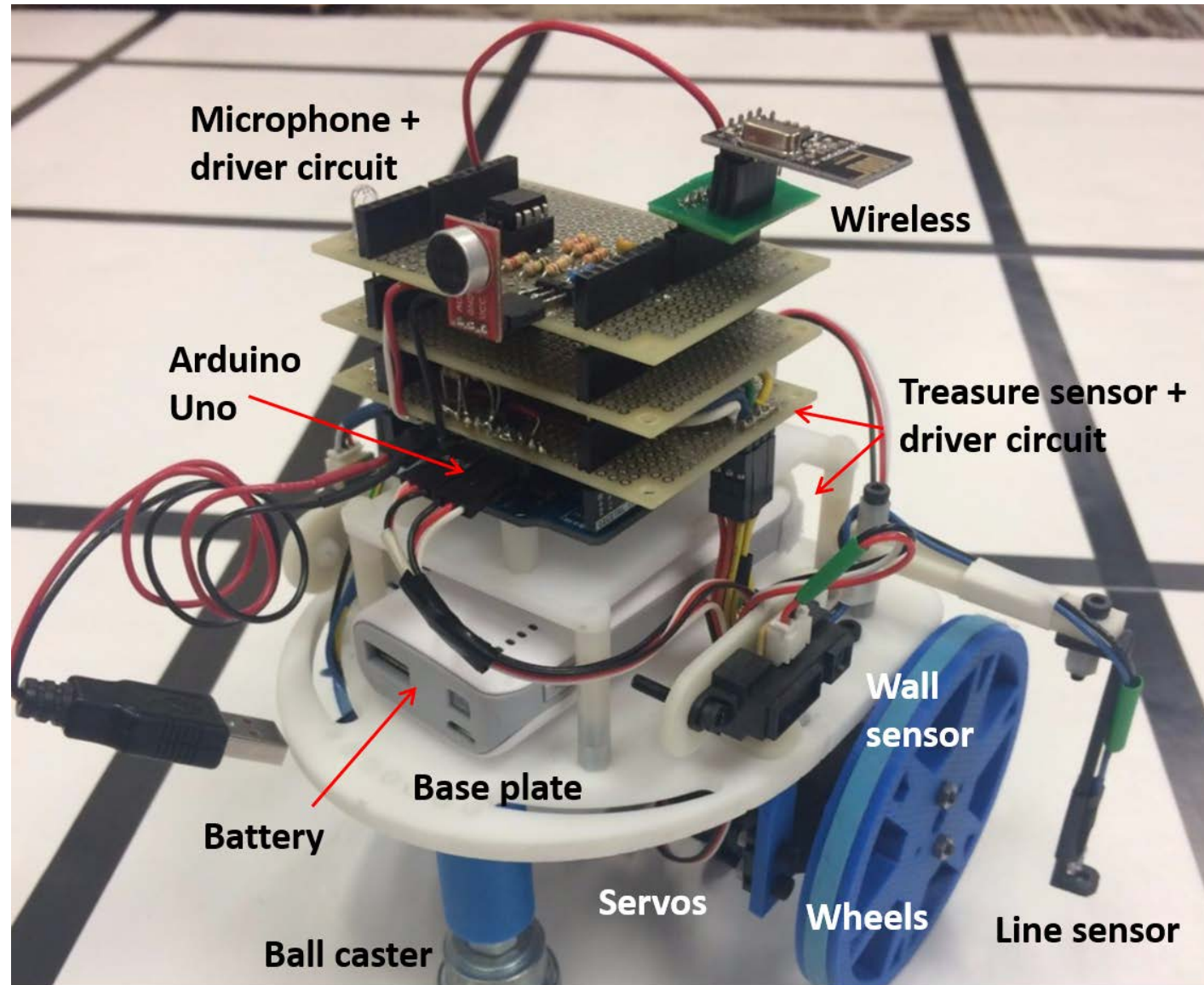


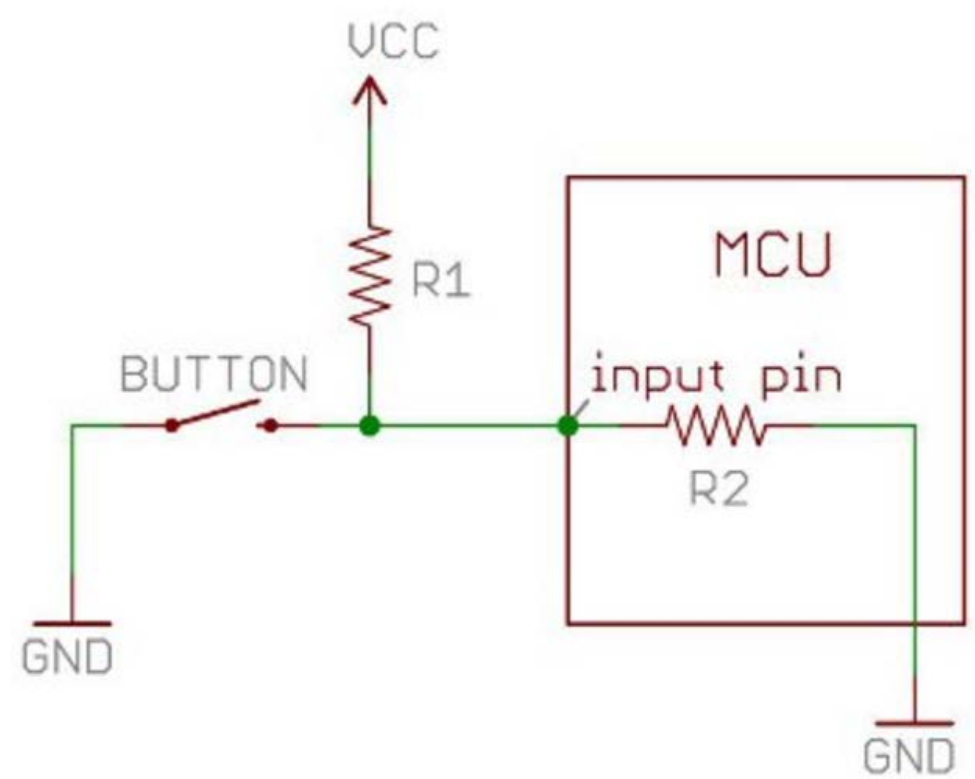
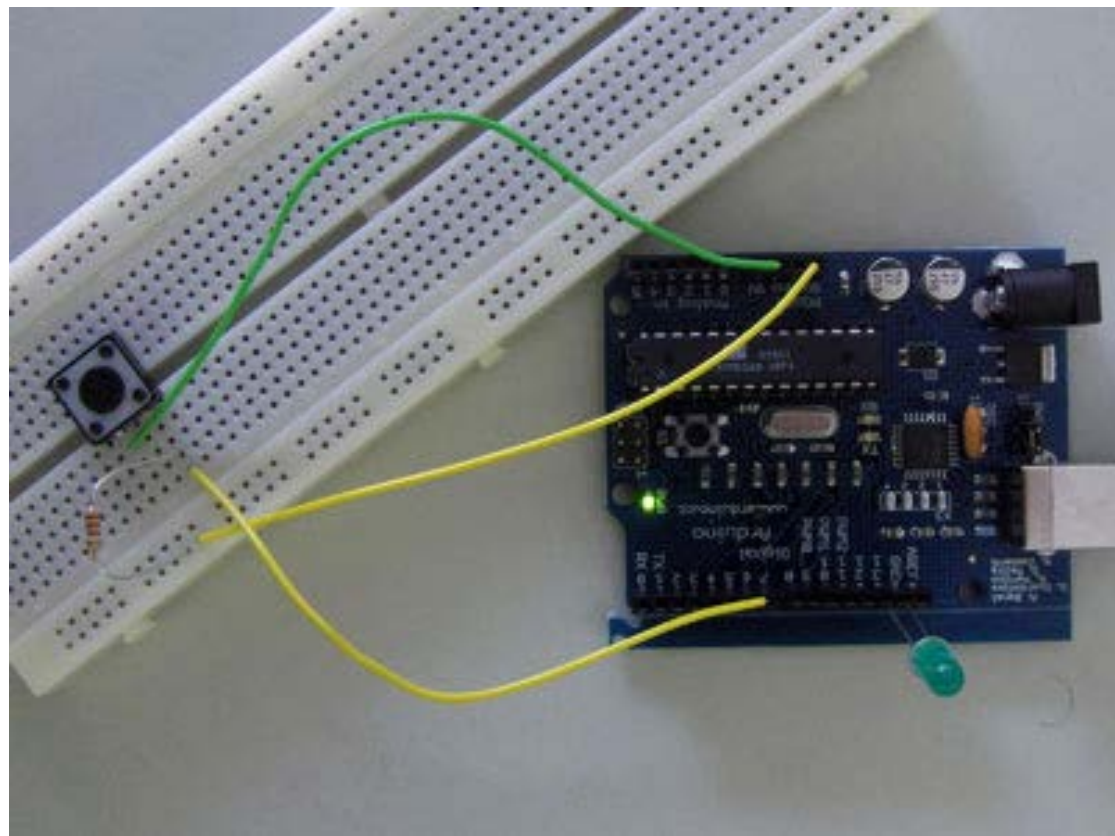
Sensors!

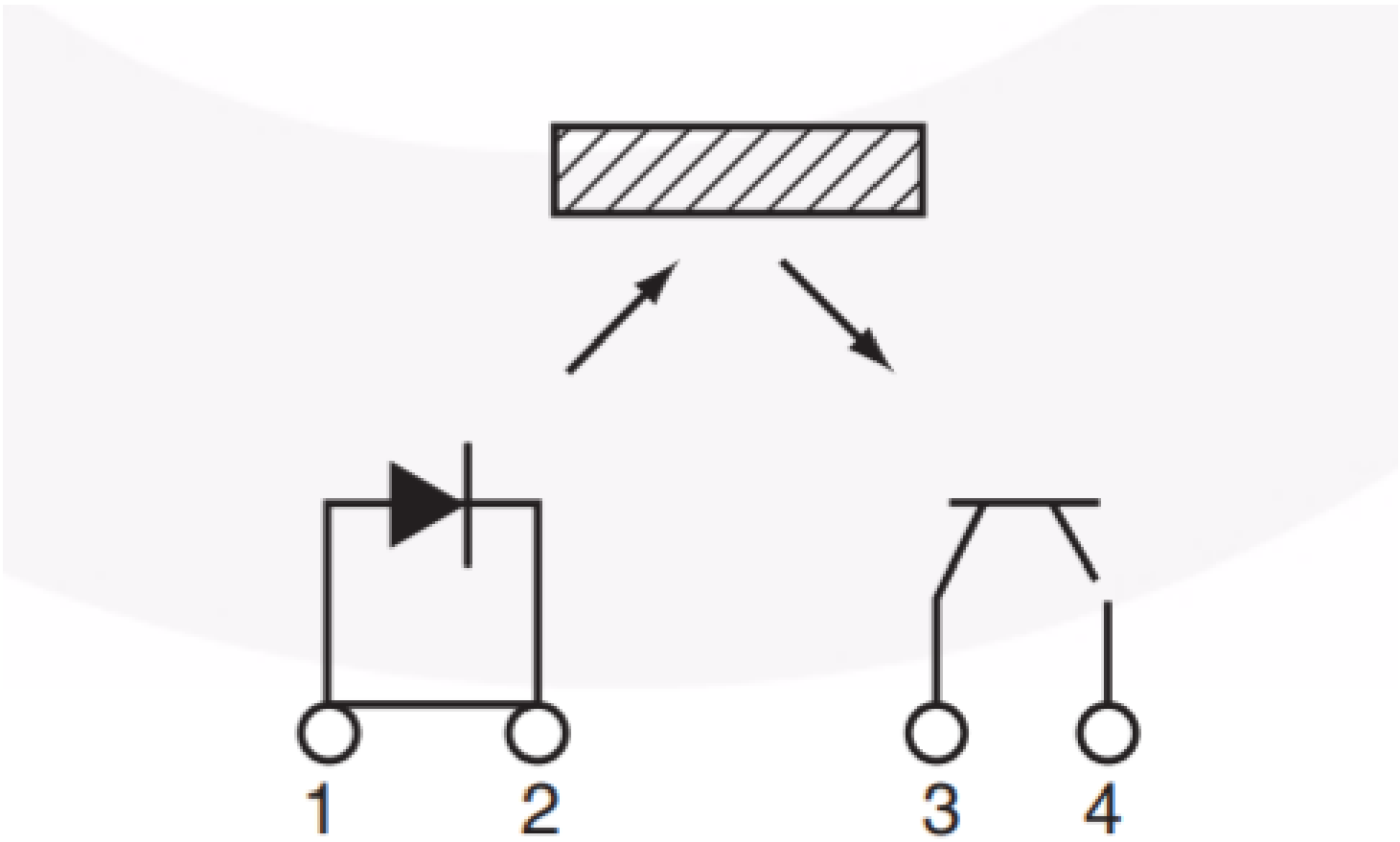
by Vidya Ramesh



Sensor = device which detects events
or changes in its environment

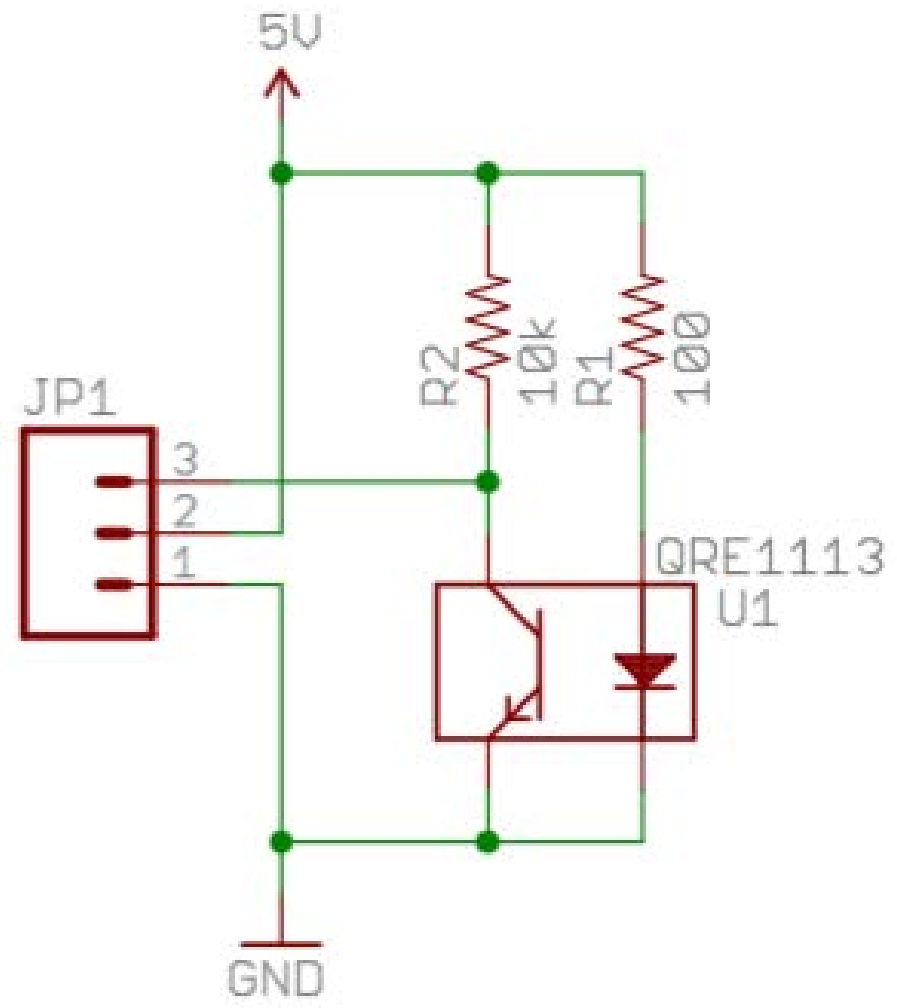


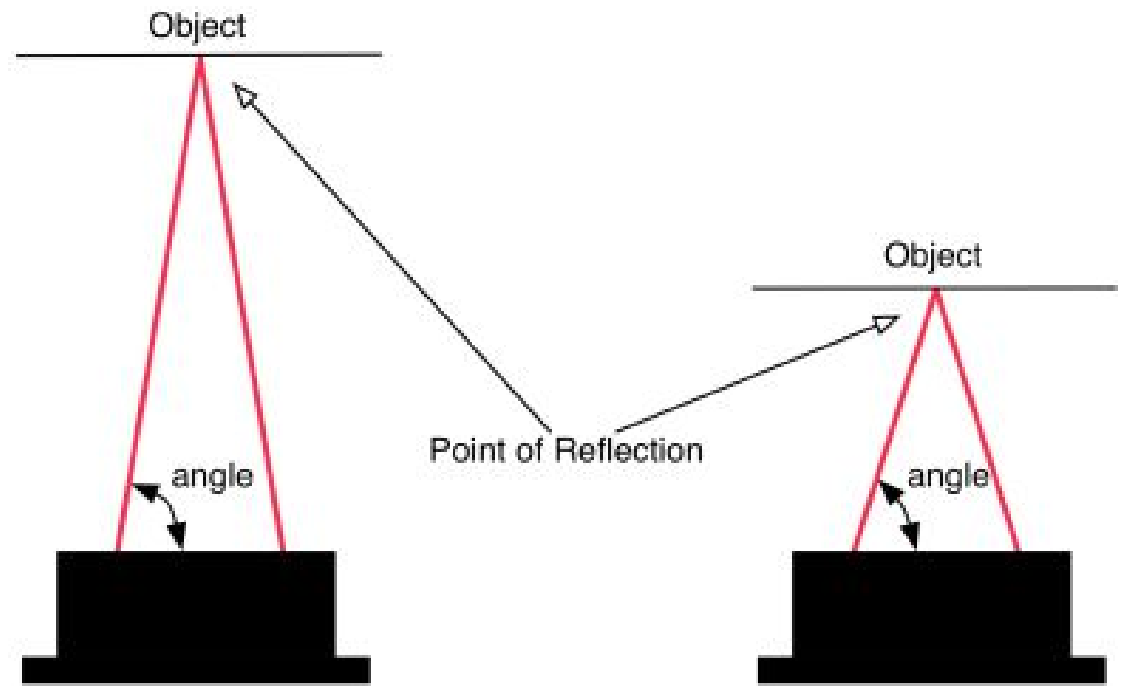
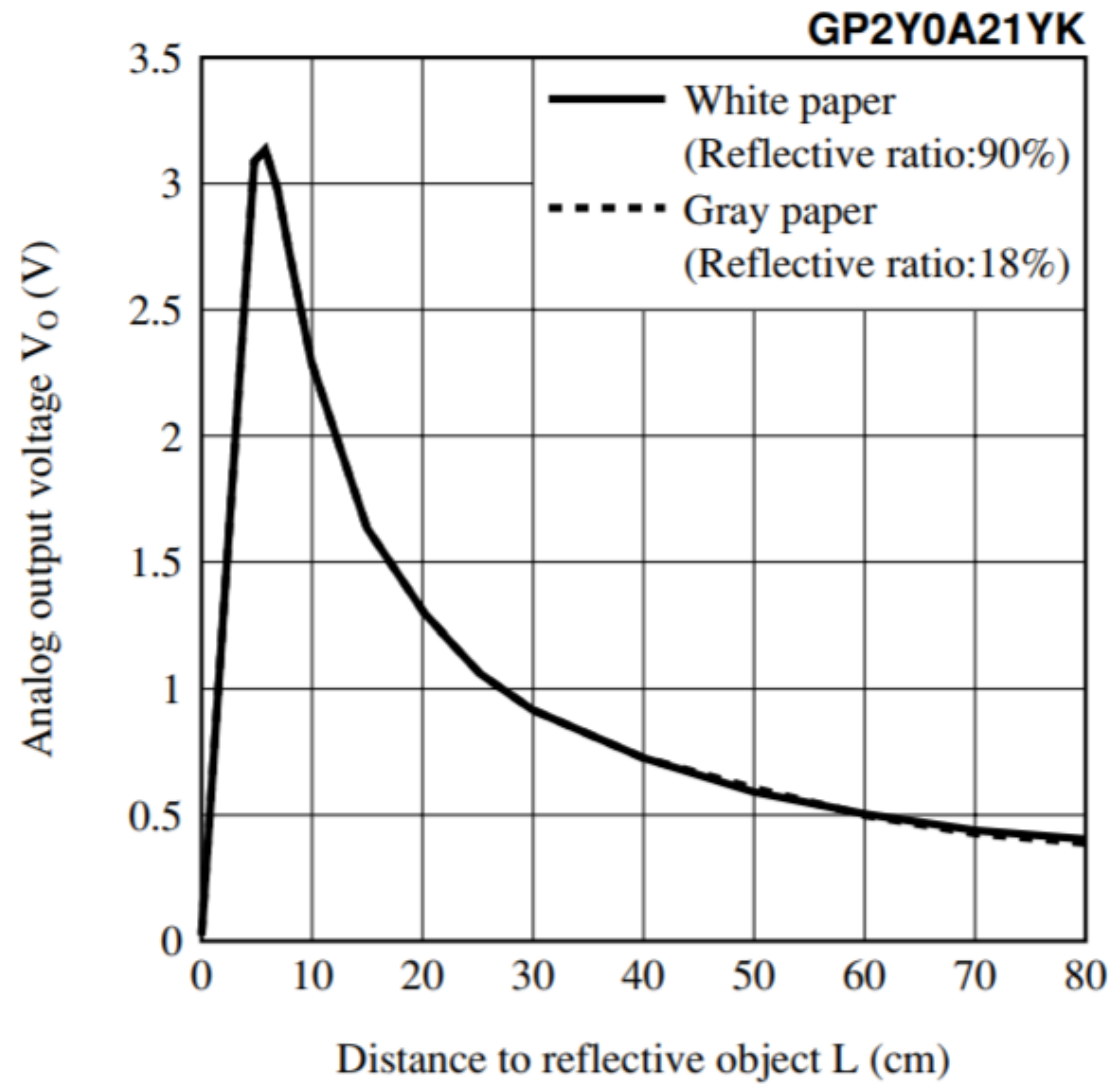


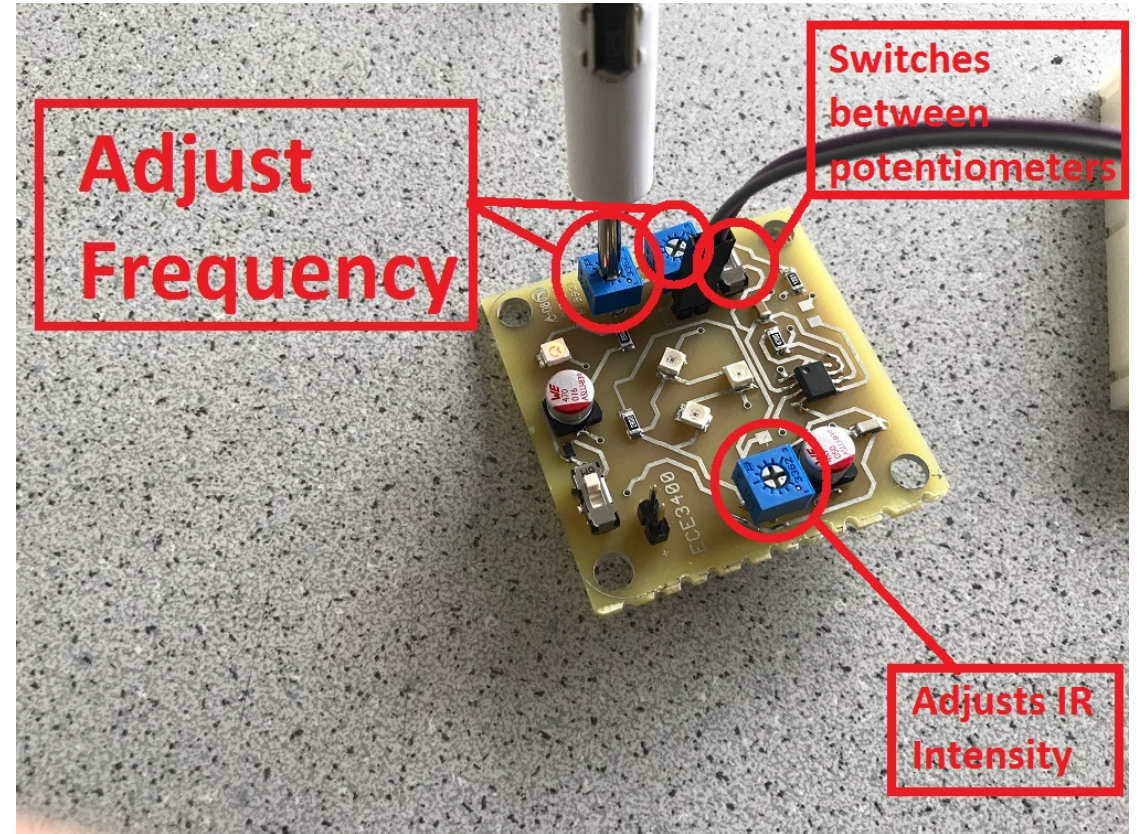
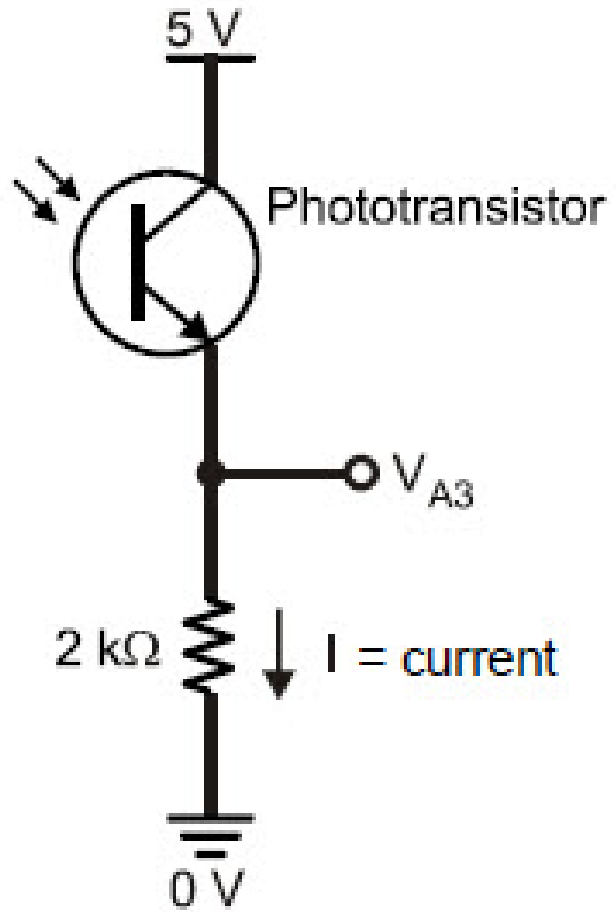


Pin 1: Anode
Pin 2: Cathode

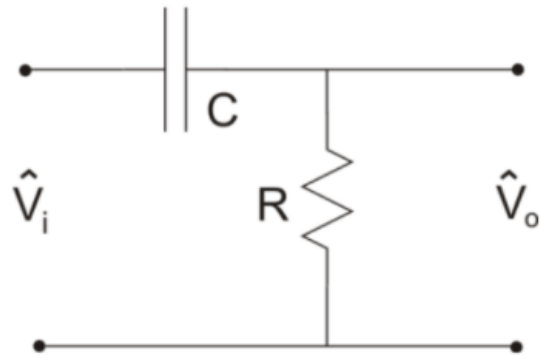
Pin 3: Collector
Pin 4: Emitter





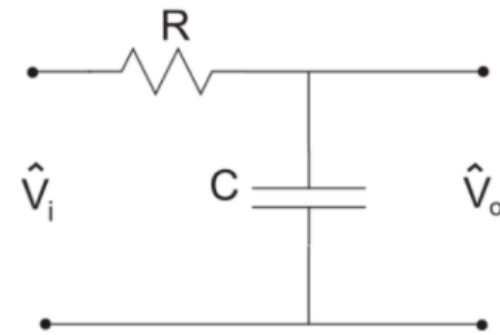


High-pass filter

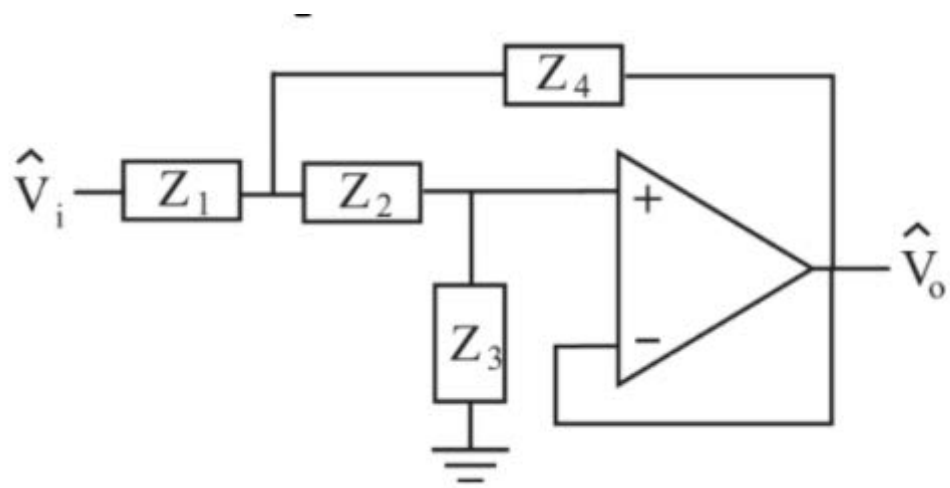


$$H(j\omega) = \frac{\hat{V}_o}{\hat{V}_i} = \frac{j\omega\tau}{1+j\omega\tau}$$

Low-pass filter



$$H(j\omega) = \frac{\hat{V}_o}{\hat{V}_i} = \frac{1}{1+j\omega\tau}$$



$$\frac{\hat{V}_o}{\hat{V}_i} = \frac{Z_3 Z_4}{Z_1 Z_2 + Z_4 (Z_1 + Z_2) + Z_3 Z_4}$$



Lt spice demo

LT Spice Demo:

High Pass Filter:

Cutoff Frequency: 7000 Hz

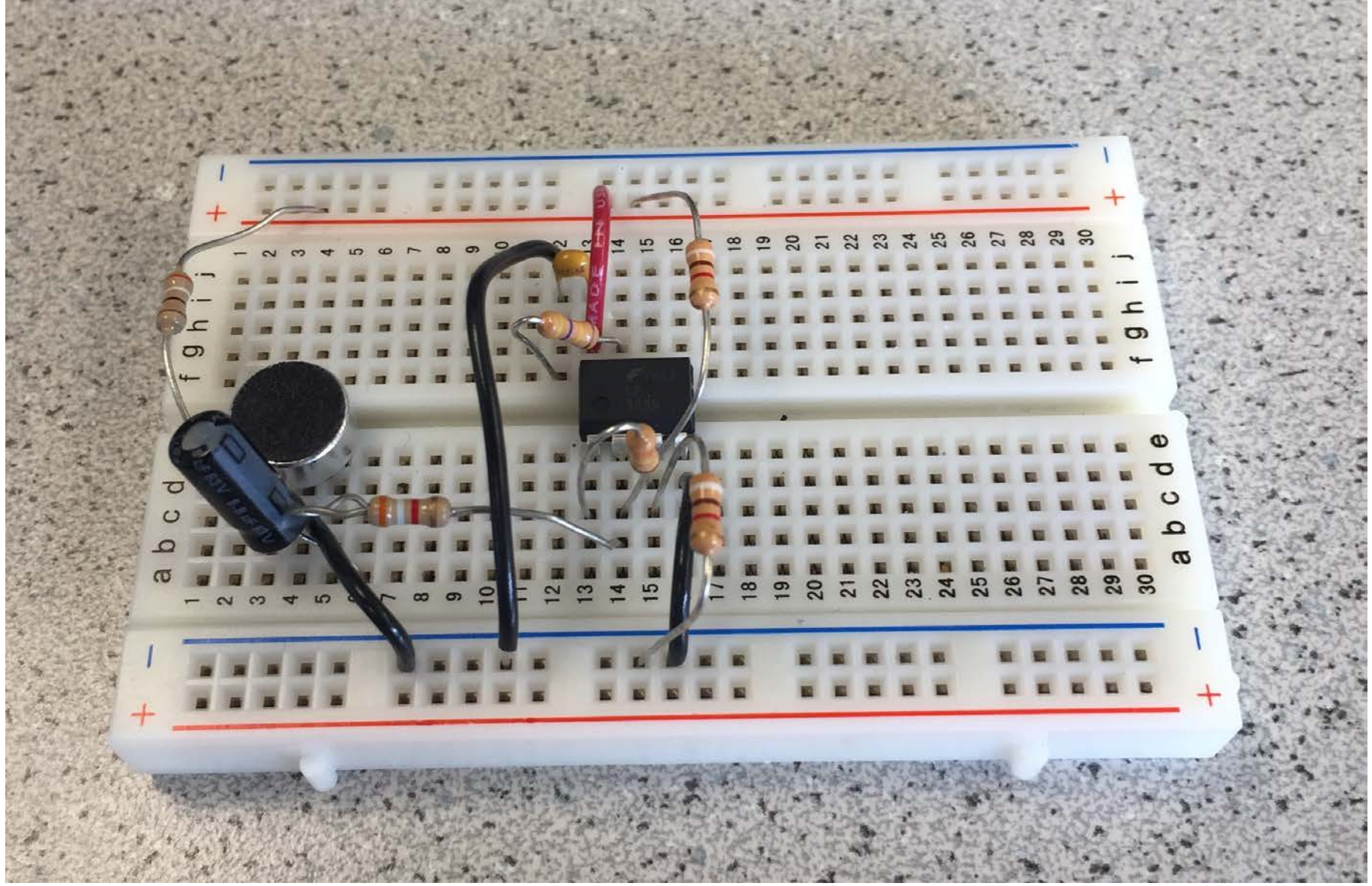
$R = 1k$

$C = 0.0002\mu$

AC amp = 1

Decade Sweep with 20 pt resolution from 1 to 2MEG

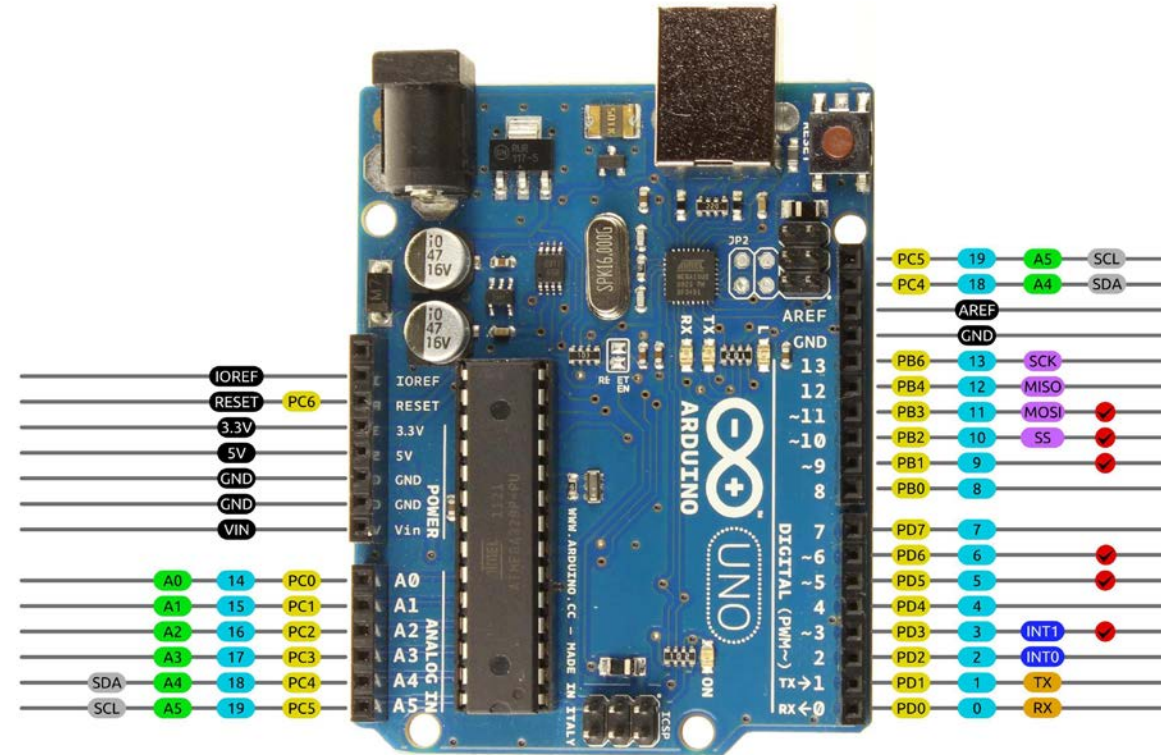
Change y axis to log scale showing voltage with max of 2



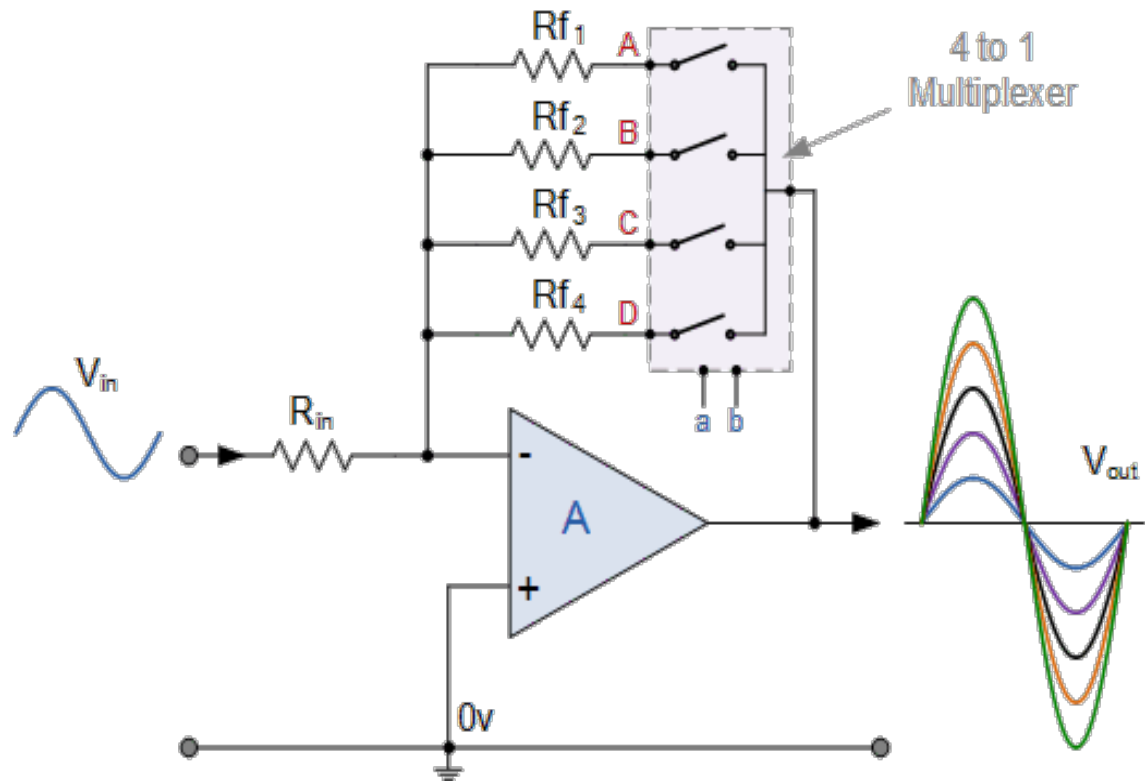


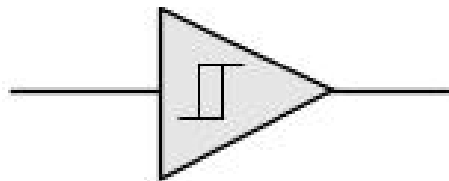
analog filter wizard

Arduino Uno R3 Pinout

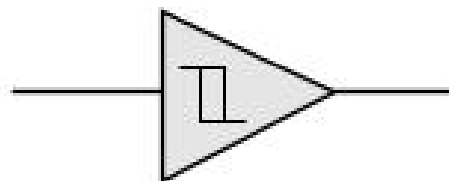


AVR DIGITAL ANALOG POWER SERIAL SPI I2C PWM INTERRUPT

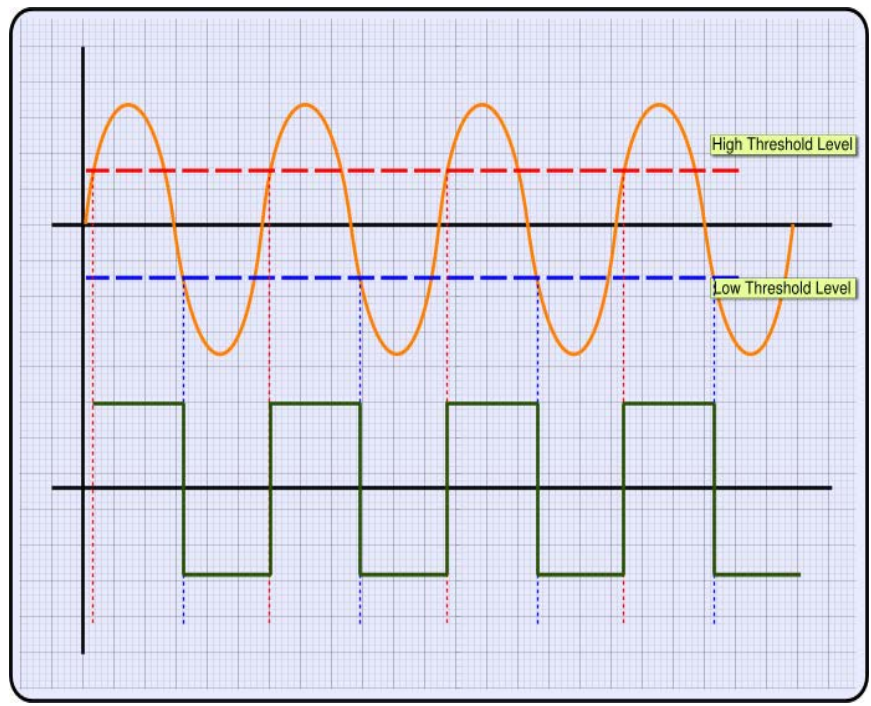


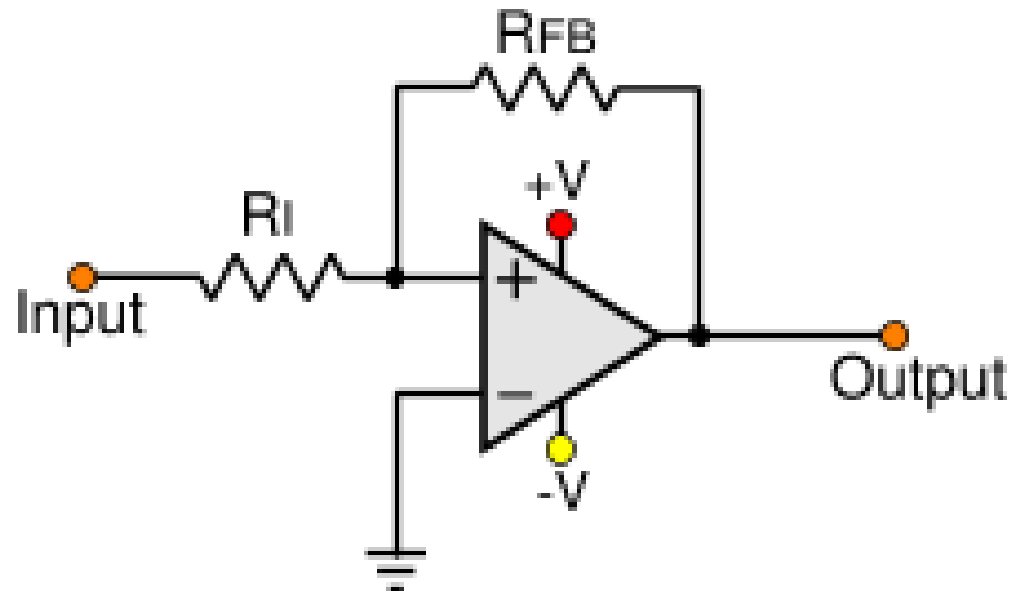


Standard (non-inverting)



Inverting





$$V_{\text{THRESHOLD}} = V_{\text{SUPPLY}} \times \frac{R_I}{R_{\text{FB}} + R_I}$$