

# A Review Paper on Infrared sensor

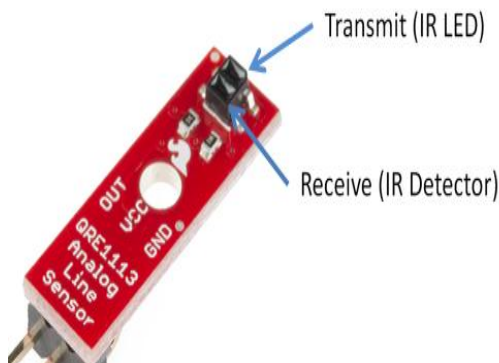
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**Abstract:** IR sensor works on by using a select- light sensors to detect a selected light wavelength in the infra-red (IR) spectrum. At present we are surrounding by electronics and communication devices such as infrared sensor use in many applications. Infra-red sensor just get any of the mobile with infrared sensor blaster feature use in all electronics devices and these device connected with just one device i.e. your phone. In this paper an infrared radiation from a simple paper made device which increase it's conductivity when exposed to hot object.

## INTRODUCTION

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and or the detecting infrared radiation. Infrared sensors are also measure or observe the heat of an object as well as by detects the motion .an infrared sensor circuit is one of the basic and popular sensor module in an electronics device. This sensor is analogous to human's visionary senses which can be used to detect obstacles and these type of sensors measures only infrared radiation, rather than emitting that is called as a passive IR sensor .usually in the infrared spectrum .all the objects radiation some from of thermal radiations are invisible tour eyes, that can be detected by an infrared sensors. The emitter is simply an IR LED ( light emitting diode ) and the detectors is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode. The resistance and these output voltage, change in proportion to the magnitude of the IR light received.



## HISTORY –

In general, infrared detectors are used to object, detect, image and measure patterns of the thermal heat radiation which all object emit. The development of thermocouple and bolometer started in the 19<sup>th</sup> century .There early devices consisted of single detector elements that relied on a change in the temperature of the detector.

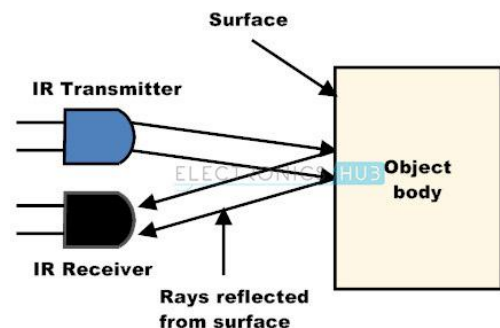
## First generation detector arrays-

Photon detectors were developed to improve sensitivity and response time. These detectors have been extensively developed since 1940's lead sulfide was the 1<sup>st</sup> practical IR detector. The 1970's witness a mushrooming of IR applications combined with the start of high volume production sensors system using liner arrays.

## Second generation detector arrays-

The invention of charge coupled device (CCDs) in the late 1960's made it possible to envision "second generation" detectors arrays coupled with on focal-plane electronic analog signal readouts which multiplex the signal from a very large array of detectors .In the late 1970's through the 1980's MCT technology efforts focused almost exclusively on PV device development because of the need for low power and high impedance for interfacing to readout input circuits in large arrays. This effort has been playing off in the 1990;s with the birth of 2<sup>nd</sup> generation IR sensors which provide large 2D arrays in both liner formats

## IR Sensor Circuit Diagram And Principle operation –



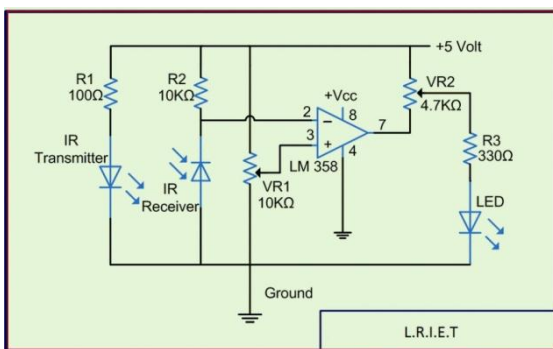
An infrared sensor circuit is one of the basic and yes very popular sensor module in an electronics device as well as electronics filed. This sensor is analogous to human's visionary senses, which can be used to detect obstacles and it is one of the common application in the real time, this circuit comprise of the following components .

- LM358 IC2 IR transmitter and receiver pair
- Resistors of the range of kilo ohms
- Variable resistors
- LED light emitting diode

In this paper the transmitter section includes an IR sensor, which transmits continuous IR rays to be receiver by an IR receiver module. An IR output terminal of the receiver varies depending upon it's receiving of IR rays .since this variation cannot be analyzed as such , therefore this output

can be fed to a comparator circuit here an op amplifier (operation amplifier) of LM339 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 LM339. Thus the output of the comparator goes low, but the led does not glow. When the IR receiver module receives signals to the potential at the inverting input goes low. Thus the output of the comparator LM339 goes high and the led starts glowing Resistor R1=100, R2=10k, and R3=330 are used to ensure that minimum 10mA current passes through the IR led device like photodiode and normal LEDs respectively . Resistor VR2 (preset=5k) is used to adjust the output terminal. Resistor VR1 (preset=10k) is used to set the sensitivity of the circuit diagram.



*Different Types of IR sensors –*

IR sensors are classified into different types depending on the applications.

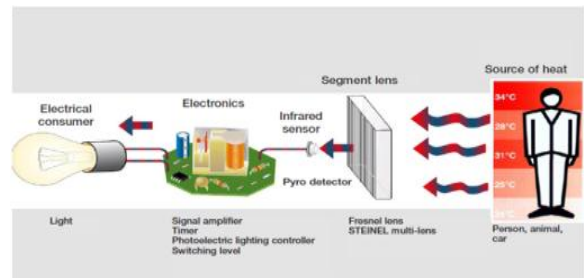
- Temperature sensor
- PIR sensor
- Ultrasonic sensor

Temperature sensor: An infrared thermometer is a thermometer which inverts temperature from a portion of the thermal radiation sometimes called black body radiation emitted by the object being measure. Sometimes called laser thermometer as a laser is used to help aim the thermometer or non-contact or temperature gun, to describe the device ability to measure temperature from a distance .By knowing the amount of infrared energy emitted by the object, the permits temperature measurement from distance without contact with the object to be measure. A non- contact infrared sensor thermometer is useful for measuring temperature under circumstance where thermocouple or other probe type sensors cannot be used or do not produce accurate data for a variety of reasons.



PIR Sensor-

PIR based motion detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of sensor. When an object such as human, passes in front of the background, such as wall, the temperature at that point in the sensor’s field of view will rise from room temperature to body temperature, and then back again. The sensor converts the resulting change in incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger the detection as well.



**ULTRASONIC SENSOR-**

An ultrasonic sensor is a device or a system that can measure the distance to an object by using sound waves. It measure distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculated the distance between the sensor and sonar and the object.

It is important to understand that some object might be not detected by ultrasonic sensors. This is because some objects are shape or positioned in such a way that the sound wave bounce off the object.



**IR SENOR APPLICATIONS –**

IR sensor are used in various sensor based project and also in various electronics devices which measure the temperature that are discussed in the below

1. Radiation Thermometer –in IR sensor are used in radiation thermometer to measure the temperature depend upon the temperature and the material of the object and these thermometer have some of the following feature.

- Measurement without direct contact with the object
- Faster response
- Easy pattern measurements

1. Moisture Analyzers- its use wavelengths which are absorbed by the moisture in IR region. Objects are irradiated with light wavelength like a 1.1micro meter 2.7 micro meter. And also with reference wavelength

2. IR Imagine Device- IR images is a device which can major applications of IR waves, primarily by virtue of its property that is not visible. It is used for thermal images, night vision devices, etc. for example water, rocks, soil, building, an atmosphere, and human tissue all features emit IR radiation.

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