

AIM

Earthquake detector using piezoelectric sensor and multiple transistor

Components Required:

1. Piezoelectric sensor: Converts mechanical vibrations into electrical signals.
2. Transistors: Two NPN transistors (e.g., BC547) for signal amplification.
3. Resistors: Used to bias the transistors and set current levels.
4. Capacitors: For filtering and stabilizing signals.
5. Diode: Protects against reverse polarity.
6. LED: Indicates vibration detection.
7. Buzzer: For an audible alarm.
8. Power supply: 9V battery or equivalent.

Circuit Description:

1. Piezoelectric Sensor: The piezoelectric sensor generates a small voltage in response to vibrations.

2. Amplification Stage:

First Transistor (T1): The small signal from the sensor is fed to the base of T1 through a coupling capacitor (C1).

A resistor (R1) is connected between the base of T1 and the ground to set the base bias.

Second Transistor (T2): The amplified signal from the collector of T1 is fed to the base of T2 for further amplification.

Another resistor (R2) is used for biasing.

NOTE: Multiple transistors are used for amplification purposes.

3. Output Stage: The collector of T2 drives an LED and a buzzer connected in parallel.

A current-limiting resistor (R3) is placed in series with the LED to prevent damage.

A diode (D1) protects the circuit from reverse voltage.

4. Power Supply: A 9V battery powers the circuit.

A capacitor (C2) across the power supply ensures stability and removes noise.

Working Principle:

Signal Generation: The piezoelectric sensor generates a small voltage when vibrations occur.

Amplification: T1 amplifies the small signal to a level detectable by T2.

T2 further amplifies the signal to drive the LED and buzzer.

Output Activation: When the amplified signal exceeds the threshold, the LED lights up and the buzzer sounds, indicating vibrations.

Result :

Earthquake detector using pezioelectric sensor and transistor is successfully tested and verified