



# Design and Construction of British Siren Triggered by Heat Operated Switch

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**ABSTRACT**—Fire outbreak is a common accident in homes and businesses and industrial areas. In our community fire alarms are mostly not used in our houses and shops to give early warning of fire outbreak for possible control. Therefore, in this design we intent to design and develop a fire alarm device made from easy to find components such as 555 timer and thermistor to sound an alarm based on British siren triggered by heat operated switch, for early warnings. The significant of the design is to develop a device that will be able to sense fire outbreak and alarm the fire fighters using alarm. Also, the aim of the design is to develop a circuit that will be able to alarm the environs in the case of fire outbreak. Finally, the significant of the design work is to reduce the level of fire accident.

**KEYWORDS**—Diodes, fire, alarm, thermistor.

## INTRODUCTION

A transducer is a device that converts energy from one form to another. Usually a transducer converts a signal in one form of energy to a signal in another. Transducers are often employed at the boundaries of automation, measurement, and control systems, where electrical signals are converted to and from other physical quantities (energy, force, torque, light, motion, position, etc.). The process of converting one form of energy to another is known as transduction. A thermistor is the transducer used for this design. A thermistor used here is as a transducer is also a resistor, the value of which changes with its temperature rise. It is known as a negative-temperature-coefficient (N.T.C) thermistor. The appearance of these thermistors is shown below;

## METHODOLOGY

The research work has started on the desired components. The methodology adopted are described in the following steps:

- 1) Assembling of electronic components.
  - a) Analysing the circuit
  - b) Get the required component,
  - c) Assembly of components is done on design board (breadboard).
  - d) Assembly of components is done on design board (breadboard).
- 2) Testing the circuit
  - a) A multi meter is used to check for continuity and open circuit of the constructed circuit.
  - b) The design is powered by a 12Vdc supply to check the desired and intended result.
  - c) At the entrance, a proximity sensor is mounted on the case of construction.
  - d) A proximity sensor is mounted at each room or location within a building.
  - e) At each slot, a proximity sensor is installed to sense the presence of fire outbreak.

## II. Components use

### B. TH1VA1098(Thermistor)

1) A thermistor is a type of resistor whose resistance is dependent on temperature, more so than in standard resistors. The word is a portmanteau of thermal and resistor. Thermistors are widely used as inrush current limiters, temperature sensors (negative temperature coefficient or NTC type typically), self-resetting overcurrent protectors, and self-regulating heating elements (positive temperature coefficient or PTC type typically).

### C. BC108, 2N3702 (Transistor)

2) The three transistors use are made from very pure silicon or germanium, but certain other semiconductor materials can also be used. A transistor may have only one kind of charge carrier, in a field effect transistor, or may have two kinds of charge carriers in bipolar junction transistor.

3) IN4001(Diode) A diode is a two-terminal electronic component that conducts current primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance in one direction, and high (ideally infinite) resistance in the other. A vacuum tube diode utilizes thermionic emission of electrons and unidirectional conduction between the cathode and plate. A semiconductor diode, the most common type today, is a crystalline piece of semiconductor material with a p–n junction connected to two electrical terminals. Semiconductor diodes were the first semiconductor electronic devices.

## The Circuit Diagram

The design circuit diagram was designed with the aid of the software called multism. The diagram below shows the circuit diagram of the heat operated switch trigger by British siren.

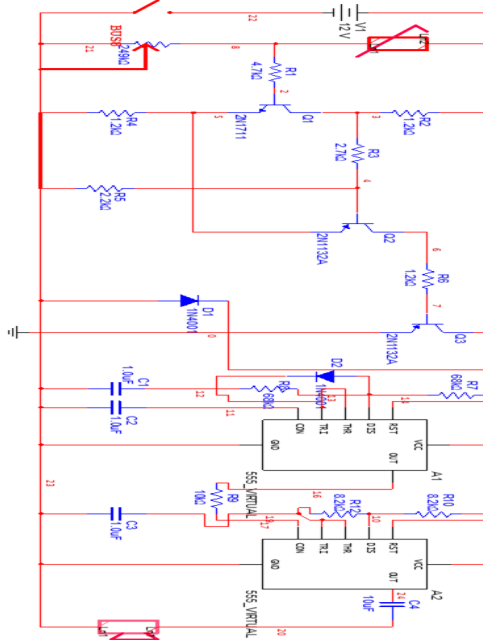


Fig. 1. Circuit Diagram of the heat operated switch

### B. NE555TIMER(IC555TIMER)

The Complete circuit diagram of the alarm system is shown in Fig 2.1. The 555 timer in the trigger unit gets activated whenever pin 2 senses a smaller potential that is less than  $1/3$  the supply voltage. When activated it sounds for duration of time determined by R3 and C1, this also determines how long the alarm will sound before going off.

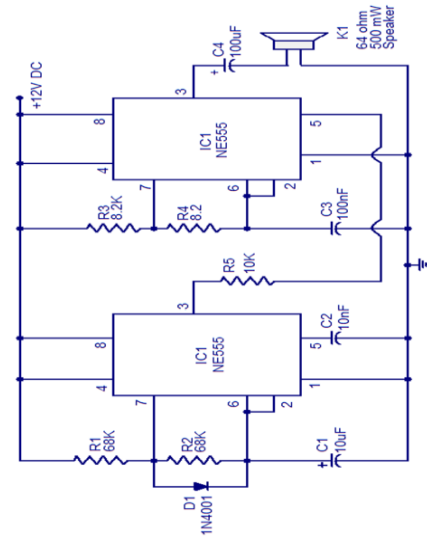


Fig.2. The British siren circuit

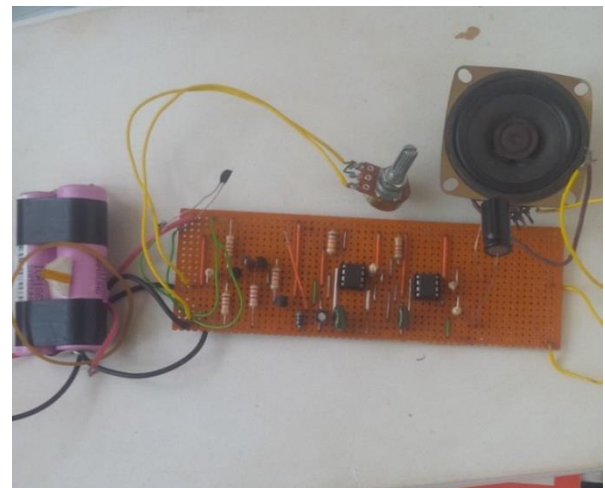


Fig.3. S-Dec layout of a heat operated switch

### CONCLUSIONS

Hence electronic circuits can be designed for the fire based alarms and they provide very high efficiency and can

Overall the design was successful. The performance of the design met the original technical problem, which was to build a circuit that would sound an alarm when the heat in the atmosphere reach a hazardous temperature. Also the design

be used for the security reasons. Early fire detection is best achieved by the installation and maintenance of fire detection equipment in all rooms and areas of the house or building.

was well under the overall design cost designed, making the design a good product since the application was successfully demonstrated and the circuit price was reasona

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