

Fire Detection and Alarm

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Abstract: The aim of the project is to design a fire detection and alarm device which can detect the fire and give us an alarm. The system works with the help of a mini board on which the fire detection sensor is fixed through the circuit which is attached to a mini battery source. This system also contains a buzzer, when the system detects the fire the buzzer automatically starts give sound which indicates us that there is fire somewhere even if we are not present at that point. Cultural property management is entrusted with the responsibility of protecting and preserving an institution's buildings, collections, operations and occupants. Constant attention is required to minimize adverse impact due to climate, pollution, theft, vandalism, insects, mold and fire. Because of the speed and totality of the destructive forces of fire, it constitutes one of the more serious threats. Vandalized or environmentally damaged structures can be repaired and stolen objects recovered. Items destroyed by fire, however, are gone forever. An uncontrolled fire can obliterate an entire room's contents within a few minutes and completely burn out a building in a couple hours. This system has its own applications which can be very useful in public places such as malls, hospitals, cinema theatres, railway station etc.

I. INTRODUCTION

Before discussing about the project let us understand some of the concept used in this project

A. Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.



Fig. 1 Resistors

B. Battery

A battery is a device consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy.



Fig. 2 Battery

C. Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

Fig.3 Buzzer



D. Fire detecting sensor

A flame detector is a sensor designed to detect and respond to the presence of a flame or fire, allowing flame detection. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system. When used in applications such as industrial furnaces, their role is to provide confirmation that the furnace is working properly; it can be used to turn off the ignition system though in many cases they take no direct action beyond notifying the operator or control system. A flame detector can often respond faster and more accurately than a smoke or heat detector due to the mechanisms it uses to detect the flame.

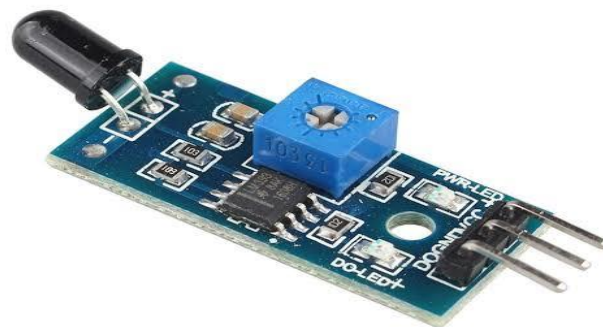


Fig. 4 Fire Detecting Sensor

II .About the project

A. Introduction to the project

No smoking zones are meant to ensure smoke free areas which promote good health and well being. Especially in public places no smoking zones ensure smoke free environment for people and children. But it is not feasible to manually monitor these zones to ensure a smoke free environment and an automated system is required to ensure this

Here we propose a fully automated smoking zone alerting monitoring system to sound an alarm in case a smoker is detected in a smoking zone. The system uses a combination of smoke sensing with 555 timer Ic circuitry to ensure this purpose

B. Working

The fire alarm circuit here is designed with the principal of working of an astable multi vibrator using IC-555. An astable multi vibrator is a circuit which generates continuous pulses at the output terminal for the designed frequency.

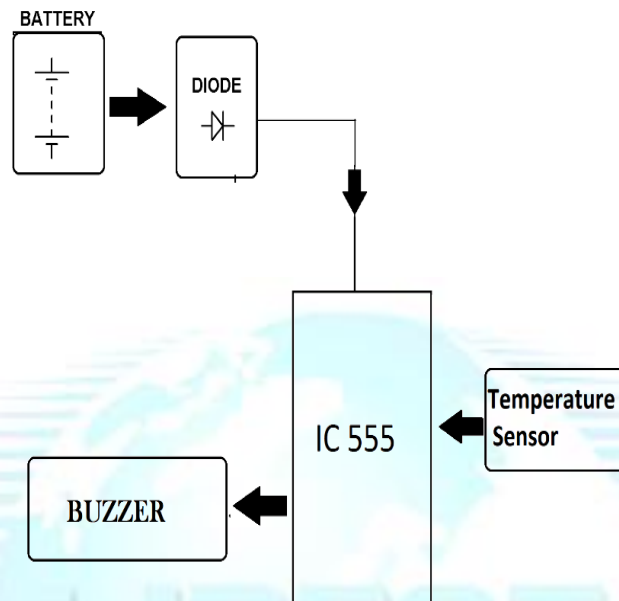


Fig. 5 Block Diagram

The generated frequency produces sound when it is connected to the loud speaker. In the above circuit the sensor uses germanium diode DR25 which is reverse biased in the circuit. The reverse resistance of the diode is very high and current cannot pass through the diode at room temperature. In the astable multi vibrator of our circuit, the reset in 8s connect ground. At this condition the astable multi vibrator cannot produce frequency.



Fig. 6 Circuit Layout

At room temperature transistor T1 on since the base of the transistor T1 gets enough potential since the diode is not conducting and offering a high resistance. When temperature of the diode increases in case of fire, the junction of the diode breakdowns and start conducting. At about 70°C its resistance drop to a value below 1kohm. This stops T1 conducting since base of T1 is now connected directly to the ground through diode D1 and ground connection to the pin 4 of IC-555bis now removed and is now connected to the Vcc through R2. Now astable multi vibrator is activated and starts generating frequency.

ACKNOWLEDGMENT

The fire alarm is a device that detects the presence of fire and atmospheric changes relating to smoke. In some cases, a fire alarm is part of a complete security system, in addition to a burglary protection system. The fire alarm operates to alert people to evacuate a location which a fire or smoke accumulation is present. When functioning properly, a fire alarm will sound to notify people of an immediate fire emergency. Fire alarms can be found in homes, schools, churches and business, and function as the catalyst to saving lives. For most fire alarms, when sounded, a beep, bell or horn noise is made. This distinct sound exists to allow the notification to be heard. The fire alarm constructed by this project work is reliable low cost.

APPLICATIONS:

This project has its own applications as follows

It can be used at

1. Home
2. Office
3. School and Colleges
4. Movie theatre
5. Railway and Bus stations
6. Air posts and in many public places

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