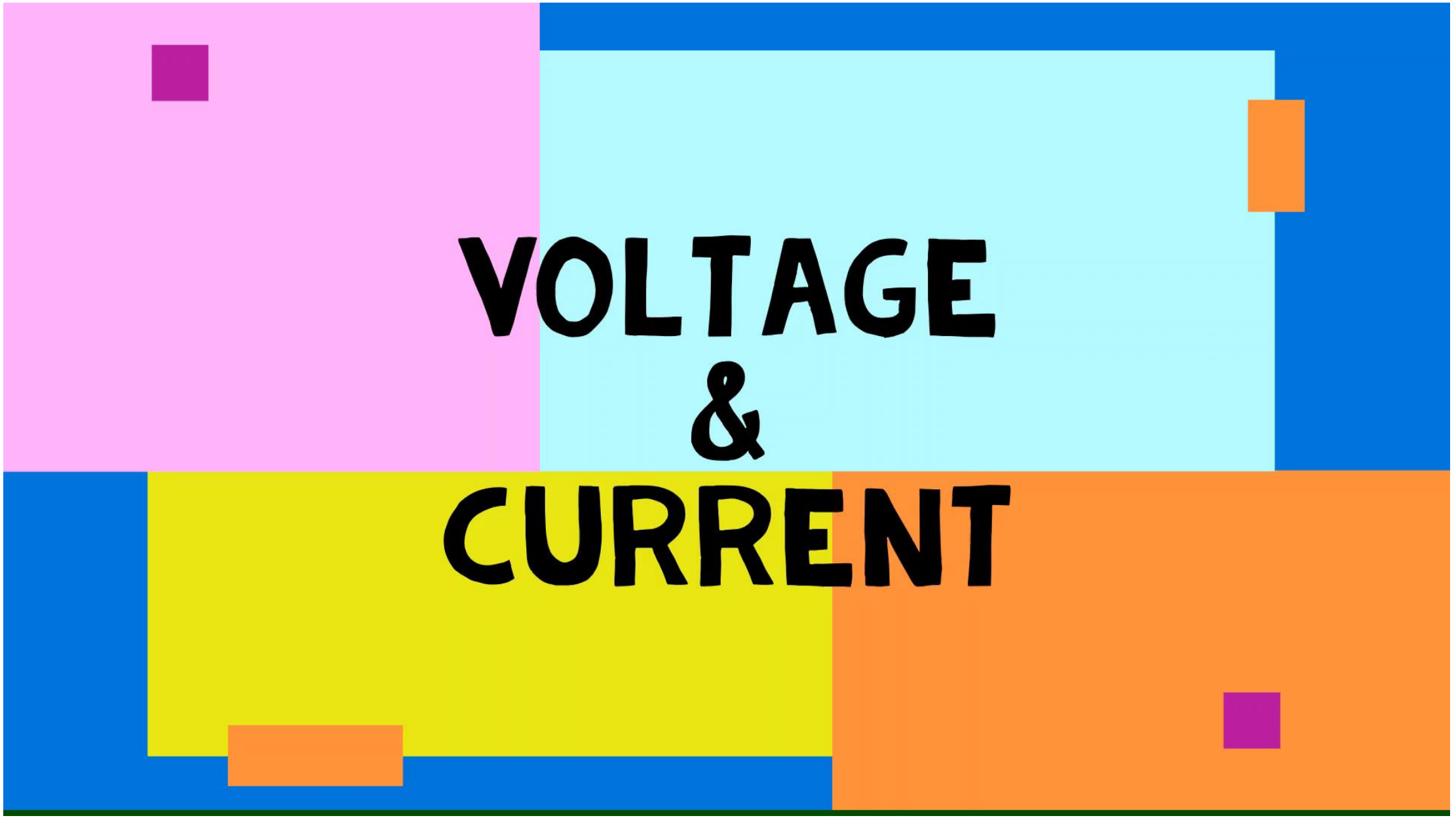
Introduction to basic Electronic devices and Electronic Components Part 1

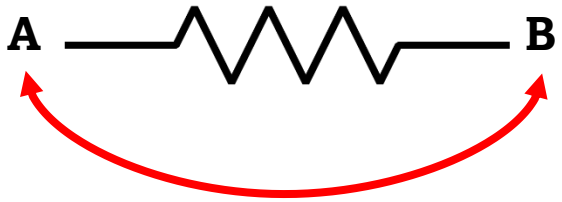
Instructed By: Mr. Supun Dissanayaka

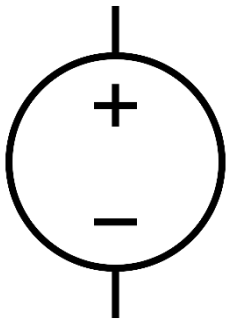

VOLTAGE
&
CURRENT

Voltage

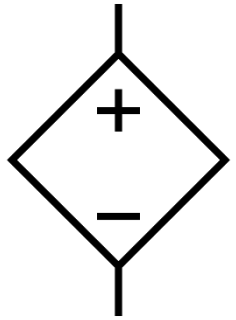
"The potential difference between two points"

"Measured in Volts (V)"





Independent voltage source

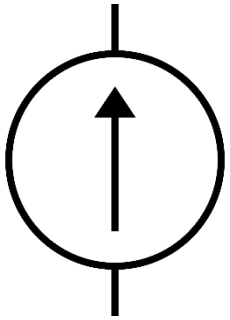


Dependent voltage source

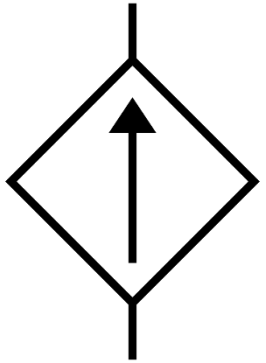
Current

“An amount of charges flow through a cross section of conductor per amount of time”

“Measured in Ampere (A)”



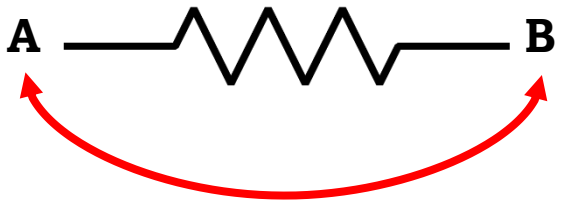
Independent current source



Dependent current source

Resistance

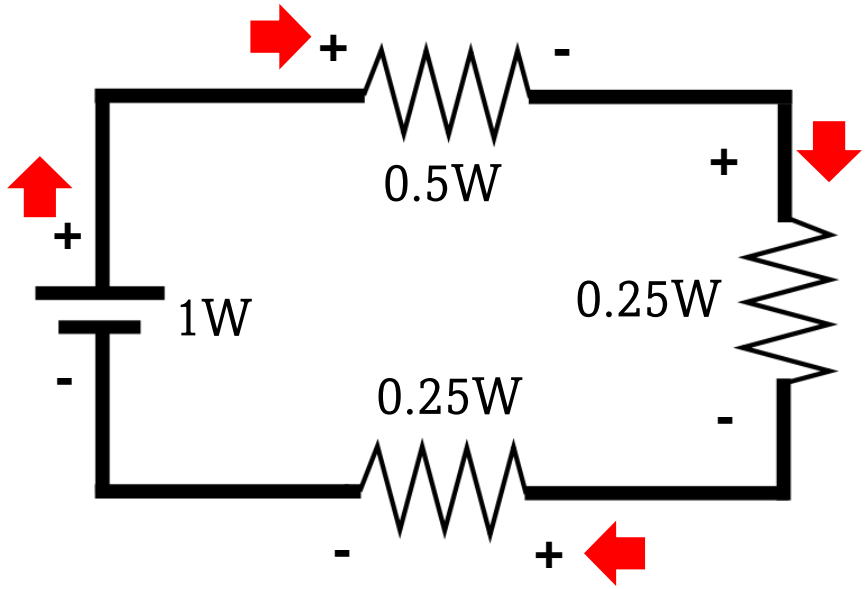
“An ability to resists the flow of current measured in Ohm (Ω)”



Power **"The time rate of expending or absorbing energy measured in Watt (W)"**

Passive sign convention
(Absorb power)

Active sign convention
(Deliver power)



Absorb power = -(Deliver power)

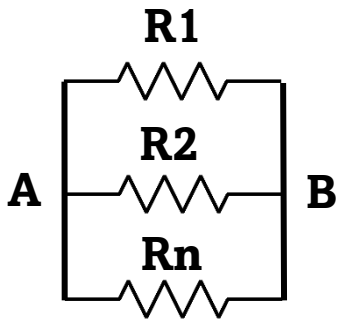
Sora

Total Resistance

Series connection

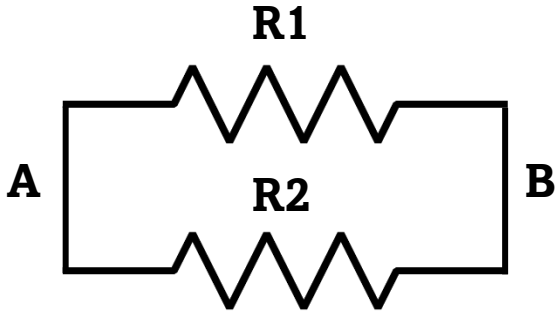
$$R_t = R_1 + R_2 + \cdots + R_n$$

Parallel connection



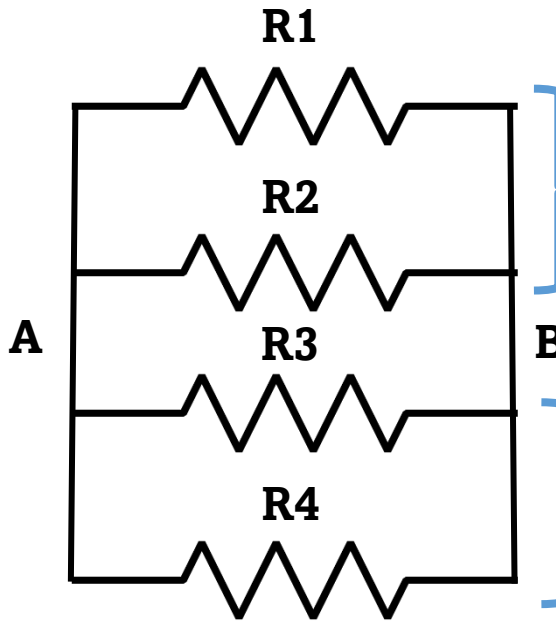
$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_n}$$

2 Resistor connected in parallel



$$R_t = \frac{R_1 \times R_2}{R_1 + R_2}$$

What if...



$$R_a = \frac{R_1 \times R_2}{R_1 + R_2}$$

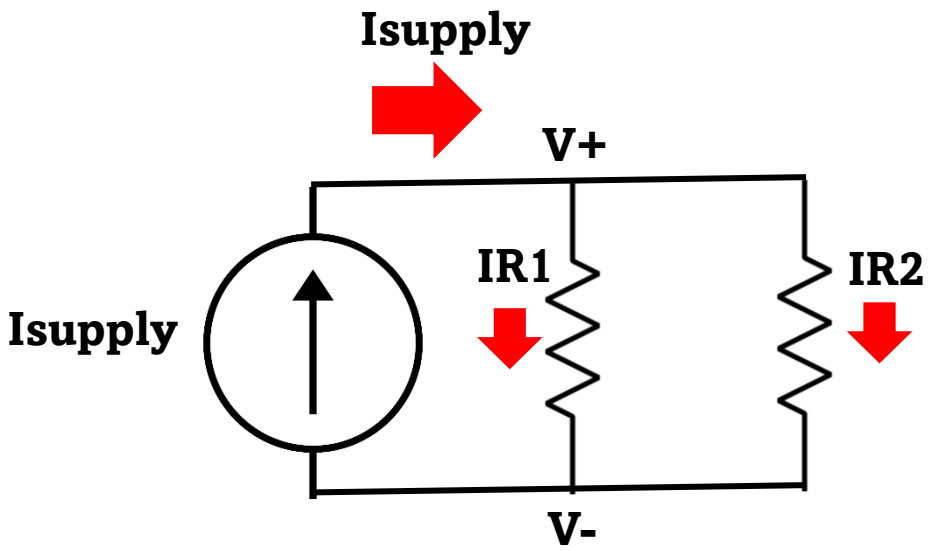
$$R_b = \frac{R_3 \times R_4}{R_3 + R_4}$$

$$R_t = \frac{R_a \times R_b}{R_a + R_b}$$

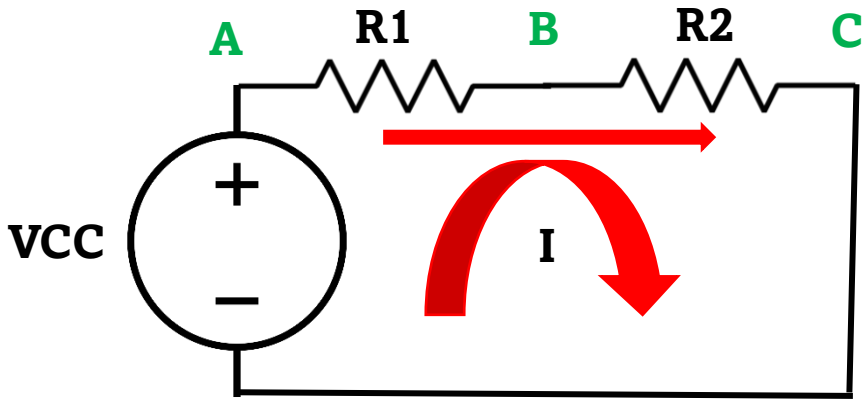
Sora

Parallel and Series circuit properties

Same voltage for all elements different current.

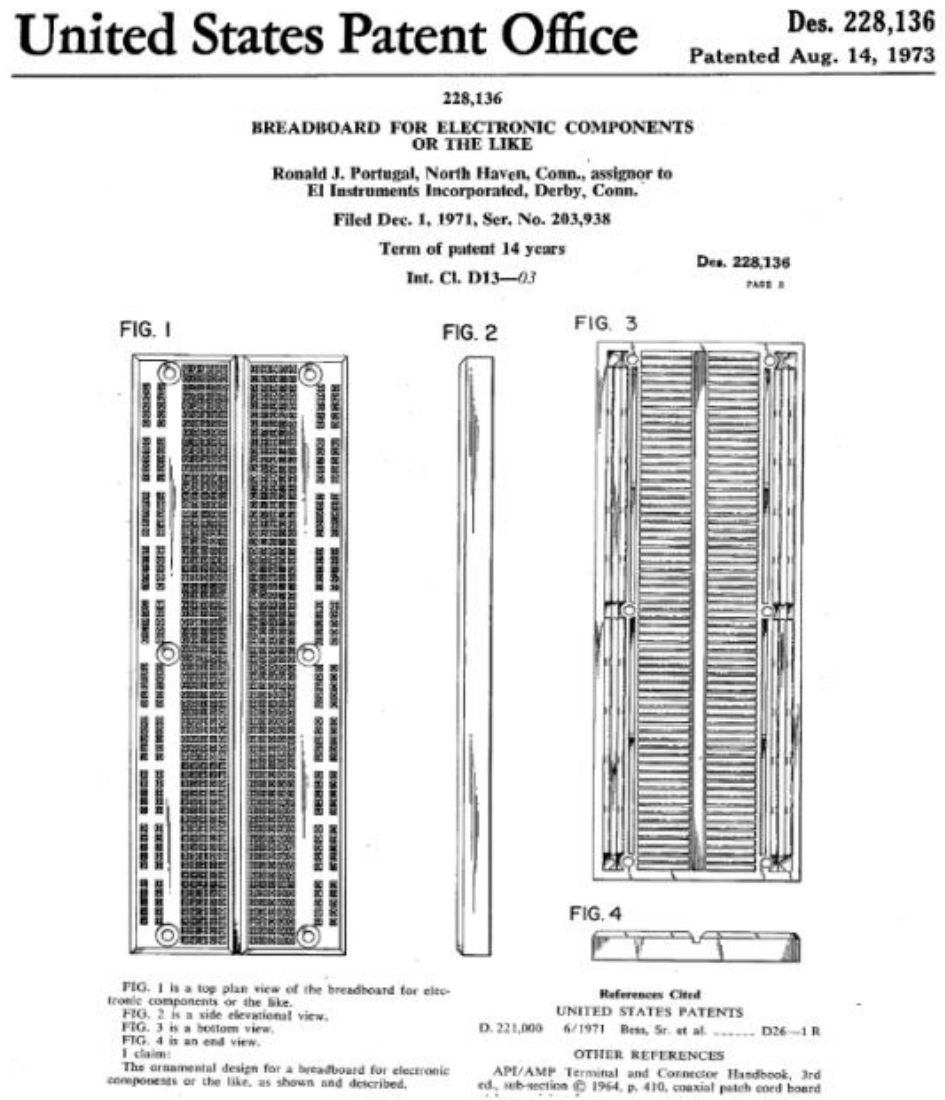


Same current for all elements different voltage.



Sora

Basic Components



United States Patent Office

Des. 228,136
Patented Aug. 14, 1973

228,136

BREADBOARD FOR ELECTRONIC COMPONENTS OR THE LIKE

Ronald J. Portugal, North Haven, Conn., assignor to EI Instruments Incorporated, Derby, Conn.

Filed Dec. 1, 1971, Ser. No. 203,938

Term of patent 14 years

Int. Cl. D13—03

Des. 228,136

FIG. 1

FIG. 2

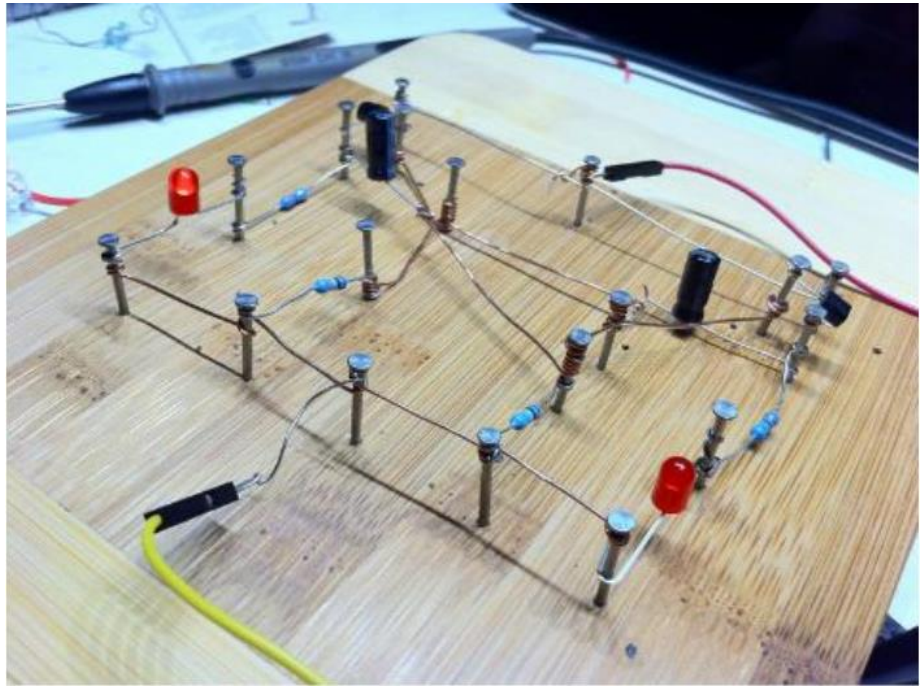
FIG. 3

FIG. 4

FIG. 1 is a top plan view of the breadboard for electronic components or the like.
FIG. 2 is a side elevational view.
FIG. 3 is a bottom view.
FIG. 4 is an end view.
I claim:
The ornamental design for a breadboard for electronic components or the like, as shown and described.

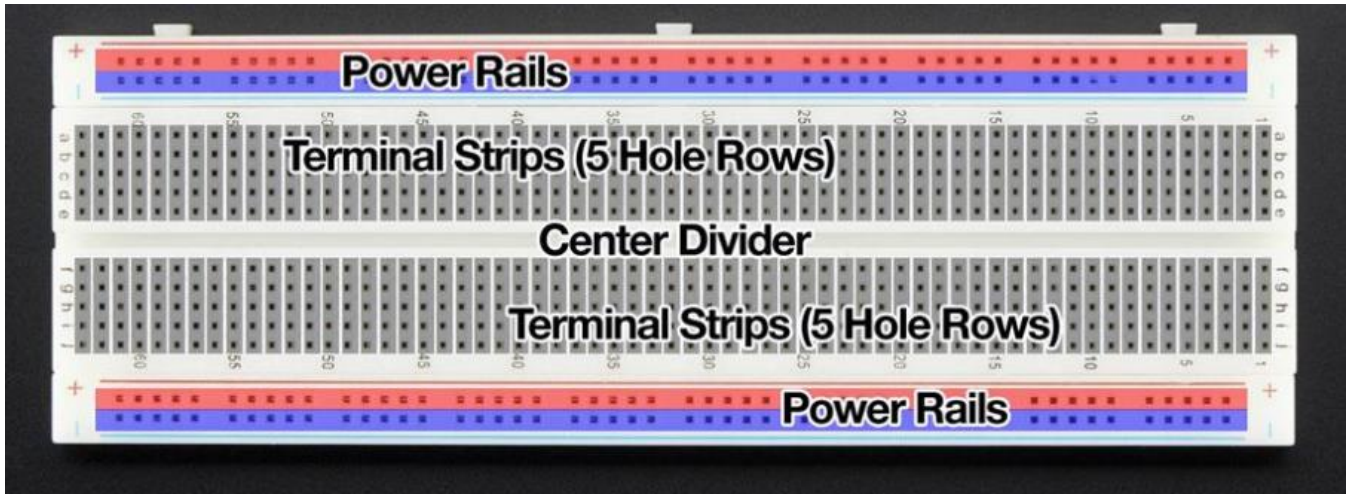
References Cited
UNITED STATES PATENTS
D. 221,000 6/1971 Bess, Sr. et al. ..... D26—1 R

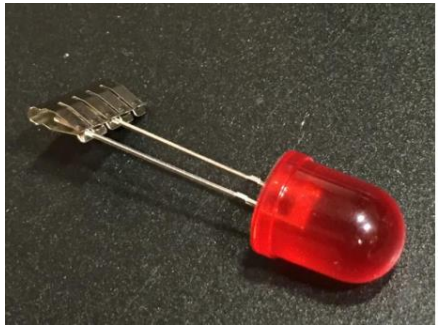
OTHER REFERENCES
API/AMP Terminal and Connector Handbook, 3rd ed., sub-section © 1964, p. 410, coaxial patch cord board



Basic Components (Contd.)

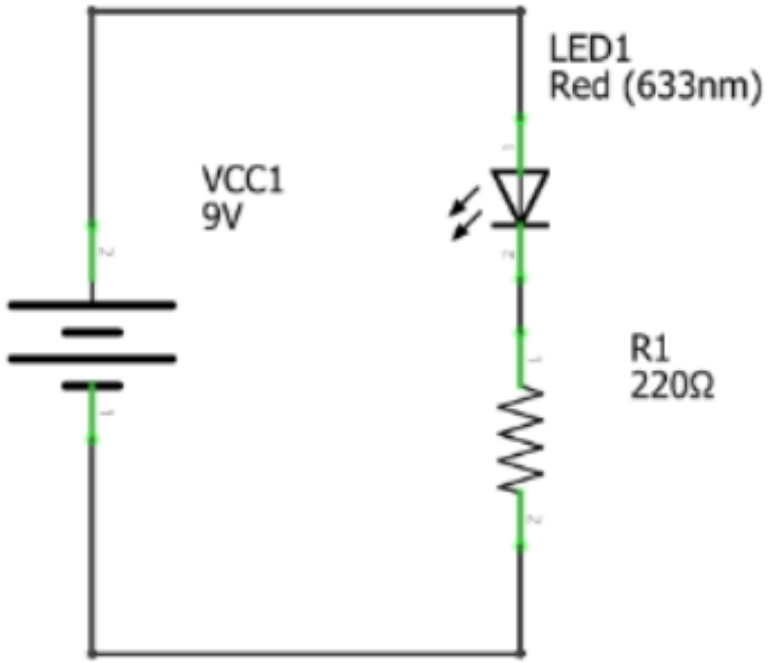
Breadboard

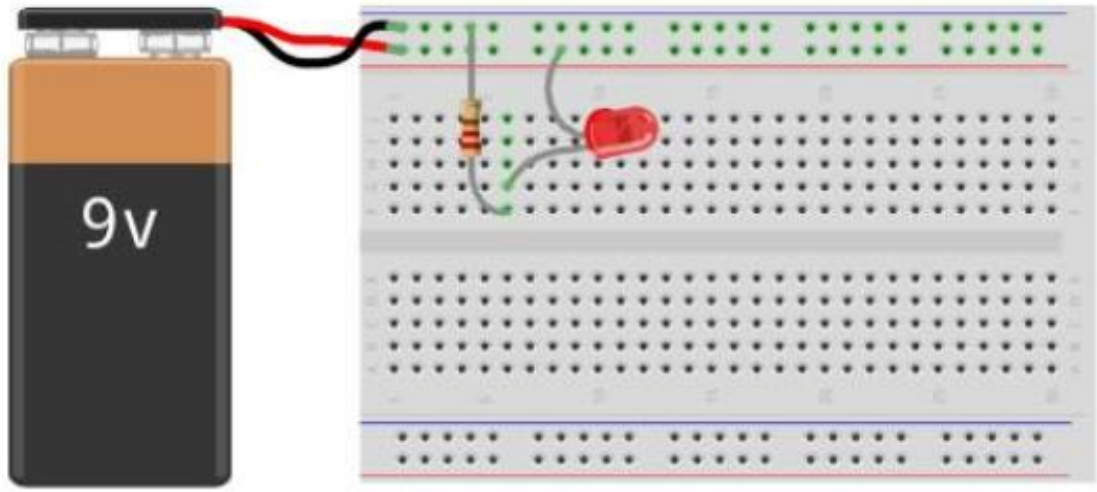




Basic Components (Contd.)

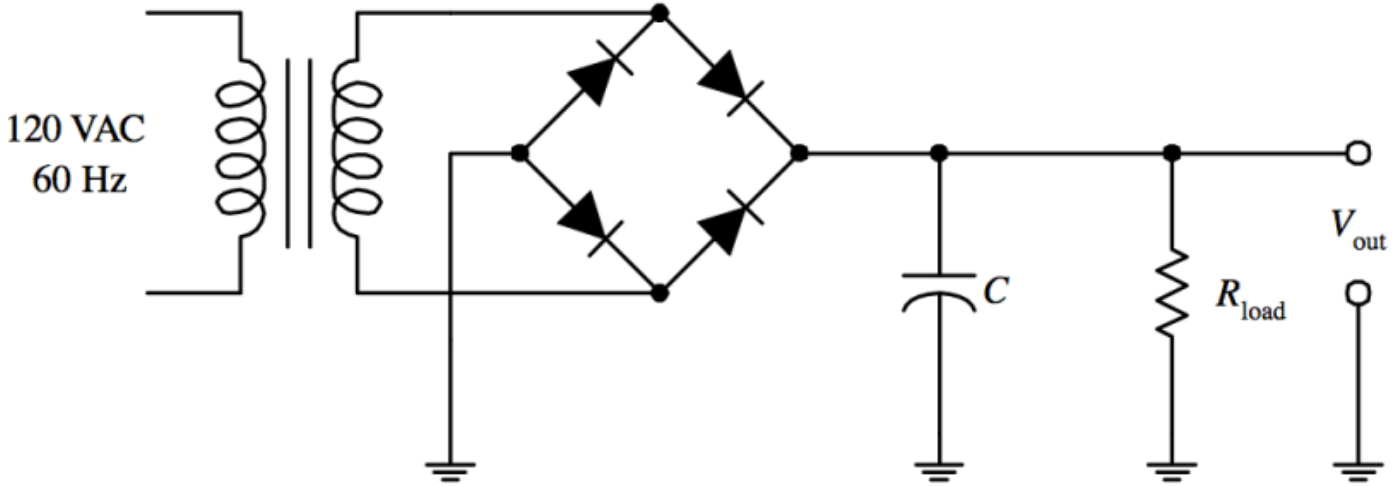
Example circuit

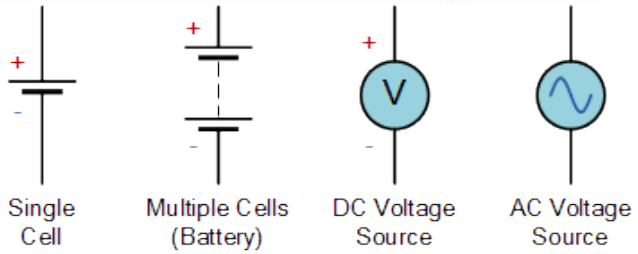




Basic Components (Contd.)

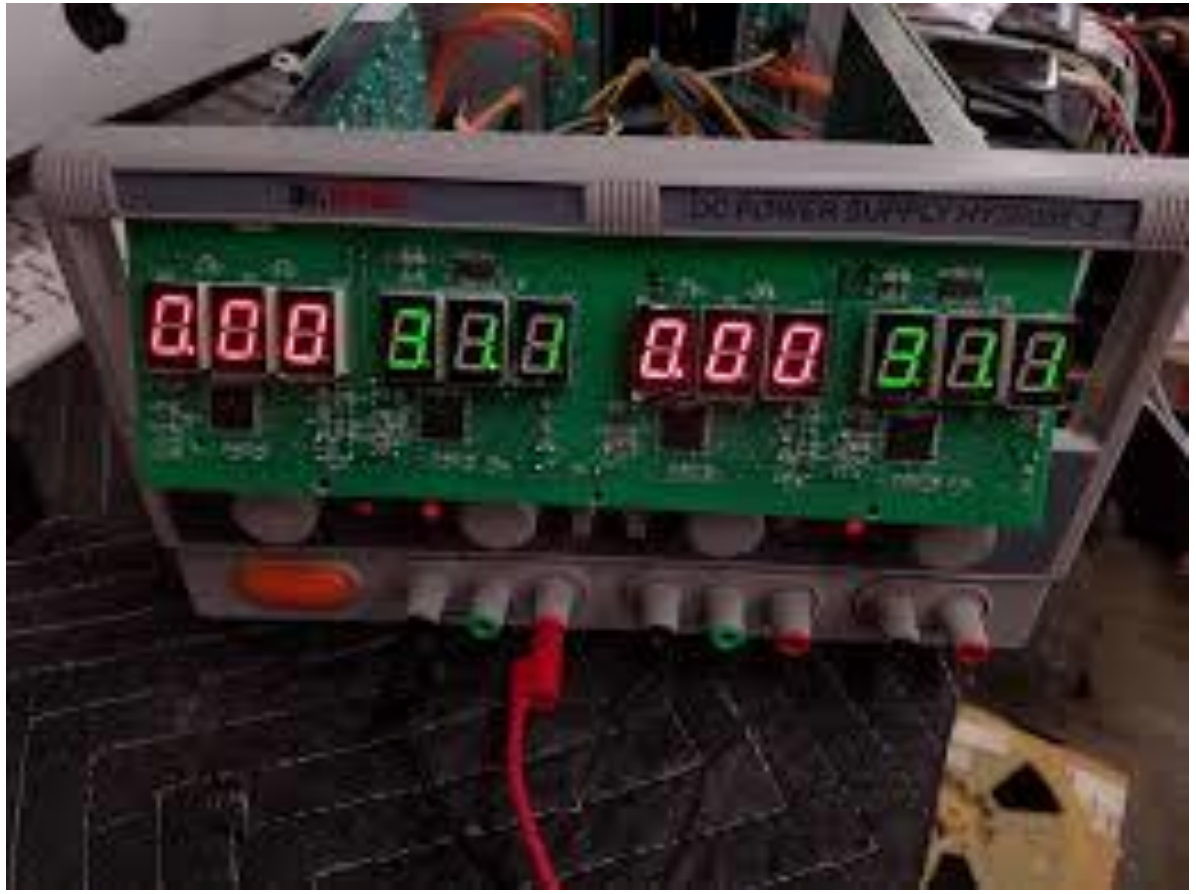
Power supply unit





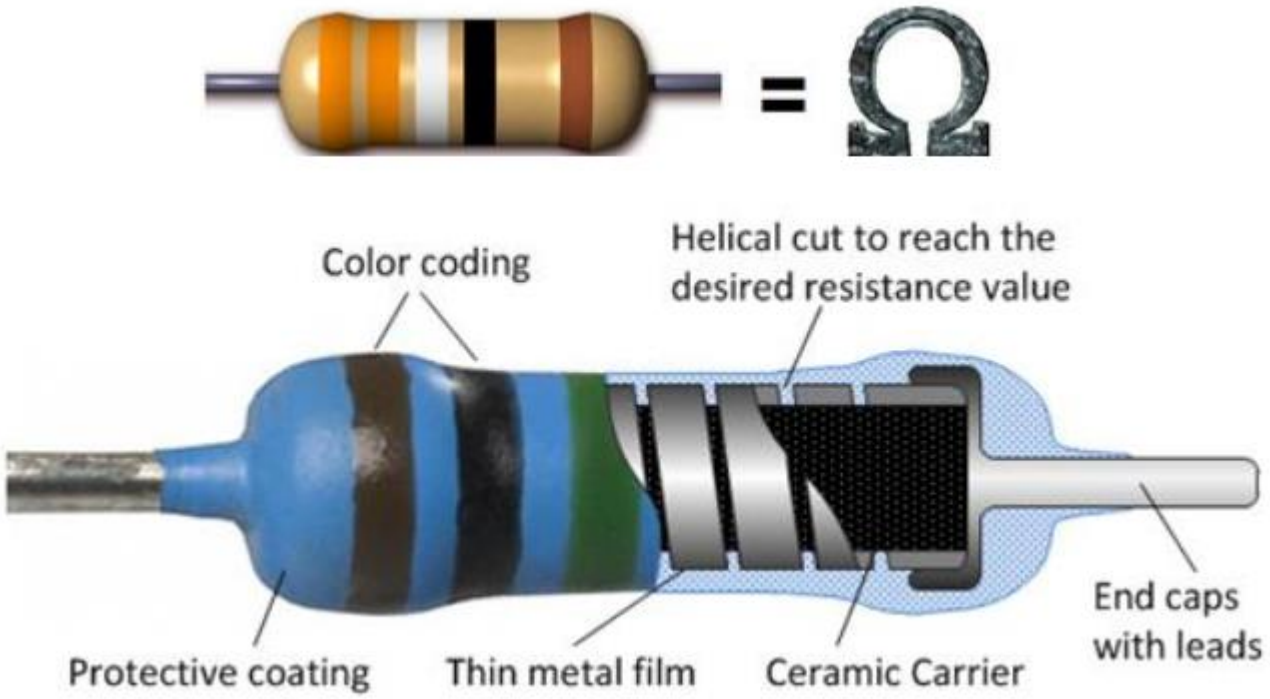
Basic Components (Contd.)

Power supply unit



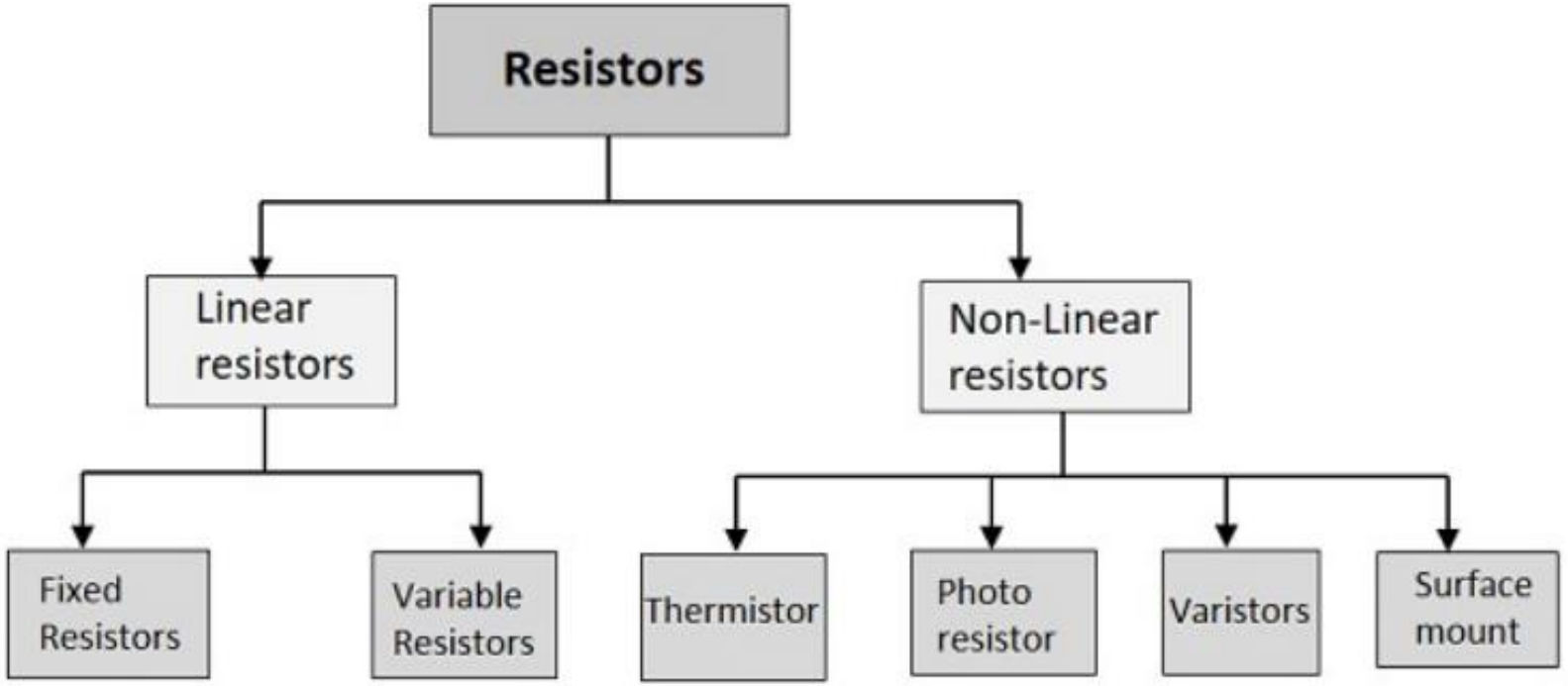
Basic Components (Contd.)

Resistors



Basic Components (Contd.)

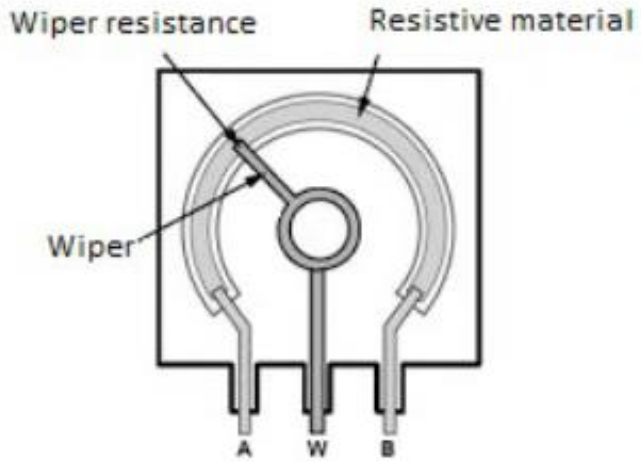
Resistor types



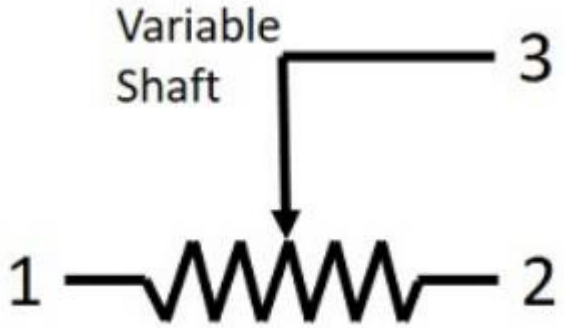
Basic Components (Contd.)

Variable Resistors: Potentiometer

Image of a Potentiometer



Internal structure of a Pot



Basic Components (Contd.)

Non-linear resistors: LDR

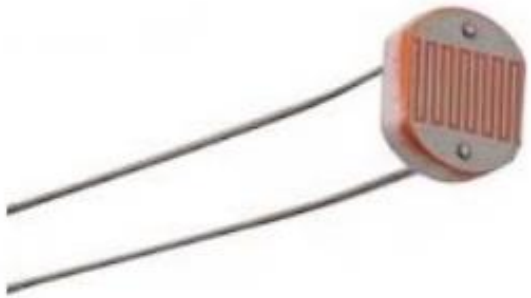
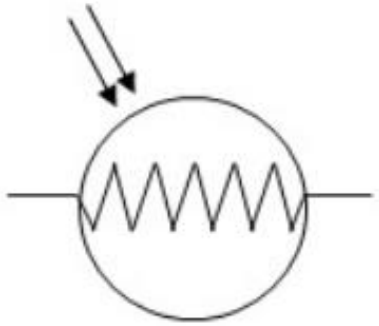


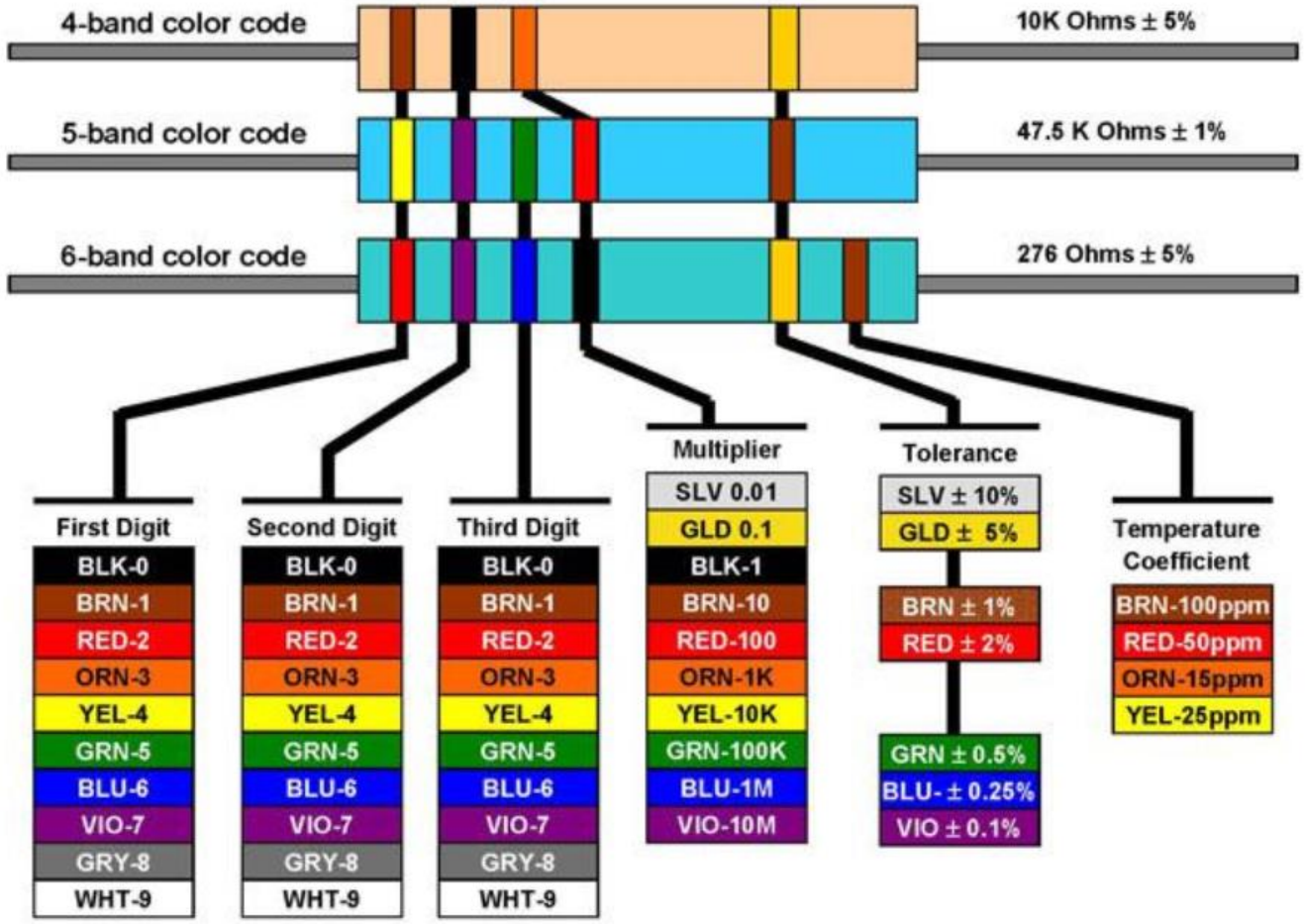
Image of LDR or
Photo resistor



Symbol for LDR or
Photo resistor

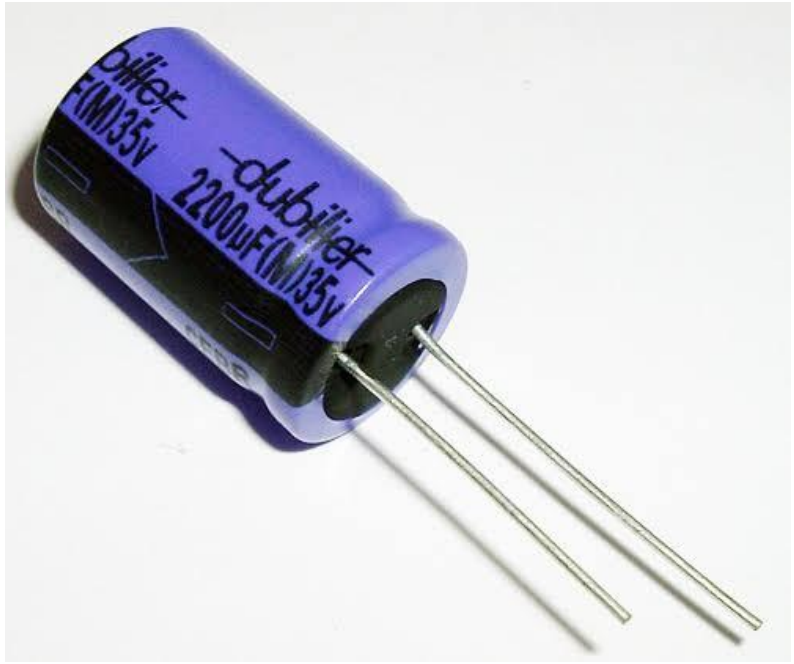
Basic Components (Contd.)

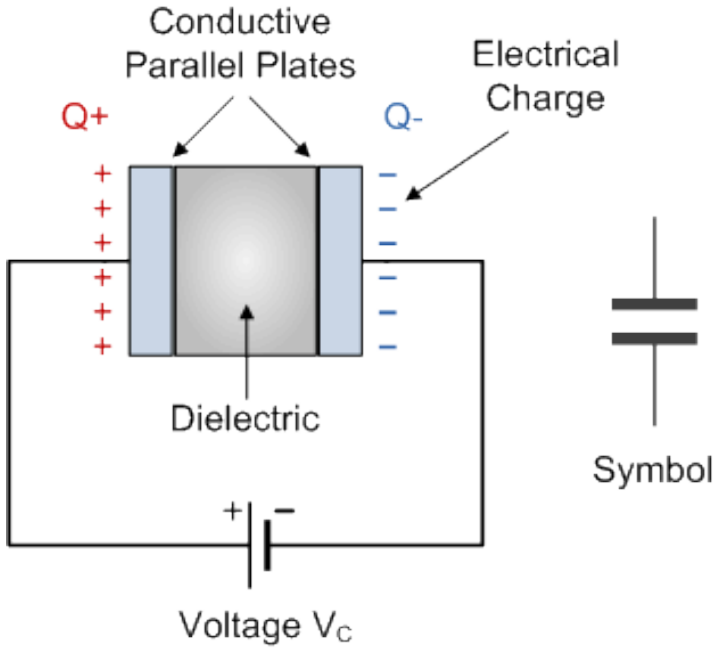
Resistor color code



Basic Components (Contd.)

Capacitors



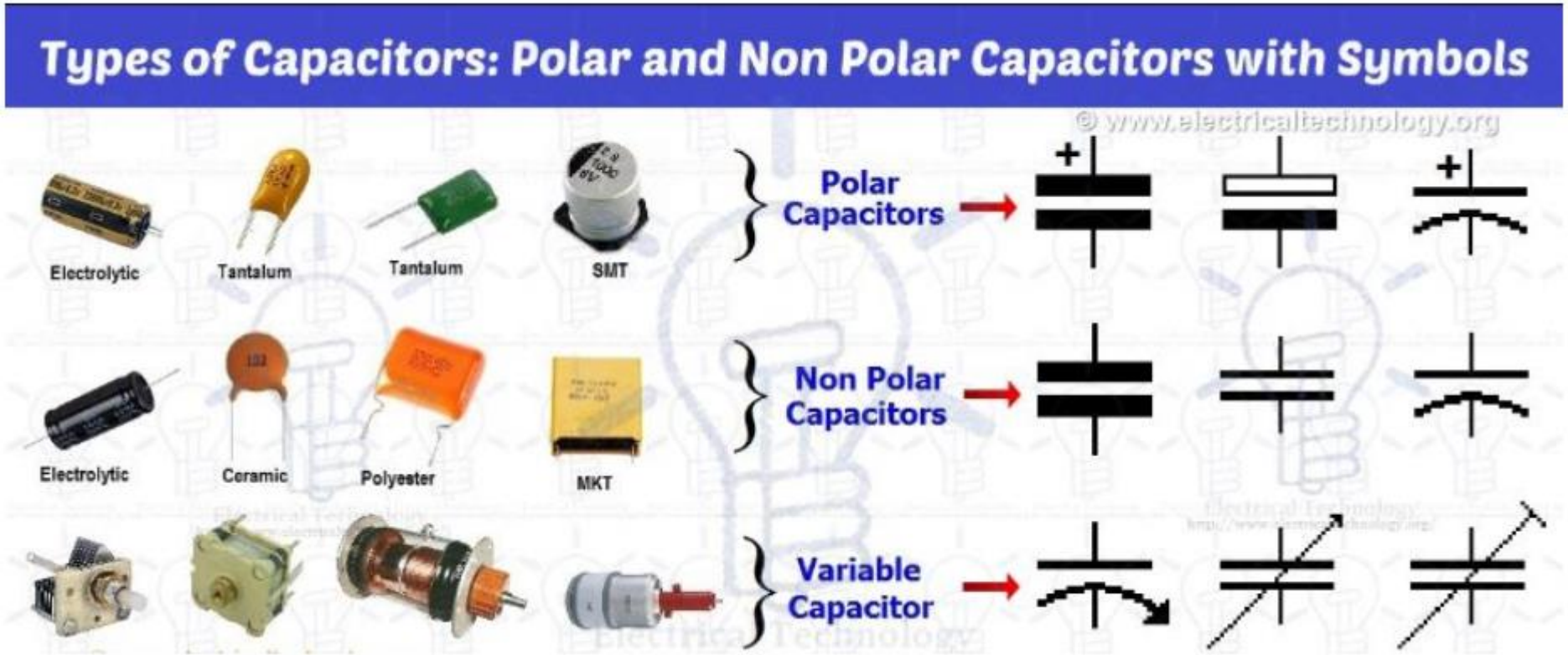


$$C = \frac{Q}{V}$$

$$C \propto \frac{A}{d}$$

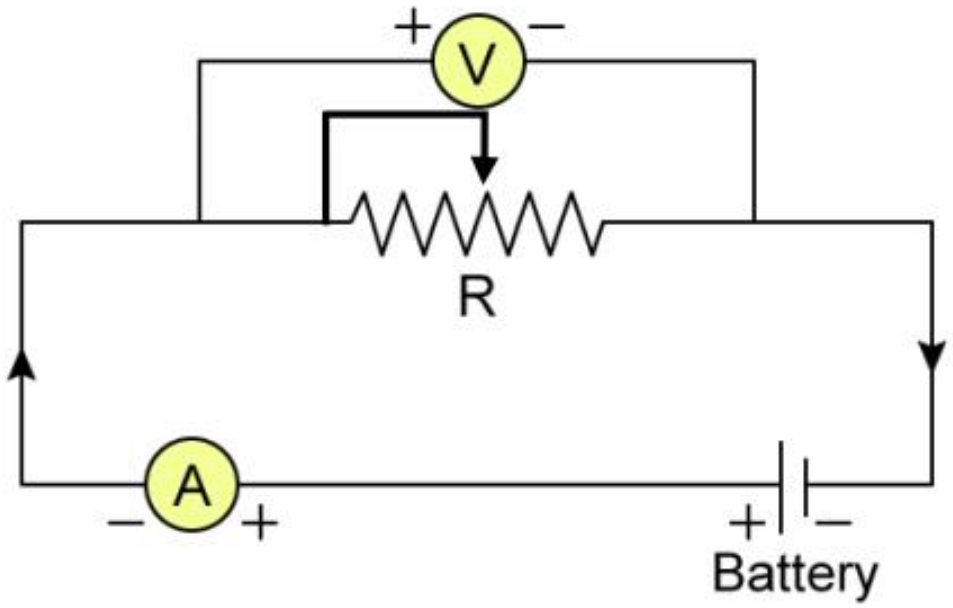
Basic Components (Contd.)

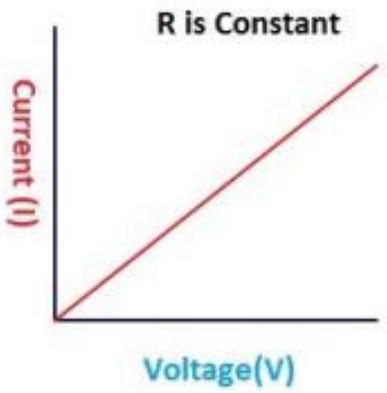
Types of Capacitors



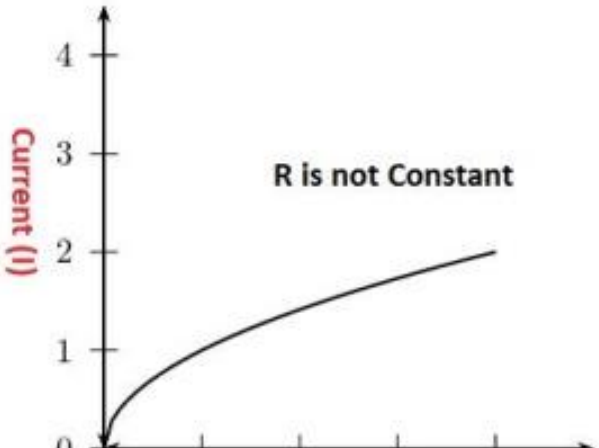
Basic Components (Contd.)

Ohm's law





Ohmic Devices Graph



Non-Ohmic Devices Graph

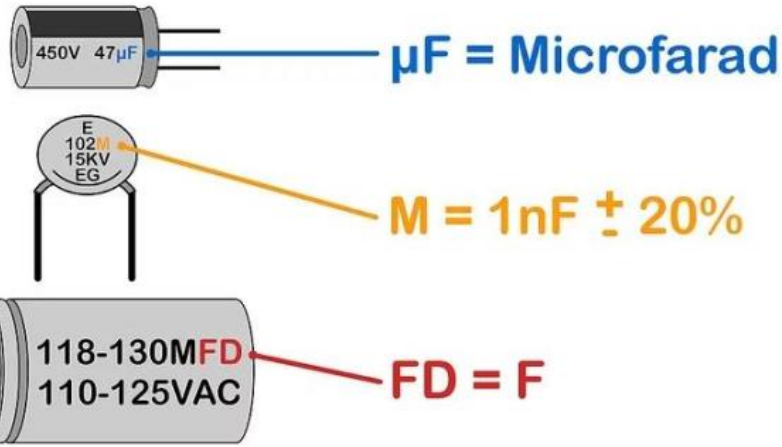
Basic Components (Contd.)

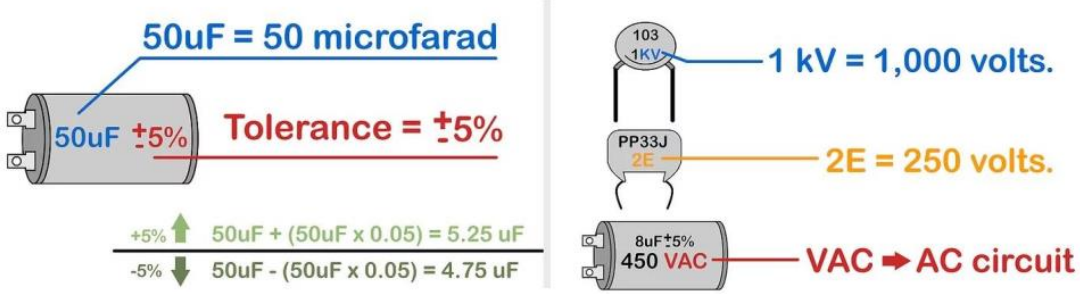
Capacitor reading: Large capacitors

μF
uF
mF — Microfarad = 10^{-6} F

nF — Nanofarad = 10^{-9} F

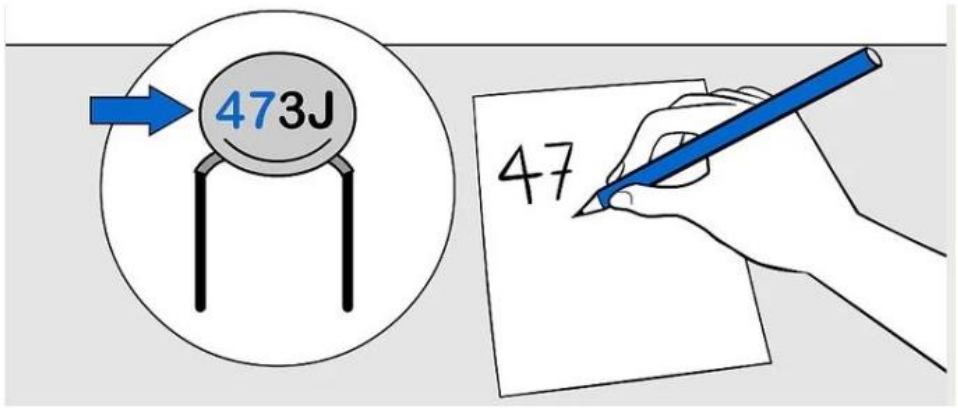
pF
mmF
uuF — Picofarad = 10^{-12} F



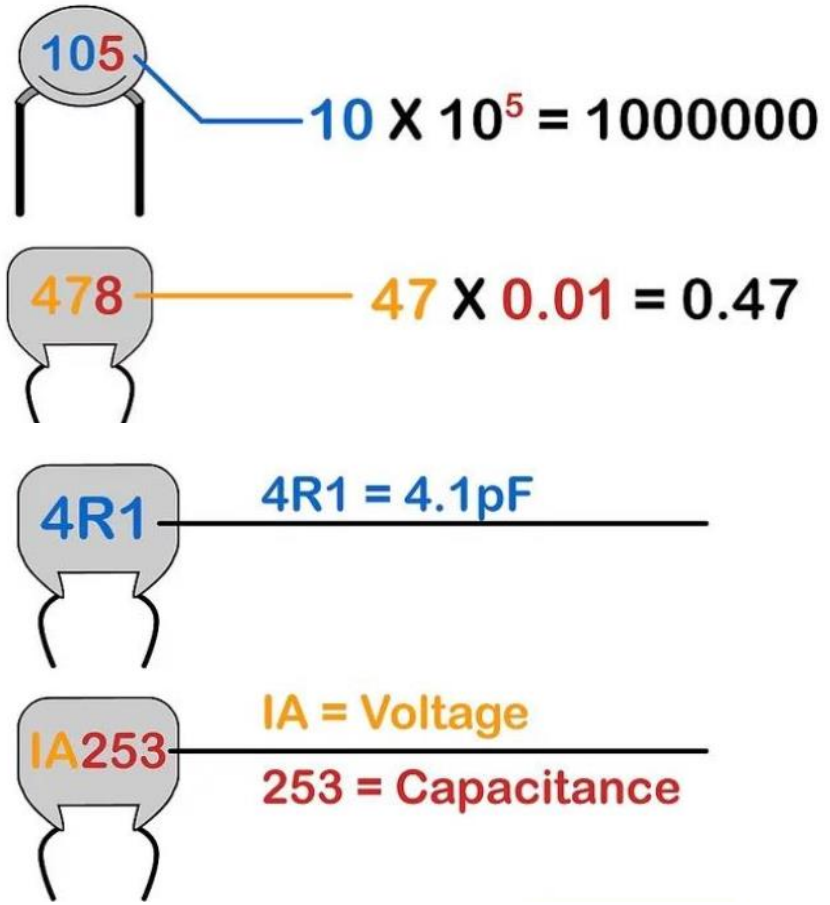


Basic Components (Contd.)

Capacitor reading: Compact capacitors

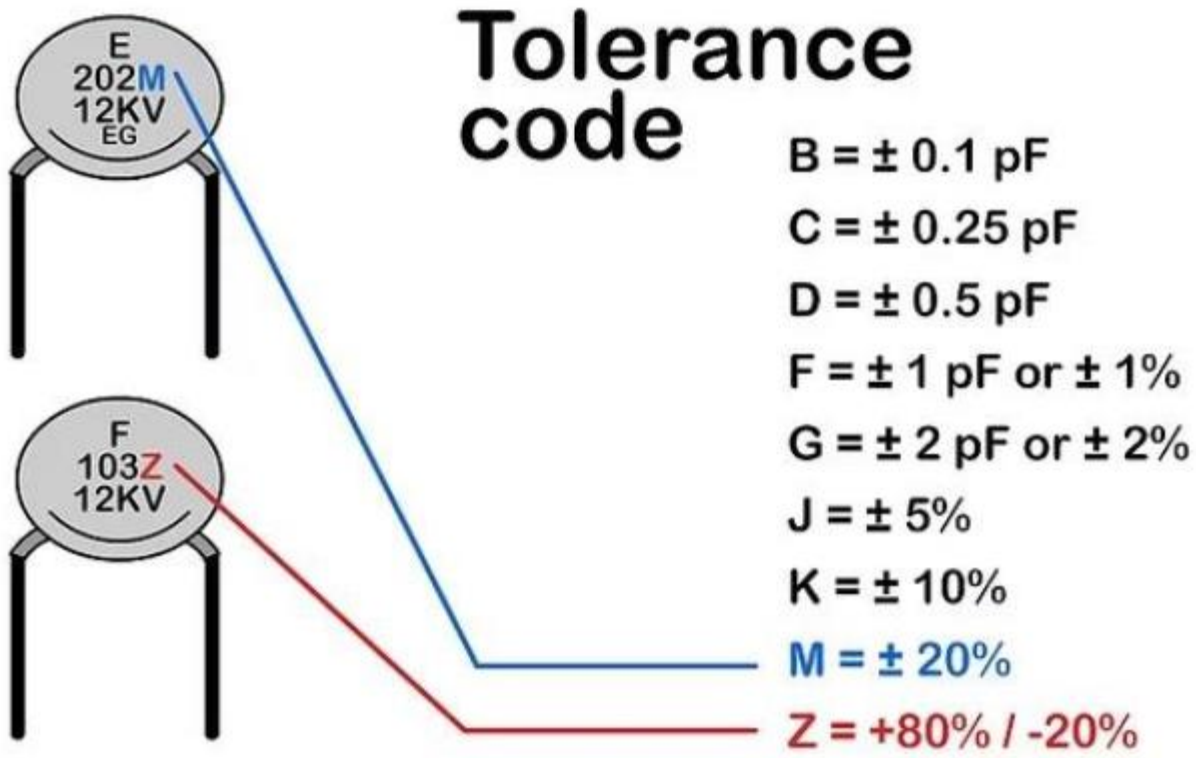


CODE	MAX. VOLTAGE
0J	6.3V
1A	10V
1C	16V
1E	25V
1H	50V
2A	100V
2D	200V
2E	250V



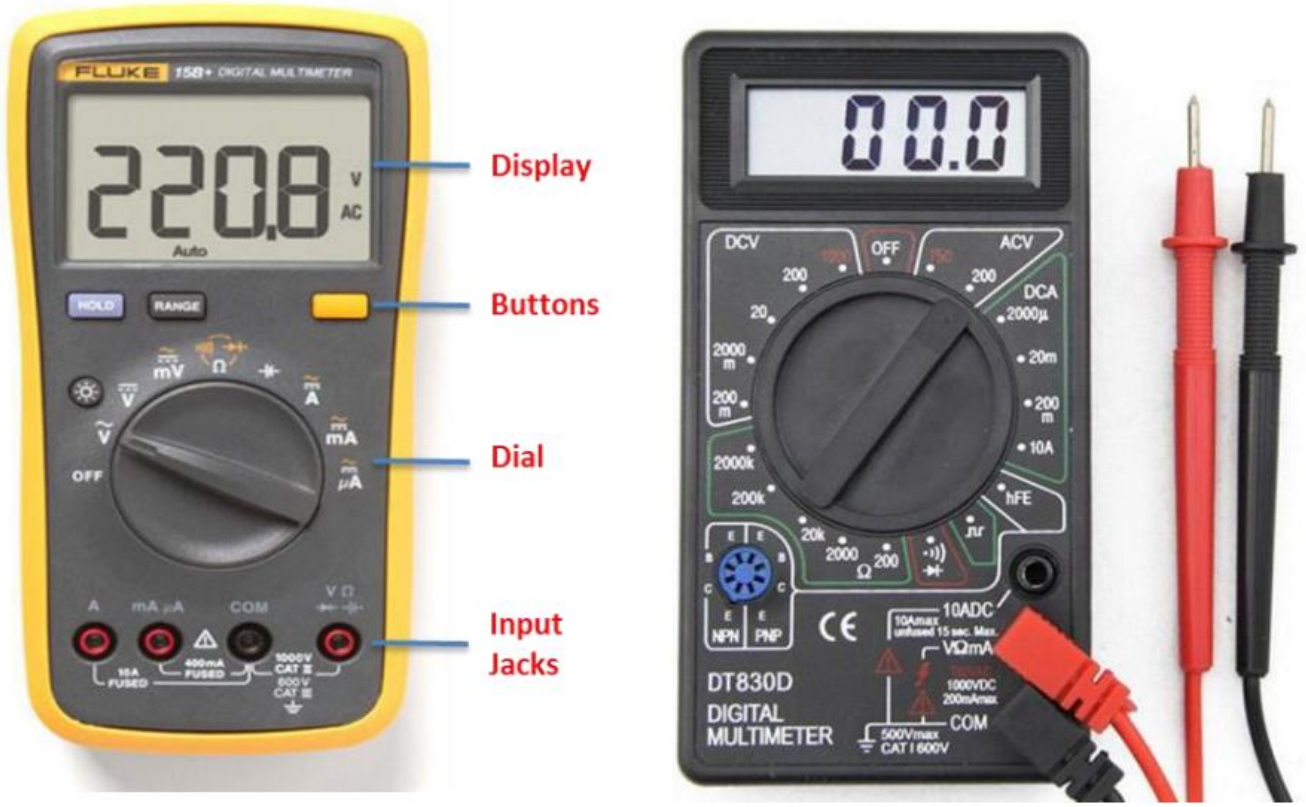
Basic Components (Contd.)

Capacitor reading: Compact capacitors



Basic Components (Contd.)

Digital multi-meter

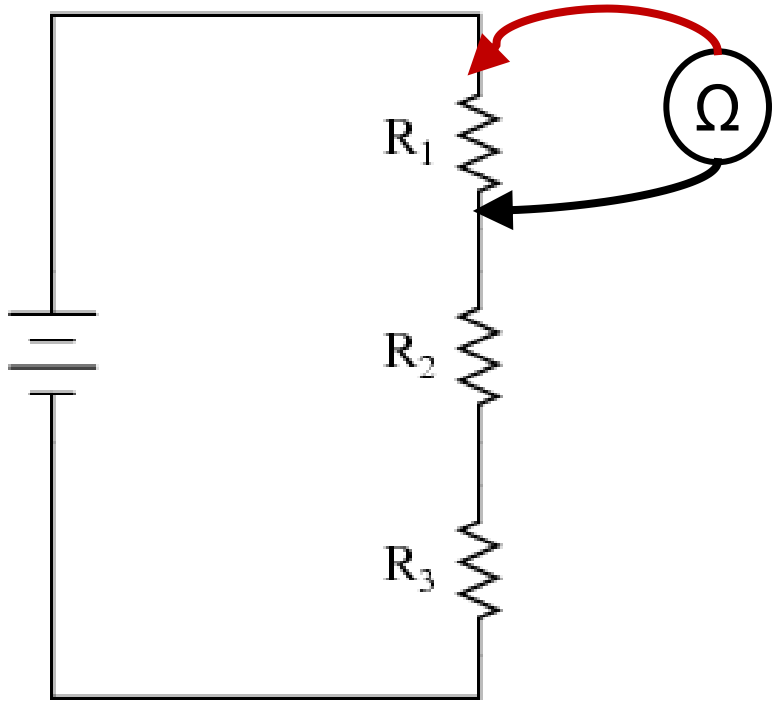


Basic Components (Contd.)

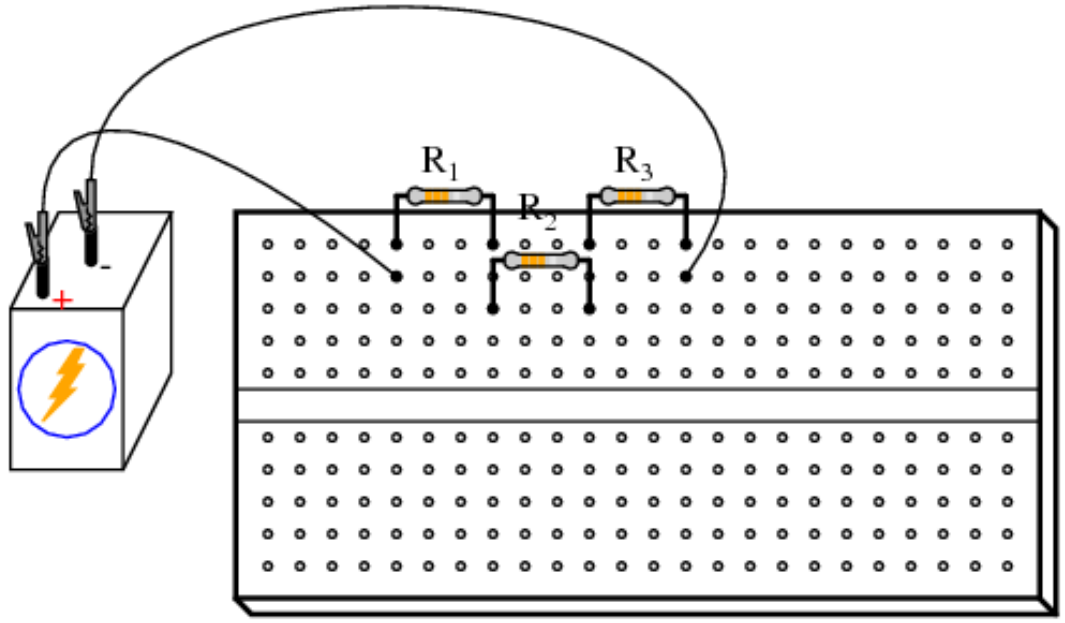
Digital multi-meter: Resistance measuring

Basic Components (Contd.)

Digital multi-meter: Resistance measuring



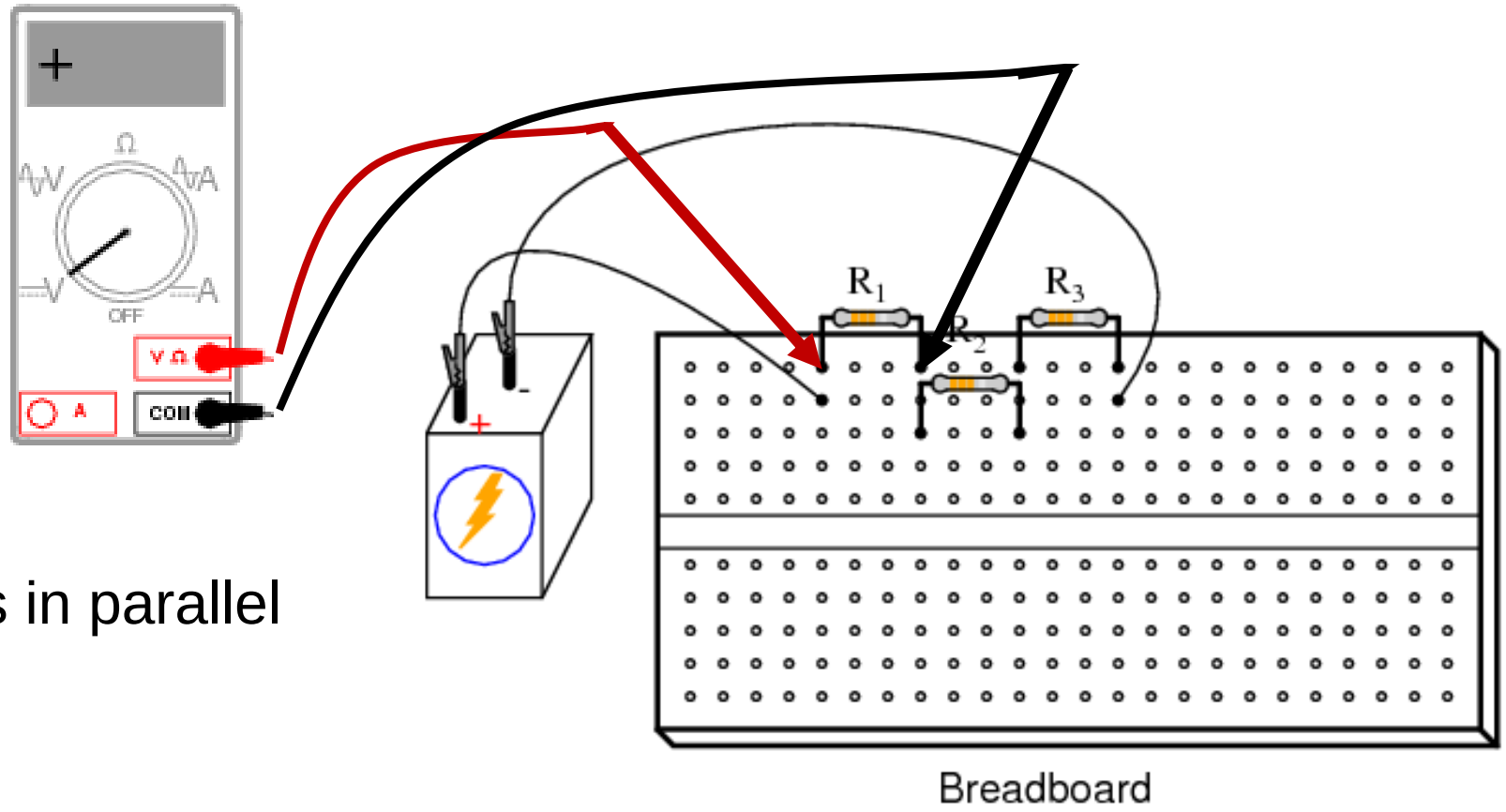
Schematic diagram



Breadboard

Basic Components (Contd.)

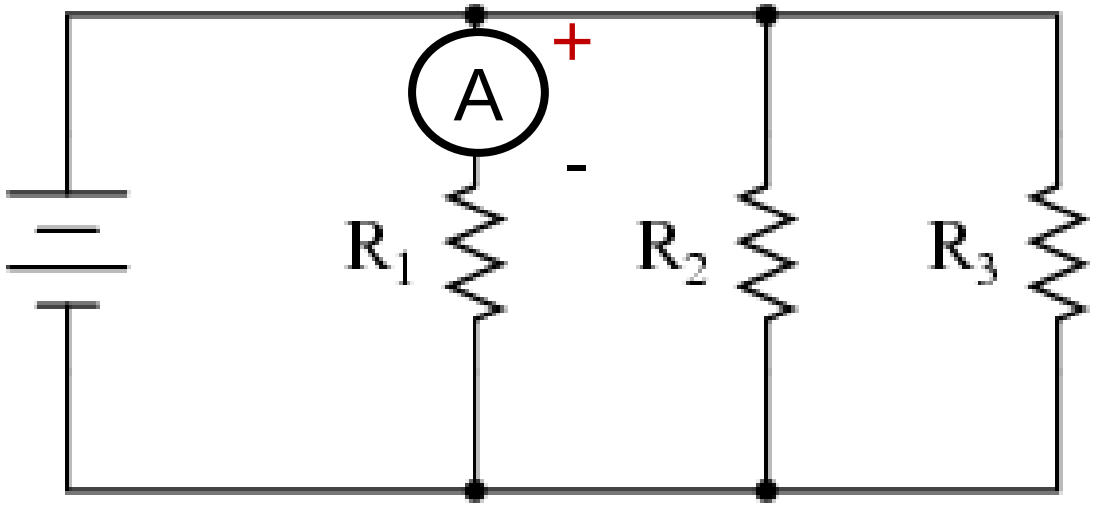
Digital multi-meter: Resistance measuring



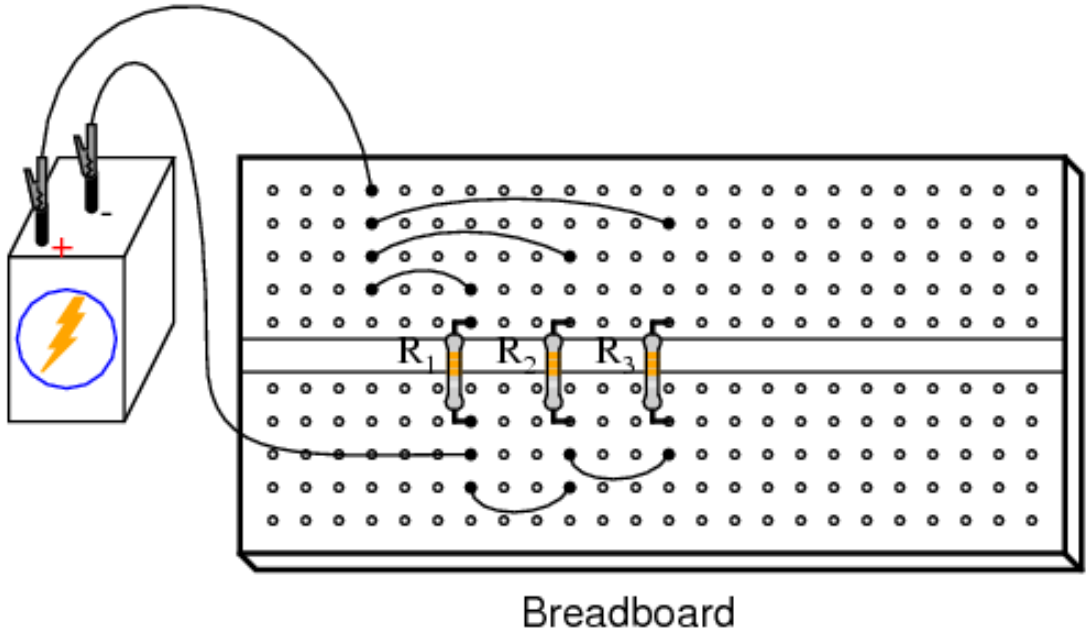
*Connection is in parallel

Basic Components (Contd.)

Digital multi-meter: Current measuring



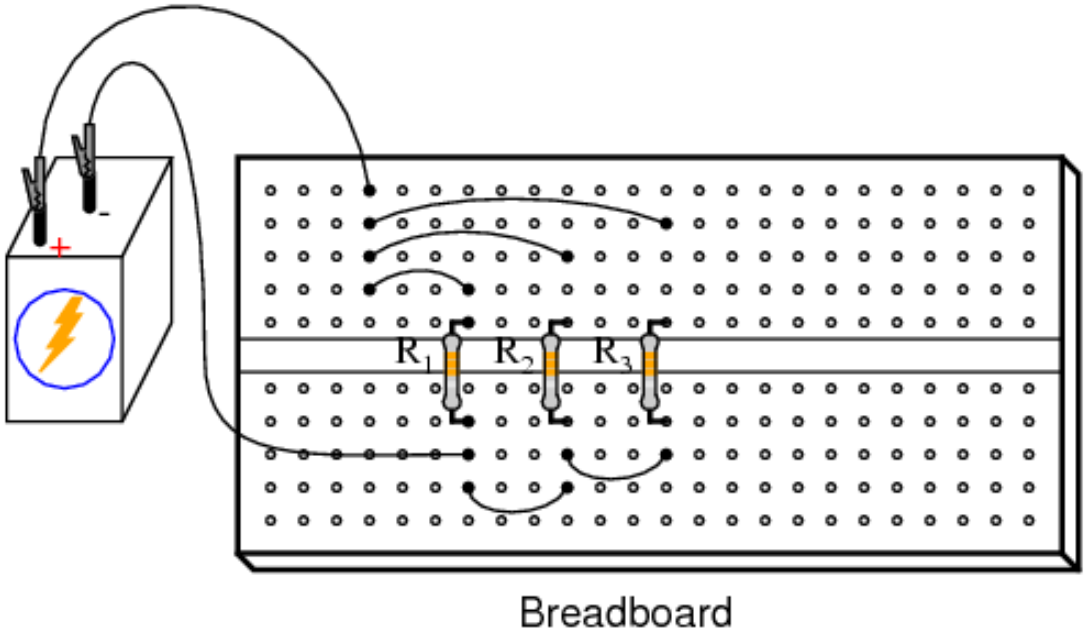
Schematic diagram



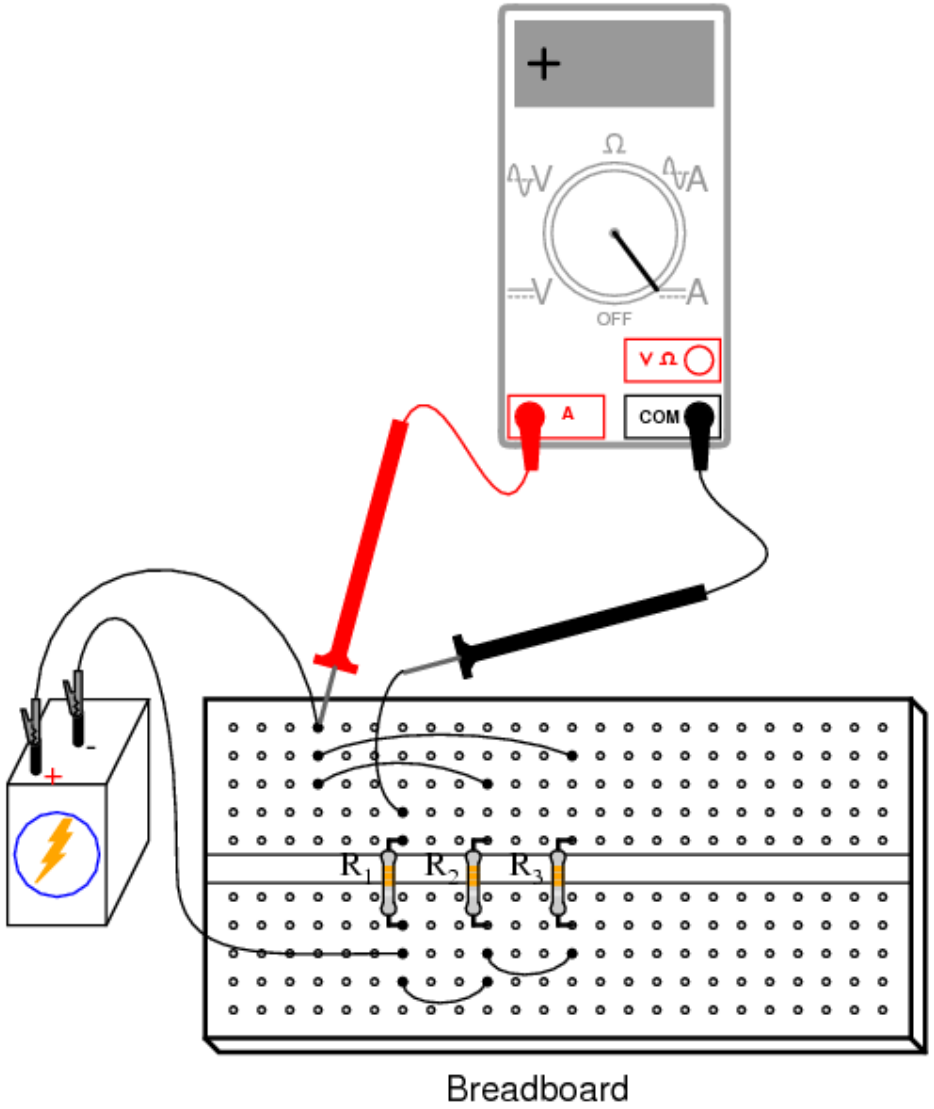
Breadboard

Basic Components (Contd.)

Digital multi-meter: Current measuring



Breadboard



Breadboard

*Connection is in series

Thank you & have fun…