Electronic Eye Controlled Security System Using LDR

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Abstract- *Electronic eye describes the design and implementation of LDR bases Security system homes, banks, malls etc. Where in security is a major concern. The proposed system uses a light dependent resistor (LDR) to sense the light intensity. The LDR sensor sense the light intensity and generates an alarm for indicating thefts, and also turns on the lights. [1]*

Keywords- LDR, Electronic eye, security system.

I. INTRODUCTION

Security is a primary concern with day to day life and properties in our environment. This Project describes effective security alarm system that can sense the intensity light with the help of LDR. This system is placed inside cash boxes and locker's in such a way that if a burglar tries to open the locker and uses a torch light to find the valuables, then the light that falls on the electronic eye (LDR) directs a signal to the buzzer and LED for indicating thefts.

Robbery has become common in our day to day life. Counting it, security system are also commercially available. The Security system available in market are too costly. So this project provides security system for cash boxes and lockers at a very low cost.

1. CONCEPT

The main concept of our project is to sense the intensity of Light through the LDR sensor. This system is placed inside the cash boxes and lockers. If the cash box is in closed condition the interior will be dark. Hence in the dark, the LDR will not activate. So neither the buzzer sounds, nor the LED glows ,indicating that the cash box is closed. If someone tries to open the door of the cash box, light most probably from the burglar's torch falls on the LDR and the LDR directs a signal to the buzzer and LDR for indicating thefts.

II. PROPOSED DESIGN

Our proposed model consist of two parts i.e, the power supply unit and the logic circuit. In the power supply 9v supply is converted to the 5V. the logic circuit operates the buzzer when light falls unit.

The power supply unit consist of a Battery, Capacitor, P-N junction diode and a regulator. Here diode is used to protect the circuit from negative voltage. A voltage regulator (IC7805) is used to regulator the output voltages of the circuit. Here 78 represents the series and 05V represented the output voltages. The capacitor are used to eliminate the ripples. Thus a constant voltages is produced at the output of the regulator, which is applied to the logic circuit.[2]

The logic circuit mainly consist of Light Dependent Resistor (LDR), transistor, LED and a buzzer. Here the LDR sense the intensity of light falling on it and produces an alarm for representing thefts and also switches on the LED.

III. COMPONENTS DESCRIPTION

1. LDR (Light dependent resistor)

A photo resistor or light dependent resistor is a component that is sensitive to light. When light falls upon it then the resistance changes. Values of the resistance of the LDR may change over many orders of magnitude the value of the resistance falling as the level of light increases. It is not uncommon for the values of resistance of an LDR or photo resistor to be several mega ohms in darkness and then to fall to a few hundred ohms in bright light.[4]

It is relatively easy to understand the basics of how an LDR works without delving into complicated explanation. An LDR or photo resistor is made any semiconductor material with a high resistance. It has a high resistance because there are very few electrons that are free and able to move – the vast majority of the electrons are locked into the crystal lattice and unable to move. Therefore in this state there is a high LDR resistance. As light falls on the semiconductor, the light photons are absorbed by the semiconductor lattice and some of their energy is transferred to the electrons. This gives some of them sufficient energy to break free from the crystal lattice so that they can then conduct electricity. This results in a lowering of the resistance of the semiconductor and hence the overall LDR resistance. The process is progressive, and as more light shines on the LDR semiconductor, so more

electrons are released to conduct electricity and the resistance falls further.

2. 7805 VOLATAGE REGULATOR IC

7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels. [5]

Table 1. Pin detail of 7805 Regulator

Pin No	Function	Name
1	Input voltage (5V-18V)	Input
2	Ground (0V)	Ground
3	Regulated output; 5V (4.8V-5.2V)	Output

3. BC547 TRANSISTOR

BC547 is an NPN bi-polar junction transistor. A transistor, stands for transfer of resistance, is commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals.

BC547 is mainly used for amplification and switching purposes. It has a maximum current gain of 800. Its equivalent transistors are BC548 and BC549.

The transistor terminals require a fixed DC voltage to operate in the desired region of its characteristic curves. This is known as the biasing. For amplification applications, the transistor is biased such that it is partly on for all input conditions. The input signal at base is amplified and taken at the emitter. BC547 is used in common emitter configuration for amplifiers. The voltage divider is the commonly used biasing mode. For switching applications, transistor is biased so that it remains fully on if there is a signal at its base. In the absence of base signal, it gets completely off.[3]

4. 1N4007 Diode

The 1N4007 is a general purpose diode with 1000v reverse breakdown. It is a member of 1N4000 series. The 1N4000 series is a family of popular 1A (ampere) general purpose silicon rectifier diodes commonly used in AC adapters for common house hold applications. Blocking voltage varies from so to 1000 volts.

5. BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

IV. CIRCUIT DESCRIPTION AND WORKING

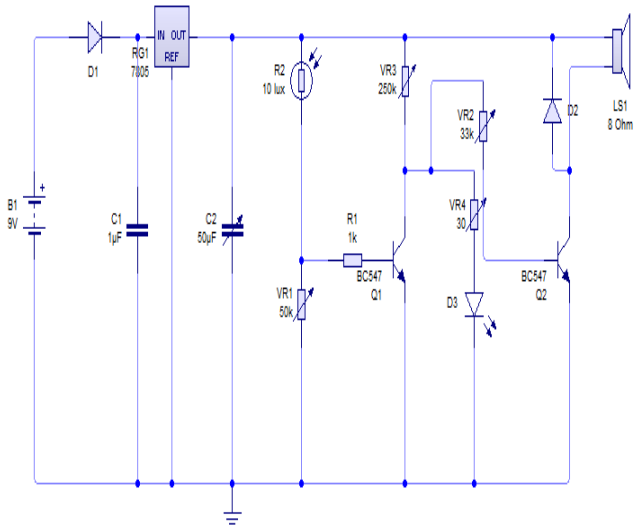

Figure 1. Circuit diagram

This circuit can be divided into two parts. One is the power supply and the other is logic circuit. In the power supply 9v supply is converted to the 5v .The logic circuit operates the buzzer when any light falls on it.

Power supply circuit consists of battery, diode, regulators and capacitors. Initially a 9v battery is connected to the diode. Diode used here is a P-N junction diode of 1N4007 series. In this circuit 1N4007 is connected in the forward bias condition .The main purpose of the diode in this circuit is to protect the circuit from negative voltages .There is a chance of connecting battery with reverse polarities which damages 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 0.7V 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 5v 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.[2]

The logic circuit is built with LDR, transistors, LED, and a buzzer. A 1 kilo ohm variable resistor and a LDR are connected in series. When the LDR is placed in a dark place, the resistance of the LDR will increase. In the same way, when it is placed in the light, then the resistance will decrease. Thus, there is a change in the series resistances.

Whenever an intensity of light falls on the light dependent resistor (LDR) then the resistance of this light dependent resistor will decrease and thus the transistor gets triggered. Also these transistors trigger the buzzer and LED to indicate a theft.

V. PCB PREPARATION FOR PROPOSED MODULE

Fig 2 represents the PCB Layout of our proposed module. This has been developed in the Circuit Wizard Software.

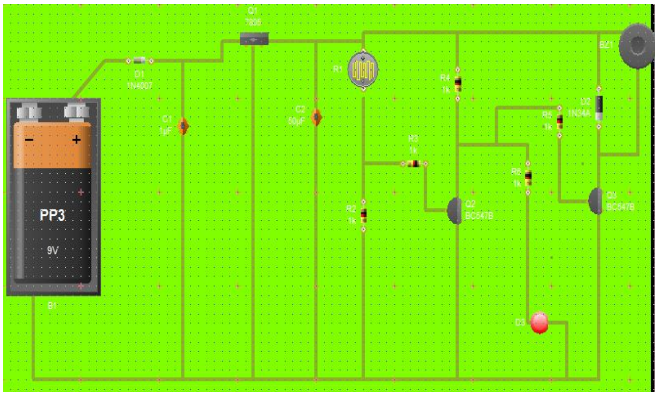

Figure 2. PCB Layout

VI. APPLICATION

Electronic eye control can be used in security applications. It can be used in malls, jeweler shops and banks to provide security for cash boxes and lockers[2]. It can be used door bell circuits and garage door opening circuits.

VII. CONCLUSION AND FUTURE SCOPE

Our proposed project is user friendly. It can be easily implemented. The application of electronic eye in the banks, schools, industries, hotels, residential buildings etc. serves for security purpose. Hence the development of similar devices is necessary. It is relatively cheap. This system is very low power consuming and efficient. We have tested and run the simulation of the magic eye system successfully.

It can be implemented by using a GSM Modem and a microcontroller.

The GSM modem can be interfaced to the microcontroller to send and received SMS to the user in case of theft. It can be used as an automatic door lock system.[4]

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