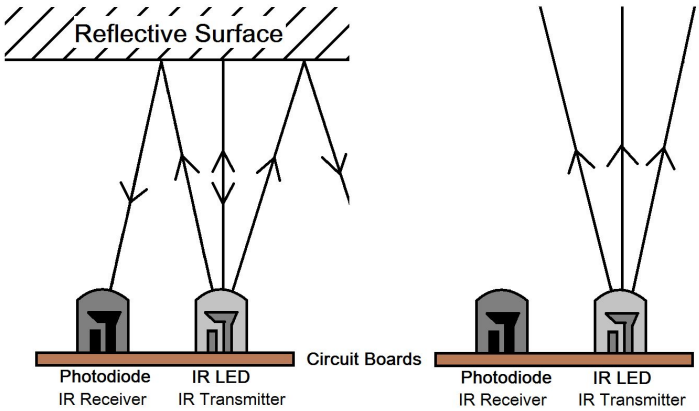
# Infrared Detector
## (Technical Note)

## What is an IR Detector?

IR(Infrared Detector) is used to detect the object in its proximity. Along with this, it can also be used to detect the shade (Dark-Blackish or Light-Whitish) of an object under certain condition. They are inspired by pyrophilous (fire loving) insects. Being highly sensitive to infrared (IR) reception, they are able to detect forest fires at considerable distances. SImilarly, IR sensors work on the principle of reflection of light.

There are 2 crucial components in the IR module; the IR Transmitter (IR Tx-LED) and IR Receiver (IR Rx-Photodiode or Phototransistor). Even though an IR Tx LED looks like a normal LED, the radiation emitted by it is invisible to the human eye.

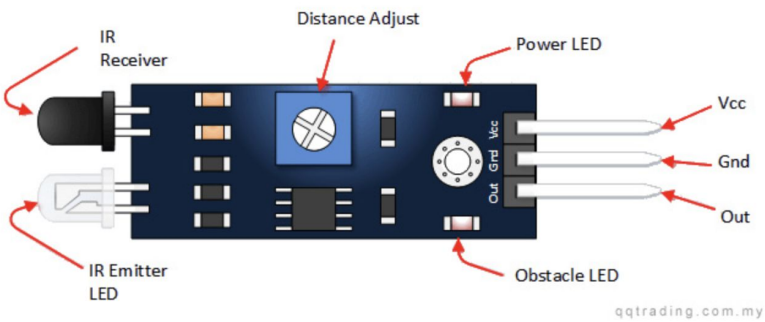

**Also called: Tracking Sensor, Proximity detector, IR Sensor, IR Obstacle Avoidance Sensor**




## Applications

**Thermal Imaging:** Modern day IR sensing technology is used to measure temperature at spots or in a whole image with medical, military, and industry applications.

**Infrared Remotes:** Digital communication using IR is a common application used ir devices such as remote controller for TVs anc air conditioners.




**Pin, Control Indicator Description**

| | |
|---|---|
| Vcc | 3.3 to 5 Vdc Supply Input |
| Gnd | Ground Input |
| Out | Output that goes low when obstacle is in range |
| Power LED | Illuminates when power is applied |
| Obstacle LED | Illuminates when obstacle is detected |
| Distance Adjust | Adjust detection distance. CCW decreases distance. CW increases distance. |
| IR Emitter | Infrared emitter LED |
| IR Receiver | Infrared receiver that receives signal transmitted by Infrared emitter. |

## References

1. https://components101.com/sensors/ir-sensor-module
2. https://www.azosensors.com/article.aspx?ArticleID=339
3. https://www.playembedded.org/blog/detecting-obstacle-with-ir-sensor-and-arduino/
4. https://economictimes.indiatimes.com/topic/Varzesh-TV-channel/news/4/4?from=mdr

Z2M Part Number:
**EMS-00013-A**

# Infra Red Detector
## (Application Note)

## Project

To detect an object closer than a set distance and turn on an LED. Use IR sensor and an LED with Arduino.

## Procedure

**IR Sensor Module:**

- Connect **Vcc** pin of sensor to **5V** of Arduino
- Wire **GND** pin of the sensor to **GND** of the Arduino
- Connect **OUT** pin to **pin 4** of Arduino

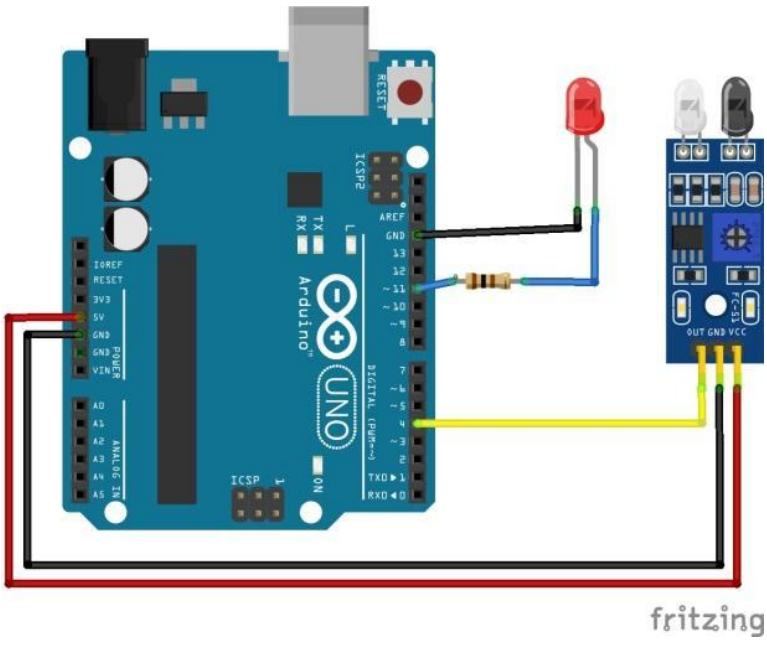
**LED:**

- Connect **shorter leg(cathode)** to **GND** of Arduino
- Connect **longer leg(anode)** to one end of **100 Ω** resistor
- Connect another end of 100 Ω resistor to **pin 11** of Arduino

**Arduino**

- Upload this code and run
- Adjust potentiometer onboard to set the trigger distance

## Schematic




## Components Required

| Component | Part No. | Qty |
|---|---|---|
| Arduino UNO | EMX-00001-A | 1 |
| IR Sensor | EMS-00013-A | 1 |
| LED - Red | EDD-00002-A | 1 |
| Jumper Wires - M-F | EDA-00001-A | 3 |
| Resistor - 100Ω | EDR-00001-100Z | 1 |

## Code

```
int sensorinput = 4; /*the digital pin
connected to the sensor*/
int ledoutput = 11;
/*pin connected to LED*/
void setup()
{
  pinMode(ledoutput, OUTPUT);
/* this function is used to declare led
connected pin as output*/
  pinMode(sensorinput, INPUT);
/* this function is used to declare sensor
connected pin as input*/
}
void loop()
{
  int value = digitalRead(sensorinput); /*
function to read analog voltage from
sensor*/
  Serial.println(value);
  if (value == LOW) /* function to check
voltage level from sensor*/
  {
    digitalWrite(ledoutput, HIGH);
/* make LED - ON*/
    delay(100); /*to make the LED visible*/
  }
  else
    digitalWrite(ledoutput, LOW);
/* make LED - OFF*/
}
```

## Challenge

1. **Car Backup Alarm** that beeps every half second when object is between 0.5-1.0 m and continuously when closer than 0.5m
2. **Proximity piano,** using multiple IR sensors, that plays different notes for each sensor