

**MINI PROJECT REPORT**

**ON**

**AC LINE DETECTOR**

**Submitted**

**By**

**ABHISHEAK REVI (19201372)**

**AFTHAB T S (19201373)**

**AJEESH N O (19201374)**

**AMAL P A (19201335)**

*In partial fulfilment for the award of the degree  
of*

**DIPLOMA IN TECHNOLOGY**

**IN**

**ELECTRONICS AND COMMUNICATION ENGINEERING**



**MGM POLYTECHNIC COLLEGE, PAMPAKUDA**  
**(Affiliated to AICTE)**

**2019 – 2022 BATCH**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING**

**MGM POLYTECHNIC COLLEGE, PAMPAKUDA**

**2021**

*Bonafide Certificate*

*This is to certify that this Project Report entitled “AC **LINE DETECTOR**” is a bonafide record of the seminar presented by ABHISHEAK REVI (19201372), AFTHAB T S (19201373), AJEESH N O (19201374), AMAL P A (19201375) towards the partial fulfilment of the requirements for the award of **Diploma in Electronics and Communication Engineering** during the year 2021.*

**VIMAL RAJ V**

Head of the Department

Dept. of ECE

MGMPTC

## ACKNOWLEDGEMENT

First and foremost I place this work on the feet of **GOD ALMIGHTY** who is the power of strength in each step of progress towards the successful completion of my Mini Project.

I am highly in debted to **Mr. N K Rajan** Principal, MGM Polytechnic College, Pampakuda for his support and facilities.

I also extend my heartfelt thanks to **Mr. Vimal Raj V** Head Department of ECE, who had been a source of inspiration.

I am thankful to our beloved class tutor **Mrs. Ajeena Paul** Assistant Professor, Department of ECE, for her encouragement and cooperation in carrying out during mini project.

I thankfully acknowledge the cooperation and help rendered by all the teaching and non- teaching staffs.

Finally, I would like to express my heartfelt thanks to my beloved parents for their blessings, my friends for their help and wishes for the successful completion of this mini project.

**ABHISHEAK REVI (19201372)**

**AFTHAB T S (19201373)**

**AJEESH N O (19201374)**

**AMAL P A (19201375)**

## **ABSTRACT**

Safety is a matter should be given priority in any circumstances whatsoever. A danger or disaster could have happened at home or place of work or anywhere else. Among the most common accidents is when nail or drill the wall or floor. Risk of electric shock is high and it can cause injuries to people. To improve safety at home or working place, a detection system of electrical wire that usually hidden in wall has been developed. Have there a few tool that can be used to detect electrical wires hidden in wall or floor. Some of the tools can pinpoint the exact location of the wire. However, the relatively high price of the device for used by the public. This research paper analysis a number of method used to detect wires hidden behind the materials, the quality of detection and detection of hidden wire alternating current flow in the wires alternating current flowing into wire. The hardware was designed and developed based on the effect of magnetic flux cancellation of inductance and charge cancellation effect of capacitance.

Developed hardware detection is able to show different reading depending on the electrical wire with and different size. Reading alternating current detection during electrical current on the wire there is also developed. An evaluation was conducted on hardware that is designed to determine whether it is able to detect electrical wires and detect the presence of an electrical current. The data obtained through the assessment carried out show that these tools are able to detect the presence of electrical current and the location of the hidden wire inside nonconductive materials.

**ABHISHEAK REVI (19201372)**

**AFTHAB T S (19201373)**

**AJEESH N O (19201374)**

**AMAL P A (19201375)**

**CONTENTS**

<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE.NO</b>
1	INDRODUCTION	6
2	BLOCK DIAGRAM	8
3	WORKING AND CIRCUITE DIAGRAM	9
	THEORY	
	WORKING	
	CITCUTE DIAGRM	
	AC Line Detector works	
	voltage detectors work	
	Transistor is used in wireless Detector	
	Use of transistor in wireless detector	
	Use of IC in wireless detector	
	The function of current sensor	
4	APPLICATION	12
5	ADVANTAGES	13
6	DISADVANTAGES	14
7	SCOPE OF PROJECT	15
8	CONCLUTION	16
	A Study of Implementation of 5S in an Electronic Laboratory	19

## LIST OF FIGUERS

Sl. No	Figure Name	Fig. No
1	Block diagram	2.1
2	Circuit diagram	3.1
3	BC547 Transistor	3.2
4	IC 4060	3.3

# **CHAPTER - 1**

## **INTRODUCTION**

Introduction Beginning a remodeling project or simply drilling into a wall to hang a picture can seem simple enough, but steps must be taken before hand to determine if electrical wires are present within nonconductive materials. With the increasing demand for safety at home and at the workplace we need a detection system that predict potential hazards exists specially this hidden live wire inside nonconductive materials when you debug home electrical wiring, a tool that determines the location of hidden wires behind nonconductive materials comes in hardly and manually. People can hurt trebly or find death during the process drilling or driving a nail at nonconductive materials without knowing the present of hidden live wire in it. The wire and the nonconductive materials can be damage during the drill or drive nail by people. The problem why its happen because people don't know where the wire flow inside of nonconductive materials when they handle house work such as drilling, nailing and etc. The objectives of this work are analyze the data used in the presence of electric currents and electrical wire with different sizes, design a proto-type device that can detect electrical wires that hide inside nonconductive materials and its alternative current flowing presences and evaluate whether the proto-type build can detect hidden electrical wires inside of nonconductive materials and its alternative current flowing presences on it.

The Long-Run Efficiency of Real-Time Electricity Pricing proposed by Severin Borenstein Retail real-time pricing (RTP) of electricity – retail pricing that changes hourly to reflect the changing supply/demand balance – is very appealing to economists because it “sends the right price signals.” Economic efficiency gains from RTP, however, are often confused with the short-term wealth transfers from producers to consumers that RTP can create. Abstracting from transfers, I focus on the longrun efficiency gains from adopting RTP in a competitive electricity market. Using simple simulations with realistic parameters, I demonstrate that the magnitude

of efficiency gains from RTP is likely to be significant even if demand shows very little elasticity. I also show that “time-of-use” pricing, a simple peak and offpeak pricing system, is likely to capture a very small share of the efficiency gains that RTP offers. Vinayak Sonandkar et.al. has proposed that the power demand has increased drastically over the last few years. One of the way by which we can solve this energy problems is by reducing usage of energy in households during peak demand. For this, demand response by real time pricing is implemented in the project. There is need for accurate and economic methods of power measurement. The main objective of this project is Power Measurement to reduce peak on generation by providing customers with their instantaneous power consumption. The aim of providing such data to the user is, to encourage them to shift their load during non-peak hour and reduce their power usage and electricity bill. Hardware, Software and the theory involved in the project is briefly described . The current and voltage signals from the load are stepped down and conditioned before they are given to the Atmega328. Load circuit, Signal conditioning circuit and their construction and functionality in the project are discussed.



## CHAPTER - 2

### BLOCK DIAGRAM

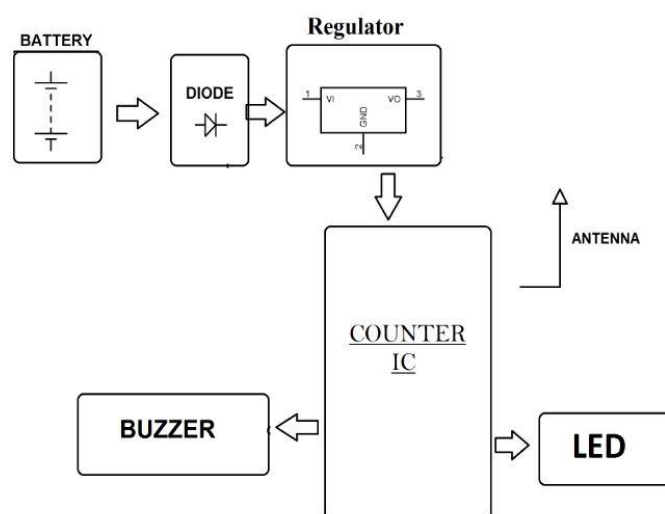


Fig. 2.1 Block diagram

The above figure shows the block diagram of ac line detector which contain Battery, Diode, Regulator, Counter IC, Buzzer, LED , Antenna.

An antenna used to receive radio wave signal from current flowing wire. And the uses NPN type transistors in order to detect voltage. A transistor has three terminals - collector, emitter and base. Collector to emitter current is controlled by the base current. When there is no base current, no collector to emitter current flows. Then the IC 4060 is a oscillator/Timer IC and can be used for producing discretely variable accurate time intervals or delays. Alternatively it may also be used as an oscillator for acquiring high grade, accurate time period oscillations of frequencies. The received waves are then converted into a human recognizable form with the help of a processing circuitry. Thus the circuit gives an audio visual signal in the form of pulsating buzzer and LED to let the user with the device inspecting the live wire know that there is a current flowing through the live wire

## CHAPTER - 3

### WORKING

- **THEORY**

AC line detector is a **device which detects AC line currents without making any electrical connections to the line**. An easy to make circuit to identify the line and the neutral of an AC circuit, without making contact with the wires.

- **WORKING**

Many of us know what an electric shock is, Right from the day of advent of commercial distribution of electricity till today we have many live wires carrying AC current doing some harm or even sometimes killing some. This simple project has the capability to sense a flow of alternating current around its vicinity without even having a physical contact with the live wire. The concept of working behind this project is that a live wire has alternating current flowing through it. These also radiate from the wires and hence can be felt by a nearby sensing circuit which is properly tuned to do so. The project has an antenna which does this task of receiving these radiated waves. The received waves are then converted into a human recognizable form with the help of a processing circuitry. Thus the circuit gives an audio visual signal in the form of pulsating buzzer and LED to let the user with the device inspecting the live wire know that there is a current flowing through the live wire. An antenna is an important part of any circuitry which is intended to receive incoming wireless signals. The radiated AC line signals are received by this antenna. These signals are then amplified and fed to the LED blink circuit section. Hence when the LED starts blinking the person testing the wire can know that the wire is Live and hence should be played safe with.

- **CIRCUIT DIAGRAM**

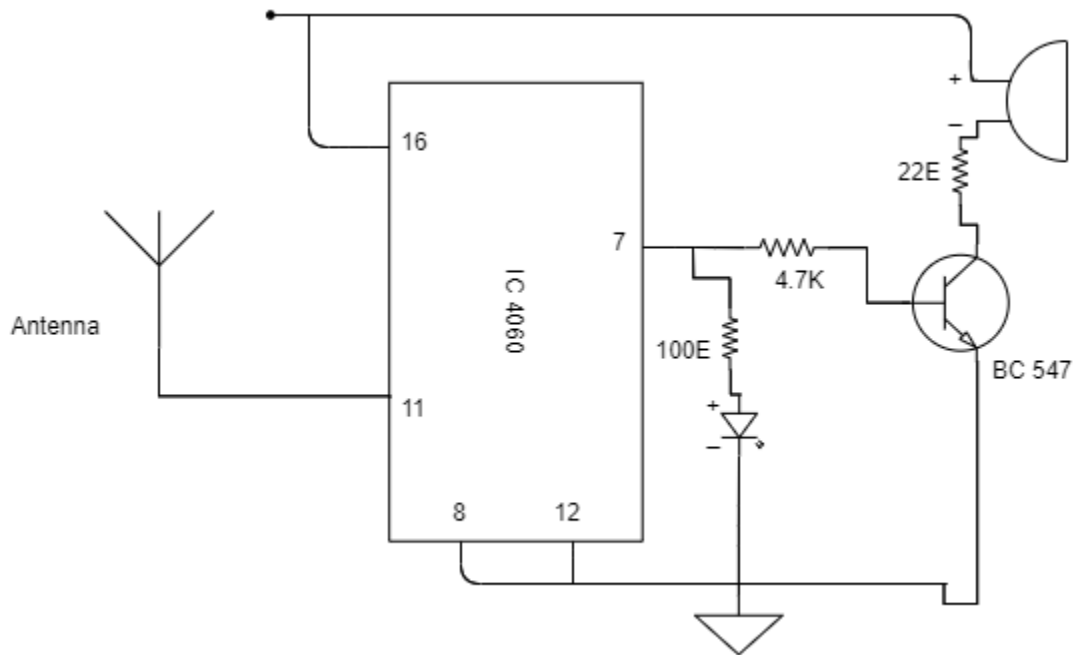


Fig 3.1 circute diagram

- **AC line detector work**

A magnetic field is produced around a current carrying conductor and if current through the conductor is alternating current (AC), the magnetic field produced varies periodically. A non-contact AC voltage detector detects the changing magnetic field around AC energized objects

- **Voltage detectors work**

Voltage detectors do not actually detect voltage, but instead electric fields. The internal circuit of a non-contact voltage detector leads to a sensor which is positioned in the tip of the tool. When the electromagnetic waves hit the sensor a signal is sent through the circuit which turns on the light and/or buzzer

- **Transistor used in wireless detector**

Voltage Detector Using **BC547** Transistor.



Fig 3.2 Transistor BC547

- **Use of transistor in wireless detector**

This non-contact AC voltage detector uses NPN type transistors in order to detect voltage. A transistor has three terminals - collector, emitter and base. Collector to emitter current is controlled by the base current. When there is no base current, no collector to emitter current flows.

- **Use of IC in wireless detector**

Basically the IC 4060 is a oscillator/Timer IC and can be used for producing discretely variable accurate time intervals or delays. Alternatively it may also be used as an oscillator for acquiring high grade, accurate time period oscillations of frequencies.

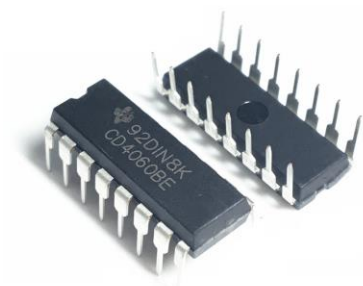


Fig 3.3 IC4060

- **The function of current sensor**

A current sensor is a device that detects electric current in a wire and generates a signal proportional to that current. The generated signal could be analog voltage or current or a digital output.

## CHAPTER - 4

### APPLICATION

The leakage can be detected by using a Wireless AC line detector which will help **to prevent accidents**. In Industries accident takes place due to leakage of electricity. The accidents can be avoided by using the wireless AC line detector. The motive of this project is to detect presence of electricity wirelessly.

- We can reduce the time taken to build underground fault
- We can check the fault point of the wire in the wall
- To check Dead or Live wires.

## **CHAPTER - 5**

### **ADVANTAGES**

1. Cheaper to generate.
2. High Voltage Generation is possible.
3. Transmission and distribution are cheaper than DC.
4. Easy to step-up/down Of voltage level.
5. Low maintenance.

## **CHAPTER - 6**

### **DISADVANTAGES**

1. AC is not very efficient to transmit over long distance compare to HVDC.
2. Present of Skin Effect.
3. Present of Corona Effect and Radio Interference.
4. Most of electronics gadgets do not run on AC Supply.
5. Needs power factor correction to maintain efficiency of the distribution. AC voltage teste



## **CHAPTER - 7**

### **FUTURE SCOPE**

This research paper analyzes a method used to detect electrical wires hidden behind materials. This analysis involves the detection of electrical live wire, the quality of detection and detection of hidden wires alternating current flowing in the wire. The hardware was designed and developed based on the effect of magnetic flux.

## **CHAPTER - 8**

### **CONCLUTION**

In this paper, we have proposed a paper on wireless AC line for preventing the leakage of power and theft of current. It is a very useful project for industrial power usage. In future, it could be extended even more for better efficiency.

## REFERENCES

1. Dr.S.P. Vimal , M. Tamilarasan, T.Balaji, C.B.Aravind babu, “**Wireless AC Line Detector**” International Journal of Scientific & Engineering Research Volume 8, Issue 7, July-2017 ISSN 2229-5518.
2. P.Priya, R.Karuppasamy, R.RagavaRaja, B. Pradeep, “Design of Wireless Networked Electricity Pole Line Multi-FaultMonitoringSystem”, International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Vol. 8, No. 4S2, 2019.
3. V. Sonandkar, A. Bhati, D. Gupta, S. Chouhan, N. Kinhekar and N. P. Padhy, "Power measurement using arduino for effective demand response", IEEE 6th International Conference on Power Systems (ICPS), New Delhi, 2016, pp. 1-5.
4. Sachil Kumar, Anoop K. Verma, Uma Shankar Singh, “Electrocutionrelated mortality in northern India – A5-year retrospective study”, Egyptian Journal of Forensic Sciences, Vol. 4, pp. 1-6, 2014.
5. Yasar Tirasci, Suleyman Goren, Mehmet Subasi, Fuat Gurkan, “Electrocution-Related Mortality: A Review of 123 Deaths in Diyarbakir, Turkey between 1996 and 2002”, Volume 208 Issue 2 Pages 141-145, 2006.
6. B. D. Gupta, R.A. Mehta, M. M. Trangadia, “Profile of Deaths due to Electrocution: A Retrospective Study”, Journal of the Indian Academy of Forensic Medicine, Vol. 34, No. 1, Jan- March 2012.
7. Z. H. Bohari, M. F. Sulaima, M. N. M. Nasir, W. M. Bukhari, M. H. Jali, M. F. Baharom, “A Novel Electromagnetic Field Detector for Extremely Low Frequency Energy”, The International Journal of Engineering and Science, Vol. 3, No.6, pp. 59-67, 2014.

## **A STUDY OF IMPLEMENTATION OF 5S IN AN ELECTRONIC LABORATORY**

5S practices in the organization influence employees thinking, their behaviour, attitude towards their work and motivation to work in their workplace at the organization. A good 5S training program sensitizes employees to all kinds of ways they can become more productive. 5S is a powerful tool and can be implemented in various industries whether it is micro, small, medium or large. This paper reviews an attempt made by VITPL, Mysuru to implement 5S in their organization that would allow great benefits like organizing the workplace, decreasing waste of time by nonvalue adding activities, optimizing quality and productivity via monitoring an organized working environment. This study seeks to answer the question to what level implementation of 5S have impact on employees and tries to investigate the important factors responsible for 5S practices at the organization. The results show that 5S is an effective tool for improvement of organization's working environment, work culture, etc. This study will inform researchers and practitioners about new management practices for the betterment of working environment.

5S represents 5 disciplines to maintain the workplace. It is a fundamental activity to improve business. 5S represents systematic approach for productivity, quality and safety improvement in all types of business. It is one of the important approaches in journey of continuous improvement is 5S. The 5S program focuses on having visual order, organization, cleanliness and standardization. 5S simplifies and organizes the work environment, reduces waste and non-value activity while improving quality efficiency and safety. And a well organized workplace motivates people. The program is called 5S, since all steps start with an "S".

5S uses five Japanese disciplines

- i. Seiri (Sort)
- ii. Seiton (Set)
- iii. Seiso (Shine)
- iv. Seiketsu (Standardization)
- v. Shitsuke (Sustain)

These five techniques are helpful in organizing workplace day to day. The 5S program focuses on having visual order, organization, cleanliness and standardization. The results from a 5S program are improved profitability, efficiency, service and safety. Takashi Osada in 1991 coined the original concept of 5S in the early 1980s. 5S is the acronym for five Japanese words Seiri (organization), Seiton (neatness), Seiso (cleanliness), Seiketsu (standardization) and Shitsuke (discipline) respectively. 5S has been introduced in Japan mainly in the manufacturing and service industries. Japanese believe that 5S Principles are not only valuable at their workplaces but also improve their cognitive sense. Osada refers to the 5S as the five pillars to establish and maintain total quality environment in an organization.

5S Principles focuses on effective workplace organization, simplification of work environment and minimization of waste while improving quality and safety. Success of 5S totally depends upon total employee involvement, its continuous monitoring and everyone should work in a team.

- i. Sort – Remove unnecessary items from the work area and attach red tag to the all unnecessary and infrequently used items.
- ii. Set in order – customize the work area for effective working by keeping important materials, tools nearby workplace.
- iii. Shine – Clean the work area, machines, tools, equipments for finding and eliminating the minor and unwanted constituents.

- iv. Standardize – create a standardized and consistent 5S work flow by maintaining high standards of housekeeping, workplace organization, cleanliness and orderliness, everything in order and in its right place.
- v. Sustain – ensure the 5S as a long term goal and give awareness and training to the workers and employees by explaining its significance.

5S is a system to reduce waste and optimize productivity through maintaining an orderly workplace and using visual cues to achieve more consistent operational results. Implementation of this method "cleans up" and organizes the workplace basically in its existing configuration, and it is typically the first lean method which organizations implement. A 5S program can be applied to any work environment. It could be a supply/store in a hospital, a repair truck for a telecom company, a CSR desk/work area in a call center, the baggage claim area of an airline or a laptop computer. The 5S begins the laying of the foundation to continuously apply lean concepts and techniques to root out waste and streamline processes.