

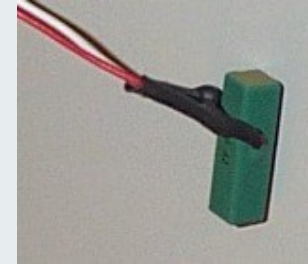
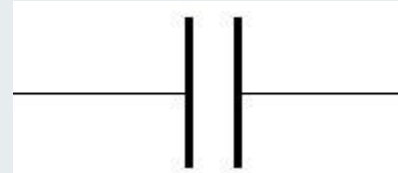


qbio
quantitative
biology

Electronics (passive components)

Capacitor/capacitance: electronic device used to store electrical energy in the form of charges

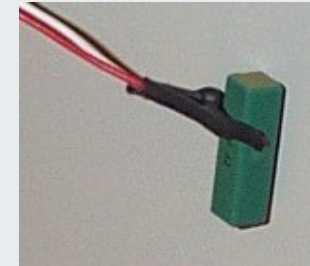
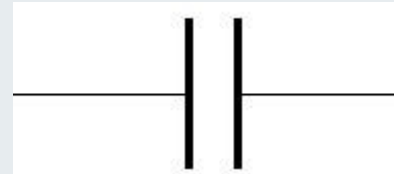
$$C = \frac{Q}{\Delta V} [F]$$



Electronics (passive components)

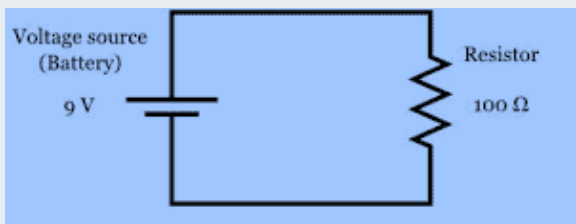
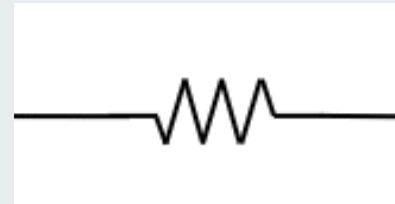
Capacitor/capacitance: electronic device used to store electrical energy in the form of charges

$$C = \frac{Q}{\Delta V} [F]$$



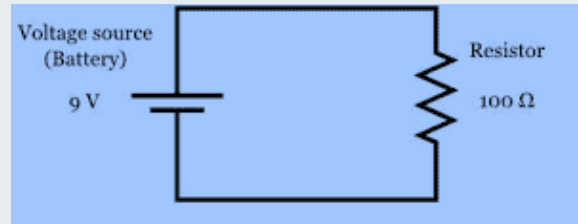
Resistor/resistance: electronic device used to resist or block the flow of current in a circuit

$$R = \frac{\Delta V}{i} [\Omega]$$



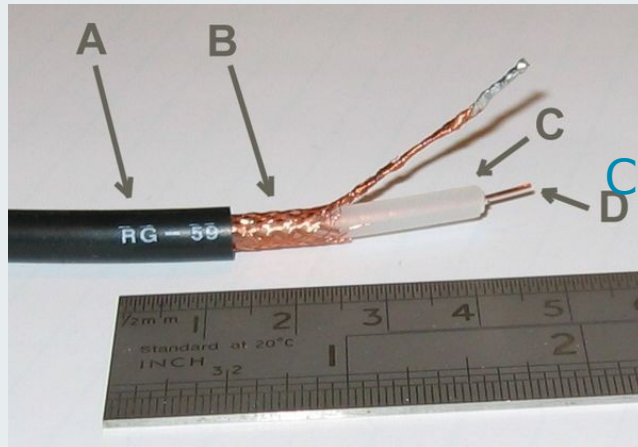
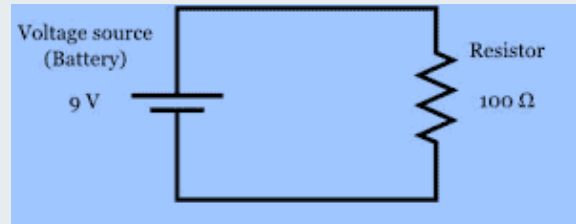
$$P = Ri^2 [W] \rightarrow P = 810 mW (heat)$$

An electrical circuit...





Electric cables (coaxial cables)

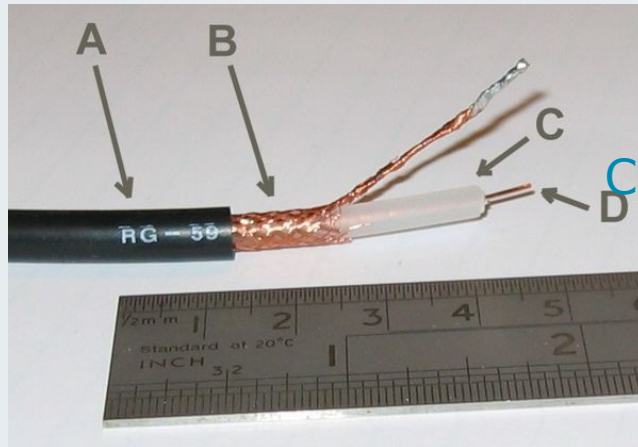
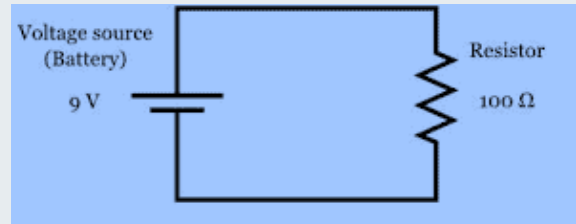


Carry high frequency signal
Low losses

Velocity factor
 V_F

Cable delay =

Electric cables (coaxial cables)



Carry high frequency signal
Low losses

Velocity factor
 V_F

Cable delay =

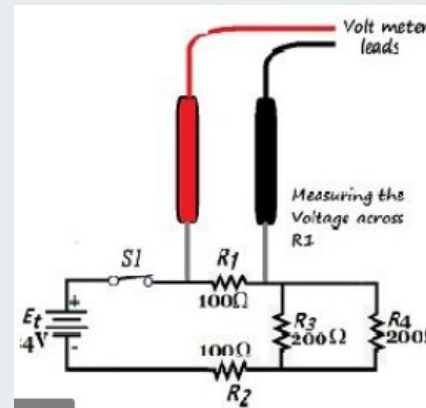
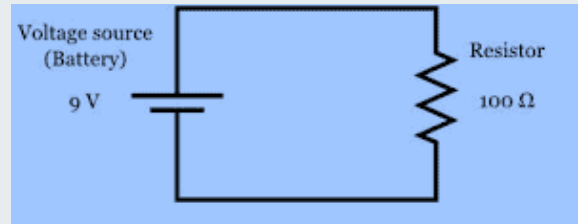
BNC connector
(Bayonet Neill-Concelman connector)



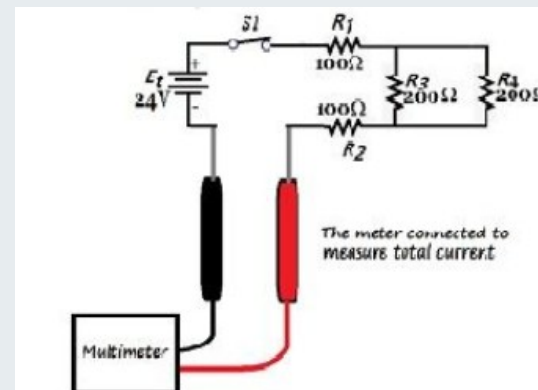
SMA connector (for RF applications)



Readout – Multimeters and oscilloscope

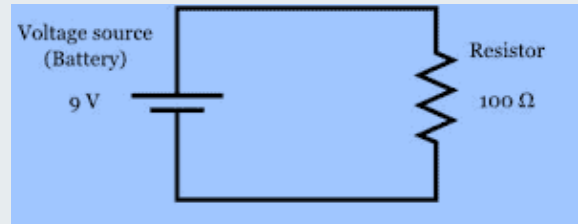


Voltage measurement

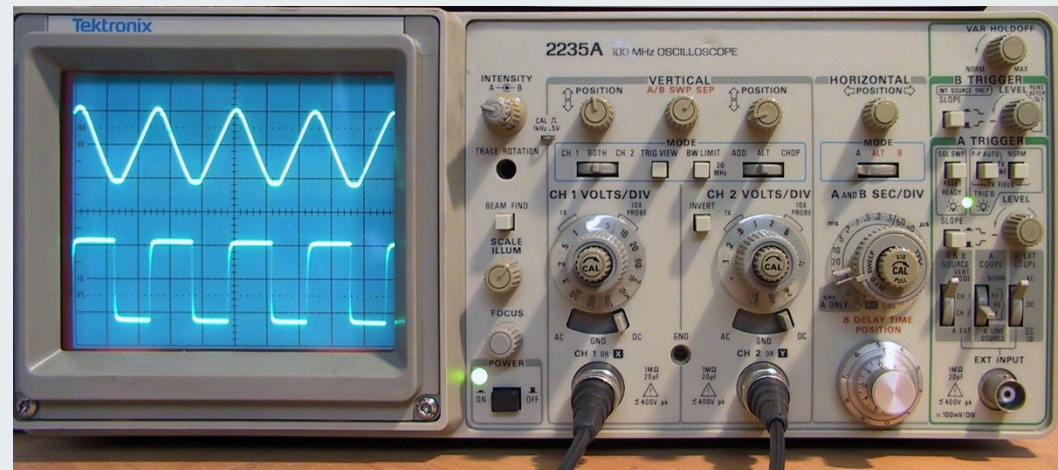


Current measurement

Readout – Multimeters and oscilloscope



Voltage measurement



An alternative: LABVIEW



Translational stages

Micrometric screws
(differential screws)



Translational stages

Micrometric screws
(differential screws)



Piezoelectric elements



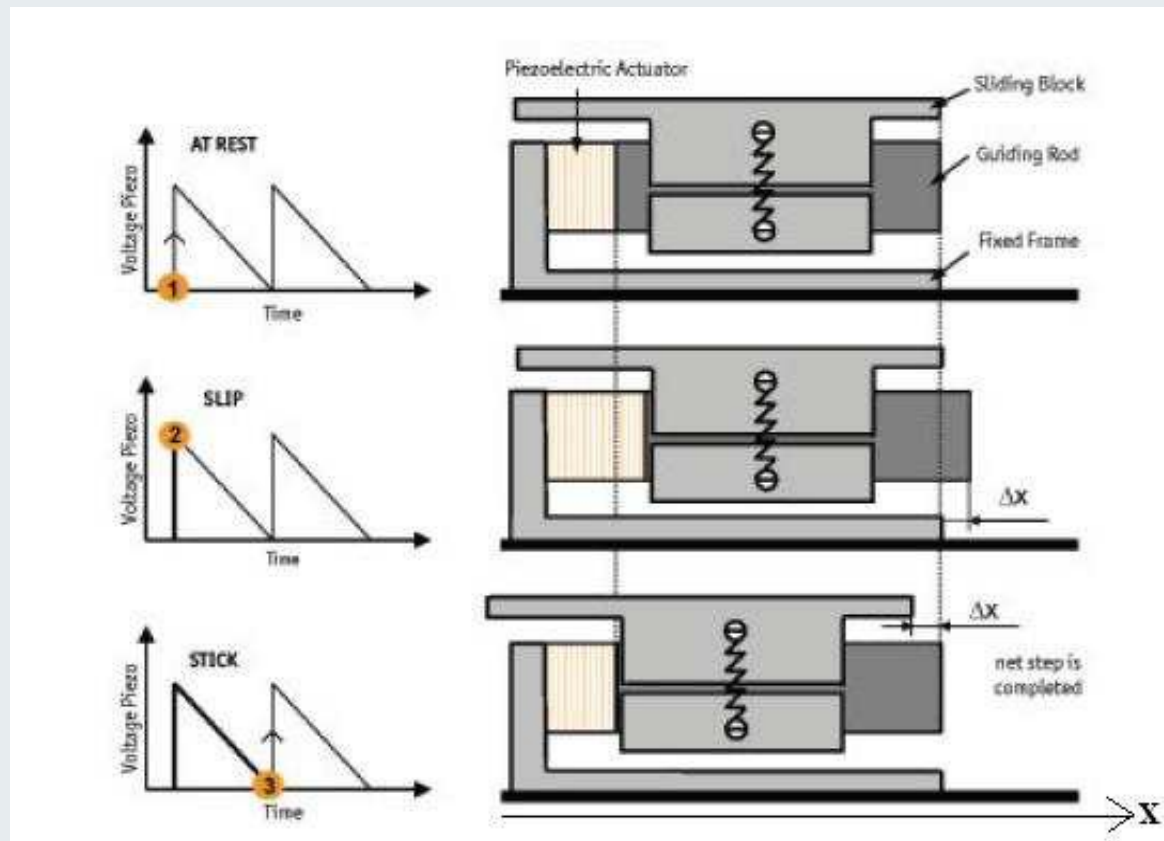
Problems:
Short displacement (<100
um)
Hysteresis
Creep

Translational stages

Micrometric screws
(differential screws)



Inertial Motors



Contacts

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