Experiment No.1
Resistor Color Code

Object

1. To learn Resistor Color Code
2. To determine the stated value of a resistor by interpreting the color code indicated on the resistor.

Apparatus

1. Set of wires.
2. Carbon Resistors.
3. Digital A.V.O. meter.

Theory

There are two ways to find the resistance value of a resistor. The color bands on the body of the resistor tell how much resistance it has. As shown in the following diagrams figure (1), there are 5-band resistors and 4-band resistors. Form both 5- and 4-band resistors, the last band indicates tolerance in table (1). Consult with the "Resistor Tolerance" in table (2) chart for finding the tolerance value.

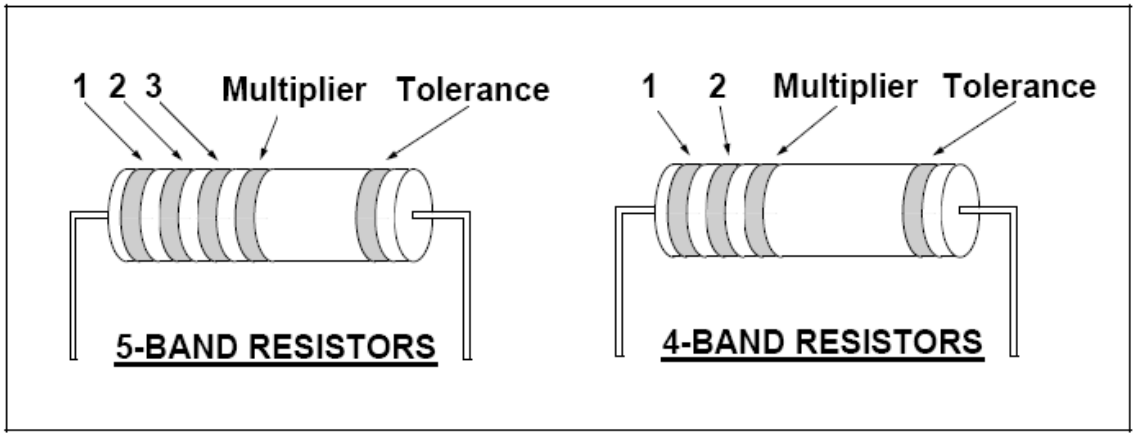


Fig.(1) 5- Band and 4- Band resistors

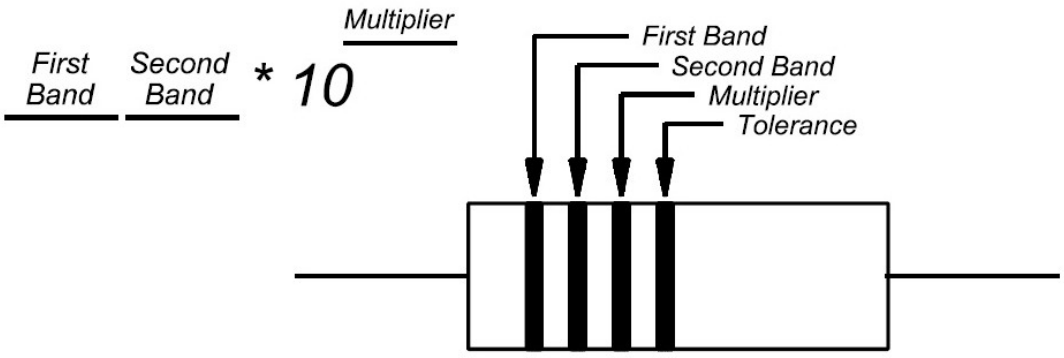


Fig.(2): First method read resistor

Table 1 : band and color value

COLOR	FIRST BAND	SECOND BAND	MULTIPLIER	TOLERANCE
BLACK		0	$10^0 = 1$	
BROWN	1	1	$10^1 = 10$	
RED	2	2	$10^2 = 100$	
ORANGE	3	3	$10^3 = 1000$	
YELLOW	4	4	$10^4 = 10000$	
GREEN	5	5	$10^5 = 100000$	
BLUE	6	6	$10^6 = 1000000$	
VIOLET	7	7	$10^7 = 10000000$	
GREY	8	8	$10^8 = 100000000$	
WHITE	9	9	$10^9 = 1000000000$	
GOLD			$10^{-1} = 0.1$	5%
SILVER			$10^{-2} = 0.01$	10%
NO COLOR				20%

The first litter word to represent color resistor code in table (1)

Better **B**e **R**eady **O**r **Y**our **G**reat **B**ig **V**enture **G**oes **W**rong, **G**o **S**tudy **N**ow

Table (2): Resistor Tolerance

Color	Tolerance
Silver	± 10%
Gold	± 5%
Red	± 2%
Brown	± 1%
Green	± 0.5%
Blue	± 0.25%
Violet	± 0.1%
Gray	± 0.05%

View the resistors and based on the color bands determine its value. Below is an example:

Table 2-1		
Band	Color Code	Numeric Value
1st Band	Brown	1
2nd Band	Black	0
3rd Band	Orange	10^3
4th Band	Gold	±5%
The Resistor Value is 10K		**The tolerance is ±5%**

- The first band is a one (1), the second band is a zero (0), and the multiplier band or third band is
- one time text to the third power (10^3) or one thousand (1000). Multiply 10 times 1000.
- Another way to tell the resistance value of a resistor is to actually measure it with the ohmmeter. The explanation of how to measure the resistance is given in the later tip.

Where:-

$$Rmax = R+(R * T)$$

Procedure

1. Measure and record twenty resistors with value of 1 Kohm.

2. Find the $R_{max.}$, R_{min} , then calculate the percentage error.

3. Repeat the steps (1,2) with resistor value of 10K ohm.

4. Repeat the steps (1,2) with resistor value of 100K ohm.

Discussion

1. Comment for your results.

2. Determine the value and tolerance of the 10 resistors as shown in the following tables for fig. (3):

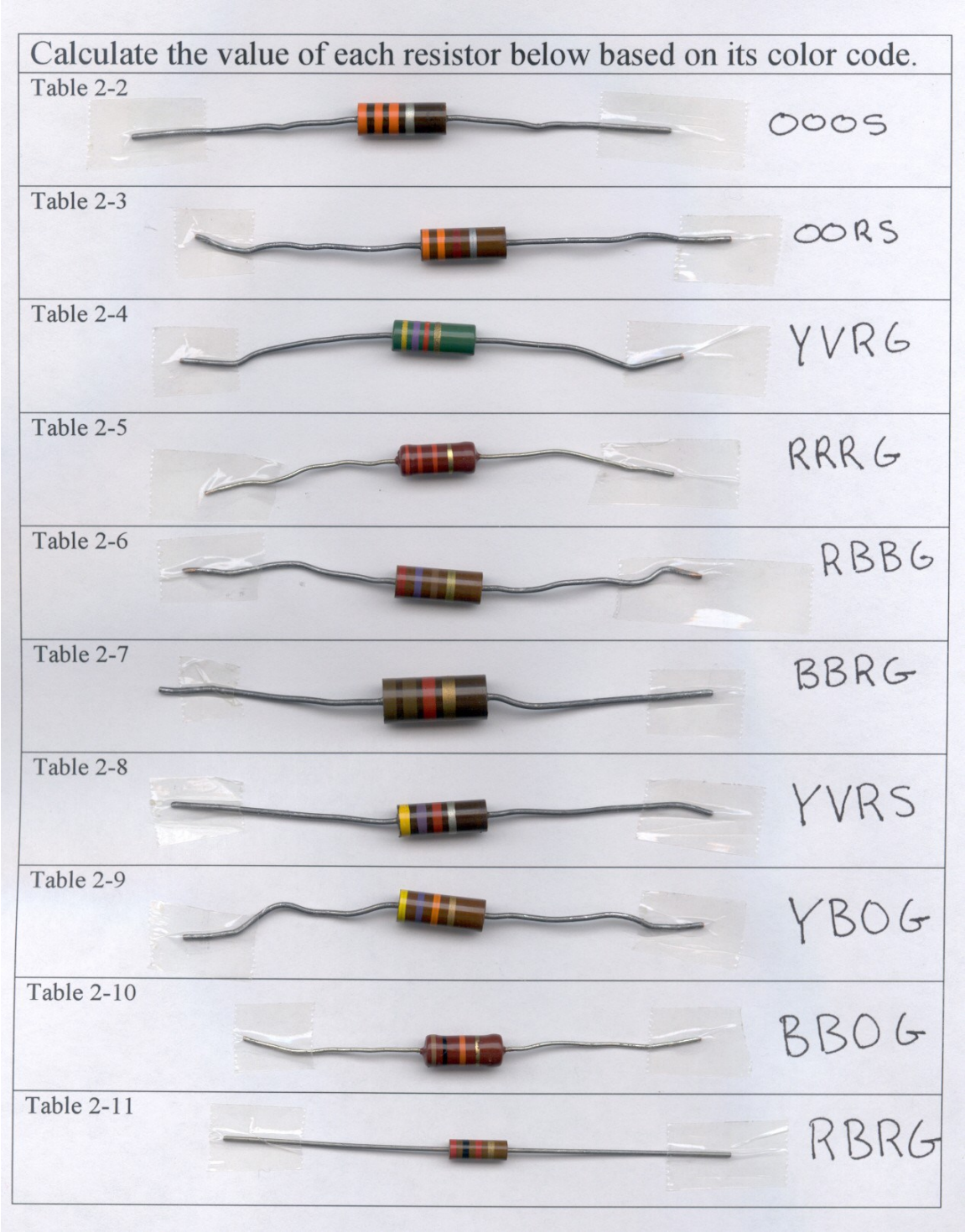
Table 2-2		
Band	Color Code	Numeric Value
1st Band	Orange	
2nd Band	Orange	
3rd Band	Orange	
4th Band	Silver	
The Resistor Value is_____		**The Tolerance is _____%**

Table 2-3		
Band	Color Code	Numeric Value
1st Band	Orange	
2nd Band	Orange	
3rd Band	Red	
4th Band	Silver	
The Resistor Value is_____		**The Tolerance is _____%**

Table 2-6		
Band	Color Code	Numeric Value
1st Band	Red	
2nd Band	Violet	
3rd Band	Brown	
4th Band	Gold	
The Resistor Value is_____		**The Tolerance is _____%**

Table 2-7		
Band	Color Code	Numeric Value
1st Band	Brown	
2nd Band	Brown	
3rd Band	Red	
4th Band	Gold	
The Resistor Value is_____		**The Tolerance is _____%**

Table 2-8		
Band	Color Code	Numeric Value
1st Band	Yellow	
2nd Band	Violet	
3rd Band	Red	
4th Band	Silver	
The Resistor Value is_____		**The Tolerance is _____%**



3. Record resistor colors gave to its value in below:

4.7 KΩ 5% , 910Ω ±10% , 12 Ω 5%, 6.8KΩ 20%