

ETEC1120 ELECTROPRINCIPLES I

EXPERIMENT #1

LAB EQUIPMENT & RESISTANCE MEASUREMENTS

PURPOSE

To properly use an analog volt-ohm meter (VOM) and a digital multimeter (DMM) to measure resistance.

EQUIPMENT

LAB SUPPLIED PARTS

Digital Multimeter (DMM)
 Volt-Ohm Meter (VOM)

SERIAL NUMBERS

PARTS KIT PARTS

Meter Leads
 Various resistors from your first year kit.

PROCEDURE PART 1 RESISTOR COLOUR CODES

- 1) Refer to the resistor values shown in the table below and determine the corresponding colour code for each.

Table 1 - Colour Codes

Resistance and Tolerance	Colour Codes
10 Ω ± 5%	
82 Ω ± 5%	
330 Ω ± 5%	
1 kΩ ± 5%	
4.7 kΩ ± 5%	
2.2 MΩ ± 5%	

- 2) The tolerance of a resistor is a specification indicating a range of possible values in which the actual resistance of the component will occur. For example:

$$\text{Tolerance} = (5\%)(10 \text{ k}\Omega) = 0.5 \text{ k}\Omega = 500 \text{ ohms}$$

- This means that the actual value of the resistor occurs between 9.5 k ohms and 10.5 k ohms.

Calculate the expected maximum and minimum values for the resistors in Table 1 and record the results in Table 2.

ETEC1120 ELECTROPRINCIPLES I

EXPERIMENT #1

LAB EQUIPMENT

Table 2 - Resistor Tolerance

Value (from colour codes)	Minimum Resistance	Maximum Resistance
10 Ω		
82 Ω		
330 Ω		
1k Ω		
4.7k Ω		
2.2 M Ω		

PROCEDURE Part 2 - Using the VOM as an Ohmmeter

When measuring resistance with an ohmmeter, some important steps must be followed.

- * Power supplies and other sources must be disconnected from the circuit. Failure to do so may damage the meter.*
 - * It is necessary to isolate the component from the rest of the circuit. This is done by disconnecting at least one terminal of the component from the circuit.*
 - * When using a moving coil meter such as a VOM to measure resistance, the meter must be zero set on each range. (Notice the 0 Ω is to the extreme right on the scale for resistance.)*
- * Note that the ohmmeter must be zero set each time you change the range.
- * To zero set the ohmmeter, touch the two probes together and adjust the ZERO OHMS (Ω) dial near the top right corner of the face plate.*
 - * Select a range that is most appropriate for the measurement being taken. An analog meter movement is usually most accurate when the pointer is at approximately mid-scale. Make sure the meter is laying flat and avoid jarring the meter when taking a measurement.*

When storing an ohmmeter or VOM, **make sure the switch is returned to the OFF position.** The internal battery source in the meter may be drained if it is left ON.

**ETEC1120 ELECTROPRINCIPLES I
EXPERIMENT #1
LAB EQUIPMENT**

PROCEDURE Part 3 - Measurements

1) Use the VOM to measure the actual resistance values and record the results in Table 3.

Table 3 - Resistance Measurements

Nominal Value	VOM	DMM	LCR Meter

3) Use the DMM and LCR meter to complete Table 3.

Conclusions Part 4 - Questions

1) Explain how an ohmmeter can be used to check a fuse.

2) Complete the table below giving the resistor value and its corresponding tolerance expressed as a percentage.

Colour Codes	Resistance and Tolerance
Brown Red Yellow Gold	
Orange White Gold Gold	
Blue Gray Green Silver	
Yellow Orange Brown Silver	
Brown Green Orange	