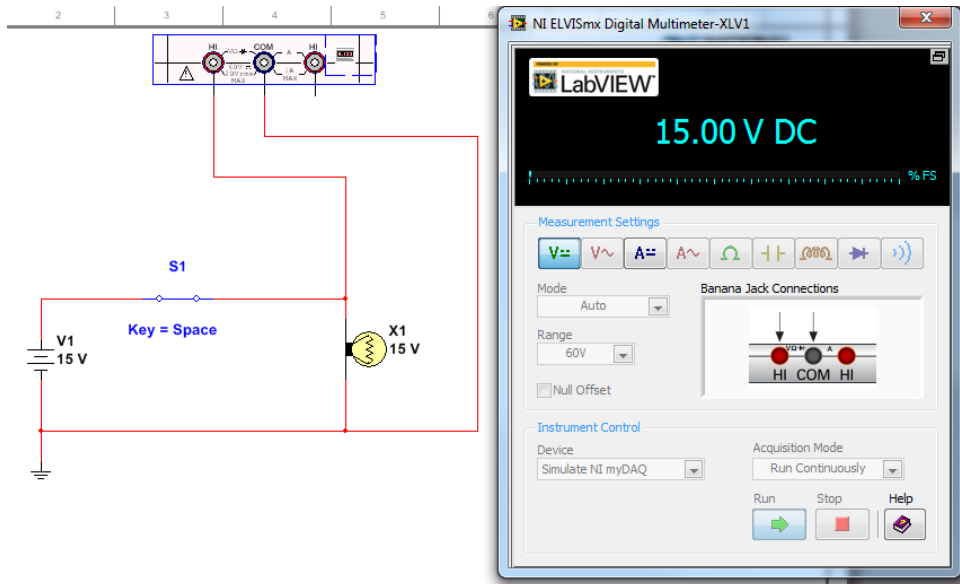


13. Run the simulation and measure the voltage across the lamp with the switch open and closed. Record your results in your log book.

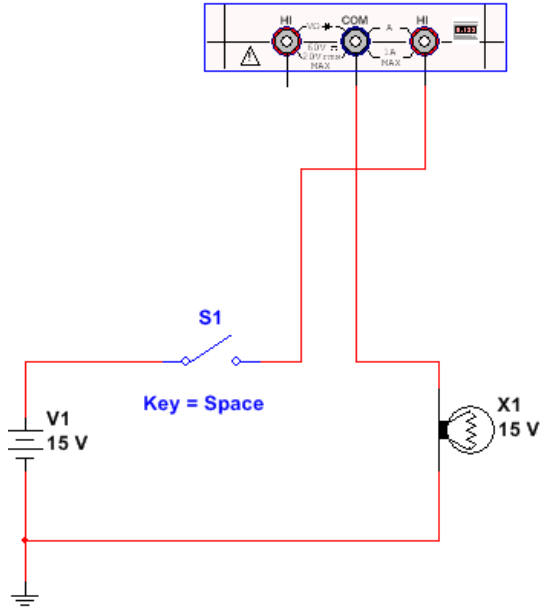
Switch Open



Switch Closed



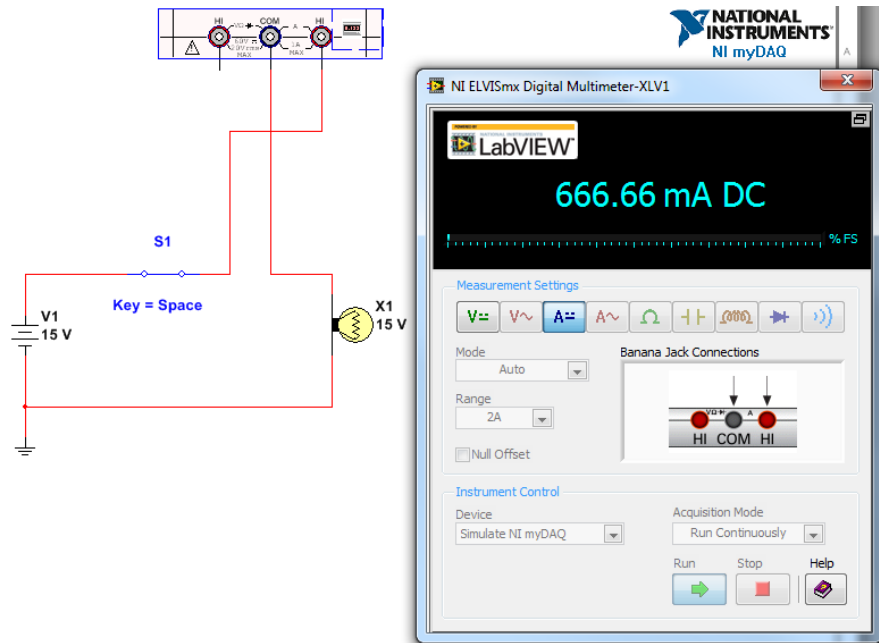
14. Connect the myDAQ to measure the current flowing through the lamp. Remember in order to measure the current *through* the circuit, the meter must be inserted into the circuit. (Break open the circuit and connect the meter).



15. Set the DMM to measure DC current. Run the simulation and record the current with the switch open and closed.

Switch Open

Switch Closed



16. Delete the **V1 15V** source and connect the circuit to the **+15V** source and **AGND** (analog ground) on the myDAQ. Run the simulation and verify that the voltage and current are the same.

Note: This won't work in reality. The myDAQ is current limited at approximately 30mA.

