Overview: The following is a tutorial showing how to connect a simple circuit to a power supply. The tutorial also explains how to use a Multimeter to measure voltage and current in the circuit.

Equipment: Any value resistor, a double sided alligator clip connector, a set of alligator clip leads, a set of Multimeter leads, an E3631A Power Supply, and a 34401A Digital Multimeter.

More Information: Contact the TA or instructor. For lab room and equipment, see: [http://www.ece.utah.edu_facilities/analog_lab.html](http://www.ece.utah.edu_facilities/analog_lab.html)

The Circuit schematic

The circuit considered here is very simple and it consists of a single source voltage and a single resistor, as seen below:

![Circuit Schematic](image)

Both schematics represent the exact same circuit and are connected in exactly the same way.

The power supply

The power supply shown on the right has two different sets of outputs: a 0V to 6V and a double set ranging from -25 V to +25 V, also shown in the picture below.

![Power supply](image)
The voltage connection can be accomplished by observing that the $V_s$ supply on the schematic is the same as one of the set of outputs in the power supply, as shown below.

Pay particular attention to the “-25V to 0V” connection. The voltage supplied is negative in the normal configuration, but if the connection is reversed (red connector on circuit schematic connected to black ‘COM’ output) the voltage supplied would be positive.

**The circuit connection**

The circuit in the schematic can now be connected as shown below:

The Multimeter

The Multimeter on the right can measure DC / AC voltage and current, among other things.

Use the top right red and right black outputs to measure voltage, as seen on picture:

See picture on next page
To measure current, use the same black output but switch to the bottom right red. As seen on picture on the right.

**CAUTION:** Make sure leads are NOT connected to any part of the circuit or power supply while switching and selecting to measure current. Carefully follow instructions given for current measurements.

Push the appropriate button (as shown below) for voltage or current, to make your measurement.

**Measuring Voltage**

To measure voltage in the circuit place the Multimeter leads at the outputs of the power supply or at the end of the alligator leads coming from the power supply, as shown.
NOTE: If the alligator leads are connected directly to the power supply, both voltage measurements will always give the same value.

**Measuring Current**

**WARNING:** It is better to keep the power supply turned off while preparing to measure current, thus preventing damage to the equipment.

- To measure current in the circuit, follow the instructions in the ‘Multimeter’ part of the tutorial to set the Multimeter up for current measurement.
- Break the circuit at the place current measurement is desired.
- Connect the Multimeter in series with the circuit: use its leads to complete the circuit in the place where the circuit was broken.
- Current should flow into the red lead and out the black lead for positive current measurements. If measurement is negative then current is flowing in the opposite direction.

Complete circuit for current measurement should look like the one below:

- Turn on the power supply.

This is the end of the tutorial.