International Journal of Multidisciplinary Engineering in Current Research - IJMEC
Volume 8, Issue 1, January-2023, http://ijmec.com/, ISSN: 2456-4265

FIRE ALARM CIRCUIT

DR.ALTAF C[1], SHAHRUKH KHAN[2], MD.UZAIR JAFFER[3], MD.WAJID[4]

[1]*Assistant Professor Department of ECE, Lords Institute of Engineering and Technology* Hyderabad, India
[2,3,4,5]*Department of ECE, Lords Institute of Engineering and Technology* Hyderabad, India

Abstract: This circuit may be used as an alarm that sounds anytime the temperature rises over a certain threshold. The project employs a 5 volt power source and is based around an AT89S52 microprocessor. When a fire is detected, it immediately turns on the buzzer and motor. Both fire detection and fire control are possible with it. For this project, a controlled 500mA, 5V power source is used. Voltage control is accomplished using the 7805 three terminal voltage regulator. The secondary output of the 230/12V step down transformer's ac output is rectified using a bridge type full wave rectifier.

I. INTRODUCTION

The project employs a 5 volt power source and is based around an AT89S52 microprocessor. When a fire is detected, it immediately turns on the buzzer and motor. Both fire detection and fire control are possible with it. For this project, a controlled 500mA, 5V power source is used. Voltage control is accomplished using the 7805 three terminal voltage regulator. The secondary output of the 230/12V step down transformer's ac output is rectified using a bridge type full wave rectifier.

II. LITERATURESURVEY

Voltages between 5 and 24 volts are fixed positively controlled by the series 78 regulators. The series 79 regulators work similarly, offering set negative regulated voltages between 5 and 24 volts. There are voltage regulator ICs with set output voltages (usually 5, 12, and 15V) and with variable output voltages. Moreover, the maximum current they can pass is used to rate them. There exist negative voltage regulators, primarily for use with multiple supply. Most regulators include some level of automated overcurrent (also known as "overload protection") and thermal (also known as "thermal protection") protection. Several fixed voltage regulator integrated circuits (ICs) have three leads and resemble power transistors, such the 7805 +5V 1Amp regulator. If required, a heat sink attachment hole is included.

III. WORKING PRINCIPLE

Transformers efficiently convert AC energy from one voltage to another. One of the reasons why mains power is AC is because transformers can only operate with AC.

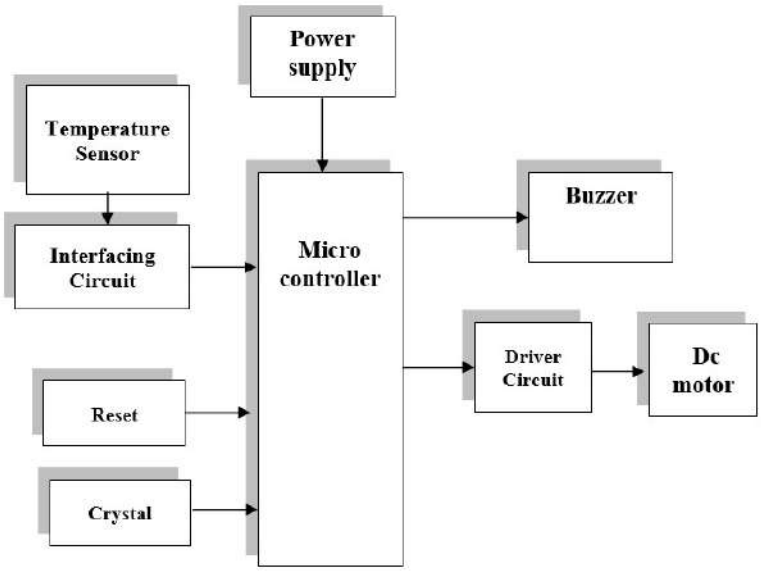
Voltage is raised by step-up transformers and lowered by step-down transformers. To lower the dangerously high mains voltage (230V in India) to a safer low voltage, the majority of power supply employ a step-down transformer. The main coil is the one at the input, while the secondary coil is the one at the output. The two coils are connected by an alternating current rather than by an electrical connection.

ISSN: 2456-4265

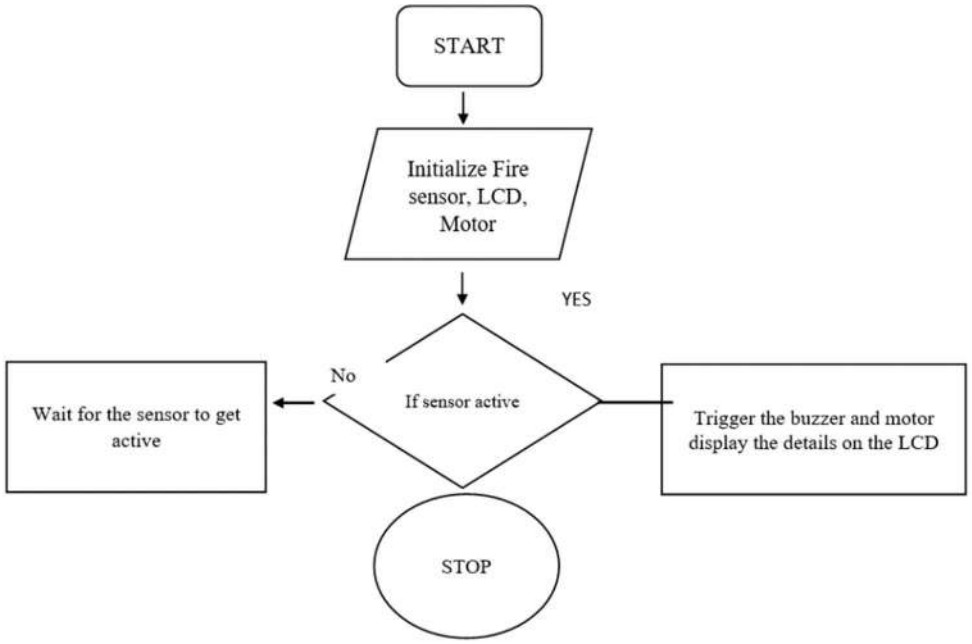
DOI: https://doi-ds.org/doilink/03.2023-49258926

The power supply voltage (0-230V) will be stepped down by the transformer to (0- 6V) level. The bridge rectifier, which is built using PN junction diodes, will then be linked to the potential transformer's secondary. The use of a bridge rectifier has the benefit of producing peak DC voltage.

IV. BLOCKDIAGRAM

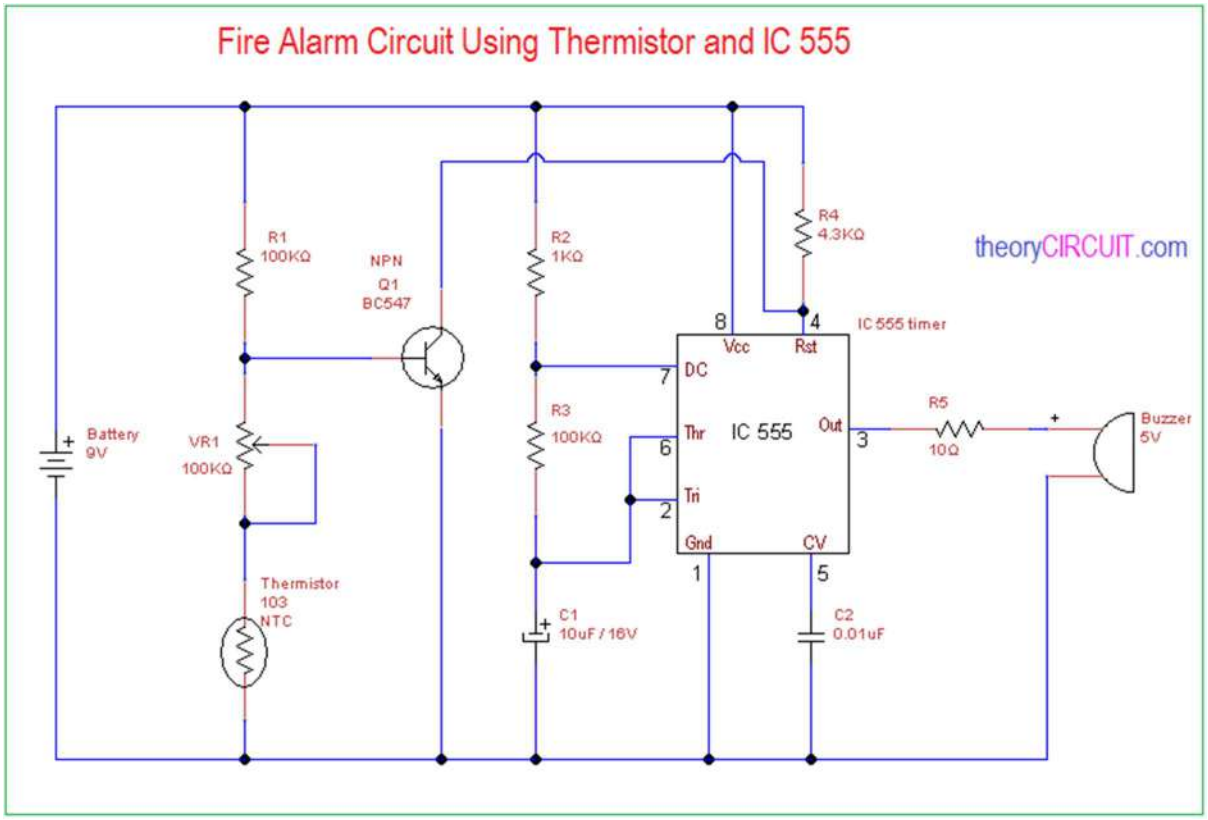


V. FLOWCHART



DOI: https://doi-ds.org/doilink/03.2023-49258926

VI. SCHEMATICDIAGRAM:



VII. HARDWAREDESCRIPTION

A. POWERSUPPLY

The power supply portion gives +5V to the components so they can function. ICLM7805 is used to provide consistent +5V power.

Connecting the ac voltage, commonly 220V, to a transformer lowers down the ac voltage to the appropriate dc output level. A diode rectifier delivers a full-wave rectified voltage, which is first filtered by a simple capacitor filter to provide a dc voltage. Typically, this dc voltage has some ripple or ac voltage change.

A regulator circuit eliminates ripples and maintains the same dc value regardless of changes in the input dc voltage or the load linked to the output dc voltage. This voltage control is often accomplished using one of the prevalent voltage regulator ICs.

DOI: https://doi-ds.org/doilink/03.2023-49258926

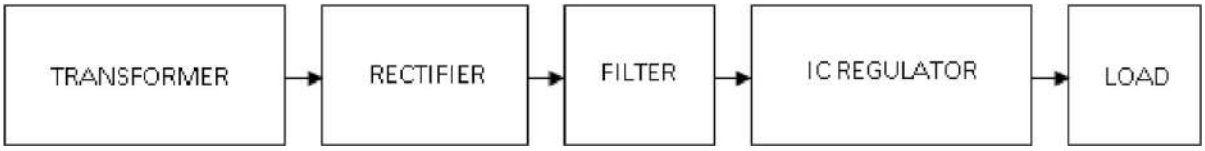


Figure: Block Diagram of Power Supply

B. MICROCONTROLLER

A microcontroller or microcontroller unit (MCU) is a computer-on-a-chip used to operate electrical devices. In contrast to a general-purpose microprocessor, this kind of microprocessor emphasises self-sufficiency and efficiency (the kind used in a PC). A basic microcontroller comprises all the required memory and ports for a small application, but a general-purpose microprocessor needs extra chips to offer these functionalities.
A microcontroller is a single integrated circuit that has the following characteristics:

- central processing unit - ranging from 8-bit to 32- or 64-bit processors input/output interfaces such as serial ports RAM for data storage
- Program storage using ROM, EEPROM, or Flash memory
- Clock generator - often an oscillator for a quartz timing crystal, resonant circuit, or RC circuit. Microcontrollers are present in a variety of electronic devices (see embedded system).

They constitute the great bulk of all sold processor chips. Around fifty percent of controllers are "basic," whereas twenty percent are more complex digital signal processors (DSPs)(ref?). In a normal house in a developed nation, there are probably just one or two general-purpose microprocessors, but between a dozen and twenty microcontrollers. A typical mid-range automobile has at least 50 microcontrollers. They are also present in almost every electrical appliance, including washing machines, microwave ovens, and cellphones.
Monitoring environmental changes linked with combustion, an automated fire alarm system is meant to detect the unwelcome presence of a fire. A fire alarm system is often characterised as either automatically activated, manually activated, or both. Automated fire alarm systems are designed to alert building inhabitants to leave in the case of a fire or other emergency, report the incident to an off-premises site to call emergency services, and prepare the structure and related systems to limit the spread of fire and smoke.

- Fire alarm control panel: This part, the system's nerve centre, keeps an eye on inputs and the integrity of the system, manages outputs, and disseminates data.
- Main Power Source: This is often a non-switched source of 120 or 240 Volt Alternating Current provided by a commercial power provider. A branch circuit is set aside for the fire alarm system and its components in non-residential applications. It's important to distinguish between "Dedicated branch circuits" and "Individual branch circuits," which provide power to a single device.

DOI: https://doi-ds.org/doilink/03.2023-49258926

- Secondary (backup) Power Supplies: In the case of a main power outage, this component is utilised to provide energy. It often consists of sealed lead-acid storage batteries or other emergency sources, such as generators.
- Initiating Devices: These devices may be manually or automatically activated and serve as an input to the fire alarm control unit. Examples include appliances like smoke alarms or pull stations.
- Notification appliances: These devices alert nearby people to the need to take action, generally to evacuate, using energy from the fire alarm system or another stored energy source. A speaker, strobe light, electromechanical horn, flashing light, or a combination of these tools are used to do this.
- Building Safety Interfaces: With the help of this interface, the fire alarm system can regulate the built environment, prepare the building for a fire, and stop the spread of smoke and fire by affecting the air flow, lighting, process control, human movement, and egress.

Fire sensor used

The St-1KL3B are high sensitivity NPN silicon photo transistors mounted on durable, hermetically sealed To-18 metal cans or a plastic can providing years of reliable performance even under demanding conditions such as use outdoors.

Features

- T0-18 can type with lens
- high reliability
- with the base terminal
- narrow angular response

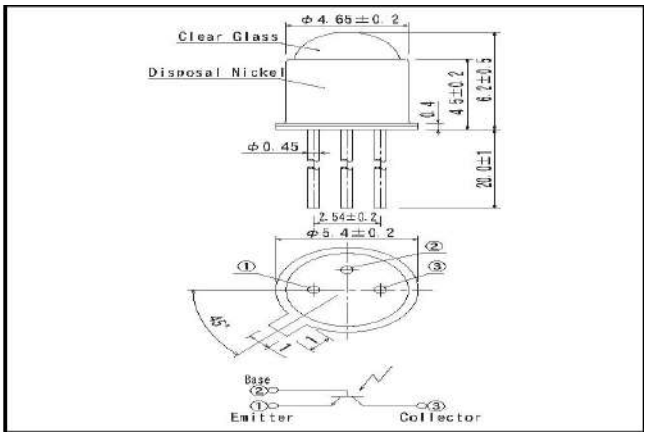


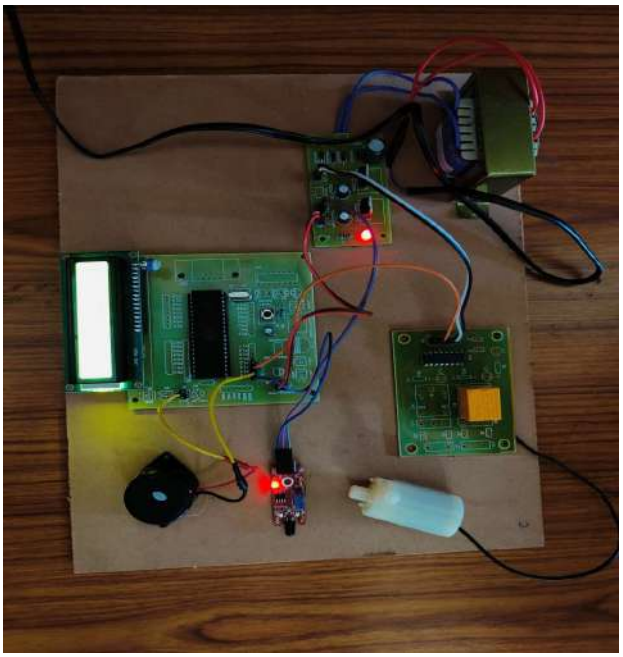
Figure: common-collector amplifier

When IR light is detected by the phototransistor, the common-collector amplifier (Fig.) provides an output that changes from a low state to a high one. By connecting a resistor between the component's emitter pin and ground, the output is produced. At the emitter terminal, the output is read. The non-inverting terminal of a comparator is linked to this output terminal.

ISSN: 2456-4265

DOI: https://doi-ds.org/doilink/03.2023-49258926

VIII. RESULT & DISCUSSION



IX. CONCLUSION

The project **"Fire Alarm Circuit"** has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly using highly advanced IC's and with the help of growing technology the project has been successfully implemented

X. REFRENCES

[1] Hegarty A, WestbrookG, GlynnD. A Low-costremote solar energy monitoring system for a buoyed iot oceanobservation platform. IEEE 5th World Forum InternetThings,WF-IoT2019-Conf.Proc.2019;386–91.

[2] Rouibah N, BarazaneL, Mellit A. Alow-cost monitoring system form aximum power point of a photo voltaic system usingIoTtechnique.2019Int.Conf. Wirel. Technol. Embed. Intell. Syst. WITS 20192019;1–5.

[3] Murdan AP, Caremben S.An autonomous solar powered wireless monitoring and surveillance system.Proc.13thIEEEConf.Ind.Electron.Appl.ICIEA20182018;784–9.

[4] Gupta A, Jain R, Joshi R, Saxena R. Real time remotesolar monitoring system. Proc. - 2017 3rd Int. Conf.Adv.Comput.Commun.Autom.(Fall),ICACCA20172018;2018–Janua:1–5.

[5] Shrihariprasath B, Rathinasabapathy V. A smart IoTsystem formonitoring solarPV powerconditioningunit. IEEE WCTFTR 2016 - Proc. 2016 World Conf.Futur.TrendsRes.Innov. Soc. Welf. 2016;

DOI: https://doi-ds.org/doilink/03.2023-49258926