BURGLAR ALARM

A lab-based Project report submitted to

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

In partial fulfilment of the Requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY

in

ELECTRONICS AND COMMUNICATION ENGINEERING

by

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DECLARATION

We hereby declare that the works is being presented in this lab-based project "**LASER SECURITY ALARM USING 555 TIMER**" submitted towards the partial fulfilment of requirements for the award of the degree of Bachelor of Technology in Electronics and Communication Engineering in VR Siddhartha Engineering College, is authentic record of our work carried out under the supervision of **Dr.A.B.Yadav SIR** in ECE department, VR Siddhartha Engineering College Vijayawada .The mater embodied in this report has not been submitted by us for the award of any other degree.

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CERTIFICATE

This is to certify that the Project report entitled “LASER SECURITY ALARM USING 555 TIMER” that is being submitted by J.Eswara Rao(218W5A0414), Iliyas Khan (218W5A0416), M.Harshavardhan (208W1A04G5),G.Anudeep (208W1A04E4), V.Joseph(208W1A04F0), G.Vinay Sai (208W1A04E3) in partial fulfilment for the award of the Degree of Bachelor of Technology in Electronics and Communication Engineering to the VR Siddhartha Engineering College affiliated to JNTUK, Kakinada is a record of bona fide work carried out during the AY 2021-22.

Dr.A.B.Yadav Sir

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(Head Of the Department)

INTRODUCTION

Need of security is the basic necessity of any individual. The feeling that we are safe and everything around us is all right is imperative for a peaceful living. But in this unsafe world, when crime, terror and threats are on their peak, how can one attain that sense of security? Here, laser security system provides us with a solution and for this reason more and more people are installing them in order to stay safe and secure. Various electronic security systems can be used at home and other important working places for security and safety purposes. Laser Security alarm is a device used for security purposes. It has a wide application in fields of security and defence starting from the security of simple house hold material to a very high valued material of an organization. They once used to be expensive solutions for security needs. Owing to cost cutting andfast technological advancements, this form of security system is becoming more affordable.

Lasers differ from other light sources in a few significant ways. There are two features that are important for security systems. Unlike a light bulb or flashlight, laser light doesn't spread out, it is a narrow beam .And laser light is essentially a single colour. Because laser light doesn't spread much, it can be sent it a long way and still have enough energy in a small area to trigger the security system detector. Because it's a single wavelength, it can put a blocking filter on the detector to let laser light through without letting background light onto the detector.

Laser light travels in a straight line. For instance, to protect the front of the yard, putting the laser at one comer and the detector at the other corner would do the job. That's not a very practical configuration, though. More typically, if it is needed to protect the perimeter of a room, or at least the enhances. So laser security systems start with a laser pointing to a small mirror. The first mirror is angled to direct the beam to a second small mirror, and so on until the final mirror directs the beam to the detector. If the beam is interrupted anywhere between the laser and the detector, the electronics will put the warning signal.

PRINCIPLE

There are three essential components to a laser security system: a laser, a detector and sensing circuit. The laser is a concentrated light source that puts out a straight line, 'pencil beam, of light of a single colour. The detector is sensitive to light and puts out a voltage when the laser light hits it. The detector is connected to the sensing circuit. When the laser beam is interrupted and cannot reach the detector, its voltage output changes, and the circuit sense the change and put out a warning signal.

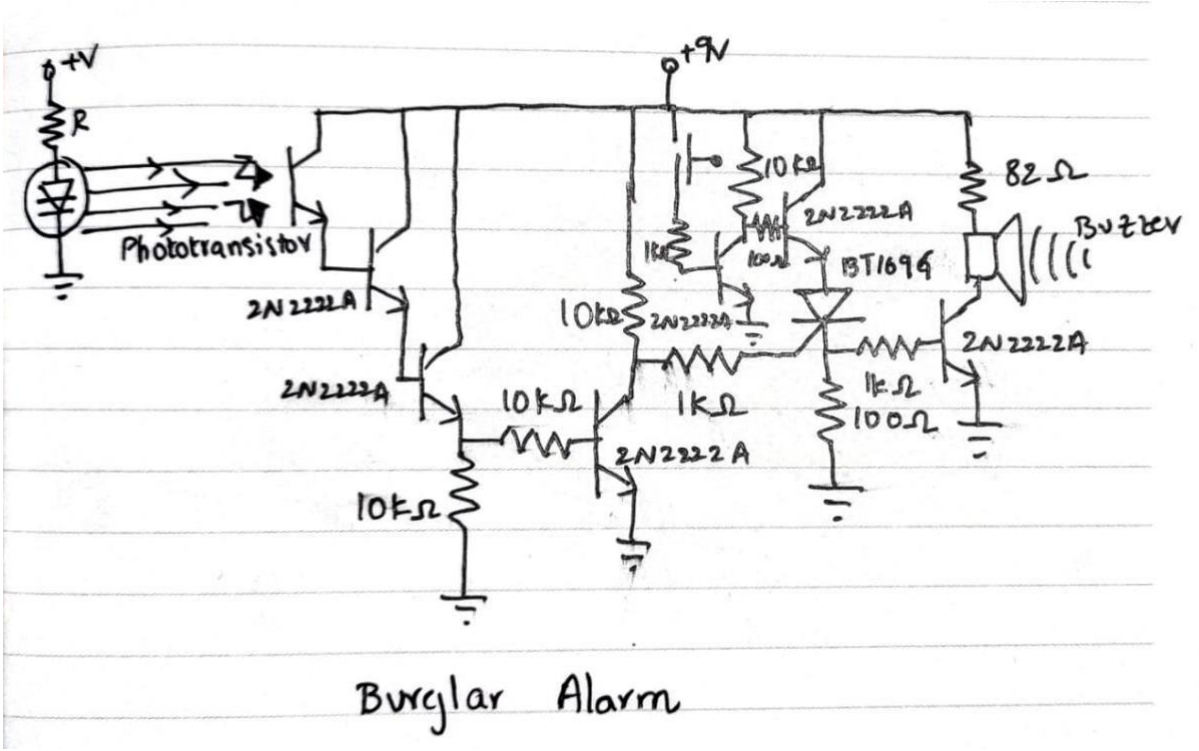
WORKING

The basic working principle of this circuit is Here, we used switching transistors, when someone or something cross the lazer light, the sudden changes in light switches/triggers the SCR, the buzzer is connected to the SCR. The buzzer continuously produces/generates Sound. The administrator can reset the alarm using reset Switch.

OBJECTIVE

The core objective of this project is to design a laser security system with laser and light dependent resistor.

CIRCUIT DIAGRAM



COMPONENTS REQUIRED:

- SCR
- Resistors
- Small Buzzer
- NPN Transistor(BC547)
- Push Button
- Laser Pointer
- 9V Battery
- Connecting Wires
- Zero PCB
- PHOTO TRANSISTOR
- SOLDERING

COMPONENT DESCRIPTION

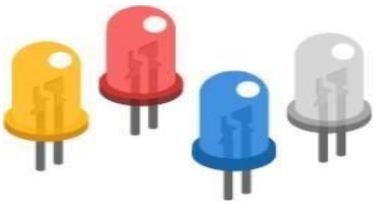
LASER:

A laser is a device that emits light through a process of optical amplification based on the stimulated emission of electromagnetic radiation. The term "laser" originated as an acronym for "light amplification by stimulated emission of radiation". The first laser was built in 1960 by Theodore H.

A laser differs from other sources of light in that it emits light coherently. Spatial coherence allows a laser to be focused to a tight spot, enabling applications such as laser cutting and lithography. Spatial coherence also allows a laser beam to stay narrow over great distances, enabling applications such as laser pointers. Lasers can also have high temporal coherence, which allows them to emit light with a very narrow spectrum,
i.e., they can emit a single colour of light. Temporal coherence can be used to produce pulses of light as short as a femtosecond.

LED (Light Emitting Diode):

Light-emitting diodes are heavily doped p-n junctions. Based on the semiconductor material used and the amount of doping, an LED will emit a coloured light at a particular spectral wavelength when forward biased. An LED is encapsulated with a transparent cover so that emitted light can come out.The energy is released in the form of



photons on recombination. In standard diodes, the energy is released in the form of heat. But in lightemitting diodes, theenergy is released in the form of photons. We call this phenomenon electroluminescence.

Electroluminescence is an optical phenomenon, and electrical phenomenon where a material emits light in response to an electric current passed through it. As the forward voltage increases, the intensity of the light increases and reaches a maximum.

BUZZER:

An audio signaling device like a beeper or

buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. It is powered through DC voltage and based on the various designs, it can generate different sounds like alarm, music, bell & siren.

TRANSISTOR:

A transistor is a device that regulates current or voltage flow and acts as a switch or gate for electronic signals. Transistors consist of three layers of a semiconductor material, each capable of carrying a current.

A small change in the current or voltage at the inner semiconductor layer (which acts as the control electrode) produces a large, rapid change in the current passing through the entire component. The component can thus act as a switch, opening and closing an electronic gate many times per second.

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, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity.

BATTERY:

An electric **battery** is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal.

SOLDERING

. Soldering is a process in which two or more items are joined together by melting and putting a filler metal into the joint, the filler metal having a lower melting point than the adjoining metal. Unlike welding, soldering does not involve melting the work pieces.

Zero PCB:

Zero PCB is basically a general-purpose printed circuit board (PCB), also known as perfboard or DOT PCB. It is a thin rigid copper sheet with holes pre-drilled at standard intervals across a grid with 2.54mm (0.1-inch) spacing between holes. Each hole is encircled by a round or square copper pad so that component lead can be inserted into the hole and soldered around the pad without short-circuiting the nearby pads and other leads. For connecting the lead of component with another lead, solder these together or join these using a suitable conducting wire.

PHOTO TRANSISTOR :

Phototransistor is an electronic switching and current amplification component which relieson exposure to light to operate. When light falls on the junction, reverse current flows which are proportional to the luminance. Phototransistors are used extensively to detect light pulses and convert them into digital electrical signals. These are operated by light rather than electric current. Providing a large amount of gain, low cost and these phototransistors might be used in numerous applications

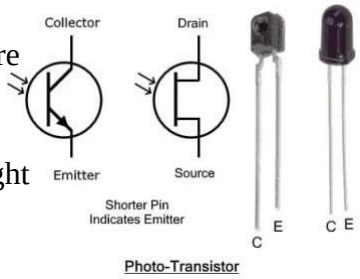
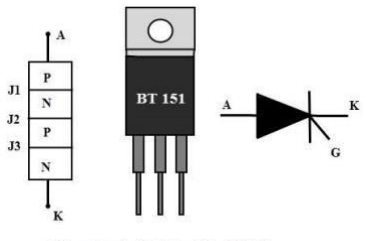


Photo-Transistor

Silicon Controlled Rectifier :

The Silicon Controlled Rectifier (SCR) is the most important and mostly used member of the thyristor family. SCR can be used for different applications like rectification, regulation of power and inversion, etc. Like a diode, SCR is a unidirectional device that direction and opposes in another direction.



Silicon Controlled Rectifier (SCR)

SCR is a three terminal device; anode, cathode and gate as shown in figure. SCR has built in feature to turn ON or OFF and its switching is controlled by biasing conditions and gate input terminal.

This results in varying the average power delivered at the load , by varying the ON periods of the SCR. It can handle several thousands of voltages and currents. SCR symbol and its terminals are shown in figure.

MODEL CIRCUIT

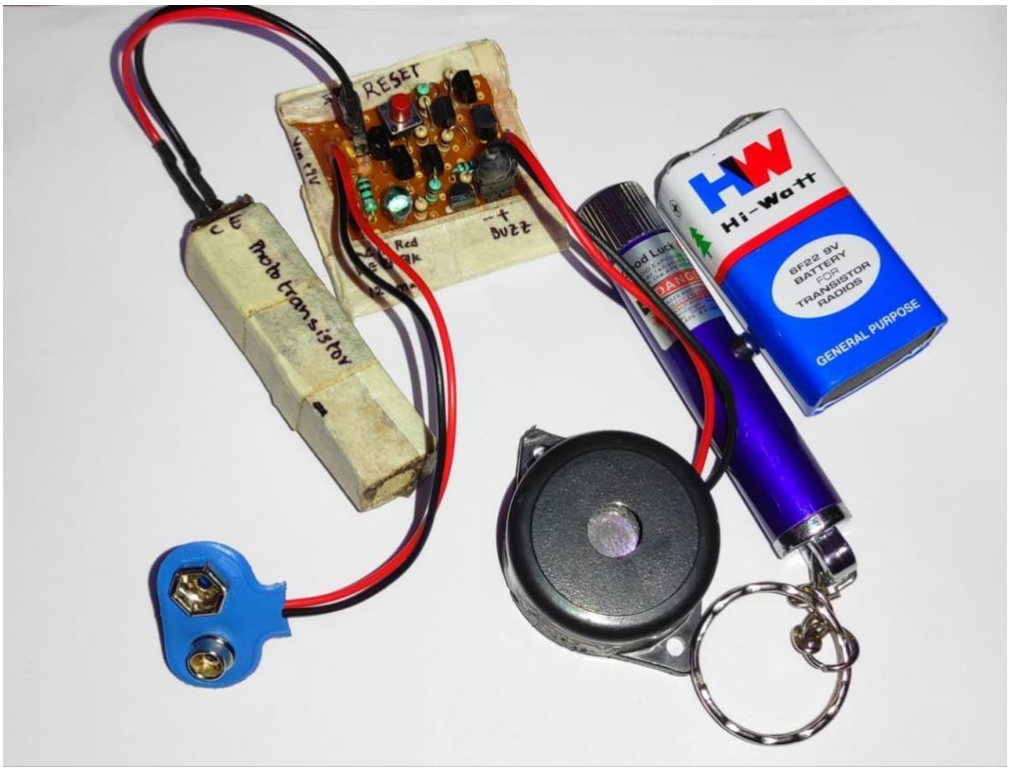


Fig : Circuit of laser security alarm using 555 timer

RESULTS

ADVANTAGES

- These are easy to install and work at both within as well as outside houses.
- These are very effective perimeter alarm systems around properties.
- In indoor systems can utilize the normal power outlets and jacks making them inconspicuous.
- At outside these can be easily hidden behind the bushes or plants without causing any damage.
- They consume less power when compared to the laser system as the whole, which is expensive.
- These laser systems can be installed in homes either by self or by hiring a technical person.
- By technological innovations cost of the security systems has been cut to a large extent. So, making laser systems one among affordable security system options can be very safe.
- Lasers are strong in beam width and can be focused on the perfect target.
- By using laser security system one can be safe in the case of harmful effects to the body. As the beam width used in the laser security systems are not strong beam widths.
- The circuit, construction and setup for the Laser Security System are very simple.
- If use with a battery, the laser security system can work even when there is a power outage.

DISADVANTAGES

- The laser security system works only if the laser is obstructed. If the intruder passes without obstructing the laser, it is considered as a failure.
- In order to secure a larger area, we need more lasers and corresponding sensors.

APPLICATIONS

- Laser Security System can be used in safety lockers in our homes, where even if the locker's code is hacked, it acts as an additional layer of security.
- Apart from security systems, this laser based setup can also be used to check if pets or babies crossed a certain boundary.

CONCLUSION

Nowadays, many thefts are taking place in many places due to lack of security. So for security purpose we can use laser security alarm.

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