

EE283 Lab 1

Introduction to LTspice Equipment Operation And Resistance Measurements

Introduction to LTspice:

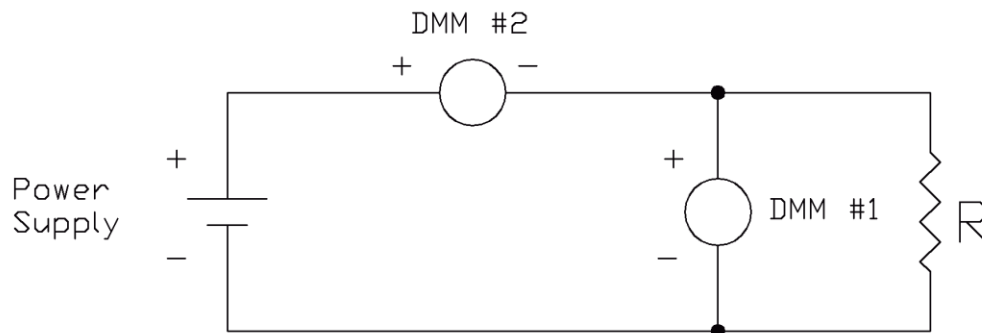
- Starting a new schematic
- Toolbar symbols
- Placement of parts on the schematic
- Labeling Nodes
- Types of Analysis AC, DC, Transient and Operating Point

Equipment Operation:

- Digital Multimeter (DMM)
- Resistor Color Codes (see attachment A)
- Power Supply (see attachment B)

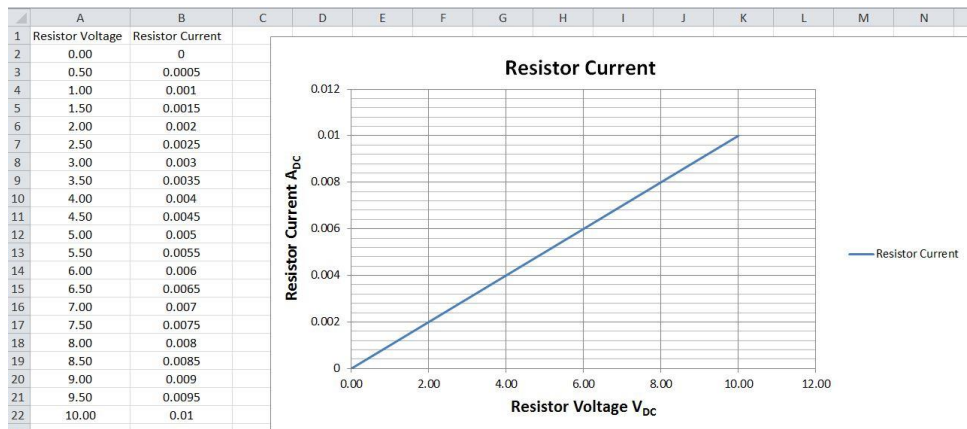
Procedure:

- Measure resistor current and calculate resistor value from data.
1. Pick one resistor from those supplied. Determine its value using the color code shown in appendix A. Write the resistance value here: _____ Ohms
Write the tolerance value here: _____%. Record these values in your report.
 2. Using the DMM measure the actual resistance of the resistor and record its value here: _____ Ohms. Record these values in your report.
 3. Set up the power supply, DMM's and resistor as shown below.



4. Set DMM #1 to measure voltage using the rack mounted DMM. Set DMM #2 to measure DC current using the handheld DMM. Before turning on the power supply have your circuit checked by the instructor or his assistant. **Never connect a DMM set to measure current across a component or power supply unless specifically told to do so by the instructor or his assistant.**

5. Turn on the power supply and adjust the voltage from 0 V_{DC} to 10 V_{DC} in increments of 0.5 volts. Record the voltages and currents in an Excel spreadsheet and make an Excel chart of the data similar to that shown below.



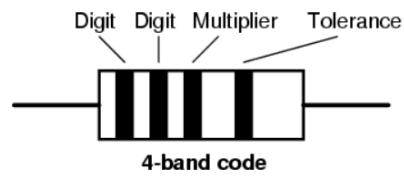
Make sure your chart is properly annotated as shown (i.e. chart and axis titles and grid lines). Your Excel data and graph are to be included in your report.

Using the chart data calculate the value of the resistance. Hint: the resistance is 1/slope. Show your calculations and resistance value in the report.

- Replace the resistor with the #50 lamp. Measure the lamp current for power supply voltages from 0 to 7.5 V_{DC} in increments of 0.5 V_{DC} (do not exceed 7.5 V_{DC} since this is the rated voltage for this lamp). Record the data in an Excel spreadsheet (as shown in step 5 above for the resistor). From your graph calculate the lamp resistance at lamp voltages of 2, 4, 6 and 7.0 V_{DC}. Record your data, graph and lamp resistance in the report.

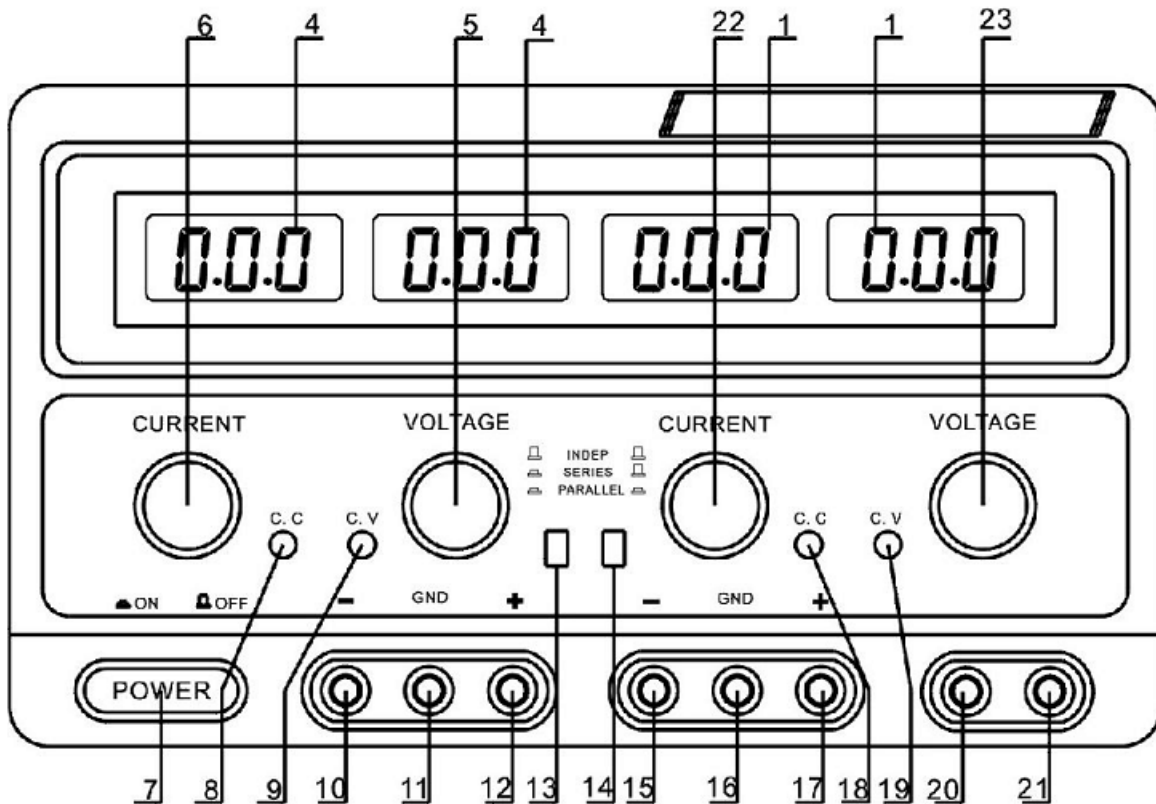
Remember that your report must be legible. If I can't read it you won't get credit for it!

Appendix A



Color	Digit	Multiplier	Tolerance (%)
Black	0	10^0 (1)	
Brown	1	10^1	1
Red	2	10^2	2
Orange	3	10^3	
Yellow	4	10^4	
Green	5	10^5	0.5
Blue	6	10^6	0.25
Violet	7	10^7	0.1
Grey	8	10^8	
White	9	10^9	
Gold		10^{-1}	5
Silver		10^{-2}	10
(none)			20

Appendix B

TekPower TP3005D-3 Power Supply

To turn this power supply on push in the power switch 7. This unit has three independent and isolated power supplies.

The first supply has an adjustable voltage range of 0 to 30 volts and can supply up to 5 amperes of current. The controls and terminals for this supply are located on the left side of the unit. Knob 5 controls the voltage, knob 6 sets the maximum current limit and the output voltage is obtained from terminals 12(+) and 10(-). Terminal 11 is connected to the chassis (we won't use this terminal). The digital readout directly above the current limit knob displays the power supply current and the digital readout directly above the voltage adjustment knob displays the power supply output voltage. If the power supply is in voltage control mode the indicator light 9 will be illuminated. If the power supply is in current limiting mode the indicator light 8 will be illuminated. We will always operate the power supply in voltage control mode.

The second power supply is identical to the first power supply except that all of the controls and terminals are located on the right hand side of the unit.

The third power supply has a fixed voltage of 5 V_{DC} which is obtained from terminals 21(+) and 20(-). We will use this voltage for our digital lab exercises.