

COIN BASED MOBILE CHARGER

BY NURATIKAH BINTI ANNUAR

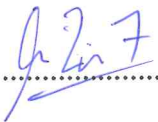
NUR 'IZZUL 'AZIRA BINTI CHE AZAHRI

A proposal project submitted in fulfillment of the requirement for the award of the diploma of Electronic Engineering (Computer) Department of Electrical Engineering Polytechnic Seberang Perai (PSP).

DECEMBER 2016

PROJECT REPORT COMFORMATION

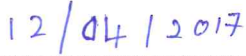
I hereby declare that the work in this report is my own except for quotations and summaries
which have been duly acknowledged.

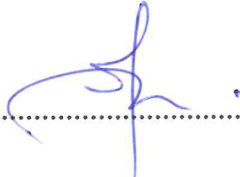
Student : 

Student : 

NURATIKAH BINTI ANNUAR

NUR 'IZZUL 'AZIRA BINTI CHE AZAHRI

Date: 

Supervisor: 

MADAM LATIFAH BT ABD AZIZ

Dedicated to,

Thanks to Allah,

For give Us a good health and strength while making this report.

To our beloved father and mother,

Who has always been our epitome of love and always pray for us strength to finish up this report.

Our beloved relatives,

Our siblings,

Thank you for your support and pray.

The person who has been very understanding and helpful,

MADAM LATIFAH BT ABD AZIZ,

For the support and guidance. Hope that we always be remembered.

Our unforgettable friends,

Our housemate, Our coursemate and all DTK students intake June 2014,

Our struggle not yet ends.

Finally, friends that always together during this third years study,

Hopefully achieved what we aspired.

	Contents	Page
ABSTRACT		i
ACKNOWLEDGEMENT		ii
 CHAPTER 1 : INTRODUCTION		
1.1	INTRODUCTION	1
1.2	ABSTRACT	2
1.3	RESEARCH BACKGROUND OBJECTIVES	2
1.4	MOTIVATION	3
1.5	PROBLEM STATEMENT	3
1.6	OBJECTIVE	3
1.7	SCOPE PROJECT	4
 CHAPTER 2 : LITERATURE REVIEW		
2.1	INTRODUCTION	5
2.2	LITERATURE REVIEW	5-7
2.3	COMPONENT OF PROJECTS	8-9
2.4	TYPES OF COMPONENTS	9-24
 CHAPTER 3 : METHODOLOGY		
3.1	INTRODUCTION	25
3.2	BENEFITS AND ADVANTAGE OF PROJECT	25
3.3	FLOW CHART PLAN OF PROJECT	26
3.4	GANTT CHART	27
3.5	WEEK PLANNING	28
3.6	BLOCK DIAGRAM	29-30
3.7	PCB WIZARD	31

3.8 TESTING COMPONENTS	41-45
3.9 EQUIPMENT	46-51

CHAPTER 4: PROJECT ANALYSIS AND DISCOVERY

4.1 INTRODUCTION	52
4.2 COMPONENT OF COST	52-54
4.3 TROUBLESHOOTING	54-56

CHAPTER 5: CONCLUSION AND SUGGESTION

5.1 CONCLUSION	57
5.2 SUGGESTION	58

REFERENCE	59
APPENDIX	

LIST OF FIGURE

PAGES

Figure 2.4 (a)	Transformer	9
Figure 2.4(b)	LCD 16X2	10
Figure 2.4 (c)	Aduino UNO	12
Figure 2.4 (d)	Relay Module	14
Figure 2.4 (e)	Code of relay	10
Figure 2.4 (f)	Coin acceptor	12
Figure 2.4 (g)	IC	17
Figure 2.4 (h)	Light Emitting Diode	19
Figure 2.4 (i)	Type of capacitor	17
Figure 2.4 (j)	Code of Resistor	21
Figure 2.4 (k)	Resistor	22
Figure 2.4 (l)	Bridge rectifier	23
Figure 2.4 (m)	DC boost module 5V	20
Figure 3.3	Flow Chart Plan Of Project	26
Figure 3.4	Gantt Chart	27
Table 3.5	Week Planning	28
Figure 3.6.1	Block Diagram of Power Supply	29
Figure 3.6.2	Block Diagram Of Coin Based Mobile	29
Figure 3.6.3	Flow Chart Of Coin Based Mobile Charger	30
Figure 3.7.2 (a)	PCB	34
Figure 3.7.2 (b)	Combining tracing paper to PCB	34
Figure 3.9.5	Drilling Process	38

Figure 3.7.4	Process of Soldering	40
Figure 3.8.1	Measuring Resistor	42
Figure 3.8.2	Color code	43
Figure 3.8.3	Testing Led	44
Figure 3.8.4	Light Emitting Diode	45
Figure 3.9.1	Multimeter	46
Figure 3.9.2	Soldering Iron	47
Figure 3.9.3	Solder Lead	48
Figure 3.9.4	Flux	48
Figure 3.9.5	Lead Remove	49
Figure 3.9.6	Philip screw Driver	50
Figure 4.2	Component of cost	54
Figure 4.3.1a	Placing of the component	55
Figure 4.3.1c	The spoil component	56

ABSTRACT

This is the smart coin based mobile charging system that charges your mobile for particular amount of time on inserting a coin. The system is to be used by shop owners, public places like railway stations to provide mobile charging facility. So the system consists of a coin recognition module that recognizes valid coins and then signals the Arduino for further action. If a valid coin is found it signals the Arduino and Arduino then starts the mobile charging mechanism providing a 5V supply through a power supply section to the mobile phone, now system also needs to monitor the amount of charging to be provided. So the Arduino starts a reverse countdown timer to display the charging time for that mobile phone. Now if the user inserts another coin in that time, the Arduino adds the time to currently remaining charging time. So the system can be used for smart mobile charging at public places.

ACKNOWLEDGEMENT

First and foremost we would like to take this opportunity to express our gratitude to everyone who supported us throughout the course of this project. We would like to say a gratitude to our supportive supervisor, Madam Latifah Bt Abd Aziz for his aspiring guidance, invaluable constructive criticism and friendly advice during the project work. A sincerely grateful to him for sharing her truthful and illuminating views on a number of issues related to the project.

Other than that, we would like to express gratitude towards our parents, and our colleague for kind encouragement, co-operation and their willingness to help us out which help better in completion of this project.

It would not have been possible without the kind support and help of many individuals and organizations. We would like to extend our sincere thanks to all of them.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Mobile phones have a great value in today's market, as well as mobile phone is a great communication media for personal and industrial purpose. Sometimes, battery becomes flat in the middle of conversation particularly at in convenient times when access to a standard charger isn't possible. It does not bring a mobile from 'dead' to fully charged state.

The charging capacity of the mobile is designed with the help of pre-defined values. It is, of course, possible to continue charging the mobile by inserting more coins. This compact and lightweight product is designed to cater for the growing number of rural mobile users worldwide.

This project is very useful to people who are all using mobile phone without charging condition in public places. Using mobile phones in outside of home are office without charging condition. The coin based mobile phone charger is very useful to that person for using coin to charge for that mobile.

1.2 ABSTRACT

This is the smart coin based mobile charging system that charges your mobile for particular amount of time on inserting a coin. The system is to be used by shop owners, public places like railway stations to provide mobile charging facility. So the system consists of a coin recognition module that recognizes valid coins and then signals the Arduino for further action. If a valid coin is found it signals the Arduino and Arduino then starts the mobile charging mechanism providing a 5V supply through a power supply section to the mobile phone, now system also needs to monitor the amount of charging to be provided. So the Arduino starts a reverse countdown timer to display the charging time for that mobile phone. Now if the user inserts another coin in that time, the Arduino adds the time to currently remaining charging time. So the system can be used for smart mobile charging at public places.

1.3 RESEARCH BACKGROUND

Nowadays, mobile phones are the things that are important to everyone. This is because, every work was carried out and the information you're looking altogether only fingertips. They use the phone to facilitate their work. so, from the use of unlimited cell phone will cause rapid battery flat. This can be helpful for those who do not bring a USB charger or powerbank. Besides, it is also to facilitate the person where the cell phone battery is running low. It can prevent cell phone off a potentially important business wanted to do.

1.4 MOTIVATION

My motivation to undertake this project is due to my experience when my cell phone's battery is running low. Meanwhile, the mobile phone is very important at the present time and of course one does not want his cell phone off at the crucial moment and they will miss important news. Besides, I also want to retain the use of the coin. This is because the coins difficult to get nowadays.

1.5 PROBLEM STATEMENT

Now days, many student bring power bank to charge the phone when the battery is low. Problems that can be detected when your phone is need to charger and students forget to bring power bank. By using coin based mobile charger can help student to charge theirs phone in polytechnic. This machine can charge many types of mobile phone. When students bring the power bank it is a little bit problem for students. This project should placed at people always stop or passing. It easier for people to used it anytime. This project also not need a long time to charge the phone and not use a lot of money.

1.6 OBJECTIVE

- i. To ensure different types of mobile can be charged.
- ii. To design coin based mobile battery charger.
- iii. To make it easier for student to charging the mobile phone in public places.

1.7 SCOPE PROJECT

Generally, this project of Coin Based Mobile Charger consists of two main parts which are hardware and software approach implementation.

In this project, Arduino UNO acts as the core system that controls the overall operation. It is also just focus on Coin Acceptor, Arduino UNO, USB charger, LED, resistor, capacitor, relay, power supply and transformer 12Volt. This project will be placed at the canteen or cottage at the office. It is for pleasure students use it and it more safety because it difficult to missing because many students can see it.

This project just use coin acceptor to security all systems. Students just insert the coin and put the phone with charger and it will charge it. The coin that we use for this project is depends on the coin size. If we put the size of 50sen on the coin acceptor, only the 50sen can use it. Other than that, for make this project useful and corresponding for others phone it have many types for USB. Example of mobile phone are, Iphone, Samsung, HuaWei , etc. Other than that, this project also use phone not over than 5Volt output. Besides, it must have the right coding to make sure all the component useful. This project also use LCD to show the instruction when charging.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

In writing the literature review, the main purpose is to convey to reader what knowledge and ideas have been established on a topic, and what the strengths and weaknesses are. As a piece of writing, the literature review must be defined by a guiding concept. Literature review or research is crucial because it provide designer to enhance understanding about the project.

2.2 LITERATURE REVIEW

The coin-based mobile battery charger can be quickly and easily installed outside any business premises. The mobile phone market is a vast industry, and has spread into rural areas as a essential means of communication. While the urban population use more sophisticated mobiles with good power batteries lasting for several days but todays smartphone has less battery backup time.[1] (Prof . R.R Bhambare)

The rural population buy the preowned mobile phones that require charging frequently. Many times battery becomes at in the middle of conversation particularly at inconvenient times when access to a standard charger isn't possible. The coin-based mobile battery chargers are designed to solve this problem. The user has to plug the mobile phone into one of the adapters and insert a coin; the phone will then be given a micro-pulse for charging. It does not bring a mobile from dead to fully charged state. [1] (Mahajan Vishal T, Patil Sachin B)

The mobile phone market is a vast industry, and has spread into rural areas as an essential means of communication. While the urban populations use more sophisticated mobiles with good power batteries lasting for several days, the rural populations buy the preowned mobile phones that require charging frequently.[1]. (G.Swaminaidu)

Many times battery becomes flat in the middle of conversation particularly at inconvenient times when access to a standard charger isn't possible. (Ch.Babu Rao)

In this generation and the future generation the mobile is playing and will be play the another role of our life. The daily usage of this mobile phone, it should be alive at every seconds without dead. we mostly face the low battery situation in the long time conversation, playing games, songs, at the interesting and serious condition the battery going to low means it brings our mood to irritation and tension. To deal with these disappointment coin based mobile charger is used by suddenly plugging the charger to the mobile. (A.Manikandan1 , U.Ganesan , Vijayaragavan)

Coin which act as the basic need of the human being and today life of human beings depends solely on machine so the detection and recognition of coin is very important rather than counting coins manually.[1] (Deepika Mehta Assistant Professor Computer Science and Engg. Volume 69– No.5, May 2013) Arduino board can provide a quick

tool in development of VLSI test bench especially of sensors. Main advantages are fast processing and easy interface.[2](Leo Louis1 1Department of Electronics and Communication Engineering.)

This article is explain the basic concepts of linear regulators and switching mode power supplies (SMPS). It is aimed at system engineers who may not be very familiar with power supply designs and selection. The basic operating principles of linear regulators and SMPS are explained and the advantages and disadvantages of each solution are discussed. The buck step-down converter is used as an example to further explain the design considerations of a switching regulator. (Henry J. Zhang. October 2013)

Modern development of semiconductor power-switching devices has promoted the use of power electronic converters as power transformers at the distribution level. This paper presents an ac-ac dual-active-bridge (DAB) converter for a solid-state transformer.(Hengsi Qin, Jonathan W. Kimball. Sept. 2013)

Liquid Crystal Display Drivers deals with Liquid Crystal Displays from the electronic engineering point of view and is the first expressively focused on their driving circuits. (Cristaldi, David J.R., Pennisi, Salvatore, Pulvirenti, Francesco)

2.3 COMPONENT OF PROJECT

This is the proposed for Coin Based Mobile Charger of material as on planned.

COMPONENTS OF COIN BASED MOBILE CHARGER		
NO.	DESCRIPTION	QUANTITY
1.	Transformer	1
2.	Led Green	1
3.	Capacitor	1
4.	Transistor	3
5.	Terminal block	5
6.	Relay Module	1
7.	Resistor	3
8.	Resistor voltage	1
9.	Con-sil	1
10.	LCD 16X2	1
11.	Arduino UNO	1

12.	Jumper	30
13.	Plug 3pin 3amp	1
14.	Bridge rectifier	1
15.	Integrated circuit	1
16.	Charger module 5V	1

2.4 TYPES OF COMPONENTS

A. Transformer

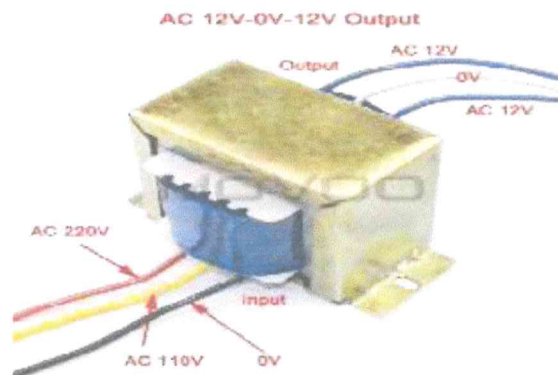


Figure 2.4a : Transformer

In a basic power supply the input power transformer has its primary winding connected to the mains (line) suppl. A secondary winding, electro-magnetically coupled but electrically isolated from the primary is used to obtain an AC voltage of suitable

amplitude, and after further processing by the PSU, to drive the electronics circuit it is to supply.

The transformer stage must be able to supply the current needed. If too small a transformer is used, it is likely that the power supply's ability to maintain full output voltage at full output current will be impaired. With too small a transformer, the losses will increase dramatically as full load is placed on the transformer.

As the transformer is likely to be the most costly item in the power supply unit, careful consideration must be given to balancing cost with likely current requirement. There may also be a need for safety devices such as thermal fuses to disconnect the transformer if overheating occurs, and electrical isolation between primary and secondary windings, for electrical safety.

b. LCD 16X2 DISPLAY MODULE

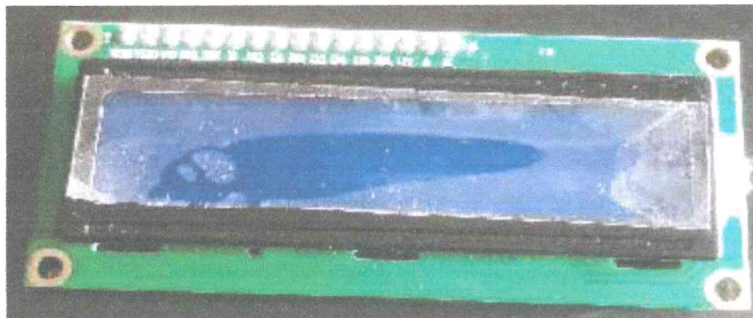


Figure 2.4b : LCD 16X2

The 16X 2 liquid crystal display (LCD) is able to display 16 characters on 2 rows. A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do

not emit light directly. LCDs are available arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. the data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

Pin description :

The most commonly used LCDs found in the market today are 1 line, 2 line or 4 line LCDs which have only 1 controller and support at most of 80 characters, where as LCDs supporting more than 80 characters make use of 2HD44780 controllers.

Most LCD switch 1 controller has 14 pins and LCDs with 2 controller has 16 pins(two pins are extra in both for back-light LED connections).

LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though it is possible to change the upper end of their range using the AREF pin and the `analogReference()` function. Additionally, some pins have specialized functionality:

TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

There are a couple of other pins on the board:

AREF. Reference voltage for the analog inputs. Used with `analogReference()`.

Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and provides simple one-click mechanism to compile and load programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch".

The Arduino IDE supports the languages C and C++ using special rules to organize code. The Arduino IDE supplies a software library called Wiring from the Wiring project, which provides many common input and output procedures.

d. Relay

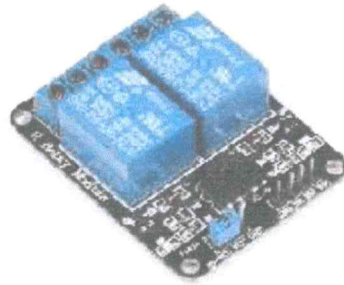


Figure 2.4d : relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power

systems these functions are performed by digital instruments still called "protective relays".

Magnetic latching relays require one pulse of coil power to move their contacts in one direction, and another, redirected pulse to move them back. Repeated pulses from the same input have no effect. Magnetic latching relays are useful in applications where interrupted power should not be able to transition the contacts.

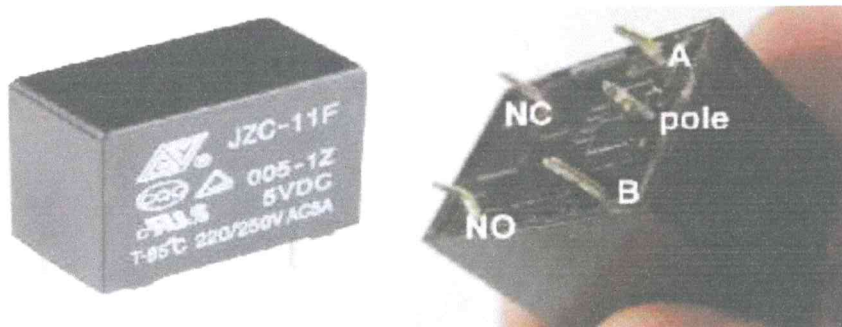


Figure 2.4e : code of relay

e. Coin Acceptor

A currency detector or currency validator is a device that determines whether banknotes or coins are genuine or counterfeit. These devices are used in many automated machines found in retail kiosks, self checkout machines, gaming machines, transportation parking machines, automatic fare collection machines, and vending machines.

The process involves examining the currency that has been inserted, and by using various tests, determining if the currency is counterfeit. Since the parameters are

different for each coin or banknote, these detectors must be programmed for each item that they are to accept.

In operation, if the coin is accepted it is retained by the machine and placed in a storage container for later collection. If the coin is rejected, the machine returns the coin. If a coin is rejected, it usually drops into a container for the customer to take back. If a note is rejected, the machine pushes it out and the customer must remove it from the slot in which it was placed.

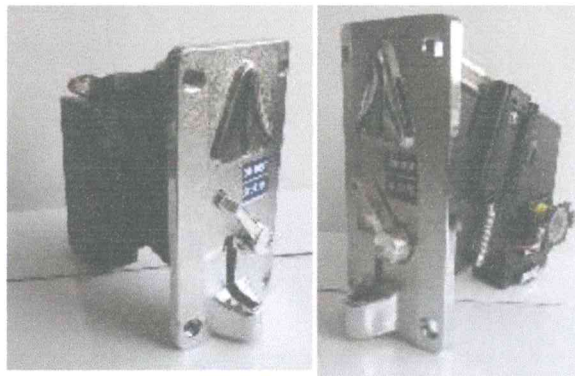


Figure 2.4f : coin acceptor

The basic principle for coin detection is to test the physical properties of the coin against known characteristics of acceptable coins. The detector evaluates the coin based on its weight, size, and/or magnetism, and then sends an appropriate electrical signal via its output connection. The next step is generally performed by the banknote-to-coins exchanger.

Today, sophisticated electronic coin acceptors are in use in some places that, in addition to validating weight and size, also scan the deposited coin using optics and match the image to a pre-defined list, or test the coin's "metallic signature" based on its alloy composition.

Normal coins pick up microscopic deposits from human fingers. When a coin acceptor is used long enough, thousands of coins rolling down a ramp will leave enough dirt to be visible. The acceptor requires periodic cleaning to prevent malfunctioning. Coin acceptors are modular, so a dirty acceptor can be replaced with a clean unit, preventing downtime. The old unit is then cleaned and refurbished.

f. IC (integrated Regulator)

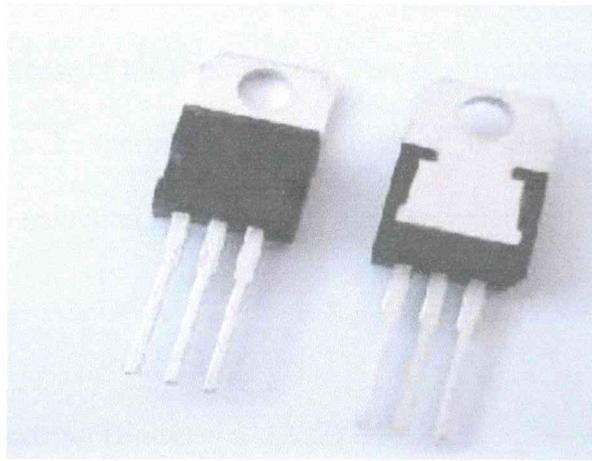


Figure 2.4g : IC

An integrated circuit or IC is small chip that can function as an amplifier, oscillator, timer, microprocessor or even computer memory. An IC is a small wafer, usually made of silicon, that can hold anywhere from hundreds to millions of transistors, resistors and capacitors. These extremely small electronics can perform calculations and store data using either digital or analog technology.

Digital ICs use logic gates, which work only with values of ones and zeros. A low signal sent to a component on a digital IC will result in a value of 0, while a high signal creates

a value of 1. Digital ICs are the kind you will usually find in computers, networking equipment and most consumer electronics.

Analog or linear ICs work with continuous values. This means a component on a linear IC can take a value of any kind and output another value. The term “linear” is used since the output value is a linear function of the input. For example, a component on a linear IC may multiply an incoming value by a factor of 2.5 and output the result. Linear ICs are typically used in audio and radio frequency amplification.

The function of an integrated circuit (IC) is to be a single component that can perform high-level tasks such as amplification, signal processing or even sophisticated digital calculations as in the case of microprocessors. Few electronic circuits do not use an IC a chip or microchip. Furthermore, the function of an integrated circuit includes miniaturization, cost reduction and performance enhancement among others.

g. LED (Light Emitting Diode)

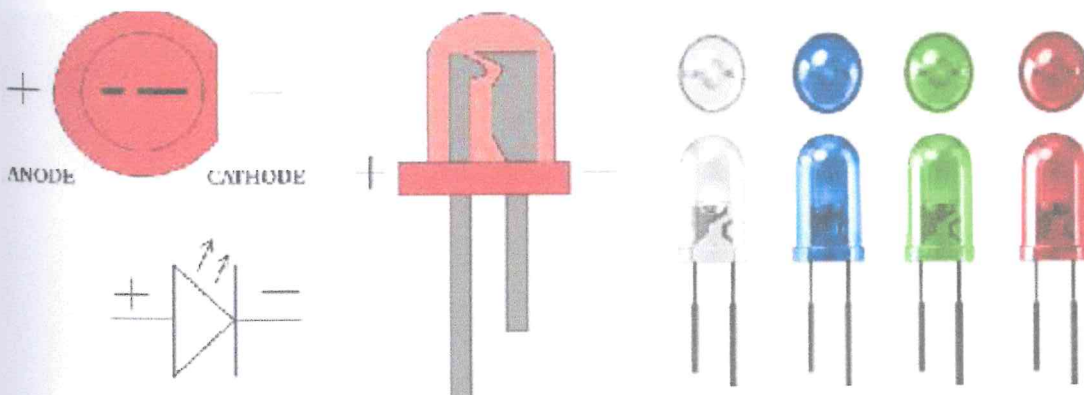


Figure 2.4h : code of Light Emitting Diode

LEDs or Light-Emitting Diodes are semiconductor that produce visible light when an electrical current passed through them. When suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. LEDs are a type of Solid State Lighting (SSL), as are organic Light-Emitting Diodes (OLEDs) and Light-Emitting Polymers (LEPs).

LED lighting differs from incandescent and compact fluorescent lighting in several ways. When designed well, LED lighting can be more efficient, durable, versatile and longer lasting. LED lighting products use Light-Emitting Diodes to produce light very efficiently. An electrical current passes through semiconductor material, which illuminates the tiny light sources we call LEDs. The heat produced is absorbed into a heat sink.

Common LED colors include amber, red, green and blue. There is actually no such thing as a “white” LED. To get white light, the kind we use for lighting our homes and offices, different colors LEDs are mixed or covered with a phosphor material that converts the color of the light. The phosphor is the yellow material you can see on some LED products. Colored LED are widely used as signal lights and indicator light, like the power button on a computer.

h. Capacitor

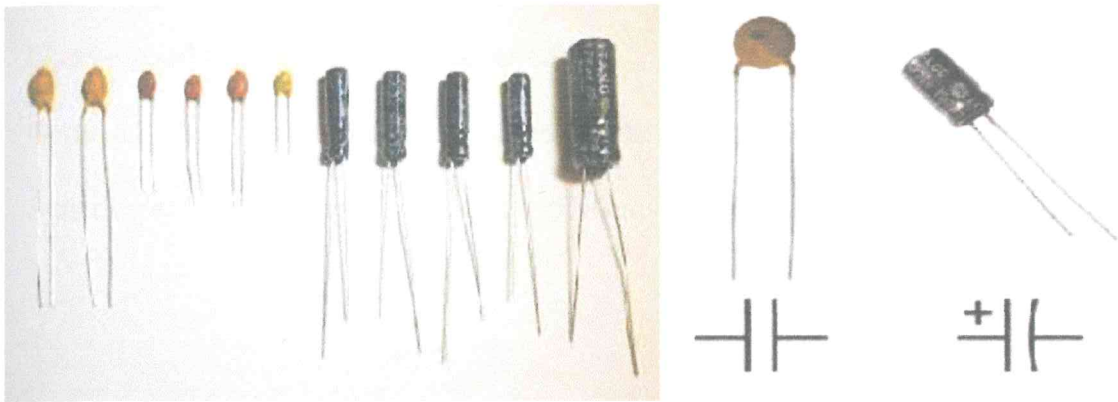


Figure 2.4i : type of capacitor

A capacitor is a two-terminal, electrical component. Along with resistors and inductors, they are one of the most fundamental passive components we use. Sometimes capacitors are used to smooth a current in a circuit as they can prevent false triggering of other components such as relays. When power is supplied to a circuit that includes a capacitor- the capacitor charges up. A capacitor are ability to store energy. They're like a fully charged electric battery. A capacitor is composed of two conductors separated by an insulating material called a Dielectric. The dielectric can be paper, plastic film, air or a vacuum. The plates can be aluminium discs, aluminium foils, or a thin film of metal applied to opposite sides of a solid dielectric.

Depending on the size and type of dielectric, some capacitors are better for high frequency uses, while some are better for high voltage applications. Capacitors can be manufactured to serve any purpose, from the smallest plastic capacitor in your calculator, to an ultra capacitor that can power a commuter bus.

Here are some of the various types of capacitors and how they are used.