A Mini-project Report on

"FIRE ALARM"

Submitted in partial fulfilment for the award of degree of

Bachelor of Engineering

In

Electronics and communication Engineering

Submitted by

Nagaratna Naik	**(1NH19EC402-T)**
Rajashekar Reddy T.V	**(1NH19EC410-T)**
Kishan	

Under the guidance of

Ms.Rajashree

Dept.of ECE

NHCE, Bengaluru-560103

ABSTRACT

This project is heat temperature the development of fire preventing system in order to detect the heat temperature level in real time to alert the people through buzzer.

A fire alarm system has a number of devices working together to detect and warn people through audio appliances when smoke, fire, carbon monoxide or other emergencies are present.

These alarms may be activated automatically from smoke detectors, Alarms can be either motorized bells or wall mountable sounders or horns.

They can also be [(speaker strobes]) which sound an alarm, followed by a voice evacuation message which warns people inside the building not to use the elevators.

Fire alarm sounders can be set to certain frequencies and different tones including low, medium and high, depending on the country and manufacturer of the device.

Most fire alarm systems in Europe sound like a siren with alternating frequencies.

Fire alarm electronic devices are known as horns in the United States and , and can be either continuous or set to different codes.

Fire alarm warning devices can also be set to different volume levels.

TABLEOFCONTENTS:

CHAPTER 1: INTRODUCTION

Fire alarm is device that offers indication of terrible sound with light-weight once fireplace materialized close to that device.

the event and construction urban and geographical region, the necessity of security takes a very important place.

All the developments directly supported electrification of the unit.

fireplace either a reason for electrical short or the other reason is a lot of common recently.

The bar of fireplace is should as a security purpose of read.

a fireplace device encompasses a variety of devices operating along to find and heat individuals through visual and audio appliances once smoke, fire, monoxide or alternative emergencies square measure gift.

These alarm is also activated mechanically from smoke detectors or might also be activated via manual fireplace alarm activation devices like manual decision points or pull stations.

Alarm are often either motorized bells or wall mountable sounders or horns.

they will even be speakers strobes that sound Associate in Nursing alarm, followed by a voice evacuation message that warns individuals within the building to not use the elevators.

fireplace alarm sounders are often set to bound frequencies and completely different tones together with low, medium and high, reckoning on the country and manufacturer of the device.

Most fireplace device in Europe sound sort of a siren with alternating frequencies.

fireplace alarm electronic devices square measure called horns within the u. s.

and Canada, and might be either continuous or set to completely different codes.

fireplace alarm warning devices can even be set to completely different volume levels.

CHAPTER 2: LITERATURE SURVEY

At the sooner days peoples don't have any fireplace security system .many assume that area unit|they're} cant in a position take smell smoke once are asleep and get up time to flee just in case of a hearth emergency.a hearth alarm alerts you after they square measure busy, operating or sleeping.you'll thus take action before major harm takes place, so saving you the value of property loss.

this method offers early signal to one thing that would be tragic-basically saving your lives.

SAMUEL RUBEN:

Samuel Ruben states that thermostat may be a style of resistance whose resistance depends on temperature, a lot of thus than in normal resistors.

The word may be a portmanteau of thermal and resistance.

Thermostats ar wide used as inpour current limiters, temperature sensors (negative temperature constant or NTC sort typically), self-resetting over current protectors, and self-moving heating components (positive temperature constant)

WILLIAM SHOCKLEY:

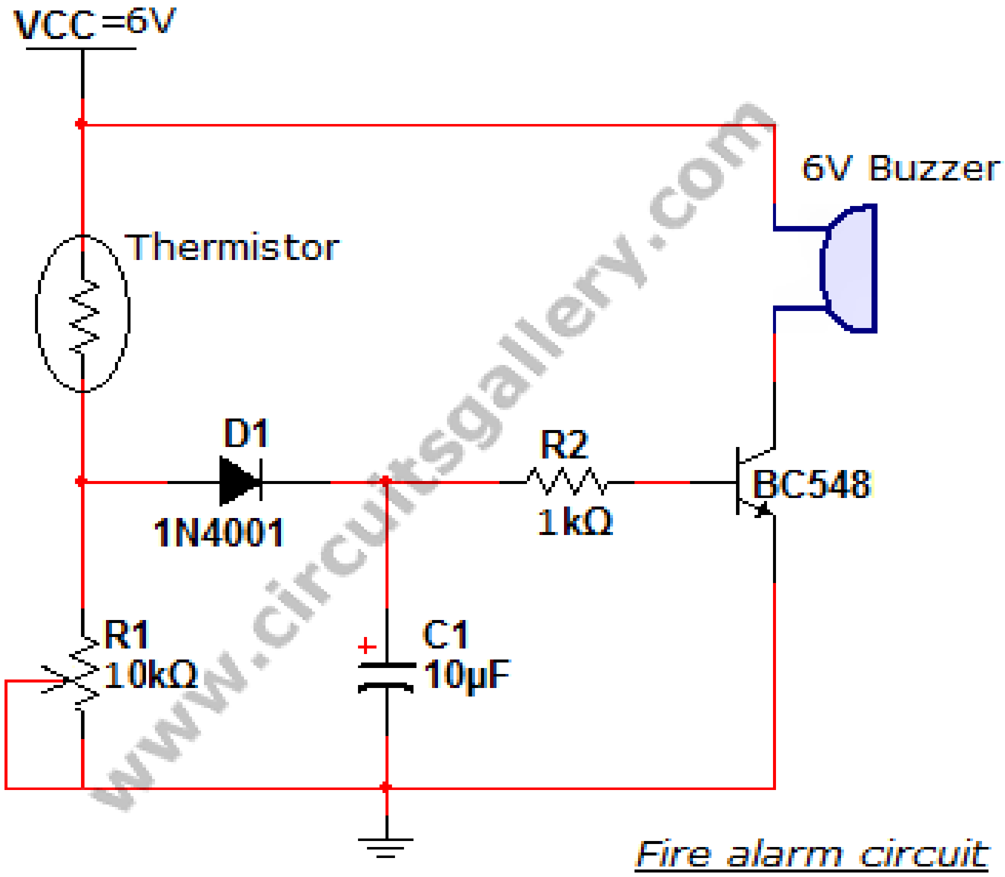
William shockley states that BC548 may be a NPN semiconductor device therefore the collector and electrode are left open (Reverse biased) once the bottom pin is control at ground and can be closed (Forward biased) once a proof is provided to base pin.

BC548 contains a gain price of a hundred and ten to 800, this price determines the amplification capability of the semiconductor device.

the utmost quantity of current that would flow through the Collector pin is 500mA, thus we tend to cannot connect hundreds that consume over 500mA victimization this semiconductor device.

To bias a semiconductor device we've to produce current to base pin, this current (IB) ought to be restricted to 5mA.

BLOCK DIAGRAM :



::

CHAPTER 04: PROJECT DESCRIPTION

RESISTORS:

A resistance could be a passive two-terminal electrical element that implements ohmic resistance as a circuit component.

In electronic circuits, resistors square measure wont to scale back current flow, regulate signal levels, to divide voltages, bias active parts, and terminate transmission lines, among alternative uses.

dynamical resistors which will dissipate several watts of power as heat, is also used as a part of motor controls, in power distribution systems, or as check hundreds for

generators.. fastened resistors have resistances that solely amendment slightly with temperature, time or in operation voltage.

Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment.

Practical resistors as discrete components can be composed of various compounds and forms.

Resistors are also implemented within integrated circuits.

The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude.

OVERVIEW OF TYPES AND MATERIALS:

Resistors can be divided in construction type as well as resistance material. The following breakdown for the type can be made:

- Fixed resistors
- Variable resistors, such as the:
- Potentiometer
- Rheostat
- Trimpot
- Resistance dependent on a physical quantity:
- Thermostats (NTC and PTC) as a result of temperature change
- Photo resistor (LDR) as a result of a changing light level
- Varistor (VDR) as a result of a changing voltage
- Magneto resistor (MDR) as a result of a changing magnetic field
- Strain Gauges as a result of mechanical load

For each of these types a standard symbol exists. Another breakdown based on the material and manufacturing process can be made:

- Carbon composition
- Carbon film
- Metal film
- Metal oxide film
- Wire wound
- Foil

The choice of material technology is a specific to the purpose.

Often it is a trade-off between costs, precision and other requirements.

For example, carbon composition is a very old technique with a low precision, but is still used for specific applications where high energy pulses occur.

Carbon composition resistors have a body of a mixture of fine carbon particles and a non-conductive ceramic.

The carbon film technique has a better tolerance.

These are made of a non-conductive rod with a thin carbon film layer around it.

This layer is treated with a spiral cut to increase and control the resistance value.

Metal and metal oxide film are widely used nowadays, and have better properties for stability and tolerance.

Furthermore, they are less influenced by temperature variations.

They are just as carbon film resistors constructed with a resistive film around a cylindrical body.

Wire wound resistors are probably the oldest type and can be used for both high precision as well as high power applications.

They are constructed by winding a special metal alloy wire, such as nickel chrome, around a non-conductive core.

They are durable, accurate and can have very low resistance value.

A disadvantage is that they suffer from parasitic reactance at high frequencies.

RESISTOR CHARACTERISTICS:

Dependent on the application, the electrical engineer specifies different properties of the resistor.

The primary purpose is to limit the flow of electrical current; therefore the key parameter is the resistance value.

The manufacturing accuracy of this value is indicated with the resistor tolerance in percentage.

Many other parameters that affect the resistance value can be specified, such as long term stability or the temperature coefficient.

The temperature coefficient, usually specified in high precision applications, is determined by the resistive material as well as the mechanical design.

In high frequency circuits, such as in radio electronics, the capacitance and inductance can lead to undesired effects.

Foil resistors generally have a low parasitic reactance, while wire wound resistors are amongst the worst.

For accurate applications such as audio amplifiers, the electric noise must be as low as possible.

This is often specified as micro volts noise per volt of applied voltage, for a 1 MHz bandwidth.

For high power applications the power rating is important.

This specifies the maximum operating power the component can handle without altering the properties or damage.

The power rating is usually specified in free air at room temperature.

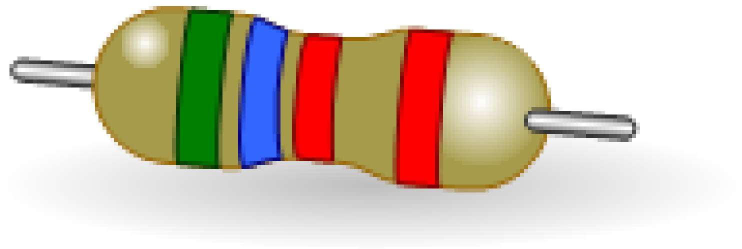
Higher power ratings require a larger size and may even require heat sinks.

Many other characteristics can play a role in the design specification.

Examples are the maximum voltage, or the pulse stability.

In situations where high voltage surges could occur this is an important characteristic.

Resistor colour code:



The resistance value and tolerance are indicated with several colored bands around the component body.

This marking technique of electronic components was already developed in the 1920’s.

Printing technology was still not far developed, what made printed numerical codes too difficult on small components.

Nowadays, the color code is still used for most axial resistors up to one watt.

In the figure an example is shown with four color bands.

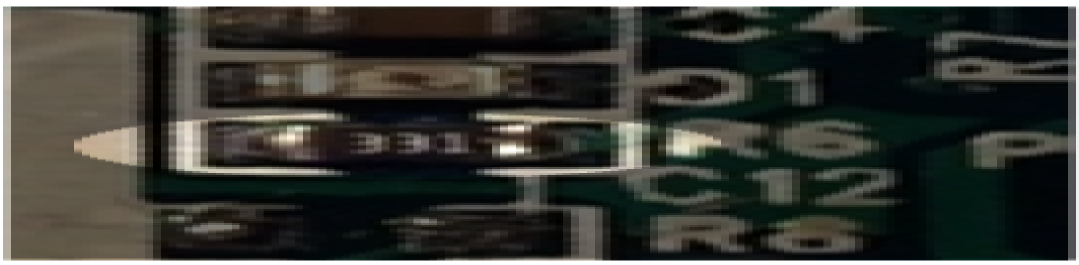
In this example the two first bands determine the significant digits of the resistance value, the third band is the multiplying factor and the fourth band gives the tolerance.

Each color represents a different number and can be looked up in a resistor color code chart.

RESISTOR COLOUR CODE CALCULATOR:

The color code can easily be decoded using this calculator. It not only provide resistance value, it also indicates when the value belongs to an e-series.

SMD RESISTORS:



For SMD (Surface Mount Device) resistors a numerical code is used, because the components are too small for color coding.

SMD resistors are -just as leaded variants – mainly available in the preferred values.

The size of the component (length and width) is standardized as well, and is referred to as resistor package.

An example of an SMD resistor on a PCB is given in the picture below.

The marking “331” means that the resistance has a value of 33Ω x 10^1 = 330Ω.

RESISTOR VALUES (PREFERRED VALUES):

In the Fifties the exaggerated production of resistors created the requirement for standardized resistance values.

The vary of resistance values is standardized with thus referred to as most well-liked values.

the popular values square measure outlined in E-series.

RESISTOR APPLICATIONS:

There is a large variation in fields of applications for resistors; from exactness parts in digital physical science, until measuring devices for physical quantities.

during this chapter sev eral in style applications ar listed.

RESISTORS IN SERIES AND PARALLEL:

In electronic circuits, resistors square measure fairly often connected serial or in parallel.

A circuit designer may as an example mix many resistors with customary worths (E-series) to succeed in a selected resistance value.

For series association, the present through every electrical device is that the same and also the equivalent resistance is up to the add of the individual resistors.

For parallel association, the voltage through every electrical device is that the same, and also the inverse of the equivalent resistance is up to the add of the inverse

within the articles resistors in parallel and series a close description of calculation examples is given.to resolve even additional complicated networks, Kirchhoff’s circuit laws could also be used.

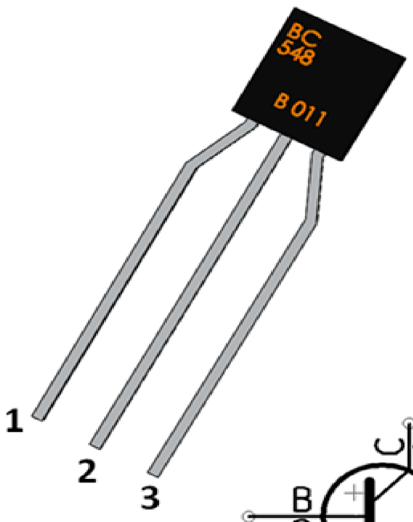
MEASURE ELECTRICAL CURRENT (SHUNT RESISTOR):

Electrical current can be calculated by measuring the voltage drop over a precision resistor with a known resistance, which is connected in series with the circuit. The current is calculated by using Ohm’s law. This is a called an ammeter or shunt resistor. Usually this is a high precision managing resistor with a low resistance value.

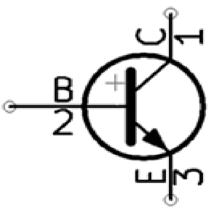
RESISTORS FOR LED’S:

LED lights need a specific current to operate. A too low current will not light up the LED, while a too high current might burn out the device. Therefore, they are often connected in series with resistors. These are called ballast resistors and passively regulate the current in the circuit.

TRANSISTOR BC 548 :



BC-548	
1	Collector
2	Base
3	Emitter



BRIEF DESCRIPTION OF BC548:

BC548 may be a NPN junction transistor therefore the collector and electrode are going to be left open (Reverse biased) once the bottom pin is control at ground and can be closed (Forward biased) once an indication is provided to base pin. BC548 contains a gain price of a hundred and ten to 800, this price determines the amplification capability of the junction transistor. the most quantity of current that might flow through the Collector pin is 500mA, thence we have a tendency to cannot connect masses that consume over 500mA victimisation this junction transistor.

To bias a junction transistor we've got to provide current to base pin, this current (IB) ought to be restricted to 5mA. When this junction transistor is absolutely biased, it will permit a most of 500mA to flow across the collector and electrode. This stage is termed Saturation Region and also the typical voltage allowed across the Collector-Emitter (V¬CE) or Base-Emitter (VBE) can be two hundred and 900 mV severally. once base current is removed the junction transistor becomes absolutely off, this stage is termed because the Cut-off Region and also the Base electrode voltage can be around 660 mV.

BC548 TRANSISTOR FEATURES:

- Bi-Polar NPN Transistor.
- DC Current Gain (hFE) is 800 maximum.
- Continuous Collector current (IC) is 500mA.
- Emitter Base Voltage (VBE) is 5V.
- Base Current(IB) is 5mA maximum.
- Available in To-92 Package.

APPLICATIONS:

- Driver Modules like Relay Driver, LED driver etc..
- Amplifier modules like Audio amplifiers, signal Amplifier etc..
- Darlington pair

THERMISTER:

A thermostat 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. Thermostats are widely used as inrush current limiters, temperature sensors (negative temperature coefficient or NTC type typically), self-resetting over current protectors, and self-regulating heating elements (positive temperature coefficient or PTC type typically).

Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable and precise change in electrical resistance when subjected to a corresponding change in body temperature. Negative Temperature Coefficient (NTC) thermistors exhibit a decrease in electrical resistance when subjected to an increase in body temperature and Positive Temperature Coefficient (PTC) thermistors exhibit an increase in electrical resistance when subjected to an increase in body temperature. U.S. Sensor Corp.®, acquired by Littelfuse in 2017, produces thermistors capable of operating over the temperature range of -100° to over +600° Fahrenheit. Because of their very predictable characteristics and their excellent long-term stability, thermistors are generally accepted to be the most advantageous sensor for many applications including temperature measurement and control.

Since the negative temperature coefficient of silver sulphide was first observed by Michael Faraday in 1833, there has been a continual improvement in thermistor technology. The most important characteristic of a thermistor is, without question, its extremely high temperature coefficient of resistance. Modern thermistor technology results in the production of devices with extremely precise resistance versus temperature characteristics, making them the most advantageous sensor for a wide variety of applications.

is used in a circuit where the power dissipated within the device is not sufficient to cause "self heating", the thermistor's body temperature will follow that of the environment. Thermistors are not "self heated" for use in applications such as temperature measurement, temperature control or temperature compensation.

When a thermistor is used in a circuit where the power dissipated within the device is sufficient to cause "self heating", the thermostat’s body temperature will be dependent upon the thermal conductivity of its environment as well as its temperature. Thermistors are "self heated" for use in application such as liquid level detection, air flow detection and thermal conductivity measurement. A thermistor's change in electrical resistance due to a corresponding temperature change is evident whether the thermistor's body temperature is changed as a result of conduction or radiation from the surrounding environment or due to "self heating" brought about by power dissipation within the device.

THERMISTOR CONSTRUCTION:

To make a thermistor, two or more semiconductor powders made of metallic oxides are mixed with a binder to form slurry. Small drops of this slurry are formed over the lead wires. For drying purpose, we have to put it into a sintering furnace. During this process, that slurry will shrink onto the lead wires to make an electrical connection. This processed metallic oxide is sealed by putting a glass coating on it. This glass coating gives a waterproof property to the thermistors – helping to improve their stability.

There are different shapes and sizes of thermistors available in the market. Smaller thermistors are in the form of beads of diameter from 0.15 millimeters to 1.5 millimeters. Thermistors may also be in the form of disks and washers made by pressing the thermistor material under high pressure into flat cylindrical shapes with diameter from 3 millimeters to 25 millimeters.

TYPES OF TEMPERATURE SENSORS:

The typical size of a thermistor is 0.125mm to 1.5 mm. Commercially available thermistors have nominal values of 1K, 2K, 10K, 20K, 100K, etc. This value indicates the resistance value at a temperature of 25^{o}C.
Thermistors are available in different models: bead type, rod type, disc type, etc. The major advantages of thermistors are their small size and relatively low cost.

This size advantage means that the time constant of thermistors operated in sheaths is small, although the size reduction also decreases its heat dissipation capability and so makes the self-heating effect greater. This effect can permanently damage the thermistor.

To prevent this, thermistors have to be operated at low levels of electric current compared to resistance thermometer – resulting in lower measurement sensitivity.

Thermistors are of two opposite fundamental types:

- With NTC thermistors, resistance decreases as temperature rises. An NTC is commonly used as a temperature sensor, or in series with a circuit as an inrush current limiter.

- With PTC thermistors, resistance increases as temperature rises. PTC thermistors are commonly installed in series with a circuit, and used to protect against *over current* conditions, as resettable fuses.

Thermistors are generally produced using powdered metal oxides.With vastly improved formulas and techniques over the past 20 years, NTC thermistors can now achieve precision accuracies over wide temperature ranges such as ±0.1 °C or ±0.2 °C from 0 °C to 70 °C with excellent long-term stability. NTC thermistor elements come in many styles [2] such as axial-leaded glass-encapsulated (DO-35, DO-34 and DO-41 diodes), glass-coated chips, epoxy-coated with bare or insulated lead wire and surface-mount, as well as rods and discs. The typical operating temperature range of a thermistor is −55 °C to +150 °C, though some glass-body thermistors have a maximal operating temperature of +300 °C.

Thermistors differ from resistance temperature detectors (RTDs) in that the material used in a thermistor is generally a ceramic or polymer, while RTDs use pure metals. The temperature response is also different; RTDs are useful over larger temperature ranges, while thermistors typically achieve a greater precision within a limited temperature range, typically −90 °C to 130 °C.

PTC (POSITIVE TEMPERATURE COEFFICIENT):

Most PTC thermostats are made from doped polycrystalline ceramic (containing barium titanate ($BaTiO_3$) and other compounds) which have the property that their resistance rises suddenly at a certain critical temperature. Barium titanate is ferroelectric and its dielectric constant varies with temperature. Below the Curie point temperature, the high dielectric constant prevents the formation of potential barriers between the crystal grains, leading to a low resistance. In this region the device has a small negative temperature coefficient. At the Curie point temperature, the dielectric constant drops sufficiently to allow the formation of potential barriers at the grain boundaries, and the resistance increases sharply with temperature. At even higher temperatures, the material reverts to NTC behavior.

Another type of thermistor is a **silistor**, a thermally sensitive silicon resistor. Silistors employ silicon as the semi conductive component material. Unlike ceramic PTC thermistors, silistors have an almost linear resistance-temperature characteristic.

Barium titanate thermistors can be used as self-controlled heaters; for a given voltage, the ceramic will heat to a certain temperature, but the power used will depend on the heat loss from the ceramic.

The dynamics of PTC thermistors being powered also is extremely useful. When first connected to a voltage source, a large current corresponding to the low, cold, resistance flows, but as the thermistor self-heats, the current is reduced until a limiting current (and corresponding peak device temperature) is reached. The current -limiting effect can replace fuses. In the degaussing circuits of many CRT monitors and televisions an appropriately chosen thermistor is connected in series with the degaussing coil. This results in a smooth current decrease for an improved degaussing effect. Some of these degaussing circuits have auxiliary heating elements to heat the thermistor (and reduce the resulting current) further.

Another type of PTC thermistor is the polymer PTC, which is sold under brand names such as "Polyswitch" "Semifuse", and "Multi-user". This consists of plastic with carbon grains embedded in it. When the plastic is cool, the carbon grains are all in contact with each other, forming a conductive path through the device. When the plastic heats up, it expands, forcing the carbon grains apart, and causing the resistance of the device to rise, which then causes increased heating and rapid resistance increase. Like the $BaTiO_3$ thermistor, this device has a highly nonlinear resistance/temperature response useful for thermal or circuit control, not for temperature measurement. Besides circuit elements used to limit current, self-limiting heaters can be made in the form of wires or strips, useful for heat tracing. PTC thermistors 'latch' into a hot / high resistance state: once hot, they stay in that high resistance state, until cooled. The effect can be used as a primitive latch/memory circuit, the effect being enhanced by using two PTC thermistors in series, with one thermistor cool, and the other thermistor hot.

NTC (NEGATIVE TEMPERATURE COEFFICIENT):

A failed (blown) NTC thermostat that worked as an inrush current limiter in a switched-mode power supply

Many NTC thermistors are made from a pressed disc, rod, plate, bead or cast chip of semiconducting material such as sintered metal oxides. They work because raising the temperature of a semiconductor increases the number of active charge carriers it promotes them into the conduction band. The more charge carriers that are available, the more current a material can conduct. In certain materials like ferric oxide (Fe_2O_3) with titanium (Ti) doping an *n-type* semiconductor is formed and the charge carriers are electrons. In materials such as nickel oxide (NiO) with lithium (Li) doping a *p-type* semiconductor is created, where holes are the charge carriers.[7]

This is described in the formula

Where,

= electric current (amperes),

= density of charge carriers (count/m^3),

= cross-sectional area of the material (m^2),

= drift velocity of electrons (m/s),

= charge of an electron (coulomb).

BUZZER:

A buzzer or electronic device is associate degree audio signalling device, which can be mechanical, mechanical device , or electricity (piezo for short). Typical uses of buzzers and beepers embody alarm devices, timers , and confirmation of user input like a depression or keystroke.

CTROMECHANICAL:

Early devices were supported AN mechanical device system clone of an electrical bell while not the metal gong. Similarly, a relay could also be connected to interrupt its own activating current, inflicting the contacts to buzz. typically these units were anchored to a wall or ceiling to use it as a sounding board. The word "buzzer" comes from the rasping noise that mechanical device buzzers created.

MECHANICAL:

A joy buzzer is associate example of a strictly mechanical buzzer and that they need drivers. alternative samples of them area unit doorbells.

PIEZOELECTRIC:

A electricity component is also driven by associate periodical electronic circuit or alternative audio signal supply, driven with a electricity audio amplifier. Sounds unremarkably wont to indicate that a button has been ironed area unit a click, a hoop or a beep.

APPLICATIONS OF BUZZER :

- Novelty uses
- Judging panels
- Educational purposes
- Enunciators panels
- Electronic metronomes

CHAPTER 4

(METHODOLOGY): WORKING PRINCIPLE :

A fire alarm system has a number of devices working together detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide or other emergencies are present. Fire detectors are detect one or more of the three characters of fire – smoke ,heat and flame . Besides that, every fire detection system must include manual call point (break glass), so that in the event of fire, help can be called immediately. During a fire, activation of an alarm sounders o r bells is to arouse the attentionof the occupants so that evacuation can be carried out without causing harm to the occupants.

CHAPTER 05

RESULT AND DISCUSSION:

CHAPTER 06

CONCLUSION AND FUTURE SCOPE:

Smoke detector is one amongst the simplest and low pricey. most of industries use it , as a result of it work fatly to guard and only. In future the employment of gas and smoke detection can will increase. In future we have a tendency to embody Bluetooth module. At finally we have a tendency to complete this project mistreatment three detector. This project has been actuated by the need to style a system that may find fires and take applicable action,without any human intervention. to beat disadvantages and looking out for implementation of automatic fireplace detection .In the place of semiconductor device need to use Sensors. Uses the speakers rather than TThermistor with warning message & Audio alert signal.

REFERENCE:

[1] www.google.co.in

[2] About circuit-basic electronic equipment function

[3] Wikipedia-www.wikipedia.org

[4] http//seminarprojects.net/rain sensor project

[6] *National Fire Protection Association (February 2001). "Chapter 3* [5] *Dunnings, A.; Breckon, T.P. (2018). "Experimentally Defined Convolutional Neural Network Architecture Variants for Non-temporal Real-time Fire Detection". Proc. International Conference on Image Processing (*PDF)*. IEEE*. Retrieved 9 August 2018*.*

Fundamental Fire Protection Program and Design Elements". NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants. National Fire Protection Association. standard: Gaseous Fire Suppression Systems 3.10.7.

[7]*National Fire Protection Association (2011). "Chapter 4 Annex A". NFPA 12 Standard on Carbon Dioxide Extinguishing Systems. National Fire Protection Association. standard: A.4.5.6.2.2.*

[8] *Cote, Arthur E. (March 2000). Fire Protection Handbook eighteenth edition. National Fire Protection Association. pp. 5–8. ISBN 0-87765-377-1.*

[9] NFPA 72 – National Fire Alarm and Signaling Code – 2010 Edition. National Fire Alarm Association, 2009, Page 118, Subsection 24.4.1

[10] *"Fire Door Holders - Geofire". Geofire*. Retrieved 21 March 2018*.*