

Sept. 20, 2004

RESISTOR COLOR CODE

RESISTORS, RESISTANCE & OHMS. (Ω : Ohms)

Resistors are one of the most popular and fundamental electronic components. You will always find them in electronic circuits.

Resistance is the opposition to current flow. We often need resistance to control current flow and in order to get it we use components known as resistors.

Each resistor contains a certain amount of resistance. Resistance is measured in ohms. For example, a resistor of 10,000 ohms would provide much more opposition to current flow than a resistor of 1000 ohms.

Pencil Exercise.

1. Resistance is the opposition to current flow.
2. Each resistor contains a certain amount of resistance.
3. Resistance is measured in ohms. (much more)
4. A resistor of 20,000 ohms will provide 2000 ohms opposition to the current flow than a resistor of 5,000 ohms.

THE RESISTOR COLOR CODE?

The resistor color code is a method of indicating the resistance value in ohms and the tolerance range. It is not a secret code designed by sinister cryptographers to confuse and frustrate us. On the contrary, it was made as easy as possible to facilitate its wide usage. Anyone can learn it in just a few minutes, including you.

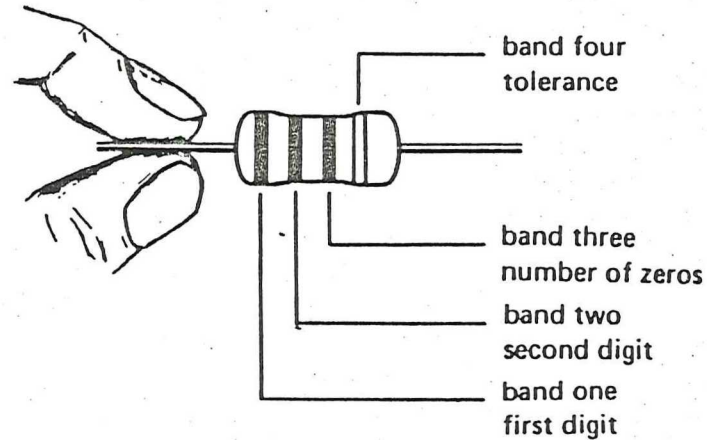
WHY THE COLOR CODE

With the color code we use colored bands in order to overcome two basic problems:

- One:** It would be very difficult to print and see large numbers on a small resistor.
- Two:** Even if we could see the number, placement of the resistor in the project might entirely obscure it.

The color coded bands that go entirely around the resistor seem to solve these two problems.

When reading the color code, the resistor should be held with the gold (or silver) band on the right, as shown in the next picture.



THIS IS THE RESISTOR COLOR CODE

black	0
brown	1
red	2
orange	3
yellow	4
green	5
blue	6
violet	7
gray	8
white	9

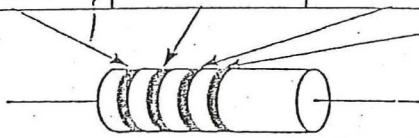
Each color stands for a particular number. For example, red equals two.

When reading the color code remember:

- The first band always represents a number.
 - The second band always represents a number.
 - The third band always represents the number of zeros to be added to the numbers. (If the third band is black, no zeros are added).
 - The fourth band represents the tolerance value. This band is usually gold, 5%; or silver 10%.
- Tolerance means the precision or exactness in the value of the resistor.

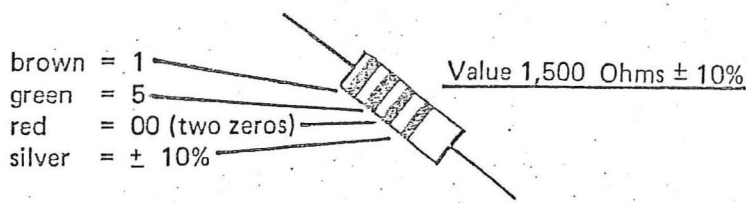
ZAHID HANICHEHAYA

COLOUR	1st NUMBER	2nd NUMBER	MULTIPLIER	TOLERANCE (PERCENT)
Black	0	0	1	
Brown	1	1	10	
Red	2	2	100	
Orange	3	3	1 000	
Yellow	4	4	10 000	
Green	5	5	100 000	
Blue	6	6	1 000 000	
Violet	7	7	10 000 000	
Gray	8	8	100 000 000	
White	9	9	1 000 000 000	
Gold			0.1	5
Silver			0.01	10
None				20
	BAND 1	BAND 2	BAND 3	BAND 4



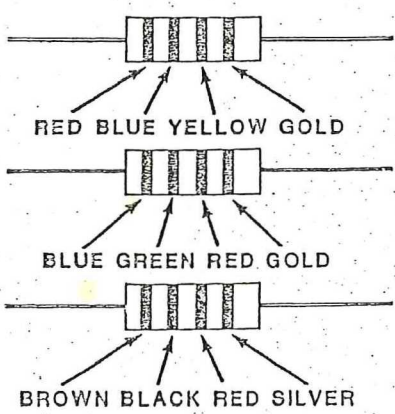
EXAMPLE

What is the value in ohms, and the tolerance of the following resistor?



PENCIL EXERCISE

Give the value in ohms and the tolerance, of these resistors.



Value 26,000 Ω ± 5%

Value 6,500 Ω ± 5%

Value 1,000 Ω ± 10%

RESISTOR COLOUR CODE

Below is a chart with colours and corresponding values. Memorizing these colours and values is very important in order to successfully recognize the many different resistors that you will be working with. Here is one way of remembering the colours and values.

BLACK	0	BLACK
BROWN	1	BEARS
RED	2	RIP
ORANGE	3	OPEN
YELLOW	4	YOUR
GREEN	5	GARBAGE
BLUE	6	BEFORE
VIOLET	7	VERY
GRAY	8	GREEDY
WHITE	9	WEASELS

RESISTOR COLOUR CODE

A. Identify the colour bands for each of the following resistors.

	Size	1st Band	2nd Band	3rd Band	4th Band
a	$12\Omega \pm 5\%$	BROWN ✓	RED ✓	BLACK ✓	GOLD ✓
b	$300\Omega \pm 10\%$	ORANGE ✓	BLACK ✓	BROWN ✓	SILVER ✓
c	$2.2k\Omega \pm 5\%$	RED ✓	RED ✓	RED ✓	GOLD ✓
d	$47k\Omega \pm 20\%$	YELLOW ✓	VIOLET ✓	ORANGE ✓	NONE ✓
e	$5M\Omega \pm 10\%$	GREEN ✓	BLACK ✓	GREEN ✓	SILVER ✓

B. State the resistance value and percentage tolerance for each of the following resistors.

	Size	1st Band	2nd Band	3rd Band	4th Band
a	$250000\Omega \pm 10\%$ ✓	Red	Green	Yellow	Silver
b	$360\Omega \pm 5\%$ ✓	Orange	Blue	Brown	Gold
c	$9100\Omega \pm 20\%$ ✓	White	Brown	Red	None
d	$80000000\Omega \pm 5\%$ ✓	Grey	Black	Blue	Gold
e	$72\Omega \pm 10\%$ ✓	Violet	Red	Black	Silver

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