

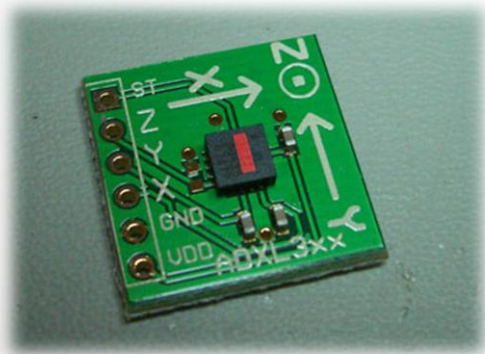
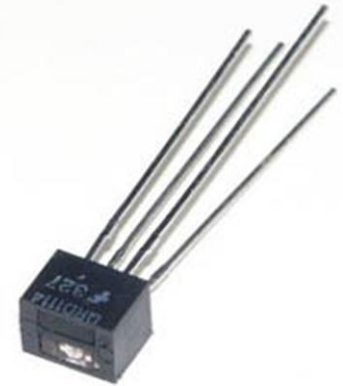
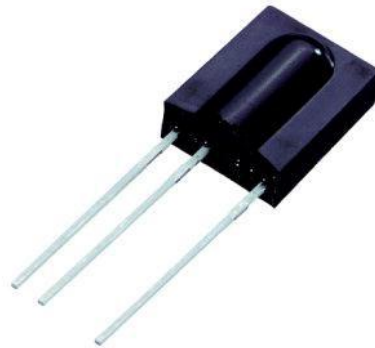
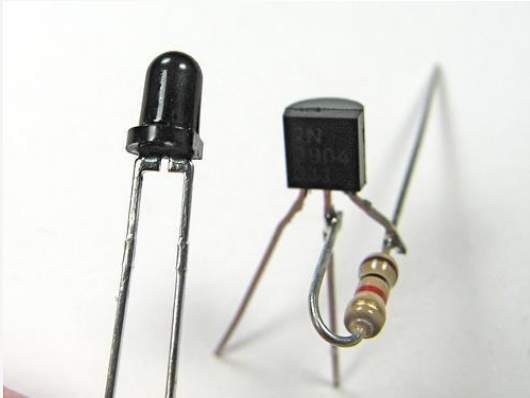
SENSORS

Robotics Club

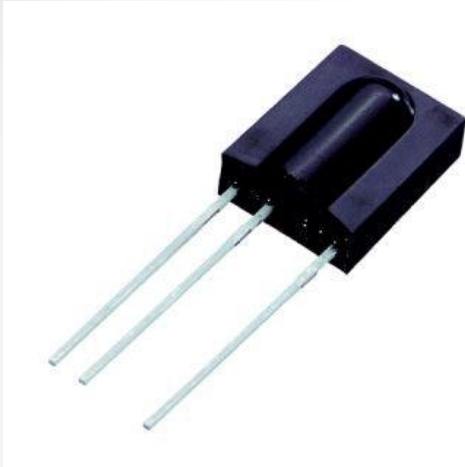
What is a sensor?

A **sensor** is a device that measures a physical quantity and converts it into a signal which can be read and later used upon for a variety of purposes.

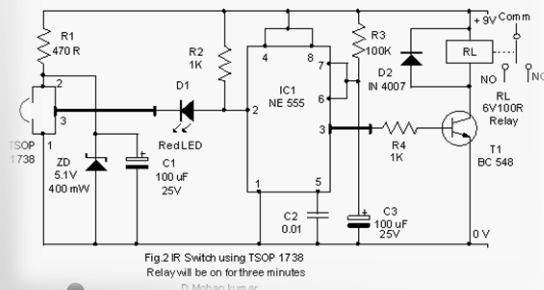
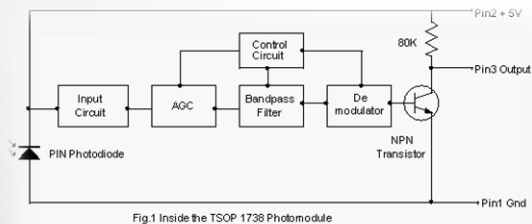
Types of Sensors:



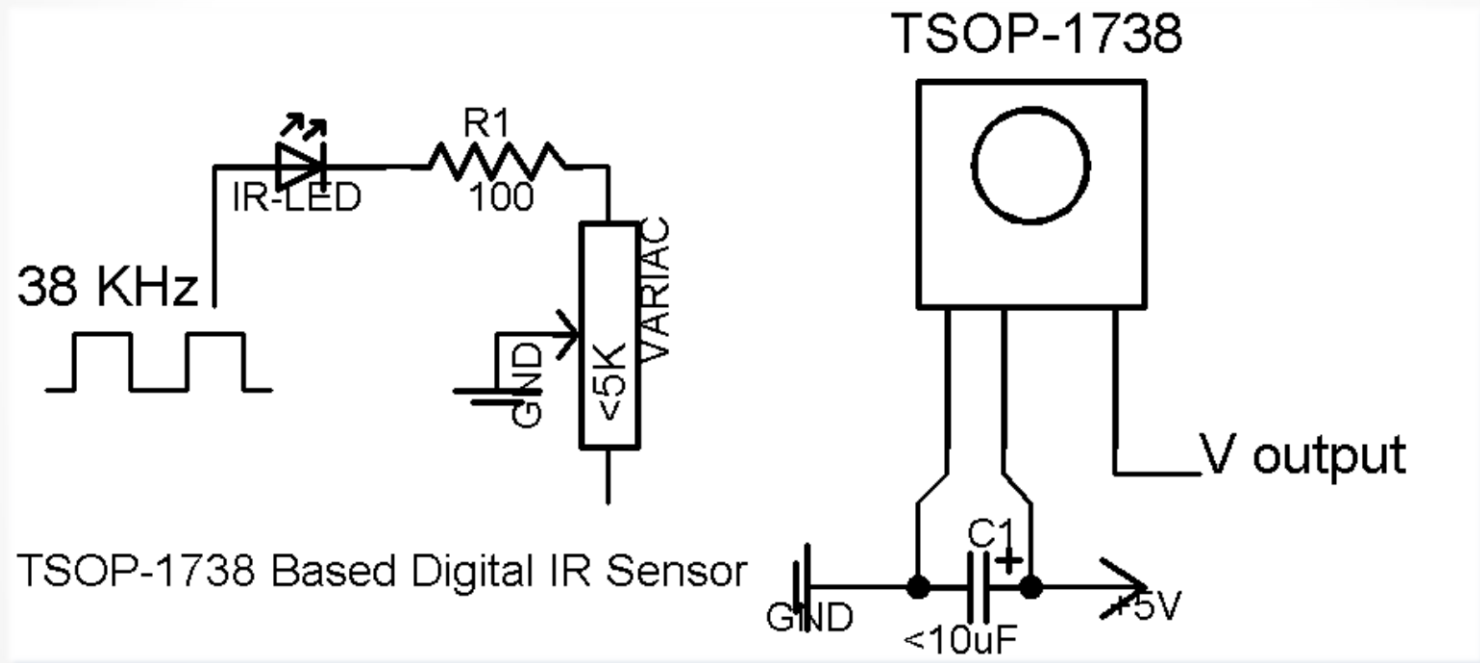
TSOP 1738:



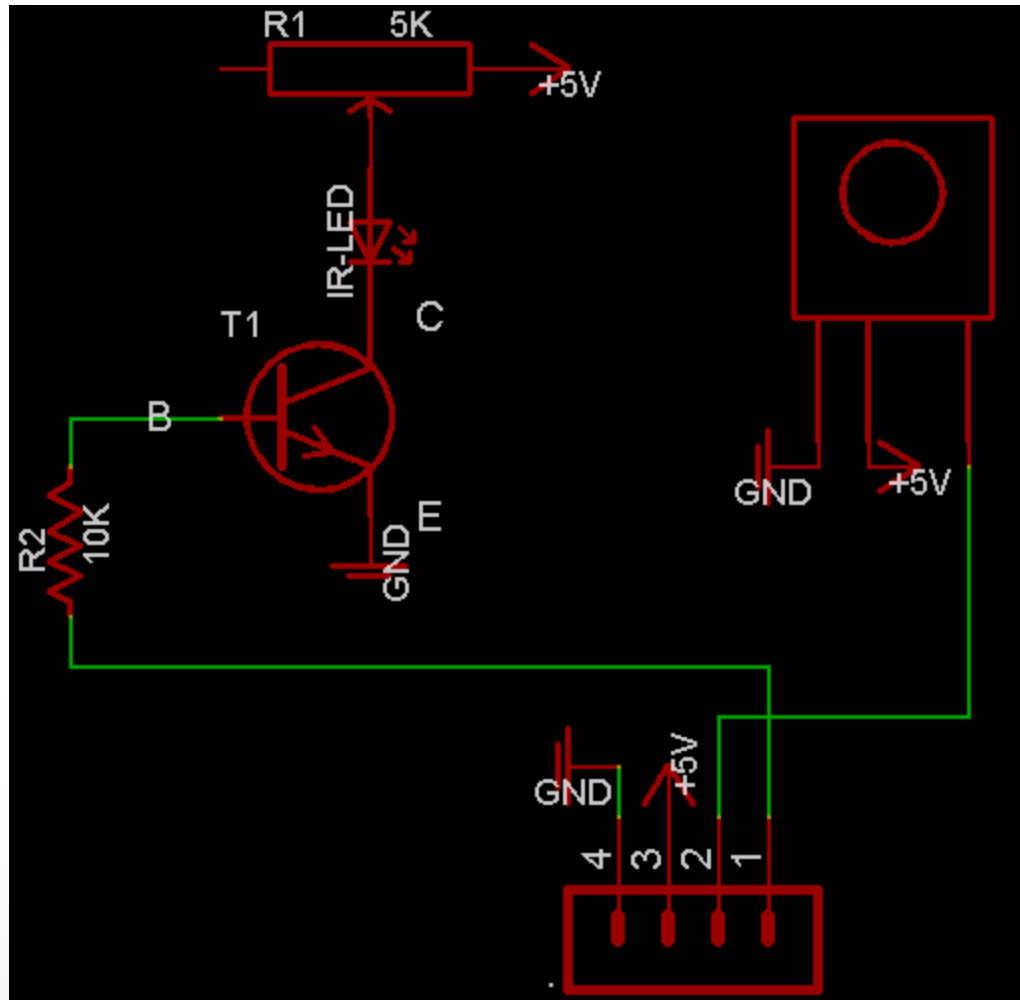
- It is a digital IR sensor, giving outputs of 0V and 5V.
- It does not respond to any stray IR, it only responds to IR falling on it at a pulse rate of 38 KHz.
- Can accurately distinguish between 2 colors.



Circuit Diagram:



How to increase its range?



IR Analog Sensor:

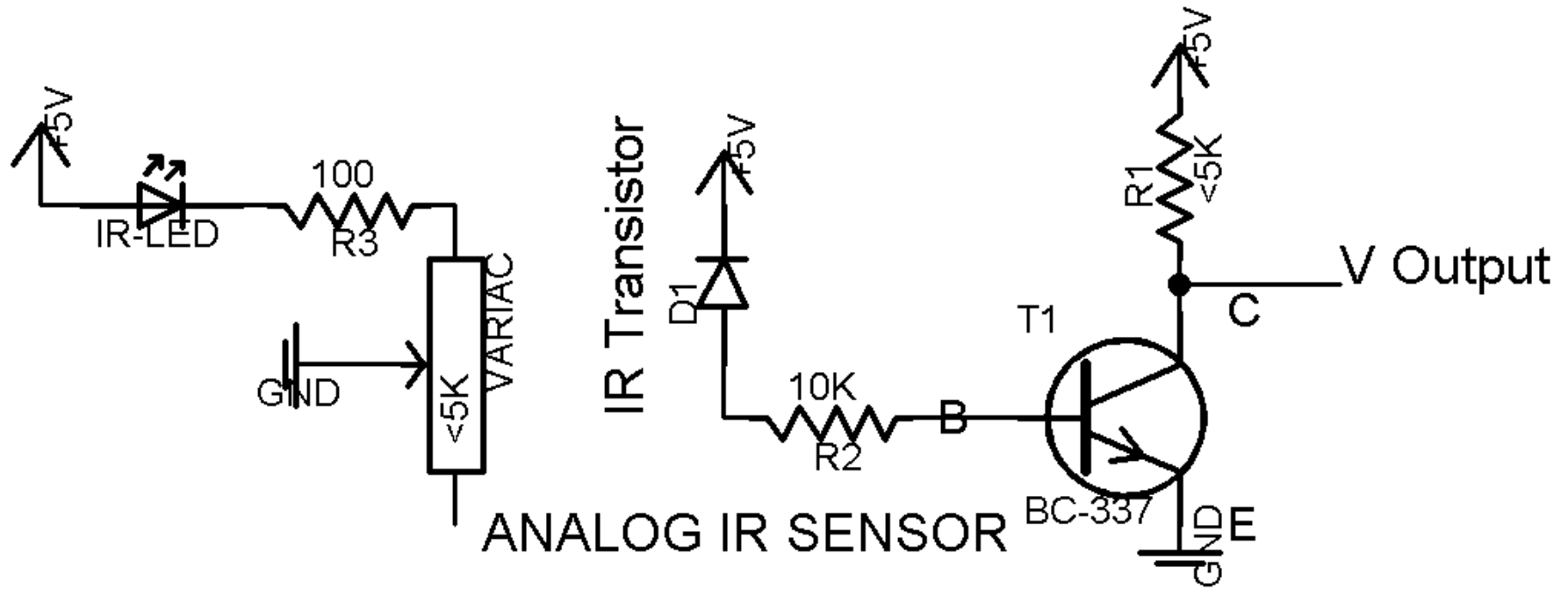


- It gives output in the range of 0V to 5V, depending on the amount of IR light falling on the photodiode.
- Hence the name analog...

...Analog Sensors:

- The output voltage corresponds to a 0 to 255 or 0 to 1024 scale in the Digital Scale (Needs to be converted using ADC Pins of a Microcontroller)
- Analog sensors are used as proximity sensors, and also for telling apart different shades of varying brightness.

Circuit Diagram:

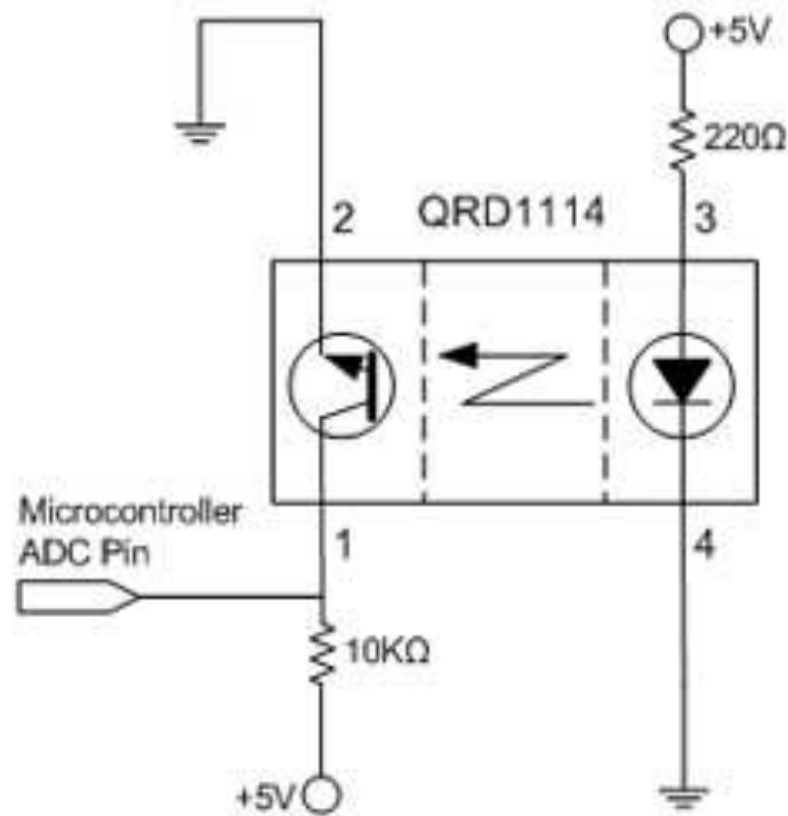


QRD1114:

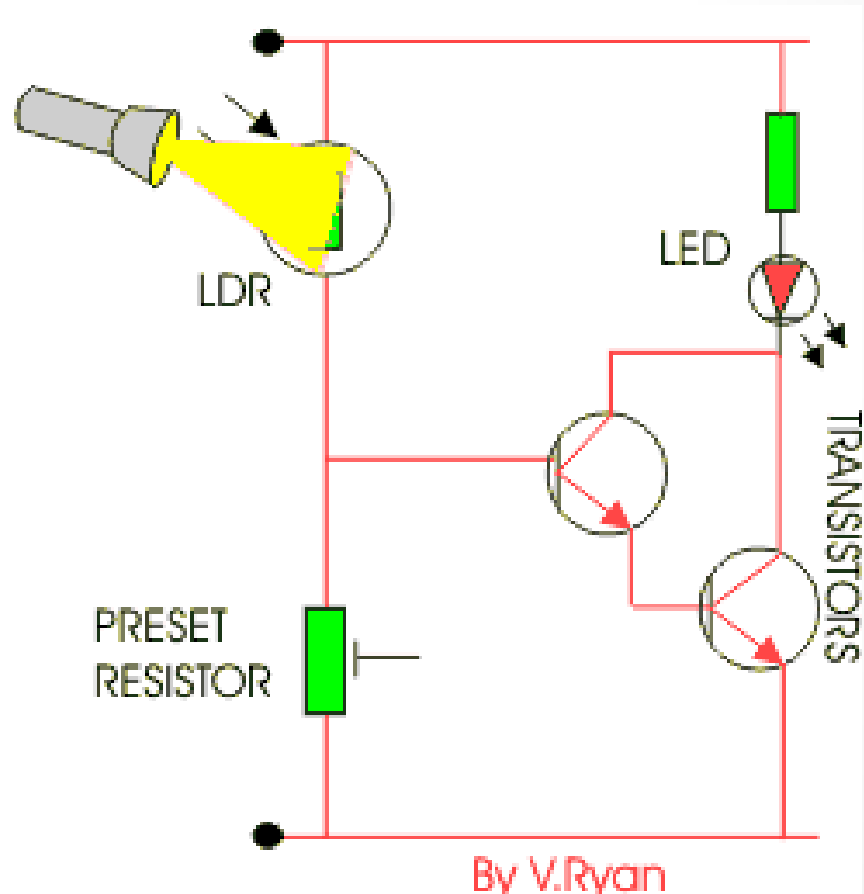


- It is an easy-to-use, simple analog sensor (Output range: 0V to 5V)
- Has a very small range: 0.5mm to 1cm
- Used to distinguish between bright and dark colours

Circuit Diagram:



LDR (Light Dependent Resistor)



ULTRASONIC PROXIMITY SENSOR:

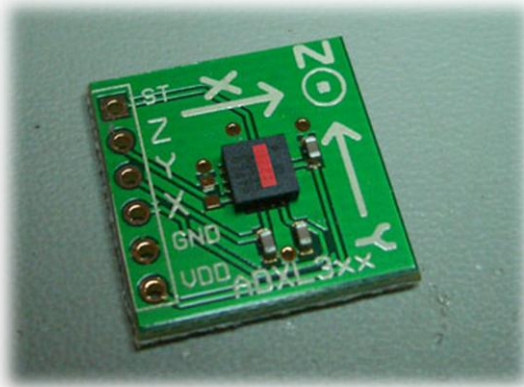


- Proximity or Sharp sensors are used to estimate the distance of the sensors from obstacles.
- These are very accurate, and have range up to 4 meters.

...Ultrasonic Sensors:

- The analog output ranges from 0V to 5V, and is high when obstacle is detected... fed to ADC of Atmega.
- Distance = (Echo pulse high time) x
(Speed of Sound)/2

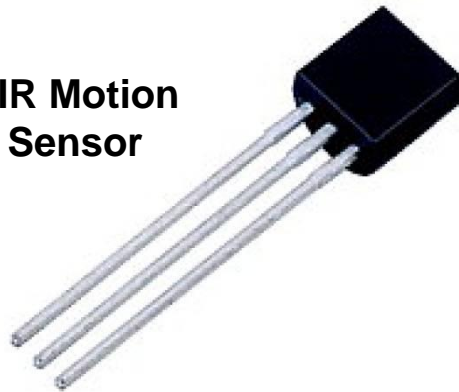
Accelerometer and Gyro Sensors:



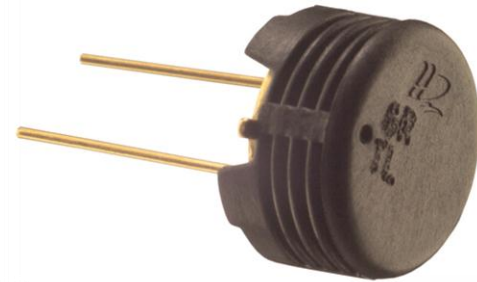
- Accelerometer measures the acceleration in its own axes in terms of 'g'
- Gyroscope measures the rate of rotation about these axes
- We convert the ADC values of these sensors to physical units (g for accelerometer, deg/sec for gyro)

Other Sensors:

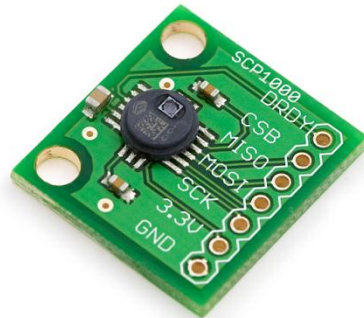
**PIR Motion
Sensor**



**Humidity
Sensor**



**PIR Motion
Sensor**



**Pressure
Sensor**



**Gas (CO₂)
Sensor**

THANK YOU