TRANSISTOR BASED SECURITY ALARM

20ECT41-ELECTRONIC CIRCUITS
A MINI PROJECT REPORT

ABSTRACT

This project deals with a model of transistor based laser security alarm system design. Laser security systems used to be difficult to install and rarely available to anyone other than the super-rich. Now, there are dozens of different security systems on the market that utilize lasers and can effectively protect everything from small apartments and businesses to large areas of property. Most home laser security systems consist of two parts: a basic alarm unit and an infrared motion detector. Laser based security system is a type of security and alarm system that uses laser light and a light sensor. Why a laser to be used? It is known that a laser light goes through long distance without any scattering effect (disturbing) and it is only visible at source and the destination point so it can be used as mediator between source and destination but to analyses the source a sensor is need, here the use of LDR is applicable. Just analysis is not enough alerting should be done in general alerting is sound effect so here buzzer act as alerting. Making use of this, a laser security system is designed. Its working: There is a laser diode that generates the laser beam which continuously strikes over the Light dependent resister sensors. When any person crosses the path, it inhibits laser to reach LDR and the sensor generate a low which is read by controller to power on the buzzer.A laser alarm system operates by projecting a beam of invisible laser light across a doorway or window opening. When the light is broken, it activates a buzzer or alarm. The principles are very similar to those of lower tech burglar alarms. A laser alarm requires only slightly more sophisticated electronics and can be put together by anyone with a soldering gun and a knack for tinkering with basic circuits and transistors.

CONTENTS

CHAPTER 1

1.1 INTRODUCTION:

Security alarms are an important part of many systems these days. They are designed to indicate the forbidden movements or actions such as prohibited entry at any place or taking any prohibited thing or device. Security alarms systems may use different sensors for different indications like motion sensors, laser light with light sensors, infrared sensors etcThe laser-based security alarm system is one of the types of security alarm systems that consists of laser light and a light sensorSecurity alarms are an important part of many systems these days. They are designed to indicate the forbidden movements or actions such as prohibited entry at any place or taking any prohibited thing or device. Security alarms systems may use different sensors for different indications like motion sensors, laser light with light sensors, infrared sensors etc.The laser-based security alarm system is one of the types of security alarm systems that consists of laser light and a light sensor. It basically works by emitting a beam of light in a certain path, if the path of light is broken the change in the output voltage is detected by the detection unit which generates an alarm.They are effectively used in different buildings and residential apartments for smart monitoring. A simple circuit is explained in this post which uses easily available components to operate. This system for security uses the combination of LASER light and LDR(Light Dependent Resistor). The LDR module has an onboard potentiometer to adjust the sensitivity of LDR, so that it only senses laser light falling onto it. The concept is quite simple and similar to what we see in movies where antique, priceless ornaments are protected under laser lights. As someone crosses these lights, an alarm runs on to indicate unauthorised presence. This project works similarly. In normal conditions, where there is always laser light falling on the LDR, the LDR module always gives a high signal to microcontroller. When someone crosses this laser light, it will behave as an obstruction between the LDR module and laser light, resulting in no light falling on LDR. In such cases LDR module gives a low signal to the microcontroller, which indicates it to switch on an alarm

CHAPTER 2

1.2 BLOCK DIAGRAM:

LASER	→	LDR

↓

LDR

LASER BEAM

↓

| NO ← | OBJECT DETECTED BY LASER | → YES |

| BUZZER OFF | | BUZZER ON |
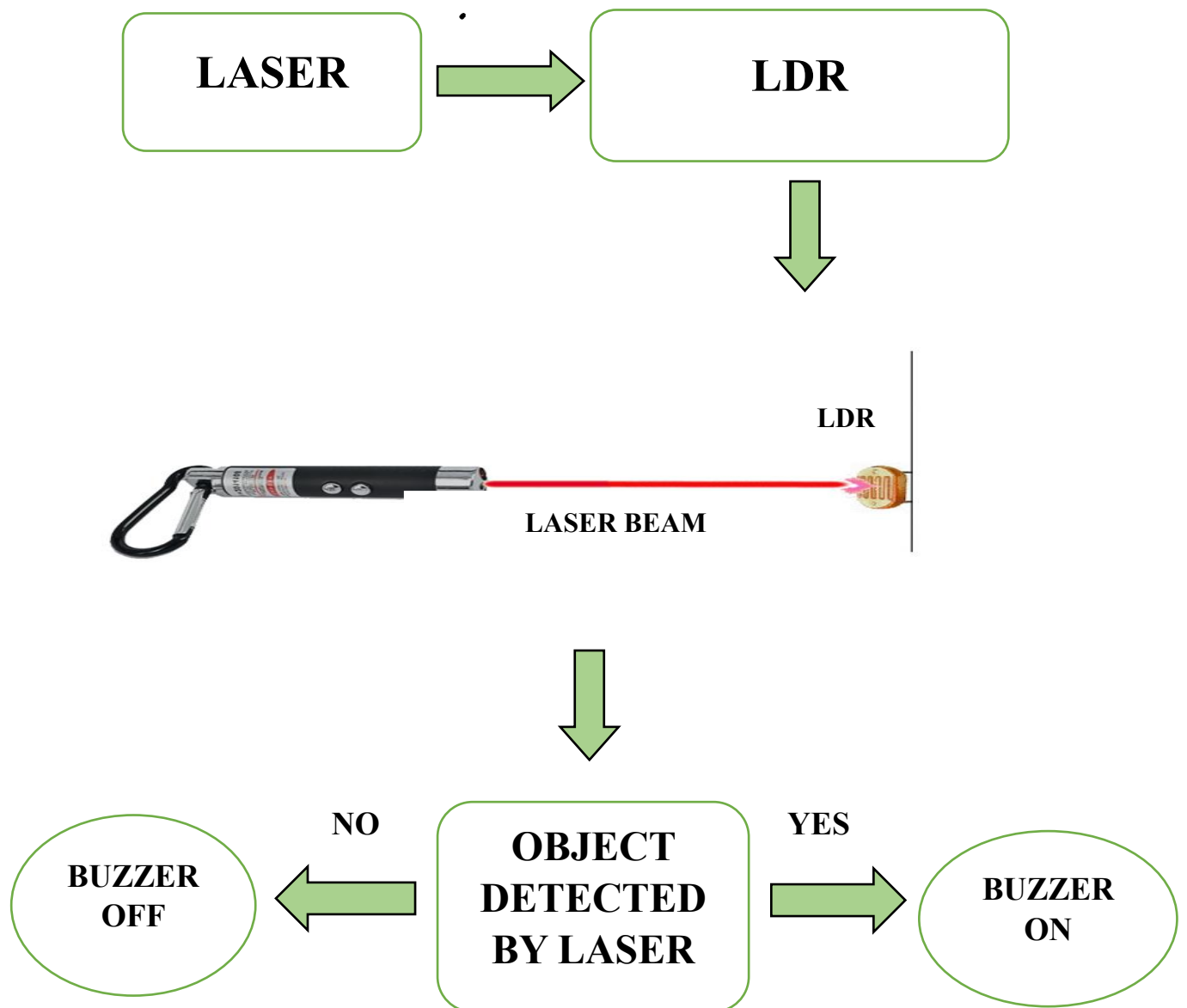
BLOCK DIAGRAM OF TRANSISTOR BASED

LASER SECURITY ALARM
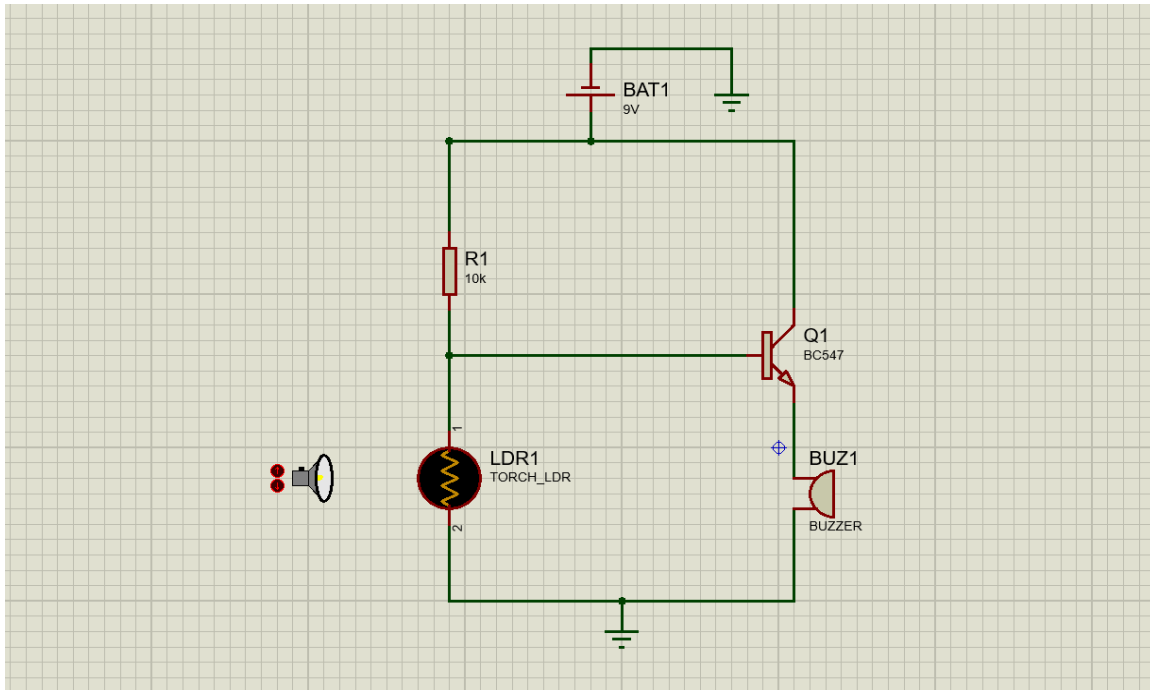
1.4 CIRCUIT DIAGRAM:

FIGURE 1.3.1

FIGURE 1.3.1 is the circuit diagram of transistor based security alarm done in PROTEUS simulation

COMPONENTS REQUIRED:

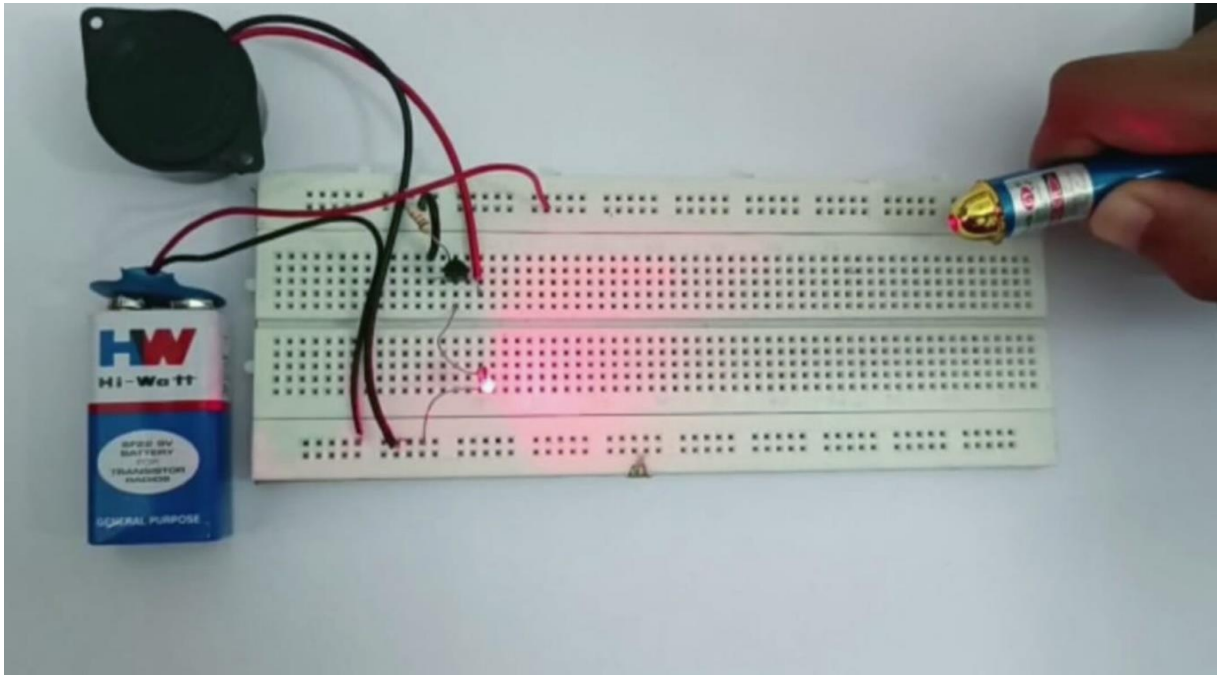| S.NO.	COMPONENTS	RANGE	QUANTITY
1.	TRANSISTOR	BC547	1
2.	LDR	-	1
3.	BUZZER	5V	1
4.	RESISTOR	10K	1
5.	BATTERY	9V	1
6.	BREADBOARD	-	1
7.	CONNECTING WIRES	-	AS REQUIRED

HARDWARE CONNECTION:

FIGURE 1.3.2

FIGURE 1.3.2 is the breadboard connection of the transistor based laser security alarm as per the circuit diagram.The circuit is in ON condition,when the laser beam is interrupted the buzzer will beep.

CHAPTER 2

2.1 METHODOLOGY:

- The laser beam and LDR module system is highly sensitive with a great range of working.
- The system senses the light emitted by the laser falling over the LDR connected with the circuit.
- Whenever the beam of light is interrupted by any means,it's output voltage changes making the transistor ON and it triggers the buzzer.

2.2 WORKING:

The working of the circuit is simply based on a voltage divider circuit. As the light intensity on LDR increases its resistance decreases, so when laser light is falling on LDR, its resistance goes very low hence the 9volt supply gets connected to the ground with the help of a 10K resistor, and in this way base of the transistor receives low value or in other words transistor is OFF.

Now as soon as light intensity decreases or laser gets interrupted by someone, LDR resistance increases which in turn gives a high value to the base of the transistor, and hence transistor turns on, and finally, the buzzer sounds up. In this way, our project is working and providing us with a security system using a laser. The LDR has to be placed in dark place or inside a case so that the other source of light except the laser beam doesn't affect the LDR. This helps the circuit to work faster and properly.

CHAPTER 3

3.1 RESULT AND DISCUSSION:
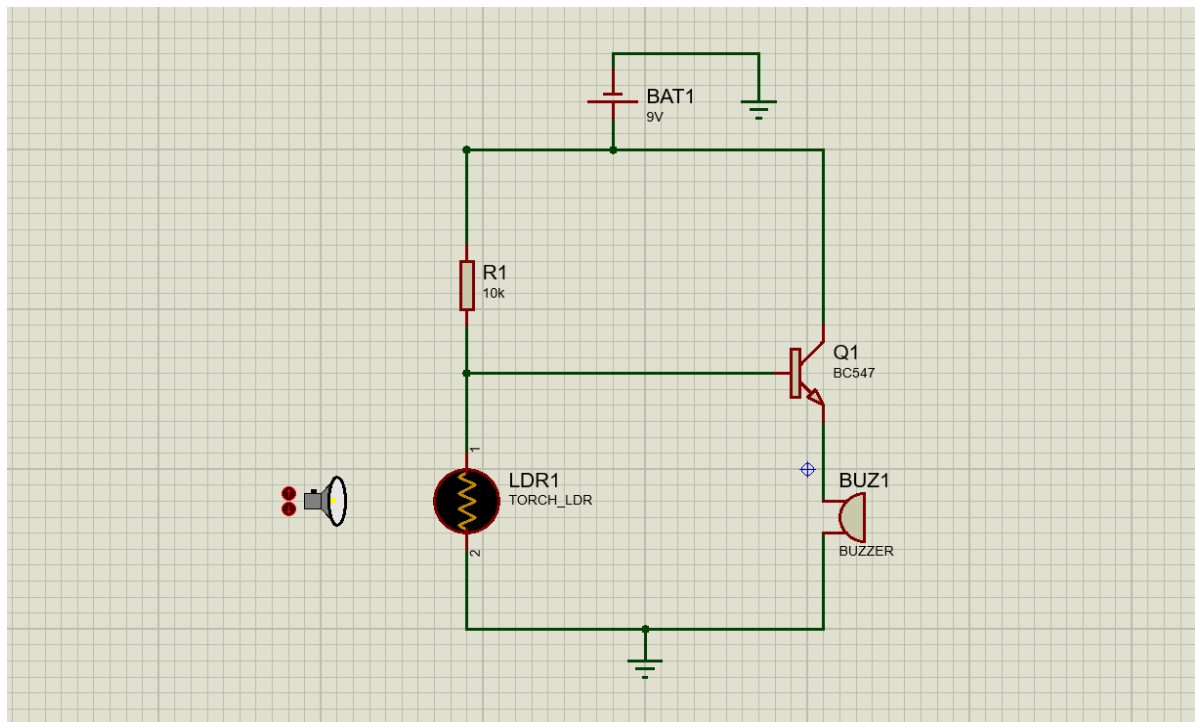
3.1.1 SIMULATION RESULT

FIGURE 3.1.1

SIMULATION OUTPUT

In the above figure 3.1.1,when the laser beam falls on the LDR the transistor is in OFF condition.But when the laser beam is interrupted by any object the LDR develops an output voltage and transistor becomes ON and the buzzer will beep indicating any intruders.

SOFTWARE REQUIREMENT:

- Proteus 8 professional
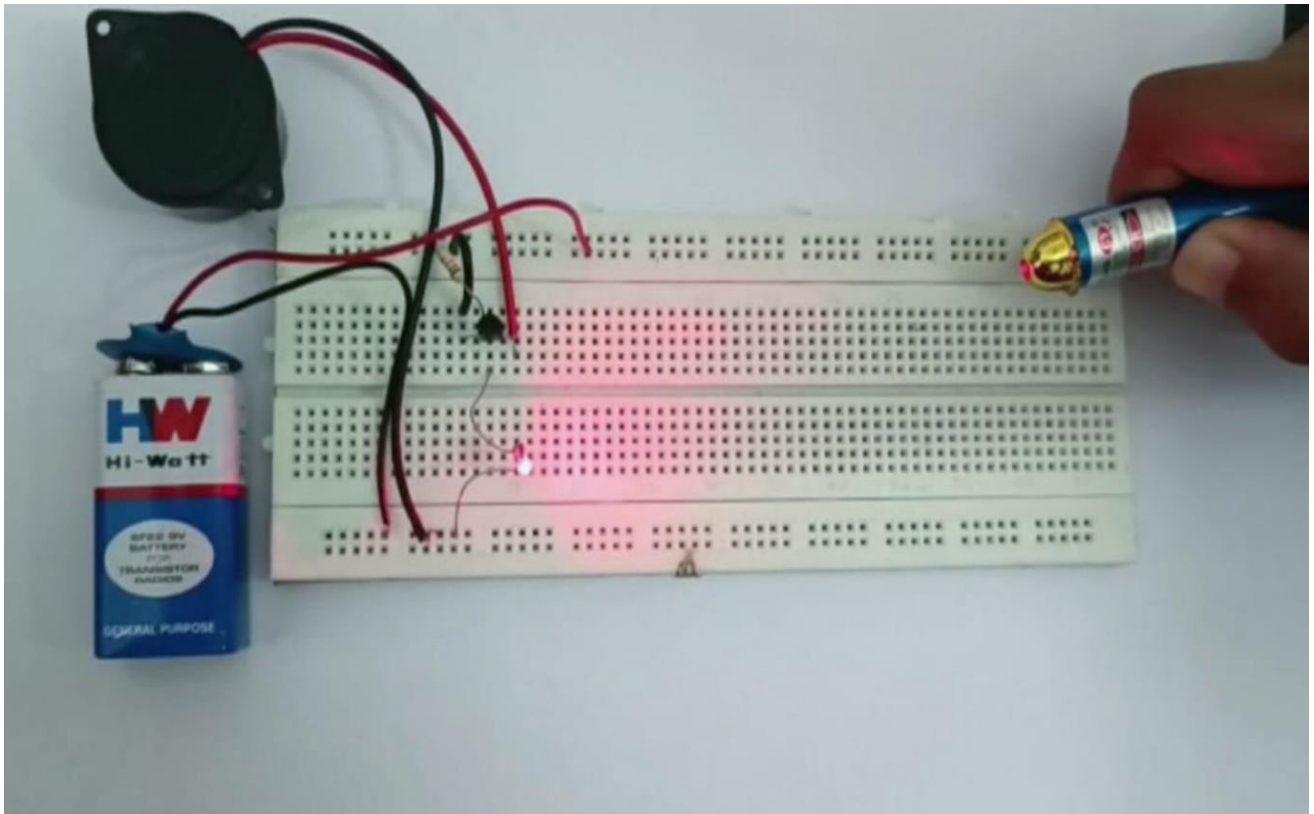- PCB Layoiut

3.1.2 HARDWARE RESULT:

FIGURE 3.1.2
HARDWARE OUTPUT

Figure 3.1.2 displays the breadboard output of Transistor based security alarm using laser.When the laser beam falling over the LDR is interrupted by the object in the field of laser net, hence the LDR develops an output voltage making the transistor ON and the alarm rings showing the sign of any intruders.The buzzer is turned on as the laser beam falling on the LDR is interrupted. The experimental model was made according to the circuit diagram and the result was as expected.

QR CODE FOR BREADBOARD SETUP AND WORKING:

LINK:https://drive.google.com/file/d/1mYWA93ouNKzcl7oTTDnzbSxrSTH_is9q/view?us
p=share_link

3.2CONCLUSION:

Transistor based laser security system provides us the security against any crime, theft in our day-to-day life and so people are installing them in order to stay safe, secure and sound.

Using this system robbery, thefts & crime can be avoided to large extend. Avoiding thieves results in the safety of our financial assets and thereby this system provides us protection against all.

The Laser & LDR system is highly sensitive with a great range of working. The system senses the light emitted by the Laser falling over the LDR connected with the circuit. Whenever the beam of light is interrupted by any means, it triggers the alarm or siren.

This highly reactive approach has low computational requirement; therefore, it is well suited to surveillance, industrial application and smart environments.

3.3 REFERENCE:

https://www.electronicshub.org

https://www.seminarsonly.com/Engineering-Projects/Physics/laser-security-system.php-Circuit diagram