

Electronic Eye Using LDR

Jeel Majithia, Yogendra Vaghela, Mihir Shah, Venkataramanan. V

Abstract: In today's world, with the amount of crime rates it is important to secure our homes and work places. Electronic Eye is also known as magic eye. It makes sure that there is a constant watch on your doors. Imagine if you are alerted each time someone is trying to enter your home or work place. This helps you to take precaution before the damage has occurred. It is one of the most helpful devices in today's security system. Electronic eye is a security system based on photo sensing arrangement. The circuit has two major parts. One being the power supply unit and the other is the logic unit. In the power supply unit 5 volt of power is obtained after its conversion from 9 volt. The logic unit consists of a Buzzer and Light Dependent Resistor (LDR). The logic unit works when a person is near the door. Light on the LDR determines the presence or absence of a shadow near the security system. When a shadow falls on the LDR, the sensor senses the absence of light and the buzzer goes off and the LED glows.

Key Words: Light Dependent Resistor (LDR), Buzzer, LED, Security system.

I INTRODUCTION:

Security is one of the most vital concerns of our daily life and properties in our environment. Security is mainly means being alert to safeguard ones expensive belongings and properties. Reducing the risk of accident or protecting against deliberate attack in our social environment is a function of the degree of safety. Technology is a boon as well as a curse and therefore with the advancement in technology the chances of theft are increasing as well. Security teams are also unable to curtail the theft chances due to human errors. An electronic eye can curtail the theft attempt by triggering the buzzer automatically. To counter the risk of robbery, we have high resolution security cameras are available for commercial purpose in the markets. These systems should be powered the entire time so that it can capture every movement of the surrounding. But the drawback of a camera based security system is that it requires a human presence to keep an eye on the captured movements at all times. This system is really effective only when someone is monitoring the image captured by the camera. The guard needs to be alert all the time and ready to take necessary action. In most of the places remote surveillance is needed. This system after sensing the presence or any unusual movement sounds the alarm by ringing the buzzer and also lights the LED to send the signal to the concerned person to be alert. As we know technology is prominent every second, plentiful home based or office based security systems have been developed and implemented to keep welfare security safe. Using a preferred safety and security measures or technique depends on the absolute environment of application

II. CIRCUIT DIAGRAM

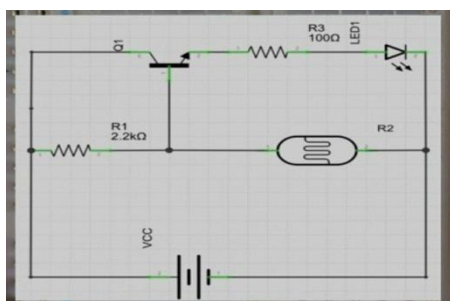


Figure 1: Circuit Diagram

III. COMPONENTS USED

- BC 548 transistor Q1
- Resistor R3,=100 ohm
- Resistor R1, R2=2.2k Ohm
- Light Dependent Resistor
- Buzzer BUZ1
- Light Emitting Diode D2.
- Bread board
- Connecting wires
- DC 9V battery.

IV THEORY

1. LDR

LDR are the light dependent resistor, they are also called as photo resistors or photocells or photoconductor .They are used to sense or detect the level of light. Generally there are two types of photo resistors namely Intrinsic photo resistors and Extrinsic photo resistors. LDR is having light sensitive placed to its upper surface that is ceramic, it is designed in snake shape, due to this it can obtain required resistance and power ratings. LDR is the component that has the basic working principle, since they are light dependent device, resistance decreases as the light falls on the sensor, vice versa, in dark the resistance increases, and depending upon the circuitry the LED glows or the BUZZER produces sound. Light depending resistors are the nonlinear devices, the sensitivity varies with the Wavelength of light falling on it. LDR's are often used because they are cheap and simple in structure. Only the Limitation of LDR is that it take few second to be at its original position once the light is removed. They are widely used in alarm circuit, alarm clock, light intensity meter etc. The basic structure of an LDR is shown below.

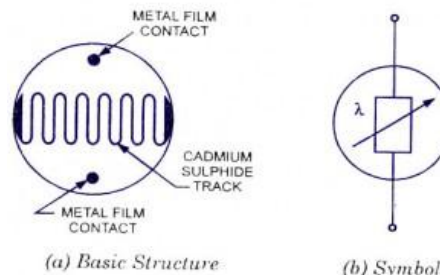


Figure 2: Basic Structure of LDR

2. LED

The light emitting diode is a specially doped p-n junction diode which emits light when in the forward biased condition. The basic principle of an LED is when in forward biased condition the flow of electron and holes increases and starts throwing one another out. The electrons flow from n-type substrate to p-type substrate. This leads to a formation of a complete atom and light is emitted in the form of energy packets. Based on the voltage applied through the diode leads, the electrons and holes movement takes place and thus, the light is emitted. This effect is called as electroluminescence. The color of the emitted light depends upon the band gap of the semiconductors. LED's have many advantages over other conventional diodes such as low energy consumption, longer lifetime and physical robustness. The light emitted from LED is different from that emitted through laser. The emitted light is neither coherent nor monochromatic.

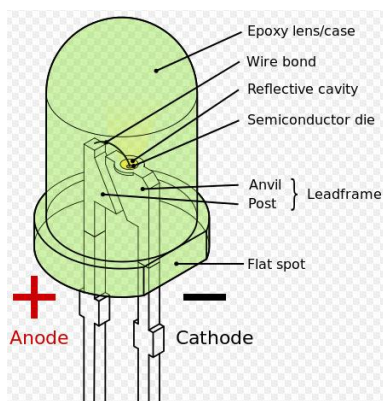


Figure 3: Internal Structure of LED

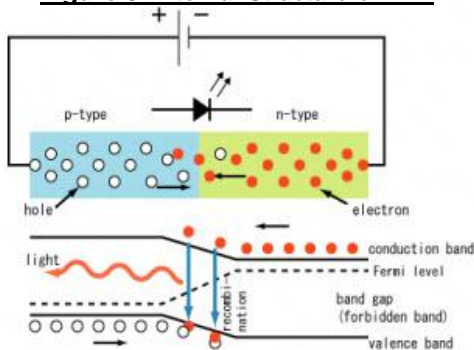


Figure 4: Electron flow in the LED

3. BC548 Transistor

A transistor is a three terminal device whose main function is to convert small signals into amplified signals. The three terminals of a transistor are Collector, Base and Emitter. Base is responsible for activating the transistor. It is composed of semiconductor material usually with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals controls the current through another pair of terminals. Transistors are generally constructed using pure germanium or silicon materials but some other semiconductors can also be used. Transistors are the basic component of any embedded or integrated circuit and based on the operational applications a N-P-N or a P-N-P transistor is used.

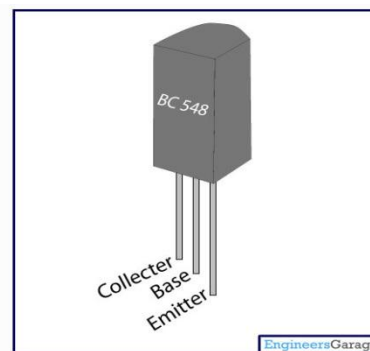


Figure 5: Pin Diagram of BC548 transistor

V WORKING PRINCIPLE

The main principle of the Electronic Eye circuit is the LDR sensing the presence and absence of light and accordingly the LED and Buzzer work. Its Power supply circuit is a combination of battery, diode, resistors and capacitors. In the beginning of the process a supply of 9 Volt has to be connected. LDR, transistor and a buzzer form a part of the Logic Unit. LDR has a resistor of 220Kohm in series with it. The main characteristic of an LDR is that it has very high mega ohms of resistance when placed in absence of light. This resistance decreases with the intensity of light. This causes constant variation in the resistance when someone tries entering the security area. The output of the LDR is at logic one in the dark and changes to logic zero in the presence of light. This helps in indicating the presence of a shadow and hence helps to guard the door from unwanted entry. A 5v magnetic buzzer is used in the Electronic Eye. The buzzer is connected to both transistor on one end and LED on another. As soon as the LDR detects the presence of a shadow the buzzer is given the signal and it starts ringing. This signal from the buzzer is then sent to the LED which glows. The buzzer and LED together help to alert the user of an unwanted entry.

RESULTS

The developed working model is tested in real time applications. This mechanism is applied by us at our home to test the reliability of the product. The Light Dependent Resistor or the photo resistor sensor detected the entry of the person and the state of the sensor is then alerted by the ringing of the buzzer. The state of the light intensity levels in the specified room is also able to monitor with the developed model. If any unauthorized person is trying to open the personal locker, the LDR senses the presence and the owner is alerted by the buzzer and LED. Alerting the security depends upon the situation. The results produced are forced to rely on the proposed methodology to be implemented for the security levels of the home and even banking systems. With the successful development and testing of this model, the following can be maximally prevented by incorporating. The electronic eye security system:

- Crime can easily be prevented.
- Murder/non-negligent manslaughter
- Negligent manslaughter
- Robbery

CONCLUSION

The method discussed in this paper has achieved the target to meet its objectives of sensing the presence of an object when the shadow falls on the LDR sensor and this could be used for security purposes. The study produced more favorable findings to implement this kind of security support to home and banking systems. Future works may be done by adding an arduino UNO board. That will help in communicating with the concerned owner and security team through mobile phones. This will enhance the security of this system. In future, this system can be powered with wireless spy camera system to transmit the status of the security levels to the authorized persons. Image and data processing is proposed to be implemented in near future.

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BIO DATA OF AUTHOR(S)

V.Venkataramanan is Assistant Professor in Electronics and Telecommunication Engineering Department, D.J Sanghvi College of Engineering Vile Parle, Mumbai. He completed his M.Tech VLSI Design from SRM University. He has an academic experience of 6.6 Years. He has published 22 papers in International Journals, international / national conferences. He has supervised 7 UG Students and 6 PG



Students till date. His research interest includes Next generation Wireless technologies, MIMO – OFDM and VLSI Systems. He reviewed a paper in referred journal of Elsevier Computer Communications, Applied computational Electromagnetics society. He is a Editorial Board Member of International Research Publication House. He chaired technical sessions in various national conferences.

Jeel, currently pursuing her B.E Electronics and Telecommunication Engineering from Dwarakadas J. Sanghvi College of Engineering, Vile Parle (W), Mumbai 56. Her areas of interest include Digital electronics, Networking, IOT, sixth-sense technology and robotics.



Yogendra, currently pursuing her B.E Electronics and Telecommunication Engineering from Dwarakadas J. Sanghvi College of Engineering, Vile Parle (W), Mumbai 56. Her areas of interest include Digital electronics, Control Systems, Instrumentation and Networking.



Mihir, currently pursuing her B.E Electronics and Telecommunication Engineering from Dwarakadas J. Sanghvi College of Engineering, Vile Parle (W), Mumbai 56. Her areas of interest include Digital electronics, Embedded Systems, Mechatronics and Networking.

