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ECLR -10

DEVICES AND NETWORK ELECTRONICS LABORATORY

MINI PROJECT.

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Mini Project Title- Electronic Eye controlled security system.

Section- ECE-A.

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ABSTRACT

Automation is imminent technology these days, imagine a doorbell that automatically rings when a person visits your home. This provides security when somebody enters the house without our permission. The electronic eye-controlled security system is an electronic device that alerts us if anyone visits our home. This circuit consists of two parts. One is the power supply and the other is a logic circuit. In the power supply 9V supply is converted to the 5V. In the logic circuit, the buzzer gets activated when a shadow falls on it. The main principle of the circuit is to ring the doorbell when there is any person at the entrance. The presence of a person is determined by the light that falls on Light Dependent Resistor (LDR). When there is any presence of an object, LDR will be dark and the buzzer starts ringing and the LED starts glowing.

INTRODUCTION

Security is a major concern in day-to-day life and the environment. Theft has become common nowadays. Countering it, Security systems with Web cameras are being developed. The security alarm system along with image recognition is supported by the VB application. The images are captured when the door opens, alarmed and then the image is transferred through a microcontroller, and the image is seen on the PC with the help of the VB application. It also serves the function of sensing and detecting false intrusion. The term false intrusion here is used to mean any form of attempt to gain entry without proper predesign protocols. As technology is being updated every second, ample home-based or industry-based security systems are created and installed for better security. The home security system is an important means of protecting homes from unknown invasions. A common home security system consists of CCTV, Web cameras, and Buzzer alarms. The electronic eye is an electronic device that continuously watches if anyone is visiting your home without your permission with the help of the DR sensor as the main sensor and other components. It can restrict the theft attempt by triggering the buzzer automatically and also sending a message quickly to the concerned persons to make them alert. The communication part can be achieved with the support of Arduino. The automation of the security monitoring system using electronics assembly is enabling to development of a mechanism to reduce theft chances. The main aim of this project is used to provide a security system for ash boxes, and lockers in malls, jewelry shops, homes, and banks.

OBJECTIVES

The main concept of this project is to design an Electronic Eye Security Controlled System for where security is needed like homes, malls, banks, etc. The proposed system uses a Light Dependent Resistor (LDR) to detect the light intensity and generates an alarm sound for thefts and turns ON the lights. This system is placed inside lockers and cash boxes in such a way that if a person or theft tries to open the door lock and uses a torch light to treasure the valuable things. The light falls on the electronic eye and immediately gives a command to the buzzer. The buzzer connected to the circuit with the help of a transistor gives a sign to the users. When an intensity of light drops on the LDR then the LDR resistance will drop, and thus it activates the transistors to make the buzzer ON and load connected to the relay to specify a theft.

CIRCUITS COMPONENTS:

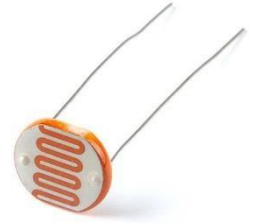
- C7805 Regulator
- Resistors – 220Ω x 2, $1K\Omega$ x 2, $100K\Omega$
- 1N4007 PN Diode
- Capacitors – $1\mu F$, $10\mu F$
- Transistors – BC 547 x 2
- Light Dependent Resistor (LDR)
- Buzzer
- LED
- Breadboard
- Connecting wires
- 9V battery

COMPONENTS DESCRIPTION

1. **RESISTOR:** A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow. The ratio of the voltage applied

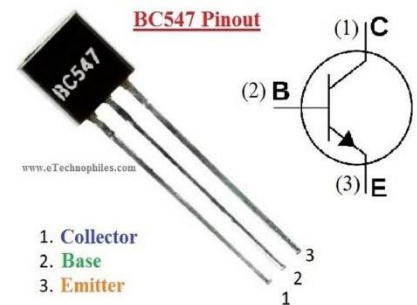
across a resistor terminal to the intensity of current through the circuit is called resistance. The relation is represented by ohms' law: $V=IR$.

2. **LDR:** A photoresistor or light-dependent resistor (LDR) is a resistor whose resistance decreases with increasing incident light intensity .it can also be referred to as a photoconductor. If light falls on the device, the photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.



3. **BATTERY:** An electrical battery is a combination of one or more electrochemical cells, used to convert stored chemical energy into electrical energy.

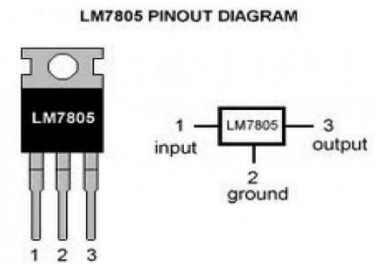
4. **TRANSISTOR BC547:** is a bipolar junction transistor (BJT). It is a kind of NPN transistor. It has three terminals: An emitter, Collector, and a Base. The maximum current gain of BC547 is 800A. The Collector–Emitter Voltage is 65V. Whenever the base is high then current start flowing through the base and emitter and after that only current will pass from the collector to the emitter.



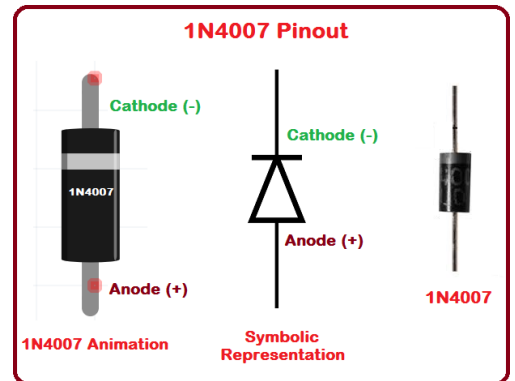
5. **BUZZER:** This buzzer is a piezo-type audio signaling device, which has a piezo element and an oscillating circuit inside which oscillates the piezo brass base plate, which when given voltage difference produces the sound of a predefined frequency. It is a pin terminal type with 4 kHz output whose construction enables direct mounting onto printed circuit boards.



6. **7805 IC VOLTAGE REGULATOR:** It is a three-pin IC with; an input pin for accepting incoming DC voltage, a ground pin for establishing the ground for the regulator, and an output pin that supplies the positive 5 volts. A regulator is mainly employed with the capacitor connected in parallel to the terminal and the output terminal of the IC regulator.



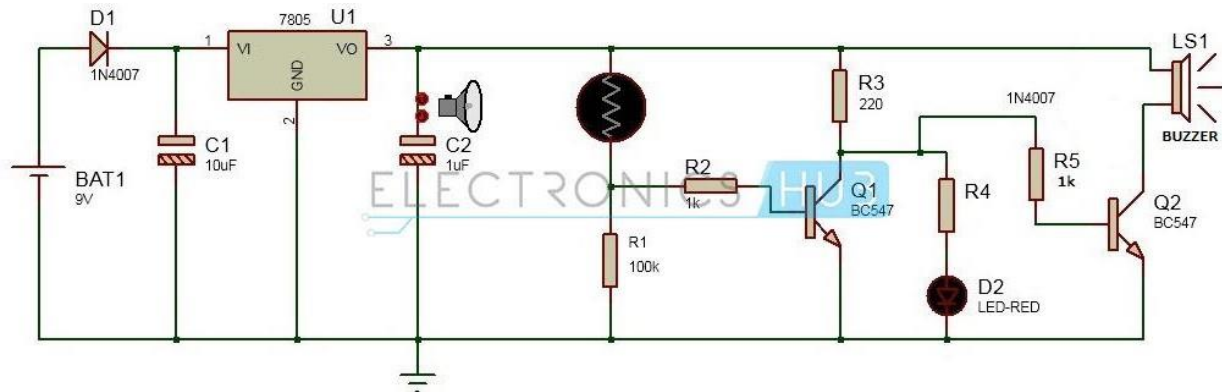
7. **1N4007 PN DIODE:** A diode is a device that allows current flow through only one direction. That is the current should always flow from the anode to the cathode. For the 1N4007 diode, the maximum current carry capacity is 1 ampere it withstands peaks up to 30 amperes. Hence we can use this in circuits that are designed for less than 1 ampere. The reverse current is 5 microamperes which are negligible. The power dissipation of this diode is 3W.



8. **Capacitor:** A capacitor is a passive two-terminal electronic component that stores electrical energy in an electric field. In a way, a capacitor is a little like a battery. The capacitor is two conductors separated by a dielectric.
9. **LED:** A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. It is a p-n junction diode that emits light when activated. The two terminals (anode and cathode) of a LED when connected to a voltage source in the correct polarity, may produce lights of different colors, as per the semiconductors substance used inside it.
10. **Breadboard:** A breadboard is a solderless device for temporary photo type with electronics and tests circuit designs. Most electronic components in the electronic circuit can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate.
11. **Connecting Wires:** A wire is a single, usually cylindrical, flexible strand or rod of metal. Wires are used to bear mechanical loads or electricity and telecommunication signal.

CIRCUIT DESIGN

The main principle of the circuit is to ring the doorbell when there is a person at the entrance. To detect a person, an LDR is used as the sensor. Light on the LDR determines whether a person is present or not. When there is any object at the entrance, LDR is in dark, and the buzzer starts ringing and the LED starts glowing.

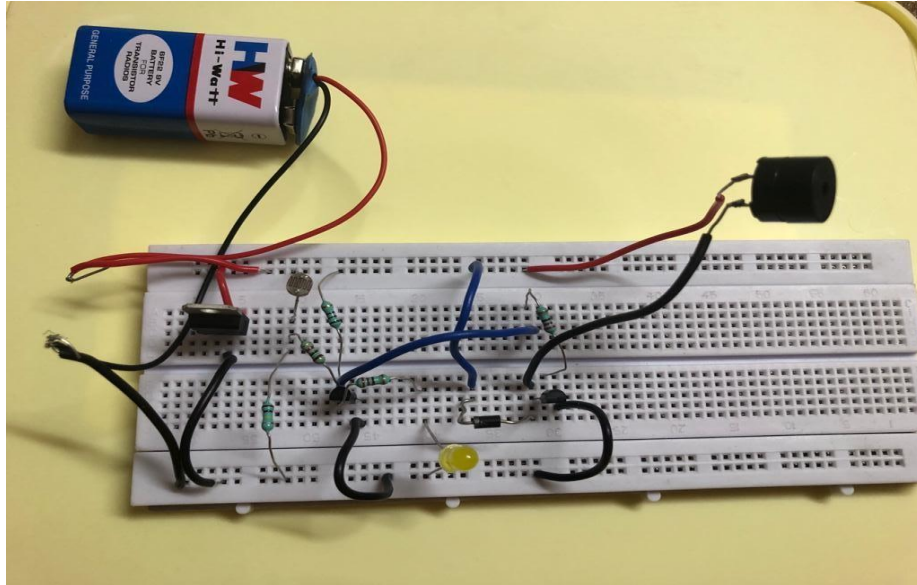


This circuit can be divided into two parts. One is the power supply and the other is the logic circuit. In the power supply circuit, a 9V supply from a battery is converted to 5V. The logic circuit operates the buzzer and an LED when any shadow falls on the LDR.

DESIGN

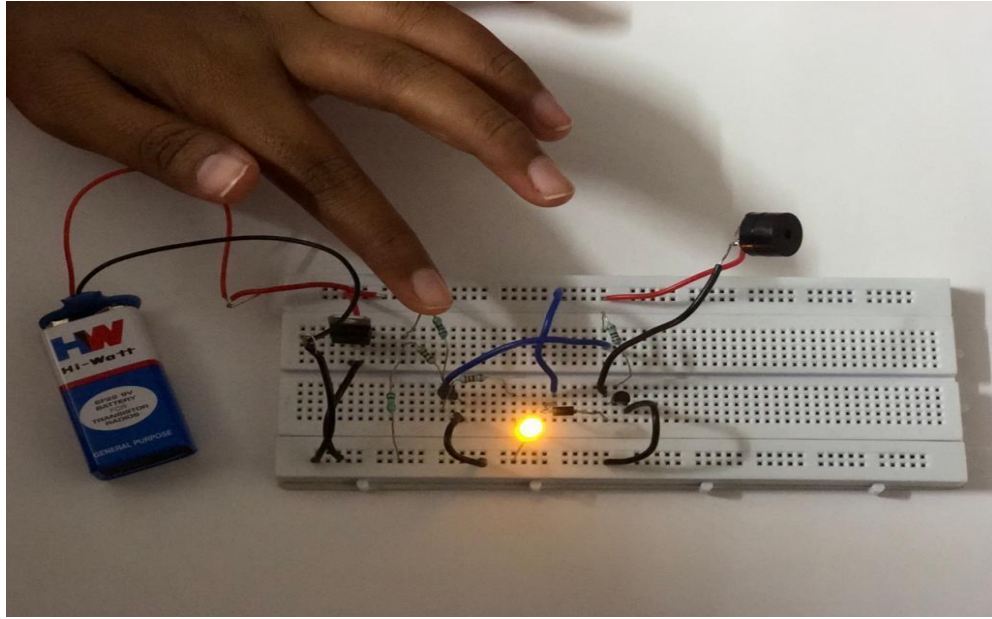
A) POWER SUPPLY CIRCUIT

The power supply circuit consists of a battery, diode, regulator, and capacitors. Initially, a 9V battery is connected to the diode. The diode used here is a simple P-N junction diode of the 1N4007 series. In this circuit, 1N4007 is connected in the forward bias condition.



B) LOGIC CIRCUIT

The logic circuit consists of Light Dependent Resistor(LDR) , transistors, a buzzer, an LED, and a few passive components. A $100\text{K}\Omega$ resistor is connected in series to the LDR in a voltage divider manner. A light-dependent resistor will have resistance in mega ohms when it is placed in the dark. This resistance value will decrease gradually when it is placed in the light. Thus, there is a variation in the series resistances. When the LDR is in dark it has high resistance and produces a high logic value at the output. When the LDR is in light, the resistance value of the LDR decreases and at the output, it gives logic low voltage. The output of the voltage divider is fed to a transistor which inverts the input from the LDR. The second transistor drives the buzzer. The buzzer used here is a 5V magnetic buzzer. It has two pins at the output. One pin is connected to the supply and the other pin is connected to the Collector of the second Transistor. LED is used for indication only. When the output from the first transistor is high, the buzzer starts ringing. Simultaneously LED is also turned on.



WORKING:

This circuit can be divided into two parts. One is the power supply and the other is a logic circuit. In the power supply, 9 volt supply is converted to 5v. The logic circuit operates the buzzer when any shadow falls on it. The power supply circuit consists of a battery, diode, regulators, and capacitors. Initially, a 9 v battery is connected to the diode. The diode used here is a p-n junction diode of the IN4007 series. In this circuit, IN4007 is connected in the forward-biased condition. The main purpose of the diode in this circuit is to protect the circuit from negative voltage there is a chance of connecting the battery with reverse polarities which damage the circuit. So p-n junction diode connected in the forward bias allows the current to flow only in one direction and thus the circuit can be protected. There is some voltage drop across the diode. A voltage of 0.7 v is dropped across the diode A regulator is used for regulating the output voltage of the circuit. The regulator IC used here is 7805.78 represents the series and 05 represents the output voltage. Thus a voltage of 5 v is produced at the output of the regulator. Two capacitors are used before and after the regulator. These two capacitors eliminate the ripples. Thus a constant voltage is produced at the output of the regulator, which is applied to the logic circuit. The logic circuit mainly consists of Light Dependent Resistors, transistors, an op-amp, IC, and a buzzer. 220 K Ohm resistors are connected in series to the LDR. Light Dependent Resistors will have resistance in mega ohms when it is placed in the dark. This resistance value will decrease gradually when it is placed in the light. Thus

there is a variation in the series resistance. When the LDR is in dark it has high resistance and produces a logic high value at the output. When the LDR is in the light, the resistance value of the LDR decreases and at the not gate it gives logic low voltage. The op-amp IC used is LM 358. This IC compares the two inputs and produces an output that is applied to the transistor. Two transistors are connected to the buzzer from this resistance. The first transistors invert the input from the op-amp. The second transistor drives the buzzer. The diode is placed for protection. The buzzer used here is a 5v magnetic buzzer. It has two pins at the output. 1 pin is connected to the not gate and the other pin is connected to the Light Emitting Diode. LED is used for indication only. When the output from the logic gate is high buzzer starts ringing. LED also starts blinking.

RESULTS AND DISCUSSIONS

With the development and testing of this model, the following can be maximally prevented by using the electronic eye security system

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

Furthermore, this electronic eye security control system project can be enhanced by using a microcontroller and a GSM modem. The GSM-based home security system can be interfaced with the microcontroller to send & receive an SMS to the authorized person in case of robbery. Therefore, this is all about an electronic eye-controlled security system using LDR, and the applications of this project mainly include doorbell circuits, door opening circuits, and security applications.

APPLICATIONS

- This can be used in doorbell circuits.
- This can be used garage door opener circuit.
- Electronic eye can be used in security applications
- It can be augmented by implementing it by using a GSM modem and a microcontroller. The GSM modem can be interfaced with the microcontroller to send and receive SMS to the user in case of burglary.

- Future suggestions for this project are very great considering the amount of time and resources it saves. This system can be used as a reference or as a base for realizing a scheme to be implemented in another project of greater including the audiovisual camera by sending the captured images to an email instantly. The project itself can be modified to achieve a complete home automation system which will then create a motion system that will then create a platform for the user to interface between himself and his household. In this system GSM shield is a very important part of communication between mobile phones and microcontroller GSM Shield required a SIM card, due to range fluctuation or busy networks sometimes the GSM shield will not work properly.

LIMITATIONS

- Light is required in front of the doorbell.
- If any person comes in and out then the bell is ringing.

CONCLUSION

It has been successfully demonstrated that an electronic eye security system will serve as a device for providing security. It provides the user with an efficient and reliable security system for houses, malls, etc. It has been demonstrated that this project will serve as a device for securing personal information where it is deployed against intruders by setting off the appropriate alarm for every door opening. The electronic eye-controlled security system is a cost-effective solution for our security needs at present. The system is cheap and can be manufactured in small sizes, which can be hidden from intruders, thus safeguarding the house, shops, cars, and private properties. . Future works may be done to enhance the security of this system. In the future, this system can be powered with a wireless spy camera system to transmit the status of the security levels to authorized persons. Image and data processing is proposed to be implemented in near future.

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