

Laser Based Alarm System with Arduino Uno

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Abstract

A study was done to help people secure their houses due to an increase in crime involving the design and execution of an Arduino-based security system employing laser light. When the switch is pressed, this laser security system starts working. The buzzer will then automatically sound if anything or anyone entered the space between the laser light and the light-dependent resistor. The test results indicate that the prototype is 80% successful. The capabilities of the laser, light-dependent resistor, and Arduino as the microcontroller were discovered and used by the researchers. The researchers draw the conclusion that the study was successful as a result.

Keywords: Arduino, microcontroller, light-dependent resistor, prototype, security, LDR, laser security.

Introduction

Having a sense of security is crucial in daily life. The fundamental need of every person is security. For a peaceful life, it is essential that we feel secure and that everything is okay. However, in this dangerous world where crime, terror, and threats are at their highest, how can one cultivate a sense of security? We have a solution in the form of laser security systems, and more and more people are installing them as a result in order to feel safe

and secure. A laser security alarm is a tool used for safety. It has numerous applications in the security and defense sectors, ranging from the protection of low-value household items to very high-value assets of an organization. They were once very expensive options for security requirements. This type of security system is becoming more accessible due to cost-cutting measures and rapid technological advancements.

In this project, we used the Laser Diode Module KY-008 to design a Laser Light Security System using Arduino with Alarm. The idea behind the project is to build a security system. The buzzer alarm will begin to ring whenever any object blocks the LASER ray. This project can be implemented anywhere; in addition to buildings or other structures, it can also be used to secure other valuable items like jewelry, diamonds, priceless antiques in museums, etc. With the help of a LASER beam security system, many people secure their homes, offices, shops, warehouses, and other structures.

Objective

This project's main goal is to create and put into use an Arduino-based laser-light security system, determine the

functions of an Arduino, laser, and light dependent resistor; Use the functions of the laser, light dependent resistor, and Arduino;

and Create a program that will sound the alarm when something blocks the laser's path.

Scope of Project

The following scopes are included in the laser-based security system powered by Arduino:

- This project has the capacity to alert people in the area.
- This project is not reliant on the local area's primary power source.
- By human vision, the laser light is hardly perceptible.

Other Significations of Laser Security System

An additional layer of security through a specific area can be provided by an Arduino-based security system,

that uses laser light. This project can be used for other purposes besides security, such as safety. For instance, some machines will stop working if a hand or other body part is placed in its path because the laser light will be blocked. This project can assist other researchers in innovating, growing, and enhancing their current projects.

Components Required

- Arduino UNO Board
- LASER Diode Module KY-008 Buzzer
- LDR
- Buzzer
- Resistors (10k)
- Push Button Switch
- Bread Board
- Jumper Wires

Arduino UNO Board

An open-source microcontroller board called Arduino Uno is built around the ATmega328P processor. Inputs include 6 analog inputs, 14 digital I/O pins, a USB port, a power jack, an ICSP header, and a reset button. All the modules required to support the microcontroller are present in it. Simply use a USB cable to connect it to a computer or an adapter to supply power to get it going.

Laser Diode Module

A laser diode module is a device that uses a semiconductor laser diode to produce laser light. Typically, it consists of a housing, a lens, and a laser diode chip. Through the process of stimulated emission, in which electrons are excited to a higher energy level and then emit photons as they return to a lower energy level, the laser diode chip produces light. The lens in a laser diode module collimates or concentrates the laser beam into a parallel beam. The housing supports the diode mechanically and shields it from harm from the outside world. Numerous industries, such as telecommunications, barcode scanning, laser pointers, and medical equipment, use laser diode modules. They are smaller, use less energy, and are more efficient than other kinds of lasers, among other benefits.

LDR

An electronic component known as an LDR, or light dependent resistor, alters its resistance in response to the amount of light

that strikes its surface. This indicates that the LDR has a low resistance when ambient light levels are high and a high resistance when ambient light levels are low. The voltage divider circuit can be used to measure this change in resistance, making the LDR useful for a variety of electronic tasks.

Buzzer

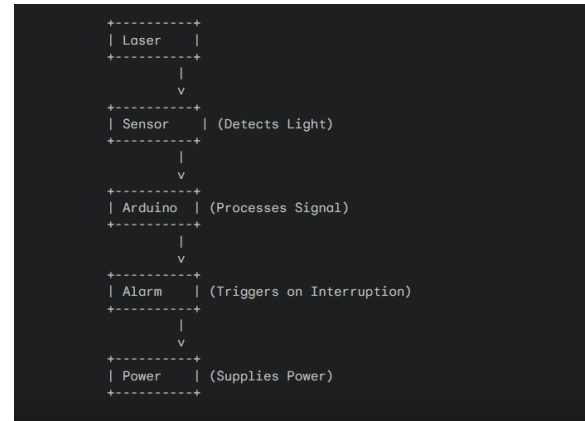
You can use this buzzer by simply providing it with a DC power supply that ranges from 4V to 9V. Simple 9V batteries can also be used, but a regulated +5V or +6V DC supply is advised. The buzzer is typically connected to a switching circuit that allows it to be turned ON or OFF at specific times and intervals.

Literature Review

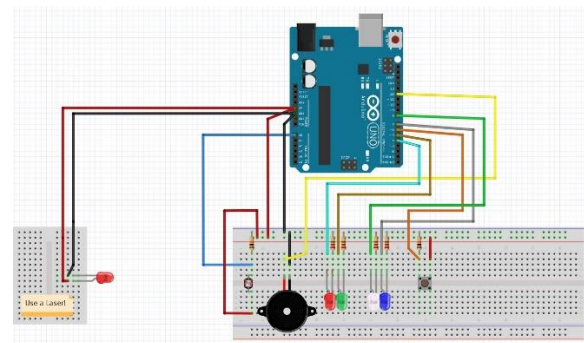
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Methodology

Experimental Block Diagram



Circuit Diagram



Working Procedure

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Source Code/Program:

```
void setup() {  
    pinMode(11,OUTPUT); //Buzzer Pin  
    pinMode(2,OUTPUT);  
    pinMode(A0,INPUT); // Light Sensor  
    delay(500);  
    Serial.begin(9600);  
}  
  
void loop() {  
    digitalWrite(2,HIGH);  
    int Read = analogRead(A0);  
    if (Read(< 1018) {  
        digitalWrite(11,HIGH);  
        delay(300);  
        digitalWrite(11,LOW);  
        delay(100);  
    }  
    else {  
        digitalWrite(11,LOW);  
    }  
}
```

References

- Olarewaju .I. K, Ayodele, O. E, Michael. F. O, Alaba. E. S, Abiodun. R. O, 2017. “Design and Construction of an Automatic Home Security System Based on GSM Technology and Embedded Microcontroller Unit”, American Journal of Electrical and Computer Engineering, Vol. 1,No. 1, pp. 25-32, Doi: 10.11648/j.ajece.20170101.14
- Zungeru. A. M, Kolo. J. G, Olumide. I, September 2012. “A Simple and Reliable Touch Sensitive Security System”, International Journal of Network Security & its Applications, ISSN 0975-2307, Volume: 4; Issue: 5; pp. 149-165, DOI: 10.5121/ijnsa.2012.4512
- British Security Industry Association (BISA), “Journal on security system section strategy for intruder alarm system”, Page 1-3, April 2005. Accessed at <https://www.thenbs.com/PublicationIndex/documents?Pub%20=BSIA>
- “History of Security Alarms”, <http://www.icee.org/organization/history%20center/fire%20alarm.html> Mohd. Saifuzzaman, AshrafHossainKhan, NazmunNessa Moon, Fernaz NarinNur, “Smart Security for an Organization based on IoT”, International Journal of Computer Applications Volume 165 –No.10, May 2017
- Suresh.S, J.Bhavaya, S.Sakshi, K.Varun and G.Debarshi, “Home Monitoring and Security System”, ICT in Business Industry & Government (ICTBIG)
- E.Kanniga, M .Sundararajan, “Design of 8051 Microcontroller Based Security System with a Laser Beam Network”, Indian Journal of Science and Technology, Vol 8
- Waqar Ali, Ghulam Dustgeer, Muhammad Awais, Munam Ali Shah, “IoT based Smart Home: Security Challenges, Security Requirements and Solutions”, Proceedings of the 23rd International Conference on Automation & Computing
- <https://www.arduino.cc/>
- <https://gemini.google.com/app/>
- <https://techatronic.com/how-to-make-a-laser-security-alarm/>