Object Detector using IR Sensor

Reflective Surface

Photodiode — IR Receiver
IR LED — IR Transmitter
Circuit Boards
Photodiode — IR Receiver
IR LED — IR Transmitter
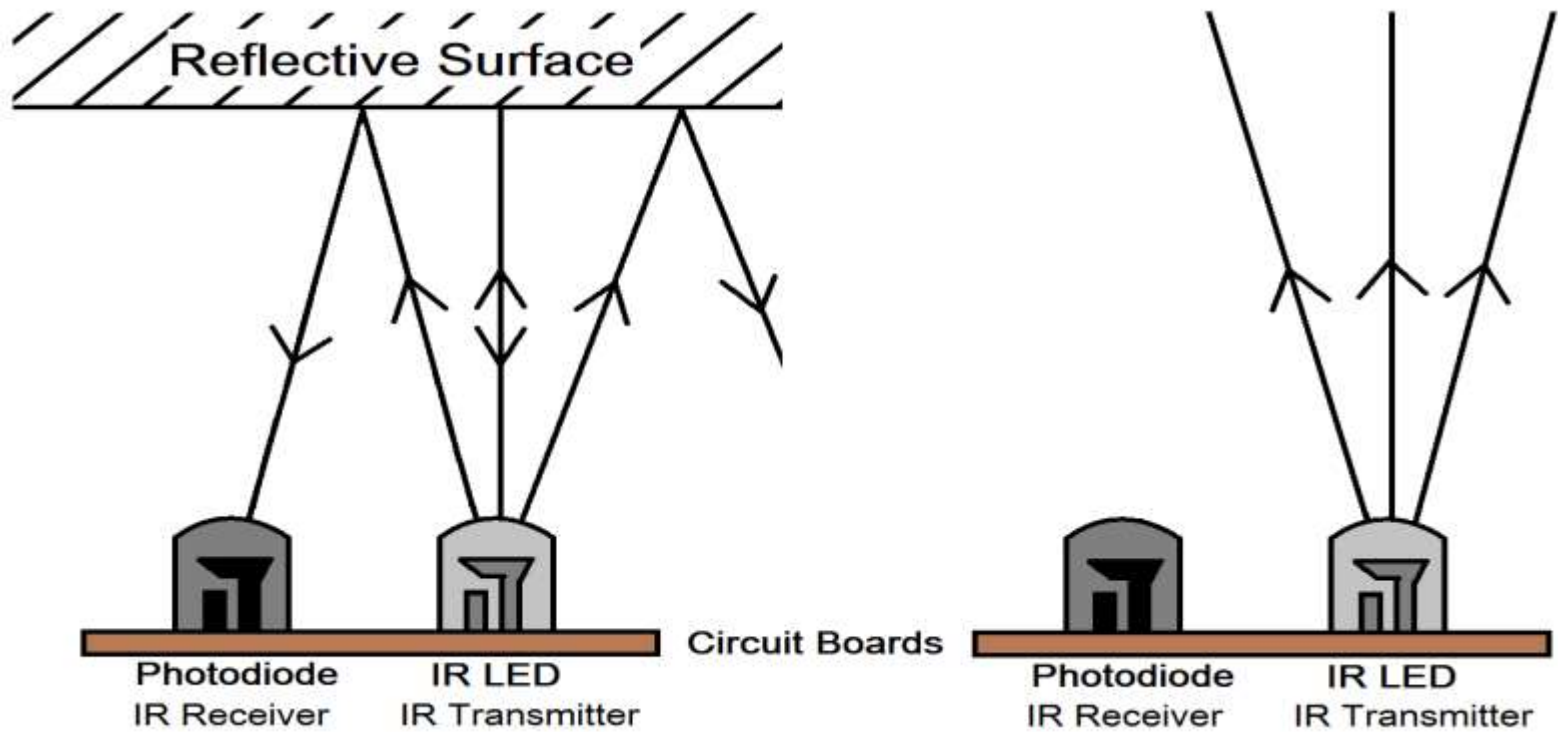
About project

- An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

- These types of sensors measures only infrared radiation. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations.

- These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED.

- The basic concept of an Infrared Sensor which is used as Object detector, is to transmit an infrared signal, this infrared signal bounces from the surface of an object and the signal is received at the infrared receiver.

IR Transmitter

Infrared Transmitter is a light emitting diode (LED) which emits infrared radiations. Hence, they are called IR LED's. Even though an IR LED looks like a normal LED, the radiation emitted by it is invisible to the human eye.
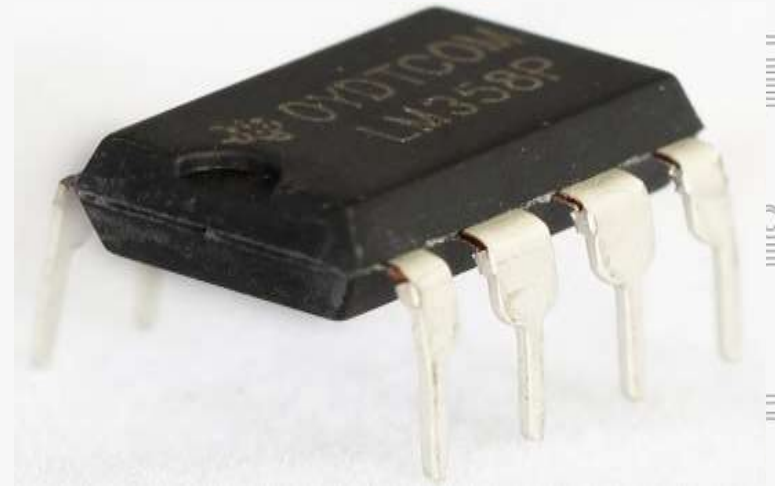
IR Receiver

Infrared receivers are also called as infrared sensors as they detect the radiation from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation.
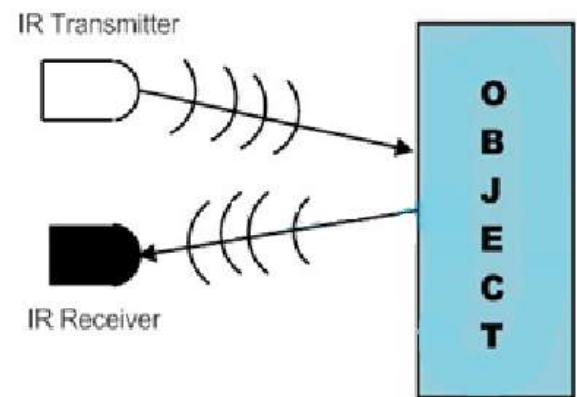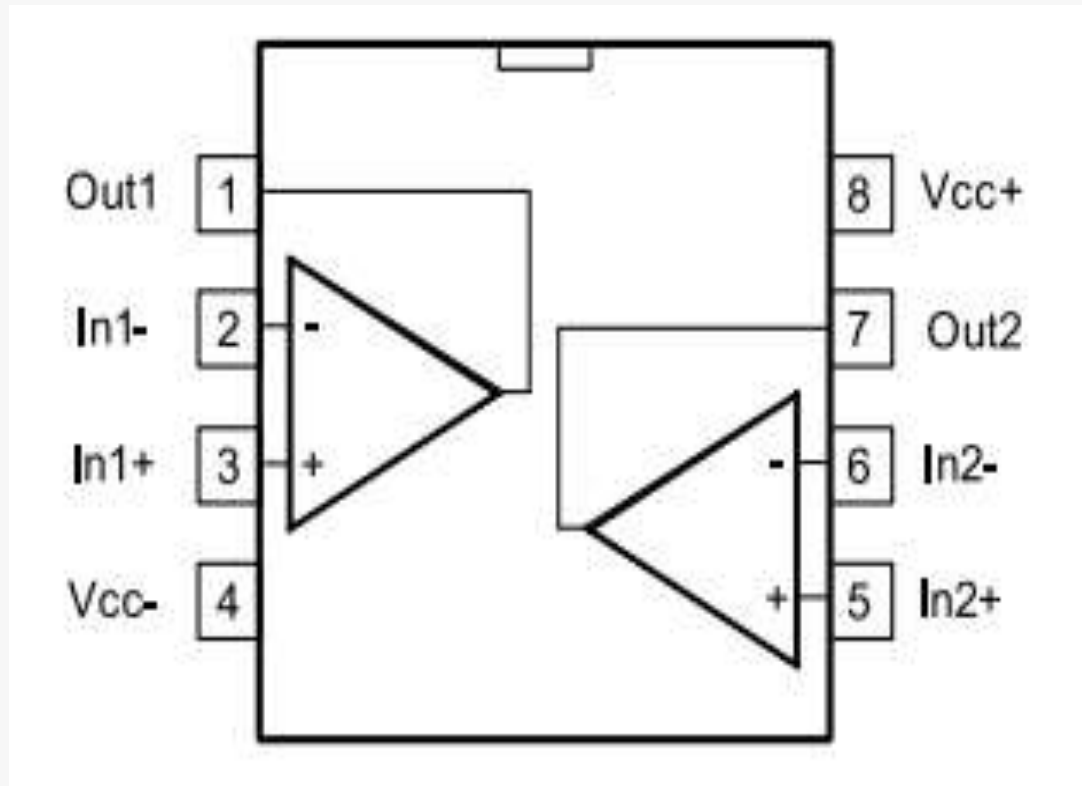
LM358 IC

The LM358 IC is a great, low power and easy to use dual channel op-amp IC. It is designed and introduced by national semiconductor. It consists of two internally frequency compensated, high gain, independent op-amps. This IC is designed for specially to operate from a single power supply over a wide range of voltages.

Pin configuration of LM358 IC

Working of project

- In this project, the transmitter section includes an IR sensor, which transmits continuous IR rays to be received by an IR receiver module.

- An IR output terminal of the receiver varies depending upon its receiving of IR rays. Since this variation cannot be analyzed as such, therefore this output can be fed to a comparator circuit.

- Here an operational amplifier of LM358 is used as comparator circuit. When the IR receiver does not receive a signal, the potential at the inverting input goes higher than that non-inverting input of the comparator IC (LM358).

- Thus the output of the comparator goes low, but the LED does not glow. When the IR receiver module receives signal to the potential at the inverting input goes low. Thus the output of the comparator goes high and the LED starts glowing.
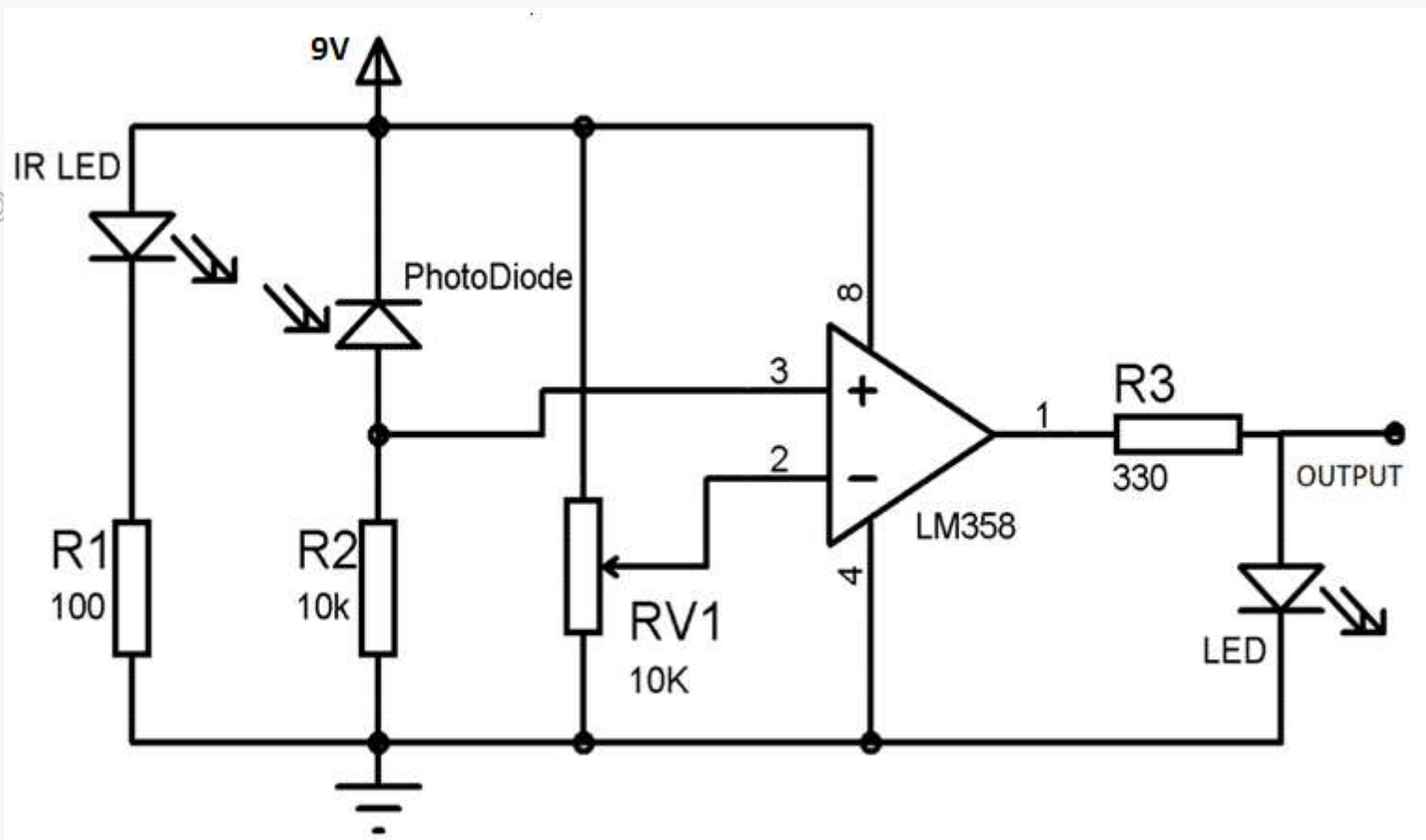
- Resistor R1 (220ohms), R2 (10k) and R3 (330ohms) are used to ensure that minimum 10 mA current passes through the **IR LED** devices like **Photodiode** and normal LEDs respectively.

- Resistor VR1 (preset=10k) is used to set the sensitivity of the circuit diagram. The principle of an IR sensor working as an Object Detection Sensor.
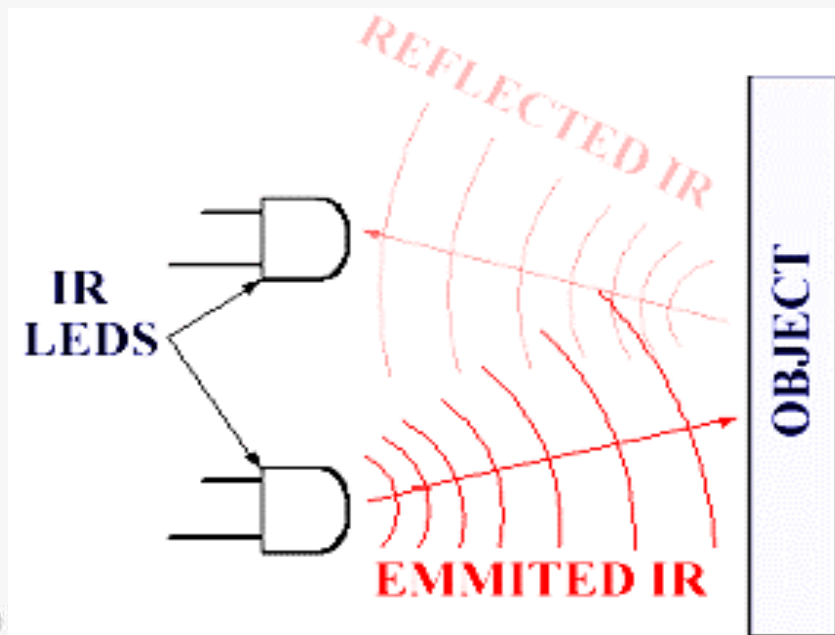
Components Required

- One LM358 IC
- One IR Sensor Both Transmitter and Receiver
- One 10k Variable Resistor
- One 10k ,One 220 Ohm and One 330 Ohm Resistors
- One Led
- One Breadboard
- One 9 Volt Battery
- One Battery Cap
- Connecting Wires

Connection Diagram

Project Link : https://youtu.be/6jsJPRb8Ug8