

Redline Security

Lab Report



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Abstract: The RedLine Security system is a laser-based intrusion detection system designed to protect restricted areas. It uses a laser beam and a photoelectric sensor to detect any unauthorized entry. When the laser beam is interrupted, the system triggers an alarm, alerting the user. This system is simple, cost-effective, and reliable for home, office, or industrial security.

Objective: The main objectives of the RedLine Security project are as follows:

- To design a compact, low-cost, and efficient home/office security system.
- To detect unauthorized entry using sensors (laser, ultrasonic, or magnetic).
- To notify the user instantly through alarm, display, or mobile alert.
- To create a user-friendly system with high reliability and low power consumption.

Problem Statement: Unauthorized access to sensitive areas is a major security concern. Traditional security methods may fail to provide immediate alerts. The RedLine Security system aims to detect intrusion instantly and alert users effectively using a simple laser-sensor mechanism.

Components Used:

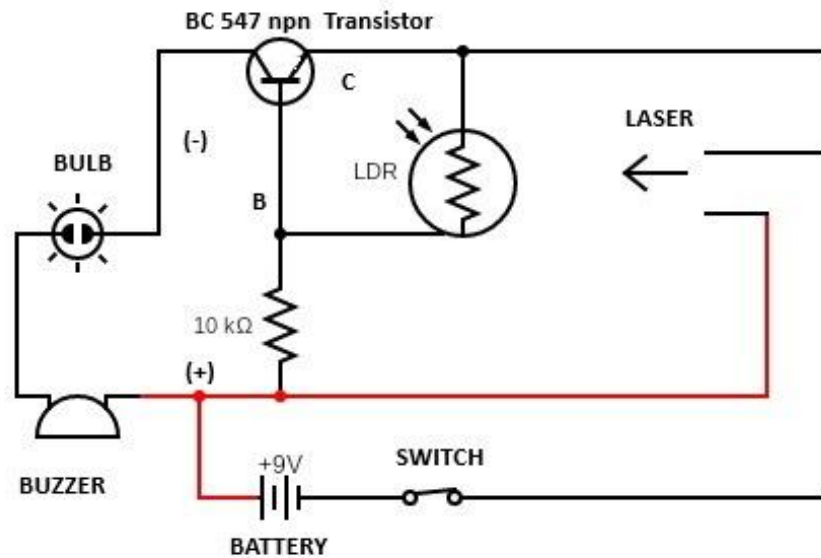
- Laser module
- Photodiode or photo resistor (LDR)
- Resistors (10K ohm)
- Transistor npn (BC 547)
- Battery (9V) or DC power supply
- PCB board & Mirrors
- Connecting wires and switch

Circuit Description: The circuit consists of a laser source aligned with a photodiode or photoresistor. When the laser beam is uninterrupted, the sensor receives light, keeping the circuit in an idle state. If an intruder crosses the beam, the light falling on the sensor is blocked, triggering the buzzer. A resistor is used to limit the current to the sensor and buzzer for safety and proper operation.

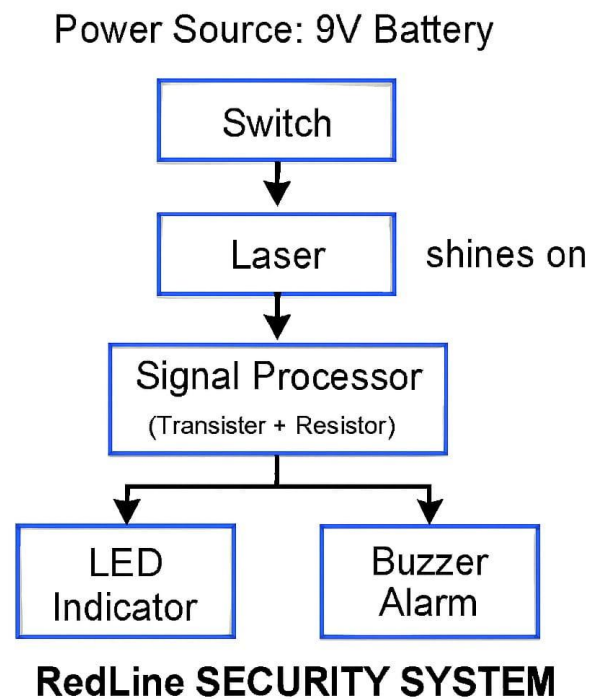
Working Principle:

- The laser beam continuously illuminates the photodiode.
- The photodiode converts the received light into a small voltage.
- This voltage is used to keep a transistor or relay in a non-conducting state.
- When the laser beam is blocked, the sensor voltage drops.
- The transistor or relay gets activated, turning on the buzzer to alert the user.

Circuit Diagram:



Block Diagram:



Cost Estimation:

Component	Quality	Approx.Price(BDT)
Leser Module	1	50-70
Photodiode or photo resistor (LDR)	1	10-20
Transistor npn (BC 547)	1	5-10
Resistor (10k ohm)	3-4	1-5
Battery (9V) with jacks	1	80-100
Connecting wires sets	-	20-40
PCB board mini	1	70-80
Switch	5	10
Mirrors small	5	20
Approximately Total Cost 300 - 400 BDT		

Applications:

- Home security systems
- Office and industrial security
- ATM and vault protection
- Museum and gallery security
- Restricted lab areas

Advantages:

- Simple and easy to implement
- Cost-effective
- Provides instant alerts
- Low power consumption
- Can be scaled for multiple entry points

Limitations:

- Works only in a straight path (line-of-sight)
- Laser alignment is crucial for proper functioning
- Sensitive to dust or obstruction
- Limited range depending on the laser strength

Future Scope: This project can be further improved and added in farm areas and industries for advanced security monitoring.

Conclusion: The RedLine Security system provides an effective, low-cost solution for detecting unauthorized access. By utilizing a simple laser and sensor mechanism, it ensures immediate alerting and enhances security for homes, offices, and other sensitive areas. With further upgrades, the system can be integrated with modern smart security technologies for even better performance.

