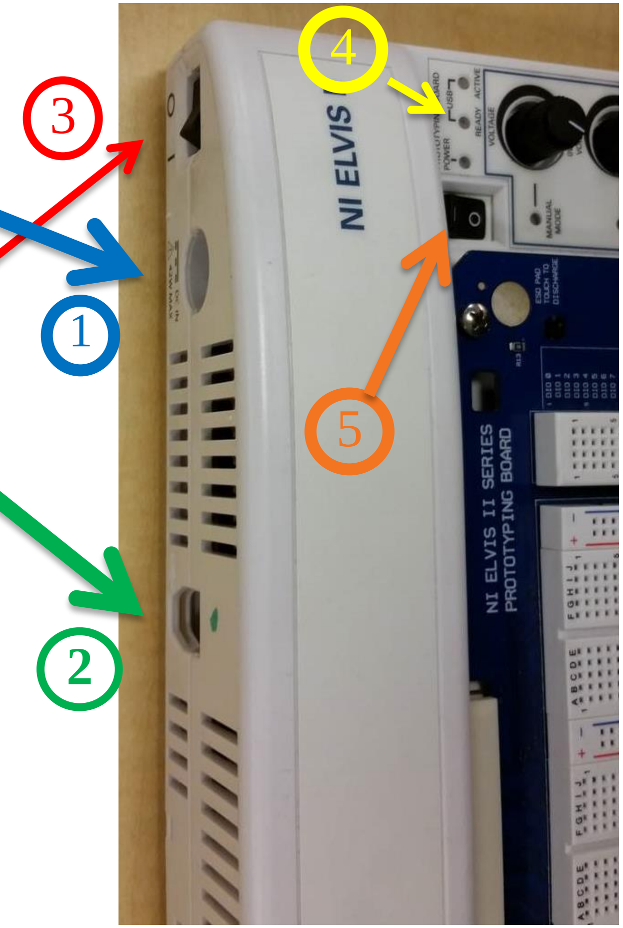
ELVIS II Orientation

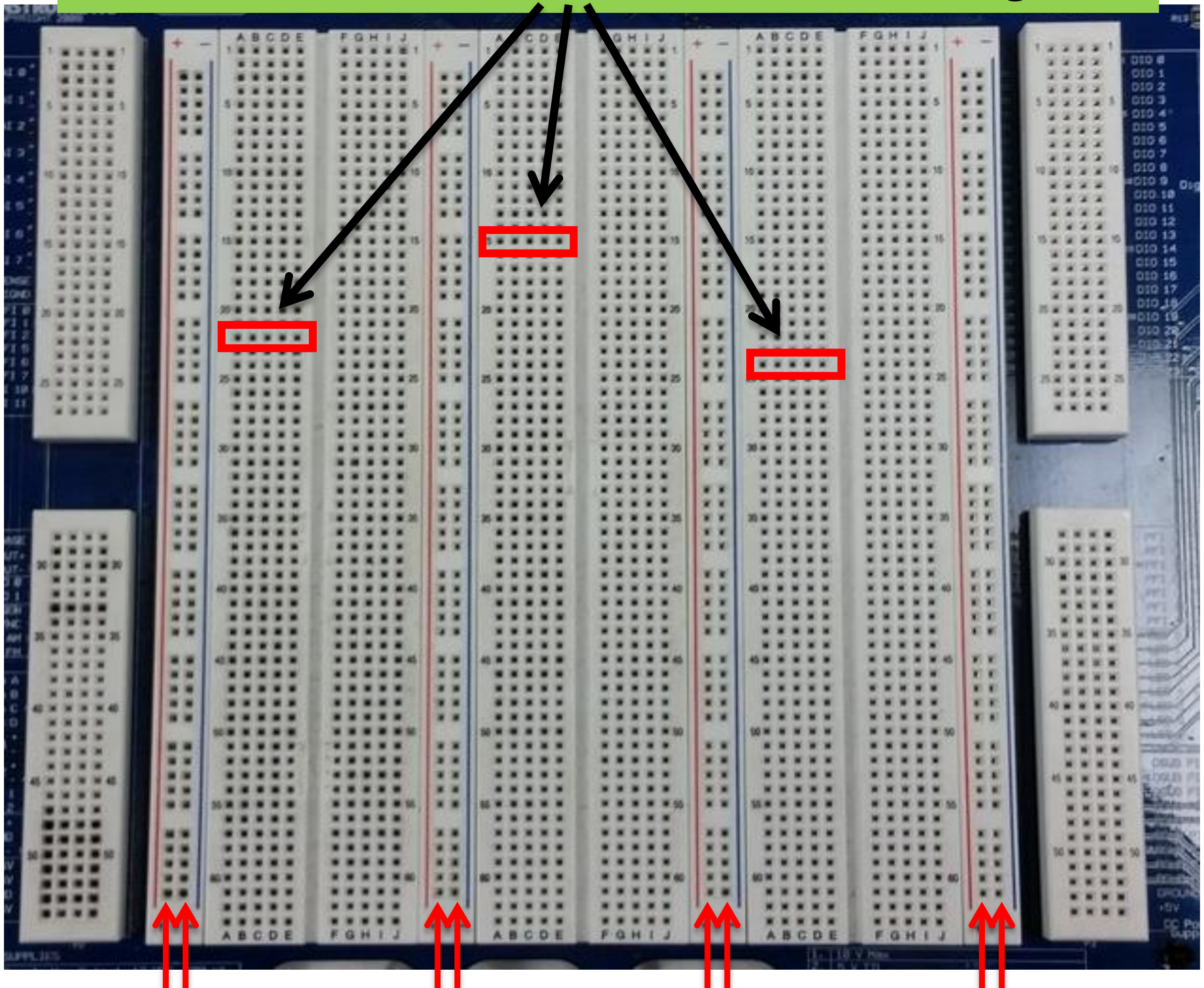
- **ELVIS II Prototype Board**
  - Software access & location
  - Grid layout, features we will use, and Run/Stop functions
    - **DMM** = Digital Multi-Meter (Modes = Volts, Amps, Ohms)
    - **VPS** = Variable Power Supply (**Stacked, Dual-Output**)
    - **Function Generator** and **Oscilloscope** discussed in Testing ELVIS
  - Connections and power up / power down procedures

Power-Up Procedure

1. Connect one end of the power cable to the back of the board, and the other end to the AC outlet
2. Connect one end of the USB cable to the board, and the other end to the PC workstation
3. Turn on the power switch on the back side of the board
4. The “Ready” LED light should turn on after several seconds.
5. Prototyping board power switch for FGEN, VPS, Oscilloscope, +/-15V, etc.
6. Start the ***<u>NI ELVIS Instrument Launcher</u>*** from the Windows Start menu
   - The easiest way to locate it is by typing “Elvis” in the start menu.

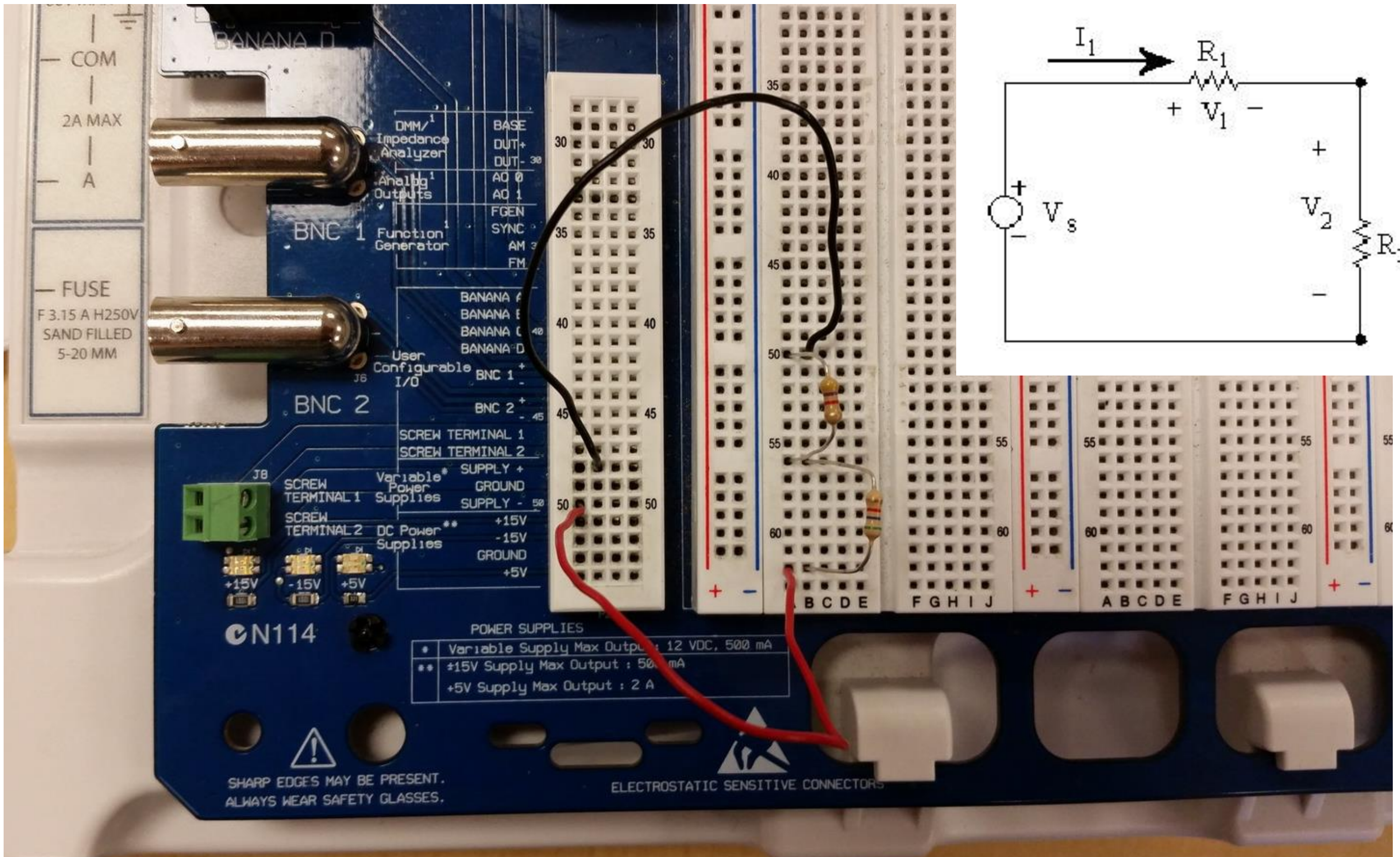


Each of these five-set of contacts are tied together

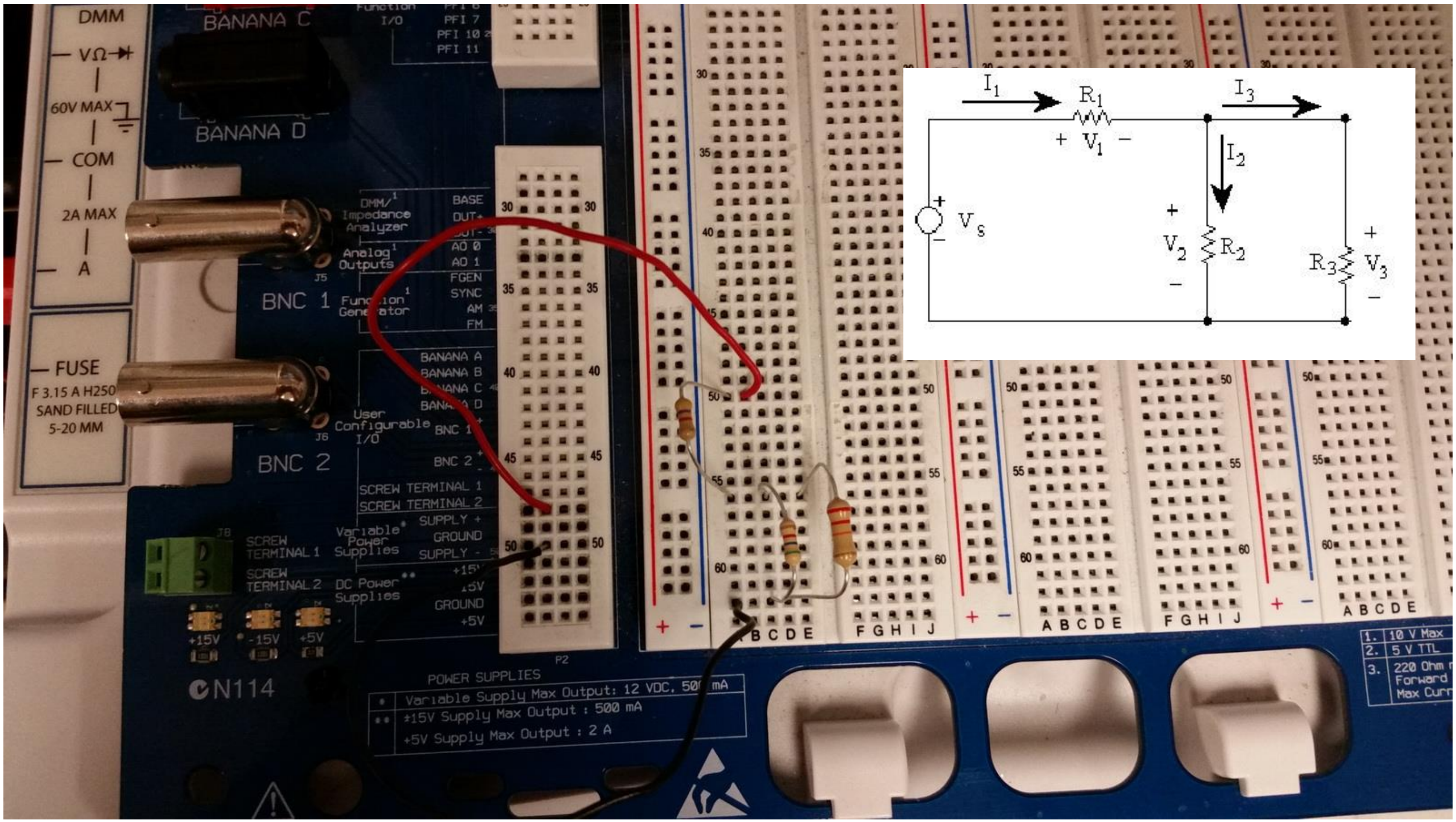


All pins on each of these columns are connected together.
So the user can use "+" for DC power supply and "-" for ground

Voltage Divider



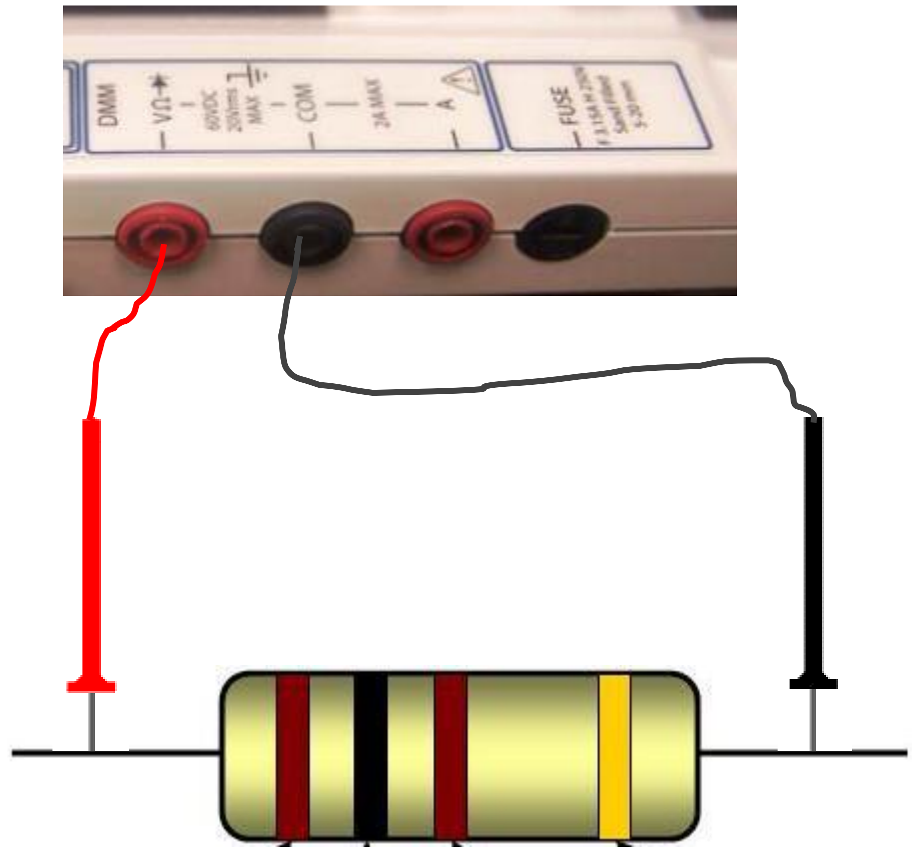
Voltage Divider with a Current Divider



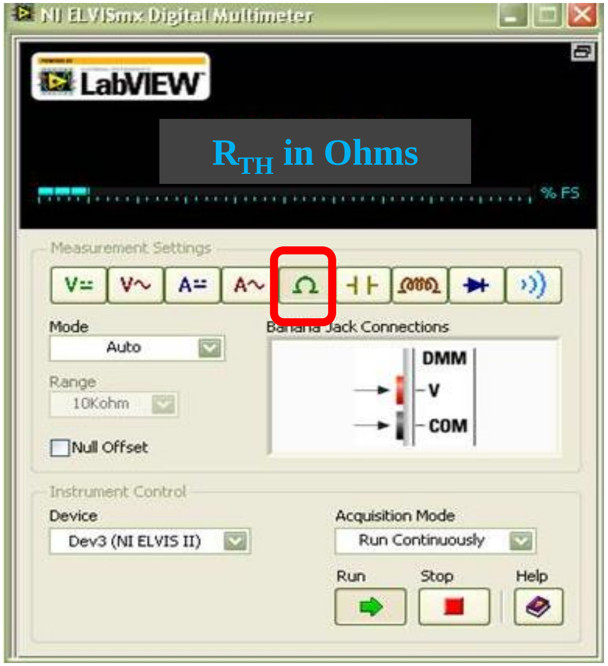
Before taking measurements:

- Null (calibrate) the voltage / current meters before taking measurements.
- Measure all component values and record them. That includes resistors, capacitors, inductors, etc.
- Measure all source voltages with the DMM. That includes the VPS, +/-15 DC sources, etc.

DMM Measurements (Ohms)

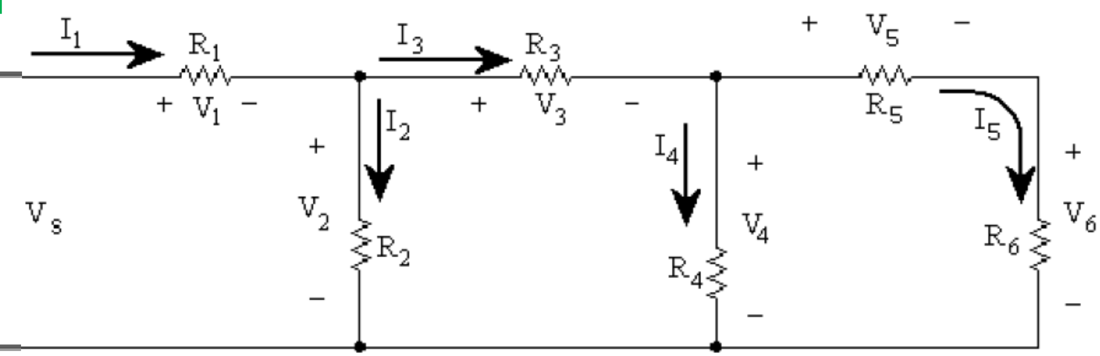


Measuring R_{TH}

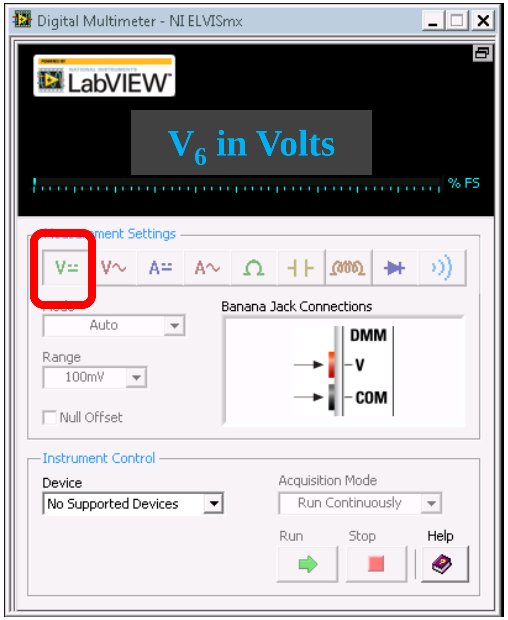


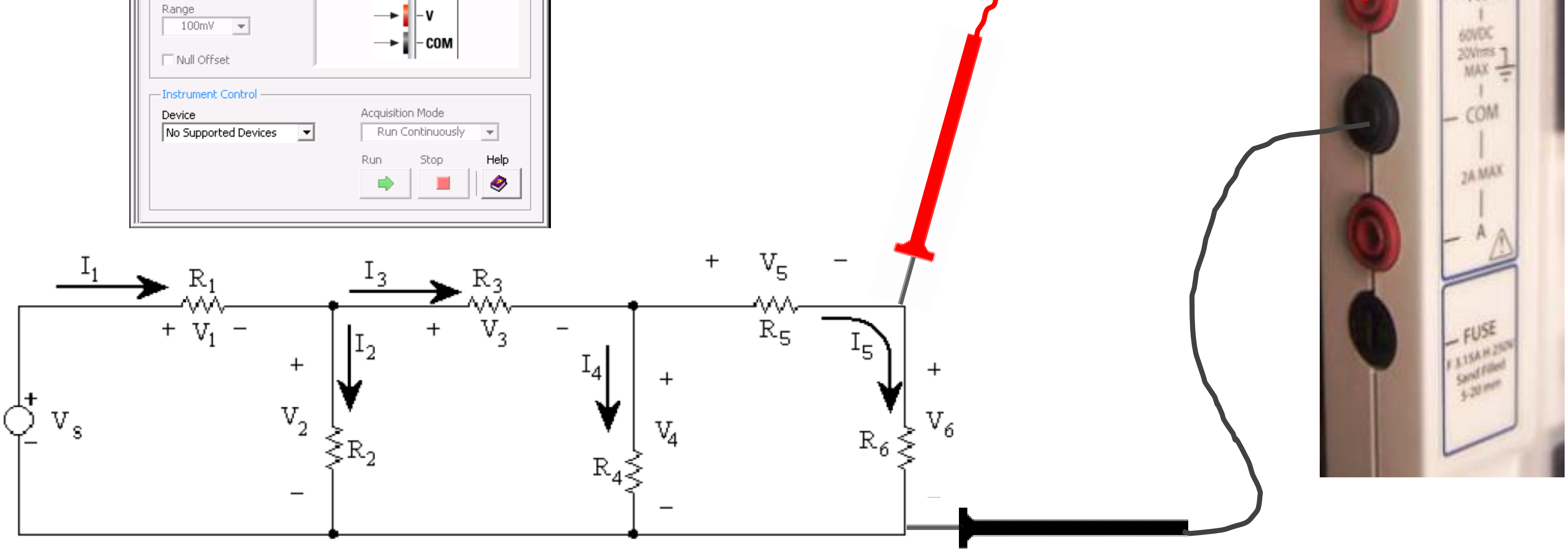
Connect the Ohm meter

Disconnect VPS's

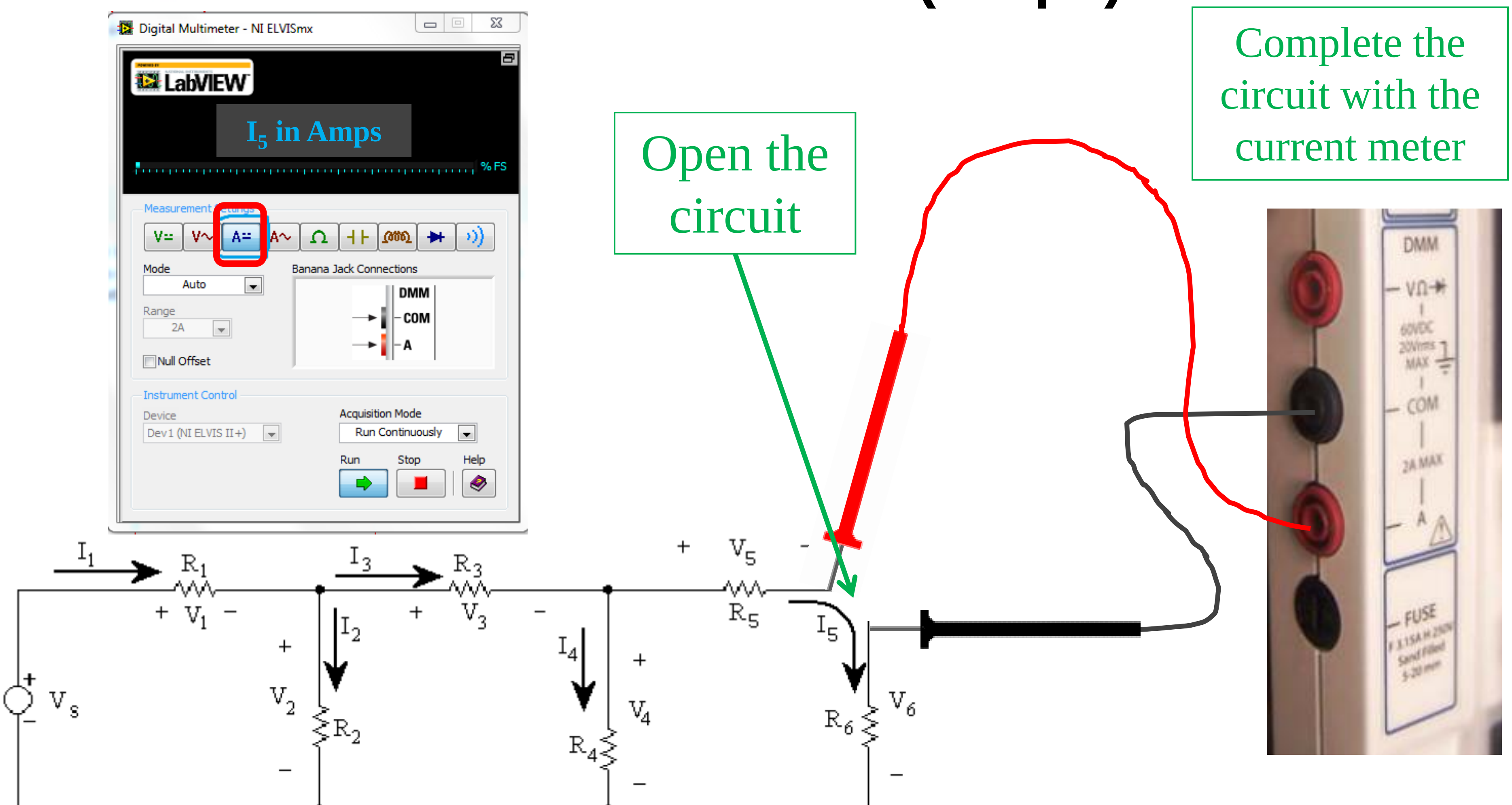


DMM Measurements (Volts)





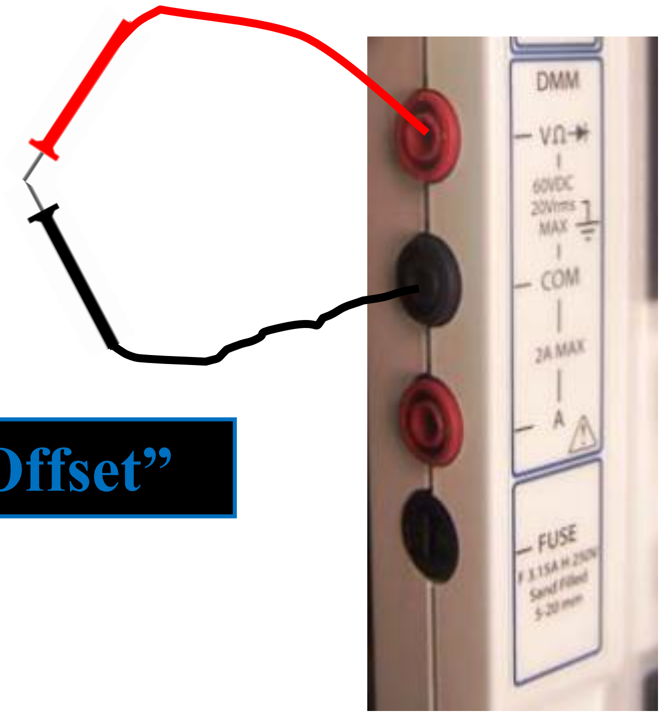
DMM Measurements (Amps)

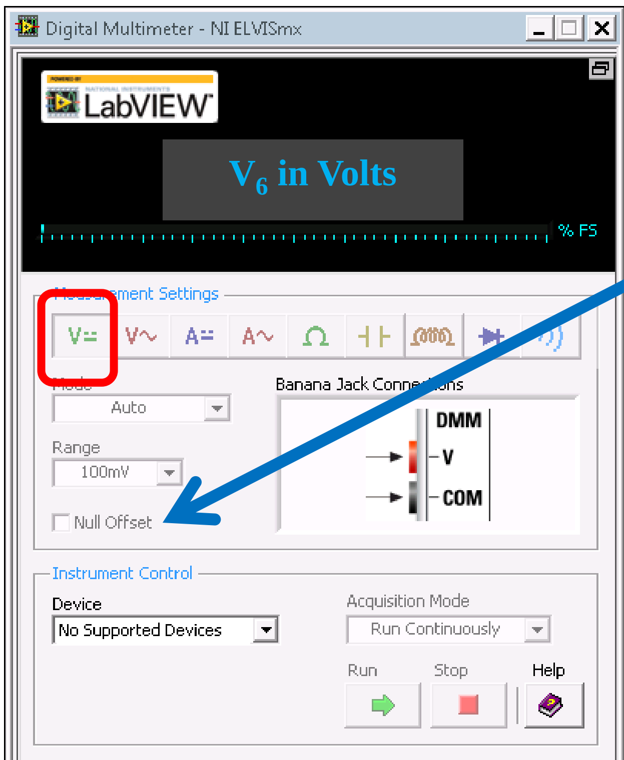


Calibrating (nulling) the voltage meter

Connect the two probes (short ckt)

1





2

Check "Null Offset"

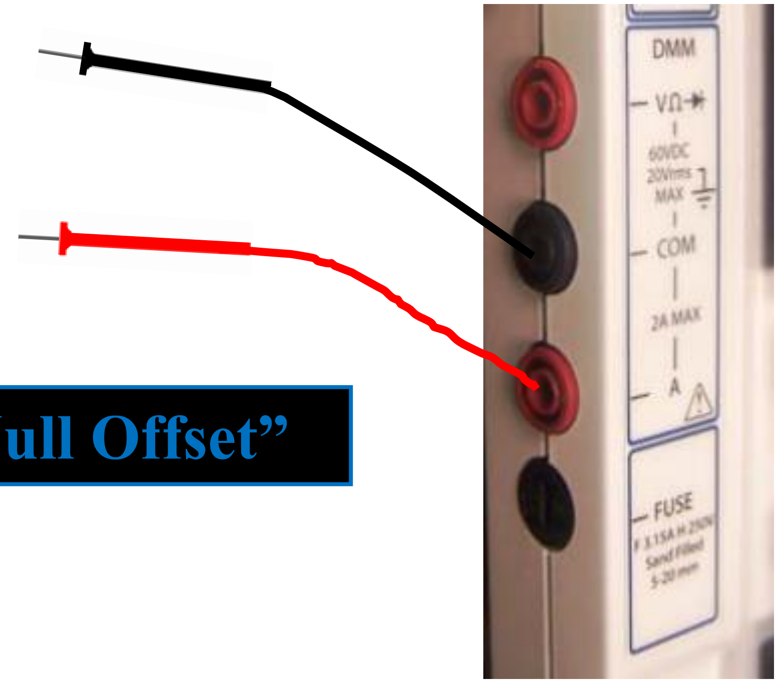
3

You are now ready to measure voltage!

Calibrating (nulling) the current meter

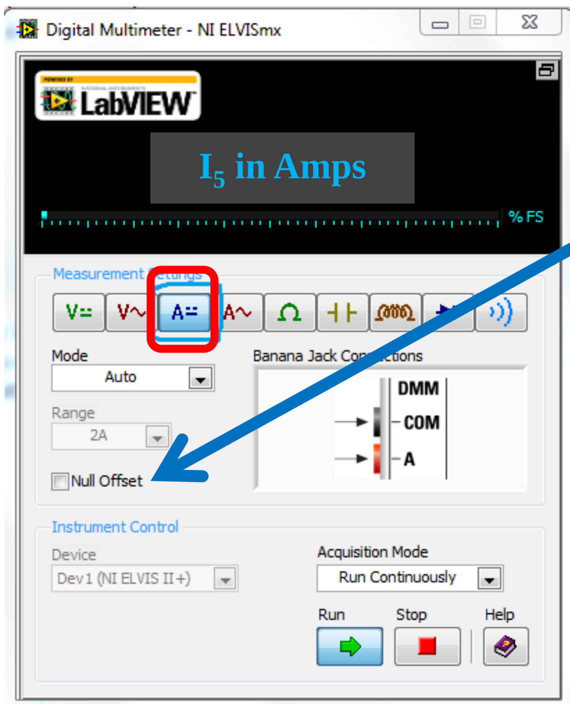
1

Disconnect the two probes (open ckt)



2

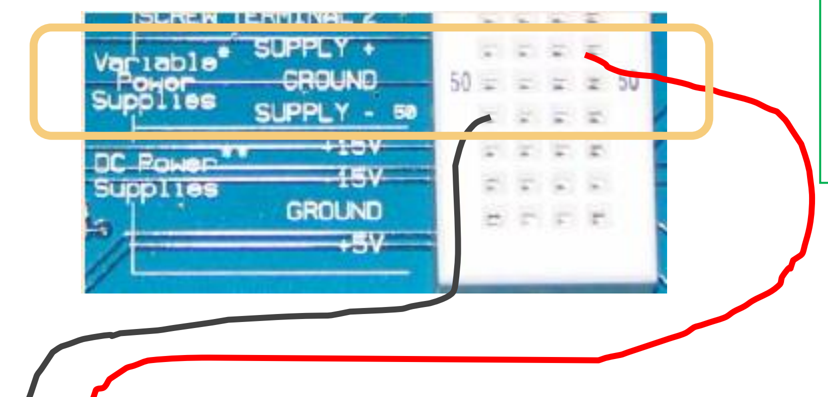
Check "Null Offset"

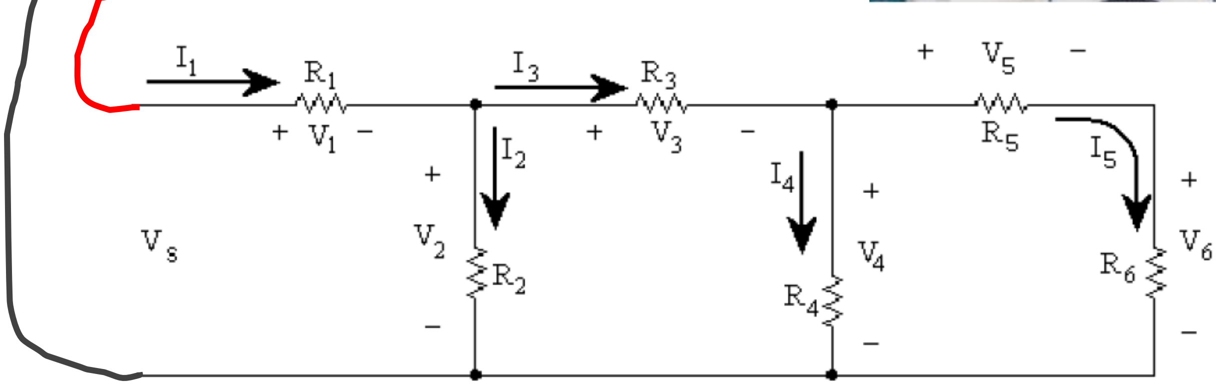


3

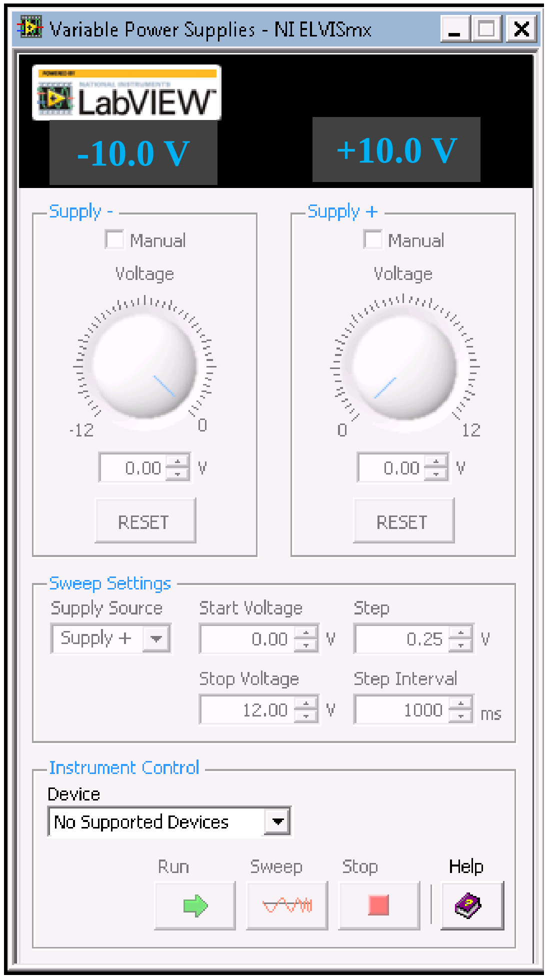
You are ready to measure current!

VPS => Dual Configuration





Turn on the Prototyping Board Power Switch to enable VPS's



% Difference = Relative change * 100

- Reference link
  http://en.wikipedia.org/wiki/Relative_change_and_difference

The absolute difference between two values is not always a good way to compare the numbers. For instance, the absolute difference of 1 between 6 and 5 is more significant than the same absolute difference between 100,000,001 and 100,000,000. We can adjust the comparison to take into account the "size" of the quantities involved, by defining, for positive values of $x_{reference}$:

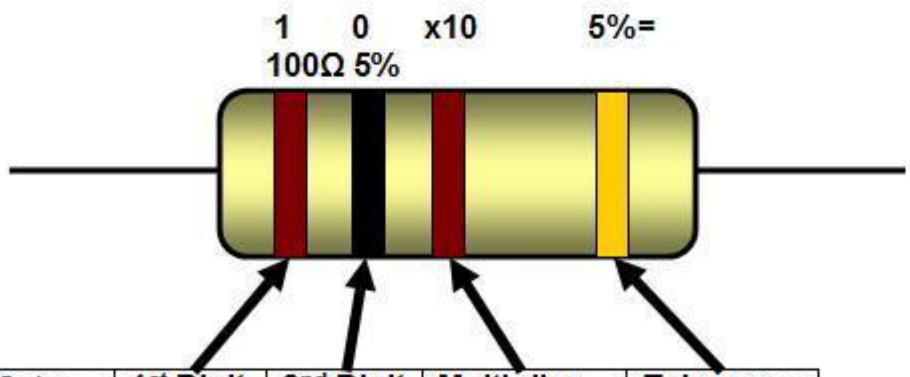
$$\text{Relative change}(x, x_{reference}) = \frac{\text{Actual change}}{x_{reference}} = \frac{\Delta}{x_{reference}} = \frac{x - x_{reference}}{x_{reference}}.$$

The relative change is not defined if the reference value ($x_{reference}$) is zero.

For values greater than the reference value, the relative change should be a positive number and for values that are smaller, the relative change should be negative. The formula given above behaves in this way only if $x_{reference}$ is positive, and reverses this behavior if $x_{reference}$ is negative. For example, if we are calibrating a thermometer which reads -6° C when it should read -10° C, this formula for relative change (which would be called *relative error* in this application) gives ((-6) - (-10)) / (-10) = 4/-10 = -0.4, yet the reading is too high. To fix this problem we alter the definition of relative change so that it works correctly for all nonzero values of $x_{reference}$:

$$\text{Relative change}(x, x_{reference}) = \frac{\text{Actual change}}{|x_{reference}|} = \frac{\Delta}{|x_{reference}|} = \frac{x - x_{reference}}{|x_{reference}|}.$$

4 Band Resistor Color Chart

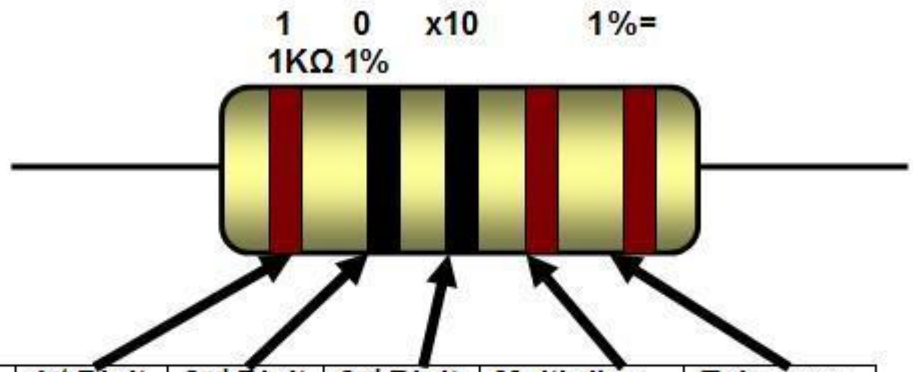


Color	1st Digit	2nd Digit	Multiplier	Tolerance
Black	0	0	X1	
Brown	1	1	X10	1%
Red	2	2	X100	2%
Orange	3	3	X1000	
Yellow	4	4	X10000	
Green	5	5	X100000	
Blue	6	6	X1000000	
Violet	7	7		
Grey	8	8	Gold **X0.1**	Gold **5%**
White	9	9	Silver **X0.01**	Silver **10%**

electronicszone.net46.net

Source: http://electronicszone.net46.net/articles/how-read-resistors

5 Band Resistor Color Chart



Color	1st Digit	2nd Digit	3rd Digit	Multiplier	Tolerance
Black	0	0	0	X1	
Brown	1	1	1	X10	1%
Red	2	2	2	X100	2%
Orange	3	3	3	X1000	
Yellow	4	4	4	X10000	
Green	5	5	5	X100000	
Blue	6	6	6	X1000000	
Violet	7	7	7		
Grey	8	8	8	Gold **X0.1**	Gold **5%**
White	9	9	9	Silver **X0.01**	Silver **10%**

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