# SUPER SENSITIVE INTRUDER ALARM

PROJECT PRESENTATION

Presented to –
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GROUP 4
65_D1

# OUR TEAM

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# Introduction

- *In today's world, security is a major concern for homes, offices, and restricted areas.*
- *Our project focuses on building a cost-effective and highly sensitive **intruder alarm system** using basic electronic components.*
- *The system uses **infrared (IR)** technology to detect motion or interruption in the IR beam.*
- *When someone blocks it, the alarm turns on, the system triggers a **buzzer** to alert about the intrusion.*
- *This kind of setup can help improve **safety and awareness** in any environment.*
- *This project is ideal for beginners and can be expanded for real-life security applications.*

# COMPONENTS USED

1. *NE555 Timer IC*
2. *LM358 Operational Amplifier (Op-Amp)*
3. *10K Preset/Variable resistor*
4. *IR Transmitter*
5. *IR Receiver*
6. *Red LED*
7. *Electrolytic Capacitor (10uF, 50V)*
8. *Resistors: 10KΩ, 1KΩ, 100KΩ, 220Ω*
9. *Buzzer*
10. *Breadboard*
11. *Connecting Wires Multiple*
12. *5V Power Supply*

# Circuit Diagram

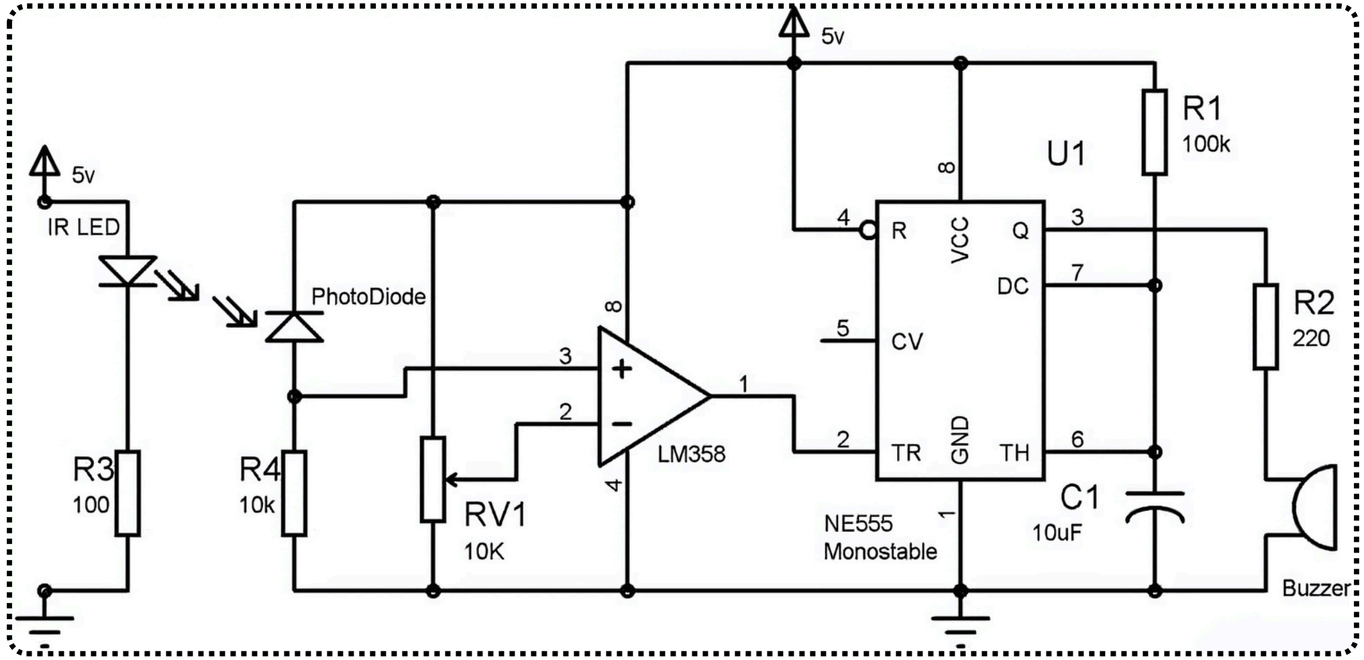


Fig. 1.1: Super Sensitive Intruder Alarm Circuit

# Project Prototype

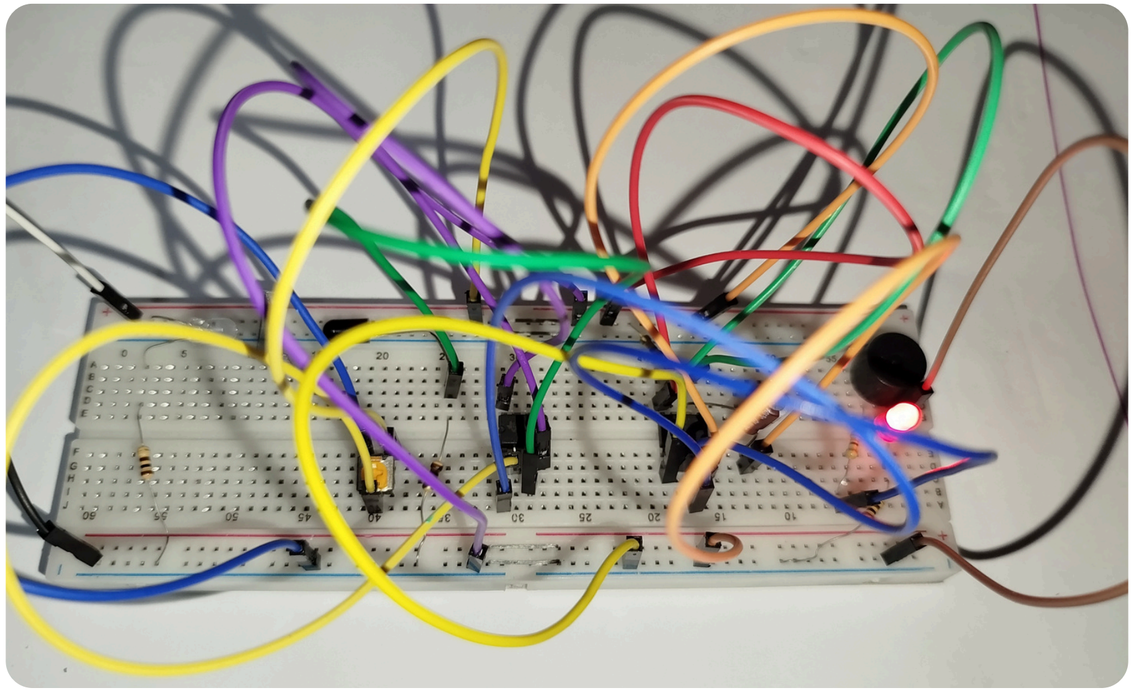

Fig. 1.2: Super Sensitive Intruder Alarm Circuit

# WORKING PRINCIPLE

## 1. IR Transmitter Section

- *IR LED emits invisible infrared light continuously.*
- *100Ω Resistor (R3) limits current to protect the IR LED.*
- *Light beam is aimed at the photodiode across the sensing area.*

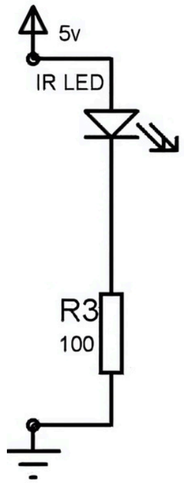


*Fig. 2.1: IR Transmitter*

# WORKING PRINCIPLE

## 👁 2. IR Receiver & Comparator Section

- *Photodiode is in reverse bias: receives IR light and allows reverse current.*
- ***10kΩ** Resistor (R4) works as a pull-down resistor, creating a voltage drop based on IR light intensity.*
- ***10kΩ** Preset (RV1) sets a fixed reference voltage at **LM358**'s inverting input.*

***LM358** Op-Amp (Comparator) compares:*

- *Pin 3 (+): voltage from photodiode*
- *Pin 2 (−): reference from preset*

*When someone blocks IR beam:*

- *Photodiode voltage increases (Pin 3 > Pin 2)*
- *Comparator output (Pin 1) goes LOW to HIGH, triggering next stage*

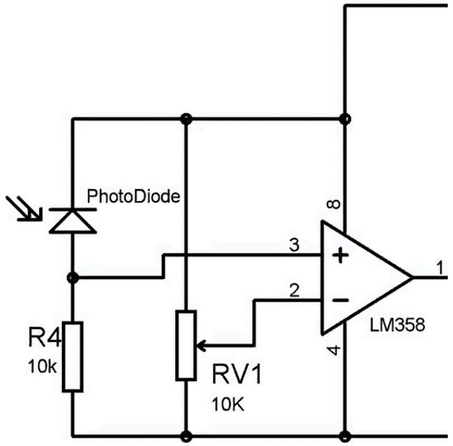


*Fig. 2.2: IR Receiver and Op-Amp (LM358)*

# WORKING PRINCIPLE

## ⏱️ 3. Monostable Timer Section (555 IC)

- *NE555 Timer is configured in monostable mode.*
- *Trigger Pin (Pin 2) is activated by **LM358** output.*
- ***100kΩ** Resistor (R1) and 10µF Capacitor (C1) define the ON-time.*

*On trigger:*

- *Pin 3 (Output) goes HIGH for a fixed duration.*
- *Timer resets automatically after time interval ends.*

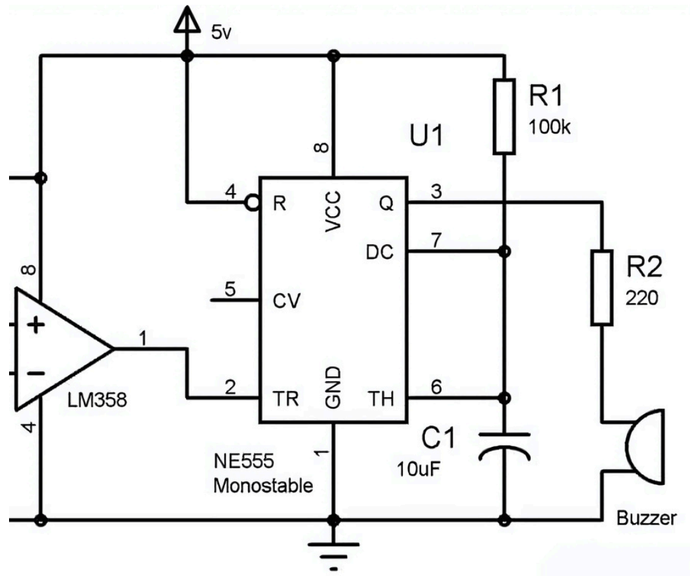


*Fig. 2.3: 555 Timer IC*

# WORKING PRINCIPLE

## 🔔 4. Output Section (Buzzer)

- ***220Ω*** *Resistor (R2) limits current to the Buzzer.*
- *When 555 output is HIGH:*
  - *Buzzer turns ON*
  - *Produces alert sound indicating intrusion*

- 🔋 *Power Supply:*
  - *Whole circuit operates on* ***+5V DC*** *supply.*
  - *All ICs and components are powered from this single source.*

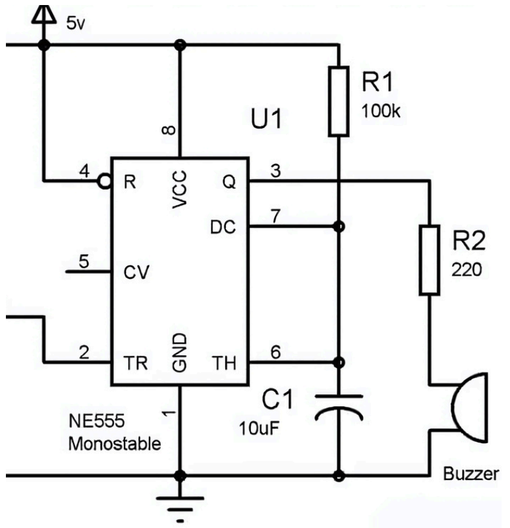


*Fig. 2.4: Buzzer Output*

# Applications & Future Improvements

## ✅ APPLICATIONS:

- **Home Security Systems**
  *Used at doors, windows, or hallways to detect unauthorized entry.*
- **Bank & ATM Booths**
  *Alerts security when someone enters during off-hours.*
- **Warehouses & Storage Units**
  *Protects valuable goods from theft by detecting movement.*
- **School Labs or Server Rooms**
  *Restricts access to sensitive areas when unsupervised.*
- **Automatic Lighting Systems**
  *Can be adapted to turn on lights when someone enters a room.*

# Applications & Future Improvements

## 🔄 FUTURE IMPROVEMENTS:

- *Add **SMS** or **Call Alert** feature using GSM module.*
- *Integrate with **CCTV systems** for real-time footage during intrusion.*
- *Make it **battery powered** for portability and use during power cuts.*
- *Add **Wi-Fi or IoT** support to control and monitor via smartphone.*
- *Use motion sensors or **camera-based** detection for more accuracy.*

# Learning Outcomes

- **Understanding Real-world Problem Solving**
  *We learned how basic electronics can be applied to real-life security issues in a cost-effective way.*
- **Circuit Design & Implementation**
  *We gained hands-on experience building a working circuit using sensors, op-amps, and timers.*
- **Sensor Technology**
  *Understood how IR sensors work and how they can be used to detect objects or people non-contact.*
- **Comparator and Timer Logic**
  *Learned how a comparator (LM358) compares voltages and how a 555 timer functions in monostable mode.*
- **Troubleshooting & Debugging**
  *Faced practical issues like incorrect wiring, loose connections, and fixed them to make the circuit stable.*

# CONCLUSION

In this project, we successfully designed and implemented a **Super Sensitive Intruder Alarm** that can detect **unauthorized entry** using an infrared sensor system. The circuit provides a quick and reliable alert whenever the **IR beam** is interrupted, making it a practical solution for basic security needs. Through this work, we not only built a **functional security system** but also gained valuable knowledge about **sensor technology**, **circuit design**, and **component integration**. This project helped strengthen our teamwork and problem-solving abilities, and with future improvements, the system holds potential for real-world applications in homes, schools, and other secure areas.

# Thank You!

FOR YOUR ATTENTION