

Project Report: Noise-Activated Street Lighting System

TEAM MEMBERS

1. GAUTHAM P NAIR (20)
2. JIYARO JOSEPH (27)
3. PAVAN MATHEW (46)

1. Aim

The aim of this project is to design and implement a **Noise-Activated Street Lighting System** that automatically turns on streetlights in response to loud sounds such as vehicle horns or emergency sirens. The system improves energy efficiency and road safety by ensuring illumination only when needed, especially in environments like tunnels, accident-prone zones, and low-visibility areas.

2. Introduction

Traditional street lighting systems operate continuously throughout the night, resulting in substantial energy consumption and unnecessary light pollution. This project addresses these issues by introducing an adaptive street lighting system using basic electronic components.

The proposed Noise-Activated Street Light automatically switches ON the light when it detects a loud noise and switches it OFF after a short duration. This smart system is ideal for applications where continuous lighting is not essential but temporary illumination significantly enhances safety and visibility.

3. Components Required

Sl. No.	Component	Description
1.	Condenser Microphone	Captures ambient noise.
2.	Transistor (BC107)	Amplifies the microphone signal.
4.	Resistors	For biasing and voltage division.
5.	Capacitors	Coupling and timing purposes.
6.	Relay Module	Switch the load (streetlight).
7.	LED/Bulb	Acts as a demonstration streetlight.
8.	Power Supply (9V–12V DC)	Powers the entire circuit.
9.	Breadboard & Wires	For assembling the circuit.

4. Working Principle

The system operates in the following stages:

4.1 Sound Detection

- A condenser microphone detects ambient sound.

- If the sound exceeds a threshold (eg: vehicle horn), the microphone outputs a small AC voltage.

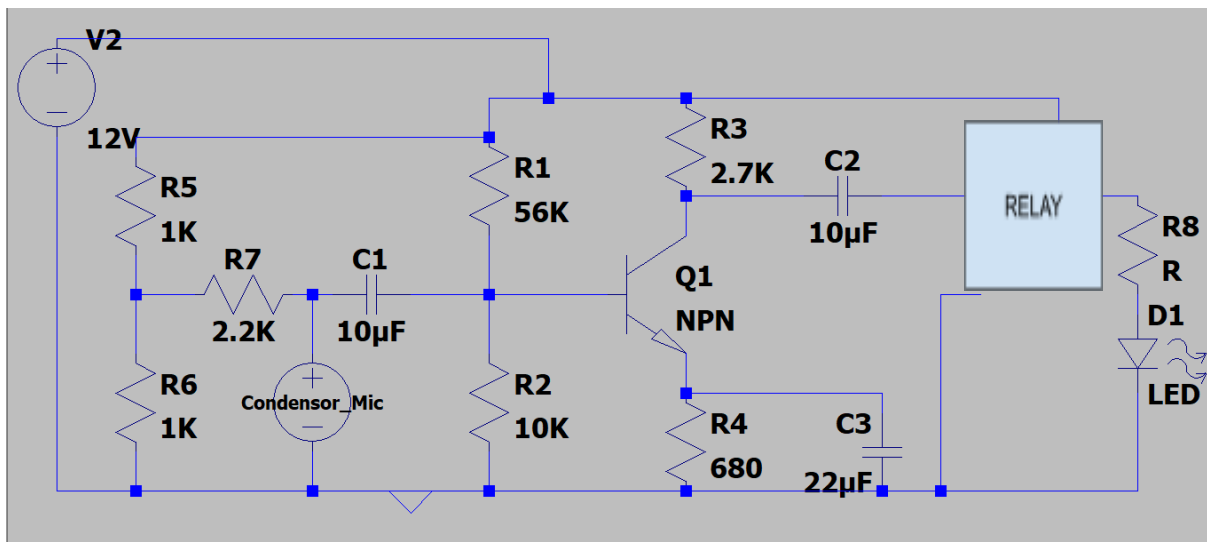
4.2 Signal Amplification

- A B107 transistor amplifies the weak microphone signal.
- The output becomes strong enough to trigger switching components.

4.3 Relay Activation

- The amplified signal is used to activate a relay.
- This closes the circuit, turning ON the connected streetlight (LED or bulb).

5. Circuit Diagram



6. Applications

6.1 Road Safety & Emergency Use

- **Tunnels & Highways:** Activates only when vehicles pass.
- **Accident Zones:** Temporary illumination in case of emergencies.

6.2 Smart Infrastructure

- **Low-Visibility Roads:** Lights up on detecting horns in foggy conditions.
- **Smart Cities:** Integrates into intelligent lighting systems.

6.3 Security & Industrial Use

- **Parking Lots:** Lights turn ON with loud noise (e.g., break-ins).
 - **Worksites:** Provides on-demand illumination, enhancing safety.
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7. Conclusion

The Noise-Activated Street Lighting System is a cost-effective, energy-efficient, and responsive lighting solution suitable for a wide range of real-world applications. By leveraging simple analog components, this project demonstrates how intelligent systems can be built with minimal resources to enhance public safety and conserve energy.

8. Result

