G.M.R.POLYTECNIC GAJWEL

A PROJECT REPORT ON

INFRARED BASED OBSTACLE DETECTOR

A Project report

Submitted in partial fulfillment of the requirements for the award of

DIPLOMA IN ELECTRONICS & COMMUNICATION ENGINEERING

DECE (2018-2021)

Under the esteemed guidance of

Sri G.SUBHADRA ,M.Tech

Acknowledgment

- This project work method of education is really a good opportunity to put our theoretical knowledge into planned exercise with an aim.
- To solve real problem through which we could have done many things developing confidence to face various practical situations likely to come across in professional life other qualities like self resources fullness reliance sense of responsibility and are encouraged, theory and practical knowledge and action reintegrated in this work
- We feel it's our duty to thank our beloved principal and our head of department (SRI N.SREENATH RAO. M.Tech)
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SINCERELY: BATCH-1

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BATCH CERTIFICATE

This is to certify that the project entitled "INFRARED BASED OBSTACLE DETECTOR"

Submitted by the final year DECE students in partial fulfillment of requirement the award of diploma in electronic & communication engineering during the academic year 2018-2021.

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GUIDE HOD EXTERNAL EXAMINER PRINCIPAL

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ABSTRACT

Our project is for helping a blind people while they are walking on the road or street or in a house generally.

They want help from second person so to avoid wasting second person time a device is needed, which gives an indication "there is something to be careful while walking on road etc." …The device is "blind way helper" that helps the blind person instead of a second person.

Introduction

To make it easier for blind people to move from one place to another place.

And also to reach their required destination and also while they are walking on the floor they don't know where the doors & walls, steps exactly they are always searching for are required. Sometimes they get some injuries also. These are all a little bit difficult to make as they own so our project is so useful to that person. It rectifies those types of problems. It gives an indication by "Buzzer" then the person who is blind he knows there is an obstacle so careful walking is needed. This project/device is helpful to know where the manholes & also steps.

The Problems facing while walking

- The biggest challenge for a blind person, especially the one with the complete loss of vision, is to navigate around places. Obviously, blind people roam easily around their house without any help because they know the position of everything in the house.
- The most important problems as perceived by the participants are installation of tactile ground surface indicators, unsafe sidewalks, existence of obstacles on sidewalks, disorientation, fear of falling, inability

to identify street places, the presence of spaces between platforms and buses, walking into glass doors, crossing streets, and the risk of **Arial** barriers.

- By these devices we can easily rectify these types of problems.

- This device has a stick and it helps to detect the walls, manholes, steps while walking in a house or street or on the roads etc. This is a device which is used to reduce third person involvement (who is a regular helper to blind persons).

HISTORY

In earlier days the people who are blind where used the sticks to walk and those people do sounds to know the objects and also the condition of the road or street, while they are walking in home also the do sound so they use energy to knock the ground and also some little bit strain also so, this made them a little bit harder to walk and to do the activates including other.

but nowadays the technology is getting evaluated day by day to help our humans a lot in our lifestyle and this is applicable for the blind people, in briefly now the technology development is a step forward towards the blind peoples, our project's main aim is to help the blind people in their day-to-day life.

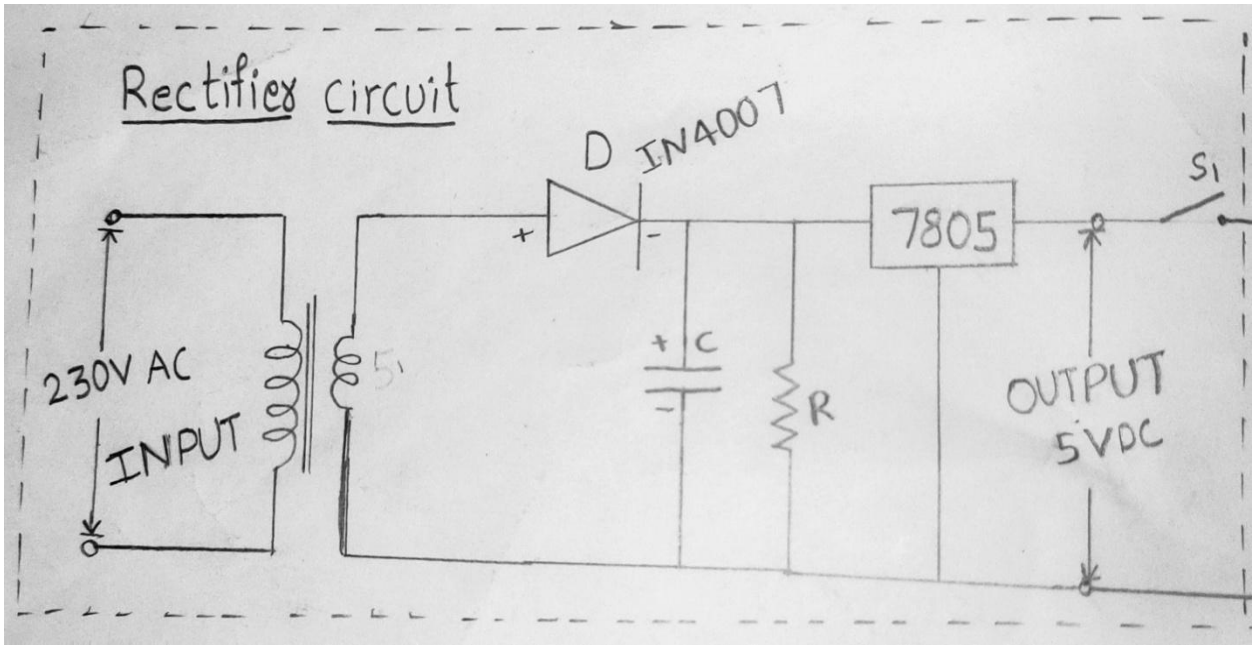
2. POWER SUPPLY (RECTIFIER CIRCUIT)

These power supplies two types ac, dc current

AC input voltage:

Nowadays many types of devices are working with only dc power supply. So, we converted that ac input voltage 230 v -5v by a step down transformer to drive the IR sensor circuit board and also to charge the battery.

RECTIFIER CIRCUIT:



CIRCUIT DIAGRAM

3.Operation of Half-Wave Rectifier

PN junction diode conducts only during the forward bias condition. Half wave rectifier uses the same principle as PN junction diode and thus converts AC to DC. In a half-wave rectifier circuit, the load resistance is connected in series with the PN junction diode. Alternating current is the input of the half-wave rectifier. A step-down transformer takes an input voltage and the resulting output of the transformer is given to the load resistor and to the diode.

- FILTER FUNCTION

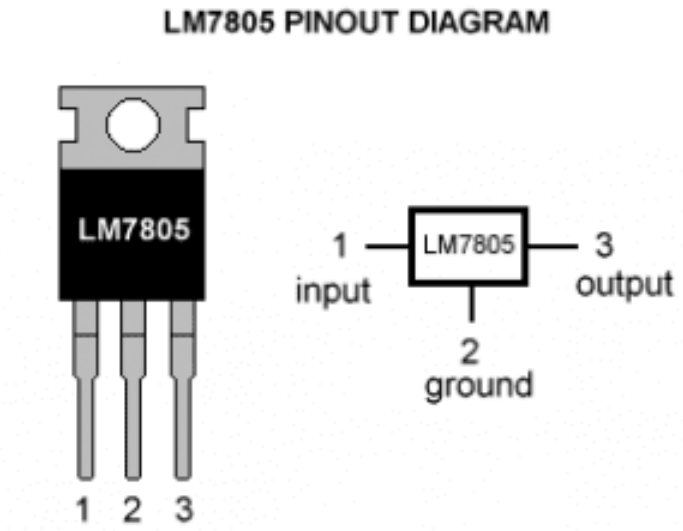
The circuit diagram of a half wave rectifier using a capacitor filter is shown above. So when the flow of current gets the filter, the ac components experience a low-resistance and dc components experience a high-resistance from the capacitor. The DC components flow through the load resistor (low resistance path).

7805 IC REGULATOR

Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs. A voltage regulator IC maintains the output voltage at a constant value. 7805 Voltage Regulator, a

member of the 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC).

The xx in 78xx indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink.



Dc current:

This dc current is obtained from the battery that is used to switch on the lm 358 IC and also the circuit board, to make it as working without continuous ac power supply and good performance of the sensor boards.

BATTERY (2300MAH)

- A battery is a device that stores chemical energy and converts it to electrical energy.
- The chemical reactions in a battery involve the flow of electrons from one material (electrode) to another, through an external circuit
- The flow of electrons provides an electric current that can be used to do work
- To balance the flow of electrons, charged ions also flow through an electrolyte solution that is in contact with both electrodes
- Different electrodes and electrolytes produce different chemical reactions that affect how the battery works, how much energy it can store and its voltage

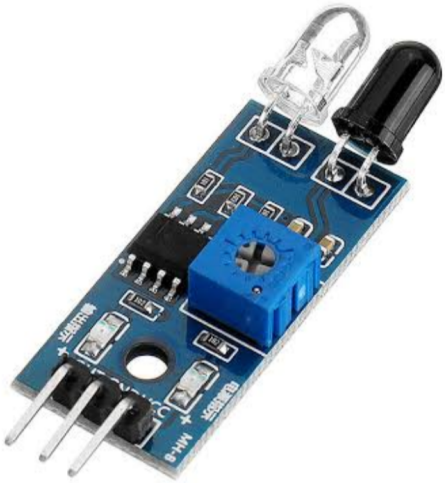
IR SENSOR

IR SENSOR INTRODUCTION

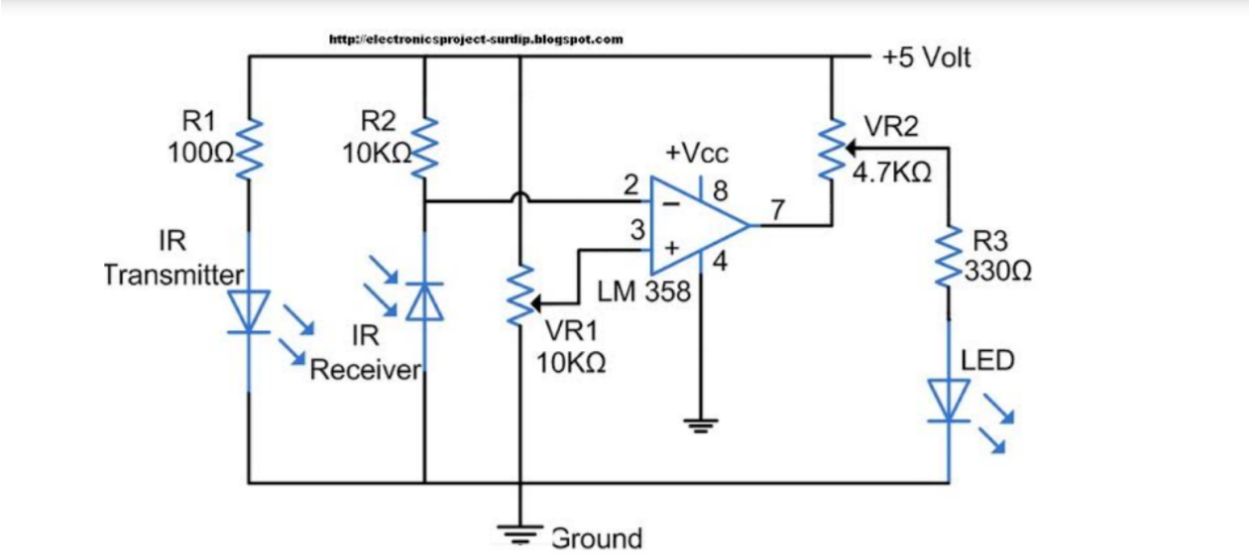
What is an IR Sensor/Infrared Sensor?

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 detect 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 radiation 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

IR SENSOR BOARD



CIRCUIT DIAGRAM:



Working Principle

The working principle of an infrared sensor is similar to the object detection sensor. This sensor includes an IR LED & an IR Photodiode, so by combining these two can be formed as a photo-coupler otherwise opt-coupler. The physics laws used in this sensor are planks radiation, Stephan Boltzmann & wien's displacement.

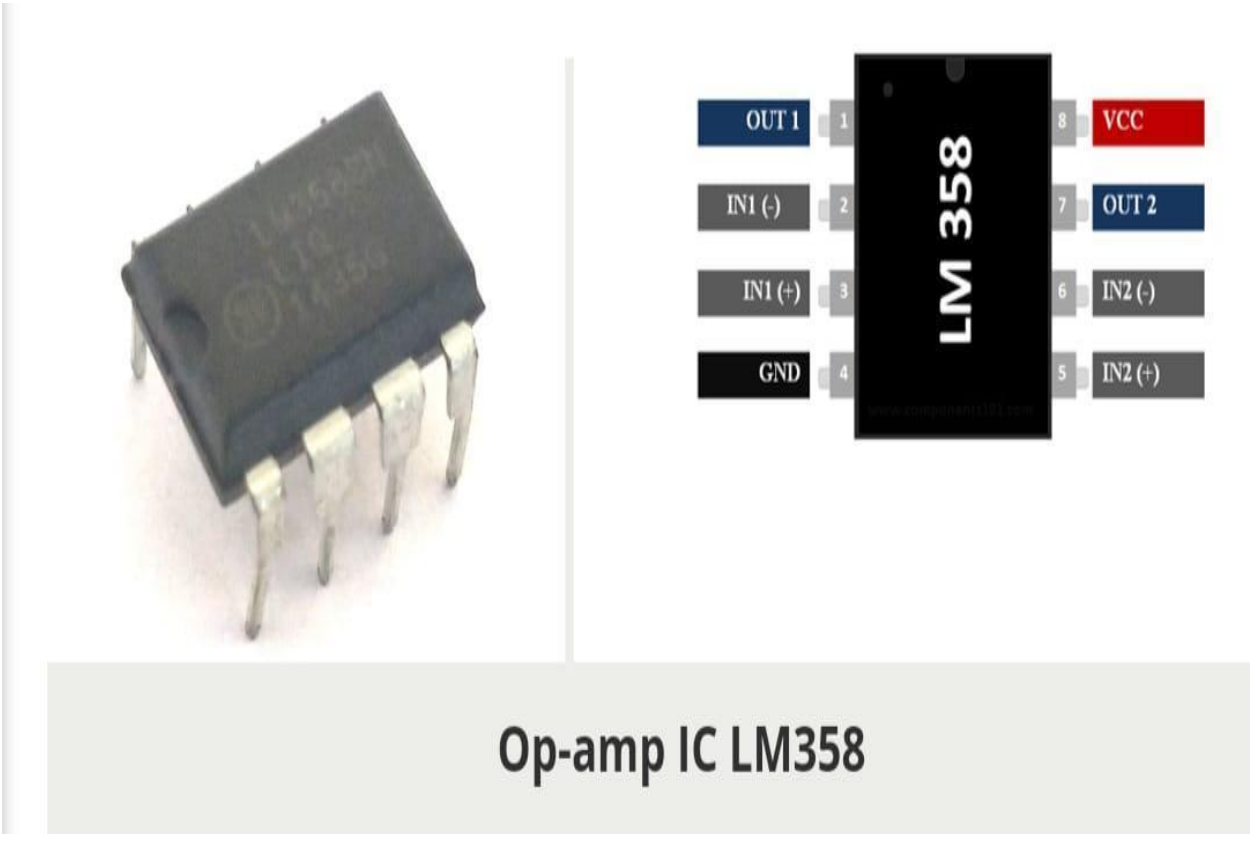
IR LED is one kind of transmitter that emits IR radiations. This LED looks similar to a standard LED and the radiation which is generated by this is not visible to the human eye. Infrared receivers mainly detect the radiation using an infrared transmitter. These infrared receivers are available in photodiodes form. IR Photodiodes are dissimilar as compared with usual photodiodes because they detect simply IR radiation. Different kinds of infrared receivers mainly exist depending on the voltage, wavelength, package, etc.

Once it is used as the combination of an IR transmitter & receiver, then the receiver’s wavelength must equal the transmitter. Here, the transmitter is IR LED whereas the receiver is IR photodiode.

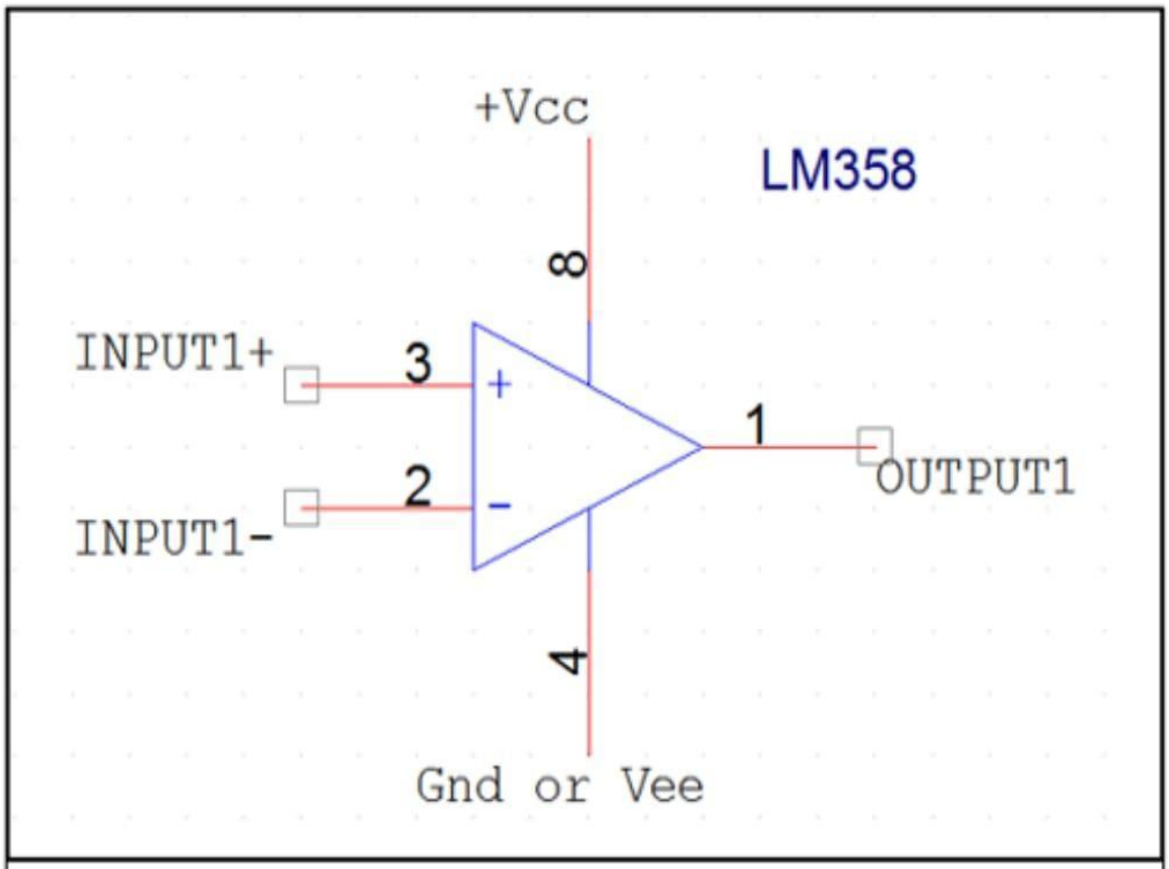
The infrared photodiode is responsive to the infrared light that is generated through an infrared LED. The resistance of the photo-diode & the change in output voltage is in proportion to the infrared light obtained. This is the IR sensor's fundamental working principle. Once the infrared transmitter generates emission, then it arrives at the object & some of the emission will reflect back toward the infrared receiver. The sensor output can be decided by the IR receiver depending on the intensity of the response.

PARTS

LM 358 DUAL OP-AMP IC



- OP-AMP CIRCUIT DIAGRAM

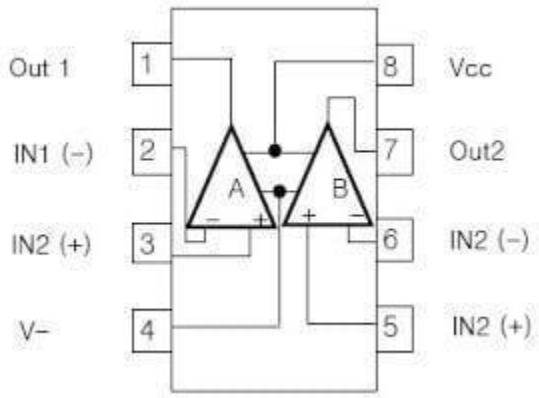


General op-amp structure

IC LM358– LM358 consists of two independent, high gain operational amplifiers in one package. Important feature of this IC is that we do not require independent power supply for

working of each comparator for a wide range of power supply. LM358 can be used as a transducer amplifier, DC gain block etc. It has a large dc voltage gain of 100dB. This IC can be operated on a wide range of power supply from 3V to 32V for single power supply or from ±1.5V to ±16V for dual power supply and it also supports large output voltage swing.

Pin configuration of IC is shown below:



From the above figure you can see that the operational amplifier has two inputs and one output in one independent LM358.

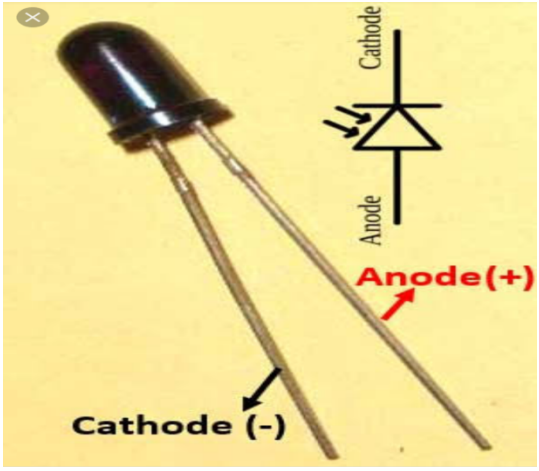
BUZZER (5V)

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of

buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

BUZZER

Photo diode & sensor



A **photodiode** is a semiconductor device that converts light into an electrical current. The current is generated when photons are absorbed in the **photodiode**. **Photodiodes** may contain optical filters, built-in lenses, and may have large or small surface areas. ... A **photodiode** is designed to operate in reverse bias.

SENSOR

Light sensor is also called photo resistor. Its working principle is based on internal photoelectric effect. The greater incidental light intensity, the less electric resistance. And when the incident light is weak, the electric resistance increases.

Working and principle

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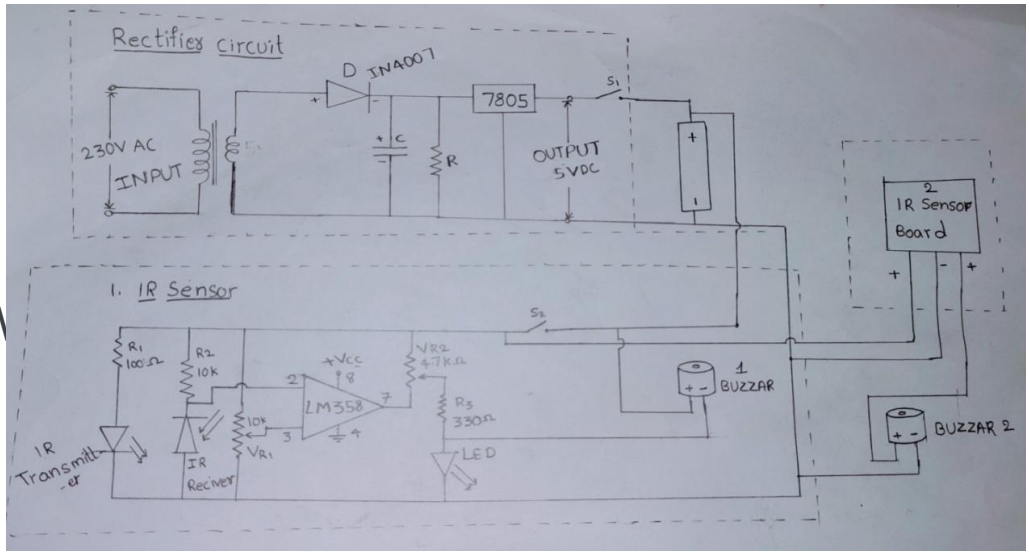
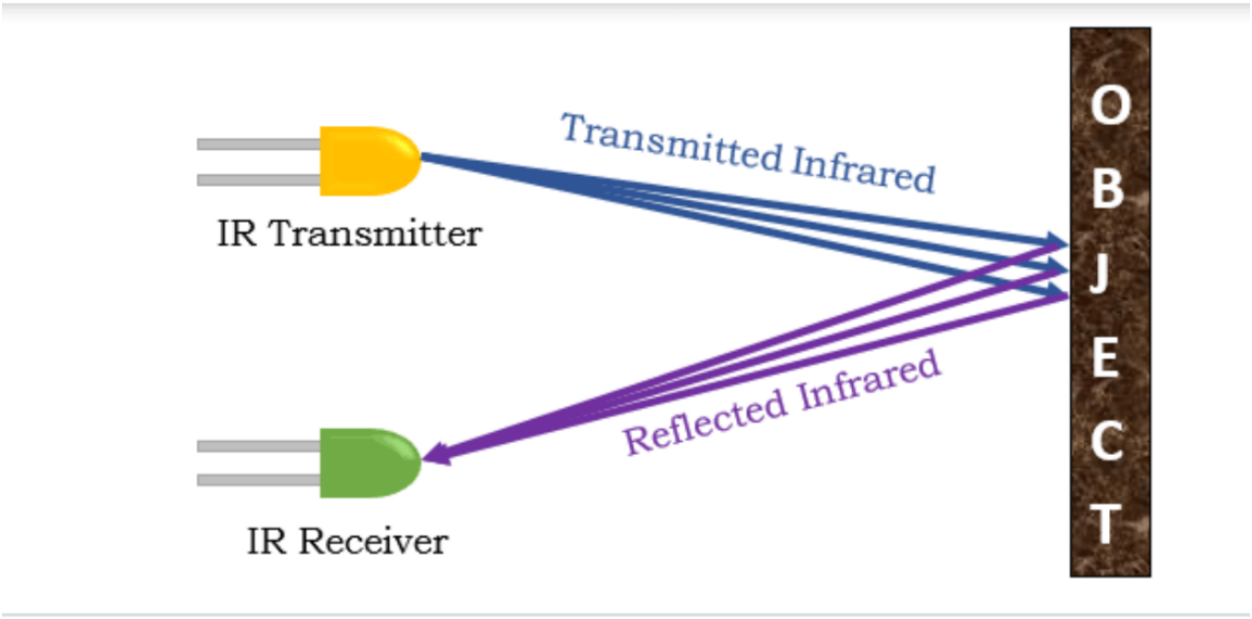


Step: 1 First we can apply 230v AC input to the device and that 230v AC input is converted as dc 5v by using a half wave rectifier circuit. That rectified output is given to a filter that removes the unwanted signal and that is applied to regulate IC (7805) which gives constant output of 5v. That gives the battery charge.

Step -2: The sensor works on the principle of infrared rays by taking 5v as input, which is obtained from the battery and it emits the infrared Rays. That rays touch an obstacle and are reflected back towards the photo diode and it gives an equivalent output in an electric signal.

That signal is given to LM358 IC and further amplified.



That output from LM358 IC is given to the buzzer.

Now the entire circuit is read to sense an obstacle

Step-3: the same IR board is used to detect the holes or steps.etc, by changing the polarity of the buzzer as shown in above circuit diagram.

ADVANTAGES:

- It is helpful to blind people
- It detects holes as well as manholes
- it is also use full to detect the steps
- it senses the obstacles
- This device makes easy to walk on the road
- This device makes easy to walk on the house
- It eliminates the waste of time to search
- It eliminates the second person involvement

Applications:

- While walking on the streets.
- While walking on the roads.
- Household purpose
- This device can also use in “where the crowd is “
- In Long journey’s
- Also for daily journey’s purpose
- It can also used in bus stops

CONCLUSION:

So, By this project we want to conclude to you all that we have developed a real time project model that can be a successful option to all the blind people in their daily lives and day to day applications so, the lifetime of the project is very long and the maintenance cost is completely low and it is available for common man in a reasonable cost so, that the blind people can overcome their difficulties successfully.

"THANKING YOU "

FOR ALL YOUR ATTENTIVENESS TOWARDS OUR PROJECT.