

# Electronic Eye for Security System

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**Abstract:** - The significant parameters to ensure the safeguard of our household components are-- home security and monitoring. An eye (metaphorically speaking) is to be focused specifically to perform the above two parameters. An electronic eye may substantially ameliorate the safety mechanism of the living house. Incidents of breach of security in the absence of the house owners is increasing day-by-day. In addition to the traditional security systems, there is now dire need of state-of-the-art communication module with a micro controller enabled system to send commands and receive alerts.

An Electronic eye is designed to provide the security system for home and offices. It is a simple, not-so-expensive, easy to use and reliable security system for room locker in homes, offices that supports the use of a sensor and an arduino is used to send the signals to control unit of electronic eye. The buzzer alarm is needed for on-the-spot security purposes.

**Keywords:** Home Security, monitoring, room locker, Arduino, Buzzer alarm.

## I. INTRODUCTION

Security is primary concern with day to day life and properties in our environment. Security is alarming every individual to safe guard their belongings and properties[1]. Reducing the risk of accident or protecting against deliberate attack in our social environment is a function of the degree of safety. The theft chances are increasing with the advancement of technology. Security persons are also unable to curtail the theft chances due to human mistakes. An electronic eye can curtail the theft attempt by triggering the buzzer automatically and also sending the 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 develop a mechanism to reduce the theft chances at any desired points. Robbery has become common and it is increasing day by day[2]. To counter it, high resolution security cameras are available for commercial purpose. These systems are powered entire time and they record the movements of the person throughout the day. A camera based security system requires the presence of a human or a security personnel at all time. This system is really effective only when someone is monitoring the image captured by the camera. The personnel needs to be alert all the time and ready to take necessary action.

In most of the places remote surveillance is needed. These system after sensing the presence or any unusual movement sounds the alarm and also gets on with transferring data through microcontroller control unit to mobile phone via arduino. 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. Usually a home security system consists of CCTV, Web cameras, Buzzer alarm. Web camera or CCTV captures images 24 hours a day to monitor the house. Using a preferred safety and security measures or technique depends on the absolute environment of application[3].

## II. MATERIALS

*Light dependent resister (LDR):*

An LDR is a device which is used as a sensor to sense the intensity of light in the particular room. It's resistance is very high in darkness, almost high as  $3M\Omega$  but when light falls on the LDR, the resistance falls down to a few  $K\Omega$ . The LDR conducts during day-time whereas it does not allow the flow of current when kept in dark. When lights are switched 'ON' an SMS will be sent to the concerned authority using Arduino.

The measured resistance of the LDR that was used in the security model, in dark, is about 2 mega ohm. The resistance measured about 220 kilo ohm when placed in sunlight at 10 o'clock in the morning.

For the turn-on output voltage of LDR[1];

The resistance is estimated with  $R_L = 500/Lux$

A  $3.3K\Omega$  resistance is used to connect the LDR to 5 V.

$$V_0 = 5 \times R_L / (R_L + 3.3)$$

Light Intensity measured is 10 Lux

$$R_L = 500 \times 10 = 5000 \Omega$$

$$V_0 = 5 \times 5000 / (5000 + 3.3)$$

$$V_0 = 10.39 \text{ V.}$$

The output voltage of the LDR is estimated as 10.39 V. If the voltage output is greater than 10.39 V, then the lights will be 'ON' and an alert message will be send to the concerned person.

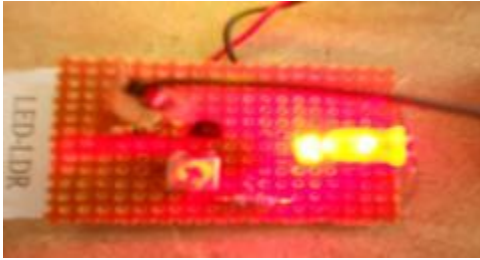


Fig. 1. LDR sensor.

#### Arduino:

The Arduino Uno is a microcontroller board which is based on the ATmega328 (datasheet). ARDUINO plays a very pivotal role in the whole project. It has 14 digital input/output pins, 6 of which can be used as PWM outputs, 6 as analog inputs and also a 16 MHz crystal oscillator.

#### Switching Module:

A command sent through SMS can be used to switch the appliance ON/OFF. A micro controller is used to control the switching module[1]. The switching module is in the form of a relay which allows a low power circuit to switch a relatively high current on or off.

#### Binary ripple counter (CD4060):

The MM74HC4060 is a high speed 14-stage binary counter, which increments on the falling edge (negative transition) of the input clock, and all the outputs are reset to a low level by applying a logical high on their reset input. The ripple counter sets the frequency for buzzer, and load activation.

Time cycle at output n is  $t = 2^n / f$  seconds

Where n=selected Q output and  $f = 1 / 2.5(R1 \times C1)$  Hz ; R1 is the resistor at pin 10 in Ohms and C1, the capacitor at pin 9 in Farads.

We have used R1=1M and C1=0.22 microF. So  $f=1.8$  Hz.

At Q3-> buzzer so  $2^n = 2 \times 2 \times 2 = 8$  and at Q4->load so  $2^n = 2 \times 2 \times 2 \times 2 = 16$ .

Hence for Q3,  $t=4.4$  sec and for Q4,  $t=8$ sec.



Fig 2. IC CD4060

#### TRANSISTOR (BC547 NPN)

BC547 is an NPN bi-polar junction transistor. It is mainly used for amplification and switching purposes. It has a maximum current gain of 800. The transistor terminals need to be biased for a fixed DC voltage to operate in the desired region of its characteristic curves.

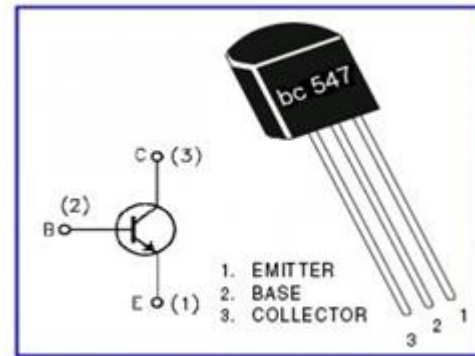


Fig 3. BC547 N-P-N Transistor

#### Buzzer

It is used to create a sound alarm when ever there is any burglary attempt. A transistor BC547 is used to drive the buzzer. The transistor provides the required current amplification. The specifications of the buzzer are:

V=5V and

I=1A



Fig 4. Buzzer

### III. WORKING OF THE PROJECT

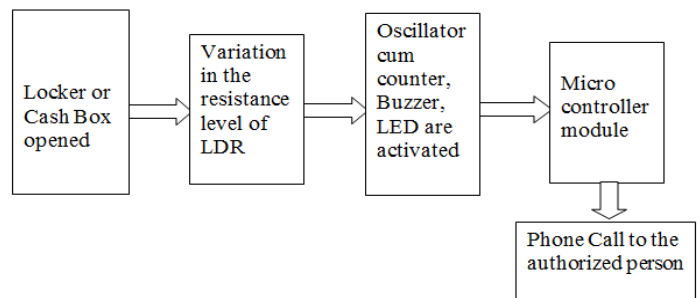


Fig 5. Block Diagram Depicting the Working Of the Electronic Eye Security System

The most important component in the working of this system is the Light Dependent Resistor (LDR).

When the cash box is opened there will be increment in the light intensity which may be due to the natural sunlight or from the light radiation coming out from the torch when light falls on the LDR which results in decreasing its resistance. More current flows through the LDR which then activates the 14-stage binary ripple counter. At the preset frequency of oscillations the alarm sounds and the LED blinks. The circuit of the electronic eye security control system is separated into two parts- logic circuit and the microcontroller. The power supply circuit is designed with a battery, capacitors, P-N junction diode and regulators. The diode is connected in forward bias mode and it protects the circuit from negative voltages. When the battery is connected in reverse polarity, there is a chance of circuit damage. So the diode is connected in the forward bias, that allows the flow of current in only one direction. The voltage across the diode is 0.7V. A voltage regulator (IC 7805) is used to regulate the o/p voltage of the circuit. IC 7805 is used for obtaining precise voltage regulation. Thus 5 volts is generated at the o/p of the voltage regulator. To eliminate the ripples two capacitors are connected before and after of the voltage regulator. Thus the voltage which is generated from the voltage regulator is applied to the logic circuit. The logic circuit is built with transistors, LDR and a buzzer. A 220 kilo ohm resistor and a LDR are connected in series. The LDR is the heart of the circuit. When the cash box is closed, the circuit is kept in darkness. The resistance of the LDR is very high in the order of mega-ohms. But when the cash box is opened or the thief flashes light from a torch or any other illuminating source, the resistance of the LDR drops massively and falls down to a few kilo-ohms. Thus, there is a change in the series resistances. When the LDR is in the dark, then it has high resistance value and generates the logic high value at the o/p. When the LDR is in light, then it has low resistance value and generates the low logic value. A 14-stage oscillator binary counter cum frequency divider is used for timing applications. It detects the intensity of light falling on the light dependent resistor and hence it counts the on/off period of alarm.

#### IV. RESULT

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 Dependant Resistor or the photoresistor sensor detected the entry of the person and the state of the sensor is communicated to the authorized person's mobile with the support of arduino UNO board. 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, a switch provided to the locker cause to send the phone call to the authorized person. 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

#### V. CONCLUSION

The method discussed in this paper has achieved the target to monitor the locker's in homes using the SMS-based system satisfying the user needs and requirements. From the convenience of a simple cell phone, a user is able to monitor virtually the lockers in the house. The study produced more favorable findings to implement this kind of security support to home and banking systems.

Future works may be done on enhancing 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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