LASER SECURITY SYSTEM USING ARDUINO UNO

ABSTRACT

The Laser Security System using Arduino UNO is an innovative and cost-effective electronic project designed for intrusion detection and security applications. The system primarily operates by continuously projecting a laser beam onto a Light Dependent Resistor (LDR). Under normal conditions, the LDR receives uninterrupted laser light and maintains a steady resistance value. However, when an intruder or object crosses the path, the laser beam is blocked, resulting in a sudden change in the LDR's resistance. This variation is sensed by the Arduino UNO microcontroller through its analog input pin. The Arduino processes this signal and immediately triggers an alert mechanism using a buzzer and LED, thereby notifying the user of unauthorized access.

This project is simple in design, consumes low power, and provides an effective method of ensuring safety at homes, offices, banks, museums, and defence areas. The use of Arduino UNO makes the system flexible and easy to program, while also keeping the cost low and the circuit compact. Furthermore, the project can be enhanced by integrating IoT modules, GSM modules, or cameras to provide real-time notifications and advanced security features. Thus, this system demonstrates a reliable, scalable, and practical solution for modern security requirements.

INTRODUCTION

• A Laser Security System is a simple electronic security project used for intrusion detection.

• It mainly uses a Laser Diode and an LDR (Light Dependent Resistor) as sensing elements.

• Under normal condition, the laser beam continuously falls on the LDR.

• When someone crosses the path and interrupts the beam, the resistance of the LDR changes.

• This variation is detected by the Arduino UNO, which then activates a buzzer and LED to alert the user.

• The system is low-cost, compact, and reliable, making it suitable for homes, banks, offices, museums, and defense areas.
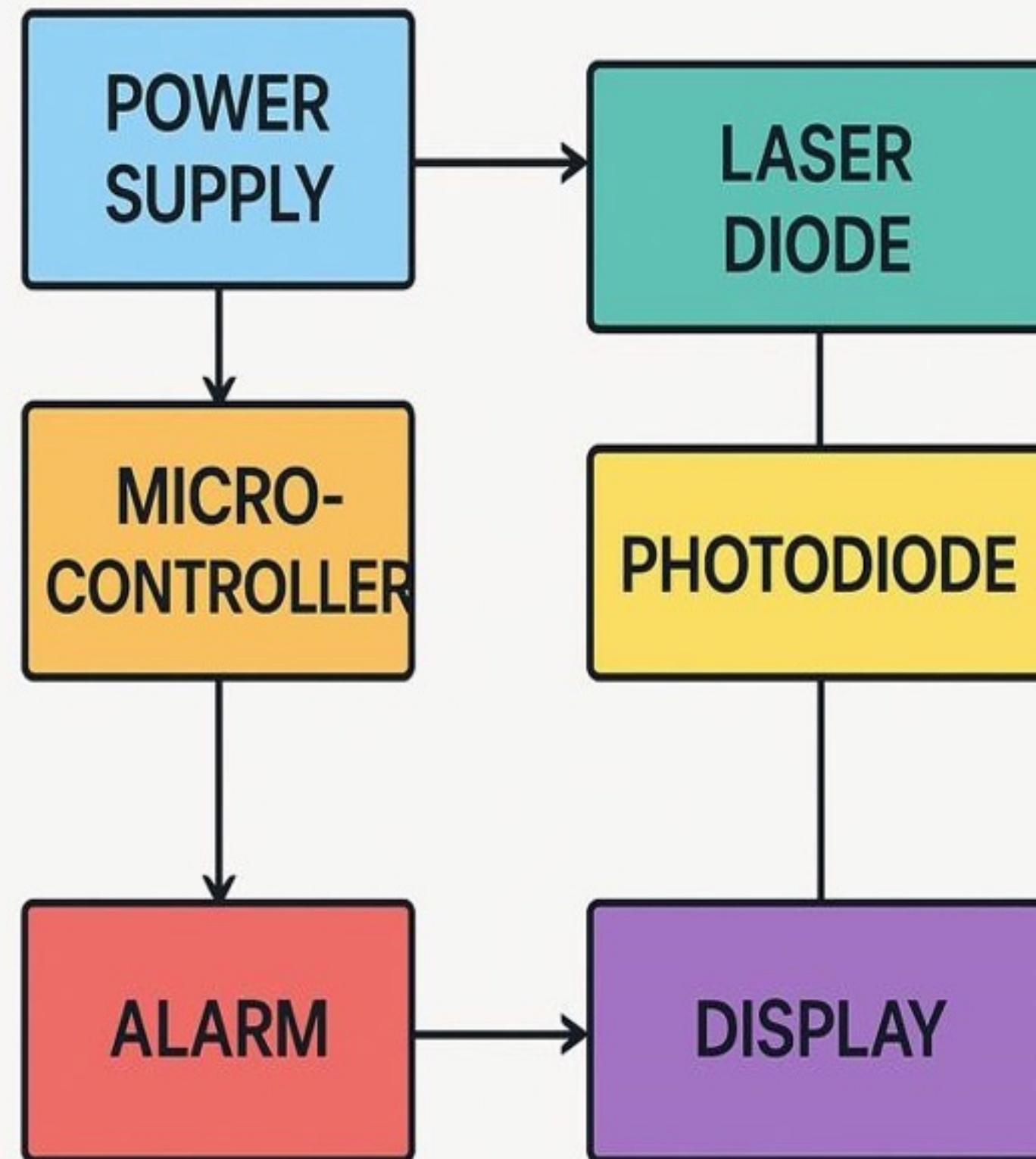
Aim:

To design and implement a Laser Security System using Arduino UNO that detects intrusions by monitoring the interruption of a laser beam and alerts the user through a buzzer and LED indication.
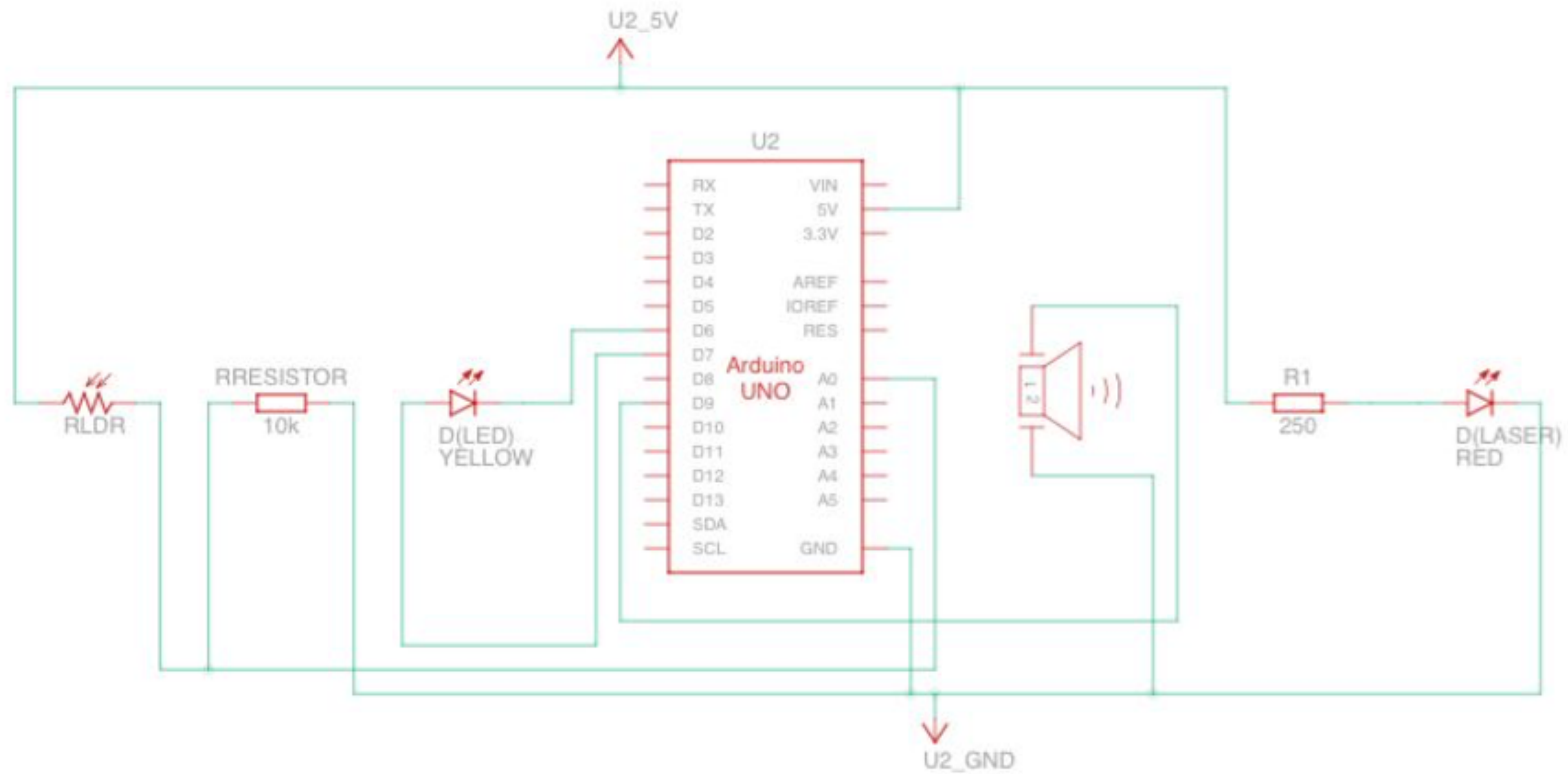
Components Required

- Arduino UNO (ATmega328P)
- Laser Diode / Laser LED
- LDR (Light Dependent Resistor)
- Resistors (10kΩ, 220Ω, etc.)
- Buzzer (for sound alert)
- LED (for visual alert)
- Breadboard & Connecting Wires
- Power Supply (5V via USB/Adapter)

Block Diagram

CIRCUIT DIAGRAM:

ADVANTAGES:

•Low-Cost Design – Uses inexpensive and easily available components.

•Simple Construction – Easy to assemble and implement.

•Low Power Consumption – Consumes very little power during operation.

•Quick Intrusion Detection – Instantly detects when the laser beam is interrupted.

•Reliable & Efficient – Provides accurate results with minimum false alarms.

•Compact & Portable – Can be installed in small spaces.

CONCLUSION :

The Laser Security System using arduino uno offers an efficient, low-cost, and reliable solution for securing critical spaces. By utilizing a simple laser-photodiode setup integrated with the arduino this system effectively detects unauthorized access by monitoring laser beam interruptions. Its Wi-Fi capability provides real-time alerts, making it ideal for smart home, commercial, or industrial security applications. The system energy-efficient, easy to install, and expandable, making it a practical option for modern security needs. overall, this project demonstrates the integration of basic electronics with IoT technology to build an affordable, scalable, and intelligent security solution.