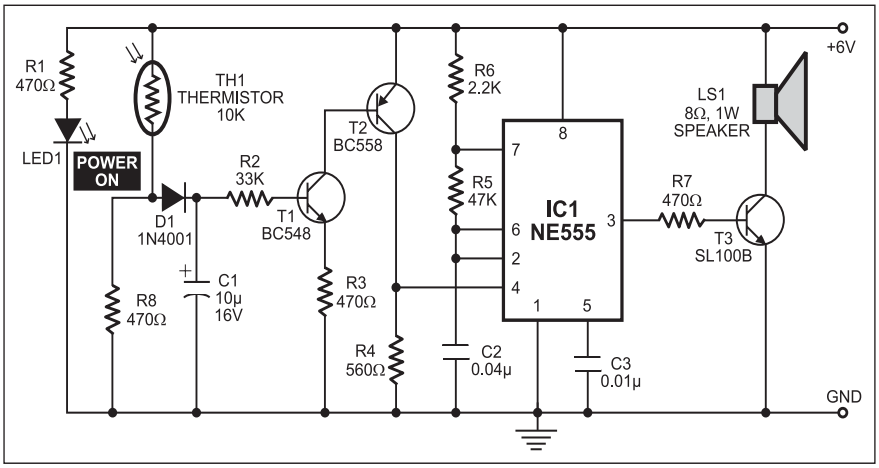
FIRE ALARM USING THERMISTOR

PRINCE PHILLIPS



In this fire alarm circuit, a thermistor works as the heat sensor. When temperature increases, its resistance decreases, and vice versa. At normal temperature, the resistance of the thermistor (TH1) is approximately 10 kilo-ohms, which reduces to a few ohms as the temperature increases beyond 100°C. The circuit uses readily available components and can be easily constructed on any general-purpose PCB.

Timer IC NE555 (IC1) is wired as an astable multivibrator oscillating in audio frequency band. Switching transistors T1 and T2 drive multivibrator NE555 (IC1). The output of IC1 is connected to npn transistor T3, which drives the loudspeaker (LS1) to generate sound. The frequency of IC1 depends on the values of resistors R5 and R6 and capacitor C2.

When thermistor TH1 becomes hot, it provides a low-resistance path to extend positive voltage to the base of transistor T1 via diode D1 and resistor R2. Capacitor C1 charges up to the positive voltage and increases the 'on' time of alarm. The higher the value of capacitor C1, the higher the forward voltage applied to the base of transistor T1 (BC548).

Since the collector of transistor T1 is connected to the base of transistor T2, transistor T2 provides positive voltage to reset pin 4 of IC1 (NE555). Resistor R4 is used such that IC1 remains inactive in the absence of positive voltage. Diode D1 stops discharging of capacitor C1 when the thermistor connected to the positive supply cools down and provides a high-resistance (10-kilo-ohm) path. It also stops the conduction of T1. To prevent the thermistor from melting, wrap it up in mica tape.

The circuit works off a 6V-12V regulated power supply. LED1 is used to indicate that power to the circuit is switched on.