

## MODULE 8: IR SENSOR

# What is a Sensor?

A sensor is a device that detects and responds to some type of input from the physical environment. The specific input could be light, heat, motion, moisture, pressure, or any one of a great number of other environmental phenomena.



## WHAT IS AN IR?

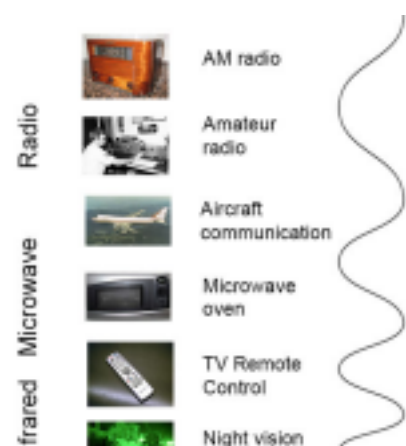
Infrared(IR) radiation, that portion of the electromagnetic spectrum that extends from the long wavelength, or red, end of the visible-light range to the microwave range. Invisible to the eye, it can be detected as a sensation of warmth on the skin.

IR technology is used in daily life and also in industries for different purposes. For example, TVs use an IR sensor to understand the signals which are transmitted from a remote control.

The main benefits of IR sensors are low power usage, their simple design & their convenient features. IR signals are not noticeable by the human eye.

## What is Electromagnetic Spectrum?

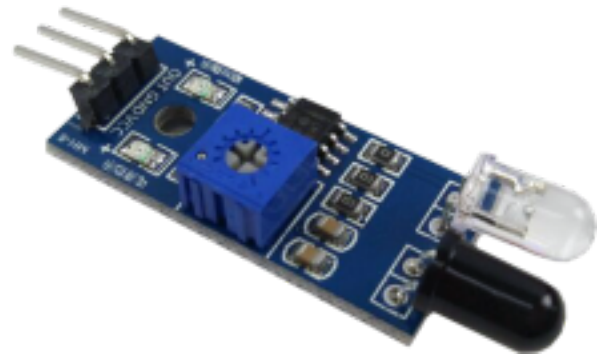
The electromagnetic (EM) spectrum is the range of all types of electromagnetic radiation. Radiation is energy that travels and spreads out as it goes – the visible light that comes from a lamp in your house



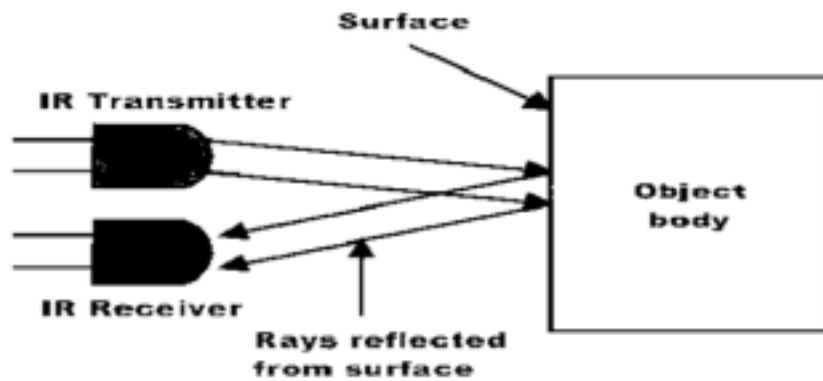
and the radio waves that come from a radio station are two types of electromagnetic radiation. The other types of electromagnetic radiation that make up the electromagnetic spectrum are microwaves, infrared light, ultraviolet light, X-rays and gamma rays.

## What is an IR (Infrared) Sensor?

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 measure only infrared radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation.



These types of radiations are invisible to our eyes, which 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 that is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.



## PIN DESCRIPTION:

The IR sensor module includes five essential parts like IR Tx, Rx, Operational amplifier, trimmer pot (variable resistor) & output LED.

The pin configuration of the IR sensor module is discussed below.

- VCC Pin is power supply input
- GND Pin is power supply ground
- OUT is an active-high o/p

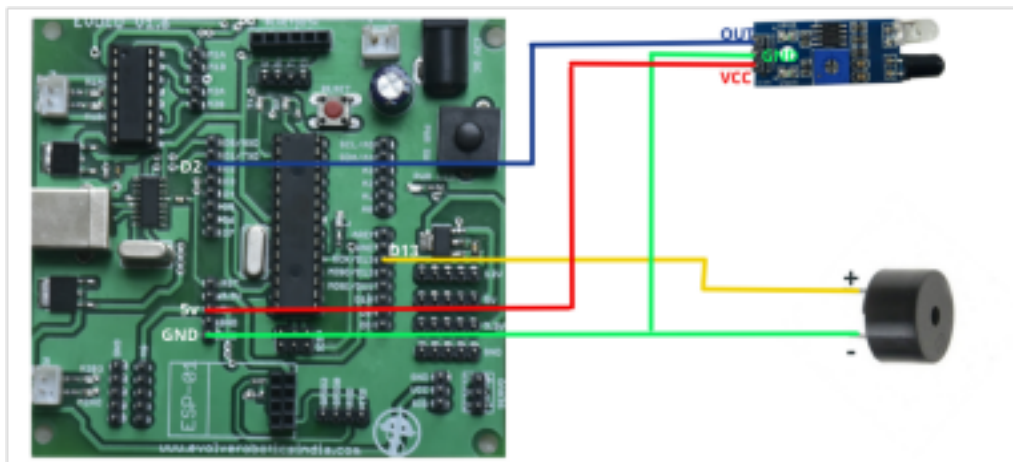
## MINI PROJECT 3 AIM:

Construct an Automatic Door Bell circuit.

## COMPONENTS REQUIRED:

EVOED BOARD, IR SENSOR MODULE, BUZZER, WIRES

## CIRCUIT DIAGRAM :



## WORKING PRINCIPLE:

1. The IR LED transmitter transmit the light in the range of Infrared frequency. The wave length of IR wave is greater than the wave length of visible length. The photodiode receiver will receive this transmitted IR light.
2. The receiver receives the transmitted signals, it compares the output of IR with the threshold we set through the potentiometer.
3. If the value exceeds the threshold limit the IR module produces an output.
4. This output detected by the EVOED board and produces a High pulse to the Buzzer and the buzzer gets activated.

PSR Voltage drop > Threshold Voltage - Output is HIGH

PSR Voltage drop < Threshold Voltage - Output is LOW

## PROGRAM:

```
void setup()
{
    pinMode(2,INPUT); // Set digital pin 2 as input from IR Sensor.
    pinMode(13,OUTPUT);
}
void loop()
{
    if(digitalRead(2)==HIGH) //When Sensor reads HIGH
    {
        digitalWrite(13,HIGH); //The Buzzer produces a sound signal }
    else //When the sensor reads LOW
```

```
{  
    digitalWrite(13,LOW); //The Buzzer will not produce any sound signal  
}
```